Db2 11 for z/OS

IBM

Notes

Before using this information and the product it supports, be sure to read the general information under "Notices" at the end of this information.

Subsequent editions of this PDF will not be delivered in IBM Publications Center. Always download the latest edition from IBM Documentation.

2022-06-01 edition

This edition applies to Db2® 11 for z/OS® (product number 5615-DB2), Db2 11 for z/OS Value Unit Edition (product number 5697-P43), and to any subsequent releases until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

Specific changes are indicated by a vertical bar to the left of a change. A vertical bar to the left of a figure caption indicates that the figure has changed. Editorial changes that have no technical significance are not noted.

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About this information

This information describes installation and migration of Db2 for z/OS (Db2) in a data sharing and non-data-sharing environment.

Throughout this information, "Db2" means "Db2 11 for z/OS". References to other Db2 products use complete names or specific abbreviations.

Important: To find the most up to date content for Db2 11 for z/OS, always use IBM® Documentation or download the latest PDF file from .

Availability of new function in Db2 11

The behavior of data definition statements such as CREATE, ALTER, and DROP, which embed data manipulation SQL statements that contain new capabilities, depends on the application compatibility value that is in effect for the application. An application compatibility value of 'V11R1' must be in effect for applications to use new capability in embedded statements such as SELECT, INSERT, UPDATE, DELETE, MERGE, CALL, and SET *assignment-statement*. Otherwise, an application compatibility value of 'V10R1' can be used for data definition statements.

Generally, new SQL capabilities, including changes to existing language elements, functions, data manipulation statements, and limits, are available only in new-function mode with applications set to an application compatibility value of 'V11R1'.

Optimization and virtual storage enhancements are available in conversion mode unless stated otherwise.

SQL statements can continue to run with the same expected behavior as in DB2® 10 new-function mode with an application compatibility value of 'V10R1'.

Who should read this information

This information is primarily intended for those people who are responsible for installing Db2 or setting up Db2 for distributed communications. This information is intended for those people who plan to install Db2 from the enterprise server using the installation CLIST.

This information assumes that you are familiar with:

- The basic concepts and facilities of Db2 in the z/OS environment
- The z/OS Time Sharing Option (TSO) and the z/OS Interactive System Productivity Facility (ISPF)
- The basic concepts of Structured Query Language (SQL)
- The basic concepts of Customer Information Control System (CICS®)
- The basic concepts of Information Management System (IMS)
- How to define and allocate z/OS data sets by using z/OS job control language (JCL)
- How to use IBM System Modification Program/Extended (SMP/E) to install IBM licensed programs

To set up Db2 for distributed communications, knowledge of Virtual Telecommunications Access Method (VTAM®) or Transmission Control Protocol/Internet Protocol (TCP/IP) is also needed.

Db2 Utilities Suite for z/OS

Important: In Db2 11, the Db2 Utilities Suite for z/OS is available as an optional product. You must separately order and purchase a license to such utilities, and discussion of those utility functions in this publication is not intended to otherwise imply that you have a license to them.

Db2 11 utilities can use the DFSORT program regardless of whether you purchased a license for DFSORT on your system. For more information, see the following informational APARs:

- II14047
- II14213
- II13495

Db2 utilities can use IBM Db2 Sort for z/OS (5655-W42) as an alternative to DFSORT for utility SORT and MERGE functions. Use of Db2 Sort for z/OS requires the purchase of a Db2 Sort for z/OS license. For more information about Db2 Sort for z/OS, see Db2 Sort for z/OS.

Related information

Terminology and citations

When referring to a Db2 product other than Db2 for z/OS, this information uses the product's full name to avoid ambiguity.

The following terms are used as indicated:

Db2

Represents either the Db2 licensed program or a particular Db2 subsystem.

IBM rebranded DB2 to Db2, and Db2 for z/OS is the new name of the offering that was previously known as "DB2 for z/OS". For more information, see Revised naming for IBM Db2 family products on IBM z/OS platform. As a result, you might sometimes still see references to the original names, such as "DB2 for z/OS" and "DB2", in different IBM web pages and documents. If the PID, Entitlement Entity, version, modification, and release information match, assume that they refer to the same product.

IBM OMEGAMON® for Db2 Performance Expert on z/OS

Refers to any of the following products:

- IBM IBM OMEGAMON for Db2 Performance Expert on z/OS
- IBM Db2 Performance Monitor on z/OS
- IBM Db2 Performance Expert for Multiplatforms and Workgroups
- IBM Db2 Buffer Pool Analyzer for z/OS

C, C++, and C language

Represent the C or C++ programming language.

CICS

Represents CICS Transaction Server for z/OS.

IMS

Represents the IMS Database Manager or IMS Transaction Manager.

MVS™

Represents the MVS element of the z/OS operating system, which is equivalent to the Base Control Program (BCP) component of the z/OS operating system.

RACF®

Represents the functions that are provided by the RACF component of the z/OS Security Server.

Accessibility features for Db2 for z/OS

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

The following list includes the major accessibility features in z/OS products, including Db2 for z/OS. These features support:

- Keyboard-only operation.

- Interfaces that are commonly used by screen readers and screen magnifiers.
- Customization of display attributes such as color, contrast, and font size

Tip: IBM Documentation (which includes information for Db2 for z/OS) and its related publications are accessibility-enabled for the IBM Home Page Reader. You can operate all features using the keyboard instead of the mouse.

Keyboard navigation

For information about navigating the Db2 for z/OS ISPF panels using TSO/E or ISPF, refer to the *z/OS TSO/E Primer*, the *z/OS TSO/E User's Guide*, and the *z/OS ISPF User's Guide*. These guides describe how to navigate each interface, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

Related accessibility information

IBM and accessibility

See the *IBM Accessibility Center* at http://www.ibm.com/able for more information about the commitment that IBM has to accessibility.

How to send your comments about Db2 for z/OS documentation

Your feedback helps IBM to provide quality documentation.

End of support (EOS): Db2 11 reached EOS on March 31, 2021. The online product documentation is provided as-is for clients with extended service contracts. For more information, see .

Send any comments about Db2 for z/OS and related product documentation by email to db2zinfo@us.ibm.com.

To help us respond to your comment, include the following information in your email:

- The product name and version
- The address (URL) of the page, for comments about online documentation
- The book name and publication date, for comments about PDF manuals
- The topic or section title
- The specific text that you are commenting about and your comment

Related information

How to read syntax diagrams

Certain conventions apply to the syntax diagrams that are used in IBM documentation.

Apply the following rules when reading the syntax diagrams that are used in Db2 for z/OS documentation:

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line.

  The ►►—— symbol indicates the beginning of a statement.

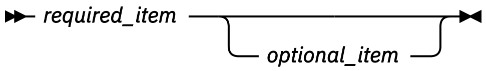
  The ——► symbol indicates that the statement syntax is continued on the next line.

  The ►—— symbol indicates that a statement is continued from the previous line.

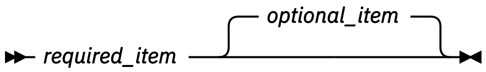
  The ——►◄ symbol indicates the end of a statement.
- Required items appear on the horizontal line (the main path).

  ►►— *required_item* —►◄

- Optional items appear below the main path.

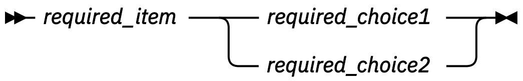


If an optional item appears above the main path, that item has no effect on the execution of the statement and is used only for readability.

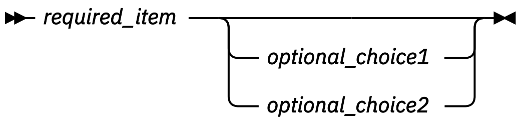


- If you can choose from two or more items, they appear vertically, in a stack.

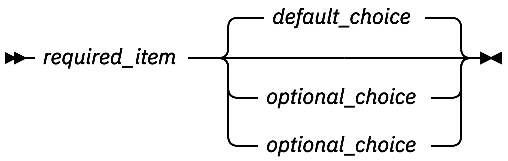
If you *must* choose one of the items, one item of the stack appears on the main path.



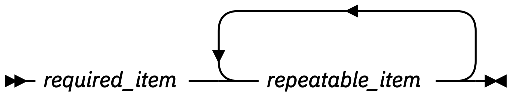
If choosing one of the items is optional, the entire stack appears below the main path.



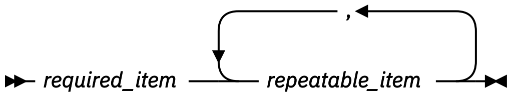
If one of the items is the default, it appears above the main path and the remaining choices are shown below.



- An arrow returning to the left, above the main line, indicates an item that can be repeated.

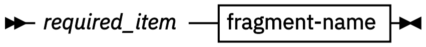


If the repeat arrow contains a comma, you must separate repeated items with a comma.

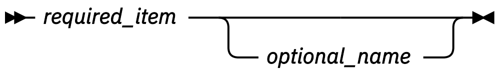


A repeat arrow above a stack indicates that you can repeat the items in the stack.

- Sometimes a diagram must be split into fragments. The syntax fragment is shown separately from the main syntax diagram, but the contents of the fragment should be read as if they are on the main path of the diagram.



fragment-name



- For some references in syntax diagrams, you must follow any rules described in the description for that diagram, and also rules that are described in other syntax diagrams. For example:
  - For *expression*, you must also follow the rules described in .
  - For references to *fullselect*, you must also follow the rules described in .
  - For references to *search-condition*, you must also follow the rules described in .
- With the exception of XPath keywords, keywords appear in uppercase (for example, `FROM`). Keywords must be spelled exactly as shown. XPath keywords are defined as lowercase names, and must be spelled exactly as shown. Variables appear in all lowercase letters (for example, *column-name*). They represent user-supplied names or values.
- If punctuation marks, parentheses, arithmetic operators, or other such symbols are shown, you must enter them as part of the syntax.

Related information

Chapter 1. Installing or migrating to Db2 11

The essential steps are similar for both installing Db2 11 and migrating to Db2 11 conversion mode. From conversion mode, you must complete additional steps to migrate to Db2 11 new-function mode.

Installation and migration tools

Db2 11 provides the following tools that help you complete the process of installing or migrating to Db2 11:

Job control language (JCL) jobs

Each installation and migration JCL job helps you perform an installation or migration task.

Installation and migration command list (CLIST)

The installation and migration CLIST helps tailor the installation and migration JCL jobs. It contains the necessary code for tailoring the jobs to suit your needs.

Tip: You can capture most settings of an existing Db2 subsystem by running the DSNTIJXZ job, which invokes the DSNTXAZP tool. Running this job reduces the effort to manually compare settings in the current DSNTIJUZ job with the values that are defined in the defaults input member. For details, see "Updating the CLIST defaults input member: job DSNTIJXZ " on page 42 and "DSNTXAZP tool" on page 47.

Interactive Systems Productivity Facility (ISPF) panels

You can use a series of ISPF panels to pass parameter values to the CLIST. The CLIST uses these values to tailor the installation and migration jobs. This process is described in Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.

Sample applications

The sample applications help you determine whether you installed or migrated Db2 correctly. Db2 provides a set of sample programs and procedures that help you determine if Db2 is operating correctly. For more information, see Chapter 9, "Verifying successful Db2 11 installation or migration with sample applications," on page 641.

All references to SYS1.PARMLIB also imply the logical PARMLIB data set that is used for Db2.

Generating Db2 initialization code

Db2 executable parameters are prepared in a quick and simple procedure referred to as an *assembly.*, which uses the supplied object code.

Ability to defer decisions about Db2 characteristics

Db2 allows you to specify many subsystem characteristics during Db2 operation. You can modify initialization parameters, authorize users, define databases and tables, and tune Db2 while Db2 is running. Therefore, you can defer many decisions until after you finish installing or migrating Db2.

Ability to update installation and migration options

During the process of installing or migrating, Db2 uses ISPF panels to prompt you for many options. Db2 allows you to update most of these options without requiring you to reinstall or remigrate. You can accept the default values for certain options and, after acquiring experience with Db2, tailor them to suit your needs.

Related tasks

"Installing, migrating, and enabling Db2 data sharing" on page 521

Whether you need to install, migrate, or enable data sharing depends on the type of system that you start with and the type of system that you want to create.

Related reference

z/OS Parallel Sysplex Configuration Overview (IBM Redbooks)

Related information

Db2 11 for z/OS Technical Overview (IBM Redbooks)

Chapter 2. Preparing your system to install or migrate to Db2 11

The key to a successful installation or migration of Db2 is planning. Prepare your environment and system before you begin installing or migrating.

Before you begin

Familiarize yourself with the various changes that Db2 11 introduces, as described in .

In particular, plan to resolve any incompatible changes that might impact your migration to Db2 11. For a summary of such changes, see and .

Plan the amount of direct-access storage and virtual storage that you need. Planning and coordinating with other Db2 subsystems is essential if you plan to install the distributed data facility (DDF). Review the values that are needed for the parameters on the installation and migration panels. By planning in advance, your task of filling in the parameters becomes easier.

For information about specific planning for Db2 data sharing, see "Planning for Db2 data sharing" on page 522.

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related information

Hardware and software requirements for Db2

Before you can install or migrate Db2 11, you must fulfill the hardware and software requirements.

Before installing or migrating to Db2 11 for z/OS, ensure that your system meets the following requirements:

Operating system:	z/OS 1.13 or later
Hardware:	IBM System z10 or later 64-bit z/Architecture® processors

For information about system requirements, see the Db2 Program Directory.

Related information

Required maintenance for Db2 11 installation or migration

In addition to ensuring that you have required hardware and software products installed, you must ensure that required service changes for Db2 11 have been applied.

FIXCATs for migrating to Db2 11

To help you identify the required service, z/OS provides enhanced HOLDDATA. Enhanced HOLDDATA categories (FIXCATs) provide a simplified, automated method of identifying and applying missing PTFs that are required for installation or migration or to support specific product functions. For installation and migration to Db2 11, use the following FIXCATs:

Fix category (FIXCAT)	Keyword
`IBM.Migrate-Fallback.DB2.V11`	`DB2MIGV11/K`
`IBM.Coexistence.DB2.SYSPLEXDataSharing`	`DB2COEXIST/K`

You can use this automated process instead of manually reviewing Preventive Service Planning (PSP) buckets, identifying service that is already installed, and applying missing PTFs.

For more information about enhanced HOLDDATA and available FIXCATs, see the following pages:

- Db2 for z/OS Keywords for searching APAR text
- IBM Fix Category Values and Descriptions
- Enhanced HOLDDATA for z/OS

Related information

Getting an RSU
IBM z/OS Consolidated Service Test and the RSU

Storage requirements for Db2 for z/OS

When you install or migrate Db2, consider the size of your site and how it will be set up to determine your storage needs.

You can use the installation CLIST to calculate your estimated storage needs. For details, see "Calculating storage requirements with the installation CLIST" on page 5.

The parameters that you specify when you run the installation CLIST affect the sizes of some data sets and the required amount of virtual storage. All data sets are linear data sets, with the exception of the bootstrap data set, which is a key-sequenced data set.

You can use Data Facility Storage Management Subsystem (DFSMS) to manage Db2 data sets. It provides automatic backup and recovery features, which might require disk storage beyond what is estimated below. Starting in DB2 10, data sets for the Db2 catalog and directory are managed by Db2 and must be SMS-managed. The SMS environment that you used for DB2 10 can be used for Db2 11. You are not required to convert existing Db2 catalog and directory data sets to the SMS environment before migrating to Db2 11. These data sets will be converted the next time the related table space is reorganized.

Related concepts

Storage estimates for data sharing environments
As part of planning for a data sharing environment, you should estimate the storage requirements for coupling facility structures and for Db2 resources.

DFSMShsm Storage Administration Reference

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Related information

Calculating storage requirements with the installation CLIST

By providing information about the sizes of your Db2 environment, you can use the installation CLIST to calculate certain storage requirements for your Db2 subsystem.

About this task

The CLIST contains the algorithms that Db2 uses to calculate storage based on the parameters that you supply during installation or migration.

Procedure

1. Run the installation CLIST, as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.
2. In the INSTALL TYPE field on panel DSNTIPA1, specify INSTALL.

   If you specify MIGRATE for the INSTALL TYPE field, Db2 11 uses values from Db2 10 instead of running the CLIST calculations.
3. On panel DSNTIPD, specify field values that describe the size of your Db2 environment.

   Specify integer values, not fractions. You can use K (as in 32 K) for multiples of 1024 bytes and M (as in 16 M) for multiples of 1,048,576 bytes in most fields. do not exceed the maximum value that is accepted by the field.

   The CLIST uses the values that you specify to calculate storage requirements. You can see the calculation results on the fields of the CLIST calculations panel: DSNTIPC.
4. On panel DSNTIPC, specify whether to accept the calculated values.

   The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

   - To accept the calculated value, ensure that the **Override** column contains no value.
   - To override the calculated value, specify a value in the **Override** column.

What to do next

If you want to examine the algorithms that Db2 uses for the CLIST calculations, that Db2 uses, print or edit the installation CLIST and REXX EXEC. The DSNTCALC EXEC contains most of the data set calculations.

Related reference

DSNTIPD: Sizes panel 1
The entries on the DSNTIPD panel establish the size of the Db2 catalog, directory, and log data sets. Entries on the DSNTIPD panel also define the amount of storage that can be used for storing large object (LOB) values.

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

Db2 subsystem storage requirements

You must configure storage sizes for your Db2 subsystem.

You can use the installation CLIST to calculate storage requirements for your Db2 installation. For details, see “Calculating storage requirements with the installation CLIST” on page 5.

If you do not accept the default values, you can calculate the storage that you need for the Db2 data sets by using the information in Active log data sets storage requirements. For other data sets, you can use the formulas in the CLIST. After calculating the required storage for each data set, you can calculate the total requirements.

Although the Db2 libraries require a fixed amount of space, disk requirements for active logs and the Db2 catalog increase with the size of a site. You need additional space for archive logs, image copies, user databases, and other working data sets.

Related reference

DSNTIPD: Sizes panel 1
The entries on the DSNTIPD panel establish the size of the Db2 catalog, directory, and log data sets. Entries on the DSNTIPD panel also define the amount of storage that can be used for storing large object (LOB) values.

Related information

Db2 catalog storage requirements

Estimated storage requirements for the Db2 catalog include space for the entire set of Db2 catalog data sets and their indexes.

Data sets for the Db2 catalog and directory are managed by Db2 and must be SMS-managed. The SMS environment that you use for Db2 catalog and directory data sets must be established before you begin installation or migration to Db2 11. The SMS environment must include a data class for allocating the data sets in extended format and using extended addressability. You are not required to convert existing Db2 catalog and directory data sets to the SMS environment before migrating to Db2 11. These data sets will be converted the next time that the related table space is reorganized.

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Related information

Db2 directory storage requirements

The amount of directory space required for the Db2 directory depends mainly on the number of user databases, application plans and packages, and tables in the Db2 subsystem.

Data sets for the Db2 catalog and directory are managed by Db2 and must be SMS-managed. The SMS environment that you use for Db2 catalog and directory data sets must be established before you begin installation or migration to Db2 11. The SMS environment must include a data class for allocating the data sets in extended format and using extended addressability. You are not required to convert existing Db2 catalog and directory data sets to the SMS environment before migrating to Db2 11. These data sets will be converted the next time the related table space is reorganized.

A typical site requires about 808 cylinders for the Db2 directory.

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Active log data sets storage requirements

Active log data sets record significant events and data changes. Active log data sets are periodically offloaded to archive log data sets. Storage requirements for active log data sets depend on the frequency of data updates and of offloads to archive log data sets.

For 3390-9 volumes:

- 87375 tracks, if allocated in units of tracks
- 5825 cylinders, if allocated in units of cylinders

For 3390-A volumes:

- 5817 cylinders. 3390-A volumes are extended address volumes (EAV), for which the space allocation unit can be 21 cylinders, instead of one cylinder. For more information, see DEFINE CLUSTER command (DFSMS Access Method Services for Catalogs).

If the archive logs are written to tape. a large data set might require two tapes instead of one. For real tape, space might also be wasted on the tapes. Therefore, you must adjust your data set sizes that are based on the size of your real or virtual tapes. Most tape products use compaction. You can also use DFSMS to compress the archive log data sets.

When Db2 fills up one active log data set, it must offload the log data to an archive log data set. At the same time, Db2 begins writing to the next active log data set. When Db2 reaches the last active log data set, it starts again with the first active log data set. However, if the applications catch up to the offload process, the applications are suspended until the offload process can finish writing the next active log data set. Such application suspensions often happen because of the following situations:

- Large batch jobs that insert, update, or delete data.
- Frequent inserts.
- Logging of large LOBs.
- The offload operation is too slow.

To prevent such application suspensions, you can use any of the following approaches:

- Enable fast offload operations. For example, you might place the archive log data sets on a disk device that has fast channels. (You might move the data sets to tape later.)
- Allocate a large amount of active log space to support sustained bursts of insert, update, delete activity. Db2 supports as many as 93 active log data sets with a maximum size of 4 GB each. This limit provides up to 372 GB of active log space. You must double the space calculation for dual logging. In many cases, fewer than the maximum number of data sets can be used. Two data sets might be sufficient. However, the more log space that you allocate, the larger a burst of insert, update, and delete operations can be without causing performance problems.

  During startup, Db2 allocates the BSDS data set, all of the active log data sets, and, when dual logging is used, all secondary log data sets. When in a data sharing group, Db2 also allocates peer BSDS data sets and active log data sets as necessary during execution. To avoid exhausting the space in the MVS task I/O table (TIOT) for the Db2 system services address space (*ssnm*MSTR), which can cause Db2 to fail, perform the following actions:

  1. Set the MVS TIOT size to 64K in the ALLOCxx PARMLIB member.
  2. Specify NON_VSAM_XTIOT=YES in the DEVSUPxx PARMLIB member to enable Db2 to use the MVS extended task I/O table (XTIOT) when allocating offload data sets.
  3. Specify a dynamic volume count (DVC) of 0 for any SMS data set class that is used to allocate a Db2 BSDS, active log, or secondary log data set.
  4. Reallocate any existing BSDS, active log, or secondary log data sets that were allocated with a DVC greater than 0.

Also, as a rule, reading active log data sets is faster than reading archive log data sets, even if the archive log data sets are stored on disk. (A possible exception to this rule is if you use DFSMS compression for the archive logs.) If your recovery performance depends on the speed of reading the logs, then recovery performance can benefit from having as many active log data sets as possible.

Consider the amount of log data that is written and archived each day. For example, assume you want the ability to restore the database to a point in time 48 hours ago and apply the log records from the past 48 hours with good performance. In that case, you must retain 48 hours of log data on disk. If your applications generate 100 GB of log data per day, you need 200 GB of log space on disk, to apply two days of log records from disk. All 200 GB can be saved in active log data sets if you allocate enough space. If you do not allocate enough space, then the rest of the log data must be read from archive log data sets.

How you plan to manage database recovery and how you manage your archive log data sets are closely related. If your archive log data sets are on tape (no matter whether they are virtual or real tapes), two recover jobs cannot allocate the same tape at the same time. Contention is worse if multiple data sets are stored on a single tape. For that reason, it is often best if the archive logs are stored on real disk devices instead of tape.

However, you can use the following alternative approaches to reduce the cost of storing the archive logs:

- Use inexpensive nearline drives for the archive logs.
- Store the archive log data sets on tape, and recall the archive log data sets from tape to disk before you submit recovery jobs.
- Tolerate slow recovery.

However, remember as you plan for managing Db2 logs, that it is too late to change your approach when you must recover your Db2 database.

Checkpoint frequency

The CHECKPOINT TYPE field on panel DSNTIPL1 specifies whether the frequency of system checkpoints is controlled by number of consecutive log records, number of minutes, or both. The RECORDS/ CHECKPOINT field and MINUTES/CHECKPOINT field on panel DSNTIPL1 determine the number of log records between checkpoints or the number of minutes per checkpoint. When you choose a value for the checkpoint frequency, you must consider the trade-offs between the costs of frequent subsystem checkpoints and the time that is needed to restart a Db2 subsystem after a termination without a quiesce. If the checkpoint value is more than 1,000,000 log records, the time that is needed to restart Db2 after a termination without a quiesce can grow to over 15 minutes. Typical values for the checkpoint frequency are in the range of 500,000 - 1,000,000 log records or 2 - 5 minutes.

Change data capture

When tables are defined with the DATA CAPTURE CHANGES option, the entire before-image of an updated row is captured on the log. This additional information can represent an increase in log data that is compared to tables that are not defined with the DATA CAPTURE CHANGES option, depending on whether the table contains fixed-length or variable-length rows.

Related reference

DSNTIPL1: Checkpoint parameters
The entries on the DSNTIPL1 panel define characteristics for log checkpoints.

Related information

Bootstrap data sets storage requirements

Each bootstrap data set (BSDS) requires 15 MB. During installation, Db2 automatically allocates two copies of the BSDS. During migration, Db2 11 adopts the BSDS characteristics that you specified for your previous version.

That is, if you specified two copies of the BSDSs for your previous version, you will have two copies for Db2 11. Keeping two copies of the BSDS is strongly recommended. The total space requirement is about 30 MB for both BSDSs. The BSDSs require about 45 cylinders of 3390 storage.

Although Db2 11 introduces a new BSDS format that supports 10-byte RBA and LRSN fields, no additional space is needed for this new format.

Related information

Work file database storage requirements

The work file database is used as storage for processing SQL statements that require working storage.

Work file storage is used for sorting, RID pool overflow to work files, and for temporary tables and common table expressions.

Work file usage varies, depending on the number of operations that require work files, and the number of concurrent users that require work files. You can monitor work file usage by gathering Db2 statistics traces. Use the high water mark value for work file usage from the traces as a guideline for determining the amount of space to allocate for work files.

If you are installing Db2, see "Storage requirements for installation" on page 11.

Storage requirements for migration

You might need more storage for the work file database if you have a large amount of data to sort and a large amount of concurrent sort activity. If you are sorting compressed data, allow for the same amount of storage that you would need if the data were not compressed. The maximum amount of storage that you need is enough to satisfy the requirements of the largest combination of concurrent activities that use the work file database. The amount of storage that is required for a sort depends on the following variables:

- Data size
- Sort key size

You can estimate the total amount of work file space that is needed to perform the sort as follows:

- Let MIN be the operation of selecting the lowest value from a set of values.
- Let FLOOR be the operation of discarding the decimal portion of a real number.
- Let CEILING be the operation of rounding a real number up to the next-highest integer.
- Let *Data* be the total data length in bytes.
- Let *Key* be the total length of the sort key.
- Let *Row-overhead* be the 6-byte record header plus the 2-byte record page map entry.
- Let *Prefix* be the 16-byte header.
- Let *Rows* be the total number of rows that are being sorted.
- Let *Segsize* be the segment size.

Then calculate as follows:

```
Records per page = MIN(MAXROWS, FLOOR (4056 / (Data + Key + Row-overhead)))

Total pages = CEILING (Rows / Records per page)

Total segments = CEILING (Total pages / Segsize)

Total pages used = Total segments + Segsize)
```

The number of records per page cannot exceed 255 (the value of MAXROWS).

This result tells you how much storage is needed in the work file database after sort processing. However, if a merge phase was required during sort processing, an additional intermediate copy of the records might exist at any given time. For most subsystems, you can assume that about half of the records that are involved in a sort have two copies. Therefore, a multiplier value of 1.5 is safe. If you want to be conservative, choose 2 for your multiplier value. Therefore, the amount of storage that is used in the work file database during sort processing can vary from 1 to 2 times the storage that is needed after sort processing. The actual storage that is used might also increase if you have little available buffer pool storage.

When a large object (LOB) column is part of a result table, and the result table must be placed in a work file for sorting, the actual LOB column data is not placed in the work file. Therefore, LOB columns do not require large increases in the amount of work file space that Db2 requires. For work file calculations, you can assume 51 bytes of storage per LOB column for the work file.

However, if a large object (LOB) column is defined with the INLINE attribute and the result table must be placed in a work file, the inline LOB data will be placed in the work file. Therefore, work file calculations need to account for the length of the inline LOB.

To determine the number of tracks that are needed, convert the number of pages into bytes, and divide the result by the number of bytes per unit. Let *r* be the number of 4096-byte records per track, and let *safety_factor* be a number from 1.5 to 2.0. For 3390 devices, *r* is 12.

```
Tracks = CEILING (Total pages used / r) * safety_factor
```

Example 1: Consider a table (TABLE1) that contains 45,327 rows, for which you want to create a *nonunique padded index* on COL1 CHAR(3) NOT NULL, COL2 CHAR(4), COL3 VARCHAR(20), and COL4 SMALLINT. Determine the amount of temporary storage that Db2 needs to create this index as follows:

- *Data* = 3 + (4 + 1) + (20 + 1) + (2 + 1) + 4 = 36
- *Key* = 36 (*Data* plus RID is key for CREATE INDEX)
- *Rows* = 45,327
- *Record overhead* = 8
- *Records per page* = MIN(MAXROWS, FLOOR (4056 / (36 + 36 + 12))) = 48
- *Total pages* = CEILING (45,327 / 50) = 907
- *Segments* = CEILING (907 / 24) = 38
- *Total pages used* = CEILING (38 * 24) = 912
- *Tracks* = CEILING (912 / 12) * 1.5 = 114

Example 1 is a data page calculation for storing index keys in the work file database. For this example, 114 tracks of a 3390 storage device are needed. The 2-byte length field of a VARCHAR column is not a part of *Data* for CREATE INDEX. The RID field is a part of *Data*, and the *Key* includes the entire *Data* portion, including the RID.

Example 2: Consider TABLE1 again and the following SQL query:

GUPI

```
SELECT COL1,COL2,COL3,COL4
   FROM TABLE1
   ORDER BY COL2,COL3,COL1;
```

GUPI

This query, which includes an ORDER BY clause, requires a sort. Determine the amount of temporary storage that is required for this table as follows:

- *Data* = 3 + (4 + 1) + (20 + 2 + 1) + (2 + 1) = 34
- *Key* = (4 + 1) + (20 + 1) + 3 = 29
- *Rows* = 45,327
- *Record overhead* = 8
- *Segsize* = 24
- *Records per page* = MIN(MAXROWS, FLOOR (4056 / (34 + 29 + 12))) = 54
- *Total pages* (final result) = CEILING (45,327 / 57) = 796
- *Segments* (final result) = CEILING (796 / 24) = 34
- *Total pages used* = CEILING (34 * 24) = 816
- *Tracks* = CEILING (816 / 12) * 1.5 = 102
- *Total pages* (during processing) = CEILING (1.5 * 796) = 1194

- *Segments* (during processing) = CEILING (1.5 * 34) = 51
- *Total pages used* (during processing) = CEILING (51 * 24) = 1224
- *Tracks (during processing)* = CEILING (1224 / 12) * 1.5 = 153

For this example, which is a table calculation, 102 tracks of a 3390 storage device are needed. The 2-byte length field of a VARCHAR column is a part of *Data*, and the *Key* does not include the entire *Data* portion.

You can use the sort summary trace record, IFCID 0096, to simplify some of the calculations. This record shows the number of records that are sorted, the sort record size (*Data* + *Key*), and an indication of whether a merge phase was required for an individual sort request.

Also note that if the overall record length (*Data* + *Key* + *Prefix*) exceeds 100 bytes, Db2 attempts to create the work file in a table space with a 32 KB page size. If the overall record length is 100 bytes or less, Db2 uses a table space with a 4 KB page size.

Storage requirements for installation

If you are installing Db2, use the following calculations to determine either PRIQTY (primary space allocation) or DSSIZE and MAXPARTITION values for creating work file table spaces. During installation, you must create at least one 4 KB work file table space and one 32 KB work file table space.

For 4 KB work file table spaces:

- Let *total space* be the total amount of space in megabytes (from the TEMP 4K SPACE field on panel DSNTIP9.
- Let *table spaces* be the number of table spaces (from the TEMP 4K TBL SPACES field on panel DSNTIP9.
- Let CEILING be the operation of rounding a real number up to the next-highest integer.
- Let *GB per table space* be the amount of space per work file table space in gigabytes.

Calculate the following:

```
GB per table space = CEILING (total space / table spaces / 1024)

If GB per table space < 1 GB, then PRIQTY = CEILING (total space / table spaces
If GB per table space ≤ 16 384 GB, then DSSIZE = 4 GB
    and MAXPARTITIONS = GB per table space / 4
Otherwise, DSSIZE = 4 GB and MAXPARTITIONS = 4096
```

For 32 KB work file table spaces:

- Let *total space* be the total amount of space in megabytes (from the TEMP 32K SPACE field on panel DSNTIP9.
- Let*table spaces* be the number of table spaces (from the TEMP 32K TBL SPACES field on panel DSNTIP9.
- Let CEILING be the operation of rounding a real number up to the next-highest integer.
- Let *GB per table space* be the amount of space per work file table space in gigabytes.

Calculate the following:

```
GB per table space = CEILING (total space / table spaces / 1024)

If GB per table space < 1 GB, then PRIQTY = CEILING (total space / table spaces)
If GB per table space ≤ 16 384 GB, then DSSIZE = 4 GB
    and MAXPARTITIONS = GB per table space / 4
If GB per table space ≤ 131 072 GB, then DSSIZE = 32 GB
    and MAXPARTITIONS = GB per table space / 32
Otherwise, DSSIZE = 32 GB and MAXPARTITIONS = 4096
```

Related reference

DSNTIPC: CLIST calculations panel 1

The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Related information

Default database storage requirements

The size of the default database depends on column lengths, page sizes, and index column lengths. The estimated size of your data, multiplied by 2, usually provides an adequate planning estimate for the default database size.

Dump data set size storage requirements

When planning for your Db2 subsystem storage, you must reserve enough space for the dump data sets. The storage requirements depend on factors such as the number of dump data sets you have defined and whether you invoke authorized Language Environment® functions.

Recommendation: Use the following guidelines to estimate storage requirements for the dump data sets:

- Have at least two dump data sets.
- Have approximately 1000 cylinders for all dump data sets.

  If you invoke authorized Language Environment functions, a different style of dump might be generated, which requires approximately 520 cylinders.
- Have 3.25 MB of space for Db2 volatile summary storage data.

Summary data in dumps is usually enough to diagnose most problems. In addition to summary data, Db2 also requests a SDUMP from the operating system to provide these additional storage areas if enough space is available in the dump data set:

- Db2 system services address space
- Db2 database services address space
- Db2 distributed data facility (DDF) address space
- Allied address space of the failing allied task
- IRLM address space for data sharing environments

Db2 passes the following parameters to the SDUMP service aid through the SDATA keyword: SQA, ALLPSA, LSQA, SUMDUMP, and CSA (subpools 231 and 241).

After Db2 SVC dump processing is complete, z/OS issues message IEA911E to indicate whether enough space was available in the dump data set to contain the requested storage areas. If this message indicates that a partial dump was taken, but the 3.25 MB of summary storage is available in the dump, this dump is probably enough for problem diagnosis. Otherwise, IBM Software Support might request that you re-create the problem if storage areas that are required for problem determination are not included in the dump.

System databases storage requirements

The Db2 installation process automatically creates system databases for the resource limit facility, DDL registration, and EXPLAIN tables that are created under the SYSIBM schema. The storage requirements for these databases depend on the amount of user data that they each contain.

Archive log data sets storage requirements

If you decide to store the archive log data sets on disk, you need to reserve enough space on the device. The active log data set and the BSDS are both written to the same location. Therefore, you must reserve enough storage for the active log and the BSDS.

Recommendation: You should store archive logs on disk, especially if Db2 will be running in data sharing mode.

The total amount of storage that is required for the logs and BSDSs is calculated by the CLIST and displayed in the messages on panel DSNTIPC1.

The amount of space for the archive primary and secondary archive log space are calculated as follows:

The primary space (PRIQTY subsystem parameter) is set to the size of the active log data set. The secondary space (SECQTY subsystem parameter) is set to a quarter the size of the active log data set.

Related concepts

Active log data sets storage requirements
Active log data sets record significant events and data changes. Active log data sets are periodically offloaded to archive log data sets. Storage requirements for active log data sets depend on the frequency of data updates and of offloads to archive log data sets.

Bootstrap data sets storage requirements
Each bootstrap data set (BSDS) requires 15 MB. During installation, Db2 automatically allocates two copies of the BSDS. During migration, Db2 11 adopts the BSDS characteristics that you specified for your previous version.

Related reference

DSNTIPC1: CLIST calculations panel 2
The DSNTIPC1 panel displays CLIST messages that indicate a variety of calculations. This panel is displayed only when you run the CLIST in INSTALL mode.

Profile tables storage requirements

You need to reserve disk space for profile tables.

The amount of required disk space is approximately 100 to 200 MB.

Related information

Virtual storage requirements for Db2 address spaces

Db2 uses several types of private address spaces, and each type requires storage.

Tip:

You might notice that the sample jobs sometimes use a region size of 0 KB. This region size is meant to simplify the installation process in those particular cases. In the following recommendations, the region sizes are based on average use under normal circumstances on typical systems. Your requirements might be quite different.

Database services address space (*ssnm*DBM1)
The *database services address space* is responsible for accessing relational databases that are controlled by Db2 for z/OS and provides most database-related services. The input and output to database resources is performed on behalf of SQL application programs in this address space. It is the largest Db2 address space. It uses storage above the 2 GB bar. The default start up procedure is DSN1DBM1. First, plan for a minimum of 90 MB in this address space, with 2 MB below the 16 MB line.

Most modules reside in the 31-bit extended private area. Storage usage below the 16-MB line is typically less than 2 MB.

System services address space (*ssnm*MSTR)
The *system services address space* starts and stops Db2, and controls local access to Db2 for z/OS, and performs various system-related functions. It needs less space than the database services address space (*ssnm*DBM1). Specify 0 KB for the system services address space. The default start up procedure is DSN1MSTR.

Distributed data facility (DDF) services address space (*ssnm*DIST)
The *distributed data facility address space* supports network communications with other remote systems and execution of database access requests on behalf of remote users. Use the default region

size of 0 KB. This address space is started as part of DDF initialization. The start-up procedure is DSN1DIST.

Internal resource lock manager (IRLM) address space (*irlmproc*)

Db2 uses the *IRLM address space* to control access to database resources and locking. When row locking is used, the number of locks that Db2 acquires might increase, which might in turn increase the amount of storage that IRLM requires. The number of locks that are acquired is dependent on your application.

You can estimate the IRLM control block structure at 540 bytes per lock. IRLM no longer supports placing locks in ECSA. All IRLM locks are now placed in the IRLM private address space.

Tip: In the EXEC statement of the IRLM startup procedure, set REGION=0 and set an estimated value for MEMLIMIT.

The PC and MAXCSA parameters are no longer used, but you must maintain them for compatibility reasons. You must specify the parameters and values, but their values are not used. The MAXCSA value must be in the range 0 - 9999. The amount of available storage for IRLM private control blocks, including locks, is determined by the operating system and site-specific IPL parameters. IRLM reserves approximately 10% of the available private storage to be used for must-complete lock requests.

Use the MODIFY *irlmproc*,STATUS,STOR command to view and monitor the amount of private storage that IRLM has available.

You can dynamically adjust the amount of below-the-bar private storage by using the MODIFY *irlmproc* SET,PVT command. This command changes only the monitoring threshold of private storage for IRLM.

You can dynamically adjust the limit for above-the-bar private storage by using the MODIFY *irlmproc* SET,MLT command. This command updates only the MEMLIMIT that z/OS uses to control the amount of above-the-bar storage that can be requested by an address space. A new value remains in effect until the next time IRLM is stopped and restarted or until the MODIFY command is issued successfully again.

Neither of these MODIFY commands change the physical amount of storage that the operating system assigns to the address space.

Enabling data sharing further increases the storage that IRLM requires.

Allied agent address spaces

In Db2, an *allied agent address space* is any user address space that attaches to Db2. This address space can include Resource Recovery Services attachment facility (RRSAF), TSO attachment facility, IMS attachment facility, CICS attachment facility, and batch address spaces.

The size of the Db2 attachment facility code in the allied agent address space depends on which attachment facilities you use. TSO requires about 372 KB for the DSN command. CAF, IMS, and RRSAF each require about 36 KB for the Db2 attachment facility code. For all attachment facilities, except CICS Transaction Server and RRSAF, the Db2 attachment facility code must run below the 16 MB line of virtual storage. Applications can run above the 16 MB line.

Db2 stored procedures address spaces (WLM-named)

WLM-established stored procedures address spaces are WLM-established address spaces that can provide multiple isolated environments for stored procedures.

Each WLM-established stored procedures address space is associated with a Workload Manager environment.

Db2 for z/OS stored procedures support both main programs and subprograms; this support requires additional storage for each task control block (TCB). However, because you can run fewer programs in an address space, you can use less storage below the 16 MB line in each address space.

The amount of space that is required by a WLM-established stored procedures address space depends on the applications. Stored procedures that internally store a large amount of in-process work require more space than those that do not store much in-process work. Also, Java™ stored procedures require more space than others, such as COBOL stored procedures.

The overall amount of required space depends on the number of WLM-established stored procedures address spaces that are running, and the amount of space that is required for each.

Administrative task scheduler address space

Each Db2 subsystem has a coordinated *administrative task scheduler address space* that it can start by using a z/OS started task procedure.

Therefore, if there are many Db2 subsystems running on a single z/OS system, there is a separate administrative task scheduler with a separate name for each one.

Two instances of the same administrative task scheduler cannot run simultaneously. To avoid starting up a duplicate administrative task scheduler, at startup the administrative task scheduler checks all of the address spaces control block first to ensure that there is no address space other than itself with the same name. If another address space with the same name is already up and running, the administrative task scheduler that is starting up immediately shuts down with a console error message. The administrative task scheduler can check only the address spaces that are in the same system, not in the entire Sysplex.

The administrative task scheduler address space stays up, even when Db2 comes down.

Db2 also uses extended common service area (ECSA), 64-bit common storage, and the z/OS Shared Memory Facility. For more information, see “Shared memory storage requirements” on page 17 and “Common service area storage requirements” on page 15.

Related information

Common service area storage requirements

Some of the Db2 load modules and control blocks are in common storage. Most of the space is in the extended common service area (ECSA) and 64-bit common storage.

With few exceptions, the CSA-resident load modules are link-edited with the residency attribute of RMODE(ANY). Most of the modules reside in ECSA (above the 16 MB line of virtual storage), as do most of the global control blocks. The IRLM lock control blocks (RHB and RLB) use 64-bit private storage.

Monitor your use of CSA and ECSA, and increase those values if necessary. By monitoring CSA below the 16-MB line, you can determine whether you need to increase the size of the ECSA.

When you IPL z/OS, you can override the CSA size with this syntax:

```
CSA=(a,b)
```

where:

- *a* is the number of kilobytes of CSA storage below the 16 MB line
- *b* is the number of kilobytes of ECSA storage above the 16 MB line

The CSA value is rounded down to the next 1 MB boundary, while the ECSA value is rounded up to the next 1 MB boundary.

To define the size of the 64-bit common area, you can use the HVCOMMON parameter of the IEASYSxx member in the parmlib concatenation.

Db2 11 requires 64-bit common storage. Db2 requires that at least 6 GB of 64-bit common storage is defined for each Db2 subsystem that runs on a z/OS image.Additionally, the 64-bit common storage must be large enough to accommodate the size of the log buffers that is specified by the OUTBUFF subsystem parameter plus 15%.

Restriction: Ensure that you have defined a high enough value for HVCOMMON to satisfy requirements for all Db2 subsystems plus all other use on the LPAR. The default value is 66 GB. The 6 GB of 64-bit common storage that is requested for each member must be contiguous.

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

Common Service Area (CSA/Extended CSA) (MVS Initialization and Tuning Guide)

Calculating the storage requirement for the common service area

You need to calculate the approximate storage requirement for the common service area (CSA). Under normal conditions, your virtual storage requirements in the CSA (below the 16-MB line) are unlikely to increase.

About this task

In a data sharing environment, if an IRLM performs member recovery or structure rebuilding, additional virtual storage is required. Any other increase in the amount of virtual storage that is needed occurs within the extended private area of the Db2 database address space and the extended private area of the distributed data address space.

Procedure

To calculate the approximate residual requirement for CSA (below the 16-MB line):

1. Start with up to 40 KB for each Db2 subsystem.
2. Add 24 KB for each started IRLM.

Calculating the storage requirement for the extended common service area

You must calculate the approximate storage requirement for the extended common service area (ECSA).

Procedure

- To estimate storage that is needed for ECSA (above the 16-MB line) for each local Db2 subsystem, use the following calculations:

  a) Start with 5 MB of ECSA for the base.

  b) Add 4 KB for each local user.

  You can use four times the value of "MAX USERS field (CTHREAD subsystem parameter)" on page 128.

  c) Add 5 MB for each IRLM subsystem.

  Each IRLM subsystem uses 4 - 5 MB of ECSA when no workload is active and the default trace settings are used. As the workload increases, the ECSA use in IRLM for locking might also increase, depending on the type of requests processed by IRLM.

  For example, if a workload processes a large number of queries or notifies through IFI calls, the ECSA increases depending on the number of locks held, number of threads, number of members in the data sharing group, and so forth. When multiple IFI requests run concurrently,the ability of IRLM to reuse and or release the ECSA storage is reduced. In such scenarios, the ECSA usage by IRLM might go up to 10 MB.

  d) If optional tracing is used for IRLM with the TRACE parameter, add memory for the IRLM optional trace buffers:

  – If TRACE=YES is used, add 1.3 MB.

  – If TRACE=*n* is used, where *n* is the number of optional trace buffers, add (512 * *n*) KB.

  e) Add at least 8 MB, and as much as 50 MB, for the instrumentation facility interface (IFI), for IFI buffers as requested by monitoring programs and the standard trace classes for accounting (1, 2, 3, 7, and 8) and statistics (1, 3, 4, 5 and 6).

If Db2 encounters a shortage of ESCA storage for IFI processing, Db2 can continue processing threads, but trace records might be lost until the ESCA shortage is resolved.

Traces that are likely to increase the storage requirement above the 8 MB minimum include: IFCID 003 or IFCID 148 with more than 10 active buffer pools (or group buffer pools), IFCID 124 (SQL statement text), IFCID 199 (Buffer pool stats), and others.

- If you use the distributed data functions of Db2 (DDF), you might find that you need more virtual storage. You can estimate how much your storage needs are likely to increase in the ECSA above the 16-MB line by adding the following amounts:

  a) Add 2.5 MB for the code that relates to distributed processing

  b) Add 1 KB for each network connection.

     You can use the value for “MAX REMOTE CONNECTED field (CONDBAT subsystem parameter)” on page 129.

  c) Add 2 KB for each thread that uses distributed processing. You can use two times the value for “MAX REMOTE ACTIVE field (MAXDBAT subsystem parameter)” on page 128.

  d) Add 1 KB for each Db2 site in your network, regardless of the number of connections between the site and the Db2 subsystem,where *site* refers to the following types of adjacent partners:

     – Downstream servers that are listed in communication database of your Db2 subsystem (as a TCP/IP address or an SNA LU name)

     – Upstream clients for which this Db2 subsystem acts as the DRDA server.

What to do next

Specify this sum or a value that is larger than this sum as the second value of the CSA parameter of the IEASYS*xx* z/OS logical PARMLIB member. The logical PARMLIB is usually referred to as SYS1.PARMLIB. Specifying values that are too high is preferable to specifying values that are too low; making your values too low can result in a need to IPL z/OS. For example, if the ECSA size is too small, z/OS places the Db2 global load modules and control blocks for Db2 in CSA below the 16-MB line instead of above it. This can cause problems with coexisting z/OS subsystems.

Distributed threads are represented by z/OS SSRB control blocks which reside in the extended system queue area (ESQA) when they are paused. The amount of storage that is used might vary depending on the z/OS release that is used. Estimate 4 KB of ESQA for every active distributed thread. You can use (4 * MAXDBAT) KB.

Shared memory storage requirements

Shared memory is a type of virtual storage that allows multiple address spaces to easily address storage that is common to Db2 address spaces. This memory resides above the 2 GB bar. Db2 also uses 64-bit common storage, which is shared by the entire LPAR, for control structures that need to be accessed while running processes in and out of the system services address space (*ssnm*MSTR), database services address space (*ssnm*DBM1), and *ssnm*DIST address space.

The shared memory object is created at Db2 startup, and the following Db2 address spaces for the subsystem (*ssnm*DIST, *ssnm*DBM1, *ssnm*MSTR, and Utilities) are registered with z/OS to be able to access the shared memory object.

To define the size of the shared memory and the 64-bit common area, use the HVSHARE and HVCOMMON parameters of the IEASYS*xx* member in the parmlib concatenation.

Restriction: Ensure that you have defined a high enough value for HVSHARE to satisfy all component requests for shared memory within the z/OS image. The default value is 510 TB. Db2 11 requires 1 TB of contiguous 64-bit shared private storage for each subsystem. This storage is virtual, and it is controlled by the z/OS HVSHARE parameter in IEASYSxx. This storage is not backed at allocation, only as it is used.

PSPI

IFCID 0225 has statistics that you can use to determine the amount of currently defined storage and how much of it is currently allocated.

PSPI

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related information

IEASYSxx (symbol definitions and IEASYSxx members) (MVS Initialization and Tuning Reference)

Virtual storage requirements for storage pools and working storage

During the ISPF tailoring session, you specify values that the DSNTINST CLIST uses to calculate main storage size.

Recommendation: Determine these values based on your estimated application workload before you install or migrate Db2.

These values provide an estimate of the private area that is needed by the database services address space (*ssnm*DBM1), the largest of the Db2 address spaces. If the estimated virtual storage for the address space is not available, you can re-evaluate the sizes that you requested.

The calculations in this topic are planning estimates. The noted values do not provide the exact limits, but they indicate a reasonable range of values.

The sum of the following values must fit the region size that Db2 supports:

- VSAM data set control block storage size
- Working storage size

The CLIST adds a fixed code size to the sum of these values to determine the main storage size.

After you specify the values listed above, the CLIST determines the EDM pool size and the size that is needed for the data set control blocks. The CLIST adds the working storage size and the fixed code size to update the region size that is used in the Db2 startup procedures. The CLIST also displays this information on CLIST calculations panel 1: DSNTIPC.

Use the formulas in this topic to estimate your storage needs. For your reference, the default values are included where appropriate.

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Related information

Calculating buffer pool size

Buffer pools are areas of virtual storage that are used to satisfy the buffering requirements for one or more table spaces or indexes. All Db2 subsystems use virtual buffer pools, which are backed by central storage or auxiliary storage. Buffer pools are created above the 2 GB bar.

About this task

Virtual buffer pools: For best results, use at least 100 KB of buffer pool space for each concurrent user. A value of 300 KB or more is recommended for improved performance. Very simple SQL statements that access small amounts of data can require less than this amount. Complex SQL statements that access large amounts of data can require more than this amount. Dynamic SQL statements might require a dynamic bind, which requires additional buffers for catalog tables and indexes. If an SQL statement requires directory access, additional buffers are also required for directory page sets. UPDATE, DELETE, and INSERT statements require more buffers to keep updated pages in a buffer pool.

To efficiently support prefetch, allow 400 KB for each object that is concurrently accessed. For example, if you have a SELECT statement with a single table space scan, allow 400 KB for that statement. For another example, suppose you have a SELECT statement with a three-table sort merge join that uses an index for each table, and a parallel degree of 4. To obtain a rough estimate, calculate the total number of objects that are accessed and multiply the number of objects by 400 KB and then by the degree of parallelism. In this example, the equation would be (3 tables + 3 indexes + 1 work file for the sort) x 400 KB x 4. The result is 11200 KB that is recommended for this statement. Typically, these objects should be defined in separate buffer pools to provide better performance control. For example, you should have at least three separate buffer pools: one for indexes, one for tables, and one for work files.

During installation, you can set the buffer pool sizes on the installation panels. Later, you can use the ALTER BUFFERPOOL command to alter the sizes and other attributes of as many as 50 buffer pools for 4-KB page sets, 10 buffer pools for 8-KB page sets, 10 buffer pools for 16-KB page sets, and 10 buffer pools for 32-KB table spaces. The ALTER BUFFERPOOL command can make the changes dynamically while Db2 is running.

Important: Do not allocate more storage for buffer pools than available real storage for buffer pools. If you attempt to use more than the available real storage, performance will suffer.

Db2 limits the total amount of storage that is allocated for virtual buffer pools to approximately twice the amount of real storage. If you specify more than this amount for virtual buffer pools, Db2 allocates buffer pools during startup until twice the amount of real storage is used. Db2 then allocates the remaining buffer pools as follows:

Page size	**Number of pages**
4 KB	2000
8 KB	1000
16 KB	500
32 KB	250

After these storage limits have been reached, you cannot increase the amount of virtual buffer pool storage unless you increase the amount of real storage that is available to the z/OS image.

Procedure

Use the following table.

Table 1. Virtual buffer pool size calculation

Virtual buffer pool calculation			**Default**
Buffers for BP0	____ x 4 KB = _____	20,000 x 4 KB	= 80,000 KB
Buffers for BP1	+____ x 4 KB = _____	+ 0 x 4 KB	= 0 KB
Buffers for BP2	+____ x 4 KB = _____	+ 0 x 4 KB	= 0 KB
.			
.			
.			
Buffers for BP49	+____ x 4 KB = _____	+ 0 x 4 KB	= 0 KB
Buffers for BP8K0	+____ x 8 KB = _____	+ 1000 x 8 KB	= 8000 KB

Table 1. Virtual buffer pool size calculation (continued)

Virtual buffer pool calculation			Default
Buffers for BP8K1	+____ x 8 KB = _____	+ 0 x 8 KB	= 0 KB
.			
.			
Buffers for BP16K0	+___ x 16 KB = ____	+ 500 x 16 KB	= 8000 KB
Buffers for BP16K1	+___ x 16 KB = ____	+ 0 x 16 KB	= 0 KB
.			
.			
Buffers for BP32K	+___ x 32 KB = ____	+250 x 32 KB	= 8000 KB
.			
.			
Buffers for BP32K9	+___ x 32 KB = ____	+ 0 x 32 KB	= 0 KB
	= ____		= 104,000KB

Related reference

DSNTIP1: Buffer pool sizes panel 1
The DSNTIP1 panel is the first of two panels on which you can specify the size of your virtual buffer pools.

DSNTIP2: Buffer pool sizes panel 2
The DSNTIP2 panel is the second of the two panels that enables you to specify the size of your virtual buffer pools.

Related information

Calculating sort pool size

The Db2 sort process uses two kinds of storage: local storage and buffer pool storage. Sort pool storage and buffer pools have storage above the 2 GB bar.

Related reference

MAX DATA CACHING field (MXDTCACH subsystem parameter)
The MXDTCACH subsystem parameter specifies the maximum amount of memory, in MB, that is to be allocated for data caching for each thread.

Calculating sort pool storage in local storage

The sort process creates fixed-length storage pools in local storage for internal sort structures and work areas. Local storage is created above the 2 GB bar at allocation time.

About this task

The Db2 sort work area (in-memory) has the following storage boundaries for **each** concurrent sort operation:

Minimum sort storage = 240 KB
Maximum sort storage = 128,000 KB

Db2 initially allocates storage for each sort and gradually adds more storage until the maximum sort work area limit is reached or the maximum number of nodes (32,000) are populated at the bottom of the sort tree, whichever occurs first. With 32,000 nodes at the bottom of the sort tree, the average run size for each sorted string is 64,000 records.

The default size of the sort pool is 10,000 KB, but you can override this default value by entering a sort pool size on installation panel DSNTIPC.

Procedure

Use the following formula:

```
32000 * (16 + sort key length + sort data length)
```

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Related information

Adjusting buffer pool storage that is used for sort work files

Sort processing uses pages in the Db2 buffer pool for its initial input, for work files that contain intermediate results, and for the final output.

About this task

The buffer pools are not always dedicated to sort work files. The amount of sort activity determines how much the buffer pools are used. For heavy sort activity, sort records that have been written to the work files are temporarily written to the disk until buffer pool space becomes available.

Db2 considers the buffers that it uses for work files as sequentially accessed pages.

Procedure

Use the VPSEQT parameter of the ALTER BUFFERPOOL command. If a buffer pool is used only for sort work files, you might set VPSEQT to 99%. If the buffer pool is used for sparse indexes or declared global temporary tables, set VPSEQT to 90%. If you do not have enough allocated storage to complete sort processing, you must allocate more disk space for the work file database.

Related concepts

Work file database storage requirements
The work file database is used as storage for processing SQL statements that require working storage.

Calculating RID pool size

The *RID pool* is an area of local storage that is reserved for record identifier (RID) sort processing, including RID list sort processing.

About this task

The RID pool is created at startup, but no space is allocated until RID storage is needed. When RID storage is needed, it is allocated above the 2 GB bar in 32 KB blocks, which are known as RID blocks.

Consider the following when you calculate RID pool size:

- If the total RID pool size is less than 2 GB, regardless of the current RID pool usage, each agent that requests a new RID map and RID list is granted two 32 KB RID blocks: one RID map and one RID list.
- If a thread needs another RID list block to be added to the existing RID map and RID list, the next 32KB block is granted only if the RID pool usage is below the maximum RID pool size. It is possible for the RID pool size to be larger than the setting of the MAXRBLK subsystem parameter because every new agent is granted at least one RID map and one RID list, if the total RID pool size is less than 2 GB.
- Startup RID storage = 0 (but acquired in 32 KB blocks as needed)

The default size of the RID pool is 400000 KB, but you can override this default value by entering a RID pool size on installation panel DSNTIPC.

Procedure

Use the following formula:

```
number of concurrent RID processing activities * average number of RIDs *
2 * 5 (bytes per RID)
```

Related reference

RID POOL SIZE field (MAXRBLK subsystem parameter)
The MAXRBLK subsystem parameter specifies the amount of storage in kilobytes that is needed for the RID pool.

Related information

Calculating EDM pool sizes

The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

About this task

In Db2 11, the EDM pools are the prepared-statement cache pool, the skeleton pool for packages, and the database descriptor (DBD) pool. All of these pools are located above the 2-GB bar.

When you cache prepared statements, they are stored in the prepared-statement cache along with static SQL statements. The number of prepared statements that are stored in the cache depends on the characteristics of the dynamic SQL statements that your application executes. One type of application typically benefits from caching prepared statements, whereas the other type usually does not. The first type of application uses dynamic SQL statements that are embedded in an application and used repeatedly. Applications and queries with this type of SQL statements benefit most from caching prepared statements because the statement can be used from the cache. However, applications that contain SQL statements that are infrequently used pay the cost of being added to the cache. For example, queries from QMF are likely to be prepared and executed only once. Caching prepared statements does not benefit applications that extensively use this kind of SQL statement.

The size of the prepared-statement cache pool is affected by the number of concurrent threads, the maximum number of DBATs, the number of plans, and the amount of estimated space for plans. If you use dynamic SQL, you need more working storage and less EDM pool space than if you use static SQL.

The skeleton pool for packages is used to store skeleton copies of packages (SKPT). The size of this pool is determined by the maximum number of unique plans in the EDM pool, the average statement size, and the average number of executed statements.

The EDM pool space for database descriptors is determined based on an estimated number of concurrently open databases and the average size of the database descriptor.

For Db2 11 installation, the CLIST provides initial EDM pool size settings on the CLIST calculations panel 1: DSNTIPC. These calculations are based on your site size. You might need to adjust these settings according to the specific needs of your site.

For migration to Db2 11, the CLIST reuses the values from your Db2 10 settings. However, you might need to adjust these values in Db2 11 if your workloads have grown.

Procedure

- If you are migrating to Db2 11, start with the EDM pool sizes that you used in Db2 10, and adjust the sizes as necessary.

- If you are installing Db2 11, the installation CLIST provides initial EDM pool size settings on the CLIST calculations panel 1: DSNTIPC. The calculations are based on your site size. You might need to adjust the settings according to the specific needs of your site.

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Calculating data set control block storage

Calculate the data set control block storage requirements by determining the total number of open data sets (DSMAX).

Procedure

To determine the main storage requirements for your data set control blocks:

- Let *concdb* be the number of concurrent databases, which is specified on installation panel DSNTIPE.
- Let *tables* be the number of tables in each database, which is specified on installation panel DSNTIPD.
- Let *indexes* be the number of indexes in each table. The installation CLIST sets this variable to 2.
- Let *pctpts* be the percentage of partitioned table spaces.
- Let *avgpart* be the average number of partitions in each partitioned table space.
- Let *partts* be the average number of partitioned table spaces per database.
- Let *nonparti* be the number of non-partitioning indexes per partitioned table space.

1. Calculate the total number of open tables with the following formula:

   ```
   opntab = concdb * tables
   ```

2. Calculate the number of open data sets for partitioned table spaces with the following formula:

   ```
   opnptsds = opntab * (pctpts / 100) * avgpartconcdb *
   (((tables *  indexes) + tblspaces) +
   ((2 * partts * avgpart) - (2 * partts)))
   ```

3. Calculate the number of open data sets with the following formula:

   ```
   concdb * (((tables *  indexes) + tblspaces) +
   ((2 * partts * avgpart) - (2 * partts)))
   ```

   You can modify DSMAX by editing job DSNTIJUZ. The maximum number of concurrently open data sets that is allowed by Db2 is 200,000.

4. To calculate the main storage that is required for your data set control blocks, use the following formula:

   ```
   DSMAX * 5 KB
   ```

Example

The default, as calculated by the DSNTINST CLIST, is

```
20000 * 5 KB = 100000 KB
```

This method of calculation ignores partitioned table spaces and partitioning index spaces. It also assumes that all data sets in the database are open if the database is in use. You could enter a smaller value for the number of concurrent databases if only a few of the data sets in a database are typically opened. The larger the value of DSMAX, the longer data sets stay open.

Recommendations:

- Move the scheduler work area (SWA) above the 16 MB line of z/OS virtual storage by using JES initialization statements, JES exit routines, or the SMF exit routine (IEFUJV). This way, you can save approximately 1 KB for each open data set in virtual storage below the 16 MB line and avoid potential storage errors. To determine the amount of storage that is needed below the 16-MB line, use 0.016 KB for the multiplication factor if the SWA is above the line or 1.2 KB for the multiplication factor if the SWA is below the line. The preceding calculations and the calculations in the CLIST presume that the SWA is above the line.
- If you do not move the SWA above the 16 MB line, you should not use a DSMAX value greater than 5000.

Related information

Calculating working storage requirements

Working storage is private virtual storage in the Db2 database services address space, which is primarily above the 2 GB bar. Working storage is used to hold temporary data that is needed for the processing of an SQL request.

About this task

If you use static SQL, you have larger plan sizes, typically varying from 15 KB to 1 MB. Typical sites would use about 300 KB for each thread of working storage for dynamic SQL users, and 100 KB per thread for static SQL users. A *thread* is a structure that describes an application connection to Db2. The CLIST does not include information about open compressed table spaces. Compression dictionaries are stored above the 2-GB bar. Therefore, if you use compressed table spaces, you need additional storage.

Procedure

To estimate the amount of working storage:

1. Start with 600 KB.
2. Determine the amount of space in KB that is needed for active users.
   - Start with 11,920 bytes for each concurrent Db2 user. This value is specified by the CTHREAD subsystem parameter.
   - Add 11,920 bytes for each remote Db2 user. This value is specified by the MAXDBAT subsystem parameter.
   - Divide the total by 1,024 to convert to KB.
3. Determine the amount of space in KB that is needed for inbound DDF connections.
   - Start with 298 bytes per connection.
   - Divide the number of bytes by 1,024 to convert to KB.
   - Subtract the result from the maximum number of concurrent inbound DDF connections. This value is specified by the CONDBAT subsystem parameter.
   - Multiply the result by 4.
4. Estimate the working storage by adding the results from steps 1, 2, and 3:

   ```
   600+(((CTHREAD+MAXDBAT)*11920)/1024)+((CONDBAT-(MAXDBAT*298)/1024)*4)
   ```

Example

The default, as calculated by the DSNTINST CLIST, is:

```
600+(((200+200)*11920)/1024)+((10000-(200*298)/1024)*4)=45024
```

Related reference

MAX USERS field (CTHREAD subsystem parameter)

The CTHREAD subsystem parameter controls the maximum number of allied threads that are to be allocated concurrently. *Allied threads* are threads that are started at the local subsystem.

MAX REMOTE CONNECTED field (CONDBAT subsystem parameter)
The CONDBAT subsystem parameter sets the maximum number of concurrent inbound DDF connections that are to be allowed.

MAX REMOTE ACTIVE field (MAXDBAT subsystem parameter)
The value of the MAXDBAT subsystem parameter specifies the maximum number of database access threads (DBATs) that are allowed to be concurrently active.

Related information

Calculating virtual storage below the 16-MB line

This calculation produces an estimate of virtual storage constraints below the 16-MB line in the Db2 database services address space.

About this task

Most of the needed virtual storage is in extended private storage and storage above the 2 GB bar, including the buffer pool, the EDM pool, and almost all of the code and working storage. This is the difference between the total storage and the estimated region size. The estimated region size does not include extended private storage or storage above the 2 GB bar. It includes only the data set control block storage size and some of the code.

Procedure

Use the following formula:

```
600 KB + (((MAX USERS + MAX REMOTE ACTIVE) * 298) / 1024) + (DSMAX * 0.016)
```

Example

The default, as calculated by the DSNTINST CLIST, is

```
600 KB + (((200 + 200) * 298) / 1024) + (20000 * 0.016 KB) = 1036 KB
```

If the scheduler work area (SWA) is above the 16-MB line, multiply the number of data sets by 0.016 KB; if the SWA is below the 16-MB line, multiply the number of data sets by 1.2 KB.

The CLIST calculations panel, DSNTIPC, displays storage sizes that are calculated by the DSNTINST CLIST.

Related reference
DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

Calculating real storage requirements

Db2 can use real storage to reduce I/O and processor times and to improve response time and throughput. The amount of real storage that Db2 needs varies greatly.

About this task

Some users find that their organizations need several times the estimates listed below, whereas others need less. The amount of storage is an important parameter in Db2 performance. Performance monitoring programs give you a more accurate estimate of your storage requirements than the formulas in this topic because these programs can take specific environmental characteristics into account.

For the Db2 buffer pools, the EDM pool, log buffers, and working storage, the amount of real storage must be the same as the amount of virtual storage. Paging activity in the buffers is an indication of a problem. If you do not have enough real storage, you might need to reduce your buffer pool size, which allows fewer concurrent users. You also need space to contain locks, the working set of code in all address spaces, log buffers, and common storage space. In Db2 11, log buffers are permanently page-fixed. Therefore, the entire size of the output buffer needs to be used to estimate real storage. Because some of the figures that are used in virtual storage calculations are maximums, whereas the real storage figures typically use activity for the peak, changes are needed in the calculations. The virtual storage figures concentrate on the most constrained address space, but real storage work must include them all. For more information about each category, see the information specified in the first two tables below.

Some storage for castout engines or DASD read and write of a compressed index might be fixed through a PAGEFIX operation. More castout engines or more compressed indexes can cause more storage to be permanently fixed. MVS Real Storage Manager (RSM) controls where the PAGEFIX occurs in real storage, and it can occur below the 16 MB line. If you have concerns about this behavior, consult with IBM Support for MVS RSM.

Procedure

To estimate real storage requirements:

1. Multiply the virtual size of each storage area by the factor that is indicated in the following table to estimate the real size for that area.

   Table 2. Real storage size calculation

Category	Default	Virtual size	× Factor	= Real size
Buffer pools	104,200 KB	_______	1.0	_______
Sort pool	10,000 KB	_______	0.5	_______
RID pool	400,000	_______	0.5	_______
EDM pool	33,600 KB	_______	1.0	_______
Data set size	17,928 KB	_______	0.6	_______
Code size + 1100 (4 address spaces)	40,000 KB	40,000 KB	0.5	20,000 KB
Working storage + (DSCF + DDF)	55,800 KB	_______	1.0	_______
Log buffers	4000 KB	_______	1.0	_______
Lock space	5000 KB	_______	0.4	_______
Common storage	2160 KB	_______	0.4	_______
			Total real storage size =	_______

2. Plan to add real storage for additional users.

   The following table uses rough estimates to approximate the amount of additional real storage that is needed by several kinds of users. If you have more concurrent users, plan to add real storage.

   Table 3. Additional real storage for more users

Type of user	Additional real storage
Transaction	150 KB
Query	400 KB
Batch	700 KB

Recommendation: If you are assessing the storage needs of a running subsystem, look at the IBM OMEGAMON for Db2 Performance Expert on z/OS report for IFCID 0225. This report calculates the virtual storage per user.

3. Plan to add 28 KB of real storage for each open index partition.

Example

The following table shows the default real storage size calculations.

Table 4. Default real storage size calculation

Category	Default virtual size	× Factor	= Real size
Buffer pools	104,000 KB	1.0	104,000 KB
Sort pool	10,000 KB	0.5	5000 KB
RID pool	400,000	0.5	200,000
EDM pool	33,600 KB	1.0	33,600 KB
Data set size	17,928 KB	0.6	10,756.8 KB
Code size + 1100 (4 address spaces)	40,000 KB	0.5	20,000 KB
Working storage + (DSCF + DDF)	55,800 KB	1.0	55,800 KB
Log buffers	4000 KB	1.0	4000 KB
Lock space	5000 KB	0.4	2000 KB
Common storage	2160 KB	0.4	864 KB

		Total real storage size =	436,021 KB

Related tasks

Calculating buffer pool size
Buffer pools are areas of virtual storage that are used to satisfy the buffering requirements for one or more table spaces or indexes. All Db2 subsystems use virtual buffer pools, which are backed by central storage or auxiliary storage. Buffer pools are created above the 2 GB bar.

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

Calculating working storage requirements
Working storage is private virtual storage in the Db2 database services address space, which is primarily above the 2 GB bar. Working storage is used to hold temporary data that is needed for the processing of an SQL request.

Planning for performance of Db2

When you install or migrate Db2, consider your performance goals for your subsystem or data sharing member. Use z/OS Workload Manager (WLM) to define these goals.

Also, consider the following guidance:

- Monitoring and managing performance are more difficult with few plans.
- Never-ending threads and plans reuse accumulate thread storage and working storage.
- Each distributed COMMIT statement needs package accounting.

- Consider reusing threads.
- Finding unused packages and cleaning up mistakes are difficult unless ownership is known.
- Performance monitoring may require analyzing everything in a CICS region instead of just one plan.
- Plan is a required short name.
- Package name is optional, long, multipart, and not always easy to find.
- Consider differentiating by plan within a CICS region and having at least 5 to 20 plans within a region. You can work faster and make changes on a more granular basis.
- Eligible processes can be offloaded to IBM Z Integrated Information Processor (zIIP) specialty engines to reduce the load on general purpose processors.

Related information

Planning for release coexistence in Db2 11

In *release coexistence*, applications can continue to access Db2 data while you migrate data sharing members or distributed subsystems. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Db2 11 supports release coexistence with Db2 10 in data sharing and distributed environments, as long as all members or subsystems remain in Db2 11 conversion mode.

For more information about release coexistence in Db2 data sharing, see "Release coexistence in Db2 data sharing" on page 612.

Related tasks

Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11
By taking appropriate actions in Db2 10 well before migration to Db2 11, you can minimize the risk of disruptive automatic binds of application plans and packages during and after migration to Db2 11.

Chapter 3. Making the Db2 product code available

IBM distributes the product code for Db2 for z/OS in various ways. However you obtain the product code, you use System Modification Program Extended (SMP/E) to create Db2 distribution libraries, Db2 target libraries, and SMP/E control data sets, and to control of subsequent software maintenance.

For more information about SMP/E, see Db2 Program Directory.

Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related information

Editing the SMP/E jobs

Before running any of the SMP/E jobs, you must edit them. Some of the items that you might want to edit include link list options and naming conventions for the Db2 library data sets.

Creating JOB statements

The SMP/E jobs do not include JOB statements. Although JOB statements are often built automatically, creating your own JOB statements that are correct for your site is usually easier than editing the provided JOB statements.

Procedure

To create JOB statements:

1. If you are using ISPF to edit and submit the SMP/E jobs, edit a member that contains the JOB statement. Delete all text except the JOB statement. Then use the ISPF COPY command to copy the member into each job before submitting it.
2. If you are using TSO to submit the SMP/E jobs, edit a JOB statement and submit that JOB statement with each job.

   For example, data set JCL.CNTL(J) might contain the following code:

   ```
   //DB2INST   JOB ACCT,NAME,
   //          MSGCLASS=A,MSGLEVEL=(1,1),
   //          TIME=(10),USER=SYSADM,PASSWORD=xxxxxxxx
   /*JOBPARM   ....
   /*ROUTE     PRINT ....
   ```

   When you are ready to submit a job, use a command like the following command:

   ```
   SUBMIT (JCL(J) JCL(DSNxxxxx))
   ```

   In this command, *xxxxx* represents the last five characters of the SMP/E job name. This command submits the JOB statement along with the job.

Choosing link list options

Before you run the SMP/E jobs to load the Db2 libraries, you can choose your link list options.

Procedure

Consider and choose your link list options based on the following information about the load module libraries:

***prefix*.SDSNLINK**

Contains Db2 modules that are referred to as *early (ERLY) code*, which must reside in an APF-authorized library. You must place early code modules in the link list because they are loaded at subsystem initialization during IPL. In the link list, you can have only one level of the early code. That early code can be shared by multiple subsystems and releases of Db2. So, you must choose the level of early code that is appropriate for all subsystems that use the link list. If your system is at the prerequisite maintenance level, your Db2 10 early code is compatible with Db2 11. The Db2 11 early code is compatible with Db2 10.

If you are migrating, maintenance to early code or an installation of new early code requires that you activate the early code, which can be done in a couple of ways:

- Activate the early code by doing an IPL of z/OS.
- Another option to activate maintenance to early code is to issue the REFRESH Db2,EARLY command. If you use this command, the subsystem that is having its early code refreshed must be stopped when the command is issued.

To initialize a new Db2 subsystem, you can issue the z/OS SETSSI command, which executes the early code initialization routine and update the subsystem vector table (SSVT).

Schedule an IPL of z/OS before or during a migration to Db2 11. This IPL is necessary because changes that migration job DSNTIJMV makes in SYS1.PARMLIB are not recognized by z/OS until the next IPL. Alternatively, you can use the SETSSI, SETPROG APF, and SETPROG LNKLST commands to define the subsystem to z/OS until the next IPL. Changes that DSNTIJMV makes to the SYS1.PARMLIB might affect the following libraries:

- New subsystem definitions in IEFSSN*xx*
- New APF libraries in IEAAPF*xx*
- New load module libraries in LNKLST*xx*

***prefix*.SDSNLOAD**

- Is a main load module repository.
- Can be shared by multiple subsystems at the same release level.
- Allows only Db2 to modify code.
- Holds default exit routines.
- Is APF-authorized.
- Must be a PDSE.

***prefix*.SDSNLOD2**

A PDSE data set that contains JDBC and SQLJ DLLs. Db2 does not require that SDSNLOD2 is APF-authorized. However, be aware that if this data set is in a STEPLIB data set concatenation of an address space that does need APF authorization, SDSNLOD2 must also be APF-authorized.

***prefix*.SDSNEXIT**

- Holds the subsystem parameter module, DSNHDECP, and user-written exit routines.
- Is modified by user.
- Is APF-authorized.

Link list recommendation for IRLM

Adding the IRLM load module DXRRL183 to the link list is highly recommended so that IBM Support can help you diagnose and resolve potential problems. IRLM can operate without this load module. However, if the DXRRL183 load module is not in the link list, users cannot run CT TRACE commands to externally start and stop IRLM component traces, which are critical for diagnosing problems. To add DXRRL183 to the link list if it is not already there, you need to copy the module into a link-listed library. After you apply maintenance to IRLM that affects DXRRL183, remember to copy the updated module to the link list.

Integrated Cryptographic Services Facility link list requirement

If you plan to use encryption with your Db2 subsystem, you must include in the link list the Integrated Cryptographic Services Facility library that contains the SCSFMOD0 load module. The SQL statement SET ENCRYPTION PASSWORD and the following built-in functions require this support:

- ENCRYPT
- DECRYPT_BIT
- DECRYPT_DB
- DECRYPT_CHAR
- GETHINT

Supporting one Db2 subsystem

You can choose among several methods of maintaining a single Db2 subsystem. The following steps describe what is probably the easier method for most sites:

a. Change the SMP/E procedure DSNALLOC to assign all load modules to *prefix*.SDSNLOAD. You can do so by changing the data set name for DDDEF (SDSNLINK) from *prefix*.SDSNLINK to *prefix*.SDSNLOAD.

b. Remove the allocation for *prefix*.SDSNLINK from the allocation job DSNALLOC.

c. Include *prefix*.SDSNLOAD (instead of *prefix*.SDSNLINK) in the LNKLST*xx* member of SYS1.PARMLIB.

Supporting multiple Db2 subsystems

Supporting multiple subsystems can mean several things. You can have two or more Db2 subsystems at the same release and service level (for example, two Db2 11 subsystems). Create separate libraries for DSNHDECP and user-written exit routines of each Db2 subsystem.

You can also have two or more Db2 subsystems at the same release level, but at different service levels. For example, you can have a Db2 11 production subsystem and a Db2 11 test subsystem at different service levels. Alternately, you can have two Db2 subsystems at different release levels. For example, you can have a Db2 11 subsystem and a Db2 10 subsystem.

In either of these cases, you can use an INCLUDE statement in JCL or a started task to identify the necessary load modules.

The Db2 subsystem must use the appropriate release level of *prefix*.SDSNLOAD, but the application attachment code (for example, CICS, CAF, or TSO attachment facilities) can use code that is either one release earlier or one later from *prefix*.SDSNLOAD. To use application attachment code from the earlier or later release, place the attachment code in a different STEPLIB data set from the STEPLIB data set that Db2 executes.

Related tasks

Preparing for Db2 11 migration in Db2 data sharing
When planning the migration of data sharing members to Db2 11 it is best to take certain actions to reduce or avoid unnecessary operation complexity.

Migration step 13: Define Db2 11 to z/OS: DSNTIJMV
Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS, including updating members of SYS1.PARMLIB and SYS1.PROCLIB.

Migration step 16: Refresh the z/OS definition of Db2

As part of the migration to Db2 11, you must refresh how Db2 is defined to z/OS.

Related reference

z/OS SETSSI Command (MVS System Commands)

z/OS SETPROG Command (MVS System Commands)

Related information

Accessing the correct Db2 program library

If you do not place *prefix*.SDSNLOAD in the LNKLST*xx* member of SYS1.PARMLIB, you must provide JOBLIB or STEPLIB statements for it in certain types of programs and procedures.

Before you begin

Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

About this task

The installation and migration jobs that are provided with Db2 11 already contain the necessary JOBLIB or STEPLIB statements. In addition, the startup procedures that Db2 provides include STEPLIB statements for their respective program libraries, *prefix*.SDSNLOAD, and *prefix*.SDSNEXIT.

Procedure

Provide STEPLIB or JOBLIB statements for the following types of programs and procedures if you do not place *prefix*.SDSNLOAD in the LNKLST*xx* member of SYS1.PARMLIB.

- **TSO or batch jobs** that access Db2 services require JOBLIB or STEPLIB statements for *prefix*.SDSNLOAD. These jobs include TSO logon procedures and batch jobs that access the DSN command and subcommands, the Db2 precompiler, and Db2 utilities.
- **IMS control, message, and batch processing jobs** also require JOBLIB or STEPLIB statements for *prefix*.SDSNLOAD. You must specify the Db2 load library in the startup procedure for each IMS region (IMS control, message processing program (MPP), batch message processing (BMP), and Fast Path region) that can communicate with Db2. You can do this in two ways:
  - If all the data sets that the JOBLIB or STEPLIB statement refers to for an IMS region are APF-authorized, add the DD statement for *prefix*.SDSNLOAD to the JOBLIB or STEPLIB statement. If you are using the DYNAM option of COBOL, the IMS RESLIB DD statement must precede the reference to *prefix*.SDSNLOAD in the JOBLIB or STEPLIB statement.
  - If any of the data sets that the JOBLIB or STEPLIB statement refers to for the IMS region are not APF-authorized, add the DFSESL DD statement for *prefix*.SDSNLOAD. All libraries that are specified on the DFSESL DD statement must be APF-authorized. The DFSESL DD statement is not required by the Db2 DL/I batch support. IMS requires that an IMS RESLIB DD statement also be referred to by the DFSESL DD statement, as in the following example:

    ```
    //DFSESL     DD      DSN=ims_reslib,DISP=SHR
    //           DD      DSN=prefix.SDSNLOAD,DISP=SHR
    ```

- **CICS procedures**, including the CICS initialization JCL, also need to include Db2 libraries.

Related tasks

CICS startup JCL requirements for connection to Db2

Performance implications of installation libraries

The performance of your system might be degraded by including modules in the libraries that are included in the link list and you might want to consider the strategies below. These general suggestions might not match the specific needs of your site.

Adding many modules to the libraries that are included in the link list can reduce system performance. However, adding only a few modules to the libraries requires additional STEPLIB or JOBLIB statements. Because these STEPLIB or JOBLIB statements must be searched before the link list is searched, this approach can also reduce system performance. The approach that produces the best performance for your site depends on the environment in which you use Db2. Regardless of which attachment facilities you use, the modules in *prefix*.SDSNLINK must always be in the link library list.

If you run multiple Db2 subsystems on the same LPAR, but the Db2 subsystems are at different release and service levels, you need to include *prefix*.SDSNLINK, but not *prefix*.SDSNLOAD, in the LNKLST*xx* member of SYS1.PARMLIB. Place the needed STEPLIB or JOBLIB statements in the JCL procedures and batch jobs.

If you are using Db2 with IMS, you need to include *prefix*.SDSNLINK, not *prefix*.SDSNLOAD, in the LNKLST*xx* member of SYS1.PARMLIB because both the IMS RESLIB and *prefix*.SDSNLOAD have the DSNHLI alias. Place the needed STEPLIB or JOBLIB statements in the IMS procedures.

If you are using Db2 with IMS and you want *prefix*.SDSNLOAD (in addition to *prefix*.SDSNLINK) in the LNKLST*xx* member of SYS1.PARMLIB, ensure that the library concatenation for *prefix*.SDSNLOAD and the IMS RESLIB are correct for your site because both libraries have the DSNHLI alias.

If you are using Db2 with CICS, you should probably put *prefix*.SDSNLINK, not *prefix*.SDSNLOAD, in the LNKLST*xx* member of SYS1.PARMLIB. Then, place the needed STEPLIB or JOBLIB statements in the CICS procedures.

If you use the TSO attachment facility, RRS attachment facility, and call attachment facility, you might need to handle placement of load modules somewhat differently, as follows:

- If you use the DSN command and its subcommands infrequently, place **only** *prefix*.SDSNLINK in the LNKLST*xx* member of SYS1.PARMLIB. Provide the necessary STEPLIB or JOBLIB statements in your TSO logon procedures or in your JCL if you are using batch.
- If you use the DSN command and its subcommands frequently, you might also want to move the TSO attachment facility load modules to a library that is defined in the LNKLST*xx*. The TSO attach modules are DSNECP00, DSNECP10, DSNESM00, and DSNELI.
- If you use the call attachment facility (CAF) frequently, move the CAF load modules (DSNACAB, DSNACAF, and DSNALI) to a library that is defined in the LNKLST*xx*.
- If you use the RRS attachment facility (RRSAF) frequently, move the RRSAF load modules (DSNARRS and DSNRLI) to a library that is defined in the LNKLST*xx*.
- If you use the CAF, RRSAF, or the DSN command and its subcommands frequently, you can move the eligible load modules to a library that is defined in the link pack area (LPA), in IEALPA*xx* member of SYS1.PARMLIB. The CAF and DSN load modules must reside below the 16 MB line of z/OS virtual storage.
  - The TSO load modules that you can place in the LPA are DSNECP00, DSNECP10, DSNESM00, and DSNELI. If you include these modules in the LPA, remember to include the appropriate aliases for DSNECP00 (DSN) and DSNELI (DSNHLI).
  - The CAF load modules that you can place in the LPA are DSNACAF and DSNALI. If you include these modules in the LPA, remember to include the appropriate alias for DSNALI (DSNHLI2). Do not include DSNACAB in the LPA because it is a data-area-only, non-executable load module.
  - The RRSAF load modules that you can place in the LPA are DSNARRS and DSNRLI. If you include these modules in the LPA, you must include the appropriate alias for DSNRLI (DSNHLIR).

⚠ **Attention:** If modules are moved or copied from one library to another, you must make changes to SMP/E control data to reflect the movement. If you do not make these changes, future service or changes to the modules will not be processed correctly.

Naming conventions for Db2 library names

You need to modify the Db2 library data set names in the SMP/E jobs.

These data sets are listed in “What you produce: Db2 distribution and target libraries” on page 36. Their names are composed of three parts:

- A user-defined prefix
- A fixed base name: for example, SDSNLOAD
- An optional user-defined suffix

The Db2 11 default prefix (*prefix*) is used in this information; the default suffix is null. You need to edit each of the Db2 SMP/E jobs and follow the directions in the header notes of each job to specify the names of the SMP/E data sets. If you want to add a suffix, edit the SMP/E procedures and allocation jobs. The prefix cannot exceed 18 characters. The suffix cannot exceed 17 characters, minus the length of the prefix. In addition, any data set names that exceed eight characters must be in groups of no more than eight characters, separated by periods. The qualified data set name cannot exceed 44 characters.

You can also change the base name of these libraries or load them into another data set. If you do this, however, you might need to do additional editing of the installation or migration jobs.

The DSNTINST CLIST, which you use later to tailor the installation and migration jobs, uses the following default data set names:

prefix.SDSNCLST
prefix.SDSNEXIT
prefix.SDSNLINK
prefix.SDSNLOAD
prefix.SDSNMACS
prefix.SDSNDBRM
prefix.SDXRRESL
prefix.SDSNSAMP
prefix.DBRMLIB.DATA
prefix.RUNLIB.LOAD
prefix.SRCLIB.DATA
prefix.SDSNIVPD
prefix.SDSNC.H

For best results, use the supplied naming convention, and be sure to document any changes that you make to the library names in the SMP/E jobs. You must specify these library names again during the ISPF tailoring session.

Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

Related concepts
What you produce: Db2 distribution and target libraries

During SMP/E processing, Db2 is loaded into the distribution and target libraries. Db2 uses the distribution libraries to maintain Db2 and contain the master copy of all elements for your Db2 subsystem.

Specifying SMP/E data set options

You have several options regarding how you establish and use SMP/E data sets.

About this task

You must decide whether you want Db2 and IMS to share SMP/E data sets. You must also decide whether you need an additional set of SMP/E data sets. An additional set of SMP/E data sets is required if you support more than one release of Db2.

Related information

SMP/E for z/OS: User's Guide

Sharing SMP/E data sets with IMS

Db2 and z/OS cannot share SMP/E data sets because some module names and macro names are common to both products. Under certain conditions, however, Db2 can share SMP/E data sets with IMS.

About this task

If you do not share SMP/E data sets with IMS, skip this step.

The allocation job DSNALLOC defines a new set of SMP/E data sets that Db2 and IMS are to share.

Procedure

You must modify your allocation job for either of the following situations:

- **Situation 1**: You decide to have separate SMP/E data sets for Db2 and IMS. In certain situations, Db2 and IMS cannot share SMP/E data sets. You must have separate SMP/E data sets if you want to have two IRLMs.

  Even if you are not required to have separate SMP/E data sets, you might want to keep them separate. If Db2 and IMS share the SMP/E data sets, you need to accept or reapply Db2 corrective service to these data sets to allow IMS SYSGENs.

  To establish separate SMP/E data sets for Db2 and IMS, change the data set prefix that your allocation job uses to a value other than the prefix that you use for your current IMS SMP/E data sets. The allocation jobs use the prefix "IMS". Changing this prefix prevents the allocation job from replacing your current SMP/E data sets and still allows it to create new SMP/E data sets.
- **Situation 2**: You decide to share SMP/E data sets between Db2 and IMS, but you want to use the SMP/E data sets that already exist for IMS. To do this, remove the data set allocation and initialization statements from your allocation job. When you run the job, no SMP/E data sets are created, and Db2 then shares the existing SMP/E data sets with IMS.

SMP/E data sets for two releases

A single set of SMP/E zone structures can record only one release of Db2. Maintaining separate zone structures for both Db2 11 and your previous release is strongly recommended until you are sure that you will not need to fall back.

The SMP/E jobs that are provided with Db2 assume that you will allocate a new set of SMP/E data sets for the new release. When you run your allocation job (DSNALLOC), it creates a set of SMP/E data sets. If you choose to reuse your Db2 10 zone structure, you can run job DSNTIJUD to delete SMP/E data for Db2 10. However, after you run this job, you cannot fall back to your previous release.

You can create an additional set of SMP/E data sets either by copying them from a prior release of Db2 or by allocating a new set. Allocating a new set is faster because no data must be deleted.

Recommendation: Copy a prior set so that you can then perform service regression checking.

Specifying a new SMP/E prefix for IRLM

The SMP/E prefix in the SMP/E jobs is the same for the new IRLM as for the old IRLM. Consequently, if you do not change the SMP/E prefix, the jobs overwrite your old IRLM.

Procedure

Edit the SMP/E jobs accordingly.

What you produce: Db2 distribution and target libraries

During SMP/E processing, Db2 is loaded into the distribution and target libraries. Db2 uses the distribution libraries to maintain Db2 and contain the master copy of all elements for your Db2 subsystem.

The target libraries contain the various Db2 components. Db2 target libraries are updated when you apply corrective service.

Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

The following table describes all the Db2 distribution libraries. The distribution libraries contain the master copy of all elements for your Db2 system.

Table 5. Db2 distribution libraries

Distribution libraries	Description
prefix.ADSNBASE	This library contains all jobs that are required to complete SMP/E installation.
prefix.ADSNENU or ADSNDKF	This library contains the Db2 English or Kanji task panels, respectively.
prefix.ADSNLOAD	This library contains an individual object module for every Db2 load module. It contains the IRLM load modules if you choose to install IRLM into the same distribution libraries as Db2. This library must be a PDSE data set.
prefix.ADSNLOD2	This library contains a PDSE data set, which contains JDBC and SQLJ DLLs.
prefix.ADSNHFS	This library contains the data that is to be copied into z/OS UNIX System Services.
prefix.ADSNIVPD	This library contains the IVP input data and expected output for sample applications.
prefix.ADSNMACS	This library contains the Db2 macros, sample programs, sample data, initialization data, TSO CLISTs, ISPF panels, and ISPF messages.
prefix.ADXRLOAD	This library contains an individual object module for every IRLM load module.
prefix.ADXRSAMP	This library contains the installation procedures for installing IRLM Version 2.

The following table describes all Db2 target libraries.

Table 6. Db2 target libraries

Target libraries	Description
prefix.SDSNBASE	This library contains all jobs that are required to complete SMP/E installation.
prefix.SDSNC.H	This library contains the header files. The command-line interface (CLI) requires header files. C language application programs can use header files.
prefix.SDSNCLST	This TSO CLIST library contains code that simplifies the process of installing and migrating, aids program preparation and the use of Db2 utilities, and allows the use of Db2 Interactive (Db2I).
prefix.SDSNDBRM	This library contains the system DBRMs for Db2 11.
prefix.SDSNEXIT	This program library is empty when first created. The installation jobs put the DSNZP*xxx* subsystem parameters load module, application defaults load module (*dsnhdecp*), and user exit modules into this library.
prefix.SDSNIVPD	This library contains the IVP input data and the expected output for sample applications.
prefix.SDSNLINK	This library contains early code of Db2 11.
prefix.SDSNLOAD	This library contains Db2 11 load modules. This library must be a PDSE data set.
prefix.SDSNLOD2	This library contains the PDSE data set, which contains JDBC and SQLJ DLLs.
prefix.SDSNMACS	This macro library contains macros that are needed for the CICS and IMS attachment facilities, the initialization parameter macros, and some data-mapping macros that are needed for some applications.
prefix.SDSNPFPE or *prefix*.SDSNPFPK	*prefix*.SDSNPFPE contains the English task and help panels, and *prefix*.SDSNPFPK contains the Kanji task and help panels.
prefix.SDSNSAMP	This initialization library contains the sample applications and data, the jobs for installing and migrating, the default installation and migration parameters, and catalog initialization data for Db2. The JCLIN for each FMID is stored in this library.
prefix.SDSNSPFM	This Db2 ISPF message library contains messages that are issued during installation or migrate processing.
prefix.SDSNSPFP	This library is the Db2 ISPF library for installation task and help routing panels.
prefix.SDSNSPFS	This library is the Db2 ISPF skeleton library that is used to produce EDITJCL.
prefix.SDSNSPFT	This library is the Db2 ISPF command table library.
prefix.SDXRRESL	This library contains the IRLM load modules. This library might be empty if you chose to install IRLM elsewhere.
prefix.SDXRSAMP	The IRLM samples library might be empty if you chose to install IRLM elsewhere.

For a description of each SMP/E job that Db2 provides, see the following table. These jobs allocate the Db2 libraries and load them with the data from the installation tapes or cartridges.

Table 7. List of SMP/E jobs

Job name	Description
DSNTIJAA	This job creates the Db2 target and distribution zones, and defines the SMP/E control data sets in these zones and in the SMP/E global zone.
DSNACEP1	This job invokes SMP/E to accept all the required and additional FMIDs into the Db2 distribution libraries (DLIBs).
DSNALLOC	This is the SMP/E allocation job. It creates the Db2 target and distribution libraries and defines the libraries in the SMP/E target and distribution zones for Db2 for the required and optional FMIDs.
DSNISMKD	This sample job invokes the supplied DSNMKDIR EXEC to allocate HFS paths for JDBC and SQLJ.
DSNLSMKD	This sample job invokes the supplied DSNLMKDR EXEC to allocate HFS paths for MQListener.
DSNWSMKD	This sample job invokes the supplied DSNWMKDR EXEC to allocate HFS paths for Web Services Object Runtime (WORF).
DSNAPPL1	This job invokes SMP/E to apply all the FMIDs to the Db2 target libraries for the required and additional FMIDs.
DSNRECV1	This job invokes SMP/E to receive all the required FMIDs (from both tapes or cartridges) from the base tape into the SMP/E control data sets.
DSNRECV2	This job invokes SMP/E to receive all the required FMIDs (from both tapes or cartridges) for IRLM into the SMP/E control data sets.
DSNRECV3	This job invokes SMP/E to receive all the additional FMIDs (from both tapes or cartridges) for ODBC, JDBC, and SQLJ into the SMP/E control data sets.
DSNRECV4	This job invokes SMP/E to receive FMIDs (from both tape or cartridge) for the Kanji DB2I panels into the SMP/E control data sets.
DSNTIJUD	This job invokes SMP/E to delete all Db2 10 entries from the SMP/E libraries.
DSNDDEF1	This job creates DDDEF entries for the SMP/E target and distribution libraries.

Related concepts

Naming conventions for Db2 library names
You need to modify the Db2 library data set names in the SMP/E jobs.

Chapter 4. Tailoring Db2 11 installation and migration jobs with the CLIST

The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Before you begin

You must use SMP/E to load the required Db2 libraries, as described in Chapter 3, "Making the Db2 product code available," on page 29. Running the installation CLIST requires the following Db2 load libraries:

- *prefix*.SDSNCLST
- *prefix*.SDSNSPFM
- *prefix*.SDSNSPFP
- *prefix*.SDSNSAMP
- *prefix*.SDSNIVPD (only if generating z/OSMF artifacts)

About this task

The installation CLIST allocates several data sets for input and output. From your TSO user ID, you should be able to allocate these data sets to the permanent or temporary unit names that are provided on installation panel DSNTIPA2. These devices can be defined by an esoteric device group.

The values that you enter or accept on the ISPF panels describe the operating characteristics of your Db2 system. If you change the default values when you install Db2 or when you migrate to a newer release, the CLIST verifies that the values that you enter are within the allowable ranges.

The values that you specify configure the subsystem parameter module and application defaults load module for the Db2 subsystem.

Subsystem parameter module

The *subsystem parameter module* is generated by job DSNTIJUZ each time that you install, migrate, or update Db2. Six macros expand to form this data-only subsystem parameter load module. The load module contains the Db2execution-time parameters that you selected using the ISPF panels. These six macros are DSN6ARVP, DSN6FAC, DSN6LOGP, DSN6SPRM, DSN6SYSP, and DSN6GRP. By default, this load module has the name that you specify in the PARAMETER MODULE field in panel DSNTIPO3. For more information, see "PARAMETER MODULE field" on page 155.

Application defaults load module

The *application defaults load module*, sometimes called the "*DSNHDECP*", is generated by job DSNTIJUZ. This module contains the application programming defaults. By default, this load module has the name that you specify in the APPL DEFAULTS field of installation panel DSNTIPO3. For more information, see "APPL DEFAULTS field" on page 156.

Running the installation CLIST also prepares the jobs that are required for installation or migration. The CLIST tailors each installation or migration job according to the values that you specify on the ISPF panels.

After a successful installation or migration, you can also update these values later to improve your operations. For more information, see "Updating subsystem parameter and application default values" on page 317.

Tip: You can capture most settings of an existing Db2 subsystem by running the DSNTIJXZ job, which invokes the DSNTXAZP tool. Running this job reduces the effort to manually compare settings in the current DSNTIJUZ job with the values that are defined in the defaults input member. For details, see

"Updating the CLIST defaults input member: job DSNTIJXZ " on page 42 and "DSNTXAZP tool" on page 47.

Important: If you use the installation CLIST, do not change any members in your *prefix*.SDSNSAMP library. If you do, the installation CLIST can fail or produce unpredictable results when tailoring the installation or migration jobs.

Procedure

To tailor Db2 11 installation and migration jobs, complete the following steps:

1. Make the Db2 ISPF libraries available to TSO by taking one of the following actions:

   - To prepare for running only the Db2 installation CLIST, issue the following commands:

     ```
     PROFILE WTP MSGID
     ALLOCATE DDNAME(SYSEXEC) DSN('prefix.SDSNCLST') SHR REUSE
     ALLOCATE DDNAME(ISPMLIB) DSN('prefix.SDSNSPFM' +
         'ISP.SISPMENU') SHR REUSE
     ALLOCATE DDNAME(ISPPLIB) DSN('prefix.SDSNSPFP' +
         'ISP.SISPPENU') SHR REUSE
     ```

   - To prepare for running the Db2 installation CLIST and the Db2 Interactive (DB2I) facility, issue the following commands. If you use Kanji DB2I panels, concatenate SDSNPFPK to ISPPLIB instead of SDSNPFPE.

     ```
     PROFILE WTP MSGID
     ALLOCATE DDNAME(SYSPROC) DSN('prefix.SDSNCLST') SHR REUSE
     ALLOCATE DDNAME(ISPMLIB) DSN('prefix.SDSNSPFM' +
         'ISP.SISPMENU') SHR REUSE
     ALLOCATE DDNAME(ISPPLIB) DSN('prefix.SDSNSPFP' 'prefix.SDSNPFPE' +
         'ISP.SISPPENU') SHR REUSE
     ALLOCATE DDNAME(ISPSLIB) DSN('prefix.SDSNSPFS' +
         'ISP.SISPSLIB' 'ISP.SISPSENU') SHR REUSE
     ```

   The PROFILE command provides complete error messages.

   The ALLOCATE command uses the default names of the libraries that contain the ISPF panels. These ISPF library names might be different at your site. To concatenate or merge existing libraries with them, put the library names in the list of names in parentheses after DSN with the largest block size first. (If two or more libraries have the same block size, you can list either one first.)

2. If you are running the CLIST to migrate to Db2 11 update an existing Db2 11 subsystem, or install a new Db2 11 based on the settings of existing installation, configure and run job DSNTIJXZ to update the defaults input member. For details, see "Updating the CLIST defaults input member: job DSNTIJXZ " on page 42.

3. If your z/OS system has multiple procedure libraries, ensure that the installation jobs access the appropriate set of procedures by specifying the order in which procedure libraries are searched. You can use the following JCLLIB statement to specify the order in which procedure libraries are searched.

   ```
   //ddname JCLLIB ORDER=(library[,library...])
   ```

   The JCLLIB statement must follow the JOB statement and precede the first EXEC statement in the job. You can have Db2 insert this statement in your JCL for you by entering the statement on installation panel DSNTIPY. For more information on the JCLLIB statement, see JCLLIB statement (MVS JCL Reference).

4. Establish system affinity to ensure that the installation jobs run on the z/OS system where the appropriate Db2 subsystem is running. The following methods are examples of several z/OS installation-specific methods for establishing system affinity:

   - For JES2 multi-access spool (MAS) systems, use the following JCL statement:

     ```
     /*JOBPARM SYSAFF=cccc
     ```

     Where *cccc* is the JES2 name. You can specify an asterisk (SYSAFF=*) to indicate that the job should run on the system from which it was submitted.

- For JES3 systems, use the following JCL statement:

  ```
  //*MAIN SYSTEM=(main-name)
  ```

  The *main-name* is the JES3 name.

You can edit the jobs manually, or you can enter the preceding statements on installation panel DSNTIPY and have Db2 insert these statements for you. For more information, see JES2 Control Statements (MVS JCL Reference) and JES3 Control Statements (MVS JCL Reference).

5. Invoke the CLIST:

   a) Check that your TSO logon region size is sufficient.

      Usually 2 MB is enough.

   b) Invoke ISPF.

   c) Select option 6 on the main ISPF panel.

   d) Invoke the installation CLIST by entering one of the following specifications:

      -
        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)'
        ```
      - If you want to receive the messages that trace the progress of the CLIST, use the following specification:

        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)' 'CONTROL(LIST)'
        ```
      - If you want to use the CLIST but skip the verification of output data sets, use the following specification:

        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)' 'CHKOUTDS(NO)'
        ```

        By default, the CLIST verifies the following information when installation panels DSNTIPT and DSNTIPA1 are displayed:

        – The CLIST verifies that the TEMP CLIST LIBRARY and SAMPLE LIBRARY that you specify on DSNTIPT can be allocated and opened for output.

        – If you specify a value for OUTPUT MEMBER NAME on DSNTIPA1, the CLIST verifies that the data set *prefix*.SDSNSAMP can be allocated and opened for output.

   The CLIST reads a set of default values and displays them on the panels. The values can be the original default values that are supplied by IBM, values that you specified in a previous run of the CLIST, or values that were generated when you ran the DSNTXAZP tool.

6. Use the CLIST panels to verify or adjust the values in the panel fields.

   For instructions for working with CLIST panels and descriptions of the panels and fields, see "The Db2 installation CLIST panel session" on page 50.

7. On the last panel that displays, CLIST calculations (DSNTIPC1 for installation or DSNTIPC for migration), press Enter to complete the CLIST processing.

   A series of messages provide details about the CLIST processing:

   a. `DSNT478I BEGINNING EDITED DATA SET OUTPUT`

   b. If the CLIST detects a problem when it checks the parameter values that you entered, you receive an error or warning message indicating the name of the parameter and the type of problem.

      - If you receive an error message, the CLIST cannot edit the installation or migration jobs properly.
      - If you receive a warning message, check the conditions. A warning message can sometimes be issued even when the conditions are normal or acceptable.
      - If you specify several large numbers in the panels, the CLIST might send a message indicating an overflow in CLIST arithmetic.

      The CLIST displays the Main Panel again. You can proceed through the panels, rechecking or changing parameter values.

c. If the CLIST does not find any errors, you receive messages on DSNTIPC1 that indicate the amount of required disk storage and virtual storage.

d. You might also receive some other information messages. For example, if you specified an existing data set for the TEMP CLIST LIBRARY field or the SAMPLE LIBRARY field on panel DSNTIPT, the following message is displayed:

```
WARNING(S) ISSUED
```

Results

The installation CLIST tailors each installation or migration job according to the panel values that you specified. For a list of the tailored jobs, see "Installation and migration jobs that the CLIST tailors" on page 314. These jobs and other output from the CLIST panel session are stored in several output data sets. For more information, see "CLIST panel session output" on page 311.

For each edited job, you receive the following message:

```
 DSNT489I CLIST EDITING dsname(member), explanation
```

Important:

If an error occurs when the installation CLIST edits your jobs, you receive the following message:

```
IKJ52506I TEXT NOT FOUND
```

Enter `END NOSAVE` to prevent modification of the original copies of your installation or migration jobs.

You can rerun the CLIST with the trace control parameter set to CONTROL(SYMLIST) to learn what caused the problem. In some cases, specifying CONTROL(LIST) as the trace control parameter may provide enough information for you to find the source of the problem.

After the CLIST finishes tailoring the jobs, it displays the Main Panel (DSNTIPA1) again. If you need to continue your tailoring at another time, conclude this session. Then, when you start a new session, use the value that you specified for OUTPUT MEMBER NAME during this session as the value for INPUT MEMBER NAME during the new session. Enter these values on the Main Panel.

What to do next

You might need to tailor several items in the installation jobs, such as data set names or library names, to meet the requirements of your site. For more information see "Tailoring the installation jobs" on page 316.

Related reference

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

Related information

Updating the CLIST defaults input member: job DSNTIJXZ

Before you run the CLIST to migrate to Db2 11, update an existing Db2 11 subsystem, or install Db2 11 using the settings of an existing Db2 11 subsystem, update your defaults input member.

Before you begin

Ensure that you have configured Resource Recovery Services (RRS).

About this task

The DSNTID*xx* defaults input member contains, the subsystem parameter settings, buffer pool settings, and other settings from an existing subsystem. It is used as input during your migration, update, or installation.

You can use job DSNTIJXZ to create an updated defaults input member, DSNTID*xx*, which contains most of the settings from your current subsystem. Running this job reduces the effort of manually comparing settings in your current DSNTIJUZ job with the values that are defined in the defaults input member.

Before running this job, you might need to bind or refresh the package and plan for the DSNTXAZP program. The necessary bind commands are in installation job DSNTIJSG.

Procedure

To update the CLIST defaults input member:

1. Obtain the correct version of the DSNTIJXZ job.
   - If you are preparing to migrate to Db2 11, use the Db2 10 DSNTIJXZ job on Db2 10 to create an updated migration input member for the Db2 11 installation CLIST.
   - If you are preparing to update an existing Db2 11 subsystem or install Db2 11 using the settings of an existing Db2 11 subsystem, use the Db2 11 DSNTIJXZ job to create an updated input member.
2. Configure and run job DSNTIJXZ.
   - If you are preparing to migrate to Db2 11, specify as input your existing Db2 10 DSNTID*xx* member. This member is the one that was created when you installed or migrated to Db2 10. If you do not have this member, specify as input the Db2 10 DSNTIDXA member, or the DSNTIDXB member if you use SAP.

     For Db2 data sharing, verify that job DSNTIJXZ runs on the data sharing member that you are preparing to migrate and that the input to job DSNTIJXZ is the DSNTID*xx* member for that data sharing member.
   - If you are preparing to update an existing Db2 11 subsystem or install Db2 11 using the settings of an existing Db2 11 subsystem, specify as input your existing Db2 11 DSNTID*xx* member. This member is the one that was created when you installed or migrated to Db2 11. If you do not have this member, specify as input the Db2 11 DSNTIDXA member, or the DSNTIDXB member if you use SAP.

   Job DSNTIJXZ uses the DSNTXAZP tool to create a copy of the specified DSNTID*xx* member and update it with the current subsystem parameter settings, buffer pool settings, and other installation settings.

   Important: The DSNTXAZP tool does not update the DSNTID*xx* CLIST input member with current settings for the following parameters or panel fields. Update the values as you complete the CLIST, or modify the values directly in the DSNTID*xx* member:

Table 8. Settings not updated by the DSNTXAZP tool

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPA2	The following fields: CATALOG ALIAS (VCATALOG) DEFINE CATALOG (VCATSTAT)

Table 8. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPA3	All fields: PERMANENT UNIT NAME (VOLSDEVT) TEMPORARY UNIT NAME (TVOLSDEVT) CLIST ALLOCATION: VOL/SER (VOLSDAT1) CLIST ALLOCATION: DATA CLASS (DATACLS1) CLIST ALLOCATION: MGMT CLASS (MGMTCLS1) CLIST ALLOCATION: STOR CLASS (STORCLS1) NON-VSAM DATA: VOL/SER (VOLSDAT2) NON-VSAM DATA: DATA CLASS (DATACLS2) NON-VSAM DATA: MGMT CLASS (MGMTCLS2) NON-VSAM DATA: STOR CLASS (STORCLS2) VSAM CATALOG, ...: VOL/SER (VOLSDAT3) VSAM CATALOG, ...: DATA CLASS (DATACLS3) VSAM CATALOG, ...: MGMT CLASS (MGMTCLS3) VSAM CATALOG, ...: STOR CLASS (STORCLS3) LOG COPY 1, BSDS 2: VOL/SER (VOLSDAT6) LOG COPY 1, BSDS 2: DATACLASS (DATACLS6) LOG COPY 1, BSDS 2: MGMTCLASS (MGMTCLS6) LOG COPY 1, BSDS 2: STOR CLASS (STORCLS6) LOG COPY 2, BSDS 1: VOL/SER (VOLSDAT7) LOG COPY 2, BSDS 1: DATA CLASS (DATACLS7) LOG COPY 2, BSDS 1: MGMT CLASS (MGMTCLS7) LOG COPY 2, BSDS 1: STOR CLASS (STORCLS7)
DSNTIPK	The following fields: WORK FILE DB (WKDBNAME) SUBGRP ATTACH (SGRPATNM)
DSNTIPG	All fields: ROUTINES CREATOR (AUTHID) SEC DEF CREATOR (SECDEFID) INSTALL SQL ID (INSSQLID) INSTALL PKG OWNER (INSPKOWN) INSTALL GRANTEE(S) (INSGRLST) IVP SQL ID (IVPSQLID) IVP PACKAGE OWNER (IVPPKOWN) IVP GRANTEE(S) (IVPGRLST)

Table 8. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPH	The following fields: COPY 1 NAME (BSDSNAM1) COPY 2 NAME (BSDSNAM2) Active logs: COPY 1 PREFIX (LOGSPRE1) Active logs: COPY 2 PREFIX (LOGSPRE2) Archive logs: COPY 1 PREFIX (ARCHPRE1) Archive logs: COPY 2 PREFIX (ARCHPRE2)
DSNTIPT	All fields: TEMP CLIST LIBRARY (NEWCL) SAMPLE LIBRARY (NEWSAMP) CLIST LIBRARY (OUTCL) APPLICATION DBRM (DBRMLIB) APPLICATION LOAD (RUNLIB) DECLARATION LIBRARY (SRCLIB) LINK LIST LIBRARY (DSNLINK) LOAD LIBRARY (DSNLOAD) JDBC AND SQLJ DLLS (DSNLOD2) MACRO LIBRARY (DSNMACS) LOAD DISTRIBUTION (DSNALOAD) EXIT LIBRARY (DSNEXIT) DBRM LIBRARY (DSNDBRM) IRLM LOAD LIBRARY (DSNIRLM) IVP DATA LIBRARY (DSNIVPD) INCLUDE LIBRARY (DSNCHDRS)
DSNTIPU	All fields: IBM LE RUNTIME LIBRARY (LERUN) IBM LE RUNTIME LIBRARY 2 (LERUN2) IBM LE LINK EDIT LIB (LELKED) IBM LE PRELINK MSG LIB (LEPLMSGL) HIGH LEVEL ASSEMBLER LIB (IASMLIB) C/CPP COMPILER MODULE (CPROG) C/CPP COMPILER LIBRARY (CCOMP) C/CPP HEADER LIBRARY (CHDRS) C/370 COMPILER MESSAGES (CMSGS) C LE PRELINKER PHASE (CPRLK) CPP LE PRELINKER PHASE (CPPPRLK) CPP CLASS LIB HEADERS (CPPHDRS) CPP AUTO CALL LIBRARY (CPPAUTCL) CPP CLASS LIBRARY (CPPCLASS) CPP PROCEDURE LIBRARY (CPPPROC)

Table 8. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPW	All fields: SYSTEM MACLIB (MACLIB) SYSTEM PROCEDURES (PROCLIB) SORT LIBRARY (SORTLIB) IMS RESLIB (RESLIB) ISPF ISPLINK MODULE (ISPLOAD) GDDM MACLIB (GDDMMACS) GDDM LOAD MODULES (GDDMLOAD) CICS LOAD LIBRARY (CICSMOD) CICS MACRO LIBRARY (CICSMAC) CICS COBOL LIBRARY (CICSCOB) CICS PL/I LIBRARY (CICSPLI) CICS EXCI LIBRARY (CICSEXCI)
DSNTIPD	All fields: DATABASES (NUMDATAB) TABLES (NUMTABLE) COLUMNS (NUMCOLUM) VIEWS (NUMVIEWS) TABLE SPACES (NUMTABSP) PLANS (NUMPLANS) PLAN STATEMENTS (NUMSTMTS) PACKAGES (NUMPKGS) PACKAGE STATEMENTS (NUMPKSTS) PACKAGE LISTS (NUMPLPL) EXECUTED STMTS (NUMSTMTE)
DSNTIP9	All fields: 4K SORT PRIMARY SPACE (S4KSPAC) 4K SORT WORK TS'S (S4KNOTS) 4K SORT WORK SEG SIZE (S4KSGSZ) 32K SORT PRIMARY SPACE (S32KSPAC) 32K SORT WORK TS'S (S32KNOTS) 32K SORT WORK SEG SIZE (S32KSGSZ) 4K TEMP PRIMARY SPACE (T4KSPAC) 4K TEMP WORK TS'S (T4KNOTS) 4K TEMP WORK SEG SIZE (T4KSGSZ) 32K TEMP PRIMARY SPACE (T32KSPAC) 32K TEMP WORK TS'S (T32KNOTS)
DSNTIPM	The following fields: SUBSYSTEM NAME (MVSNAME) COMMAND PREFIX (MVSPREF)
DSNTIPR	The following fields: DB2 LOCATION NAME (DDLOC) DB2 NETWORK LUNAME (DDLUNAM)

Table 8. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIP5	The following fields: DRDA PORT (DRDAPRT) RESYNC PORT (RESYNPRT)
DSNTIPX	The following fields: WLMENV (WLMENV)
DSNTIPR1	The following fields: All fields (WLMENV*x*).
DSNTIPRA	On panels DSNTIPRB - DSNTIPRQ: All WLM ENV NAME fields (RT*xnn*WLM)
DSNTIPY	All numbered job card information fields.

3. When you run the CLIST, specify the DSNTID*xx* member that is created by this job during instillation or migration:
   - For migration, specify the DSNTID*xx* member that is created by this job in the DATA SET(MEMBER) NAME field on panel DSNTIPA1.
   - During installation, or for updates, specify the DSNTID*xx* member that is created by this job in the INPUT MEMBER NAME field on panel DSNTIPA1.

Related reference

DATA SET(MEMBER) NAME field
The value of the DATA SET(MEMBER) NAME field indicates the name of the input data set to use for migrating from Db2 10. If you are installing, migrating to new-function mode, or updating, the DATA SET(MEMBER) NAME field must remain blank.

INPUT MEMBER NAME field
The INPUT MEMBER NAME field specifies the member name of the input data set. This data set contains the default Db2 11 parameter values that are used for installation and migration, as in *prefix*.SDSNSAMP.*suffix*.

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

DSNTXAZP tool

The DSNTXAZP tool updates a CLIST defaults input member (DSNTID*xx*) with certain current subsystem parameter and buffer pool settings that are defined in a specified Db2 subsystem.

Job DSNTIJXZ invokes the DSNTXAZP tool.

The DSNTXAZP tool requires Resource Recovery Services (RRS).

The DSNTXAZP tool does not update all entries in the DSNTID*xx* member. For a list of entries that are not updated, see "Updating the CLIST defaults input member: job DSNTIJXZ " on page 42.

The batch program requires the following arguments:

```
//STEP01   EXEC PGM=DSNTXAZP,PARM='ssid action'
```

ssid is the subsystem ID.

action is one of the following values:

UPDATE_ALL
Creates a new CLIST defaults input member and updates it with the current subsystem parameter and buffer pool settings.

UPDATE_BPOOL
Creates a new CLIST defaults input member and updates it with the current buffer pool settings only (no subsystem parameter changes).

UPDATE_ZPARM
Creates a new CLIST defaults input member and updates it with the current subsystem parameter settings only (no buffer pool changes).

The following DD statements are required for processing:

XAINPUT
Used as input to the DSNTXAZP program. It allocates the current CLIST defaults input member that will be used as the source for creating a new CLIST defaults input member. The version of the member should match the version of the selected Db2 subsystem.

XAOUTPUT
Used as output by the DSNTXAZP program. It allocates the generated CLIST defaults input member with updated subsystem parameter and buffer pool settings. This should be a member of a PDS that is defined with RECFM=FB, LRECL=80.

SYSPRINT
Used as output by the DSNTXAZP program for informational and error messages. It also contains a report on the parameters that were processed and modified. For additional details on the report, see the example below.

The following JCL is an example of running the tool:

```
//DSNTIXZ  EXEC PGM=DSNTXAZP,PARM='DSN UPDATE_ALL'
//XAINPUT  DD   DSN=prefix.SDSNSAMP(DSNTIDXA),DISP=SHR
//XAOUTPUT DD   DSN=prefix.SDSNSAMP(DSNTIDNU),DISP=SHR
//SYSPRINT DD   SYSOUT=*
```

The tool generates a CLIST input member with the current subsystem parameter settings, buffer pool settings, or both, and the following prolog:

```
* **********************************************************************
*  CREATED MEMBER = MY.DATASET.NAME(DSNTIDNU)                          *
*                                                                      *
*  CREATED ON = MAR 24, 2010 11:12:30                                  *
*                                                                      *
*  SOURCE MEMBER = MY.SOURCE.NAME(DSNTIDXA)                            *
*                                                                      *
*  DESCRIPTIVE NAME = DB2 INSTALLATION DATA                            *
*                                                                      *
*  FUNCTION = PROVIDE UPDATED VALUES FOR MIGRATING TO A NEW RELEASE    *
*             OF DB2 OR INSTALLING A NEW RELEASE OF DB2                *
*                                                                      *
*  PARAMETERS:                                                         *
*    PARM NAME = NAME FOR ISPF PANEL VARIABLE                          *
*    PARM TYPE = TYPE FOR VALIDITY CHECKING                            *
*    DS SCP    = DATA SHARING SCOPE:  G = GROUP, M = MEMBER            *
*    MIN, MAX  = RANGE VALUES FOR VALIDITY CHECKING                    *
*    CURRENT VALUE = VALUE USED AS INPUT FOR NAMED ISPF VARIABLE       *
*                                                                      *
* **********************************************************************
* ************************************************* *
* PARM   PARM DS  MIN         MAX           CURRENT *
* NAME   TYPE SCP VALUE       VALUE         VALUE   *
* ************************************************* *
```

In addition to creating a new CLIST input member, the DSNTXAZP tool provides a report of all parameters. The report indicates whether each parameter was updated or if the original value from the input member was retained. It also shows the mapping between the subsystem parameter and the CLIST parameter. This is a sample report:

```
CLIST INPUT MEMBER GENERATION REPORT ** 2010-03-24 08:25:35
-----------------------------------------------------------
```

```
CLIST PARAMETER REPORT:

0001 PARAMETER NAME             = ABEXP
     ZPARM/BUFFERPOOL PARAMETER = ABEXP
     PARAMETER TYPE             = CHAR
     DATA SHARING SCOPE         = M
     MINIMUM VALUE              = NO
     MAXIMUM VALUE              = YES
     CURRENT CLIST VALUE        = YES
     CURRENT INSTALLED VALUE    = YES
     STATUS                     = RETAINED

0002 PARAMETER NAME             = ABIND
     ZPARM/BUFFERPOOL PARAMETER = ABIND
     PARAMETER TYPE             = CHAR
     DATA SHARING SCOPE         = M
     MINIMUM VALUE              = NONE
     MAXIMUM VALUE              = NONE
     CURRENT CLIST VALUE        = YES
     CURRENT INSTALLED VALUE    = NO
     STATUS                     = UPDATED
 :
nnnn PARAMETER NAME             = DB2REL
     ZPARM/BUFFERPOOL PARAMETER = N/A
     PARAMETER TYPE             = CHAR
     DATA SHARING SCOPE         = M
     MINIMUM VALUE              = NONE
     MAXIMUM VALUE              = NONE
     CURRENT CLIST VALUE        = 1010
     CURRENT INSTALLED VALUE    = N/A
     STATUS                     = RETAINED
  :

CHANGE SUMMARY REPORT:

  CLIST PARAMETER               ZPARM/BUFFERPOOL PARAMETER    VALUE
  ----------------------------------------------------------------------------------
  ABEXP                         -SAME-                        YES
* ABIND                         -SAME-                        NO (YES)
   :
* BP0_VPSEQT                    BP0 VPSEQT                    50 (35)
* BP0_DWQT                      BP0 DWQT                      50 (35)
* BP0_VDWQT                     BP0 VDWQT                     10,0 (20)
   :
  BUFMAX00                      BPO VPSIZE                    20000
   :
  DB2REL                        -NONE-                        1010
   :
* NUMCONCR                      CTHREAD                       220 (200)
  OVDSMAX                       DSMAX                         20000
   :
  ----------------------------------------------------------------------------------
  SOURCE MEMBER        : prefix.SDSNSAMP(DSNTIDXA)
  CREATED MEMBER       : DB2.CLIST.MEMBER(DSNTIDX0)
  PARAMETERS PROCESSED : n
  PARAMETERS MODIFIED  : m
  ----------------------------------------------------------------------------------
```

Related tasks

Automating Db2 migration by using z/OS Management Facility
You can use z/OSMF to automate the process of migrating Db2 subsystems to Db2 11 for z/OS.

Related reference

Directory of subsystem parameters, panel fields, and application default values

Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

The Db2 installation CLIST panel session

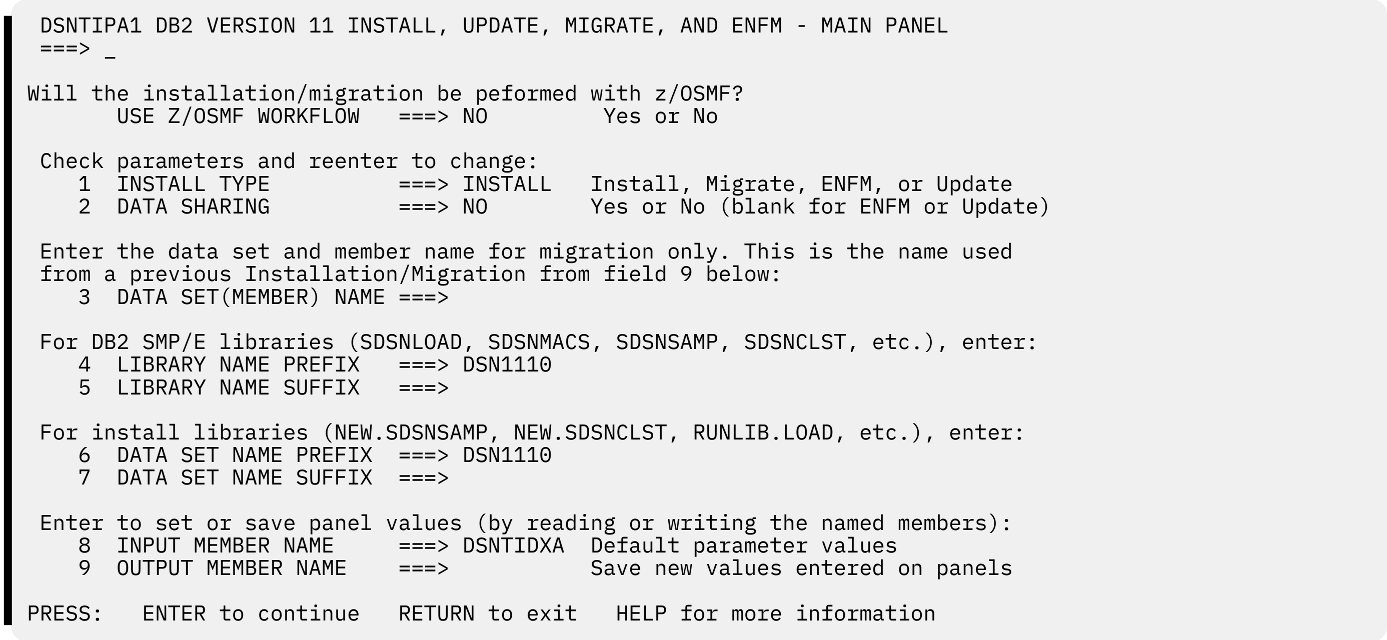
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

For instructions for invoking the Db2 installation and migration CLIST, see Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.

In general, you can change the default values to match the needs of your organization. However, some values cannot be changed, depending on the INSTALL TYPE value that you specify on panel DSNTIPA1, and whether you are installing the first or subsequent members of a data sharing group.

Navigating in the CLIST panel session

All panel sequences begin with the Main Panel, DSNTIPA1.



```
 DSNTIPA1 DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
 ===> _

Will the installation/migration be peformed with z/OSMF?
       USE Z/OSMF WORKFLOW   ===> NO         Yes or No

 Check parameters and reenter to change:
    1  INSTALL TYPE          ===> INSTALL   Install, Migrate, ENFM, or Update
    2  DATA SHARING          ===> NO        Yes or No (blank for ENFM or Update)

 Enter the data set and member name for migration only. This is the name used
 from a previous Installation/Migration from field 9 below:
    3  DATA SET(MEMBER) NAME ===>

 For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
    4  LIBRARY NAME PREFIX   ===> DSN1110
    5  LIBRARY NAME SUFFIX   ===>

 For install libraries (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
    6  DATA SET NAME PREFIX  ===> DSN1110
    7  DATA SET NAME SUFFIX  ===>

 Enter to set or save panel values (by reading or writing the named members):
    8  INPUT MEMBER NAME     ===> DSNTIDXA  Default parameter values
    9  OUTPUT MEMBER NAME    ===>           Save new values entered on panels

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 1. Main panel: DSNTIPA1

You can use the following approaches to navigate in the CLIST panel session:

- To display the panel identifiers, enter the following command in any panel: `PANELID ON`.
- Enter your choices on a panel in the space that is marked by an arrow (===>). Begin your entry in the second position to the right of the arrow. The first position is protected and you cannot write in it.
- To validate entries in the current panel and display the next panel, press Enter.
- Panel fields that are marked with asterisks contain values that are primed on the basis of values from a previous panel. The following message is found on these panels:

  ```
  DSNT444I SCROLLING BACKWARD MAY CHANGE FIELDS MARKED WITH ASTERISKS
  ```

  If you scroll back to the panel that has the original value, the values on the succeeding panels are refreshed only if the original value is changed. If the values are changed, the following message is displayed:

  ```
  DSNT443I VALUES MARKED WITH AN ASTERISK HAVE BEEN UPDATED
  ```

For example, panel DSNTIPH has fields that are marked with asterisks indicating values that are primed on the basis of the CATALOG ALIAS value on installation panel DSNTIPA2.

- To scroll back to the previous panels to review or change values press the End key (usually PF3).
- To save your changes at any point during the panel session, enter the following command in any installation panel: SAVE Then select option 1 in panel DSNTIPSV.

```
+--------------------------------+
|DSNTIPSV                        |
| Save changes in progress:      |
|                                |
| Select one.                    |
|   S 1. Save and continue       |
|     2. Save and exit           |
|     3. Continue without saving |
|                                |
| PRESS: ENTER to continue       |
| RETURN to exit                 |
+--------------------------------+
```

The changes are saved in the output member that is specified in the OUTPUT MEMBER NAME field on panel DSNTIPA1.

- To exit completely from the installation process, press the Return key (usually PF4).

The CLIST session completes when you press Enter from the last panel: DSNTIPC1 for installation or DSNTIPC for migration. For the more information about complete ting the CLIST panel session, see step 7 in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.

CLIST panel and field descriptions

The CLIST panel field descriptions following information:

Acceptable values

This part of a panel field description indicates the range or list of allowable values for an installation panel field. The acceptable values apply to the installation panel field, but not necessarily to the subsystem parameter that is associated with that field. Differences might occur if a panel field is used to determine the value of the associated subsystem parameter and the values do not correspond exactly.

In most cases, if a maximum supported panel field value is large enough, you can specify the following multipliers:

- *value*K for *value* multiplied by 1024
- *value*M for *value* multiplied by 1,048,576
- *value*G for values greater than 1024 MB
- *value*T for values greater than 1024 GB

The maximum acceptable values might be too large for smaller systems; therefore, ensure that the values that you enter are valid for the size of your system.

Default values

The default values that documentation shows are the original values that are supplied by IBM. If you previously ran the CLIST and saved the updated panel values in a DSNTID*xx* input data set, the previously entered values appear as default values on the panels.

Tip: You can capture most settings of an existing Db2 subsystem by running the DSNTIJXZ job, which invokes the DSNTXAZP tool. Running this job reduces the effort to manually compare settings in the current DSNTIJUZ job with the values that are defined in the defaults input member. For details, see “Updating the CLIST defaults input member: job DSNTIJXZ ” on page 42 and “DSNTXAZP tool” on page 47.

Panel values that are modified outside of the installation process are not saved in the DSNTID*xx* data set and are not reflected on the panels.

Update
: This information identifies a corresponding field on the Update Selection Panel (DSNTIPB) or refers to information that provides instructions for updating the field value. For more information, see “DSNTIPB: Update selection menu panel ” on page 319.

dsnhdecp
: These are the names of the parameters in the application defaults load module *dsnhdecp*. For more information, see “Application defaults parameters” on page 582.

DSNZP*xxx*
: These are the names of the parameters in the data-only load module DSNZP*xxx*.

Some Db2 subsystem parameters do not appear on CLIST panels. For details, see “Subsystem parameters that are not on installation panels” on page 323.

DSNTIPA1 or DSNTILA1: Main panel

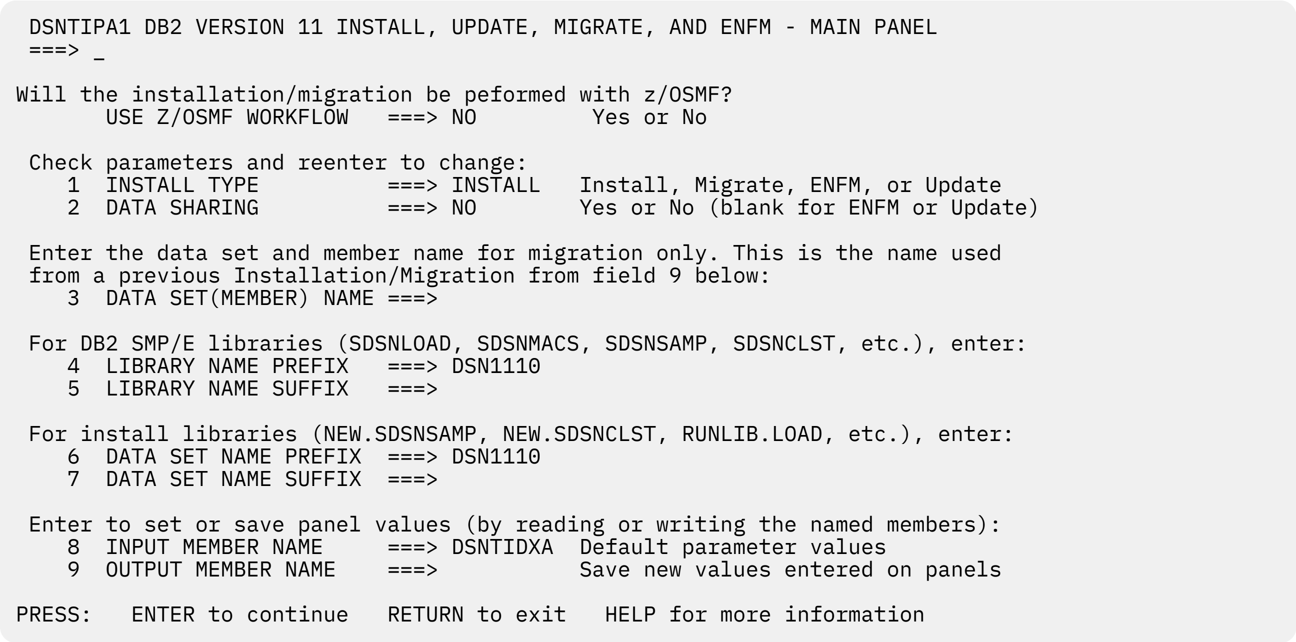
The entries on the Main panel control input to and output from the installation CLIST.

When processing is complete, this panel is displayed again. The values that you enter are saved in the ISPF profile for your authorization ID and are displayed each time that you run the CLIST.

To save your panel input, you must specify an output member name in the OUTPUT MEMBER NAME field.

The DSNTINST CLIST saves the panel input into your DSNTID*xx* output member just before the CLIST issues this message:

```
DSNT4781 BEGINNING EDITED DATA SET OUTPUT
```



```
 DSNTIPA1 DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
 ===> _

Will the installation/migration be peformed with z/OSMF?
       USE Z/OSMF WORKFLOW   ===> NO         Yes or No

 Check parameters and reenter to change:
    1  INSTALL TYPE          ===> INSTALL   Install, Migrate, ENFM, or Update
    2  DATA SHARING          ===> NO        Yes or No (blank for ENFM or Update)

 Enter the data set and member name for migration only. This is the name used
 from a previous Installation/Migration from field 9 below:
    3  DATA SET(MEMBER) NAME ===>

 For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
    4  LIBRARY NAME PREFIX   ===> DSN1110
    5  LIBRARY NAME SUFFIX   ===>

 For install libraries (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
    6  DATA SET NAME PREFIX  ===> DSN1110
    7  DATA SET NAME SUFFIX  ===>

 Enter to set or save panel values (by reading or writing the named members):
    8  INPUT MEMBER NAME     ===> DSNTIDXA  Default parameter values
    9  OUTPUT MEMBER NAME    ===>           Save new values entered on panels

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 2. Main panel: DSNTIPA1

Recommended approach for new installers

If you are installing for the first time, try the following suggestions.

- In the INSTALL TYPE field, enter INSTALL.
- Set the PREFIX and SUFFIX fields to the values that you used when you allocated the Db2 libraries by using job DSNALLOC.

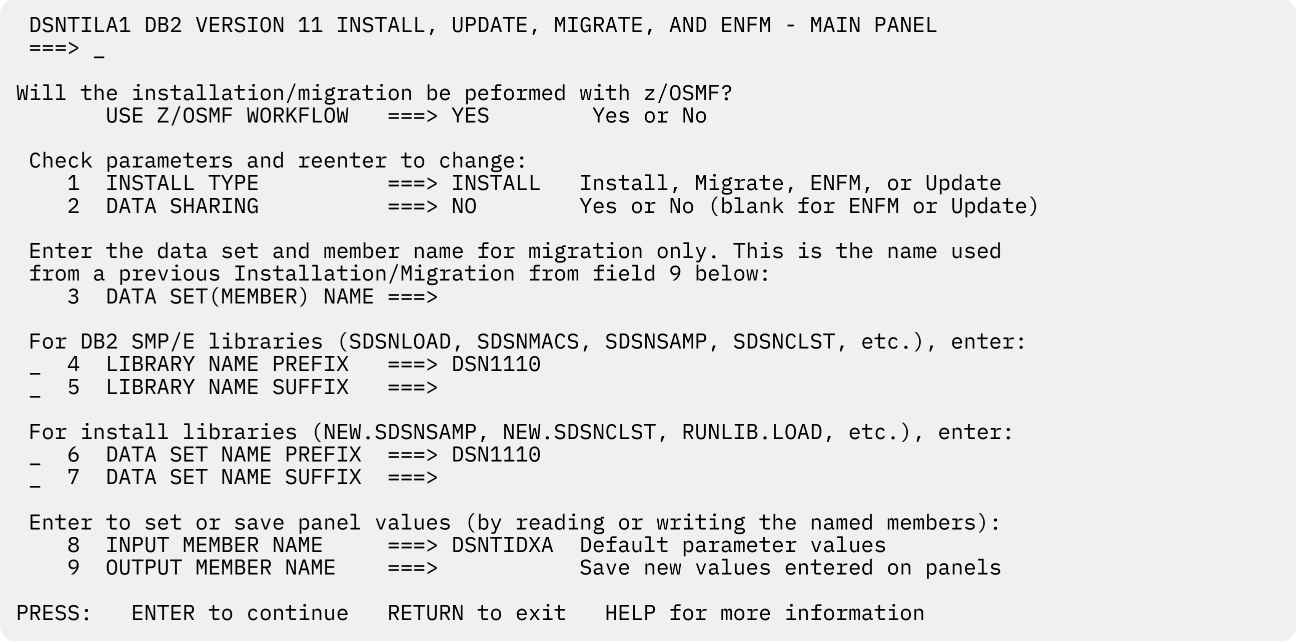
- In the INPUT MEMBER NAME field, use DSNTIDXA (the default) for the first run. If you are using SAP, specify DSNTIDXB, the SAP-specific CLIST input member, instead. For any later runs, the CLIST sets the default input name to the prior output name.
- Specify a value in the OUTPUT MEMBER NAME field to save your options. Specify values in the TEMP CLIST LIBRARY, CLIST LIBRARY, and SAMPLE LIBRARY fields on installation panel DSNTIPT when you want output data sets tailored.

Important: Do not run the installation jobs before tailoring them with the CLIST. If you want to update the parameters later, the CLIST sets the default input name to the prior output name.

DSNTILA1: Main panel for generating z/OSMF workflows

When you specify USE `Z/OSMF WORKFLOW ===> YES`, panel DSNTILA1 opens, and the CLIST runs with a modified set of installation panels that support the generation of z/OSMF workflows. For more information about the modified panels, see "Installation panels for installing or migrating with z/OSMF" on page 507.

The CLIST continues to run starting with the DSNTILA1 and the other modified panels unless and until you set USE `Z/OSMF WORKFLOW ===> NO`.



```
 DSNTILA1 DB2 VERSION 11 INSTALL, UPDATE, MIGRATE, AND ENFM - MAIN PANEL
 ===> _

Will the installation/migration be peformed with z/OSMF?
       USE Z/OSMF WORKFLOW   ===> YES        Yes or No

 Check parameters and reenter to change:
    1  INSTALL TYPE          ===> INSTALL   Install, Migrate, ENFM, or Update
    2  DATA SHARING          ===> NO        Yes or No (blank for ENFM or Update)

 Enter the data set and member name for migration only. This is the name used
 from a previous Installation/Migration from field 9 below:
    3  DATA SET(MEMBER) NAME ===>

 For DB2 SMP/E libraries (SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNCLST, etc.), enter:
 _  4  LIBRARY NAME PREFIX   ===> DSN1110
 _  5  LIBRARY NAME SUFFIX   ===>

 For install libraries (NEW.SDSNSAMP, NEW.SDSNCLST, RUNLIB.LOAD, etc.), enter:
 _  6  DATA SET NAME PREFIX  ===> DSN1110
 _  7  DATA SET NAME SUFFIX  ===>

 Enter to set or save panel values (by reading or writing the named members):
    8  INPUT MEMBER NAME     ===> DSNTIDXA  Default parameter values
    9  OUTPUT MEMBER NAME    ===>           Save new values entered on panels

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 3. Main panel: DSNTILA1

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Automating Db2 installation or migration with z/OS Management Facility
You can use z/OSMF to automate the process of installing or migrating to Db2 11 for z/OS.

USE Z/OSMF WORKFLOW field

The USE Z/OSMF WORKFLOW field specifies whether to run the CLIST with panels that support the creating of z/OSMF workflows for migrating or installing Db2.

Acceptable values:	NO, YES
Default:	NO

DSNHDECP:	None

NO
The CLIST uses a set of installation panels that support tailoring the CLIST in preparation for installing or migrating Db2, as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.

YES
The CLIST uses a modified set of panels that support the generation z/OSMF workflow definition files and input variable files.

As soon as you set `USE Z/OSMF WORKFLOW ===> YES`, panel DSNTILA1 opens. The CLIST then runs starting with the DSNILA1 panel each time, until you set `USE Z/OSMF WORKFLOW ===> NO`. Then, the CLIST runs starting with panel DSNTIPA1 again.

Related tasks

Automating Db2 installation or migration with z/OS Management Facility
You can use z/OSMF to automate the process of installing or migrating to Db2 11 for z/OS.

Related reference

Installation panels for installing or migrating with z/OSMF
If you specify `USE Z/OSMF WORKFLOW ===> YES` on panel DSNTIPA1, panel DSNTILA1 opens, and the CLIST uses a modified set of installation panels.

INSTALL TYPE field

The value of the INSTALL TYPE field specifies whether you are installing Db2, updating Db2, migrating to Db2 11 conversion mode, or migrating to new-function mode.

Acceptable values:	INSTALL, UPDATE, MIGRATE , ENFM
Default:	INSTALL
DSNHDECP:	none

INSTALL
Specifies that you are installing Db2 for the first time. This is the default value for the first run of the CLIST. After you complete the installation, Db2 is in new-function mode.

MIGRATE
Specifies that you are migrating from Db2 10 to Db2 11 conversion mode.

When you are migrating, the DATA SET(MEMBER) NAME field is required.

UPDATE
Specifies that you are updating parameters for an existing Db2 subsystem.

ENFM
Specifies that you are migrating the Db2 catalog to new-function mode. You must run the CLIST in MIGRATE mode before you can choose this option. You should be stabilized in Db2 11 conversion mode before using this option to move to new-function mode. In a data sharing environment, the process to migrate to new-function mode is done once for the data sharing group.

If you are updating or migrating, you use the same set of panels that you use for installation. Each panel displays all fields; however, the fields that cannot be changed in update or migrate mode are protected. This way, you can see the values that are related to ones that you want to change.

You can also choose either INSTALL or UPDATE to recheck values you that chose before.

Certain fields cannot be changed during a migration. See panels DSNTIPH, DSNTIPD, DSNTIP7, and DSNTIPP for more information. Ensure that those fields are correct in the data set member that you provide.

Related tasks

Installing Db2 11

Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Updating subsystem parameter and application default values
You can dynamically update the value of some subsystem parameters while Db2 is running. For other subsystem parameters, you must stop and restart Db2 to change the values.

Related reference

DSNTIPH: System resource data set names panel
The entries on the DSNTIPH panel specify the names of bootstrap data sets, active logs, and archive logs. These entries also specify the number of copies (1 for single logging or 2 for dual logging) for the active and archive logs.

DSNTIPD: Sizes panel 1
The entries on the DSNTIPD panel establish the size of the Db2 catalog, directory, and log data sets. Entries on the DSNTIPD panel also define the amount of storage that can be used for storing large object (LOB) values.

DSNTIP7: SQL OBJECT DEFAULTS PANEL 1
The entries on the DSNTIP7 panel provide general default settings for creating table spaces.

DSNTIPP: Protection panel
The entries on the DSNTIPP panel are related to security matters.

Related information

DATA SHARING field (DSHARE subsystem parameter)

The DSHARE subsystem parameter controls whether the data sharing function is to be used.

Acceptable values:	YES, NO, blank (for update and ENFM)
Default:	NO
DSNZP*xxx*:	DSN6GRP DSHARE

Choose NO if you are not using data sharing. If you choose YES, you will continue to panel DSNTIPK after completing panel DSNTIPA2.

DSNTIP0A - DATA SHARING FUNCTION:

If you specify YES in the DATA SHARING field for installation, window DSNTIP0A is displayed:

```
.-------------------------------.
| DSNTIP0A                      |
|                               |
|  DATA SHARING FUNCTION:       |
|                               |
|  Select one.                  |
|          _ 1. Group           |
|            2. Member          |
|            3. Enable          |
|                               |
|  PRESS:  ENTER to continue    |
|          RETURN to exit       |
|                               |
|                               |
|                               |
'-------------------------------'
```

Figure 4. DSNTIP0A

Specify the data sharing function. A value is required.

1. Group
Specify this value to install a new data sharing group. For more information, see “Installing a new data sharing group” on page 582.

2. Member
Specify this value to add a new data sharing member. For more information, see “Running the CLIST for adding a new member” on page 595.

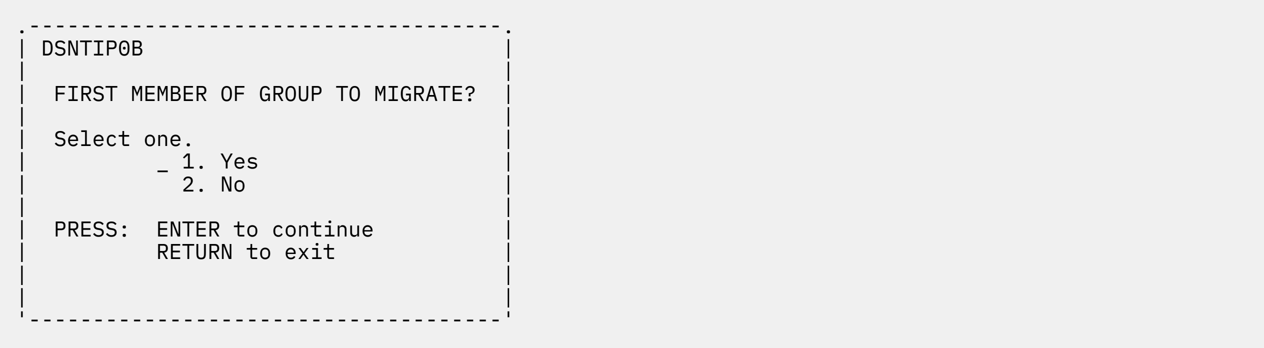
3. Enable
Specify this value to enable an existing Db2 subsystem to become the originating member of a data sharing group. For more information, see “Running the CLIST for enabling data sharing” on page 584.

Acceptable values:	Group, Member, Enable
Default:	none
DSNZP*xxx*:	none

After entering a value, you proceed to panels DSNTIPA2 and DSNTIPK.

DSNTIP0B - FIRST MEMBER OF GROUP TO MIGRATE?

If you specify YES in the DATA SHARING field for migration, window DSNTIP0B is displayed to ask if the current member is the first to migrate.



```
.--------------------------------------.
| DSNTIP0B                             |
|                                      |
|  FIRST MEMBER OF GROUP TO MIGRATE?   |
|                                      |
|  Select one.                         |
|          _ 1. Yes                    |
|            2. No                     |
|                                      |
|  PRESS:  ENTER to continue           |
|          RETURN to exit              |
|                                      |
|                                      |
'--------------------------------------'
```

Figure 5. DSNTIP0B

Specify whether you are preparing to migration the first data sharing member or the subsquent members. A value is required.

1. Yes
Specify this option to migrate the first member of a data sharing group. For more information, see “Migrating the first member of a group to Db2 11” on page 621.

2. No
Specify this option to migrate subsequent members of a data sharing group. For more information, see “Running the CLIST for migrating data sharing members” on page 623.

Acceptable values:	Yes, No
Default:	none
DSNZP*xxx*:	none

After entering a value, you proceed to panels DSNTIPA2 and DSNTIPK.

Related tasks

Adding a new data sharing member
After you install a new data sharing group or enable an existing Db2 subsystem for data sharing, you can add new data sharing members. Always add a member as a new installation. After being added to the group, the new member uses the Db2 catalog of the originating member.

Enabling Db2 data sharing

The enabling process allows an existing Db2 subsystem to be the originating member of a data sharing group; it does not allow you to change the subsystem name.

Installing a new data sharing group
Although you can install and immediately enable Db2 data sharing on a new Db2 11 member, you should do so only in low-risk situations. The recommended approach is to migrate to, or install, a Db2 11 member, use it for a while, and then enable data sharing.

DATA SET(MEMBER) NAME field

The value of the DATA SET(MEMBER) NAME field indicates the name of the input data set to use for migrating from Db2 10. If you are installing, migrating to new-function mode, or updating, the DATA SET(MEMBER) NAME field must remain blank.

Acceptable values:	1 - 44 alphanumeric characters
Default:	NULL
DSNZP*xxx*:	none

The named member contains the output parameters that were produced when you last installed, updated, or migrated the prior release of Db2. Provide the fully qualified data set name as shown in the following example:

```
DSN1010.SDSNSAMP(DSNTIDXA)
```

If you no longer have this data set member, or if the one you have is incorrect, use the installation or update process from your previous release to re-create or correct the member. Enter the correct values on the panels, and save them under a new output member name. Discard the JCL that is created by this process; use the newly created member for migration.

Alternatively, you can run job DSNTIJXZ on your subsystem to create an updated data set member that contains the subsystem parameter and buffer pool settings from your previous release.

Valid data set name

Valid data set names can be unqualified or qualified:

Unqualified name
One to eight alphanumeric or national characters, a hyphen, or the character X'C0'. The first character must be alphabetic or national. Do not use hyphens in data set names for RACF-protected data sets. For example, ALPHA is an unqualified data set name.

Qualified name
Multiple names joined by periods. Each name is coded like an unqualified name. Therefore, the name must contain a period within every eight characters. For example, ALPHA.PGM is a qualified data set name. The maximum length of a qualified data set name is:

- 44 characters if you use the TSO PROFILE setting NOPREFIX.
- 42 characters if you use the TSO PROFILE setting PREFIX.
- For an output tape data set, 17 characters, including periods. If the name is longer than 17 characters, only the right-most 17 characters are written to the tape header label.

Related tasks

Updating the CLIST defaults input member: job DSNTIJXZ
Before you run the CLIST to migrate to Db2 11, update an existing Db2 11 subsystem, or install Db2 11 using the settings of an existing Db2 11 subsystem, update your defaults input member.

Migrating an existing data sharing group to Db2 11 conversion mode

If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

LIBRARY NAME PREFIX field

The LIBRARY NAME PREFIX field specifies the input prefix for the SDSNLOAD, SDSNMACS, SDSNSAMP, SDSNDBRM, and SDSNCLST libraries.

Acceptable values:	1 - 18 characters
Default:	DSN1110
DSNZP*xxx*:	none

The prefix must be the same as the name that you specified for the symbolic parameter TARGPRE in SMP/E job DSNALLOC.

This is the prefix of the Db2 SMP/E target libraries. If you specify DSNTIDXA or DSNTIDXB in the INPUT MEMBER NAME field, the prefix for the INCLUDE LIBRARY field, and the prefix and suffix for the LINK LIST LIBRARY field through the IVP DATA LIBRARY field on " DSNTIPT: Data set names panel 1 " on page 85 are set. If all these data sets do not have the same prefix and suffix, you can change them on installation panel DSNTIPT.

Related reference
INPUT MEMBER NAME field
The INPUT MEMBER NAME field specifies the member name of the input data set. This data set contains the default Db2 11 parameter values that are used for installation and migration, as in *prefix*.SDSNSAMP.*suffix*.

LIBRARY NAME SUFFIX field

The LIBRARY NAME SUFFIX field specifies a suffix for the names of the libraries that are to be used by installation and sample jobs.

Acceptable values:	1 - 17 characters
Default:	NULL
DSNZP*xxx*:	none

The fully qualified data set name cannot exceed 44 characters. Names that exceed eight characters must be in groups of no more than eight characters, separated by periods.

Use a suffix only if you have added a common suffix to the following libraries when you created them in job DSNTIJAE:

prefix.ADSNLOAD
prefix.SDSNLOAD
prefix.SDSNCLST
prefix.SDXRRESL
prefix.SDSNLINK
prefix.SDSNEXIT
prefix.SDSNSAMP
prefix.SDSNIVPD
prefix.SDSNMACS
prefix.ADSNMACS
prefix.SDSNDBRM

If you did not add a common suffix to these libraries, enter their correct data set names on panel DSNTIPT.

To use the default Db2 data set names, specify DSN1010 in the LIBRARY NAME PREFIX field, and leave the LIBRARY NAME SUFFIX field blank.

DATA SET NAME PREFIX field

The DATA SET NAME PREFIX field specifies the input prefix for the Db2 sample application libraries and for data sets that are to be created by the CLIST.

Acceptable values:	1 - 18 characters that form a valid z/OS data set name prefix
Default:	DSN1110
DSNZP*xxx*:	none

The prefix applies to the following data sets. The fully qualified data set name cannot exceed 44 characters. Names that exceed eight characters must be in groups of no more than eight characters that are separated by periods.

- *prefix*.NEW.SDSNTEMP
- *prefix*.NEW.SDSNSAMP
- *prefix*.NEW.SDSNCLST
- *prefix*.DBRMLIB.DATA
- *prefix*.RUNLIB.LOAD
- *prefix*.SRCLIB.DATA

If you specified YES in the USE Z/OSMF WORKFLOW field on panel DSNTIPA1, the installation CLIST creates two additional libraries to which the prefix applies:

- *prefix*.NEW.SDSNMFSA
- *prefix*.NEW.SDSNSAM2

These data sets are partitioned data sets. The first two are deleted if they exist, and they are created or re-created during the tailoring session. If you specify DSNTIDXA or DSNTIDXB in the INPUT MEMBER NAME field, the prefix for fields 1, 2, and 3, and the prefix and suffix for fields 4, 5, and 6 on installation panel " DSNTIPT: Data set names panel 1 " on page 85 are set. If all these data sets do not have the same prefix and suffix, you can change them on installation panel DSNTIPT.

DATA SET NAME SUFFIX field

The DATA SET NAME SUFFIX field specifies the suffix for the Db2 sample application libraries and for data sets that are to be created by the CLIST.

Acceptable values:	1 to 17 characters that form a valid z/OS data set name prefix
Default:	blank
DSNZP*xxx*:	none

The suffix applies to the following data sets. The fully qualified data set name cannot exceed 44 characters. Names that exceed eight characters must be in groups of no more than eight characters that are separated by periods.

- *prefix*.DBRMLIB.DATA
- *prefix*.RUNLIB.LOAD
- *prefix*.SRCLIB.DATA

If you do not use a common suffix to these libraries, enter their correct data set names on panel DSNTIPT.

To use the default Db2 data set names, specify DSN1110 in the DATA SET NAME PREFIX field, and leave the DATA SET NAME SUFFIX field blank.

INPUT MEMBER NAME field

The INPUT MEMBER NAME field specifies the member name of the input data set. This data set contains the default Db2 11 parameter values that are used for installation and migration, as in *prefix*.SDSNSAMP.*suffix*.

Acceptable values:	1 - 8 characters
Default:	DSNTIDXA
DSNZP*xxx*:	none

Installing Db2

If you are installing Db2 for the first time and not using SAP, use the supplied defaults input member, DSNTIDXA. If you are using SAP, you should specify DSNTIDXB, the SAP-specific input member. If you process the panels several times within a single run of the CLIST, all the previous values that are entered, except edited output data sets, remain the same.

To install Db2 using default parameter values from a previous installation, you must supply the member that contains the output from the previous run of the CLIST. That member was specified in the OUTPUT MEMBER NAME field during the previous run of the CLIST.

Recommendation: Before rerunning the CLIST, use job DSNTIJXZ to refresh the output member from the previous run of the CLIST.

Migrating to conversion mode

If you are migrating to conversion mode, you must specify two member names for input values: one in the INPUT MEMBER NAME field, and one in the DATA SET(MEMBER) NAME field. The INPUT MEMBER NAME field must specify a member that contains the default parameter values for the new release (usually DSNTIDXA, or DSNTIDXB if you use SAP). This member is applied first to establish the CLIST parameters.

The member that is specified in the DATA SET(MEMBER) NAME field must be different from the one that is specified in the INPUT MEMBER NAME field. The DATA SET(MEMBER) NAME field must specify a member that contains the Db2 10 values at your site. You can create this member by running job DSNTIJXZ on your previous release. This member is applied last and it overrides the CLIST values that are established by the member that is specified in the INPUT MEMBER NAME field.

Migrating a data sharing group to conversion mode

If you are migrating a data sharing group, follow the instructions under "Migrating to conversion mode" on page 60 for the first member that you migrate. You also need to specify a name in the OUTPUT MEMBER NAME field. For each subsequent member, follow the instructions under "Migrating to conversion mode" on page 60, *with the following exception*: Enter the name that you specified in the OUTPUT MEMBER NAME field when you ran the CLIST to migrate the first member.

Migrating to new-function mode

If you are migrating to new-function mode, enter a member name for input values. The INPUT MEMBER NAME that you specify for migration to new-function mode should be the same as the OUTPUT MEMBER NAME that you specified during migration to conversion mode. In a data sharing environment, the INPUT MEMBER NAME should be the same as the OUTPUT MEMBER NAME that was specified during migration of the first member of the data sharing group to Db2 11 conversion mode.

Updating an existing Db2 subsystem

Before running the CLIST in UPDATE mode, use job DSNTIJXZ to refresh the output member from the previous run of the CLIST. Specify the refreshed member in the INPUT MEMBER NAME field.

The following table lists the data set names that are generated with the *prefix* and *suffix* values from PREFIX and SUFFIX only when the INPUT MEMBER NAME is DSNTIDXA or DSNTIDXB.

Table 9. Resulting data set names when using prefix and suffix parameters

Default library name	**CLIST edited library name**
prefix.DBRMLIB.DATA	*prefix*.DBRMLIB.DATA*suffix*
prefix.RUNLIB.LOAD	*prefix*.RUNLIB.LOAD.*suffix*
prefix.SRCLIB.DATA	*prefix*.SRCLIB.DATA.*suffix*
prefix.SDSNDBRM	*prefix*.SDSNDBRM.*suffix*
prefix.SDSNLINK	*prefix*.SDSNLINK.*suffix*
prefix.SDSNLOAD	*prefix*.SDSNLOAD.*suffix*
prefix.SDSNMACS	*prefix*.SDSNMACS.*suffix*
prefix.ADSNLOAD	*prefix*.ADSNLOAD.*suffix*
prefix.ADSNMACS	*prefix*.SDSNMACS.*suffix*
prefix.SDSNSAMP	*prefix*.SDSNSAMP.*suffix*
prefix.SDSNCLST	*prefix*.SDSNCLST.*suffix*
prefix.SDSNIVPD	*prefix*.SDSNIVPD.*suffix*
prefix.SDSNC.H	*prefix*.SDSNC.H
prefix.SDXRRESL.	*prefix*.SDXRRESL.*suffix*

Related tasks

Adding a new data sharing member
After you install a new data sharing group or enable an existing Db2 subsystem for data sharing, you can add new data sharing members. Always add a member as a new installation. After being added to the group, the new member uses the Db2 catalog of the originating member.

Migrating an existing data sharing group to Db2 11 conversion mode
If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

Related reference

DATA SET(MEMBER) NAME field
The value of the DATA SET(MEMBER) NAME field indicates the name of the input data set to use for migrating from Db2 10. If you are installing, migrating to new-function mode, or updating, the DATA SET(MEMBER) NAME field must remain blank.

OUTPUT MEMBER NAME field

The OUTPUT MEMBER NAME field specifies the member name of the output data set in which to save the values that are entered on the installation panels.

Acceptable values:	1 - 8 characters
Default:	NULL
DSNZP*xxx*:	none

If you do not specify a name, the values are lost when you leave the installation CLIST, and you no longer have the values available for future updates. This member is stored in *prefix*.SDSNSAMP (not the one created by the DSNTINST CLIST). To avoid replacing any members of *prefix*.SDSNSAMP that were shipped with the product, specify DSNTID*xx* as the value of OUTPUT MEMBER NAME, where *xx* is any alphanumeric value except SA, VB, XA, or XB.

Always give a new value in the OUTPUT MEMBER NAME field for a new panel session. You supply the name from your current session in the INPUT MEMBER NAME field for your next session. You should not use the same member name for output as for input.

Recommendation: Write down the output member name that you entered for reference during future sessions.

DSNTIPO1: OTC license usage panel

Use the DSNTIPO1 panel to indicate whether Db2 is to operate under a one-time license charge. This panel is displayed only if you purchased Db2 11 for z/OS Value Unit Edition (FMID JDBBB1Z) for use with z/OS on zNALC.

```
+----- OTC LICENSE USAGE ------+
| DSNTIPO1                     |
|  Will this subsystem or data |
|  sharing member be operated  |
|  under an OTC license?       |
|                              |
|     _ 1. No                  |
|       2. Yes                 |
|                              |
|  PRESS:  ENTER to continue   |
|          RETURN to exit      |
|                              |
+------------------------------+
```

Figure 6. OTC license usage panel: DSNTIPO1

On this panel, specify whether this Db2 subsystem or data sharing member is to be configured to operate using the OTC license. Enter a 1 (NO) or 2 (YES) .

DSNTIPO2: Notice and acceptance of OTC license panel

Panel DSNTIPO2 is displayed only when you indicate on panel DSNTIPO1 (OTC license usage) that an OTC license is or will be in effect on this Db2 subsystem or data sharing member.

This panel displays the terms of that license and checks for your consent to abide by them. Review the terms by using the ISPF Up and Down keys to scroll through the text.

```
DSNTIPO2             NOTICE AND ACCEPTANCE OF OTC LICENSE
 ===>

  This  subsystem or data sharing member has been selected for operation
  using an OTC license.  Use of this license is controlled by terms defined
  of the following agreement:

  ---------------------------------- TERMS ------------------------------------
                                                                   More:     +
  A "Qualified Sysplex" means a Parallel Sysplex in which z/OS is eligible for
  aggregated zNALC charges as described in the Charges section of the Attach-
  ment for zNALC License Charges on IBM System z.

  Your license authorizes use of the Program only in a validly licensed System
  z New Application License Charge ("zNALC") LPAR for Eligible Workloads which
  are defined as workloads that meet the following criteria:
   * A workload (excluding applications running under Lotus Domino) that in-
  -----------------------------------------------------------------------------

 You must accept these terms of this license in order to proceed:
   LICENSE TERMS ACCEPTED ===>        Enter YES to proceed or RETURN to exit

 PRESS:  UP/DOWN to scroll terms   RETURN to EXIT   HELP for more information
```

Figure 7. Notice and acceptance of OTC license panel: DSNTIPO2

LICENSE TERMS ACCEPTED field (OTC_LICENSE subsystem parameter)

The OTC_LICENSE subsystem parameter indicates whether you accept the terms of the one-time charge (OTC) license.

Acceptable values:	YES
Default:	none
DSNZP*xxx*:	DSN6SYSP.OTC_LICENSE

This field accepts only one value, YES. You cannot pass this panel with any other value in that field. If you do not accept the terms of this license, press the Return key to exit the Db2 installation CLIST.

DSNTIPA2: Db2 catalog and directory panel

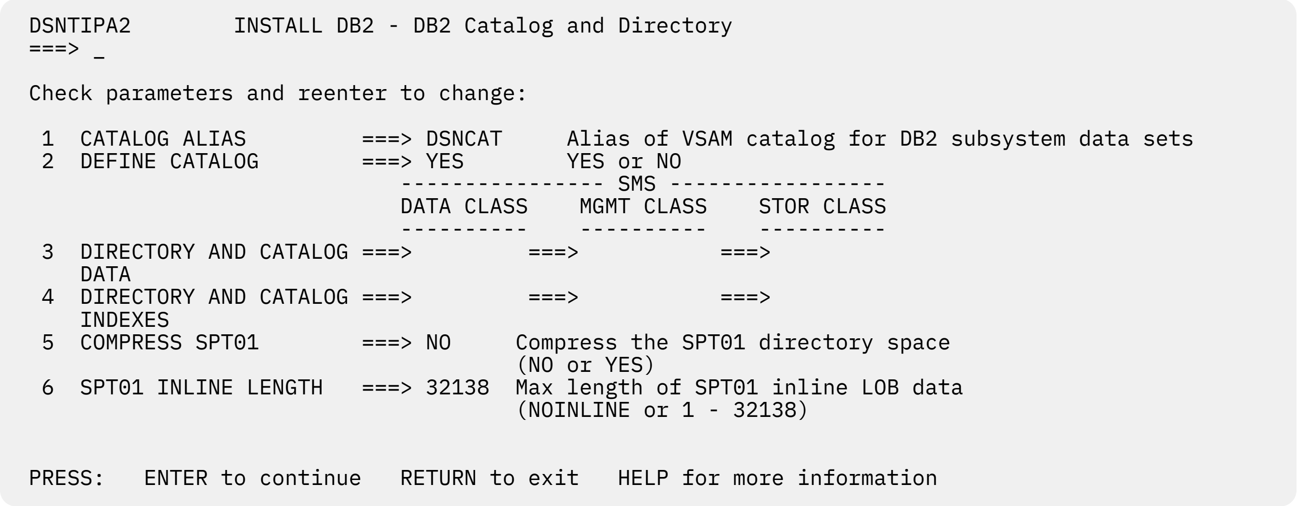
The entries on the DSNTIPA2 panel define the name of the ICF catalog for Db2 VSAM data sets and indicate whether to create the specified catalog. The entries also define z/OS Storage Management Subsystem (SMS) classes that are to be used when defining data sets for the Db2 catalog and directory.

The values that you enter on this and each of the subsequent panels are saved in the data set member that you named in the OUTPUT MEMBER NAME field on the Main Panel, DSNTIPA1.

Db2 11 requires SMS, so ensure that the following conditions are met before you proceed:

- SMS is active on the system where this Db2 subsystem resides or is being installed or migrated. SMS must be configured to allocate all data sets for the Db2 catalog and directory in extended format and to use extended addressability.
- Your system storage administrator has provided the required SMS automatic class selection (ACS) routines for data sets and Db2 storage groups created during Db2 installation or migration.
- Your system storage administrator has provided any SMS data classes, management classes, and storage classes that you plan to specify on this panel and the DSNTIPA3 panel.

To help performance and recovery, reduce dependency on a single storage device by using more than one SMS scheme.



```
DSNTIPA2        INSTALL DB2 - DB2 Catalog and Directory
===> _

Check parameters and reenter to change:

 1  CATALOG ALIAS         ===> DSNCAT     Alias of VSAM catalog for DB2 subsystem data sets
 2  DEFINE CATALOG        ===> YES        YES or NO
                            ---------------- SMS -----------------
                            DATA CLASS    MGMT CLASS    STOR CLASS
                            ----------    ----------    ----------
 3  DIRECTORY AND CATALOG ===>         ===>           ===>
    DATA
 4  DIRECTORY AND CATALOG ===>         ===>           ===>
    INDEXES
 5  COMPRESS SPT01        ===> NO     Compress the SPT01 directory space
                                      (NO or YES)
 6  SPT01 INLINE LENGTH   ===> 32138  Max length of SPT01 inline LOB data
                                      (NOINLINE or 1 - 32138)


PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 8. Db2 catalog and directory panel: DSNTIPA2

CATALOG ALIAS field (CATALOG subsystem parameter)

The value of the CATALOG ALIAS field specifies the high-level qualifier for VSAM data sets that are to be used by the Db2 catalog and directory.

The installation CLIST also uses the value in the CATALOG ALIAS field to customize the following statements in Db2 installation and migration jobs:

- The NAME parameter of the DEFINE ALIAS statement for the optional VSAM ICF user catalog for Db2 data sets (job DSNTIJCA)
- The CATALOG parameter of AMS DELETE and DEFINE statements for Db2 catalog (DSNDB06), Db2 directory (DSNDB01), active logs, and bootstrap data sets (jobs DSNTIJDE, DSNTIJEN, and DSNTIJIN)
- The VCAT parameter of various CREATE STOGROUP statements (jobs DSNTIJTM, DSNTIJSG, DSNTEJ1, DSNTEJ2A, and DSNTEJ3M)

Acceptable values:	1 - 8 characters
Default:	DSNCAT
Update:	See Changing the high-level qualifier for Db2 data sets
DSNZP*xxx*:	DSN6SPRM CATALOG

VSAM data set cataloging options

The installation jobs classify the Db2 VSAM data sets, which include recovery log, subsystem, and user data sets. You must create the catalog that defines these data sets through the VSAM ICF.

Recommendation: Use an ICF user catalog to classify all Db2 objects because you can use aliases for user catalogs. Multi-level ICF catalog aliases are acceptable. However, when you use the CREATE STOGROUP statement, you might need to use an alias for the VCAT option, which must be a single-level one- to eight-character name. You can use a master catalog, but only if the name of the master catalog is a single-level name that is one to eight characters.

Ensure that your alias conforms to your local naming conventions. If you are migrating, you should use the same ICF catalog aliases for Db2 11 that you used for your previous version because Db2 11 uses many of the data sets from your previous version that are already classified.

Whether you are installing or migrating, Db2 does not require you to catalog all Db2 VSAM data sets in the same ICF catalog nor use the same prefix or catalog alias. However, data sets for the Db2 catalog (DSNDB06) and Db2 directory (DSNDB01) must have the high-level qualifier that you specify in the CATALOG ALIAS field. See the following table for guidelines for the high-level qualifier of data sets. The BSDS is VSAM KSDS. The archive logs are sequential. All other data sets are VSAM linear data sets.

Table 10. Db2 data sets ICF catalog guidelines

Db2 data sets	Guidelines
Db2 directory (DSNDB01) Db2 catalog (DSNDB06)	The first-level qualifier of these data sets must be the value that you specify in the CATALOG ALIAS field. These data sets must be SMS-managed with allocation for extended format and extended addressability.
Active logs Bootstrap data set Default database (DSNDB04) Work file database	The first-level qualifier of these data sets does not need to match the value that you specify in the CATALOG ALIAS field. You can also catalog the data sets in different ICF catalogs using different prefixes.

Table 10. Db2 data sets ICF catalog guidelines (continued)

Db2 data sets	Guidelines
Archive logs	The first-level qualifier of these data sets does not need to match the value that you specify in the CATALOG ALIAS field. If the archive log data set is allocated on disk, the data set must be cataloged according to the values of the ARCPFX1 or ARCPFX2 subsystem parameters, which are set through the COPY 1 PREFIX and COPY 2 PREFIX fields on panel DSNTIPH. If the archive log data set is allocated on a tape device, cataloging the data set is optional.
User table spaces User index spaces	The first-level qualifier of these data sets does not need to match the value that you specify in the CATALOG ALIAS field. You can catalog different user spaces in different ICF catalogs, using different prefixes.

You must provide any catalog connections for log and bootstrap data sets that you catalog apart from the Db2 directory and catalog data sets.

Recommendation: Add an alias for the proper catalog.

Although you can catalog two Db2 subsystems in the same ICF catalog, they must not share the same ICF catalog alias because the alias is the only parameter that makes the data set names unique.

Data set naming conventions

The value that you specify as the ICF catalog alias is also used as the high-level qualifier for Db2 directory and catalog VSAM data sets. The data sets for the Db2 directory and catalog databases and the default database are all VSAM linear data sets (LDSs). Their data set names have the following format:

```
dddddddd.DSNDBn.bbbbbbbb.xxxxxxxx.y0001.Accc
```

With the following definitions:

dddddddd
The high-level qualifier, which is the value that you supply for the CATALOG ALIAS field.

DSNDB*n*
A constant identifying this as a Db2 data set. For *n*, use C for a cluster name or D for a data component name.

bbbbbbbb
The database name. The system database names are:

DSNDB01
The Db2 directory database

DSNDB04
The default database

DSNDB06
The Db2 catalog database

DSNDB07
The default work file database

xxxxxxxx
The individual table space or index space.

_y_0001.A_ccc_

The data set. For table spaces and index spaces that can be reorganized with SHRLEVEL CHANGE or SHRLEVEL REFERENCE, *y* can be I or J, depending on whether REORG has been run. For other table spaces and index spaces, *y* is I. *ccc* is the partition number of a partitioned table space or index space, or the relative data set number of a simple or segmented table space or index space.

For example, if the catalog alias is DSNCAT, one of the Db2 directory data sets is named:

```
DSNCAT.DSNDBD.DSNDB01.DBD01.I0001.A001
```

Similarly, one of the Db2 catalog data sets is named:

```
DSNCAT.DSNDBD.DSNDB06.SYSTSVEW.I0001.A001
```

DEFINE CATALOG field

The value of the DEFINE CATALOG field determines whether Db2 is to create a new ICF catalog.

Acceptable values:	YES, NO
Default:	YES
Update:	see Changing the high-level qualifier for Db2 data sets
DSNZP*xxx*:	none

YES

Builds a new ICF catalog by using the alias that is specified in the CATALOG ALIAS field.

NO

Signals that the catalog that is named in the CATALOG ALIAS field already exists; the CLIST does not create a new one.

If you specify YES, Db2 edits job DSNTIJCA which, when run, creates a user catalog and an alias for that catalog. Db2 creates the high-level qualifier of the catalog name by adding a number to the end of the alias that is defined in the CATALOG ALIAS field. If the alias has fewer than eight characters, Db2 appends a "1" to the end of the alias. For example, if you accept the default of DSNCAT for the CALTALOG ALIAS field, the catalog that Db2 creates is named DSNCAT1.USER.CATALOG. If the alias has eight characters, Db2 changes the last character into a 1. If the last character is already a 1, Db2 changes the 1 to a 2.

DIRECTORY AND CATALOG DATA field (CATDDACL, CATDMGCL, and CATDSTCL subsystem parameters)

The DIRECTORY AND CATALOG DATA field specifies the explicit Storage Management Subsystem (SMS) classes that are to be used for defining VSAM data sets for the Db2 catalog and directory. Your SMS storage administrator defines these SMS classes. To use ACS routines for defining these data sets, leave this field blank.

For migration, values that you enter in this field initially apply only for defining new Db2 catalog and directory data sets. Existing Db2 data sets are not changed until they are redefined as part of a REORG invoked from the DSNTIJEN job.

Table 11. Acceptable values and defaults for columns of DIRECTORY AND CATALOG DATA field

Column	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank
Update:	None	None	None
DSNZP*xxx*:	DSN6SPRM CATDDACL	DSN6SPRM CATDMGCL	DSN6SPRM CATDSTCL

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

DIRECTORY AND CATALOG INDEXES field (CATXDACL, CATXMGCL, and CATXSTCL subsystem parameters)

The DIRECTORY AND CATALOG INDEXES field specifies the explicit Storage Management Subsystem (SMS) classes that are to be used for defining VSAM data sets for Db2 catalog and directory indexes. Your SMS storage administrator defines these SMS classes. To use ACS routines for defining these data sets, leave this field blank.

For migration, values that you enter in this field initially apply only for defining new data sets for Db2 catalog and directory indexes. Existing Db2 catalog and directory index data sets are not changed until they are redefined as part of a REORG invoked from the DSNTIJEN job.

Table 12. Acceptable values and defaults for columns of DIRECTORY AND CATALOG INDEXES field

Column	**DATA CLASS**	**MGMT CLASS**	**STOR CLASS**
Acceptable values:	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank
Update:	None	None	None
DSNZP*xxx*:	DSN6SPRM CATXDACL	DSN6SPRM CATXMGCL	DSN6SPRM CATXSTCL

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

COMPRESS SPT01 field (COMPRESS_SPT01 subsystem parameter)

The value of the COMPRESS_SPT01 subsystem parameter specifies whether the SPT01 directory table space is to be compressed.

Acceptable values:	NO, YES
Default:	NO
Update:	option 1 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM COMPRESS_SPT01

NO
The SPT01 table space is not compressed. This is the default value.

YES
The SPT01 table space is compressed during the next reorganization of the table space.

In a data sharing environment, all members should use the same setting for the COMPRESS_SPT01 parameter. The result of a table space reorganization will be determined by the value of the COMPRESS_SPT01 parameter on the member that executes the REORG TABLESPACE utility.

SPT01 INLINE LENGTH field (SPT01_INLINE_LENGTH subsystem parameter)

The SPT01_INLINE_LENGTH subsystem parameter specifies the maximum length of LOB column data in the SPT01 directory table space that is to be maintained in the base table. The length is specified in single-byte characters.

In a data sharing environment, all members must use the same setting for this parameter.

Acceptable values:	NOINLINE, 1 - 32138
Default:	32138
Update:	option 1 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SPT01_INLINE_LENGTH

To optimize performance, use the largest possible setting for this parameter, which will decrease the likely number of fetches from the SPT01 LOB auxiliary tables. A large value also increases the efficiency of SPT01 compression when you specify YES for the COMPRESS_SPT01 subsystem parameter. Use a smaller value for the SPT01_INLINE_LENGTH parameter to increase the capacity for storing additional rows in SPT01 if the size of SPT01 exceeds the maximum of 64 GB even with compression activated.

A change to this parameter does not take effect until you issue the SET SYSPARM command. In other words, even if you start or restart Db2 after changing the value, the change is not honored until you issue the SET SYSPARM command. If you increase the setting, Db2 places SPT01 in REORG-pending advisory status (AREO*) after you issue the SET SYSPARM command. If you decrease the setting, Db2 places SPT01 in REORG-pending restrictive status (REORP) after you issue the SET SYSPARM command.

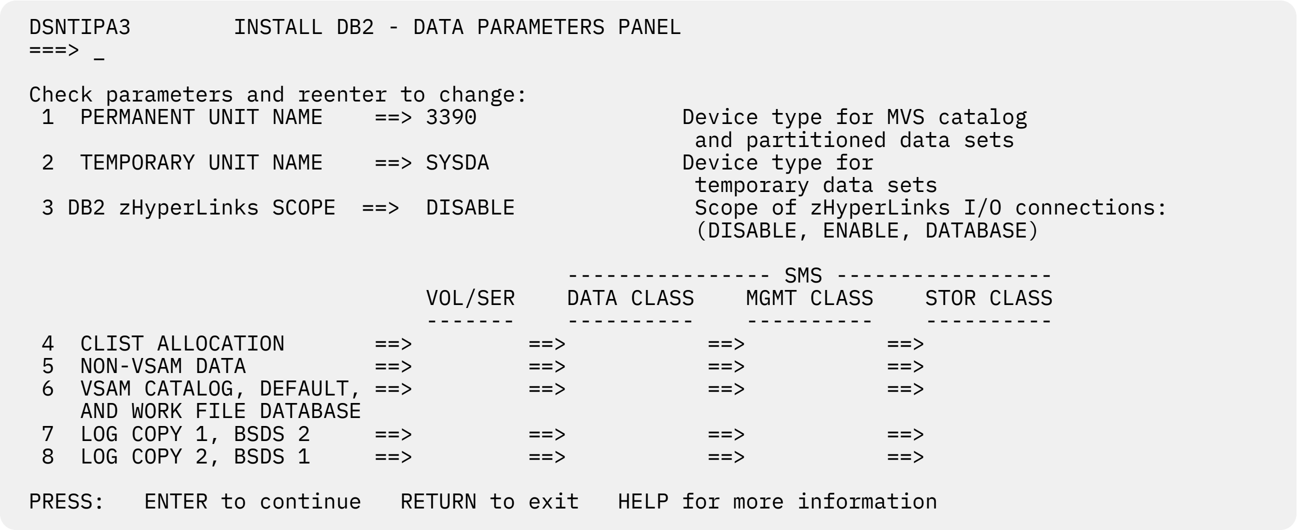
If you change the setting of SPT01_INLINE_LENGTH for a data sharing member, change the setting on all members before running the -SET SYSPARM command on any member.

DSNTIPA3: Data parameters panel

The entries on the DSNTIPA3 panel define the storage management preferences for the storage groups and data sets that are created during installation and migration.

Recommendation: If you use dual active logging, place the two active logs on different disk volumes and, ideally, on different channels and control units. To do that, if you specify volume serial numbers explicitly in the LOG COPY 1, BSDS 2 and LOG COPY 2, BSDS 1 fields, do not use the same volume serial number for both fields.

For information about updating parameters with changes that cannot be made by using the panels, see "Updating subsystem parameter and application default values" on page 317.



```
DSNTIPA3        INSTALL DB2 - DATA PARAMETERS PANEL
===> _

Check parameters and reenter to change:
 1  PERMANENT UNIT NAME    ==> 3390               Device type for MVS catalog
                                                   and partitioned data sets
 2  TEMPORARY UNIT NAME    ==> SYSDA              Device type for
                                                   temporary data sets
 3 DB2 zHyperLinks SCOPE  ==>  DISABLE             Scope of zHyperLinks I/O connections:
                                                   (DISABLE, ENABLE, DATABASE)

                                          ---------------- SMS -----------------
                               VOL/SER    DATA CLASS    MGMT CLASS    STOR CLASS
                               -------    ----------    ----------    ----------
 4  CLIST ALLOCATION       ==>         ==>           ==>           ==>
 5  NON-VSAM DATA          ==>         ==>           ==>           ==>
 6  VSAM CATALOG, DEFAULT, ==>         ==>           ==>           ==>
    AND WORK FILE DATABASE
 7  LOG COPY 1, BSDS 2     ==>         ==>           ==>           ==>
 8  LOG COPY 2, BSDS 1     ==>         ==>           ==>           ==>

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 9. Data parameters panel: DSNTIPA3

PERMANENT UNIT NAME field

The PERMANENT UNIT NAME field specifies the device type or unit name that is to be used for allocating data sets that are created during installation or migration.

Acceptable values:	blank, valid device type, unit name
Default:	3390
Update:	none
DSNZP*xxx*:	none

The device type or unit name applies to the following data sets:

- ICF catalog
- *prefix*.DBRMLIB.DATA.*suffix*
- *prefix*.RUNLIB.LOAD.*suffix*
- *prefix*.SRCLIB.DATA.*suffix*
- The two data sets that the DSNTINST CLIST generates:
  - *prefix*.NEW.SDSNTEMP
  - *prefix*.NEW.SDSNSAMP

The value of PERMANENT UNIT NAME identifies a direct access unit name for partitioned data sets and the ICF catalog. If you want to use different device types for different data sets, edit the installation or migration jobs after you complete the tailoring session. A common device type is 3390.

The value of PERMANENT UNIT NAME is sometimes used during IVP processing to place output (from COPY TABLESPACE, for example) on the device type that is specified for the PERMANENT UNIT NAME field.

A change to PERMANENT UNIT NAME during migration does not affect the ICF catalog, Db2 catalog, directory, or logs. The new value is used for data sets that are created during migration.

TEMPORARY UNIT NAME field

The value of the TEMPORARY UNIT NAME field specifies the device type or unit name that is to be used for allocating temporary data sets.

Acceptable values:	blank, or valid device type or unit name

Default:	SYSDA
Update:	none
DSNZP*xxx*:	none

The value of TEMPORARY UNIT NAME is the direct access or disk unit name that is used for the precompiler, compiler, assembler, sort, linkage editor, and utility work files in the tailored jobs and CLISTs.

Be aware that this field was previously used to specify the VOLTDEVT subsystem parameter, which provides the device type that is used by Db2 utilities that dynamically allocate temporary data sets. You now specify the VOLTDEVT parameter in the TEMPORARY DS UNIT NAME field on "DSNTIP61: Db2 utilities parameters panel 2 " on page 209.

DB2 zHyperLinks SCOPE field (ZHYPERLINK subsystem parameter)

The ZHYPERLINK subsystem parameter specifies the default scope of the zHyperLink protocol for I/O requests.

Acceptable values:	DISABLE, ENABLE, DATABASE
Default:	DISABLE
Online changeable:	Yes
Update:	option 2 on panel DSNTIPB
DSNZPxxx:	DSN6SPRM ZHYPERLINK

The following values can be used to specify the default value for the ZHYPERLINK parameter:

DISABLE
Db2 does not use zHyperLink for any I/O requests.

ENABLE
All eligible I/O requests that Db2 makes request the zHyperLink protocol.

DATABASE
Db2 requests the zHyperLink protocol only for database synchronous read I/Os.

Related information

CLIST ALLOCATION field

The CLIST ALLOCATION field controls the storage management properties for the *prefix*.NEW.SDSNTEMP and *prefix*.NEW.SDSNSAMP data sets, which the CLIST creates during the tailoring session.

Table 13. Acceptable values and defaults for field columns

Column	VOL/SER	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid z/OS volume serial number	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank	Blank
Update:	None	None	None	None
DSNZP*xxx*:	None	None	None	None

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

NON-VSAM DATA field

The values of the NON-VSAM DATA field specify the storage management properties for non-VSAM data. Specifically, the NON-VSAM DATA field applies to the *prefix*.DBRMLIB.DATA, *prefix*.RUNLIB.LOAD, and *prefix*.SRCLIB.DATA data sets.

Table 14. Acceptable values and defaults for field columns

Column	VOL/SER	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid z/OS volume serial number	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank	Blank
Update:	None	None	None	None
DSNZP*xxx*:	None	None	None	None

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

VSAM CATALOG, DEFAULT AND WORK FILE DATABASE field

The values in the VSAM CATALOG, DEFAULT AND WORK FILE DATABASE field specify storage management properties. These properties apply to temporary data sets, the default storage group and sample storage group, and the VSAM catalog (if a new one is created).

Table 15. Acceptable values and defaults for field columns

Column	VOL/SER	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid z/OS volume serial number	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank	Blank
Update:	None	None	None	None
DSNZP*xxx*:	None	None	None	None

The CREATE STOGROUP statements for the default storage group and sample storage groups are tailored to include or exclude the VOLUMES, DATACLAS, MGMTCLAS, and STORCLAS parameters according to whether you specify arguments for them in this field.

- If a column is not blank, the corresponding parameter is included, with the value as its argument.
- If a column is blank, the corresponding parameter is excluded.
- If all columns are blank, the VOLUMES parameter is included, with the asterisk as its argument.

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

For migration, this field has no effect on the VSAM catalog or the default storage group because these objects are provided by the previous release of Db2.

LOG COPY 1, BSDS 2 field

When installing Db2, you can change the values of the LOG COPY 1, BSDS 2 field. Specify the storage management properties for the first copy of the active log data set and the second copy of the bootstrap data set (BSDS).

When migrating Db2, you cannot change any values in this field.

This field has four columns where you can indicate the volume serial number and the SMS classes for data, management, and storage that are to be used for defining particular data sets or storage groups. The acceptable values and default values for each column are shown in the following table. All fields are optional.

Edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.

Also edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.

Table 16. Acceptable values and defaults for field columns

Column	VOL/SER	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid z/OS volume serial number	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank	Blank
Update:	None	None	None	None
DSNZP*xxx*:	None	None	None	None

A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

LOG COPY 2, BSDS 1 field

When installing Db2, you can change the values of the LOG COPY 2, BSDS 1 field. Use this field to specify the storage management properties for the second copy of the active log and the first copy of the BSDS.

When migrating Db2, you cannot change any values in this field.

This field has four columns where you can indicate the volume serial number and the SMS classes for data, management, and storage that are to be used for defining particular data sets or storage groups. The acceptable values and default values for each column are shown in the following table. All fields are optional.

Edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.

Also edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.

Table 17. Acceptable values and defaults for field columns

Column	VOL/SER	DATA CLASS	MGMT CLASS	STOR CLASS
Acceptable values:	Blank or a valid z/OS volume serial number	Blank or a valid SMS data class name	Blank or a valid SMS management class name	Blank or a valid SMS storage class name
Default:	Blank	Blank	Blank	Blank
Update:	None	None	None	None
DSNZP*xxx*:	None	None	None	None

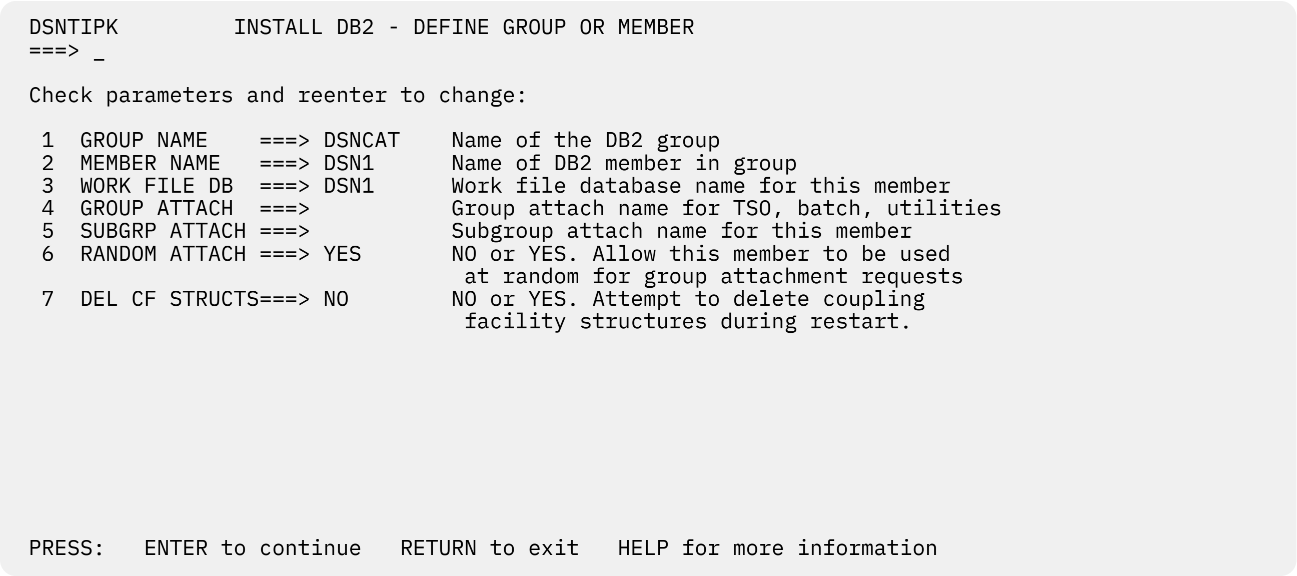
A blank value in a column directs the CLIST to remove the corresponding storage-management-related parameters from all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field. A non-blank value is used by the CLIST to customize the corresponding storage-management-related parameters in all JCL, AMS, ALLOC, and DDL statements that are used to create data sets and storage groups that are associated with the field.

Recommendation: To help performance and recovery, avoid dependency on a single storage device by using an SMS scheme that uses more than one volume serial number.

DSNTIPK: Define group or member panel

The DSNTIPK panel follows panel DSNTIPA2 when you select a data sharing function (GROUP, MEMBER, or ENABLE).

You must start Db2 and IRLM group names with an alphabetic character. You should carefully consider the naming convention for a data sharing system. See "Naming in Db2 data sharing" on page 529 for guidance on planning a naming convention before you choose names for the fields on panel DSNTIPK.



```
DSNTIPK         INSTALL DB2 - DEFINE GROUP OR MEMBER
===> _

Check parameters and reenter to change:

 1  GROUP NAME    ===> DSNCAT    Name of the DB2 group
 2  MEMBER NAME   ===> DSN1      Name of DB2 member in group
 3  WORK FILE DB  ===> DSN1      Work file database name for this member
 4  GROUP ATTACH  ===>           Group attach name for TSO, batch, utilities
 5  SUBGRP ATTACH ===>           Subgroup attach name for this member
 6  RANDOM ATTACH ===> YES       NO or YES. Allow this member to be used
                                  at random for group attachment requests
 7  DEL CF STRUCTS===> NO        NO or YES. Attempt to delete coupling
                                  facility structures during restart.










PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 10. Define group or member panel: DSNTIPK

GROUP NAME field (GRPNAME subsystem parameter)

The GRPNAME subsystem parameter identifies the name of a new or existing Db2 data sharing group that is to be used for this subsystem.

Acceptable values:	1 - 8 characters consisting of letters A - Z, numbers 0 - 9, $, #, @
Default:	DSNCAT
DSNZP*xxx*:	DSN6GRP GRPNAME

The group name encompasses the entire data sharing group and forms the basis for the coupling facility structure names.

To avoid names that IBM uses for its z/OS cross-system coupling facility (XCF) groups, the first character must be an uppercase letter J - Z unless the name begins with DSN. Do not use SYS as the first three characters, and do not use UNDESIG as the group name.

MEMBER NAME field (MEMBNAME subsystem parameter)

The MEMBNAME subsystem parameter specifies the name of a new or existing Db2 data sharing member that is to be used for this subsystem.

Acceptable values:	1 - 8 characters
Default:	DSN1
DSNZP*xxx*:	DSN6GRP MEMBNAME

Recommendation: Use the z/OS subsystem name. Db2 uses this name as its XCF member name. An example of a member name is DB1G. The member name can consist of letters A - Z, numbers 0 - 9, $, #, and @.

WORK FILE DB field

The value of the WORK FILE DB field specifies the name of the work file database that is to be used for the Db2 member.

Acceptable values:	1 - 8 characters
Default:	DSN1
DSNZP*xxx*:	none

Each Db2 member has its own work file database (called DSNDB07 in a non-data-sharing environment). One member of the data sharing group can have the name DSNDB07, but the recommendation is that you use a more meaningful name, such as WRKDSN1. You cannot specify a name that begins with DSNDB unless the name is DSNDB07.

GROUP ATTACH field (SSID DECP value)

The value of the GROUP ATTACH field specifies a generic group attachment name. This name is to be used for batch programs, the call attachment facility (CAF), the RRS attachment facility (RRSAF), IMS, CICS Transaction Server for z/OS, and utilities.

Acceptable values:	1 - 4 characters
Default:	none
dsnhdecp:	SSID

An example of a group attachment name is DB0G. The value that you specify here is also used in the IEFSSN*xx* member of SYS1.PARMLIB.

If you leave this field blank, the SSID DECP value is set to the value that is specified in the SUBSYSTEM NAME field on panel DSNTIPM.

Related concepts

Group attachment names and subgroup attachment names
Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

Related tasks

Registering the command prefixes, member group attachment name, and subgroup attachment name
Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Related reference

SUBSYSTEM NAME field (SSID DECP value)
The SUBSYSTEM NAME field specifies the z/OS subsystem name for Db2.

Related information

SUBGRP ATTACH field

The SUBGRP ATTACH field identifies the name of a new or existing subgroup attachment that is to be associated with this subsystem. A subgroup attachment name can be specified with a group attachment name to organize how TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections find an active Db2 subsystem.

Acceptable values:	blank, 1 - 4 characters. Characters must be letters A – Z, numbers 0 – 9, $, #, or @
Default:	blank
Update:	modify IEFSSN*xx* and IPL
DSNZP*xxx*:	none

The value that you specify for the SUBGRP ATTACH field is used in the IEFSSN*xx* member of SYS1.PARMLIB.

The default value, blank, means that the member that is specified in the MEMBER NAME field is not to be associated with a subgroup attachment. If a subgroup attachment name is entered in the SUBGRP ATTACH field, a group attachment name must also be specified in the GROUP ATTACH field. A subgroup attachment can belong to only one group attachment and cannot have the same name as the group attachment. A member can belong to one subgroup attachment at most.

Related concepts

Group attachment names and subgroup attachment names
Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

Related tasks

Registering the command prefixes, member group attachment name, and subgroup attachment name
Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Related information

RANDOM ATTACH field (RANDOMATT subsystem parameter)

The RANDOMATT subsystem parameter specifies whether this Db2 member can be used for randomized group attachment or subgroup attachment processing. This setting is ignored when the GROUP ATTACH field is blank.

Acceptable values:	YES, NO
Default:	YES
DSNZP*xxx*:	DSN6GRP RANDOMATT

YES
Allows this member to be used, at random, for group attachments or subgroup attachments.

NO
Prevents this member from being considered for group attachments or subgroup attachments unless no other members of the defined group are available.

Related concepts

Group attachment names and subgroup attachment names
Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

Related information

DEL CF STRUCTS field (DEL_CFSTRUCTS_ON_RESTART subsystem parameter)

The DEL_CFSTRUCTS_ON_RESTART parameter specifies whether, during restart, Db2 is to attempt to delete the SCA, IRLM lock structure, and any allocated group buffer pools from the coupling facility.

Acceptable values:	NO, YES
Default:	NO
Update:	option 3 on DSNTIPB
DSNZP*xxx*:	DSN6SYSP.DEL_CFSTRUCTS_ON_RESTART

NO
During restart, Db2 does not attempt to delete the data sharing group's coupling facility structures.

Recommendation: Use this setting for production systems.

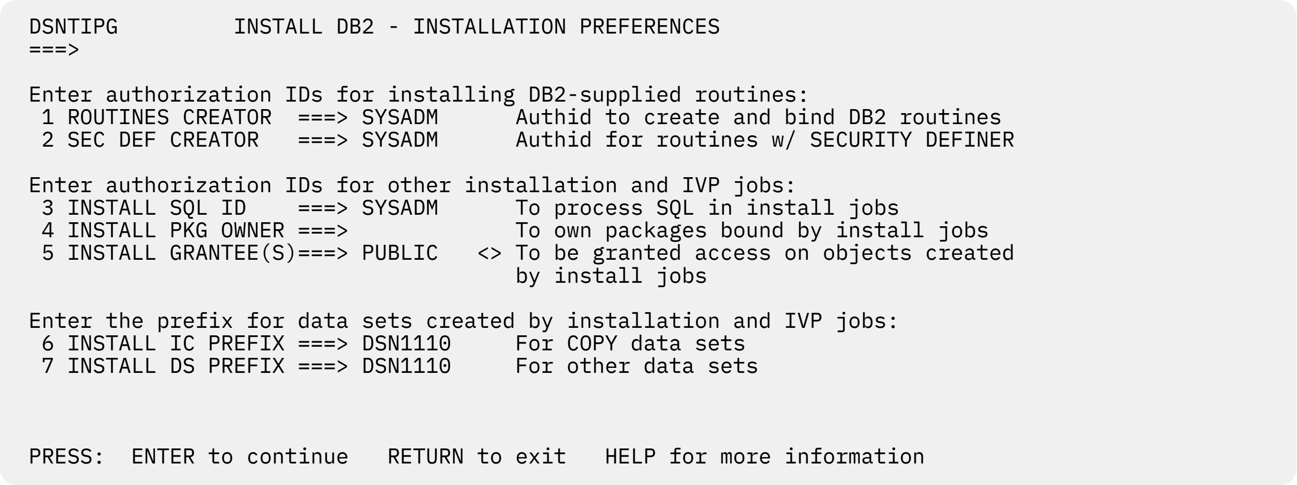
YES
During restart, Db2 attempts to delete the data sharing group's coupling facility structures. The deletion is successful only if no other Db2 subsystems are connected to the structures when the deletion is attempted. If the deletion is successful, the deleted structures are recovered as necessary during a group restart or group buffer pool RECOVER-pending (GRECP) recovery process. This process might increase the amount of time that Db2 takes to complete a restart.

Recommendation: Use this setting for disaster recovery systems.

Use the same setting for the DEL CF STRUCTS field on all members of a data sharing group.

DSNTIPG: Installation preferences panel

The entries on the DSNTIPG panel specify the authorization IDs for installation and IVP jobs. These entries also specify the prefix for data sets that are created by installation and IVP jobs.



```
DSNTIPG         INSTALL DB2 - INSTALLATION PREFERENCES
===>

Enter authorization IDs for installing DB2-supplied routines:
 1 ROUTINES CREATOR  ===> SYSADM      Authid to create and bind DB2 routines
 2 SEC DEF CREATOR   ===> SYSADM      Authid for routines w/ SECURITY DEFINER

Enter authorization IDs for other installation and IVP jobs:
 3 INSTALL SQL ID    ===> SYSADM      To process SQL in install jobs
 4 INSTALL PKG OWNER ===>             To own packages bound by install jobs
 5 INSTALL GRANTEE(S)===> PUBLIC   <> To be granted access on objects created
                                      by install jobs

Enter the prefix for data sets created by installation and IVP jobs:
 6 INSTALL IC PREFIX ===> DSN1110     For COPY data sets
 7 INSTALL DS PREFIX ===> DSN1110     For other data sets



PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 11. Installation preferences panel: DSNTIPG

ROUTINES CREATOR field

The ROUTINES CREATOR field specifies the CURRENT SQLID setting that is to be used when creating, configuring, and validating most Db2-supplied routines. This field also specifies the default OWNER that is to be used when binding packages for these routines.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	SYSADM
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The value that you enter in the ROUTINES CREATOR field is assigned by the installation CLIST as the setting of the AUTHID parameter for installation programs DSNTRIN in job DSNTIJRT and DSNTRVFY in job DSNTIJRV.

The AUTHID parameter is used by the DSNTRIN program as the CURRENT SQLID setting when Db2-supplied routines are created or configured. The DSNTRIN program also uses the AUTHID parameter as the default OWNER when binding packages for the Db2-supplied routines.

The AUTHID parameter is used by the DSNTRVFY program as the CURRENT SQLID setting when validating Db2-supplied routines. The DSNTRVFY program also uses the AUTHID parameter as the default OWNER when binding packages for validation of these routines.

Recommendation: Specify an authorization ID that has installation SYSADM authority. Routines that are created or configured with installation SYSADM authority are marked as system-defined.

Related information

SEC DEF CREATOR field

The SEC DEF CREATOR field specifies the CURRENT SQLID value for creating and configuring Db2-supplied routines that are defined with the SECURITY DEFINER option.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	SYSADM

Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The value that you enter in the SEC DEF CREATOR field is assigned by the installation CLIST as the setting of the SECDEFID parameter for installation program DSNTRIN in job DSNTIJRT.

The SECDEFID parameter is used by the DSNTRIN program as the CURRENT SQLID setting when creating and configuring Db2-supplied routines that have the SECURITY DEFINER attribute. The default OWNER of any packages bound for the routines is specified in the INSTALL PKG OWNER field. If the INSTALL PKG OWNER field is not specified, the default OWNER is the value of the ROUTINES CREATOR field.

Requirement: Specify an ID that can be used as a logon ID because it will be used by WLM to execute routines that have the SECURITY DEFINER attribute.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related reference

ROUTINES CREATOR field
The ROUTINES CREATOR field specifies the CURRENT SQLID setting that is to be used when creating, configuring, and validating most Db2-supplied routines. This field also specifies the default OWNER that is to be used when binding packages for these routines.

INSTALL SQL ID field

The INSTALL SQL ID field specifies the CURRENT SQLID setting that is to be used when SQL is processed by most Db2 installation and sample jobs.

The INSTALL SQL ID does not apply to the DSNTIJRT and DSNTIJRV jobs. For these jobs, use the ROUTINES CREATOR and SEC DEF CREATOR fields, to specify the CURRENT SQLID.

Acceptable values:	1 - 8 characters. The first character must be alphabetic.
Default:	SYSADM
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The installation CLIST assigns the value of this field as the value of CURRENT SQLID for installation and IVP jobs except DSNTIJRT and DSNTIJRV.

Related reference

INSTALL PKG OWNER field
The INSTALL PKG OWNER field specifies the authorization ID to assign as the owner of packages and plans that are bound by most installation and sample jobs.

SEC DEF CREATOR field
The SEC DEF CREATOR field specifies the CURRENT SQLID value for creating and configuring Db2-supplied routines that are defined with the SECURITY DEFINER option.

ROUTINES CREATOR field

The ROUTINES CREATOR field specifies the CURRENT SQLID setting that is to be used when creating, configuring, and validating most Db2-supplied routines. This field also specifies the default OWNER that is to be used when binding packages for these routines.

INSTALL PKG OWNER field

The INSTALL PKG OWNER field specifies the authorization ID to assign as the owner of packages and plans that are bound by most installation and sample jobs.

This field does not apply to the DSNTIJRT and DSNTIJRV jobs. Use installation panels DSNTIPRA - DSNTIPRP to specify package owners for stored procedures that are provided by Db2.

Acceptable values:	1 - 8 characters. The first character must be alphabetic.
Default:	blank
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The installation CLIST assigns this value as the value of the OWNER parameter in BIND statements that are processed by installation and sample jobs except DSNTIJRT and DSNTIJRV. If this field is blank, the OWNER clause is omitted from those BIND statements.

INSTALL GRANTEE(S) field

The INSTALL GRANTEE(S) field specifies the authorization IDs that are to be granted access to objects that are created and bound by most installation and sample jobs.

This field does not apply to the DSNTIJRT and DSNTIJRV jobs. Use installation panels DSNTIPRA - DSNTIPRP to specify authorization IDs for routines that are provided by Db2. For more information, see "DSNTIPR1: Parameters for Db2-supplied routines panel" on page 272.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas. The authorization IDs that you enter in this field are granted the following privileges:

- The USE privilege for STOGROUPs and table spaces that are created by IVP jobs
- The USE privilege for buffer pool BP0, the SYSDEFLT storage group, and table space DSNDB04.SYSDEFLT
- The DBADM privilege for databases that are created by IVP jobs
- The CREATETAB and CREATETS privileges for the temporary database, DSNDB04
- The DELETE, INSERT, SELECT, and UPDATE privileges for tables and created global temporary tables that are created by IVP and installation jobs other than DSNTIJRT
- The EXECUTE privilege for packages and plans that are bound by IVP and installation jobs other than DSNTIJRT
- The BIND privilege on most plans that are bound by IVP jobs

INSTALL IC PREFIX field

The INSTALL IC PREFIX field specifies the prefix for image copy data sets that are created by Db2 installation and IVP jobs.

Acceptable values:	1 - 17 characters that form a valid z/OS data set name prefix

Default:	DSN1110
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The installation CLIST assigns the value of this field as the prefix for all image copy data sets that are created by Db2 installation and IVP jobs.

INSTALL DS PREFIX field

The INSTALL DS PREFIX field specifies the prefix for most data sets that are created by most Db2 installation and IVP jobs. This field does not apply to data sets that are created by job DSNTIJIN.

Acceptable values:	1 - 17 characters that form a valid z/OS data set name prefix
Default:	DSN1110
Update:	option 4 on panel DSNTIPB
DSNZP*xxx*:	none

The installation CLIST assigns the value of this field as the prefix for most data sets that are created by Db2 installation and IVP jobs. However, the following exceptions apply:

- Image copy data sets use the prefix that is specified by the INSTALL IC PREFIX field.
- Db2 sample application libraries (*prefix*.DBRMLIB.DATA, *prefix*.RUNLIB.LOAD, and `prefix`.SRCLIB.DATA) use the prefix that is specified by the DATA SET NAME PREFIX field on panel DSNTIPA1.
- Db2 catalog and directory data sets and the Db2 administrative task scheduler file use the prefix that is specified by the CATALOG ALIAS field on panel DSNTIPA2.
- BSDS and active log copy data sets use the fields on panel DSNTIPH to specify the full name.

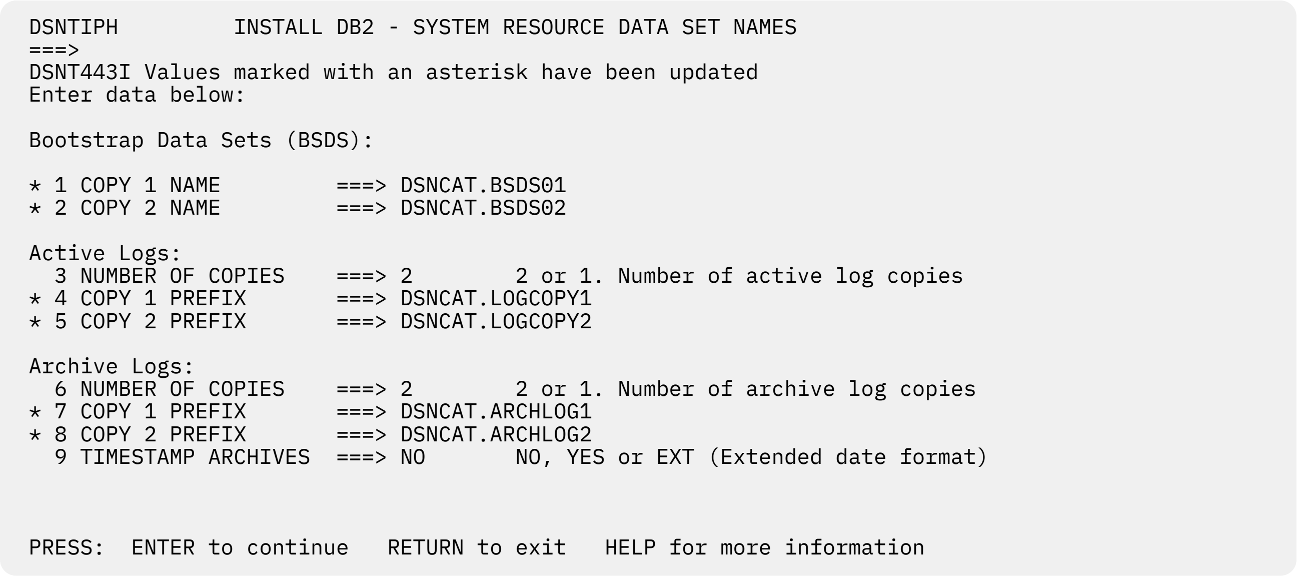
DSNTIPH: System resource data set names panel

The entries on the DSNTIPH panel specify the names of bootstrap data sets, active logs, and archive logs. These entries also specify the number of copies (1 for single logging or 2 for dual logging) for the active and archive logs.

Fields 1, 2, 4, 5, 7, and 8 on the DSNTIPH panel contain the prefix that was entered in the CATALOG ALIAS field on installation panel DSNTIPA2. If you scroll back to panel DSNTIPA2 and change the CATALOG ALIAS value, the values for fields 1, 2, 4, 5, 7, and 8 on DSNTIPH change. When you scroll from panel DSNTIPA2 to panel DSNTIPH, check these values and enter them again if necessary. In MIGRATE or UPDATE modes, the CATALOG ALIAS value cannot be changed, so the fields on DSNTIPH are not affected.

Dual logging improves reliability of recovering and, for active log reads, eases device contention.

Recommendation: Specify dual logging for both active and archive logs. If you specify dual logging, and an error occurs during offload to the archive logs, Db2 restarts the archive process using the second copy of the active log.



```
DSNTIPH         INSTALL DB2 - SYSTEM RESOURCE DATA SET NAMES
===>
DSNT443I Values marked with an asterisk have been updated
Enter data below:

Bootstrap Data Sets (BSDS):

* 1 COPY 1 NAME         ===> DSNCAT.BSDS01
* 2 COPY 2 NAME         ===> DSNCAT.BSDS02

Active Logs:
  3 NUMBER OF COPIES    ===> 2        2 or 1. Number of active log copies
* 4 COPY 1 PREFIX       ===> DSNCAT.LOGCOPY1
* 5 COPY 2 PREFIX       ===> DSNCAT.LOGCOPY2

Archive Logs:
  6 NUMBER OF COPIES    ===> 2        2 or 1. Number of archive log copies
* 7 COPY 1 PREFIX       ===> DSNCAT.ARCHLOG1
* 8 COPY 2 PREFIX       ===> DSNCAT.ARCHLOG2
  9 TIMESTAMP ARCHIVES  ===> NO       NO, YES or EXT (Extended date format)



PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 12. System resource data set names: DSNTIPH

COPY 1 NAME field

The value of the COPY 1 NAME field specifies the fully qualified name that is to be used for the first copy of the bootstrap data set.

Acceptable values:	valid data set name; 1 - 33 characters
Default:	DSNCAT.BSDS01 or DSNCAT.DSN1.BSDS01
Update:	option 5 on panel DSNTIPB; not during migration
DSNZP*xxx*:	none

For non-data-sharing environments, the default prefix is DSNCAT.BSDS*xx*. For data sharing environments, the default prefix is DSNCAT.DSN1.BSDS*xx*. The resulting data set name is DSNCAT.BSDS*xx*.A*nnnnnnn* or DSNCAT.DSN1.BSDS*xx*.A*nnnnnnn* where:

- DSNCAT is the value of the CATALOG ALIAS field on panel DSNTIPA2. You can change this portion of the data set prefix on this panel. If you change it, you need to supply another catalog alias. This additional catalog alias is not automatically defined by the installation process.
- DSN1 is the value of the MEMBER NAME field on panel DSNTIPK.
- *xx* is **01** for the first copy of the logs and **02** for the second copy.
- A*nnnnnnn* is generated by Db2.

For the definition of a valid data set name, see Valid data set name.

COPY 2 NAME field

The value of the COPY 2 NAME field specifies the fully qualified name that is to be used for the second copy of the bootstrap data set.

Acceptable values:	valid data set name; 1 - 33 characters
Default:	DSNCAT.BSDS02 or DSNCAT.DSN1.BSDS02
Update:	option 5 on panel DSNTIPB; not during migration
DSNZP*xxx*:	none

For non-data-sharing environments, the default prefix is DSNCAT.BSDS*xx*. For data sharing environments, the default prefix is DSNCAT.DSN1.BSDS*xx*. The resulting data set name is DSNCAT.BSDS*xx*.A*nnnnnnn* or DSNCAT.DSN1.BSDS*xx*.A*nnnnnnn* where:

- DSNCAT is the value of the CATALOG ALIAS field on panel DSNTIPA2. You can change this portion of the data set prefix on this panel. If you change it, you need to supply another catalog alias. This additional catalog alias is not automatically defined by the installation process.
- DSN1 is the value of the MEMBER NAME field on panel DSNTIPK.
- *xx* is **01** for the first copy of the logs and **02** for the second copy.
- A*nnnnnnn* is generated by Db2.

For the definition of a valid data set name, see Valid data set name.

NUMBER OF COPIES field (TWOACTV subsystem parameter)

The TWOACTV subsystem parameter specifies the number of copies of the active log that Db2 is to maintain: 1 (single logging) or 2 (dual logging).

Acceptable values:	1, 2
Default:	2
Update:	option 5 on panel DSNTIPB; not during migration
DSNZP*xxx*:	DSN6LOGP TWOACTV

Dual logging increases reliability of recovery. If your Db2 subsystem creates copies of the archive log on tape, two tape drives must be available during the offload process.

COPY 1 PREFIX field

The value of the COPY 1 PREFIX field specifies the prefix that is to be used for the first copy of the active log data sets.

Acceptable values:	valid data set name prefix; 1 - 30 characters
Default:	DSNCAT.LOGCOPY1 or DSNCAT.DSN1.LOGCOPY1
Update:	option 5 on panel DSNTIPB; not during migration
DSNZP*xxx*:	none

For non-data-sharing environments, the default prefix is DSNCAT.LOGCOPY*x*. For data sharing environments, the default prefix is DSNCAT.DSN1.LOGCOPY*x*. The resulting data set name is DSNCAT.LOGCOPY*x*.A*nnnnnnn* or DSNCAT.DSN1.LOGCOPY*x*.A*nnnnnnn*, where:

- DSNCAT is the value of the CATALOG ALIAS field on panel DSNTIPA2. You can change this portion of the data set prefix on this panel. If you change it, you need to specify another catalog alias. This additional catalog alias is not automatically defined by the installation process.
- DSN1 is the of the MEMBER NAME field on panel DSNTIPK.
- LOGCOPY is part of the data set prefix that you can change on this panel.
- *x* is **1** for the first copy of the logs and **2** for the second copy.
- *nnnnnnn* is the data set number.

For the definition of a valid data set name, see Valid data set name.

COPY 2 PREFIX field

The value of the COPY 2 PREFIX field specifies the prefix that is to be used for the second copy of the active log data sets.

Acceptable values:	valid data set name prefix; 1 - 30 characters

Default:	DSNCAT.LOGCOPY2 or DSNCAT.DSN1.LOGCOPY2
Update:	option 5 on panel DSNTIPB; not during migration
DSNZP*xxx*:	none

If you are using single logging, accept the default value. Do not leave the entry blank.

For non-data-sharing environments, the default prefix is DSNCAT.LOGCOPY*x*. For data sharing environments, the default prefix is DSNCAT.DSN1.LOGCOPY*x*. The resulting data set name is DSNCAT.LOGCOPY*x*.A*nnnnnnn* or DSNCAT.DSN1.LOGCOPY*x*.A*nnnnnnn*, where:

- DSNCAT is the value of the CATALOG ALIAS field on panel DSNTIPA2. You can change this portion of the data set prefix on this panel. If you change it, you need to specify another catalog alias. This additional catalog alias is not automatically defined by the installation process.
- DSN1 is the value of the MEMBER NAME field on panel DSNTIPK.
- LOGCOPY is part of the data set prefix that you can change on this panel.
- *x* is **1** for the first copy of the logs and **2** for the second copy.
- *nnnnnnn* is the data set number.

For the definition of a valid data set name, see Valid data set name.

NUMBER OF COPIES field (TWOARCH subsystem parameter)

The TWOARCH subsystem parameter specifies the number of copies of the archive log that Db2 is to produce during offloading.

Acceptable values:	1, 2
Default:	2
Update:	option 5 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP TWOARCH

If you run the installation or migration CLIST, the setting of the NUMBER OF COPIES field determines the setting of the TWOARCH subsystem parameter. Valid values of the TWOARCH subsystem parameter are NO and YES.

1

Db2 produces a single copy of the archive log during offloading. This setting corresponds with a value of NO for the TWOARCH subsystem parameter.

2

Db2 produces two copies of the archive log during offloading. Dual logging increases reliability of recovery. This setting corresponds with a value of YES for the TWOARCH subsystem parameter.

COPY 1 PREFIX field (ARCPFX1 subsystem parameter)

The ARCPFX1 subsystem parameter specifies the prefix that is to be used for the first copy of the archive log data set.

Acceptable values:	valid data set name prefix; 1 - 35 characters
Default:	DSNCAT.ARCHLOG1 or DSNCAT.DSN1.ARCLG1
Update:	option 5 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP ARCPFX1

For definitions of valid data set names, see Valid data set name.

COPY 2 PREFIX field (ARCPFX2 subsystem parameter)

The ARCPFX2 subsystem parameter specifies the prefix that is to be used for the second copy of the archive log data set. If you use single logging, accept the default value.

Acceptable values:	valid data set name prefix; 1 - 35 characters
Default:	DSNCAT.ARCHLOG2 or DSNCAT.DSN1.ARCLG2
Update:	option 5 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP ARCPFX2

Do not leave the COPY 2 PREFIX field blank.

TIMESTAMP ARCHIVES field (TSTAMP subsystem parameter)

The TSTAMP subsystem parameter specifies whether the Db2 archive log data set name is to contain the date and time that the archive log data set was created.

Acceptable values:	NO, YES, EXT
Default:	NO
Update:	option 5 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP TSTAMP

NO
The archive data set name does not contain a timestamp.

YES
The maximum allowable length of the user-controlled portion of the archive log prefix is reduced from 35 characters to 19 characters. This reduction in size permits the 16-character date and time qualifiers (timestamp) to be added to the archive log data set prefix. The timestamp format is as follows:

```
.Dyyddd.Thhmmsst,
```

where:

D
is the letter D.

yy
is the last two digits of the year.

ddd
is the day of the year.

T
is the letter T.

hh
is the hour.

mm
is the minutes.

ss
is the seconds.

t
is tenths of a second.

EXT

The archive data set name contains a timestamp with an **extended** date component in the format:

```
.Dyyyyddd.
```

A value of EXT in this field causes the lengths of the values that are entered for field COPY 1 PREFIX and field COPY 2 PREFIX to be audited to ensure that neither exceeds 17 bytes (19 bytes for other settings of TIMESTAMP ARCHIVES).

DSNTIPT: Data set names panel 1

The entries on the DSNTIPT panel establish data set names for the libraries that are used in the Db2 CLIST and JCL that Db2 provides. The values that you enter on this panel are edited into all pertinent sample and installation jobs.

You can enter these values in one of three ways: same data set name prefix, no data set name prefix, or a new data set name prefix. The following table summarizes these selections.

Table 18. Summary of values

If you use ...	Then
Same data set name prefix or data set names	Current data sets are deleted and reallocated for installation and migration.
No data set names	No new output is created. Previous output remains intact.
New prefix	Output is saved in new data set. Previous output remains intact.

When you run the CLIST in INSTALL or MIGRATE mode, the following warning message is displayed for any output data set that already exists:

```
DSNT434I WARNING, DATA SETS MARKED WITH ASTERISKS EXIST AND WILL BE OVERWRITTEN
```

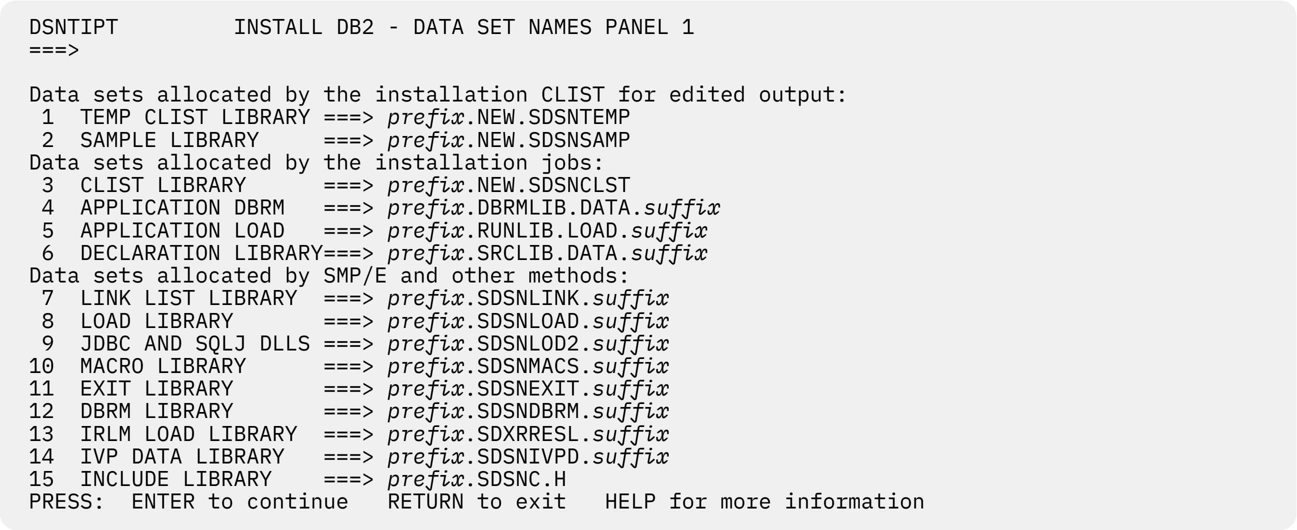
To avoid deleting these data sets, take one of the following actions:

- Press Enter to leave the installation process.
- Change the data set names.

Press Enter again if you want to continue; this overwrites your data sets.

When you run the CLIST in UDPATE or ENFM mode, this panel is displayed immediately after panel DSNTIPA1. This allows you to check the SDSNSAMP data set name to see if it is the one you want to use for the DSNTIJUZ job. Data sets are marked with an asterisk but not deleted or reallocated if you use the same name. Instead, the data set is compressed, and only the DSNTIJUZ member is replaced within the data set. Other members in the data set are left unchanged. When the CLIST completes processing and returns to panel DSNTIPA1, the following message is displayed:

```
WARNING MESSAGE(S) WAS PRODUCED DURING CLIST TAILORING SESSION
```



```
DSNTIPT         INSTALL DB2 - DATA SET NAMES PANEL 1
===>

Data sets allocated by the installation CLIST for edited output:
 1  TEMP CLIST LIBRARY ===> prefix.NEW.SDSNTEMP
 2  SAMPLE LIBRARY     ===> prefix.NEW.SDSNSAMP
Data sets allocated by the installation jobs:
 3  CLIST LIBRARY      ===> prefix.NEW.SDSNCLST
 4  APPLICATION DBRM   ===> prefix.DBRMLIB.DATA.suffix
 5  APPLICATION LOAD   ===> prefix.RUNLIB.LOAD.suffix
 6  DECLARATION LIBRARY===> prefix.SRCLIB.DATA.suffix
Data sets allocated by SMP/E and other methods:
 7  LINK LIST LIBRARY  ===> prefix.SDSNLINK.suffix
 8  LOAD LIBRARY       ===> prefix.SDSNLOAD.suffix
 9  JDBC AND SQLJ DLLS ===> prefix.SDSNLOD2.suffix
10  MACRO LIBRARY      ===> prefix.SDSNMACS.suffix
11  EXIT LIBRARY       ===> prefix.SDSNEXIT.suffix
12  DBRM LIBRARY       ===> prefix.SDSNDBRM.suffix
13  IRLM LOAD LIBRARY  ===> prefix.SDXRRESL.suffix
14  IVP DATA LIBRARY   ===> prefix.SDSNIVPD.suffix
15  INCLUDE LIBRARY    ===> prefix.SDSNC.H
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 13. Data set names panel 1: DSNTIPT

TEMP CLIST LIBRARY and SAMPLE LIBRARY are data sets that are allocated by the installation CLIST for edited output. CLIST LIBRARY is allocated by DSNTIJVC. If the INPUT MEMBER NAME field on installation panel DSNTIPA1 is set to DSNTIDXA or DSNTIDXB, the three data sets default to *prefix*.NEW.SDSNTEMP, *prefix*.NEW.SDSNCLST, and *prefix*.NEW.SDSNSAMP respectively. In these names, *prefix* is the value that is entered for the DATA SET NAME PREFIX field on installation panel DSNTIPA1. The following table shows the job-tailoring fields.

Table 19. Job-tailoring fields

Mode	Tailored output	No tailored output
Installing	All three fields entered	All three fields blank
Migrating	All three fields entered	All three fields blank
Updating	SAMPLE LIBRARY entered	SAMPLE LIBRARY blank

Db2 adds blanks to these fields after a successful tailoring session to avoid writing over the tailored output.

TEMP CLIST LIBRARY field

The value of the TEMP CLIST LIBRARY field specifies the name of the data set where edited CLISTs are to be placed.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.NEW.SDSNTEMP
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

This field must not be blank if you are tailoring output.

SAMPLE LIBRARY field

The value of the SAMPLE LIBRARY field specifies the name of the edited JCL library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.NEW.SDSNSAMP

Update:	option 6 on panel DSNTIPB
DSNZP*xxx*:	none

In update mode, the new sample library data set is not reallocated. It is compressed and member DSNTIJUZ is overwritten. This field must not be blank if you are tailoring output.

CLIST LIBRARY field

The CLIST LIBRARY field identifies the name of the data set into which job DSNTIJVC is to load all CLISTs.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.NEW.SDSNCLST
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

This field must not be blank if you are tailoring output.

APPLICATION DBRM field

The value of the APPLICATION DBRM field specifies the name of the library that is to be used for Db2 sample application DBRMs.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.DBRMLIB.DATA.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The APPLICATION DBRM field, APPLICATION LOAD field, and DECLARATION LIBRARY field are for Db2-provided sample applications. The names of your own development libraries are most likely different from the default values that are shown here. Job DSNTIJMV references another set of DBRMLIB, RUNLIB, and SRCLIB data sets for SYS1.PROCLIB. See "Installation step 2: Define Db2 to z/OS: DSNTIJMV" on page 361 for more information. These fields must not be blank.

APPLICATION LOAD field

The value of the APPLICATION LOAD field specifies the name of the Db2 sample application load module library.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.RUNLIB.LOAD.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The APPLICATION DBRM field, APPLICATION LOAD field, and DECLARATION LIBRARY field are for Db2-provided sample applications. The names of your own development libraries most likely are different from the default values that are shown here. Job DSNTIJMV references another set of DBRMLIB, RUNLIB, and SRCLIB data sets for SYS1.PROCLIB. See "Installation step 2: Define Db2 to z/OS: DSNTIJMV" on page 361 for more information. These fields must not be blank.

DECLARATION LIBRARY field

The value of the DECLARATION LIBRARY field specifies the name of the Db2 declaration library that is to be used for sample application include files.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SRCLIB.DATA.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The DECLARATION LIBRARY field is for Db2-provided sample applications. The name of your own development library is most likely different from the default value for this field.

LINK LIST LIBRARY field

The LINK LIST LIBRARY field specifies the name of the APF-authorized Db2 early code library.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNLINK.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The LINK LIST LIBRARY field specifies the name of a data set that is allocated during SMP processing. This field must not be blank.

LOAD LIBRARY field

The value of the LOAD LIBRARY field specifies the name of the main APF-authorized Db2 load module library that is to be used by installation and sample jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNLOAD.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The LOAD LIBRARY field specifies the name of a data set that is allocated during SMP processing. This field must not be blank.

JDBC AND SQLJ DLLS field

The JDBC AND SQLJ DLLS field specifies the name of the main DLL library for Db2 Java support. This library is used by installation and sample jobs and some of the stored procedures that are provided by Db2.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNLOD2.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The JDBC AND SQLJ DLLS field specifies the name of a data set that is allocated during SMP processing. This field cannot be blank.

MACRO LIBRARY field

The value of the MACRO LIBRARY field specifies the name of the macro library that is to be used by installation and sample jobs. This library contains the CICS and IMS attachment facility macros, the initialization parameter macros, and some data-mapping macros that are needed for some applications.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNMACS.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The MACRO LIBRARY field specifies the name of a data set that is allocated during SMP processing. This field must not be blank.

EXIT LIBRARY field

The value of the EXIT LIBRARY field specifies the name of the library where your DSNZP*xxx* module, application defaults load module (*dsnhdecp*), and exit routines are to be placed.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNEXIT.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

When you use *prefix*.SDSNLOAD and *prefix*.SDSNEXIT together, list *prefix*.SDSNEXIT first to override the IBM defaults in *prefix*.SDSNLOAD.

The EXIT LIBRARY field specifies the name of a data set that is allocated during SMP processing. This field must not be blank.

DBRM LIBRARY field

The value of the DBRM LIBRARY field identifies the name of the library where the DBRMs that are shipped with Db2 are to be placed.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNDBRM.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

The DBRM LIBRARY field specifies the names of data sets that are allocated during SMP processing. This field must not be blank.

IRLM LOAD LIBRARY field

The value of the IRLM LOAD LIBRARY field specifies the name of the IRLM load library data set that is to be used in the IRLM procedure.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDXRRESL.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

This field must not be blank. It specifies the name of a data set that is allocated during SMP processing.

IVP DATA LIBRARY field

The value of the IVP DATA LIBRARY field specifies the data set name of SDSNIVPD. SDSNIVPD is the SMP/E target library for the Db2 installation verification procedure (IVP) input data and for the expected output from the sample applications.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNIVPD.*suffix*
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

INCLUDE LIBRARY field

The value of the INCLUDE LIBRARY field identifies the name of the include library data set that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	*prefix*.SDSNC.H
Update:	cannot change during update or ENFM
DSNZP*xxx*:	none

This library is used in the Db2 language PROCS for C and C++.

DSNTIPU: Data set names panel 2

The entries on panels DSNTIPU and DSNTIPW establish data set names for other product libraries. The values that you enter on these panels are edited into sample and installation jobs. Accept the default values for products that you do not have. Jobs for those particular products should not be run.

Db2 makes assumptions about which one of the possible C, C++, and PL/I compilers that you are using, depending on the values you supply or leave as default in the C, C++, and PL/I fields.

Many data set names for other products appear in the jobs. You can enter most of these data sets on this panel and on installation panel DSNTIPW. These names are shown in the following table as they appear in the jobs that are shipped with Db2. Change the names of the data sets if they are different at your site.

Table 20. Data set names that are used in jobs for related products

Job	Data set name	Function
DSNTEJ1	SYS1.MACLIB	Assembler macro library
	SYS1.SORTLIB	DFSORT load modules (can be deleted if DFSORT is in link list)
DSNTEJ1L	CEE.SCEELKED	Language Environment linkage editor library
	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ1P	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ1U	CEE.SCEERUN	Language Environment dynamic run time library
	SYS1.SORTLIB	DFSORT load modules (can be deleted if DFSORT is in link list)
DSNTEJ2A	SYS1.SORTLIB	DFSORT load modules (can be deleted if DFSORT is in link list)
DSNTEJ2C	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ2D	CEE.SCEERUN	Language Environment dynamic run time library

Table 20. Data set names that are used in jobs for related products (continued)

Job	Data set name	Function
DSNTEJ2E	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ2F	SYS1.MACLIB	Assembler macro library
	SYS1.VSF2FORT	VS Fortran run time library
DSNTEJ2P	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ3C	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ3P	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ4C	IMSVS.RESLIB	IMS linkage editor library
	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ4P	IMSVS.RESLIB	IMS linkage editor library
	CEE.SCEELKED	PL/I linkage editor base library
	CEE.SCEERUN	PL/I dynamic run time base library
DSNTEJ5A	CICS410.SDFHLOAD	CICS command translator and linkage editor
	CICS410.SDFHMAC	CICS macro library
	SYS1.MACLIB	Assembler macro library
DSNTEJ5C	CICS410.SDFHLOAD	CICS command translator and linkage editor library
	IGY.SIGYCOMP	Enterprise COBOL for z/OS
		See also the list of libraries that are used by DSNH CLIST in
DSNTEJ5P	CICS410.SDFHLOAD	CICS command translator and linkage editor library
	CICS410.SDFHPLI	CICS PL/I linkage editor library
	CEE.SCEELKED	Language Environment link editor library
DSNTEJ6D	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6P	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6R	CEE.SCEERUN	Language Environment dynamic run time library
	CEE.SCEEH.H	C library headers
	CEE.SCEELKED	Language Environment linkage editor library
DSNTEJ6S	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6T	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6U	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6V	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6W	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ6Z	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ61	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ62	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ63	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ64	CEE.SCEERUN	Language Environment dynamic run time library

Table 20. Data set names that are used in jobs for related products (continued)

Job	Data set name	Function
DSNTEJ65	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ66	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ7	SYS1.SORTLIB	DFSORT load modules (can be deleted if DFSORT is in link list)
DSNTEJ71	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ73	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ75	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ76	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ77	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJ78	CEE.SCEERUN	Language Environment dynamic run time library
DSNTEJXP	CEE.SCEERUN	Language Environment dynamic run time library
DSNTIJMV	SYS1.MACLIB	Assembler macro library
	CEE.SCEERUN	Language Environment dynamic run time library
	CEE.SCEELKED	Language Environment linkage editor library
	EDCPRLK	Language Environment pre-link editor library
	CEE.SCEEMSGP	Language Environment pre-link message file
	CBC.SCCNCMP	C/C++ for z/OS compiler library
	CCNDRVR	C/C++ compiler load module
	CEE.SCEEH.H	C library headers
	CEE.SCLBH.H	C++ library headers
	CEE.SCEECPP	C++ autolink library
	CBC.SCLBCPP	C++ class library
	CICS.SCLBCPP	CICS library for COBOL
	CICS.SDFHLOAD	CICS command translator and linkage editor
	CICS.SDFLPLI	CICS library for PL/I
	prefix.SDSNLOAD(DSNHPC)	Db2 precompiler
	prefix.SDSNLOAD	Db2 linkage editor library
	DSNHPC	Db2 precompiler module
	GDDM.SADMSAM	GDDM macro library
	GDDM.SADMMOD	GDDM load module library
	IGY.SIGYCOMP	Enterprise COBOL for z/OS compiler library
	IGYCRCTL	Enterprise COBOL for z/OS compiler load module
	IMSVS.RESLIB	IMS linkage editor library
	ISP.SISPLOAD	ISPF ISPLINK module
	IBM.SIBMZCMP	Enterprise PL/I for z/OS compiler library
	SYS1.VSF2FORT	VS Fortran run time library

Use this panel to define the data set names of your IBM Language Environment, C/370, or C/C++ program product libraries. For more information about these libraries, consult the appropriate program product documentation For more information about these libraries, consult the appropriate program product documentation.

Data sets that are specified on this panel are used by the Db2 installation process to tailor the Db2 language procedures that are generated by installation job DSNTIJMV:

- DSNHASM can be used to prepare Db2 programs using assembly language
- DSNHC can be used to prepare Db2 programs that use C.
- DSNHCPP can be used to prepare Db2 programs that use C++.
- DSNHCPP2 can be used to prepare a class and a client for a Db2 object-oriented program that use C++.
- DSNHCPPS contains the header file search path that is to be used by DSNHCPP and DSNHCPP2.
- DSNHFOR can be used to prepare Db2 programs using FORTRAN
- DSNHICOB can be used to prepare Db2 programs using COBOL
- DSNHPLI can be used to prepare Db2 programs using PL/I
- DSNHSQL can be used to prepare Db2 external SQL procedures

Data sets that you specify on this panel are also used by the Db2 installation process to tailor the Db2 Interactive (DB2I) program preparation CLIST, DSNH.

When the compiler fields are left blank, the DSNH CLIST and the provided JCL procedures operate differently. The DSNH CLIST issues a specific call statement, using the default load module data set name as the argument of the call. The JCL procedures use the z/OS link list to find the data set in which the load module resides.

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Use fields 1 through 4 of DSNTIPU to specify the IBM Language Environment run time environment, link editor, and pre-link editor message libraries. The CLIST assumes that these libraries are used by all language products except FORTRAN.

Use fields 6 through 13 to define C/370, AD/Cycle, or C/C++ for z/OS. If you need to define C++, you must also define C/C++ for C.

If C is not installed on your system:

- Accept the default values for fields 6 through 13.
- Do not run IVP jobs DSNTEJ2D, DSNTEJ2U, DSNTEJ6D, DSNTEJ6R, DSNTEJ6T, DSNTEJ63, DSNTEJ6W, DSNTEJ6Z, DSNTEJ64, DSNTEJ65, DSNTEJ66, DSNTEJ71, DSNTEJ73, and DSNTEJ75.

If C++ is not installed on your system:

- Accept the default values for fields 6 through 13.
- Do not run jobs DSNTEJ2E or DSNTEJ6V. Skip steps PH02US08 and PH02US09 of IVP job DSNTEJ2U.
- Remove all statements that refer to DAYNAME and MONTHNAME from part DSNTESU in the *prefix*.SDSNSAMP library if C++ is not available.

If COBOL is not installed on your system:

- Accept the default value for field 14.
- Do not run IVP jobs DSNTEJ2C, DSNTEJ3C, DSNTEJ4C, DSNTEJ5C, DSNTEJ61, DSNTEJ62, DSNTEJ76, DSNTEJ77, and DSNTEJ78.

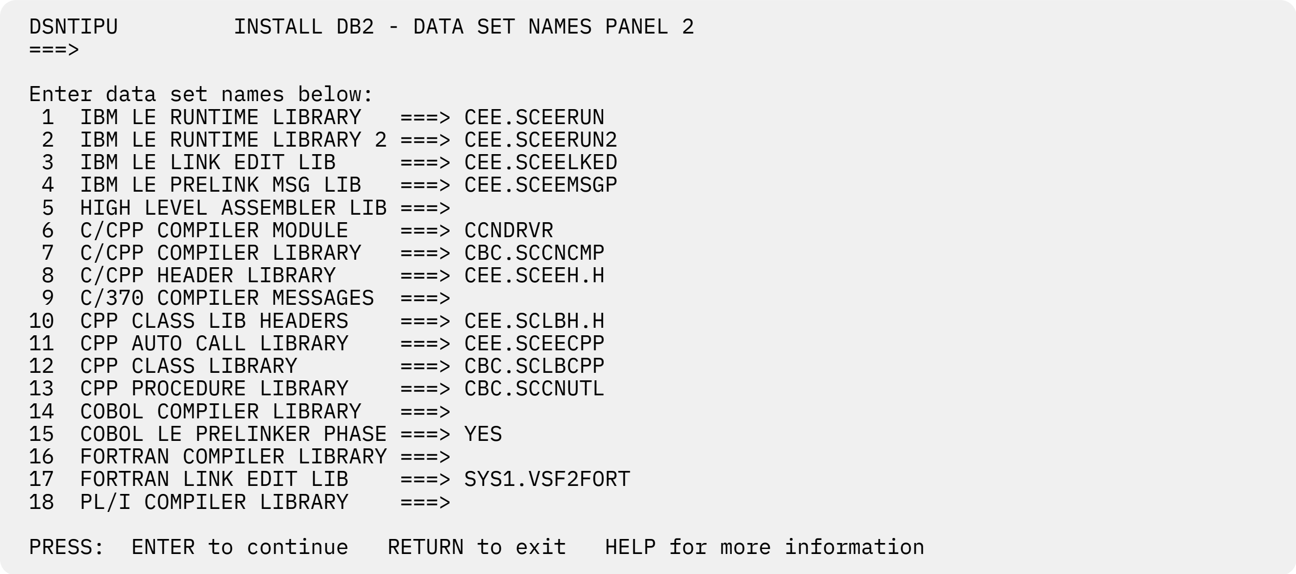
If Fortran is not installed on your system:

- Accept the default values for fields 15 and 16.
- Do not run IVP job DSNTEJ2F.

If PL/I is not installed on your system:

- Accept the default values for field 17.

- Do not run IVP jobs DSNTEJ1P, DSNTEJ2P, DSNTEJ3P, DSNTEJ4P, DSNTEJ5P, DSNTEJ6P, DSNTEJ6S, and DSNTEJ6U.



```
DSNTIPU         INSTALL DB2 - DATA SET NAMES PANEL 2
===>

Enter data set names below:
 1  IBM LE RUNTIME LIBRARY   ===> CEE.SCEERUN
 2  IBM LE RUNTIME LIBRARY 2 ===> CEE.SCEERUN2
 3  IBM LE LINK EDIT LIB     ===> CEE.SCEELKED
 4  IBM LE PRELINK MSG LIB   ===> CEE.SCEEMSGP
 5  HIGH LEVEL ASSEMBLER LIB ===>
 6  C/CPP COMPILER MODULE    ===> CCNDRVR
 7  C/CPP COMPILER LIBRARY   ===> CBC.SCCNCMP
 8  C/CPP HEADER LIBRARY     ===> CEE.SCEEH.H
 9  C/370 COMPILER MESSAGES  ===>
10  CPP CLASS LIB HEADERS    ===> CEE.SCLBH.H
11  CPP AUTO CALL LIBRARY    ===> CEE.SCEECPP
12  CPP CLASS LIBRARY        ===> CBC.SCLBCPP
13  CPP PROCEDURE LIBRARY    ===> CBC.SCCNUTL
14  COBOL COMPILER LIBRARY   ===>
15  COBOL LE PRELINKER PHASE ===> YES
16  FORTRAN COMPILER LIBRARY ===>
17  FORTRAN LINK EDIT LIB    ===> SYS1.VSF2FORT
18  PL/I COMPILER LIBRARY    ===>

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 14. Data set names panel 2: DSNTIPU

IBM LE RUNTIME LIBRARY field

The IBM LE RUNTIME LIBRARY field identifies the name of the IBM Language Environment dynamic run time library that is to be used by sample and installation jobs.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CEE.SCEERUN
Update:	cannot change during update
DSNZP*xxx*:	none

The data set name typically includes the qualifier SCEERUN. Leave this field blank if SCEERUN is in the link list. If you enter a value in this field, it is used in the STEPLIB concatenation of the JCL procedures generated by installation job DSNTIJMV, including the following procedures:

- The database services address space (*ssnm*DBM1) and system services address space (*ssnm*MSTR) for Db2
- The Db2–supplied WLM procedures DSNWLM and DSNCICS
- The Db2 language procedures
- The JOBLIB concatenation of many IVP jobs

If you plan to use Db2 to run XPLINK or AMODE 64 applications, provide the SCEERUN and SCEERUN2 libraries for IBM Language Environment in the z/OS program search order. See Description of Language Environment target libraries (z/OS Language Environment Customization) for more information.

IBM LE RUNTIME LIBRARY 2 field

The IBM LE RUNTIME LIBRARY 2 field identifies the name of the IBM Language Environment dynamic run time library for programs that require the library to be in an extended partitioned data set (PDSE).

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CEE.SCEERUN2
Update:	cannot change during update

DSNZP*xxx*:	none

The data set name typically includes the qualifier SCEERUN2. Leave this field blank if SCEERUN2 is in the link list. If you enter a value in this field, it is used in the STEPLIB concatenation of the DSNDBM1 JCL procedure that is generated by installation job DSNTIJMV.

If you plan to use Db2 to run XPLINK or AMODE 64 applications, provide the SCEERUN and SCEERUN2 libraries for IBM Language Environment in the z/OS program search order. See Description of Language Environment target libraries (z/OS Language Environment Customization) for more information.

IBM LE LINK EDIT LIB field

The IBM LE LINK EDIT LIB field identifies the name of the IBM Language Environment linkage editor library that sample and installation jobs are to use.

Acceptable values:	valid data set name: see Valid data set name
Default:	CEE.SCEELKED
Update:	cannot change during update
DSNZP*xxx*:	none

The data set name typically includes the qualifier SCEELKED. SCEELKED is required to link-edit load modules for C, C++, COBOL, and PL/I application programs. The value that you enter here is used to customize the Db2 language procedures and the DSNH CLIST.

IBM LE PRELINK MSG LIB field

The IBM LE PRELINK MSG LIB field identifies the data set name for messages that are to be issued by the IBM Language Environment pre-linkage editor (EDCPRLK).

Acceptable values:	valid data set name: see Valid data set name
Default:	CEE.SCEEMSGP
Update:	cannot change during update
DSNZP*xxx*:	none

The SMP/E target data set name typically includes the qualifier SCEEMSGP. SCEEMSGP is required to pre-link edit load modules for C, C++, COBOL, and PL/I application programs. The value that you enter here is used to customize Db2 language procedures and the DSNH CLIST.

HIGH LEVEL ASSEMBLER LIB field

The value of the HIGH LEVEL ASSEMBLER LIB field specifies the data set name of the assembler load module library. This value is to be used by sample and installation jobs.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

The data set name typically includes the qualifier SASMMOD1. The value that you specify for this field is used to customize the DSNHASM language procedure and the DSNH CLIST. It is also added to the STEPLIB concatenation of each Db2-provided job that uses the assembler. You can leave this field blank if the library is in the link list.

C/CPP COMPILER MODULE field

The C/CPP COMPILER MODULE field specifies the load module name of the C/370 or C/C++ compiler that is to be used on your system.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CCNDRVR
Update:	cannot change during update
DSNZP*xxx*:	none

The default value is CCNDRVR for C/C++ for z/OS. The value that you enter here is used to determine the configuration for the DSNHC, DSNHCPP, DSNHCPP2, and DSNHSQL language procedures, the DSNH CLIST, and the IVP jobs that use C and C++. The value is used as follows:

- If the entry begins with the string "EDC", the CLIST configures your system to use C/370.

  Important: You cannot use C/370 and C++.
- If the entry begins with any other value, including blanks, the CLIST configures your system to use C/C++ for z/OS.

C/CPP COMPILER LIBRARY field

The C/CPP COMPILER LIBRARY FIELD specifies the name of the compiler library that is to be used for C/C++ or C/370.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CEE.SCCNCMP
Update:	cannot change during update
DSNZP*xxx*:	none

This value is used to customize the DSNHC, DSNHCPP, DSNHCPP2, and DSNHSQL language procedures, and the DSNH CLIST. This field can be left blank if the compiler library is in the link list.

The following guidelines apply to the target data set name:

- For C/C++ for z/OS, the SMP/E target data set name typically includes the qualifier SCCNCMP.
- For C/370, the SMP/E target data set name typically includes the qualifier SEDCDCMP or SEDCCOMP.

C/CPP HEADER LIBRARY field

The C/CPP HEADER LIBRARY field specifies the name of the header include library that is to be used for C/C++ or C/370.

Acceptable values:	blank, or valid load module name: see Valid data set name
Default:	CEE.SCEEH.H
Update:	cannot change during update
DSNZP*xxx*:	none

- For C/C++, the SMP/E target data set name typically includes the qualifier SCEEH.H.
- For C/370, the SMP/E target data set name typically includes the qualifier SEDCDCMP or SEDCCOMP.

This value is used to customize the DSNHC, DSNHCPP, DSNHCPP2, and DSNHSQL language procedures, and the DSNH CLIST. This field can be left blank if the compiler library is in the link list.

C/370 COMPILER MESSAGES field

The value of the C/370 COMPILER MESSAGES field is the name of the message library that is to be used for the C/370 compiler.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

The data set name typically includes the qualifier SEDCDMSG or SEDCMSGS. If you are using C or C++, leave this field blank. This value is used to customize the DSNHC and DSNHSQL language procedures and the DSNH CLIST.

You can specify C/C++ for MVS/ESA V3R1, or C/C++ for MVS/ESA V3R2. These are shipped as single products, but you need to define them separately on this line and on line 1, depending on your need for C or C++. If you specify a name in this field, a STEPLIB is added to the compiler step of the DSNHCPP and DSNHCPP2 procedures in job DSNTIJMV, and to the C++ portion of the DSNH CLIST. You can leave this field blank if the compiler library is in the link list.

CPP CLASS LIB HEADERS field

The value of the CPP CLASS LIB HEADERS field specifies the data set name for the C++ class header files.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CBC.SCLBH.H
Update:	cannot change during update
DSNZP*xxx*:	none

Accept the default value if C++ is not available on your system.

For C/C++ for z/OS, the data set name typically includes the qualifier CBC.SCLBH.H.

If you specify a name in this field, it is used to customize the DSNHCPP and DSNHCPP2 language procedures and the DSNH CLIST.

CPP AUTO CALL LIBRARY field

The value of the CPP AUTO CALL LIBRARY field specifies the data set name of the C++ auto call library.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CEE.SCEECPP
Update:	cannot change during update
DSNZP*xxx*:	none

This data set name typically includes the qualifier SCEECPP. Accept the default value if C++ is not available on your system. The value of the CPP AUTO CALL LIBRARY field is used to customize the DSNHCPP and DSNHCPP2 language procedures and the DSNH CLIST.

CPP CLASS LIBRARY field

The value of the CPP CLASS LIBRARY field specifies the data set name of the C++ class library.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	CEE.SCLBCPP

Update:	cannot change during update
DSNZP*xxx*:	none

Accept the default value if C++ is not available on your system.

For C/C++ for z/OS, the data set name typically includes the qualifier SCLBCPP.

The value of the CPP CLASS LIBRARY field is used to customize the DSNHCPP and DSNHCPP2 language procedures and the DSNH CLIST.

CPP PROCEDURE LIBRARY field

The value of the CPP PROCEDURE LIBRARY field specifies the data set name for the C++ procedure library.

Acceptable values:	valid data set name: see Valid data set name
Default:	CEE.SCCNUTL
Update:	cannot change during update
DSNZP*xxx*:	none

Accept the default value if C++ is not available on your system.

For C/C++ for z/OS, the data set name typically includes the qualifier SCCNUTL.

COBOL COMPILER LIBRARY field

The value of the COBOL COMPILER LIBRARY field identifies the name of the compiler library that is to be used for COBOL.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

The data set name typically includes the qualifier SIGYCOMP. The value that you enter here is used to customize the DSNHICOB language procedure and the DSNH CLIST. You can leave this field blank if the compiler library is in the link list.

COBOL LE PRELINKER PHASE field

The value of the COBOL LE PRELINKER PHASE field indicates whether to customize the DSNHICOB language procedure to include a procedure step that executes the IBM Language Environment prelinker.

Acceptable values:	NO or YES
Default:	YES
Update:	cannot change during update
DSNZP*xxx*:	none

NO

Specifies that the DSNHICOB procedure is customized to prepare COBOL programs without using the prelinker. NO is required when using IBM Enterprise COBOL Version 5.1 and later releases. It is acceptable for older versions of the COBOL compiler that are supported by this release of Db2. Additional DD statements are allocated for the COBOL compiler and object code is passed directly from the compiler to the z/OS binder to create a program object, which must reside in a partitioned data set extended (PDSE).

YES

Specifies that the DSNHICOB procedure is customized to prepare COBOL programs using the prelinker. YES is acceptable only when using IBM Enterprise COBOL Version 4.2 and older releases. Object code is passed from the compiler to the IBM Language Environment prelinker and then to the z/OS binder. The binder creates a load module if the output library is a partitioned data set (PDS). It creates a program object if the output library is a PDSE. YES is the default setting.

FORTRAN COMPILER LIBRARY field

The FORTRAN COMPILER LIBRARY field identifies the data set name of the Fortran compiler library that is to be used by the Db2 installation process.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

If you specify a value here, it is used to customize the DSNHFOR language procedure and the DSNH CLIST. You can leave this field blank if the compiler library is in the link list.

FORTRAN LINK EDIT LIB field

The FORTRAN LINK EDIT LIB field identifies the data set name of the Fortran linkage editor library that is to be used by the Db2 installation process.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	SYS1.VSF2FORT
Update:	cannot change during update
DSNZP*xxx*:	none

The value that you enter here is used to customize the DSNHFOR language procedure and the DSNH CLIST. Accept the default value if FORTRAN is not available on your system, and do not run IVP job DSNTIJ2F.

PL/I COMPILER LIBRARY field

The value of the PL/I COMPILER LIBRARY field specifies the name of the PL/I compiler library that is to be used by installation and sample jobs.

Acceptable values:	blank, or valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

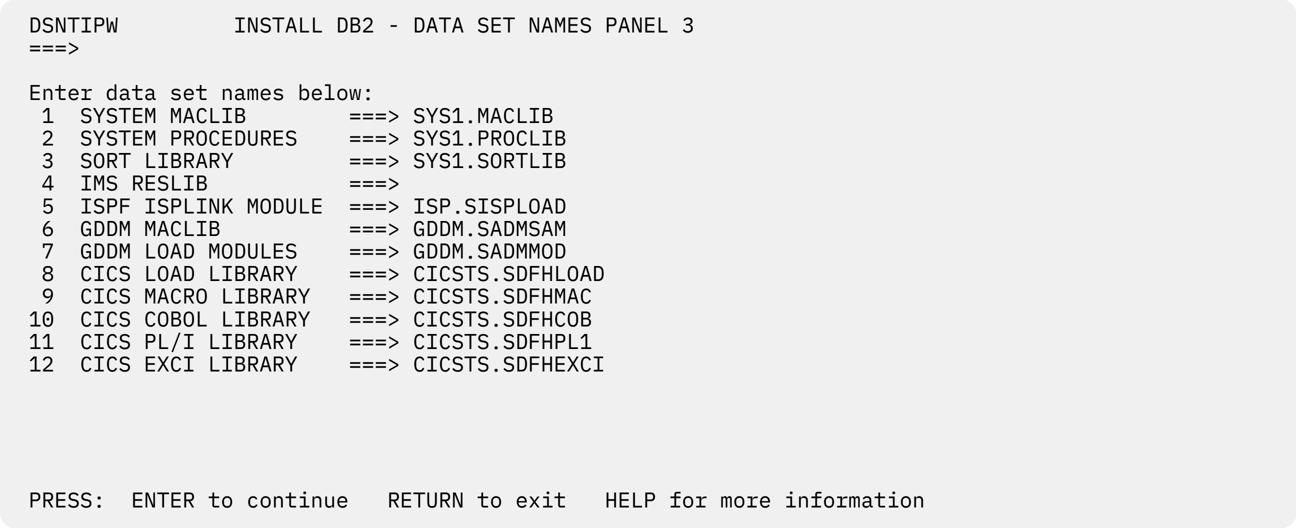
For Enterprise PL/I, the data set name typically includes the qualifier SIBMZCMP. The value that you enter here is used to customize the DSNHPLI language procedure and the DSNH CLIST. You can leave the field blank if the PL/I compiler library is in the system link list.

DSNTIPW: Data set names panel 3

The entries on the DSNTIPW panel establish data set names for the libraries of other products in your system. The values that are entered on this panel are edited into all pertinent sample and installation jobs.

If you do not have the product, accept the default. The default cannot be blank.

Many data set names for other products appear in the jobs. You can enter most of these data set names on this panel and on installation panel DSNTIPU. These names are shown in the table in Data set names panel 2: DSNTIPU as they appear in the jobs that are shipped with Db2. Change the names of the data sets if they are different at your site.



```
DSNTIPW         INSTALL DB2 - DATA SET NAMES PANEL 3
===>

Enter data set names below:
 1  SYSTEM MACLIB        ===> SYS1.MACLIB
 2  SYSTEM PROCEDURES    ===> SYS1.PROCLIB
 3  SORT LIBRARY         ===> SYS1.SORTLIB
 4  IMS RESLIB           ===>
 5  ISPF ISPLINK MODULE  ===> ISP.SISPLOAD
 6  GDDM MACLIB          ===> GDDM.SADMSAM
 7  GDDM LOAD MODULES    ===> GDDM.SADMMOD
 8  CICS LOAD LIBRARY    ===> CICSTS.SDFHLOAD
 9  CICS MACRO LIBRARY   ===> CICSTS.SDFHMAC
10  CICS COBOL LIBRARY   ===> CICSTS.SDFHCOB
11  CICS PL/I LIBRARY    ===> CICSTS.SDFHPL1
12  CICS EXCI LIBRARY    ===> CICSTS.SDFHEXCI




PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 15. Data set names panel 3: DSNTIPW

SYSTEM MACLIB field

The value of the SYSTEM MACLIB field specifies the data set name of the assembler macro library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	SYS1.MACLIB
Update:	cannot change during update
DSNZP*xxx*:	none

SYSTEM PROCEDURES field

The value of the SYSTEM PROCEDURES field specifies the data set name of the system procedures library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	SYS1.PROCLIB
Update:	cannot change during update
DSNZP*xxx*:	none

SORT LIBRARY field

The value of the SORT LIBRARY field specifies the name of the data set where the DFSORT load module resides.

Acceptable values:	valid data set name: see Valid data set name
Default:	SYS1.SORTLIB
Update:	cannot change during update
DSNZP*xxx*:	none

If you use the Db2 Sort for z/OS product, Db2 does not use the value of this field. However, you should set this value to a valid data set name in case you need to use DFSORT as a fallback. The following guidance applies if you set the DB2SORT subsystem parameter to DISABLE or Db2 Sort for z/OS is not installed.

If you use DFSORT, and your load library is not in the link list, you can change the DSNUPROC JCL procedure in job DSNTIJMV.

If DFSORT is installed as your primary z/OS sort product, you do not need to take any action to make DFSORT available to Db2. If multiple releases of DFSORT are installed, ensure that DFSORT R14 is found first in the system search order.

If DFSORT is not installed as your primary z/OS sort product, use one of the following methods to enable Db2 to use DFSORT:

- Add the DFSORT SORTLPA library to the link pack area list; then add the DFSORT SICELINK library to the link list.
- Add the DFSORT SICELINK library to the link list; then add the DFSORT SORTLPA library to the link list.

  Important: If any non-IBM primary sort product is installed in the link list, install DFSORT in the link list, in system search order, after the non-IBM primary sort product.

  Recommendation: If any non-IBM primary sort product is installed in the link pack area, add the DFSORT libraries to the link list.
- Add the DFSORT SICELINK library to the JOBLIB statement; then add the DFSORT SORTLPA library to the JOBLIB statement.
- Add the DFSORT SICELINK library to the STEPLIB DD statement; then add the DFSORT SORTLPA library to the STEPLIB DD statement.
- Add the DFSORT modules to a private library that is equivalent to one of the above configurations.

  Important: If your non-IBM primary sort product is run from a private library, you must use DFSORT in the same way.

If you install DFSORT in the link pack area or link library, you must install it after you install the non-IBM primary sort product.

Db2 uses only the SORT and MERGE functions in DFSORT. If you want to use DFSORT for any other uses outside of this limited Db2 support, you must separately order and license DFSORT.

Related reference

UT DB2 SORT USE field (DB2SORT subsystem parameter)
The DB2SORT subsystem parameter specifies whether Db2 utilities are to use Db2 Sort for z/OS instead of DFSORT for utility sort processing when Db2 Sort for z/OS is installed.

Related information

DFSORT Installation and Customization

IMS RESLIB field

The IMS RESLIB field identifies the data set name of the IMS linkage editor library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	none
Update:	cannot change during update
DSNZP*xxx*:	none

If you do not have IMS, you do not need to connect Db2 to IMS, and you can skip the phase 4 sample application jobs DSNTEJ4C and DSNTEJ4P.

ISPF ISPLINK MODULE field

The ISPF ISPLINK MODULE field identifies the data set name of the ISPF load module library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	ISP.SISPLOAD
Update:	cannot change during update
DSNZP*xxx*:	none

GDDM MACLIB field

The GDDM MACLIB field identifies the data set name of the GDDM macro library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	GDDM.SADMSAM
Update:	cannot change during update
DSNZP*xxx*:	none

This field and the GDDM LOAD MODULES field must both have a valid data set name or must both be blank. The data set name that you specify in this field is included in the compiler step SYSLIB DD concatenations of DSNHASM, DSNHC, DSNHCOB, DSNHCOB2, DSNHICOB, DSNHICB2, and DSNHPLI. The installation CLIST only generates sample jobs DSNTEJ75 and DSNTEJ78 if you specify a GDDM MACLIB name.

GDDM LOAD MODULES field

The GDDM LOAD MODULES field identifies the data set name of the GDDM load module library that is to be used by sample and installation jobs.

Acceptable values:	valid data set name: see Valid data set name
Default:	GDDM.SADMMOD
Update:	cannot change during update
DSNZP*xxx*:	none

This field and the GDDM MACLIB field must both have a valid data set name or must both be blank. The data set name that you specify in this field is included in the link-edit SYSLIB concatenations of DSNHASM, DSNHC, DSNHCOB, DSNHCOB2, DSNHICOB, DSNHICB2, and DSNHPLI.

CICS LOAD LIBRARY field

The CICS LOAD LIBRARY field identifies the data set name that is to be used for the CICS load module library.

Acceptable values:	valid data set name: see Valid data set name
Default:	CICSTS.SDFHLOAD
Update:	cannot change during update
DSNZP*xxx*:	none

If you do not use CICS, use a blank in the CICS LOAD LIBRARY field.

CICS MACRO LIBRARY field

The CICS MACRO LIBRARY field identifies the data set name that is to be used for the CICS macro library.

Acceptable values:	valid data set name: see Valid data set name
Default:	CICSTS.SDFHMAC
Update:	cannot change during update
DSNZP*xxx*:	none

CICS COBOL LIBRARY field

The CICS COBOL LIBRARY FIELD specifies the data set name for the CICS library that the COBOL programs are to use.

Acceptable values:	valid data set name: see Valid data set name
Default:	CICSTS.SDFHCOB
Update:	cannot change during update
DSNZP*xxx*:	none

CICS PL/I LIBRARY field

The CICS PL/I LIBRARY field identifies the data set name for the CICS library that PL/I programs are to use.

Acceptable values:	valid data set name: see Valid data set name
Default:	CICSTS.SDFHPLI
Update:	cannot change during update
DSNZP*xxx*:	none

CICS EXCI LIBRARY field

The CICS EXCI LIBRARY field identifies the data set name for the CICS library that contains the CICS EXCI load modules.

Acceptable values:	valid data set name: see Valid data set name
Default:	CICS.SDFHEXCI
Update:	cannot change during update
DSNZP*xxx*:	none

DSNTIPD: Sizes panel 1

The entries on the DSNTIPD panel establish the size of the Db2 catalog, directory, and log data sets. Entries on the DSNTIPD panel also define the amount of storage that can be used for storing large object (LOB) values.

The values that you supply on this panel are estimates that are used in calculating sizes for main storage and data sets. The values do not reduce any system limits and do not preclude an application or user from exceeding these estimates, within reasonable limits. For example, if you specify 500 databases, you could create 600. However, if you exceed the values by a large margin, you might encounter a shortage of main storage or use many secondary extents for some data sets. You can usually change the main storage values by using the next panel. If you cannot change these values, see “Updating subsystem parameter and application default values” on page 317 for the appropriate method.

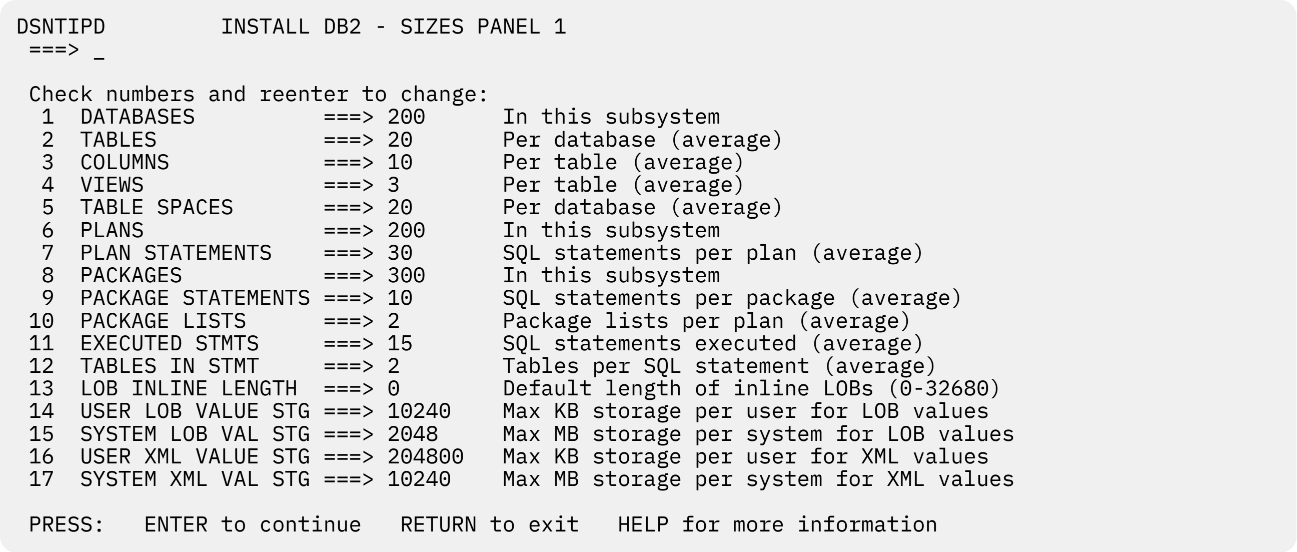
The installation CLIST contains formulas that calculate the space for each catalog data set and the indexes that Db2 requires for each data set. Data that you enter on this panel is used in these formulas. Use integers. Do not enter fractions. You can use K (as in 32 K) for multiples of 1024 bytes and M (as in 16 M) for multiples of 1,048,576 bytes in most fields, but do not exceed the maximum value that is accepted by the field. For example, for the PACKAGE LISTS field, which has a maximum of 32,000, you can enter 31 K, meaning 31,744 bytes. Values of 32 K and above exceed the maximum acceptable value for this field.

Many of the fields on this panel affect the values of the EDMPOOL, EDMSTATC, and EDMDBDC parameters in macro DSN6SPRM.

If you are migrating, Db2 11 adopts the Db2 catalog, directory, BSDS, and active logs from your previous version. Therefore, during migration, you cannot change any of the fields on this panel that affect those data sets.

Updating the parameters:

You can alter the characteristics of the Db2 catalog, directory, BSDS, and active and archive logs by using the methods described on "Updating subsystem parameters that cannot be updated by using DSNTIPB" on page 322. You cannot actually change the values of these parameters.



```
DSNTIPD         INSTALL DB2 - SIZES PANEL 1
 ===> _

 Check numbers and reenter to change:
  1  DATABASES          ===> 200      In this subsystem
  2  TABLES             ===> 20       Per database (average)
  3  COLUMNS            ===> 10       Per table (average)
  4  VIEWS              ===> 3        Per table (average)
  5  TABLE SPACES       ===> 20       Per database (average)
  6  PLANS              ===> 200      In this subsystem
  7  PLAN STATEMENTS    ===> 30       SQL statements per plan (average)
  8  PACKAGES           ===> 300      In this subsystem
  9  PACKAGE STATEMENTS ===> 10       SQL statements per package (average)
 10  PACKAGE LISTS      ===> 2        Package lists per plan (average)
 11  EXECUTED STMTS     ===> 15       SQL statements executed (average)
 12  TABLES IN STMT     ===> 2        Tables per SQL statement (average)
 13  LOB INLINE LENGTH  ===> 0        Default length of inline LOBs (0-32680)
 14  USER LOB VALUE STG ===> 10240    Max KB storage per user for LOB values
 15  SYSTEM LOB VAL STG ===> 2048     Max MB storage per system for LOB values
 16  USER XML VALUE STG ===> 204800   Max KB storage per user for XML values
 17  SYSTEM XML VAL STG ===> 10240    Max MB storage per system for XML values

 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 16. Sizes panel 1: DSNTIPD

Related tasks

Calculating storage requirements with the installation CLIST
By providing information about the sizes of your Db2 environment, you can use the installation CLIST to calculate certain storage requirements for your Db2 subsystem.

Related reference

DSNTIPC: CLIST calculations panel 1
The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

DATABASES field for panel DSNTIPD

The value of the DATABASES field of panel DSNTIPD indicates the estimated number of user databases that are to exist in your subsystem.

Acceptable values:	1 - 64000
Default:	200
Update:	see "Updating subsystem parameter and application default values" on page 317; cannot update during migration

DSNZP*xxx*:	none

TABLES field

The value of the TABLES field indicates the estimated average number of tables that is to exist for each database in your subsystem.

Acceptable values:	1 - 400
Default:	20
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

COLUMNS field

The value of the COLUMNS field identifies the average number of columns per table in your subsystem. This value is to be used in calculating sizes for main storage and data sets.

Acceptable values:	1 - 750
Default:	10
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

VIEWS field

The value of the VIEWS field specifies the estimated average number of views that are to exist for each table in your subsystem.

Acceptable values:	1 - 200
Default:	3
Update:	see “Updating subsystem parameter and application default values” on page 317
DSNZP*xxx*:	none

TABLE SPACES field

The value of the TABLE SPACES field indicates the estimated average number of table spaces that is to exist per database in your subsystem.

Acceptable values:	1 - 400
Default:	20
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

PLANS field

The value of the PLANS field is the estimated number of application plans that are to exist in your subsystem. Each program requires a separate application plan.

Acceptable values:	1 - 32000

Default:	200
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

PLAN STATEMENTS field

The value of the PLAN STATEMENTS field specifies the estimated average number of SQL statements that are to exist for each application plan.

Acceptable values:	1 - 32000
Default:	30
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

PACKAGES field

The value of the PACKAGES field specifies the estimated number of packages that are to exist in the system.

Acceptable values:	1 - 256000
Default:	300
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

PACKAGE STATEMENTS field

The value of the PACKAGE STATEMENTS field specifies the estimated number of individual SQL statements that are to exist for each package.

Acceptable values:	1 - 32000
Default:	10
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

PACKAGE LISTS field

The value of the PACKAGE LISTS field is the average number of packages that are estimated to be in a package list for each plan.

Acceptable values:	1 - 32000
Default:	2
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

EXECUTED STMTS field

The value of the EXECUTED STMTS field is an estimate of the average number of SQL statements that are to be executed per plan.

Acceptable values:	1 - 32000
Default:	15
Update:	see “Updating subsystem parameter and application default values” on page 317; not during migration
DSNZP*xxx*:	none

The number of SQL statements that are executed can be less than the number of statements that are written.

TABLES IN STMT field

The value of the TABLES IN STMT field indicates the estimated average number of tables that is to be used per SQL statement.

Acceptable values:	1 - 16
Default:	2
Update:	see “Updating subsystem parameter and application default values” on page 317; cannot update during migration
DSNZP*xxx*:	none

Some SQL statements use more than one table (for example, those using joins, unions, or subselect clauses). Consider how often you expect to use such statements when choosing a value for this parameter.

LOB INLINE LENGTH field (LOB_INLINE_LENGTH subsystem parameter)

The LOB_INLINE_LENGTH subsystem parameter specifies the default length (in bytes) that is to be used for inline LOB columns.

An *inline LOB* is the portion of a LOB column that resides in the containing table's base table space rather than in the column's auxiliary table space. The value in this field is used when the INLINE LENGTH option is not specified in the definition of a LOB column in a CREATE TABLE or ALTER TABLE ADD statement.

Acceptable values:	0 - 32680
Default:	0
Update:	option 9 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP LOB_INLINE_LENGTH

When you enter a value in this field, keep the following points in mind:

- A value of 0 causes LOB columns to be created with no inline attribute by default.
- Odd values are rounded to the next even integer for any DBCLOB column created. For example, if you enter 1023, then 1024 bytes of data for new DBCLOB columns reside in the base table.
- The value of this parameter is in bytes, regardless of the LOB column's data type or subtype.

Related information

USER LOB VALUE STG field (LOBVALA subsystem parameter)

The LOBVALA subsystem parameter controls the maximum amount of storage in KB for storing all LOB values being processed for each user.

Acceptable values:	1 - 2097152
Default:	10240
Update:	option 9 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP LOBVALA

1 - 2097152
The maximum amount of storage in KB for storing all LOB values being processed for each user.

SYSTEM LOB VAL STG field (LOBVALS subsystem parameter)

The LOBVALS subsystem parameter sets an upper limit, in MB, for the amount of memory per system that is to be used for storing LOB values.

Acceptable values:	1 - 51200
Default:	2048
Update:	option 9 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP LOBVALS

USER XML VALUE STG field (XMLVALA subsystem parameter)

The XMLVALA subsystem parameter specifies, the upper limit in KB for the amount of storage for each user to store XML values.

Acceptable values:	1 - 2,097,152 KB
Default:	204,800 KB
Update:	option 9 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP XMLVALA

1 - 2,097,152
The upper limit in KB for the amount of storage for each user to store XML values

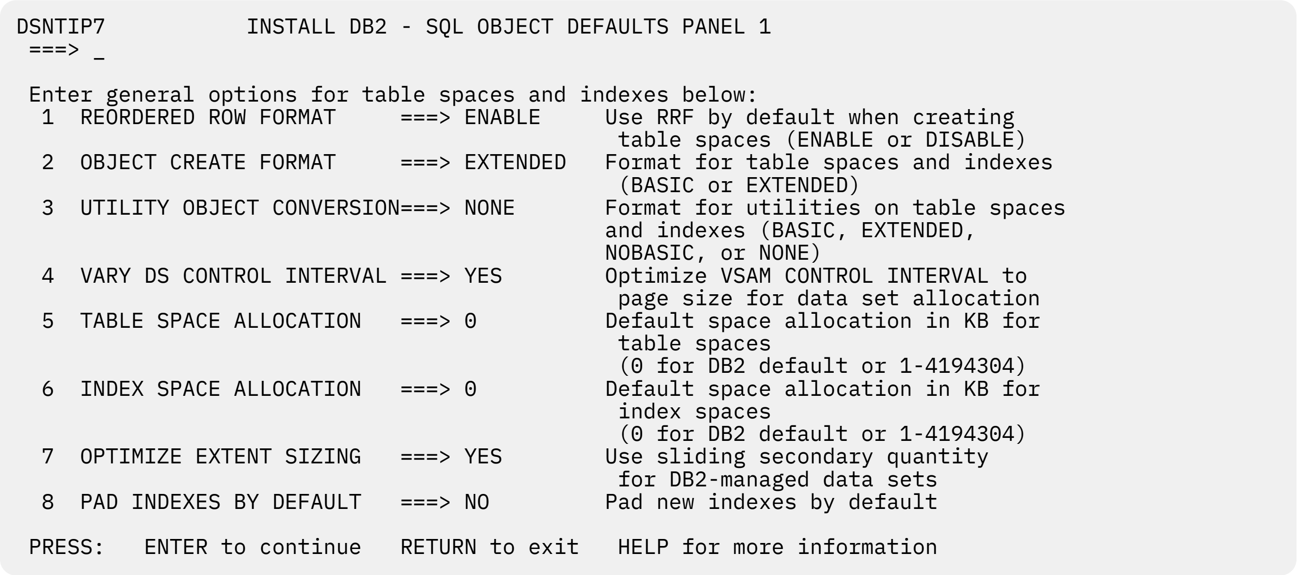
SYSTEM XML VALUE STG field (XMLVALS subsystem parameter)

The XMLVALS subsystem parameter specifies, in MB, an upper limit for the amount of storage that each system can use for storing XML values.

Acceptable values:	1 - 51200 MB
Default:	10240 MB
Update:	option 9 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP XMLVALS

DSNTIP7: SQL OBJECT DEFAULTS PANEL 1

The entries on the DSNTIP7 panel provide general default settings for creating table spaces.



```
DSNTIP7           INSTALL DB2 - SQL OBJECT DEFAULTS PANEL 1
 ===> _

 Enter general options for table spaces and indexes below:
  1  REORDERED ROW FORMAT     ===> ENABLE     Use RRF by default when creating
                                               table spaces (ENABLE or DISABLE)
  2  OBJECT CREATE FORMAT     ===> EXTENDED   Format for table spaces and indexes
                                               (BASIC or EXTENDED)
  3  UTILITY OBJECT CONVERSION===> NONE       Format for utilities on table spaces
                                              and indexes (BASIC, EXTENDED,
                                              NOBASIC, or NONE)
  4  VARY DS CONTROL INTERVAL ===> YES        Optimize VSAM CONTROL INTERVAL to
                                               page size for data set allocation
  5  TABLE SPACE ALLOCATION   ===> 0          Default space allocation in KB for
                                               table spaces
                                               (0 for DB2 default or 1-4194304)
  6  INDEX SPACE ALLOCATION   ===> 0          Default space allocation in KB for
                                               index spaces
                                               (0 for DB2 default or 1-4194304)
  7  OPTIMIZE EXTENT SIZING   ===> YES        Use sliding secondary quantity
                                               for DB2-managed data sets
  8  PAD INDEXES BY DEFAULT   ===> NO         Pad new indexes by default

 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 17. SQL OBJECT DEFAULTS PANEL 1: DSNTIP7

REORDERED ROW FORMAT field (RRF subsystem parameter)

The value of this parameter specifies whether most newly created table spaces are to store data in reordered row format (RRF) or basic row format (BRF) by default.

Acceptable values:	ENABLE, DISABLE
Default:	ENABLE
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RRF

ENABLE
Newly created table spaces or newly added partitions that are created by ALTER ADD PARTITION statements on partition-by-growth table spaces will be created in RRF. Existing BRF table spaces will be converted to RRF by running LOAD REPLACE or REORG TABLESPACE.

DISABLE
Newly created table spaces, including universal table spaces, and newly added partitions that are created by ALTER ADD PARTITION statements on partition-by-growth table spaces will be created in BRF. Existing BRF table spaces will not be converted to RRF by LOAD REPLACE or REORG TABLESPACE.

The following additional restrictions apply, regardless of the setting of the REORDERED ROW FORMAT field:

- Newly created partitions for existing BRF table spaces that contain tables with an EDITPROC will always be in BRF format.
- XML table spaces will always be in RRF.
- Existing RRF table spaces will never be converted to BRF by LOAD REPLACE or REORG TABLESPACE except when requested explicitly with the ROWFORMAT keyword.
- Universal table spaces that are involved in a CLONE relationship will never be converted from BRF to RRF or from RRF to BRF by LOAD REPLACE or REORG TABLESPACE, regardless of the subsystem parameter or utility keyword setting.

OBJECT CREATE FORMAT field (OBJECT_CREATE_FORMAT subsystem parameter)

The OBJECT_CREATE_FORMAT subsystem parameter specifies whether Db2 is to create new table spaces and indexes to use a basic or extended log record format.

Deprecated function: The OBJECT_CREATE_FORMAT subsystem parameter is deprecated. You must set the value to EXTENDED before migrating to Db2 12.

Acceptable values:	BASIC, EXTENDED
Default:	for installation: EXTENDED; for migration: BASIC
Update:	option 10 on panel DSNTIP7
DSNZP*xxx*:	DSN6SPRM.OBJECT_CREATE_FORMAT

BASIC
New table spaces and indexes are created with a maximum of 256 TB of log record addressing capacity over the life of a Db2 subsystem, or a maximum log record sequence number (LRSN) of 2**48 over the life of a Db2 data-sharing group. BASIC is recommended if you intend to use this instance of Db2 to copy or recover data from an instance of Db2 that does not support the extended format. However, after the 6-byte logging limit is exceeded, all new objects are created in EXTENDED format.

EXTENDED
New table spaces and indexes are created with a maximum of 1 YB of log record addressing capacity over the life of a Db2 subsystem or a maximum LRSN of 2**80 over the life of the Db2 data-sharing group. This setting is the default and is recommended in either of the following situations:

- When Db2 is likely to exhaust the basic log format. This setting is required to update database objects if the Db2 log RBA exceeds x'FFFFFFFFFFFF' for non-data-sharing environments or if the LRSN exceeds 2**48 for data-sharing environments.
- In data-sharing environments only, when duplicate LRSN values occur because the processing speed exceeds the precision of the traditional log addressing format.

In conversion mode, basic 6-byte format is used regardless of the setting of this parameter.

Subsystem parameter OBJECT_CREATE_FORMAT does not affect new partitions that are added to existing partition-by-growth table spaces. New partitions use the RBA format of the previous logical partition.

Related information

UTILITY OBJECT CONVERSION field (UTILITY_OBJECT_CONVERSION subsystem parameter)

The value of the UTILITY_OBJECT_CONVERSION parameter specifies whether Db2 utilities that accept the RBALRSN_CONVERSION option will convert existing table spaces and indexes to 6-byte page format, to a 10-byte page format, or perform no conversion.

Deprecated function: The UTILITY OBJECT CONVERSION subsystem parameter is deprecated. You must set the value to NOBASIC before migrating to Db2 12.

The default behavior normally applies when the utility control statement does not specify the RBALRSN_CONVERSION option. Alternatively, the UTILITY_OBJECT_CONVERSION parameter can also be used to prevent use of RBALRSN_CONVERSION options to convert existing table spaces and indexes to 6-byte page format.

Acceptable values:	BASIC, EXTENDED, or NOBASIC, NONE
Default:	NONE
Update:	option 10 on panel DSNTIP7

DSNZP*xxx*:	DSN6SPRM.UTILITY_OBJECT_CONVERSION

BASIC
Existing table spaces and indexes that use extended 10-byte page format are converted to basic 6-byte page format. BASIC is allowed only if the OBJECT CREATE FORMAT field is also set to BASIC.

EXTENDED
Existing table spaces and indexes that use 6-byte page format are converted to extended 10-byte page format. EXTENDED is allowed only if the OBJECT CREATE FORMAT field is also set to EXTENDED.

NOBASIC
Existing table spaces and indexes that use 6-byte page format are converted to extended 10-byte page format. Table spaces and indexes that already use extended 10-byte page format cannot be returned to the 6-byte page format. When this setting is in effect, utilities that specify the RBALRSN_CONVERSION keyword with BASIC fail. In addition, utilities that specify RBALRSN_CONVERSION keyword with NONE when the object is in 6-byte page format fail. NOBASIC is allowed in this field only if the OBJECT CREATE FORMAT field is set to EXTENDED. If a value is not specified for RBALRSN_CONVERSION, the RBALRSN_CONVERSION value defaults to EXTENDED.

NONE
No conversion is performed. This option is the default setting of this parameter. NONE is allowed regardless of the OBJECT CREATE FORMAT setting.

Conversion is disabled before new-function mode regardless of the setting of this parameter.

VARY DS CONTROL INTERVAL field (DSVCI subsystem parameter)

The DSVCI subsystem parameter controls whether Db2-managed data sets that are created by CREATE TABLESPACE or CREATE INDEX statements are to have variable VSAM control intervals.

Deprecated subsystem parameter: Non-default settings for DSVCI are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value YES.

Acceptable values:	YES, NO
Default:	YES
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP DSVCI

YES
Db2 creates Db2-managed data sets for table spaces and index spaces. The Db2-managed data sets have a VSAM control interval that corresponds to the buffer pool that is used for the table space or index space.

NO
Db2-managed data sets are created with a fixed control interval of 4 KB, regardless of the buffer pool size.

This parameter is online-updatable. If you change this value from NO to YES, any pre-existing or migrated data sets remain in 4 KB control intervals until they are redefined. If you change this value from YES to NO, any pre-existing or migrated data sets in 8 KB, 16 KB, or 32 KB control intervals remain in those control intervals until they are redefined. You can explicitly redefine a data set. In addition, data sets are implicitly redefined by utilities such as LOAD REPLACE, REORG TABLESPACE, or RECOVER.

TABLE SPACE ALLOCATION field (TSQTY subsystem parameter)

The TSQTY subsystem parameter specifies the amount of space in KB that is to be allocated for primary and secondary spaces. This parameter applies to Db2-defined data sets for table spaces that are created without the PRIQTY and SECQTY clauses.

Acceptable values:	0 - 4194304

Default:	0
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TSQTY

A value of 0 indicates that Db2 is to use a default value of 1 cylinder for a non-LOB table space or 10 cylinders for a LOB table space.

In a data sharing environment, this parameter has group scope.

Related information

INDEX SPACE ALLOCATION field (IXQTY subsystem parameter)

The IXQTY subsystem parameter controls the amount of space in KB that is to be allocated for primary and secondary spaces. This parameter applies to Db2-defined data sets for index spaces that are created without the PRIQTY and SECQTY clauses.

Acceptable values:	0 - 4194304
Default:	0
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IXQTY

A value of 0 indicates that Db2 is to use a default allocation of one cylinder.

In a data sharing environment, this parameter has group scope.

OPTIMIZE EXTENT SIZING field (MGEXTSZ subsystem parameter)

The MGEXTSZ subsystem parameter controls whether secondary extent allocations for Db2-managed data sets are to be sized according to a sliding scale. Sizing the secondary extents on a sliding scale optimizes the likelihood of reaching the maximum data set size before secondary extents are exhausted.

Acceptable values:	YES, NO
Default:	YES
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP MGEXTSZ

YES

Db2 automatically optimizes the secondary extent allocations of data sets for table spaces and index spaces that have a SECQTY value of greater than zero. When all secondary extents are exhausted for the first data set of a nonpartitioned table space or a nonpartitioned index space that has a SECQTY value of greater than zero, the primary space allocation of each subsequent data set is the larger of the SECQTY setting and the value that is derived from the sliding scale algorithm.

NO

Secondary extent allocations are managed manually. For nonpartitioned table spaces and nonpartitioned index spaces, when all extents of the first data set are exhausted, the primary space allocation of each subsequent data set is always the PRIQTY setting.

When the sliding scale is used, secondary extent allocations that are allocated earlier are smaller than those allocated later, until a maximum allocation is reached. The maximum allocation is 127 cylinders for data sets with a maximum size of 16 GB or less, and 559 cylinders for data sets with a maximum size of 32 GB or 64 GB.

Secondary extent allocations for data sets in implicitly created table spaces are not influenced by this setting because they always use the sliding scale.

In migration mode, the input migration value for this field is overridden to YES, so you need to reset it to NO if you want to continue to disable secondary extent optimization.

PAD INDEXES BY DEFAULT field (PADIX subsystem parameter)

The PADIX subsystem parameter determines whether new indexes are to be padded by default.

Acceptable values:	NO, YES
Default:	NO
Update:	option 10 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.PADIX

NO

New indexes will not be padded unless the PADDED option is specified on the CREATE INDEX statement.

This is the default value.

YES

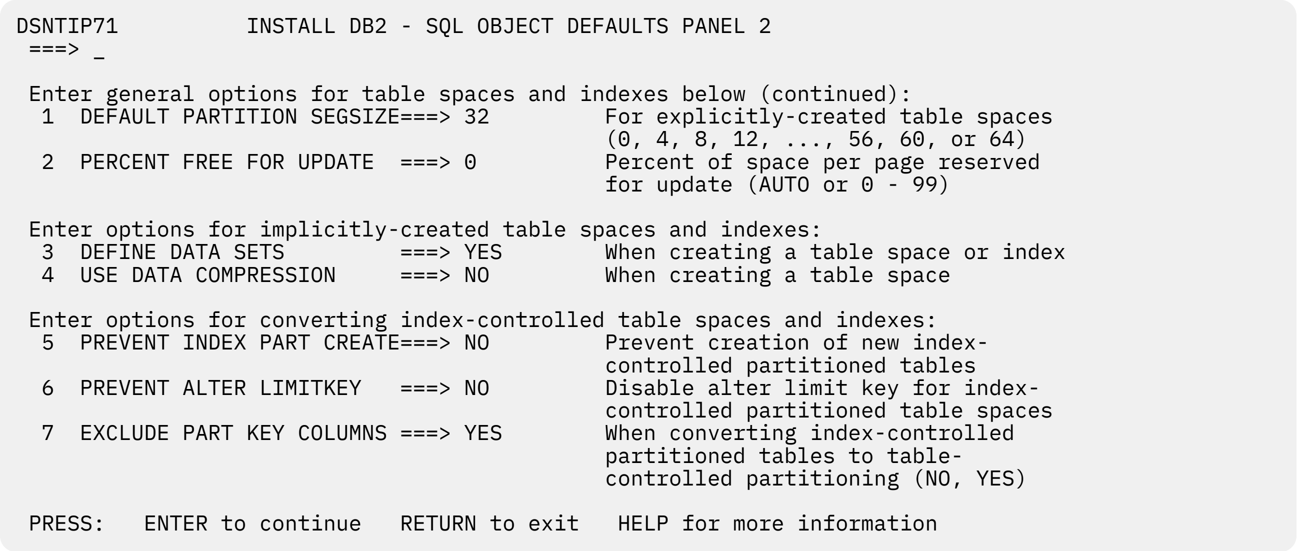
New indexes will be padded unless the NOT PADDED option is specified on the CREATE INDEX statement.

This parameter affects only indexes that have at least one varying-length column.

Related information

DSNTIP71: SQL OBJECT DEFAULTS PANEL 2

The first entry on the DSNTIP71 panel provides a general default setting for creating table spaces. The remaining fields define default values for the system-required objects that Db2 creates automatically. Db2 uses these options for any indexes or table spaces that it implicitly creates.



```
DSNTIP71          INSTALL DB2 - SQL OBJECT DEFAULTS PANEL 2
 ===> _

 Enter general options for table spaces and indexes below (continued):
  1  DEFAULT PARTITION SEGSIZE===> 32         For explicitly-created table spaces
                                              (0, 4, 8, 12, ..., 56, 60, or 64)
  2  PERCENT FREE FOR UPDATE  ===> 0          Percent of space per page reserved
                                              for update (AUTO or 0 - 99)

 Enter options for implicitly-created table spaces and indexes:
  3  DEFINE DATA SETS         ===> YES        When creating a table space or index
  4  USE DATA COMPRESSION     ===> NO         When creating a table space

 Enter options for converting index-controlled table spaces and indexes:
  5  PREVENT INDEX PART CREATE===> NO         Prevent creation of new index-
                                              controlled partitioned tables
  6  PREVENT ALTER LIMITKEY   ===> NO         Disable alter limit key for index-
                                              controlled partitioned table spaces
  7  EXCLUDE PART KEY COLUMNS ===> YES        When converting index-controlled
                                              partitioned tables to table-
                                              controlled partitioning (NO, YES)

 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 18. SQL OBJECT DEFAULTS PANEL 2: DSNTIP71

DEFAULT PARTITION SEGSIZE field (DPSEGSZ subsystem parameter)

The DPSEGSZ subsystem parameter specifies the default segment size in pages for a CREATE TABLESPACE statement that omits the SEGSIZE clause. It applies only for partitioned table spaces.

Acceptable values:	0, 4 - 64 (multiples of 4)

Default:	32
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP.DPSEGSZ

The DPSEGSZ subsystem parameter has no effect on the explicit creation of a segmented (non-UTS) table spaces, which are not partitioned, or implicitly created table spaces. However, the table includes the segmented (non-UTS) table spaces for completeness.

Table 21. SEGSIZE clause default in effect, by table space type and DPSEGSZ value

Table space type created	**DPSEGSZ=0**	**DPESEGZ=*n* (*n*>0)**
Partition-by-growth	SEGSIZE 32	SEGSIZE *n*
Partition-by-range	SEGSIZE 32	SEGSIZE *n*
Partitioned (non-UTS)	SEGSZE 0	Not applicable
Segmented (non-UTS)	SEGSIZE 4	SEGSIZE 4

Related information

PERCENT FREE FOR UPDATE field (PCTFREE_UPD subsystem parameter)

The PCTFREE_UPD subsystem parameter specifies the default value to use for the PCTFREE FOR UPDATE clause of CREATE TABLESPACE or ALTER TABLESPACE statements. It specifies the default amount of free space to reserve on each page for use by subsequent UPDATE operations when data is added to the table by INSERT operations or utilities.

Acceptable values:	AUTO, 0 - 99
Default:	0
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.PCTFREE_UPD
Data sharing scope:	The recommendation is to use the same value on all members.

This value is used as the default FOR UPDATE value when no PCTFREE FOR UPDATE clause is specified for a CREATE TABLESPACE or ALTER TABLESPACE statement.

AUTO
Db2 uses real-time statistics values to automatically calculate the percentage of free space that is to be used by update operations. This value is equivalent to specifying PCTFREE FOR UPDATE -1 in the CREATE TABLESPACE or ALTER TABLESPACE statement.

0 - 99
Db2 reserves the specified percentage of space for use by update operations.

Related information

DEFINE DATA SETS field (IMPDSDEF subsystem parameter)

The IMPDSDEF subsystem parameter specifies whether Db2 is to define the underlying data set for certain implicitly created table spaces and indexes.

This parameter applies to:

- Base table spaces
- Index spaces of indexes that are implicitly created on base tables

- Implicitly created LOB or XML table spaces
- Auxiliary indexes
- Node ID indexes
- Document ID indexes

Acceptable values:	YES, NO
Default:	YES
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IMPDSDEF

YES
Underlying data sets are defined when the table space or index space is created. This is the default setting.

NO
Underlying data sets are defined when data is first inserted into the table or index.

However, if all of the following conditions are met, underlying data sets are defined when the table space or index space is created:

- The table contains an LOB column.
- The table is in a clone relationship.
- The containing table space is a partition-by-growth table space.

USE DATA COMPRESSION field (IMPTSCMP subsystem parameter)

The IMPTSCMP subsystem parameter determines whether an implicitly created table space is to use data compression.

Acceptable values:	NO, YES
Default:	NO
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IMPTSCMP

NO
Disables data compression. This is the default value.

YES
Enables data compression for implicitly created table spaces.

The value of the USE DATA COMPRESSION field applies only to implicitly created base table spaces. It is not used for implicitly created LOB or XML table spaces.

PREVENT INDEX PART CREATE field (PREVENT_NEW_IXCTRL_PART subsystem parameter)

The PREVENT_NEW_IXCTRL_PART subsystem parameter determines whether Db2 disallows the creation of new index-controlled partitioned tables. This subsystem parameter ensures that new partitioned tables use table-controlled partitioning, which is the preferred partitioning method for non-universal table spaces.

Deprecated subsystem parameter: Non-default settings for PREVENT_NEW_IXCTRL_PART are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, set the value to YES.

Acceptable values:	NO, YES

Default:	NO
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PREVENT_NEW_IXCTRL_PART

YES
Specifies that new partitioned table spaces must use table-controlled partitioning. A CREATE INDEX statement must not attempt to create an index-controlled partitioned table.

NO
Specifies that new index-controlled partitioned tables can be created.

Learn more: For comprehensive background, how-to information, and examples for various paths for converting your deprecated "classic" partitioned (non-UTS) table spaces to partition-by-range table spaces, see the white paper Conversion from index-controlled partitioning to Universal Table Space (UTS).

Related information

PREVENT ALTER LIMITKEY field (PREVENT_ALTERTB_LIMITKEY subsystem parameter)

PREVENT_ALTERTB_LIMITKEY determines whether Db2 disallows altering the limit key by using an ALTER TABLE statement for index-controlled partitioned table spaces. This alter operation places the table space in REORG-pending (REORP) restrictive status, and the data is unavailable until the affected partitions are reorganized. Use PREVENT_ALTERTB_LIMITKEY to avoid this data unavailability.

Acceptable values:	NO, YES
Default:	NO
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PREVENT_ALTERTB_LIMITKEY

NO
Specifies that you can alter a limit key by using an ALTER TABLE statement for index-controlled partitioned table spaces.

NO is the default.

YES
Specifies that altering a limit key by using an ALTER TABLE statement for index-controlled partitioned table spaces is not permitted. An ALTER TABLE statement must not attempt to alter the limit key for an index-controlled partitioned table.

Related information

EXCLUDE PART KEY COLUMNS field (IX_TB_PART_CONV_EXCLUDE subsystem parameter)

Specifies whether to exclude trailing columns from the table-controlled partitioning keys when table spaces are converted from index-controlled partitioning to table-controlled partitioning.

Deprecated subsystem parameter: Non-default settings for IX_TB_PART_CONV_EXCLUDE are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value YES.

Acceptable values:	YES, NO
Default:	YES

Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM IX_TB_PART_CONV_EXCLUDE

YES

When converting from index-controlled partitioning to table-controlled partitioning, Db2 defines the new partitioning key to use only significant columns of the original partitioning index by default. If all partitions contain 'FF'x for a column in the internal limit key value that is stored in the table's SYSINDEXPART.LIMITKEY entry, Db2 excludes that column. Such columns were specified with a value of 'FF'x, MAXVALUE, MINVALUE, or no value when the index-controlled partitioning index was defined. However, if a new limit key value is specified for a column in an ALTER TABLE statement that is issued in one of the following cases, the column is used to define the new partitioning key regardless of whether the column was originally specified with a value of 'FF'x, MAXVALUE, or MINVALUE:

- To add a new partition
- To change a partition boundary
- To rotate a partition to last on an index-controlled partitioned table space

NO

When converting from index-controlled partitioning to table-controlled partitioning, Db2 uses all columns of the original partitioning index to define the new partitioning key. This definition includes the trailing columns of the original partitioning index that do not affect the partitioning.

This parameter does not affect the automatic conversion to table-controlled partitioning when a CREATE INDEX statement is issued with an ENDING AT clause and without a CLUSTER clause. In this case, the Db2 subsystem uses the partitioning key that is specified by the CREATE INDEX statement.

Learn more: For comprehensive background, how-to information, and examples for various paths for converting your deprecated "classic" partitioned (non-UTS) table spaces to partition-by-range table spaces, see the white paper Conversion from index-controlled partitioning to Universal Table Space (UTS).

Related information

DSNTIP9: Work file database panel

The fields on the DSNTIP9 panel configure the 4 KB and 32 KB page size table spaces in the Db2 work file database.

The values in these fields determine the following:

- The total amount of space that is available for each type of table space.
- The number of table spaces that are to be created during the installation or migration process for each type of table space. In INSTALL mode, you must specify at least 1 for each of the 4 types of work file table spaces: 4 KB sort work, 32 KB sort work, 4 KB temporary work, and 32 KB temporary work. In MIGRATE mode, you can specify 0 for any or all of these table spaces.
- The segment size of each type of table space.

The settings on this panel are used to tailor installation job DSNTIJTM, which creates the work file database. For more information about job DSNTIJTM, see “Installation step 16: Create default storage group, define temporary work files, and bind Db2 REXX Language Support: DSNTIJTM” on page 383. To determine the storage requirements for work file database table spaces, see “Work file database storage requirements” on page 9.

Sort work table space in the work file database are used as temporary space for SQL statements and triggers that require working storage. In particular, this includes statements that use the following types of operations:

- GROUP BY or HAVING (without index)
- ORDER BY (without index)

- DISTINCT (without index)
- UNION (except UNION ALL)
- EXISTS (subselect)
- ANY (subselect)
- SOME (subselect)
- ALL (subselect)
- Some joins

Temporary work table spaces in the work file database are used for declared global temporary tables. They can increase in size beyond the primary allocation. When the value of the INSTALL TYPE field is INSTALL, temporary work table spaces are created as either partition-by-growth or segmented table spaces, depending on the amount of primary space per table space.

Unlike temporary work table spaces, sort work table spaces are always segmented table spaces and cannot increase in size.

You can add a work file table space or change the size of an existing one by deleting and redefining it. Db2 needs to be started for these activities and you do not need to stop the work file database. All Db2 users share the work file database table spaces. You cannot use utilities on the work file database table spaces.

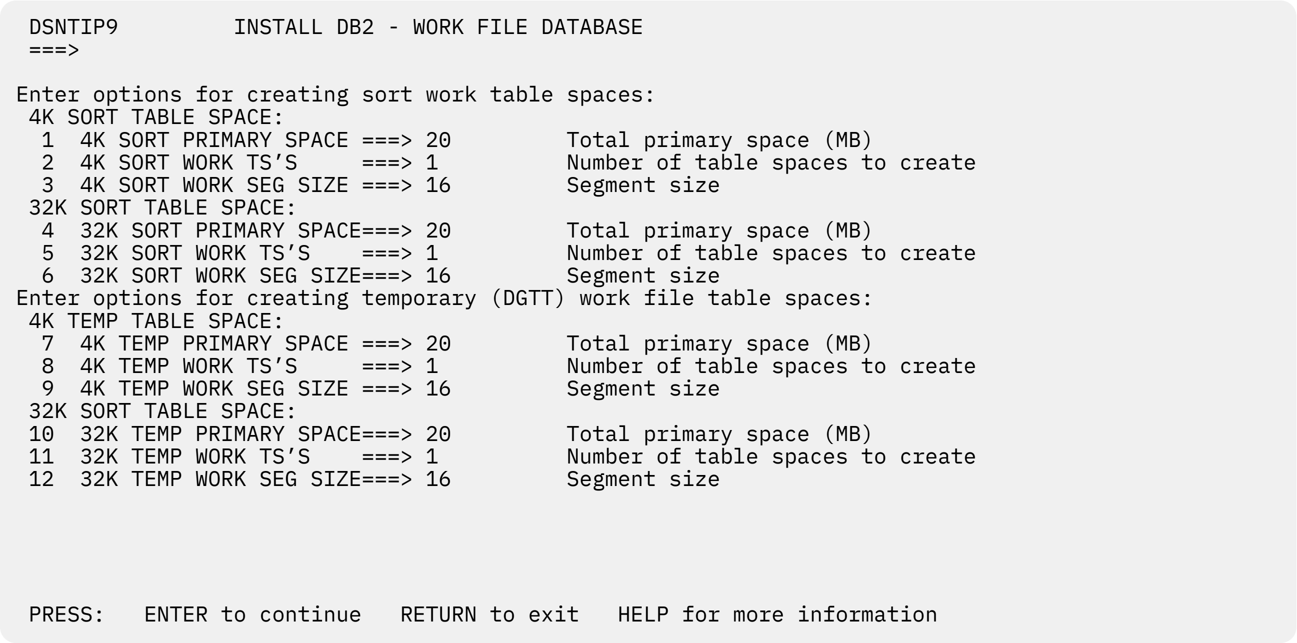
You can create additional work file table spaces at any time, including during migration. Creating additional work file table spaces can improve Db2 performance by reducing device contention among applications that require working storage.

For temporary work only, the work file database can contain partition-by-growth table spaces to increase the available space for declared global temporary tables and reduce the possibility of receiving SQLCODE -904. A partition-by-growth table space can grow up to 128 TB. The maximum number of partitions to which the partition-by-growth table space can grow and the maximum size of the table space are determined by the MAXPARTITIONS and DSSIZE values that are specified for the table space.

Recommendation: If you have not already done so, drop work file table spaces for temporary work and re-create them as partition-by-growth table spaces. (Existing table spaces cannot be altered to become partition-by-growth table spaces.)

Updating the parameters

You can alter the characteristics of the Db2 catalog, directory, work file databases, BSDS, and active and archive logs by using the methods described on “Updating subsystem parameter and application default values” on page 317.



```
 DSNTIP9         INSTALL DB2 - WORK FILE DATABASE
 ===>

Enter options for creating sort work table spaces:
 4K SORT TABLE SPACE:
  1  4K SORT PRIMARY SPACE ===> 20         Total primary space (MB)
  2  4K SORT WORK TS’S     ===> 1          Number of table spaces to create
  3  4K SORT WORK SEG SIZE ===> 16         Segment size
 32K SORT TABLE SPACE:
  4  32K SORT PRIMARY SPACE===> 20         Total primary space (MB)
  5  32K SORT WORK TS’S    ===> 1          Number of table spaces to create
  6  32K SORT WORK SEG SIZE===> 16         Segment size
Enter options for creating temporary (DGTT) work file table spaces:
 4K TEMP TABLE SPACE:
  7  4K TEMP PRIMARY SPACE ===> 20         Total primary space (MB)
  8  4K TEMP WORK TS’S     ===> 1          Number of table spaces to create
  9  4K TEMP WORK SEG SIZE ===> 16         Segment size
 32K SORT TABLE SPACE:
 10  32K TEMP PRIMARY SPACE===> 20         Total primary space (MB)
 11  32K TEMP WORK TS’S    ===> 1          Number of table spaces to create
 12  32K TEMP WORK SEG SIZE===> 16         Segment size




 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 19. Work file database panel: DSNTIP9

Related information

4K SORT PRIMARY SPACE field

The value of the 4K SORT PRIMARY SPACE field specifies the total amount of space for all 4 KB sort work table spaces in the work file database. This value is specified in MB, but you can enter the value in GB by specifying a suffix of G, for example 1024G.

Unlike temporary work table spaces, sort work table spaces are always segmented table spaces and cannot increase in size.

Acceptable values:	for installation: 1 - 32,702,464; for migration: 0 - 32,702,464
Default:	for installation: 20; for migration: 0
Update:	none
DSNZP*xxx*:	none

The value of the 4K SORT PRIMARY SPACE field is divided by the value of the 4K SORT WORK TS’S field to determine the primary space quantity (PRIQTY) for creating each 4 KB type sort work file table space. For example, if you specify a value of 16 for the 4K SORT PRIMARY SPACE field and a value of 4 for the 4K SORT WORK TS’S field, the PRIQTY for each 4 KB type table space is 4096 KB.

The secondary space quantity (SECQTY) value for each 4 KB type table space is always 0.

If you run the CLIST in MIGRATE mode, the value of the 4K SORT PRIMARY SPACE field is used only when additional 4 KB type sort work file table spaces are created. Db2 does not take into account the space that is already used by existing 4 KB type work files.

4K SORT WORK TS'S field

The value of the 4K SORT WORK TS'S field specifies the number of 4 KB sort work file table spaces that are to be created.

Acceptable values:	for installation: 1 - 499; for migration: 0 - 500
Default:	for installation: 1 for migration: 0

Update:	none
DSNZP*xxx*:	none

The sum of the values of the 4K SORT WORK TS’S field, the 32K SORT WORK TS’S field, the 4K TEMP WORK TS’S field, and the 32K TEMP WORK TS’S field cannot exceed 500.

If you run the CLIST in MIGRATE mode, and you enter a non-zero value, the value is used for creating new 4 KB type sort work file table spaces. Db2 does not take into account the number of existing 4 KB type sort work file table spaces.

4K SORT WORK SEG SIZE field

The value of the 4K SORT WORK SEG SIZE field specifies the segment size that is to be used for 4 KB sort work file table spaces. The value must be a multiple of 4 between 4 and 64, inclusive.

Acceptable values:	4, 8, 12, ..., 60, 64 (multiples of 4)
Default:	16
Update:	none
DSNZP*xxx*:	none

The value of the 4K SORT WORK SEG SIZE field does not apply to existing 4 KB work file table spaces.

32K SORT PRIMARY SPACE field

The value of the 32K SORT PRIMARY SPACE field specifies the total amount of space for all 32 KB sort work table spaces in the work file database. This value is specified in MB but you can enter the value in GB by specifying a suffix of G, for example `1024G`.

Unlike temporary work table spaces, sort work table spaces are always segmented table spaces and cannot increase in size.

Acceptable values:	for installation: 1 - 32,702,464; for migration: 0 - 32,702,464
Default:	for installation: 20; for migration: 0
Update:	none
DSNZP*xxx*:	none

The value of the 32K SORT PRIMARY SPACE field is divided by the value of the 32K SORT WORK TS’S field to determine the primary space quantity (PRIQTY) for creating each 32 KB type sort work file table space. For example, if you specify a value of 16 for the 32K SORT PRIMARY SPACE field and a value of 4 for the 32K SORT WORK TS’S field, the PRIQTY for each 32 KB type table space is 4096 KB.

The secondary space quantity (SECQTY) value for each 32 KB type table space is always 0.

If you run the CLIST in MIGRATE mode, the value of the 32K SORT PRIMARY SPACE field is used only when additional 32 KB type sort work file table spaces are created. Db2 does not take into account the space that is already used by existing 32 KB type work files.

32K SORT WORK TS'S field

The value of the 32K SORT WORK TS'S field specifies the number of 32 KB sort work file table spaces that are to be created.

Acceptable values:	for installation: 1 - 499; for migration: 0 - 500
Default:	for installation: 1 for migration: 0
Update:	none

DSNZP*xxx*:	none

The sum of the values of the 4K SORT WORK TS'S field, the 32K SORT WORK TS'S field, the 4K TEMP WORK TS'S field, and the 32K TEMP WORK TS'S field cannot exceed 500.

If you run the CLIST in MIGRATE mode, and you enter a non-zero value, the value is used for creating new 32 KB type sort work file table spaces. Db2 does not take into account the number of existing 32 KB type sort work file table spaces.

32K SORT WORK SEG SIZE field

The value of the 32K SORT WORK SEG SIZE field specifies the segment size that is to be used for 32 KB sort work file table spaces. The value must be a multiple of 4 between 4 and 64, inclusive.

Acceptable values:	4, 8, 12, ..., 60, 64 (multiples of 4)
Default:	16
Update:	none
DSNZP*xxx*:	none

The value of the 32K SORT WORK SEG SIZE field does not apply to existing 32 KB work file table spaces.

4K TEMP PRIMARY SPACE field

The value of the 4K TEMP PRIMARY SPACE field specifies the total amount of space for all 4 KB temporary work table spaces in the work file database. This value is specified in MB, but you can enter the value in GB by specifying a suffix of G, for example `1024G`.

Unlike sort work table spaces, temporary work table spaces can increase in size beyond the primary allocation. In installation mode, temporary work table spaces, unlike sort work table spaces, are created as either partition-by-growth table spaces or segmented table spaces, depending on the amount of primary space per table space.

Acceptable values:	for installation: 1 - 8,388,608,000; for migration: 0 - 32,702,464
Default:	for installation: 20; for migration: 0
Update:	none
DSNZP*xxx*:	none

The value of the 4K TEMP PRIMARY SPACE field is divided by the value of the 4K TEMP WORK TS'S field to determine either of the following values:

- The primary space quantity (PRIQTY)
- The maximum number of partitions (MAXPARTITIONS) and the maximum size (DSSIZE) of each partition

The PRIQTY value is used for creating each 4 KB type temporary work table space as a segmented table space. The MAXPARTITIONS and DSSIZE values are used for creating each 4 KB type temporary work table space as a partition-by-growth table space.

When there is 1 GB or less per table space, segmented table spaces are created by using the PRIQTY parameter. Otherwise, partition-by-growth table spaces are created by using the DSSIZE and MAXPARTITIONS parameters. If necessary, the CLIST curtails the calculated space at 16,384 GB, which is the maximum for a 4 KB page size partition-by-growth table space.

For example:

- If you specify a value of 16 for the 4K TEMP PRIMARY SPACE field and a value of 4 for the 4K TEMP WORK TS'S field, the PRIQTY for each 4 KB type table space is 4096 KB.

- If you specify a value of 16G for the 4K TEMP PRIMARY SPACE field and a value of 4 for the 4K TEMP WORK TS'S field, the MAXPARTITIONS for each 4 KB type table space is 1 with a DSSIZE of 4.

If you run the CLIST in MIGRATE mode, the value of the 4K TEMP PRIMARY SPACE field is used only when additional 4 KB type work file table spaces are created. Db2 does not take into account the space that is already used by existing 4 KB type work files.

4K TEMP WORK TS'S field

The value of the 4K TEMP WORK TS'S field specifies the number of 4 KB temporary work file table spaces that are to be created.

Acceptable values:	for installation: 1 - 499; for migration: 0 - 500
Default:	for installation: 1; for migration: 0
Update:	none
DSNZP*xxx*:	none

The sum of the values of the 4K SORT WORK TS'S field, the 32K SORT WORK TS'S field, the 4K TEMP WORK TS'S field, and the 32K TEMP WORK TS'S field cannot exceed 500.

If you run the CLIST in MIGRATE mode, and you enter a non-zero value, the value is used when new 4 KB type temporary work file table spaces are created. Db2 does not take into account the number of existing 4 KB type temporary work file table spaces.

4K TEMP WORK SEG SIZE field

The value of the 4K TEMP WORK SEG SIZE field specifies the segment size that is to be used for 4 KB temporary work file table spaces. The value must be a multiple of 4 between 4 and 64, inclusive.

Acceptable values:	4, 8, 12, ..., 60, 64 (multiples of 4)
Default:	16
Update:	none
DSNZP*xxx*:	none

32K TEMP PRIMARY SPACE field

The value of the 32K TEMP PRIMARY SPACE field specifies the total amount of space for all 32 KB temporary work table spaces in the work file database. This value is specified in MB, but you can enter the value in GB by specifying a suffix of G, for example `1024G`.

Unlike sort work table spaces, temporary work table spaces can increase in size beyond the primary allocation. In installation mode, temporary work table spaces, unlike sort work table spaces, are created as either partition-by-growth or segmented table spaces, depending on the amount of primary space per table space.

Acceptable values:	for installation: 1 - 67,108,864,000; for migration: 0 - 32,702,464
Default:	for installation: 20; for migration: 0
Update:	none
DSNZP*xxx*:	none

The value of the 32K TEMP PRIMARY SPACE field is divided by the value of the 32K TEMP WORK TS'S field to determine either of the following values:

- The primary space quantity (PRIQTY)

- The maximum number of partitions (MAXPARTITIONS) and the maximum size (DSSIZE) of each partition

The PRIQTY value is used for creating each 32 KB type temporary work table space as a segmented table space. The MAXPARTITIONS and DSSIZE values are used for creating each 32 KB type temporary work table space as a partition-by-growth table space.

When there is 1 GB or less per table space, segmented table spaces are created by using the PRIQTY parameter. Otherwise, partition-by-growth table spaces are created using the DSSIZE and MAXPARTITIONS parameters. If necessary, the CLIST curtails the calculated space at 131,072 GB, which is the maximum for a 32 KB page size partition-by-growth table space.

For table spaces that are larger than 16,384 GB, data sets must be associated with a Data Facility Storage Management Subsystem (DFSMS) data class that has been specified with extended format and extended addressability.

For example:

- If you specify a value of 16 for the 32K TEMP PRIMARY SPACE field and a value of 4 for the 32K TEMP WORK TS'S field, the PRIQTY value for each 32 KB type table space is 4096 KB.
- If you specify a value of 16G for the 32K TEMP PRIMARY SPACE field and a value of 4 for the 32K TEMP WORK TS'S field, the MAXPARTITIONS value for each 32 KB type table space is 1 and the DSSIZE is 4.

If you run the CLIST in MIGRATE mode, the value of the 32K TEMP PRIMARY SPACE field is used only when additional 32 KB type work file table spaces or partition-by-growth table spaces are created. Db2 does not take into account the space that is already used by existing 32 KB type work files or partition-by-growth table spaces. If necessary, the CLIST curtails the calculated space at 131,072 GB, which is the maximum for a 32 KB page size partition-by-growth table space.

32K TEMP WORK TS'S field

The value of the 32K TEMP WORK TS'S field specifies the number of 32 KB temporary work file table spaces that are to be created.

Acceptable values:	for installation: 1 - 499; for migration: 0 - 500
Default:	for installation: 1; for migration: 0
Update:	none
DSNZP*xxx*:	none

The sum of the values of the 4K SORT WORK TS'S field, the 32K SORT WORK TS'S field, the 4K TEMP WORK TS'S field, and the 32K TEMP WORK TS'S field cannot exceed 500.

If you run the CLIST in INSTALL mode, you must enter a value of at least 1.

If you run the CLIST in INSTALL mode, and you do not have an existing 32 KB work file table space, enter a non-zero value. If you enter a non-zero value, the value is used for creating new 32 KB type temporary work file table spaces. Db2 does not take into account the number of existing 32 KB type temporary work file table spaces.

32K TEMP WORK SEG SIZE field

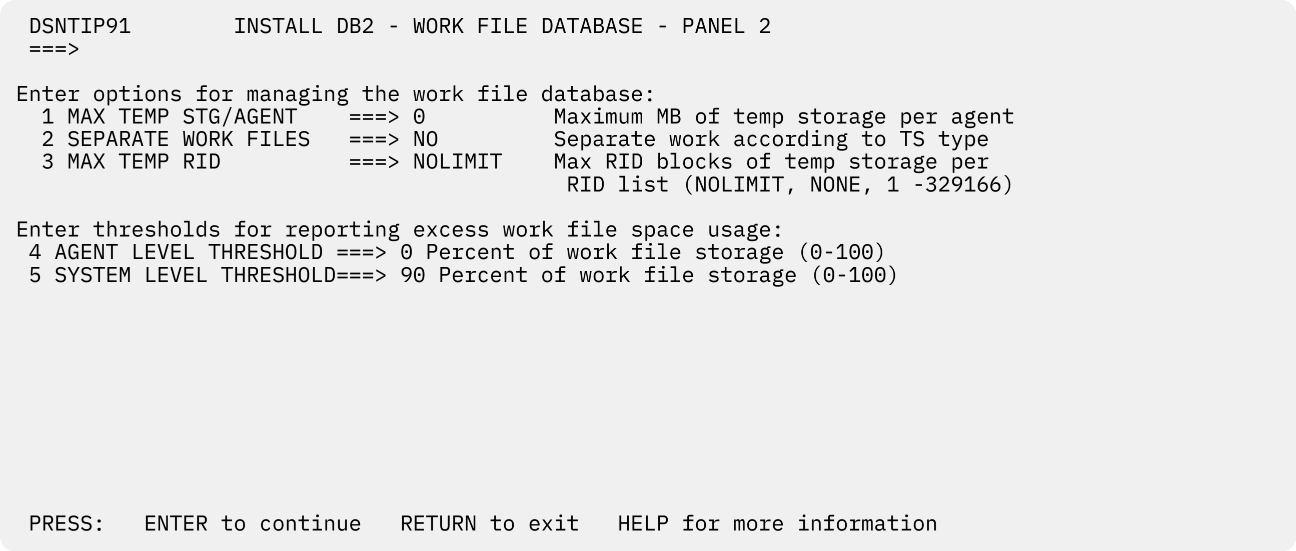
The value of the 32K TEMP WORK SEG SIZE field specifies the segment size that is to be used for 32 KB temporary work file table spaces. The value must be a multiple of 4 between 4 and 64, inclusive.

Acceptable values:	4, 8, 12, ..., 60, 64 (multiples of 4)
Default:	16
Update:	none
DSNZP*xxx*:	none

DSNTIP91: Work file database panel 2

The fields on the DSNTIP91 panel configures options for managing the Db2 work file database and thresholds for reporting excess work file space usage.

Updating the parameters: You can use the UPDATE mode of the installation CLIST to update any value on this panel.



```
 DSNTIP91        INSTALL DB2 - WORK FILE DATABASE - PANEL 2
 ===>

Enter options for managing the work file database:
  1 MAX TEMP STG/AGENT    ===> 0          Maximum MB of temp storage per agent
  2 SEPARATE WORK FILES   ===> NO         Separate work according to TS type
  3 MAX TEMP RID          ===> NOLIMIT    Max RID blocks of temp storage per
                                           RID list (NOLIMIT, NONE, 1 -329166)

Enter thresholds for reporting excess work file space usage:
 4 AGENT LEVEL THRESHOLD ===> 0 Percent of work file storage (0-100)
 5 SYSTEM LEVEL THRESHOLD===> 90 Percent of work file storage (0-100)










 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 20. Work file database panel 2: DSNTIP91

Related information

MAX TEMP STG/AGENT field (MAXTEMPS subsystem parameter)

The MAXTEMPS subsystem parameter determines the maximum amount of temporary storage in the work file database that a single agent can use at any given time for any type of usage. The usage can be for sort work files, created global temporary tables, declared global temporary tables, scrollable cursors result tables, and so on.

Acceptable values:	0 - 2147483647
Default:	0
Update:	option 13 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAXTEMPS

An entry of 0 means that no limit is enforced.

By default, the specified value for MAXTEMPS is in MB, and in job DSNTIJUZ, the parameter value must be specified in MB. However, you can enter a GB value in the MAX TEMP STG/AGENT field of the installation CLIST by specifying a suffix of G, for example 4G.

SEPARATE WORK FILES field (WFDBSEP subsystem parameter)

The WFDBSEP subsystem parameter specifies whether Db2 should provide an unconditional separation of table spaces in the work file database based on the allocation attributes of the table spaces.

Acceptable values:	YES, NO
Default:	NO
Update:	option 13 on panel DSNTIPB

DSNZP*xxx*:	DSN6SPRM.WFDBSEP

YES

Db2 directs declared global temporary table work only to Db2-managed (STOGROUP) work file table spaces that are defined as partition-by-growth (regardless of the SECQTY setting) or segmented (non-universal) table spaces with a non-zero SECQTY setting. Db2 directs work file work only to Db2-managed table spaces that are defined as segmented (non-universal) with a zero SECQTY value or user-managed table spaces. If no table space with the preferred allocation type is available, Db2 issues an error message, a negative SQLCODE, or both.

NO

Db2 attempts to direct declared global temporary table work to Db2-managed (STOGROUP) work file table spaces that are defined as partition-by-growth (regardless of the SECQTY value). It then attempts to direct the work to segmented (non-universal) table spaces with a non-zero SECQTY value. Db2 attempts to direct work file work to Db2-managed table spaces that are defined as segmented (non-universal) with a zero SECQTY value or user-managed table spaces. If no table space with the preferred allocation type is available, Db2 selects a table space with a non-preferred allocation type.

MAX TEMP RID field (MAXTEMPS_RID subsystem parameter)

The MAXTEMPS_RID subsystem parameter determines the maximum amount of temporary storage in the work file database that a single RID list can use at a time.

The work file storage is used for the RID list when the RID pool storage cannot be used to contain all the RIDs. In other words, when RID pool storage overflow occurs for a RID list, the Db2 subsystem attempts to store the RID list in work file storage instead of falling back to a relational scan. This subsystem parameter specifies the maximum number of RIDs (measured in RID blocks) that the subsystem is allowed to store in the work file. If the maximum number of RIDs is exceeded, the subsystem falls back to a relational scan.

The MAXTEMPS_RID subsystem parameter does not affect RID list processing for pair-wise join.

Acceptable values:	NONE, NOLIMIT, or 1 to 329166
Default:	NOLIMIT
Update:	option 13 on panel DSNTIPB
DSNZP*xxx*:	MAXTEMPS_RID

The MAXTEMPS_RID value is specified in number of RID blocks. An entry of NONE means that the RID list processing will not use work file storage. An entry of NOLIMIT means that the number of RID blocks that can be stored in a work file is unrestricted. This is the default behavior.

Each RID block that is stored in the work file occupies 32 KB of work file storage and contains 6524 RIDs. For example, a value of 10000 for MAXTEMPS_RID limits the number of RIDs that are allowed to be stored in the work file to 65,240,000, or approximately 312.5 MB.

Another subsystem parameter, MAXTEMPS, controls the maximum amount of temporary storage in the work file database that a single agent can use at a time for any type of usage. The scope of the parameter includes work file usage for storing RIDs. Therefore, if MAXTEMPS is set to a non-zero value, it overrides the setting of MAXTEMPS_RID in some cases.

For example, consider the following scenario:

MAXTEMPS is set to 2G, meaning that 2 GB of work file storage is allowed to be used by the agent. MAXTEMPS_RID is set to 20000, meaning that 20,000 RID blocks are allowed to be stored in a work file, which translates to 625 MB of work file storage. Suppose that a RID list processing encountered a RID pool overflow, and therefore, the Db2 subsystem is using work file storage to store the RID list. Suppose that 104,384,000 RIDs are fetched into the RID list. The list therefore, takes up 16,000 RID blocks, which is below the MAXTEMPS_RID value of 20000. If no other activity is using much work file storage in the agent, the RID list should be successfully stored in a work file, and RID processing could continue. However, if other activities in the agent are using more than 1.5 GB of work file storage, less than 500 MB of work file storage is available to the agent (MAXTEMPS - 1.5 GB). The 16,000 RID blocks cannot fit in the 500 MB of available space. RID processing will not have enough work file storage and will fall back to a relational scan although the MAXTEMPS_RID value is well above the amount that the RID list needs.

Related reference

RID POOL SIZE field (MAXRBLK subsystem parameter)
The MAXRBLK subsystem parameter specifies the amount of storage in kilobytes that is needed for the RID pool.

MAX TEMP STG/AGENT field (MAXTEMPS subsystem parameter)
The MAXTEMPS subsystem parameter determines the maximum amount of temporary storage in the work file database that a single agent can use at any given time for any type of usage. The usage can be for sort work files, created global temporary tables, declared global temporary tables, scrollable cursors result tables, and so on.

Related information

AGENT LEVEL THRESHOLD field (WFSTGUSE_AGENT_THRESHOLD subsystem parameter)

The WFSTGUSE_AGENT_THRESHOLD subsystem parameter determines the percentage of available space in the work file database on a Db2 subsystem or data sharing member that can be consumed by a single agent before a warning message is issued.

Space in the work file database can be configured for declared temporary table work and for sort work. Sort work includes work for global temporary tables and transition tables for triggers.

Acceptable values:	0 - 100
Default:	0
Update:	option 13 on panel DSNTIPB
DSNZP*xxx*:	WFSTGUSE_AGENT_THRESHOLD

0
Db2 does not issue agent-level space usage warnings for the work file database.

1 - 100
If the WFDBSEP subsystem parameter is set to YES, Db2 issues a warning message when the percentage of total temporary work file space or the percentage of total sort work file space that is consumed by an agent exceeds this value.

If WFDBSEP is set to NO, Db2 issues a warning message when the percentage of all work file space that is consumed by an agent exceeds this value.

Related reference

SEPARATE WORK FILES field (WFDBSEP subsystem parameter)
The WFDBSEP subsystem parameter specifies whether Db2 should provide an unconditional separation of table spaces in the work file database based on the allocation attributes of the table spaces.

SYSTEM LEVEL THRESHOLD field (WFSTGUSE_SYSTEM_THRESHOLD subsystem parameter)

The WFSTGUSE_SYSTEM_THRESHOLD subsystem parameter determines the percentage of available space in the work file database on a Db2 subsystem or data sharing member that can be consumed by all agents before a warning message is issued.

Space in the work file database can be configured for declared temporary table work and for sort work. Sort work includes work for global temporary tables and transition tables for triggers.

Acceptable values:	0 - 100

Default:	90
Update:	option 13 on panel DSNTIPB
DSNZP*xxx*:	WFSTGUSE_SYSTEM_THRESHOLD

1 - 100
If the WFDBSEP subsystem parameter is set to YES, Db2 issues a warning message when the percentage of total temporary work file space or the percentage of total sort work file space that is consumed by all agents exceeds this value.

If WFDBSEP is set to NO, Db2 issues a warning message when the percentage of all work file space that is consumed by all agents exceeds this value.

0
Db2 does not issue system-level space usage warnings for the work file database.

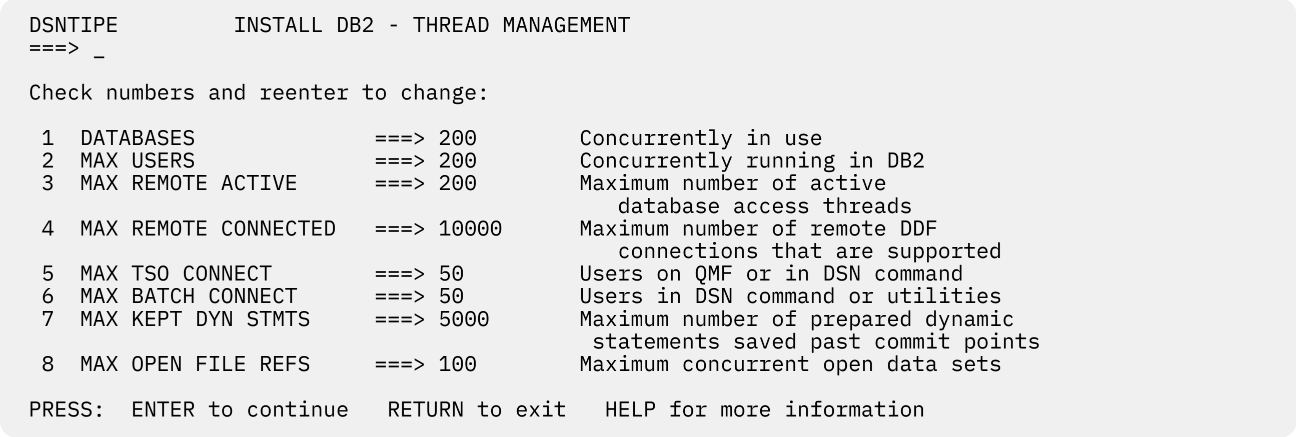
Related reference

SEPARATE WORK FILES field (WFDBSEP subsystem parameter)
The WFDBSEP subsystem parameter specifies whether Db2 should provide an unconditional separation of table spaces in the work file database based on the allocation attributes of the table spaces.

DSNTIPE: Thread management panel 1

The entries on the DSNTIPE panel determine main storage sizes.

Updating the parameters: You can use the UPDATE mode of the CLIST to update any value on this panel.



```
DSNTIPE         INSTALL DB2 - THREAD MANAGEMENT
===> _

Check numbers and reenter to change:

 1  DATABASES              ===> 200        Concurrently in use
 2  MAX USERS              ===> 200        Concurrently running in DB2
 3  MAX REMOTE ACTIVE      ===> 200        Maximum number of active
                                              database access threads
 4  MAX REMOTE CONNECTED   ===> 10000      Maximum number of remote DDF
                                              connections that are supported
 5  MAX TSO CONNECT        ===> 50         Users on QMF or in DSN command
 6  MAX BATCH CONNECT      ===> 50         Users in DSN command or utilities
 7  MAX KEPT DYN STMTS     ===> 5000       Maximum number of prepared dynamic
                                            statements saved past commit points
 8  MAX OPEN FILE REFS     ===> 100        Maximum concurrent open data sets

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 21. Thread management panel: DSNTIPE

DATABASES field for panel DSNTIPE

The value of the DATABASES field of panel DSNTIPE indicates the maximum number of databases that are to be open at one time.

Acceptable values:	1 - 800
Default:	200
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	none

The maximum number of concurrent databases is affected primarily by the DSMAX field on panel DSNTIPC, which specifies the maximum number of open data sets.

Related reference

DSMAX field (DSMAX subsystem parameter)

The DSMAX subsystem parameter specifies the maximum number data sets that can be open at one time.

Related information

MAX USERS field (CTHREAD subsystem parameter)

The CTHREAD subsystem parameter controls the maximum number of allied threads that are to be allocated concurrently. *Allied threads* are threads that are started at the local subsystem.

Acceptable values:	1 - 20000
Default:	200
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP CTHREAD

Count each of the following items as separate users:

- Each TSO user (whether running a DSN command or a Db2 request from QMF)
- Each batch job (whether running a DSN command or a Db2 utility)
- Each IMS region that can access Db2
- Each active CICS transaction that can access Db2
- Each utility (each utility uses one thread, plus one thread for each subtask)
- Each connection from users of CAF and RRSAF
- Each WebSphere application server or other application server that uses JDBC or ODBC has multiple connections to DB2. The number of connections is determined by the application server.

The maximum number of threads accessing data that can be allocated concurrently is the sum of the value of the MAX USERS field and the MAX REMOTE ACTIVE field on panel DSNTIPE. The maximum allowable value for this sum is 20000. When the number of users who are attempting to access Db2 exceeds the number that you specify, excess plan allocation requests are queued. In most situations, the amount of real storage determines the maximum number of threads that Db2 can handle.

Due to parallelism, Db2 utilities each use a minimum of one thread, plus an additional thread for each subtask. Therefore, a single utility might use many threads. Specify a thread value accordingly to accommodate parallelism within utilities. Consider using a value that is higher than the default value or the value that you specified in a previous version of Db2.

MAX REMOTE ACTIVE field (MAXDBAT subsystem parameter)

The value of the MAXDBAT subsystem parameter specifies the maximum number of database access threads (DBATs) that are allowed to be concurrently active.

Acceptable values:	0 - 19999
Default:	200
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP MAXDBAT

The total number of threads accessing data concurrently is the sum of the value of the MAX USERS field and this field, MAX REMOTE ACTIVE. The maximum allowable value for this sum is 20000. If a request for a new connection to Db2 is received and MAX REMOTE ACTIVE has been reached, the resulting action depends on the setting of the DDF THREADS field on panel DSNTIPR.:

If DDF THREADS is ...	Action taken is ...
ACTIVE	The allocation request is allowed but any further processing for the connection is queued waiting for an active database access thread to terminate.
INACTIVE	The allocation request is allowed and is processed when Db2 can assign an unused database access thread slot to the connection.

Setting MAXDBAT to 0

You can use a 0 in this field to restrict DDF server activity on a member of a data sharing group, with the following results:

- DDF does not register the member with WLM for member-specific Sysplex routing. This does not prevent the member from using WLM for enclave prioritization, but it prevents WLM from including this member in the Sysplex routing data that is sent to remote sites.
- In an SNA network, DDF does not register the member's LU name with the VTAM generic LU name during DDF startup. This causes VTAM generic resource connections to be directed to Db2 members that specify a MAX REMOTE ACTIVE value of greater than 0.
- In a TCP/IP network, DDF does not listen on the DRDA SQL port. This means TCP/IP SQL connections can be accepted only by members that specify a MAXDBAT setting greater than 0.
- DDF rejects requests for the Sysplex Routing TPN with the following sense code: SNA TPN not available.
- MAX REMOTE CONNECTED (CONDBAT) is lowered to zero by default if it is not set explicitly.
- Db2 will still accept inbound Automatic Resynchronization requests.

Related reference

DDF THREADS field (CMTSTAT subsystem parameter)
The CMTSTAT subsystem parameter controls whether threads are to be made active or inactive after they successfully commit or roll back and hold no cursors. A thread can become inactive only if it holds no cursors, has no temporary tables defined, and executes no statements from the dynamic statement cache.

MAX REMOTE CONNECTED field (CONDBAT subsystem parameter)
The CONDBAT subsystem parameter sets the maximum number of concurrent inbound DDF connections that are to be allowed.

CONN QUEUE MAX DEPTH field (MAXCONQN subsystem parameter)
If the number of active in-use DBATs has reached the MAXDBAT threshold, the MAXCONQN subsystem parameter specifies the maximum number of inactive or new connection requests that can be queued waiting for a DBAT to process the request.

MAX REMOTE CONNECTED field (CONDBAT subsystem parameter)

The CONDBAT subsystem parameter sets the maximum number of concurrent inbound DDF connections that are to be allowed.

Acceptable values:	0 - 150000
Default:	10000
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP CONDBAT

This value must be greater than or equal to the value of the MAXDBAT subsystem parameter. If MAXDBAT is set to zero, CONDBAT is also set to zero. If a request to allocate a new connection to Db2 is received, and the CONDBAT value has been reached or CONDBAT is zero, the connection request is rejected.

Related reference

MAX REMOTE ACTIVE field (MAXDBAT subsystem parameter)

The value of the MAXDBAT subsystem parameter specifies the maximum number of database access threads (DBATs) that are allowed to be concurrently active.

“CONN QUEUE MAX DEPTH field (MAXCONQN subsystem parameter)” on page 264
If the number of active in-use DBATs has reached the MAXDBAT threshold, the MAXCONQN subsystem parameter specifies the maximum number of inactive or new connection requests that can be queued waiting for a DBAT to process the request.

Related information

MAX TSO CONNECT field (IDFORE subsystem parameter)

The IDFORE subsystem parameter determines the maximum number of users that can be identified to Db2 from TSO foreground at the same time.

Acceptable values:	1 - 20000
Default:	50
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IDFORE

Count each of the following items as a separate user:

- Each TSO foreground user that is executing a DSN command.
- Each TSO foreground user that is connected to Db2 through the CAF or RRSAF. This can include QMF users who are running in TSO foreground or user-written CAF or RRSAF applications running in TSO foreground.

When the number of TSO users who are attempting to access Db2 exceeds the number you specify, excess connection requests are rejected. No Db2 subsystem parameter controls the maximum concurrent connections for IMS and CICS. You can control those limits by using IMS and CICS facilities. For the CICS attachment, the maximum number of connections to Db2 by using the resource control table (RCT) TYPE=INIT THRDMAX value.

MAX BATCH CONNECT field (IDBACK subsystem parameter)

The IDBACK subsystem parameter determines the maximum number of concurrent connections that can be identified to Db2 from batch.

Acceptable values:	1 - 20000
Default:	50
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IDBACK

Recommendation: Use a minimum setting of 30.

Count each of the following items as a separate connection:

- Each Db2 utility.
- Each batch job that uses QMF.
- Each batch job that uses the DSN command processor.
- Each task that is connected to Db2 through the call attachment facility, which runs in batch. Among others, this can include:
  - Batch jobs that use QMF.
  - TCP/IP FTP connections.
- Each RRSAF connection that runs in batch.

- Each WebSphere application server or other application server that uses JDBC or ODBC has multiple connections to Db2. The number of connections is determined by the application server.

Batch job requests to access Db2 that exceed this limit are rejected.

REBUILD INDEX processing uses Db2 connections and might cause message DSNU397I to be issued. If you receive message DSNU397I indicating the REBUILD INDEX utility is constrained, increase the number of concurrent connections.

MAX KEPT DYN STMTS field (MAXKEEPD subsystem parameter)

The MAXKEEPD subsystem parameter specifies the maximum number of prepared, dynamic SQL statements that are to be saved past a commit point. This parameter applies to applications that run with the KEEPDYNAMIC(YES) bind option.

Acceptable values:	0 - 204800
Default:	5000
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAXKEEPD

This is a system-wide limit. This parameter does not limit the size of the dynamic cache itself.

When many applications that are bound with KEEPDYNAMIC(YES) run in a system that has the dynamic statement cache active, they can use a considerable amount of storage in the database services address space (*ssnm*DBM1). This parameter helps limit the amount of storage that these applications use by limiting the total number of prepared statements held by these applications past a commit point. If this limit is exceeded, Db2 honors the KEEPDYNAMIC(YES) behavior, but "implicit" prepares might be necessary to rebuild the executable version of some SQL statements when they are executed after a commit point.

If you enter 0, Db2 cannot keep the executable version of dynamic SQL statements past commit points. To retain the KEEPDYNAMIC(YES) behavior after a commit point, Db2 implicitly prepares dynamic SQL statements to rebuild the executable version.

Related information

MAX OPEN FILE REFS field (MAXOFILR subsystem parameter)

The MAXOFILR subsystem parameter specifies the maximum number of data sets that can be open concurrently for the processing of LOB file references.

Acceptable values:	0 to value specified in MAX USERS field
Default:	100
Update:	option 14 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP MAXOFILR

DSNTIPE1: Thread management panel

The entries on the DSNTIPE1 panel determine main storage sizes.

Updating the parameters: You can use the UPDATE mode of the CLIST to update any value on this panel.

Figure 22. Thread management panel 2: DSNTIPE1

```
DSNTIPE1 INSTALL DB2 - THREAD MANAGEMENT PANEL 2
===>
Check numbers and reenter to change:
1 MANAGE REAL STORAGE    ===> AUTO       Manage real storage usage (AUTO,OFF,ON)
2 CONTRACT THREAD STG    ===> YES        Periodically free unused thread stg
3 MANAGE THREAD STORAGE  ===> NO         Manage thread stg to minimize size

4 LONG-RUNNING READER    ===> 10         Minutes before read claim warning

5 DATA DEF TIMEOUT       ===> 1          For unavailable resources (-254-254)

6 INDEX CLEANUP THREADS  ===> 10         To remove pseudo empty index pages &
                                          pseudo deleted index entries (0-128)













PRESS:  ENTER to continue     RETURN to exit     HELP for more information
```

MANAGE REAL STORAGE field (REALSTORAGE_MANAGEMENT subsystem parameter)

The REALSTORAGE_MANAGEMENT subsystem parameter specifies whether Db2 should manage real storage consumption.

Acceptable values:	AUTO, ON, OFF
Default:	AUTO
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REALSTORAGE_MANAGEMENT

AUTO

Db2 discards thread storage at thread deallocation, or every 120 commits if the thread is reused.

If the available real storage on the LPAR drops below the z/OS frame Available Frame Queue Low threshold, Db2 enables contraction mode.

In *contraction mode*, Db2 discards every 30 commits. Db2 indicates when it enters contraction mode by issuing console messages DNV516I and DSN005I with reason `LOW ON AVAILABLE FRAMES`.

```
DSNV516I  csect-name DSNVMON - BEGINNING STORAGE CONTRACTION MODE
DSNS005I  csect-name DSNVMON - CONTRACTION INITIATED DUE TO LOW ON AVAILABLE FRAMES
```

When Db2 leaves contraction mode, it issues the following message:

```
DSNV517I csect-name DSNVMON - ENDING STORAGE CONTRACTION MODE
```

ON

Db2 always operates in contraction mode. Discarding the frames results in some CPU overhead, and this option is intended for systems in which the availability of real storage is limited. This value is most likely appropriate for LPARs that have many Db2 subsystems, such as a development LPAR.

OFF

Db2 does not discard unused real storage frames until one of the following conditions are met:

- The LPAR reaches an auxiliary critical state.
- The total real and auxiliary storage reaches the value of the REALSTORAGE_MAX subsystem parameter.

Related tasks

Calculating real storage requirements
Db2 can use real storage to reduce I/O and processor times and to improve response time and throughput. The amount of real storage that Db2 needs varies greatly.

Related reference

REALSTORAGE_MAX in macro DSN6SPRM
Specifies the maximum GB of real and auxiliary storage that Db2 can consume.

Related information

CONTRACT THREAD STG field (CONTSTOR subsystem parameter)

The CONTSTOR parameter controls whether Db2 is to periodically contract each thread's working storage area. If YES is used, Db2 examines threads at commit points and periodically returns storage that is no longer in use to the operating system. Storage that a thread acquires is normally allocated to that thread until deallocation.

Acceptable values:	YES, NO
Default:	YES
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CONTSTOR

Recommendation: For subsystems that have many long-running threads and that are constrained on storage in the database services address space (*ssnm*DBM1), specifying YES for this parameter can reduce the total amount of storage that is used in the database services address space (*ssnm*DBM1). For a subsystem that does not have storage constraints, specify NO for this parameter to achieve optimal performance. If you specify NO, monitor storage usage to ensure that no storage shortage occurs.

MANAGE THREAD STORAGE field (MINSTOR subsystem parameter)

The MINSTOR subsystem parameter controls whether Db2 is to use storage management algorithms that minimize the amount of working storage that is consumed by individual threads.

Acceptable values:	YES, NO
Default:	NO
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MINSTOR

LONG-RUNNING READER field (LRDRTHLD subsystem parameter)

The LRDRTHLD subsystem parameter specifies the number of minutes that an agent is to be allowed to hold a read claim. If a read claim is held longer than allowed, Db2 issues a warning message, DSNB260I, and writes a trace record to report it as a long-running reader.

Acceptable values:	0 - 1439 minutes
Default:	10
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM LRDRTHLD

If you specify a value of 0, Db2 will not report long-running readers.

Related information

DATA DEF TIMEOUT field (DDLTOX subsystem parameter)

The DDLTOX subsystem parameter specifies how long a request for SQL data definition is to wait for a resource before timing out. This parameter is used for the processing of DDL statements and GRANT, REVOKE, and LOCK statements.

Acceptable values:	0 to 254
Default:	1
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DDLTOX

0
Db2 resolves the timeout or deadlock situation by returning an error for data definition, GRANT, REVOKE, and LOCK statements.

1 - 254
The actual timeout value is the product of the value of this subsystem parameter and the value of the IRLMRWT subsystem parameter. The default value of 1 means that the value of the IRLMRWT subsystem parameter is used as the timeout value.

Related reference

RESOURCE TIMEOUT field (IRLMRWT subsystem parameter)
The IRLMRWT subsystem parameter controls the number of seconds that are to elapse before a resource timeout is detected.

INDEX CLEANUP THREADS field (INDEX_CLEANUP_THREADS subsystem parameter)

Specifies the maximum number of threads that can be created to process the cleanup of pseudo-deleted index entries on this subsystem or data sharing member. Pseudo-deleted entries in an index are entries that are logically deleted but still physically present in the index.

Acceptable values:	0 - 128
Default:	10
Data sharing scope:	Members are not required to use the same setting
Online changeable:	Yes
Update:	option 15 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM INDEX_CLEANUP_THREADS

This parameter works in conjunction with the SYSIBM.SYSINDEXCLEANUP catalog table, which controls cleanup processing of pseudo-deleted index entries.

The default setting is appropriate for most situations. However, a larger setting might be appropriate in cases where large indexed tables or large numbers of indexed tables are constantly modified. A smaller value might be appropriate in cases where thread count is severely constrained.

When INDEX_CLEANUP_THREADS is set to 0, no cleanup is performed by the subsystem or data sharing member regardless of the entries in the SYSIBM.SYSINDEXCLEANUP catalog table.

Related information

DSNTIP1: Buffer pool sizes panel 1

The DSNTIP1 panel is the first of two panels on which you can specify the size of your virtual buffer pools.

Updating the default buffer pool assignments

You can also change the default buffer pool assignments for user data on this panel. Objects in the catalog and directory always use the following buffer pools, and the assignments cannot be changed: BP0, BP8K0, BP16K0, and BP32K.

It is best to separate the buffer pools for Db2 catalog and directory from the buffer pools for user data to isolate catalog and directory activities. In most cases, choose buffer pools other than the default buffer pools for user data, user indexes, and work files.

For more information about default buffer pool assignments, see .

Updating the buffer pool sizes

You can change your buffer pool sizes online with the ALTER BUFFERPOOL command, but you cannot change these sizes by running the DSNTINST CLIST in update mode.

```
 DSNTIP1         INSTALL DB2 - BUFFER POOL SIZES - PANEL 1
===> _


 1 DEFAULT  4-KB BUFFER POOL FOR USER DATA ===> BP0       BP0    - BP49
 2 DEFAULT  8-KB BUFFER POOL FOR USER DATA ===> BP8K0     BP8K0  - BP8K9
 3 DEFAULT 16-KB BUFFER POOL FOR USER DATA ===> BP16K0    BP16K0 - BP16K9
 4 DEFAULT 32-KB BUFFER POOL FOR USER DATA ===> BP32K     BP32K  - BP32K9
 5 DEFAULT BUFFER POOL FOR USER LOB DATA   ===> BP0       BP0    - BP32K9
 6 DEFAULT BUFFER POOL FOR USER XML DATA   ===> BP16K0    BP16K0 - BP16K9
 7 DEFAULT BUFFER POOL FOR USER INDEXES    ===> BP0       BP0    - BP32K9
Enter buffer pool sizes in number of pages.
 8 BP0  ==> 20000        18 BP10 ==> 0           28 BP20 ==> 0
 9 BP1  ==> 0            19 BP11 ==> 0           29 BP21 ==> 0
10 BP2  ==> 0            20 BP12 ==> 0           30 BP22 ==> 0
11 BP3  ==> 0            21 BP13 ==> 0           31 BP23 ==> 0
12 BP4  ==> 0            22 BP14 ==> 0           32 BP24 ==> 0
13 BP5  ==> 0            23 BP15 ==> 0           33 BP25 ==> 0
14 BP6  ==> 0            24 BP16 ==> 0           34 BP26 ==> 0
15 BP7  ==> 0            25 BP17 ==> 0           35 BP27 ==> 0
16 BP8  ==> 0            26 BP18 ==> 0           36 BP28 ==> 0
17 BP9  ==> 0            27 BP19 ==> 0           37 BP29 ==> 0

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 23. Buffer pool sizes panel 1: DSNTIP1

Related tasks

Calculating buffer pool size
Buffer pools are areas of virtual storage that are used to satisfy the buffering requirements for one or more table spaces or indexes. All Db2 subsystems use virtual buffer pools, which are backed by central storage or auxiliary storage. Buffer pools are created above the 2 GB bar.

Related reference

DSNTIP2: Buffer pool sizes panel 2
The DSNTIP2 panel is the second of the two panels that enables you to specify the size of your virtual buffer pools.

Related information

DEFAULT 4-KB BUFFER POOL FOR USER DATA field (TBSBPOOL subsystem parameter)

The TBSBPOOL subsystem parameter specifies the default buffer pool to use for 4 KB page size table spaces that are created implicitly.

Acceptable values:	Any 4 KB buffer pool names
Default:	BP0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBPOOL

If you do not specify a buffer pool name, Db2 uses the TBSBPOOL value as the default buffer pool for 4 KB page size table spaces. Db2 uses the value differently for the following statements:

CREATE DATABASE
Db2 uses the TBSBPOOL value.

CREATE TABLE
If you do not specify a table space name, Db2 implicitly creates a table space and selects the buffer pool as described in .

Related information

DEFAULT 8-KB BUFFER POOL FOR USER DATA field (TBSBP8K subsystem parameter)

The TBSBP8K subsystem parameter specifies the default buffer pool to use for 8 KB page size table spaces that are created implicitly.

Acceptable values:	Any 8 KB buffer pool names
Default:	BP8K0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBP8K

If you do not specify a buffer pool name, Db2 uses the TBSBP8K value as the default buffer pool for 8 KB page size table spaces. If you do not specify a table space name for a CREATE TABLE statement, Db2 implicitly creates a table space and selects the buffer pool as described in .

DEFAULT 16-KB BUFFER POOL FOR USER DATA field (TBSBP16K subsystem parameter)

The TBSBP16K subsystem parameter specifies the default buffer pool to use for 16 KB page size table spaces that are created implicitly.

Acceptable values:	Any 16 KB buffer pool names
Default:	BP16K0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBP16K

If you do not specify a buffer pool name, Db2 uses the TBSBP16K value as the default buffer pool for 16 KB page size table spaces. If you do not specify a table space name for a CREATE TABLE statement, Db2 implicitly creates a table space and selects the buffer pool as described in .

DEFAULT 32-KB BUFFER POOL FOR USER DATA field (TBSBP32K subsystem parameter)

The TBSBP32K subsystem parameter specifies the default buffer pool to use for 32 KB page size table spaces that are created implicitly.

Acceptable values:	Any 32 KB buffer pool names
Default:	BP32K
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBP32K

If you do not specify a buffer pool name, Db2 uses the TBSBP32K value as the default buffer pool for 32 KB page size table spaces. If you do not specify a table space name for a CREATE TABLE statement, Db2 implicitly creates a table space and selects the buffer pool as described in .

DEFAULT BUFFER POOL FOR USER LOB DATA field (TBSBPLOB subsystem parameter)

The TBSBPLOB subsystem parameter specifies the default buffer pool that is to be used for LOB table spaces that are created implicitly. This parameter also applies to LOB tables spaces that are created explicitly without the BUFFERPOOL clause.

Acceptable values:	Any 4 KB, 8 KB, 16 KB, or 32 KB buffer pool names
Default:	BP0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBPLOB

USE privilege is required on the specified buffer pool to use it by default.

Related information

DEFAULT BUFFER POOL FOR USER XML DATA field (TBSBPXML subsystem parameter)

The TBSBPXML subsystem parameter specifies the default buffer pool that is to be used for XML table spaces that are created implicitly.

Acceptable values:	Any 16 KB buffer pool name
Default:	BP16K0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TBSBPXML

USE privilege is required on the specified buffer pool to use it by default.

Related information

DEFAULT BUFFER POOL FOR USER INDEXES field (IDXBPOOL subsystem parameter)

The IDXBPOOL subsystem parameter identifies the default buffer pool that is to be used for indexes on user data.

Db2 uses the IDXBPOOL value if a value for INDEXBP is not specified on a CREATE DATABASE statement. Db2 does not use this value for a CREATE INDEX statement without the BUFFERPOOL option. In that case, Db2 uses the default index buffer pool for the database.

Acceptable values:	Any 4-KB, 8-KB, 16-KB, or 32-KB buffer pool names
Default:	BP0
Update:	option 16 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IDXBPOOL

BUFFERPOOL fields BP0 - BP29

The values of fields BP0 - BP29 on panel DSNTIP1 specify the number of 4 KB buffers in each of those virtual buffer pools (BP0 - BP29).

Acceptable values:	BP0: 2000 - 250000000 BP1 - BP29: 0 - 250000000
Default:	BP0: 20000 BP1 - BP29: 0
Update:	ALTER BUFFERPOOL command
DSNZP*xxx*:	none

Restriction: The sum of the storage that is available in all buffer pools cannot exceed 1 TB. The amount of storage configured on the subsystem can further limit the buffer pool sizes. If you specify more storage than the total real storage that is available, performance can suffer.

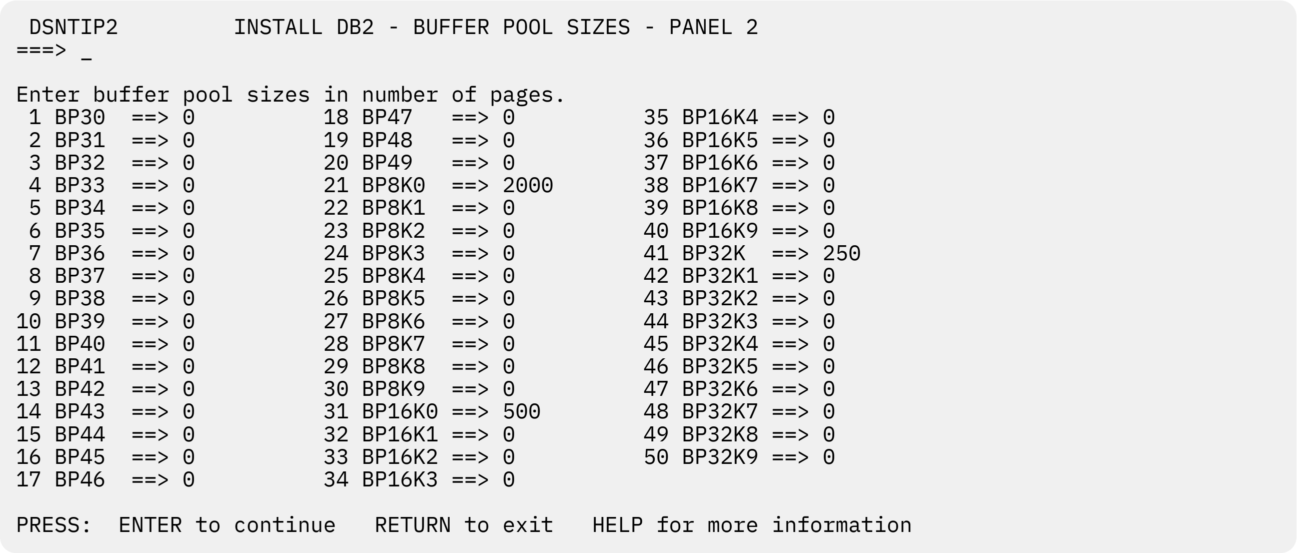
DSNTIP2: Buffer pool sizes panel 2

The DSNTIP2 panel is the second of the two panels that enables you to specify the size of your virtual buffer pools.

The total size of all buffer pools cannot exceed 1TB.

Updating the buffer pool sizes

You can change your buffer pool sizes online with the ALTER BUFFERPOOL command. You cannot change these sizes by running the DSNTINST CLIST in update mode.



```
 DSNTIP2         INSTALL DB2 - BUFFER POOL SIZES - PANEL 2
===> _

Enter buffer pool sizes in number of pages.
 1 BP30  ==> 0          18 BP47   ==> 0          35 BP16K4 ==> 0
 2 BP31  ==> 0          19 BP48   ==> 0          36 BP16K5 ==> 0
 3 BP32  ==> 0          20 BP49   ==> 0          37 BP16K6 ==> 0
 4 BP33  ==> 0          21 BP8K0  ==> 2000       38 BP16K7 ==> 0
 5 BP34  ==> 0          22 BP8K1  ==> 0          39 BP16K8 ==> 0
 6 BP35  ==> 0          23 BP8K2  ==> 0          40 BP16K9 ==> 0
 7 BP36  ==> 0          24 BP8K3  ==> 0          41 BP32K  ==> 250
 8 BP37  ==> 0          25 BP8K4  ==> 0          42 BP32K1 ==> 0
 9 BP38  ==> 0          26 BP8K5  ==> 0          43 BP32K2 ==> 0
10 BP39  ==> 0          27 BP8K6  ==> 0          44 BP32K3 ==> 0
11 BP40  ==> 0          28 BP8K7  ==> 0          45 BP32K4 ==> 0
12 BP41  ==> 0          29 BP8K8  ==> 0          46 BP32K5 ==> 0
13 BP42  ==> 0          30 BP8K9  ==> 0          47 BP32K6 ==> 0
14 BP43  ==> 0          31 BP16K0 ==> 500        48 BP32K7 ==> 0
15 BP44  ==> 0          32 BP16K1 ==> 0          49 BP32K8 ==> 0
16 BP45  ==> 0          33 BP16K2 ==> 0          50 BP32K9 ==> 0
17 BP46  ==> 0          34 BP16K3 ==> 0

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 24. Buffer pool sizes panel 2: DSNTIP2

BUFFERPOOL fields BP30 - BP32K9

The values of fields BP30 - BP32K9 on panel DSNTIP2 specify the number of buffers in each of those virtual buffer pools (BP30 - BP32K9).

Acceptable values:	BP30 - BP49: 0 - 250000000 BP8K0 - BP8K9: 0 - 125000000 BP16K0 - BP16K9: 0 - 62500000 BP32K: 250 - 31250000 BP32K1 - BP32K9: 0 - 31250000
Default:	BP8K0: 2000 BP16K0: 500 BP32K: 250 All others: 0
Update:	ALTER BUFFERPOOL command
DSNZP*xxx*:	none

Related tasks

Calculating buffer pool size
Buffer pools are areas of virtual storage that are used to satisfy the buffering requirements for one or more table spaces or indexes. All Db2 subsystems use virtual buffer pools, which are backed by central storage or auxiliary storage. Buffer pools are created above the 2 GB bar.

Related reference

DSNTIP1: Buffer pool sizes panel 1
The DSNTIP1 panel is the first of two panels on which you can specify the size of your virtual buffer pools.

Related information

BUFFERPOOL fields BP30 - BP32K9

The values of fields BP30 - BP32K9 on panel DSNTIP2 specify the number of buffers in each of those virtual buffer pools (BP30 - BP32K9).

Acceptable values:	BP30 - BP49: 0 - 250000000 BP8K0 - BP8K9: 0 - 125000000 BP16K0 - BP16K9: 0 - 62500000 BP32K: 250 - 31250000 BP32K1 - BP32K9: 0 - 31250000
Default:	BP8K0: 2000 BP16K0: 500 BP32K: 250 All others: 0
Update:	ALTER BUFFERPOOL command
DSNZP*xxx*:	none

Restriction: The sum of the storage that is available in all buffer pools cannot exceed 1 TB. The amount of storage that is configured on the subsystem can further limit the buffer pool sizes.

DSNTIPN: Tracing parameters panel

The entries on the DSNTIPN panel affect the audit, global, accounting, and monitor traces and the checkpoint frequency.

Because space on this panel is limited, some input fields are not wide enough to display the entire contents of the field at one time. These fields are defined as ISPF scrollable fields, which let you see the field contents. A less-than symbol (<) or a greater-than (>) symbol denotes a scrollable field. A > symbol indicates that the field can be scrolled to the right, and a < symbol indicates that the field can be scrolled to the left. You can position your cursor in the field and use ISPF scroll commands LEFT and RIGHT to scroll through the field. To see the entire contents of the field at one time, type EXPAND in the command field, position your cursor in the scrollable field, and press Enter. (Alternatively, you can assign your PF keys to be the LEFT, RIGHT, and EXPAND commands.)

```
DSNTIPN         INSTALL DB2 - TRACING PARAMETERS

===> _
Enter data below:

 1  AUDIT TRACE        ===> NO       > Audit classes to start. NO,YES,list
 2  TRACE AUTO START   ===> NO       > Global classes to start. YES,NO,list
 3  TRACE SIZE         ===> 64K        Trace table size in bytes. 4K-396K
 4  SMF ACCOUNTING     ===> 1        > Accounting classes to start. NO,YES,list
 5  SMF STATISTICS     ===> YES      > Statistics classes to start. NO,YES,list
 6  STATISTICS TIME    ===> 1          Time interval in minutes. 1-60
 7  STATISTICS SYNC    ===> NO         Synchronization within the hour. NO,0-59
 8  DATASET STATS TIME ===> 5          Time interval in minutes. 1-60
 9  MONITOR TRACE      ===> NO       > Monitor classes to start. NO,YES,list
10  MONITOR SIZE       ===> 1M         Default monitor buffer size. 1M-64M
11  UNICODE IFCIDS     ===> NO         Include UNICODE data when writing IFCIDS
12  DDF/RRSAF ACCUM    ===> 10         Rollup accting for DDF/RRSAF. NO, 2-64K
13  AGGREGATION FIELDS ===> 0          Rollup accting aggregation fields
14  COMPRESS SMF RECS  ===> OFF        Compress trace records destined for SMF

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 25. Tracing panel: DSNTIPN

Related information

AUDIT TRACE field (AUDITST subsystem parameter)

The AUDITST parameter controls whether the audit trace is to start automatically when Db2 is started. You can specify the classes for which the audit trace is to start.

Acceptable values:	NO, YES, *list of classes*, * (asterisk)
Default:	NO
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP AUDITST
Security parameter:	Yes

This is a scrollable field.

NO
Audit trace is not started automatically. If the audit trace is to be used, it must be started with the START TRACE command.

YES
The audit trace for the default class (class 1) starts whenever Db2 is started.

list of classes
The audit trace for the specified classes starts whenever Db2 is started. To specify classes, list the numbers (any integer from 1 to 32) separated by commas.

*** (asterisk)**
The audit trace starts for all classes whenever Db2 is started.

Note: This is a security-related parameter. Audit traces should be enabled to collect information about Db2 security controls to ensure that data access is allowed only for authorized users.

Recommendation: Either AUDITST or audit policies should be enabled at Db2 startup.

Related information

TRACE AUTO START field (TRACSTR subsystem parameter)

The TRACSTR subsystem parameter specifies whether the global trace is to start automatically when Db2 is started. This parameter also specifies the classes for which the global trace is to automatically start.

Deprecated subsystem parameter: Non-default settings for TRACSTR are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value NO.

Acceptable values:	YES, NO, *list of classes*, an asterisk (*)
Default:	NO
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TRACSTR

This is a scrollable field.

YES
Starts the global trace for the default classes (classes 1, 2, and 3) whenever Db2 is started, and it performs additional data consistency checks whenever a data or index is modified.

NO
Specifies no automatic start of the global trace. If the global trace is to be used, it must be started with a special START TRACE command.

list of classes
Starts the global trace for the specified classes. Enter a list of class numbers (any integer from 1 - 32) separated by commas. Only classes 1 - 9 are defined by Db2.

asterisk (*)
Starts global trace for all classes.

The global trace is used to diagnose problems in Db2. Users with production systems that require high performance might consider turning off global trace. However, be aware that turning off global trace presents a serviceability exposure. In the event of a system failure, IBM Support might request that you turn on global trace and attempt to re-create the problem.

Related information

TRACE SIZE field (TRACTBL subsystem parameter)

The TRACTBL subsystem parameter specifies the size, in bytes, of the RES trace table. This table is the default destination for the global trace records in Db2. Most trace records require 32 byte entries. Events with more than three data items require 64 byte entries.

Acceptable values:	4K to 396K
Default:	64K
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP TRACTBL

You can use the abbreviation K for multiples of 1024 bytes. The actual value is rounded up to a multiple of 4. If you use 50K, for example, the actual table size is 52 KB.

In the subsystem parameter, use a multiple of 4. For example, to get a 64 KB table, code TRACTBL=16.

Related information

SMF ACCOUNTING field (SMFACCT subsystem parameter)

The SMFACCT subsystem parameter specifies whether Db2 is to send accounting data to SMF automatically when Db2 is started. This parameter also specifies which classes are to be sent.

Acceptable values:	NO, YES, *list of classes*, * (asterisk)
Default:	1
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP SMFACCT

This is a scrollable field.

NO
Specifies no automatic start of classes.

YES
Starts the trace for the default class (class 1). You might also need to update the SMFPRM*xx* member of SYS1.PARMLIB to permit SMF to write the records.

list of classes
Starts the specified classes. Enter a list of class numbers (any integer from 1 - 32), separated by commas. Only classes 1 - 5, 7, 8, and 10 are defined by Db2.

*** (asterisk)**
Starts all classes.

Related tasks

Installation step 8: Record Db2 data to SMF (optional)
When you install Db2, you can specify whether Db2 statistical, accounting, and audit trace data is to be collected.

Related information

SMF STATISTICS field (SMFSTAT subsystem parameter)

The SMFSTAT subsystem parameter specifies whether Db2 is to send statistical data to SMF automatically when Db2 is started. This parameter also specifies which classes are sent.

Acceptable values:	NO, YES, *list of classes*, an asterisk (*)
Default:	YES
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP SMFSTAT

This is a scrollable field.

NO
Specifies no automatic start.

YES
Starts the trace for the default classes (classes 1, 3, 4, 5, and 6). You might also need to update the SMFPRM*xx* member of SYS1.PARMLIB to permit SMF to write the records.

list of classes
Starts the specified classes. Enter a list of class numbers (any integer from 1 - 32), separated by commas. Only classes 1 - 5 are defined by Db2.

asterisk (*)
Starts all classes.

Related tasks

Installation step 8: Record Db2 data to SMF (optional)
When you install Db2, you can specify whether Db2 statistical, accounting, and audit trace data is to be collected.

Related information

STATISTICS TIME field (STATIME subsystem parameter)

The STATIME subsystem parameter specifies the time interval in minutes for collection of certain statistics trace records.

Acceptable values:	1 - 60 (minutes)
Default:	1
Update:	option 18 on panel DSNTIPB
Data sharing scope:	Member
Online changeable:	Yes
DSNZP*xxx*:	DSN6SYSP STATIME

1 - 60
The interval in minutes for writing statistics records for the following IFCIDs:

- 0105 (Db2 performance trace)

- 0106 (system parameters)
- 0199 (data set statistics)
- 0365 (remote location statistics)
- 0402 (monitor profile warnings or exceptions)

The statistics records are written at approximately the end of the specified interval.

Other interval-driven statistics trace records are controlled by the STATIME_MAIN subsystem parameter.

Related reference

STATISTICS SYNC field (SYNCVAL subsystem parameter)
The SYNCVAL subsystem parameter specifies whether to synchronize recording of the Db2 statistics trace records that the STATIME subsystem parameter controls with a specific part of the hour, such as 15 minutes past the hour.

STATISTICS SYNC field (SYNCVAL subsystem parameter)

The SYNCVAL subsystem parameter specifies whether to synchronize recording of the Db2 statistics trace records that the STATIME subsystem parameter controls with a specific part of the hour, such as 15 minutes past the hour.

Acceptable values:	NO, 0 - 59
Default:	NO
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP SYNCVAL

NO
Specifies that statistics recording is not synchronized. NO is the default.

0 - 59
Db2 statistics recording interval is synchronized with the beginning of the hour (0 minutes past the hour) or with any number of minutes past the hour up to 59, for the following IFCIDs:

- 0105 (Db2 performance trace)
- 0106 (system parameters)
- 0199 (data set statistics)
- 0365 (remote location statistics)
- 0402 (monitor profile warnings or exceptions)

Example

You want the Db2 statistics recording interval to have a length of 15 minutes and to be synchronized with 15 minutes past the hour. Thus, Db2 statistics are recorded at 15, 30, 45, and 60 minutes past the hour. To establish this interval, you would specify the following:

```
STATIME=15
SYNCVAL=15
```

Related reference

STATISTICS TIME field (STATIME subsystem parameter)

The STATIME subsystem parameter specifies the time interval in minutes for collection of certain statistics trace records.

DATASET STATS TIME field (DSSTIME subsystem parameter)

The DSSTIME subsystem parameter specifies the time interval, in minutes, that is to occur between the resetting of data set statistics for online performance monitors.

Acceptable values:	1 - 60
Default:	5
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP DSSTIME

Online performance monitors can request Db2 data set statistics for the current interval with an IFI READS request for IFCID 0199.

MONITOR TRACE field (MON subsystem parameter)

The MON subsystem parameter specifies whether the monitor trace is to start automatically when Db2 is started. The trace can be started for all classes, a default class, or a specified list of classes.

Acceptable values:	NO, YES, *list of classes*, an asterisk (*)
Default:	NO
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP MON

This is a scrollable field.

NO
Specifies no automatic start.

YES
Starts the trace for the default classes (class 1) whenever Db2 is started.

list of classes
Start the trace automatically for the specified classes. Enter a list of class numbers (any integer from 1 - 32), separated by commas. Only classes 1 - 8 are defined by Db2.

asterisk (*)
Starts the trace automatically for all classes.

Related information

MONITOR SIZE field (MONSIZE subsystem parameter)

The MONSIZE subsystem parameter determines the default buffer size that is to be used for monitor traces when data is sent to monitor destinations.

Acceptable values:	1048576 - 67108864
Default:	1048576
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP MONSIZE

You can enter the value in bytes (for example, 4194304) or use the abbreviation K for kilobytes (for example, 4096K) or M for megabytes (for example, 4M).

UNICODE IFCIDS field (UIFCIDS subsystem parameter)

The UIFCIDS subsystem parameter specifies whether output from IFC records is to include Unicode information.

Acceptable values:	NO, YES
Default:	NO
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP UIFCIDS

Only a subset of the character fields are encoded in Unicode. These fields are identified in the IFCID record definition by a %U in the comment area to the right of the field declaration in the DSNDQWxx copy files. The remaining fields maintain the same encoding of previous releases.

DDF/RRSAF ACCUM field (ACCUMACC subsystem parameter)

The ACCUMACC parameter determines whether Db2 accounting data is to be accumulated by the user for DDF and RRSAF threads.

Acceptable values:	NO, 2 - 65535
Default:	10
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP ACCUMACC

NO

Db2 writes an accounting record when a DDF thread is made inactive or when sign-on processing occurs for an RRSAF thread.

integer

Db2 writes an accounting record every *integer* accounting intervals for a given user identifier. *integer* is between 2 and 65535.

A user identifier is a concatenation of one or more values, which can include the user ID, application name or transaction name, and workstation name. Those values are set by DDF threads, or by RRSAF threads through the RRSAF SIGNON, AUTH SIGNON, and CONTEXT SIGNON functions. The possible concatenations are described in "AGGREGATION FIELDS field (ACCUMUID subsystem parameter)" on page 146.

An accounting record might be written prior to the completion of *integer* accounting intervals for a given user in the following cases:

- An internal storage threshold is reached for the accounting rollup blocks.
- Db2 has not rolled data into an internal block in approximately 10 minutes.

Related reference

AGGREGATION FIELDS field (ACCUMUID subsystem parameter)
The ACCUMUID subsystem parameter determines the aggregation fields that are to be used for DDF and RRSAF accounting rollup.

Related information

AGGREGATION FIELDS field (ACCUMUID subsystem parameter)

The ACCUMUID subsystem parameter determines the aggregation fields that are to be used for DDF and RRSAF accounting rollup.

Acceptable values:	0 - 17

Default:	0
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP ACCUMUID

The values are defined in the following table.

Table 22. Values for the aggregation fields that are used for DDF and RRSAF accounting rollup

Value	**Rollup criteria**	**String of X'00' or string of X'40' considered for rollup?**
0	User ID, application name or transaction name, and workstation name	Yes"1" on page 147
1	User ID	No
2	User application name or transaction name	No
3	User workstation name	No
4	User ID and application name or transaction name	Yes"1" on page 147
5	User ID and workstation name	Yes"1" on page 147
6	User application name or transaction name and workstation name	Yes"1" on page 147
7	User ID, application name or transaction name, and workstation name	No
8	User ID and application name or transaction name	No
9	User ID and workstation name	No
10	User application name or transaction name and workstation name	No
11	User ID, application name or transaction name, and workstation name	Yes
12	User ID	Yes
13	User application name or transaction name	Yes
14	User workstation name	Yes
15	User ID and application name or transaction name	Yes
16	User ID and workstation name	Yes
17	User application name or transaction name and workstation name	Yes

Note:

1. At least one value in the set of criteria must have a value other than a string of X'00's or a string of X'40's.

For example, if a thread has the user ID set to a string of X'00' and the workstation name set to myws, the thread qualifies for rollup if ACCUMUID is set to 5, but not if ACCUMUID is set to 9.

Assume that ACCUMUID is set to 5. The threads in the following table all qualify for rollup.

Table 23. Values for user ID and workstation name

User ID	Workstation name
myuser	myws
myuser	A string of X'40'
A string of X'40'	myws
myuser	A string of X'00'
A string of X'00'	myws

The thread with user ID set to myuser and workstation name set to a string of X'40' and the thread with user ID set to myuser and workstation name set to a string or X'00' are included in the same rollup record. The thread with user ID set to a string of X'40' and workstation name set to myws and the thread with user ID set to a string of X'00' and workstation name set to myws are included in the same rollup record.

Db2 writes individual accounting threads for threads that do not meet the criteria for rollup.

The value of ACCUMUID is ignored if the value of ACCUMACC is set to NO.

Related information

COMPRESS SMF RECS field (SMFCOMP subsystem parameter)

The SMFCOMP subsystem parameter specifies whether Db2 is to compress trace records that are to be written to SMF.

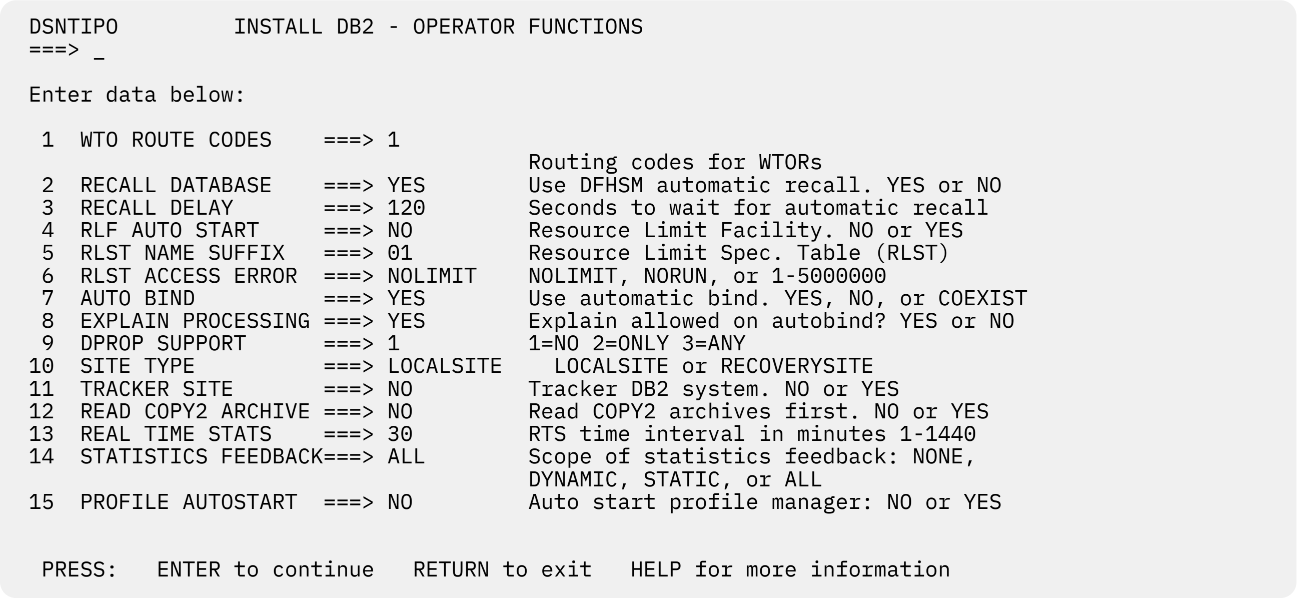
Acceptable values:	OFF, ON
Default:	OFF
Update:	option 18 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP SMFCOMP

OFF
SMF trace records are not compressed.

ON
Trace records that are to be written to SMF are compressed. The z/OS compression service CSRCESRV compresses everything after the SMF header (SM100END, SM101END, or SM102END). See SM100, SM101, and SM102 for compression flags and the uncompressed size of compressed data.

DSNTIPO: Operator functions panel

The entries on the DSNTIPO panel affect various operator functions. These functions include write-to-operator route codes, automatic recall, and the maximum amount of CPU time that is to be allocated for a dynamic SQL statement.



```
DSNTIPO         INSTALL DB2 - OPERATOR FUNCTIONS
===> _

Enter data below:

 1  WTO ROUTE CODES    ===> 1
                                      Routing codes for WTORs
 2  RECALL DATABASE    ===> YES       Use DFHSM automatic recall. YES or NO
 3  RECALL DELAY       ===> 120       Seconds to wait for automatic recall
 4  RLF AUTO START     ===> NO        Resource Limit Facility. NO or YES
 5  RLST NAME SUFFIX   ===> 01        Resource Limit Spec. Table (RLST)
 6  RLST ACCESS ERROR  ===> NOLIMIT    NOLIMIT, NORUN, or 1-5000000
 7  AUTO BIND          ===> YES       Use automatic bind. YES, NO, or COEXIST
 8  EXPLAIN PROCESSING ===> YES       Explain allowed on autobind? YES or NO
 9  DPROP SUPPORT      ===> 1         1=NO 2=ONLY 3=ANY
10  SITE TYPE          ===> LOCALSITE   LOCALSITE or RECOVERYSITE
11  TRACKER SITE       ===> NO        Tracker DB2 system. NO or YES
12  READ COPY2 ARCHIVE ===> NO        Read COPY2 archives first. NO or YES
13  REAL TIME STATS    ===> 30        RTS time interval in minutes 1-1440
14  STATISTICS FEEDBACK===> ALL       Scope of statistics feedback: NONE,
                                      DYNAMIC, STATIC, or ALL
15  PROFILE AUTOSTART  ===> NO        Auto start profile manager: NO or YES


 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 26. Operator functions panel: DSNTIPO

WTO ROUTE CODES field (ROUTCDE subsystem parameter)

The ROUTCDE subsystem parameter specifies the z/OS console routing codes that are to be assigned to messages that are not solicited from a specific console.

Acceptable values:	1 - 16 route codes. Specify at least one code. Separate multiple codes by commas only, with no blanks; for example: 1,3,5,7,9,10,11.
Default:	1
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP ROUTCDE

Related reference

Routing Codes (MVS System Messages)

Routing the Message (z/OS MVS Assembler Services Guide

RECALL DATABASE field (RECALL subsystem parameter)

The RECALL subsystem parameter controls whether DFSMShsm automatic recall is to be performed for Db2 databases.

Acceptable values:	YES, NO
Default:	YES
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RECALL

YES

Indicates that DFSMShsm is invoked to automatically recall migrated table spaces.

NO

Indicates that a Db2 table space that has been migrated is considered to be an unavailable resource. It must be recalled explicitly before Db2 can use it.

RECALL DELAY field (RECALLD subsystem parameter)

The RECALLD subsystem parameter specifies the maximum length of time, in seconds, that a program can be delayed for a DFSMShsm recall.

Acceptable values:	0 - 32767
Default:	120
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RECALLD

If the recall is not completed within the specified number of seconds, the program receives an error message indicating that the set is unavailable, but that a recall was initiated. If you use 0 and the RECALL DATABASE field is YES, the recall is performed asynchronously. This field is ignored if the RECALL DATABASE field is NO.

The RECALL DELAY option is not used when running a Db2 utility against a Db2-migrated data set.

RLF AUTO START field (RLF subsystem parameter)

The RLF subsystem parameter specifies whether the resource limit facility (governor) is to automatically start each time Db2 is started.

Acceptable values:	YES, NO
Default:	NO
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP RLF

Related information

RLST NAME SUFFIX field (RLFTBL subsystem parameter)

The RLFTBL subsystem parameter specifies the suffix that is to be used for the default resource limit specification table (RLST). The default RLST is used when the resource limit facility (governor) is automatically started or when the governor is started without a specified suffix.

Acceptable values:	any 2 alphanumeric characters; national characters are not allowed
Default:	01
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP RLFTBL

RLST ACCESS ERROR field (RLFERR subsystem parameter)

The RLFERR subsystem parameter specifies the action that Db2 takes for dynamic SQL statements that originate from the local server if the resource limit facility encounters a condition that prevents it from accessing the resource limit specification table, or when Db2 cannot find an applicable row in the resource limit specification table.

An applicable row is one that applies to the authorization ID, collection ID, package name, and name of the logical unit of work of the query user.

Acceptable values:	NOLIMIT, NORUN, 1 to 5000000
Default:	NOLIMIT
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP RLFERR

NOLIMIT
Allows all dynamic SQL statements to run without limit.

NORUN
Terminates all dynamic SQL statements immediately with an SQL error code.

1 to 5000000
Specifies the number of service units to use as the default resource limit. If the limit is exceeded, the SQL statement is terminated.

Related information

AUTO BIND field (ABIND subsystem parameter)

The ABIND subsystem parameter specifies whether Db2 automatically rebinds packages and plans in certain situations at run time.

Acceptable values:	YES, NO, COEXIST
Default:	YES
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM ABIND

Automatic rebinds can improve the availability and administration of packages and plans, by reducing the need for explicit rebinds. However, automatic binds can also harm performance because they require access to the Db2 catalog and directory, resource contention might cause them to fail, and they might result in access path regressions.

Tip: For best results enable automatic binds by specifying COEXIST in data-sharing environments and YES in non-data-sharing environments, but also take action to avoid migration-related automatic binds. For details, see "Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11" on page 419.

Important: Apply APAR PI87675 to remove the possibility of repeating automatic remigration binds.

COEXIST or YES
Db2 automatically rebinds packages or plans at run time in the following conditions:

- A package that is marked invalid runs (VALID='N' in the SYSIBM.SYSPACKAGE catalog table).
- A package that was last bound in a release earlier than DB2 9 runs in Db2 11.
- In release coexistence or fallback, a package or plan that was last bound on Db2 11 runs again on Db2 10. After the automatic bind, the package or plan continues to run without automatic binds, even if it runs again on Db2 11. Packages and plans continue to run on Db2 11 as bound on Db2 10. The plan or package does not use any new features that Db2 11 introduces.

NO
Specifies that no automatic binds occur. If any of the following conditions are true when a package attempts to run, Db2 issues SQLCODE -908 SQLSTATE 23510, unless you explicitly rebind the package:

- A package is marked invalid (VALID='N' in the SYSIBM.SYSPACKAGE catalog table).
- A package that was last bound (explicitly or automatically) in Db2 11 attempts to run on Db2 10.

Related concepts

Automatic binds in coexistence
Changes to package structures that are introduced in Db2 11 are not available to members of the group that have not migrated. You must plan accordingly when developing your migration plan.

Related information

EXPLAIN PROCESSING field (ABEXP subsystem parameter)

The ABEXP subsystem parameter controls whether EXPLAIN processing is to occur during an automatic rebind.

Acceptable values:	YES, NO
Default:	YES
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM ABEXP

YES
EXPLAIN processing occurs during the automatic rebind of a plan or package when the bind option EXPLAIN(YES) is specified. If the PLAN_TABLE does not exist, the automatic rebind continues, but generates no EXPLAIN output. EXPLAIN processing does not occur during the automatic rebind of plans or packages with the bind option EXPLAIN(NO).

NO
EXPLAIN processing does not occur during the automatic rebind of a plan or package.

DPROP SUPPORT field (EDPROP and CHGDC subsystem parameters)

The value of the DPROP SUPPORT field determines whether IMS DataPropagator is to be used to propagate SQL changes to tables defined with DATA CAPTURE CHANGES.

Acceptable values:	1, 2, 3
Default:	1
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EDPROP, DSN6SPRM CHGDC

1
Specifies that you do not intend to propagate SQL changes.

2
Specifies that you intend to use IMS DataPropagator to propagate SQL changes, and that changes made to tables defined with DATA CAPTURE CHANGES are allowed **only** when all of the following conditions are met:

- Monitor trace class 6 is active.
- IMS DataPropagator is installed.
- The Db2 application is running in an IMS environment.

If you specify 2 and monitor trace class 6 is not active, IMS DataPropagator is not installed, or the IMS DataPropagator application is not running in an IMS environment, then no changes to the Db2 table are permitted.

3
Specifies that data propagation occurs when all of the following conditions are met:

- Monitor trace class 6 is active.
- IMS DataPropagator is installed.

- The Db2 application is running in an IMS environment.

The ANY option for IMS DataPropagator Support is intended for subsystems that need to propagate some data with IMS DataPropagator and need to propagate some data with a different program.

If you specify 3, an application that is not running in an IMS environment can update Db2 tables that are defined with DATA CAPTURE CHANGES. However, these changes are not propagated to IMS. You might have tables in your Db2-IMS environment that you want to be updated only by Db2 applications. You can protect these tables by using any of the following methods:

- Use the ENABLE parameter on BIND to specify a specific attachment facility through which updates to data propagation tables can be made.
- Define a validation procedure for data propagation tables to allow only certain plans to update those tables.
- Use a group authorization ID to assign update authority for data propagation tables to a group of authorization IDs that can run only in the IMS environment.

The DPROP SUPPORT field values correspond with the CHGDC and EDPROP subsystem parameters as indicated in the following table.

Table 24. Relationship between DPROP SUPPORT field and CHGDC and EDPROP subsystem parameters

DPROP SUPPORT field value	CHGDC setting	EDPROP setting
1	NO	NO
2	YES	YES
3	YES	NO

Related concepts

IMS DataPropagator

SITE TYPE field (SITETYP subsystem parameter)

The SITETYP subsystem parameter specifies whether the current system is at a local site or a recovery site.

Acceptable values:	LOCALSITE, RECOVERYSITE
Default:	LOCALSITE
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SITETYP

LOCALSITE

Specifies that the current system is at the site where the multiple image copies are made and are operational.

RECOVERYSITE

Specifies that the current system is at the site that is named as an alternative for recovery purposes.

The RECOVER utility uses this value to determine what site the current system is on. It then recovers everything from the copies of data that are registered at that site. The RECOVER and MERGECOPY utilities use this value to determine whether COPYDDN or RECOVERDDN is allowed with NEWCOPY NO.

TRACKER SITE field (TRKRSITE subsystem parameter)

The value of the TRKRSITE subsystem parameter indicates whether the subsystem that is being installed is to be used as a remote tracker site. A remote tracker site is used by another Db2 subsystem in case of a disaster.

Acceptable values:	NO, YES

Default:	NO
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM TRKRSITE

Related information

READ COPY2 ARCHIVE field (ARC2FRST subsystem parameter)

The ARC2FRST subsystem parameter determines whether COPY2 archives are to be read first when the Db2 subsystem is started.

Acceptable values:	NO, YES
Default:	NO
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP ARC2FRST

REAL TIME STATS field (STATSINT subsystem parameter)

The STATSINT subsystem parameter specifies the interval, in minutes, at which Db2 writes in-memory page set statistics to the real-time statistics tables. The value of the STATSINT subsystem parameter also controls the interval for writing statistics recommendations to the SYSIBM.SYSSTATSFEEDBACK catalog table. Db2 waits the specified number of minutes after the completion of the previous operation to begin the next operation.

Acceptable values:	1 - 1440
Default:	30
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM STATSINT

Related information

STATISTICS FEEDBACK field (STATFDBK_SCOPE subsystem parameter)

The STATFDBK_SCOPE subsystem parameter specifies the scope of the SQL statements that Db2 collects statistics recommendations for in the SYSIBM.SYSSTATFEEDBACK catalog table.

Acceptable values:	ALL, DYNAMIC, NONE, or STATIC
Default:	ALL
Update:	option 19 on panel DSNTIPO
DSNZP*xxx*:	DSN6SPRM STATFDBK_SCOPE

NONE
No statistics recommendations are collected in the catalog table.

DYNAMIC
Statistics recommendations are collected in the catalog table for dynamic SQL statements only.

STATIC
Statistics recommendations are collected in the catalog table for static SQL statements only.

ALL
Statistics recommendations are collected in the catalog table for all SQL Statements.

Related information

PROFILE AUTOSTART field (PROFILE_AUTOSTART subsystem parameter)

The PROFILE_AUTOSTART subsystem parameter specifies whether START PROFILE command processing is automatically initiated as part of Db2 start processing.

Acceptable values:	NO, YES
Default:	NO
Online changeable:	no
Update:	option 19 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP PROFILE_AUTOSTART

NO
Profile remain inactive after Db2 is started until a START PROFILE command is issued. NO is the default value.

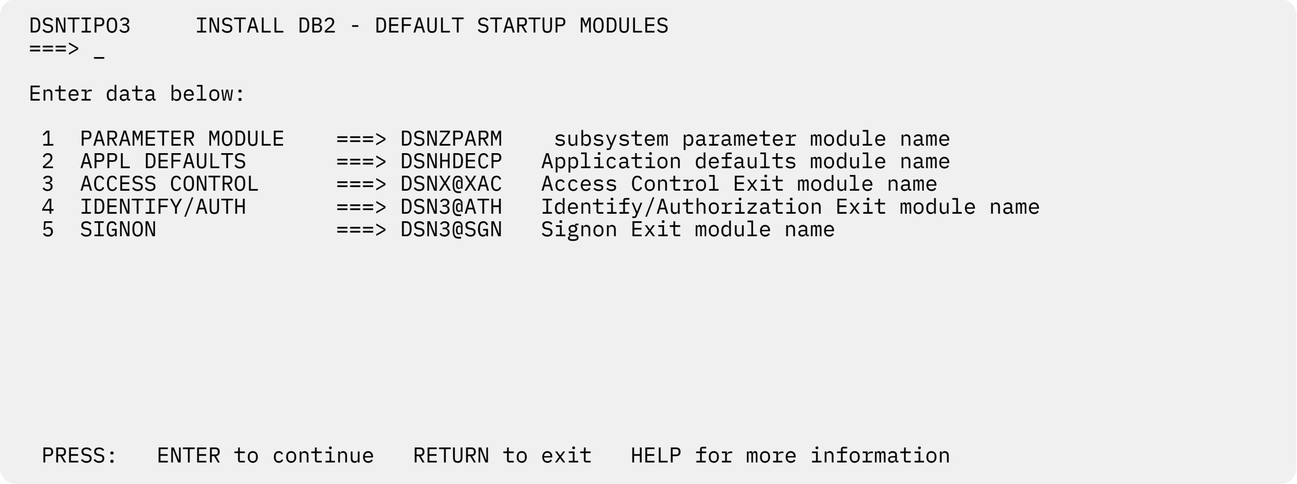
YES
A START PROFILE command is issued as part of Db2 start processing. The rules specified in profiles become effective immediately at the end of the start process.

This value is ignored for START DB2 commands that specify ACCESS(MAINT) or LIGHT(YES).

Related information

DSNTIPO3: Default startup modules panel

The DSNTIPO3 panel enables you to specify the default member names of certain modules that are to be loaded at Db2 startup. These modules are the subsystem parameter module, the application defaults module, and the exit modules.



```
DSNTIPO3     INSTALL DB2 - DEFAULT STARTUP MODULES
===> _

Enter data below:

 1  PARAMETER MODULE    ===> DSNZPARM    subsystem parameter module name
 2  APPL DEFAULTS       ===> DSNHDECP   Application defaults module name
 3  ACCESS CONTROL      ===> DSNX@XAC   Access Control Exit module name
 4  IDENTIFY/AUTH       ===> DSN3@ATH   Identify/Authorization Exit module name
 5  SIGNON              ===> DSN3@SGN   Signon Exit module name










 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 27. Default startup modules panel: DSNTIPO3

PARAMETER MODULE field

The value of the PARAMETER MODULE field specifies the member name of the load module that is to be used for Db2 subsystem parameters.

Acceptable values:	1 - 8 characters

Default:	DSNZPARM
Update:	option 20 on panel DSNTIPB
DSNZP*xxx*:	none

The parameter module typically resides in library *prefix*.SDSNEXIT. To avoid conflict with members of *prefix*.SDSNLOAD, use DSNZP*xxx*, where *xxx* is any set of three alphanumeric characters. Db2 puts this name in the startup JCL procedure in SYS1.PROCLIB, but you can override this value by using the START DB2 command.

APPL DEFAULTS field

The value of the APPL DEFAULTS field specifies the member name of the load module that is to be used for Db2 application default values.

Acceptable values:	for installation: 1 - 8 characters; for migration: DSNHDECP
Default:	DSNHDECP
Update:	option 20 on panel DSNTIPB
DSNZP*xxx*:	none

This module typically resides in library *prefix*.SDSNEXIT. The application default values that are specified within this module are defined by panels DSNTIPK, DSNTIPM, DSNTIPF, and DSNTIP4. The value that is entered in this field will be assigned to the DECP parameter of the *ssnm*MSTR startup JCL procedure in SYS1.PROCLIB. The DECP parameter specifies the name of the applications defaults module that is to be loaded by default when Db2 is started. You can override this value by using the DECP option of the START DB2 command. If you use a name that starts with DSN, use DSNHDE*xx*, where *xx* is any set of two alphanumeric characters. This naming convention avoids conflict with members of *prefix*.SDSNLOAD.

If you specify a name other than DSNHDECP, the DSNTIJUZ and DSNTIJNG jobs create a module with that name, with an alias of DSNHDECP. If alias DSNHDECP already exists, it is replaced. If a module that is named DSNHDECP already exists, the link-edit request fails. In this case, you must delete the DSNHDECP module or remove the ALIAS directive for DSNHDECP from the link-edit in job step DSNTIZQ of DSNTIJUZ and DSNTIJNG.

This parameter cannot be changed online.

ACCESS CONTROL field (ACCESS_CNTL_MODULE subsystem parameter)

The value of this field specifies the member name of the load module that is to be used for the Db2 access control exit routine.

Acceptable values:	for installation: 1 - 8 characters; for migration: DSNX@XAC
Default:	DSNX@XAC
Update:	option 20 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP ACCESS_CNTL_MODULE

This module typically resides in library *prefix*.SDSNEXIT. If you specify a name that starts with DSN, use DSNX@*xxx*, where *xxx* is any unused set of three alphanumeric characters. This naming convention avoids conflict with members of *prefix*.SDSNLOAD.

If you specify a name other than DSNX@XAC, the DSNTIJEX job creates a module with that name, with an alias of DSNX@XAC. If alias DSNX@XAC already exists, it is replaced. If a module that is named DSNX@XAC already exists, the link-edit request fails. In this case, you must delete the DSNX@XAC module or remove the ALIAS directive for DSNX@XAC from the link-edit in job step JEX0003 of DSNTIJEX.

This parameter cannot be changed online.

IDENTIFY/AUTH field (IDAUTH_MODULE subsystem parameter)

The value of this field specifies the member name of the load module that is to be used for the Db2 connection authorization exit routine.

Acceptable values:	for installation: 1 - 8 characters; for migration: DSN3@ATH
Default:	DSN3@ATH
Update:	option 20 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP IDAUTH_MODULE

This module typically resides in library *prefix*.SDSNEXIT. If you specify a name that starts with DSN, use DSN3@*xxx*, where *xxx* is any unused set of three alphanumeric characters. This naming convention avoids conflict with members of *prefix*.SDSNLOAD.

If you specify a name other than DSN3@ATH, the DSNTIJEX job creates a module with that name, with an alias of DSN3@ATH. If alias DSN3@ATH already exists, it is replaced. If a module that is named DSN3@ATH already exists, the link-edit request fails. In this case, you must delete the DSN3@ATH module or remove the ALIAS directive for DSN3@ATH from the link-edit in job step JEX0002 of DSNTIJEX.

This parameter cannot be changed online.

SIGNON field (SIGNON_MODULE subsystem parameter)

The value of this field specifies the member name of the load module that is to be used for the Db2 sign-on exit routine.

Acceptable values:	for installation: 1 - 8 characters; for migration: DSN3@SGN
Default:	DSN3@SGN
Update:	option 20 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP SIGNON_MODULE

This module typically resides in library *prefix*.SDSNEXIT. If you specify a name that starts with DSN, use DSN3@*xxx*, where *xxx* is any unused set of three alphanumeric characters. This naming convention avoids conflict with members of *prefix*.SDSNLOAD.

If you specify a name other than DSN3@SGN, the DSNTIJEX job creates a module with that name, with an alias of DSN3@SGN. If alias DSN3@SGN already exists, it is replaced. If a module that is named DSN3@SGN already exists, the link-edit request fails. In this case, you must delete the DSN3@SGN module or remove the ALIAS directive for DSN3@SGN from the link-edit in job step JEX0001 of DSNTIJEX.

If you run the installation CLIST in MIGRATE mode, this field is always set to DSN3@SGN and cannot be modified.

This parameter cannot be changed online.

Related tasks

Migration step 15: Define user authorization exit routines: DSNTIJEX (optional)
You can use job DSNTIJEX to define user authorization exit routines. If you did not run job DSNTIJEX in the release from which you are migrating, you can skip this step.

Related information

DSNTIPF: Application programming defaults panel 1

The entries on the DSNTIPF panel and the DSNTIP4 panel define application programming default values. These values are used as default values by the program preparation panels, the program preparation

CLIST (DSNH), and the precompiler. These values can also be used as default values by other programs, such as QMF.

Migrating or updating the parameters: If you alter parameter values for which a change during migration or update is "not recommended," this change can invalidate the syntax of existing SQL statements or affect the way that application programs run. Update is allowed, but must be handled with caution.

Most of the values that are set here and on the DSNTIP4 panel are contained in the application defaults load module, *dsnhdecp*. The load module is located in library *prefix*.SDSNEXIT, which can be loaded and accessed by application programs. When modifying the application defaults load module, do so only by changing and running the installation CLIST.

Important: You should always use the CLIST to modify installation parameters. Do not directly modify the data in the application defaults load module. If you modify any installation parameters by changing job DSNTIJUZ directly, these values are not recorded for later updates, new installations, or migrations. In addition, these values are not checked for validity. If you do not use the CLIST to modify these parameters, Db2 may not start.

Many of the fields on this panel involve the selection of coded character set identifiers (CCSIDs). Here is some information that can help you choose values for these fields:

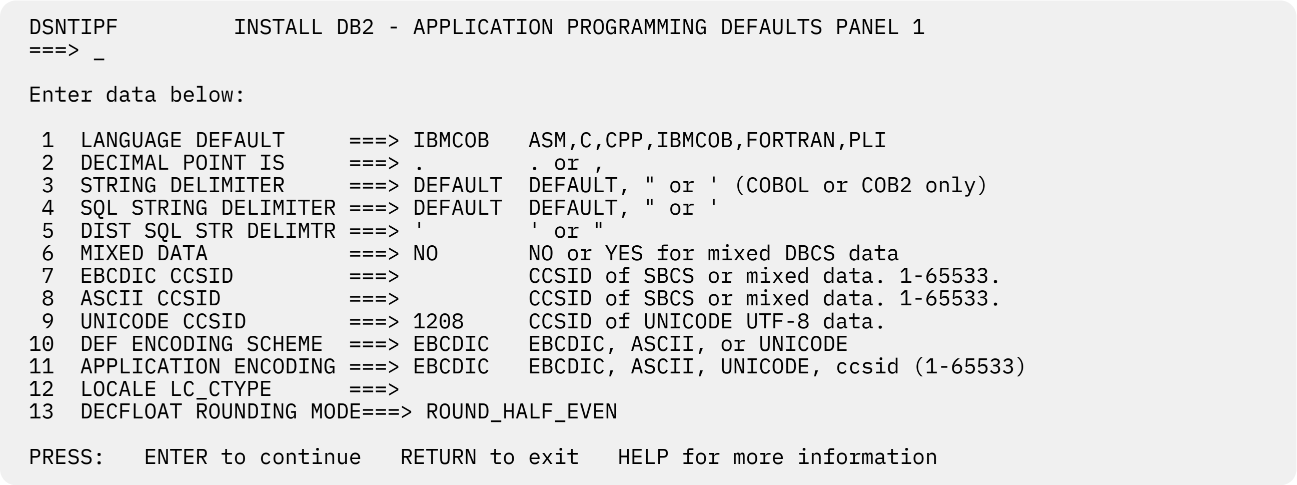
- If you choose YES for the MIXED DATA field, you must specify a mixed data CCSID from Table 151 on page 856 or Table 152 on page 857. An error occurs if you do not specify a CCSID or if the CCSID you specify is not listed in the table.
- If you specify an incorrect CCSID, data can become corrupted. For example, assume that the coded character set used at your site is 37, but you specify 500 as the system CCSID. If Db2 receives data with a CCSID of 500, the data can become corrupted because character conversion does not occur. Conversely, if Db2 receives data with a CCSID other than 500 and a conversion is made from that CCSID **to** 500, the data can become corrupted because character conversion occurs.

  Recommendation: Never change CCSIDs on an existing Db2 system without specific guidance from IBM Support.
- If you need to convert to a CCSID that supports the euro symbol, you can correct it by altering the CCSID field for your default encoding scheme.
- During code conversion, Db2 first looks in the SYSSTRINGS table to see if a conversion is defined. If Db2 finds a conversion, it is used. If Db2 does not find a conversion, it uses z/OS Unicode Services. In some cases, z/OS Unicode Services is used instead of the value in SYSSTRINGS. If the conversion is not available, an error occurs.
- Converting statements to Unicode for parsing depends on having the correct input CCSID specified. The system CCSIDs must be set up correctly at installation time.

  During connect processing, a requester and server provide default CCSIDs for character data sent on the connection.

  The Db2 requester uses the application encoding scheme for its default CCSIDs. If an application provides character data that is not in the CCSID that the application encoding scheme identifies, Db2 overrides the default CCSID by tagging each field with the actual CCSID prior to sending to the server. For applications that use the Unicode encoding scheme, the Db2 requester overrides the application encoding scheme CCSIDs with the system EBCDIC CCSIDs and converts the Unicode data to EBCDIC if Db2 determines that the server does not support Unicode character data. If the server cannot accept character data in these CCSIDs, connect fails with a -332 SQLCODE.

  The Db2 server uses the system default encoding scheme to determine the default CCSID values for character data that is to be returned to the requester. For servers using the encoding scheme of Unicode, the Db2 server overrides the Unicode encoding scheme CCSIDs with the system EBCDIC CCSIDs and converts the Unicode data to EBCDIC if Db2 determines that the requester does not support Unicode character data. If the requester cannot accept character data in these CCSIDs, connect fails with a -332 SQLCODE.



```
DSNTIPF         INSTALL DB2 - APPLICATION PROGRAMMING DEFAULTS PANEL 1
===> _

Enter data below:

 1  LANGUAGE DEFAULT     ===> IBMCOB   ASM,C,CPP,IBMCOB,FORTRAN,PLI
 2  DECIMAL POINT IS     ===> .        . or ,
 3  STRING DELIMITER     ===> DEFAULT  DEFAULT, " or ' (COBOL or COB2 only)
 4  SQL STRING DELIMITER ===> DEFAULT  DEFAULT, " or '
 5  DIST SQL STR DELIMTR ===> '        ' or "
 6  MIXED DATA           ===> NO       NO or YES for mixed DBCS data
 7  EBCDIC CCSID         ===>          CCSID of SBCS or mixed data. 1-65533.
 8  ASCII CCSID          ===>          CCSID of SBCS or mixed data. 1-65533.
 9  UNICODE CCSID        ===> 1208     CCSID of UNICODE UTF-8 data.
10  DEF ENCODING SCHEME  ===> EBCDIC   EBCDIC, ASCII, or UNICODE
11  APPLICATION ENCODING ===> EBCDIC   EBCDIC, ASCII, UNICODE, ccsid (1-65533)
12  LOCALE LC_CTYPE      ===>
13  DECFLOAT ROUNDING MODE===> ROUND_HALF_EVEN

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 28. Application programming defaults panel: DSNTIPF

Related concepts

Euro symbol support
Db2 enables users to migrate to CCSIDs that support the euro symbol. This support is limited to conversion from specific CCSIDs that do not define the euro symbol to specific CCSIDs that define the euro symbol.

Related reference

DSNTIP4: Application programming defaults panel 2
The DSNTIP4 panel is a continuation of the DSNTIPF panel, and it is used to set application programming default values. The values that you specify on this panel are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler.

Code set converters supplied (XL C/C++ Programming Guide)

Related information

LANGUAGE DEFAULT field (DEFLANG DECP value)

The DEFLANG DECP value identifies the default programming language that is to be used for your site.

Acceptable values:	ASM, C, CPP, FORTRAN, IBMCOB, PLI
Default:	IBMCOB
Update:	not recommended
dsnhdecp::	DEFLANG

ASM
Specifies High Level Assembler/MVS as the default programming language.

C
Specifies C as the default programming language. If you specify C, you can fold SQL identifiers to uppercase. However, this is not a default from any installation panel.

CPP
Specifies C++ as the default programming language. If you specify CPP, you can fold SQL identifiers to uppercase. However, this is not a default from any installation panel.

FORTRAN
Specifies Fortran as the default programming language.

IBMCOB
Specifies Enterprise COBOL for z/OS as the default programming language.

PLI
Specifies PL/I as the default programming language.

Related information

DECIMAL POINT IS field (DECIMAL DECP value)

The DECIMAL DECP value determines whether the decimal point for numbers is to be a comma (,) or a period (.).

Acceptable values:	. (period) or , (comma)
Default:	. (period)
Update:	recommended only to recover an error
dsnhdecp:	DECIMAL

For example, some nations customarily signify the number "one and one-half," as 1.5; other nations use 1,5 for the same value.

This parameter is used in the following cases:

- For running dynamic SQL statements with DYNAMICRULES:
  - Whether the value of field DECIMAL POINT IS is COMMA or PERIOD, Db2 recognizes the value as the decimal point for numbers.
- For binding, defining, or invoking dynamic SQL statements with DYNAMICRULES:
  - If the value of field USE FOR DYNAMICRULES is NO, Db2 does not use the value in field DECIMAL POINT IS if you specify the option COMMA or PERIOD when you precompile the application that contains the dynamic SQL statements. Db2 uses the precompiler option to determine the decimal point for numbers.
  - If the value of field USE FOR DYNAMICRULES is YES, and the value of field DECIMAL POINT IS is PERIOD or COMMA, Db2 recognizes the value as the decimal point for numbers.
- For static SQL statements in COBOL programs, DECIMAL POINT IS specifies the default precompiler option (PERIOD or COMMA).

This parameter is the default for binds at this Db2 site that are requested by a remote system that does not indicate whether the period or the comma is used to represent a decimal point. In most cases, however, requesting systems give Db2 this information.

Related information

STRING DELIMITER field (DELIM DECP value)

The DELIM DECP value determines the string delimiter that is to be used for COBOL.

Acceptable values:	DEFAULT, " (quotation mark), ' (apostrophe)
Default:	DEFAULT
Update:	not recommended
dsnhdecp:	DELIM

This option is effective for all varieties of COBOL.

DEFAULT
The string delimiter is the quotation mark.

"
The string delimiter is the quotation mark.

'

The string delimiter is the apostrophe.

See the SQL STRING DELIMITER field for a description of how to use this field to get the set of character string delimiters for COBOL and SQL.

SQL STRING DELIMITER field (SQLDELI DECP value)

The SQLDELI DECP value specifies the character that is to be used as the SQL string delimiter to delimit character strings in dynamic SQL.

Acceptable values:	DEFAULT, " (quotation mark), ' (apostrophe)
Default:	DEFAULT
Update:	not recommended
dsnhdecp:	SQLDELI

This option is effective for all varieties of COBOL.

The value in this field also determines which character is the escape character for delimited identifiers in dynamic SQL. If you specify an apostrophe in this field, you get a quotation mark for your SQL escape character. If you specify a quotation mark in this field, you get an apostrophe for your SQL escape character.

For SQL statements that are embedded in COBOL programs, COBOL precompiler options specify which character is the SQL string delimiter and which character is the SQL escape character. If you specify DEFAULT in this field, a quotation mark is passed to the precompiler as the default SQL string delimiter.

Some applications might require a particular value for the SQL STRING DELIMITER. Determine the required values for those applications before installing Db2.

The following table shows the different combinations of character string delimiters that result from specifying different values in the STRING DELIMITER field and the SQL STRING DELIMITER field.

Table 25. Effect of STRING DELIMITER field and SQL STRING DELIMITER field on SQL and COBOL string delimiters

When you want this combination of character string delimiters...			**Specify this in STRING DELIMITER field**	**Specify this in SQL STRING DELIMITER field**
COBOL	**Dynamic SQL**	**Embedded SQL**		
"	'	"	DEFAULT	DEFAULT
'	'	'	'	'
"	"	"	"	"
"	'	'	"	'

The values that you specify in the STRING DELIMITER field and the SQL STRING DELIMITER field are also used by the program preparation panels, the DSNH CLIST, and the precompiler. The following table shows why you might specify different combinations of values in these fields.

Table 26. Effect of the STRING DELIMITER field and the SQL STRING DELIMITER field on precompiler options

Purpose	**STRING DELIMITER field**	**SQL STRING DELIMITER field**
Force APOST default (even in COBOL) and provide a default similar to APOST in Db2 Server for VSE & VM.	'	'

Table 26. Effect of the STRING DELIMITER field and the SQL STRING DELIMITER field on precompiler options (continued)

Purpose	STRING DELIMITER field	SQL STRING DELIMITER field
Change dynamic query string delimiter to the quotation mark. This is helpful if you use COBOL with the QUOTE option. It allows queries to be tested with dynamic SQL and moved into the program more easily.	"	"
Enables compatibility with the Db2 Server for VSE & VM option.	"	'

DIST SQL STR DELIMTR field (DSQLDELI DECP value)

The DSQLDELI DECP value specifies whether an apostrophe or quotation mark is to be used as the SQL string delimiter for bind operations at this Db2 site. This delimiter is to be used when the requester does not give Db2 that information.

In most cases, requesters tell Db2 whether the apostrophe or the quotation mark is to be used as the SQL string delimiter.

Acceptable values:	' (apostrophe) or " (quotation mark)
Default:	' (apostrophe)
Update:	not recommended
dsnhdecp:	DSQLDELI

MIXED DATA field (MIXED DECP value)

The value of the MIXED DECP field indicates how the EBCDIC CCSID and ASCII CCSID fields are to be interpreted by Db2.

The MIXED DATA option has no effect on a Unicode string, including a Unicode column in an EBCDIC table. Regardless of the setting for MIXED DATA, UNICODE UTF-8 data is considered mixed data and is processed according to the rules for mixed data.

Acceptable values:	YES, NO
Default:	NO
Update:	not recommended
dsnhdecp:	MIXED

YES

The CCSID that is specified in the EBCDIC CCSID and ASCII CCSID field must be the mixed CCSID for the encoding scheme. From this, Db2 determines the associated SBCS and DBCS CCSIDs for the encoding scheme. MIXED DATA YES allows EBCDIC and ASCII mixed-character data and graphic data to be defined.

Important: MIXED DATA applies to both the EBCDIC CCSID and ASCII CCSID. If you choose MIXED DATA YES, you must select mixed CCSIDs for EBCDIC and ASCII.

NO

The CCSID specified in the EBCDIC CCSID or ASCII CCSID field must be the CCSID for the encoding scheme. MIXED DATA NO does not allow for EBCDIC or ASCII mixed character data or graphic data to be defined.

For EBCDIC data, the value specifies whether the code points X'0E' and X'0F' have special meaning as the shift-out and shift-in controls for character strings that include double-byte characters.

- NO indicates that these code points have no special meaning. Therefore, all character strings are single-byte character set (SBCS) data.
- YES indicates that these code points have the special meaning described above. Therefore, character strings can be either SBCS or MIXED data.

Related reference

EBCDIC and ASCII support
Db2 supports both EBCDIC and ASCII encoding of data.

EBCDIC CCSID field (SCCSID, MCCSID, and GCCSID DECP values)

The value of the EBCDIC CCSID field specifies the default CCSID for EBCDIC-encoded character data that is stored in your Db2 subsystem or data sharing system.

Db2 uses this value to perform conversion of character data that is received from external sources including other database management systems. Choose this value carefully to avoid loss of data integrity. The values that you choose for EBCDIC CCSID and ASCII CCSID are closely related.

Acceptable values:	1 - 65533
Default:	(none)
Update:	not recommended; data integrity may be compromised
dsnhdecp:	SCCSID (single-byte), MCCSID (mixed), GCCSID (graphic)

If you specify NO for the MIXED DATA field, the MCCSID and GCCSID values are 65534. If you specify YES for the MIXED DATA field, ensure that you use the correct single-byte CCSID and MCCSID.

Recommendation: Use this parameter to specify an MCCSID. By doing so, you also receive system CCSIDs for your SBCS and GRAPHIC data. If you edit DSNHDECP directly, you will not receive the system CCSIDs for your SBCS and GRAPHIC data.

Conversions are determined in the following order:

1. SYSIBM.SYSSTRINGS.
2. z/OS Unicode conversion services.

Considerations for mixed data:

- If the MIXED DATA field is set to YES, you must specify a MCCSID from "EBCDIC and ASCII support" on page 854. An error occurs if you do not specify a CCSID or if the CCSID you specify is not listed in the table.
- If you specify 930, 1390, or 5026, Katakana characters are allowed in ordinary identifiers, and letters are not changed to uppercase.

If you specify a CCSID that is recognized by Db2 but is inappropriate for your site, data might be corrupted. For example, assume that the coded character set at your site is 37, but you specify 500 as the system CCSID. If Db2 receives data with a CCSID of 37, the data might be corrupted because character conversion does not occur. Conversely, if Db2 receives data with a CCSID other than 500 and a conversion is made from that CCSID to 500, the data may be corrupted because character conversion does occur.

Altering CCSIDs can be very disruptive to a system. Converting to a CCSID that supports the euro symbol is potentially less disruptive because specific pre-euro CCSIDs map to specific CCSIDs for the euro. Converting to a different CCSID for other reasons, particularly when a Db2 system has been operating with the wrong CCSID, could render data unusable and unrecoverable.

Recommendation: Never change CCSIDs on an existing Db2 system without specific guidance from IBM Software Support.

Related concepts

Euro symbol support

Db2 enables users to migrate to CCSIDs that support the euro symbol. This support is limited to conversion from specific CCSIDs that do not define the euro symbol to specific CCSIDs that define the euro symbol.

Related reference

EBCDIC and ASCII support
Db2 supports both EBCDIC and ASCII encoding of data.

Related information

ASCII CCSID field (ASCCSID, AMCCSID, AGCCSID DECP values)

The ASCII CCSID field identifies the default coded character set identifier (CCSID) for ASCII-encoded character data that is to be stored in your Db2 subsystem or data sharing system.

Db2 uses the value of this field to convert character data that is received from external sources, including other database management systems. You must specify a value for this field, even if you do not have or plan to create ASCII-encoded objects. Choose this value carefully to prevent loss of data integrity.

Acceptable values:	1 - 65533
Default:	(none)
Update:	not recommended; data integrity may be compromised
dsnhdecp:	ASCCSID (single-byte), AMCCSID (mixed), AGCCSID (graphic)

Recommendation: Never change CCSIDs on an existing Db2 system without specific guidance from IBM Software Support.

Related reference

EBCDIC and ASCII support
Db2 supports both EBCDIC and ASCII encoding of data.

EBCDIC CCSID field (SCCSID, MCCSID, and GCCSID DECP values)
The value of the EBCDIC CCSID field specifies the default CCSID for EBCDIC-encoded character data that is stored in your Db2 subsystem or data sharing system.

UNICODE CCSID field (USCCSID, UMCCSID, and UGCCSID DECP values)

The value of the UNICODE CCSID field specifies the CCSID that is to be used for Unicode data.

Acceptable values:	1208
Default:	1208
Update:	not recommended; data integrity may be compromised
dsnhdecp:	USCCSID (367 for single-byte), UMCCSID (1208 for mixed), UGCCSID (1200 for graphic)

Accept the default CCSID for Unicode.Db2 currently allows specification of only CCSID 1208 for this value. Db2 automatically chooses the CCSIDs for double-byte and single-byte data. Do not change CCSID values after they have been specified. SQL results might be unpredictable if you do not accept the default.

DEF ENCODING SCHEME field (ENSCHEME DECP value)

The ENSCHEME DECP value specifies the default format in which data is to be stored in Db2.

Acceptable values:	EBCDIC, ASCII, UNICODE
Default:	EBCDIC
Update:	not recommended

dsnhdecp:	ENSCHEME

If you set DEF ENCODING SCHEME to ASCII or EBCDIC and MIXED DATA is set to YES, specify a mixed CCSID.

The DDL uses the default encoding scheme in the following cases:

- CREATE DATABASE
- CREATE DISTINCT TYPE
- CREATE FUNCTION
- CREATE GLOBAL TEMPORARY TABLE
- DECLARE GLOBAL TEMPORARY TABLE
- CREATE TABLESPACE (in DSNDB04 database)

APPLICATION ENCODING field (APPENSCH DECP value)

The APPENSCH DECP value determines the system's default application encoding scheme, which affects how Db2 interprets data coming into Db2.

For example, if your default application encoding scheme is set to 37, and your EBCDIC coded character is set to 500, Db2 converts all data coming into the system to 500 from 37 before using it. This includes, but is not limited to, SQL statement text and host variables.

Acceptable values:	ASCII, EBCDIC, UNICODE, or CCSID (1 - 65533)
Default:	EBCDIC
Update:	not recommended
dsnhdecp:	APPENSCH

The following statements set the value of the host variable and do not require the package to be bound into the plan:

```
    SET CURRENT PACKAGE SET = :HV ,
    SET :HV = CURRENT PACKAGE SET ,
    SET :HV = CURRENT PACKAGE PATH ,
    SET CURRENT PACKAGE PATH = :HV
```

The host variable uses the system's default application encoding scheme, even when the application is bound with the ENCODING(EBCDIC/UNICODE) bind option.

The default value, EBCDIC, causes Db2 to retain the behavior of previous versions of Db2. (Assume that all data is in the EBCDIC system CCSID.)

LOCALE LC_CTYPE field (LC_TYPE DECP value)

The LC_TYPE DECP value specifies the system LOCALE LC_CTYPE. A *locale* is the part of your system environment that depends on language and cultural conventions. An *LC_CTYPE* is a subset of a locale that applies to character functions.

Acceptable values:	A valid locale of 0 to 50 characters.
Default:	Blank
Update:	not recommended
dsnhdecp:	LC_TYPE

The UPPER, LOWER, and TRANSLATE scalar functions use the CURRENT LOCALE LC_CTYPE system default or special register. The results of these functions can vary, depending on the setting of the locale.

Recommendation: Use the default value for LOCALE LC_CTYPE unless you need to execute the UPPER, LOWER, or TRANSLATE functions for data that must be interpreted by using the rules provided by specific locales. For example, specify En_US for English in the United States or Fr_CA for French in Canada.

Related reference

LC_CTYPE category (XL C/C++ Programming Guide)

Related information

DECFLOAT ROUNDING MODE field (DEF_DECFLOAT_ROUND_MODE DECP value)

The DEF_DECFLOAT_ROUND_MODE DECP value specifies the system default action that is to be used for rounding decimal floating point values.

Acceptable values:	ROUND_CEILING, ROUND_DOWN, ROUND_FLOOR, ROUND_HALF_DOWN, ROUND_HALF_EVEN, ROUND_HALF_UP, ROUND_UP
Default:	ROUND_HALF_EVEN
Update:	not recommended
dsnhdecp:	DEF_DECFLOAT_ROUND_MODE

ROUND_CEILING
Rounds towards +infinity. If all of the discarded digits are zero or if the sign is negative, Db2 removes the discarded digits and the rest of the result remains the same. In all other cases, Db2 increments the result coefficient by 1.

ROUND_DOWN
Rounds towards 0. Db2 ignores the discarded digits.

ROUND_FLOOR
Rounds towards -infinity. If all of the discarded digits are zero or if the sign is positive, Db2 removes the discarded digits and the rest of the result remains the same. In all other cases, Db2 increments the result coefficient by 1.

ROUND_HALF_DOWN
Rounds to the nearest number. If the discarded digits are greater than 0.5 of the value of a one in the next left position, Db2 increments the result coefficient by 1. If the discarded digits are equal or less than 0.5, Db2 ignores the discarded digits.

ROUND_HALF_EVEN
Rounds to the nearest number. If the discarded digits are greater than 0.5, the value of a one in the next left position, Db2 increments the result coefficient by 1. If the discarded digits are less than 0.5, Db2 ignores the discarded digits. If the discarded digits are 0.5 and the rightmost digit is even, Db2 does not alter the result coefficient. If the discarded digits are 0.5 and the rightmost digit is odd, Db2 increments the result coefficient by 1 to make it an even digit.

ROUND_HALF_UP
Rounds to the nearest number. If the discarded digits are greater than or equal to 0.5 of the value of a one in the next left position, Db2 increments the result coefficient by 1. In all other cases, Db2 ignores the discarded digits.

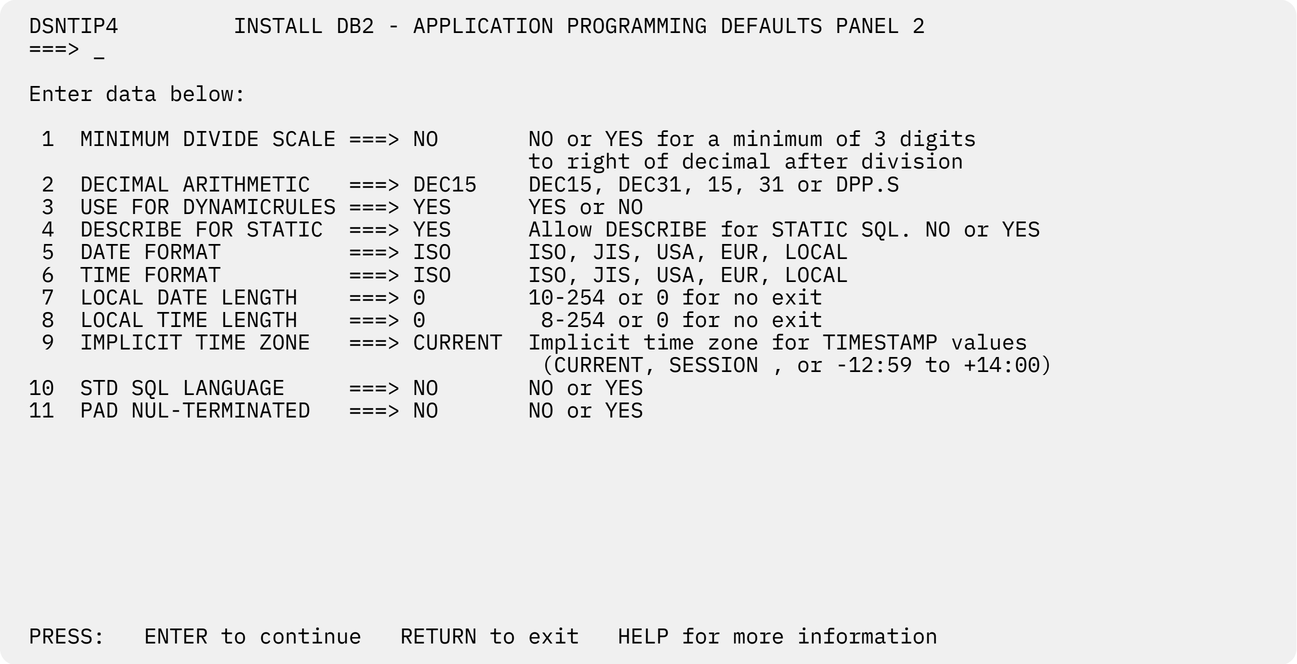
ROUND_UP
Rounds away from 0. If all of the discarded digits are zero, Db2 removes the discarded digits and the rest of the result remains the same. In all other cases, Db2 increments the result coefficient by 1.

Related information

DSNTIP4: Application programming defaults panel 2

The DSNTIP4 panel is a continuation of the DSNTIPF panel, and it is used to set application programming default values. The values that you specify on this panel are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler.

The values that you specify on this panel can also be used as default values by other programs, such as QMF.



```
DSNTIP4         INSTALL DB2 - APPLICATION PROGRAMMING DEFAULTS PANEL 2
===> _

Enter data below:

 1  MINIMUM DIVIDE SCALE ===> NO       NO or YES for a minimum of 3 digits
                                       to right of decimal after division
 2  DECIMAL ARITHMETIC   ===> DEC15    DEC15, DEC31, 15, 31 or DPP.S
 3  USE FOR DYNAMICRULES ===> YES      YES or NO
 4  DESCRIBE FOR STATIC  ===> YES      Allow DESCRIBE for STATIC SQL. NO or YES
 5  DATE FORMAT          ===> ISO      ISO, JIS, USA, EUR, LOCAL
 6  TIME FORMAT          ===> ISO      ISO, JIS, USA, EUR, LOCAL
 7  LOCAL DATE LENGTH    ===> 0        10-254 or 0 for no exit
 8  LOCAL TIME LENGTH    ===> 0         8-254 or 0 for no exit
 9  IMPLICIT TIME ZONE   ===> CURRENT  Implicit time zone for TIMESTAMP values
                                        (CURRENT, SESSION , or -12:59 to +14:00)
10  STD SQL LANGUAGE     ===> NO       NO or YES
11  PAD NUL-TERMINATED   ===> NO       NO or YES









PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 29. Application programming defaults panel: DSNTIP4

Related reference

DSNTIPF: Application programming defaults panel 1
The entries on the DSNTIPF panel and the DSNTIP4 panel define application programming default values. These values are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler. These values can also be used as default values by other programs, such as QMF.

Related information

MINIMUM DIVIDE SCALE field (DECDIV3 subsystem parameter)

The DECDIV3 subsystem parameter determines whether to retain at least three digits to the right of the decimal point after any decimal division.

Acceptable values:	YES, NO
Default:	NO
Update:	option 22 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DECDIV3

Certain accounting applications might need this option.

YES
Retains at least three digits to the right of the decimal point after any decimal division.

NO
Does not retain three digits to the right of the decimal point after decimal division. Use NO, the default, to accept the usual rules for decimal division in SQL.

Related reference

MINDVSCL subsystem parameter in DSN6SPRM
The MINDVSCL subsystem parameter specifies the minimum scale for the result of a decimal division. If set to a value other than NONE, MINDVSCL overrides the DECDIV3 subsystem parameter.

Related information

DECIMAL ARITHMETIC field (DECARTH DECP value)

The DECARTH DECP value specifies the rules that are to be used when both operands in a decimal operation have precisions of 15 or less.

Acceptable values:	DEC15, DEC31, 15, 31, or DPP.S
Default:	DEC15
Update:	not recommended; cannot be changed during migration
dsnhdecp:	DECARTH

DEC15 or 15
Specifies the rules that do not allow a precision greater than 15 digits.

DEC31 or 31
Specifies the rules that allow a precision of up to 31 digits. The rules for DEC31 are always used if either operand has a precision greater than 15. If you chose DEC15 for your previous installation, choosing DEC31 can produce different results for operations on existing data.

D*PP.S*
"PP" is either 15 or 31 and "S" is a number between 1 and 9. If the form "DPP.S" is used, "PP" represents the precision that is to be used with the rules that are used for DEC15 or DEC31, and "S" represents the minimum divide scale to use for division operations. The separator that is used in the form "DPP.S" can be either the "." or the "," character, regardless of the setting of the default decimal point. An error occurs if any other values are specified.

This installation option applies to dynamic SQL by becoming the initial value for the CURRENT PRECISION special register, and it provides the default for the DEC precompiler option. DEC15 is sufficient for most sites. Do not choose DEC31 unless you are certain that you need the extra precision. If you use DEC31, you are more likely to get a bind error, particularly in division operations.

Related information

USE FOR DYNAMICRULES field (DYNRULS DECP value)

The DYNRULS DECP value specifies whether Db2 is to use the application programming default values that are specified on this panel. The other option is to use the values of the Db2 precompiler options for dynamic SQL statements that are bound by using DYNAMICRULES bind, define, or invoke behavior.

Acceptable values:	YES or NO
Default:	YES
Update:	not recommended
dsnhdecp:	DYNRULS

YES
Db2 uses the application programming defaults for these fields regardless of the DYNAMICRULES option:

- DECIMAL POINT IS
- STRING DELIMITER
- SQL STRING DELIMITER
- MIXED DATA
- DECIMAL ARITHMETIC

NO

Db2 uses the Db2 precompiler values for dynamic SQL statements in plans or packages that are bound by using the DYNAMICRULES bind, define, or invoke behavior.

DESCRIBE FOR STATIC field (DESCSTAT subsystem parameter)

The DESCSTAT subsystem parameter specifies whether Db2 builds a SQL descriptor area (SQLDA) when binding static SQL statements. This SQLDA is where Db2 returns names of result table columns for a DESCRIBE CURSOR statement.

The DESCSTAT subsystem parameter provides the default value for the DESCSTAT BIND or REBIND option. The DESCSTAT BIND or REBIND option value always overrides the DESCSTAT subsystem parameter value.

Normally, a DESCRIBE request cannot be issued against a static SQL statement, with the following exceptions:

- In a distributed environment, where Db2 for z/OS is the server, and the requester supports extended dynamic SQL. In this scenario, a DESCRIBE request that is executed on an SQL statement in the extended dynamic package appears to Db2 as a DESCRIBE on a static SQL statement in the Db2 package.
- When an application uses a stored procedure result set, and the application must allocate a cursor for that result set. The application can describe that cursor by using a DESCRIBE CURSOR statement. The SQL statement that is actually described is the one for which the cursor is declared in the stored procedure. If that statement is static, this requires that a static SQL statement must be described.

Acceptable values:	NO or YES
Default:	YES
Update:	option 22 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DESCSTAT

NO

Db2 does not generate a DESCRIBE SQLDA at bind time for static SQL statements. If a DESCRIBE request is received at execution time, Db2 generates an error. However, if the describe request comes from a DESCRIBE CURSOR statement, Db2 satisfies the request but is able to provide only data type and length information. Column names are not provided.

YES

Specifies that Db2 builds a SQL descriptor area (SQLDA) when binding static SQL statements, so that it can return names of result table columns for a DESCRIBE CURSOR statement. Specifying YES increases the size of some packages because the DESCRIBE SQLDA is now stored with each statically bound SQL SELECT statement.

YES is the default value.

If your Db2 for z/OS subsystem or Db2 for Linux®, UNIX, and Windows systems use the IBM Data Server Driver for JDBC and SQLJ, or if your Db2 for Linux, UNIX, and Windows systems use the CLI driver, you must set the DESCSTAT parameter to YES.

Related information

DATE FORMAT field (DATE DECP value)

The DATE DECP value controls the default format that is to be used to represent dates in output.

Acceptable values:	ISO, USA, EUR, JIS, LOCAL
Default:	ISO
Update:	not recommended
dsnhdecp:	DATE

The date formats that are associated with the acceptable values for this field are shown in the table below.

Table 27. Date formats

Format name	Abbreviation	Format	Example
International Standards Organization	ISO	yyyy-mm-dd	2003-12-23
IBM USA standard	USA	mm/dd/yyyy	12/23/2003
IBM European standard	EUR	dd.mm.yyyy	23.12.2003
Japanese Industrial Standard Christian Era	JIS	yyyy-mm-dd	2003-12-23
Locally defined (by an installation exit routine)	LOCAL	your choice	

Db2 accepts dates in any format as input. Db2 interprets the input date based on the punctuation, and then provides date output in the format that you specify for this parameter. If you use LOCAL, you must provide a date exit routine to perform date formatting.

Related information

TIME FORMAT field (TIME DECP value)

The value of the TIME FORMAT field specifies which format is to be used as a default output to represent times.

Acceptable values:	ISO, USA, EUR, JIS, LOCAL
Default:	ISO
Update:	not recommended
dsnhdecp:	TIME

Table 28. Time formats

Format name	Abbreviation	Time format	Example
International Standards Organization[1]	ISO[1]	hh.mm.ss	13.30.05
IBM USA standard	USA	hh:mm AM or PM	1:30 PM
IBM European standard	EUR	hh.mm.ss	13.30.05
Japanese Industrial Standard Christian Era	JIS	hh:mm:ss	13:30:05
Installation-defined	LOCAL	Any installation-defined form	—

Table 28. Time formats (continued)

Format name	Abbreviation	Time format	Example
Note: 1. This is an earlier version of the ISO format. JIS can be used to get the current ISO format.			

In the USA format:

- The minutes can be omitted, thereby specifying 00 minutes. For example, 1 PM is equivalent to 1:00 PM.
- The letters A, M, and P can be lowercase.
- A single blank must precede the AM or PM.
- The hour must not be greater than 12 and cannot be 0 except for the special case of 00:00 AM.

Using the ISO format of the 24-hour clock, the correspondence between the USA format and the 24-hour clock is as follows:

- 12:01 AM through 12:59 AM correspond to 00.01.00 through 00.59.00.
- 01:00 AM through 11:59 AM correspond to 01.00.00 through 11.59.00.
- 12:00 PM (noon) through 11:59 PM correspond to 12.00.00 through 23.59.00.
- 12:00 AM (midnight) corresponds to 24.00.00.
- 00:00 AM (midnight) corresponds to 00.00.00.

Db2 can accept a time in any format as input. Db2 interprets the input time based on the punctuation and then provides time output in the format that you specify for this parameter. If you use LOCAL, you must provide a time exit routine to perform time formatting.

Related information

LOCAL DATE LENGTH field (DATELEN DECP value)

If you use a locally defined date exit routine, the DATELEN DECP value defines the length of the longest field that is required to hold a date. To use your own default date format, you must also enter LOCAL for the DATE FORMAT field on panel DSNTIP4.

Acceptable values:	0, 10 - 254
Default:	0
Update or migrate:	not recommended
dsnhdecp:	DATELEN

Accept the default value of 0 if you want to use one of the IBM-supplied date formats (ISO, JIS, USA, or EUR). This value indicates that no user-defined date format exists in your system.

LOCAL TIME LENGTH field (TIMELEN DECP value)

Accept the default value of **0** if you want to use one of the IBM-supplied time formats (ISO, JIS, USA, or EUR).

Acceptable values:	0, 8 - 254
Default:	0
Update or migrate:	not recommended
dsnhdecp:	TIMELEN

This indicates that no user-defined time format exists in your system. If you use a locally defined time exit routine, enter the length of the longest field that is required to hold a time. If you want your own time format to be the default, enter LOCAL for field 2 on this panel.

IMPLICIT TIME ZONE field (IMPLICIT_TIMEZONE DECP value)

The IMPLICIT_TIMEZONE DECP value determines the implicit time zone that is to be used when a time zone is not provided. This parameter applies to Db2 table columns and routing parameters that are declared with TIMESTAMP WITH TIME ZONE data types.

Acceptable values:	CURRENT, SESSION, -12:59 to +14:00
Default:	CURRENT
Update:	not recommended[1]
dsnhdecp:	IMPLICIT_TIMEZONE

[1] Given the way that the implicit time zone is defined, a query might return different results before and after the IMPLICIT_TIMEZONE setting is changed. Or, if IMPLICIT_TIMEZONE is set to SESSION and an application changes the value of SESSION TIME ZONE through a SET SESSION TIME ZONE statement, a query might also return a different result. These situations apply to both static and dynamic applications.

CURRENT
Uses the setting of the CURRENT TIME ZONE special register as the implicit time zone. This is the default setting.

SESSION
Uses the setting of the SESSION TIME ZONE special register as the implicit time zone.

-12:59 to +14:00
Uses the value of the string as the implicit time zone. The format of the value is *th*:*tm*, where *th* is the time zone hour (-12 to +14), and *tm* is the time zone minute (00 - 59). This value is an offset of hours and minutes from the coordinated universal time (UTC). If the string does not indicate '+' or '-', a '+' value is assumed

STD SQL LANGUAGE field (STDSQL DECP value)

The STD SQL LANGUAGE field specifies the SQL standard that is to be used in writing application programs. Specifically, the parameter specifies whether the SQL language conforms to the portions of the 1992 ANSI SQL standard that are implemented by Db2.

Acceptable values:	YES, NO
Default:	NO
Update:	not recommended
dsnhdecp:	STDSQL

YES
The SQL language that is used in application programs conforms to the portions of the 1992 ANSI SQL standard that are implemented by Db2.

NO
Programs are written in accordance with the SQL language that is defined by Db2.

PAD NUL-TERMINATED field (PADNTSTR DECP value)

The PADNTSTR subsystem parameter determines whether output host variables that are nul-terminated strings are to be padded with blanks and a nul-terminator.

Acceptable values:	NO, YES
Default:	NO

Update:	not recommended
dsnhdecp:	PADNTSTR

NO

Nul-terminated output host variables have the nul-terminator placed at the end of actual data that is returned in the host variable.

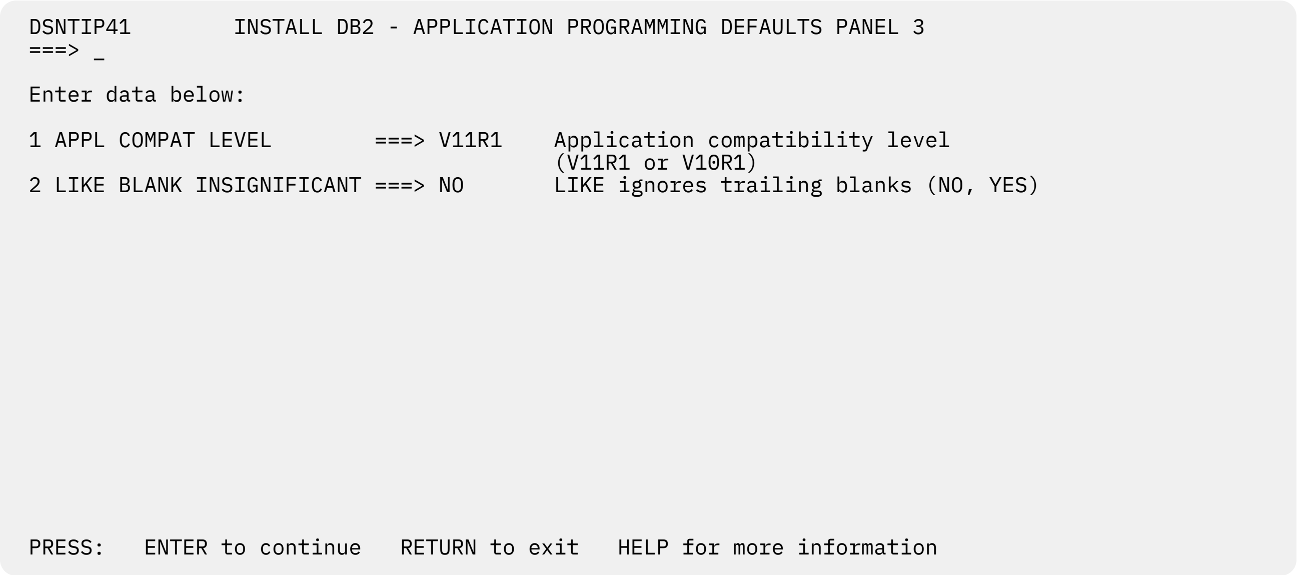
YES

Nul-terminated output host variables have the nul-terminator placed at the end of the string, after the string has been padded with blanks from the end of the actual data to the length of the output host variable.

DSNTIP41: Application programming defaults panel 3

The DSNTIP41 panel is a continuation of the DSNTIPF panel, and it is used to set application programming default values. The values that you specify on this panel are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler.

The values that you specify on this panel can also be used as default values by other programs, such as QMF.



```
DSNTIP41        INSTALL DB2 - APPLICATION PROGRAMMING DEFAULTS PANEL 3
===> _

Enter data below:

1 APPL COMPAT LEVEL        ===> V11R1    Application compatibility level
                                         (V11R1 or V10R1)
2 LIKE BLANK INSIGNIFICANT ===> NO       LIKE ignores trailing blanks (NO, YES)
















PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 30. Application programming defaults panel 3: DSNTIP41

Related reference

DSNTIPF: Application programming defaults panel 1

The entries on the DSNTIPF panel and the DSNTIP4 panel define application programming default values. These values are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler. These values can also be used as default values by other programs, such as QMF.

Related information

APPL COMPAT LEVEL field (APPLCOMPAT subsystem parameter)

The APPL COMPAT LEVEL field specifies the default value of the APPLCOMPAT BIND option. The APPL COMPAT LEVEL field specifies the default value of the APPLCOMPAT REBIND option when there is no APPLCOMPAT value for the existing package in the Db2 catalog.

This subsystem parameter is the default value of the APPLCOMPAT BIND option when it is not explicitly specified. This subsystem parameter is the default for the APPLCOMPAT REBIND option when there is no APPLCOMPAT value for the existing package in the Db2 catalog.

Tip: Do not to raise the default application compatibility level of the Db2 subsystem immediately after migration. Instead, wait until applications are stable in Db2 11 and any incompatibilities are resolved, or any applications with remaining incompatibilities are explicitly bound at an appropriate application compatibility level. For details, see .

Tip: Set all Db2 data sharing members to the same value.

Acceptable values:	V11R1, V10R1
Default:	V10R1 after migration;V11R1 for a new installation
Update:	option 23 on panel DSNTIPB
DSNZPxxx:	DSN6SPRM.APPLCOMPAT

The following values can be used to specify the default value for the APPLCOMPAT bind option for packages:

V11R1
Compatibility with the behavior of Db2 11 new-function mode.

V10R1
Compatibility with the behavior of DB2 10 new-function mode.

Related information

LIKE BLANK INSIGNIFICANT field (LIKE_BLANK_INSIGNIFICANT subsystem parameter)

LIKE_BLANK_INSIGNIFICANT subsystem parameter specifies whether blanks are significant when applying the LIKE predicate to a string. If set, the blank insignificant behavior applies.

Acceptable values:	NO, YES
Default:	NO
Update:	option 23 on panel DSNTIPB
DSNZPxxx:	DSN6SPRM.LIKE_BLANK_INSIGNIFICANT

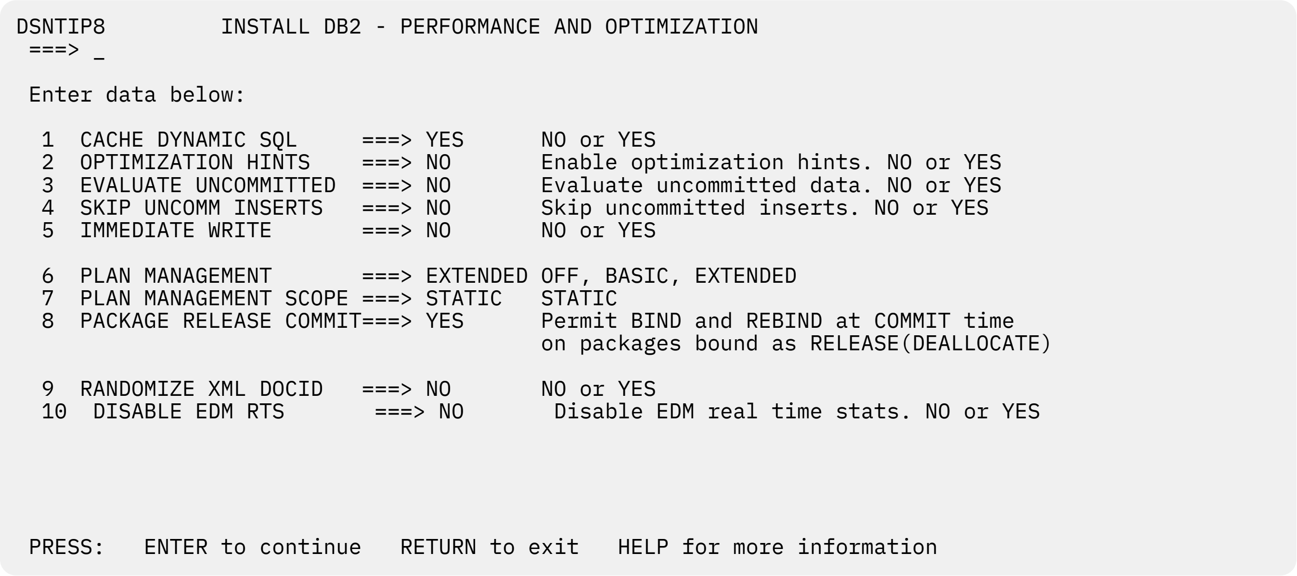
NO
LIKE treats trailing blanks within fixed-length character strings as significant.

YES
When the LIKE predicate is applied against fixed-length character column data, Db2 strips trailing blanks from the data before performing the comparison. If the data is all blank, Db2 reduces it to a single blank before performing the comparison.

Related information

DSNTIP8: Performance and optimization panel

The DSNTIP8 panel is a continuation of the DSNTIP4 panel. It is used to set application programming default values pertaining to performance and optimization.



```
DSNTIP8         INSTALL DB2 - PERFORMANCE AND OPTIMIZATION
 ===> _

 Enter data below:

  1  CACHE DYNAMIC SQL     ===> YES      NO or YES
  2  OPTIMIZATION HINTS    ===> NO       Enable optimization hints. NO or YES
  3  EVALUATE UNCOMMITTED  ===> NO       Evaluate uncommitted data. NO or YES
  4  SKIP UNCOMM INSERTS   ===> NO       Skip uncommitted inserts. NO or YES
  5  IMMEDIATE WRITE       ===> NO       NO or YES

  6  PLAN MANAGEMENT       ===> EXTENDED OFF, BASIC, EXTENDED
  7  PLAN MANAGEMENT SCOPE ===> STATIC   STATIC
  8  PACKAGE RELEASE COMMIT===> YES      Permit BIND and REBIND at COMMIT time
                                         on packages bound as RELEASE(DEALLOCATE)

  9  RANDOMIZE XML DOCID   ===> NO       NO or YES
  10  DISABLE EDM RTS       ===> NO       Disable EDM real time stats. NO or YES




 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 31. Performance and optimization panel: DSNTIP8

CACHE DYNAMIC SQL field (CACHEDYN subsystem parameter)

The CACHEDYN subsystem parameter controls whether prepared, dynamic SQL statements are to be cached for later use by eligible application processes.

Acceptable values:	YES, NO
Default:	YES
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CACHEDYN
Security parameter:	Yes

YES
Causes prepared, dynamic SQL statements to be cached in the EDM dynamic statement cache. If you specify YES, consider this usage when you calculate your EDM pool size. If you specify YES, you must also specify YES for the USE PROTECTION field on panel DSNTIPP.

NO
Causes prepared, dynamic SQL statements to not be cached.

Note: This is a security-related parameter. When RACF authorization is used and this parameter is set, the changes that are made in RACF profiles are not immediately reflected. This setting might result in a user (cached AUTHID) being able to issue the dynamic statements until the cache is refreshed.

Related reference

USE PROTECTION field (AUTH subsystem parameter)
The AUTH subsystem parameter controls whether Db2 is to check authorizations.

Related information

Dynamic Statement Cache (white paper)

OPTIMIZATION HINTS field (OPTHINTS subsystem parameter)

The OPTHINTS subsystem parameter specifies whether Db2 applies various methods for influencing access path selection when static SQL statements are bound or dynamic SQL statements are prepared.

Db2 applies matching various methods for influencing access path selection for SQL statements only when the value of the OPTHINTS subsystem parameter is set to YES.

Examples of these methods include:

- Statement-level predicate selectivity overrides.
- Statement-level access paths.
- Statement-level optimization parameters.
- PLAN_TABLE access path hints.

Acceptable values:	NO, YES
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM OPTHINTS

If you accept the default value, you the methods are not applied and the statements are optimized normally.

When the value is set to YES, Db2 applies hints in the following situations:

- For rows in a PLAN_TABLE instance that contain a value in the OPTHINT column that matches the value of the OPTHINT bind option or the CURRENT OPTIMIZATION HINT special register.
- For any instance of a statement whose application environment and text matches rows in the SYSIBM.SYSQUERY catalog table.

Related information

EVALUATE UNCOMMITTED field (EVALUNC subsystem parameter)

The EVALUNC subsystem parameter controls whether predicate evaluation is to be allowed on uncommitted data of other transactions. This parameter applies only to stage 1 predicate processing that uses table access for queries with isolation level RS or CS. Table access includes table space scan, index-to-data access, and RID-list processing.

The EVALUNC subsystem parameter applies to predicates in queries, searched UPDATE statements, and searched DELETE statements.

EVALUNC does not apply to the following cases:

- To predicates in SQL statements that access the Db2 catalog or directory
- To data definition statements, such as DROP TABLESPACE, for which internal processes query catalog or directory tables

Acceptable values:	NO, YES
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EVALUNC

NO

Predicate evaluation occurs only on committed data (or on the application's own uncommitted changes). NO ensures that all qualifying data is always included in the answer set.

This is the default value.

YES

Predicate evaluation can occur on uncommitted data of other transactions. With YES, data might be excluded from the answer set. Data that does not satisfy the predicate during evaluation but then, because of undo processing (ROLLBACK or statement failure), reverts to a state that does satisfy the predicate is missing from the answer set. A value of YES enables Db2 to take fewer locks during query processing. The number of avoided locks depends on:

- The query's access path
- The number of evaluated rows that do not satisfy the predicate
- The number of those rows that are on overflow pages

Recommendation: Specify YES to improve concurrency if your applications can tolerate returned data that might falsely exclude any data that would be included as the result of undo processing (ROLLBACK or statement failure).

Although the option influences whether predicate evaluation can occur on uncommitted data, it does not influence whether uncommitted data is returned to an application. Queries with isolation level RS or CS return only committed data. They never return the uncommitted data of other transactions, even if predicate evaluation occurs. If data satisfies the predicate during evaluation, the data is locked as needed, and the predicate is re-evaluated as needed before the data is returned to the application.

SKIP UNCOMM INSERTS field (SKIPUNCI subsystem parameter)

The SKIPUNCI subsystem parameter specifies whether statements ignore a row that was inserted by another transaction if the row has not yet been detected as committed. A newly inserted row can be detected as committed only after the lock held on the row has been released.

Acceptable values:	NO, YES
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SKIPUNCI

SKIP UNCOMM INSERTS applies only to statements running with row-level locking and read stability or cursor stability isolation level.

NO

Db2 waits for the inserted row to be committed or rolled back. It then processes the row if the insert commits, or it moves on to find another row if the insert is rolled back. If a transaction performs one or more inserts, and then spawns a second transaction, specify NO for SKIP UNCOMM INSERTS if the first transaction needs the second transaction to wait for the outcome of the inserts.

This is the default value.

YES

Until the lock held on a newly inserted row is released, Db2 behaves as though the newly inserted row has not yet arrived and the row is skipped. Specifying a value of YES offers greater concurrency than the default value of NO.

Related information

IMMEDIATE WRITE field (IMMEDWRI subsystem parameter)

The IMMEDWRI subsystem parameter determines when updates to group buffer pool-dependent buffers are to be written to the coupling facility.

Deprecated subsystem parameter: Non-default settings for IMMEDWRI are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value NO.

Acceptable values:	YES, NO
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6GRP IMMEDWRI

YES
Db2 immediately writes the page to the coupling facility after the update occurs.

NO
Db2 does not immediately write the change buffer to the coupling facility. Instead, Db2 waits until phase 1 of commit.

If either the IMMEDWRITE bind option or the IMMEDWRI subsystem parameter is set to YES, the value of the immediate write option at run time is also YES.

PLAN MANAGEMENT field (PLANMGMT subsystem parameter)

The PLANMGMT subsystem parameter specifies which default plan management policy to use for storing information about access paths information for SQL statements when the PLANMGMT bind option is not explicitly specified for the rebind of a package.

Acceptable values:	EXTENDED, OFF, BASIC,
Default:	EXTENDED
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PLANMGMT

EXTENDED
Db2 saves the active copy, and two older copies, which are known as the *previous* and *original* copies. Db2 replaces the previous copy with the former active copy and saves the newest copy as the active copy. Db2 saves the original copy at the first rebind that EXTENDED is specified and retains the original copy unchanged at subsequent rebinds. EXTENDED is the default value.

BASIC
Db2 saves the active copy and one older copy, which is known as the *previous* copy. Db2 replaces the previous copy path with the former active copy and saves the newest copy the active copy.

OFF
No copies are saved.

Related information

PLAN MANAGEMENT SCOPE field (PLANMGMTSCOPE subsystem parameter)

The PLANMGMTSCOPE subsystem parameter specifies the types of SQL statements for applying the PLANMGMT subsystem parameter setting. The only supported value is STATIC.

Deprecated subsystem parameter: The PLANMGMTSCOPE subsystem parameter is deprecated, meaning that it might be removed eventually.

Acceptable values:	STATIC
Default:	STATIC
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PLANMGMTSCOPE

STATIC
Db2 stores access path information for only static SQL queries.

Related reference

PLAN MANAGEMENT field (PLANMGMT subsystem parameter)
The PLANMGMT subsystem parameter specifies which default plan management policy to use for storing information about access paths information for SQL statements when the PLANMGMT bind option is not explicitly specified for the rebind of a package.

Related information

PACKAGE RELEASE COMMIT field (PKGREL_COMMIT subsystem parameter)

The PKGREL_COMMIT subsystem parameter specifies whether persistent Db2 threads release packages that are active on the thread at ROLLBACK or COMMIT, if certain Db2 operations are waiting for exclusive access to the package. This parameter is applicable to both local and distributed threads.

The value in this field is meaningful only for packages that are bound with the RELEASE(DEALLOCATE) bind option.

Acceptable values:	YES, NO
Default:	YES
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PKGREL_COMMIT

YES

For packages that are bound with the RELEASE(DEALLOCATE) option, the following operations can proceed at COMMIT or ROLLBACK while the package is active and allocated for a persistent Db2 thread:

- BIND REPLACE PACKAGE and REBIND PACKAGE requests, including automatic rebind for online schema changes (DDL statements) for tables and indexes that are statically referenced by the package
- Online REORG operations that materialize pending definition changes for objects that are statically referenced by the package

YES is the default value.

NO

Db2 does not implicitly release an active package at COMMIT or ROLLBACK when it is activate and allocated for a persistent Db2 thread.

Related information

RANDOMIZE XML DOCID field (XML_RANDOMIZE_DOCID subsystem parameter)

Specifies whether Db2 is to sequentially or randomly generate the DOCID values for XML columns.

This parameter does not affect existing tables that have XML columns. Those tables continue to generate DOCIDs in the order that was specified by XML_RANDOMIZE_DOCID when the table was created or in sequential order if the parameter was not specified.

Acceptable values:	NO, YES
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP XML_RANDOMIZE_DOCID

NO
Db2 generates the DOCID values for XML columns sequentially.

YES
Db2 generates the DOCID values for XML columns randomly. Setting this parameter to YES can be beneficial for performance when concurrent inserts are expected.

Once a table starts to randomly generate DOCID values for XML columns, it cannot be changed to generate the value sequentially. Changing this parameter back to NO does not have any effect on tables that have had columns added with a randomized DOCID.

DISABLE EDM RTS field (DISABLE_EDMRTS subsystem parameter)

The DISABLE_EDMRTS subsystem parameter specifies whether to disable the collection of real-time statistics by the environmental description manager (EDM). By default, EDM collects real-time statistics to track when packages were last used.

Acceptable values:	NO, YES
Default:	NO
Update:	option 24 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DISABLE_EDMRTS

NO
EDM continues to collect real-time statistics about the last use of packages. This is the recommended value.

YES
EDM does not collect real-time statistics about the last use of packages. YES might be appropriate in the following situations:

- You have no need to collect information about the last use of packages.
- The SYSIBM.SYSPACKAGE table is persistently unavailable, which prevents the recording of EDM real-time statistics.
- Deferred externalization of these statistics to the SYSIBM.SYSPACKAGE table causes excessive Db2 shutdown time.
- Collection of these EDM statistics causes performance degradation.

In a data sharing environment, all members should use the same setting for this parameter.

DSNTIP81: Performance and optimization panel 2

The DSNTIP81 panel is a continuation of the DSNTIP8 panel. It is used to set application programming default values pertaining to performance and optimization panel.

Figure 32. Performance and optimization panel: DSNTIP81

CURRENT DEGREE field (CDSSRDEF subsystem parameter)

The CDSSRDEF subsystem parameter determines the default value that is to be used for the CURRENT DEGREE special register. The default value is used when a degree is not explicitly set in the SQL statement SET CURRENT DEGREE.

Acceptable values:	1, ANY
Default:	1
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CDSSRDEF

1

Specifies that when a query is dynamically prepared, the execution of that query will not use parallelism.

If this value is specified, Db2 does not use any optimization hints for parallelism.

ANY

Specifies that when a query is dynamically prepared, the execution of that query can involve parallelism.

Recommendation: In almost all situations, accept the default value of 1. You should use parallelism selectively where it provides value, rather than globally. Although parallelism can provide a substantial reduction in elapsed time for some queries with only a modest overhead in processing time, parallelism does not always provide the intended benefit. For some queries and in many other situations, query parallelism does not provide an improvement, or it uses too many resources. If you are using nearly all of your CPU, I/O, or storage resources, parallelism is more likely to cause degradation of performance. Use parallelism only where it is most likely to provide benefits.

MAX DEGREE field (PARAMDEG subsystem parameter)

The PARAMDEG subsystem parameter specifies the maximum degree of parallelism for a parallel group. When you specify a non-zero value for this parameter, you limit the degree of parallelism so that Db2 cannot create too many parallel tasks that use virtual storage.

Acceptable values:	0 - 254
Default:	0
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PARAMDEG

0

Specifies no limit to the maximum degree of parallelism that Db2 chooses based on the cost estimate for the query and the system configuration, in particular the number of processors online. Db2 counts both general purpose and zIIP processors equally, and applies further adjustment to determine the degree to use.

1 - 254

Specifies the maximum degree of parallelism that Db2 uses.

When optimization hints for parallelism are used, the value of the PARAMDEG subsystem parameter does not limit the degree of parallelism at bind time. However, the value of the PARAMDEG subsystem parameter is enforced at execution time. So, if the value of the PARAMDEG subsystem parameter is lower than the degree of parallelism that is specified at bind time, the degree of parallelism is reduced at execution time.

Tip: For systems with more than two zIIP processors configured, use the number of zIIP processors as the starting value, and then adjust as needed for your response time requirements.

Related information

MAX DEGREE FOR DPSI (PARAMDEG_DPSI subsystem parameter)

The PARAMDEG_DPSI subsystem parameter specifies the maximum degree of parallelism that you can specify for a parallel group in which a data partitioned secondary index (DPSI) is used to drive parallelism.

A DPSI is a nonpartitioning index that is physically partitioned according to the partitioning scheme of the table. When you specify a value of greater than 0 for this parameter, you limit the degree of parallelism for DPSIs so that Db2 does not create too many parallel tasks that use virtual storage.

Acceptable values:	0-254, DISABLE

Default:	0
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PARAMDEG_DPSI
Data sharing scope:	All members use the same setting

0
Specifies that Db2 uses the value that is specified for the PARAMDEG subsystem parameter, instead of PARAMDEG_DPSI, to control the degree of parallelism when DPSI is used to drive parallelism. This is the default value for the field.

1
Specifies that Db2 creates multiple child tasks but works on one task at a time when DPSI is used to drive parallelism.

2-254
Specifies that Db2 creates multiple child tasks and works concurrently on the tasks that are specified. The number of specified tasks may be larger or smaller than the number of tasks as specified in PARAMDEG. When PARAMDEG is set to 1, the rest of the query does not have any parallelism.

DISABLE
Specifies that Db2 does not use DPSI to drive parallelism. Parallelism might still occur for the query if PARAMDEG is greater than 1.

PARALLELISM EFFICIENCY field (PARA_EFF subsystem parameter)

The PARA_EFF subsystem parameter controls the efficiency that Db2 assumes for parallelism when Db2 chooses an access path. The integer value that is used for this parameter represents a percentage efficiency.

Deprecated subsystem parameter: Non-default settings for PARA_EFF are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 50.

Acceptable values:	0 – 100
Default:	50
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PARA_EFF

Related information

STAR JOIN QUERIES field (STARJOIN subsystem parameter)

The STARJOIN subsystem parameter specifies whether star join processing is to be enabled.

Acceptable values:	DISABLED, ENABLED, 1 - 32768
Default:	DISABLED
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM STARJOIN

DISABLED
Star schema processing is disabled.

ENABLED
Star schema processing is enabled if the cardinality of the fact table is at least 25 times the cardinality of the largest dimension that is a base table that is joined to the fact table.

1
Star schema processing is enabled. The single table with the largest cardinality is the fact table. However, if more than one table has this cardinality, star join is not enabled.

2 - 32768
Star schema processing is enabled if the cardinality of the fact table is at least the specified number times the cardinality of the largest dimension that is a base table that is joined to the fact table.

Related reference

SJTABLES in macro DSN6SPRM
Specifies whether Db2 enables star join processing.

Related information

MAX DATA CACHING field (MXDTCACH subsystem parameter)

The MXDTCACH subsystem parameter specifies the maximum amount of memory, in MB, that is to be allocated for data caching for each thread.

Acceptable values:	0 - 512
Default:	20
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MXDTCACH

MXDTCACH controls memory allocation for queries that use sparse index access (PLAN_TABLE column PRIMARY_ACCESSTYPE='T') or pair-wise join access (PLAN_TABLE column JOIN_TYPE='P').

If you specify 0, Db2 does not use data caching during query execution. If you specify a value between 1 and 512, Db2 allocates memory from above the 2 GB bar pool up to the specified size for data caching.

Related tasks

Calculating sort pool size
The Db2 sort process uses two kinds of storage: local storage and buffer pool storage. Sort pool storage and buffer pools have storage above the 2 GB bar.

Related information

CURRENT REFRESH AGE field (REFSHAGE subsystem parameter)

The REFSHAGE subsystem parameter specifies the default value for the CURRENT REFRESH AGE special register. The default value is used when no value is explicitly set by using the SET CURRENT REFRESH AGE statement.

Acceptable values:	0, ANY
Default:	0
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REFSHAGE

Accepting the default value of 0 disables query rewrite using deferred materialized query tables.

CURRENT MAINT TYPES field (MAINTYPE subsystem parameter)

The MAINTYPE subsystem parameter specifies the default value for the CURRENT MAINTAINED TABLE TYPES FOR OPTIMIZATION special register. This value is to be used when no value is explicitly set by using the SQL statement SET CURRENT MAINTAINED TABLE TYPES FOR OPTIMIZATION.

Acceptable values:	NONE, SYSTEM, USER, ALL

Default:	SYSTEM
Update:	option 25 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAINTYPE

NONE
Does not allow query rewrite.

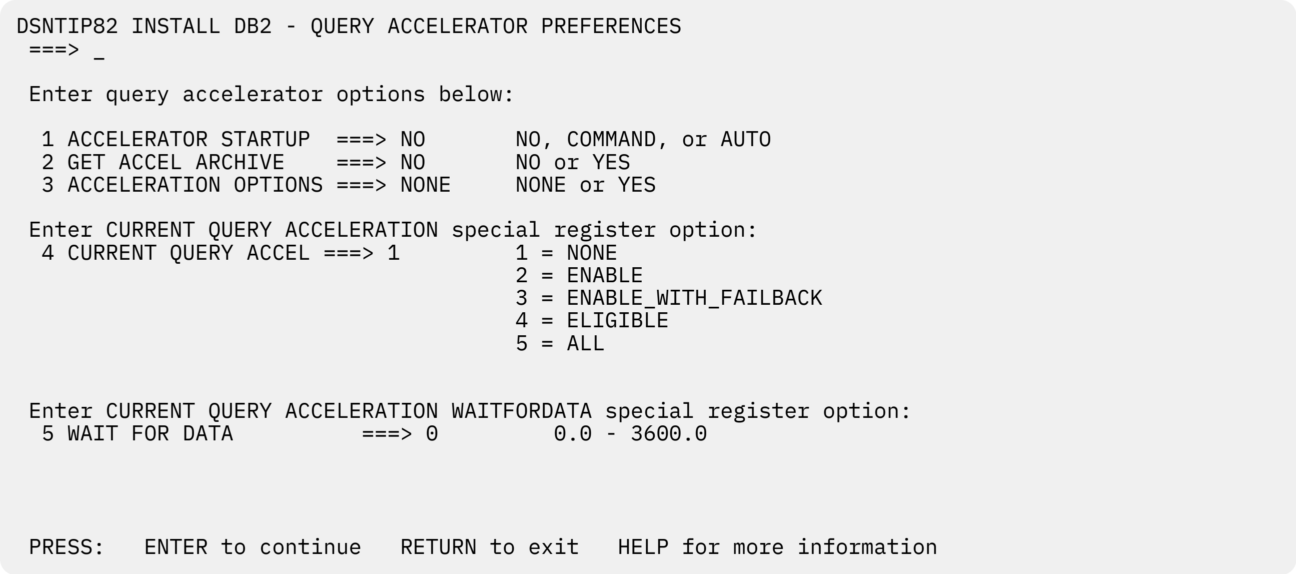
SYSTEM
Allows query rewrite by using system-maintained materialized query tables (SYSTEM) when CURRENT REFRESH AGE is set to ANY.

USER
Allows query rewrite by using user-maintained materialized query tables when CURRENT REFRESH AGE is set to ANY.

ALL
Allows query rewrite by using both system-maintained and user-maintained materialized query tables.

DSNTIP82: Query accelerator preferences panel

The DSNTIP82 panel is used to set application programming default values pertaining to query accelerators.



```
DSNTIP82 INSTALL DB2 - QUERY ACCELERATOR PREFERENCES
 ===> _

 Enter query accelerator options below:

  1 ACCELERATOR STARTUP  ===> NO       NO, COMMAND, or AUTO
  2 GET ACCEL ARCHIVE    ===> NO       NO or YES
  3 ACCELERATION OPTIONS ===> NONE     NONE or YES

 Enter CURRENT QUERY ACCELERATION special register option:
  4 CURRENT QUERY ACCEL ===> 1         1 = NONE
                                       2 = ENABLE
                                       3 = ENABLE_WITH_FAILBACK
                                       4 = ELIGIBLE
                                       5 = ALL


 Enter CURRENT QUERY ACCELERATION WAITFORDATA special register option:
  5 WAIT FOR DATA          ===> 0         0.0 - 3600.0




 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 33. Query accelerator preferences panel: DSNTIP82

ACCELERATION STARTUP field (ACCEL subsystem parameter)

Specifies whether accelerator servers can be used with a Db2 subsystem, and how the accelerator servers are to be enabled and started. An accelerator server cannot be started unless it is enabled.

Acceptable values:	NO, AUTO, COMMAND
Default:	NO
Update:	option 26 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.ACCEL

NO
Specifies that accelerator servers cannot be used with the Db2 subsystem.

AUTO
Specifies that accelerator servers are automatically enabled and started when the Db2 subsystem is started.

COMMAND
Specifies that accelerator servers are automatically enabled when the Db2 subsystem is started. The accelerator servers can be started with the Db2 START ACCEL command.

GET ACCEL ARCHIVE field (GET_ACCEL_ARCHIVE subsystem parameter)

The GET_ACCEL_ARCHIVE subsystem parameter determines the default value that is to be used for the CURRENT GET_ACCEL_ARCHIVE special register.

The GET_ACCEL_ARCHIVE subsystem parameter is used when no value is explicitly set for the CURRENT GET_ACCEL_ARCHIVE special register by the SQL statement SET CURRENT GET_ACCEL_ARCHIVE.

Acceptable values:	NO, YES
Default:	NO
Update:	option 26 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.GET_ACCEL_ARCHIVE

NO
Specifies that if a table is archived in an accelerator server, and a query references that table, the query does not use the data that is archived.

YES
Specifies that if a table is archived in an accelerator server, and a query references that table, the query uses the data that is archived.

ACCELERATION OPTIONS field (QUERY_ACCEL_OPTIONS subsystem parameter)

The QUERY_ACCEL_OPTIONS subsystem parameter controls whether certain types of queries are allowed to execute on an accelerator server.

Acceptable values:	ACCELERATION OPTIONS field: NONE, YES QUERY_ACCEL_OPTIONS parameter: NONE, *options-list*
Default:	NONE
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS

NONE
Specifies that you do not want to choose whether Db2 allows certain types of queries to run on an accelerator server. Db2 does not allow any of those types of queries to run on an accelerator server.

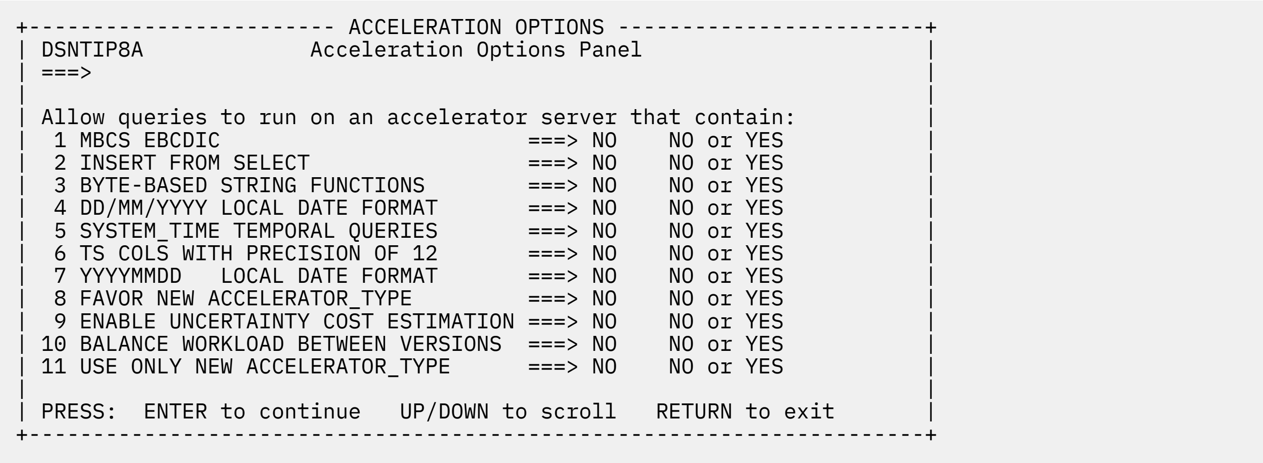
YES
Panel DSNTIP8A opens after you complete DSNTIP82, and the *options-list* value for QUERY_ACCEL_OPTIONS is based on the options that you specify.

For example, if you specify YES for fields 1, 2, and 5 on panel DSNTIP8A, Db2 uses the following setting:

```
QUERY_ACCEL_OPTIONS=(1,2,5)
```

Panel DSNTIP8A

On panel DSNTIP8A, you select the types of queries that Db2 allows to run on an accelerator server.



```
+------------------------ ACCELERATION OPTIONS ------------------------+
| DSNTIP8A             Acceleration Options Panel                      |
| ===>                                                                 |
|                                                                      |
| Allow queries to run on an accelerator server that contain:          |
|  1 MBCS EBCDIC                        ===> NO    NO or YES           |
|  2 INSERT FROM SELECT                 ===> NO    NO or YES           |
|  3 BYTE-BASED STRING FUNCTIONS        ===> NO    NO or YES           |
|  4 DD/MM/YYYY LOCAL DATE FORMAT       ===> NO    NO or YES           |
|  5 SYSTEM_TIME TEMPORAL QUERIES       ===> NO    NO or YES           |
|  6 TS COLS WITH PRECISION OF 12       ===> NO    NO or YES           |
|  7 YYYYMMDD   LOCAL DATE FORMAT       ===> NO    NO or YES           |
|  8 FAVOR NEW ACCELERATOR_TYPE         ===> NO    NO or YES           |
|  9 ENABLE UNCERTAINTY COST ESTIMATION ===> NO    NO or YES           |
| 10 BALANCE WORKLOAD BETWEEN VERSIONS  ===> NO    NO or YES           |
| 11 USE ONLY NEW ACCELERATOR_TYPE      ===> NO    NO or YES           |
|                                                                      |
| PRESS:  ENTER to continue   UP/DOWN to scroll   RETURN to exit       |
+----------------------------------------------------------------------+
```

Figure 34. DSNTIP8A

1 MBCS EBCDIC

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 1)

NO

Specifies that queries that include data that is encoded in a multi-byte-character-set EBCDIC encoding scheme are blocked from executing on an accelerator server.

YES

Specifies that queries that include data that is encoded in a multi-byte-character-set EBCDIC encoding scheme are allowed to execute on an accelerator server.

If the accelerator server encodes data in another encoding scheme, such as Unicode UTF-8, the collating sequence for the data on the accelerator server is different from the collating sequence for the data in Db2. This difference affects data ordering and the results from range predicates. Therefore, if table columns include any mixture of uppercase characters, lowercase characters, numeric characters, or national language characters, and the SQL statements that query those tables include range predicates or ordering on those columns, the results of executing a query in Db2 might be different from the results of executing the same query on an accelerator server.

2 INSERT FROM SELECT

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 2)

NO

Specifies that for queries that include an INSERT FROM SELECT statement, the SELECT operation does not run on an accelerator server.

YES

Specifies that for queries that include an INSERT FROM SELECT statement, the SELECT operation can run on an accelerator server.

If the SELECT operation runs on the accelerator server, the data that is operated on by the SELECT operation might not be current in the accelerator server.

3 BYTE-BASED STRING FUNCTIONS

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 3)

NO
Specifies that queries that contain built-in functions for which Db2 processes each byte of the input string, rather than each character of the input string, do not run on an accelerator server.

YES
Specifies that queries that contain built-in functions for which Db2 processes each byte of the input string, rather than each character of the input string, can run on an accelerator server. The queries can run on an accelerator server even when the input string is encoded in a multi-byte-character encoding scheme. Unicode is an example of a multi-byte-character encoding scheme.

For an accelerator server that supports only functions that operate on the characters in an input string, if the input data on which the function operates contains only single-byte characters, the function returns the same result when it runs on the accelerator server and when it runs on Db2. However, if the input data contains multi-byte characters, the function returns different results when it runs on the accelerator server and when it runs on Db2.

4 DD/MM/YYYY LOCAL DATE FORMAT

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 4)

NO
Specifies that queries that reference an expression with a DATE data type that uses a LOCAL format are blocked from running on an accelerator server.

YES
Specifies that queries that reference an expression with a DATE data type that uses a LOCAL format are not blocked from running on an accelerator server. The accelerator server uses the format `'dd/mm/yyyy'` to interpret the input and output date value.

Option 4 is not permitted when option 7 has been selected.

Specify option 4 only when one of the following conditions exists:

- The DATE FORMAT field of the DSNTIP4 panel specifies LOCAL.
- Application programs that process SQL on Db2 are precompiled with the DATE(LOCAL) option.

In both of these cases, the LOCAL date exit routine must define the specific `'dd/mm/yyyy'` date format. If the LOCAL format is not defined as `'dd/mm/yyyy'`, the query might return unpredictable results.

5 SYSTEM_TIME TEMPORAL QUERIES

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 5)

NO
Specifies that SYSTEM_TIME temporal queries will not be offloaded to an accelerator.

YES
Specifies that SYSTEM_TIME temporal queries will be offloaded to an accelerator.

6 TS COLS WITH PRECISION OF 12

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 6)

NO
Specifies that queries will not be offloaded to an accelerator if the queries reference timestamp columns with precision of 12.

YES
Specifies that queries will be offloaded to an accelerator if the queries reference timestamp columns with precision of 12.

7 YYYYMMDD LOCAL DATE FORMAT

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 7)

NO
Specifies that queries that reference an expression with a DATE data type that uses a LOCAL format are blocked from running on an accelerator server.

YES
Specifies that queries that reference an expression with a DATE data type that uses a LOCAL format are not blocked from running on an accelerator server. The accelerator server uses the format YYYYMMDD, padded with two blanks at the end, to interpret the input and output data value.

Option 7 is not permitted when option 4 has been selected.

Specify option 7 only when one of the following conditions exists:

- The DATE FORMAT field of the DSNTIP4 panel specifies LOCAL.
- Application programs that process SQL on Db2 are precompiled with the DATE(LOCAL) option.

In both cases, the LOCAL date exit routine must define the specific `'yyyymmdd'` date format. If the LOCAL format is not defined as `'yyyymmdd'`, the query might return unpredictable results.

8 FAVOR NEW ACCELERATOR_TYPE

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 8)

NO
Specifies that in a Db2 environment that includes both a V5 accelerator server and a V7 accelerator server, statements that are eligible to be accelerated on either of the accelerator servers are sent to the V5 accelerator server.

YES
Specifies that in a Db2 environment that includes both a V5 accelerator server and a V7 accelerator server, statements that are eligible to be accelerated on either of the accelerator servers are sent to the V7 accelerator server.

9 ENABLE UNCERTAINTY COST ESTIMATION

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 9)

NO
Specifies that uncertainty cost consideration is disabled on the accelerator for offloaded queries.

YES
Specifies that uncertainty cost consideration is enabled on the accelerator for offloaded queries.

10 BALANCE WORKLOAD BETWEEN VERSIONS

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 10)

NO
Specifies that Db2 will not attempt to balance query acceleration between different versions of accelerator servers based on the actual workload of each available server.

YES
Specifies that Db2 will attempt to balance query acceleration between different versions of accelerator servers based on the actual workload of each available server.

Workload balancing can also be influenced by the CURRENT ACCELERATOR register. For example, when option 10 = YES, if the CURRENT ACCELERATOR special register specifies a particular accelerator server, the workload will be offloaded only to that server if it is available, even if other accelerator servers with less workload are available.

11 USE ONLY NEW ACCELERATOR_TYPE

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCEL_OPTIONS (option 11)

NO
Specifies that in a Db2 environment that includes V5 accelerators and V7 or later accelerators, EXPLAIN processing, accelerator modeling, and query execution is supported for all accelerators regardless of version.

YES
Specifies that in a Db2 environment that includes V5 accelerators and V7 or later accelerators, EXPLAIN processing, accelerator modeling, and query execution is supported only for V7 and later accelerators.

Important: When option 11 is set to YES, the following options, if specified, are ignored:

- 8: FAVOR NEW ACCELERATOR_TYPE
- 10: BALANCE WORKLOAD BETWEEN VERSIONS

CURRENT QUERY ACCEL field (QUERY_ACCELERATION subsystem parameter)

The QUERY_ACCELERATION subsystem parameter determines the default value that is to be used for the CURRENT QUERY ACCELERATION special register.

The QUERY_ACCELERATION subsystem parameter is used when no value is explicitly set for the CURRENT QUERY ACCELERATION special register by the SQL statement SET CURRENT QUERY ACCELERATION.

Acceptable values:	1, 2, 3, 4, 5
Default:	1
Update:	option 26 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCELERATION

1 (NONE)
Specifies that no query acceleration is done.

2 (ENABLE)
Specifies that queries are accelerated only if Db2 determines that it is advantageous to do so. If there is an accelerator failure while a query is running, or the accelerator returns an error, Db2 returns a negative SQLCODE to the application.

3 (ENABLE_WITH_FAILBACK)
Specifies that queries are accelerated only if Db2 determines that it is advantageous to do so. If the accelerator returns an error during the PREPARE or first OPEN for the query, Db2 executes the query without the accelerator. If the accelerator returns an error during a FETCH or a subsequent OPEN, Db2 returns the error to the user, and does not execute the query.

4 (ELIGIBLE)
Specifies that queries are accelerated if they are eligible for acceleration. Db2 does not use cost information to determine whether to accelerate the queries. Queries that are not eligible for acceleration are executed by Db2. If there is an accelerator failure while a query is running, or the accelerator returns an error, Db2 returns a negative SQLCODE to the application.

5 (ALL)
Specifies that queries are accelerated if they are eligible for acceleration. Db2 does not use cost information to determine whether to accelerate the queries. Queries that are not eligible for acceleration are not executed by Db2, and an SQL error is returned. If there is an accelerator failure while a query is running, or the accelerator returns an error, Db2 returns a negative SQLCODE to the application.

WAIT FOR DATA field (QUERY_ACCEL_WAITFORDATA subsystem parameter)

The QUERY_ACCEL_WAITFORDATA subsystem parameter determines the default value that is to be used for the CURRENT QUERY ACCELERATION WAITFORDATA special register.

The QUERY_ACCEL_WAITFORDATA subsystem parameter is used when no value is explicitly set for the CURRENT QUERY ACCELERATION WAITFORDATA special register by the SQL statement SET CURRENT QUERY ACCELERATION WAITFORDATA.

Acceptable values:	0.0 - 3600.0 or 0 - 3600
Default:	0.0
Update:	option 26 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.QUERY_ACCELERATION_WAITFORDATA

Valid values are a DECIMAL(5,1) numeric constant in the range of 0.0 - 3600.0 seconds. For example, a value of 20.0 represents 20.0 seconds (or 20000 milliseconds), and a value of 30.5 represents 30.5 seconds (or 30500 milliseconds). The maximum value of 3600.0 means that the query is delayed for 60 minutes.

The default value is 0.0, which means that the query is not delayed and is run immediately on the accelerator. Other WAITFORDATA behavior is not applied to the query.

The wait time value can also be specified as an INTEGER numeric constant value ranging from 0 - 3600 seconds, which Db2 will convert to a DECIMAL (5,1) value.

When a non-zero value is specified for QUERY_ACCEL_WAITFORDATA, Db2 and the accelerator will apply other WAITFORDATA delay behavior, restrictions, and requirements to *all* dynamic queries to be accelerated. These behaviors, restrictions, and requirements can validly stop or even fail the acceleration of some queries that formerly were accelerated successfully. If you specify a non-zero WAITFORDATA delay on the new Db2 subsystem parameter, *all* dynamic queries on the Db2 subsystem for which acceleration is requested will be affected. For more information about these behaviors, restrictions, and requirements, see .

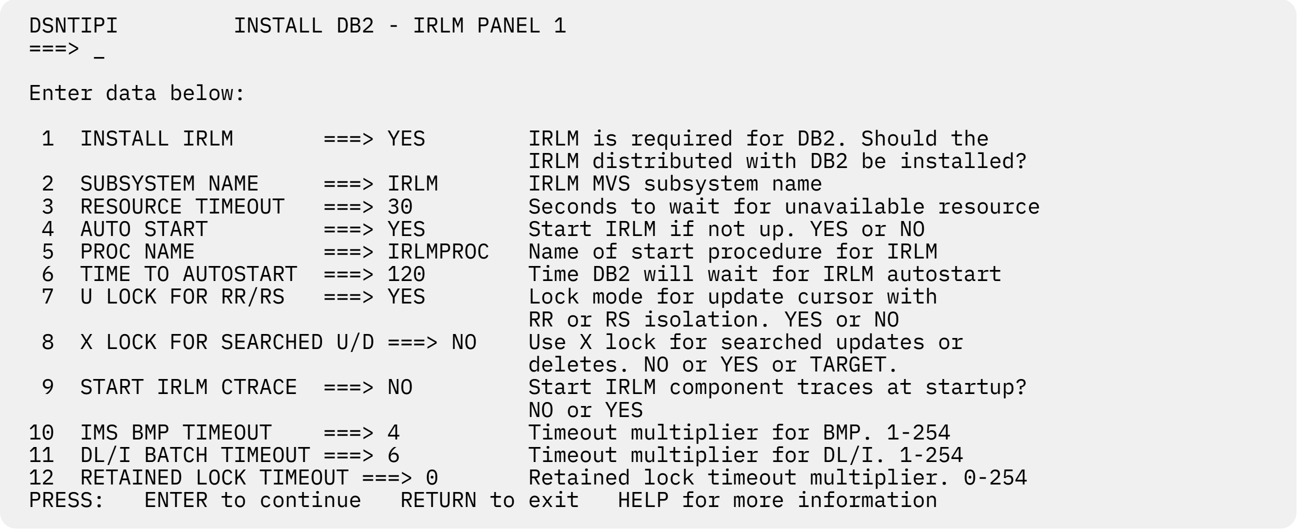
Attention: It is recommended that you do not use the QUERY_ACCEL_WAITFORDATA subsystem parameter to provide an initial non-zero default value for CURRENT QUERY ACCELERATION WAITFORDATA special register unless you fully understand and can accept the possible impact of WAITFORDATA behavior, requirements, and restrictions on *all* dynamic queries to be accelerated on the Db2 subsystem.

Related information

DSNTIPI: IRLM panel 1

The entries on the DSNTIPI panel affect the installation of the internal resource lock manager (IRLM).

You must use one IRLM for each Db2 subsystem.



```
DSNTIPI         INSTALL DB2 - IRLM PANEL 1
===> _

Enter data below:

 1  INSTALL IRLM       ===> YES       IRLM is required for DB2. Should the
                                      IRLM distributed with DB2 be installed?
 2  SUBSYSTEM NAME     ===> IRLM      IRLM MVS subsystem name
 3  RESOURCE TIMEOUT   ===> 30        Seconds to wait for unavailable resource
 4  AUTO START         ===> YES       Start IRLM if not up. YES or NO
 5  PROC NAME          ===> IRLMPROC  Name of start procedure for IRLM
 6  TIME TO AUTOSTART  ===> 120       Time DB2 will wait for IRLM autostart
 7  U LOCK FOR RR/RS   ===> YES       Lock mode for update cursor with
                                      RR or RS isolation. YES or NO
 8  X LOCK FOR SEARCHED U/D ===> NO   Use X lock for searched updates or
                                      deletes. NO or YES or TARGET.
 9  START IRLM CTRACE  ===> NO        Start IRLM component traces at startup?
                                      NO or YES
10  IMS BMP TIMEOUT    ===> 4         Timeout multiplier for BMP. 1-254
11  DL/I BATCH TIMEOUT ===> 6         Timeout multiplier for DL/I. 1-254
12  RETAINED LOCK TIMEOUT ===> 0      Retained lock timeout multiplier. 0-254
PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 35. IRLM panel 1: DSNTIPI

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

DSNTIPJ: IRLM panel 2
The entries on the DSNTIPJ panel affect several characteristics of IRLM time-sharing fields and other locking options.

Related information

INSTALL IRLM field

The INSTALL IRLM field determines whether IRLM subsystem entries are to be provided in job DSNTIJMV and whether an IRLM procedure is to be built.

Acceptable values:	YES, NO
Default:	YES
Update:	Edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.
DSNZP*xxx*:	none

YES
The required entries are provided, and the IRLM procedure is built. .

NO
No IRLM procedure is produced. On installation panel DSNTIPJ, all values are ignored except the LOCKS PER TABLE(SPACE) field and the LOCKS PER USER field.

If you do not have a new IRLM procedure created, ensure that your old IRLM procedure is updated with any new keywords that were added.

SUBSYSTEM NAME field (IRLMSID subsystem parameter)

The IRLMSID subsystem parameter specifies the name by which z/OS is to know the IRLM subsystem.

Acceptable values:	1 - 4 characters. First character must be A - Z, #, $, or @. Other characters must be A - Z, 1 - 9, #, $, or @.
Default:	IRLM
Update:	option 27 on panel DSNTIPB. Also edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.
DSNZP*xxx*:	DSN6SPRM IRLMSID

The name is used for communication between Db2 and the IRLM. This name is included in the z/OS subsystem table IEFSSN*xx*, where *xx* is the value of the SUBSYSTEM MEMBER field on installation panel DSNTIPM.

If you installed the IRLM for IMS, The IRLM name for Db2 must be different. Two IRLMs that reside in the same z/OS system must have unique z/OS subsystem names. If you already have IRLM installed, use the z/OS subsystem name for that IRLM. Otherwise, accept the default value, IRLM.

The associated IRLM PROC parameter is IRLMNM.

Related reference

COMMAND PREFIX field
The value of the COMMAND PREFIX field specifies the Db2 subsystem command prefix. When the prefix appears at the beginning of a command that is entered at a z/OS operator's console, z/OS passes the command to Db2 for processing. The command prefix is used in the Db2 entry of member IEFSSN*xx* of SYS1.PARMLIB.

RESOURCE TIMEOUT field (IRLMRWT subsystem parameter)

The IRLMRWT subsystem parameter controls the number of seconds that are to elapse before a resource timeout is detected.

Acceptable values:	1 - 3600
Default:	30

Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM IRLMRWT

Timeout means that a lock request has waited for a resource (or for claims on a resource for a particular claim class to be released) longer than the number of seconds specified on this option. The value that is specified for this option must be a multiple of the DEADLOCK TIME on installation panel DSNTIPJ because IRLM uses its deadlock timer to initiate timeout detection and deadlock detection. This value is rarely the actual time. For data sharing, the actual timeout period is longer than the timeout value.

Related reference

DEADLOCK TIME field
The DEADLOCK TIME field controls the amount of time for which local deadlock detection cycles are to run. A *deadlock* is a situation in which two or more requesters are waiting for resources that are held by another requester. *Deadlock detection* is the procedure that identifies deadlocks and its participants.

DATA DEF TIMEOUT field (DDLTOX subsystem parameter)
The DDLTOX subsystem parameter specifies how long a request for SQL data definition is to wait for a resource before timing out. This parameter is used for the processing of DDL statements and GRANT, REVOKE, and LOCK statements.

Related information

AUTO START field (IRLMAUT subsystem parameter)

The IRLMAUT subsystem parameter defines whether Db2 is to automatically start and stop the IRLM.

Acceptable values:	YES, NO
Default:	YES
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM IRLMAUT

YES
When Db2 starts, it tries to start the IRLM if the IRLM is not already started. When Db2 stops, IRLM automatically stops if the IRLM was started by Db2. However, IRLM will not automatically terminate if it is defined with DISCONNECT IRLM = NO.

NO
Db2 terminates if the IRLM is not started when Db2 comes up.

Recommendation: Use YES if you use the IRLM for only a single Db2 subsystem.

When IRLM initializes, it is registered with the z/OS automatic restart manager (ARM). IRLM deregisters from the ARM when the IRLM is shut down normally. When IRLM terminates, it sends Db2 the registration information so that Db2 can determine whether IRLM was terminated normally. Db2 then deregisters from the ARM to prevent unwanted restarts. Otherwise, IRLM might be restarted with Db2, if AUTO START is YES.

Related concepts

IRLM names
Each member of a data sharing group has its own IRLM. The IRLM group name, subsystem name, and member ID are parameters on the IRLM startup procedure.

Related information

PROC NAME field (IRLMPRC subsystem parameter)

The IRLMPRC subsystem parameter specifies the name of the IRLM procedure that z/OS is to invoke if the AUTO START field is set to YES.

Acceptable values:	1 - 8 characters
Default:	IRLMPROC
Update:	option 27 on panel DSNTIPB. Also edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.
DSNZP*xxx*:	DSN6SPRM IRLMPRC

The name that is specified in the PROC NAME field **cannot** be the same as the subsystem name that is specified in the SUBSYSTEM NAME field.

The procedure is created during installation or migration by job DSNTIJMV and is placed in SYS1.PROCLIB. You can review the procedure by examining DSNTIJMV.

TIME TO AUTOSTART field (IRLMSWT subsystem parameter)

The IRLMSWT subsystem parameter specifies the IRLM wait time in seconds. This is the amount of time that Db2 is to wait for the IRLM to start during autostart. If the time expires, Db2 abends.

Acceptable values:	1 - 3600
Default:	120
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM IRLMSWT

U LOCK FOR RR/RS field (RRULOCK subsystem parameter)

When operations use repeatable read (RR) or read stability (RS) isolation levels to access a table, a specified locking method is used. The RRULOCK subsystem parameter specifies whether Db2 is to use U (UPDATE) locks or S (SHARE) locks.

Acceptable values:	YES, NO
Default:	YES
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RRULOCK

YES

The lock mode for operations with RR or RS isolation levels is U. If your applications make frequent updates with repeatable-read isolation, the U-lock might provide greater concurrency than the S-lock. However, applications that require high concurrency are almost always more efficient if they use cursor stability (CS) isolation.

NO

The lock mode for operations with RR or RS isolation levels is S. If the cursor in your applications includes the FOR UPDATE OF clause, but updates are infrequent, S-locks generally provide better performance.

Related information

X LOCK FOR SEARCHED U/D field (XLKUPDLT subsystem parameter)

The XLKUPDLT subsystem parameter specifies the locking method that is to be used when Db2 executes a searched update or delete.

Acceptable values:	YES, NO, TARGET
Default:	NO
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM XLKUPDLT

YES

Db2 uses an X-lock on qualifying rows or pages. For ISOLATION(CS), the lock is released if the rows or pages are not updated or deleted. For ISOLATION(RS) or ISOLATION(RR), an X-lock is retained until the next commit point. A value of YES is beneficial in a data sharing environment when most or all searched updates and deletes use an index. If YES is specified and searched updates or deletes result in a table space scan, the likelihood of timeouts and deadlocks greatly increases.

NO

Db2 uses an S- or U-lock when scanning for qualifying rows. For any qualifying rows or pages, the lock is upgraded to an X-lock before performing the update or delete. For non-qualifying rows or pages the lock is released if ISOLATION(CS) is used. For ISOLATION(RS) or ISOLATION(RR), an S-lock is retained on the rows or pages until the next commit point. Use this option to achieve higher rates of concurrency.

TARGET

Db2 combines YES and NO behavior. Db2 uses an X-lock on qualifying rows or pages of the specific table that is targeted by the update or delete statement. Db2 uses an S- or U-lock when scanning for rows or pages of other tables that are referenced by the query (for example, tables that are referenced only in the WHERE clause of the query). For non-qualifying rows or pages the lock is released if ISOLATION(CS) is used. For ISOLATION(RS) or ISOLATION(RR), an S-lock is retained on the rows or pages until the next commit point.

Related information

START IRLM CTRACE field

The value of the START IRLM CTRACE field specifies whether the IRLM component traces are to be activated when IRLM is started. The Db2-provided IRLM procedure in DSNTIJMV is tailored according to this value.

Acceptable values:	NO, YES
Default:	NO
Update:	Edit the associated parameter in job DSNTIJUZ, the IRLM start procedure, and the CLIST input member.
DSNZP*xxx*:	none

NO

IRLM starts only the low-activity subtraces EXP, INT, and XIT.

YES

IRLM starts with all its subtraces active. Starting all IRLM subtraces has a slight impact on performance demand for ECSA storage, but it improves serviceability.

IMS BMP TIMEOUT field (BMPTOUT subsystem parameter)

The BMPTOUT subsystem parameter is used to determine the amount of time that an IMS BMP connection is to wait for a lock to be released. The value of this field is multiplied by the value specified in the RESOURCE TIMEOUT field to determine the wait time.

For example, if you use the default value, an IMS BMP connection can wait for a resource for four times as long as the resource timeout value. This option gives you flexibility in tuning your system to avoid timeouts.

Acceptable values:	1 - 254
Default:	4
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM BMPTOUT

Related information

DL/I BATCH TIMEOUT field (DLITOUT subsystem parameter)

The DLITOUT subsystem parameter controls the number of resource timeout values that a DL/I batch connection is to wait for a lock to be released. The resource timeout value is specified in the RESOURCE TIMEOUT field.

Acceptable values:	1 - 254
Default:	6
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DLITOUT

For example, if you use the default value of 6, a DL/I batch application can wait 6 times the resource timeout value for a resource. This option gives you flexibility in tuning your system to avoid timeouts.

Related reference

RESOURCE TIMEOUT field (IRLMRWT subsystem parameter)
The IRLMRWT subsystem parameter controls the number of seconds that are to elapse before a resource timeout is detected.

Related information

RETAINED LOCK TIMEOUT field (RETLWAIT subsystem parameter)

When another Db2 subsystem in a data sharing group has failed, it can hold an incompatible lock on a resource. Locks that are held by failed Db2 members are called *retained locks*. The RETLWAIT subsystem parameter is used to calculate how long a transaction is to wait for a retained lock.

Acceptable values:	0 - 254
Default:	0
Update:	option 27 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RETLWAIT

This value is of importance only in a data sharing environment.

The value that you use is a multiplier that is applied to the normal timeout value of the connection. For example, imagine that the retained lock multiplier is 2. The timeout period for a call attachment connection that is waiting for a retained lock is 1 * 2 (1 for the normal CAF timeout period, 2 for the additional time that is specified for retained locks).

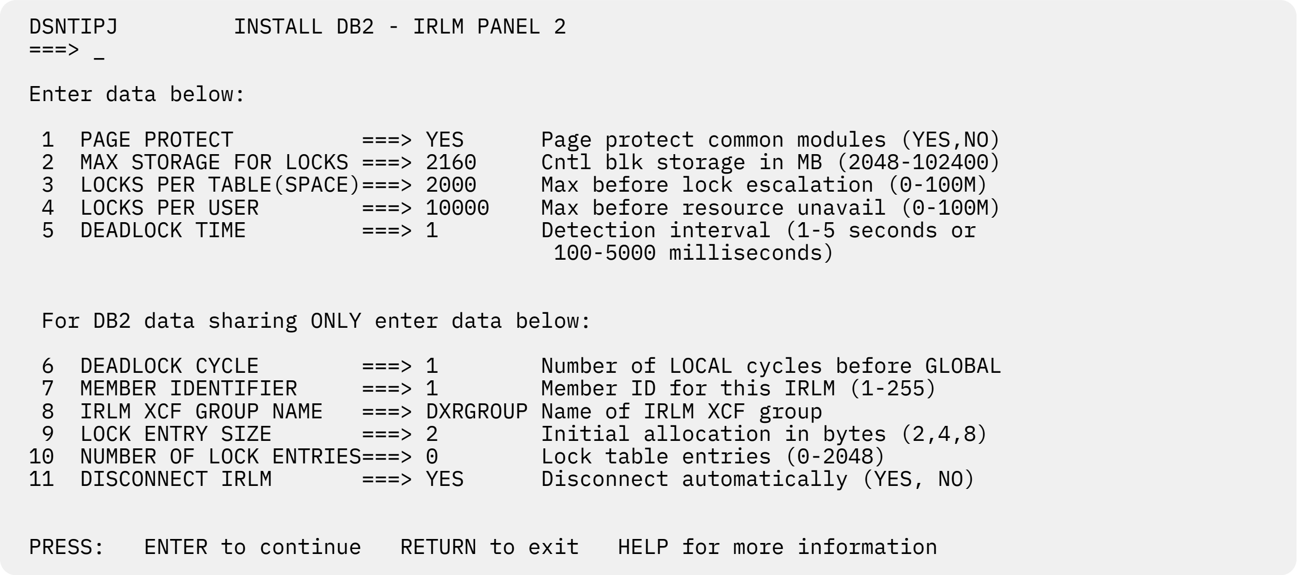
If you use the default value, 0, applications do not wait for incompatible retained locks. Instead, the lock request is immediately rejected, and the application receives a resource unavailable SQLCODE.

Related information

DSNTIPJ: IRLM panel 2

The entries on the DSNTIPJ panel affect several characteristics of IRLM time-sharing fields and other locking options.

The default values are adequate for most sites under ordinary conditions. Db2 and IRLM group names must start with a letter.



```
DSNTIPJ         INSTALL DB2 - IRLM PANEL 2
===> _

Enter data below:

 1  PAGE PROTECT          ===> YES      Page protect common modules (YES,NO)
 2  MAX STORAGE FOR LOCKS ===> 2160     Cntl blk storage in MB (2048-102400)
 3  LOCKS PER TABLE(SPACE)===> 2000     Max before lock escalation (0-100M)
 4  LOCKS PER USER        ===> 10000    Max before resource unavail (0-100M)
 5  DEADLOCK TIME         ===> 1        Detection interval (1-5 seconds or
                                         100-5000 milliseconds)


 For DB2 data sharing ONLY enter data below:

 6  DEADLOCK CYCLE        ===> 1        Number of LOCAL cycles before GLOBAL
 7  MEMBER IDENTIFIER     ===> 1        Member ID for this IRLM (1-255)
 8  IRLM XCF GROUP NAME   ===> DXRGROUP Name of IRLM XCF group
 9  LOCK ENTRY SIZE       ===> 2        Initial allocation in bytes (2,4,8)
10  NUMBER OF LOCK ENTRIES===> 0        Lock table entries (0-2048)
11  DISCONNECT IRLM       ===> YES      Disconnect automatically (YES, NO)


PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 36. IRLM panel 2: DSNTIPJ

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

DSNTIPI: IRLM panel 1
The entries on the DSNTIPI panel affect the installation of the internal resource lock manager (IRLM).

Related information

PAGE PROTECT field

The value of the PAGE PROTECT field specifies whether IRLM is to load its common storage modules into page-protected storage.

Acceptable values:	NO, YES
Default:	YES
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

NO
Indicates that common storage modules are to be loaded into CSA or ECSA without page protecting that memory.

YES
Indicates that modules located in common storage are to be loaded into page-protected storage to prevent programs from overlaying the instructions. YES is recommended because it requires no additional overhead after the modules are loaded, and the protection can prevent code-overlay failures.

This is the default value.

The associated IRLM PROC parameter is PGPROT.

MAX STORAGE FOR LOCKS field

The MAX STORAGE FOR LOCKS field specifies, in MB, the maximum amount of private storage above the 2 GB bar for the IRLM lock control block structure.

Acceptable values:	2048 - 102400
Default:	2160
Update:	edit IRLM start procedure
DSNZP*xxx*:	none
Data sharing scope:	Member

This value becomes the setting of the MLMT parameter for the IRLM address space procedure. The IRLM address space procedure sets the z/OS MEMLIMIT value for the address space.

Ensure that you set this value high enough so that IRLM does not reach the limit. The value that you choose should provide space for possible retained locks. IRLM only gets storage as it needs it, so choose a large value. You can also change the value dynamically by using the z/OS command `MODIFY irlmproc,SET,MLT`.

The associated IRLMPROC parameter is MLMT.

Related concepts

Common service area storage requirements
Some of the Db2 load modules and control blocks are in common storage. Most of the space is in the extended common service area (ECSA) and 64-bit common storage.

LOCKS PER TABLE(SPACE) field (NUMLKTS subsystem parameter)

The NUMLKTS subsystem parameter specifies the default maximum number of page, row, or LOB locks that an application can hold simultaneously in a table or table space. If a single application exceeds the maximum number of locks in a single table or table space, lock escalation occurs.

Acceptable values:	0 - 104857600
Default:	2000
Update:	option 28 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM NUMLKTS

You can enter the number of locks as an integer or you can enter a value with a suffix of K or M. If you enter a value with a suffix of K, the number of locks is that value multiplied by 1024. If you enter a value with a suffix of M, the number of locks is that value multiplied by 1024 × 1024, or 1,048,576.

The value that you specify for this field must be less than the value that is specified for the LOCKS PER USER field (NUMLKUS subsystem parameter), except when the NUMLKUS setting is 0.

The NUMLKTS subsystem parameter values specifies the default value used when you specify LOCKMAX SYSTEM in CREATE TABLESPACE and ALTER TABLESPACE statements.

A 0 value for the NUMLKTS setting specifies that there is no limit to the number of data and row locks that a program can acquire.

Recommendation: Do not set the value to 0, because it can cause the IRLM to experience storage shortages.

Related reference

LOCKS PER USER field (NUMLKUS subsystem parameter)
The NUMLKUS subsystem parameter specifies the maximum number of page, row, or LOB locks that a single application can hold concurrently for all table spaces.

Related information

LOCKS PER USER field (NUMLKUS subsystem parameter)

The NUMLKUS subsystem parameter specifies the maximum number of page, row, or LOB locks that a single application can hold concurrently for all table spaces.

Acceptable values:	0 - 104857600
Default:	10000
Update:	option 28 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM NUMLKUS

0 - 104857600

The maximum number includes locks on data pages, LOBs, XMLs, and rows that the program acquires when it accesses table spaces. The limit applies to all table spaces that are defined with the LOCKSIZE PAGE, LOCKSIZE ROW, or LOCKSIZE ANY options. A value of 0 indicates that there is no limit to the number of data and row locks that a program can acquire.

You can enter the number of locks as an integer or you can enter a value with a suffix of K or M. If you enter a value with a suffix of K, the number of locks is that value multiplied by 1024. If you enter a value with a suffix of M, the number of locks is that value multiplied by 1,048,576.

Db2 assumes that each lock requires 540 bytes of storage. If you define referential constraints between values, you might want to select a higher value for this field.

To avoid exhausting the IRLM's storage for locks, follow these guidelines:

- Do not specify 0 or a very large value unless it is specifically required to run an application.
- Consider the design of your applications. Long-running applications, particularly those that perform row-level locking, have few or infrequent commit points, or use repeatable-read isolation may use substantial amounts of lock storage. You should perform frequent commits to release locks.

Important: These values are constraints for a single application. Each concurrent application can hold the maximum number of locks specified here.

Check panel DSNTIPC to ensure that the required storage for the IRLM does not exceed the available region size for the IRLM.

Related information

DEADLOCK TIME field

The DEADLOCK TIME field controls the amount of time for which local deadlock detection cycles are to run. A *deadlock* is a situation in which two or more requesters are waiting for resources that are held by another requester. *Deadlock detection* is the procedure that identifies deadlocks and its participants.

Acceptable values:	1 - 5, 100 to 5000
Default:	1
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

Db2 interprets values between 1 and 5 as seconds and values between 100 and 5000 as milliseconds. Depending on the value that you enter, IRLM might substitute a smaller maximum value.

The associated IRLM PROC parameter is DEADLOK.

Related information

DEADLOCK CYCLE field

The value of the DEADLOCK CYCLE field specifies the number of local deadlock cycles that must expire before the IRLM does global deadlock detection processing.

Acceptable values:	1
Default:	1
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

The DEADLOCK CYCLE field is used only for Db2 data sharing.

The associated IRLM PROC parameter is DEADLOK.

MEMBER IDENTIFIER field

The value of the MEMBER IDENTIFIER field specifies an ID number that uniquely names this IRLM member within an IRLM data sharing group.

Acceptable values:	1 - 255
Default:	1
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

Recommendation: Correlate the IRLM member ID with the Db2 member name. For example, for Db2 member DSN1, specify an IRLM member ID of 1.

The IRLM ID that you specify does not relate directly to the limit of IRLM members that can be in the data sharing group. That limit is determined by the current hardware limits (32). If you edit the IRLMPROC directly, you can specify a value from 1 - 255.

This option is used only for Db2 data sharing.

The associated IRLM PROC parameter is IRLMID.

Related information

IRLM XCF GROUP NAME field

The value of the IRLM XCF GROUP NAME field is the name that is to be used for the IRLM group. This name must be different from the Db2 group name.

Acceptable values:	1 - 8 characters
Default:	DXRGROUP
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

Recommendation: Begin this name with DXR. All members in the Db2 group must have the same IRLM XCF group name.

This option is used only for Db2 data sharing.

To avoid names that IBM uses for its cross-system coupling facility (XCF) groups, the first character must be an uppercase letter J - Z unless the name begins with DXR. Do not use SYS as the first three characters, and do not use UNDESIG as the group name.

The associated IRLM PROC parameter is IRLMGRP

LOCK ENTRY SIZE field

The value of the LOCK ENTRY SIZE field specifies the initial size, in bytes, of individual lock entries in the lock table portion of the lock structure.

Acceptable values:	2, 4, 8
Default:	2
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

Recommendation: If you have seven or fewer members in your data sharing group, use the default value for the most efficient use of coupling lock structure space. If you have more than seven members, use a value of 4 to avoid an automatic rebuild for maximum connections.

Db2 converts the value for LOCK ENTRY SIZE to a corresponding value for the IRLM parameter MAXUSRS as shown in the table below.

Table 29. Converting lock entry size to MAXUSRS values

LOCK ENTRY SIZE	MAXUSRS value
2	7
4	23
8	32

Related reference

NUMBER OF LOCK ENTRIES field
The value of the NUMBER OF LOCK ENTRIES field specifies the number of lock table entries that are to be in the coupling facility lock structure.

Related information

NUMBER OF LOCK ENTRIES field

The value of the NUMBER OF LOCK ENTRIES field specifies the number of lock table entries that are to be in the coupling facility lock structure.

Acceptable values:	0, 1 - 2048 (powers of two)
Default:	0
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

0
Specifies that IRLM determines the number of lock table entries, up to a maximum of 2048 M lock entries, based on the lock structure size that is specified in CFRM policy and the number of users (MAXUSRS). 0 is the default value.

***value* (1 - 2048)**
Specifies that the maximum number of lock table entries is *value* M (the value that you specify multiplied by 1,048,576). *value* must be a power of two. (Do not specify M in *value*.) Increasing the number of lock table entries might help reduce the amount of false contention in XES. However, allocating too many lock table entries might result in too few record list entries. You should monitor this number to find the optimum values for your installation.

The associated IRLM PROC parameter is LTE.

Related reference

LOCK ENTRY SIZE field
The value of the LOCK ENTRY SIZE field specifies the initial size, in bytes, of individual lock entries in the lock table portion of the lock structure.

Related information

DISCONNECT IRLM field

The value of the DISCONNECT IRLM field determines whether IRLM is to automatically disconnect from the data sharing group when Db2 is not identified to it.

Acceptable values:	YES, NO
Default:	YES
Update:	edit IRLM start procedure
DSNZP*xxx*:	none

YES
Causes IRLM to disconnect from the data sharing group when Db2 is stopped normally or it stops as the result of a Db2 failure.

If you specify YES for the DISCONNECT IRLM field and YES for the AUTO START field on panel DSNTIPI, stopping IRLM does not require manual intervention.

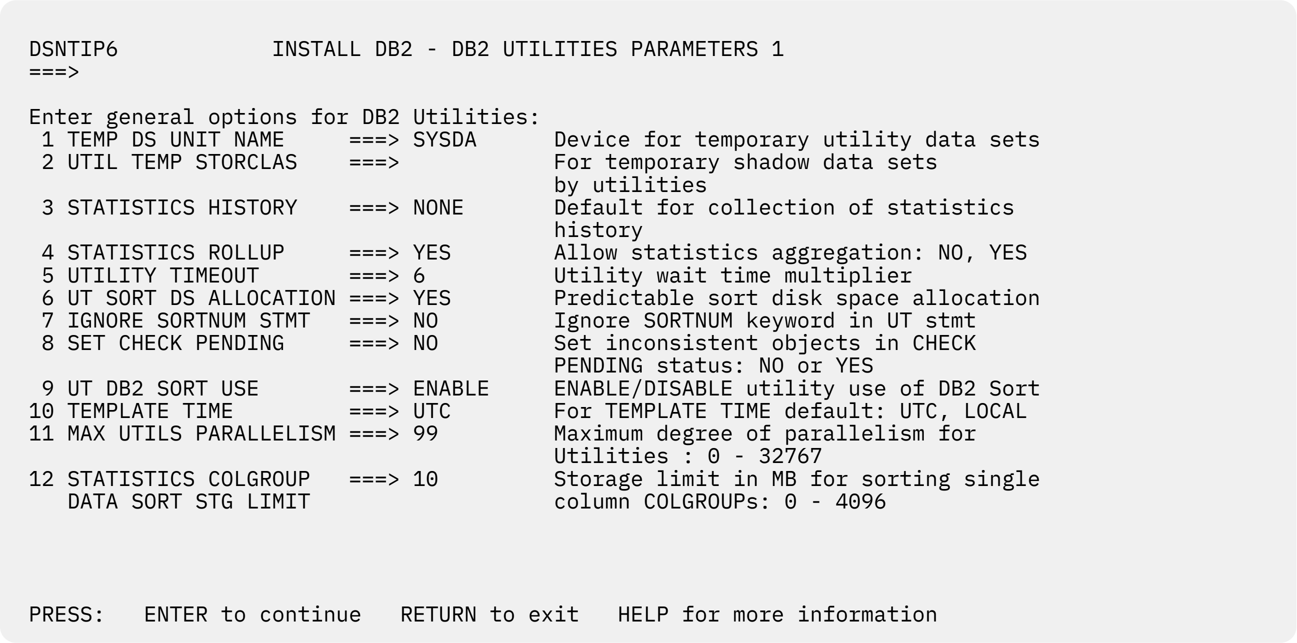
NO
IRLM remains connected to the data sharing group even when Db2 is stopped. In this case, you must explicitly stop IRLM to bring it down.

This option has less impact on other systems when a Db2 fails because z/OS is not required to perform certain recovery actions that it normally performs when IRLM comes down. Specifying NO can also mean that Db2 restarts more quickly after a Db2 normal or abnormal termination because it does not have to wait for IRLM to rejoin the IRLM data sharing group.

The associated IRLM PROC parameter is SCOPE.

DSNTIP6: Db2 utilities parameters panel 1

The fields on the DSNTIP6 panel configure the default behavior of enhancements to the BACKUP SYSTEM, RESTORE SYSTEM, RECOVER, and other utilities.



```
DSNTIP6            INSTALL DB2 - DB2 UTILITIES PARAMETERS 1
===>

Enter general options for DB2 Utilities:
 1 TEMP DS UNIT NAME     ===> SYSDA      Device for temporary utility data sets
 2 UTIL TEMP STORCLAS    ===>            For temporary shadow data sets
                                         by utilities
 3 STATISTICS HISTORY    ===> NONE       Default for collection of statistics
                                         history
 4 STATISTICS ROLLUP     ===> YES        Allow statistics aggregation: NO, YES
 5 UTILITY TIMEOUT       ===> 6          Utility wait time multiplier
 6 UT SORT DS ALLOCATION ===> YES        Predictable sort disk space allocation
 7 IGNORE SORTNUM STMT   ===> NO         Ignore SORTNUM keyword in UT stmt
 8 SET CHECK PENDING     ===> NO         Set inconsistent objects in CHECK
                                         PENDING status: NO or YES
 9 UT DB2 SORT USE       ===> ENABLE     ENABLE/DISABLE utility use of DB2 Sort
10 TEMPLATE TIME         ===> UTC        For TEMPLATE TIME default: UTC, LOCAL
11 MAX UTILS PARALLELISM ===> 99         Maximum degree of parallelism for
                                         Utilities : 0 - 32767
12 STATISTICS COLGROUP   ===> 10         Storage limit in MB for sorting single
   DATA SORT STG LIMIT                   column COLGROUPs: 0 - 4096



PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 37. Db2 utilities parameters panel 1: DSNTIP6

TEMP DS UNIT NAME field (VOLTDEVT subsystem parameter)

The VOLTDEVT subsystem parameter specifies the device type or unit name that is to be used by the Db2 COPY CONCURRENT and CHECK utilities for dynamically allocating temporary data sets. Specifying a value for VOLTDEVT removes the need to specify the FILTERDDN DD in the utility job.

Acceptable values:	valid device type or unit name
Default:	SYSDA
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM VOLTDEVT

The temporary data sets are deleted when the utility execution is complete.

UTIL TEMP STORCLAS field (UTIL_TEMP_STORCLAS subsystem parameter)

The UTIL_TEMP_STORCLAS subsystem parameter specifies the storage class that the CHECK INDEX, CHECK DATA, and CHECK LOB utilities are to use when allocating temporary shadow data sets. (These utilities allocate shadow data sets when you specify the SHRLEVEL CHANGE option.)

Acceptable values:	blank or a valid SMS management class name
Default:	blank
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM UTIL_TEMP_STORCLAS

The default value of blank indicates that the shadow data sets are to be defined in the same storage class as the production page set.

Recommendation: Specifying an explicit storage class for this subsystem parameter can improve performance, especially when the system uses paired disk volumes for peer to peer remote copy.

In a data sharing group, this parameter has group scope.

STATISTICS HISTORY field (STATHIST subsystem parameter)

The STATHIST subsystem parameter specifies which inserts and updates are to be recorded in catalog history tables.

Acceptable values:	SPACE, NONE, ALL, ACCESSPATH
Default:	NONE
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM STATHIST

SPACE
All inserts and updates that Db2 makes to space-related catalog statistics are recorded.

NONE
None of the changes that Db2 makes in the catalog are recorded. NONE is the default value.

ALL
All inserts and updates that Db2 makes in the catalog are recorded.

ACCESSPATH
All inserts and updates that Db2 makes to ACCESSPATH-related catalog statistics are recorded.

Related information

STATISTICS ROLLUP field (STATROLL subsystem parameter)

The STATROLL subsystem parameter specifies whether the RUNSTATS utility is to aggregate the partition-level statistics, even though some parts might not contain data.

Acceptable values:	YES, NO
Default:	YES
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM STATROLL

For Db2 subsystems that have large partitioned table spaces and indexes, it is recommended that you specify YES for STATISTICS ROLLUP. Specifying YES for STATISTICS ROLLUP enables the aggregation of partition-level statistics and helps the optimizer to choose a better access path.

UTILITY TIMEOUT field (UTIMOUT subsystem parameter)

The UTIMOUT subsystem parameter specifies how long, in number of resource values, that a utility or utility command is to wait for a resource. The utility or utility command waits until a lock or all claims on a resource of a particular claim class is released.

Acceptable values:	1 - 254
Default:	6
Update:	option 29on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM UTIMOUT

For example, if you use the default value of six, a utility can wait six times longer than an SQL application for a resource. This option allows utilities to wait longer than SQL applications to access a resource.
For more information about setting the resource timeout for SQL applications, see the discussion of the RESOURCE TIMEOUT field on DSNTIPI.

The value of UTILITY TIMEOUT is used as the default value for the RETRY parameter of Db2 Utilities such as CHECK INDEX and online REBUILD INDEX.

Related reference

RESOURCE TIMEOUT field (IRLMRWT subsystem parameter)
The IRLMRWT subsystem parameter controls the number of seconds that are to elapse before a resource timeout is detected.

Related information

UT SORT DATA SET ALLOCATION field (UTSORTAL subsystem parameter)

The UTSORTAL subsystem parameter specifies how sort work data sets are allocated when utilities are run. This parameter applies to the CHECK, LOAD, REBUILD, REORG, and RUNSTATS utilities.

Acceptable values:	YES, NO
Default:	YES
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM UTSORTAL

YES

The utility attempts to allocate the sort work data sets. To increase the possible degree of parallelism, the utility minimizes the number of sort work data sets that are used. If the SORTNUM clause is specified in the utility control statement and the IGNSORTN subsystem parameter is set to NO, the sort program is used to allocate the sort work data sets. The utility also does not allocate the work data sets if they are allocated in the JCL.

The following table illustrates the result of using UTSORTAL=YES in combination with the IGNSORTN subsystem parameter and the SORTNUM clause.

Table 30. Results of using UTSORTAL=YES in combination with the IGNSORTN subsystem parameter and the SORTNUM clause

UTSORTAL setting	IGNSORTN setting	SORTNUM specified?	Result
YES	NO	YES	The sort program is used to allocate the sort work data sets based on the SORTNUM specification. The estimate for the number of records to be sorted is determined from real-time statistics if they are available.
YES	NO	NO	The utility allocates the sort work data sets. The estimate for the number of records to be sorted is determined from real-time statistics if they are available.

Table 30. Results of using UTSORTAL=YES in combination with the IGNSORTN subsystem parameter and the SORTNUM clause (continued)

UTSORTAL setting	IGNSORTN setting	SORTNUM specified?	Result
YES	YES	YES, NO, or N/A	The utility allocates the sort work data sets. The estimate for the number of records to be sorted is determined from real-time statistics if they are available. Any SORTNUM specifications are ignored.

NO
The sort program dynamically allocates the sort work data sets. The data sets are allocated according to the parameters that are specified in the SORTNUM and SORTDEVT clauses of the control statement if they are specified. Otherwise, the data sets are allocated according to the installation defaults of the sort program.

Related reference

IGNORE SORTNUM STMT field (IGNSORTN subsystem parameter)
The IGNSORTN subsystem parameter determines whether occurrences of the SORTNUM clause in utility control statements are to be ignored.

IGNORE SORTNUM STMT field (IGNSORTN subsystem parameter)

The IGNSORTN subsystem parameter determines whether occurrences of the SORTNUM clause in utility control statements are to be ignored.

Acceptable values:	YES or NO
Default:	NO
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM IGNSORTN

YES
Db2 ignores any SORTNUM specifications in utility control statements, and utilities attempt to allocate the sort work data sets. This parameter can be set to YES only when YES is specified for the UTSORTAL subsystem parameter.

NO
Any SORTNUM specifications in utility control statements are passed to the sort program. The SORTNUM specification is used to determine the number of sort work data sets to dynamically allocate.

SET CHECK PENDING field (CHECK_SETCHKP subsystem parameter)

The CHECK_SETCHKP subsystem parameter specifies whether the CHECK DATA and CHECK LOB utilities are to place inconsistent objects in CHECK PENDING status.

Acceptable values:	YES or NO
Default:	NO
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CHECK_SETCHKP

When the CHECK DATA and CHECK LOB utilities detect an inconsistency in an object, they write diagnostic messages and end with a return code. The return code matches the return code that is associated with the diagnostic messages. If several messages have been issued, the highest return code is used.

YES
The CHECK DATA and CHECK LOB utilities place inconsistent objects in CHECK PENDING status. If an object is in CHECK PENDING status, it is unavailable for further processing until you correct the inconsistency and rerun the CHECK utility. There is no impact if the CHECK utilities are running in mode SHRLEVEL CHANGE because the utilities are running on a shadow copy and a restrictive state is not set in this mode.

NO
The CHECK DATA and CHECK LOB utilities do not place objects in CHECK PENDING status if an inconsistency is detected. If the object was already in CHECK PENDING status, it remains in that status.

To change the CHECK_SETCHKP parameter without using the panel interface:

1. Edit member DSN6SPRM of the *prefix*.SDSNMACS library and locate the entry for CHECK_SETCHKP.
2. Change the setting for CHECK_SETCHKP and save your changes.
3. Run the first two steps of your customized copy of job DSNTIJUZ to rebuild your Db2 subsystem parameter (DSNZP*xxx*) module.
4. After rebuilding the Db2 subsystem parameter module, refresh the subsystem parameter module by issuing the SET SYSPARM command.

UT DB2 SORT USE field (DB2SORT subsystem parameter)

The DB2SORT subsystem parameter specifies whether Db2 utilities are to use Db2 Sort for z/OS instead of DFSORT for utility sort processing when Db2 Sort for z/OS is installed.

Acceptable values:	ENABLE, DISABLE
Default:	ENABLE
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DB2SORT

ENABLE
Db2 utilities use Db2 Sort for z/OS when it is installed. If Db2 Sort for z/OS is not installed, DFSORT is used instead.

DISABLE
Db2 utilities use DFSORT for utility sort processing, regardless of whether Db2 Sort for z/OS is installed.

TEMPLATE TIME field (TEMPLATE_TIME subsystem parameter)

The TEMPLATE_TIME subsystem parameter specifies the default setting for the TIME option of the TEMPLATE statement.

Tip: Set all Db2 data sharing members to the same value.

Acceptable values:	UTC, LOCAL
Default:	UTC
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM TEMPLATE_TIME

UTC
Coordinated Universal Time.

LOCAL
Local time at the Db2 database manager.

Related information

MAX UTILS PARALLELISM field (PARAMDEG_UTIL subsystem parameter)

The PARAMDEG_UTIL subsystem parameter specifies the maximum number of parallel subtasks for some utilities.

PARAMDEG_UTIL affects the following utilities:

- REORG TABLESPACE
- REBUILD INDEX
- CHECK INDEX
- UNLOAD
- LOAD
- COPY
- RECOVER

Acceptable values:	0 - 32767
Default:	99
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PARAMDEG_UTIL

0
No additional constraint is placed on the maximum degree of parallelism in a utility.

1 - 32767
Specifies the maximum number of parallel subtasks for all affected utilities.

STATISTICS COLGROUP DATA SORT STG LIMIT field (STATCLGSRT subsystem parameter)

The STATCLGSRT subsystem parameter specifies how the sort program is to be used by the RUNSTATS utility or by an inline statistics job when collecting statistics on a single column that is defined with the COLGROUP option.

Acceptable values:	0 - 4096 MB
Default:	10
Update:	option 29 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM STATCLGSRT
Data sharing scope:	Member
Online changeable:	Yes

When you specify FREQVAL to collect statistics on single-column COLGROUPs, consider adjusting the value of the STATCLGSRT subsystem parameter to avoid sort, if both of the following conditions exist:

- The specified COUNT value is less than or equal to 1000.
- The LEAST and BOTH options are not specified.

If either of these conditions does not exist or if STATCLGSRT specifies 0, Db2 does a data sort, which can negatively affect the performance of statistics collection. A non-zero value for STATCLGSRT indicates the amount of memory space, specified in MB, that the utility can use to avoid the data sort. Specifying a non-zero value is likely to improve performance and reduce costs for collecting statistics in these circumstances, but storage costs might increase.

0
An indication that a data sort is always performed.

1 - 4096
The amount of memory space for the utility to use to avoid the data sort. Values are specified in megabytes (for example, 4096, which is the maximum allowable value). Increasing the value might be necessary when utility jobs specify a large number of single-column COLGROUPs, and message DSNU1388I is issued.

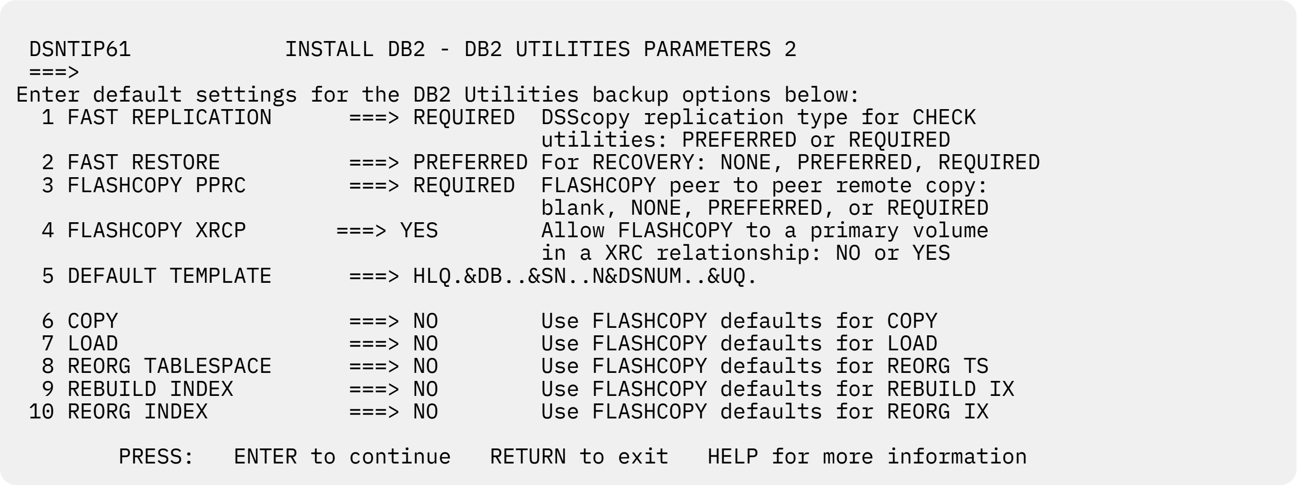
Although histogram statistics can be collected in the same RUNSTATS or inline statistics job, any COLGROUPs for which histogram statistics are being collected are not eligible for the sort-avoidance performance improvement.

You can override the STATCLGSRT value for a particular utility job by specifying the STATCLGMEMSRT option on the utility statement.

Related information

DSNTIP61: Db2 utilities parameters panel 2

The fields on the DSNTIP61 panel are used to configure the default behavior of various Db2 utilities.



```
 DSNTIP61            INSTALL DB2 - DB2 UTILITIES PARAMETERS 2
 ===>
Enter default settings for the DB2 Utilities backup options below:
  1 FAST REPLICATION      ===> REQUIRED  DSScopy replication type for CHECK
                                         utilities: PREFERRED or REQUIRED
  2 FAST RESTORE          ===> PREFERRED For RECOVERY: NONE, PREFERRED, REQUIRED
  3 FLASHCOPY PPRC        ===> REQUIRED  FLASHCOPY peer to peer remote copy:
                                         blank, NONE, PREFERRED, or REQUIRED
  4 FLASHCOPY XRCP       ===> YES        Allow FLASHCOPY to a primary volume
                                         in a XRC relationship: NO or YES
  5 DEFAULT TEMPLATE      ===> HLQ.&DB..&SN..N&DSNUM..&UQ.

  6 COPY                  ===> NO        Use FLASHCOPY defaults for COPY
  7 LOAD                  ===> NO        Use FLASHCOPY defaults for LOAD
  8 REORG TABLESPACE      ===> NO        Use FLASHCOPY defaults for REORG TS
  9 REBUILD INDEX         ===> NO        Use FLASHCOPY defaults for REBUILD IX
 10 REORG INDEX           ===> NO        Use FLASHCOPY defaults for REORG IX

        PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 38. DB2 utilities parameters panel 2: DSNTIP61

FAST REPLICATION field (CHECK_FASTREPLICATION subsystem parameter)

The CHECK_FASTREPLICATION parameter specifies the type of replication that DSS COPY uses to copy objects to shadow data sets when it is invoked by the Db2 CHECK utilities. The CHECK utilities can stipulate fast replication as PREFERRED or REQUIRED.

Deprecated subsystem parameter: Non-default settings for CHECK_FASTREPLICATION are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value REQUIRED.

Acceptable values:	PREFERRED, REQUIRED
Default:	REQUIRED
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.CHECK_FASTREPLICATION

This parameter applies to the CHECK utilities in all Db2 modes (conversion mode through new-function mode)

PREFERRED
The CHECK utilities direct DSS COPY to use fast replication only if FlashCopy® support is available.

REQUIRED
The CHECK utilities force DSS COPY to use fast replication, ensuring that object copies occur as quickly as possible. This reduces the opportunity for resource contention and unavailability. This option causes CHECK utilities to fail if FlashCopy cannot be used.

Related information

FAST RESTORE field (REC_FASTREPLICATION subsystem parameter)

The REC_FASTREPLICATION parameter specifies whether the RECOVER utility should use FlashCopy to recover from a FlashCopy image copy.

Acceptable values:	NONE, PREFERRED, REQUIRED
Default:	PREFERRED
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.REC_FASTREPLICATION

NONE
The RECOVER utility uses standard I/O to restore a FlashCopy image copy.

PREFERRED
The RECOVER utility uses FlashCopy to recover from a FlashCopy image copy if FlashCopy support is available.

REQUIRED
The RECOVER utility forces the use of FlashCopy to recover from a FlashCopy image copy to ensure that recovery occurs as quickly as possible. This option causes RECOVERY to fail if FlashCopy cannot be used.

If you use BACKUP SYSTEM to create system-level backups, using FlashCopy for a restore might cause BACKUP SYSTEM to fail because bi-directional FlashCopy is not supported.

Related information

FLASHCOPY PPRC field (FLASHCOPY_PPRC subsystem parameter)

The FLASHCOPY_PPRC subsystem parameter specifies the behavior for DFSMSdss FlashCopy requests when the target disk storage volume is the primary device in a peer-to-peer remote copy (Metro Mirror) relationship.

Specifically, FLASHCOPY_PPRC determines the following:

- Whether DFSMSdss preserves mirroring while processing a Db2 utilities request
- Whether the target device pair is allowed to go to duplex pending state

The FLASHCOPY_PPRC parameter applies to the CHECK DATA, CHECK INDEX, CHECK LOB, COPY, REORG TABLESPACE, REORG INDEX, REBUILD INDEX, LOAD, and RECOVER utilities in all Db2 modes (conversion mode through new-function mode).

Important: Set this field to blank if PPRC is not available on the subsystem.

Acceptable values:	NONE, PREFERRED, REQUIRED, blank
Default:	REQUIRED

Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.FLASHCOPY_PPRC

NONE
DFSMSdss does not preserve mirroring while processing a Db2 utilities request, even if all the configuration requirements for preserving the mirror operation are met.

PREFERRED
DFSMSdss allows a volume pair to go into the duplex pending state while processing a Db2 utilities request only if it is required.

The IBM DS8880 series and newer IBM storage systems do not support the Preserve Mirror Preferred option for PPRC. If you are using one of those storage systems, and you want to preserve your disk mirror or copy, specify REQUIRED.

REQUIRED
DFSMSdss does not permit a PPRC volume pair to go into duplex pending state while processing a Db2 utilities request.

blank
No preserve mirror command is passed to DFSMSdss.

Related information

FLASHCOPY XRCP field (FLASHCOPY_XRCP subsystem parameter)

The FLASHCOPY_XRCP subsystem parameter specifies whether a data set level FlashCopy operation is allowed to a primary volume in an XRC relationship when the z/OS DFSMSdss support for RPFC for XRC is installed and enabled.

Acceptable values:	YES, NO
Default:	YES
Update	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_XRCP

YES
If z/OS DFSMSdss support for RPFC in XRC is installed and enabled, supported utilities specify the FCTOXRCPrimary option when they issue DFSMSdss COPY commands.

YES is ignored in the following situations:

- For CHECK utilities, if the CHECK_FASTREPLICATION subsystem parameter value is NONE.
- For the RECOVER utility, if the REC_FASTREPLICATION subsystem parameter value is NONE.

NO
The utilities do not specify the FCTOXRCPrimary option when they issue DFSMSdss COPY commands.

Related information

COPY Command for DFSMSdss (z/OS DFSMSdss Storage Administration)

DEFAULT TEMPLATE field (FCCOPYDDN subsystem parameter)

The FCCOPYDDN subsystem parameter defines the default value that is to be used for the FCCOPYDDN parameter of the FLASHCOPY option of Db2 utilities control statements. This parameter applies to the COPY, LOAD, REBUILD INDEX, REORG INDEX, and REORG TABLESPACE utilities.

FCCOPYDDN specifies the template for deriving the data set name for the FlashCopy image copy.

FlashCopy technology can be used to create VSAM copies of objects almost instantaneously. It creates a separate data set for each piece of the object that is being copied. FlashCopy technology can also be used to recover the object if necessary, which reduces recovery time and therefore provides greater availability.

Important: You must replace "HLQ" in the default value with a high-level qualifier that is appropriate for your subsystem.

Acceptable values:	valid Db2 utilities template
Default:	HLQ.&DB..&SN..N&DSNUM..&UQ.
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FCCOPYDDN

If you assign the FCCOPYDDN setting directly in DSNTIJUZ, you need to repeat each ampersand (&) character to conform with IBM High-Level Assembler rules. For example, you would need to assign the default value above as FCCOPYDDN=HLQ.&&DB..&&SN..N&&DSNUM..&&UQ. (notice the trailing period).

COPY field (FLASHCOPY_COPY subsystem parameter)

The value of the FLASHCOPY_COPY parameter specifies whether the FLASHCOPY option of the COPY utility is to be used by default.

Acceptable values:	NO, YES
Default:	NO
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_COPY

NO
Specifies that the FLASHCOPY option of the COPY utility is not used by default.

YES
Specifies that the COPY utility uses FlashCopy technology when the FLASHCOPY option is not specified in the control statement. Specify YES only if the Db2 data sets are on FlashCopy Version 2 DASD.

LOAD field (FLASHCOPY_LOAD subsystem parameter)

The value of the FLASHCOPY_LOAD subsystem parameter specifies whether the FLASHCOPY option of the LOAD utility is to be used by default.

Acceptable values:	NO, YES
Default:	NO
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_LOAD

NO
Specifies that the FLASHCOPY option of the LOAD utility is not used by default.

YES
Specifies that the LOAD utility uses FlashCopy technology when the FLASHCOPY option is not specified in the control statement. Specify YES only if the Db2 data sets are on FlashCopy Version 2 DASD.

REORG TABLESPACE field (FLASHCOPY_REORG_TS subsystem parameter)

The value of the FLASHCOPY_REORG_TS subsystem parameter specifies whether the FLASHCOPY option of the REORG TABLESPACE utility is to be used by default.

Acceptable values:	NO, YES
Default:	NO
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_REORG_TS

NO
Specifies that the FLASHCOPY option of the REORG TABLESPACE utility is not used by default.

YES
Specifies that the REORG TABLESPACE utility uses FlashCopy technology when the FLASHCOPY option is not specified in the control statement. Specify YES only if the Db2 data sets are on FlashCopy Version 2 DASD.

REBUILD INDEX field (FLASHCOPY_REBUILD_INDEX subsystem parameter)

The value of the FLASHCOPY_REBUILD_INDEX subsystem parameter specifies whether the FLASHCOPY option of the REBUILD INDEX utility is to be used by default.

Acceptable values:	NO, YES
Default:	NO
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_REBUILD_INDEX

NO
Specifies that the FLASHCOPY option of the REBUILD INDEX utility is not used by default.

YES
Specifies that the REBUILD INDEX utility uses FlashCopy technology when the FLASHCOPY option is not specified in the control statement. Specify YES only if the Db2 data sets are on FlashCopy Version 2 DASD.

REORG INDEX field (FLASHCOPY_REORG_INDEX subsystem parameter)

The value of the FLASHCOPY_REORG_INDEX subsystem parameter specifies whether the FLASHCOPY option of the REORG INDEX utility is to be used by default.

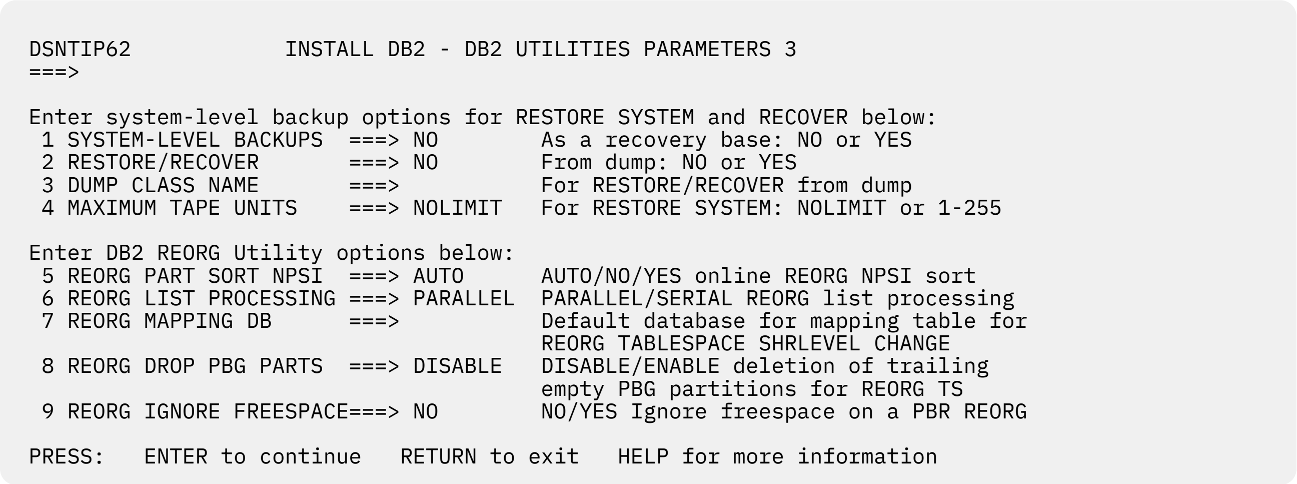
Acceptable values:	NO, YES
Default:	NO
Update:	option 30 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM FLASHCOPY_REORG_INDEX

NO
Specifies that the FLASHCOPY option of the REORG INDEX utility is not used by default.

YES
Specifies that the REORG INDEX utility uses FlashCopy technology when the FLASHCOPY option is not specified in the control statement. Specify YES only if the Db2 data sets are on FlashCopy Version 2 DASD.

DSNTIP62: Db2 utilities parameters panel 3

The fields on the DSNTIP62 panel are used to configure the default behavior of various Db2 utilities.



```
DSNTIP62            INSTALL DB2 - DB2 UTILITIES PARAMETERS 3
===>

Enter system-level backup options for RESTORE SYSTEM and RECOVER below:
 1 SYSTEM-LEVEL BACKUPS  ===> NO        As a recovery base: NO or YES
 2 RESTORE/RECOVER       ===> NO        From dump: NO or YES
 3 DUMP CLASS NAME       ===>           For RESTORE/RECOVER from dump
 4 MAXIMUM TAPE UNITS    ===> NOLIMIT   For RESTORE SYSTEM: NOLIMIT or 1-255

Enter DB2 REORG Utility options below:
 5 REORG PART SORT NPSI  ===> AUTO      AUTO/NO/YES online REORG NPSI sort
 6 REORG LIST PROCESSING ===> PARALLEL  PARALLEL/SERIAL REORG list processing
 7 REORG MAPPING DB      ===>           Default database for mapping table for
                                        REORG TABLESPACE SHRLEVEL CHANGE
 8 REORG DROP PBG PARTS  ===> DISABLE   DISABLE/ENABLE deletion of trailing
                                        empty PBG partitions for REORG TS
 9 REORG IGNORE FREESPACE===> NO        NO/YES Ignore freespace on a PBR REORG

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 39. DB2 utilities parameters panel 3: DSNTIP62

SYSTEM-LEVEL BACKUPS field (SYSTEM_LEVEL_BACKUPS subsystem parameter)

The RECOVER utility uses image copies and concurrent copies for object-level recoveries. The SYSTEM_LEVEL_BACKUPS subsystem parameter specifies whether the RECOVER utility is to also use system-level backups as a recovery base for object-level recoveries.

Acceptable values:	NO, YES
Default:	NO
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SYSTEM_LEVEL_BACKUPS

Specify the default of NO if you do not take system-level backups with the BACKUP SYSTEM utility. Specify YES if you take system-level backups with the BACKUP SYSTEM utility.

Related information

RESTORE/RECOVER field (RESTORE_ RECOVER_FROMDUMP subsystem parameter)

The RESTORE_ RECOVER_FROMDUMP subsystem parameter controls whether the system-level backup for the RESTORE SYSTEM and the RECOVER utilities is to occur from the dump on tape.

Acceptable values:	YES or NO
Default:	NO
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RESTORE_ RECOVER_FROMDUMP

YES
System-level backup for the RESTORE SYSTEM and the RECOVER utilities occurs from the dump on tape.

NO

System-level backup for the RESTORE SYSTEM and the RECOVER utilities occurs from the disk copy of the system-level backup.

You can override the setting of RESTORE/RECOVER by executing the RESTORE SYSTEM utility statement or the RECOVER utility statement with the FROMDUMP keyword.

DUMP CLASS NAME field (UTILS_DUMP_CLASS_NAME subsystem parameter)

A system-level backup can occur from a dump on tape or from a disk copy. For backups that occur from the dump on tape, the UTILS_DUMP_CLASS_NAME subsystem parameter specifies the name of the DFSMShsm dump class that is to be used.

Acceptable values:	blank or a valid DFSMShsm dump class name not exceeding 8 characters in length
Default:	blank
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM UTILS_DUMP_CLASS_NAME

This dump class is to be used by the RECOVER utility and the RESTORE SYSTEM utility to restore objects from a system-level backup that has been dumped to tape. The setting for this field is applicable only when you specify YES in the RESTORE/RECOVER field on panel DSNTIP6. You can override the setting for DUMP CLASS NAME by executing the RESTORE SYSTEM utility statement or the RECOVER utility statement with the DUMPCLASS keyword.

Related concepts

Dump Tasks (z/OS DFSMShsm Storage Administration)

MAXIMUM TAPE UNITS field (RESTORE_TAPEUNITS subsystem parameter)

When the RESTORE SYSTEM utility restores a system-level backup that has been dumped to tape, it allocates a number of tape units or tape drives. The RESTORE_TAPEUNITS subsystem parameter specifies the maximum number of tape units or tape drives that the RESTORE SYSTEM utility can allocate.

Acceptable values:	NOLIMIT or 1 - 255
Default:	NOLIMIT
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RESTORE_TAPEUNITS

The default value, NOLIMIT, means that the RESTORE SYSTEM utility will allocate as many tape units as necessary to restore the system-level backup. You can override the setting for MAXIMUM TAPE UNITS by executing the RESTORE SYSTEM utility statement with the TAPEUNITS keyword.

REORG PART SORT NPSI field (REORG_PART_SORT_NPSI subsystem parameter)

The REORG_PART_SORT_NPSI subsystem parameter specifies whether the REORG TABLESPACE PART utility decides to sort all of the keys of a non-partitioned secondary index. The setting is ignored for a REORG that is not part-level or without non-partitioned secondary indexes.

Acceptable values:	AUTO, NO, YES
Default:	AUTO
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REORG_PART_SORT_NPSI

AUTO

The utility determines whether to sort all NPSI keys or only keys in the scope of the REORG operation.

The decision is based on many factors, including a projection of the estimated elapsed time and CPU performance savings of sorting all NPSI keys being processed. However, the actual performance varies depending on the specific scenario, and CPU and elapsed time reductions are not always guaranteed.

YES

Specifies that if sorting all keys of the non-partitioned secondary indexes improves the elapsed time, all keys are sorted.

NO

Specifies that only keys of the non-partitioned secondary indexes that are in the scope of the REORG are sorted.

REORG LIST PROCESSING field (REORG_LIST_PROCESSING subsystem parameter)

The REORG_LIST_PROCESSING subsystem parameter specifies the default setting for the PARALLEL option of the Db2 REORG TABLESPACE utility.

Acceptable values:	PARALLEL, SERIAL
Default:	PARALLEL
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REORG_LIST_PROCESSING

PARALLEL

The default value PARALLEL specifies that the REORG TABLESPACE utility is to use a default PARALLEL YES option when the PARALLEL keyword is not specified in the utility control statement. The PARALLEL YES option specifies that the REORG TABLESPACE utility is to process all partitions that are specified in the input LISTDEF statement in a single execution of the utility.

SERIAL

SERIAL specifies that the REORG TABLESPACE utility is to use a default PARALLEL NO option when the PARALLEL keyword is not specified in the utility control statement. The PARALLEL NO option specifies that each partition that is specified in the input LISTDEF statement is to be processed in a separate execution of the utility.

REORG MAPPING DB field (REORG_MAPPING_DATABASE subsystem parameter)

The REORG_MAPPING_DATABASE subsystem parameter specifies the default database that REORG TABLESPACE SHRLEVEL CHANGE uses to implicitly create the mapping table.

Acceptable values:	*database-name*
Default:	blank
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.REORG_MAPPING_DATABASE
Online changeable:	Yes
Data sharing scope:	Member

database-name

The name of the default database that REORG TABLESPACE SHRLEVEL CHANGE uses to implicitly create the mapping table. The name must a character string with maximum length of 8 bytes.

blank
An implicitly defined database is used.

When processing a REORG TABLESPACE SHRLEVEL CHANGE request, the REORG utility has the option to create its own mapping table and mapping index, instead of relying on user's input. Specifying this subsystem parameter with a valid database name directs REORG to allocate the mapping table in the database that is specified. By default, REORG uses an implicitly defined database for the mapping table allocation.

REORG DROP PBG PARTS field (REORG_DROP_PBG_PARTS subsystem parameter)

The REORG_DROP_PBG_PARTS subsystem parameter specifies whether the REORG utility removes trailing empty partitions when operating on an entire partition-by-growth table space. An empty trailing partition occurs when the REORG utility moves all data records from a partition into lower numbered partitions.

Acceptable values:	DISABLE, ENABLE
Default:	DISABLE
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REORG_DROP_PBG_PARTS

This parameter is meaningful only when the REORG utility is run against an entire partition-by-growth table space. It is ignored for:

- LOB table spaces
- Table spaces that are not defined as partition-by-growth
- Partition-by-growth table spaces that are defined with a MAXPARTITONS value of 1
- Partition-by-growth table spaces that contain tables that are defined with DATA CAPTURE CHANGES
- Hash partition-by-growth table spaces

ENABLE
Specifies that any trailing empty partitions that are present at the successful completion of the REORG are always removed. LOB table spaces and auxiliary indexes that are associated with these empty partition-by-growth partitions are also removed.

DISABLE
Specifies that the number of partition-by-growth partitions at the successful completion of the REORG are always equal or greater than the number of partitions before the REORG utility was run. Even if the REORG is able to relocate all data records into the lowest numbered partitions, trailing empty partition-by-growth partitions are retained.

REORG IGNORE FREESPACE field (REORG_IGNORE_FREESPACE subsystem parameter)

By default, when REORG TABLESPACE is run against a partition-by-growth table space, it uses the defined PCTFREE and FREEPAGE values in the partition or table space. As data is loaded back into the table space, new partitions are created as necessary to accommodate the partition or table space's growth in size.

However, the addition of new partitions might cause the utility to fail because of a lack of disk space in the following situations:

- When REORG TABLESPACE is run against a subset of the partitions in a partition-by-growth table space
- When REORG TABLESPACE is run against a partition-by-growth table space in which a table contains LOB columns

The REORG_IGNORE_FREESPACE subsystem parameter controls whether Db2 ignores the PCTFREE and FREEPAGE values that are defined for partition-by-growth table spaces in these situations.

Acceptable values:	NO, YES
Default:	NO
Update:	option 31 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REORG_IGNORE_FREESPACE

NO
The REORG TABLESPACE utility uses the defined PCTFREE and FREEPAGE values.

YES
Db2 uses 0 for the PCTFREE and FREEPAGE values when it reloads data into the table space. This setting can alleviate space problems when REORG TABLESPACE is run against partition-by-growth table spaces.

Related information

DSNTIPP: Protection panel

The entries on the DSNTIPP panel are related to security matters.

```
DSNTIPP         INSTALL DB2 - PROTECTION
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

```
DSNTIPP         INSTALL DB2 - PROTECTION
 ===> _

 Enter data below:

  1  ARCHIVE LOG RACF   ===> NO        RACF protect archive log data sets
  2  USE PROTECTION     ===> YES       DB2 authorization enabled. YES or NO
  3  PLAN AUTH CACHE    ===> 3072      Size in bytes per plan (0 - 4096)
  4  PACKAGE AUTH CACHE ===> 5M        Global - size in bytes (0-10M)
  5  ROUTINE AUTH CACHE ===> 5M        Global - size in bytes (0-10M)
  6  AUTH EXIT LIMIT    ===> 10        Access control exit shutdown threshold
  7  AUTH EXIT CHECK    ===> PRIMARY   ID for access control exit auth checks
                                       (PRIMARY or DB2)
  8  AUTH EXIT CACHE REFR===>NONE      Refresh DB2 auth caches when user profile
                                       or resource access changes (ALL or NONE)

 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 40. Protection panel: DSNTIPP

ARCHIVE LOG RACF field (PROTECT subsystem parameter)

The PROTECT subsystem parameter specifies whether archive log data sets are to be protected with individual profiles with RACF when they are created.

Acceptable values:	YES, NO
Default:	NO
Update:	see “DSNTIPP: Protection panel ” on page 218; not during migration
DSNZP*xxx*:	DSN6ARVP PROTECT

If you specify YES, RACF protection must be active for Db2. However, a value of YES also means that you cannot use RACF generic profiles for archive log data sets. In addition, RACF class TAPEVOL must be active if your archive log is on tape. Otherwise, the offload fails.

Related information

USE PROTECTION field (AUTH subsystem parameter)

The AUTH subsystem parameter controls whether Db2 is to check authorizations.

Acceptable values:	YES, NO
Default:	YES
Update:	option 32 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM AUTH
Security parameter:	Yes

YES

Enables authorization checking in Db2.

If you specified YES for the value of CACHE DYNAMIC SQL on panel DSNTIP8, you must also specify YES for this value.

Recommendation: Specify YES.

NO

Disables all authorization checking in Db2 and disables the GRANT statement. In this case, every privilege is granted to PUBLIC.

Note: This is a security-related parameter. If it is set to NO, individual grants cannot be performed and all privileges are granted to PUBLIC, which allows any user to access user data.

PLAN AUTH CACHE field (AUTHCACH subsystem parameter)

The AUTHCACH subsystem parameter specifies the size (in bytes per plan) of the authorization cache that is to be used if no CACHESIZE is specified on the BIND PLAN subcommand.

Note:	0 - 4096 in multiples of 256
Acceptable values:	
Default:	3072
Update:	option 32 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM AUTHCACH
Security parameter:	Yes

0

Specifies that no authorization cache is to be used.

256 - 4096 (integers in multiples of 256)

For an authorization cache, you need 32 bytes of overhead plus (8 bytes of storage times the number of concurrent users).

Note: This is a security-related parameter.

Related information

PACKAGE AUTH CACHE field (CACHEPAC subsystem parameter)

The CACHEPAC subsystem parameter determines the amount of storage in bytes to allocate for caching package authorization information for all packages on this Db2 member. The cache is stored in the database services address space (*ssnm*DBM1).

Acceptable values:	0 - 10M
Default:	5M
Update:	option 32 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CACHEPAC
Security parameter:	Yes

Note: This is a security-related parameter. When RACF authorization is used and this parameter is set, the changes that are made in RACF profiles are not immediately reflected. This setting might result in a user (cached AUTHID) being able to run a package.

ROUTINE AUTH CACHE field (CACHERAC subsystem parameter)

The CACHERAC subsystem parameter determines the amount of storage in bytes to allocate for caching routine authorization information for all routines on this Db2 member. Routines include stored procedures and user-defined functions.

Acceptable values:	0 - 10M
Default:	5M
Update:	option 32 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM CACHERAC
Security parameter:	Yes

Note: This is a security-related parameter. When RACF authorization is used and this parameter is set, the changes that are made in RACF profiles are not immediately reflected. This setting might result in a user (cached AUTHID) being able to invoke a routine or function.

AUTH EXIT LIMIT field (AEXITLIM subsystem parameter)

The AEXITLIM subsystem parameter controls the number of abends of the Db2 access control authorization exit routine that are to be tolerated before it is shut down.

Acceptable values:	0 - 32767
Default:	10
Update:	option 32 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM AEXITLIM

After the exit routine shuts down, it can be reactivated only by restarting Db2. A very low setting for the AUTH EXIT LIMIT field might cause the exit routine to shut down in response to routine abends such as timeouts. A very high setting, on the other hand, may mask a problem with the exit routine environment that can result in degraded Db2 or system performance.

AUTH EXIT CHECK (AUTHEXIT_CHECK subsystem parameter)

The AUTHEXIT_CHECK subsystem parameter specifies whether the owner or the primary authorization ID is used for authorization checks when the access control authorization exit (DSNX@XAC) is active.

Acceptable values:	PRIMARY, DB2

Default:	PRIMARY
Update:	No
DSNZP*xxx*:	DSN6SPRM.AUTHEXIT_CHECK
Data sharing scope:	Group
Security parameter:	Yes

PRIMARY
Specifies that Db2 provides the ACEE of the primary authorization ID to perform all authorization checks. The primary authorization ID must be permitted access to the resources in RACF. This is the default value for the field.

DB2
Specifies that Db2 provides the ACEE of the package or plan owner to perform authorization checking when processing the autobind, BIND and REBIND commands and, if needed, during the execution of the package or plan. Db2 also provides the ACEE of the authorization ID as determined by the DYNAMICRULES option to perform dynamic SQL authorization checking at run time. The access control authorization exit uses the ACEE for XAPLUCHK for authorization checking. The XAPLUCHK authorization ID can be a user or a group in RACF.

To ensure successful authorization checks with the owner ACEE, the owner authorization ID in XAPLUCHK must be permitted access to the resources in RACF. If the owner is a group in RACF, you need to permit the group access to the resource associated with the connection in the RACF DSNR class. You can issue the PERMIT command to grant a group access to *subsystem*.BATCH in the DSNR class, as follows:

```
PERMIT DSN.BATCH CLASS(DSNR) ID(DB2GRP) ACCESS(READ)
```

Related information

AUTH EXIT CACHE REFR (AUTHEXIT_CACHEREFRESH subsystem parameter)

The AUTHEXIT_CACHEREFRESH subsystem parameter specifies whether the cache entries of the package authorization, the routine authorization, the DDF user authentication, and the dynamic statement are refreshed and whether the dependent packages are invalidated when a user profile or resource access is changed in RACF.

Acceptable values:	ALL, NONE
Default:	NONE
Update:	No
DSNZP*xxx*:	DSN6SPRM.AUTHEXIT_CACHEREFRESH
Data sharing scope:	Group
Security parameter:	Yes

ALL
Specifies that:

- Db2 refreshes the entries in the package authorization cache, the routine authorization cache, and the dynamic statement cache when the user profile or resource access is changed in RACF, and the access control authorization exit (DSNX@XAC) is active.
- Db2 invalidates dependent packages when the user profile or resource access is changed in RACF, and the access control authorization exit (DSNX@XAC) is active.

- Db2 refreshes the entries in the DDF user authentication cache when the user profile is changed in RACF. The DDF user authentication cache is refreshed regardless of whether security is managed with Db2 facilities or with the access control authorization exit.

NONE
Specifies that Db2 does not refresh the cache entries of the package authorization, the routine authorization, and the dynamic statement or invalidate dependent packages when the user profile or resource access is changed in RACF. This is the default value for the field.

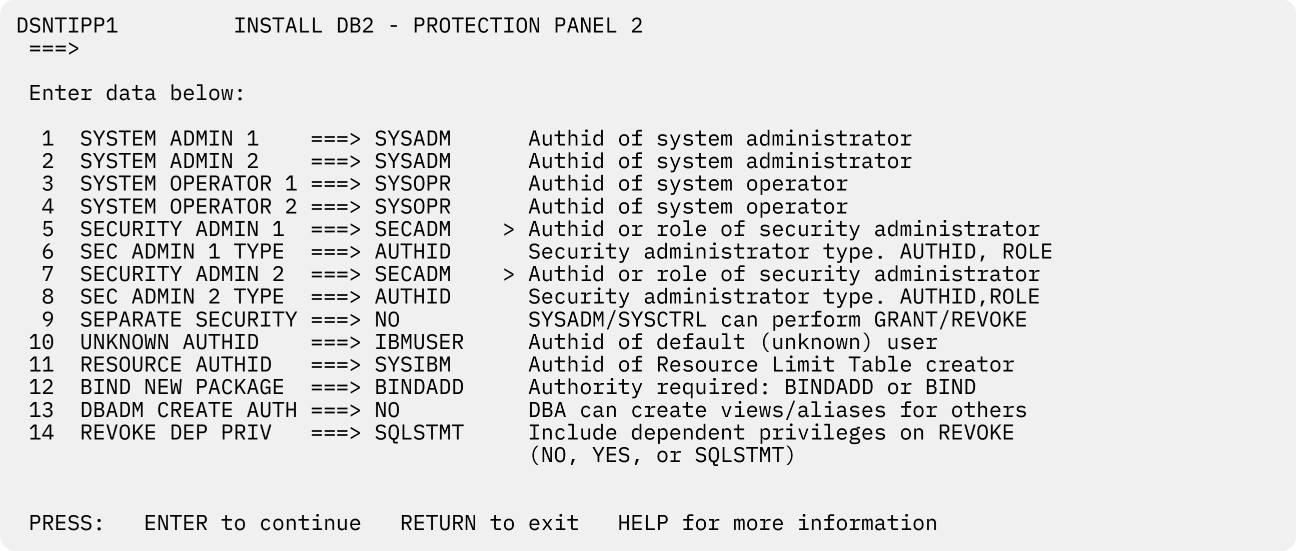
When the AUTHEXIT_CACHEREFRESH subsystem parameter is set to ALL and the access control authorization exit is active, Db2 listens to type 62, type 71, and type 79 ENF signals from RACF for user profile or resource access changes and refreshes the Db2 cache entries accordingly. If you define RACF classes for Db2 objects and administrative authorities without using IBM-supplied RACF resource classes, you need to enable the SIGNAL=YES option for these classes in the RACF Class Descriptor Table.

Related information

DSNTIPP1: Protection panel 2

Use the DSNTIPP1 panel to specify security options, including the authorization IDs that are required for system administrators and system operators, and the authorization IDs or roles that are required for security administrators. You can also specify the authorization IDs that are to be used to install, configure, and validate Db2-supplied routines.

Because space on this panel is limited, some input fields are not wide enough to display the entire contents of the field at one time. These fields are defined as ISPF scrollable fields, which let you see the field contents. A less-than symbol (<) or a greater-than (>) symbol denotes a scrollable field. A > symbol indicates that the field can be scrolled to the right, and a < symbol indicates that the field can be scrolled to the left. You can position your cursor in the field and use ISPF scroll commands LEFT and RIGHT to scroll through the field. To see the entire contents of the field at one time, type EXPAND in the command field, position your cursor in the scrollable field, and press Enter. (Alternatively, you can assign your PF keys to be the LEFT, RIGHT, and EXPAND commands.)



```
DSNTIPP1         INSTALL DB2 - PROTECTION PANEL 2
 ===>

 Enter data below:

  1  SYSTEM ADMIN 1    ===> SYSADM      Authid of system administrator
  2  SYSTEM ADMIN 2    ===> SYSADM      Authid of system administrator
  3  SYSTEM OPERATOR 1 ===> SYSOPR      Authid of system operator
  4  SYSTEM OPERATOR 2 ===> SYSOPR      Authid of system operator
  5  SECURITY ADMIN 1  ===> SECADM    > Authid or role of security administrator
  6  SEC ADMIN 1 TYPE  ===> AUTHID      Security administrator type. AUTHID, ROLE
  7  SECURITY ADMIN 2  ===> SECADM    > Authid or role of security administrator
  8  SEC ADMIN 2 TYPE  ===> AUTHID      Security administrator type. AUTHID,ROLE
  9  SEPARATE SECURITY ===> NO          SYSADM/SYSCTRL can perform GRANT/REVOKE
 10  UNKNOWN AUTHID    ===> IBMUSER     Authid of default (unknown) user
 11  RESOURCE AUTHID   ===> SYSIBM      Authid of Resource Limit Table creator
 12  BIND NEW PACKAGE  ===> BINDADD     Authority required: BINDADD or BIND
 13  DBADM CREATE AUTH ===> NO          DBA can create views/aliases for others
 14  REVOKE DEP PRIV   ===> SQLSTMT     Include dependent privileges on REVOKE
                                        (NO, YES, or SQLSTMT)


 PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 41. Protection panel 2: DSNTIPP1

SYSTEM ADMIN 1 field (SYSADM subsystem parameter)

The SYSADM subsystem parameter specifies the first of two authorization IDs that are to have installation SYSADM authority.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character

Default:	SYSADM
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SYSADM
Security parameter:	Yes

The two users with installation SYSADM authority are permitted access to Db2 in all cases.

Note: This is a security-related parameter. The authorization ID that is specified for this parameter can manage the Db2 subsystem even when the Db2 catalog is unavailable. This authorization ID can access all user data and can run any application.

Related information

SYSTEM ADMIN 2 field (SYSADM2 subsystem parameter)

The SYSADM2 subsystem parameter specifies the second of two authorization IDs that are to have installation SYSADM authority.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	SYSADM
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SYSADM2
Security parameter:	Yes

If you leave this field blank, the value is set to the value of the SYSTEM ADMIN 1 field.

Note: This is a security-related parameter. The authorization ID that is specified for this parameter can manage the Db2 subsystem even when the Db2 catalog is unavailable. This authorization ID can access all user data and can run any application.

SYSTEM OPERATOR 1 field (SYSOPR1 subsystem parameter)

The SYSOPR1 subsystem parameter specifies the first of two authorization IDs that are to have installation SYSOPR authority.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	SYSOPR
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SYSOPR1
Security parameter:	Yes

The two users with installation SYSOPR authority are permitted access to Db2 even if the Db2 catalog is unavailable.

If you leave this field blank, the value is set to the value of the SYSTEM ADMIN 1 field.

Recommendation: Set the value of this field or the value of the SYSTEM OPERATOR 2 field to SYSOPR. Doing so ensures that Db2 commands that are issued from the console can be processed correctly when the Db2 catalog is unavailable.

Note: This is a security-related parameter. The authorization ID that is specified for this parameter can issue most of the Db2 commands such as BIND QUERY, CANCEL THREAD, and STOP DB2. This ability might provide the authorization ID with information about user data. Also, the authorization ID can run the DSN1SDMP utility and terminate any utility job.

Related information

SYSTEM OPERATOR 2 field (SYSOPR2 subsystem parameter)

The SYSOPR2 subsystem parameter specifies the second of two system operators that are to have installation SYSOPR authority.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	SYSOPR
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SYSOPR2
Security parameter:	Yes

If you leave this field blank, the value is set to the value of the SYSTEM OPERATOR 1 field.

Recommendation: Set the value of this field or the value of the SYSTEM OPERATOR 1 field to SYSOPR. Doing so ensures that Db2 commands that are issued from the console can be processed correctly when the Db2 catalog is unavailable.

Note: This is a security-related parameter. The authorization ID that is specified for this parameter can issue most of the Db2 commands such as BIND QUERY, CANCEL THREAD, and STOP DB2. This ability might provide the authorization ID with information about user data. Also, the authorization ID can run the DSN1SDMP utility and terminate any utility job.

SECURITY ADMIN 1 field (SECADM1 subsystem parameter)

The SECADM1 subsystem parameter specifies the first of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 1 TYPE field, specify whether this entry is an authorization ID or a role.

Acceptable values:	Depends on the SEC ADMIN 1 TYPE value: For AUTHID, 1 - 8 characters, starting with an alphabetic character. For ROLE, an ordinary SQL identifier (up to 128 bytes) that designates a role. The role identifier cannot begin with "SYS" and cannot be ACCESSCTRL, DATAACCESS, DBADM, DBCTRL, DBMAINT, NONE, NULL, PACKADM, PUBLIC, SECADM, or SQLADM.
Default:	SECADM
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*	DSN6SPRM SECADM1
Security parameter:	Yes

If you want to separate Db2 security administrator duties from system administrator duties for this subsystem, set at least one SECADM subsystem parameter to an authorization ID, or create the necessary trusted contexts and roles before setting the SEPARATE SECURITY field to YES. If you specify YES for SEPARATE SECURITY, system administrator authority can no longer be used to perform security tasks, and the SECADM authority is required to manage security objects such as trusted contexts and roles. If both SECADM subsystem parameters are set to roles and those roles have not been created, no one will have the authority to manage security objects..

If the access control authorization exit routine (DSNX@XAC) is active, then the exit routine is called to check for SECADM authorization and this subsystem parameter is not checked.

Note: This is a security-related parameter. A user that has SECADM authority can manage security-related objects such as trusted contexts, roles, and column masks. The user can also grant privileges and revoke privileges that are granted by others.

Related tasks

Installation step 9: Establish subsystem security (optional)
Db2 can control access to data within a Db2 subsystem. Db2 also works with outside security systems, such as RACF, that control access to the Db2 subsystem.

Related reference

SEPARATE SECURITY field (SEPARATE_SECURITY subsystem parameter)
The SEPARATE_SECURITY subsystem parameter specifies whether Db2 security administrator duties are to be separated from system administrator duties for this subsystem.

SEC ADMIN 1 TYPE field (SECADM1_TYPE subsystem parameter)
The SECADM1_TYPE subsystem parameter specifies whether the entry in the SECURITY ADMIN 1 field is an authorization ID or a role.

SECADM1_INPUT_STYLE in macro DSN6SPRM
Specifies whether the SECADM1 setting is a character string or a hexadecimal string.

Related information

SEC ADMIN 1 TYPE field (SECADM1_TYPE subsystem parameter)

The SECADM1_TYPE subsystem parameter specifies whether the entry in the SECURITY ADMIN 1 field is an authorization ID or a role.

Acceptable values:	AUTHID, ROLE
Default:	AUTHID
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SECADM1_TYPE
Security parameter:	Yes

AUTHID
The SECADM1 value is an authorization ID.

ROLE
The SECADM1 value is a role.

Note: This is a security-related parameter. The value specifies whether the SECADM1 parameter is an authorization ID or a role. Changing the value of this field changes the SECADM1 parameter from an authorization ID to a role, or from a role to an authorization ID.

Related reference

SECURITY ADMIN 1 field (SECADM1 subsystem parameter)
The SECADM1 subsystem parameter specifies the first of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 1 TYPE field, specify whether this entry is an authorization ID or a role.

SECADM1_INPUT_STYLE in macro DSN6SPRM
Specifies whether the SECADM1 setting is a character string or a hexadecimal string.

Related information

SECURITY ADMIN 2 field (SECADM2 subsystem parameter)

The SECADM2 subsystem parameter specifies the second of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 2 TYPE field, specify whether this entry is an authorization ID or a role.

Acceptable values:	If SEC ADMIN 2 TYPE is AUTHID: 1 - 8 characters, starting with an alphabetic character. If SEC ADMIN 2 TYPE is ROLE: an ordinary SQL identifier (up to 128 characters) that designates a role. The role identifier cannot begin with "SYS" and cannot be ACCESSCTRL, DATAACCESS, DBADM, DBCTRL, DBMAINT, NONE, NULL, PACKADM, PUBLIC, SECADM, or SQLADM.
Default:	SECADM
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SECADM2
Security parameter:	Yes

If you leave this field blank, the value is set to the value of the SECURITY ADMIN 1 field.

If you want to separate Db2 security administrator duties from system administrator duties for this subsystem, set at least one SECADM subsystem parameter to an authorization ID, or create the necessary trusted contexts and roles before setting the SEPARATE SECURITY field to YES. If you specify YES for SEPARATE SECURITY, system administrator authority can no longer be used to perform security tasks, and the SECADM authority is required to manage security objects such as trusted contexts and roles. If both SECADM subsystem parameters are set to roles and those roles have not been created, no one will have the authority to manage security objects.

If the access control authorization exit (DSNX@XAC) is active, then the exit is called to check for SECADM authorization and this parameter is not checked.

Note: This is a security-related parameter. A user that has SECADM authority can manage security-related objects such as trusted contexts, roles, and column masks. The user can also grant privileges and revoke privileges that are granted by others.

Related tasks

Installation step 9: Establish subsystem security (optional)
Db2 can control access to data within a Db2 subsystem. Db2 also works with outside security systems, such as RACF, that control access to the Db2 subsystem.

Related information

SEC ADMIN 2 TYPE field (SECADM2_TYPE subsystem parameter)

The SECADM2_TYPE subsystem parameter specifies whether the entry in the SECURITY ADMIN 2 field is an authorization ID or a role.

Acceptable values:	AUTHID, ROLE
Default:	AUTHID
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SECADM2_TYPE
Security parameter:	Yes

AUTHID
The SECADM2 value is an authorization ID.

ROLE
The SECADM2 value is a role.

Note: This is a security-related parameter. The value specifies whether the SECADM2 parameter is an authorization ID or a role. Changing the value of this field changes the SECADM2 parameter from an authorization ID to a role, or from a role to an authorization ID.

Related reference

SECURITY ADMIN 2 field (SECADM2 subsystem parameter)
The SECADM2 subsystem parameter specifies the second of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 2 TYPE field, specify whether this entry is an authorization ID or a role.

SECADM2_INPUT_STYLE in macro DSN6SPRM
Specifies whether the SECADM2 setting is a character string or a hexadecimal string.

Related information

SEPARATE SECURITY field (SEPARATE_SECURITY subsystem parameter)

The SEPARATE_SECURITY subsystem parameter specifies whether Db2 security administrator duties are to be separated from system administrator duties for this subsystem.

Acceptable values:	NO, YES
Default:	NO
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SEPARATE_SECURITY
Security parameter:	Yes

NO
Overlaps Db2 security administrator duties and system administrator duties. If you are migrating and want SYSADM and SYSCTRL authorities to remain unchanged, use this setting. Users with SYSADM authority can manage all security objects, perform grants, and revoke privileges that are granted by others. Users with SYSCTRL authority can manage roles, perform most grants, and revoke privileges that are granted by others.

YES
Separates Db2 security administrator duties from system administrator duties. Users with SYSADM authority cannot manage security objects (such as roles and trusted contexts), perform grants, or revoke privileges granted by others. Users with SYSCTRL authority cannot manage roles, perform grants, or revoke privileges granted by others. However, existing grants made by users with SYSADM or SYSCTRL authority are unchanged. SECADM or ACCESSCTRL authority is required for security administration. The SEPARATE_SECURITY subsystem parameter does not apply to or affect users with installation SYSADM authority.

Before setting SEPARATE SECURITY to YES, set at least one SECADM system parameter to an authorization ID, or create the necessary trusted contexts and roles. If you specify YES, system administrator authority can no longer be used to perform security tasks, and the SECADM authority is required to manage security objects such as trusted contexts and roles. If both SECADM system parameters are set to roles and those roles have not been created, no one will have the authority to manage security objects.

Note: This is a security-related parameter.

Related tasks

Installation step 9: Establish subsystem security (optional)

Db2 can control access to data within a Db2 subsystem. Db2 also works with outside security systems, such as RACF, that control access to the Db2 subsystem.

UNKNOWN AUTHID field (DEFLTID subsystem parameter)

The DEFLTID subsystem parameter specifies the authorization ID that is to be used if RACF is not available for batch access and USER= is not specified in the JOB statement.

Acceptable values:	1 - 8 characters, the first of which must be an alphabetic character
Default:	IBMUSER
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM DEFLTID

RESOURCE AUTHID field (RLFAUTH subsystem parameter)

The RLFAUTH subsystem parameter specifies the authorization ID that is to be used if you plan to use the resource limit facility (governor).

Acceptable values:	1 - 8 characters
Default:	SYSIBM
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP RLFAUTH

BIND NEW PACKAGE field (BINDNV subsystem parameter)

The BINDNV subsystem parameter controls whether BIND or BINDADD authority is to be required for a user to bind a new version of an existing package.

Acceptable values:	BINDADD, BIND
Default:	BINDADD
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM BINDNV
Security parameter:	Yes

If you accept the default, BINDADD, only users with the BINDADD system privilege are allowed to create a new package. If you specify BIND, users with the BIND privilege on a package or collection are allowed to create a new version of an existing package when they bind it. Users with PACKADM authority are also allowed to add a new package or a new version of a package to a collection.

Note: This is a security-related parameter. When this parameter is set to BIND, the BINDADD privilege check is bypassed, and a user with PACKADM authority can create new packages.

Related information

DBADM CREATE AUTH field (DBACRVW subsystem parameter)

The DBACRVW subsystem parameter controls whether an authorization ID with DBADM authority on a database is to be allowed to complete certain tasks.

Acceptable values:	NO, YES
Default:	NO
Update:	option 33 on panel DSNTIPB

DSNZP*xxx*:	DSN6SPRM DBACRVW
Security parameter:	Yes

NO

Does not allow authorization IDs with DBADM authority on a database to complete the following tasks:

- Create a view for another authorization ID on tables in that database.
- Create a materialized query table or alter a table to become a materialized query table for another authorization ID.
- Create an alias for itself or another authorization ID for a table in that database.

YES

Allows authorization IDs with DBADM authority on a database to complete the following tasks:

- Create a view for another authorization ID on tables in that database.
- Create a materialized query table or alter a table to become a materialized query table for another authorization ID. This action requires that DBADM authority is held on the database in which the tables of the fullselect reside and that the authorization ID has DBADM authority on the database in which the materialized query table is to reside.
- Create an alias for itself or another authorization ID for a table in that database.

If you specify YES, an authorization ID with DBCTRL authority on a database can also create an alias for itself or for another authorization ID for a table in any database.

Specifying YES results in less need for SYSADM authority on a database. However, users that need full authority may still need to have SYSADM authority. Specifying YES does not allow an authorization ID with DBADM authority to grant authority on that view.

Note: This is a security-related parameter. It controls whether an authorization ID or role with DBADM authority on a database is to be allowed to create views, aliases, and materialized query tables for another authorization ID or role. If it is set to YES, authorization IDs and roles with DBADM authority on a database can give others access to user data.

REVOKE DEP PRIV field (REVOKE_DEP_PRIVILEGES subsystem parameter)

The REVOKE_DEP_PRIVILEGES subsystem parameter controls whether revoking a privilege from a user is to cause dependent privileges to be revoked. If dependent privileges are to be revoked, revoking a privilege from a user also revokes the privilege from anyone that the user has granted that privilege to.

Acceptable values:	NO, YES, SQLSTMT
Default:	SQLSTMT
Update:	option 33 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM REVOKE_DEP_PRIVILEGES
Security parameter:	Yes

NO

REVOKE statements do not include dependent privileges. An error occurs if a REVOKE statement contains the INCLUDING DEPENDENT PRIVILEGES clause.

YES

REVOKE statements include dependent privileges, except when ACCESSCTRL, DATAACCESS, and system DBADM authorities are revoked. An error occurs if a REVOKE statement contains the NOT INCLUDING DEPENDENT PRIVILEGES clause, except when ACCESSCTRL, DATAACCESS, and system DBADM authorities are revoked.

SQLSTMT

Allows revoking of dependent privileges to be controlled at the SQL level, as specified in REVOKE statements. Db2 recognizes the dependent privileges clause (INCLUDING DEPENDENT PRIVILEGES or NOT INCLUDING DEPENDENT PRIVILEGES) of the REVOKE statement

Note: This is a security-related parameter. If it is set to NO, privileges that were granted by a user are retained even if that user loses the authority that allowed the user to perform the grant.

DSNTIPM: MVS PARMLIB updates panel

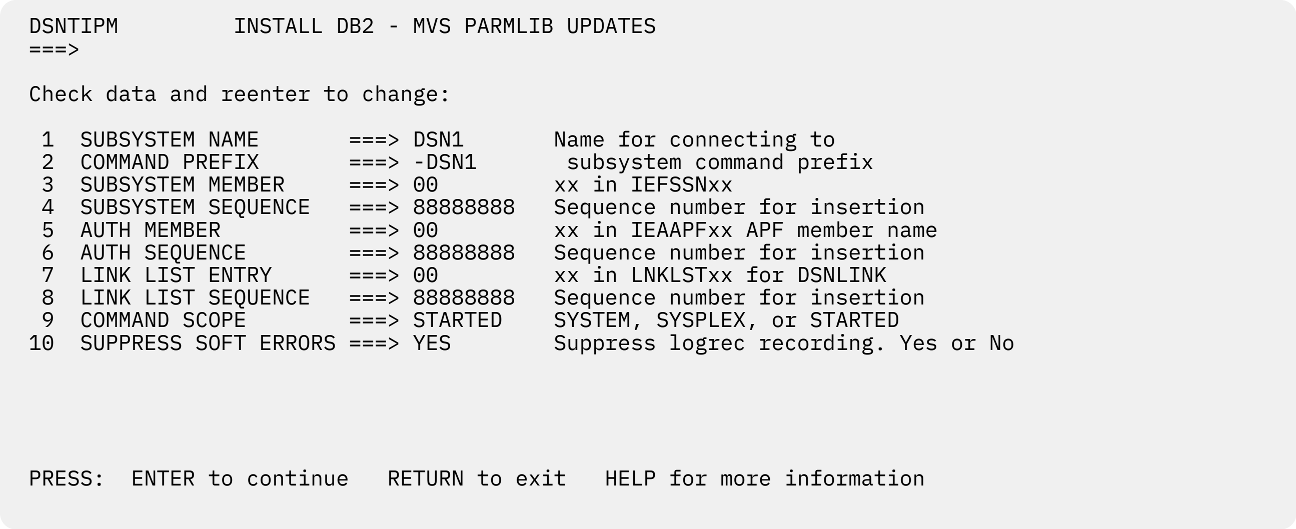
The entries on the DSNTIPM panel produce the DSNTIJMV job, which defines Db2 to z/OS and updates several PARMLIB members.

DSNTIJMV updates the following PARMLIB members:

- IEFSSN*xx*, to define Db2 and IRLM as formal z/OS subsystems
- IEAAPF*xx*, to authorize the *prefix*.SDSNLOAD, *prefix*.SDSNLINK, and *prefix*.SDSNEXIT libraries
- LNKLST*xx*, to include the *prefix*.SDSNLINK library.

Updating the parameters

Different sites have different requirements for identifying Db2 to z/OS; as a result, the updates that DSNTIJMV makes to z/OSPARMLIB members might be incomplete. To ensure that the updates are complete, it is recommended that you edit the z/OS PARMLIB members directly when you install or migrate Db2. This is substantially easier than editing DSNTIJMV.



```
DSNTIPM         INSTALL DB2 - MVS PARMLIB UPDATES
===>

Check data and reenter to change:

 1  SUBSYSTEM NAME       ===> DSN1       Name for connecting to
 2  COMMAND PREFIX       ===> -DSN1       subsystem command prefix
 3  SUBSYSTEM MEMBER     ===> 00         xx in IEFSSNxx
 4  SUBSYSTEM SEQUENCE   ===> 88888888   Sequence number for insertion
 5  AUTH MEMBER          ===> 00         xx in IEAAPFxx APF member name
 6  AUTH SEQUENCE        ===> 88888888   Sequence number for insertion
 7  LINK LIST ENTRY      ===> 00         xx in LNKLSTxx for DSNLINK
 8  LINK LIST SEQUENCE   ===> 88888888   Sequence number for insertion
 9  COMMAND SCOPE        ===> STARTED    SYSTEM, SYSPLEX, or STARTED
10  SUPPRESS SOFT ERRORS ===> YES        Suppress logrec recording. Yes or No




PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 42. MVS PARMLIB updates panel: DSNTIPM

SUBSYSTEM NAME field (SSID DECP value)

The SUBSYSTEM NAME field specifies the z/OS subsystem name for Db2.

Acceptable values:	1 - 4 characters, the first of which must be a letter (A - Z), #, $, or @. Others must be letters A - Z, integers 0 - 9, #, $, or @.
Default:	DSN1
Update:	see below
dsnhdecp:	SSID

The name is used in member IEFSSN*xx* of SYS1.PARMLIB.

If you specified a group attachment name in the GROUP ATTACH field on panel DSNTIPK, the SSID DECP value is set to that value.

Updating the parameters: Different sites have different requirements for identifying Db2 to z/OS; as a result, the updates that DSNTIJMV makes to z/OS PARMLIB members might be incomplete. To ensure that the updates are complete, you should edit the z/OS PARMLIB members directly when you install or migrate Db2. This is substantially easier than editing DSNTIJMV.

COMMAND PREFIX field

The value of the COMMAND PREFIX field specifies the Db2 subsystem command prefix. When the prefix appears at the beginning of a command that is entered at a z/OS operator's console, z/OS passes the command to Db2 for processing. The command prefix is used in the Db2 entry of member IEFSSN*xx* of SYS1.PARMLIB.

Acceptable values:	1 - 8 characters; the first character must be a non-alphanumeric character.
Default:	-DSN1 (hyphen, concatenated with subsystem name)
Update:	see “DSNTIPM: MVS PARMLIB updates panel” on page 230
DSNZP*xxx*:	none

The first character of the command prefix must be a character from the table below. The remaining characters of the command prefix must be from the table below, letters A - Z, or numbers 0 - 9.

Table 31. Allowable special characters for the command prefix

Name	Character	Hexadecimal representation
cent sign	¢	X'4A'
period	.	X'4B'
less-than sign	<	X'4C'
plus sign	+	X'4E'
vertical bar	|	X'4F'
ampersand “1” on page 232	&	X'50'
exclamation point	!	X'5A'
dollar sign	$	X'5B'
asterisk	*	X'5C'
right parenthesis	)	X'5D'
semi-colon	;	X'5E'
hyphen	-	X'60'
slash	/	X'61'
percent sign	%	X'6C'
underscore	_	X'6D'
question mark	?	X'6F'
colon	:	X'7A'
number sign	#	X'7B'
at sign	@	X'7C'

Table 31. Allowable special characters for the command prefix (continued)

Name	**Character**	**Hexadecimal representation**
apostrophe “2” on page 232	'	X'7D'
equal sign	=	X'7E'
quotation marks	"	X'7F'

1. To use the ampersand (&), accept the default in this field, and then edit job DSNTIJMV to specify the ampersand as the command prefix.
2. To use the apostrophe (`'`), you must code two consecutive apostrophes in your IEFSSN*xx* member. For example, the entry for subsystem DB2A with a command prefix of `'DB2A` and a scope of started looks like this:

```
DB2A,DSN3INI,'DSN3EPX,''DB2A,'
```

Do not use the JES2 backspace character as a command prefix character. Do not assign a command prefix that is used by another subsystem or that can be interpreted as belonging to more than one subsystem or z/OS application. Specifically, do not specify a multiple-character command prefix that is a subset or a superset of another command prefix beginning from the first character. For example, you cannot assign `-` to one subsystem and `-DB2A` to another. Similarly, you cannot assign `?DB2` to one subsystem and `?DB2A` to another. However, you can assign `-DB2A` and `-DB2B` to different Db2 subsystems.

To use multiple-character command prefixes, have the system programmer update the IEFSSN*xx* subsystem definition statements in SYS1.PARMLIB.

Related information

SUBSYSTEM MEMBER field

The value of the SUBSYSTEM MEMBER field specifies the last two characters (*xx*) of the name of member IEFSSN*xx* of SYS1.PARMLIB.

Acceptable values:	2 alphanumeric characters
Default:	00
Update:	see “DSNTIPM: MVS PARMLIB updates panel” on page 230
DSNZP*xxx*:	none

The subsystem member name indicates the available z/OS subsystems, including Db2 and IRLM.

SUBSYSTEM SEQUENCE field

The SUBSYSTEM SEQUENCE field specifies a sequence number that is to be used for insertion. Use any number that is greater than the highest sequence number that is already used in the IEFSSN*xx* PARMLIB member.

Acceptable values:	1 - 99999993
Default:	88888888
Update:	see “DSNTIPM: MVS PARMLIB updates panel” on page 230
DSNZP*xxx*:	none

AUTH MEMBER field

The value of the AUTH MEMBER field specifies the last two characters (*xx*) of the name of member IEAAPF*xx* of SYS1.PARMLIB. This member is to be used for authorized program facility (APF) authorization of the *prefix*.SDSNLOAD, *prefix*.SDSNLINK, and *prefix*.SDSNEXIT libraries.

Acceptable values:	2 alphanumeric characters
Default:	00
Update:	see "DSNTIPM: MVS PARMLIB updates panel" on page 230
DSNZP*xxx*:	none

The specified data set must be APF-authorized. The member name must currently exist for the z/OS update job DSNTIJMV to work correctly.

You can use the PROG*xx* member instead of the IEAAPF*xx* member. In this case, you must manually name the PROG*xx* member because job DSNTIJMV does not do it for you.

AUTH SEQUENCE field

The value of the AUTH SEQUENCE field is to be used as the sequence number for insertion in the IEAAPF*xx* PARMLIB member. Specify any number that is greater than the highest sequence number that is already used in the IEAAPF*xx* PARMLIB member.

Acceptable values:	1 - 99999995
Default:	88888888
Update:	see "DSNTIPM: MVS PARMLIB updates panel" on page 230
DSNZP*xxx*:	none

LINK LIST ENTRY field

The value of the LINK LIST ENTRY field specifies the last two characters of LNKLST*xx* as needed to include the *prefix*.SDSNLINK library.

Acceptable values:	2 alphanumeric characters
Default:	00
Update:	see "DSNTIPM: MVS PARMLIB updates panel" on page 230
DSNZP*xxx*:	none

LINK LIST SEQUENCE field

The LINK LIST SEQUENCE field specifies the sequence number that is to be used for insertion. Use any number that is greater than the highest sequence number that is already used in the LNKLST*xx* PARMLIB member.

Acceptable values:	1 - 99999999
Default:	88888888
Update:	see "DSNTIPM: MVS PARMLIB updates panel" on page 230
DSNZP*xxx*:	none

COMMAND SCOPE field

The value of the COMMAND SCOPE field controls whether the scope of the command prefix is to be one z/OS system or the entire Sysplex.

Acceptable values:	SYSTEM, SYSPLEX, STARTED
Default:	STARTED
Update:	see “DSNTIPM: MVS PARMLIB updates panel” on page 230
DSNZP*xxx*:	none

SYSTEM
Sets the scope of commands to one z/OS system. The command prefix is registered at z/OS IPL.

SYSPLEX
Sets the scope of commands to the entire Sysplex. The command prefix is registered at z/OS IPL.

STARTED
Sets the scope of commands to the entire Sysplex. The command prefix is registered at Db2 startup and unregistered when Db2 stops.

Although STARTED specifies a Sysplex scope, you can also use it for a Db2 subsystem in a non-data-sharing environment. Use STARTED if you intend to use the z/OS automatic restart manager, or if you might move this Db2 into a data sharing group.

SUPPRESS SOFT ERRORS field (SUPERRS subsystem parameter)

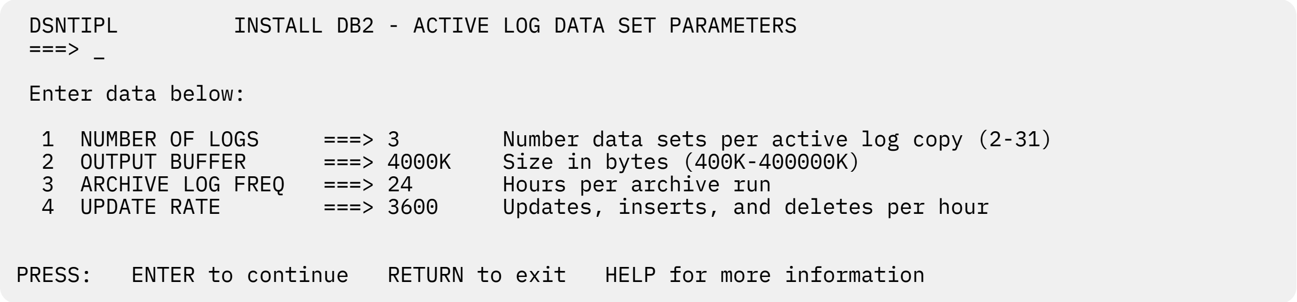
The SUPERRS subsystem parameter specifies whether Db2 is to record errors such as invalid decimal data and arithmetic exceptions and issue SQLCODEs for them. This option enables or disables the recording of these errors in the operating system data set, SYS1.LOGREC.

Acceptable values:	YES, NO
Default:	YES
Update:	option 34 on panel DSNTIPB
DSNZP*xxx*:	SUPERRS

DSNTIPL: Active log data set parameters

The entries on the DSNTIPL panel define characteristics of active log data sets.

Performance note: Several fields on this panel affect the Db2 use of logging. Be careful when you determine the values that are associated with fields on this panel. These values can greatly affect the performance of your Db2 subsystem.



```
 DSNTIPL         INSTALL DB2 - ACTIVE LOG DATA SET PARAMETERS
 ===> _

 Enter data below:

  1  NUMBER OF LOGS     ===> 3        Number data sets per active log copy (2-31)
  2  OUTPUT BUFFER      ===> 4000K    Size in bytes (400K-400000K)
  3  ARCHIVE LOG FREQ   ===> 24       Hours per archive run
  4  UPDATE RATE        ===> 3600     Updates, inserts, and deletes per hour


PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 43. Log data sets panel: DSNTIPL

Related information

NUMBER OF LOGS field

The NUMBER OF LOGS field specifies the number of data sets that are to be established for each copy of the active log during installation.

Acceptable values:	2 - 93
Default:	3
Update:	cannot change during update or migration
DSNZP*xxx*:	none

You can later use the DSNJU003 utility to change the number of log data sets. If you use the DSNJU003 utility to modify the number of logs, your modified value is not reflected on this panel.

Related tasks

Updating subsystem parameters that cannot be updated by using DSNTIPB
Some subsystem parameters cannot be updated by using panel DSNTIPB.

OUTPUT BUFFER field (OUTBUFF subsystem parameter)

The OUTPUT BUFFER field sets the OUTBUFF subsystem parameter, which specifies the size of the output buffer for writing active log data sets.

Acceptable values:	OUTPUT BUFFER field: 409600 - 409600000, 400K - 400000K, 1M- 390M OUTBUFF subsystem parameter: 400 - 400000
Default:	OUTPUT BUFFER field: 4000K OUTBUFF subsystem parameter: 4000
Update:	option 35 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP OUTBUFF

OUTPUT BUFFER field

409600 - 409600000
The size in bytes of the output buffer for writing active log data sets, when specified in the OUTPUT BUFFER field.

400K - 400000K
The size in kilobytes of the output buffer for writing active log data sets, when specified in the OUTPUT BUFFER field.

1M - 390M
The size in megabytes of the output buffer for writing active log data sets, when specified in the OUTPUT BUFFER field.

OUTBUFF subsystem parameter

400 - 400000
The size in kilobytes of the output buffer for writing active log data sets, when specified for the OUTBUFF subsystem parameter. Omit "K" in this context.

The larger the output buffer, the more likely that a log read request can return the required log records without needing I/O operations. This is a particularly important consideration if the Db2 subsystem is to be used with a data replication product that uses IFCID 306. In Db2 11, log buffers are permanently page-fixed. When you estimate real storage usage, you must use the entire size that you specify for the OUTBUFF parameter. To avoid page-fixing more storage than necessary, carefully choose the setting for OUTBUFF.

ARCHIVE LOG FREQ field

The value of the ARCHIVE LOG FREQ field determines, in hours, the interval at which the active log is to be offloaded to the archive log.

Acceptable values:	1 - 200
Default:	24
Update:	cannot change during update
DSNZP*xxx*:	none

If you accept the default value of 24, the active log is offloaded approximately once each day.

UPDATE RATE field

The value of the UPDATE RATE field specifies the estimated average number of inserts, updates, and deletes that are expected per hour in your subsystem.

Acceptable values:	1 - 16,777,216
Default:	3600
Update:	cannot change during update
DSNZP*xxx*:	none

You can use K (as in 32K) for multiples of 1024 bytes and M (as in 16M) for multiples of 1,048,576 bytes.

The size calculations in the DSNTINST CLIST assume that about 400 bytes of data are logged for each insert, update, and delete. The amount of data that is logged for these changes might be different at your site. Therefore, consider changing the size of the log data sets after you gain some experience with Db2 and have a better idea of how many bytes of data are logged for each change. Generally, if you have a subsystem that is tuned for maximum efficiency, you can expect to log about 10 GB of data per hour while processing several millions of updates and inserts.

Together, the UPDATE RATE and the ARCHIVE LOG FREQ (field 3) determine the size of the active logs.

DSNTIPL1: Checkpoint parameters

The entries on the DSNTIPL1 panel define characteristics for log checkpoints.

```
DSNTIPL1        INSTALL DB2 - CHECKPOINT PARAMETERS
 ===>

 Enter log checkpoint options:
   1 CHECKPOINT TYPE     ===> MINUTES   LOGRECS only, MINUTES only, or BOTH
   2 RECORDS/CHECKPOINT  ===> NOTUSED    Log records per checkpoint
                                          - LOGRECS only: 1000 - 16000000
                                          - MINUTES only: NOTUSED
                                          - BOTH        : 1000 - 99999999
   3 MINUTES/CHECKPOINT  ===> 5          Minutes per checkpoint:
                                          - LOGRECS only: NOTUSED
                                          - MINUTES only: 1 - 60
                                          - BOTH        : 1 - 1439
   4 UR CHECK FREQ       ===> 5         Checkpoints to enable UR check. 0-255
   5 UR LOG WRITE CHECK  ===> 10K       Log Writes to enable UR check. 0-1000K
   6 LIMIT BACKOUT       ===> AUTO      Limit backout processing (AUTO, YES, NO,
                                        LIGHT, or LIGHTAUTO)
   7 BACKOUT DURATION    ===> 5         Checkpoints processed during backout if
                                        LIMIT BACKOUT is not NO (0-255)
   8 RO SWITCH CHKPTS    ===> 10        Checkpoints to read-only switch. 1-32767
   9 RO SWITCH TIME      ===> 10        Minutes to read-only switch. 1-32767
  10 LEVELID UPDATE FREQ ===> ON        Checkpoints between updates. ON or OFF

 PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

CHECKPOINT TYPE field (CHKTYPE subsystem parameter)

The CHKTYPE subsystem parameter indicates whether the interval between log checkpoints is to be based on the number of written log records, the time between checkpoints, or both.

Acceptable values:	**CHECKPPOINT TYPE field:** LOGRECS, MINUTES, BOTH **CHKTYPE subsystem parameter:** SINGLE, BOTH
Default:	MINUTES
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP CHKTYPE

The CHECKPOINT TYPE field and CHKTYPE subsystem parameters use different values.

CHECKPOINT TYPE field value descriptions

The following values can be specified in the CHECKPOINT TYPE field on panel DSNTIPL1. If you run the installation or migration CLIST, the setting of the CHECKPOINT TYPE field determines the setting of the CHKTYPE subsystem parameter. The setting of the CHECKPOINT TYPE field also defines which settings are allowed in the RECORDS/CHECKPOINT and MINUTES/CHECKPOINT fields.

MINUTES

Log checkpoints occur at an interval of a certain number of minutes, as specified by the CHKFREQ subsystem parameter. The CHKFREQ subsystem parameter is set through the MINUTES/ CHECKPOINT field, and the CHKLOGR and CHKMINS subsystem parameters are both assigned a value of NOTUSED. When MINUTES is specified in the CHECKPOINT TYPE field, the CHKTYPE subsystem parameter is set to SINGLE.

LOGRECS

Log checkpoints occur after a certain number of log records are created, as specified by the CHKFREQ subsystem parameter. The CHKFREQ subsystem parameter is set through the RECORDS/ CHECKPOINT field, and the CHKLOGR and CHKMINS subsystem parameters are both assigned a value of NOTUSED. When LOGRECS is specified in the CHECKPOINT TYPE field, the CHKTYPE subsystem parameter is set to SINGLE.

BOTH

Log checkpoints occur after a specified number of log records are created or after a specified number of minutes, whichever occurs first. The number of log records is specified by the CHKLOGR subsystem parameter and the number of minutes is specified by the CHKMINS subsystem parameter. These subsystem parameters are set through the RECORDS/CHECKPOINT and MINUTES/CHECKPOINT fields, respectively. The CHKFREQ parameter is assigned a value of NOTUSED. When BOTH is specified in the CHECKPOINT TYPE field, the CHKTYPE subsystem parameter is set to BOTH.

CHKTYPE subsystem parameter value descriptions

The following settings are valid for the CHKTYPE subsystem parameter:

SINGLE

The CHECKPOINT TYPE panel field setting is LOGRECS or MINUTES. The CHKFREQ subsystem parameter setting determines the checkpoint frequency, depending on the value specified:

1 - 60

The number of minutes between checkpoints.

1000 to 16 000 000

The number of log records between checkpoints. CHKFREQ settings from 200 - 999 are automatically increased to 1000.

The CHKLOGR and CHKMINS subsystem parameters must both be set to NOTUSED.

BOTH

Log checkpoints occur after a specified number of log records are created or after a specified number of minutes, whichever occurs first. The CHKLOGR subsystem parameter specifies the number of log records and the CHKMINS subsystem parameter specifies the number of minutes. The CHKFREQ subsystem parameter must be set to NOTUSED.

Panel fields and subsystem parameter settings for Db2 checkpoint frequency

The following table summarizes how the CHECKPOINT TYPE, MINUTES/CHECKPOINT, and RECORDS/CHECKPOINT fields on panel DSNTIPL1 set the related subsystem parameters to specify the Db2 checkpoint frequency.

Table 32. Panel DSNTIPL1 fields and related subsystem parameters for Db2 checkpoint frequency

CHECKPOINT TYPE field	CHKTYPE subsystem parameter	CHKFREQ subsystem parameter	CHKMINS subsystem parameter	CHKLOGR subsystem parameter
MINUTES (default)	SINGLE	**1 - 60 (default 5)** Set in the MINUTES/CHECKPOINT field to specify the number of minutes between checkpoints.	NOT USED	NOT USED
LOGRECS	SINGLE	**1000 - 16 000 000** Set in the RECORDS/CHECKPOINT field to specify the number of log records between checkpoints.	NOT USED	NOT USED
BOTH	BOTH	NOT USED	**1-1439** Set in the MINUTES/CHECKPOINT field to specify the number of minutes between checkpoints.	**1000 - 99 999 999** Set in the RECORDS/CHECKPOINT field to specify the number of log records between checkpoints.

RECORDS/CHECKPOINT field (CHKFREQ and CHKLOGR subsystem parameters)

The RECORDS/CHECKPOINT field determines the approximate number of log records that are to be created between scheduled log checkpoints.

Acceptable values:	Depending on the CHECKPOINT TYPE value: **CHECKPOINT TYPE is LOGRECS:** 1000 - 160 00 000 **CHECKPOINT TYPE is MINUTES:** NOT USED **CHECKPOINT TYPE is BOTH:** 1000 - 99 999 999
Default:	NOTUSED
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP.CHKFREQ and DSN6SYSP.CHKLOGR

NOT USED (if CHECKPOINT TYPE is MINUTES)
The value NOTUSED is assigned to the CHKLOGR parameter. (The CHECKFREQ parameter is assigned the value specified for the MINUTES/CHECKPOINT field. See "MINUTES/CHECKPOINT field (CHKFREQ and CHKMINS subsystem parameters)" on page 240.)

1000 - 160 00 000 (if CHECKPOINT TYPE is LOGRECS)
The number of log records that are created between checkpoints. The specified value is assigned to the CHKFREQ parameter, and the CHKLOGR parameter is set to NOT USED.

1000 - 99 999 999 (if CHECKPOINT TYPE is BOTH)
The number of log records that are created between checkpoints. The specified value is assigned to the CHKLOGR parameter, and the CHEKFREQ parameter is set to NOT USED.

Db2 prevents log checkpoints from being taken too frequently and degrading performance. Log checkpoints are scheduled, but not necessarily immediately taken, when the number of minutes that passes reaches the value of CHKMINS.

The following table summarizes how the CHECKPOINT TYPE, MINUTES/CHECKPOINT, and RECORDS/CHECKPOINT fields on panel DSNTIPL1 set the related subsystem parameters to specify the Db2 checkpoint frequency.

Table 33. Panel DSNTIPL1 fields and related subsystem parameters for Db2 checkpoint frequency

CHECKPOINT TYPE field	CHKTYPE subsystem parameter	CHKFREQ subsystem parameter	CHKMINS subsystem parameter	CHKLOGR subsystem parameter
MINUTES (default)	SINGLE	**1 - 60 (default 5)** Set in the MINUTES/CHECKPOINT field to specify the number of minutes between checkpoints.	NOT USED	NOT USED

Table 33. Panel DSNTIPL1 fields and related subsystem parameters for Db2 checkpoint frequency (continued)

CHECKPOINT TYPE field	**CHKTYPE subsystem parameter**	**CHKFREQ subsystem parameter**	**CHKMINS subsystem parameter**	**CHKLOGR subsystem parameter**
LOGRECS	SINGLE	**1000 - 16 000 000** Set in the RECORDS/ CHECKPOINT field to specify the number of log records between checkpoints.	NOT USED	NOT USED
BOTH	BOTH	NOT USED	**1-1439** Set in the MINUTES/ CHECKPOINT field to specify the number of minutes between checkpoints.	**1000 - 99 999 999** Set in the RECORDS/ CHECKPOINT field to specify the number of log records between checkpoints.

MINUTES/CHECKPOINT field (CHKFREQ and CHKMINS subsystem parameters)

The MINUTES/CHECKPOINT field determines the approximate number of minutes that are to pass between scheduled log checkpoints.

Acceptable values:	Depending on the CHECKPOINT TYPE value: **CHECKPOINT TYPE is LOGRECS:** NOT USED **CHECKPOINT TYPE is MINUTES:** 1 - 60 **CHECKPOINT TYPE is BOTH:** 1 - 1439
Default:	5
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP.CHKFREQ and DSN6SYSP.CHKMINS

1 - 60 (if CHECKPOINT TYPE is MINUTES)
The number of minutes between checkpoints. The specified value is assigned to the CHKFREQ subsystem parameter value, and the CHKMINS subsystem parameter is set to NOT USED.

NOT USED (if CHECKPOINT TYPE is LOGRECS)
NOTUSED is assigned to the CHKMINS parameter. (The CHKFREQ parameter is assigned the value specified for the RECORDS/CHECKPOINT field. See "RECORDS/CHECKPOINT field (CHKFREQ and CHKLOGR subsystem parameters)" on page 239.)

1 - 1439 (if CHECKPOINT TYPE is BOTH)
The number of minutes between checkpoints. The specified value is assigned to the CHKMINS subsystem parameter value, and the CHKFREQ subsystem parameter is set to NOT USED.

Db2 prevents log checkpoints from being taken too frequently and degrading performance. Log checkpoints are scheduled, but not necessarily immediately taken, when the number of minutes that passes reaches the value of CHKMINS.

The following table summarizes how the CHECKPOINT TYPE, MINUTES/CHECKPOINT, and RECORDS/CHECKPOINT fields on panel DSNTIPL1 set the related subsystem parameters to specify the Db2 checkpoint frequency.

Table 34. Panel DSNTIPL1 fields and related subsystem parameters for Db2 checkpoint frequency

CHECKPOINT TYPE field	**CHKTYPE subsystem parameter**	**CHKFREQ subsystem parameter**	**CHKMINS subsystem parameter**	**CHKLOGR subsystem parameter**
MINUTES (default)	SINGLE	**1 - 60 (default 5)** Set in the MINUTES/CHECKPOINT field to specify the number of minutes between checkpoints.	NOT USED	NOT USED
LOGRECS	SINGLE	**1000 - 16 000 000** Set in the RECORDS/CHECKPOINT field to specify the number of log records between checkpoints.	NOT USED	NOT USED
BOTH	BOTH	NOT USED	**1-1439** Set in the MINUTES/CHECKPOINT field to specify the number of minutes between checkpoints.	**1000 - 99 999 999** Set in the RECORDS/CHECKPOINT field to specify the number of log records between checkpoints.

UR CHECK FREQ field (URCHKTH subsystem parameter)

Unless the option is disabled, Db2 issues a warning message to the console for an uncommitted unit of recovery (UR) after a certain number of checkpoint cycles. The URCHKTH subsystem parameter specifies the number of checkpoint cycles that are to complete before Db2 issues the warning message.

Acceptable values:	0 - 255
Default:	5
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP URCHKTH

This option does not affect performance. If you use this option, specify a value that is based on how often a checkpoint occurs in your system and how much time you can allow for a restart or shutdown.

For example, if your site's checkpoint interval is 5 minutes and the standard limit for issuing commits with units of recovery is 20 minutes, divide 20 by 5 to determine the best value for your system.

UR LOG WRITE CHECK field (URLGWTH subsystem parameter)

Unless this option is disabled, Db2 issues a warning message to the console after log records are written by an uncommitted unit of recovery (UR). The URLGWTH subsystem parameter specifies the number of log records that are to be written before Db2 issues a warning message.

Acceptable values:	0 - 1000K
Default:	10K
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP URLGWTH

The purpose of this option is to provide notification of a long-running UR. Long-running URs might result in a lengthy Db2 restart or a lengthy recovery situation for critical tables. Specify the value in 1 K (1000 log records) increments. A value of 0 indicates that no write check is to be performed.

LIMIT BACKOUT field (LBACKOUT subsystem parameter)

The LBACKOUT subsystem parameter specifies whether Db2 postpones backward-log processing for some units of work.

Acceptable values:	AUTO, YES, LIGHT, LIGHTAUTO, NO
Default:	AUTO
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP LBACKOUT

AUTO

Db2 postpones some backout processing, but automatically starts the backout processing when Db2 restarts and begins acceptance of new work. When Db2 is restarted with the LIGHT(YES) or LIGHT(NOINDOUBTS) option, Db2 ignores this setting and behaves as if LBACKOUT is set to NO.

YES

Db2 postpones backout processing for some units of work until the RECOVER POSTPONED command is issued. When Db2 is restarted with the LIGHT(YES) or LIGHT(NOINDOUBTS) option, Db2 ignores this setting and behaves as if LBACKOUT is set to NO.

LIGHT

Db2 postpones backout processing for some units of work until the RECOVER POSTPONED command is issued. When Db2 is restarted with the LIGHT(YES) or LIGHT(NOINDOUBTS) option, it creates but does not process postponed-abort units of recovery (URs). The URs are not processed until the RECOVER POSTPONED command is issued on a normal Db2 restart.

LIGHTAUTO

Db2 postpones some backout processing, but automatically starts the backout processing when Db2 restarts and begins acceptance of new work. When Db2 is restarted with the LIGHT(YES) or LIGHT(NOINDOUBTS) option, it creates but does not process postponed-abort URs. The postponed-abort URs are automatically processed after a normal Db2 restart.

NO

Specifies that Db2 backward-log processing should process all inflight and in-abort units of recovery (URs).

If you specify AUTO, YES, LIGHT, or LIGHTAUTO, backout processing runs concurrently with new work. Sets or partitions with pending backout work are unavailable until their backout work is complete.

Related reference

BACKOUT DURATION field (BACKODUR subsystem parameter)

The BACKODUR subsystem parameter is used to calculate the number of log records that are to be backed out during a restart. This value is applied when the LIMIT BACKOUT field is set to AUTO, YES, LIGHT, or LIGHTAUTO.

Related information

BACKOUT DURATION field (BACKODUR subsystem parameter)

The BACKODUR subsystem parameter is used to calculate the number of log records that are to be backed out during a restart. This value is applied when the LIMIT BACKOUT field is set to AUTO, YES, LIGHT, or LIGHTAUTO.

Acceptable values:	0 - 255
Default:	5
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP BACKODUR

During a restart, backward-log processing continues until the following events occur:

- All inflight and in-abort URs with update activity against the catalog or directory are backed out.
- All inflight and in-abort URs that only update temporary tables are backed out.
- The number of processed log records equals the number specified in the BACKOUT DURATION field multiplied by the number of log records per checkpoint. If the CHECKPOINT TYPE field is set to LOGRECS or BOTH, the value of the RECORDS/CHECKPOINT field is used as the number of log records per checkpoint. If the CHECKPOINT TYPE field is set to MINUTES, the default value of 500000 is used as the number of log records per checkpoint.

Inflight and in-abort URs that are not completely backed out during restart are converted to postponed-abort status. Sets or partitions with postponed backout work are put into restart-pending (RESTP) state. This state blocks most access to the object. The exceptions are access by the RECOVER POSTPONED command state or by automatic backout processing that Db2 performs when the LIMIT BACKOUT field is set to AUTO or LIGHTAUTO.

A table space might be in restart-pending mode, without the associated index spaces also in restart-pending mode. This happens if a postponed-abort UR makes updates only to non-indexed fields of a table in a table space. In this case, the indexes are accessible to SQL (for index-only queries), even though the table space is inaccessible.

Related reference

CHECKPOINT TYPE field (CHKTYPE subsystem parameter)
The CHKTYPE subsystem parameter indicates whether the interval between log checkpoints is to be based on the number of written log records, the time between checkpoints, or both.

LIMIT BACKOUT field (LBACKOUT subsystem parameter)
The LBACKOUT subsystem parameter specifies whether Db2 postpones backward-log processing for some units of work.

Related information

RO SWITCH CHKPTS field (PCLOSEN subsystem parameter)

The PCLOSEN subsystem parameter specifies the number of consecutive Db2 checkpoints that a page set or partition remains read-write after it is updated. After the specified number of checkpoints occur, Db2 converts the page set or partition to read-only.

Acceptable values:	1 - 32767
Default:	10 (checkpoints)

Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP PCLOSEN

1 - 32767
The number of consecutive Db2 checkpoints that a page set or partition remains read-write after it is updated. After the specified number of checkpoints occur, Db2 converts the page set or partition from to read-only.

This value is used in conjunction with the value of the RO SWITCH TIME field. If the condition for either RO SWITCH TIME or RO SWITCH CHKPTS is met, the page set or partition is converted from read-write to read-only.

For NOT LOGGED table spaces, Db2 converts the page set or partition from read-write to read-only after one checkpoint, regardless of the value of RO SWITCH CHKPTS.

Having Db2 switch an infrequently updated set from read-write to read-only can be a performance benefit for recovery, logging, and for data sharing processing.

Related tasks

Testing group buffer pool caching
You can use SQL statements in member DSNTESD to verify that the group buffer pool caching operates correctly.

Related reference

RO SWITCH TIME field (PCLOSET subsystem parameter)
The PCLOSET subsystem parameter specifies the number of minutes that a partition or page set remains read-write after it is updated. After the specified number of minutes, Db2 converts the set or partition to read-only.

RO SWITCH TIME field (PCLOSET subsystem parameter)

The PCLOSET subsystem parameter specifies the number of minutes that a partition or page set remains read-write after it is updated. After the specified number of minutes, Db2 converts the set or partition to read-only.

Acceptable values:	1 - 32767
Default:	10 (minutes)
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP PCLOSET

1 - 32767
The number of minutes that a page set or partition remains read-write after it is updated. After the specified number of minutes, Db2 converts the set or partition to read-only.

This value is used in conjunction with the value of the RO SWITCH CHKPTS field. If the condition for RO SWITCH CHKPTS or RO SWITCH TIME is met, the page set or partition is converted from read-write to read-only.

For NOT LOGGED table spaces, Db2 converts the page set or partition from read-write to read-only after one minute, regardless of the value of RO SWITCH TIME.

Having Db2 switch an infrequently updated page set from read-write to read-only can be a performance benefit for recovery, logging, and for data sharing processing.

Related tasks

Testing group buffer pool caching

You can use SQL statements in member DSNTESD to verify that the group buffer pool caching operates correctly.

Related information

LEVELID UPDATE FREQ field (DLDFREQ subsystem parameter)

The DLDFREQ subsystem parameter specifies whether the level ID of a page set or partition is to be updated at Db2-determined checkpoint intervals.

Acceptable values:	ON, OFF
Default:	ON
Update:	option 36 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP DLDFREQ

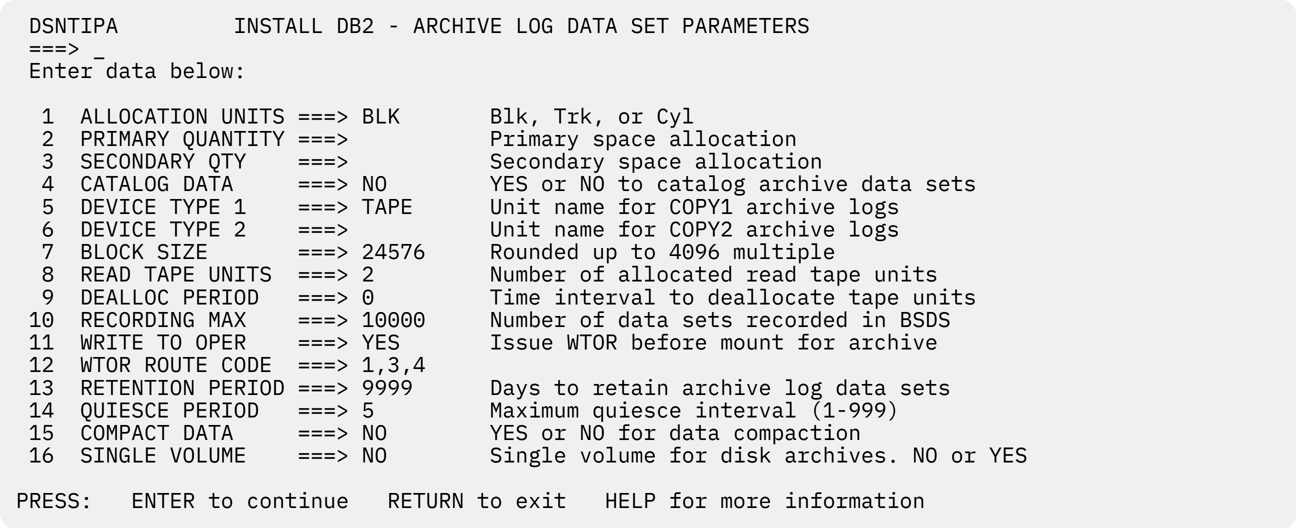
ON
Level ID updates for down-level detection are enabled.

OFF
Level ID updates for down-level detection are disabled.

DSNTIPA: Archive log data set parameters panel

The entries on the DSNTIPA panel define the characteristics of archive log data sets.

Updating the parameters: You can update all the parameters on this panel by using their subsystem parameter name.



```
 DSNTIPA         INSTALL DB2 - ARCHIVE LOG DATA SET PARAMETERS
 ===> _
 Enter data below:

  1  ALLOCATION UNITS ===> BLK       Blk, Trk, or Cyl
  2  PRIMARY QUANTITY ===>           Primary space allocation
  3  SECONDARY QTY    ===>           Secondary space allocation
  4  CATALOG DATA     ===> NO        YES or NO to catalog archive data sets
  5  DEVICE TYPE 1    ===> TAPE      Unit name for COPY1 archive logs
  6  DEVICE TYPE 2    ===>           Unit name for COPY2 archive logs
  7  BLOCK SIZE       ===> 24576     Rounded up to 4096 multiple
  8  READ TAPE UNITS  ===> 2         Number of allocated read tape units
  9  DEALLOC PERIOD   ===> 0         Time interval to deallocate tape units
 10  RECORDING MAX    ===> 10000     Number of data sets recorded in BSDS
 11  WRITE TO OPER    ===> YES       Issue WTOR before mount for archive
 12  WTOR ROUTE CODE  ===> 1,3,4
 13  RETENTION PERIOD ===> 9999      Days to retain archive log data sets
 14  QUIESCE PERIOD   ===> 5         Maximum quiesce interval (1-999)
 15  COMPACT DATA     ===> NO        YES or NO for data compaction
 16  SINGLE VOLUME    ===> NO        Single volume for disk archives. NO or YES

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 44. Archive log data sets panel: DSNTIPA

ALLOCATION UNITS field (ALCUNIT subsystem parameter)

The ALCUNIT subsystem parameter controls the units (blocks, tracks, or cylinders) for primary and secondary space allocations.

Acceptable values:	BLK, TRK, CYL
Default:	BLK
Update:	option 37 on panel DSNTIPB

DSNZP*xxx*:	DSN6ARVP ALCUNIT

BLK
Blocks

TRK
Tracks

CYL
Cylinders

Related reference

PRIMARY QUANTITY field (PRIQTY subsystem parameter)
The PRIQTY subsystem parameter specifies the amount of primary space that is to be allocated for archive log data sets. The units for this parameter are specified in the ALLOCATION UNITS field.

SECONDARY QTY field (SECQTY subsystem parameter)
The SECQTY subsystem parameter specifies the amount of secondary space that is to be allocated for a disk data set. The units for this parameter are specified in the ALLOCATION UNITS field.

PRIMARY QUANTITY field (PRIQTY subsystem parameter)

The PRIQTY subsystem parameter specifies the amount of primary space that is to be allocated for archive log data sets. The units for this parameter are specified in the ALLOCATION UNITS field.

Acceptable values:	blank or 1 - 999999
Default:	blank (or calculated value)"1" on page 246
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP PRIQTY

Notes:

1. The default value is blank, which is accepted when the ALLOCATION UNITS field is set to BLK. When the PRIMARY QUANTITY field is blank and the ALLOCATION UNITS field is set to BLK, the CLIST calculates the PRIQTY value as 4096 times the calculated size of the active log, divided by the specified BLOCK SIZE value.

By default, DFSMS Direct Access Device Space Management (DADSM) limits the space allocation on a single volume to less than 65535 tracks. Therefore, if the archive log data set size can be greater than or equal to 65535 tracks, you need to specify a primary space quantity of less than 65535 tracks. This action forces the archive log data set to extend to a second volume.

Alternatively, the archive log data sets can be allocated by a DFSMS data class that has a DSNMTYP (data set name type) setting of LARGE or EXT. In this case, you can specify a primary space quantity larger than 65535 tracks without extending to a second volume. LARGE indicates that data sets in the data class are to be allocated in large physical sequential format. EXT indicates that data sets in the data class are to be allocated in extended physical sequential format. A setting of EXT is recommended, and it is required for striping of data sets. If you specify EXT, also set the IFEXT (if extended) parameter to R (required) rather than P (preferred).

Related concepts

Archive log data sets storage requirements

If you decide to store the archive log data sets on disk, you need to reserve enough space on the device. The active log data set and the BSDS are both written to the same location. Therefore, you must reserve enough storage for the active log and the BSDS.

SECONDARY QTY field (SECQTY subsystem parameter)

The SECQTY subsystem parameter specifies the amount of secondary space that is to be allocated for a disk data set. The units for this parameter are specified in the ALLOCATION UNITS field.

Acceptable values:	blank or 1 - 999999
Default:	blank
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP SECQTY

If you use the default, a blank, the CLIST calculates this space using block size and size of the log.

CATALOG DATA field (CATALOG subsystem parameter)

The value of the CATALOG DATA field specifies whether archive log data sets on tape are to be cataloged.

Acceptable values:	YES, NO
Default:	NO
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP CATALOG

This option is meaningful only if you specify TAPE for the DEVICE TYPE 1 or DEVICE TYPE 2 field on panel DSNTIPA. The reason is that Db2 requires all archive log data sets that are allocated on disk to be cataloged.

If you choose to archive to disk, the CATALOG DATA field must be set to YES. If it is set to NO, you receive message DSNJ072E each time an archive log data set is allocated, although the Db2 subsystem still catalogs the data set.

Recommendation: If you archive to data sets on tape, set CATALOG DATA to YES.

Doing so allows the archive log data sets to be portable. Db2 accesses the archive logs through the catalog instead of the BSDS content that was written when the archive was created. One advantage to cataloging archived tape data sets is evident when you perform operations like concurrent recovery. During such operations, for which the archive data sets must be shared and require faster devices, you can copy and recatalog the archive logs without modifying the BSDS.

Important: Setting CATALOG DATA to YES might prevent log read errors when the archive log data sets span multiple tape volumes. In this case, Db2 accesses the entire archive log data set through the catalog instead of using the individual volume information that is recorded in the BSDS.

DEVICE TYPE 1 field (UNIT subsystem parameter)

The UNIT subsystem parameter specifies the device type or unit name that is to be used for storing archive log data sets.

Acceptable values:	device type or unit name
Default:	TAPE
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP UNIT

The value can be any alphanumeric string. If you choose to archive to disk, you can specify a generic device type with a limited volume range. Db2 requires all archive log data sets that are allocated on disk to be cataloged. If the device type specifies disk, set the CATALOG DATA field on panel DSNTIPA to YES.

If the unit name specifies disk, the archive log data sets can extend to a maximum of 15 volumes. If the unit name specifies a tape device, Db2 can extend to a maximum of 20 volumes. If you chose to use disk, make the values of the PRIQTY and SECQTY subsystem parameters large enough to contain all of the data that comes from the active log data sets without extending beyond 15 volumes.

When archiving to disk, Db2 uses the number of online storage volumes for the specified UNIT name to determine a count of candidate volumes, up to a maximum of 15 volumes. If the archives are to be managed by SMS, do not use a storage class with the Guaranteed Space attribute. SMS attempts to allocate a primary extent on every candidate volume. This can result in allocation failures or unused space because the primary extent on each unused volume is not released when the archive data set is closed.

Related tasks

Defining Db2 11 initialization parameters for migrating data sharing members

Related information

DEVICE TYPE 2 field (UNIT2 subsystem parameter)

The UNIT2 subsystem parameter specifies the device type or unit name that is to be used for storing the second copy of archive log data sets. These data sets are the COPY2 data sets.

Acceptable values:	device type or unit name
Default:	none
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP UNIT2

BLOCK SIZE field (BLKSIZE subsystem parameter)

The BLKSIZE subsystem parameter determines the block size that is to be used for the archive log data set.

Acceptable values:	8192 - 28672
Default:	24576
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP BLKSIZE

The block size must be compatible with the device type that you use for archive logs. The value is rounded up to the next multiple of 4096 bytes. You can also enter the value with a K; for example, 28K.

If the archive log is written to tape, use the largest possible block size to improve the speed of reading the archive logs. Use the table below as a guide.

Table 35. Recommended block size values

Archive log device	**Block size**
Tape	28672
3390 geometry disk	24576

READ TAPE UNITS field (MAXRTU subsystem parameter)

The MAXRTU subsystem parameter specifies the maximum number of dedicated tape units that can be allocated to concurrently read archive log tape volumes.

Acceptable values:	1 - 99
Default:	2
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP MAXRTU

This installation option, along with the DEALLOC PERIOD field, allows Db2 to optimize archive log reading from tape devices.

In a data sharing environment, the archive tape is not available to other members of the group until the deallocation period expires. You might not want to use this option in a data sharing environment unless all recover jobs are submitted from the same member.

Recommendation: Set the READ TAPE UNITS value to be at least one less than the number of tape units available to Db2. If you do otherwise, the OFFLOAD process could be delayed, which would affect the performance of your Db2 subsystem. For maximum throughput during archive log processing, specify the largest value possible for this option, remembering that you need at least one tape unit for offload processing. You can override this value by using the SET ARCHIVE command.

DEALLOC PERIOD field (DEALLCT subsystem parameter)

The DEALLCT subsystem parameter determines the length of time that an archive read tape unit is to be allowed to remain unused before it is deallocated.

Acceptable values:	*minutes*,*seconds*, 1440, NOLIMIT
Default:	0
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP DEALLCT

minutes*,*seconds

Sets the amount of time before deallocation as the specified number of minutes (0 – 1440) and number of seconds (0 – 59). Separate the number of minutes and number of seconds with a comma and no spaces.

1440

Sets the amount of time before deallocation to 1440 minutes.

NOLIMIT

Sets no limit on the amount of time before deallocation. Specifying NOLIMIT allows maximum optimization opportunities.

Recommendation: If you are not using data sharing and your archive log data is on tape, set this value high enough to allow Db2 to optimize tape handling for multiple read applications. When all tape reading is complete, you can update this option with the SET ARCHIVE command. If you are using data sharing, tapes should be deallocated quickly to avoid deadlocks. If Db2 is running in data sharing mode, it is strongly recommended that you use disk archive logs, not tape archive logs.

Examples

Assume that you want the deallocation period to be 30 seconds. Enter `0,30`.

Assume that you want the deallocation period to be 23 minutes and 47 seconds. Enter `23,47`.

RECORDING MAX field (MAXARCH subsystem parameter)

The MAXARCH subsystem parameter controls the maximum number of archive log volumes that are to be recorded in the BSDS.

Deprecated subsystem parameter: Non-default settings for MAXARCH are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 10000.

Acceptable values:	10 - 10000
Default:	10000
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6LOGP MAXARCH

When this number is exceeded, recording resumes at the beginning of the BSDS.

You must create image copies of all Db2 objects, probably several times, before the archive log data sets are discarded. If you fail to retain an adequate number of archive log data sets for all the image copies, you might need to cold start or reinstall Db2. In both cases, data is lost.

Related information

WRITE TO OPER field (ARCWTOR subsystem parameter)

The ARCWTOR subsystem parameter controls whether Db2 is to send a message to the operator and wait for an answer before attempting to mount an archive log data set.

Acceptable values:	YES, NO
Default:	YES
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP ARCWTOR

Other Db2 users can be forced to wait while the mount is pending. They are not affected while Db2 is waiting for a response to the message.

YES
Specifies that the system is to send a message to the operator before attempting to mount an archive log data set. Specify this value if you use a device for storing archive log data sets, such as tape, that requires long delays for mounts.

NO
Specifies that the system will not send a message to the operator and wait for an answer before attempting to mount an archive log data set. Use this value if you use a device that does not have long delays for mounts.

The DEVICE TYPE 1 field specifies the device type or unit name.

WTOR ROUTE CODE field (ARCWRTC subsystem parameter)

The ARCWRTC subsystem parameter identifies the list of route codes to be used in messages from the archive log data sets to the operator.

Acceptable values:	1 - 16 route codes. Specify at least one code. Separate multiple codes by commas only, with no blanks; for example: 1,3,5,7,9,10,11
Default:	1,3,4
Update:	option 37 on panel DSNTIPB

DSNZP*xxx*:	DSN6ARVP ARCWRTC

Related reference

Routing Codes (MVS System Messages)

Routing the Message (z/OS MVS Assembler Services Guide

RETENTION PERIOD field (ARCRETN subsystem parameter)

The ARCRETN subsystem parameter specifies the retention period, which is the number of days that Db2 is to retain archive log data sets. The retention period is added to the current date to calculate the expiration date of the archive log data sets.

Acceptable values:	0 - 9999
Default:	9999
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP ARCRETN

The retention period is often used in tape management systems to control the reuse and scratching of data sets and tapes. Db2 uses the ARCRETN value as the value for the dynamic allocation parameter DALRETPD when archive log data sets are created.

The retention period set by the DFSMSdfp storage management subsystem (SMS) can be overridden by this Db2 parameter. Typically, the retention period is set to the smaller value that is specified by either Db2 or SMS. The storage administrator and database administrator should agree on a retention period value that is appropriate for Db2.

Important: A wide variety of tape management systems exists, along with the opportunity for external manual overrides of retention periods. Consequently, Db2 does not have an automated method to delete the archive log data sets from the BSDS inventory of archive log data sets. Therefore, the information about an archive log data set might be in the BSDS after its retention period has expired. The information might be held long after the tapes have been scratched by a tape management system. Conversely, the maximum number of archive log data sets might be exceeded (see READ TAPE UNITS field). In such a case, the data from the BSDS might be dropped long before the data set reaches its expiration date.

Related information

QUIESCE PERIOD field (QUIESCE subsystem parameter)

The QUIESCE subsystem parameter determines the maximum amount of time, in seconds, that Db2 is to be allowed to attempt a full system quiesce.

Acceptable values:	1 - 999
Default:	5
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP QUIESCE

This parameter requires some tuning. If you specify too short an interval, the quiesce period expires before a full quiesce is accomplished. If you specify too long an interval, the quiesce period might cause unnecessary Db2 lock contention and timeouts.

Related information

COMPACT DATA field (COMPACT subsystem parameter)

The COMPACT subsystem parameter controls whether data that is written to archive logs is to be compacted.

Acceptable values:	YES or NO
Default:	NO
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP COMPACT

This option only applies to data that is written to a tape device that has the improved data recording capability (IDRC) feature. When this feature is turned on, hardware in the IDRC-compliant tape control unit uses several techniques to increase the amount of data that can be written on a tape. Specify NO if you do not want your data to be compacted or you do not use a tape device with the IDRC feature. Specify YES if you use a tape device with the IDRC feature and you want the data to be compacted.

Recommendation: Archive to disk and then use another facility, such as DFSMShsm, to archive the archive log from disk to tape. Be aware that data that is compressed to tape can only be read with a device that supports the IDRC feature. This could be a concern when you send archive tapes to another site for remote recovery.

SINGLE VOLUME field (SVOLARC subsystem parameter)

The SVOLARC subsystem parameter specifies whether Db2 is to use a single volume for disk archives.

Acceptable values:	YES, NO
Default:	NO
Update:	option 37 on panel DSNTIPB
DSNZP*xxx*:	DSN6ARVP SVOLARC

NO

When archiving to disk, Db2 determines a count of candidate volumes, up to 15, based on the number of online volumes that have a use attribute of STORAGE for the specified UNIT name. If one or zero volumes are mounted with STORAGE as the use attribute, Db2 does not pass a volume or unit count, which is effectively the same as specifying SVOLARC=YES.

YES

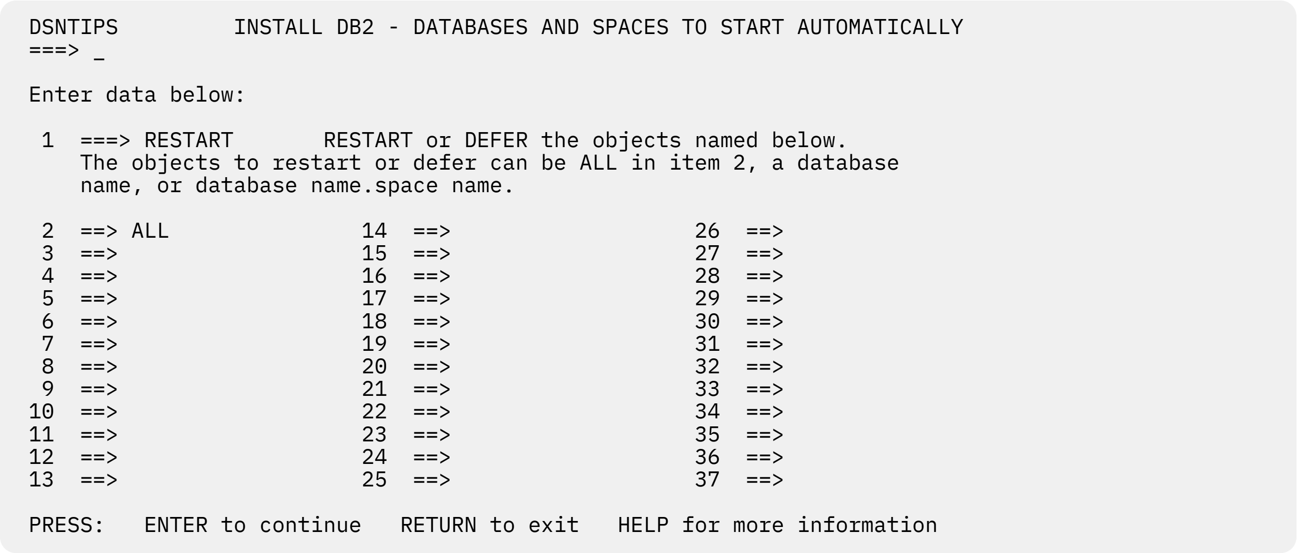
Db2 specifies no unit or volume count. The result is the default unit and volume count of 1, unless SMS overrides it. Use YES for SMS-managed data sets. SMS provides the volume count from the data class. If no value is specified in the data class or no data class is assigned the default volume count is 1.

Related information

DSNTIPS: Databases and spaces to start automatically panel

The entries on the DSNTIPS panel name the databases, table spaces, and index spaces to restart automatically when you start Db2.

Updating the parameters: You can update all parameters on this panel by using their subsystem parameter name.



```
DSNTIPS         INSTALL DB2 - DATABASES AND SPACES TO START AUTOMATICALLY
===> _

Enter data below:

 1  ===> RESTART       RESTART or DEFER the objects named below.
    The objects to restart or defer can be ALL in item 2, a database
    name, or database name.space name.

 2  ==> ALL               14  ==>                 26  ==>
 3  ==>                   15  ==>                 27  ==>
 4  ==>                   16  ==>                 28  ==>
 5  ==>                   17  ==>                 29  ==>
 6  ==>                   18  ==>                 30  ==>
 7  ==>                   19  ==>                 31  ==>
 8  ==>                   20  ==>                 32  ==>
 9  ==>                   21  ==>                 33  ==>
10  ==>                   22  ==>                 34  ==>
11  ==>                   23  ==>                 35  ==>
12  ==>                   24  ==>                 36  ==>
13  ==>                   25  ==>                 37  ==>

PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

Figure 45. Databases and spaces to start automatically panel: DSNTIPS

RESTART OR DEFER field (RESTART subsystem parameter)

The RESTART subsystem parameter determines whether Db2 is to restart or defer processing for the specified databases, table spaces, and index spaces when Db2 is started. The specified objects are those that are listed in fields 2 through 37 of panel DSNTIPS

Acceptable values:	RESTART, DEFER
Default:	RESTART
Update:	option 38 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RESTART

RESTART
Causes Db2 to perform restart processing for the listed objects.

DEFER
Causes Db2 not to perform restart processing for the objects.

START NAMES field (ALL subsystem parameter)

The ALL subsystem parameter specifies the databases, table spaces, and index spaces that are to be restarted or deferred when Db2 starts. The value of the RESTART OR DEFER field determines whether the object is to be restarted or if the restart is to be deferred.

Acceptable values:	ALL, space names
Default:	ALL
Update:	option 38 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM ALL

ALL

The restart or defer restart applies to all Db2 databases, table spaces, and index spaces. If you use this value, leave the remaining fields on the DSNTIPS panel blank. Use ALL in this field and DEFER in the RESTART OR DEFER field to defer recovery of all objects, including Db2 catalog objects. Trusted connections are not available if ALL is used in this field and DEFER is used in the RESTART OR DEFER field.

ALL is the default value.

<database name>
: The restart or defer restart applies to all spaces in the database.

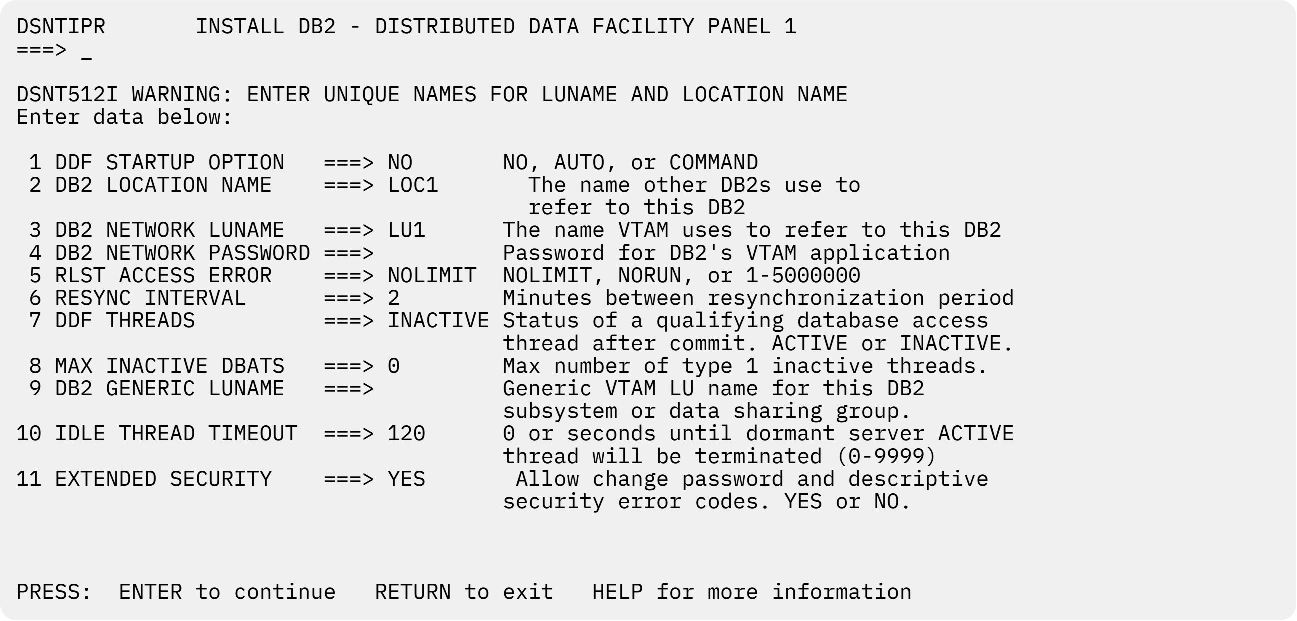
***<table space or index space name>* in the format `database-name.space-name`**
: The restart or defer restart applies to the individual table space or index space.

You can specify up to 36 object names on this panel. If you want to control restart processing for more than 36 objects, edit job DSNTIJUZ after you run the CLIST, and add the object names as ending positional parameters to macro DSN6SPRM. You can add up to 2500 object names in DSNTIJUZ.

Related information

DSNTIPR: Distributed data facility panel 1

The entries on the DSNTIPR panel control the starting of the distributed data facility (DDF). The entries on the DSNTIPR panel also specify location names that are used to connect another Db2 subsystem.



```
DSNTIPR       INSTALL DB2 - DISTRIBUTED DATA FACILITY PANEL 1
===> _

DSNT512I WARNING: ENTER UNIQUE NAMES FOR LUNAME AND LOCATION NAME
Enter data below:

 1 DDF STARTUP OPTION   ===> NO       NO, AUTO, or COMMAND
 2 DB2 LOCATION NAME    ===> LOC1       The name other DB2s use to
                                        refer to this DB2
 3 DB2 NETWORK LUNAME   ===> LU1      The name VTAM uses to refer to this DB2
 4 DB2 NETWORK PASSWORD ===>          Password for DB2's VTAM application
 5 RLST ACCESS ERROR    ===> NOLIMIT  NOLIMIT, NORUN, or 1-5000000
 6 RESYNC INTERVAL      ===> 2        Minutes between resynchronization period
 7 DDF THREADS          ===> INACTIVE Status of a qualifying database access
                                      thread after commit. ACTIVE or INACTIVE.
 8 MAX INACTIVE DBATS   ===> 0        Max number of type 1 inactive threads.
 9 DB2 GENERIC LUNAME   ===>          Generic VTAM LU name for this DB2
                                      subsystem or data sharing group.
10 IDLE THREAD TIMEOUT  ===> 120      0 or seconds until dormant server ACTIVE
                                      thread will be terminated (0-9999)
11 EXTENDED SECURITY    ===> YES       Allow change password and descriptive
                                      security error codes. YES or NO.



PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 46. Distributed data facility panel: DSNTIPR

Related concepts

Connecting distributed database systems
You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

Related information

DDF STARTUP OPTION field (DDF subsystem parameter)

The DDF subsystem parameter specifies whether the distributed data facility (DDF) is loaded at Db2 startup, and whether DDF is started automatically or by a command.

Acceptable values:	NO, AUTO, COMMAND
Default:	NO
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC DDF

AUTO
DDF is automatically loaded and started when the Db2 subsystem is started.

NO
DDF is not loaded at Db2 startup, and DDF cannot be started with a command.

If you specify NO, the stored procedures sample application and DDF sample jobs (DSNTEJ6, DSNTEJ6D, DSNTEJ6P, DSNTEJ6S, DSNTEJ6T, DSNTEJ6Z, DSNTEJ61, DSNTEJ62, DSNTEJ63, DSNTEJ64, DSNTEJ65, and DSNTEJ66) are not edited.

Also, the remaining fields on the DSNTIPR panel are ignored, so you can accept the default values.

COMMAND
DDF is loaded at Db2 startup but not started. However, DDF is prepared to receive the START DDF command.

If AUTO or COMMAND is specified, the DDF address space (*ssnm*DIST) is started when Db2 starts.

Related information

DB2 LOCATION NAME field

Acceptable values:	1 - 16 alphanumeric characters, beginning with a letter, and containing no special characters
Default:	LOC1
Update:	see "Updating subsystem parameters that cannot be updated by using DSNTIPB" on page 322
DSNZP*xxx*:	none

The location name must begin with a letter and cannot contain special characters. Acceptable characters are letters A through Z, numbers 0 through 9, and underscores.

You must specify a value for this field, even if you do not use DDF.

The value of this field is stored in the bootstrap data set (BSDS). The BSDS is updated by the change log inventory utility in step DSNTLOG of installation job DSNTIJUZ.

Related concepts

Connecting distributed database systems
You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

Related information

DB2 NETWORK LUNAME field

The value of the DB2 NETWORK LUNAME field specifies the LU name that is to uniquely identify this Db2 subsystem to VTAM. The name is also to be used to uniquely identify logical units of work within Db2 trace records.

Acceptable values:	1 - 8 alphanumeric characters
Default:	LU1
Update:	see "Updating subsystem parameters that cannot be updated by using DSNTIPB" on page 322
DSNZP*xxx*:	none

The name must begin with a letter and must not contain special characters.

You must specify a value for this field.

The value of this field is stored in the bootstrap data set (BSDS). The BSDS is updated by the change log inventory utility in step DSNTLOG of installation job DSNTIJUZ.

db2z_choosevtamnamessubsys

Related tasks

Connecting systems with VTAM (deprecated)
Virtual Telecommunications Access Method (VTAM) is a program that you can use to control remote Db2 communication.

Choosing names for the local subsystem
You define the names for the local subsystem and its VTAM password to Db2 by using the installation panels, or by using the change log inventory utility.

Related information

DB2 NETWORK PASSWORD field

The optional DB2 NETWORK PASSWORD field specifies the password that VTAM is to use to recognize this Db2 subsystem.

Acceptable values:	1 - 8 alphanumeric characters
Default:	none
Update:	see Update on “Updating subsystem parameters that cannot be updated by using DSNTIPB” on page 322
DSNZP*xxx*:	none

This password must also be supplied to VTAM on the VTAM APPL definition statement. The password must begin with a letter and must not contain special characters.

The value of this field is stored in the bootstrap data set (BSDS). The BSDS is updated by the change log inventory utility in step DSNTLOG of installation job DSNTIJUZ.

Related tasks

Choosing a password for the local subsystem
Choosing a VTAM password is optional. Db2 does not require you to use a password as long as you have not included one in the VTAM APPL statement.

RESYNC INTERVAL field (RESYNC subsystem parameter)

A *resynchronization period* is the time during which indoubt logical units of work that involve this Db2 subsystem and partner logical units are processed. The RESYNC subsystem parameter specifies the time interval, in minutes, that is to occur between resynchronization periods.

Deprecated subsystem parameter: Non-default settings for RESYNC are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 2.

Acceptable values:	1 - 99
Default:	2
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC RESYNC

RLST ACCESS ERROR field (RLFERRD subsystem parameter)

The RLFERRD subsystem parameter specifies the action that Db2 takes for dynamic SQL statements from remote locations if the resource limit facility encounters a condition that prevents it from accessing the resource limit specification table. This setting also applies if Db2 cannot find an applicable row in the resource limit specification table. This parameter applies to the distributed data facility.

An applicable row is one that applies to the authorization ID, collection ID, or package name, and name of the logical unit of work of the query user. This parameter applies to the distributed data facility.

Acceptable values:	NOLIMIT, NORUN, 1 to 5000000
Default:	NOLIMIT
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC RLFERRD

NOLIMIT
Allows all dynamic SQL statements to run without limit.

NORUN
Terminates all dynamic SQL statements immediately with an SQL error code.

1 - 5000000
Specifies the number of service units to use as the default resource limit. If the limit is exceeded, the SQL statement is terminated.

Related information

DDF THREADS field (CMTSTAT subsystem parameter)

The CMTSTAT subsystem parameter controls whether threads are to be made active or inactive after they successfully commit or roll back and hold no cursors. A thread can become inactive only if it holds no cursors, has no temporary tables defined, and executes no statements from the dynamic statement cache.

Acceptable values:	ACTIVE, INACTIVE
Default:	INACTIVE
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC CMTSTAT

INACTIVE
Db2 supports two different types of inactive concepts:

- An *inactive DBAT* (previously called a type 1 inactive thread), which has the same characteristics as inactive threads that were available in releases prior to Db2 11. In this case, the thread remains associated with the connections, but the use of storage by the thread is reduced as much as possible. However, this still potentially requires a large number of threads to support a large number of connections.
- An *inactive connection* (previously called a type 2 inactive thread), which uses less storage than an inactive DBAT. In this case, the connections are disassociated from the thread. The thread is allowed to be pooled and reused for other connections, new or inactive. This provides better resource utilization because there are typically a small number of threads that can be used to service a large number of connections.

ACTIVE
Threads remain active after they successfully commit or roll back and hold no cursors. This setting provides the best performance but consumes system resources. If your installation must support a large number of connections, specify INACTIVE instead.

Because they use less storage, inactive connections are preferable. However, not all threads can become inactive connections. The following table summarizes the conditions under which you can have an inactive DBAT or an inactive connection. If a thread is to become inactive, Db2 tries to make it an inactive connection. If Db2 cannot make it an inactive connection, it tries to make it a inactive DBAT. If neither attempt is successful, the thread remains active.

Table 36. Requirements for inactive DBATs and inactive connections

If the event is...	Inactive connection can be created	Inactive DBAT can be created
A hop to another location with a pending request"1" on page 258	No	Yes[2]
A package bound with RELEASE(COMMIT)	Yes	Yes"2" on page 258
A package bound with RELEASE(DEALLOCATE)	Yes	No
An outstanding open and held cursor"3" on page 258, a held LOB locator, or a package bound with KEEPDYNAMIC(YES)	No	No
A declared temporary table that is active (the table was not explicitly dropped through the DROP TABLE statement or the ON COMMIT DROP TABLE clause on the DECLARE GLOBAL TEMPORARY TABLE statement)	No	No

Notes:

1. A pending request occurs when a hop connection is created but no SQL statements are run at that location.
2. An inactive DBAT can only be created if the MAXTYPE1 subsystem parameter is set to a value greater than 0.
3. A cursor can be closed with fast implicit close. For more information, see .

IBM Systems Virtualization Engine Enterprise Workload Manager (EWLM) is a robust performance management tool that allows you to monitor and manage work that runs within your environment. If you use EWLM with Db2, specify INACTIVE for DDF THREADS. Otherwise, DDF ignores all EWLM correlators that are passed to it.

MAX INACTIVE DBATS field (MAXTYPE1 subsystem parameter)

The MAXTYPE1 subsystem parameter determines the number of inactive DBATs that Db2 is to allow.

Deprecated subsystem parameter: Non-default settings for MAXTYPE1 are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 0.

Acceptable values:	0 to the value of the MAX REMOTE CONNECTED field
Default:	0
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC MAXTYPE1

This limit is defined because a large number of inactive DBATs might adversely affect system performance. Inactive DBATs were traditionally used for private protocol, while DRDA uses inactive connections. However, inactive DBATS can occur in DRDA when Db2 acts as an intermediate server, receiving a connection from a client, and the thread then hops to another location while a held cursor spans the commit scope.

A value of 0 indicates that inactive DBATs are not allowed. If a thread meets the requirement of an inactive DBATs, and MAX INACTIVE DBATS is 0, the thread remains active.

A value of greater than 0 indicates that inactive DBATs are allowed, but they are limited to the specified number. When a thread meets the requirement of an inactive DBAT, and MAX INACTIVE DBATS is reached, the remote connection is terminated.

If you want to allow inactive DBATs, set this value to the maximum number of concurrent connections that you want to allow to go inactive that access another remote location with three-part names.

A value that is equal to the value in the MAX REMOTE CONNECTED field from panel DSNTIPE allows all remote threads to become type 1 inactive threads.

DB2 GENERIC LUNAME field

Acceptable values:	1 - 8 alphanumeric characters
Default:	none
DSNZP*xxx*:	none

You can use a generic LU name only if Db2 is running as part of a z/OS Sysplex. Using a generic LU name helps you control the distributed workload among the servers in a data sharing group. Previously, you could associate only one LU name with a LOCATION name. Now, you can associate multiple NETID.LUNAME values with a single LOCATION name. When an application requests access to a particular location, Db2 uses the SYSIBM.LOCATIONS and SYSIBM.LULIST tables to find the available network destinations (LU names) for that location.

Related concepts

Connecting distributed database systems
You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

Related information

IDLE THREAD TIMEOUT field (IDTHTOIN subsystem parameter)

The IDTHTOIN subsystem parameter controls the amount of time, in seconds, that an active server thread is allowed to remain idle. If the IDTHTOIN value is non-zero, the value is also the timeout value for TCP/IP synchronous receive operations with distributed clients.

Acceptable values:	0 - 9999
Default:	No timeout for idle thread timeout. 120 for TCP/IP synchronous receive operations.
Update:	Option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC IDTHTOIN

The amount of time, in seconds, that an active server thread is allowed to remain idle is known as the idle thread timeout value. The thread is canceled after the timeout value expires, and its locks and cursors are released. Threads are checked every two minutes to see if they have exceeded the timeout value. If the timeout value is less than two minutes, the thread might not be canceled if it has been inactive for more than the timeout value but less than two minutes.

Inactive and indoubt threads are not subject to timeout. The value that you specify for the DDF THREADS field determines whether a thread can become inactive, and thus not subject to timeout.

If the IDTHTOIN value is 0:

- For idle thread timeout, timeout processing is disabled, and idle server threads can remain in the system and continue to hold any resources.

- For TCP/IP synchronous receive operations, Db2 sets the timeout value to 120 seconds.

If the IDTHTOIN value is non-zero, Db2 also uses the IDTHTOIN value as the timeout value for TCP/IP synchronous receive operations. A Db2 server uses TCP/IP synchronous receive operations when the server determines that the requester has not yet sent it all the data for a DRDA request or for a LOB or XML object.

You can enable longer idle wait times for threads from specific remote applications, without increasing the system-wide limit for idle thread timeouts, by creating MONITOR IDLE THREADS profiles. The IDTHTOIN setting does not apply to any thread that qualifies for the filtering criteria of a MONITOR IDLE THREADS profile. For more information, see .

EXTENDED SECURITY field (EXTSEC subsystem parameter)

The EXTSEC subsystem parameter specifies how two related security options are to be set. These settings control what happens when a DDF connection has security errors and whether RACF users can change their passwords through the DRDA change password function.

Acceptable values:	YES, NO
Default:	YES
Update:	option 39 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP EXTSEC
Subsystem parameter:	Yes

YES

Detailed reason codes are returned to a DRDA level 3 client when a DDF connection request fails because of security errors. When using SNA protocols, the requester must have included a product that supports the extended security sense codes. One such product is Db2 Connect.

RACF users can change their passwords by using the DRDA change password function. This support is only for DRDA requesters that have implemented support for changing passwords.

NO

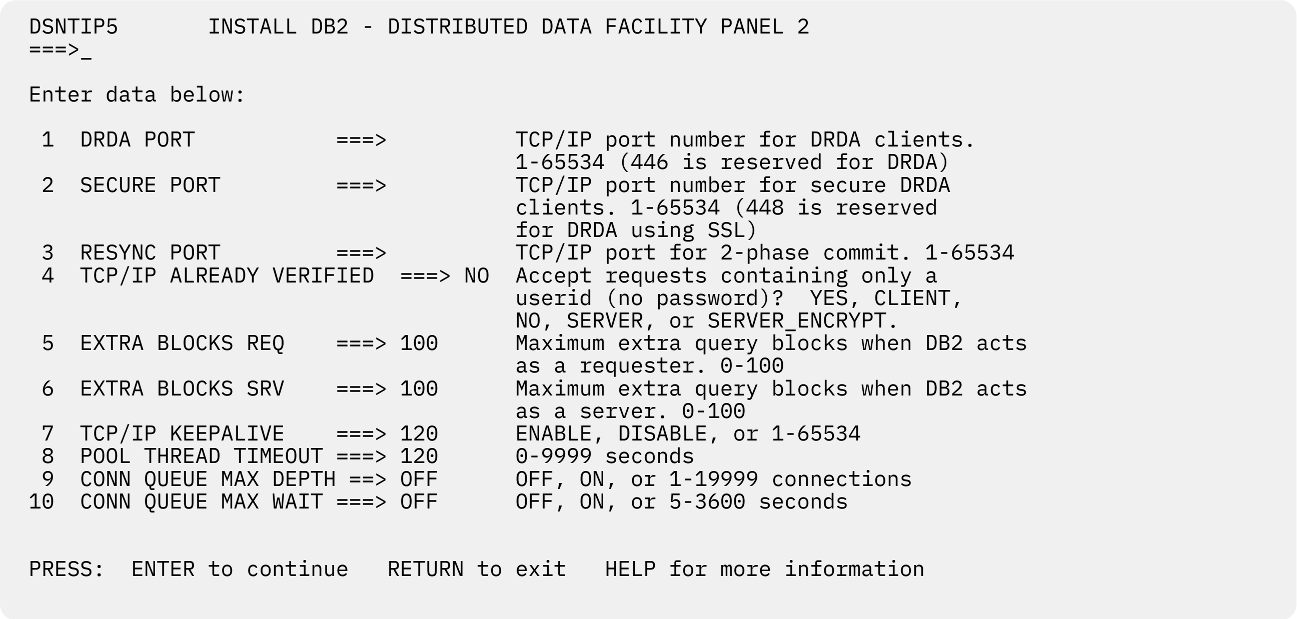
Generic error codes are returned to the clients and RACF users are prevented from changing their passwords.

Recommendation: Specify a value of YES. This setting allows properly enabled DRDA clients to determine the cause of security failures without requiring Db2 operator support. A value of YES also allows RACF users on properly enabled Db2 clients to change their passwords.

Note: This is a security-related parameter. When this parameter is set to YES, detailed reason codes are returned to the client when a DDF connection request fails because of security errors that might enable more malicious attacks. If this parameter is set to YES, RACF users can change their passwords by using the DRDA change password function.

DSNTIP5: Distributed data facility panel 2

The entries on the DSNTIP5 panel are used to configure the distributed data facility (DDF).



```
DSNTIP5       INSTALL DB2 - DISTRIBUTED DATA FACILITY PANEL 2
===>_

Enter data below:

 1  DRDA PORT           ===>          TCP/IP port number for DRDA clients.
                                      1-65534 (446 is reserved for DRDA)
 2  SECURE PORT         ===>          TCP/IP port number for secure DRDA
                                      clients. 1-65534 (448 is reserved
                                      for DRDA using SSL)
 3  RESYNC PORT         ===>          TCP/IP port for 2-phase commit. 1-65534
 4  TCP/IP ALREADY VERIFIED  ===> NO  Accept requests containing only a
                                      userid (no password)?  YES, CLIENT,
                                      NO, SERVER, or SERVER_ENCRYPT.
 5  EXTRA BLOCKS REQ    ===> 100      Maximum extra query blocks when DB2 acts
                                      as a requester. 0-100
 6  EXTRA BLOCKS SRV    ===> 100      Maximum extra query blocks when DB2 acts
                                      as a server. 0-100
 7  TCP/IP KEEPALIVE    ===> 120      ENABLE, DISABLE, or 1-65534
 8  POOL THREAD TIMEOUT ===> 120      0-9999 seconds
 9  CONN QUEUE MAX DEPTH ==> OFF      OFF, ON, or 1-19999 connections
10  CONN QUEUE MAX WAIT ===> OFF      OFF, ON, or 5-3600 seconds


PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 47. Distributed data facility panel: DSNTIP5

DRDA PORT field

The value of the DRDA PORT field determines the TCP/IP port number that is to be used for accepting TCP/IP connection requests from remote DRDA clients.

Acceptable values:	1 - 65534
Default:	none
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	none

If you are enabling data sharing, each member must have the same DRDA port number. You must specify a value for the DRDA PORT field if you plan to use TCP/IP. Leaving this field blank means that you are not using TCP/IP. A blank field is equivalent to using 0 in the change log inventory (DSNJU003) utility.

Related information

SECURE PORT field

The value of the SECURE PORT field specifies the TCP/IP port number that is to be used for accepting secure TCP/IP connection requests from remote DRDA clients and REST services.

Acceptable values:	1 - 65534
Default:	none
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	none

If you are enabling data sharing, each member must have the same secure TCP/IP port number. You must specify a value if you plan to use TCP/IP with Secure Socket Layer (SSL). Leaving this field blank means that you are not using TCP/IP with SSL. A blank field is equivalent to using 0 in the change log inventory (DSNJU003) utility.

Related information

RESYNC PORT field

The value of the RESYNC PORT field specifies the TCP/IP port number that is to be used to process requests for two-phase commit resynchronization.

Acceptable values:	1 - 65534
Default:	none
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	none

This value must be different than the value that is specified for DRDA PORT. If you are enabling data sharing, each member must have a unique resynchronization port. Leaving this field blank means that you are not using TCP/IP. A blank field is equivalent to using 0 in the change log inventory (DSNJU003) utility.

Related information

TCP/IP ALREADY VERIFIED field (TCPALVER subsystem parameter)

The TCPALVER subsystem parameter specifies whether Db2 is to accept TCP/IP connection requests containing only a user ID, or if a stronger form of security is required. If Db2 is to accept only a user ID, no password, RACF PassTicket, or Kerberos ticket is needed.

The TCPALVER subsystem parameter has no effect in the following situations:

- Trusted context users that have been switched
- Connections that use SECPORT, including SSL implementations, such as AT-TLS

Acceptable values:	YES, CLIENT, NO, SERVER, SERVER_ENCRYPT
Default:	NO (SERVER)
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC TCPALVER
Security parameter:	Yes

YES
A new connection is accepted with a user ID only.

CLIENT
This value can be used as an alternative to YES.

NO
A user ID and password are required for connection requests, or the connection must be authenticated by a RACF PassTicket or Kerberos ticket. The user ID and password can be encrypted or non-encrypted.

SERVER
This value can be used as an alternative to NO.

SERVER_ENCRYPT
A user ID and password are required for connection requests. Kerberos tickets are also accepted. In addition, one of the following must be true:

- The user ID and password is AES (Advanced Encryption Standard)-encrypted.

- The connection is accepted on a port that ensures AT-TLS (Application Transparent - Transport Layer Security) policy protection, such as a Db2 security port (SECPORT).

Non-encrypted security credentials are not accepted unless the connection is secured by the TCP/IP network. DES-based (Data Encryption Standard) encryption is also considered insecure. If RACF PassTickets are used, Db2 must be permitted to execute the SAF IRRSPK00 service. That is, the use of SERVER_ENCRYPT requires a RACF PERMIT for Db2 (the user ID associated to the *ssnm*DIST started task ID) to execute the IRRSPK00 service, as shown in the following exampt RACF commands:

```
RDEF PTKTDATA IRRPTAUTH.SYEC1B.* UACC(NONE)
PE IRRPTAUTH.SYEC1B.* CLASS(PTKTDATA) ID(SYSDSP) ACCESS(READ)
SETR RACLIST(PTKTDATA) REFRESH
```

This value must be the same for all members of a data sharing group. This option applies to all incoming requests that use TCP/IP, regardless of the requesting location.

Attention: This is a security-related parameter. A setting of YES or CLIENT provides minimal security. With YES or CLIENT, Db2 is subject to security attacks, because the identity of the user or process that is attempting to gain access is not verified. Specify these settings only if you have a highly secure network.

Recommendation: Setting the parameter to SERVER_ENCRYPT provides the best security. Connections are accepted only if user credentials are provided to authenticate the user ID, and strong encryption is used to protect the user ID and credentials.

Related information

EXTRA BLOCKS REQ field (EXTRAREQ subsystem parameter)

The EXTRAREQ subsystem parameter limits the number of extra DRDA query blocks that Db2 is to request from a remote DRDA server. This parameter does not limit the size of the SQL query answer set. It simply controls the total amount of data that can be transmitted on a network exchange.

Deprecated subsystem parameter: Non-default settings for EXTRAREQ are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 100.

Acceptable values:	0 - 100
Default:	100
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP EXTRAREQ

EXTRA BLOCKS SRV field (EXTRASRV subsystem parameter)

The EXTRASRV subsystem parameter limits the number of extra DRDA query blocks that Db2 is to return to a DRDA client. This parameter not limit the size of the SQL query answer set. It simply controls the total amount of data that can be transmitted on a network exchange.

Deprecated subsystem parameter: Non-default settings for EXTRASRV are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value 100.

Acceptable values:	0 - 100
Default:	100
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP EXTRASRV

TCP/IP KEEPALIVE field (TCPKPALV subsystem parameter)

The TCPKPALV subsystem parameter determines whether the TCP/IP KeepAlive value in the TCP/IP configuration is to be overridden with a different value. This option can be used in cases where the TCP/IP KeepAlive value in the TCP/IP configuration is not appropriate for the Db2 subsystem.

Acceptable values:	ENABLE, DISABLE, or 1 to 65534
Default:	120
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC TCPKPALV

ENABLE
The TCP/IP KeepAlive configuration value is not overridden.

DISABLE
KeepAlive probing is disabled for this subsystem.

1 - 65534
The TCP/IP KeepAlive configuration value is overridden with the value of the TCP/IP KEEPALIVE field. This value is specified in seconds. Consider setting this value close to the IDLE THREAD TIMEOUT value on installation panel DSNTIPR or the RESOURCE TIMEOUT value on installation panel DSNTIPI.

Avoid using very small values. KeepAlive detection is accomplished by probing the network based on the time that is entered in the KeepAlive parameter. A small KeepAlive value can cause excessive network traffic and system resource consumption. Maintain a proper balance that allows network failures to be detected on a timely basis without a severe impact on system and network performance.

Related information

POOL THREAD TIMEOUT field (POOLINAC subsystem parameter)

The POOLINAC subsystem parameter specifies the approximate time, in seconds, that a database access thread (DBAT) can remain idle in the pool before it is terminated.

Acceptable values:	0 - 9999
Default:	120
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC POOLINAC

A database access thread in the pool counts as an active thread against MAX REMOTE ACTIVE and can hold locks, but does not have any cursors.

Threads are checked every two minutes to see if they have exceeded the timeout value. If the timeout value is less than two minutes, the thread might not be canceled if it has been inactive for more than the timeout value but less than two minutes.

Specifying 0 causes a DBAT to terminate rather than go into the pool if the pool has a sufficient number of threads to process the number of inactive DBATs (type 2 inactive threads) that currently exist.

CONN QUEUE MAX DEPTH field (MAXCONQN subsystem parameter)

If the number of active in-use DBATs has reached the MAXDBAT threshold, the MAXCONQN subsystem parameter specifies the maximum number of inactive or new connection requests that can be queued waiting for a DBAT to process the request.

Acceptable values:	OFF, ON, 1 - 19999
Default:	OFF

Update:	option 40 on panel DSNTIPB
Online changeable:	Yes
DSNZP*xxx*:	DSN6FAC MAXCONQN

ON
The depth of the connection queue is limited by the value of the MAXDBAT subsystem parameter. If the number of queued connection requests exceeds the MAXDBAT value, DDF closes the client connection that has waited the longest in the connection queue.

OFF
The depth of the connection queue is limited by the value of the CONDBAT subsystem parameter. OFF is the default value.

1 - 19999
The maximum number of connections that can be queued waiting for a DBAT to process a request. If the number of queued connection requests exceeds the numeric MAXCONQN value, DDF closes the client connection that has waited the longest in the connection queue.

The closed connections give remote clients an opportunity to redirect the work to other members of the group that have more resources to process the work.

The function is enabled only when the Db2 subsystem is a member of a data sharing group, and Db2 was started with subsystem parameter CMTSTAT set to INACTIVE.

Related reference

MAX REMOTE ACTIVE field (MAXDBAT subsystem parameter)
The value of the MAXDBAT subsystem parameter specifies the maximum number of database access threads (DBATs) that are allowed to be concurrently active.

MAX REMOTE CONNECTED field (CONDBAT subsystem parameter)
The CONDBAT subsystem parameter sets the maximum number of concurrent inbound DDF connections that are to be allowed.

DDF THREADS field (CMTSTAT subsystem parameter)
The CMTSTAT subsystem parameter controls whether threads are to be made active or inactive after they successfully commit or roll back and hold no cursors. A thread can become inactive only if it holds no cursors, has no temporary tables defined, and executes no statements from the dynamic statement cache.

CONN QUEUE MAX WAIT field (MAXCONQW subsystem parameter)

The MAXCONQW subsystem parameter specifies the maximum length of time that a client connection waits for a DBAT to process the next unit-of-work or new connection request.

Acceptable values:	OFF, ON, 5 - 3600 seconds
Default:	OFF
Update:	option 40 on panel DSNTIPB
DSNZP*xxx*:	DSN6FAC MAXCONQW

ON
Connections wait as long as the value specified by the IDTHTOIN subsystem parameter.

OFF
Connections wait indefinitely for a DBAT to process requests.

Numeric value
The time duration in seconds that a connection waits for a DBAT to process the request.

Each queued connection request entry is examined to see if its time waiting in the queue has exceeded the specified value. If the time is exceeded, the client connection is closed.

The function is enabled only when the Db2 subsystem is a member of a data sharing group, and Db2 was started with subsystem parameter CMTSTAT set to INACTIVE.

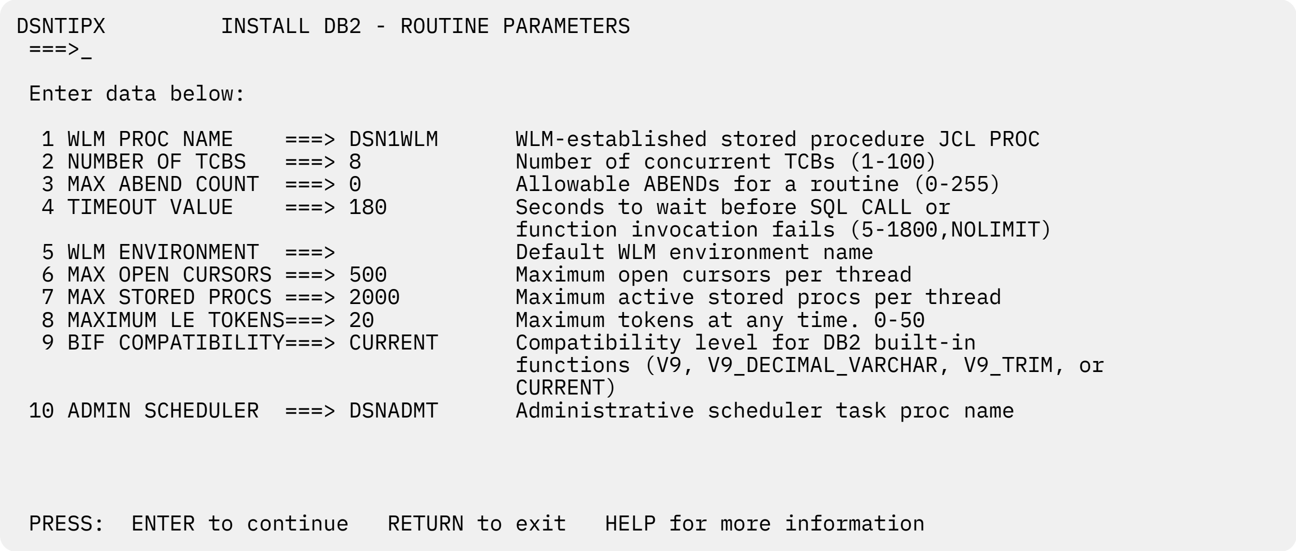
This subsystem parameter can be updated online.

Related reference

IDLE THREAD TIMEOUT field (IDTHTOIN subsystem parameter)
The IDTHTOIN subsystem parameter controls the amount of time, in seconds, that an active server thread is allowed to remain idle. If the IDTHTOIN value is non-zero, the value is also the timeout value for TCP/IP synchronous receive operations with distributed clients.

DSNTIPX: Routine parameters panel

The entries on this panel are used to start the stored procedures address space so that it can run stored procedures or user-defined functions.



```
DSNTIPX         INSTALL DB2 - ROUTINE PARAMETERS
 ===>_

 Enter data below:

  1 WLM PROC NAME    ===> DSN1WLM      WLM-established stored procedure JCL PROC
  2 NUMBER OF TCBS   ===> 8            Number of concurrent TCBs (1-100)
  3 MAX ABEND COUNT  ===> 0            Allowable ABENDs for a routine (0-255)
  4 TIMEOUT VALUE    ===> 180          Seconds to wait before SQL CALL or
                                       function invocation fails (5-1800,NOLIMIT)
  5 WLM ENVIRONMENT  ===>              Default WLM environment name
  6 MAX OPEN CURSORS ===> 500          Maximum open cursors per thread
  7 MAX STORED PROCS ===> 2000         Maximum active stored procs per thread
  8 MAXIMUM LE TOKENS===> 20           Maximum tokens at any time. 0-50
  9 BIF COMPATIBILITY===> CURRENT      Compatibility level for DB2 built-in
                                       functions (V9, V9_DECIMAL_VARCHAR, V9_TRIM, or
                                       CURRENT)
 10 ADMIN SCHEDULER  ===> DSNADMT      Administrative scheduler task proc name



 PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 48. Routine parameters panel: DSNTIPX

Related concepts

Migration step 22: Configure Db2 for running stored procedures and user-defined functions (optional)

WLM management of stored procedures
Workload Manager (WLM) is a component of z/OS that manages incoming work requests for the operating system and allocates available system resources to meet these requests. Db2 for z/OS uses WLM to allocate workload requests for Db2 stored procedures.

WLM PROC NAME field

The value of the WLM PROC NAME field specifies a name for the stored procedures JCL procedure that is to be generated during installation. This JCL procedure is generated for the default WLM environment that is specified in the WLM ENVIRONMENT field.

Acceptable values:	1 - 8 alphanumeric characters
Default:	*ssnm*WLM
DSNZP*xxx*:	none

This procedure is used for a WLM-established stored procedures address space.

If this field has a blank, the JCL procedure is still generated. In this case, the JCL procedure will be named by appending the string WLM to the Db2 subsystem name (specified on panel DSNTIPM in the field SUBSYSTEM NAME).

NUMBER OF TCBS field

The NUMBER OF TCBS field determines the number of SQL CALL statements and invocations of user-defined functions that can be processed concurrently in the address space of the default WLM environment. The default WLM environment is specified in the WLM ENVIRONMENT field.

Acceptable values:	1 - 100
Default:	8
DSNZP*xxx*:	none

The larger the value, the more stored procedures and user-defined functions you can run concurrently in one address space. This value is dependent on the z/OS UNIX System Services MAXPROCUSER value. If this value is set above the z/OS UNIX System Services MAXPROCUSER value, you may exceed the maximum number of processes for the user.

Related reference

WLM ENVIRONMENT field (WLMENV subsystem parameter)
The WLMENV subsystem parameter specifies the name of the default WLM_ENVIRONMENT that is to be used for a user-defined function or stored procedure. This environment is used when a value is not specified for the WLM_ENVIRONMENT option on the CREATE FUNCTION or CREATE PROCEDURE statements.

Related information

MAX ABEND COUNT field (STORMXAB subsystem parameter)

The STORMXAB subsystem parameter specifies the number of times a stored procedure or an invocation of a user-defined function is to be allowed to terminate abnormally. If this threshold is reached, SQL CALL statements for the stored procedure or user-defined function are rejected.

Acceptable values:	0 - 255
Default:	0
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP STORMXAB

The default of 0 means that the first abend of a stored procedure or user defined function causes SQL CALL statements to that procedure or function to be rejected. For production systems, you should accept the default.

TIMEOUT VALUE field (STORTIME subsystem parameter)

The STORTIME subsystem parameter specifies the number of seconds before Db2 is to stop waiting for an SQL CALL statement or invocation of a user-defined function. This parameter applies to user-defined functions that are to be assigned to one of the task control blocks (TCBs) in a Db2 stored procedures address space.

Acceptable values:	5 - 1800, NOLIMIT
Default:	180
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP STORTIME

If the time interval expires, the SQL statement fails. The default is a reasonable waiting time for most sites. You might want to choose a higher value if your system has long queues. You might want to choose a lower value if you want to minimize the waiting time for end-user requests. The NOLIMIT value means that Db2 waits indefinitely for the SQL request to complete, while the thread is active.

Recommendation: Do not select the NOLIMIT value. If the stored procedure address space is down for some reason or the user-defined function does not complete, your SQL request hangs until the request is satisfied or the thread is canceled.

WLM ENVIRONMENT field (WLMENV subsystem parameter)

The WLMENV subsystem parameter specifies the name of the default WLM_ENVIRONMENT that is to be used for a user-defined function or stored procedure. This environment is used when a value is not specified for the WLM_ENVIRONMENT option on the CREATE FUNCTION or CREATE PROCEDURE statements.

Acceptable values:	Any valid name from 1 - 32 alphanumeric characters, including underscores
Default:	blank
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SYSP WLMENV

Changing this value does not change existing routines because the value is stored in the catalog when the function or procedure is created.

MAX OPEN CURSORS field (MAX_NUM_CUR subsystem parameter)

The MAX_NUM_CUR subsystem parameter specifies the maximum number of cursors, including allocated cursors, that can be open at a given Db2 site for each thread.

Acceptable values:	0 - 99999
Default:	500
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAX_NUM_CUR

Db2 keeps a count of currently open cursors. If an application attempts to open a thread after the maximum is reached, the statement will fail.

MAX STORED PROCS field (MAX_ST_PROC subsystem parameter)

The MAX_ST_PROC subsystem parameter determines the maximum number of stored procedures that are to be allowed for each thread.

Acceptable values:	0 - 99999
Default:	2000
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAX_ST_PROC

If an application attempts to call a stored procedure after the maximum is reached, the statement will fail.

MAXIMUM LE TOKENS field (LEMAX subsystem parameter)

The LEMAX subsystem parameter specifies the maximum number of Language Environment tokens that are to be active at any time.

Acceptable values:	0 - 50
Default:	20
Update:	option 41 on panel DSNTIPB

DSNZP*xxx*:	DSN6SPRM LEMAX

If the value is 0, no tokens are available. A token is used each time one of the following functions is used:

- Trigonometry functions (SIN, SINH, ASIN, COS, COSH, ACOS, TAN, TANH, ATANH, ATAN, and ATAN2)
- DEGREES
- RADIANS
- RAND
- EXP
- POWER®
- Log functions (LOG, and LOG10)
- UPPER
- LOWER
- TRANSLATE
- ROUND_TIMESTAMP
- TRUNC_TIMESTAMP
- LAST_DAY
- NEXT_DAY
- ADD_MONTHS
- Decimal float functions

Related information

BIF COMPATIBILITY field (BIF_COMPATIBILITY subsystem parameter)

The BIF_COMPATIBILITY subsystem parameter specifies whether built-in functions and specifications are to return results in the newer format or revert to the pre-DB2 10 format.

Recommendation: Avoid making online changes to the BIF_COMPATIBILITY setting, even though they are supported. Such changes do not affect SQL statements in the dynamic SQL statement cache.

Acceptable values:	V9_DECIMAL_VARCHAR, V9_TRIM, CURRENT, or V9
Default:	For installation: CURRENT For migration: the setting that your Db2 10 DSNTIDXA or DSNTIDXB input member specifies
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM.BIF_COMPATIBILITY

In Db2 11, when the input data to the CHAR or VARCHAR function is a decimal value or a decimal is input to a CAST specification where the target data type is CHAR or VARCHAR, the result does not have any of the following attributes:

- Leading zeros.
- A trailing decimal point character.
- Leading blanks for positive decimal values.

You might need to modify some of your applications to handle this change, which differs from the behavior in DB2 9. While you prepare for this change, you can use the following options of the BIF_COMPATIBILITY subsystem parameter to temporarily revert to the DB2 9 behavior.

CURRENT

All built-in functions return data in the Db2 11 format, unless they are controlled by the APPLCOMPAT bind option. When you run the installation CLIST in INSTALL mode, CURRENT is the default setting.

V9_DECIMAL_VARCHAR

For decimal input, the CHAR and VARCHAR functions, and the CAST specification with decimal input and a target data type of CHAR or VARCHAR, return data in the DB2 9 format.

Tip: You can run with BIF_COMPATIBILITY set to CURRENT, and use the CHAR9 or VARCHAR9 functions instead for applications that depend on the DB2 9 behavior for the CHAR and VARCHAR functions with decimal input.

For information about how to modify your applications to use the CHAR9 and VARCHAR9 functions, see .

Db2 also continues to allow some unsupported timestamp strings for applications. Furthermore, as in previous Db2 releases, SQLCODE -180 is not issued for these unsupported timestamp strings. Because these strings are not supported by Db2, you must modify the application SQL to use a supported format for a timestamp string. For the supported formats, see .

V9_TRIM

The V9_DECIMAL_VARCHAR setting rules are in effect, and if the APPLCOMPAT bind option is V10R1, the LTRIM, RTRIM and STRIP built-in functions behave like in DB2 9 with respect to tolerating invalid EBCDIC mixed data strings and treatment of EBCDIC control characters `X'0E0F'`.

V9

For decimal input, the CHAR built-in function returns data in the DB2 9 format.

This value has no effect on the output of the VARCHAR built-in function with a decimal value as input or on the result of the CAST(*decimal-expression* AS VARCHAR) specification. Unless you need DB2 9 behavior only for CHAR output, specify the V9_DECIMAL_VARCHAR value.

Examples

The following examples show the effect of the BIF_COMPATIBILITY subsystem parameter on the output of these built-in functions and cast specifications.

Table 37. Example output for CHAR based on BIF_COMPATIBILITY settings

BIF_COMPATIBILITY setting	OUTPUT for CHAR(000.1)	OUTPUT for CHAR(1000.)	OUTPUT for CHAR(1.1)
V9_DECIMAL_VARCHAR	' 000.1'	' 1000.'	' 1.1'
CURRENT	'.1 '	'1000 '	'1.1 '
V9	' 000.1'	' 1000.'	' 1.1'

Table 38. Example output for VARCHAR and CAST(decimal-expression AS VARCHAR) based on BIF_COMPATIBILITY settings

BIF_COMPATIBILITY setting	Output for VARCHAR(000.1) or CAST(000.1 AS VARCHAR(3))	Output for VARCHAR(1000.) or CAST(1000. AS VARCHAR(5))	Output for VARCHAR(1.1) or CAST(1.1 AS VARCHAR(3))
V9_DECIMAL_VARCHAR	'0.1'	'1000.'	'1.1'
CURRENT	'.1'	'1000'	'1.1'

Table 39. Example output for CAST(decimal-expression AS CHAR) based on BIF_COMPATIBILITY settings

BIF_COMPATIBILITY setting	Output for CAST(000.1 AS CHAR(6))	Output for CAST(1000. AS CHAR(6))	Output for CAST(1.1 AS CHAR(4))
V9_DECIMAL_VARCHAR	'0.1 '	'1000. '	'1.1 '
CURRENT	'.1 '	'1000 '	'1.1 '
V9	'.1 '	'1000 '	'1.1 '

Related information

ADMIN SCHEDULER field (ADMTPROC subsystem parameter)

The ADMIN SCHEDULER field identifies a name for the JCL procedure that is used to start the Db2 administrative task scheduler that is associated with this Db2 subsystem.

Acceptable values:	1 - 8 alphanumeric characters
Default:	*ssn*ADMT
Update:	option 41 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM ADMTPROC

1 - 8 alphanumeric characters

When Db2 starts, it starts the administrative task scheduler that is specified in the ADMIN SCHEDULER field, if that scheduler is not yet started. Also, every time Db2 starts or stops, it posts an event to the administrative task scheduler so that the administrative task scheduler can execute tasks that depend on those events.

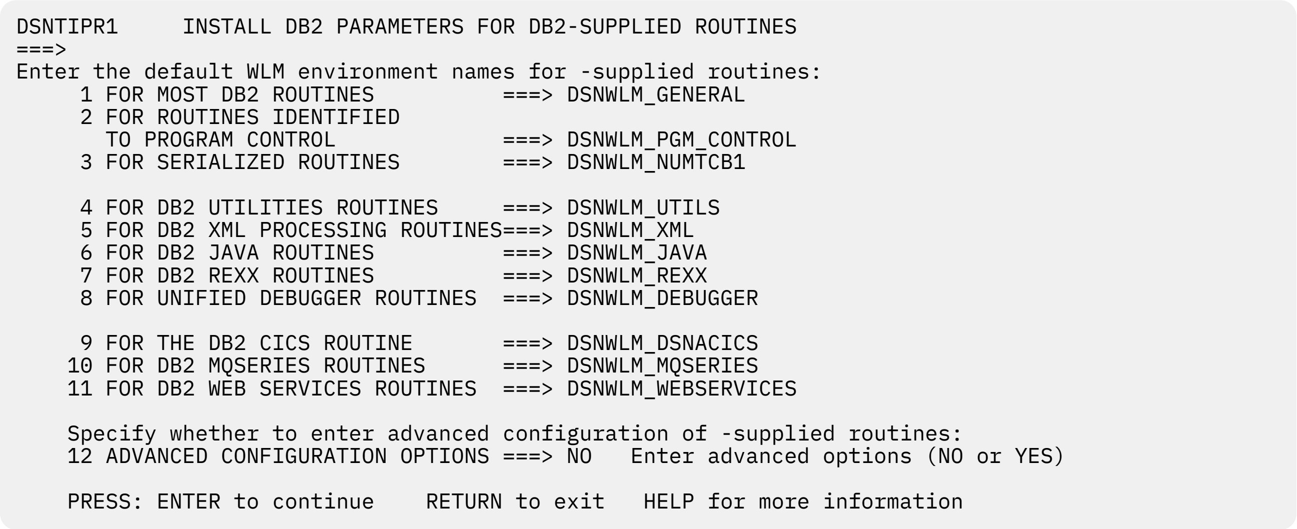
blank

To disable the administrative task scheduler, enter blanks in the ADMIN SCHEDULER field. If you replace the default value with blanks, Db2 will not start the administrative task scheduler until you update the subsystem parameter.

This parameter cannot be updated online.

DSNTIPR1: Parameters for Db2-supplied routines panel

The DSNTIPR1 panel enables you to establish default WLM environment names for Db2-supplied routines and to access panels for advanced configuration of these routines.



```
DSNTIPR1     INSTALL DB2 PARAMETERS FOR DB2-SUPPLIED ROUTINES
===>
Enter the default WLM environment names for -supplied routines:
     1 FOR MOST DB2 ROUTINES          ===> DSNWLM_GENERAL
     2 FOR ROUTINES IDENTIFIED
       TO PROGRAM CONTROL             ===> DSNWLM_PGM_CONTROL
     3 FOR SERIALIZED ROUTINES        ===> DSNWLM_NUMTCB1

     4 FOR DB2 UTILITIES ROUTINES     ===> DSNWLM_UTILS
     5 FOR DB2 XML PROCESSING ROUTINES===> DSNWLM_XML
     6 FOR DB2 JAVA ROUTINES          ===> DSNWLM_JAVA
     7 FOR DB2 REXX ROUTINES          ===> DSNWLM_REXX
     8 FOR UNIFIED DEBUGGER ROUTINES  ===> DSNWLM_DEBUGGER

     9 FOR THE DB2 CICS ROUTINE       ===> DSNWLM_DSNACICS
    10 FOR DB2 MQSERIES ROUTINES      ===> DSNWLM_MQSERIES
    11 FOR DB2 WEB SERVICES ROUTINES  ===> DSNWLM_WEBSERVICES

    Specify whether to enter advanced configuration of -supplied routines:
    12 ADVANCED CONFIGURATION OPTIONS ===> NO   Enter advanced options (NO or YES)

    PRESS: ENTER to continue    RETURN to exit   HELP for more information
```

Figure 49. Parameters for Db2-supplied routines panel: DSNTIPR1

Values on the DSNTIPR1 panel are used to customize configuration statements in installation job DSNTIJRT, which creates and grants access to the Db2-supplied routines and any related databases, table spaces, tables, indexes, and created global temporary tables. The values are also used to customize installation job DSNTIJRW, which defines core WLM environments for Db2-supplied stored procedures and user-defined functions. If you change an environment name on the DSNTIPR1 panel, the change is applied in the advanced configuration panel settings to all routines that use the original name.

If you change a WLM environment name on this panel, the WLM ENV NAME field of each corresponding routine in the advanced configuration options panels is also changed. For example, if you change the setting of the FOR DB2 XML PROCESSING ROUTINES field from DSNWLM_XML to DSNWLM_MY_XML, then the DSNTIPRJ panel will contain DSNWLM_MY_XML in the WLM ENV NAME fields for all routines.

Changes on the DSNTIPR1 panel do not affect a corresponding routine's WLM ENV NAME field if the WLM ENV NAME value has been previously modified on the advanced configuration options panel. For example, if you change the WLM ENV NAME setting for XSR_ADDSCHEMADOC from DSNWLM_XML to MY_WLM_ENVIRONMENT on the DSNTIPRJ panel, it will remain MY_WLM_ENVIRONMENT even if you subsequently change the setting of the FOR DB2 XML PROCESSING ROUTINES field on the DSNTIPR1 panel from DSNWLM_XML to DSNWLM_MY_XML.

FOR MOST Db2 ROUTINES field

The value of the FOR MOST Db2 ROUTINES field identifies the WLM environment that is to be used for running most Db2-supplied routines.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2

Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR ROUTINES IDENTIFIED TO PROGRAM CONTROL field

The FOR ROUTINES IDENTIFIED TO PROGRAM CONTROL field identifies the WLM environment that is to be used for running Db2-supplied routines that require program control. These routines can be registered to RACF or an equivalent product.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_PGM_CONTROL
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

Related information

Defining modules to program control (UNIX System Services Planning)

FOR SERIALIZED ROUTINES field

The value of the FOR SERIALIZED ROUTINES field identifies the WLM environment that is to be used for Db2-supplied routines that need to run serially. A routine that must run serially cannot share a task control block with another routine.

These routines require an environment that has a NUMTCB setting of 1. These routines do not include LANGUAGE REXX routines or SYSPROC.DSNUTILS and SYSPROC.DSNUTILU.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_NUMTCB1
DSNZP*xxx*:	none

FOR Db2 UTILITIES ROUTINES field

The value of the FOR Db2 UTILITIES ROUTINES field identifies the name of the WLM environment that is to be used for running the Db2-supplied routines for utilities. This WLM environment should be used only by the SYSPROC.DSNUTILS and SYSPROC.DSNUTILU stored procedures.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_UTILS
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR Db2 XML PROCESSING ROUTINES field

The value of the FOR Db2 XML PROCESSING ROUTINES field identifies the WLM environment that is to be used for running most Db2-supplied XML processing routines. This applies to the XSR_ADDSCHEMADOC, XSR_REGISTER, and XSR_REMOVE routines.

Acceptable values:	a valid WLM environment name

Default:	DSNWLM_XML
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR MOST Db2 JAVA ROUTINES field

The value of the FOR MOST Db2 JAVA ROUTINES field identifies the WLM environment that is to be used for running most Db2-supplied Java routines.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_JAVA
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR Db2 REXX ROUTINES field

The value of the FOR Db2 REXX ROUTINES field identifies the name of the WLM environment that is to be used for Db2-supplied REXX routines.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_REXX
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR UNIFIED DEBUGGER ROUTINES field

The FOR UNIFIED DEBUGGER ROUTINES field identifies the WLM environment that is to be used for Db2-supplied routines that are for the unified debugger tool.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_DEBUGGER
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2

Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR THE Db2 CICS ROUTINE field

The value of the FOR THE Db2 CICS ROUTINE field identifies the WLM environment that is to be used for the Db2 CICS transaction processor routine SYSPROC.DSNACICS.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_CICS
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR Db2 MQSERIES ROUTINES field

The value of the FOR Db2 MQSERIES ROUTINES field specifies the name of the WLM environment that is to be used for Db2 IBM MQ functions.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_MQSERIES
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

FOR Db2 WEB SERVICES ROUTINES field

The value of the FOR Db2 WEB SERVICES ROUTINES field identifies the WLM environment that is to be used for Db2 web services functions.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_WEBSERVICES
DSNZP*xxx*:	none

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

ADVANCED CONFIGURATION OPTIONS field

The value of the ADVANCED CONFIGURATION OPTIONS field determines whether optional panels that are for advanced configuration of Db2-supplied stored procedures and functions are to be displayed.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	none

NO
Skips the panels for advanced configuration of stored procedures and displays the DSNTIPZ panel.

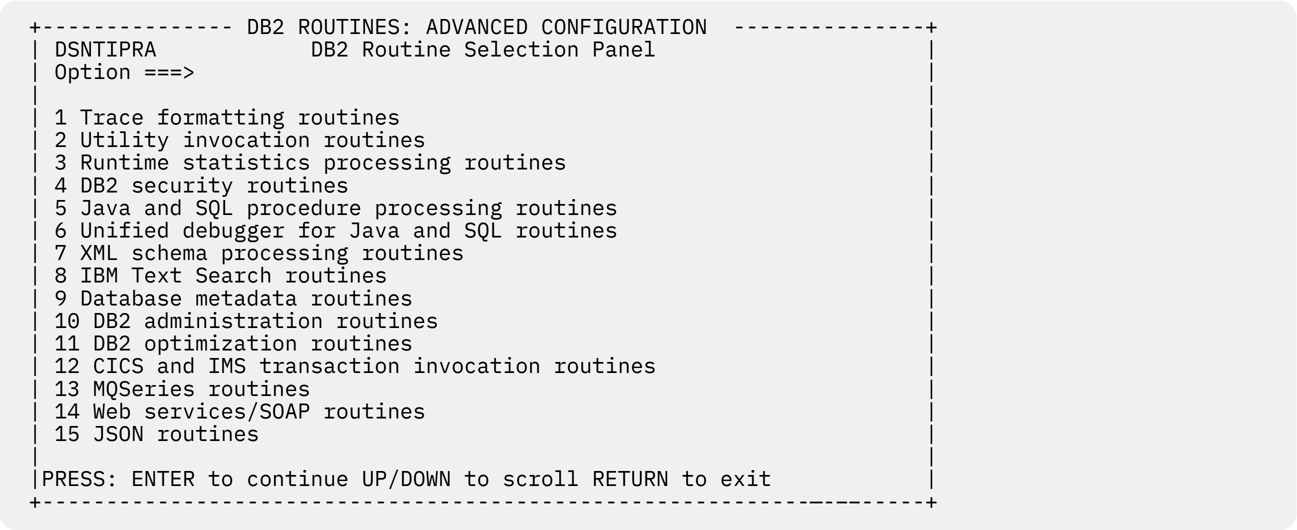
YES
Displays panels for advanced configuration of Db2-supplied stored procedures, starting with panel DSNTIPRA.

Db2 routine selection panel: DSNTIPRA

The DSNTIPRA panel provides access to additional panels for advanced configuration options of Db2-supplied routines. This panel is displayed if you specify YES in the ADVANCED CONFIGURATION OPTIONS field on the DSNTIPR1 panel.

If you specify NO in the ADVANCED CONFIGURATION OPTIONS field, the DSNTIPZ panel is displayed instead.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+--------------- DB2 ROUTINES: ADVANCED CONFIGURATION  ---------------+
| DSNTIPRA            DB2 Routine Selection Panel                     |
| Option ===>                                                         |
|                                                                     |
| 1 Trace formatting routines                                         |
| 2 Utility invocation routines                                       |
| 3 Runtime statistics processing routines                            |
| 4 DB2 security routines                                             |
| 5 Java and SQL procedure processing routines                        |
| 6 Unified debugger for Java and SQL routines                        |
| 7 XML schema processing routines                                    |
| 8 IBM Text Search routines                                          |
| 9 Database metadata routines                                        |
| 10 DB2 administration routines                                      |
| 11 DB2 optimization routines                                        |
| 12 CICS and IMS transaction invocation routines                     |
| 13 MQSeries routines                                                |
| 14 Web services/SOAP routines                                       |
| 15 JSON routines                                                    |
|                                                                     |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit            |
+---------------------------------------------------------------------+
```

Figure 50. Db2 routine selection panel: DSNTIPRA

To view and modify the advanced options for a routine type:
In the Option field, enter the number of the routine type, and then press the Enter key.

To exit advanced configuration and display the next standard installation panel, DSNTIPZ:
Leave the Option field blank and press the Enter key.

To return to the DSNTIPRA panel:
Press the Return key.

Trace formatting routines panel: DSNTIPRB

The DSNTIPRB panel allows you to modify configuration options for trace formatting routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-)

indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)

```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRB           Trace Formatting routines                       |
| ===>                                                               |
| DSNWSPM                                                            |
|   WLM ENV NAME  ===> DSNWLM_NUMTCB1                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DSNWZP                                                             |
|   WLM ENV NAME  ===> DSNWLM_NUMTCB1                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit           |
+--------------------------------------------------------------------+
```

Figure 51. Trace formatting routines panel: DSNTIPRB

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_NUMTCB1
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

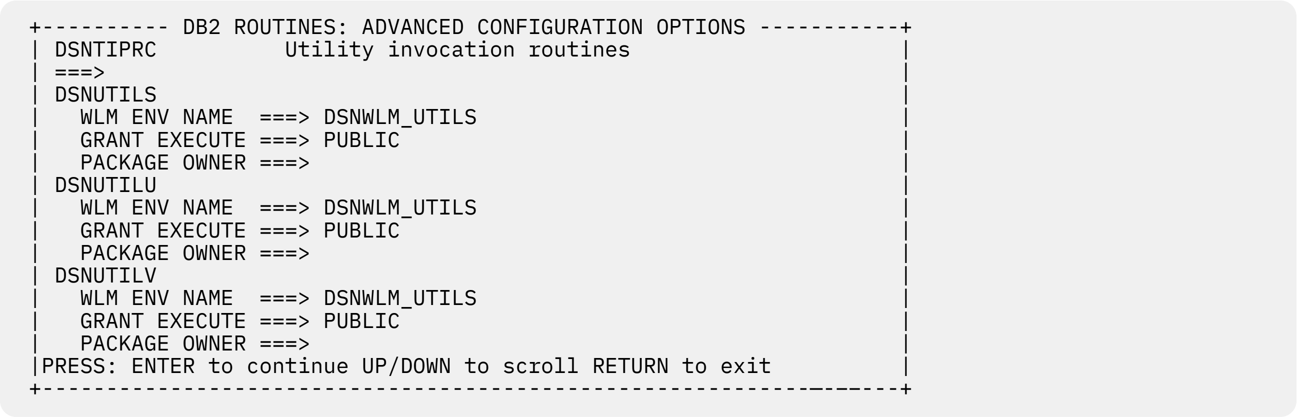
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Utility invocation routines panel: DSNTIPRC

The DSNTIPRC panel allows you to modify configuration options for utility invocation routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRC          Utility invocation routines                      |
| ===>                                                               |
| DSNUTILS                                                           |
|   WLM ENV NAME  ===> DSNWLM_UTILS                                  |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DSNUTILU                                                           |
|   WLM ENV NAME  ===> DSNWLM_UTILS                                  |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DSNUTILV                                                           |
|   WLM ENV NAME  ===> DSNWLM_UTILS                                  |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit           |
+--------------------------------------------------------------------+
```

Figure 52. Utility invocation routines panel: DSNTIPRC

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_UTILS
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

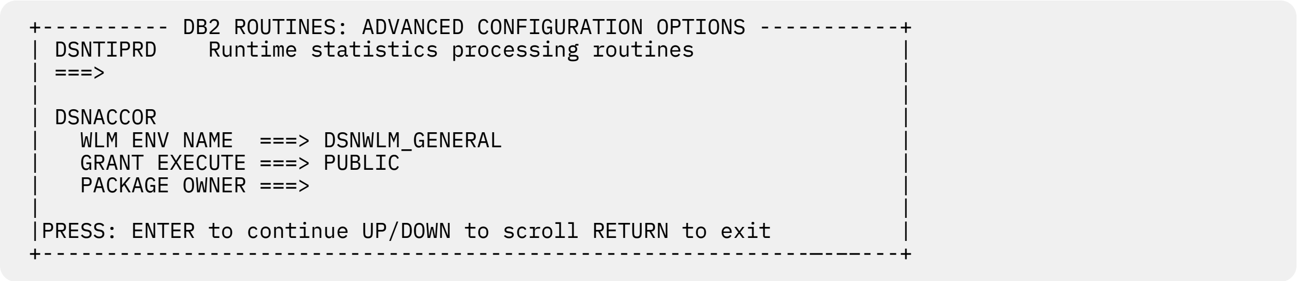
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Run time statistics processing routines panel: DSNTIPRD

The DSNTIPRD panel allows you to modify configuration options for run time statistics processing routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRD    Runtime statistics processing routines                |
| ===>                                                              |
|                                                                   |
| DSNACCOR                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 53. Run time statistics processing routines panel: DSNTIPRD

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

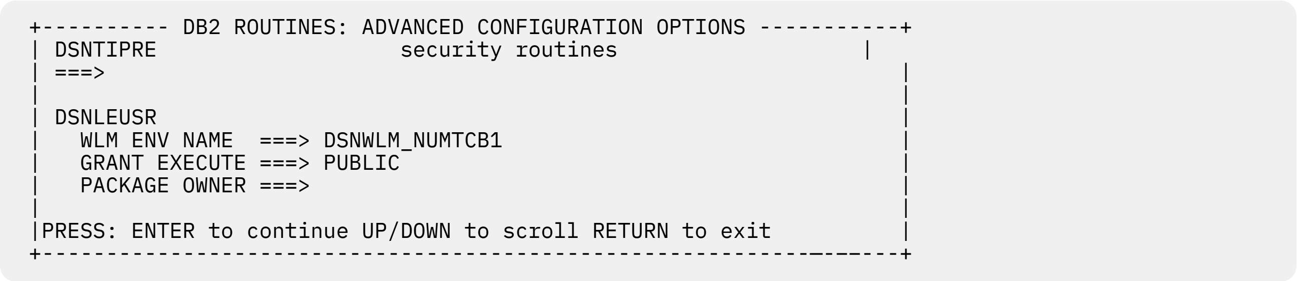
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Db2 security routines panel: DSNTIPRE

The DSNTIPRE panel allows you to modify configuration options for the SYSIBM.USERNAMES encryption routine.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
 +---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
 | DSNTIPRE                   security routines                 |
 | ===>                                                              |
 |                                                                   |
 | DSNLEUSR                                                          |
 |   WLM ENV NAME  ===> DSNWLM_NUMTCB1                               |
 |   GRANT EXECUTE ===> PUBLIC                                       |
 |   PACKAGE OWNER ===>                                              |
 |                                                                   |
 |PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
 +-------------------------------------------------------------------+
```

Figure 54. Db2 security routines panel: DSNTIPRE

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_NUMTCB1
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

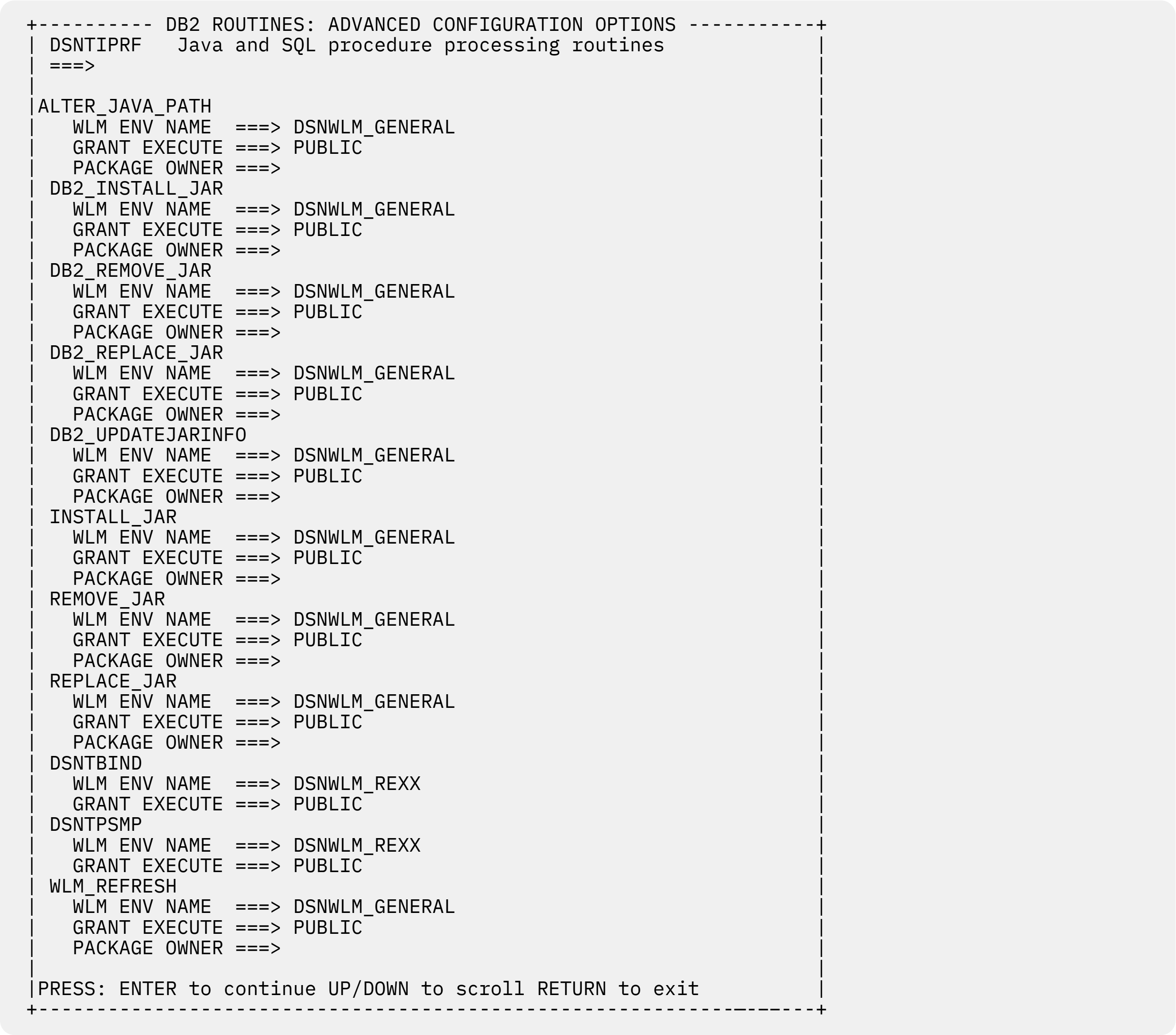
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Java and SQL procedure processing routines panel: DSNTIPRF

The DSNTIPRF panel allows you to modify configuration options for SQL procedure processing routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRF   Java and SQL procedure processing routines              |
| ===>                                                               |
|                                                                    |
|ALTER_JAVA_PATH                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DB2_INSTALL_JAR                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DB2_REMOVE_JAR                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DB2_REPLACE_JAR                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DB2_UPDATEJARINFO                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| INSTALL_JAR                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| REMOVE_JAR                                                         |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| REPLACE_JAR                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| DSNTBIND                                                           |
|   WLM ENV NAME  ===> DSNWLM_REXX                                   |
|   GRANT EXECUTE ===> PUBLIC                                        |
| DSNTPSMP                                                           |
|   WLM ENV NAME  ===> DSNWLM_REXX                                   |
|   GRANT EXECUTE ===> PUBLIC                                        |
| WLM_REFRESH                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
|                                                                    |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+--------------------------------------------------------------------+
```

Figure 55. Java and SQL procedure processing routines panel: DSNTIPRF

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL for most routines, DSNWLM_REXX for DSNTBIND and DSNTPSMP
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

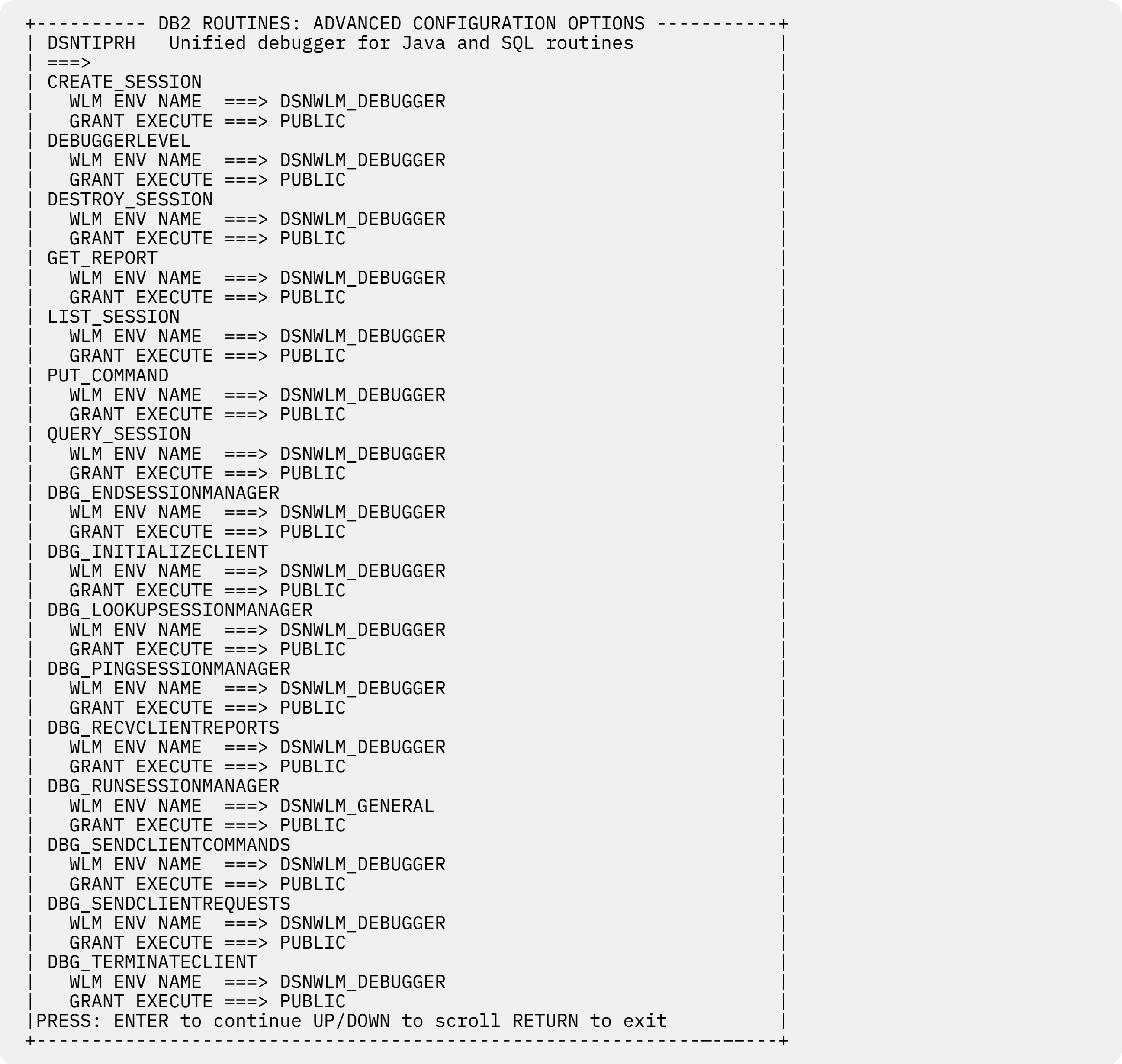
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Unified debugger for Java and SQL routines panel: DSNTIPRH

The DSNTIPRH panel allows you to modify configuration options for unified debugger for SQL and Java routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRH   Unified debugger for Java and SQL routines             |
| ===>                                                              |
| CREATE_SESSION                                                    |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DEBUGGERLEVEL                                                     |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DESTROY_SESSION                                                   |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| GET_REPORT                                                        |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| LIST_SESSION                                                      |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| PUT_COMMAND                                                       |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| QUERY_SESSION                                                     |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_ENDSESSIONMANAGER                                             |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_INITIALIZECLIENT                                              |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_LOOKUPSESSIONMANAGER                                          |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_PINGSESSIONMANAGER                                            |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_RECVCLIENTREPORTS                                             |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_RUNSESSIONMANAGER                                             |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_SENDCLIENTCOMMANDS                                            |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_SENDCLIENTREQUESTS                                            |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
| DBG_TERMINATECLIENT                                               |
|   WLM ENV NAME  ===> DSNWLM_DEBUGGER                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 56. Unified debugger for Java and SQL routines panel: DSNTIPRH

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_DEBUGGER for most routines, DSNWLM_GENERAL for DBG_RUNSESSIONMANAGER
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID

Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

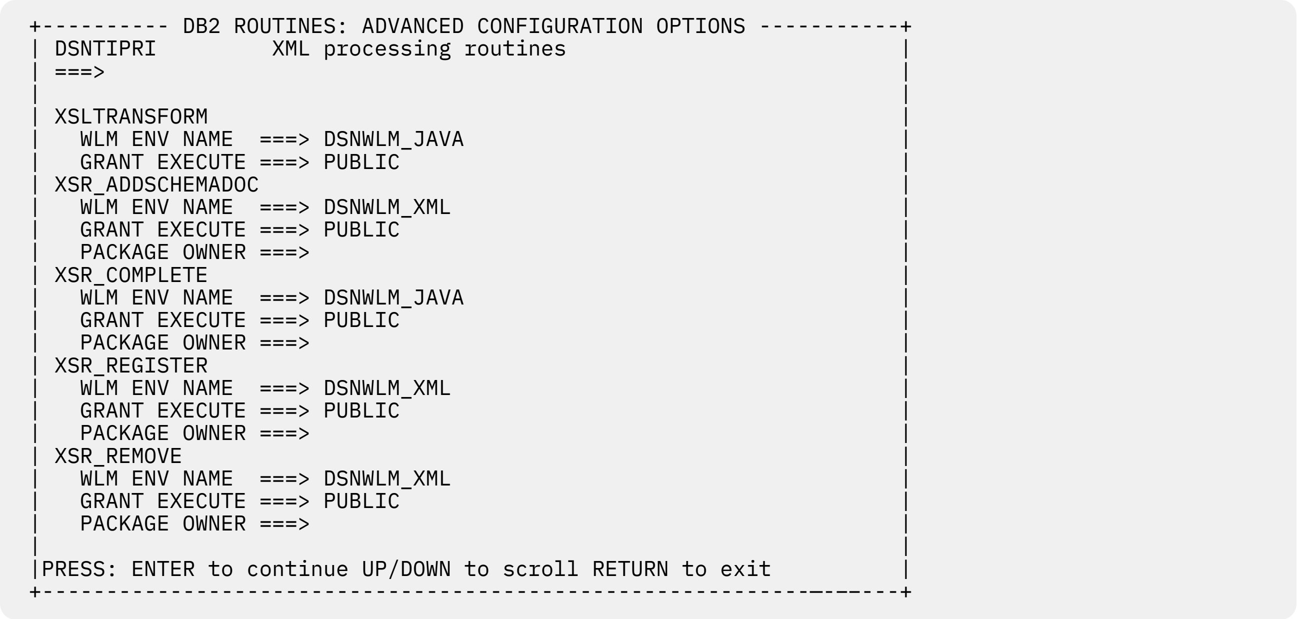
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

XML processing routines panel: DSNTIPRI

The DSNTIPRI panel allows you to modify configuration options for XSL transform and XML schema processing routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRI         XML processing routines                          |
| ===>                                                              |
|                                                                   |
| XSLTRANSFORM                                                      |
|   WLM ENV NAME  ===> DSNWLM_JAVA                                  |
|   GRANT EXECUTE ===> PUBLIC                                       |
| XSR_ADDSCHEMADOC                                                  |
|   WLM ENV NAME  ===> DSNWLM_XML                                   |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| XSR_COMPLETE                                                      |
|   WLM ENV NAME  ===> DSNWLM_JAVA                                  |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| XSR_REGISTER                                                      |
|   WLM ENV NAME  ===> DSNWLM_XML                                   |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| XSR_REMOVE                                                        |
|   WLM ENV NAME  ===> DSNWLM_XML                                   |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 57. XML processing routines panel: DSNTIPRI

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_XML for most routines, DSNWLM_JAVA for XSR_COMPLETE and XSLTRANSFORM
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

IBM Text Search routines panel: DSNTIPRJ

The DSNTIPRJ panel allows you to modify configuration options for Text Search routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)

```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRJ            IBM Text Search routines                      |
| ===>                                                              |
| SYSTS_ALTER                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_CREATE                                                      |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_DROP                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_ENCRYPT                                                     |
|   WLM ENV NAME  ===> DSNWLM_JAVA                                  |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_RESTORE                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_START                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_STOP                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_TAKEOVER                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SYSTS_UPDATE                                                      |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 58. IBM Text Search routines panel: DSNTIPRJ

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL (DSNWLM_JAVA for SYSTS_ENCRYPT)
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Database metadata routines panel: DSNTIPRK

The DSNTIPRK panel allows you to modify configuration options for database metadata routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)

```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRK           Database metadata routines                      |
| ===>                                                               |
|                                                                    |
| SQLCAMESSAGE                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
| SQLCOLPRIVILEGES                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLCOLUMNS                                                         |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLFOREIGNKEYS                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLFUNCTIONCOLS                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLFUNCTIONS                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLGETTYPEINFO                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLPRIMARYKEYS                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLPROCEDURECOLS                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLPROCEDURES                                                      |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLPSEUDOCOLUMNS                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLSPECIALCOLUMNS                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLSTATISTICS                                                      |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLTABLEPRIVILEGES                                                 |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLTABLES                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| SQLUDTS                                                            |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
|                                                                    |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit           |
+--------------------------------------------------------------------+
```

Figure 59. Database metadata routines panel: DSNTIPRK

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name

Default:	DSNWLM_GENERAL
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Db2 administration routines panel: DSNTIPRL

The DSNTIPRL panel allows you to modify configuration options for routines that are to be used for administration.

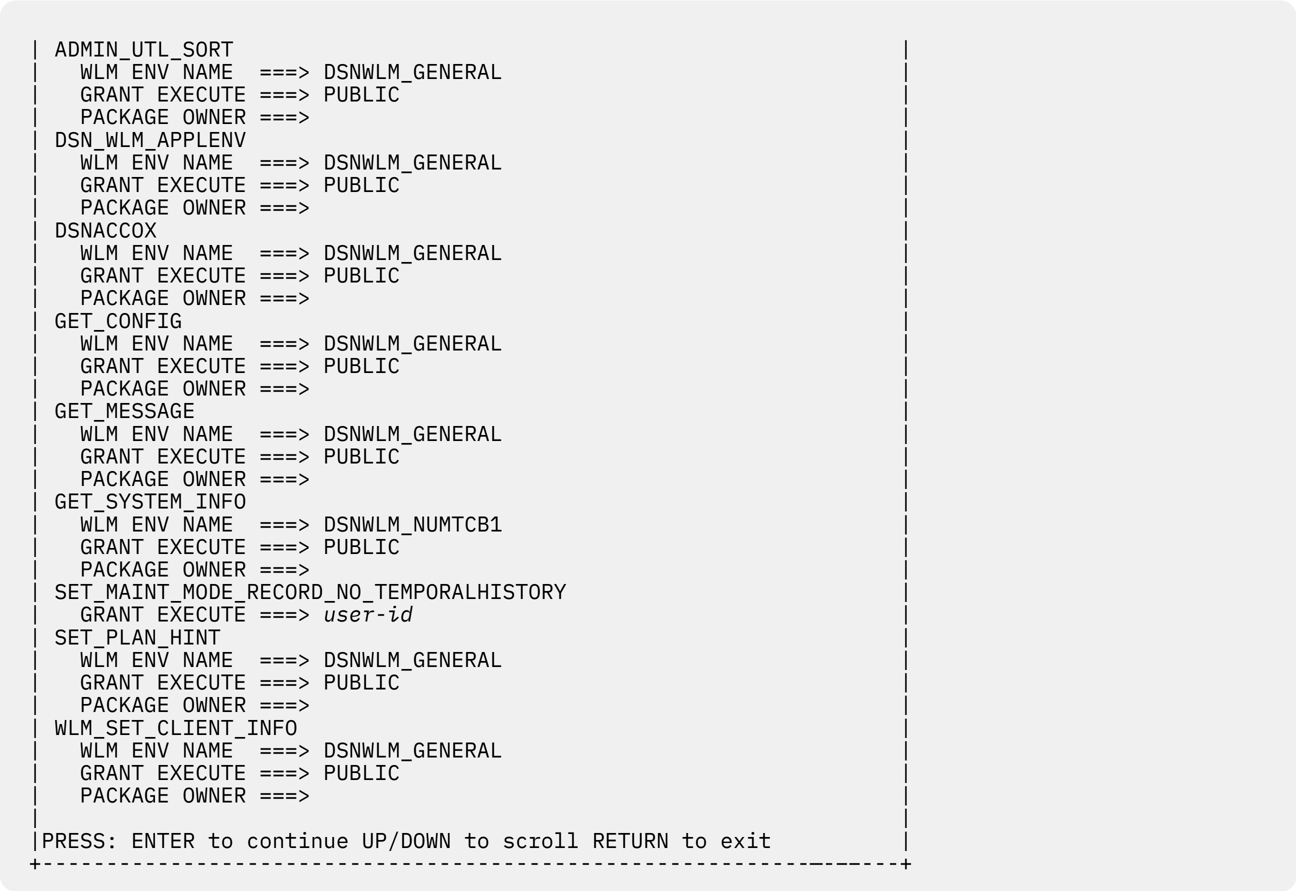
Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)

```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRL           administration routines                      |
| ===>                                                              |
| ADMIN_COMMAND_DB2                                                 |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_COMMAND_DSN                                                 |
|   WLM ENV NAME  ===> DSNWLM_REXX                                  |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_COMMAND_MVS                                                 |
|   WLM ENV NAME  ===> DSNWLM__GENERAL                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_COMMAND_UNIX                                                |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                           |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_BROWSE                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_DELETE                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_LIST                                                     |
|  WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|  GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_RENAME                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_SEARCH                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_DS_WRITE                                                    |
|  WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_EXPLAIN_MAINT                                               |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_INFO_HOST                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |

| ADMIN_INFO_SMS                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_INFO_SQL                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| ADMIN_INFO_SSID                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
```

Figure 60. DB2 administration routines panel: DSNTIPRL (part 1 of 3)

```
| ADMIN_INFO_SYSLOG                                                  |
|   WLM ENV NAME  ===> DSNWLM_REXX                                   |
|   GRANT EXECUTE ===> PUBLIC                                        |
| ADMIN_INFO_SYSPARM                                                 |
|   WLM ENV NAME  ===> DSNWLM_NUMTCB1                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_JOB_CANCEL                                                   |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                            |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_JOB_FETCH                                                    |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                            |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_JOB_QUERY                                                    |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                            |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_JOB_SUBMIT                                                   |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                            |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_ADD                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_CANCEL                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_LIST                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_OUTPUT                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_REMOVE                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_STATUS                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_TASK_UPDATE                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_UPDATE_SYSPARM                                               |
|   WLM ENV NAME  ===> DSNWLM_REXX                                   |
|   GRANT EXECUTE ===> PUBLIC                                        |
| ADMIN_UTL_EXECUTE                                                  |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_UTL_MODIFY                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_UTL_MONITOR                                                  |
|   WLM ENV NAME  ===> DSNWLM_PGM_CONTROL                            |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| ADMIN_UTL_SCHEDULE                                                 |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                                |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
```

Figure 61. DB2 administration routines panel: DSNTIPRL (part 2 of 3)



```
| ADMIN_UTL_SORT                                                    |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| DSN_WLM_APPLENV                                                   |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| DSNACCOX                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| GET_CONFIG                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| GET_MESSAGE                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| GET_SYSTEM_INFO                                                   |
|   WLM ENV NAME  ===> DSNWLM_NUMTCB1                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| SET_MAINT_MODE_RECORD_NO_TEMPORALHISTORY                          |
|   GRANT EXECUTE ===> user-id                                      |
| SET_PLAN_HINT                                                     |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| WLM_SET_CLIENT_INFO                                               |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 62. Db2 administration routines panel: DSNTIPRL (part 3 of 3)

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	see the panel illustration for the default environment name of each routine
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

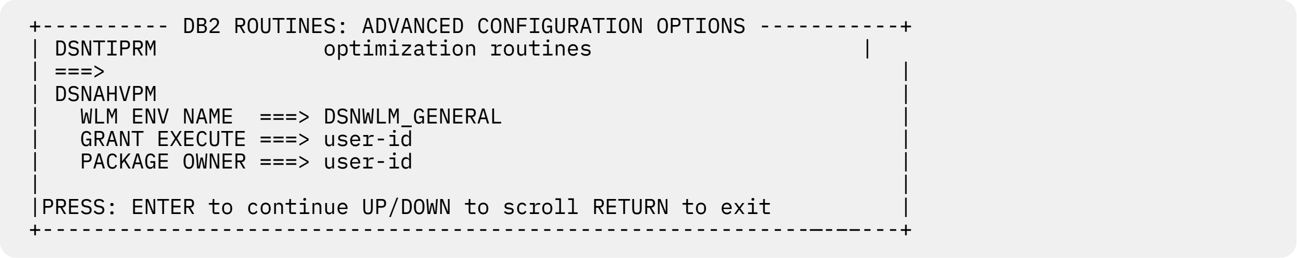
Acceptable values:	blank, or a valid authorization ID

Default:	blank
DSNZP*xxx*:	none

Db2 optimization routines panel: DSNTIPRM

The DSNTIPRM panel allows you to modify configuration options for routines that are to be used for optimization.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRM             optimization routines                     |
| ===>                                                              |
| DSNAHVPM                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> user-id                                      |
|   PACKAGE OWNER ===> user-id                                      |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 63. Db2 query optimization routines panel: DSNTIPRM

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

The setting *user-id* is the TSO user ID used to run the installation CLIST.

Acceptable values:	at least one valid authorization ID
Default:	user-id
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

The setting *user-id* is the TSO user ID used to run the installation CLIST.

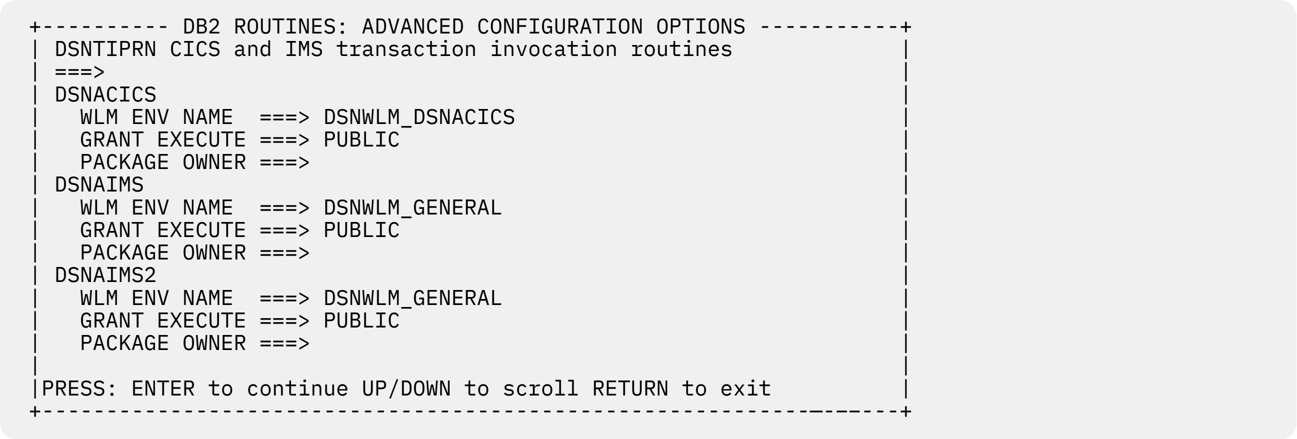
Acceptable values:	blank, or a valid authorization ID
Default:	user-id

DSNZP*xxx*:	none

CICS and IMS transaction invocation routines panel: DSNTIPRN

The DSNTIPRN panel allows you to modify configuration options for CICS and IMS transaction invocation routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRN CICS and IMS transaction invocation routines             |
| ===>                                                              |
| DSNACICS                                                          |
|   WLM ENV NAME  ===> DSNWLM_DSNACICS                              |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| DSNAIMS                                                           |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
| DSNAIMS2                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
|   PACKAGE OWNER ===>                                              |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 64. CICS and IMS transaction invocation routines panel: DSNTIPRN

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL (DSNWLM_DSNACICS for DSNACICS)
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

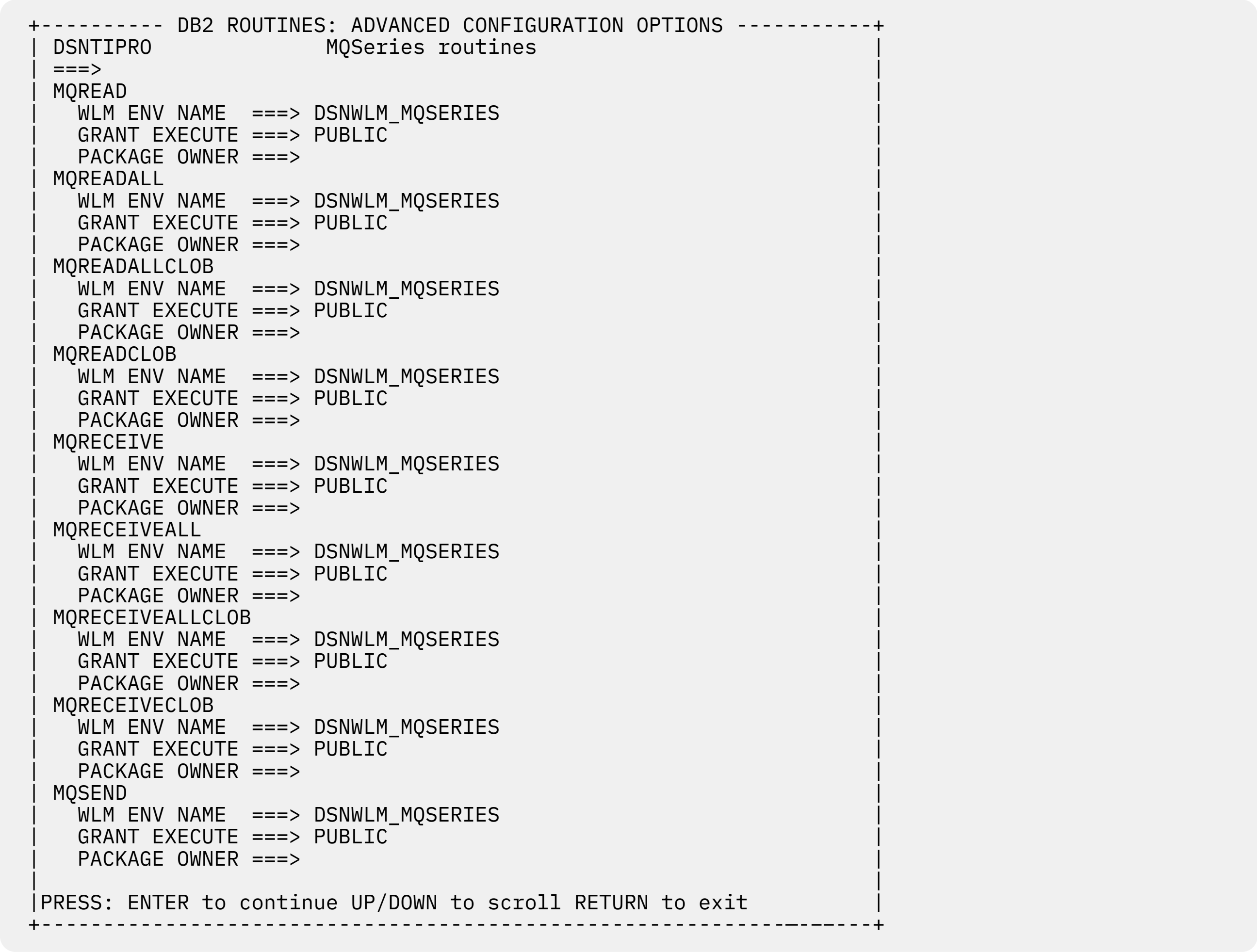
Acceptable values:	blank, or a valid authorization ID

Default:	blank
DSNZP*xxx*:	none

MQSeries routines panel: DSNTIPRO

The DSNTIPRO panel allows you to modify configuration options for IBM MQ routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRO              MQSeries routines                            |
| ===>                                                               |
| MQREAD                                                             |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQREADALL                                                          |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQREADALLCLOB                                                      |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQREADCLOB                                                         |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQRECEIVE                                                          |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQRECEIVEALL                                                       |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQRECEIVEALLCLOB                                                   |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQRECEIVECLOB                                                      |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
| MQSEND                                                             |
|   WLM ENV NAME  ===> DSNWLM_MQSERIES                               |
|   GRANT EXECUTE ===> PUBLIC                                        |
|   PACKAGE OWNER ===>                                               |
|                                                                    |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit           |
+--------------------------------------------------------------------+
```

Figure 65. IBM MQ routines panel: DSNTIPRO

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_MQSERIES
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

Related tasks

Customizing the WLM application environment for running IBM MQ user-defined function support
To run the Db2 MQ user-defined functions, you must configure a WLM environment and the corresponding WLM startup procedure.

Related information

Web services/SOAP routines panel: DSNTIPRP

The DSNTIPRP panel allows you to modify configuration options for web services and SOAP routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)

```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRP          Web services/SOAP routines                      |
| ===>                                                              |
|                                                                   |
| SOAPHTTPC                                                         |
|   WLM ENV NAME  ===> DSNWLM_WEBSERVICES                           |
|   GRANT EXECUTE ===> PUBLIC                                       |
| SOAPHTTPNC                                                        |
|   WLM ENV NAME  ===> DSNWLM_WEBSERVICES                           |
|   GRANT EXECUTE ===> PUBLIC                                       |
| SOAPHTTPNV                                                        |
|   WLM ENV NAME  ===> DSNWLM_WEBSERVICES                           |
|   GRANT EXECUTE ===> PUBLIC                                       |
| SOAPHTTPV                                                         |
|   WLM ENV NAME  ===> DSNWLM_WEBSERVICES                           |
|   GRANT EXECUTE ===> PUBLIC                                       |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 66. Web services/SOAP routines panel: DSNTIPRP

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_WEBSERVICES
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

PACKAGE OWNER

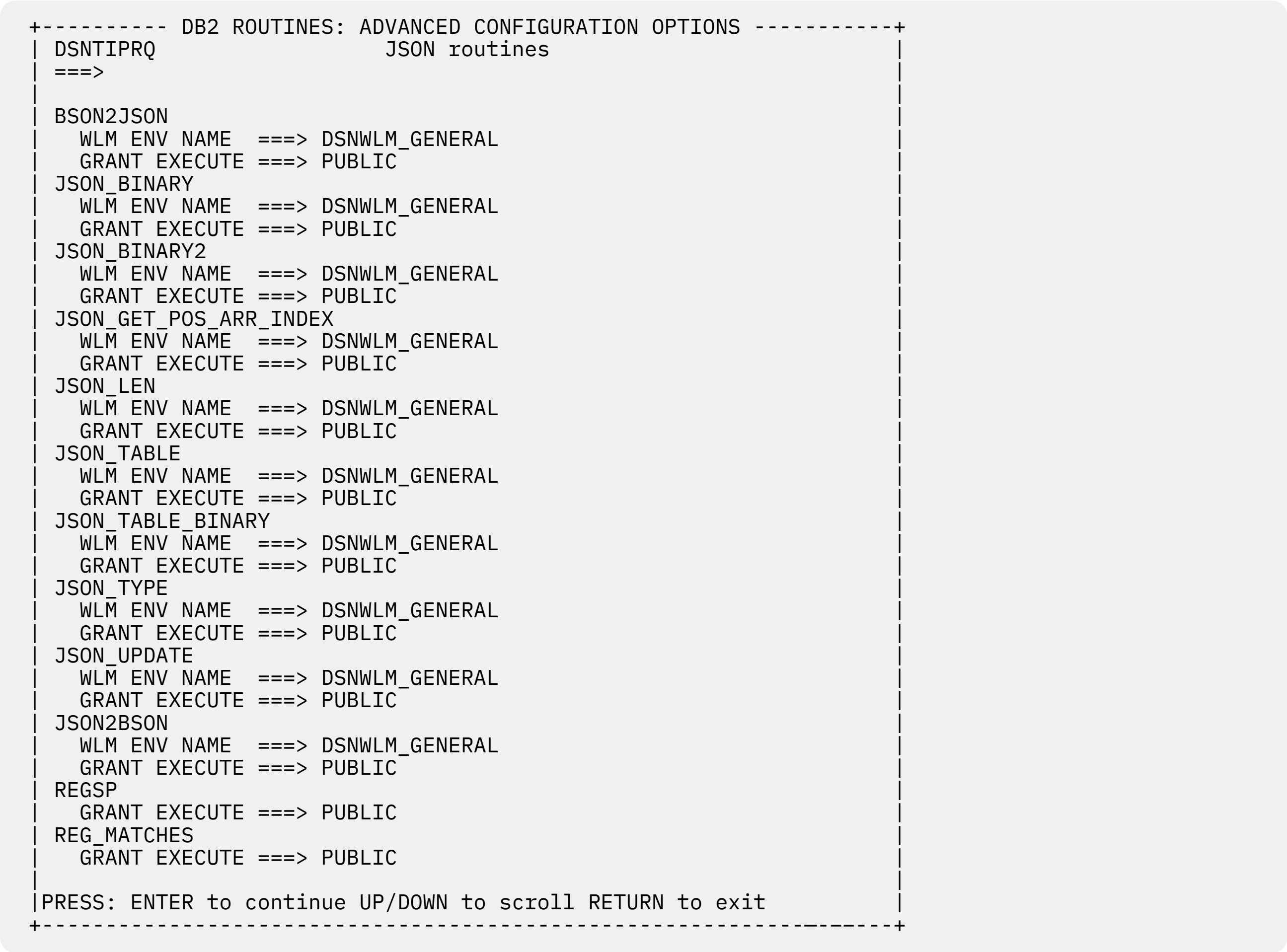
Specify the ID that should own the package when it is bound (the value for the OWNER parameter of the BIND PACKAGE command). The default for most routines is blank, meaning that no OWNER parameter is included in the BIND PACKAGE command. This field does not display for routines that do not have package.

Acceptable values:	blank, or a valid authorization ID
Default:	blank
DSNZP*xxx*:	none

JSON routines panel: DSNTIPRQ

The DSNTIPRQ panel allows you to modify configuration options for JSON routines.

Because space on this panel is limited, all fields might not be displayed at one time. The number of fields that are displayed depends on the maximum number of rows your ISPF display device can display at one time, whether you use split screen mode, and where you choose to split the screen. This panel is defined as a scrollable panel, which enables you to view all the fields if they are not displayed at one time. The panel can be scrolled when the label "More" displays near the upper right corner of the panel. A plus symbol (+) following "More" indicates that the panel can be scrolled down, and a minus symbol (-) indicates that the panel can be scrolled up. You can use the ISPF scroll commands DOWN and UP to scroll through the fields. (Alternatively, you can assign your PF keys to be the DOWN and UP commands.)



```
+---------- DB2 ROUTINES: ADVANCED CONFIGURATION OPTIONS -----------+
| DSNTIPRQ                  JSON routines                           |
| ===>                                                              |
|                                                                   |
| BSON2JSON                                                         |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_BINARY                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_BINARY2                                                      |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_GET_POS_ARR_INDEX                                            |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_LEN                                                          |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_TABLE                                                        |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_TABLE_BINARY                                                 |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_TYPE                                                         |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON_UPDATE                                                       |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| JSON2BSON                                                         |
|   WLM ENV NAME  ===> DSNWLM_GENERAL                               |
|   GRANT EXECUTE ===> PUBLIC                                       |
| REGSP                                                             |
|   GRANT EXECUTE ===> PUBLIC                                       |
| REG_MATCHES                                                       |
|   GRANT EXECUTE ===> PUBLIC                                       |
|                                                                   |
|PRESS: ENTER to continue UP/DOWN to scroll RETURN to exit          |
+-------------------------------------------------------------------+
```

Figure 67. JSON routines panel: DSNTIPRQ

WLM ENV NAME

Specify the WLM environment name for the routine.

Acceptable values:	a valid WLM environment name
Default:	DSNWLM_GENERAL
DSNZP*xxx*:	none

GRANT EXECUTE

Specify one or more authorization IDs that are to be granted EXECUTE access on the routine. Use commas to separate individual IDs. Do not use embedded blanks. You can enter up to 44 characters, including commas.

Acceptable values:	at least one valid authorization ID
Default:	PUBLIC
DSNZP*xxx*:	none

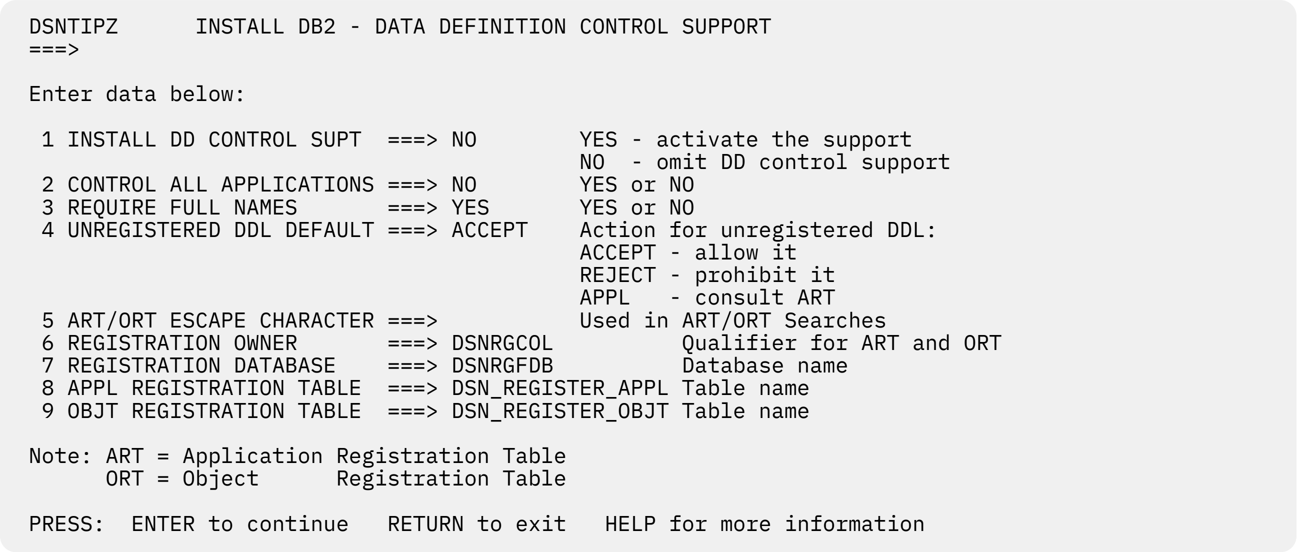
DSNTIPZ: Data definition control support panel

The entries on the DSNTIPZ panel allow you to install and tailor data definition control support.

Two SQL tables (application registration and object registration) are identified and created even if data definition control support is not installed. This simplifies future activation of the facility. Specified application identifiers (Db2 plans or collections of packages) can be registered in the application

]

registration table, and, optionally, their associated Db2 object names can be registered in the object registration table. Db2 consults these two tables prior to accepting a given DDL statement to make sure that a particular application identifier and object name are registered.



```
DSNTIPZ      INSTALL DB2 - DATA DEFINITION CONTROL SUPPORT
===>

Enter data below:

 1 INSTALL DD CONTROL SUPT  ===> NO        YES - activate the support
                                           NO  - omit DD control support
 2 CONTROL ALL APPLICATIONS ===> NO        YES or NO
 3 REQUIRE FULL NAMES       ===> YES       YES or NO
 4 UNREGISTERED DDL DEFAULT ===> ACCEPT    Action for unregistered DDL:
                                           ACCEPT - allow it
                                           REJECT - prohibit it
                                           APPL   - consult ART
 5 ART/ORT ESCAPE CHARACTER ===>           Used in ART/ORT Searches
 6 REGISTRATION OWNER       ===> DSNRGCOL          Qualifier for ART and ORT
 7 REGISTRATION DATABASE    ===> DSNRGFDB          Database name
 8 APPL REGISTRATION TABLE  ===> DSN_REGISTER_APPL Table name
 9 OBJT REGISTRATION TABLE  ===> DSN_REGISTER_OBJT Table name

Note: ART = Application Registration Table
      ORT = Object      Registration Table

PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 68. Data definition control support panel: DSNTIPZ

Related information

INSTALL DD CONTROL SUPT field (RGFINSTL subsystem parameter)

The RGFINSTL subsystem parameter determines whether data definition control support is to be installed.

Acceptable values:	YES, NO
Default:	NO
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFINSTL

YES
Data definition control support is installed.

NO
Data definition control support is not installed. DDL statements are not validated by this support. The application registration table and object registration table are still created according to values that are entered in fields 5 through 8 on panel DSNTIPZ.

CONTROL ALL APPLICATIONS field (RGFDEDPL subsystem parameter)

The RGFDEDPL subsystem parameter specifies whether the Db2 subsystem is to be completely controlled by a set of closed applications that are identified in the application registration table.

Acceptable values:	YES, NO
Default:	NO
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFDEDPL

Closed applications require their Db2 objects to be managed solely through the plans or packages of the closed application that is registered in the application registration table.

REQUIRE FULL NAMES field (RGFFULLQ subsystem parameter)

The RGFFULLQ subsystem parameter specifies whether registered objects are to require fully qualified names.

Acceptable values:	YES, NO
Default:	YES
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFFULLQ

UNREGISTERED DDL DEFAULT field (RGFDEFLT subsystem parameter)

The RGFDEFLT subsystem parameter specifies the action that is to be taken for DDL statements that name unregistered objects.

Acceptable values:	ACCEPT, REJECT, APPL
Default:	ACCEPT
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFDEFLT

ACCEPT
DDL statements that name unregistered objects are accepted.

REJECT
DDL statements that name unregistered objects are rejected.

APPL
DDL statements that name unregistered objects are rejected if the current application is not registered.

ART/ORT ESCAPE CHARACTER field (RGFESCP subsystem parameter)

The RGFESCP subsystem parameter specifies the escape character that is to be used in the application registration table (ART) or object registration table (ORT).

Acceptable values:	any non-alphanumeric character
Default:	none
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFESCP

Sets of names in the ART and ORT can be represented by patterns that use the underscore (_) and percent sign (%) characters in the same way as in an SQL LIKE predicate.

If you enter a character in this field, it can be used in those patterns in the same way as an escape character is used in an SQL LIKE predicate.

Related information

REGISTRATION OWNER field (RGFCOLID subsystem parameter)

The RGFCOLID subsystem parameter specifies the ID that is to own both the application registration table and the object registration table.

Acceptable values:	1 - 8 characters
Default:	DSNRGCOL

Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFCOLID

REGISTRATION DATABASE field (RGFDBNAM subsystem parameter)

The RGFDBNAM subsystem parameter specifies the name of the database that is to contain the registration tables that are used for data definition control support.

Acceptable values:	1 - 8 characters
Default:	DSNRGFDB
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFDBNAM

APPL REGISTRATION TABLE field (RGFNMPRT subsystem parameter)

The RGFNMPRT subsystem parameter specifies the name that is to be used for the application registration table.

Acceptable values:	1 - 17 characters
Default:	DSN_REGISTER_APPL
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFNMPRT

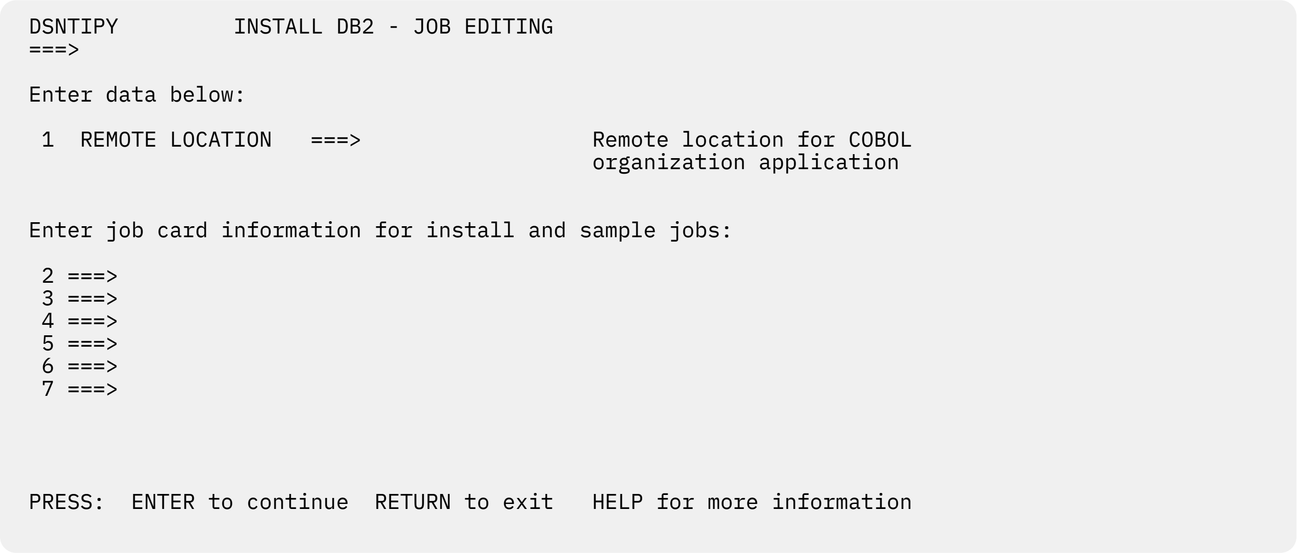
OBJT REGISTRATION TABLE field (RGFNMORT subsystem parameter)

The RGFNMORT subsystem parameter specifies the name that is to be used for the object registration table (ORT).

Acceptable values:	1 - 17 characters
Default:	DSN_REGISTER_OBJT
Update:	option 43 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RGFNMORT

DSNTIPY: Job editing panel

The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.



```
DSNTIPY         INSTALL DB2 - JOB EDITING
===>

Enter data below:

 1  REMOTE LOCATION   ===>                  Remote location for COBOL
                                            organization application


Enter job card information for install and sample jobs:

 2 ===>
 3 ===>
 4 ===>
 5 ===>
 6 ===>
 7 ===>



PRESS:  ENTER to continue  RETURN to exit   HELP for more information
```

Figure 69. Job editing panel: DSNTIPY

Related concepts

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related reference

JCLLIB statement (MVS JCL Reference)
JES2 Control Statements (MVS JCL Reference)
JES3 Control Statements (MVS JCL Reference)

REMOTE LOCATION field

The REMOTE LOCATION field specifies the location of another Db2 subsystem. The remote subsystem is used by the COBOL preparation sample job DSNTEJ3C, the DDF remote location update sample job DSNTEJ6, and the stored procedures sample jobs. The stored procedures sample jobs that require a remote location name are DSNTEJ6D, DSNTEJ6P, DSNTEJ6S, DSNTEJ6T, DSNTEJ61, and DSNTEJ62.

Acceptable values:	1 - 16 characters
Default:	none
Update:	See “Updating subsystem parameter and application default values” on page 317
DSNZP*xxx*:	none

The location name must begin with a letter and must not contain special characters. A remote location name is accepted only if you have also entered a Db2 location name for the Db2 LOCATION NAME field on installation panel DSNTIPR.

Related reference

DB2 LOCATION NAME field

Job card information fields

The job card information fields specify the job statements that are to be used in all the installation and sample application jobs.

Acceptable values:	see below
Default:	none
Update:	option 44 on panel DSNTIPB
DSNZP*xxx*:	none

Specify the job name in one of two ways:

- If the job name is *member*, the job name for each job is the same as its member name.
- If the job name is any value other than *member*, the name is truncated to seven characters, and one character is added to the end of the name to identify the run order for that job.

An example of job card information follows:

```
3====> //MEMBER JOB,
4====> // MSGLEVEL=(1,1),MSGCLASS=H,REGION=2M,CLASS=A
5====> // USER=SYSADM,PASSWORD=SYSADM,NOTIFY=SYSADM
6====>
```

DSNTIPC: CLIST calculations panel 1

The DSNTIPC panel displays the messages that the installation CLIST issues to indicate calculated storage sizes.

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

Space estimates from these messages do not account for cylinder rounding. Base requirements can be 10% - 20% higher than the message indicates, depending on the disk type.

The messages show that most of the needed virtual storage is in extended private storage and storage above the 2 GB bar, including the buffer pool, the EDM pool, and almost all of the code and working storage.

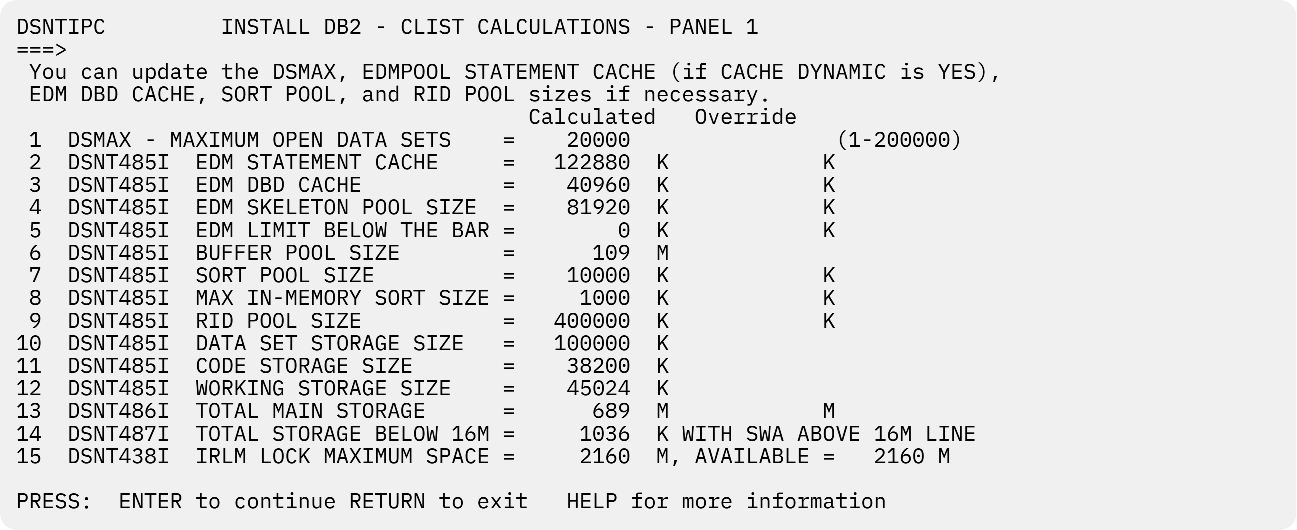
For most fields on this panel, you have a choice between accepting or overriding the calculated value:

During the tailoring session, message DSNT438I is issued to the tailoring terminal. This message, which shows the IRLM LOCK MAXIMUM SPACE and MAX STORAGE FOR LOCKS values, is always issued if you accept the default values.

This message indicates that the IRLM could request a total amount of space that is larger than the available space, causing an abend. The message is based on the following variables:

- The maximum number of data or row locks per user that is specified on installation panel DSNTIPJ (LOCKS PER USER)
- The number of users that is specified on installation panel DSNTIPE for MAX USERS and MAX REMOTE ACTIVE

The CLIST assumes that the private region that is available for IRLM locks is estimated as 60,000 KB.



```
DSNTIPC         INSTALL DB2 - CLIST CALCULATIONS - PANEL 1
===>
 You can update the DSMAX, EDMPOOL STATEMENT CACHE (if CACHE DYNAMIC is YES),
 EDM DBD CACHE, SORT POOL, and RID POOL sizes if necessary.
                                        Calculated   Override
 1  DSMAX - MAXIMUM OPEN DATA SETS    =    20000                (1-200000)
 2  DSNT485I  EDM STATEMENT CACHE     =   122880  K            K
 3  DSNT485I  EDM DBD CACHE           =    40960  K            K
 4  DSNT485I  EDM SKELETON POOL SIZE  =    81920  K            K
 5  DSNT485I  EDM LIMIT BELOW THE BAR =        0  K            K
 6  DSNT485I  BUFFER POOL SIZE        =      109  M
 7  DSNT485I  SORT POOL SIZE          =    10000  K            K
 8  DSNT485I  MAX IN-MEMORY SORT SIZE =     1000  K            K
 9  DSNT485I  RID POOL SIZE           =   400000  K            K
10  DSNT485I  DATA SET STORAGE SIZE   =   100000  K
11  DSNT485I  CODE STORAGE SIZE       =    38200  K
12  DSNT485I  WORKING STORAGE SIZE    =    45024  K
13  DSNT486I  TOTAL MAIN STORAGE      =      689  M            M
14  DSNT487I  TOTAL STORAGE BELOW 16M =     1036  K WITH SWA ABOVE 16M LINE
15  DSNT438I  IRLM LOCK MAXIMUM SPACE =     2160  M, AVAILABLE =   2160 M

PRESS:  ENTER to continue RETURN to exit   HELP for more information
```

Figure 70. CLIST calculations panel 1: DSNTIPC

Related tasks

Calculating storage requirements with the installation CLIST
By providing information about the sizes of your Db2 environment, you can use the installation CLIST to calculate certain storage requirements for your Db2 subsystem.

Related reference

DSNTIPD: Sizes panel 1
The entries on the DSNTIPD panel establish the size of the Db2 catalog, directory, and log data sets. Entries on the DSNTIPD panel also define the amount of storage that can be used for storing large object (LOB) values.

Related information

DSMAX field (DSMAX subsystem parameter)

The DSMAX subsystem parameter specifies the maximum number data sets that can be open at one time.

Acceptable values:	1 - 200000
Default:	based on calculations
Update:	enter a value in the override column
DSNZP*xxx*:	DSN6SPRM DSMAX

32768 - 200000
If the number of open data sets reaches the specified value, new OPEN statements begin to fail with reason code 00C20113. However, when the number of open data sets approaches the specified value, Db2 also begins closing a number of open data sets, starting with the least recently used CLOSE YES data sets.

1 - 32767
For any value in this range, if the number of open data sets reaches 32,768, new OPEN statements begin to fail with reason code 00C20113. However, when the number of open data sets approaches 32,768, Db2 also begins closing a number of open data sets, starting with the least recently used CLOSE YES data sets.

Although the maximum number of data sets is 200000, the practical limit can be much lower, depending on the available 31-bit storage below the bar in the database services address space (*ssnm*DBM1). The value that you enter can substantially influence the performance of Db2.

Complete one of the following actions to improve the performance of opening and closing data sets:

- Update the ALLOC*xx* parmlib member to set the SYSTEM MEMDSENQMGMT value to ENABLE.
- Issue system command SETALLOC SYSTEM,MEMDSENQMGMT=ENABLE.

It is best to update the ALLOC*xx* parmlib because the change remains effective across IPLs. If the SETALLOC command is used to enable SYSTEM MEMDSENQMGM, you must restart Db2.

When a secondary index is nonpartitioned, the number of data sets that are required for the index is dependent on the total required space to contain the tree structure and on the size limit of each data set. When a secondary index is data-partitioned, the number of data sets that are required for the index is equal to the number of data partitions in the table space that contains the table. Unless a small piece size is used for nonpartitioned secondary indexes, partitioning generally results in an increase in the number of data sets for the index.

If the partitioning of secondary indexes causes the number of data sets to increase or decrease appreciably, you can modify the value of DSMAX. The default value for DSMAX is calculated by Db2 and does not count partitioned objects. Choose the value for DSMAX according to the impact that partitioning secondary indexes has on the number of data sets for those objects. Db2 defers closing and deallocating table spaces or indexes until the number of open data sets reaches the operating system limit or approaches the value that is specified by DSMAX.

Related information

EDM STATEMENT CACHE field (EDMSTMTC subsystem parameter)

The EDMSTMTC subsystem parameter determines the amount of EDM storage, in kilobytes, that is to be used for cached dynamic statements. This storage pool is located above the 2 GB bar.

Acceptable values:	5000 - 4194304
Default:	113386 “1” on page 305
Update:	press ENTER on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EDMSTMTC

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see “Calculating storage requirements with the installation CLIST” on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

Related tasks

Calculating storage requirements with the installation CLIST
By providing information about the sizes of your Db2 environment, you can use the installation CLIST to calculate certain storage requirements for your Db2 subsystem.

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

Related information

EDM DBD CACHE field (EDMDBDC subsystem parameter)

The EDMDBDC subsystem parameter determines the minimum size (in KB) of the DBD cache that is to be used by the environmental descriptor manager (EDM).

Acceptable values:	5000 - 4194304
Default:	23400"1" on page 306
Update:	press ENTER on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EDMDBDC

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see "Calculating storage requirements with the installation CLIST" on page 5

The default value for EDM DBD CACHE is the larger of the EDM calculated value or 5000 K.

You can use the SET SYSPARM command to change this value. This value is used at Db2 startup time as the minimum value. This value cannot be decreased below the value that is specified at Db2 startup. This storage pool is located above the 2 GB bar.

Related tasks

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

Related information

EDM SKELETON POOL SIZE field (EDM_SKELETON_POOL subsystem parameter)

The EDM_SKELETON_POOL subsystem parameter determines the minimum size of the EDM skeleton pool in KB.

Acceptable values:	5120 - 4194304
Default:	10240 "1" on page 306
Update:	press ENTER on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EDM_SKELETON_POOL

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see "Calculating storage requirements with the installation CLIST" on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

You can change this value by using the SET SYSPARM command. The setting is used at Db2 start time. The skeleton pool, which is located above the bar, is a component of EDM for storing skeleton package tables (SKPTs), where each SKPT represents a package.

Related tasks

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

Related information

EDM LIMIT BELOW THE BAR (EDMPOOL subsystem parameter)

The EDMPOOL subsystem parameter determines the maximum KB of storage below the 2 GB bar that can be consumed by the environmental descriptor manager (EDM). A value of 0 means that 31-bit EDM consumption is unbounded.

Acceptable values:	0 - 2097152
Default:	0
Update:	press ENTER twice on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM EDMPOOL

EDM does not allocate storage below the bar from the thread level pool except to process a package or plan that was last bound or re-bound prior to DB2 10.

Recommendation: If you have packages or native SQL procedures that were bound prior to DB2 10, you can re-bind the packages by using ALTER PROCEDURE with REGENERATE to eliminate use of storage below the bar. If you do not take these steps to eliminate use of storage below the bar, you can override the default setting with the EDMPOOL value that you used in the previous release.

If the specified limit is reached or a new request would otherwise exceed the limit, Db2 issues a resource unavailable message, and the requested operation is not performed.

The EDMPOOL parameter can be changed online. When you dynamically update EDMPOOL by using the SET SYSPARM command, you can set EDMPOOL to any acceptable value.

Related tasks

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

BUFFER POOL SIZE field

The value of the BUFFER POOL SIZE field is the buffer pool size that is calculated by the CLIST.

Acceptable values:	none
Default:	101 M “1” on page 307
Update:	run CLIST again
DSNZP*xxx*:	none

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see "Calculating storage requirements with the installation CLIST" on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

This field is protected and cannot be changed during update processing. If you want to change the size of a buffer pool, you must use the command ALTER BUFFERPOOL.

Related information

SORT POOL SIZE field (SRTPOOL subsystem parameter)

The SRTPOOL subsystem parameter specifies the amount of storage in kilobytes that is needed for the sort pool.

Acceptable values:	240 - 128000
Default:	10000"1" on page 308
Update:	press Enter twice on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM SRTPOOL

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see "Calculating storage requirements with the installation CLIST" on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

If you decide to change this field, estimate the sort pool value by using the following formula:

```
32000 * (16 + sort key length + sort data length)
```

Related information

MAX IN-MEMORY SORT SIZE field (MAXSORT_IN_MEMORY subsystem parameter)

The MAXSORT_IN_MEMORY subsystem parameter specifies the maximum allocation of storage in kilobytes for a query that contains an ORDER BY clause, a GROUP BY clause, or both. The storage is allocated only during the processing of the query. Increasing the value in this field can improve performance of such queries but might require large amounts of real storage when several such queries run simultaneously.

Acceptable values:	1000 to the value specified in SORT POOL SIZE, whichever is larger
Default:	"1" on page 309
platform	
Update:	press Enter twice on panel DSNTIPB

DSNZP*xxx*:	DSN6SPRM MAXSORT_IN_MEMORY

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see “Calculating storage requirements with the installation CLIST” on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

Related reference

SORT POOL SIZE field (SRTPOOL subsystem parameter)
The SRTPOOL subsystem parameter specifies the amount of storage in kilobytes that is needed for the sort pool.

RID POOL SIZE field (MAXRBLK subsystem parameter)

The MAXRBLK subsystem parameter specifies the amount of storage in kilobytes that is needed for the RID pool.

Acceptable values:	0, 128 - 2000000
Default:	400000 “1” on page 309
Update:	press Enter twice on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM MAXRBLK

Notes:

1. Db2 calculates the value when you run the installation CLIST with INSTALL for INSTALL TYPE on panel DSNTIPA1, based on values that you specify on panel DSNTIPD.

   When you run the installation CLIST with MIGRATE for INSTALL TYPE on panel DSNTIPA1, Db2 11 uses the Db2 10 field value. For more information, see “Calculating storage requirements with the installation CLIST” on page 5

The **Override** column of panel DSNTIPC controls whether Db2 uses the calculated value:

- To accept the calculated value, ensure that the **Override** column contains no value.
- To override the calculated value, specify a value in the **Override** column.

If you decide to change this field, estimate the storage that is required for the RID pool by using the following formula:

```
Number of concurrent RID processing activities *
average number of RIDs * 2 * 5 (bytes per RID)
```

Choosing 0 disables the use of the RID pool. In this case, Db2 does not use access paths or join methods that depend on RID pool storage.

This storage is located above the 2 GB bar.

Related reference

MAX TEMP RID field (MAXTEMPS_RID subsystem parameter)

The MAXTEMPS_RID subsystem parameter determines the maximum amount of temporary storage in the work file database that a single RID list can use at a time.

Related information

CLIST messages fields for panel DSNTIPC

The CLIST messages fields display storage sizes that are calculated by the CLIST. These fields are protected and cannot be changed by the user.

Acceptable values:	none
Default:	none
Update:	run CLIST again
DSNZP*xxx*:	none

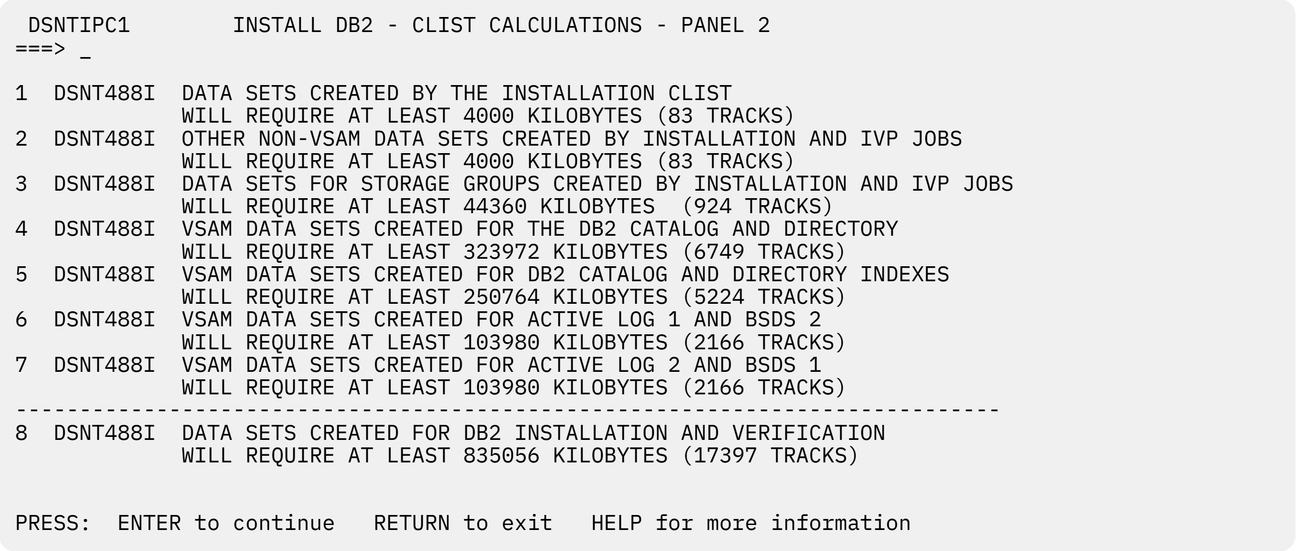
Storage messages fields

The storage messages fields indicate the results of the calculations described on panel DSNTIPC. These fields are protected and cannot be changed by a user.

Acceptable values:	none
Default:	none
Update:	run CLIST again
DSNZP*xxx*:	none

DSNTIPC1: CLIST calculations panel 2

The DSNTIPC1 panel displays CLIST messages that indicate a variety of calculations. This panel is displayed only when you run the CLIST in INSTALL mode.



```
 DSNTIPC1        INSTALL DB2 - CLIST CALCULATIONS - PANEL 2
===> _

1  DSNT488I  DATA SETS CREATED BY THE INSTALLATION CLIST
             WILL REQUIRE AT LEAST 4000 KILOBYTES (83 TRACKS)
2  DSNT488I  OTHER NON-VSAM DATA SETS CREATED BY INSTALLATION AND IVP JOBS
             WILL REQUIRE AT LEAST 4000 KILOBYTES (83 TRACKS)
3  DSNT488I  DATA SETS FOR STORAGE GROUPS CREATED BY INSTALLATION AND IVP JOBS
             WILL REQUIRE AT LEAST 44360 KILOBYTES  (924 TRACKS)
4  DSNT488I  VSAM DATA SETS CREATED FOR THE DB2 CATALOG AND DIRECTORY
             WILL REQUIRE AT LEAST 323972 KILOBYTES (6749 TRACKS)
5  DSNT488I  VSAM DATA SETS CREATED FOR DB2 CATALOG AND DIRECTORY INDEXES
             WILL REQUIRE AT LEAST 250764 KILOBYTES (5224 TRACKS)
6  DSNT488I  VSAM DATA SETS CREATED FOR ACTIVE LOG 1 AND BSDS 2
             WILL REQUIRE AT LEAST 103980 KILOBYTES (2166 TRACKS)
7  DSNT488I  VSAM DATA SETS CREATED FOR ACTIVE LOG 2 AND BSDS 1
             WILL REQUIRE AT LEAST 103980 KILOBYTES (2166 TRACKS)
-----------------------------------------------------------------------------
8  DSNT488I  DATA SETS CREATED FOR DB2 INSTALLATION AND VERIFICATION
             WILL REQUIRE AT LEAST 835056 KILOBYTES (17397 TRACKS)


PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 71. CLIST calculations panel 2: DSNTIPC1

CLIST messages fields for panel DSNTIPC1

The messages in these fields might be used depending on how many unique volume names were supplied on installation panel DSNTIPA2. These fields are protected and cannot be changed.

Acceptable values:	none

Default:	none
Update:	run CLIST again
DSNZP*xxx*:	none

CLIST panel session output

As output, the CLIST produces several data sets and a data set member.

Specifically, the CLIST panel session produces the following data sets and members:

***prefix*.SDSNSAMP**
The existing data set contains a new member, if specified, that contains the resulting parameter values from the session.

***prefix*.NEW.SDSNSAMP**
A new data set that contains the edited JCL with the values that you entered on the panels.

***prefix*.NEW.SDSNTEMP**
A new data set that contains tailored CLISTs for input to job DSNTIJVC, which is run during installation or migration.

The following data sets are also created if you specify the use of z/OSMF for installation or migration.

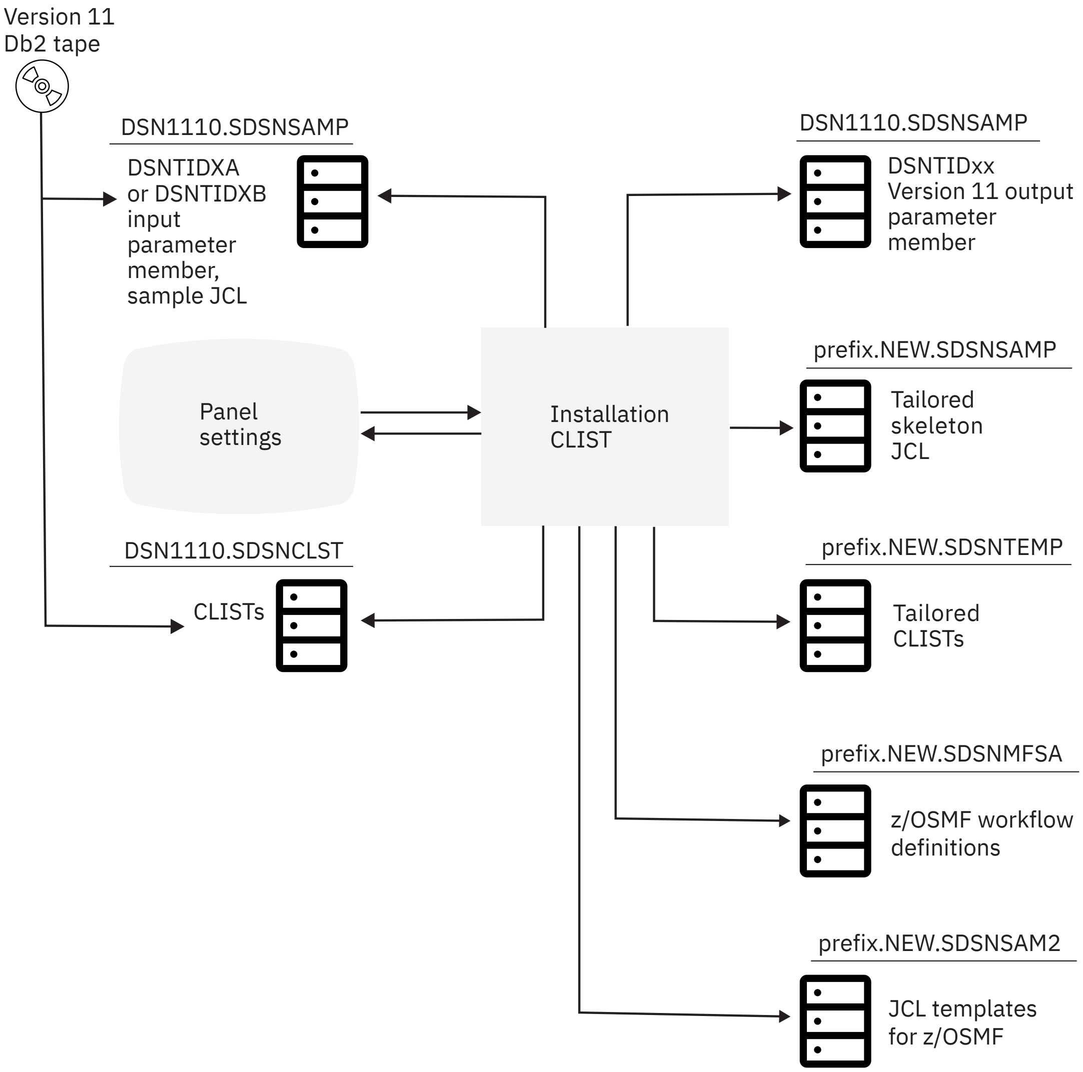
***prefix*.NEW.SDSNMFSA**
A new data set that contains the z/OSMF workflow definitions

***prefix*.NEW.SDSNSAM2**
A new data that set contains the JCL templates for z/OSMF

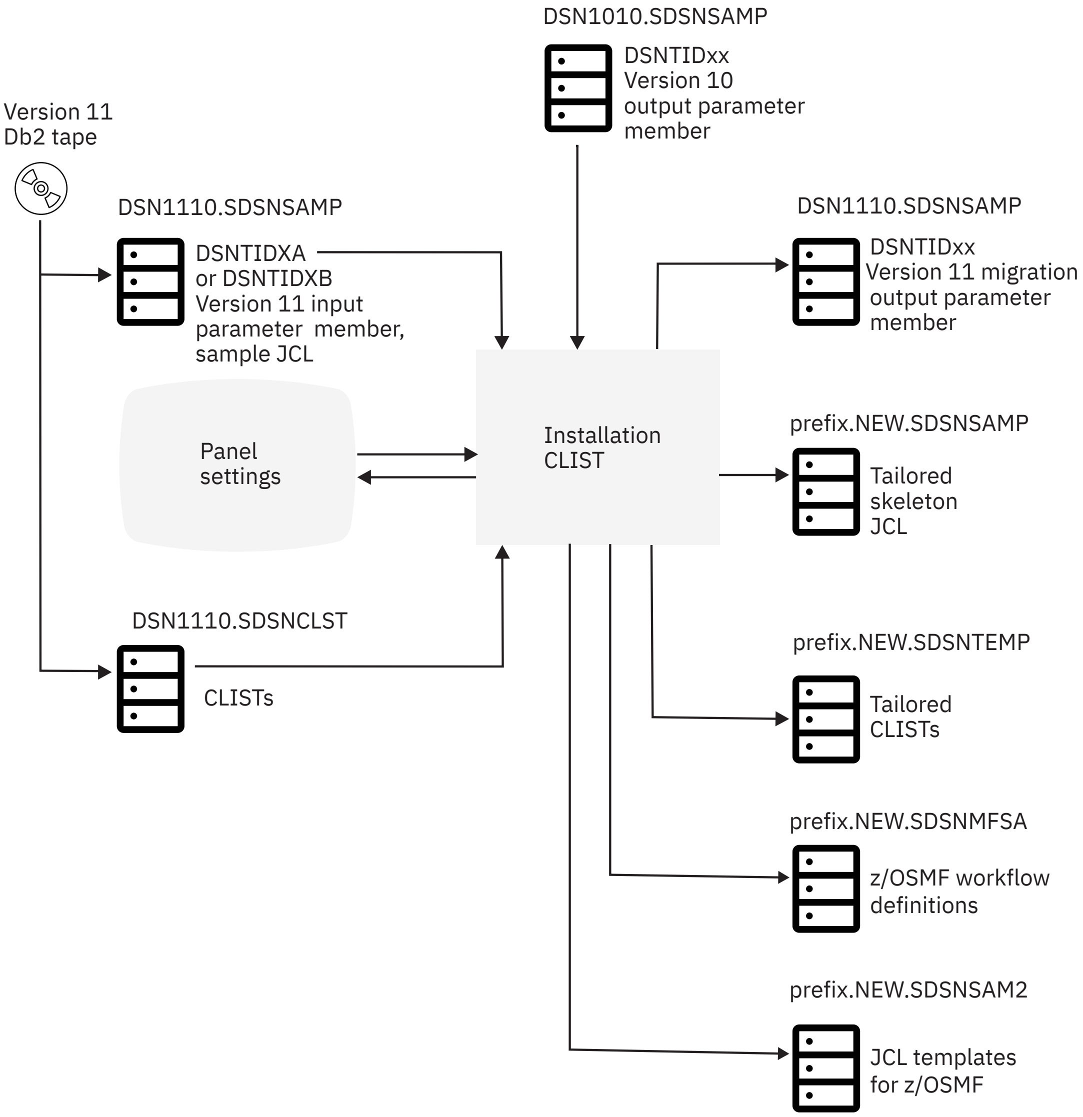
You can use job DSNTIJVC to combine the CLISTs into a common data set.

Db2 performs validity checking of the values that you enter during the panel sessions. If you receive an ISPF error message, press the HELP key for additional information.

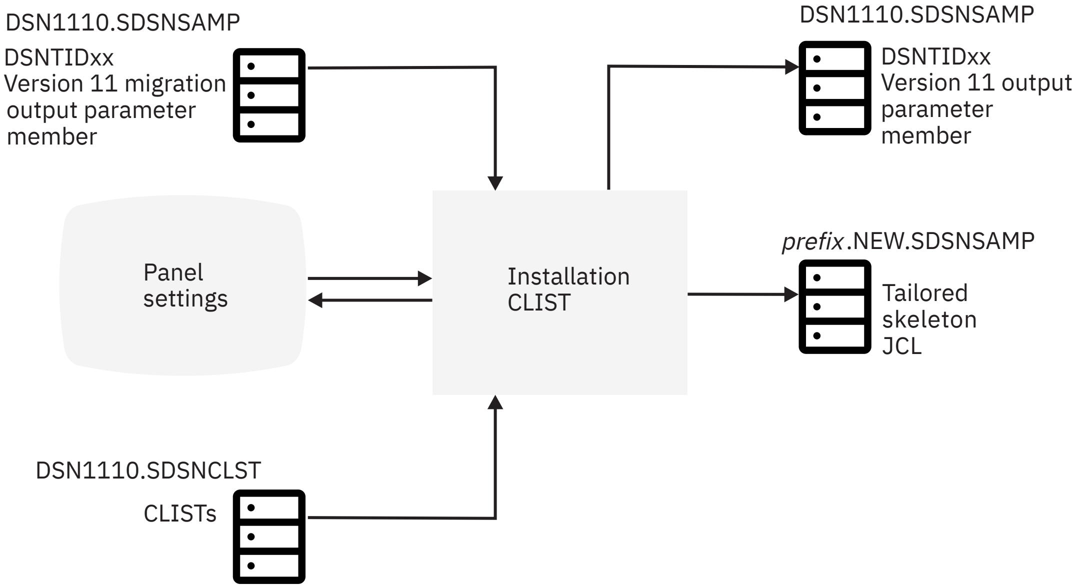
The following figure illustrates by examples how the CLIST works during installation.



The following figure illustrates how the CLIST works during migration to conversion mode.



The following figure illustrates how the CLIST works during migration to new-function mode.



Installation and migration jobs that the CLIST tailors

The installation CLIST uses the values that you specify on the installation panels to tailor and load the installation or migration jobs. Each job is composed of one or more JCL procedures or job steps.

The CLIST loads each job as a separate member of the newly created `*prefix*.NEW.SDSNSAMP`.

Before you run any of these jobs, however, you might want to perform some editing that the CLIST does not do. If disk allocation is completely controlled by SMS for your installation, verify that the input to IDCAMS from the installation jobs does not conflict with the requirements for SMS.

The tailored jobs are described in the procedures for Chapter 5, “Installing Db2 11,” on page 359 and Chapter 6, “Migrating to Db2 11,” on page 413. Recovery information is provided, along with a description of each job. Unless otherwise stated in the job description, a return code of 0 or 4 from any of the jobs indicates successful completion. Some of the jobs contain statements that could fail without causing the job to fail. For instance, delete commands for data sets, drop statements for SQL objects, and stop commands could fail when you first run a job because the data sets or objects do not exist. Unless otherwise stated, you can ignore these failures. The statements are needed to allow you to rerun the job (if necessary) without performing the deletes, drops, and stops manually; they are merely for cleanup or initialization processing. If a job fails, follow the instructions that are provided in the recovery information for the job.

Which jobs you edit depends on the task that you are performing: installation, migration, or update. In data sharing environments, you edit different jobs depending on the data sharing function: group, member, or enable. The installation CLIST tailors a different set of jobs for each task.

Jobs for installing Db2 11

If you are installing Db2 11, the CLIST tailors the following jobs:

DSNADMZW
DSNTEJ0
DSNTEJ1
DSNTEJ1L
DSNTEJ1P
DSNTEJ1S
DSNTEJ1T
DSNTEJ1U
DSNTEJ2A
DSNTEJ2C
DSNTEJ2D
DSNTEJ2E
DSNTEJ2F
DSNTEJ2H
DSNTEJ2P
DSNTEJ3C
DSNTEJ3M
DSNTEJ3P
DSNTEJ4C
DSNTEJ4P
DSNTEJ67
DSNTEJ6U
DSNTEJ7
DSNTEJ71
DSNTEJ73
DSNTEJ75
DSNTEJ76
DSNTEJ77
DSNTEJ78
DSNTESA
DSNTESC
DSNTESD
DSNTESE
DSNTESH
DSNTIJCA
DSNTIJCB
DSNTIJDE
DSNTIJEX
DSNTIJIC
DSNTIJID
DSNTIJIE
DSNTIJIF
DSNTIJIN
DSNTIJMV
DSNTIJRT
DSNTIJRV
DSNTIJRW
DSNTIJSG
DSNTIJTC
DSNTIJTM
DSNTIJUZ
DSNTIJVC

If you specified a default WLM environment name in the WLM ENVIRONMENT field of installation panel DSNTIPX, the CLIST edits DSNTEJ2U, DSNTEJ6O, DSNTEJ6R, DSNTEJ6V, and DSNTEJ6W.

If you activated DDF and specified a value in the REMOTE LOCATION field of panel DSNTIPY, the CLIST also tailors job DSNTEJ6.

If you activated DDF and specified a default WLM environment name in the WLM ENVIRONMENT field of installation panel DSNTIPX, the CLIST edits DSNTEJ6Z, DSNTEJ63, DSNTEJ64, DSNTEJ65, and DSNTEJ66.

If you activated DDF, specified a value in the REMOTE LOCATION field of panel DSNTIPY, and specified a default WLM environment name in the WLM ENVIRONMENT field of installation panel DSNTIPX, the CLIST edits DSNTEJ6D, DSNTEJ6P, DSNTEJ6S, DSNTEJ6T, DSNTEJ61, and DSNTEJ62.

If CICS is selected, the CLIST edits DSNTEJ5A, DSNTEJ5C, and DSNTEJ5P.

If you are using data sharing, the CLIST edits DSNTIJGF and DSNTIJFT.

The installation CLIST tailors the DSNHC, DSNH, DSNU, and DSNEMC01 CLISTs for installation.

Jobs for migrating to Db2 11 conversion mode

If you are migrating to conversion mode, the CLIST tailors the following jobs:

DSNTIJCX
DSNTIJEX
DSNTIJFV
DSNTIJIC
DSNTIJIN
DSNTIJMV
DSNTIJRT
DSNTIJRV
DSNTIJRW
DSNTIJSG
DSNTIJTC
DSNTIJTM
DSNTIJUZ
DSNTIJVC

The CLIST also tailors the DSNH, DSNHC, DSNU, and DSNEMC01 CLISTs for migration to conversion mode.

Jobs for migrating to Db2 11 new-function mode (NFM)

If you are migrating to new-function mode, the CLIST tailors the following jobs: DSNTIJEN, DSNTIJNF, DSNTIJES, DSNTIJCS, DSNTEJ*xx*, DSNTIJNG, and DSNTIJNH.

Jobs for updating a Db2 11 installation

If you are updating, the CLIST tailors the following jobs: DSNTIJRT and DSNTIJUZ. DSNTIJRT is updated only if you select installation panel DSNTIPR1.

Related information

Tailoring the installation jobs

You might want to tailor several items in the installation jobs, such as data set names or library names, to meet the requirements of your site.

About this task

The changes that are described below are general; that is, they apply to all the jobs processed by the CLIST.

Before you begin editing, you might want to print or back up the jobs. You can print the JCL for these jobs by using IEBPTPCH or any other print facility that is available at your site.

Procedure

To prepare the installation jobs for your site:

1. Tailor the jobs to suit the needs of your site.

   You should edit the jobs to conform to any unique requirements that you might have. Also, you might want to make any minor JCL changes for items that the ISPF panels did not handle.
2. If you specified volume serial numbers on installation panel DSNTIPA3, examine the volume serial numbers that are used in the various jobs.

   The volume serial number fields of installation panel DSNTIPA3 enable you to specify up to five volumes for the data sets that are defined during installation or migration. If you want to use more than five volumes, specify them before continuing with installation or migration tasks.

   If you specified volume serial numbers on installation panel DSNTIPA3, the DSNTINST CLIST spreads the data sets across these volumes. If you use explicit volume serials instead of SMS, adding more volumes to provide more separation of data sets can help improve system performance and recoverability. Many of the log data sets are large and easy to place on separate volumes. The CLIST produces a series of messages that estimate space for each type of data set that is created during the installation or migration process.
3. Edit the DSNH CLIST if needed.

   The DSNH CLIST allows you to precompile, compile, prelink-edit, link-edit, bind, and run an application by issuing a single command. You might need to edit the DSNH CLIST to change values for some of the entries. Verify that DSNH keyword parameters for all Db2-supported compilers that your applications use.

   a) Check the default data set names for the licensed programs that you have installed.

      These defaults are in the parameter definitions at the beginning of each program. If the names and prefixes are not correct for your site, change them.

   b) Check default library names.

      If the names and prefixes are not correct for your site, change them. Ensure that the data sets exist and are cataloged for BLIB, CLIB, LLIB, and PLIB. When the DSNH CLIST runs, it creates

DBRMLIB and LOAD data sets if they do not already exist. The DBRMLIB data set is created only if the DBRMLIB(DEFAULT) is set. The following are the default library names:

- BLIB(NONE)
- DBRMLIB(DEFAULT) - The DBRM library must be allocated exclusively when the precompiler writes to it.

  Recommendation: Set up a temporary library, or one per user, rather than trying to share libraries.
- CLIB(NONE)
- LLIB(NONE)
- LOAD(RUNLIB.LOAD) - This library is allocated exclusively when it is being written.

  Recommendation: Set up a temporary library, or one per user, rather than trying to share libraries.
- PLIB(NONE)

c) Check default processor options.

If you prefer other default options, change them. The default processor options follow:

CICSOPT(NONE)	LOPTION(NONE)
COPTION(NONE)	PASS(DEFAULT)

d) Check print and work space defaults.

If the default allocation sizes are not acceptable for your site, change them. The print and work space defaults follow:

PSECSPAC(20)	WSECSPAC(20)
PSPACE(20)	WSPACE(20)
WORKUNIT(DEFAULT)	

4. Examine the data set names for other products.

   Many data set names for other products appear in the jobs. These names are shown in the table on panel DSNTIPU. Change them if they are different at your site.

Related reference

DSNTIPA3: Data parameters panel
The entries on the DSNTIPA3 panel define the storage management preferences for the storage groups and data sets that are created during installation and migration.

DSNTIPU: Data set names panel 2
The entries on panels DSNTIPU and DSNTIPW establish data set names for other product libraries. The values that you enter on these panels are edited into sample and installation jobs. Accept the default values for products that you do not have. Jobs for those particular products should not be run.

Related information

Updating subsystem parameter and application default values

You can dynamically update the value of some subsystem parameters while Db2 is running. For other subsystem parameters, you must stop and restart Db2 to change the values.

Before you begin

Important: Changes to subsystem parameters affect the entire subsystem. Carefully evaluate and plan for the impact of any changes to these values. Also, follow any advice that is included in the documentation for the parameter.

Determine whether you will update the subsystem parameters values online or offline. Not all parameters can be updated online. To check whether a particular subsystem parameter can be updated online, see "Directory of subsystem parameters, panel fields, and application default values" on page 343.

About this task

When you update subsystem parameter values, Db2 does not generate a complete list of installation or migration jobs, as it did during the installation and migration process. Instead, the update process generates only one job, DSNTIJUZ. This job assembles and link-edits the Db2 data-only subsystem parameter module and the application defaults load module (*dsnhdecp*).

Restriction: The following procedure cannot be used for some subsystem parameters that define characteristics of the Db2 catalog, directory, BSDS, and logs or for the DDF subsystem parameter. For these parameters, follow the instructions in "Updating subsystem parameters that cannot be updated by using DSNTIPB" on page 322.

Procedure

GUPI To update subsystem parameter values, complete the following steps:

1. Invoke the CLIST:
   a) Check that your TSO logon region size is sufficient.

      Usually 2 MB is enough.
   b) Invoke ISPF.
   c) Select option 6 on the main ISPF panel.
   d) Invoke the installation CLIST by entering one of the following specifications:

      -
        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)'
        ```
      - If you want to receive the messages that trace the progress of the CLIST, use the following specification:

        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)' 'CONTROL(LIST)'
        ```
      - If you want to use the CLIST but skip the verification of output data sets, use the following specification:

        ```
        EXEC 'prefix.SDSNCLST(DSNTINST)' 'CHKOUTDS(NO)'
        ```

        By default, the CLIST verifies the following information when installation panels DSNTIPT and DSNTIPA1 are displayed:

        – The CLIST verifies that the TEMP CLIST LIBRARY and SAMPLE LIBRARY that you specify on DSNTIPT can be allocated and opened for output.

        – If you specify a value for OUTPUT MEMBER NAME on DSNTIPA1, the CLIST verifies that the data set *prefix*.SDSNSAMP can be allocated and opened for output.

   The CLIST reads a set of default values and displays them on the panels. The values can be the original default values that are supplied by IBM, values that you specified in a previous run of the CLIST, or values that were generated when you ran the DSNTXAZP tool.
2. On installation panel DSNTIPA1, in field 1 INSTALL TYPE, specify UPDATE and press Enter.
3. On installation panel DSNTIPT, in field 2 SAMPLE LIBRARY, specify the output SDSNSAMP data set and press Enter.

   Panel DSNTIPB is displayed.
4. On panel DSNTIPB, specify the installation panel that you want to update and press Enter.
5. Change the values on the panel as needed, and press Enter to return to panel DSNTIPB.
6. Optional: Repeat steps 4 - 5 until you specify all of the updates that you want.
7. On panel DSNTIPB, press ENTER again to complete the update process.

This process produces a new DSNTIJUZ job with the new values; it also saves these values in the file that is specified in the OUTPUT MEMBER NAME field on panel DSNTIPA1. For more information, see "OUTPUT MEMBER NAME field" on page 61.

8. Assemble and link edit the new DSNTIJUZ job, and then submit the job to create the new load module with the new subsystem parameter values.
9. Use one of the following methods to tell the subsystem to begin using the new load module:
   - For online updates, issue the SET SYSPARM command:

     ```
     SET SYSPARM LOAD(load-module-name)
     ```

     where *load-module-name* is the same as the OUTPUT MEMBER NAME field value that was specified on the DSNTIPA1 panel.

     If you want to specify the load module name that is used during Db2 startup, you can issue the following command:

     ```
     SET SYSPARM RELOAD
     ```

   - For offline updates, stop and restart Db2 with the new subsystem parameter load module. GUPI

Related concepts

Job DSNTIJUZ and the subsystem parameter load module, application defaults load module, and DSNHMCID

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

DSNTIPT: Data set names panel 1
The entries on the DSNTIPT panel establish data set names for the libraries that are used in the Db2 CLIST and JCL that Db2 provides. The values that you enter on this panel are edited into all pertinent sample and installation jobs.

DSNTIPB: Update selection menu panel
During the update process, you can use the DSNTIPB panel to access all the installation panels and view the values that you specified during installation or migration.

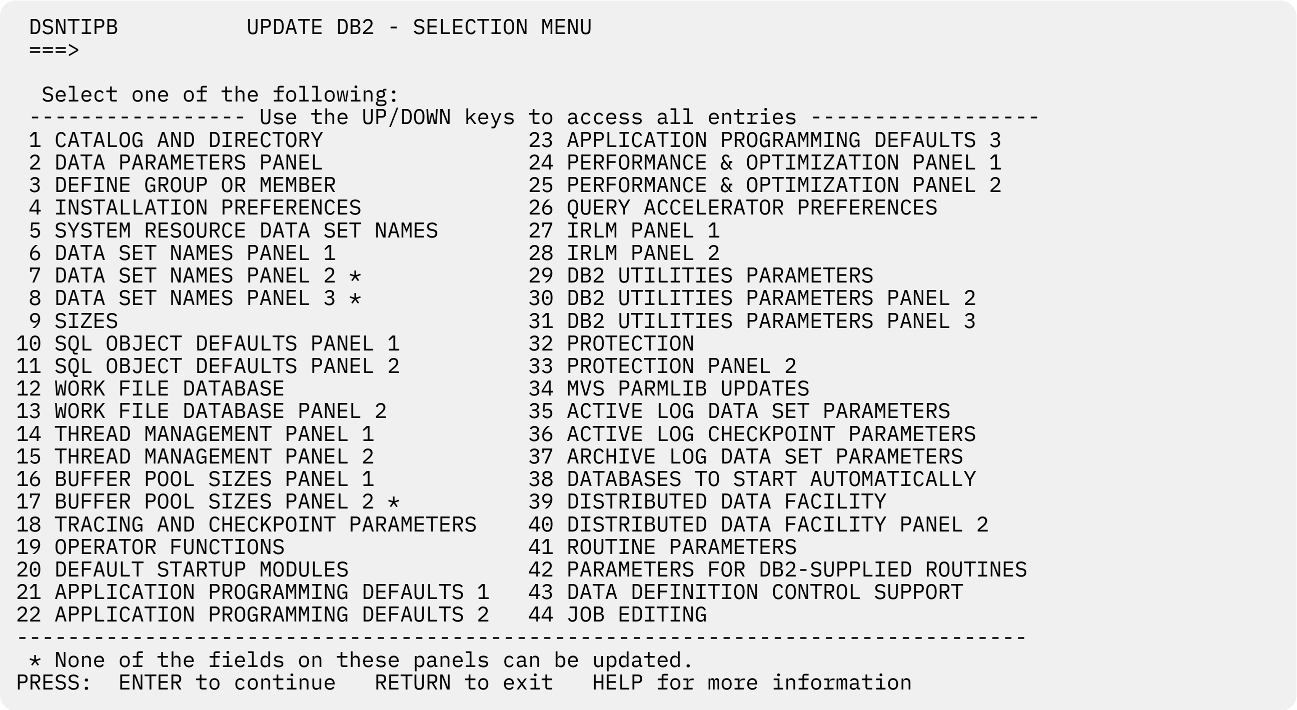
Related information

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

DSNTIPB: Update selection menu panel

During the update process, you can use the DSNTIPB panel to access all the installation panels and view the values that you specified during installation or migration.

Parameters that you can update are highlighted. Panels containing fields that cannot be updated are marked with an asterisk.



```
 DSNTIPB          UPDATE DB2 - SELECTION MENU
 ===>

  Select one of the following:
 ----------------- Use the UP/DOWN keys to access all entries ------------------
 1 CATALOG AND DIRECTORY                  23 APPLICATION PROGRAMMING DEFAULTS 3
 2 DATA PARAMETERS PANEL                  24 PERFORMANCE & OPTIMIZATION PANEL 1
 3 DEFINE GROUP OR MEMBER                 25 PERFORMANCE & OPTIMIZATION PANEL 2
 4 INSTALLATION PREFERENCES               26 QUERY ACCELERATOR PREFERENCES
 5 SYSTEM RESOURCE DATA SET NAMES         27 IRLM PANEL 1
 6 DATA SET NAMES PANEL 1                 28 IRLM PANEL 2
 7 DATA SET NAMES PANEL 2 *               29 DB2 UTILITIES PARAMETERS
 8 DATA SET NAMES PANEL 3 *               30 DB2 UTILITIES PARAMETERS PANEL 2
 9 SIZES                                  31 DB2 UTILITIES PARAMETERS PANEL 3
10 SQL OBJECT DEFAULTS PANEL 1            32 PROTECTION
11 SQL OBJECT DEFAULTS PANEL 2            33 PROTECTION PANEL 2
12 WORK FILE DATABASE                     34 MVS PARMLIB UPDATES
13 WORK FILE DATABASE PANEL 2             35 ACTIVE LOG DATA SET PARAMETERS
14 THREAD MANAGEMENT PANEL 1              36 ACTIVE LOG CHECKPOINT PARAMETERS
15 THREAD MANAGEMENT PANEL 2              37 ARCHIVE LOG DATA SET PARAMETERS
16 BUFFER POOL SIZES PANEL 1              38 DATABASES TO START AUTOMATICALLY
17 BUFFER POOL SIZES PANEL 2 *            39 DISTRIBUTED DATA FACILITY
18 TRACING AND CHECKPOINT PARAMETERS      40 DISTRIBUTED DATA FACILITY PANEL 2
19 OPERATOR FUNCTIONS                     41 ROUTINE PARAMETERS
20 DEFAULT STARTUP MODULES                42 PARAMETERS FOR DB2-SUPPLIED ROUTINES
21 APPLICATION PROGRAMMING DEFAULTS 1     43 DATA DEFINITION CONTROL SUPPORT
22 APPLICATION PROGRAMMING DEFAULTS 2     44 JOB EDITING
-------------------------------------------------------------------------------
 * None of the fields on these panels can be updated.
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 72. Individual update menu panel: DSNTIPB

Panels to update field

From the DSNTIPB panel, you can select a family of parameters to display and update. Some parameters cannot be updated.

On the command line, enter a number to select the family of parameters that you want to update. These numbers correspond to the installation panels in the following table.

Table 40. Panel names and identifiers, by DSNTIPB panel to update field option values

Option Value	Panel Name and Identifier
1	“DSNTIPA2: Db2 catalog and directory panel” on page 63
2	“DSNTIPA3: Data parameters panel” on page 68
3	“DSNTIPK: Define group or member panel ” on page 73
4	“DSNTIPG: Installation preferences panel” on page 77
5	“DSNTIPH: System resource data set names panel” on page 80
6	“ DSNTIPT: Data set names panel 1 ” on page 85
7	“ DSNTIPU: Data set names panel 2 ” on page 90
8	“ DSNTIPW: Data set names panel 3 ” on page 99
9	“DSNTIPD: Sizes panel 1 ” on page 103
10	“DSNTIP7: SQL OBJECT DEFAULTS PANEL 1 ” on page 109
11	“DSNTIP71: SQL OBJECT DEFAULTS PANEL 2” on page 113
12	“DSNTIP9: Work file database panel” on page 117
13	“DSNTIP91: Work file database panel 2” on page 124

Table 40. Panel names and identifiers, by DSNTIPB panel to update field option values (continued)

Option Value	Panel Name and Identifier
14	“DSNTIPE: Thread management panel 1 ” on page 127
15	“DSNTIPE1: Thread management panel” on page 131
16	“DSNTIP1: Buffer pool sizes panel 1 ” on page 135
17	“DSNTIP2: Buffer pool sizes panel 2” on page 138
18	“ DSNTIPN: Tracing parameters panel” on page 140
19	“DSNTIPO: Operator functions panel” on page 149
20	“DSNTIPO3: Default startup modules panel” on page 155
21	“DSNTIPF: Application programming defaults panel 1” on page 157
22	“DSNTIP4: Application programming defaults panel 2 ” on page 167
24	“DSNTIP8: Performance and optimization panel” on page 175
25	“DSNTIP81: Performance and optimization panel 2” on page 180
26	“DSNTIP82: Query accelerator preferences panel” on page 184
27	“DSNTIPI: IRLM panel 1 ” on page 191
28	“DSNTIPJ: IRLM panel 2” on page 197
29	“ DSNTIP6: Db2 utilities parameters panel 1 ” on page 203
30	“DSNTIP61: Db2 utilities parameters panel 2 ” on page 209
31	“DSNTIP62: Db2 utilities parameters panel 3 ” on page 214
32	“DSNTIPP: Protection panel ” on page 218
33	“DSNTIPP1: Protection panel 2 ” on page 222
34	“DSNTIPM: MVS PARMLIB updates panel” on page 230
35	“DSNTIPL: Active log data set parameters” on page 234
36	“DSNTIPL1: Checkpoint parameters” on page 236
37	“DSNTIPA: Archive log data set parameters panel” on page 245
38	“DSNTIPS: Databases and spaces to start automatically panel” on page 252
39	“DSNTIPR: Distributed data facility panel 1 ” on page 254
40	“DSNTIP5: Distributed data facility panel 2” on page 261
41	“DSNTIPX: Routine parameters panel” on page 266
42	“DSNTIPR1: Parameters for Db2-supplied routines panel” on page 272
43	“DSNTIPZ: Data definition control support panel” on page 298
44	“DSNTIPY: Job editing panel” on page 302

When the panel that you select is displayed, enter the new parameters. Press the `Enter` key to return to the update selection menu panel. Make another panel selection, or press `Enter` again to process. Press End to leave the update selection menu panel and return to the main panel (DNSTIPA1).

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

Updating subsystem parameters that cannot be updated by using DSNTIPB

Some subsystem parameters cannot be updated by using panel DSNTIPB.

Procedure

To update subsystem parameters that you cannot update by using panel DSNTIPB:

- To update the CATALOG ALIAS and DEFINE CATALOG fields on DSNTIPA2, see .

  The CATALOG ALIAS parameter establishes an alias name for your ICF catalog. This name is also used as the high-level qualifier name for Db2 VSAM data sets. The DEFINE CATALOG parameter controls the creation of the ICF catalog.
- To update Db2 to use the distributed data facility (DDF), follow these steps:

  a) Go through the normal update process of running the CLIST to add DDF information to installation panel DSNTIPR.

  b) Run job DSNTIJUZ.

  c) Populate the CDB.

  d) Stop and start Db2.

  e) Bind or rebind these plans:

  GUPI

  ```
  BIND PLAN(DSNESPCS) PKLIST(*.DSNESPCS.DSNESM68)
       ISOLATION(CS) ACTION(REPLACE)

  BIND PLAN(DSNESPRR) PKLIST(*.DSNESPRR.DSNESM68)
       ISOLATION(RR) ACTION(REPLACE)

  BIND PLAN(DSNESPUR) PKLIST(*.DSNESPUR.DSNESM68)
       ISOLATION(UR) ACTION(REPLACE)
  ```

  GUPI

  f) Start DDF if you specified COMMAND instead of AUTO as the DDF STARTUP OPTION on installation panel DSNTIPR.
- To change the data set sizes for the Db2 catalog and directory:

  a) Copy the catalog and directory table spaces.

  b) Stop the table spaces or their databases.

  c) Delete the data sets and redefine them, using VSAM commands.

  d) Use the RECOVER utility to recover the catalog and directory to the new data sets.

  e) Start the table spaces or databases again.
- To change from single to dual logging for the active log:

  a) Define the second copy of the log with a VSAM IDCAMS DEFINE statement.

  Refer to job DSNTIJIN, which contains the DEFINE statement for the first copy of the log.

  b) Run the DSNJU003 (change log inventory) utility.

  This adds the second copy of the log to the BSDS.

  c) Update the NUMBER OF COPIES field on installation panel DSNTIPH from 1 to 2.

  d) Run job DSNTIJUZ to make the change effective.
- To move or expand the bootstrap data sets, use the IMPORT and EXPORT commands of access method services.

The bootstrap data sets are accessed using JCL when Db2 starts.

- To access the log data sets, you can use stand-alone access macros or the IMPORT and EXPORT commands of access method service.
- To change the number of data sets for active logs, you can use the DSNJU003 utility.

Related tasks

Populating the communications database for use with TCP/IP
If you plan to use Db2 only as a server, you do not need to populate the CDB.

Related information

Subsystem parameters that are not on installation panels

Some subsystem parameters are defined by job DSNTIJUZ and are not associated with fields on any installation panels.

Related tasks

Installation step 5: Define Db2 initialization parameters: DSNTIJUZ
Job DSNTIJUZ generates the Db2 data-only load module DSNHMCID, the application defaults load module (*dsnhdecp*), and the subsystem parameter module. The application defaults load module is the name that was specified for the APPL DEFAULTS field on installation panel DSNTIPO3. The subsystem parameter module is the name that was specified for the PARAMETER MODULE field on installation panel DSNTIPO3.

Related reference

Defining data classes (DFSMS Implementing System-Managed Storage: Optimizing Tape Usage)

ACCELMODEL in macro DSN6SPRM

Specifies whether to enable the modeling of query workloads for evaluating the potential savings for both accumulated elapsed time and processor time if the plan is run on an accelerator server.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM ACCELMODEL
Security parameter:	No

YES

Enables modeling of query acceleration. The YES value applies only when the following requirements are also met:

- The value of the QUERY ACCELRATION subsystem parameter value is NONE, ENABLE, ENABLE WITH FAILBACK or ELIGIBLE.
- The CURRENT GET_ACCEL_ARCHIVE special register value is NO.
- The GET_ACCEL_ARCHIVE subsystem parameter value is NO

If other values are specified, Db2 tries to accelerate queries instead of doing accelerator modeling.

Only queries that Db2 deems eligible to run on an accelerator server are included in the accelerator-related fields of accounting trace IFCID 3.

NO

Disables modeling of query acceleration.

Related reference

CURRENT QUERY ACCEL field (QUERY_ACCELERATION subsystem parameter)

The QUERY_ACCELERATION subsystem parameter determines the default value that is to be used for the CURRENT QUERY ACCELERATION special register.

GET ACCEL ARCHIVE field (GET_ACCEL_ARCHIVE subsystem parameter)
The GET_ACCEL_ARCHIVE subsystem parameter determines the default value that is to be used for the CURRENT GET_ACCEL_ARCHIVE special register.

Related information

CACHE_DEP_TRACK_STOR_LIM in macro DSN6SPRM

Specifies the amount of storage in gigabytes that Db2 allocates for hashing entries in the dynamic statement cache.

Acceptable values:	2 - 10
Default:	2
DSNZP*xxx*:	DSN6SPRM CACHE_DEP_TRACK_STOR_LIM
Security parameter:	No

2 - 10
The integer number of gigabytes that Db2 allocates for hashing entries in the dynamic statement cache.

CACHEDYN_FREELOCAL in macro DSN6SPRM

Indicates whether Db2 can free cached dynamic statements to relieve database services address space (*ssnm*DBM1) below-the-bar storage. CACHEDYN_FREELOCAL applies only when the KEEPDYNAMIC(YES) bind option is active.

Acceptable values:	1, 0
Default:	1
DSNZP*xxx*:	DSN6SPRM CACHEDYN_FREELOCAL
Security parameter:	No

1
Db2 frees some cached dynamic statements to relieve high use of storage when the cached SQL statement pools have grown to a certain size.

0
Db2 does not free cached dynamic statements to relieve high use of storage by dynamic SQL caching.

CDDS_MODE in macro DSN6LOGP

The CDDS_MODE subsystem parameter specifies how a member of a Db2 data sharing group participates in a GDPS® Continuous Availability with zero data loss (GDPS Continuous Availability with zero data loss) environment.

Acceptable values:	NONE, SOURCE, PROXY
Default:	NONE
Data sharing scope:	A setting of SOURCE or PROXY is valid only in a data sharing environment. All members of the data sharing group must have the same setting.
Online changeable:	No
DSNZP*xxx*:	DSN6LOGP.CDDS_MODE

NONE

The Db2 subsystem or data sharing group does not participate in a GDPS Continuous Availability with zero data loss environment. The subsystem or data sharing group member supports only replication of its own log. The data set that the CDDS_PREFIX parameter specifies can be defined locally but is not used.

SOURCE

The data sharing group that contains the member that is being installed is the source group in an implementation of the GDPS Continuous Availability with zero data loss solution. The source data sharing group supports replication of the logs and log data sets of its members by another data sharing group, which is the proxy group in the implementation of the GDPS Continuous Availability with zero data loss solution. The proxy group performs replication of tables in the source data sharing group that are enabled for changed data capture.

The source group must contain a key-sequenced data set with the name that is specified by the CDDS_PREFIX subsystem parameter. That data set is the compression dictionary data set (CDDS). When IFI READS calls are made to the proxy group to retrieve compressed log records, Db2 uses the CDDS to decompress the log records.

The location of the source group must be defined in the communications database of the proxy group.

PROXY

The data sharing group that contains the member that is being installed supports only replication of log data sets for the source data sharing group in an implementation of the GDPS Continuous Availability with zero data loss solution.

The location of the proxy group must be defined in the communications database of the source group.

Related tasks

Populating the communications database for use with TCP/IP
If you plan to use Db2 only as a server, you do not need to populate the CDB.

Related reference

CDDS_PREFIX in macro DSN6LOGP
The CDDS_PREFIX subsystem parameter specifies the prefix for the name of the data set that contains dictionaries that Db2 uses to decompress compressed log records when a proxy data sharing group in an implementation of the GDPS Continuous Availability with zero data loss (GDPS Continuous Availability with zero data loss) solution captures the log records on behalf of a source data sharing group. The data set is known as the *compression dictionary data set* (CDDS).

CDDS_PREFIX in macro DSN6LOGP

The CDDS_PREFIX subsystem parameter specifies the prefix for the name of the data set that contains dictionaries that Db2 uses to decompress compressed log records when a proxy data sharing group in an implementation of the GDPS Continuous Availability with zero data loss (GDPS Continuous Availability with zero data loss) solution captures the log records on behalf of a source data sharing group. The data set is known as the *compression dictionary data set* (CDDS).

Acceptable values:	1 - 39 bytes that form a valid z/OS data set name prefix
Default:	DSNCAT
Data sharing scope:	All members of the data sharing group must have the same setting.
Online changeable:	No
DSNZP*xxx*:	DSN6LOGP.CDDS_PREFIX

The data set name is formed by appending the string '.CDDS' to the value of CDDS_PREFIX.

This subsystem parameter is used only if the Db2 data sharing group that contains a member that is being installed is part of an implementation of the GDPS Continuous Availability with zero data loss solution.

If CDDS_MODE is set to SOURCE or PROXY, the CDDS must be defined at the source data sharing group and mirrored through peer-to-peer remote copy (PPRC) at the proxy data sharing group.

Related reference

CDDS_MODE in macro DSN6LOGP
The CDDS_MODE subsystem parameter specifies how a member of a Db2 data sharing group participates in a GDPS® Continuous Availability with zero data loss (GDPS Continuous Availability with zero data loss) environment.

Related information

COMCRIT in macro DSN6SPRM

Sets the Common Criteria environment, which requires that tables that you create (other than created global temporary tables, declared global temporary tables, and auxiliary tables) must have multilevel security.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM COMCRIT
Security parameter:	Yes

NO
The behavior of Db2 is unchanged.

YES
All tables that you create (other than created global temporary tables, declared global temporary tables, and auxiliary tables) must have multilevel security. If the AS SECURITY LABEL clause is missing from a table, an error occurs and the table is not created. Setting COMCRIT to YES causes some of the current installation and migration processes to fail. A value of YES also limits the number of concurrent sessions that are allowed for a primary authorization ID if a RACF custom field is defined for that ID.

You can change the value of COMCRIT online by using SET SYSPARM and you can audit COMCRIT with IFCID 0106.

Related information

DDF_COMPATIBILITY in macro DSN6FAC

Controls certain characteristics of a connection between a client application and a Db2 for z/OS data server.

Deprecated subsystem parameter: Non-default settings for DDF_COMPATIBILITY are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value NULL.

Values can be specified in any combination and in any order. If more than one value is specified, the values must be separated by commas, and the entire set of values must be enclosed in parentheses.

You can specify the following values for DDF_COMPATIBILITY:

null
The DDF_COMPATIBILITY parameter has no effect and Db2 11 new function behavior is used for all applications.

DISABLE_ITTO_EXCPTN
Specifies that the Db2 for z/OS server does not send serviceability information to clients for idle thread timeout conditions.

DISABLE_ITTO_EXCPTN is deprecated. If application compatibility is set to V11R1 or later, the Db2 for z/OS server sends serviceability information to clients for idle thread timeout conditions.

DISABLE_IMPCAST_JV

Specifies that the Db2 for z/OS server disables implicit casting of input host variables from numeric data types to string data types, or from string data types to numeric data types, when the application is a Java client application that uses the IBM Data Server Driver for JDBC and SQLJ.

If DISABLE_IMPCAST_JV is not specified, Db2 enables implicit casting of input host variables from numeric data types to string data types, or from string data types to numeric data types.

Db2 uses DISABLE_IMPCAST_JV only if application compatibility is set to V10R1. If application compatibility is set to V11R1 or later, Db2 always does implicit casting.

DISABLE_IMPCAST_JV is not needed and has no effect if the client JDBC driver is at version 3.63 or 4.13, or later.

DISABLE_IMPCAST_NJV

Specifies that the Db2 for z/OS disables implicit casting of input host variables from numeric data types to string data types, or from string data types to numeric data types, when the application is a non-Java client application that uses an IBM Data Server client or driver that is at Version 10.5 or earlier.

If DISABLE_IMPCAST_NJV is not specified, Db2 enables implicit casting of input host variables from numeric data types to string data types, or from string data types to numeric data types.

Db2 uses DISABLE_IMPCAST_NJV only if application compatibility is set to V10R1. If application compatibility is set to V11R1 or later, Db2 always does implicit casting.

IDNTFY_V11_PRIOR_VER

Specifies that a Db2 11 server in any mode identifies itself to all remote clients as a Db2 10 server in new-function mode.

Specify IDNTFY_V11_PRIOR_VER as a temporary solution if an error occurs for a connection from a remote client or driver only because the server identifies itself to the client or driver as a Db2 11 server.

SP_PARMS_JV

Specifies that when a Java client application calls a Db2 for z/OS stored procedure, Db2 returns output argument values with data types that match the data types that were specified in the `CallableStatement.registerOutParameter` method calls.

If SP_PARMS_JV is not specified, Db2 returns output parameter values with data types that match the data types of the parameters in the stored procedure definition.

SP_PARMS_JV is deprecated. Db2 ignores this value if application compatibility is set to V11R1 or later.

SP_PARMS_JV is not needed and has no effect if the client JDBC driver is at version 3.63 or 4.13, or later.

IGNORE_TZ

Specifies that the time zone information is ignored during boundary error checking for TIMESTAMP WITH TIME ZONE input variables when the target data type is TIMESTAMP and the client driver is IBM Data Server Driver for JDBC and SQLJ.

IGNORE_TZ is deprecated. IGNORE_TZ is effective only if application compatibility is set to V10R1.

IGNORE_TZ is not needed and has no effect if the client JDBC driver is at version 3.63 or 4.13, or later.

SP_PARMS_NJV

Specifies that when a non-Java client application calls a Db2 for z/OS stored procedure, Db2 returns output argument values with data types that match the data types of the corresponding CALL statement arguments.

Exception: If the stored procedure uses a parameter data type that was introduced in DB2 10 (XML, TIMESTAMP WITH TIMEZONE, or TIMESTAMP with precision greater than 6), Db2 does not return output argument values with data types that match the data types of the corresponding CALL statement arguments.

If SP_PARMS_NJV is not specified, Db2 returns output parameter values with data types that match the data types of the parameters in the stored procedure definition.

SP_PARMS_NJV is deprecated. Db2 ignores this value if application compatibility is set to V11R1 or later.

DISALLOW_SEL_INTO_UNION in macro DSN6SPRM

Specifies whether to disallow a UNION or UNION ALL as the outermost from-clause of a SELECT INTO statement, which is invalid SQL syntax. Such statements were inadvertently allowed before Db2 12. However, in Db2 11 they are disallowed by default.

Acceptable values:	YES, NO
Default:	NO
Online changeable:	YES
Data sharing scope:	Group
DSNZP*xxx*:	DSN6SPRM DISALLOW_SEL_INTO_UNION

YES
SELECT INTO statements with UNION or UNION ALL as the outermost from-clause are not supported. This setting enforces valid SQL syntax.

NO
SELECT INTO statements with UNION or UNION ALL as the outermost from-clause are accepted. This setting tolerates invalid SQL syntax.

Important: In Db2 12, the default value of DISALLOW_SEL_INTO_UNION changes from NO to YES.

DISALLOW_SEL_INTO_UNION is also deprecated. Although it remains supported, support is likely to be removed eventually. Identify any packages that use UNION or UNION ALL in the from-clause of a SELECT INTO statement and correct them as necessary.

You can identify affected packages while DISALLOW_SEL_INTO_UNION is set to NO by binding suspected packages into a dummy collection ID with EXPLAIN(ONLY) and monitoring IFCID 0376 records. Use the following procedure:

1. Issue the following SQL statement to generate a list of BIND commands.

   ```
   SELECT 'BIND PACKAGE(DUMMYCOL) COPY(' ||
          COLLID || '.' || NAME || ') ' ||
          CASE WHEN(VERSION <> '')
               THEN 'COPYVER(' || VERSION || ') '
               ELSE '' END ||
          'EXPLAIN(ONLY)'
   FROM SYSIBM.SYSPACKSTMT
   WHERE STATEMENT LIKE '%SELECT%INTO%UNION%';
   ```

   The statement generates output similar to the following result:

   ```
   BIND PACKAGE(DUMMYCOL) COPY(DSN_DEFAULT_COLLID_PLAY01.PLAY01) EXPLAIN(ONLY)
   ```

2. Copy the SELECT statement in a BIND job. If the result is longer than 72 characters, formatting is required.
3. Start and collect the IFCID 0376 trace.
4. Run the bind job that you created.
5. Stop the IFCID 0376 trace and analyze the output.

EN_PJSJ in macro DSN6SPRM

Disables or enables *dynamic index ANDing*, which is also called *pair-wise join* processing, when star-join processing is enabled on Db2.

Acceptable values:	OFF, ON
Default:	OFF
DSNZP*xxx*:	DSN6SPRM EN_PJSJ
Security parameter:	No

OFF
Dynamic index ANDing is disabled.

ON
Dynamic index ANDing is enabled.

When dynamic index ANDing is enabled, it can improve the execution performance of qualified queries in the following cases:

- The fact table has indexes that provide matching for join predicates with some dimension tables having local filtering. The indexes on the fact table can be single-key indexes (but not limited).
- No multi-column index on the fact table is suitable for the existing star join method.

Setting EN_PJSJ to ON might provide more flexibility with index design on star schema fact tables when multi-column index design makes effective exploitation the star join access method difficult.

Related information

HONOR_KEEPDICTIONARY in macro DSN6SPRM

Specifies whether Db2 honors the LOAD and REORG parameter KEEPDICTIONARY when tables are converted between basic row format and reordered row format.

Deprecated subsystem parameter: Non-default settings for HONOR_KEEPDICTIONARY are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value NO.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM HONOR_KEEPDICTIONARY
Security parameter:	No

NO
Db2 ignores the LOAD and REORG parameter KEEPDICTIONARY when tables are converted between basic row format and reordered row format.

YES
Db2 honors the LOAD and REORG parameter KEEPDICTIONARY.

IMPDSSIZE in macro DSN6SYSP

Specifies the default maximum data set size (DSSIZE) in gigabytes, for implicitly created table spaces for base tables.

Acceptable values:	1, 2, 4, 8, 16, 32, 64, 128, 256
Default:	64 for SAP, otherwise 4
DSNZP*xxx*:	DSN6SYSP IMPDSSIZE

Security parameter:	No

1, 2, 4, 8, 16, 32, 64, 128, 256
Maximum data set size (DSSIZE) in gigabytes that Db2 uses for creating implicit base table spaces.

If you specify an SAP-specific input member (for example, DSNTIDXB) during installation or migration, the DSNTIJUZ job that is generated by the Db2 CLIST specifies IMPDSSIZE=64.

Related information

IMPTKMOD in macro DSN6SYSP

Specifies the default TRACKMOD option for CREATE TABLESPACE statements and implicitly created tables spaces, which specifiesDb2 tracks changed pages of the base table space in the space map pages.

Acceptable values:	YES, NO
Default:	YES
DSNZP*xxx*:	DSN6SYSP IMPTKMOD
Security parameter:	No

YES
Db2 tracks changed pages of the base table space in the space map pages. This tracking is intended to improve the performance of incremental image copies. YES is the default value.

NO
Db2 does not track changed pages in the space map pages. Db2 uses the LRSN value in each page to determine whether a page has been changed.

If you specify an SAP-specific input member (for example, DSNTIDXB) during installation or migration, the DSNTIJUZ job that is generated by the Db2 CLIST specifies IMPTKMOD=NO.

The setting is not used for LOB or XML table spaces.

Related information

INDEX_IO_PARALLELISM in macro DSN6SPRM

Specifies whether I/O parallelism is enabled for index insertion.

Acceptable values:	YES, NO
Default:	YES
DSNZP*xxx*:	DSN6SPRM INDEX_IO_PARALLELISM
Security parameter:	No

YES
I/O parallelism is enabled for index processing. I/O parallelism allows concurrent insert operations on multiple indexes and can reduce I/O wait time when many indexes are defined in a table.

NO
I/O parallelism is disabled for index processing.

Related information

INLISTP in macro DSN6SPRM

Specifies the maximum number of elements in an IN-list for certain IN predicate optimizations to occur.

Acceptable values:	1 - 5000, 0
Default:	50
DSNZP*xxx*:	DSN6SPRM INLISTP
Security parameter:	No

1 - 5000

Db2 optimizes for an IN predicate with the specified number of values, with the following optimizations:

- Pushes the IN predicate down from the parent query block into the materialized table expression.
- Moves a correlated IN predicate in a subquery that is generated by transitive closure up to the parent query block.

0

Disables optimization for in predicates.

Related information

MATERIALIZE_NODET_SQLTUDF in macro DSN6SPRM

Specifies whether the Db2 database manager materializes the result of a user-defined SQL table function that is defined as NOT DETERMINISTIC.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM MATERIALIZE_NODET_SQLTUDF
Security parameter:	No

NO

Valid values are YES and NO. The Db2 database manager enables the merging of a user-defined SQL table function that is defined as NOT DETERMINISTIC.

YES

The Db2 database manager materializes the result of a user-defined SQL table function that is defined as NOT DETERMINISTIC. Use this setting to avoid errors in processing SQL statements that reference those user-defined SQL table functions.

Related information

MAX_CONCURRENT_PKG_OPS in macro DSN6SPRM

Specifies the maximum number of automatic bind requests, remote bind requests, remote rebind requests, CREATE TRIGGER statements, and CREATE PROCEDURE statements for packages that can be processed simultaneously.

If the value of the ABIND subsystem parameter is set to NO, the value of MAX_CONCURRENT_PKG_OPS has no effect.

Acceptable values:	1 - 20
Default:	10
DSNZP*xxx*:	DSN6SPRM MAX_CONCURRENT_PKG_OPS

Security parameter:	No

1 - 20
The maximum number of automatic bind requests, remote bind requests, remote rebind requests, CREATE TRIGGER statements, and CREATE PROCEDURE statements for packages that can be processed simultaneously.

Related reference

AUTO BIND field (ABIND subsystem parameter)
The ABIND subsystem parameter specifies whether Db2 automatically rebinds packages and plans in certain situations at run time.

Related information

MINDVSCL subsystem parameter in DSN6SPRM

The MINDVSCL subsystem parameter specifies the minimum scale for the result of a decimal division. If set to a value other than NONE, MINDVSCL overrides the DECDIV3 subsystem parameter.

Acceptable values:	NONE, 3, 6
Default:	NONE
Online changeable:	Yes
DSNZP*xxx*:	DSN6SPRM MINDVSCL

NONE
No minimum divide scale. The DECDIV3 subsystem parameter influences the minimum divide scale for decimal division.

NONE is the default value.

3
The minimum divide scale is 3.

6
The minimum divide scale is 6.

Related reference

MINIMUM DIVIDE SCALE field (DECDIV3 subsystem parameter)
The DECDIV3 subsystem parameter determines whether to retain at least three digits to the right of the decimal point after any decimal division.

Related information

MOVE_TO_ARCHIVE_DEFAULT in macro DSN6SPRM

Specifies the default for the SYSIBMADM.MOVE_TO_ARCHIVE built-in global variable.

Acceptable values:	N, E, Y
Default:	N
DSNZP*xxx*:	DSN6SPRM MOVE_TO_ARCHIVE_DEFAULT
Security parameter:	No

N
Specifies that a delete of a row in an archive-enabled table will not result in storing a copy of the deleted row in the associated archive table.

E

Specifies that a delete of a row in an archive-enabled table will result in storing a copy of the deleted row in the associated archive table.

Y

Specifies that a delete of a row in an archive-enabled table will result in storing a copy of the deleted row in the associated archive table. Additionally, when the global variable is set to 'Y', an insert or update operation that specifies the archive-enabled table as the target of the statement will result in an error.

Related information

NPGTHRSH in macro DSN6SPRM

Specifies that Db2 favors matching index access, through the index with the most matching columns, for tables or partitions that have fewer data pages than the specified value.

Db2 compares the NPGTHRSH value to the NPAGESF column in the SYSIBM.SYSTABLES catalog table for table-level comparisons and the NPAGES column of the SYSIBM.SYSTABSTATS table for partition-level comparisons.

Acceptable values:	0, 1 - 2147483647
Default:	0 "1" on page 333
DSNZP*xxx*:	DSN6SPRM NPGTHRSH
Security parameter:	No

Note:

1. For SAP installations, the default value is 10.

1 - 2147483647

Db2 uses matching index access for queries that access a table or partition that contains fewer data pages than the specified NPGTHRSH value. Db2 uses the index with the most matching columns.

For default statistics (-1), Db2 11 uses 501 pages for the NPGTHRSH comparison.

0

Db2 always chooses the access path based on cost estimates, regardless of the number of data pages that statistics indicate for the table or partition.

Related information

NEWFUN in macro DSNHDECP

Specifies the default setting for the NEWFUN SQL processing option for the Db2 precompiler and coprocessor.

Acceptable values:	V11, V10, V9, V8
Default:	V11
DSNZP*xxx*:	DSNHDECP NEWFUN
Security parameter:	No

V11

Specifies that the precompiler or coprocessor accept SQL syntax that is supported by Db2 11.

V10

Specifies that the precompiler or coprocessor accepts SQL syntax that is supported by DB2 10.

V9
Specifies that the precompiler or coprocessor can accept SQL syntax that is supported by DB2 9.

V8
Specifies that the precompiler or coprocessor accepts SQL syntax that is supported by DB2 Version 8.

OPT1ROWBLOCKSORT in macro DSN6SPRM

Specifies whether Db2 explicitly blocks sort operations when the OPTIMIZE FOR 1 ROW clause is specified on a query.

Deprecated subsystem parameter: Non-default settings for OPT1ROWBLOCKSORT are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value DISABLE.

Acceptable values:	DISABLE, ENABLE
Default:	DISABLE
DSNZP*xxx*:	DSN6SPRM OPT1ROWBLOCKSORT
Security parameter:	No

DISABLE
when OPTIMIZE FOR 1 ROW is specified, Db2 avoids access paths that involve sorts. If an access path that avoids a sort exists, it is possible, although unlikely, that an access path that involves a sort is chosen instead. This behavior was always used in DB2 9 and earlier releases.

ENABLE
When OPTIMIZE FOR 1 ROW is specified, Db2 chooses access paths that avoid sorts whenever such a path is available. For example, Db2 must choose between two index access paths. One index is very selective and filters two rows, but it requires a sort. The other index does not filter any rows, but it does not require a sort. If the OPT1ROWBLOCKSORT subsystem parameter is set to ENABLE, Db2 chooses the path that does not require a sort.

Related information

PREVENT INDEX PART CREATE field (PREVENT_NEW_IXCTRL_PART subsystem parameter)

The PREVENT_NEW_IXCTRL_PART subsystem parameter determines whether Db2 disallows the creation of new index-controlled partitioned tables. This subsystem parameter ensures that new partitioned tables use table-controlled partitioning, which is the preferred partitioning method for non-universal table spaces.

Deprecated subsystem parameter: Non-default settings for PREVENT_NEW_IXCTRL_PART are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, set the value to YES.

Acceptable values:	NO, YES
Default:	NO
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM PREVENT_NEW_IXCTRL_PART

YES
Specifies that new partitioned table spaces must use table-controlled partitioning. A CREATE INDEX statement must not attempt to create an index-controlled partitioned table.

NO
Specifies that new index-controlled partitioned tables can be created.

Learn more: For comprehensive background, how-to information, and examples for various paths for converting your deprecated "classic" partitioned (non-UTS) table spaces to partition-by-range table spaces, see the white paper Conversion from index-controlled partitioning to Universal Table Space (UTS).

Related information

PRIVATE_PROTOCOL in macro DSN6FAC

Private protocol is no longer supported; however, this subsystem parameter controls package EXECUTE authorization behavior related to remote Db2 requester applications.

Acceptable values:	NO, AUTH
Default:	NO
DSNZP*xxx*:	DSN6FAC PRIVATE_PROTOCOL
Security parameter:	No

NO
When a remote Db2 requester application accesses the Db2 subsystem through DRDA protocol, package EXECUTE authority must be explicitly granted at this subsystem. The authority must be granted to the primary ID or an associated secondary ID for packages that the requester application executes as part of the plan

AUTH
When a remote Db2 requester application accesses the Db2 subsystem through DRDA protocol, package EXECUTE authority must be explicitly granted to the plan owner at this subsystem. This plan owner must have EXECUTE authority at this subsystem for packages that the requester application executes as part of the plan. The plan owner needs no other privilege to execute the package.

When a remote Db2 requester application accesses the server Db2 subsystem through DRDA protocol, a plan owner is associated with the remote Db2 requester application plan. For packages that are executed as part of this plan by a remote Db2 requester application using DRDA protocol, the PRIVATE_PROTOCOL parameter has the following effects. This parameter is online updatable, and valid values are NO and AUTH.

PTASKROL in macro DSN6SYSP

Indicates whether to roll up accounting trace records from a parallel query task into the originating task's accounting trace.

Acceptable values:	YES, NO
Default:	YES
DSNZP*xxx*:	DSN6SYSP PTASKROL
Security parameter:	No

YES
The originating task is to generate an additional accounting trace record with all the roll-up values from parallel tasks.

NO
Each parallel task produces its own accounting trace record.

REALSTORAGE_MAX in macro DSN6SPRM

Specifies the maximum GB of real and auxiliary storage that Db2 can consume.

Acceptable values:	NOLIMIT, 1 - 65535.

Default:	NOLIMIT
DSNZP*xxx*:	DSN6SPRM REALSTORAGE_MAX
Security parameter:	No

NOLIMIT
Real and auxiliary storage consumption for Db2 is not bounded.

1 - 65535
If the total real and auxiliary storage in GB exceeds the specified limit, Db2 is terminated. In most cases, set this parameter to twice the amount of real and auxiliary storage that the subsystem might reasonably consume.

Related reference

MANAGE REAL STORAGE field (REALSTORAGE_MANAGEMENT subsystem parameter)
The REALSTORAGE_MANAGEMENT subsystem parameter specifies whether Db2 should manage real storage consumption.

REMOTE_COPY_SW_ACCEL in macro DSN6LOGP

The REMOTE COPY SW ACCEL field specifies whether Db2 uses software to control the remote copy process for active log output in peer-to-peer remote copy (PPRC) environments.

Acceptable values:	DISABLE, ENABLE
Default:	DISABLE
Data sharing scope:	It is recommended but not required that all members use the same setting. DISABLE is recommended if the active log data sets are not on PPRC-enabled devices.
Online changeable:	Yes
DSNZP*xxx*:	DSN6LOGP.REMOTE_COPY_SW_ACCEL

DISABLE
The hardware PPRC function is used if available; this setting is appropriate for non-PPRC environments.

ENABLE
Host software is used. This option can improve overall Db2 performance in PPRC environments at the expense of some additional SRB CPU time in the *xxxx*MSTR address space. z/OS 2.1 or later is required to support this function.

Related information

RENAMETABLE in macro DSN6SPRM

The RENAMETABLE subsystem parameter specifies whether RENAME TABLE issues an error or allows the operation when RENAME TABLE is issued for a table that is referenced in a view definition or the definition of an SQL table function.

Acceptable values:	DISALLOW_DEP_VIEW_SQLTUDF, ALLOW_DEP_VIEW_SQLTUDF
Default:	DISALLOW_DEP_VIEW_SQLTUDF
Update:	option 11 on panel DSNTIPB
DSNZP*xxx*:	DSN6SPRM RENAMETABLE

DISALLOW_DEP_VIEW_SQLTUDF
Db2 issues an error when RENAME TABLE is issued for a table that is referenced in the definition of a view or an SQL table function.

ALLOW_DEP_VIEW_SQLTUDF

Db2 does not issue an error when RENAME TABLE is issued for a table that is referenced in the definition of a view or an SQL table function.

When a RENAME TABLE statement is issued for such a table, the Db2 database manager takes the following actions:

- Updates internal information about object dependencies, but does not change the text representations of statements that created or altered views or routines that depend on the renamed table in the SYSIBM.SYSVIEWS or SYSIBM.SYSROUTINES catalog tables.
- Invalidates statements that refer to the table that is renamed

In a data sharing environment, specify the same value of RENAMETABLE for all members.

Related information

RESTRICT_ALT_COL_FOR_DCC in macro DSN6SPRM

Specifies whether restrictions apply to ALTER TABLE ALTER COLUMN statements for target tables that are defined with the DATA CAPTURE CHANGES attribute. Valid values are NO and YES.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM RESTRICT_ALT_COL_FOR_DCC
Security parameter:	No

NO

Restrictions do not apply to altering column data types or default values of tables that are defined with the DATA CAPTURE CHANGES attribute. For such tables, ALTER TABLE ALTER COLUMN statements with the SET DATA TYPE, SET DEFAULT, or DROP DEFAULT options are allowed.

YES

restrictions apply to altering column data types or default values of tables that are defined with the DATA CAPTURE CHANGES attribute. ALTER TABLE ALTER COLUMN statements that are issued with the SET DATA TYPE, SET DEFAULT, or DROP DEFAULT options for such tables result in SQLCODE -148.

Related information

RETRY_STOPPED_OBJECTS in macro DSN6SPRM

The RETRY_STOPPED_OBJECTS subsystem parameter specifies whether Db2 immediately rejects requests for a stopped object or rechecks whether the object is started, up to the IRLM timeout limit.

Acceptable values:	NO, YES
Default:	NO
Data sharing scope:	It is recommended but not required that all members use the same setting.
Online changeable:	Yes
DSNZP*xxx*:	DSN6SPRM.RETRY_STOPPED_OBJECTS

NO

Db2 immediately rejects requests for stopped objects.

YES

Db2 retries requests for stopped objects in case the object is restarted, up to IRLM timeout limit, which is specified by the value of the IRLMRWT subsystem parameter.

Related reference

RESOURCE TIMEOUT field (IRLMRWT subsystem parameter)
The IRLMRWT subsystem parameter controls the number of seconds that are to elapse before a resource timeout is detected.

SECADM1_INPUT_STYLE in macro DSN6SPRM

Specifies whether the SECADM1 setting is a character string or a hexadecimal string.

Acceptable values:	CHAR, HEX
Default:	CHAR
DSNZP*xxx*	DSN6SPRM SECADM1_INPUT_STYLE
Security parameter:	Yes

CHAR
The SECADM1 value is a standard character string. SECADM1 must be a 1 - 8 character authorization ID. If SECADM1_TYPE=ROLE, SECADM1 must be a 1 - 128 character ordinary SQL identifier.

HEX
The SECADM1 values is a hexadecimal character string that represents a Unicode-encoded role name. HEX is valid only when SECADM1_TYPE=ROLE. SECADM1 must be an even number of bytes in the range 2 - 256 , consisting entirely of 0 - 9 and A - F.

Related reference

SEC ADMIN 1 TYPE field (SECADM1_TYPE subsystem parameter)
The SECADM1_TYPE subsystem parameter specifies whether the entry in the SECURITY ADMIN 1 field is an authorization ID or a role.

SECURITY ADMIN 1 field (SECADM1 subsystem parameter)
The SECADM1 subsystem parameter specifies the first of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 1 TYPE field, specify whether this entry is an authorization ID or a role.

SECADM2_INPUT_STYLE in macro DSN6SPRM

Specifies whether the SECADM2 setting is a character string or a hexadecimal string.

Acceptable values:	CHAR, HEX
Default:	CHAR
DSNZP*xxx*	DSN6SPRM SECADM2_INPUT_STYLE
Security parameter:	Yes

CHAR
The SECADM2 value is a standard character string. SECADM2 must be a 1 - 8 character authorization ID. If SECADM2_TYPE=ROLE, SECADM2 must be a 1 - 128 character ordinary SQL identifier.

HEX
The SECADM2 values is a hexadecimal character string that represents a Unicode-encoded role name. HEX is valid only when SECADM2_TYPE=ROLE. SECADM2 must be an even number of bytes in the range 2 - 256, consisting entirely of 0 - 9 and A - F.

Related reference

SECURITY ADMIN 2 field (SECADM2 subsystem parameter)
The SECADM2 subsystem parameter specifies the second of two authorization IDs or roles that are to have Db2 security administrator authority. In the SEC ADMIN 2 TYPE field, specify whether this entry is an authorization ID or a role.

SEC ADMIN 2 TYPE field (SECADM2_TYPE subsystem parameter)

The SECADM2_TYPE subsystem parameter specifies whether the entry in the SECURITY ADMIN 2 field is an authorization ID or a role.

SIMULATED_CPU_COUNT in macro DSN6SPRM

Specifies the number of CPUs that are being simulated. This parameter is to be used for Db2 optimization modeling only.

Acceptable values:	OFF, 1 - 255
Default:	OFF
DSNZP*xxx*:	DSN6SPRM SIMULATED_CPU_COUNT
Security parameter:	No

OFF
Db2 optimizes for the number of CPUs that it runs on.

1 - 255
Specifies the simulated number of CPUs.

Related information

SIMULATED_CPU_SPEED in macro DSN6SPRM

Specifies the microseconds of execution time for tasks or service request blocks (SRBs) per service unit for the CPU that is being simulated. This parameter is used only for Db2 optimization modeling.

Acceptable values:	OFF, 1 - 2147483647
Default:	OFF
Online changeable:	YES
DSNZP*xxx*:	DSN6SPRM.SIMULATED_CPU_SPEED

OFF
Db2 optimizes for the CPU that it runs on. Use this setting in production environments.

1 - 2147483647
Microseconds of execution time for tasks or service request blocks (SRBs) per service unit for the CPU that is being simulated. If the specified value is 1 -27, Db2 uses a value of 27

Related information

SJTABLES in macro DSN6SPRM

Specifies whether Db2 enables star join processing.

Acceptable values:	0 - 32767
Default:	10
DSNZP*xxx*:	DSN6SPRM SJTABLES
Security parameter:	No

0
Star join processing is considered for a query block that has 10 or more tables.

1 - 3
Star join processing is always considered.

4 - 225
Star join processing is considered for a query block that has at least the specified number of tables.

226 - 32767
Star join processing is disabled.

Related reference

STAR JOIN QUERIES field (STARJOIN subsystem parameter)
The STARJOIN subsystem parameter specifies whether star join processing is to be enabled.

Related information

SMF89 in macro DSN6SYSP

Specifies whether Db2 is to do detailed tracking for measured usage pricing. If you select YES, Db2 does detailed measured usage tracking if SMF type 89 records are activated.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SYSP SMF89
Security parameter:	No

NO
Db2 does not do detailed measured usage tracking. If the SMF type 89 record is activated, only high-level tracking is recorded in the SMF type 89 record. Selecting NO reduces CPU usage, but also increases the amount of time spent in Db2 as measured by SMF 89.

YES
Db2 invokes a z/OS service on every entry into or exit out of Db2 to ensure accurate tracking.

Recommendation: Select SMF89 YES only if you use measured usage pricing.

SQWIDSC in macro DSN6SPRM

Specifies whether, when RENAME TABLE or DROP ALIAS is issued against an object against which there is already SQL activity, the Db2 database manager performs only an invalidate operation, or performs a quiesce operation and an invalidate operation on all SQL statements in the dynamic statement cache that depend on that object.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	
Security parameter:	No

NO
The database manager invalidates and performs a quiesce operation on SQL statements in the dynamic statement cache that depend on an object that is the target of a RENAME TABLE or DROP ALIAS statement.

YES
The database manager invalidates but does not quiesce SQL statements in the dynamic statement cache that depend on an object that is the target of a RENAME TABLE or DROP ALIAS statement.

In a data sharing environment, all data sharing members need to use the same setting.

This parameter is deprecated.

SUBQ_MIDX in macro DSN6SPRM

Specifies whether to enable or disable multiple index access on some non-Boolean uncorrelated subquery predicates.

Deprecated subsystem parameter: Non-default settings for SUBQ_MIDX are deprecated. Db2 11 supports these settings, but their use is discouraged, and support is likely to be removed eventually. For best results, use the default value ENABLE.

Acceptable values:	ENABLE, DISABLE
Default:	ENABLE
DSNZP*xxx*:	DSN6SPRM SUBQ_MIDX
Security parameter:	No

ENABLE
Multiple index access is allowed for queries that have subquery predicates.

DISABLE
Multiple index access is not allowed for queries that have subquery predicates.

The following example query contains such non-Boolean uncorrelated subquery predicates:

```
SELECT *
  FROM T1
 WHERE (T1.C1= ? )
        OR (T1.C2 >= T1.C3
            AND T1.C4 = (SELECT T2.C1
                           FROM T2
                          WHERE T2.c2  = ?)
           )
```

Related information

SUPPRESS_HINT_SQLCODE_DYN in macro DSN6SPRM

Specifies whether Db2 suppresses SQLCODE +394 and SQLCODE +395 when specified access paths are applied for dynamic SQL statements.

Acceptable values:	NO, STMT, ALL
Default:	NO
DSNZP*xxx*:	DSN6SPRM SUPPRESS_HINT_SQLCODE_DYN
Security parameter:	No

NO
Db2 issues +394 and +395 for statement-level access paths and PLAN_TABLE access paths.

STMT
Db2 suppresses +394 and +395 for statement-level access paths for dynamic SQL statements.

ALL
Db2 suppresses +394 and +395 for statement-level access paths and PLAN_TABLE access paths for dynamic SQL statements.

The SUPPRESS_HINT_SQLCODE_DYN subsystem parameter does not apply to static SQL statements or dynamic EXPLAIN statements.

Related information

UNION_COLNAME_7 in macro DSN6SPRM

Specifies the behavior for result column names in UNION queries.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM UNION_COLNAME_7
Security parameter:	No

NO
If the column name is the same across all sub-queries in the UNION query, the result column name is that column name. Otherwise, the result column is unnamed. DB2 Version 8 introduced this behavior.

YES
The column name that is returned in the SQLNAME field of an SQLDA following a DESCRIBE statement, where the result table that is described is the result of a union, is the column name from the first subquery of the union operation. Db2 used this behavior in DB2 Version 7 and earlier.

Related information

XML_RESTRICT_EMPTY_TAG in DSN6SPRM

Specifies whether Db2 always serializes an empty XML element using a start-element tag followed by an end-element tag.

Acceptable values:	NO, YES
Default:	NO
DSNZP*xxx*:	DSN6SPRM XML_RESTRICT_EMPTY_TAG
Security parameter:	No

NO
Db2 serializes an empty XML element in either of the following ways:

- As a start-element tag followed by an end-element tag. For example:

  ```
  <emptyElement></emptyElement>
  ```

- As an empty-element tag. For example:

  ```
  <emptyElement/>
  ```

YES
Db2 always serializes an empty XML element as a start-element tag followed by an end-element tag. For example:

```
<emptyElement></emptyElement>
```

Related information

ZOSMETRICS in macro DSN6SPRM

Enables Db2 to gather z/OS metrics, including CPU usage and storage metrics, by using the z/OS Resource Measurement Facility (RMF) interface.

Acceptable values:	NO, YES
Default:	NO

DSNZP*xxx*:	DSN6SPRM ZOSMETRICS
Security parameter:	No

NO
Db2 does not use RMF to gather z/OS metrics.

YES
Db2 uses RMF to gather z/OS metrics, including CPU usage and storage.

The following actions are required to make the RMF interface operational:

- Verify that the DSNWVRMF module is placed in a LINKLIST library. If the Db2 subsystem is in a data sharing group, ensure that DSNWVRMF is available in a LINKLIST library on all z/OS systems in the Parallel Sysplex®, regardless of whether a z/OS system contains a Db2 data sharing member.

  After installation, refresh the LINKLIST by issuing the following MVS command:

  ```
  f lla,refresh
  ```

- Start the RMF and RMF Monitor III Sysplex Data Retrieval Service.

In some cases, the z/OS metrics might not be provided, or they might be only partially provided in the Db2 trace. This lack of metrics is likely caused by setup problems that are related to RMF. If support is required, provide the incomplete trace data.

Directory of subsystem parameters, panel fields, and application default values

Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

The following table lists subsystem parameters and macro names, installation panel fields and panel names, and whether each parameter can be updated online. "Yes" in the Update online column means that the parameter can be updated online.

Table 41. Directory of subsystem parameters and application default values

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
ABEXP	EXPLAIN PROCESSING	DSN6SPRM	DSNTIPO	Yes	ABEXP
ABIND	AUTO BIND	DSN6SPRM	DSNTIPO	Yes	ABIND
ACCEL	ACCELERATION STARTUP	DSN6SPRM	DSNTIP82		ACCEL
ACCELMODEL	—	DSN6SPRM	—	Yes	ACCELMODEL
ACCESS_CNTL_MODULE	ACCESS CONTROL	DSN6SYSP	DSNTIPO3		ACCTLMOD
ACCUMACC	DDF/RRSAF ACCUM	DSN6SYSP	DSNTIPN	Yes	ACCUMAC
ACCUMUID	AGGREGATION FIELDS	DSN6SYSP	DSNTIPN	Yes	ACCUMUID
ADMTPROC	ADMIN SCHEDULER	DSN6SPRM	DSNTIPX		ADMTPROC
AEXITLIM	AUTH EXIT LIMIT	DSN6SPRM	DSNTIPP	Yes	AEXITLIM
AGCCSID	ASCII CCSID	DSNHDECP	DSNTIPF		AGCCSID
ALCUNIT	ALLOCATION UNITS	DSN6ARVP	DSNTIPA	Yes	ALCUNIT
—	*dbname*ALL/	DSN6SPRM	DSNTIPS		—
AMCCSID	ASCII CCSID	DSNHDECP	DSNTIPF		AMCCSID

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable “1” on page 358
APPENSCH	APPLICATION ENCODING	DSNHDECP	DSNTIPF		APPENSCH
APPLCOMPAT	APPL COMPAT LEVEL	DSN6SPRM		Yes	APPLCOMPAT
ARCPFX1	Archive logs: COPY 1 PREFIX	DSN6ARVP	DSNTIPH	Yes	ARCHPRE1
ARCPFX2	Archive logs: COPY 2 PREFIX	DSN6ARVP	DSNTIPH	Yes	ARCHPRE2
ARCRETN	RETENTION PERIOD	DSN6ARVP	DSNTIPA	Yes	ARCRETN
ARCWRTC	WTOR ROUTE CODE	DSN6ARVP	DSNTIPA	Yes	ARCHWRTC
ARCWTOR	WRITE TO OPER	DSN6ARVP	DSNTIPA	Yes	ARCHWTOR
ARC2FRST	READ COPY2 ARCHIVE	DSN6LOGP	DSNTIPO	Yes	ARC2FRST
ASCCSID	ASCII CCSID	DSNHDECP	DSNTIPF		ASCCSIDE
AUDITST	AUDIT TRACE	DSN6SYSP	DSNTIPN		AUDIT
AUTH	USE PROTECTION	DSN6SPRM	DSNTIPP		PROAUTH
AUTHCACH	PLAN AUTH CACHE	DSN6SPRM	DSNTIPP	Yes“2” on page 358	AUTHCACH
AUTHEXIT_CACHEREFRESH	AUTH EXIT CACHE REFR	DSN6SPRM	DSNTIPP		AECR
AUTHEXIT_CHECK	AUTH EXIT CHECK	DSN6SPRM	DSNTIPP		RACK
BACKODUR	BACKOUT DURATION	DSN6SYSP	DSNTIPL1		BACKODUR
BIF_COMPATIBILITY	BIF COMPATIBILITY	DSN6SPRM	DSNTIPX	Yes	BIFCP
BINDNV	BIND NEW PACKAGE	DSN6SPRM	DSNTIPP1	Yes“2” on page 358	BINDNV
BLKSIZE	BLOCK SIZE	DSN6ARVP	DSNTIPA	Yes	ARCHSIZE
BMPTOUT	IMS BMP TIMEOUT	DSN6SPRM	DSNTIPI	Yes	BMPTOUT
CACHE_DEP_TRACK_STOR_LIM	—	DSN6SPRM	—	Yes	CDTSL
CACHEDYN	CACHE DYNAMIC SQL	DSN6SPRM	DSNTIP8	Yes	CACHEDUM
CACHEDYN_FREELOCAL	—	DSN6SPRM	—	Yes	CACHFRE
CACHEPAC	PACKAGE AUTH CACHE	DSN6SPRM	DSNTIPP		CACHEPAC
CACHERAC	ROUTINE AUTH CACHE	DSN6SPRM	DSNTIPP		CACHERAC
CATALOG	CATALOG DATA	DSN6ARVP	DSNTIPA	Yes	ARCHCTLG
CATALOG	CATALOG ALIAS	DSN6SPRM	DSNTIPA2		VCATALOG
CATDDACL	DIRECTORY AND CATALOG DATA	DSN6SPRM	DSNTIPA2	Yes	CATDDACL
CATDMGCL	DIRECTORY AND CATALOG DATA	DSN6SPRM	DSNTIPA2	Yes	CATDMGCL
CATDSTCL	DIRECTORY AND CATALOG DATA	DSN6SPRM	DSNTIPA2	Yes	CATDSTCL
CATXDACL	DIRECTORY AND CATALOG INDEXES	DSN6SPRM	DSNTIPA2	Yes	CATXDACL
CATXMGCL	DIRECTORY AND CATALOG INDEXES	DSN6SPRM	DSNTIPA2	Yes	CATXMGCL
CATXSTCL	DIRECTORY AND CATALOG INDEXES	DSN6SPRM	DSNTIPA2	Yes	CATXSTCL
CDDS_MODE	—	DSN6LOGP	—		CDDSMOD

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable “1” on page 358
CDDS_PREFIX	—	DSN6LOGP	—		CDDSPFX
CDSSRDEF	CURRENT DEGREE	DSN6SPRM	DSNTIP81 DSNTIP8	Yes	CDSSRDEF
CHECK_FASTREPLICATION	FAST REPLICATION	DSN6SPRM	DSNTIP61	Yes	CHKFASRP
CHECK_SETCHKP	SET CHECK PENDING	DSN6SPRM	DSNTIP6	Yes	CHKSCHKP
CHGDC	DPROP SUPPORT	DSN6SPRM	DSNTIPO	Yes	CHGDC
CHKFREQ	CHECKPOINT FREQ	DSN6SYSP	DSNTIPL1	Yes	CHKFREQ
CHKLOGR	RECORDS/CHECKPOINT	DSN6SYSP	DSNTIPL1	Yes	CHKLOGR
CHKMINS	MINUTES/CHECKPOINT	DSN6SYSP	DSNTIPL1	Yes	CKPTTIME
CHKTYPE	CHECKPOINT TYPE	DSN6SYSP	DSNTIPL1	Yes	CHKTYPE
CMTSTAT	DDF THREADS	DSN6FAC	DSNTIPR		CMTSTAT
COMCRIT	—	DSN6SPRM	—	Yes	COMCRIT
COMPACT	COMPACT DATA	DSN6ARVP	DSNTIPA	Yes	ARCHCOMP
COMPRESS_SPT01	COMPRESS SPT01	DSN6SPRM	DSNTIPA2	Yes	CMPSPT01
CONDBAT	MAX REMOTE CONNECTED	DSN6SYSP	DSTIPE	Yes	CONDBAT
CONTSTOR	CONTRACT THREAD STG	DSN6SPRM	DSNTIPE	Yes	CONTSTOR
CTHREAD	MAX USERS	DSN6SYSP	DSNTIPE	Yes	NUMCONCR
DBACRVW	DBADM CREATE AUTH	DSN6SPRM	DSNITPP1	Yes “2” on page 358	DBACRVW
DATE	DATE FORMAT	DSNHDECP	DSNTIP4		DEFDATE
DATELEN	LOCAL DATE LENGTH	DSNHDECP	DSNITP4		DEFDATEL
DB2SORT	UT DB2 SORT USE	DSN6SPRM	DSNTIP6	Yes	DB2SORT
DB2SUPLD	—	DSNHDECP	—		DB2SUPLD
DDF	DDF STARTUP OPTION	DSN6FAC	DSNTIPR		DDSTART
DDF_COMPATIBILITY	—	DSN6FAC	—	Yes	DDFCMPAT
DDLTOX	DATA DEF TIMEOUT	DSN6SPRM	DSNTIPE1	Yes	DDLTOX
DEALLCT	DEALLOC PERIOD	DSN6LOGP	DSNTIPA	Yes	ARCHDEAP
DECARTH	DECIMAL ARITHMETIC	DSNHDECP	DSNTIP4		DECARTH
DECDIV3	MINIMUM DIVIDE SCALE	DSN6SPRM	DSNTIP4		DECDIV3
DECIMAL	DECIMAL POINT IS	DSNHDECP	DSNTIPF		DECPOINT
DEF_DECFLOAT_ROUND_MODE	DECFLOAT ROUNDING MODE	DSNHDECP	DSNTIPF		DEFDFPRM
DEFLANG	LANGUAGE DEFAULT	DSNHDECP	DSNTIPF		DEFLANG
DEFLTID	UNKNOWN AUTHID	DSN6SPRM	DSNTIPP1		PROTUNKN
DEL_CFSTRUCTS_ON_RESTART	DEL CF STRUCTS	DSN6SYSP	DSNTIPK		DCFS
DELIM	STRING DELIMITER	DSNHDECP	DSNTIPF		DEFSTRNG
DESCSTAT	DESCRIBE FOR STATIC	DSN6SPRM	DSNTIP4	Yes	DECSTAT
DISABLE_EDMRTS	DISABLE EDM RTS	DSN6SPRM	DSNTIP8	Yes	DEDR
DISALLOW_SEL_INTO_UNION	—	DSN6SPRM	—	Yes	—
DLDFREQ	LEVELID UPDATE FREQ	DSN6SYSP	DSNTIPL1	Yes	DLDFREQ

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
DLITOUT	DL/I BATCH TIMEOUT	DSN6SPRM	DSNTIPI	Yes	DLITOUT
DPSEGSZ	DEFAULT PARTITION SEGSIZE	DSN6SYSP	DSNTIP71	Yes	DPSEGSZ
DSHARE	DATA SHARING	DSN6GRP	DSNTIPA1		DSHARE
DSMAX	DSMAX	DSN6SPRM	DSNTIPC	Yes	OPNDS
DSQLDELI	DIST SQL STR DELIMTR	DSNHDECP	DSNTIPF		DECPDSSD
DSSTIME	DATASET STATS TIME	DSN6SYSP	DSNTIPN	Yes	DSSTIME
DSVCI	VARY DS CONTROL INTERVAL	DSN6SYSP	DSNTIP7	Yes	DSVCI
DYNRULS	USE FOR DYNAMICRULES	DSNHDECP	DSNTIP4		DYNRULS
EDM_SKELETON_POOL	EDM SKELETON POOL SIZE	DSN6SPRM	DSNTIPC	Yes	EDMSKP
EDMDBDC	EDM DBD CACHE	DSN6SPRM	DSNTIPC	Yes	EDMDBDC
EDMPOOL	EDM LIMIT BELOW THE BAR	DSN6SPRM	DSNTIPC	Yes	EDMPOOL
EDMSTMTC	EDM STATEMENT CACHE	DSN6SPRM	DSNTIPC	Yes	EDMSTMTC
EDPROP	DPROP SUPPORT	DSN6SPRM	DSNTIPO	Yes	EDPROP
EN_PJSJ	—	DSN6SPRM	—	Yes	ENSHCEME
ENSCHEME	DEF ENCODING SCHEME	DSNHDECP	DSNTIPF		ENPJSJ
EVALUNC	EVALUATE UNCOMMITTED	DSN6SPRM	DSNTIP8	Yes	EVALUNC
EXTRAREQ	EXTRA BLOCKS REQ	DSN6SYSP	DSNTIP5	Yes	EXTRAREQ
EXTRASRV	EXTRA BLOCKS SRV	DSN6SYSP	DSNTIP5	Yes	EXTRSRV
EXTSEC	EXTENDED SECURITY	DSN6SYSP	DSNTIPR	Yes "2" on page 358	EXTSEC
FCCOPYDDN	DEFAULT TEMPLATE	DSN6SPRM	DSNTIP61	Yes	FCCDTEMP
FLASHCOPY_COPY	COPY	DSN6SPRM	DSNTIP61	Yes	FCCP
FLASHCOPY_LOAD	LOAD	DSN6SPRM	DSNTIP61	Yes	FCLP
FLASHCOPY_PPRC	FLASHCOPY PPRC	DSN6SPRM	DSNTIP61	Yes	FCPPRC
FLASHCOPY_REBUILD_INDEX	REBUILD INDEX	DSN6SPRM	DSNTIP61	Yes	FCROT
FLASHCOPY_REORG_INDEX	REORG INDEX	DSN6SPRM	DSNTIP61	Yes	FCRBI
FLASHCOPY_REORG_TS	REORG TABLESPACE	DSN6SPRM	DSNTIP61	Yes	FCROI
FLASHCOPY_XRCP	FLASHCOPY XRCP	DSN6SPRM	DSNTIP61	Yes	—
GCCSID	EBCDIC CCSID	DSNHDECP	DSNTIPF		GCCSID
GET_ACCEL_ARCHIVE	GET ACCEL ARCHIVE	DSN6SPRM	DSNTIP82	Yes	CGAA
GRPNAME	GROUP NAME	DSN6GRP	DSNTIPK		GRPNAME
HONOR_KEEPDICTIONARY	—	DSN6SPRM	—	Yes	HNRKPDIC
IDAUTH_MODULE	IDENTIFY/AUTH	DSN6SYSP	DSNTIPO3		IDAUTMOD
IDBACK	MAX BATCH CONNECT	DSN6SYSP	DSNTIPE	Yes	NUMCONBT
IDFORE	MAX TSO CONNECT	DSN6SYSP	DSNTIPE	Yes	NUMCONTS
IDTHTOIN	IDLE THREAD TIMEOUT	DSN6FAC	DSNTIPR	Yes	IDTHTOIN
IDXBPOOL	DEFAULT BUFFER POOL FOR USER INDEXES	DSN6SYSP	DSNTIP1	Yes	IDXBPOOL
IGNSORTN	IGNORE SORTNUM STMT	DSN6SPRM	DSNTIP6	Yes	IGNSORTN

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable “1” on page 358
IMMEDWRI	IMMEDIATE WRITE	DSN6GRP	DSNTIP8	Yes	IMMEDWRI
IMPDSDEF	DEFINE DATA SETS	DSN6SYSP	DSNTIP71	Yes	IMPDSDEF
IMPDSSIZE	—	DSN6SYSP	—	Yes	IMPDSIZE
IMPLICIT_TIMEZONE	IMPLICIT TIME ZONE	DSNHDECP	DSNTIP4		IMTZ
IMPTKMOD	—	DSN6SYSP	—	Yes	IMPTKMOD
IMPTSCMP	USE DATA COMPRESSION	DSN6SYSP	DSNTIP71	Yes	IMPTSCMP
INDEX_CLEANUP_THREADS	INDEX CLEANUP THREADS	DSN6SPRM	DSNTIPE1	Yes	IXCU
INDEX_IO_PARALLELISM	—	DSN6SPRM	—	Yes	—
INLISTP	—	DSN6SPRM	—	Yes	INLISTP
IRLMAUT	AUTO START	DSN6SPRM	DSNTIPI		IRLMAUTO
IRLMPRC	PROC NAME	DSN6SPRM	DSNTIPI		IRLMPROC
IRLMRWT	RESOURCE TIMEOUT	DSN6SPRM	DSNTIPI		IRLMWAIT
IRLMSID	SUBSYSTEM NAME	DSN6SPRM	DSNTIPI		IRLMSSID
IRLMSWT	TIME TO AUTOSTART	DSN6SPRM	DSNTIPI	Yes	IRLMSTTO
IX_TB_PART_CONV_EXCLUDE	EXCLUDE PART KEY COLUMNS	DSN6SPRM	DSNTIP71	Yes	XPKE
IXQTY	INDEX SPACE ALLOCATION	DSN6SYSP	DSNTIP7	Yes	IXQTY
LBACKOUT	LIMIT BACKOUT	DSN6SYSP	DSNTIPL1		LBACKOUT
LC_TYPE	LOCALE LC_CTYPE	DSNHDECP	DSNTIPF		LCCTYPE
LEMAX	MAXIMUM LE TOKENS	DSN6SPRM	DSNTIPX		LEMAX
LIKE_BLANK_INSIGNIFICANT	LIKE BLANK INSIGNIFICANT	DSN6SPRM	DSNTIP41	Yes	LBIN
LOB_INLINE_LENGTH	LOB INLINE LENGTH	DSN6SYSP	DSNTIPD	Yes	LOBINLEN
LOBVALA	USER LOB VALUE STG	DSN6SYSP	DSNTIPD	Yes	LOBVALA
LOBVALS	SYSTEM LOB VAL STG	DSN6SYSP	DSNTIPD	Yes	LOBVALS
LRDRTHLD	LONG-RUNNING READER	DSN6SPRM	DSNTIPE	Yes	LRDRTHLD
MAINTYPE	CURRENT MAINT TYPES	DSN6SPRM	DSNTIP81	Yes	MAINTYPE
MATERIALIZE_NODET_SQLTUDF	—	DSN6SPRM	—	Yes	MNSU
MAXSORT_IN_MEMORY	MAX IN-MEMORY SORT SIZE	DSN6SPRM	DSNTIPC	Yes	ARHCMAX
MAX_CONCURRENT_PKG_OPS	—	DSN6SPRM	—	Yes	MXCONPKG
MAX_NUM_CUR	MAX OPEN CURSORS	DSN6SPRM	DSNTIPX	Yes	MXNUMCUR
MAX_ST_PROC	MAX STORED PROCS	DSN6SPRM	DSNTIPX	Yes	MXSTPROC
MAXARCH	RECORDING MAX	DSN6LOGP	DSNTIPA		ARCHMAXV
MAXCONQN	CONN QUEUE MAX DEPTH —	DSN6FAC	DSNTIP5	Yes	MAXCONQN
MAXCONQW	CONN QUEUE MAX WAIT	DSN6FAC	DSNTIP5	Yes	MAXCONQW
MAXDBAT	MAX REMOTE ACTIVE	DSN6SYSP	DSNTIPE	Yes	NUMCONRM
MAXKEEPD	MAX KEPT DYN STMTS	DSN6SPRM	DSNTIPE	Yes	MAXKEEPD
MAXOFILR	MAX OPEN FILE REFS	DSN6SYSP	DSNTIPE	Yes	MAXOFILR
MAXRBLK	RID POOL SIZE	DSN6SPRM	DSNTIPC	Yes	RIDPOOL
MAXRTU	READ TAPE UNITS	DSN6LOGP	DSNTIPA	Yes	ARCHMRTU

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
MAXTEMPS	MAX TEMP STG/AGENT	DSN6SPRM	DSNTIP91	Yes	MAXTEMPS
MAXTEMPS_RID	MAX TEMP RID	DSN6SPRM	DSNTIP91	Yes	MXTMPRID
MAXTYPE1	MAX INACTIVE DBATS	DSN6FAC	DSNTIPR	Yes	MAXTYPE1
MCCSID	EBCDIC CCSID	DSNHDECP	DSNTIPF		MCCSID
MEMBNAME	MEMBER NAME	DSN6GRP	DSNTIPK		MEMBNAME
MGEXTSZ	MGEXTSZ	DSN6SYSP	DSNTIP7	Yes	MGEXTSZ
MINDVSCL	—	DSN6SPRM	—	Yes	MINDVSCL
MINSTOR	MANAGE THREAD STORAGE	DSN6SPRM	DSNTIPE	Yes	MINSTOR
MIXED	MIXED DATA	DSNHDECP	DSNTIPF		DEFMIXED
MON	MONITOR TRACE	DSN6SYSP	DSNTIPN		MON
MONSIZE	MONITOR SIZE	DSN6SYSP	DSNTIPN		MONSIZE
MOVE_TO_ARCHIVE_DEFAULT	—	DSN6SPRM	—	Yes	MOVE_TO_ ARCHIVE_DEFAULT
MXDTCACH	MAX DATA CACHING	DSN6SPRM	DSNTIP81	Yes	MXDCACH
NEWFUN	—	DSNHDECP	—	No	NEWFUN
NPGTHRSH	—	DSN6SPRM	—	Yes	NPGTHRSH
NUMLKTS	LOCKS PER TABLE(SPACE)	DSN6SPRM	DSNTIPJ	Yes	IRLMLKTS
NUMLKUS	LOCKS PER USER	DSN6SPRM	DSNTIPJ	Yes	IRLMLKUS
OBJECT_CREATE_FORMAT	OBJECT CREATE FORMAT	DSN6SPRM	DSNTIP7	Yes	OBCF
OPT1ROWBLOCKSORT	—	DSN6SPRM	—	Yes	OP1RBSRT
OPTHINTS	OPTIMIZATION HINTS	DSN6SPRM	DSNTIP8	Yes	OPTHINTS
OTC_LICENSE	OTC LICENSE USAGE	DSN6SYSP	DSNTIPO2		OTC_LICENSE
OUTBUFF	OUTPUT BUFFER	DSN6LOGP	DSNTIPL		OUTBUFF
PADIX	PAD INDEXES BY DEFAULT	DSN6SPRM	DSNTIP7	Yes	PADIX
PADNTSTR	PAD NUL-TERMINATED	DSNHDECP	DSNTIP4		PADNSTSR
PARA_EFF	PARALLELISM EFFICIENCY	DSN6SPRM	DSNTIP81	Yes	PARAEFF
PARAMDEG	MAX DEGREE	DSN6SPRM	DSNTIP81	Yes	PARAMDEG
PARAMDEG_DPSI	MAX DEGREE FOR DPSI	DSN6SPRM	DSNTIP81	Yes	DEGD
PARAMDEG_UTIL	MAX UTILS PARALLELISM	DSN6SPRM	DSNTIP6	Yes	UMD
PCLOSEN	RO SWITCH CHKPTS	DSN6SYSP	DSNTIPL1	Yes	PCLOSEN
PCTFREE_UPD	PERCENT FREE FOR UPDATE	DSN6SPRM	DSNTIP71	Yes	PFUP
PCLOSET	RO SWITCH TIME	DSN6SYSP	DSNTIPL1	Yes	PKRC
PKGREL_COMMIT	PACKAGE RELEASE COMMIT	DSN6SPRM	DSNTIP8	Yes	PKRC
PLANMGMT	PLAN MANAGEMENT	DSN6SPRM	DSNTIP8	Yes	PLANMGMT
PLANMGMTSCOPE	PLAN MANAGEMENT SCOPE	DSN6SPRM	DSNTIP8	Yes	PMSCOPE
POOLINAC	POOL THREAD TIMEOUT	DSN6FAC	DSNTIP5	Yes	POOLINAC
PRIQTY	PRIMARY QUANTITY	DSN6ARVP	DSNTIPA	Yes	ARCHPRI

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
PREVENT_ALTERTB_LIMITKEY	PREVENT ALTER LIMITKEY	DSN6SPRM	DSNTIP71	Yes	PALK
PREVENTPREVENT_NEW_IXCTRL_PAR T	PREVENT INDEX PART CREATE	DSN6SPRM	DSNTIP71	Yes	PCIP
PRIVATE_PROTOCOL	—	DSN6FAC	—	Yes	PRIVPRTL
PROFILE_AUTOSTART	PROFILE AUTOSTART	DSN6SYSP	DSNTIPO		PFAS
PROTECT	ARCHIVE LOG RACF	DSN6ARVP	DSNTIPP	Yes	PROTARAC
PTASKROL	—	DSN6SYSP	—	Yes	PTASKROL
QUERY_ACCEL_OPTIONS	ACCELERATION OPTIONS	DSN6SPRM	DSNTIP82	Yes	QACO
QUERY_ACCELERATION	CURRENT QUERY ACCEL	DSN6SPRM	DSNTIP82	Yes	QCAC
QUERY_ACCEL_WAITFORDATA	WAIT FOR DATA	DSN6SPRM	DSNTIP82	Yes	QAWFD
QUIESCE	QUIESCE PERIOD	DSN6ARVP	DSNTIPA	Yes	ARCHMQP
RANDOMATT	RANDOM ATTACH	DSN6GRP	DSNTIPK	Yes	RANDOMAT
REALSTORAGE_MANAGEMENT	MANAGE REAL STORAGE	DSN6SPRM	DSNTIPE1	Yes	RSMGMT
REALSTORAGE_MAX	—	DSN6SPRM	—	Yes	RSMAX
REC_FASTREPLICATION	FAST RESTORE	DSN6SPRM	DSNTIP61	Yes	RECFASRP
RECALL	RECALL DATABASE	DSN6SPRM	DSNTIPO		RECALL
RECALLD	RECALL DELAY	DSN6SPRM	DSNTIPO	Yes	RECALLD
REFSHAGE	CURRENT REFRESH AGE	DSN6SPRM	DSNTIP81	Yes	REFSHAGE
REMOTE_COPY_SW_ACCEL		DSN6LOGP	—	Yes	RCSA
RENAMETABLE	—	DSN6SPRM	—	Yes	ERTS
REORG_DROP_PBG_PARTS	REORG DROP PBG PARTS	DSN6SPRM	DSNTIP62	Yes	RPBG
REORG_IGNORE_FREESPACE	REORG IGNORE FREESPACE	DSN6SPRM	"DSNTIP62: Db2 utilities parameters panel 3 " on page 214	Yes	RIFS
REORG_LIST_PROCESSING	REORG LIST PROCESSING	DSN6SPRM	DSNTIP62	Yes	RLPR
REORG_MAPPING_DATABASE	REORG MAPPING DB	DSN6SPRM	DSNTIP62	Yes	RMDB
REORG_PART_SORT_NPSI	REORG PART SORT NPSI	DSN6SPRM	DSNTIP62	Yes	RPSN
RESTART	RESTART OR DEFER	DSN6SPRM	DSNTIPS		RESTART
RESTORE_RECOVER_FROMDUMP	RESTORE/RECOVER	DSN6SPRM	DSNTIP62	Yes	RESRECFD
RESTORE_TAPEUNITS	MAXIMUM TAPE UNITS	DSN6SPRM	DSNTIP62 DSNTIP6	Yes	RESTORTU
RESTRICT_ALT_COL_FOR_DCC	—	DSN6SPRM	—	Yes	RACFD
RESYNC	RESYNC INTERVAL	DSN6FAC	DSNTIPR	Yes	RESYNC
RETLWAIT	RETAINED LOCK TIMEOUT	DSN6SPRM	DSNTIPI	Yes	RETLWAIT
RETRY_STOPPED_OBJECT	—	DSN6SPRM	—		RSO
REVOKE_DEP_PRIVILEGES	REVOKE DEP PRIV	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	REVDPRIV
RGFCOLID	REGISTRATION OWNER	DSN6SPRM	DSNTIPZ		RGFCOLID
RGFDBNAM	REGISTRATION DATABASE	DSN6SPRM	DSNTIPZ		RGFDBNAM

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
RGFDEDPL	CONTROL ALL APPLICATIONS	DSN6SPRM	DSNTIPZ		RGFDEDPL
RGFDEFLT	UNREGISTERED DDL DEFAULT	DSN6SPRM	DSNTIPZ		RGFDEFLT
RGFESCP	ART/ORT ESCAPE CHARACTER	DSN6SPRM	DSNTIPZ		RGFESCP
RGFFULLQ	REQUIRE FULL NAMES	DSN6SPRM	DSNTIPZ		RGFFULLQ
RGFINSTL	INSTALL DD CONTROL SUPT	DSN6SPRM	DSNTIPZ		RGFINSTL
RGFNMORT	OBJT REGISTRATION TABLE	DSN6SPRM	DSNTIPZ		RGFNMORT
RGFNMPRT	APPL REGISTRATION TABLE	DSN6SPRM	DSNTIPZ		RGFNMPRT
RLF	RLF AUTO START	DSN6SYSP	DSNTIPO		RLFSTART
RLFAUTH	RESOURCE AUTHID	DSN6SYSP	DSNTIPP1	Yes	PROTRLF
RLFERR	RLST ACCESS ERROR	DSN6SYSP	DSNTIPO	Yes	RLFERROR
RLFERRD	RLST ACCESS ERROR	DSN6FAC	DSNTIPR	Yes	RLFERRD
RLFTBL	RLST NAME SUFFIX	DSN6SYSP	DSNTIPO	Yes	RLFSUFF
ROUTCDE	WTO ROUTE CODES	DSN6SYSP	DSNTIPO		OPROUTCD
RRF	REORDERED ROW FORMAT	DSN6SPRM	DSNTIP7	Yes	RRF
RRULOCK	U LOCK FOR RR/RS	DSN6SPRM	DSNTIPI	Yes	RRULOCK
SCCSID	EBCDIC CCSID	DSNHDECP	DSNTIPF		SCCSID
SECADM1	SECURITY ADMIN 1	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	SECADM1
SECADM1_INPUT_STYLE	—	DSN6SPRM	—	Yes	SECA1IS
SECADM1_TYPE	SEC ADMIN 1 TYPE	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	SECAMD1T
SECADM2	SECURITY ADMIN 2	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	SECADMN2
SECADM2_INPUT_STYLE	—	DSN6SPRM	—	Yes	SECA2IS
SECADM2_TYPE	SEC ADMIN 2 TYPE	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	SECADM2T
SECQTY	SECONDARY QTY	DSN6ARVP	DSNTIPA	Yes	ARCHSEC
SEPARATE_SECURITY	SEPARATE SECURITY	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	SEPSECUR
SIGNON_MODULE	SIGNON	DSN6SYSP	DSNTIPO3		SIGNON
SIMULATED_CPU_COUNT	—	DSN6SPRM	—	Yes	SIMCCNT
SIMULATED_CPU_SPEED	—	DSN6SPRM	—	Yes	SIMCSPD
SITETYP	SITE TYPE	DSN6SPRM	DSNTIPO		SITETYP
SJTABLES	—	DSN6SPRM	—	Yes	SJTABLES
SKIPUNCI	SKIP UNCOMM INSERTS	DSN6SPRM	DSNTIP8	Yes	SKIPUNCI
SMF89	—	DSN6SYSP	—	Yes	SMF89
SMFACCT	SMF ACCOUNTING	DSN6SYSP	DSNTIPN		OPSMFACT
SMFCOMP	COMPRESS SMF RECS	DSN6SYSP	DSNTIPN	Yes	SMFCOMP
SMFSTAT	SMF STATISTICS	DSN6SYSP	DSNTIPN		OPSMFSTA

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
SPT01_INLINE_LENGTH	SPT01 INLINE LENGTH	DSN6SPRM	DSNTIPA2	Yes"3" on page 358	SPT01INL
SQLDELI	SQL STRING DELIMITER	DSNHDECP	DSNTIPF		DEFSQSTR
SQWIDSC	—	DSN6SPRM	—	Yes	SQWIDSC
SRTPOOL	SORT POOL SIZE	DSN6SPRM	DSNTIPC	Yes	SRTPOOL
SSID	SUBSYSTEM NAME	DSNHDECP	DSNTIPM		MVSSNAME
STARJOIN	STAR JOIN QUERIES	DSN6SPRM	DSNTIP81	Yes	STARJOIN
STATCLGSRT	STATISTICS COLGROUP DATA SORT	DSN6SPRM	DSNTIP6	Yes	STCS
STATFDBK_SCOPE	STATISTICS FEEDBACK	DSN6SPRM	DSNTIPO	Yes	SFBS
STATHIST	STATISTICS HISTORY	DSN6SPRM	DSNTIP6 DSNTIP61	Yes	STATHIST
STATIME	STATISTICS TIME	DSN6SYSP	DSNTIPN	Yes	OPSTATIM
STATROLL	STATISTICS ROLLUP	DSN6SPRM	DSNTIP6	Yes	STATROLL
STATSINT	REAL TIME STATS	DSN6SPRM	DSNTIPO	Yes	STATSINT
STDSQL	STD SQL LANGUAGE	DSNHDECP	DSNTIP4		DEFSQLVL
STORMXAB	MAX ABEND COUNT	DSN6SYSP	DSNTIPX	Yes	STORMXAB
STORTIME	TIMEOUT VALUE	DSN6SYSP	DSNTIPX	Yes	STORTIME
SUBQ_MIDX	—	DSN6SPRM	—	Yes	SUBQ_MIDX
SUPERRS	SUPPRESS SOFT ERRORS	DSN6SPRM	DSNTIPM	Yes	SUPERRS
SUPPRESS_HINT_SQLCODE_DYN	—	DSN6SPRM	—	Yes	SHSD
SVOLARC	SINGLE VOLUME	DSN6ARVP	DSNTIPA	Yes	SVOLARC
SYNCVAL	STATISTICS SYNC	DSN6SYSP	DSNTIPN	Yes	SYNCVAL
SYSADM	SYSTEM ADMIN 1	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	PROTADMN
SYSADM2	SYSTEM ADMIN 2	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	PROTADM2
SYSOPR1	SYSTEM OPERATOR 1	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	PROTOPR1
SYSOPR2	SYSTEM OPERATOR 2	DSN6SPRM	DSNTIPP1	Yes"2" on page 358	PROTOPR2
SYSTEM_LEVEL_BACKUPS	SYSTEM-LEVEL BACKUPS	DSN6SPRM	DSNTIP62 DSNTIP6	Yes	SYSLVLBK
TBSBP8K	DEFAULT 8-KB BUFFER POOL FOR USER DATA	DSN6SYSP	DSNTIP1	Yes	TBSBP8K
TBSBP16K	DEFAULT 16-KB BUFFER POOL FOR USER DATA	DSN6SYSP	DSNTIP1	Yes	TBSBP16K
TBSBP32K	DEFAULT 32-KB BUFFER POOL FOR USER DATA	DSN6SYSP	DSNTIP1	Yes	TBSBP32K
TBSBPLOB	DEFAULT BUFFER POOL FOR USER LOB DATA	DSN6SYSP	DSNTIP1	Yes	TBSBPLOB
TBSBPOOL	DEFAULT 4-KB BUFFER POOL FOR USER DATA	DSN6SYSP	DSNTIP1	Yes	TBSBPOOL

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
TBSBPXML	DEFAULT BUFFER POOL FOR USER XML DATA	DSN6SYSP	DSNTIP1	Yes	TBSBPXML
TCPALVER	TCP/IP ALREADY VERIFIED	DSN6FAC	DSNTIP5	Yes	TCPALVER
TCPKPALV	TCP/IP KEEPALIVE	DSN6FAC	DSNTIP5	Yes "2" on page 358	TCPKPALV
TEMPLATE_TIME	TEMPLATE TIME	DSN6SPRM	DSNTIP6	Yes	TPTM
TIME	TIME FORMAT	DSNHDECP	DSNTIP4		DEFTIME
TIMELEN	LOCAL TIME LENGTH	DSNHDECP	DSNTIP4		DEFTIMEL
TRACSTR	TRACE AUTO START	DSN6SYSP	DSNTIPN		OPTRCAUT
TRACTBL	TRACE SIZE	DSN6SYSP	DSNTIPN		CALC/OPTRCSIZ
TRKRSITE	TRACKER SITE	DSN6SPRM	DSNTIPO		TRKRSITE
TSQTY	TABLE SPACE ALLOCATION	DSN6SYSP	DSNTIP7	Yes	TSQTY
TSTAMP	TIMESTAMP ARCHIVES	DSN6ARVP	DSNTIPH	Yes	ARCHTS
TWOACTV	NUMBER OF COPIES	DSN6LOGP	DSNTIPH		CALC/LOGSTWO
TWOARCH	NUMBER OF COPIES	DSN6LOGP	DSNTIPH		CALC/ARCHTWO
TWOBSDS	—	DSN6LOGP	—		TWOBSDS
UGCCSID	UNICODE CCSID	DSNHDECP	DSNTIPF		UGCCSID
UIFCIDS	UNICODE IFCIDS	DSN6SYSP	DSNTIPN	Yes	UIFCIDS
UMCCSID	UNICODE CCSID	DSNHDECP	DSNTIPF		UMCCSID
UNION_COLNAME_7	—	DSN6SPRM	—	Yes	UNCOLN7
UNIT	DEVICE TYPE 1	DSN6ARVP	DSNTIPA	Yes	ARCHDEVT
UNIT2	DEVICE TYPE 2	DSN6ARVP	DSNTIPA	Yes	ARCHDEV2
URCHKTH	UR CHECK FREQ	DSN6SYSP	DSNTIPL1	Yes	URCHKTH
URLGWTH	UR LOG WRITE CHECK	DSN6SYSP	DSNTIPL1	Yes	URLGWTH
USCCSID	UNICODE CCSID	DSNHDECP	DSNTIPF		USCCSID
UTIL_TEMP_STORCLAS	UTIL TEMP STORCLAS	DSN6SPRM	DSNTIP6	Yes	UTTEMPSC
UTILS_DUMP_CLASS_NAME	DUMP CLASS NAME	DSN6SPRM	DSNTIP62 DSNTIP61	Yes	UTDUMPCL
UTILITY_OBJECT_CONVERSION	UTILITY OBJECT CONVERSION	DSN6SPRM	DSNTIP7	Yes	UTOC
UTIMOUT	UTILITY TIMEOUT	DSN6SPRM	DSNTIP6 DSNTP61	Yes	UTIMOUT
UTSORTAL	UT SORT DATA SET ALLOCATION	DSN6SPRM	DSBTIP6	Yes	UTSORTAL
VOLTDEVT	TEMP DS UNIT NAME	DSN6SPRM	DSNTIP6	Yes	VOLTDEVT
WFDBSEP	SEPARATE WORK FILES	DSN6SPRM	DSNTIP91		WFDBSEP
WFSTGUSE_AGENT_THRESHOLD	AGENT LEVEL THRESHOLD	DSN6SPRM	DSNTIP91	Yes	WFSAT
WFSTGUSE_SYSTEM_THRESHOLD	SYSTEM LEVEL THRESHOLD	DSN6SPRM	DSNTIP91	Yes	WFSST
WLMENV	WLM ENVIRONMENT	DSN6SYSP	DSNTIPX	Yes	WLMENV
XLKUPDLT	X LOCK FOR SEARCHED U/D	DSN6SPRM	DSNTIPI	Yes	XLKUPDLT

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
XMLVALA	USER XML VALUE STG	DSN6SYSP	DSNTIPD	Yes	XMLVALA
XMLVALS	SYSTEM XML VALUE STG	DSN6SYSP	DSNTIPD	No	XMLVALS
XML_RANDOMIZE_DOCID	RANDOMIZE XML DOCID	DSN6SYSP	DSNTIP8	Yes	XRDI
XML_RESTRICT_EMPTY_TAG	—	DSN6SPRM	—	Yes	NOET
ZOSMETRICS	—	DSN6SPRM	—	Yes	ZOSMETRI
ZHYPERLINK	DB2 zHyperLinks SCOPE	DSN6SPRM	DSNTIPA3	Yes	ZHYPL
—	ADVANCED CONFIGURATION OPTIONS	—	DSNTIPR1		—
—	APPL DEFAULTS	—	DSNTIPO3		—
—	APPLICATION DBRM	—	DSNTIPT		DBRMLIB
—	APPLICATION LOAD	—	DSNTIPT		RUNLIB
—	ARCHIVE LOG FREQ	—	DSNTIPL		NUMHRARC
—	AUTH MEMBER	—	DSNTIPM		MVSAMEMB
—	AUTH SEQUENCE	—	DSNTIPM		MVSASEQN
—	BP0 - BP29	—	DSNTIP1		BP0 - BP29
—	BP30 - BP32K9	—	DSNTIP2		BP30 - BP32K9
—	BUFFER POOL SIZE	—	DSNTIPC		—
—	BYTE-BASED STRING FUNCTIONS	—	DSNTIP8A	Yes	—
—	CICS and IMS transaction invocation routines (DSNTIPRN)	—	DSNTIPRA		—
—	CICS COBOL LIBRARY	—	DSNTIPW		CICSCOB
—	CICS EXCI LIBRARY	—	DSNTIPW		CICSEXCI
—	CICS LOAD LIBRARY	—	DSNTIPW		CICSMOD
—	CICS MACRO LIBRARY	—	DSNTIPW		CICSMAC
—	CICS PL/I LIBRARY	—	DSNTIPW		CICSPLI
—	C/CPP COMPILER LIBRARY>	—	DSNTIPU		CCOMP
—	C/CPP COMPILER MODULE	—	DSNTIPU		CPROG
—	C/CPP HEADER LIBRARY	—	DSNTIPU		CHDRS
—	C/370 COMPILER MESSAGES	—	DSNTIPU		CMSGS
—	CLIST ALLOCATION	—	DSNTIPA2		VOLSDAT1
—	CLIST LIBRARY	—	DSNTIPT		OUTCL
—	COBOL COMPILER LIBRARY	—	DSNTIPU		ICOBCOMP
—	COBOL LE PRELINKER PHASE	—	DSNTIPU		ICOBPRLK
—	COLUMNS	—	DSNTIPD		—
—	COMMAND PREFIX	—	DSNTIPM		MVSSPREF
—	COMMAND SCOPE	—	DSNTIPM		CMDSCOPE
—	COPY 1 NAME	—	DSNTIPH		BSDSNAM1

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
—	COPY 2 NAME	—	DSNTIPH		BSDSNAM2
—	Active logs: COPY 1 PREFIX	—	DSNTIPH		LOGSPRE1
—	Active logs: COPY 2 PREFIX	—	DSNTIPH		LOGSPRE2
—	CPP AUTO CALL LIBRARY	—	DSNTIPU		CPPAUTCL
—	CPP CLASS LIB HEADERS	—	DSNTIPU		CPPHDRS
—	CPP CLASS LIBRARY	—	DSNTIPU		CPPCLASS
—	CPP PROCEDURE LIBRARY	—	DSNTIPU		CPPPROC
—	DATA SET NAME PREFIX	—	DSNTIPA1		DSNILIBP
—	DATA SET NAME SUFFIX	—	DSNTIPA1		DSNILIBS
—	DATABASES	—	DSNTIPD		—
—	Database metadata routines (DSNTIPRK)	—	DSNTIPRA		—
—	DATABASES	—	DSNTIPE		—
—	DBRM LIBRARY	—	DSNTIPT		DSNDBRM
—	DB2 administrator routines (DSNTIPRL)	—	DSNTIPRA		—
—	DB2 GENERIC LUNAME	—	DSNTIPR		GENLUNM
—	DB2 LOCATION NAME	—	DSNTIPR		DDLOC
—	DB2 NETWORK LUNAME	—	DSNTIPR		DDLUNAM
—	DB2 NETWORK PASSWORD	—	DSNTIPR		DDPASS
—	DB2 optimization routines (DSNTIPRM)	—	DSNTIPRA		—
—	DB2 security routines (DSNTIPRE)	—	DSNTIPRA		—
—	DD/MM/YYYY LOCAL DATE FORMAT	—	DSNTIP8A	Yes	—
—	DEADLOCK CYCLE	—	DSNTIPJ		—
—	DEADLOCK TIME	—	DSNTIPJ		—
—	DECLARATION LIBRARY	—	DSNTIPT		SRCLIB
—	DEFINE CATALOG	—	DSNTIPA2		—
—	DISCONNECT IRLM	—	DSNTIPJ		IRLMDISC
—	DRDA PORT	—	DSNTIP5		DRDAPRT
—	Enter job card information for install and sample jobs	—	DSBNTIPY		—
—	EXECUTED STMTS	—	DSNTIPD		NUMSTMTE
—	EXIT LIBRARY	—	DSNTIPT		DSNEXIT
—	FAVOR NEW ACCELERATOR_TYPE	—	DSNTIP8A	Yes	—
—	FORTRAN COMPILER LIBRARY	—	DSNTIPU		FORTCOMP
—	FORTRAN LINK EDIT LIB	—	DSNTIPU		FORTLINK
—	FOR DB2 REXX ROUTINES	—	DSNTIPR1		WLMENVR

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable “1” on page 358
—	FOR DB2 UTILITIES ROUTINES	—	DSNTIPR1		WLMENVU
—	FOR DB2 XML PROCESSING ROUTINES	—	DSNTIPR1		WLMENVX
—	FOR MOST DB2 ROUTINES	—	DSNTIPR1		WLMENVG
—	FOR MOST DB2 JAVA ROUTINES	—	DSNTIPR1		WLMENVJ
—	FOR ROUTINES IDENTIFIED TO PROGRAM CONTROL	—	DSNTIPR1		WLMENVP
—	FOR SERIALIZED ROUTINES	—	DSNTIPR1		WLMENV1
—	FOR THE DB2 CICS ROUTINE	—	DSNTIPR1		WLMENVC
—	FOR DB2 MQSERIES ROUTINES	—	DSNTIPR1		WLMENVM
—	FOR DB2 WEB SERVICES ROUTINES	—	DSNTIPR1		WLMENVW
—	FOR UNIFIED DEBUGGER ROUTINES	—	DSNTIPR1		WLMENVD
—	GDDM LOAD MODULES	—	DSNTIPW		GDDMLOAD
—	GDDM MACLIB	—	DSNTIPW		GDDMMACS
—	GRANT EXECUTE (on many sub-panels)	—	DSNTIPRA (sub-panels)		—
—	GROUP ATTACH	—	DSNTIPK		GRPATTNM
—	HIGH LEVEL ASSEMBLER LIB	—	DSNTIPU		ASMLIB
—	IBM LE LINK EDIT LIB	—	DSNTIPU		LELKED
—	IBM LE PRELINK MSG LIB	—	DSNTIPU		LEPLMSGL
—	IBM LE RUNTIME LIBRARY	—	DSNTIPU		LERUN
—	IBM LE RUNTIME LIBRARY 2	—	DSNTIPU		LERUN2
—	IBM Text Search routines (DSNTIPRJ)	—	DSNTIPRA		—
—	IMS RESLIB	—	DSNTIPW		RESLIB
—	INCLUDE LIBRARY	—	DSNTIPT		DSNCHDRS
—	INPUT MEMBER NAME	—	DSNTIPA1		—
—	INSERT FROM SELECT	—	DSNTIP8A	Yes	—
—	INSTALL GRANTEE(S)	—	DSNTIPG		INSGRLST
—	INSTALL IC PREFIX	—	DSNTIPG		INSICPRE
—	INSTALL IRLM	—	DSNTIPG		—
—	INSTALL DS PREFIX	—	DSNTIPG		INSDSPRE
—	INSTALL PKG OWNER	—	DSNTIPG		INSPKOWN
—	INSTALL SQL ID	—	DSNTIPG		INSSQLID
—	INSTALL TYPE	—	DSNTIPA1		INSTYPE
—	IRLM LOAD LIBRARY	—	DSNTIPT		DSNIRLM

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
—	IRLM XCF GROUP NAME	—	DSNTIPJ		IRLMGRPN
—	ISPF ISPLINK MODULE	—	DSNTIPW		ISPLOAD
—	IVP DATA LIBRARY	—	DSNTIPT		DSNIVPD
—	Java and SQL procedure processing routines (DSNITPRF)	—	DSNTIPRA		IVPSQLID
—	JDBC AND SQLJ DLLS	—	DSNTIPT		DSNLOD2
—	JSON routines (DSNTIPRQ)	—	DSNTIPRA		—
—	LIBRARY NAME PREFIX	—	DSNTIPA1		DSNTLIBP
—	LIBRARY NAME SUFFIX	—	DSNTIPA1		DSNTLIBS
—	LICENSE TERMS ACCEPTED	—	DSNTIPO2		—
—	LINK LIST ENTRY	—	DSNTIPM		MVSLMEMB
—	LINK LIST LIBRARY	—	DSNTIPT		DSNLINK
—	LINK LIST SEQUENCE	—	DSNTIPM		MVSLSEQN
—	LOAD LIBRARY	—	DSNTIPT		DSNLOAD
—	LOCK ENTRY SIZE	—	DSNTIPJ		IRLMLKSZ
—	LOG COPY 1, BSDS 2	—	"DSNTIPA3: Data parameters panel" on page 68		VOLSDAT6 DATACLS6 MGMTCLS6 STORCLS6
—	LOG COPY 2, BSDS 1	—	DSNTIPA3		VOLSDAT7 DATACLS7 MGMTCLS7 STORCLS7
—	MBCS EBCDIC	—	DSNTIP8A	Yes	—
—	MEMBER IDENTIFIER	—	DSNTIPJ		IRLMIDEN
—	NON-VSAM DATA	—	DSNTIPA3		VOLSDAT2 DATACLS2 MGMTCLS2 STORCLS2
—	MACRO LIBRARY	—	DSNTIPT		DSNMACS
—	MAX STORAGE FOR LOCKS	—	DSNTIPJ		—
—	MQseries routines (DSNTIPRO)	—	DSNTIPRA		—
—	NUMBER OF LOCK ENTRIES	—	DSNTIPJ		IRLMLTE
—	NUMBER OF LOGS	—	DSNTIPL		LOGSNUM
—	NUMBER OF TCBS	—	DSNTIPX		STORTCBS
—	OTC LICENSE USAGE	—	DSNTIPO1		—
—	OUTPUT MEMBER NAME	—	DSNTIPA1		—
—	PACKAGE LISTS	—	DSNTIPD		—
—	GRANT OWNER (on many sub-panels)	—	DSNTIPRA (sub-panels)		—

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
—	PACKAGE STATEMENTS	—	DSNTIPD		—
—	PACKAGES	—	DSNTIPD		—
—	PAGE PROTECT	—	DSNTIPJ		IRLMPGPR
—	PARAMETER MODULE	—	DSNTIPO3		DSNZPARM
—	PERMANENT UNIT NAME	—	DSNTIPA3		VOLSDEVT
—	PLAN STATEMENTS	—	DSNTIPD		—
—	PLANS	—	DSNTIPD		—
—	PL/I COMPILER LIBRARY	—	DSNTIPU		PLICOMP
—	REMOTE LOCATION	—	DSNTIPY		—
—	RESYNC PORT	—	DSNTIP5		RESYNPRT
—	ROUTINES CREATOR	—	DSNTIPG		AUTHID
—	Runtime statistics processing routines (DSNTIPRD)	—	DSNTIPRA		—
—	SAMPLE LIBRARY	—	DSNTIPT		NEWSAMP
—	SECURE PORT	—	DSNTIP5		SECPORT
—	SEC DEF CREATOR	—	DSNTIPG		SECDEFID
—	START IRLM CTRACE	—	DSNTIPJ		—
—	SORT LIBRARY	—	DSNTIPW		SORTLIB
—	SUBGRP ATTACH	—	DSNTIPK		SGRPATNM
—	SUBSYSTEM MEMBER	—	DSNTIPM		MVSSMEMB
—	SUBSYSTEM SEQUENCE	—	DSNTIPM		MVSSSEQN
—	SYSTEM MACLIB	—	DSNTIPW		MACLIB
—	SYSTEM PROCEDURES	—	DSNTIPW		PROCLIB
—	SYSTEM_TIME TEMPORAL QUERIES	—	DSNTIP8A	Yes	—
—	TABLES	—	DSNTIPD		—
—	TABLES IN STMT	—	DSNTIPD		—
—	TABLESPACES	—	DSNTIPD		—
—	TEMP CLIST LIBRARY	—	DSNTIPT		—
—	TEMPORARY UNIT NAME	—	DSNTIPA3		TVOLDEVT
—	Trace formatting routines (DSNTIPRB)	—	DSNTIPRA		—
—	TS COLS WITH PRECISION OF 12	—	DSNTIP8A	Yes	—
—	UPDATE RATE	—	DSNTIPL		NUMCOMHR
—	Unified debugger for Java and SQL routines (DSNTIPRH)	—	DSNTIPRA		—
—	USE ZOSMF WORKFLOW	—	DSNTIPA1		—
—	Utility invocation routines (DSNTIPRC)	—	DSNTIPRA		—

Table 41. Directory of subsystem parameters and application default values (continued)

Parameter name	Field name	Macro	Panel	Update online	DSNTID*xx* entry or z/OSMF variable "1" on page 358
—	VSAM CATALOG, DEFAULT AND WORK FILE DATABASE	—	DSNTIPA3		VOLSDAT3 DATACLS3 MGMTCLS3 STORCLS3
—	VIEWS	—	DSNTIPD		—
—	Web services/SOAP routines (DSNTIPRP)	—	DSNTIPRA		—
—	WLM ENV NAME (on many sub-panels)	—	DSNTIPRA (sub-panels)		—
—	WLM PROC NAME	—	DSNTIPX		STORWLM
—	WORK FILE DB	—	DSNTIPK		WKDBNAME
—	XML schema processing routines IVP(DSNTIPRI)	—	DSNTIPRA		—
—	4K SORT PRIMARY SPACE	—	DSNTIP9		S4KSPAC
—	4K SORT WORK TS'S		DSNTIP9		S4KNOTS
—	4K SORT WORK SEG SIZE	—	DSNTIP9		S4KSGSZ
—	4K TEMP PRIMARY SPACE		DSNTIP9		T4KSPAC
—	4K TEMP WORK TS'S	—	DSNTIP9		T4KNOTS
—	4K TEMP WORK SEG SIZE	—	DSNTIP9		T4KSGSZ
—	32K SORT PRIMARY SPACE	—	DSNTIP9		S32KSPAC
—	32K SORT WORK TS'S	—	DSNTIP9		S32KNOTS
—	32K SORT WORK SEG SIZE		DSNTIP9		S32KSGSZ
—	32K TEMP PRIMARY SPACE	—	DSNTIP9		T32KSPAC
—	32K TEMP WORK TS'S	—	DSNTIP9		T32KNOTS
—	32K TEMP WORK SEG SIZE	—	DSNTIP9		T32KSGSZ

Notes

1. For use when installing or migrating to Db2 11 or later by using z/OSMF workflows only. For more information, see Chapter 7, "Automating Db2 installation or migration with z/OS Management Facility," on page 493 .
2. You must use a privilege set of the process that includes installation SYSADM authority or SECADM authority to update this parameter.
3. This subsystem parameter can only be changed online. Restarting Db2 has no effect on the setting.
4. For online updates the SQLLEVEL, the precompiler and coprocessor begin using the new value immediately. However, the SYSIBM.DEFAULT_SQLLEVEL global variable value is not updated until Db2 is restarted.

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Chapter 5. Installing Db2 11

Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Before you begin

Before you begin installing Db2:

- Review the information about Db2 security with your system security administrator, and plan and implement your Db2 security environment. See in particular and , which can help you plan your security environment even if you use an alternative security product. After initial installation of Db2, subsequent installation tasks and jobs require specific authorization in order to connect to Db2.
- If you plan to have data sharing enabled (Enable option on panel DSNTIPP1), you should save all your jobs from the original installation or migration in a different data set than the enabling jobs. If you save them in *prefix*.NEW.SDSNSAMP, the jobs might be overwritten.
- Use Information/Access or the ServiceLink facility of IBMLink to check the most current information about Db2 and other products. If you do not have access to IBMLink, contact IBM Support. For keyword specifications used for Preventive Service Planning (PSP), see the Db2 Program Directory.

You must not use secondary authorization IDs to perform any of the following installation steps.

Procedure

1. Estimate storage needs for your Db2 11 environment. For more information, see "Storage requirements for Db2 for z/OS" on page 4.
2. If you are using distributed data, install TCP/IP, VTAM, or both. For more information, see "Connecting distributed database systems " on page 779.
3. If you plan to use data sharing, set up a Parallel Sysplex. For more information, see "Parallel Sysplex requirements for Db2 data sharing" on page 522.
4. Use SMP/E to load the Db2 11 libraries. For more information, see Chapter 3, "Making the Db2 product code available," on page 29.

   Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

   If you plan to use the callable SQL interface of Db2, see for the additional installation jobs that you need to run. If you plan to use Db2 for z/OS Java Edition, you must run more installation jobs. For more information, see Installing the IBM Data Server Driver for JDBC and SQLJ.
5. Provide an SMS environment for managing Db2 catalog and directory data sets.

   The SMS environment must include a data class for allocating the data sets in extended format and using extended addressability. You are not required to convert existing Db2 catalog and directory data sets to the SMS environment before migrating to Db2 11. These data sets will be converted the next time the related table space is reorganized. For information on using sample job DSNTIJSS to define an SMS environment for data sets that are associated with the Db2 catalog and directory, see "Installation step 1: Define the SMS environment for Db2 catalog and directory data sets: DSNTIJSS" on page 361.
6. Tailor the installation or migration jobs. For more information, see Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.

Tip: Consider automating the remainder of the installation or migration process by usingz/OSMF work flows. For more information, see Chapter 7, “Automating Db2 installation or migration with z/OS Management Facility,” on page 493.

7. Edit and run the jobs that install your Db2 Db2 11 subsystem by completing the following tasks:

   “Installation step 1: Define the SMS environment for Db2 catalog and directory data sets: DSNTIJSS” on page 361
   “Installation step 2: Define Db2 to z/OS: DSNTIJMV” on page 361
   “Installation step 3: Define the ICF catalog and alias: DSNTIJCA (optional)” on page 366
   “Installation step 4: Define system data sets: DSNTIJIN” on page 367
   “Installation step 5: Define Db2 initialization parameters: DSNTIJUZ” on page 368
   “Installation step 6: Initialize system data sets: DSNTIJID, DSNTIJIE, and DSNTIJIF” on page 369
   “Installation step 7: Define user authorization exit routines: DSNTIJEX (optional)” on page 370
   “Installation step 8: Record Db2 data to SMF (optional)” on page 371
   “Installation step 9: Establish subsystem security (optional)” on page 372
   “Installation step 10: Connect Db2 to TSO” on page 373
   “Installation step 11: Connect Db2 to IMS (optional)” on page 379
   “Installation step 12: Connect CICS to Db2 (optional)” on page 379
   “Installation step 13: Define Db2 to z/OS” on page 379
   “Installation step 14: Start the Db2 subsystem” on page 380
   “Installation step 15: Tailor the Db2 catalog: DSNTIJTC” on page 382
   “Installation step 16: Create default storage group, define temporary work files, and bind Db2 REXX Language Support: DSNTIJTM” on page 383
   “Installation step 17: Define and bind Db2 objects: DSNTIJSG” on page 384
   “Installation step 18: Populate the user-maintained databases (optional)” on page 386
   “Installation step 19: Configure Db2 for running stored procedures and user-defined functions” on page 386
   “Installation step 20: Set up Db2-supplied routines” on page 396
   “Installation step 21: Back up the Db2 directory and catalog: DSNTIJIC” on page 407
   “Installation step 22: Set up the administrative task scheduler” on page 408
   “Installation step 23: Verify successful installation of Db2 11” on page 411

   A new installation starts in new-function mode.

8. Enable more capabilities in your Db2 environment. For more information, see Chapter 10, “Configuring additional capabilities for Db2 for z/OS,” on page 731.

What to do next

You might want to activate new capabilities that are introduced by higher Db2 11 function levels. For more information about continuous delivery and function levels in Db2 11, see the following topics:

-
-

Related concepts

Loading the Db2 libraries
IBM distributes the product code for Db2 for z/OS in various ways. However you obtain the product code, you use System Modification Program Extended (SMP/E) to create Db2 distribution libraries, Db2 target libraries, and SMP/E control data sets, and to control of subsequent software maintenance.

Related tasks

Strategy for creating a Db2 data sharing group
When you create a data sharing group, add one member at a time. You can install a new Db2 for the first member (the *originating member*), or you can enable an existing Db2 subsystem as the originating member.

Tailoring Db2 11 installation and migration jobs with the CLIST

The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Automating Db2 migration by using z/OS Management Facility
You can use z/OSMF to automate the process of migrating Db2 subsystems to Db2 11 for z/OS.

Related information

Db2 11 for z/OS Technical Overview (IBM Redbooks)

Installation step 1: Define the SMS environment for Db2 catalog and directory data sets: DSNTIJSS

All data sets for the Db2 catalog and directory must reside on SMS-managed storage and belong to a SMS data class that is defined with the extended addressability attribute.

About this task

To define a data class with the extended addressability attribute, specify EXT in the DATA SET NAME TYPE field of the DATA SET CLASS DEFINE panel of ISMF and ensure that the automatic class selection (ACS) routine associates the Db2 catalog and directory data sets with this data class. Job DSNTIJSS shows how to create a stand-alone SMS environment for the Db2 catalog and directory data sets. DSNTIJSS is designed for use on systems that do not already have a SMS environment, but it can also be used as a reference for adapting an existing one. In particular, job step STEP061 shows an example of defining a data class with the extended addressability attribute, and job step STEP071 shows example ACS routines that associate the Db2 catalog and directory data sets with the data class and a storage class.

Procedure

To create the stand-alone SMS environment for the Db2 catalog and directory:

1. Customize job DSNTIJSS according to the directions in the job prolog.
2. Run job DSNTIJSS.
3. To activate the SMS environment, use this z/OS command, where *scds-name* is the name of the SMS source control data set that was specified by DSNTIJSS:

   ```
   SETSMS SCDS(scds-name)
   ```

   Attention: This command will deactivate any existing SMS environment that is defined from another SCDS.

Installation step 2: Define Db2 to z/OS: DSNTIJMV

Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS. These steps include updating members of SYS1.PARMLIB and SYS1.PROCLIB and creating Language Environment options data sets for the Db2 core WLM environment for Java routines.

Before you begin

Before you begin to install Db2 11, you must have the prerequisite level of z/OS installed.

Tip: Edit the updates directly in SYS1.PARMLIB instead of submitting the updates in the DSNTIJMV step. For SYS1.PROCLIB, submit the procedure-update section of job DSNTIJMV. Before you make the updates, read the following information and examine job DSNTIJMV to study the updates that it makes. Then use an editor such as ISPF/PDF to make the updates to SYS1.PARMLIB.

About this task

Do not overwrite the entries for Db2 and IRLM in the program properties table (PPT). Note that PPT entries should no longer be defined in SYS1.PARMLIB(SCHED*xx*). Default entries are supplied in the SYS1.LINKLIB(IEFSDPPT) load module, which is provided by z/OS. For details of the PPT entries, see Program properties table (PPT) (MVS Initialization and Tuning Reference).

Procedure

To define Db2 to z/OS:

1. Run job DSNTIJMV.

   If job DSNTIJMV runs successfully, it produces return codes of 0.
2. Review the content of the Language Environment options data set and adjust the following environment variables as needed. The data set is created by DSNTIJMV and must be allocated by the JAVAENV DD of the address space procedure for the Db2 core WLM environment for Java routines.

   - _CEE_ENVFILE if present, must be set to the name and path of the environment variable file that was created by job step DSNTIJR.
   - JVMPROPS needs to be set to the name and path of the JVM startup options file that was created by job step DSNTIJS.
   - DB2_BASE and JCC_HOME need to be set to the names of the HFS directories that you selected for the Db2 for z/OS and JCC product classes.

What to do next

z/OS requirements: Each Db2 and each IRLM that you define to z/OS in the IEFSSN*xx* PARMLIB member requires a z/OS system linkage index (LX). The default number of these indexes that z/OS reserves is 165. If you place all of your Db2 and IRLM subsystem definitions in a single IEFSSN*xx* member, you might need more than 165 LXs; otherwise, your subsystems might not start. If you need more than 165 LXs, use the NSYSLX option on the z/OS IEASYS*xx* PARMLIB member to increase this number.

For later diagnosis of IRLM problems, also ensure that the following requirements are met:

- Specify the IRLM dump formatting modules DXRRLM50, DXRRLM55, and DXRRLS55 in a BLSCUSER member in a data set that is in the system's PARMLIB concatenation.
- Copy the DXRRL186, DXRRLFTB, DXRRLM50, DXRRLM55, and DXRRLS55 modules from the IRLM SDXRRESL data set to a data set in the system's link list. Or, add the SDXRRESL data set to the system's link list in a PROG*xx* member of a data set in the system's PARMLIB concatenation. If you use more than one level of IRLM, you will need to use a STEPLIB concatenation when using IPCS to process dumps that are taken for the levels whose modules are not in the link list.

Additional changes to SYS1.PARMLIB and SYS1.PROCLIB: Because different sites have different requirements for identifying Db2 to z/OS, job DSNTIJMV cannot anticipate all the necessary updates. For this reason, the updates that job DSNTIJMV makes to SYS1.PARMLIB and SYS1.PROCLIB might be incomplete. You might have additional procedures of your own to rename. You can complete these updates either by making the updates directly in SYS1.PARMLIB and SYS1.PROCLIB, or by editing DSNTIJMV.

DSNTIJMV updates to SYS1.PARMLIB

Job DSNTIJMV updates the following SYS1.PARMLIB members: IEFSSN*xx*, IEAAPF*xx* or PROG*xx*, and LNKLST*xx*.

- **IEFSSN*xx***

  This member contains an entry for every z/OS subsystem. Db2 adds to this list of entries, making one entry for Db2 and two entries for the IRLM. The second IRLM entry, whose subsystem name is JRLM, is there to make it easier to add a second IRLM to your system if the first is damaged. You must provide your own procedure to add JRLM. Unique names must be used for each entry.

z/OS provides subsystem entries for Db2 and IRLM in IEFSSN00. Examine these entries to determine whether they are appropriate for your needs. Make sure that a subsystem name appears only once in the subsystem name list.

Place the SMS line as the first line in an IEFSSN*xx* member. Place the primary system's record (JES2 or JES3) record next. Other products might affect the position of the entries during system initialization. The Db2 line should come after SMS, the JES subsystem, and other vendor products.

The Db2 entry has the following format:

```
SUBSYS SUBNAME(ssname) INITRTN(DSN3INI)
   INITPARM('DSN3EPX,cmd-prefix<,scope<,group-attach<<,subgroup-attach>>>')
```

where:

ssname

is the Db2 subsystem name.

DSN3INI

is the name of the Db2 load module that z/OS invokes during z/OS master scheduler initialization. This module must be located in a link list data set (or in SYS1.LINKLIB).

DSN3EPX

is the name of the Db2 load module that responds to Db2 requests that are received from the z/OS subsystem interface. (Db2 can be active or inactive when the requests are received.) This module must be located in a link list data set (or in SYS1.LINKLIB).

cmd-prefix

is the one- to eight-character command prefix.

The first character of the command prefix must be one of the following characters: @ # . / ') * + - = ¢ < | & ! ; % _ ? : ". The remaining characters of the command prefix must be one of the above characters, A-Z, or 0-9. Do not use the JES2 backspace character or command prefix character. The default is the hyphen (-).

Do not assign a command prefix that is used by another subsystem or that can be interpreted as belonging to more than one subsystem or z/OS application. Specifically, do not specify a multiple-character command prefix that is a subset or a superset of another command prefix beginning from the first character. For example, you cannot assign '-' to one subsystem and '-Db2A' to another. Similarly, you also cannot assign '?Db2' to one subsystem and '?DB2A' to another. You can assign '-DB2A' and '-DB2B' to different Db2 subsystems.

scope

is the one-character scope for the command prefix. Db2 registers its command prefix with the operating system. When this is done, the scope of the command prefix is controlled by the value you choose:

S

Started; and the prefix is registered with Sysplex scope at Db2 startup instead of during z/OS IPL. This is the default.

Recommendation: Choose S, which allows you to have a single IEFSSN*xx* PARMLIB member that all z/OS systems in the Sysplex can use. Choosing S also simplifies the task of moving a Db2 from one system to another; you can stop Db2 on one z/OS and start it up on another without having to re-IPL the system.

M

z/OS system scope; the prefix is registered during z/OS IPL.

X

Sysplex scope; the prefix is registered during z/OS IPL. As a result, this Db2 cannot be restarted on another z/OS without changing the definitions and re-IPLing both z/OSs.

group-attach

is the group attachment name, which is used for data sharing. You can specify this on installation panel DSNTIPK.

subgroup-attach

is the name of the subgroup attachment, which is used in data sharing environments to provide more control over how TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections find active Db2 subsystems. You can specify this value by entering a subgroup name in the SUBGRP ATTACH field on installation panel DSNTIPK.

- **IEAAPF*xx* or PROG*xx***

  Job DSNTIJMV updates IEAAPF*xx* to include the Db2 program libraries (*prefix*.SDSNEXIT, *prefix*.SDSNLOAD, *prefix*.SDSNLOD2, *prefix*.SDXRRESL, and *prefix*.SDSNLINK) as APF-authorized libraries.

  If a program library that contains DFSORT or Db2 Sort for z/OS is not already APF-authorized, you can edit DSNTIJMV to authorize it. To do this, you can include the authorization either in this list or in LNKLST*xx*. All libraries that are concatenated with *prefix*.SDSNLOAD in STEPLIB and JOBLIB statements must be APF-authorized. Ensure that the volume serial number in this member is the volume on which the data set resides.

  If you are using the PROG*xx* member instead of the IEAAPF*xx* member, you need to update the member manually—job DSNTIJMV does not edit it.

- **LNKLST*xx***

  Job DSNTIJMV updates this member to include the Db2 load module library, *prefix*.SDSNLINK. If you moved the modules from *prefix*.SDSNLINK into another library, edit DSNTIJMV to include that library in the LNKLST*xx* member. If you have combined *prefix*.SDSNLINK and *prefix*.SDSNLOAD into one library, edit DSNTIJMV to include the combined library in the LNKLST*xx* member.

  Any data set that is added to the LNKLST*xx* member must be cataloged in the master catalog of the system. This is normally true of *prefix*.SDSNLINK; however, if an alias points to a user catalog when you run DSNALLOC, *prefix*.SDSNLINK is cataloged in a user catalog. In this case, you must either ensure that *prefix*.SDSNLINK is also cataloged in the master catalog or give *prefix*.SDSNLINK a high-level qualifier other than *prefix*, the high-level qualifier for this release. You must give a high-level qualifier other than *prefix* to all release-sensitive data sets that are placed in the LNKLST*xx* member.

  If you do not include the DFSORT library, the Db2 Sort for z/OS library, or both in the LNKLST*xx* member, you must provide a JOBLIB or STEPLIB statement for all utility jobs that include one of those libraries. You can accomplish this by placing a STEPLIB statement in DSNUPROC, which appears later in this job. If you use customized modules and exits, *prefix*.SDSNEXIT must precede *prefix*.SDSNLOAD in JOBLIB and STEPLIB statements.

You must do additional editing for the SYS1.PARMLIB updates. If you are editing DSNTIJMV, rather than making the changes directly, you have two options. One option is to include additional entries for the SYS1.PARMLIB members (IEAAPF*xx* and LNKLST*xx*) at the end of the existing entry list. The other option is to place the entries earlier in the list.

If you include them at the end of the existing SYS1.PARMLIB entries, ensure that commas (the continuation character) delimit each entry except the last.

Another SYS1.PARMLIB change to consider at this time is the extended common storage area (ECSA) size, which is specified in the CSA parameter of the IEASYS00 parameter. Ensure that you have specified an adequate size for this subsystem.

The IOP parameter is another SYS1.PARMLIB change to consider at this time. Db2 can schedule I/O priority. To enable this, you must:

- Use the IOP parameter to set the I/O priority for the address space of a performance group. The IOP parameter is in the IEAIPS*xx* member of SYS1.PARMLIB.
- Enable z/OS I/O priority scheduling by specifying IOQ=PRTY in the IEAIPS*xx* member of SYS1.PARMLIB.

You must issue an IPL command for z/OS for the PARMLIB updates to take effect. To avoid issuing an IPL command for z/OS during Db2 installation, you can make these updates and issue the IPL in advance of your Db2 installation or migration session.

Related reference

COMMAND PREFIX field
The value of the COMMAND PREFIX field specifies the Db2 subsystem command prefix. When the prefix appears at the beginning of a command that is entered at a z/OS operator's console, z/OS passes the command to Db2 for processing. The command prefix is used in the Db2 entry of member IEFSSN*xx* of SYS1.PARMLIB.

Related information

Using the command prefix facility (z/OS MVS Planning: Operations)

DSNTIJMV updates to SYS1.PROCLIB

Job DSNTIJMV updates SYS1.PROCLIB to include the Db2 procedures.

DSNTIJMV includes the following procedures, where *ssnm* is the subsystem name:

- System services address space startup procedure (must be named *ssnm*MSTR)
- Database services address space startup procedure (must be named *ssnm*DBM1)
- Distributed data facility address space startup procedure (must be named *ssnm*DIST)
- Administrative task schedule address space startup procedure
- z/OS Workload Manager (WLM) procedure
- Address space startup procedures for the Db2 core WLM environments (*ssnm*WLM1, *ssnm*WLMC, *ssnm*WLMD, *ssnm*WLMG, *ssnm*WLMJ, *ssnm*WLMM, *ssnm*WLMP, *ssnm*WLMR, *ssnm*WLMU, *ssnm*WLMW, and *ssnm*WLMX)
- IRLM address space startup procedure (IRLMPROC or user-defined address space name)
- Precompiler procedures
- Utilities procedure (DSNUPROC)

Examine the SYS1.PROCLIB updates carefully. You might want to use a procedure library other than SYS1.PROCLIB for the procedures. The first seven procedures are used for start-up tasks. The other procedures are used to prepare application programs for execution and to invoke Db2 utilities. The program preparation procedures are required for the sample applications and can be helpful in generating other JCL procedures.

Change any data set names that differ at your site. If you specified a data set name suffix in the DATA SET NAME SUFFIX field of DSNTIPA1, that suffix is appended to data sets &USER..DBRMLIB.DATA, &USER..RUNLIB.LOAD, and &USER..SRCLIB.DATA. To override these data set names, you must edit the updates to SYS1.PROCLIB.

The language preparation procedures in job DSNTIJMV use the DISP=OLD parameter to enforce data integrity. However, when the installation CLIST runs, the DISP=OLD parameter for the DBRM library data set is modified to DISP=SHR. This might cause data integrity problems when you run multiple precompiler jobs. To avoid these data integrity problems, if you are not using DFSMSdfp partitioned data set extended (PDSE), you must change the language preparation procedures (DSNHICOB, DSNHICB2, DSNHFOR, DSNHC, DSNHCPP, DSNHCPP2, DSNHPLI, DSNHASM, and DSNHSQL) to specify the DISP=OLD parameter instead of the DISP=SHR parameter.

If compiler STEPLIB statements are needed, add them.

The STEPLIB concatenation of the database services address space (*ssnm*DBM1) procedure includes a commented-out DD for the IBM Language Environment data sets SCEERUN and SCEERUN2. If your system does not include SCEERUN and SCEERUN2 in the system link list, you must uncomment this DD.

Examine the size of the private area on the Db2 start procedures. If necessary, modify the procedures to satisfy the requirements for environmental descriptor manager (EDM) pool size, buffers, number of data sets open, and amount of available private address space.

Related tasks

Calculating working storage requirements
Working storage is private virtual storage in the Db2 database services address space, which is primarily above the 2 GB bar. Working storage is used to hold temporary data that is needed for the processing of an SQL request.

Language Environment options data sets for the Db2 core Java WLM environment

Job DSNTIJMV creates the Language Environment options data sets for the Db2 core Java WLM environment.

Job step DSNTIJJ of DSNTIJMV creates the Language Environment options data set for DSNWLM_JAVA, which is the WLM environment for Db2-supplied Java stored procedures and user-defined functions. This data set is allocated by the JAVAENV DD of the *ssnm*WLMJ address space procedure that is created in job step DSNTIPM of DSNTIJMV.

In job step DSNTIJJ, review the *JAVA_HOME* path, which is the path where the JDK is located, and update if necessary.

If you are using a 64-bit JVM, use the following path:

```
JAVA_HOME=/usr/lpp/java160/J6.0_64
```

If you are using a 31-bit JVM, use the following path for Java 5:

```
JAVA_HOME=/usr/lpp/java150/J5.0
```

Or use the following path for Java 6:

```
JAVA_HOME=/usr/lpp/java160/J6.0
```

You cannot specify two JDKs in a single *JAVA_HOME* path.

Installation step 3: Define the ICF catalog and alias: DSNTIJCA (optional)

The ICF catalog is the VSAM object in which Db2 records the data sets that you create during installation. Db2 uses the catalog alias as the prefix for your Db2 VSAM data sets.

About this task

Creating the catalog is optional. If you specified YES for the DEFINE CATALOG option on installation panel DSNTIPA2, you must create the catalog. Do not run this job if you want to use an existing ICF catalog and alias (that is, you specified NO for the DEFINE CATALOG parameter on installation panel DSNTIPA2). However, ensure that the ICF catalog that you are going to use is created and that you defined an ICF catalog alias.

Procedure

To create the ICF catalog and its alias:

1. Before running job DSNTIJCA, examine the DEFINE UCAT statement carefully to ensure that the parameters are appropriate for your needs.
2. Run job DSNTIJCA.

   If DSNTIJCA runs successfully, it produces return codes of 0.
3. If DSNTIJCA fails or abends, delete the ICF catalog (if it was created) and run the job again.

Related tasks

Installation step 1: Define the SMS environment for Db2 catalog and directory data sets: DSNTIJSS

All data sets for the Db2 catalog and directory must reside on SMS-managed storage and belong to a SMS data class that is defined with the extended addressability attribute.

Related reference

DEFINE CATALOG field
The value of the DEFINE CATALOG field determines whether Db2 is to create a new ICF catalog.

Installation step 4: Define system data sets: DSNTIJIN

Use job DSNTIJIN to define the VSAM and non-VSAM data sets for Db2.

Before you begin

Before you define the system data sets, ensure that you have defined an SMS environment for data sets that are associated with the Db2 catalog and directory. Data sets for the Db2 catalog and directory are managed by Db2 and must be SMS-managed. The SMS environment that you use for Db2 catalog and directory data sets must be established before you begin installation or migration to Db2 11. The SMS environment must include a data class for allocating the data sets in extended format and using extended addressability.

Procedure

To define system data sets:

1. Check the DEFINE CLUSTER statements in job DSNTIJIN to ensure that they allocate adequate disk space for your system.

   Recommendation: For recovery purposes, place system data sets such as the Db2 recovery log and the VSAM catalog on different disk volumes. Because these data sets are used frequently, do not migrate them by using DFSMShsm.
2. Run job DSNTIJIN.

   If DSNTIJIN runs successfully, it produces return codes of 0 for all DEFINE statements and steps. Check any VSAM messages carefully.
3. If job DSNTIJIN fails or abends, complete the following steps:
   a) Remove the z/OS catalog delete statements from job DSNTIJDE.
   b) Run job DSNTIJDE. This job deletes the previously created data sets for the Db2 directory and Db2 catalog.
   c) Run DSNTIJIN again.

Related tasks

Installation step 1: Define the SMS environment for Db2 catalog and directory data sets: DSNTIJSS
All data sets for the Db2 catalog and directory must reside on SMS-managed storage and belong to a SMS data class that is defined with the extended addressability attribute.

Related information

Job DSNTIJIN

During installation, job DSNTIJIN defines VSAM and non-VSAM data sets for Db2.

DSNTIJIN performs the following tasks:

- Defines three non-VSAM data sets for the Db2 sample objects:
  - *prefix*.DBRMLIB.DATA
  - *prefix*.SRCLIB.DATA
  - *prefix*.RUNLIB.LOAD
- Defines the VSAM clusters for the bootstrap data sets.

Each bootstrap data set (BSDS) consists of a VSAM key-sequenced data set. You defined the BSDS names during the ISPF tailoring session

- Defines the VSAM clusters for the active log data sets.

  You specified up to 93 primary active log data sets during the ISPF tailoring session (NUMBER OF LOGS field on installation panel DSNTIPL). You might also have requested dual logging to generate two copies of each active log data set. Consequently, job DSNTIJIN can define up to 186 active log data sets. If you specified that DSNTIJIN is to create fewer active log data sets, then after installation, you can run the DSNJU003 utility to add additional active log data sets to the BSDS.
- Defines the VSAM clusters for the task list data set of the administrative task scheduler.
- Defines the VSAM clusters for the Db2 directory.
- Defines the VSAM clusters for the Db2 catalog.
- Invokes the LISTCAT command of access method service so that you can verify that the VSAM definitions were successful.
- Creates control intervals based on the value you specified in VARY DS CONTROL INTERVAL on panel DSNTIP7. If you specified YES, Db2 creates 4-KB, 8-KB, 16-KB, and 32-KB control intervals as appropriate in the AMS DEFINE CLUSTER commands for the Db2 catalog and directory data sets. If you specified NO, these data sets are created using a fixed control interval of 4-KB.

Job DSNTIJDE

Job DSNTIJDE deletes the Db2 system data sets that are defined by job DSNTIJIN. If a job fails or abends, you might need to run DSNTIJDE job before restarting the Db2 installation process.

Job DSNTIJDE is not part of the normal installation process; use this job only for rerunning part of the process. Do not run this job during migration or fallback.

In most cases, you must remove or comment out the delete statement in this job for the ICF catalog (if the statement is present). The ICF catalog probably does not need to be deleted and redefined.

Deletes might fail for data sets that do not exist. This does not necessarily indicate that the job failed. If you receive other messages, check them carefully.

Job DSNTIJDE does not work properly if job DSNTIJSG or job DSNTIJTM has been executed. Job DSNTIJDE does not delete the resource limit specification table, the data sets that are used by the distributed data facility, or the data sets that are created for work file table spaces.

If job DSNTIJDE fails or abends, correct the error conditions and rerun the job. If you want to delete the ICF catalog, first list its contents and delete the data sets that are cataloged there. This could include sample data sets, user-defined data sets, or subsystem data sets that were not deleted properly. You can use a FORCE command to delete the user catalog. If you delete the catalog using FORCE before deleting all the data sets, you can use the RECATALOG option of DEFINE CLUSTER and delete the data sets.

Installation step 5: Define Db2 initialization parameters: DSNTIJUZ

Job DSNTIJUZ generates the Db2 data-only load module DSNHMCID, the application defaults load module (*dsnhdecp*), and the subsystem parameter module. The application defaults load module is the name that was specified for the APPL DEFAULTS field on installation panel DSNTIPO3. The subsystem parameter module is the name that was specified for the PARAMETER MODULE field on installation panel DSNTIPO3.

Procedure

To define Db2 initialization parameters:

1. Verify that data sets that are allocated by the SYSLMOD DD statements of this job are also allocated by the STEPLIB DD statements of the DSNMSTR address space for Db2.
2. Insert the DSPREFIX value after SDSNLOAD.

3. Run job DSNTIJUZ.

   If you want DSNTIJUZ to establish SMP/E GENASM entries in the Db2 system parameter (DSN6*xxxx*) and application defaults module macros, you need to uncomment job step DSNTIMQ. Advanced SMP/E skills are recommended for users of job step DSNTIMQ. Read the job step prolog before proceeding. You might receive message GIM65001 when you run steps DSNTLOG and DSNTIMQ, or you might receive a return code of 4 when you run step DSNTIMQ. You can ignore these messages.
4. If job DSNTIJUZ fails or abends, correct the problem and rerun the job.

Related reference

DSNTIPO3: Default startup modules panel
The DSNTIPO3 panel enables you to specify the default member names of certain modules that are to be loaded at Db2 startup. These modules are the subsystem parameter module, the application defaults module, and the exit modules.

Subsystem parameters that are not on installation panels
Some subsystem parameters are defined by job DSNTIJUZ and are not associated with fields on any installation panels.

Installation step 6: Initialize system data sets: DSNTIJID, DSNTIJIE, and DSNTIJIF

After you define your system data sets and Db2 initialization parameters, you must initialize your system data sets.

Procedure

Run the following jobs in the specified order:

a. DSNTIJID

b. DSNTIJIE

c. DSNTIJIF

- If the jobs run successfully, they produce return codes of 0. Otherwise, check for and resolve error conditions that might be reported by VSAM messages.
- If any of the jobs fail or abend, remove the ICF catalog delete statements (job step DSNTIVC) from job DSNTIJDE, run job DSNTIJDE, and then rerun the following jobs:
  - DSNTIJIN
  - DSNTIJUZ
  - DSNTIJID
  - DSNTIJIE
  - DSNTIJIF

  .

Results

Job DSNTIJID records the active log data set names to the BSDS, formats the active log data sets, and initializes the Db2 directory table spaces and indexes. The BSDS is initialized in the basic, pre-Db2 11 format. After you complete your installation, you can optionally use job DSNTIJCB to convert the BSDS to the new format that supports 10-byte RBA and LRSN fields.

Job DSNTIJIE initializes the Db2 catalog table spaces and indexes (through the SYSGRTNS table space).

Job DSNTIJIF initializes the remaining Db2 catalog table spaces and indexes.

Related concepts

Installation step 7: Define user authorization exit routines: DSNTIJEX (optional)

Job DSNTIJEX builds sample authorization exit routines from the source code in *prefix*.SDSNSAMP. These sample authorization exit routines are DSN3@SGN and DSN3@ATH, and the user version of the access control authorization exit routine, DSNX@XAC.

Installation step 7: Define user authorization exit routines: DSNTIJEX (optional)

Job DSNTIJEX builds sample authorization exit routines from the source code in *prefix*.SDSNSAMP. These sample authorization exit routines are DSN3@SGN and DSN3@ATH, and the user version of the access control authorization exit routine, DSNX@XAC.

Job DSNTIJEX includes a step to assemble and link-edit the sample version of DSNACICX, which you can use to modify CICS parameters that the DSNACICS caller specifies. Then DSNTIJEX places the exit routines in the *prefix*.SDSNEXIT library. The Db2 CLIST tailors the JCL in DSNTIJEX to match your site's environment.

The sample authorization exit routines are not the same as the default authorization exit routines that are supplied by Db2. By implementing the sample authorization exit routines, you can provide group names as secondary authorization IDs. By modifying the sample authorization exit routines, you can tailor authorization processing for your subsystem.

DSNXSXAC is a copy of the default access control authorization exit routine that users can modify. This exit routine allows you to bypass some or most of Db2 authorization checking to specify your own authorization checking. If you do not modify it, this step is not needed and you should delete it.

DSNACICS is a stored procedure that invokes user exit routine DSNACICX, which you can use to modify CICS parameters that the DSNACICS caller specifies. If you do not need to modify the caller's parameter values, you can use the default DSNACICX exit routine. However, if you need to modify the caller's parameter values, you need to perform the following tasks:

1. Write a user exit routine in assembler, COBOL, C, or PL/I
2. Assemble or compile the source code
3. Link-edit the object code into the Db2 exit routine library

Installation job DSNTIJEX includes a step to assemble and link-edit the sample version of DSNACICX. You can use this step as a model for your program preparation job.

You have the following options regarding exit routines:

- To use the sample authorization exit routines, run job DSNTIJEX.
- To use the default authorization exit routines, skip job DSNTIJEX.
- To use the modified sample authorization exit routines, modify DSNTIJEX to reference the correct library before you run it.

If you will use the RACF/Db2 external security module (DSNXRXAC) as your Db2 access control authorization exit routine, modify DSNTIJEX to refer to DSNXRXAC instead of DSNXSXAC.

If job DSNTIJEX runs successfully, it produces return codes of 4.

If job DSNTIJEX fails or abends, correct the problem and rerun the job.

Related reference

DSNTIPO3: Default startup modules panel
The DSNTIPO3 panel enables you to specify the default member names of certain modules that are to be loaded at Db2 startup. These modules are the subsystem parameter module, the application defaults module, and the exit modules.

Related information

Installation step 8: Record Db2 data to SMF (optional)

When you install Db2, you can specify whether Db2 statistical, accounting, and audit trace data is to be collected.

Procedure

To specify the data that is to be collected:

1. Choose from the following options:

Option	Description
To have Db2 collect statistical information	Accept the default (YES class 1) for the SMF STATISTICS option on installation panel DSNTIPN. To collect statistical information for deadlock or timeout, specify class 3. To collect information about DDF error conditions, specify class 4.
To have Db2 collect accounting information	Accept the default (1) or specify * (all classes) for the SMF ACCOUNTING option on installation panel DSNTIPN.
To have Db2 collect auditing information	Specify * (all classes) for the AUDIT TRACE option on installation panel DSNTIPN.

   In all cases, Db2 invokes a trace, passing the data it collects to the System Management Facility (SMF) of z/OS.

   Db2 also passes performance data to SMF whenever an accounting, statistics, or audit trace is successfully started or stopped. Db2 can also record other performance data. After you complete the installation process, you can use commands to have Db2 record performance data for subsystem events.

2. If, during installation, you requested that Db2 pass accounting and statistics data to SMF, update the SMFPRM*xx* member of SYS1.PARMLIB as follows:

   - Specify the ACTIVE parameter.
   - Specify STC,NODETAIL for the SUBSYS parameter.
   - Specify the proper TYPE subparameter of the SYS and SUBSYS parameters.

What to do next

During Db2 execution, you can use the SMF SET or SS command to alter the SMF parameters. For example, you can record the statistics trace class 1 IFCIDs 0001, 0002, and 0202 (SMF record type 100); accounting trace class 1 IFCIDs 0003 and 0239 (SMF record type 101); and all other Db2 trace records (SMF record type 102) to SMF. To record this information, issue the following command:

```
SYS(TYPE(100:102))
```

For Db2 to pass data to SMF, you must allocate an adequate supply of SMF buffers. The default buffer settings are probably insufficient.

You can specify SMF buffering on the VSAM BUFSP parameter of the Access Method Services DEFINE CLUSTER statement. Do not use the default settings if Db2 data is sent to SMF. Specify CISZ(4096) and BUFSP(81920) on the DEFINE CLUSTER statement for each SMF VSAM data set. These values for CISZ and BUFSP are the minimum requirement for Db2. You might need higher values for CISZ and BUFSP, depending on the requirements of all your z/OS subsystems.

You can also code an IEFU84 SMF exit routine to process the records that are produced.

Related reference

z/OS MVS Initialization and Tuning Guide

Related information

z/OS MVS Initialization and Tuning Reference

Installation step 9: Establish subsystem security (optional)

Db2 can control access to data within a Db2 subsystem. Db2 also works with outside security systems, such as RACF, that control access to the Db2 subsystem.

Before you begin

Your system security administrator should have provided a Db2 for z/OS security environment as outlined in the information about managing Db2 security, including user IDs and resource profiles for batch connections. If you are using RACF, ensure that the system security administrator also defined your Db2 resources to RACF.

The following IDs should have been specified on installation panel DSNTIPP1:

- Two system administrator (installation SYSADM) authorization IDs
- Two system operator (installation SYSOPR) authorization IDs
- Two security administrator (installation SECADM) authorization IDs or roles
- One authorization ID (installation IBMUSER) if RACF is not available for batch access and USER= is not specified in the JOB statement

Procedure

To establish subsystem security:

- Ensure that the specified installation SYSADM IDs are defined in your TSO and RACF systems before attempting to access Db2. You can also define installation SYSOPR IDs, SECADM IDs, and the installation IBMUSER ID.
- To enable primary and secondary user IDs to issue Db2 commands from the z/OS console or TSO SDSF, define RACF classes to authorize Db2 commands. Use the following RACF commands:

  ```
  SETR CLASSACT(DSNADM)
  RDEFINE DSNADM DSN1.SYSOPR UACC(NONE)
  SETR RACLIST(DSNADM) REFRESH
  PERMIT DSN1.SYSOPR CLASS(DSNADM) ID(userid) ACCESS(READ)
  SETR RACLIST(DSNADM) REFRESH
  ```

  You can grant SYSOPR authority to all primary and secondary user IDs that issue Db2 commands from the z/OS console or TSO SDSF, but only after Db2 can process SQL.
- To separate security tasks from system administration tasks, use the SEPARATE SECURITY field on the DSNTIPP1 panel. Before setting the SEPARATE SECURITY field to YES, set at least one SECADM system parameter to an authorization ID, or create the necessary trusted contexts and roles. If you specify YES for SEPARATE SECURITY, system administrator authority cannot be used to perform security tasks, and the SECADM authority is required to manage trusted contexts and roles. If both SECADM system parameters are set to roles and those roles have not been created, no one will have the authority to manage trusted contexts and roles.
- Run job DSNTIJRA to complete the following tasks:
  - Define the administrative task scheduler started task module to RACF program control
  - Define the administrative task scheduler as a trusted context in RACF

  If you are using a Db2 data sharing environment, customize and run DSNTIJRA for each member of the group.

Related information

Installation step 10: Connect Db2 to TSO

Although you can eventually connect Db2 to IMS, CICS, or both, connecting initially only to TSO is recommended for a first-time installation.

About this task

For a first-time installation, you can run the sample applications that do not require CICS or IMS, allowing your database and system administrators to gain familiarity with the administrative facilities of this version of Db2.

If you have previously installed Db2 and are performing that task again, your database and system administrators are probably already familiar with Db2. In this case, you can connect IMS, CICS, or both, at the same time that you connect TSO. You can then run the sample applications that require CICS and IMS at the same time that you run the sample applications for TSO and batch.

Procedure

To attach Db2 to TSO:

1. Make Db2 load modules available to TSO and batch users.
2. Make Db2 CLISTs available to TSO and batch users.
3. Make PL/I options available (if applicable).
4. Make panels, messages, and load modules available to ISPF and TSO.
5. Connect the DB2I panels to the ISPF Main Panel.

Make Db2 load modules available to TSO and batch users

As part of installation, you must make Db2 load modules available to TSO and batch users. If *prefix*.SDSNEXIT and *prefix*.SDSNLOAD are not included in your LNKLST*xx*, you can skip this step.

Procedure

If you have not included *prefix*.SDSNEXIT and *prefix*.SDSNLOAD in your LNKLST*xx*, you must add STEPLIB statements to your logon procedures and to the JCL for jobs to ensure that you access the Db2 11 load modules. If *prefix*.SDSNEXIT is not in your LINK*xx*, add it to your STEPLIB and JOBLIB concatenations before *prefix*.SDSNLOAD.

Related tasks

Choosing link list options
Before you run the SMP/E jobs to load the Db2 libraries, you can choose your link list options.

Make Db2 CLISTs available to TSO and batch users (DSNTIJVC)

To connect Db2 to TSO, you must make Db2 CLISTs available to TSO and batch users by running the DSNTIJVC job.

About this task

From *prefix*.SDSNCLST, the CLIST reads and edits these four CLISTs: DSNEMC01, DSNH, DSNU, and DSNHC. It then places those CLISTs in *prefix*.NEW.SDSNTEMP. You might want to modify the default values. The DSNEMC01 CLIST provides installation default values for the DB2I Default panels (option D on panel DSNEPRI). The first time that a TSO user executes DB2I on a specific ISPF application such as DSNE (NEWAPPL), the DSNEMC01 CLIST sets the defaults based on the values that are specified on installation panel DSNTIPF. DSNEMC01 stores the values in the ISPF profile member DSNEPROF.

Job DSNTIJVC merges the tailored CLISTs from *prefix*.NEW.SDSNTEMP with unchanged CLISTs and REXX execs from *prefix*.SDSNCLST. Then job DSNTIJVC places all CLISTs and REXX execs in *prefix*.NEW.SDSNCLST. It also converts the record format of the Db2 CLISTs from fixed-block to variable-block format with a record length of 84 and a block size of 3120. A CLIST that has been converted from fixed-block to variable-block format cannot be used as input to the DSNTINST CLIST; use the unedited version of the SDSNCLST data set, as created by SMP/E.

Procedure

To make the CLISTs available to TSO and batch users:

1. If you use fixed-block format for your CLIST libraries, modify job DSNTIJVC as follows:
   - Change the SYSIN DD statement to DUMMY.
   - Change the allocation of *prefix*.NEW.SDSNCLST to match the data control block (DCB) attributes of your other CLIST libraries.
2. Run job DSNTIJVC.
3. Either concatenate *prefix*.NEW.SDSNCLST with your existing CLIST libraries or copy *prefix*.NEW.SDSNCLST into an existing CLIST library.

What to do next

If you need to rerun job DSNTIJVC, first delete data set *prefix*.NEW.SDSNCLST, which is created by this job.

When corrective service is applied to a CLIST, SMP/E changes only the *prefix*.SDSNCLST data set. You need to redo any record format changes and reapply any special tailoring that is required. You also need to move the CLIST to *prefix*.NEW.SDSNCLST. Corrective service (program temporary fixes) for these CLISTs is sent with ++HOLD statements, calling to your attention the possibility of additional work.

Related concepts

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Ensure that PL/I options are available

If you are using PL/I, ensure that the options that your Db2 programmers use are included in the compiler.

Procedure

To ensure that PL/I options are included in the compiler:

1. Ensure that the following options that are used by the program preparation function are available:

   ```
   FLAG    OBJECT    SOURCE    TERMINAL    XREF
   ```

   Restrictions that are imposed by your site on PL/I compiler options affect how you can use Db2 program preparation.
2. If the macro pass is used, ensure that the following options are also available:

   ```
   MACRO    MDECK    SYNTAX
   ```

Make DB2I panels, messages, and load modules available to ISPF and TSO

During installation, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

About this task

DB2I uses the ISPF PROFILE and SHARED variable pools for most panel variable fields. As a result, you can easily re-enter a panel when panel variables have previously been specified. For the Db2 subcommands that permit lists of plan names, package names, DBRMs, and ENABLE and DISABLE statements, DB2I provides ISPF to contain all the user-specified variables for these subcommand keywords.

DB2I creates and maintains a set of ISPF tables in a user-defined TSO data set that is allocated to a data set with a ddname of DSNETBLS. The DB2I-generated tables in this library are DSNCONNS, DSNDBRMS, and DSNPLPKN. The following table shows the library table member names and their contents.

Table 42. The Db2 ISPF table library

DSNCONNS	ENABLE or DISABLE connection type and connection name variables that are referenced by plan or package name
DSNDBRMS	Subcommand DBRM member and LIBRARY name variables that are referenced by plan name
DSNPLPKN	Package list variables that are referenced by package name
DSNPATHS	Schema name variables that are referenced by plan or package name and that are to be included in the PATH keyword

DB2I uses ISPF table services to maintain individual ISPF tables within the DSNETBLS data set. For performance reasons, ISPF keeps this table library in an open state once an individual table has been updated. Attempts to close this data set by using the TSO FREE command results in error message IKJ56861I.

Procedure

To make panels, messages, and load modules available to ISPF and TSO:

1. If you added the DB2I libraries as part of Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39, you can skip this step. Otherwise, concatenate the Db2 ISPF libraries with the ISPPLIB, ISPTLIB, ISPSLIB, and ISPMLIB DD statements in your logon procedures. You must also concatenate the Db2 ISPF libraries with these DD statements in any of your CLISTs where the libraries might be allocated. These libraries are *prefix*.SDSNSPFP, *prefix*.SDSNSPFM, *prefix*.SDSNSPFS, and *prefix*.SDSNPFPE or *prefix*.SDSNPFP. If you use English DB2I panels, concatenate SDSNPFPE to ISPPLIB. If you use Kanji DB2I panels, concatenate SDSNPFPK instead of SDSNPFPE.

   ```
   PROFILE WTP MSGID
   ALLOCATE DDNAME(SYSPROC) DSN('prefix.SDSNCLST') SHR REUSE
   ALLOCATE DDNAME(ISPMLIB) DSN('prefix.SDSNSPFM' +
       'ISP.SISPMENU') SHR REUSE
   ALLOCATE DDNAME(ISPPLIB) DSN('prefix.SDSNSPFP' 'prefix.SDSNPFPE' +
       'ISP.SISPPENU') SHR REUSE
   ALLOCATE DDNAME(ISPSLIB) DSN('prefix.SDSNSPFS' +
       'ISP.SISPSLIB' 'ISP.SISPSENU') SHR REUSE
   ```

2. Create the DSNETBLS data set.

   When allocating this data set, you should assign the following DCB attributes, where *n* is any integer:

   ```
   DSORG(PO) RECFM(F B) LRECL(80) BLKSIZE(n*LRECL)
   ```

   The following example shows how to set up an ALLOCATE statement to create the data set:

```
ALLOC DA(DSNSPFT) NEW SP(1 1) TR DIR(10) +
DSORG(PO) RECFM(F B) LRECL(80) BLKSIZE(800)
F(DSNETBLS) REUSE
```

The following example shows how to allocate an existing data set to the data set with the DSNETBLS ddname:

```
ALLOC DA(DSNSPFT)      F(DSNETBLS) REUSE
```

3. If you want to run the ISPF/CAF sample application that is provided with Db2, ensure that the data set *prefix*.RUNLIB.LOAD is included in the logon procedures or in the ISPLLIB concatenation. If you chose IBMCOB for your LANGUAGE DEFAULT on panel DSNTIPF, you should also include the data set *prefix*.CEE.SCEERUN.

Related concepts

Dynamic SQL and the ISPF/CAF application
The Phase 3 jobs of the installation or migration verification process install the ISPF/CAF sample application. This sample consists of an assembler or COBOL call attachment facility (CAF) interface, a connection manager program, and the phone application. The sample also includes the distributed application that uses DRDA access.

Related reference

z/OS ISPF Messages and Codes

Connect DB2I panels to the ISPF main panel

You can connect the DB2I panels to the standard ISPF panels that are already installed on your system.

About this task

Recommendation: Use the following panels for establishing the connection. See your TSO administrator for other possibilities.

- Use panel ISP@MSTR, ISR@PRIM, or ISRFPA for the connection to Db2 Interactive services.
- Use panel ISR00003 for the tutorial menu update.

Two example panels are provided. Their names are DSN8ISPM (the Db2 version of an ISPF primary options panel) and DSN8ISPT (the Db2 version of a tutorial table of contents).

If the Db2 panel library is concatenated before the standard ISPF library, the connection is made.

Procedure

To connect DB2I panels to the ISPF main panel:

1. Using the TSO RENAME command, give DSN8ISPM an alias of ISR@PRIM, and give DSN8ISPT an alias of ISR00003. For example:

```
RENAME 'prefix.SDSNSPFP(DSN8ISPM)' (ISR@PRIM) ALIAS
RENAME 'prefix.SDSNSPFP(DSN8ISPT)' (ISR00003) ALIAS
```

2. Modify the panels as shown in the following examples. If your site has made changes to either of these panels, change your existing panels rather than using the examples.

Examples

```
)ATTR
/********************************************************************/
/* COPYRIGHT = 5740-XYR (C) COPYRIGHT IBM CORP 1982, 1985, 1990, 2003 */
/* REFER TO COPYRIGHT INSTRUCTIONS FORM NUMBER G120-2083              */
/* STATUS = VERSION 8, LEVEL 0                                        */
/********************************************************************/
)BODY
%-----------------------  ISPF/PDF PRIMARY OPTION MENU  ------------------------
%OPTION  ===>_ZCMD                                        +USERID   - &ZUSER .
%   0 +ISPF PARMS  - Specify terminal and user parameters   +TIME     - &ZTIME .
%   1 +BROWSE      - Display source data or output listings +TERMINAL - &ZTERM .
%   2 +EDIT        - Create or change source data           +PF KEYS  - &ZKEYS .
%   3 +UTILITIES   - Perform utility functions
%   4 +FOREGROUND  - Invoke language processors in foreground
%   5 +BATCH       - Submit job for language processing
%   6 +COMMAND     - Enter TSO command or CLIST
%   7 +DIALOG TEST - Perform dialog testing
%   8 +DB2I        - Perform DATABASE 2 Interactive functions
%   C +CHANGES     - Display summary of changes for this release
%   T +TUTORIAL    - Display information about ISPF/PDF
%   X +EXIT        - Terminate ISPF using log and list defaults
%
+Enter%END+command to terminate ISPF.
%
 )INIT
   .HELP = ISR00003
   &ZPRIM = YES        /* ALWAYS A PRIMARY OPTION MENU      */
   &ZHTOP = ISR00003   /* TUTORIAL TABLE OF CONTENTS        */
   &ZHINDEX = ISR91000 /* TUTORIAL INDEX - 1ST PAGE         */
 )PROC
   &ZSEL = TRANS( TRUNC (&ZCMD'.')
                 0,'PANEL(ISPOPTA)'
                 1,'PGM(ISRBRO)'
                 2,'PGM(ISREDIT)'
                 3,'PANEL(ISRUTIL)'
                 4,'PANEL(ISRFPA)'
                 5,'PGM(ISRJB1) PARM(ISRJPA) NOCHECK'
                 6,'PGM(ISRPTC)'
                 7,'PGM(ISPYXDR) PARM(&ZTAPPLID) SCRNAME(DTEST) NOCHECK'
                 8,'CMD(DSNECPRI) NEWAPPL(DSNE)'
                 C,'PGM(ISPTUTOR) PARM(ISR00005)'
                 T,'PGM(ISPTUTOR) PARM(ISR00000)'
               ' ' ' '
                  ,
                 X,'EXIT'
                 *,'?' )
   &ZTRAIL = .TRAIL
 )END
```

Figure 73. ISPF primary option panel (DSN8ISPM), edited to include Db2I

The figure above shows panel DSN8ISPM. Notice the added lines in boldface type. Adding these lines allows you to invoke the Db2 Interactive (Db2I) functions. The added lines include one displayed line:

```
%   8 +DB2I        - Perform DATABASE 2 Interactive functions
```

You can also choose to add one of these undisplayed lines:

```
8,'CMD(DSNECPRI) NEWAPPL(DSNE)'
8,'CMD(DSNECPRI SSID(xxxx)) NEWAPPL(DSNE)'
```

The displayed line lets the user choose DB2I. Both of the undisplayed lines invoke the Db2I main panel (DSNEPRI). If you use the first undisplayed line, you accept the default for the subsystem identifier (SSID) parameter. If you use the second undisplayed lines, you can specify a different SSID parameter.

DSNECPRI is a CLIST and can be invoked directly from another user CLIST. It is an alternative way to invoke DSNEPRI without updating the primary ISPF panel.

By specifying NEWAPPL(DSNE), you define DSNE as the ISPF application that DB2I uses. ISPF uses the name DSNE to create the ISPF profile pool member name (DSNEPROF) in the TSO_*userid*.ISPPROF data set, which contains all ISPF panel variables defined during DB2I execution. Any customized DSNEPROF members can be migrated from Db2 11.

Recommendation: Examine any new or changed default panel values to ensure that your custom values are still valid, specifically the option values for the subcommands BIND PLAN, REBIND PLAN, BIND PACKAGE, and REBIND PACKAGE.

Using a NEWAPPL name other than DSNE: You can define any valid ISPF application name.

```
)ATTR
/**********************************************************************/
/* COPYRIGHT = 5740-XYR (C) COPYRIGHT IBM CORP 1982, 1985, 1990, 2003 */
/* REFER TO COPYRIGHT INSTRUCTIONS FORM NUMBER G120-2083              */
/* STATUS = VERSION 8, LEVEL 0                                        */
/**********************************************************************/
)BODY
 %TUTORIAL -------------------- TABLE OF CONTENTS ------------------ TUTORIAL
 %OPTION  ===>_ZCMD

                  ----------------------------------------------
                  | ISPF PROGRAM DEVELOPMENT FACILITY TUTORIAL |
                  |             TABLE OF CONTENTS              |
                  ----------------------------------------------
    The following topics are presented in sequence, or can be selected by
    entering a one-character selection code in the option field on line 2:
       %G+ GENERAL     - General information about ISPF
       %0+ ISPF PARMS  - Specify terminal and user parameters
       %1+ BROWSE      - Display source data or output listings
       %2+ EDIT        - Create or change source data
       %3+ UTILITIES   - Perform utility functions
       %4+ FOREGROUND  - Invoke language processors in foreground
       %5+ BATCH       - Submit job for language processing
       %6+ COMMAND     - Enter TSO command or CLIST
       %7+ DIALOG TEST - Perform dialog testing
       %8+ DB2         - Information about DB2
       %X+ EXIT        - Terminate ISPF using log and list defaults
    The following topics are presented only if explicitly selected:
       %A+ APPENDIX A  - Dynamic allocation interface routine (DAIR) errors
       %B+ APPENDIX B  - ISPF listing formats
       %I+ INDEX       - Alphabetic index of tutorial topics
 )PROC
    &ZSEL = TRANS(&ZCMD
                 G,ISR01000
                 0,ISP05000
                 1,ISR10000
                 2,ISR20000
                 3,ISR30000
                 4,ISR40000
                 5,ISR50000
                 6,ISR60010
                 7,ISR70000
                 8,DSN4V2DB
                 X,ISP90100
                 A,*ISP93030
                 B,*ISR95000
                 I,*ISR91000
                 )
 )END
```

Figure 74. ISPF program development facility tutorial panel (DSN8ISPT), edited to include Db2 tutorial

The figure above shows panel DSN8ISPT. Notice the two added lines in boldface type. Adding these lines allows you to invoke the Db2 tutorial panels. One of the two added lines is displayed:

```
%8+ DB2         - Information about DB2
```

The other added line is undisplayed:

```
8,DSN4V2DB
```

The displayed line presents the user with a choice for the Db2 tutorial. The undisplayed line actually invokes the Db2 tutorial menu (DSN4V2DB).

Related reference

z/OS ISPF Dialog Developer's Guide and Reference

ISPF User's Guide Vol I

Installation step 11: Connect Db2 to IMS (optional)

Connecting Db2 to IMS is an optional part of installation. Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

1. Make Db2 load modules available to IMS.
2. Define Db2 to IMS.
3. Define new programs and transactions to IMS.
4. Prepare IMS applications for Db2.
5. Depending on your site, you might also need to:
   - Define Db2 plans for IMS applications.
   - Generate a user language interface.

Related tasks

Connecting the IMS attachment facility
Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Installation step 12: Connect CICS to Db2 (optional)

To connect Db2 to CICS, you need to disconnect and connect the CICS region.

About this task

Coordinate this connection with your CICS support group.

Related tasks

Defining the CICS Db2 connection

Installation step 13: Define Db2 to z/OS

After you run job DSNTIJMV to define Db2 in SYS1.PARMLIB, you must activate the definition in z/OS.

About this task

Job DSNTIJMV makes the following changes to the SYS1.PARMLIB library:

- Creates new subsystem definitions in the IEFSSN*xx* member
- Creates new APF libraries in the IEAAPF*xx* member
- Creates new load module libraries in the LNKLST*xx* member

The load module library SDSNLINK contains the early code. SDSNLINK contains modules that must be placed in the link list look-aside address space (LLA) because they are loaded at subsystem initialization during the IPL.

Procedure

IPL z/OS.

During the z/OS IPL, message DSN3100I appears on the z/OS console, stating that Db2 is ready for the START command.

Alternatively, to define Db2 to z/OS until the next IPL, you can use these commands, in the following order:

a. SETPROG LNKLST, to update the link list concatenations

b. MODIFY LLA,REFRESH, to rebuild the LLA directory for the entire set of libraries that are managed by the LLA. This action is also known as a complete refresh of the LLA.

c. SETPROG APF, to update the APF list

d. SETSSI ADD, to dynamically add the new Db2 and IRLM subsystems

Example: Suppose that you want to perform these actions to define a Db2 subsystem to z/OS before the next IPL:

a. Add the Db2 ERLY code to a link list data set named MY.LNKLST.

b. Perform a complete refresh of the LLA.

c. Add the Db2 and IRLM libraries to the dynamic APF list.

d. Dynamically add a new Db2 subsystem named DSN1, with these characteristics:

- Command prefix -DSN
- Command prefix scope S (started)

Use the following commands:

```
SETPROG LNKLST,ADD,NAME=MY.LNKLST,DSNAME=prefix.SDSNLINK          a

MODIFY LLA,REFRESH                                                b

SETPROG APF,FORMAT=DYNAMIC,ADD,DSNAME=prefix.SDSNLINK             c
SETPROG APF,FORMAT=DYNAMIC,ADD,DSNAME=prefix.SDSNEXIT
SETPROG APF,FORMAT=DYNAMIC,ADD,DSNAME=prefix.SDSNLOAD
SETPROG APF,FORMAT=DYNAMIC,ADD,DSNAME=prefix.SDXRRESL

SETSSI ADD,SUB=DSN1,INITRTN=DSN3INI,INITPARM='DSN3EPX,-DSN,S'     d
```

Related tasks

Installation step 2: Define Db2 to z/OS: DSNTIJMV
Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS. These steps include updating members of SYS1.PARMLIB and SYS1.PROCLIB and creating Language Environment options data sets for the Db2 core WLM environment for Java routines.

Related reference

z/OS SETPROG Command (MVS System Commands)
z/OS SETSSI Command (MVS System Commands)

Installation step 14: Start the Db2 subsystem

During installation of Db2, start the Db2 subsystem after you IPL z/OS.

Procedure

To start Db2:

1. Start the IRLM, if you have not requested that Db2 automatically start the IRLM.

   You must start IRLM before you start Db2.

   Use the following command:

   ```
   START irlmproc
   ```

   where *irlmproc* is the name that you specified for the PROC NAME option on IRLM Panel 1 (DSNTIPI).

   If you specified YES for the AUTO START option on IRLM Panel 1 (DSNTIPI), Db2 starts the IRLM automatically.

2. Start Db2 from the z/OS console.

   The simplest form of the following command is:

   ```
   -DSN1 START DB2
   ```

where *-DSN1* is the subsystem command prefix that you defined for Db2.

When you issue the START DB2 command with this command format, Db2 uses the subsystem parameter module that is specified in the *ssnm*MSTR start-up JCL procedure in SYS1.PROCLIB.

If you need to change the name of the subsystem parameter module, you can edit the *ssnm*MSTR JCL member in SYS1.PROCLIB. Alternatively, you can override the default subsystem parameter module name by using the PARM option, as follows:

```
-DSN1 START DB2,PARM(DSNZPxxx)
```

If you have not run job DSNTIJRT, and the administrative task scheduler starts, the administrative task scheduler issues error message DSNA679I to report SQLCODE -805 until you run job DSNTIJRT. The administrative task scheduler starts if you specified an address space procedure name in the ADMIN SCHEDULER field on installation panel DSNTIPX.

If Db2 starts successfully, some or all of the following address spaces start, where *ssnm* is the Db2 subsystem name.

- The system services address space (*ssnm*MSTR)
- The database services address space (*ssnm*DBM1)
- The IRLM address space (*irlmproc*), where *irlmproc* is the IRLM procedure name
- Possibly, the DDF address space (*ssnm*DIST)
- Possibly, the administrative task scheduler stored procedure address space (*ssnm*ADMT)

If Db2 starts successfully, the series of RESTART messages that you receive concludes with these two messages:

```
DSNR002I   RESTART COMPLETED
DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
```

When you start Db2 11 for the first time, Db2 issues message DSNT501I with reason code 00C900A6. This message is expected. When you run job DSNTIJTC, which is required to complete the tailoring of the Db2 catalog, the cause of this message is corrected. Job DSNTIJTC is described in a later installation step.

After you start Db2, identify unusual conditions for databases with the command:

```
-DSN1 DISPLAY DATABASE(*) SPACENAM(*) RESTRICT
```

If Db2 does not start successfully, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. Ensure that the DSNTIJID, DSNTIJIE, DSNTIJIF, DSNTIJIN, and DSNTIJUZ jobs ran correctly. Also, verify that the subsystem parameter member that you specified (or allowed by default) when you started Db2 is the one that is built by job DSNTIJUZ. Check the JCL for the Db2 startup procedure.

If you use distributed data facility, you must define VTAM before DDF can start. However, you do not need to have TCP/IP configured to start DDF. In addition, transactions such as those from DDF or CICS may fail because work files have not yet been defined.

3. Optional: Start TSO.

   After Db2 starts, it is available to TSO. If you want to use the TSO SUBMIT command to do housekeeping and installation verification, you must start TSO (if it is not already started).

Installation step 15: Tailor the Db2 catalog: DSNTIJTC

Job DSNTIJTC invokes the CATMAINT utility to tailor your Db2 11 catalog, which you must do to fully install Db2. DSNTIJTC performs site-specific tailoring of the catalog.

Before you begin

To execute DSNTIJTC, you must have the installation SYSADM authority. Also, SMS must be active on the system where this Db2 subsystem is being installed. SMS must be configured to allocate all data sets for the Db2 catalog and directory in extended format and to use extended addressability.

About this task

DSNTIJTC contains the following job steps:

- Job step DSNTITC, which creates new catalog and directory objects, adds columns to existing catalog tables, and creates and updates indexes on the catalog tables to accommodate new Db2 11 objects. All IBM-supplied objects are created or updated sequentially during the execution of this step.
- Job step DSNTIRI, which executes only when job step DSNTITC terminates abnormally or with a return code of 8 or greater. DSNTIRI rebuilds catalog indexes that were placed in REBUILD-pending status during execution of DSNTITC.

Important: In a data sharing environment, do not run DSNTIJTC after installing non-originating members.

Procedure

Run job DSNTIJTC. You must ensure that the installation job runs on the same z/OS system on which the appropriate Db2 subsystem is running.

A status message, DSNU777I, is issued at several points to indicate progress. Diagnostic error messages are issued when CATMAINT processing fails. If a problem is found during the SQL processing phase of installation, message DSNU778I is issued. If non-supported functions are encountered, message DSNU776I is issued. All of these messages are written to the SYSPRINT data set.

Because this is the first use of Db2, errors from earlier steps might be detected here.

Results

If you receive abend reason code 00C200EF, the catalog and directory data sets are not in a compliant SMS environment.

If you receive an abend reason code from the data manager (X'00C9'*xxxx*) or buffer manager (X'00C2'*xxxx*), carefully recheck jobs DSNTIJIN, DSNTIJID, DSNTIJIE, and DSNTIJIF.

Related reference

DSNTIPY: Job editing panel
The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.

Related information

Installation step 16: Create default storage group, define temporary work files, and bind Db2 REXX Language Support: DSNTIJTM

You must create the default storage group that is for user-defined Db2 tables that are not specifically assigned to a storage group. You must also define the database that is for temporary work files, and bind Db2 REXX Language Support.

Procedure

Run job DSNTIJTM.

If job DSNTIJTM runs successfully, it produces the return codes that are shown in the following table:

Table 43. DSNTIJTM return codes

Step	PROCSTEP	Return code
DSNTIAD	PC ASM LKED	0000 0000 0000
DSNTIAB	(none)	0000
DSNTIAS	(none)	0000
DSNTICR	(none)	0000
DSNTIRX	(none)	0000
DSNTIST	(none)	0000

Results

DSNTIJTM assembles, link-edits, binds, and runs DSNTIAD, a program that processes certain SQL statements dynamically. It also defines the initial buffer pool sizes that are specified on installation panels DSNTIP1 and DSNTIP2. When you use the ENABLE or MEMBER functions, the steps to prepare and bind the DSNTIAD program are unnecessary and are removed during editing.

DSNTIJTM also provides some cleanup to ease reruns.

The SYSDEFLT storage group is the default storage group, and it is used for your database, table space, and table definitions that are not related to a specific storage group. By default, it is also used for the work file database and for work file table spaces that are created during Db2 installation and migration. When DSNTIJTM creates the SYSDEFLT storage group, it completes the following grants:

- Grants use of the default buffer pool and storage group to PUBLIC or the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG.
- Grants use of the SYSDEFLT storage group to PUBLIC or to the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG. This access is necessary to give users the ability to implicitly create table spaces in the default database.
- Grants authority to create tables and table spaces in the default database to PUBLIC or to the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG.

What to do next

For non-data-sharing installations, the work file database name is DSNDB07. For data sharing installations, the work file database name is the name that was specified in the WORK FILE DB field on installation panel DSNTIPK. After creating the work file database, the DSNTIJTM job creates the work file table spaces as specified on installation panel DSNTIP9.

You can increase the number of additional temporary work file table spaces by increasing the values in the work file table space fields on panel DSNTIP9, particularly if you expect a large amount of sorting at your site. Additional temporary work file table spaces can improve Db2 performance by reducing device contention among applications. These additional work files also can be used for sorting indexes on large tables during index creation.

You can choose to have job DSNTIJTM create these additional table spaces, or you can create them after you run DSNTIJTM. To create additional work file table spaces after you run job DSNTIJTM, use the DSNTWFG exec in job step DSNTIST. See the comment block for job step DSNTIST for information about the parameters for DSNTWFG.

If you do not run the installation CLIST, customize DSNTIJTM or the DSNTWFG exec to create at least one 4 KB and one 32 KB work file table space.

Related concepts

Work file database storage requirements
The work file database is used as storage for processing SQL statements that require working storage.

Installation step 17: Define and bind Db2 objects: DSNTIJSG

Use job DSNTIJSG to bind Db2-supplied packages and plans, initialize the Db2 communications database, and create user-managed databases for the Db2 resource limit facility (RLF), Data Definition Control support, and query optimization.

Before you begin

Important: In a data sharing environment, you must ensure that the resource limit facility (RLF) is inactive on all members in the data sharing group before running DSNTIJSG. To do this, issue the STOP RLIMIT command for each member.

Procedure

To use job DSNTIJSG:

1. If you use a product that uses a semicolon as a delimiter, replace the semicolons at the end of each SQL statement in job DSNTIJSG before you run the job.

   If you use a product that uses a semicolon as a delimiter, the CLIST adds SQL statements to job DSNTIJSG. Products that use a semicolon as a delimiting character cause semicolons to be removed from the installation CLIST before it is executed.
2. Run job DSNTIJSG.

   If the DSNTIJSG job runs successfully, it produces return codes of 0. It might also produce a return code of 4 because a step within this job attempts to delete a row from a table that might not exist at the time that this job runs. Expect the following messages from the BIND statement for each object that Db2 provides:

   ```
   DSNE932I  WARNING, ONLY IBM-SUPPLIED PLAN NAMES SHOULD BEGIN WITH DSN

   DSNE932I  WARNING, ONLY IBM-SUPPLIED PACKAGE-IDS SHOULD BEGIN WITH DSN

   DSNE932I  WARNING, ONLY IBM-SUPPLIED COLLECTION-IDS SHOULD BEGIN WITH DSN
   ```
3. If the DSNTIJSG job fails or abends:

   a) Be sure that the user that is specified on the JOB statement is authorized. Use the same name that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1.

   b) Correct any other problems with the DSNTIJSG job, and run it again. If you do not have enough resources to run the job, review the values that you specified for the Db2 installation parameters. (See job DSNTIJUZ.) Use the standard update procedure to make any necessary modifications. Then stop Db2, run the DSNTIJUZ job, start Db2, and run the DSNTIJSG job again.

What to do next

During the ISPF tailoring session, you named one or two IDs to have installation SYSADM authority. One of these users can now grant various levels of authority to other users. You can use SPUFI or a job similar to DSNTIJSG to perform the authorization. To grant SYSOPR authority to all primary and secondary user IDs that issue Db2 commands from the z/OS console or TSO SDSF, issue the following statement in SPUFI:

```
GRANT SYSOPR TO userid
```

Related tasks

Populating the communications database for use with TCP/IP
If you plan to use Db2 only as a server, you do not need to populate the CDB.

Updating subsystem parameter and application default values
You can dynamically update the value of some subsystem parameters while Db2 is running. For other subsystem parameters, you must stop and restart Db2 to change the values.

Verifying successful Db2 11 installation or migration with sample applications
You can use the Db2 Db2 11 sample applications to verify either installation or migration to new-function mode. These sample applications are also called installation verification procedures (IVPs).

Related reference

DSNTIP5: Distributed data facility panel 2
The entries on the DSNTIP5 panel are used to configure the distributed data facility (DDF).

Related information

Job DSNTIJSG

During installation, job DSNTIJSG binds Db2-supplied packages and plans.

When you run job DSNTIJSG during installation, it binds Db2 plans, including the plans for SPUFI and DCLGEN. DSNTIJSG also binds a package for a message routine that is used by SPUFI and DCLGEN, and binds that package into the plans for SPUFI and DCLGEN. If you use SPUFI to access remote sites, you might need to bind different packages and plans for SPUFI. You also might need to bind different packages and plans for SPUFI if some users need to run SPUFI under different terminal CCSIDs.

Job DSNTIJSG also binds the package and plan for the DSNTXAZP program, which updates a specified CLIST defaults input member (DSNTID*xx*) with the current subsystem parameter and buffer pool settings that are defined in the subsystem.

The DSNTIJSG job also completes the following tasks for user-maintained database activity:

- Creates the resource limit facility database.
- Within the resource limit facility database, creates a new resource limit facility table, DSNRLMT*nn*, and a new resource limit facility index, DSNMRL*nn*. By default, the step that creates this new table and index is commented out in the JCL. To have Db2 create DSNRLMT*nn* and DSNMRL*nn*, uncomment the step.
- Creates the data definition control support database.
- Creates the program authorization database, table space, table, and index.

  The SYSIBM.DSNPROGAUTH program authorization table is used to verify that a program is authorized to use a plan. A sample INSERT statement is provided, which you can uncomment, customize, and execute to populate the table.

The DSNTIJSG job inserts a blank row into the communication database (CDB) table SYSIBM.LUNAME. The CDB holds tables that contain information about your connection with remote Db2 subsystems, and a blank row allows all SNA clients to access DDF. TCP/IP remote clients cannot be controlled by using the CDB. If you run DSNTIJSG again, SQLCODE -803 is issued after an INSERT request because the blank row already exists.

The TCP/IP ALREADY VERIFIED field of panel DSNTIP5 defines the minimum security requirements for all TCP/IP clients because inbound security requirements cannot be established on individual clients.

Installation step 18: Populate the user-maintained databases (optional)

Job DSNTIJSG creates user-maintained databases that you might need to populate.

Procedure

Populate the user-maintained databases, including the resource limit specification table, and the data definition control support tables.

Although Db2 automatically creates the user-maintained databases, you must complete this step if you plan to use data definition control or the resource limit facility (RLF).

Installation step 19: Configure Db2 for running stored procedures and user-defined functions

Before you can use user-defined functions or the following types of stored procedures, you need to perform some set-up tasks:

- External stored procedures
- Native SQL procedures that satisfy any of the following conditions:
  - Calls at least one external stored procedure, external SQL procedure, or user-defined function.
  - Defined with ALLOW DEBUG MODE or DISALLOW DEBUG MODE.
- External SQL procedures (deprecated)
- Db2-supplied stored procedures

All routines, except native SQL procedures, must run in an environment that is established by the z/OS Workload Manager (WLM). A set of Db2-supplied routines are installed by job DSNTIJRT and validated by job DSNTIJRV as part of the installation process. You can also define your own routines or use routines that are provided by a non-IBM vendor. Before you can use any stored procedures and user-defined functions, however, you need to set up WLM environments for these routines. If you plan to use certain Db2-supplied stored procedures or user-defined functions, you need to perform some additional steps.

Related information

Tailoring Db2 subsystem parameters for stored procedures during installation (optional)

Several subsystem parameters should be tailored to your Db2 environment before you use stored procedures. These parameters were set when you installed or migrated Db2. If you are satisfied with those values, you do not need to complete this step.

About this task

The subsystem parameters for stored procedures are:

- MAX_NUM_CUR
- MAX_ST_PROC
- STORMXAB
- STORTIME

Procedure

To modify the values of these subsystem parameters, complete one of the following tasks:

- Run the installation CLIST again in INSTALL or MIGRATE mode. On the installation panels, leave most of the existing values and change the following fields on their respective panels:
  1. On panel DSNTIPA1, specify the input member that contains field values for your current installation.
  2. On panel DSNTIPT, specify different names for the TEMP CLIST LIBRARY and SAMPLE LIBRARY fields to avoid overwriting your original libraries.
  3. On panel DSNTIPX, add or change the values of the MAX ABEND COUNT, TIMEOUT VALUE, MAX OPEN CURSORS, and MAX STORED PROCS fields as appropriate.
  4. On panel DSNTIPY, specify a name for the REMOTE LOCATION field. Db2 uses this name for the stored procedure sample applications.
- Edit job DSNTIJUZ to add or change values for the subsystem parameters for routines.

  This method has the following disadvantages:

  - Db2 does not use these new values for any future migrations because your DSNTID*xx* member and DSNTIJUZ parameters are not saved for future input.
  - Db2 does not generate the sample jobs for stored procedure and user-defined functions because you are not running the DSNTINST CLIST.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

DSNTIPT: Data set names panel 1
The entries on the DSNTIPT panel establish data set names for the libraries that are used in the Db2 CLIST and JCL that Db2 provides. The values that you enter on this panel are edited into all pertinent sample and installation jobs.

DSNTIPX: Routine parameters panel
The entries on this panel are used to start the stored procedures address space so that it can run stored procedures or user-defined functions.

DSNTIPY: Job editing panel
The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

Setting up Language Environment for stored procedures during installation

Language Environment (LE) is a component of the z/OS operating system that establishes a common runtime environment for all applications, regardless of programming language. Db2 uses Language Environment to provide a runtime environment for external stored procedures and external SQL procedures.

About this task

Language Environment provides a set of essential run time services that are available through a set of interfaces that are consistent across programming languages. These services include routines for run time message handling, condition handling, and storage management.

Language Environment provides the following advantages for Db2 stored procedures:

- Language Environment hides the differences between programming languages.
- Language Environment provides the ability to make a stored procedure resident in the stored procedure address spaces.

- Language Environment supports a large number of run time options, including those options that are needed to use tools to debug your stored procedures.

Procedure

To set up Language Environment for stored procedures:

1. Customize Language Environment by completing the instructions in z/OS Language Environment Customization.
2. Specify the Language Environment run time library in the JCL startup procedure for each WLM-managed address space for stored procedures.

   This library must be the only available run time library. Do not reference any other language run time libraries within the system link list or within the STEPLIB statements. If other language run time libraries are defined in the system link list, use STEPLIB statement overrides to exclude them.

   Multiple languages can share the same Language Environment run time library. Therefore, you do not need to specify the language-specific libraries in the JCL startup procedure of each stored procedure address space.

   Restriction: Do not use compilers (or associated run time libraries) that are no longer supported by IBM.

What to do next

After you set up Language Environment for stored procedures, you can override the Language Environment run time options for individual stored procedures. You can do this by using the RUN OPTIONS clause in the CREATE PROCEDURE statement or ALTER PROCEDURE statement. The default values for Language Environment run time options are defined by z/OS. You might have overridden some of these default values when you customized Language Environment.

Related reference

Customizing Language Environment run-time options (z/OS Language Environment Customization)

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Implementing RRS for stored procedures during installation

To use some Db2 stored procedures, you must implement Resource Recovery Services (RRS). RRS is a sync point manager program that coordinates two-phase commit processing. Db2 requires that RRS be active because WLM-managed stored procedure address spaces use the RRS attachment facility (RRSAF).

About this task

RRS records events for protected resources in log streams that are managed by a z/OS component called the system logger. The following table identifies the log streams that RRS uses, where *gname* can be your Sysplex name or any name in a non-Sysplex environment:

Table 44. Log streams that RRS uses

Log stream type	Log stream name	Content
Main unit-of-recovery log state stream	ATR.*gname*.MAIN.UR	The state of active units of recover (URs). RRS periodically moves this information into the RRS delayed UR state log when UR completion is delayed.
Delayed unit-of-recovery log state stream	ATR.*gname*.DELAYED.UR	The state of active URs, when UR completion is delayed.

Table 44. Log streams that RRS uses (continued)

Log stream type	Log stream name	Content
Resource manager data log stream	ATR.*gname*.RM.DATA	Information about the resource managers that use RRS services.
Restart log stream	ATR.*gname*.RESTART	Information, which is needed during restart, about incomplete URs. This information enables a functioning RRS instance to assume remaining incomplete work from an RRS instance that failed.
Archive log stream	ATR.*gname*.ARCHIVE	Information about completed URs. This log stream is optional, but recommended.

All of these log streams are required except for the archive log stream. RRS does not start if it is not able to connect to the required log streams.

In a Sysplex environment, these log streams are shared by the systems of the Sysplex.

Procedure

To implement RRS for stored procedures:

1. Define the RRS log streams that are to be written, either on disk or in the coupling facility by completing the following actions:

   a) If you are using the coupling facility, add definitions for the RRS structures in the CFRM policy.

   When you are use coupling facility log streams, each log stream needs to be mapped to a coupling facility structure.

   The following example shows JCL that updates the CFRM policy to add the RRS structures:

```
//DEFCFRM1 JOB MSGCLASS=X,TIME=10,MSGLEVEL=(1,1),NOTIFY=&SYSUID
//STEP1 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSIN DD *
    DATA TYPE(CFRM) REPORT(YES)
    DEFINE POLICY NAME(CFRM18) REPLACE(YES)
    CF NAME(CF01)
        TYPE(009672)
        MFG(IBM)
        PLANT(02)
        SEQUENCE(000000040104)
        PARTITION(1)
        CPCID(00)
        DUMPSPACE(2048)
        CF NAME(CF02)
        TYPE(009672)
        MFG(IBM)
        PLANT(02)
................
................
................
STRUCTURE NAME(RRS_ARCHIVE_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_RMDATA_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_MAINUR_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_DELAYEDUR_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_RESTART_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
```

b) Define the log streams in the system logger policy by using the IXCMIAPU utility. This utility program is provided in the SYS1.MIGLIB system library.

If you are using the coupling facility, also define the structures in the system logger policy. You can map each log stream to a single structure or you can map log streams of like data types to the same structure.

Example: Defining coupling facility log streams

The following example JCL shows definitions for coupling facility structures and RRS log streams. In this case, each RRS log stream is mapped to a structure.

```
//STEP1 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DATA TYPE(LOGR) REPORT(YES)

  DEFINE STRUCTURE NAME(RRS_ARCHIVE_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(262)

  DEFINE STRUCTURE NAME(RRS_RMDATA_1) LOGSNUM(1)
         MAXBUFSIZE(1024) AVGBUFSIZE(252)

  DEFINE STRUCTURE NAME(RRS_MAINUR_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

  DEFINE STRUCTURE NAME(RRS_DELAYEDUR_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

  DEFINE STRUCTURE NAME(RRS_RESTART_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.ARCHIVE) STRUCTNAME(RRS_ARCHIVE_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.RM.DATA) STRUCTNAME(RRS_RMDATA_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.MAIN.UR) STRUCTNAME(RRS_MAINUR_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.DELAYED.UR) STRUCTNAME(RRS_DELAYEDUR_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.RESTART) STRUCTNAME(RRS_RESTART_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
```

```
RETPD(15) AUTODELETE(YES)
/*
```

Example: Defining disk log streams

The following example JCL shows definitions for RRS log streams on disk.

```
/DEFSTREXECPGM=IXCMIAPU
//SYSPRINT DDSYSOUT=A
//SYSINDD *
   DATA TYPE(LOGR)

   DEFINE LOGSTREAM NAME(ATR.PLEX1.MAIN.UR)
      LOWOFFLOAD(60)
      HIGHOFFLOAD(80)
      DASDONLY(YES)
      HLQ(TEST)
      LS_SIZE(1024)
      LS_DATACLAS(VSAMLS)
      STG_SIZE(1024)

   DEFINE LOGSTREAM NAME(ATR.PLEX1.DELAYED.UR)
      LOWOFFLOAD(60)
      HIGHOFFLOAD(80)
      DASDONLY(YES)
      HLQ(TEST)
      LS_SIZE(960)
      LS_DATACLAS(VSAMLS)
      STG_SIZE(960)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.ARCHIVE)
     LOWOFFLOAD(0)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(960)
     LS_DATACLAS(VSAMLS)
     AUTODELETE(YES)
     RETPD(2)
     STG_SIZE(2000)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.RM.DATA)
     LOWOFFLOAD(60)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(192)
     LS_DATACLAS(VSAMLS)
     STG_SIZE(192)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.RESTART)
     LOWOFFLOAD(60)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(960)
     LS_DATACLAS(VSAMLS)
     STG_SIZE(960)
```

c) If you are using coupling facility log streams, compile and link-edit the changed CFRM policy.

d) If you are using coupling facility log streams, activate the updated CFRM policy in your Sysplex by using the following operator command:

```
SETXCF START,POLICY,TYPE=CFRM,POLNAME=polname
```

2. Establish the priority for RSS within the WLM policy.

   The RRS priority needs to be equal to or higher than the dispatching priority of Db2. You can use the SYSSTC service class for the RRS address space to achieve a higher dispatching priority.

3. Move the ATRRRS procedure that is supplied by IBM from SYS1.SAMPLIB to your SYS1.PROCLIB as member RRS, and make any necessary changes.

   This JCL procedure is used to start RRS.

   You can use a member name other than RRS, but the first four characters of this name must match the subsystem name that you specify in the IEFSSN*xx* member of SYS1.PARMLIB in the next step.

The GNAME value in the procedure must match the *gname* that you specified when defining the log streams. The default value for *gname* at RRS startup is the Sysplex name.

The following example shows a sample procedure to start RRS.

```
//RRS   PROC GNAME='',CTMEM=''
//RRS   EXEC PGM=ATRIMIKE,REGION=0M,TIME=NOLIMIT,
//          PARM='GNAME=&GNAME CTMEM=&CTMEM'
//
```

4. Define RRS as a subsystem to z/OS by editing the active IEFSSN*xx* member of SYS1.PARMLIB to include the following entry:

```
SUBSYS SUBNAME(RRS) /* RESOURCE RECOVERY SERVICES */
```

The subsystem name can be RRS or any other name that you choose. However, the first four characters (or fewer characters if the name is shorter) must match the name of the JCL procedure to start RRS.

5. Start RRS by using the following operator command:

```
START RRS
```

If you subsequently need to stop RRS, use one of the following operator commands:

- `SETRRS CANCEL`
- `SETRRS SHUTDOWN`

If neither of these commands stops RRS, use the `FORCE RRS,ARM` command. In this command, RRS is the subsystem name that your installation assigned to RRS in PARMLIB member IEFSSN*xx*.

Related reference

z/OS MVS Programming: Resource Recovery

Configuring and defining RRS logging requirements (z/OS MVS Programming: Resource Recovery)

Systems Programmer's Guide to Resource Recovery Services (RRS) (IBM Redbooks)

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Setting up a WLM application environment for stored procedures during installation

All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

About this task

If you use data sharing, see "Special considerations for WLM-managed stored procedures in coexistence" on page 613 for additional guidance about setting up WLM environments.

Recommendation: Use partitioned data set extended (PDSE) for load libraries that contain external modules for stored procedures. Using PDSEs might eliminate your need to stop and start the stored procedures address space due to growth of the load libraries. If a load library grows from additions or replacements, the library might need to be extended.

Procedure

To set up a WLM application environment for one or more stored procedures:

1. Gather requirements for the WLM environment. These requirements include:
   - The name of the Db2 subsystem or data sharing group where the stored procedure or user-defined function is to run.

- The maximum number of task control blocks (TCBs) that can run concurrently in an address space that is initiated by the WLM environment. This setting, referred to as the NUMTCB, is the maximum number of procedures or functions that should run concurrently in that WLM-managed address space. The appropriate setting depends on the requirements or limitations of the individual stored procedure or user-defined function.
  - For recommended NUMTCB values for Db2-supplied stored procedures, see "Installation information for procedures and functions that are supplied with Db2" on page 731.
  - For recommended NUMTCB values for your own stored procedures, see . If a routine allocates a large amount of memory or if the external module for the routine is not re-entrant, the NUMTCB value should be 1. If there is a need for serialization, the NUMTCB value should also be 1.
  - The WLM environment for a REXX stored procedure must have a NUMTCB setting of 1.
- Requirements for Authorized Program Facility (APF).
  - Stored procedures and user-defined functions that execute privileged instructions (for example, WLM_REFRESH) must run in a WLM environment that has an APF-authorized address space.
  - Db2 REXX stored procedures, such as DSNTPSMP, and other routines that use TSO/E and REXX facilities must run in a WLM environment that does not have an APF-authorized address space.
  - Most stored procedures can run in a WLM environment that either has or does not have an APF-authorized address space. However, running a routine in an APF-authorized environment is recommended only when doing so is necessary.
- Special data sets and DD names that are needed by the stored procedure or user-defined function. For example, all Java stored procedures implicitly require a Language Environment run time options data set to be allocated to DD name JAVAENV. Other routines might also have an explicit requirement for a work file to be allocated to a particular DD name.

2. Create a JCL startup procedure for the WLM application environment.

   Use *ssnm*WLM (where *ssnm* is the Db2 subsystem ID) as the basis for creating the new startup procedure. *ssnm*WLM is the default name of the sample JCL procedure for starting WLM-established address spaces. If you specified a name in the WLM PROC NAME field on the DSNTIPX installation panel, the sample procedure has that specified name. The sample procedure is placed in your system PROCLIB by installation job DSNTIJMV. For the DSNACICS stored procedure, DSNTIJMV also provides sample procedure *ssnm*CICS, where *ssnm* is the subsystem ID. Tailor your new startup procedure as follows:

   - Change the APPLENV value to the name of the WLM application environment that you plan to define.
   - Change the startup procedure name to an appropriate procedure name.

     Recommendation: Specify the same name for the application environment name and the procedure name. Using the same name simplifies monitoring the WLM environment definitions.
   - Change the value of DB2SSN to your Db2 subsystem name.
   - Ensure that the NUMTCB value is appropriate. If the minimum number of address spaces is specified, the NUMTCB value will be the number of task control blocks that are started in an address space.

     Recommendation: If you want to be able to easily change the NUMTCB value, specify the NUMTCB value here, and do not specify this parameter on the application environment definition panel when you define the WLM application environment. Specifying NUMTCB on the environment definition panel associates this parameter with the WLM application environment definition. Any changes to the JCL startup procedure can be made by refreshing the WLM application environment. However, changes to the WLM application environment require that you reinstall the z/OS service policy at an LPAR or sysplex level. If you specify the NUMTCB parameter for both the WLM application environment and the startup procedure, the value in the WLM application environment overrides the value in the startup procedure.
   - If the environment is one in which the cost of starting new address spaces is very high, you can use the MNSPAS parameter. The MNSPAS parameter specifies the minimum number of address spaces that are to be started and maintained. The value can be 0 through 50. The default value is 0, which

  means that no minimum number of address spaces is specified. If the number of address spaces is at the specified minimum, cancelling an address space causes WLM to start another one to maintain the minimum. If you refresh a WLM environment, WLM starts a number of new address spaces as needed (or the specified minimum number) and stops the old address spaces.

  If the MNSPAS parameter is specified, the NUMTCB value is the number of task control blocks that are started in an address space. If the MNSPAS parameter is not specified, the NUMTCB value is the maximum number of task control blocks that can be started in an address space.

- Edit the data set names to match your data set names.
- Ensure that the library in which the stored procedure resides is in the STEPLIB concatenation.
- Ensure that the IBM Language Environment run time library is specified in the STEPLIB concatenation, unless your system includes the Language Environment run time library in the system link list.
- If you want to run the stored procedure in a WLM environment that has an APF-authorized address space, ensure that all the libraries in the STEPLIB concatenation are defined to the Authorized Program Facility.
- Add any special DD statements that are required for the stored procedures or user-defined functions that are to run in the WLM environment.
  - If you plan to use stored procedures that use the ODBA interface to access IMS databases, make the following additional changes:
    - Add the data set name of the IMS data set that contains the ODBA callable interface code to the end of the STEPLIB concatenation. The name of this data set is usually IMS.RESLIB.
    - After the STEPLIB DD statement, add a DFSRESLB DD statement that names the IMS data set that contains the ODBA callable interface code.
  - If your routines are defined as PROGRAM TYPE SUB and use UNIX System Services (USS) syscall statements, you might need to add a NOUNDUB DD statement. By default, the USS process and its resources are cleaned up after every stored procedure and user-defined function invocation. If you need the task in this WLM environment to retain the process across subsequent invocations, add a dummy NOUNDUB DD statement. This option specifies that no cleanup will occur unless the WLM environment is refreshed. To enable this option, add the following statement to the WLM stored procedure address space startup JCL:

    ```
    //NOUNDUB DD DUMMY
    ```

    Use this option with caution because routines use the USS process that was used by the previous routine that was run under the same task. Also note that any open resources such as file descriptors remain open for the next routine that is run under the same task. Consider using this option on new workloads only if reusing the USS process is the desired behavior.

The following example shows a startup procedure for a WLM application environment for external SQL, COBOL, C, C++, PL/I, and assembler stored procedures. This startup procedure for external SQL stored procedures needs one unauthorized data set included in STEPLIB.

```
//*******************************************************************
//* JCL FOR RUNNING THE WLM-ESTABLISHED STORED PROCEDURES
//* ADDRESS SPACE
//* RGN     -- THE MVS REGION SIZE FOR THE ADDRESS SPACE.
//* DB2SSN  -- THE DB2 SUBSYSTEM NAME.
//* NUMTCB  -- THE NUMBER OF TCBS USED TO PROCESS
//*            END USER REQUESTS.
//* APPLENV -- THE MVS WLM APPLICATION ENVIRONMENT
//*            SUPPORTED BY THIS JCL PROCEDURE.
//*
//********************************************************************
//DB9AWLM PROC RGN=0K,APPLENV=WLMENV,DB2SSN=DB9A,NUMTCB=40,MNSPAS=3
//IEFPROC EXEC PGM=DSNX9WLM,REGION=&RGN,TIME=NOLIMIT,
//             PARM='&DB2SSN,&NUMTCB,&APPLENV,&MNSPAS'
//STEPLIB  DD  DISP=SHR,DSN=DB9AU.RUNLIB.LOAD
//         DD  DISP=SHR,DSN=CEE.SCEERUN
```

```
//          DD  DISP=SHR,DSN=DB9A9.SDSNEXIT
//          DD  DISP=SHR,DSN=DB9A9.SDSNLOAD
```

3. Define the application environment to WLM by using one of the following methods.

   - Use the WLM administrative application (IWMARIN0) to define a new environment or copy or modify an existing one.

     a. In the first WLM panel, **Definition Menu**, enter 9 for Application Environments.

        The application environment definition panel is displayed.

     b. On the application environment definition panel, specify the appropriate action code:

        – Create a new WLM application environment.

        – Copy an existing WLM application environment.

        – Modify an existing WLM application environment.

        The appropriate panel for creating, copying or modifying the application environment is displayed.

     c. If you are creating or modifying a WLM environment, specify the appropriate options for the WLM application environment definition, using the same application environment name and procedure name that you specified for the startup procedure.

     d. After you specify the appropriate options, press Enter to create the application environment definition.

   - Modify and run sample job DSNTIJRW. As provided, DSNTIJRW creates the core Db2 WLM environments, but you can modify the job to define your own WLM environments. Job DSNTIJMV copies an address space procedure for each of the Db2 core WLM environments into SYS1.PROCLIB.

4. Install the WLM service definition that contains information about the application environment by opening the WLM **Definition Menu** panel and selecting the **Install** function in the **Utilities** menu bar.

5. Activate the WLM service policy from the installed service definition by completing one of the following actions:

   - Issue the VARY WLM command as follows:

     ```
     VARY WLM,POLICY=policy-name
     ```

   - On the WLM **Definition Menu** panel, choose the **Activate service policy** option from **Utilities** menu bar.

6. Set up security for the WLM application environments and for creating stored procedures by completing the following actions:

   a) Specify which WLM-established address spaces can run stored procedures.

      If you do not complete this step, any WLM-established address space can run stored procedures.

   b) Grant access to users to create procedures in specific WLM address spaces.

   c) Grant access to users to create procedures in specific schemas. Use the GRANT statement with the CREATIN option for the appropriate schema.

   d) Grant access to users to create packages for procedures in specific collections. Use the GRANT statement with the CREATE option for the appropriate collection.

      Requirement: For native SQL procedures, the collection name for the package must be the same as the schema name.

   e) Grant access to refresh the WLM environments to the appropriate people.

   For more detail, see .

7. Ensure that the ID that is used to run the JCL startup procedure for the WLM application environment has permission to use RRSAF.

   Each time one of the Db2 WLM address spaces is started, it uses RRSAF to attach to Db2.

What to do next

When you create or alter a stored procedure, specify the WLM application environment that Db2 is to use in the WLM_ENVIRONMENT option of the CREATE or ALTER PROCEDURE statement. When you specify environments, be aware that:

- Routines that have low memory requirements and that are frequently called should not share an environment with routines that have high memory requirements and are rarely called. Otherwise, storage is wasted.
- Stored procedures can be grouped according to the authorization settings for a WLM environment.
- WLM environments should not be shared among routines that use the same DD name for different purposes.
- WLM environments should not be shared among routines if one routine allocates data sets in the environment and that routine is run only occasionally. If other routines that do not use the data sets use the environment, the data sets are kept artificially allocated, which might interfere with other tasks.

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

DSNTWLMB tool
The DSNTWLMB tool provides a batch interface for defining, installing, and activating WLM environments. You can also use DSNTWLMB to remove WLM application environments. This tool is invoked by job DSNTIJRW to create the core Db2 WLM environments.

set_dub_default (BPX1SDD, BPX4SDD) (z/OS UNIX System Services Programming): Assembler Callable Services Reference

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Using Operator Commands for Application Environments (z/OS MVS Planning: Workload Management)

Installation step 20: Set up Db2-supplied routines

Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Setting up the Db2 core WLM environments during installation

Db2 stored procedures (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

About this task

For Db2-supplied routines, you can use the provided definitions for core WLM environments as a starting point for defining your environments. You can also manually define the WLM environments by using the IWMARIN0 application, as described in “Setting up a WLM application environment for stored procedures during installation” on page 392.

Exception: You do not need to complete this configuration task for native SQL procedures unless they call at least one external stored procedure or external SQL procedure. This task also applies to native SQL procedures that call at least one user-defined function or that are defined with ALLOW DEBUG MODE or DISALLOW DEBUG MODE. Otherwise, this task applies to only user-defined functions, external stored procedures, external SQL procedures, and Db2-supplied stored procedures

Procedure

Run job DSNTIJRW.

Job DSNTIJRW invokes the DSNTWLMB tool to create the core WLM environments. The CLIST assigns the core WLM environment names in DSNTIJRW according to the values that are specified on panel DSNTIPR1. For detailed information about the environments that are created by DSNTIJRW, see "Core WLM environments for Db2-supplied routines" on page 739.

Related concepts

WLM management of stored procedures
Workload Manager (WLM) is a component of z/OS that manages incoming work requests for the operating system and allocates available system resources to meet these requests. Db2 for z/OS uses WLM to allocate workload requests for Db2 stored procedures.

Related reference

DSNTWLMB tool
The DSNTWLMB tool provides a batch interface for defining, installing, and activating WLM environments. You can also use DSNTWLMB to remove WLM application environments. This tool is invoked by job DSNTIJRW to create the core Db2 WLM environments.

DSNTIPR1: Parameters for Db2-supplied routines panel
The DSNTIPR1 panel enables you to establish default WLM environment names for Db2-supplied routines and to access panels for advanced configuration of these routines.

Installing Db2-supplied routines during installation

The DSNTIJRT and DSNTIJRV jobs install and validate the installation of Db2-supplied routines. These jobs are configured with the options that you specified on installation panel DSNTIPR1 and panels DSNTIPRA through DSNTIPRP.

Before you begin

If the RACF facility class is active and a profile was defined for MVSADMIN.WLM.POLICY, the user that runs the DSNTIJRV job requires READ access. To grant READ access to a user, an administrator must submit the following command:

```
PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(user) ACCESS(READ)
```

If the RACF OPERCMDS class is active and a profile was defined for MVS.MCSOPER.*, the user ID that runs the DSNTIJRV job requires READ access. Alternatively, you can add a discrete profile for the DSNTRVFY console that is used in this job. To add a discrete profile for the DSNTRVFY console, an administrator must complete the following steps:

1. Establish a discrete profile for MVS.MCSOPER.DSNTRVFY by issuing the following command:

   ```
   RDEFINE OPERCMDS MVS.MCSOPER.DSNTRVFY UACC(NONE)
   ```

2. Grant READ access to the user that runs the DSNTIJRV job by issuing the following command:

   ```
   PERMIT MVS.MCSOPER.DSNTRVFY CLASS(OPERCMDS) ID(user) ACCESS(READ)
   ```

3. Refresh the OPERCMDS class by issuing the following command:

   ```
   SETROPTS RACLIST(OPERCMDS)REFRESH
   ```

Resource Recovery Services (RRS) is also required for these jobs.

Procedure

To install the Db2-supplied routines:

1. Run job DSNTIJRT to install and configure all Db2-supplied routines.
2. After DSNTIJRT successfully completes, run job DSNTIJRV to validate the installation of the routines.
3. Authorize the appropriate users to use one or more of these stored procedures by issuing the GRANT EXECUTE statement.

   As part of the installation process, job DSNTIJRT defines, binds, and grants access to the stored procedures and user-defined functions. Job DSNTIJRT grants EXECUTE authority to the authorization IDs that are specified for the GRANT EXECUTE fields on installation panels DSNTIPRB through DSNTIPRP. The default setting for GRANT EXECUTE is PUBLIC, meaning that anyone who can access Db2 can use these stored procedures.

   Recommendation: When you run the installation CLIST, use the GRANT EXECUTE fields on panels DSNTIPRB through DSNTIPRP to specify different access lists.
4. Complete additional setup steps for any of the following routines that you plan to use.
   - The stored procedures for XML schema support
   - The administrative task scheduler routines and administrative enablement routines
   - The CICS transaction invocation procedure
   - The common SQL API stored procedures
   - The IBM MQ user-defined functions
   - The web service user-defined functions

What to do next

After installing the Db2-supplied routines, you can choose to disable any of the routines that are unnecessary or unusable on your subsystem.

Related concepts

Configuration control statements for Db2-supplied routines
Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Related tasks

Disabling Db2-supplied routines for validation
Job DSNTIJRT installs all Db2-supplied routines on your subsystem. After installation or migration, you can disable any routines that are unnecessary or unusable so the validation program can exclude it from processing.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Related information

Job DSNTIJRT

Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

DSNTIJRT provides a *configuration control statement* for each Db2-supplied routine and the mode for processing those statements. The configuration control statement specifies the WLM environment, list of authorization IDs that are allowed to execute the routine, and optional package owner for the routine. DSNTRIN reads and validates those statements and uses them to create and customize routines and supporting objects.

Format

DSNTRIN accepts the following parameters:

DB2SSN

Identifies the Db2 subsystem on which to install and configure the Db2-supplied routines.

MODE

During SQL processing, DSNTRIN configures each routine with the WLM environment specified in the configuration control statement for that routine. Processing behavior depends on the DSNTRIN run mode, the Db2 catalog mode, and which objects already exist.

INSTALL

This is the normal operating mode. Use it when installing or migrating to Db2.

Create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the routine already exists, it is updated, if necessary, to use the WLM environment specified in the configuration control statement for that routine. If the package for a routine already exists, it is not bound again unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. If a supporting object is used by more than one routine, the object is created when one of those routines is first created.

REINSTALL

This mode behaves like INSTALL mode, except that existing Db2-supplied routines and created global temporary tables are dropped ahead of other processing. Existing related databases, table spaces, tables, and indexes are not dropped, except as discussed in the special notices section of the DSNTIJRT job prolog.

Use REINSTALL mode only if you have a specific need to drop and re-create all Db2-supplied routines. Before running the job, verify that each GRANTTO statement in DSNTIJRT specifies all users who are authorized to use that routine.

In particular, use this mode to create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the package for a routine already exists, it is not rebound unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. Existing routines and any related created global temporary tables are first dropped before they are re-created. Related databases are not dropped if they already exist, but they are created if they do not exist. If a supporting object is used by more than one routine, the object is created when one of those routines is first created. Drop processing of routines and related objects that do not exist is bypassed.

REINITIALIZE

This mode behaves like REINSTALL mode, except that existing databases, table spaces, tables, and indexes used by the Db2-supplied routines are also dropped ahead of other processing.

REINITIALIZE mode drops and reinitializes databases such as the XSR database that may contain information needed by Db2 for other processing. Therefore, use REINITIALIZE mode only when advised to do so by IBM Support. Before running the job, verify that each GRANTTO statement in DSNTIJRT specifies all users who are authorized to use that routine.

In particular, use this mode to create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the package for a routine already exists, it is not rebound unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. Existing routines, existing related created global temporary tables, and existing related databases are first dropped before they are re-created. After each SQL statement, a COMMIT statement is issued. If a supporting object is used by more than one routine, the object is created when one of those routines is first created.

INSTALL-PREVIEW
Simulate INSTALL mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

REINSTALL-PREVIEW
Simulate REINSTALL mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

REINITIALIZE-PREVIEW
Simulate REINITIALIZE mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

AUTHID
DSNTRIN uses this value as the CURRENT SQLID for creating and configuring most Db2-supplied routines. DSNTRIN also uses this value as the default OWNER for binding packages for the Db2-supplied routines that do not have the PKGOWNER specified in the configuration control statement.

SECDEFID
DSNTRIN uses this value as the CURRENT SQLID setting when creating and configuring Db2-supplied routines that are defined with the SECURITY DEFINER option.

The ID that you specify for SECDEFID must be an ID that can be used as a logon ID, because WLM uses the ID to execute Db2-supplied routines that are defined with SECURITY DEFINER.

Input

DSNTRIN allocates the following DD statements for input:

DBRMLIB
Location of the DBRMs for Db2-supplied routines. This is typically the *prefix*.SDSNDBRM target library.

SYSUT1
Internal work file for the Db2 installation bind interface (DSNTRBI).

CFIGIN
Location of the configuration control statements for Db2-supplied routines.

DB2OPT
This required DD can contain the following optional parameters:

STOGROUP
Specifies a storage group to use for creating databases and table spaces that are used by the routines that are supplied with Db2. If this parameter is not specified, the default SYSDEFLT storage group is used.

INDEXSTOG
Specifies a storage group to use for creating indexes instead of the default SYSDEFLT storage group.

BP4K
Specifies an alternate 4-KB buffer pool for base table spaces that are created by DSNTRIN. The default 4-KB buffer pool is BP0.

BP8K
Specifies an alternate 8-KB buffer pool for base table spaces that are created by DSNTRIN. The default 8-KB buffer pool is BP8K0.

BP16K
Specifies an alternate 16-KB buffer pool for base table spaces that are created by DSNTRIN. The default 16-KB buffer pool is BP16K0.

BP32K
Specifies an alternate 32-KB buffer pool for base table spaces that are created by DSNTRIN. The default 32-KB buffer pool is BP32K.

LOBBP8K
Specifies an alternate 8-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 8-KB buffer pool is BP8K0.

LOBBP16K

Specifies an alternate 16-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 16-KB buffer pool is BP16K0.

LOBBP32K

Specifies an alternate 32-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 32-KB buffer pool is BP32K0.

IMS_SECURITY

The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied IMS routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 IMS routines are altered if needed to conform with the SECURITY type that is specified here.

MQ_SECURITY

The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied MQ routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 MQ routines are altered if needed to conform with the SECURITY type that is specified here.

SOAP_SECURITY

The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied web services/SOAP routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 SOAP routines are altered if needed to conform with the SECURITY type that is specified here.

Note: DSNTRIN does not create or activate this storage group or any of these buffer pools.

Output

DSNTRIN allocates the following DD statements for output:

SYSPRINT

Destination for echo of configuration control statements that are read and for messages that are generated during processing. Each processed routine generates at least one status message.

SYSTSPRT

Internal message file for the Db2 installation bind interface (DSNTRBI).

CFIGOUT

Destination for configuration control statements that are read by DSNTRIN. This output is useful for diagnostic purposes when DSNTRIN reports an error in a configuration control statement.

SQLOUT

Destination for DDL statements that are generated and processed by DSNTRIN. These statements are useful for diagnostic purposes.

BINDOUT

Destination for bind statements that are generated and processed by DSNTRIN. These statements are useful for diagnostic purposes.

JCLOUT

Destination for a generated sample job that is generated when one of the PREVIEW modes is specified. The job contains steps that process inline DDL and bind statements that are needed to install and configure missing, down-level, or incorrectly configured Db2-supplied routines. This DD is required if you specify a PREVIEW mode.

Example of executing DSNTRIN in INSTALL mode:

```
//DSNTRIN  EXEC PGM=DSNTRIN
//         PARM=('DB2SSN(VA1A) MODE(INSTALL) AUTHID(AUTHID) SECDEFI-
           D(ADMF001)')
//DBRMLIB  DD DISP=SHR,DSN=DSN!!0.SDSNDBRM
//SYSUT1   DD UNIT=SYSDA,SPACE=(27930,(10,5)),
//            DCB=(RECFM=FB,LRECL=133)
//SYSPRINT DD SYSOUT=*,DCB=(RECFM=FB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//CFIGOUT  DD SYSOUT=*
//SQLOUT   DD SYSOUT=*
//BINDOUT  DD SYSOUT=*
```

```
//DB2OPT   DD *
 STOGROUP(DB2_ROUTINES_GROUP)
 INDEXSTOG(DB2_INDEX_GROUP)
 BP4K(BP0)
 BP8K(BP8K0)
 BP16K(BP16K0)
 BP32K(BP32K)
 LOBBP8K(BP8K0)
 LOBBP16K(BP16K0)
 LOBBP32K(BP32K0)
 IMS_SECURITY(DB2)
 MQ_SECURITY(DB2)
 SOAP_SECURITY(DB2)

/*
//CFIGIN   DD *
  ...
SYSPROC.DSNWSPM
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)

SYSPROC.DSNWZP
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)
  ...
//*
```

Example of executing DSNTRIN in INSTALL-PREVIEW mode:

```
//DSNTRIN  EXEC PGM=DSNTRIN
//         PARM='DB2SSN(VA1A) MODE(INSTALL-PREVIEW) AUTHID(AUTHID)'
//DBRMLIB  DD DISP=SHR,DSN=DSN!!0.SDSNDBRM
//SYSUT1   DD UNIT=SYSDA,SPACE=(27930,(10,5)),
//            DCB=(RECFM=FB,LRECL=133)
//SYSPRINT DD SYSOUT=*,DCB=(RECFM=FB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//CFIGOUT  DD SYSOUT=*
//SQLOUT   DD SYSOUT=*
//BINDOUT  DD SYSOUT=*
//JCLOUT   DD DSN=USER.JCLLIB(DB2INST),DISP=SHR
//DB2OPT   DD *
 STOGROUP(DB2_ROUTINES_GROUP)
 INDEXSTOG(DB2_INDEX_GROUP)
 BP4K(BP0)
 BP8K(BP8K0)
 BP16K(BP16K0)
 BP32K(BP32K)
 LOBBP8K(BP8K0)
 LOBBP16K(BP16K0)
 LOBBP32K(BP32K0)
 IMS_SECURITY(DB2)
 MQ_SECURITY(DB2)
 SOAP_SECURITY(DB2)
/*
//CFIGIN   DD *
  ...
SYSPROC.DSNWSPM
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)

SYSPROC.DSNWZP
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)
  ...
//*
```

Related concepts

Configuration control statements for Db2-supplied routines
Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Installation and migration jobs that the CLIST tailors

The installation CLIST uses the values that you specify on the installation panels to tailor and load the installation or migration jobs. Each job is composed of one or more JCL procedures or job steps.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Job DSNTIJRV

Job DSNTIJRV validates the Db2-supplied routines by executing program DSNTRVFY. You should validate these routines after Db2 installation and after each phase of migration.

DSNTRVFY validates a single routine, multiple routines, or all Db2-supplied routines. DSNTRVFY produces a report that identifies routines that passed the validation and possible problem areas for routines that failed.

Authorizations

If the RACF facility class is active and a profile was defined for MVSADMIN.WLM.POLICY, the user that submits this job requires READ access.

If the RACF OPERCMDS class is active and a profile was defined for MVS.MCSOPER.*, the user ID that submits this job requires READ access. Alternatively, you can add a discrete profile for the DSNTRVFY console that is used in this job.

Format

DSNTRVFY accepts the following required parameters:

DB2SSN(*ssid*)
Identifies which Db2 subsystem to connect to for validating the Db2-supplied routines.

ROUTINE(*name*)
Identifies which Db2-supplied routine needs to be validated. The following values are supported for *name*:

- A routine name in the form of *schema-name.routine-specific-name*.
- The keyword **DD:SYSIN** to specify a list of routines. List the routines in the form of *schema-name.routine-specific-name* under the SYSIN DD statement with one routine per line.
- The keyword **ALL** to specify all Db2-supplied routines.

DSNTRVFY also accepts the following optional parameters:

AUTHID(*authorization ID*)
DSNTRVFY uses this value as the OWNER for BIND PACKAGE and BIND PLAN statements and as the CURRENT SQLID for issued SQL statements. If this value is not specified, the primary authorization ID is used for BIND PACKAGE, BIND PLAN, and issued SQL statements.

Output

DSNTRVFY allocates the following required DD statements for output:

SYSPRINT
Contains messages generated during verification processing. Each processed routine can generate one or more messages.

SYSTSPRT
DSNTRVFY writes bind output to SYSTSPRT if an error occurs during bind processing.

The following JCL example is for validating a single routine:

```
//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(SYSPROC.DSNUTILS)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
```

The following JCL example is for validating multiple routines:

```
//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(DD:SYSIN)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  SYSPROC.DSNWZP
  SYSPROC.DSNACCOR
  SYSPROC.DSNUTILS
  SYSPROC.DSNUTILU
```

The following JCL example is for validating all routines:

```


//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(ALL) AUTHID(FVTGRP2)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
```

Processing

DSNTRVFY completes the following validation:

- Verifies that the routine is defined to the SYSIBM.SYSROUTINES catalog.
- Verifies that the collection ID defined in the SYSIBM.SYSROUTINES catalog table matches the collection ID used to bind the package.
- Verifies that the routine is currently defined with the Db2-reserved WLM application environment name DSNWLM_NOT_ENABLED, indicating that it is not enabled to run on the current Db2 subsystem. If it is, then a warning message is issued and the validation is bypassed.
- Verifies if the routine can be executed on the current Db2 catalog mode.
- Verifies the APF authorization requirements.
- Verifies if the WLM application environment is defined and available for use.
- Verifies if the NUMTCB setting is valid or within the recommended range.
- Verifies if the required DD statements for some of the routines are defined.
- Verifies if the WLM environment assigned to Java routines is enabled for Java.
- Verifies security coexistence requirements (for example, some routines should run on only their own WLM application environment).
- Verifies that the selected routine can be called successfully. Certain routines such as DSNACICS, DSNAIMS, IBM MQ functions, and most debugger routines are restricted to basic validation and are not called.

During the running of this job, the following message might be issued on the system console:

```
IEFC452I  DB2UDSMD - JOB NOT RUN - JCL ERROR
```

In most cases, this message is normal and can be disregarded. If you use IBM Optim™ Development Studio, see Debugging stored procedures on Db2 for z/OS with Optim Development Studio, Part 2 (IBM developerWorks) for information about DB2UDSMD.

If the validation is successful, the following message is issued:

DSNT027I DSNTRVFY VALIDATION FOR *schema.routine-specific-name* SUCCESSFUL

If the validation fails, messages are issued to explain the reasons for failure. Examine these messages and make necessary adjustments before running the validation job again.

Input

DSNTRVFY requires the following DD statements for input:

DBRMLIB
Identifies the library where the DBRM for the DSNTRVFY program is located. This is typically the *prefix*.SDSNDBRM target library.

SYSIN
Contains the list of Db2 routines. This is required when the validation type is for multiple routines (DD:SYSIN).

SYSUT1
Work data set required for bind processing.

Limitations

The following limitations apply to the DSNTRVFY program:

- The name of the routine in the form *schema-name.routine-specific-name* is limited to 72 characters, the maximum line length in JCL.
- Only Db2 11 Db2-supplied routines are supported for validation.
- Some routines, if enabled, receive basic validation to ensure that they are defined correctly and assigned to a valid WLM application environment. However, validation will not extend to calling these routines for one or more of the following reasons:
  - Optional system support such as CICS, IMS, or IBM MQ is required.
  - External setup on a remote server or workstation is required.
  - A call could introduce or modify data unexpectedly in a production environment.

  The Db2-supplied routines that are restricted to basic validation are:

  - DB2DEBUG.CREATE_SESSION
  - DB2DEBUG.DESTROY_SESSION
  - DB2DEBUG.GET_REPORT
  - DB2DEBUG.LIST_SESSION
  - DB2DEBUG.PUT_COMMAND
  - SYSFUN.SYSTS_ENCRYPT
  - SYSFUN.XSLTRANSFORM
  - SYSPROC.ADMIN_COMMAND_UNIX
  - SYSPROC.ADMIN_JOB_CANCEL
  - SYSPROC.ADMIN_JOB_FETCH
  - SYSPROC.ADMIN_JOB_QUERY
  - SYSPROC.ADMIN_JOB_SUBMIT
  - SYSPROC.DBG_ENDSESSIONMANAGER
  - SYSPROC.DBG_INITIALIZECLIENT
  - SYSPROC.DBG_RECVCLIENTREPORTS
  - SYSPROC.DBG_SENDCLIENTREQUESTS
  - SYSPROC.DBG_SENDCLIENTCOMMANDS

- SYSPROC.DBG_TERMINATECLIENT
- SYSPROC.DSNACICS
- SYSPROC.DSNAIMS
- SYSPROC.DSNAIMS2
- SYSPROC.DSNLEUSR
- SYSPROC.SET_MAINT_MODE_RECORD_NO_TEMPORALHISTORY
- SYSPROC.SYSTS_ALTER
- SYSPROC.SYSTS_CREATE
- SYSPROC.SYSTS_DROP
- SYSPROC.SYSTS_RESTORE
- SYSPROC.SYSTS_START
- SYSPROC.SYSTS_STOP
- SYSPROC.SYSTS_TAKEOVER
- SYSPROC.SYSTS_UPDATE
- All IBM MQ, web services, and SOAP functions (those with schema DB2MQ, DB2MQ1C, DB2MQ2C, or DB2XML)

Notes

Temporary stored procedures used by DSNTIJRV

DSNTRVFY creates, calls, and drops two temporary stored procedures. These temporary stored procedures are SYSPROC.DSNWLM_INSTALL_INFOJ and SYSPROC.DSNWLM_INSTALL_INFO. Both of these stored procedures exist only when DSNTRVFY is executing. DSNTRVFY calls SYSPROC.DSNWLM_INSTALL_INFOJ to validate the WLM environment that is assigned to each Db2-supplied Java routine. DSNTRVFY calls SYSPROC.DSNWLM_INSTALL_INFO to validate the WLM environment that is assigned to each Db2-supplied non-Java routine that runs in a WLM environment.

Using DSNTIJRV to verify 64-bit Java routines

Java on z/OS has two types of architectures: a 31-bit version and a 64-bit version. If your Java routines run in a 31-bit Java virtual machine (JVM), the startup procedure for the WLM environment in which the routines run must initialize a 31-bit environment. If you are running Java routines in a 64-bit JVM, the startup procedure for the WLM environment in which your Java routines run must initialize a 64-bit environment. The program that initializes a 31-bit WLM environment is DSNX9WLM. The program that initializes a 64-bit WLM environment is DSNX9WJM.

For example, you might use the Db2 core Java WLM environment, DSNWLM_JAVA, for your Java routines. By default, the DSNWLMJ startup procedure for DSNWLM_JAVA runs program DSNX9WLM. If your JAVA_HOME environment variable specifies the path to a 31-bit JVM, such as /usr/lpp/java/IBM/J8.0, you need to run program DSNX9WLM to initialize the WLM environment. However, if your JAVA_HOME variable specifies a path to a 64-bit JVM, such as /usr/lpp/java/8.0_64, you need to run program DSNX9WJM to initialize the WLM environment. If you switch to a 64-bit JVM for your Java stored procedures, but do not update the initialization program to DSNX9WJM, DSNTIJRV fails.

Related information

Installation step 21: Back up the Db2 directory and catalog: DSNTIJIC

For backup purposes, create a copy of the Db2 directory and catalog.

About this task

Attention: If you do not create this copy, Db2 can start. However, if errors that require you to reinstall Db2 occur in the directory or catalog and you do not have backup copies, you lose all your tables and data.

Recommendation: Copy the catalog and directory at least daily if you make any changes in them. Recovery time for these databases is longer if the copies are not current, and the entire subsystem is affected.

Procedure

To create an image copy of the directory and catalog:

1. Examine job DSNTIJIC for the following information:
   - The tape unit name. The job lists the tape unit name as TAPE. If this is incorrect for your site, correct it. The name TAPE is also the unit name for the default archive log data sets.
   - Expiration date or retention period. You can add a retention period or an expiration date to the job.
   - The user on the JOB statement. Ensure that the user is authorized. If Db2 is started under ACCESS(MAINT), this must be the same user that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1.
2. Run job DSNTIJIC.

   The DSNTIJIC job contains a list of all the Db2 directory and catalog table spaces. When you run job DSNTIJIC, it invokes the Db2 image copy utility to copy these table spaces to tape. Having copies of table spaces enables you to recover the Db2 catalog and Db2 directory in case of a failure.
3. If the DSNTIJIC job fails or abends, verify that no problems exist with the tape setup for image copy. If you find no problems with the tape setup, examine the utility job output (JOBLOG) or the console log for problems. For example, look for I/O errors or incorrect sizes.

What to do next

Run the DSNTIJIC job periodically, perhaps daily or weekly, to reduce the amount of time required for recovering the directory or catalog. The copied data and log data sets are needed for recovery.

Related tasks

Installation step 17: Define and bind Db2 objects: DSNTIJSG
Use job DSNTIJSG to bind Db2-supplied packages and plans, initialize the Db2 communications database, and create user-managed databases for the Db2 resource limit facility (RLF), Data Definition Control support, and query optimization.

Migrating an existing data sharing group to Db2 11 conversion mode
If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

Related information

Installation step 22: Set up the administrative task scheduler

You can use the administrative task scheduler to execute administrative tasks according to a time-based or event-based schedule.

Before you begin

You should have run job DSNTIJRA and job DSNTIJIN before you set up the administrative task scheduler.

About this task

Restriction: After migration to conversion mode, the administrative task scheduler is disabled until you run job DSNTIJRT.

The following figure shows an overview of the steps for installing and configuring the administrative task scheduler.

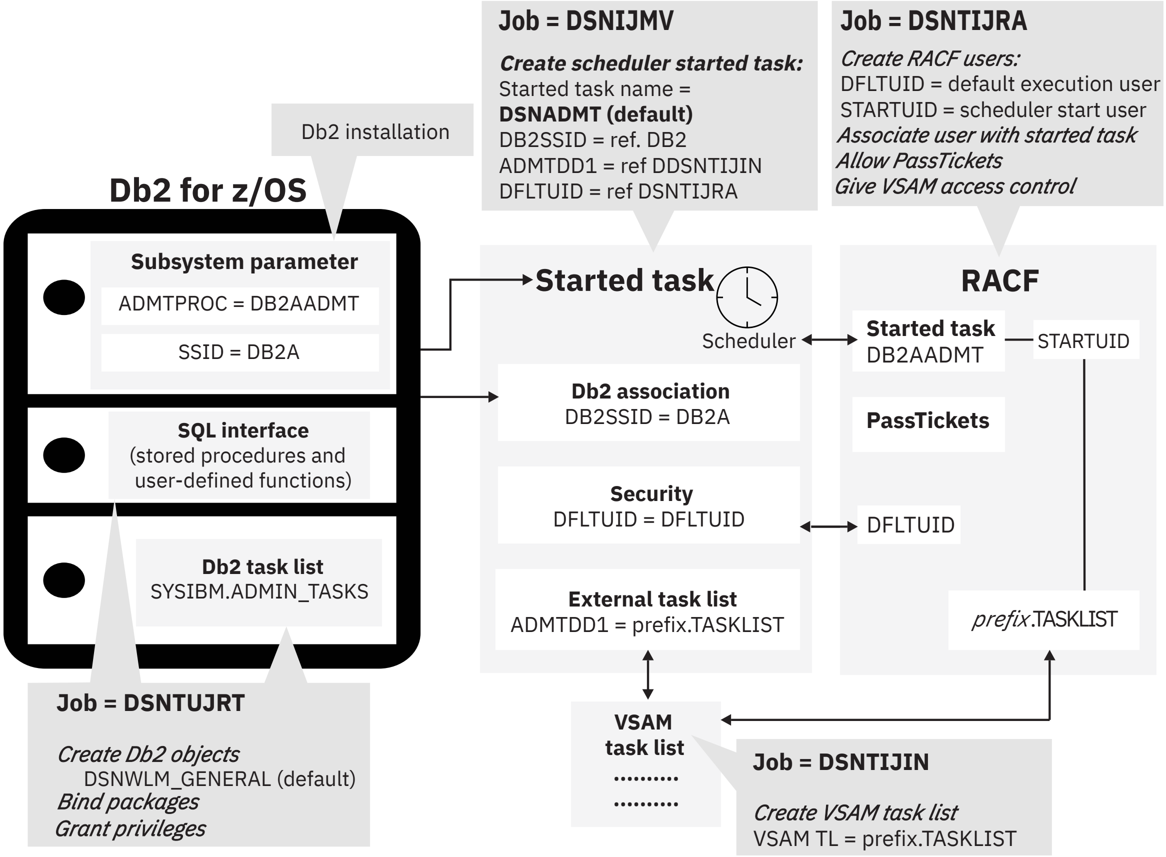


Figure 75. Setting up the administrative task scheduler

Procedure

To set up the administrative task scheduler:

1. Customize the administrative task scheduler address space startup procedure (xxxxADMT) in job DSNTIJMV.

   The name of the startup procedure needs to match the value of the ADMTPROC subsystem parameter. Before using the startup procedure, locate and review the settings for the following parameters:

   DB2SSID
   The name of this Db2 subsystem.

   DFLTUID
   The default ID that is used by the administrative task scheduler to execute its tasks. DFLTUID must be different than the ID that is used to start this address space. DFLTUID must be an ID that can be used as a logon ID and has a password. DFLTUID cannot be a group ID.

   TRACE
   Indicates whether to activate tracing for the administrative task scheduler. The value can be ON or the default value of OFF.

   You can specify other parameters, such as ERRFREQ, MAXHIST, MAXTHD, or STOPONDB2STOP in the startup procedure similarly to the three parameters DB2SSID, DFLTUID and TRACE.

   ERRFREQ
   Specifies how frequently message DSNA679I displays on the console, indicating that one of the redundant, active copies of the task list is not accessible. By default, this message displays on the console once per minute, for example, when Db2 is offline.

   MAXHIST
   Specifies the number of status entries per task that are stored. This parameter is a positive integer with a default value of 10. When the limit is reached, the oldest status entries are deleted.

   MAXTHD
   Specifies the maximum number of execution threads for an administrative task scheduler. The default value is 99.

   STOPONDB2STOP
   Specifies that the administrative task scheduler will terminate when Db2 is stopped.

   Also locate and review the ADMTDD1 DD statement. The VSAM data set that is indicated must match the VSAM task list data set that is defined in job DSNTIJIN.

   The following example shows how these parameters can be updated.

   ```
   //DSNADMT  PROC LIB='DSN!!0.SDSNLOAD',
   //          DB2SSID=DSN,
   //          DFLTUID=DFLTUID,
   //          TRACE=OFF,
   //          MAXTHD=10
   //*
   //STARTADM EXEC PGM=DSNADMT0,DYNAMNBR=100,REGION=0K,
   //          PARM=('DB2SSID=&DB2SSID',
   //          ' DFLTUID=&DFLTUID',
   //          ' TRACE=&TRACE'
   //          ' MAXTHD=&MAXTHD'
   //          ' ERRFREQ=1440'
   //          ' STOPONDB2STOP')
   //STEPLIB  DD DISP=SHR,DSN=&LIB
   //ADMTDD1  DD DISP=SHR,DSN=DSNC!!0.TASKLIST
   ```

2. Ensure that the administrative task scheduler routines were enabled.

   They were enabled by job DSNTIJRT.

3. Create a job to make image copies of the administrative task scheduler table spaces. Establish a schedule for making image copies.

   In general, you should back up important databases on a regular basis. The database for the administrative task scheduler is no exception and should be copied on the same frequency as the

Db2 catalog and directory. The following example shows how to copy the table spaces in this database to stacked data sets on tape with a retention period of 99 days:

```
//*
//DSNTIC   EXEC PGM=DSNUTILB,PARM='DSN,IMAGCOPY',COND=(4,LT)
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//DSNTRACE DD  SYSOUT=*
//SYSLISTD DD  *
  LISTDEF DSNLDEF
          INCLUDE TABLESPACES DATABASE DSNADMDB
//SYSIN    DD  *

  TEMPLATE DSNTPLT
           DSN(prefix.IMAGCOPY.&DB..;&TS.;)
           DISP (NEW,KEEP,DELETE)
           UNIT TAPE
           STACK YES
           RETPD 99
      COPY LIST DSNLDEF
           COPYDDN(DSNTPLT)
/*
```

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related tasks

Installation step 4: Define system data sets: DSNTIJIN
Use job DSNTIJIN to define the VSAM and non-VSAM data sets for Db2.

Additional steps for enabling the administrative task scheduler and administrative enablement routines
The administrative task scheduler routines are Db2-supplied routines that enable you to schedule work. The administrative enablement routines are Db2-supplied routines that enable you to execute administrative work immediately.

Related information

Installation step 23: Verify successful installation of Db2 11

You can run the sample applications to verify that your installation process was successful.

Procedure

Tailor and run the jobs for the sample applications, as described in Chapter 9, “Verifying successful Db2 11 installation or migration with sample applications,” on page 641.

You can select the phases that you need to run based on the attachment facilities you installed, the languages you use, and whether the sample objects exist.

What to do next

You might want to enable more capabilities in the newly installed Db2 subsystem. For instructions, see Chapter 10, “Configuring additional capabilities for Db2 for z/OS,” on page 731.

Chapter 6. Migrating to Db2 11

Migration is the process of upgrading from Db2 10 to Db2 11.

Availability of new function and Db2 11 function levels

Availability of new function in Db2 11

The behavior of data definition statements such as CREATE, ALTER, and DROP, which embed data manipulation SQL statements that contain new capabilities, depends on the application compatibility value that is in effect for the application. An application compatibility value of 'V11R1' must be in effect for applications to use new capability in embedded statements such as SELECT, INSERT, UPDATE, DELETE, MERGE, CALL, and SET *assignment-statement*. Otherwise, an application compatibility value of 'V10R1' can be used for data definition statements.

Generally, new SQL capabilities, including changes to existing language elements, functions, data manipulation statements, and limits, are available only in new-function mode with applications set to an application compatibility value of 'V11R1'.

Optimization and virtual storage enhancements are available in conversion mode unless stated otherwise.

SQL statements can continue to run with the same expected behavior as in DB2 10 new-function mode with an application compatibility value of 'V10R1'.

Application compatibility in Db2 11

After migration to Db2 11 is complete, you can resolve application incompatibilities before you rebind applications at the appropriate application compatibility, so that they can use new SQL capabilities. You can do these steps when you are ready and satisfied that your environment is stable on Db2 11. For details see,

Related tasks

"Automating Db2 migration by using z/OS Management Facility" on page 499
You can use z/OSMF to automate the process of migrating Db2 subsystems to Db2 11 for z/OS.

Db2 migration modes

The five Db2 migration modes are: *conversion mode*, *conversion mode**, enabling-new-function mode, *enabling-new-function mode**, and *new-function mode*. You can migrate to Db2 11 conversion mode only from Db2 10 new-function mode.

Conversion mode

The state of the catalog after the Db2 11 migration process is complete. In a Db2 data sharing group, members in conversion mode can coexist with members that are still in Db2 10. New Db2 11 functions are not available for use in conversion mode. A system in Db2 11 conversion mode can fall back to Db2 10.

Conversion mode*

A state that is similar to conversion mode, but the * indicates that at one time the Db2 subsystem or data sharing group was in enabling-new-function mode, enabling-new-function mode*, or new-function mode. You can still access objects that were created in enabling-new-function mode or new-function mode. Data sharing groups cannot have any Db2 10 members. A system in Db2 11 conversion mode* cannot fall back to Db2 10 or coexist with a Db2 10 system.

Enabling-new-function mode

A transitional state that indicates that the Db2 subsystem or data sharing group is in the process of enabling new function. New Db2 11 functions are not available in enabling-new-function mode. A system in Db2 11 enabling-new-function mode cannot return to Db2 11 conversion mode, but can return to Db2 11 conversion mode*. A system in Db2 11 enabling-new-function mode also cannot fall back to Db2 10 or coexist with a Db2 10 system.

Enabling-new-function mode*

A transitional state that is similar to enabling-new-function mode, but the * indicates that at one time the Db2 subsystem or data sharing group was in new-function mode. In enabling-new-function mode*, you can still access objects that were created in new-function mode, but you cannot create any new objects. A system in Db2 11 enabling-new-function mode* can return to Db2 11 conversion mode*, but cannot fall back to Db2 10 or coexist with a Db2 10 system.

New-function mode

The state of the catalog after enabling-new-function mode processing is complete and job DSNTIJNF runs successfully. The catalog has been marked as being in new-function mode. All new Db2 11 functions are available in new-function mode. A system that is in new-function mode can return to Db2 11 conversion mode* or Db2 11 enabling new-function mode*, but cannot fall back to Db2 10 or coexist with a Db2 10 system.

To see what mode Db2 is currently in, issue a -DISPLAY GROUP command. The output shows C for conversion mode, C* for conversion mode*, E for enabling-new-function mode, E* for enabling-new-function mode*, or N for new-function mode.

The flow from one migration mode to another is illustrated in the following figure:

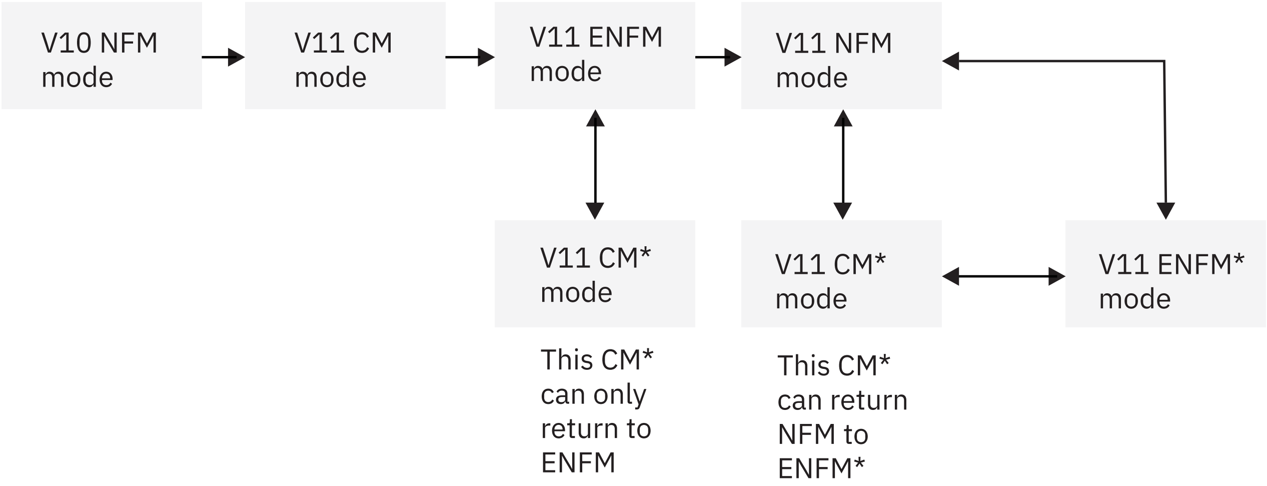


Figure 76. The flow from one mode to another during migration

Availability of new functions

Availability of new function in Db2 11

The behavior of data definition statements such as CREATE, ALTER, and DROP, which embed data manipulation SQL statements that contain new capabilities, depends on the application compatibility value that is in effect for the application. An application compatibility value of 'V11R1' must be in effect for applications to use new capability in embedded statements such as SELECT, INSERT, UPDATE, DELETE, MERGE, CALL, and SET *assignment-statement*. Otherwise, an application compatibility value of 'V10R1' can be used for data definition statements.

Generally, new SQL capabilities, including changes to existing language elements, functions, data manipulation statements, and limits, are available only in new-function mode with applications set to an application compatibility value of 'V11R1'.

Optimization and virtual storage enhancements are available in conversion mode unless stated otherwise.

SQL statements can continue to run with the same expected behavior as in DB2 10 new-function mode with an application compatibility value of 'V10R1'.

Related information

Premigration checklist for migration to Db2 11 conversion mode

Before you migrate to Db2 11 conversion mode, complete the premigration activities to prepare your subsystem.

Procedure

__ 1. Complete the following tasks in any order.

- __ • Ensure that you meet the hardware and software requirements.
- __ • Plan for storage requirements.
- __ • Plan for performance.
- __ • Make adjustments for the following changes in Db2 11:
  - __ –
  - __ –
  - __ –

__ 2. Use SMP/E to load the Db2 libraries.

__ 3. Complete the following tasks in any order.

- __ • Tailor the installation jobs by running the installation CLIST in migration mode.
- __ • Run premigration query DSNTIJPM.
- __ • Examine new or changed DB2I default panel values to ensure that your customized values are still valid.
- __ • Ensure that sample objects from Db2 10 are still available.

__ 4. Immediately before starting the migration tasks, ensure that no utility jobs are running.

What to do next

See for the list of migration tasks to complete after premigration.

Checklist for migration to Db2 11 conversion mode

After you complete the premigration tasks to prepare your Db2 10 subsystem, you can continue with migrating to Db2 11 conversion mode.

About this task

Complete these steps in the order that they are listed.

Procedure

__ • Complete premigration activities.

__ • Run the link checker on Db2 table spaces.

__ • Optional: Determine which packages are invalid after migration.

__ • Optional: Check for consistency between catalog tables.

__ • Take image copies of the directory and catalog: job DSNTIJIC.

__ • Connect Db2 to TSO.

__ • Optional: Connect Db2 to IMS.

__ • Optional: Connect CICS to Db2.

__ • Stop your Db2 10 subsystem.

__ • Optional: Back up your Db2 10 volumes.

__ • Define Db2 initialization parameters: job DSNTIJUZ.

__ • Optional: Establish subsystem security.

__ • Define Db2 11 to z/OS, and build cataloged procedures: job DSNTIJMV.

__ • Define system data sets: job DSNTIJIN.

__ • Optional: Define authorization exit routines: job DSNTIJEX.

You can skip this step if you did not run job DSNTIJEX for your Db2 10 subsystem.

__ • Optional: Refresh the z/OS definition of Db2.

You can skip this step if no PARMLIB updates exist and your early code is at the correct level.

__ • Start Db2 11.

__ • Tailor the Db2 11 catalog: job DSNTIJTC.

__ • Optional: Check the integrity of the catalog and directory.

__ • Prepare the dynamic SQL program and bind the packages for Db2 REXX Language Support. Optionally, create additional table spaces in the work file database: job DSNTIJTM.

__ • Rebind SPUFI packages and packages that are defined by IBM: job DSNTIJSG.

__ • Configure Db2 for running stored procedures and user-defined functions.

__ • Set up supplied routines and supported objectsin Db2 11: jobs DSNTIJRW, DSNTIJRT and DSNTIJRV.

__ • Convert your EXPLAIN tables to the current format.

__ • Verify views.

__ • Take an image copy of the Db2 11 catalog: job DSNTIJIC.

__ • Optional: Run Db2 10 verification jobs: jobs DSNTEJ*xx*.

Migrating your Db2 subsystem to conversion mode

The first step in migrating your Db2 subsystem is to migrate Db2 10 to Db2 11 conversion mode.

About this task

Attention: If you do not follow the documented procedures, unpredictable results might occur after migration to conversion mode.

Ensure that your Db2 10 subsystem is running in new-function mode and is at the proper service level. Before you migrate to Db2 11 conversion mode, you must have a maintenance level on Db2 10 that contains the fallback SPE, and you must start Db2 10 at least once with the fallback SPE applied. If you do not start Db2 10 with the fallback SPE applied at least once, your Db2 11 conversion mode migration process will fail.

When you start Db2, the code level of the starting Db2 is compared to the code level that is required by the current Db2 catalog. If the starting Db2 has a code-level mismatch with the catalog, Db2 does not start and a message is issued.

Refer to the Db2 Program Directory for keyword specifications that are used for Preventive Service Planning (PSP) and for information about the service levels of any coupling facilities. You can use the z/OS DISPLAY CF command to display the service level of coupling facilities. Check Information/Access or the ServiceLink facility of IBMLink for PSP information before you migrate. Or, to help you identify required service, you can instead use enhanced HOLDDATA and fix categories (FIXCATs), which provide a simplified, automated method of identifying and applying missing PTFs that are required for installation or migration. Also check monthly for current information about Db2.

Restriction: After migration to conversion mode, the administrative task scheduler is disabled until you run job DSNTIJRT.

Procedure

Complete the following tasks:

“Migration step 1: Actions to complete before migration” on page 419
“Migration step 2: Verify the integrity of Db2 table spaces (optional)” on page 423
“Migration step 3: Identify invalid plans and packages after migration (optional)” on page 425
“Migration step 4: Check for consistency between catalog tables (optional)” on page 425
“Migration step 5: Take image copies of the directory and catalog: DSNTIJIC” on page 426
“Migration step 6: Connect Db2 to TSO” on page 427
“Migration step 7: Connect Db2 to IMS (optional)” on page 430
“Migration step 8: Connect CICS to Db2 (optional)” on page 430
“Migration step 9: Stop Db2 10 activity” on page 431
“Migration step 10: Back up your Db2 10 volumes (optional)” on page 432
“Migration step 12: Establish subsystem security (optional)” on page 434
“Migration step 13: Define Db2 11 to z/OS: DSNTIJMV” on page 435
“Migration step 14: Define system data sets: DSNTIJIN” on page 437
“Migration step 15: Define user authorization exit routines: DSNTIJEX (optional)” on page 438
“Migration step 16: Refresh the z/OS definition of Db2 ” on page 439
“Migration step 17: Start Db2 11” on page 440
“Migration step 18: Tailor Db2 11 catalog: DSNTIJTC” on page 441
“Migration step 19: Ensure that the catalog has no problems (optional)” on page 443
“Migration step 20: Prepare dynamic SQL program: DSNTIJTM” on page 443
“Migration step 21: Bind SPUFI and DCLGEN and user-maintained database activity: DSNTIJSG” on page 443
“Migration step 22: Configure Db2 for running stored procedures and user-defined functions (optional)” on page 445

“Migration step 23: Set up Db2-supplied routines” on page 455
“Migration step 24: Convert EXPLAIN tables to the current format” on page 466
“Migration step 25: Verify views” on page 468
“Migration step 26: Take an image copy of the Db2 11 conversion mode catalog: DSNTIJIC” on page 469
“Migration step 27: Verify your Db2 11 conversion mode system (optional)” on page 469

Related concepts

Loading the Db2 libraries
IBM distributes the product code for Db2 for z/OS in various ways. However you obtain the product code, you use System Modification Program Extended (SMP/E) to create Db2 distribution libraries, Db2 target libraries, and SMP/E control data sets, and to control of subsequent software maintenance.

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Related information

Migration step 1: Actions to complete before migration

Before you migrate to Db2 11 conversion mode, you must prepare your system for migration. Preparations include making adjustments for release compatibilities, running premigration queries, and completing other premigration tasks.

Run premigration queries (DSNTIJPM)

Before you migrate to Db2 11, run premigration queries on the Db2 10 catalog.

Procedure

To run premigration queries:

1. Copy updated job DSNTIJPM from Db2 11 to Db2 10.
2. Customize job DSNTIJPM as described in the job prolog.
3. Run job DSNTIJPM.

Results

Job DSNTIJPM generates reports about conditions that require action before or during the migration process. Such conditions include obsolete object formats, missing required objects, packages that must be rebound before migration, and dependencies that are affected by the migration process. For detailed information about the contents of the reports for migration to Db2 11, see the report descriptions in job DSNTIJPM.

You can find the complete DSNTIJPM job in IBM Documentation.

Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11

By taking appropriate actions in Db2 10 well before migration to Db2 11, you can minimize the risk of disruptive automatic binds of application plans and packages during and after migration to Db2 11.

Before you begin

Identify plans and packages that are subject to autobind at migration to Db2 11 because they were last bound in a release earlier than DB2 9. To do so, run job DSNTIJPM and examine the premigration reports about package copies and plans that are not supported after migration to Db2 11. For more information, see “Run premigration queries (DSNTIJPM)” on page 419.

Important: Apply APAR PI87675 to eliminate the possibility of repeating automatic remigration binds during release coexistence.

About this task

Tip: Do this task well in advance (months if possible) before migration to Db2 11, so that you have sufficient time to run the applications and address any performance problems that might occur after the rebinds. The goal is to remove the operational and performance risks related to automatic bind from the Db2 11 migration window.

Migration-related *automatic binds* (also called "autobinds") occur in Db2 11 because it cannot use runtime structures from a plan or package that was last bound in a release earlier than DB2 9. Plans and packages that were bound in Db2 10 can run in Db2 11, without the risk of migration-related autobinds. However, plans and packages that are bound in Db2 11 cannot run on Db2 10 members without an autobind in Db2 10.

If the autobinds are allowed to occur, they are inevitably disruptive for rolling online migrations, or any time that different releases coexist in data sharing environments. During and after migration, such autobinds can result in costly problems, including performance regression and even application outages.

Autobinds occur the first time that any plan or package runs in Db2 11, which means that the autobinds, and resulting problems and application outages, can occur well after a migration window. That is, such problems and resulting outages can occur any time in the "first impression" window in Db2 11, which is any time until the plan or package first runs in Db2 11.

The best approach is to bind all packages and plans that might be subject to migration-related autobinds in Db2 10 with good performance before you start the migration to Db2 11. Doing so reduces the risk of the following problems that can result from autobinds:

- Application failures because of contention between releases. For any migration that brings into release coexistence, autobinds might fail for plans or packages that are in use by a Db2 10 member, causing applications to fail on the Db2 11 member.

  Successful autobinds on Db2 11 in a coexistence environment also create a package or plan that Db2 10 members cannot run without another autobind. The autobind might also fail if the plan or package is in use by a Db2 11 member.
- Application failures, when autobinds fail for access control authorization exit users because the authorization ID for the autobind has insufficient privileges, compared to the owner of the package or the plan.
- Difficult to resolve performance regressions. For packages, a migration-related autobind also destroys the current package. If the autorebind succeeds but introduces an access path regression, REBIND SWITCH is not possible. Any performance regression that occurs in Db2 11 might also occur in Db2 10.

Procedure

To avoid autobinds during or after the Db2 11 migration process, take the following actions. For best results, complete these actions well before migration to Db2 11 (months if possible) so that you have sufficient time to run the applications and resolve any performance issues that might occur after the rebinds.

1. In Db2 10 and well before migration to Db2 11, rebind any plans that job DSNTIJPM identifies.

   Autobinds of plans can be particularly disruptive for application workloads that depend on few or even a single large plan.
2. In Db2 10 and well before migration to Db2 11, rebind any packages that job DSNTIJPM identifies, and specify the PLANMGMT(EXTENDED) bind option.
3. Run the applications on Db2 10 for a period of time so that you have plenty of time to address any performance issues that might occur.

4. Free old package copies regularly, and especially just before the migration, to get recent original package copies.

   The prior package is preserved for use by Db2 10. If a performance regression occurs, you can rebind the package with the SWITCH option to recover the previous access path.
5. Set the ABIND subsystem parameter appropriately for your environment:
   - In data sharing, set ABIND to COEXIST. If a package or plan is bound in Db2 11 and it runs later in Db2 10, it is automatically rebound. However, the Db2 10 plan or package can be used when it runs again in Db2 11, without another rebind. However, the plan or package runs without any Db2 11 enhancements in this case.
   - In non-data sharing Db2 subsystems, set ABIND to YES. Coexistence across releases is not an issue in such cases. If you must fall back to Db2 10, explicitly rebind packages and plans that were bound in Db2 11. By doing so, you can avoid remigration autobinds that occur for packages or plans that were bound in Db2 11 and are then automatically bound after fallback to Db2 10.
6. Bind most packages or plans in Db2 11 only after migration is complete for all members and coexistence with Db2 10 is no longer a concern.

Related concepts

Automatic binds in coexistence
Changes to package structures that are introduced in Db2 11 are not available to members of the group that have not migrated. You must plan accordingly when developing your migration plan.

Related reference

AUTO BIND field (ABIND subsystem parameter)
The ABIND subsystem parameter specifies whether Db2 automatically rebinds packages and plans in certain situations at run time.

Related information

Free inactive package copies

When you use plan management polices to save package copies, original copies can become stale. By freeing inactive copies just before migration, you enable Db2 to save usable original package copies at the first rebind in Db2 11.

Before you begin

You can do this task only if you previously specified a plan management policy to specify that Db2 saves access path information for SQL statements, as described in . Use the default option EXTENDED in most cases.

About this task

Original package copies in particular can become stale or invalid because Db2 never replaces the original copies after you first rebind with EXTENDED, unless you free them. An original copy that is many years old probably cannot be used. Because the goal is to keep stable and usable access paths available, it is best to free invalid copies before migration, so that Db2 saves a new original copy in the first rebind after migration.

Procedure

Just before migration, issue FREE PACKAGE commands and specify PLANMGMTSCOPE(INACTIVE).

Db2 removes all original and previous package copies from the Db2 catalog. Then at the first rebind after migration to Db2 11, Db2 saves the last current package copies from Db2 10 as the new original package copies in Db2 11.

Related information

Make adjustments for incompatible changes in Db2 11

Some changes in Db2 11 might affect your Db2 operations after migrating.

Procedure

Familiarize yourself with the following information and plan to make appropriate adjustments:

-
-
-

Related information

Examine all new and changed values for DB2I panels

During a migration, the DB2I default panels DSNEOP01 and DSNEOP02 are not initialized with the values that are specified during the installation CLIST process. The DB2I panel variables in the ISPF profile from the previous release are used on the current release. Any customized DSNEPROF members are migrated from your previous release to Db2 11.

Procedure

Examine any new or changed DB2I default panel values.

Related information

Ensure that sample objects from your previous release are available

If you no longer have the IVP jobs from your previous release, you need to run the previous release's installation CLIST to regenerate them.

Procedure

If you dropped your previous release's sample database (by running job DSNTEJ0), run the previous IVP jobs from the previous release through phase 3 before you start the migration.

If you do not have the jobs from the previous release available during migration, you will not have a Db2-supported IVP to verify a successful migration to conversion mode.

Related information

Ensure that no utility jobs are running

In Db2 11, you can restart or terminate a utility only on the same release on which it was started.

About this task

Outstanding utility jobs started in Db2 10 cannot be restarted or terminated after migration to Db2 11.

Immediately before you begin the migration process, ensure that you do not have outstanding utility jobs.

Procedure

Issue the DISPLAY UTILITY(*) command.

Related information

Identify applications that are incompatible with online migration

Before scheduling an online migration, you can identify applications, activities, and Db2 resources that might be incompatible with catalog migrations and updates and take appropriate actions beforehand to minimize the possibility of a failed migration.

About this task

Recommendation: Complete the following steps on a regular basis during potential migration windows to identify any and all applications that might be incompatible with migration processing.

Procedure

To identify applications that might interfere with online migration, take one of the following actions:

- Issue the DISPLAY BLOCKERS command, which displays locks and claims that active threads hold against specified databases.

  You can use the optional DETAIL keyword to receive additional report information about each lock or claim.
- Invoke the BLOCKING_THREADS built-in function, which returns a table that contains one row for each lock or claim that threads hold against specified databases.

What to do next

If incompatible applications exist, take one of the following actions:

- Terminate any active threads that hold locks or claims against the specified databases. See for more information.
- Schedule the migration during a time window when the incompatible applications are not running.
- Schedule a planned outage for running the CATMAINT utility.

Related information

Migration step 2: Verify the integrity of Db2 table spaces (optional)

Use the DSN1COPY and CHECK INDEX utilities to verify the integrity of the Db2 directory and catalog table spaces on the subsystem that you are migrating.

About this task

Important: This migration step identifies data integrity issues that might interfere with subsequent migration tasks.

Tip: For best results, use this process to check the Db2 catalog and directory regularly, even outside of the migration process.

Procedure

To verify the integrity of your Db2 directory and catalog table spaces:

1. Run the DSN1COPY utility with the CHECK option on all catalog table spaces to ensure that the table space pages are physically correct and that the catalog table spaces are clustered.

   When you run this utility on segmented table spaces or LOB table spaces, you might receive message DSN1985I. You can ignore this message.

   The segmented table spaces in the directory and catalog are:

   - DSNDB01.SPT01

- DSNDB01.SYSUTILX
- DSNDB06.SYSDDF
- DSNDB06.SYSSTATS
- DSNDB06.SYSSTR

The LOB table spaces in the directory and catalog are:

- DSNDB01.SYSDBDXA
- DSNDB01.SYSSPUXA
- DSNDB01.SYSSPUXB
- DSNDB06.SYSJAUXA
- DSNDB06.SYSJAUXB
- DSNDB06.SYSPLUXA
- DSNDB06.SYSPLUXB
- DSNDB06.SYSTSATX
- DSNDB06.SYSTSCTD
- DSNDB06.SYSTSCTR
- DSNDB06.SYSTSIXR
- DSNDB06.SYSTSIXT
- DSNDB06.SYSTSOBX
- DSNDB06.SYSTSPDT
- DSNDB06.SYSTSPHX
- DSNDB06.SYSTSPKX
- DSNDB06.SYSTSPTX
- DSNDB06.SYSTSPVR
- DSNDB06.SYSTSQRA
- DSNDB06.SYSTSTRT
- DSNDB06.SYSTSVAD
- DSNDB06.SYSTSVAT
- DSNDB06.SYSTSVTR
- DSNDB06.SYSTSVWT

2. Run the CHECK DATA and CHECK INDEX utilities.
3. You should run the following query on your Db2 10 catalog tables to ensure that you do not have a STOGROUP that is defined with both specific and non-specific volume IDs. If the query returns any rows, the identified STOGROUPs have both specific and non-specific volume IDs. Table spaces in databases that use these STOGROUPs cannot be image copied or recovered until ALTER STOGROUP is used to remove volumes so that the STOGROUP has either specific or non-specific volume IDs.

   This query is commented out in the Db2 11 member DSNTESQ of *prefix*.SDSNSAMP.

   GUPI

```
SELECT * FROM SYSIBM.SYSVOLUMES V1
         WHERE VOLID ¬= '*' AND
               EXISTS (SELECT * FROM SYSIBM.SYSVOLUMES V2
                                WHERE V1.SGNAME = V2.SGNAME AND
                                      V2.VOLID = '*')
```

   GUPI

Related information

Migration step 3: Identify invalid plans and packages after migration (optional)

Migrating to Db2 11 conversion mode renders some plans and packages invalid.

Procedure

Run the following queries on your Db2 10 subsystem. These two queries are commented out in the Db2 11 member DSNTESQ of *prefix*.SDSNSAMP. You can run these queries from SPUFI or from a dynamic SQL program like DSNTEP2.

PSPI

```
SELECT DISTINCT DNAME
  FROM SYSIBM.SYSPLANDEP
  WHERE BNAME IN
        ('SYSTABLEPART' ,'SYSTABLESPACE'  ,'DSNDOB02')
    AND BCREATOR = 'SYSIBM'
    AND BTYPE IN ('I','T')
  ORDER BY DNAME;

SELECT DISTINCT COLLID, NAME, VERSION
  FROM SYSIBM.SYSPACKDEP, SYSIBM.SYSPACKAGE
  WHERE BNAME IN
        ('SYSTABLEPART' ,'SYSTABLESPACE'  ,'DSNDOB02')
    AND LOCATION = ' '
    AND BQUALIFIER = 'SYSIBM'
    AND BTYPE IN ('I','T')
    AND COLLID = DCOLLID
    AND NAME = DNAME
    AND CONTOKEN = DCONTOKEN
  ORDER BY COLLID, NAME, VERSION;
```

PSPI

If you are not in a data sharing coexistence environment, after migration, you can explicitly rebind these packages or let Db2 rebind them automatically. If you are in a data sharing coexistence environment, rebind these packages before you migrate any members to Db2 11.

Related information

Migration step 4: Check for consistency between catalog tables (optional)

The DSNTESQ queries check the logical correctness of the Db2 catalog.

Before you begin

Before you run these queries, complete "Migration step 2: Verify the integrity of Db2 table spaces (optional)" on page 423 to run the DSN1COPY utility with the CHECK option and the CHECK DATA and CHECK INDEX utilities.

About this task

Tip: For best results, use this process to check the Db2 catalog regularly, even outside of the migration process.

Procedure

Run the queries that are not commented out in member DSNTESQ of the *prefix*.SDSNSAMP library. You can execute the SQL statements in DSNTESQ from SPUFI or from a dynamic SQL program like DSNTEP2.

You can run the queries on the actual catalog tables or on "mirror" copies of the catalog tables. If you run the queries on the copies, use the comment lines in member DSNTESQ for guidance. By running queries on copies of the catalog table, you reduce contention on the catalog.

Related tasks

Migration step 2: Verify the integrity of Db2 table spaces (optional)
Use the DSN1COPY and CHECK INDEX utilities to verify the integrity of the Db2 directory and catalog table spaces on the subsystem that you are migrating.

Related information

Migration step 5: Take image copies of the directory and catalog: DSNTIJIC

For backup purposes, create a copy of the catalog and directory of the system that you are migrating.

About this task

⚠ **Attention:** If you do not create this copy, Db2 can start. However, if errors in the catalog or directory require you to fall back to your previous version, you risk losing some of your tables and data.

Procedure

To create an image copy of the directory and catalog, perform the following steps with the Db2 10 copy of DSNTIJIC:

1. Examine job DSNTIJIC for the following items, and modify as needed:
   - The tape unit name. The job lists the tape unit name as TAPE. If this is incorrect for your site, correct it. The name TAPE is also used as the unit name for the default archive log data sets.
   - Expiration date or retention period. You can add a retention period or an expiration date to the job.
   - The user on the JOB statement. Ensure that the user is authorized. If Db2 is started under ACCESS(MAINT), this must be the same user that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1.
2. Run the Db2 10 DSNTIJIC job.

   Job DSNTIJIC contains a list of all the Db2 directory and catalog table spaces. When you run DSNTIJIC, it invokes the Db2 image copy utility to copy these table spaces to tape. The copied table spaces allow you to recover the Db2 catalog and directory in case of a failure.
3. If job DSNTIJIC fails or abends, look for problems with the tape that is set up for image copy. If you do not find a problem, examine the log for problems. For example, look for incorrect size or I/O errors.

What to do next

After migration, periodically run the Db2 11 job DSNTIJIC against the Db2 11 directory and catalog, perhaps daily or weekly. This action reduces the amount of time that is required for recovering the Db2 directory or catalog. The copied data and log data sets are needed for recovery.

If you are remigrating, you need to complete one of the following actions:

- Change the names of the data sets in which the new image copies are to reside. (Migration image copies use the current data set names.)
- Run the MODIFY utility to remove the migration image copies. If you select this option, ensure that you are familiar with the MODIFY utility.

If DSNTIJIC has been modified to copy table spaces to disk instead of tape, the job is limited to two disk volumes. To change the number of disk volumes, the job needs to be modified again, using volume serial numbers instead of VOL=REF=*.*jobstep*.

Related information

Migration step 6: Connect Db2 to TSO

Access to TSO is required to support the interactive component of Db2 (DB2I). Access to TSO also allows batch applications to access Db2 when those batch programs are executed under the TSO terminal monitor program (TMP).

Procedure

To attach Db2 to TSO:

1. Make Db2 load modules available to TSO and batch users.
2. Make Db2 CLISTs available to TSO and batch users.
3. Make panels, messages, and load modules available to ISPF and TSO.

What to do next

Save your TSO logon procedures and JCL from Db2 10 in case you need to fall back from Db2 11.

Related information

Make Db2 load modules available to TSO and batch users

To connect Db2 to TSO, you must first make Db2 load modules available to TSO and batch users. If *prefix*.SDSNEXIT and *prefix*.SDSNLOAD are not included in your LNKLST*xx*, you can skip this step.

Procedure

If you have not included *prefix*.SDSNEXIT and *prefix*.SDSNLOAD in your LNKLST*xx*, add JOBLIB or STEPLIB statements to your logon procedures and JCL to ensure that you access the Db2 11 load modules. Include *prefix*.SDSNEXIT before *prefix*.SDSNLOAD in your JOBLIB or STEPLIB concatenations.

What to do next

You can attach to multiple releases of Db2 with your existing TSO or CAF logon procedures without changing the load libraries for your applications. After you migrate completely to the latest level of Db2, you must update those procedures and jobs to point to the latest level of Db2 load libraries.

Make Db2 CLISTs available to TSO and batch users: DSNTIJVC

Job DSNTIJVC merges the tailored CLISTs from *prefix*.NEW.SDSNTEMP with unchanged CLISTs from *prefix*.SDSNCLST, and it places all CLISTs in *prefix*.NEW.SDSNCLST.

About this task

Tailoring changes can modify these CLISTs: DSNEMC01, DSNH, DSNU, and DSNHC. The DSNTINST CLIST reads these CLISTs from *prefix*.SDSNCLST, edits them, and places them in *prefix*.NEW.SDSNTEMP. You can modify the default values.

The DSNEMC01 CLIST uses the values that are specified on installation panel DSNTIPF and stores the results in the ISPF profile member DSNEPROF. You can migrate any customized DSNEPROF members from Db2 10 to Db2 11 conversion mode. However, you need to examine any new or changed default panel values to ensure that your customized values are still valid.

DSNTIJVC also converts the Db2 CLISTs from a fixed-block record format to a variable-block format, with a record length of 84 and a block size of 3120. A CLIST that has been converted from fixed-block format to variable-block format cannot be used as input to the DSNTINST CLIST; use the unedited version of the SDSNCLST data set, as created by SMP/E.

Procedure

To make the CLISTs available to TSO and batch users:

1. If you use fixed-block CLIST libraries, modify the DSNTIJVC job as follows:
   - Change the SYSIN DD to DUMMY.
   - Change the allocation of *prefix*.SDSNCLST to match the data control block (DCB) attributes of your other CLIST libraries.
2. Run job DSNTIJVC.
3. Either concatenate *prefix*.NEW.SDSNCLST with your existing CLIST libraries or copy *prefix*.NEW.SDSNCLST into an existing CLIST library.

What to do next

If you need to rerun job DSNTIJVC, first delete data set *prefix*.NEW.SDSNCLST, which is created by this job.

When corrective service is applied to a CLIST, SMP/E changes only the *prefix*.SDSNCLST data set. You need to redo any record format changes and reapply any special tailoring that is required. You also need to move the CLIST to *prefix*.NEW.SDSNCLST. Corrective service (program temporary fixes) for these CLISTs is sent with ++HOLD statements, calling your attention to the possibility of additional work.

Related concepts

Installation and migration jobs that the CLIST tailors
The installation CLIST uses the values that you specify on the installation panels to tailor and load the installation or migration jobs. Each job is composed of one or more JCL procedures or job steps.

Make DB2I panels, messages, and load modules available to ISPF and TSO

During migration, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

About this task

DB2I uses the ISPF PROFILE and SHARED variable pools for most panel variable fields. As a result, you can easily re-enter a panel when panel variables have previously been specified. For the Db2 subcommands that permit lists of plan names, package names, DBRMs, and ENABLE and DISABLE statements, DB2I provides ISPF to contain all the user-specified variables for these subcommand keywords.

DB2I creates and maintains a set of ISPF tables in a user-defined TSO data set that is allocated to a data set with a ddname of DSNETBLS. The DB2I-generated tables in this library are DSNCONNS, DSNDBRMS, and DSNPLPKN. The following table shows the library table member names and their contents.

Table 45. The Db2 ISPF table library

DSNCONNS	ENABLE or DISABLE connection type and connection name variables that are referenced by plan or package name
DSNDBRMS	Subcommand DBRM member and LIBRARY name variables that are referenced by plan name
DSNPLPKN	Package list variables that are referenced by package name
DSNPATHS	Schema name variables that are referenced by plan or package name and that are to be included in the PATH keyword

DB2I uses ISPF table services to maintain individual ISPF tables within the DSNETBLS data set. For performance reasons, ISPF keeps this table library in an open state once an individual table has been updated. Attempts to close this data set by using the TSO FREE command results in error message IKJ56861I.

Procedure

To make panels, messages, and load modules available to ISPF and TSO:

1. If you added the DB2I libraries as part of Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39, you can skip this step. Otherwise, concatenate the Db2 ISPF libraries with the ISPPLIB, ISPTLIB, ISPSLIB, and ISPMLIB DD statements in your logon procedures. You must also concatenate the Db2 ISPF libraries with these DD statements in any of your CLISTs where the libraries might be allocated. These libraries are *prefix*.SDSNSPFP, *prefix*.SDSNSPFM, *prefix*.SDSNSPFS, and *prefix*.SDSNPFPE or *prefix*.SDSNPFP. If you use English DB2I panels, concatenate SDSNPFPE to ISPPLIB. If you use Kanji DB2I panels, concatenate SDSNPFPK instead of SDSNPFPE.

   ```
   PROFILE WTP MSGID
   ALLOCATE DDNAME(SYSPROC) DSN('prefix.SDSNCLST') SHR REUSE
   ALLOCATE DDNAME(ISPMLIB) DSN('prefix.SDSNSPFM' +
       'ISP.SISPMENU') SHR REUSE
   ALLOCATE DDNAME(ISPPLIB) DSN('prefix.SDSNSPFP' 'prefix.SDSNPFPE' +
       'ISP.SISPPENU') SHR REUSE
   ALLOCATE DDNAME(ISPSLIB) DSN('prefix.SDSNSPFS' +
       'ISP.SISPSLIB' 'ISP.SISPSENU') SHR REUSE
   ```

2. Create the DSNETBLS data set.

   When allocating this data set, you should assign the following DCB attributes, where *n* is any integer:

   ```
   DSORG(PO) RECFM(F B) LRECL(80) BLKSIZE(n*LRECL)
   ```

   The following example shows how to set up an ALLOCATE statement to create the data set:

   ```
   ALLOC DA(DSNSPFT) NEW SP(1 1) TR DIR(10) +
   DSORG(PO) RECFM(F B) LRECL(80) BLKSIZE(800)
   F(DSNETBLS) REUSE
   ```

   The following example shows how to allocate an existing data set to the data set with the DSNETBLS ddname:

   ```
   ALLOC DA(DSNSPFT)      F(DSNETBLS) REUSE
   ```

3. If you want to run the ISPF/CAF sample application that is provided with Db2, ensure that the data set *prefix*.RUNLIB.LOAD is included in the logon procedures or in the ISPLLIB concatenation. If you chose IBMCOB for your LANGUAGE DEFAULT on panel DSNTIPF, you should also include the data set *prefix*.CEE.SCEERUN.

Related concepts

Dynamic SQL and the ISPF/CAF application
The Phase 3 jobs of the installation or migration verification process install the ISPF/CAF sample application. This sample consists of an assembler or COBOL call attachment facility (CAF) interface, a connection manager program, and the phone application. The sample also includes the distributed application that uses DRDA access.

Related tasks

Make Db2 load modules available to TSO and batch users
To connect Db2 to TSO, you must first make Db2 load modules available to TSO and batch users. If *prefix*.SDSNEXIT and *prefix*.SDSNLOAD are not included in your LNKLST*xx*, you can skip this step.

Related reference

z/OS ISPF Messages and Codes

Migration step 7: Connect Db2 to IMS (optional)

Connecting Db2 to IMS is an optional part of migration. Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

1. Make Db2 load modules available to IMS.
2. Define Db2 to IMS.
3. Define new programs and transactions to IMS.
4. Prepare IMS applications for Db2.
5. Depending on your site, you might also need to:
   - Define Db2 plans for IMS applications.
   - Generate a user language interface.

Related tasks

Connecting the IMS attachment facility
Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Related information

Migration step 8: Connect CICS to Db2 (optional)

To connect Db2 to CICS, you need to disconnect and connect the CICS region.

About this task

A macro is supplied with CICS to define the connection between CICS and Db2 by using a resource control table (RCT).

Ensure that you coordinate the attachment facility connection with your CICS support group.

Procedure

To connect the CICS attachment facility:

1. Recalculate space requirements for the CICS attachment facility.
2. Define your CICS attachment facility parameters using the RCT.
3. Update the CICS system tables.
4. Update the CICS initialization JCL.
5. Coordinate Db2 and CICS security if necessary.
6. Prepare new CICS applications for Db2 if necessary.

Related tasks

Defining the CICS Db2 connection

Related information

Migration step 9: Stop Db2 10 activity

Before making Db2 11 conversion mode operational, ensure that all work is stopped on the Db2 10 subsystem.

Before you begin

If you do not stop work on the Db2 10 subsystem or data sharing member that you are migrating, fallback procedures might fail.

Procedure

To stop work on the system that you are migrating:

1. Issue the following command, where *-DSN1* is the subsystem command prefix that is defined for Db2.

   You must have system administrator (SYSADM) or system operator (SYSOPR) authority to issue this command.

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   The QUIESCE keyword allows Db2 to complete the processing of programs that are currently executing. This might require some processing time.
2. Issue the following command to allow only the system administrators and system operators that were defined during installation to access Db2:

   GUPI

   ```
   -DSN1 START DB2 ACCESS(MAINT)
   ```

   GUPI

   If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. For example, if the bootstrap data set (BSDS) does not match the subsystem parameter values, ensure that the correct jobs were run for DSNTIJUZ. Ensure that you started Db2 with the correct subsystem parameter option.
3. Follow these steps to ensure that all Db2 10 work is stopped:

   - Make sure no units of recovery remain. Issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY THREAD(*) TYPE(*)
     ```

     GUPI

     Then use -DSN1 RECOVER INDOUBT for any indoubt threads.
   - All utilities must be restarted or terminated on the version on which they were started. If you do not use data sharing, ensure that all utilities are completed or terminated on Db2 10. To ensure that no utility work remains, issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY UTILITY(*)
     ```

     GUPI

After you have determined the utilities that are running, you can let them complete processing or you can terminate the utility. To stop all utilities, issue the following command:

```
-DSN1 TERM UTILITY(*)
```

- Ensure that no table spaces and index spaces in the Db2 directory (DSNDB01) or the Db2 catalog (DSNDB06) have write error ranges or deferred restart states. To determine existing restrictions, issue the following commands:

  GUPI

  ```
  -DSN1 DISPLAY DATABASE(DSNDB01) SPACENAM(*) RESTRICT
  -DSN1 DISPLAY DATABASE(DSNDB06) SPACENAM(*) RESTRICT
  ```

  GUPI

  You must have system administrator or system operator authority (specified on installation panel DSNTIPP1) to issue this command.

  Recover any table spaces and index spaces that have write error ranges or deferred restart states by using the RECOVER utility.

4. Stop Db2by issuing the following command:

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   A user with installation system administrator (installation SYSADM) or installation system operator (installation SYSOPR) authority must enter this command.

Related information

Migration step 10: Back up your Db2 10 volumes (optional)

After you have stopped Db2 10 activity, you can back up your Db2 10 subsystem. This backup provides a recovery base in case one becomes necessary.

Procedure

Take dumps of the Db2 subsystem data sets. You also can take dumps of the SMP/E data sets and the Db2 distribution and target libraries.

Related information

Migration step 11: Define Db2 initialization parameters: DSNTIJUZ

Job DSNTIJUZ generates the Db2 data-only subsystem parameter module DSNZP*xxx*, the application defaults load module (*dsnhdecp*), and the data-only load module DSNHMCID.

Before you begin

If the Db2 subsystem that you are migrating has only one bootstrap data set (BSDS), add second BSDS before you migrate. For more information, see “Adding a second BSDS” on page 434.

About this task

The subsystem parameter module consists of the expansion of six macros that contain the Db2 execution-time parameters that you selected by using the ISPF panels. The names of these macros are DSN6ARVP, DSN6FAC, DSN6GRP, DSN6LOGP, DSN6SPRM, and DSN6SYSP.

Procedure

To define the Db2 initialization parameters:

1. Save your Db2 10 subsystem parameter module so that it is available in case you need to fall back.
2. Run job DSNTIJUZ.

Results

The DSNTINST CLIST performs calculations by using the values that you specified for some of the parameter values that you entered on the panels. These calculations appear in the macro descriptions.

Related information

DSNTIJUZ actions

Job DSNTIJUZ defines the Db2 data-only subsystem parameter module DSNZP*xxx*, the application defaults load module, and the data-only load module DSNHMCID.

Job DSNTIJUZ also completes the following actions:

- Assembles and link-edits the application defaults module, *dsnhdecp*, into the *prefix*.SDSNEXIT library.
- Assembles and link-edits the subsystem parameter module, DSNZP*xxx*, into the *prefix*.SDSNEXIT library.
- Assembles and link-edits the DSNHMCID data-only module, which is needed for message conversion by Db2 applications and utilities. DSNHMCID is link-edited into both the *prefix*.SDSNEXIT and *prefix*.SDSNLOAD libraries.
- Uses SMP/E in step DSNTIMQ to read in the edited version of DSNTIJUZ and set up GENASM entries for the Db2 application defaults macro and system parameter (DSN6*xxxx*) macro. This action causes service to any of these macros to trigger SMP/E to initiate a reassembly of the Db2 system parameter module.

  This job step is optional and commented out. If you want to run it, you need to uncomment it and run it once to feed the appropriate includes and library names to SMP/E.

If DSNHMCID cannot exist in *prefix*.SDSNLOAD, take one of the following actions:

- Include *prefix*.SDSNEXIT ahead of *prefix*.SDSNLOAD in the system link list.
- Include *prefix*.SDSNEXIT ahead of *prefix*.SDSNLOAD in the JOBLIB or STEPLIB statements for all Db2 applications, address space start-up procedures, TSO log-on procedures, CICS tasks, and IMS tasks that use Db2.

Additional steps for DSNTIJUZ are as follows:

1. If you added a STEPLIB DD statement to the Db2 start procedures ahead of *prefix*.SDSNEXIT and *prefix*.SDSNLOAD, you can move the SYSLMOD output to that library.
2. If you changed the prefix for the Db2 distribution libraries, edit DSNTIJUZ to correct the data set names.

Related reference

Subsystem parameters that are not on installation panels

Some subsystem parameters are defined by job DSNTIJUZ and are not associated with fields on any installation panels.

Adding a second BSDS

If you are migrating a Db2 subsystem that has only one bootstrap data set (BSDS), add second BSDS to before you migrate.

About this task

A second BSDS simplifies recovery in most situations. With a second BSDS, you can continue working in many cases that otherwise require recovery and restart. The required storage is small, and the data set is relatively inactive.

Important: If you do not add a second BSDS, add `TWOBSDS=NO` in the DSN6LOGP macro.

Procedure

To add a second BSDS, complete the following steps:

1. Run job DSNTIJUZ to set the `TWOBSDS=YES` parameter in the DSN6LOGP macro.

   For more information, see .

   You might receive message GIM65001W when you run steps DSNTLOG and DSNTIMQ, or you might receive a return code of 4 when you run step DSNTIMQ. You can ignore these messages.

   If DSNTIJUZ fails or abends, correct the problem and rerun the job, using the same subsystem parameter name.
2. Define a second BSDS. Use the VDSNTISAM BSDS definition in job DSNTIJIN as an example.

   For more information, see "Job DSNTIJIN" on page 367.
3. Add a `//BSDS2 DD` statement to the DSN1MSTR Db2 startup procedure.
4. Issue a RECOVER BSDS command to establish the dual BSDS.

   For more information, see .

Related tasks

Migration step 11: Define Db2 initialization parameters: DSNTIJUZ
Job DSNTIJUZ generates the Db2 data-only subsystem parameter module DSNZP*xxx*, the application defaults load module (*dsnhdecp*), and the data-only load module DSNHMCID.

Related information

Using Access Method Services (DFSMS Access Method Services for Catalogs)

Migration step 12: Establish subsystem security (optional)

Db2 lets you control access to data within Db2. Db2 also works together with outside security systems, such as RACF, that control access to the Db2 subsystem.

About this task

Because your Db2 11 subsystem reuses the data objects from your Db2 10 subsystem, you have probably already supplied the protection that those objects need. However, you probably want to protect the new (Db2 11) Db2 data objects.

Procedure

To establish subsystem security:

1. Customize job DSNTIJRA, as described in the job prolog.
2. Run job DSNTIJRA.

Job DSNTIJRA defines the administrative task scheduler started task module to RACF program control and defines the administrative task scheduler as a trusted context in RACF. DSNTIJRA is intended for the site security administrator, and can be run any time prior to installing or migrating to Db2 11.

3. If you have a Db2 data sharing environment, customize and run DSNTIJRA for each member of the group.

Related information

Migration step 13: Define Db2 11 to z/OS: DSNTIJMV

Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS, including updating members of SYS1.PARMLIB and SYS1.PROCLIB.

Before you begin

Ensure that you completed the task in "Make Db2 load modules available to TSO and batch users" on page 427.

Tip: For SYS1.PROCLIB, submit the procedure-update section of DSNTIJMV as necessary. However, before you make the updates, read the information about DSNTIJMV, and examine DSNTIJMV to study the updates that it makes. Edit the updates directly in SYS1.PARMLIB instead of submitting the updates in the DSNTIJMV job.

About this task

DSNTIJMV renames your Db2 10 procedures so that they do not conflict with Db2 11 procedures, which replace your old procedures. The job also creates Language Environment options data sets for the Db2 core WLM environment for Java routines.

Procedure

To define Db2 11 to z/OS:

1. Run job DSNTIJMV.

   If job DSNTIJMV runs successfully, it produces return codes of 0. Because a rename can fail without setting the return code, verify all renames.

2. Review the content of the Language Environment options data set and adjust the following environment variables as needed. The data set is created by DSNTIJMV and must be allocated by the JAVAENV DD of the address space procedure for the Db2 core WLM environment for Java routines.

   - _CEE_ENVFILE, if present, needs to be set to the name and path of the environment variable file that was created by job step DSNTIJR.
   - JVMPROPS needs to be set to the name and path of the JVM startup options file that was created by job step DSNTIJS.
   - DB2_BASE and JCC_HOME need to be set to the names of the HFS directories that you selected for the Db2 for z/OS and JCC product classes.

What to do next

Because different sites have different requirements for identifying Db2 to z/OS, DSNTIJMV cannot anticipate all the necessary updates. For this reason, the updates that job DSNTIJMV makes in SYS1.PARMLIB and SYS1.PROCLIB are incomplete. You might have additional procedures of your own to rename, or you might have to provide procedures for both releases, using alias names to indicate the current release. If you changed the Db2 subsystem name, the names of the Db2 address space startup procedures also change. If you made any changes to your Db2 10 procedures (such as data set names), make similar changes to the Db2 11 procedures. You can complete these updates either by making the updates directly in SYS1.PARMLIB and SYS1.PROCLIB or by editing DSNTIJMV.

Before starting Db2, check the private area sizes in the SYS1.PROCLIB update section to ensure that you have enough user private area.

Also, examine the size of the private area on the Db2 startup procedures. If necessary, modify them to satisfy the requirements for EDM pool size, buffers, numbers of open data sets, and the amount of available private address space.

Related information

DSNTIJMV actions

Job DSNTIJMV updates SYS1.PARMLIB and SYS1.PROCLIB to help identify Db2 to z/OS. It also creates Language Environment options data sets for the Db2 core WLM environment for Java routines.

Job DSNTIJMV completes the following actions:

1. Updates the following SYS1.PARMLIB members:

   IEFSSN*xx*

   This member contains an entry for every z/OS subsystem. Unless you change the Db2 subsystem name or the Db2 command prefix, you do not need to change this member. If you change the subsystem name or the command prefix, either change the current member or create a new member.

   Place the primary system's record (JES2 or JES3) record as the first line in an IEFSSN*xx* member. However, if you use SMS, place the SMS line before the primary system. There might also be other products that change position during system initialization. The Db2 line should come after SMS, the JES subsystem, and other vendor products.

   IEAAPF*xx* or PROG*xx*

   This member is updated to include the Db2 program libraries (*prefix*.SDSNEXIT, *prefix*.SDSNLOAD, *prefix*.SDXRRESL, and *prefix*.SDSNLINK) as libraries that are authorized by using the authorized program facility (APF).

   prefix.SDSNLINK does not need to be included in the list of APF-authorized libraries unless LNKAUTH=APFTAB is set.

   All libraries that are concatenated with *prefix*.SDSNEXIT and *prefix*.SDSNLOAD in STEPLIB and JOBLIB statements must be APF-authorized.

   LNKLST*xx*

   This member is updated to include the Db2 load module library, *prefix*.SDSNLINK, in the LNKLST*xx*. If you moved the modules from *prefix*.SDSNLINK into another library, edit DSNTIJMV to include that library in the LNKLST*xx*. If you have combined *prefix*.SDSNLINK and *prefix*.SDSNLOAD into one library, edit DSNTIJMV to include the combined library in the LNKLST*xx*.

   Tip:

   You can do additional editing for the SYS1.PARMLIB updates. If you are editing DSNTIJMV rather than making the changes directly, you have a choice: You can either include your additional entries for the SYS1.PARMLIB members (IEAAPF*xx* and LNKLST*xx*) at the end of the existing list of entries, or you can place them earlier in the list.

   If you include these entries at the end of the existing SYS1.PARMLIB list, ensure that commas (the continuation character) delimit each entry except the last entry.

   ECSA size is another SYS1.PARMLIB change to consider at this time. You specify ECSA size in the CSA parameter of the IEASYS00 parameter. Ensure that you have specified an adequate size for this subsystem.

2. Renames your Db2 10 procedures so that they are not replaced by Db2 for z/OS Db2 11 procedures.
3. Updates SYS1.PROCLIB to include the following Db2 11 procedures, where *ssnm* is the subsystem name:

- system services address space (*ssnm*MSTR)
- database services address space (*ssnm*DBM1)
- DDF address space (*ssnm*DIST)
- address space startup procedures for the Db2 core WLM environments (*ssnm*WLM1, *ssnm*WLMC, *ssnm*WLMD, *ssnm*WLMG, *ssnm*WLMJ, *ssnm*WLMM, *ssnm*WLMP, *ssnm*WLMR, *ssnm*WLMU, *ssnm*WLMW, and *ssnm*WLMX)
- WLM sample procedure for stored procedures
- IRLM address space startup procedure (IRLMPROC)
- program preparation procedures
- Db2 Utilities procedure (DSNUPROC)

If you specified a suffix on panel DSNTIPA1, that suffix is appended to data sets &USER..DBRMLIB.DATA.*suffix*, &USER..RUNLIB.LOAD.*suffix*, and &USER..SRCLIB.DATA.*suffix*. To override these data set names, edit the updates to SYS1.PROCLIB.

The STEPLIB concatenation of the database services address space (*ssnm*DBM1) procedure includes a commented-out DD for the IBM Language Environment data sets SCEERUN and SCEERUN2. If your system does not include SCEERUN and SCEERUN2 in the system link list, you must uncomment this DD.

4. Creates a Language Environment options data set for the Db2 core WLM environment for Java routines. The data set is created by job step DSNTIJJ and is allocated by the JAVAENV DD of the *ssnm*WLMJ address space procedure that is created by job step DSNTIPM.
5. Defines an environment variable file for the Db2 core WLM environment for Java routines. This step is completed by job step DSNTIJR. The file that is created in this step is referenced by the Language Environment options data set that is created by job step DSNTJJ.
6. Defines a sample JVM startup options file for the Db2 core WLM environment for Java routines. This step is completed by job step DSNTIJS. The file that is created in this step is referenced by the Language Environment options data set that is created by job step DSNTIJJ.

Related concepts

Language Environment options data sets for the Db2 core Java WLM environment
Job DSNTIJMV creates the Language Environment options data sets for the Db2 core Java WLM environment.

Related information

Migration step 14: Define system data sets: DSNTIJIN

When job DSNTIJIN is tailored for migration, it defines the following non-VSAM data sets: *prefix*.SRCLIB.DATA, *prefix*.RUNLIB.LOAD, and *prefix*.DBRMLIB.DATA.

About this task

When job DSNTIJIN is tailored for migration, it does not define data sets for new Db2 catalog and directory table spaces and indexes. Catalog and directory data sets are automatically defined by Db2 when you run job DSNTIJTC to tailor the catalog and job DSNTIJEN to enable new-function mode.

When migrating to Db2 11, do not use DSNTIJIN or any other job to define data sets for the Db2 catalog and directory.

Procedure

Run job DSNTIJIN.

Related information

Migration step 15: Define user authorization exit routines: DSNTIJEX (optional)

You can use job DSNTIJEX to define user authorization exit routines. If you did not run job DSNTIJEX in the release from which you are migrating, you can skip this step.

About this task

Job DSNTIJEX builds sample authorization exit routines from the source code in *prefix*.SDSNSAMP. These sample authorization exit routines are DSN3@SGN and DSN3@ATH, and the user version of the access control authorization exit routine DSNX@XAC. DSNTIJEX then places the exit routines in the *prefix*.SDSNEXIT library.

Job DSNTIJEX includes a step to assemble and link-edit the sample version of DSNACICX, which you can use to modify CICS parameters that the DSNACICS caller specifies. You can modify the access control authorization exit routine DSNX@XAC and use DSNTIJEX to assemble and link-edit it. This exit routine allows you to bypass some or most of Db2 authorization checking and to specify your own authorization checking. The Db2 CLIST tailors the JCL in DSNTIJEX to meet the requirements of your site.

The sample authorization exit routines are not the same as the default authorization exit routines that are supplied by Db2. By implementing the sample authorization exit routines, you can provide group names as secondary authorization IDs.

You have the following options regarding exit routines:

- To use the default authorizations, skip job DSNTIJEX.
- To use the sample authorization exit routines, run job DSNTIJEX.
- To use your own authorization exit routines, modify job DSNTIJEX to reference the correct library, and then run it.

Procedure

If you choose to run job DSNTIJEX:

1. Make the following optional adjustments to DSNTIJEX if they apply to your site:
   - DSNXSXAC is a copy of the default access control authorization exit routine that you can modify. This exit routine allows you to bypass some or most of Db2 authorization checking and to specify your own authorization checking. If you do not change the exit routine, you should delete this step.
   - DSNACICS is a stored procedure that invokes user exit routine DSNACICX, which you can use to modify CICS parameters that the DSNACICS caller specifies. If you do not need to modify the caller's parameter values, you can use the default DSNACICX exit routine. However, if you need to modify the caller's parameter values, you need to perform the following tasks:
     a. Write a user exit routine in assembler, COBOL, C, or PL/I
     b. Assemble or compile the source code
     c. Link-edit the object code into the Db2 exit routine library

     Installation job DSNTIJEX includes a step to assemble and link-edit the sample version of DSNACICX. You can use this step as a model for your program preparation job.
   - If you will use the RACF/Db2 external security module (DSNXRXAC) as your Db2 access control authorization exit, modify job DSNTIJEX to refer to DSNXRXAC instead of DSNXSXAC.
2. Run job DSNTIJEX.

   If job DSNTIJEX runs successfully, it produces a return code of 0 or 4.

   If job DSNTIJEX fails or abends, correct the problem, and rerun the job.

Related information

Migration step 16: Refresh the z/OS definition of Db2

As part of the migration to Db2 11, you must refresh how Db2 is defined to z/OS.

Before you begin

Complete the following tasks:

- Ensure that the early code pre-conditioning PTFs are installed on your system before you migrate. For details, see "Required maintenance for Db2 11 installation or migration" on page 3.
- Determine the version of the ERLY code to include in the system link list, as described in "Choosing link list options" on page 30. In most cases, use the ERLY code that is distributed with the Db2 release you are migrating to. The link list can contain only one level of the early code, and it must support all Db2 subsystems and different Db2 releases that share it.
- Run job DSNTIJMV, as described in "Migration step 13: Define Db2 11 to z/OS: DSNTIJMV" on page 435.

About this task

This migration task is necessary to apply changes for Db2 11 migration in the following z/OS structures:

- The link list look-aside address space (LLA), which contains the Db2 11 early (ERLY) code from the SDSNLINK load module library.
- Member IEFSSN*xx*, for new Db2 and IRLM subsystem parameter definitions.
- Member IEAAPF*xx*, for new APF libraries.
- Member LNKLST*xx*, for new load module libraries.
- JCL startup procedures for the Db2 11 address spaces, including WLM environments used by stored procedures and user-defined functions.
- JCL procedures for preparing Db2 11 application programs.

Procedure

- Refresh how Db2 is defined to z/OS by using one of the following approaches:
  - Do an initial program load (IPL) of z/OS. You must choose this approach if you issued z/OS SETPROG LINKLST commands to refresh the system link list in member LNKLST*xx*.

    After the IPL of z/OS completes, message DSN3100I is displayed on the z/OS console, stating that Db2 is ready for the START command.
  - If you changed to a new version of the ERLY code, and you did not refresh the system link list in member LNKLST*xx*, run the -REFRESH DB2,EARLY command from a z/OS console that has START command capability. When -REFRESH DB2,EARLY is run, previous copies of the ERLY modules are deleted from the system the next time that Db2 is started. -REFRESH DB2,EARLY is valid only when Db2 is not started.

What to do next

"Migration step 17: Start Db2 11" on page 440

Related concepts

DSNTIJMV actions

Job DSNTIJMV updates SYS1.PARMLIB and SYS1.PROCLIB to help identify Db2 to z/OS. It also creates Language Environment options data sets for the Db2 core WLM environment for Java routines.

Related reference

z/OS SETPROG Command (MVS System Commands)

Related information

Migration step 17: Start Db2 11

During migration to Db2 11, start the Db2 subsystem after you run job DSNTIJMV and IPL z/OS.

Procedure

To start Db2:

1. Start the IRLM.

   If you have not requested that Db2 automatically start the IRLM, you should start it before you start Db2. Use the following command, where *irlmproc* is the name that you assigned to the IRLM startup procedure:

   ```
   START irlmproc
   ```

   The *irlmproc* is the value that you specified for the PROC NAME option on installation panel DSNTIPI.

   If you specified YES for the AUTO START option on installation panel DSNTIPI, Db2 starts the IRLM automatically.

2. Start Db2 from the z/OS console with the following command, where -DSN1 is the subsystem command prefix that you defined for Db2, and *DSNZPxxx* is the name of the Db2 initialization parameter module:

   ```
   -DSN1 START DB2 PARM(DSNZPxxx)
   ```

   If you omit the PARM parameter, and you specified a value in the PARAMETER MODULE field on installation panel DSNTIPO3, that value is used as the parameter module name. If you did not specify a parameter module on panel DSNTIPO3, Db2 uses the default, DSNZPARM.

   If you have not run job DSNTIJRT, and the administrative task scheduler starts, the administrative task scheduler issues error message DSNA679I to report SQLCODE -805 until you run job DSNTIJRT. The administrative task scheduler starts if you specified an address space procedure name in the ADMIN SCHEDULER field on installation panel DSNTIPX.

   If Db2 starts successfully, some or all of the following address spaces start, where *ssnm* is the Db2 subsystem name.

   - The system services address space (*ssnm*MSTR)
   - The database services address space (*ssnm*DBM1)
   - The IRLM address space (*irlmproc*), where *irlmproc* is the IRLM procedure name
   - Possibly, the DDF address space (*ssnm*DIST)
   - Possibly, the administrative task scheduler stored procedure address space (*ssnm*ADMT)

   If Db2 starts successfully, the series of RESTART messages that you receive concludes with these two messages:

   ```
   DSNR002I   RESTART COMPLETED
   DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
   ```

   In the next migration step, you migrate the Db2 catalog. Before the catalog is migrated, some catalog or directory table spaces are restricted.

   The following messages might occur during startup of Db2 because the catalog and directory table spaces are restricted:

   - DSNT500I with reason code 00C900A6
   - DSNT501I with reason code 00C900A6
   - DSNL700I with reason code 00C900A6 (if DDF is auto-started). This message might be followed by messages DSNL007I and DSNL008I, indicating that DDF is terminating.
   - Abend 04E with reason code 00E70014 (during DDL registration)

These restrictions can cause failure of processes that are started as part of normal Db2 startup, such as collection of real-time statistics, until catalog tailoring is completed. Possible actions to restart such processes are explained in the discussion of job DSNTIJTC.

You can determine existing restrictions by issuing this command after you start Db2:

```
-DSN1 DISPLAY DATABASE(*) SPACENAM(*) RESTRICT
```

The preceding command might also generate message DSNT501I with reason code 00C900A6.

If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. A common cause of startup failure is that the BSDS does not match the subsystem parameter values; ensure that the correct job was run for DSNTIJUZ. Also, check that the subsystem parameter member that you specified (or used by default) when you started Db2 is the one that the DSNTIJUZ job built. Check the JCL for the Db2 startup procedure.

3. If you want to use the TSO SUBMIT command to do housekeeping and migration verification, start TSO (if it is not already started).
4. If you did not enable primary user IDs to issue Db2 commands from the z/OS console or TSO SDSF when you first installed the subsystem, take one of the following actions:
   - Grant SYSOPR authority to all primary user IDs that issue Db2 commands from the z/OS console or TSO SDSF. Issue the following command:

     ```
     GRANT SYSOPR TO userid
     ```

   - Define RACF classes to authorize Db2 commands. Use the following statements:

     ```
     SETR CLASSACT(DSNADM)
     RDEFINE DSNADM DSN1.SYSOPR UACC(NONE)
     SETR RACLIST(DSNADM) REFRESH
     PERMIT DSN1.SYSOPR CLASS(DSNADM) ID(userid) ACCESS(READ)
     SETR RACLIST(DSNADM) REFRESH
     ```

Related information

Migration step 18: Tailor Db2 11 catalog: DSNTIJTC

Job DSNTIJTC invokes the CATMAINT utility to migrate the Db2 10 catalog to the Db2 11 catalog.

Before you begin

Ensure that no incompatible applications will interfere with the catalog migration. For details, see "Identify applications that are incompatible with online migration" on page 423.

About this task

DSNTIJTC contains the following job steps:

DSNTITC
Job step DSNTITC, which creates new catalog and directory objects, adds columns to existing catalog tables, and creates and updates indexes on the catalog tables to accommodate new Db2 11 objects. All IBM-supplied indexes are created or updated sequentially during the execution of this step. At migration to Db2 11 this job step updates that catalog level to .

CHKTITC
Job step CHKTITC checks the return code of the CATMAINT utility. If the return code is 8 or greater, the job executes the job steps that follow CHKTITC.

DSNTIRI

Job step DSNTIRI executes only when job step DSNTITC terminates abnormally or with a return code of 8 or greater. DSNTIRI rebuilds catalog indexes that were placed in REBUILD-pending status during execution of DSNTITC.

DSNTITD

Job step DSNTITD executes only when job step DSNTITC terminates abnormally or with a return code of 8 or greater. DSNTITD issues the DISPLAY BLOCKERS command with the DETAIL option and displays information about locks or claims that might have interfered with the catalog migration.

Procedure

To complete the tailoring of the Db2 catalog:

1. Run job DSNTIJTC on your Db2 11 subsystem.

   A status message, DSNU777I, is issued at several points to indicate migration progress. Diagnostic error messages are issued when CATMAINT processing fails. If a problem is found during the SQL processing phase of migration, message DSNU778I is issued. If non-supported functions are encountered, message DSNU776I is issued. All of these messages are written to the SYSPRINT data set.

   If you receive abend reason code 00C200EF, the catalog and directory data sets are not in a compliant SMS environment.
2. If job DSNTIJTC fails, save the output and correct the problem.
   a) Terminate the CATMAINT utility if it is pending.
   b) Run job DSNTIJTC again without modification.
3. If job DSNTIJTC fails again, return to Db2 10.

   Because CATMAINT failures roll back all Db2 11 changes, the catalog and directory are in the format of Db2 10. Altered indexes are not rolled back. Determine if any index is in a pending status by using the CHECK INDEX utility. To return to Db2 10, complete these steps:
   a) Rename procedures to use the libraries of your previous release.
   b) Reconnect TSO, IMS, and CICS to the libraries of your previous release.
4. If your previous release is damaged, you need to complete a point-in-time recovery to recover the system. To complete a point-in-time recovery:
   a) Restore your previous version's catalog and directory from image copies.
   b) Restore the BSDSs from archive logs that were made prior to migration.
   c) Flush the SCA (for data sharing environments only).
   d) Recover the catalog and directory indexes.

   When you remigrate to Db2 11, run the DSNTIJTC job again.

Results

When you start Db2 11 for the first time, you might receive message DSNT501I with reason code 00C900A6. You can ignore this message. Running job DSNTIJTC corrects the cause of this message.

What to do next

If you received message DSNL700I with reason code 00C900A6 and DDF terminated after you started Db2 11 for the first time, start DDF manually after you run DSNTIJTC.

Related concepts

Work file database storage requirements
The work file database is used as storage for processing SQL statements that require working storage.

Related tasks

Falling back to Db2 10

If you encounter serious errors after tailoring the catalog and directory for Db2 11, you can return to Db2 10. Fall back to Db2 10 is supported only if Db2 11 isDb2 11 conversion mode.

Related information

Migration step 19: Ensure that the catalog has no problems (optional)

After you tailor your Db2 11 for z/OS catalog, you should check the integrity of your catalog and directory.

Procedure

To check the integrity of your catalog and directory, complete these steps in any order:

- Run the CHECK INDEX utilities on all the indexes in the catalog and directory by using job DSNTIJCX.
- Run the queries in member DSNTESQ of *prefix*.SDSNSAMP. Because SPUFI is not yet bound, you cannot use SPUFI to run these queries.

  One alternative is to use the Db2 10 DSNTEP2 program to run the queries.
- Run the DSN1COPY utility with the CHECK option on the catalog table spaces.

Related tasks

Migration step 2: Verify the integrity of Db2 table spaces (optional)
Use the DSN1COPY and CHECK INDEX utilities to verify the integrity of the Db2 directory and catalog table spaces on the subsystem that you are migrating.

Related information

Migration step 20: Prepare dynamic SQL program: DSNTIJTM

Job DSNTIJTM assembles, link-edits, binds, and runs DSNTIAD, a program that processes certain SQL statements dynamically.

Procedure

To prepare the dynamic SQL program:

1. Review and possibly modify or delete the GRANT statements in job DSNTIJTM. This job grants PUBLIC access to a number of Db2-supplied objects. Consider granting execute access on the plan to PUBLIC.
2. Run job DSNTIJTM.

Related information

Migration step 21: Bind SPUFI and DCLGEN and user-maintained database activity: DSNTIJSG

Use job DSNTIJSG to bind packages for SPUFI, DCLGEN, and the EXEC SQL utility.

About this task

In migration mode, DSNTIJSG completes the following actions:

- Binds packages at the new release level for SPUFI, DCLGEN, and the EXEC SQL utility.
- Creates a new resource limit facility table, DSNRLMT*nn*, and a new resource limit facility index, DSNMRL*nn*. By default, the step that creates this new table and index is commented out in the JCL. To have Db2 create DSNRLMT*nn* and DSNMRL*nn*, uncomment the step.

- Adds new EXPLAIN tables under the SYSIBM schema.

Procedure

To bind the SPUFI, DCLGEN, and the EXEC SQL packages for Db2 11, complete the following steps:

1. If you bound special SPUFI packages and plans in Db2 10, you need to bind those packages again in Db2 11. You do not need to bind those plans again. For example, to update special SPUFI packages that were created for use by SPUFI users who require a TSO terminal CCSID of 1047, issue the following commands.

   GUPI

   ```
   BIND PACKAGE(SPUR1047) MEMBER(DSNESM68) -
        ACTION(REPLACE) ISOLATION(UR) ENCODING(1047) -
        LIBRARY('prefix.SDSNDBRM')
   BIND PACKAGE(TIAP1047) MEMBER(DSNTIAP) -
        ACTION(REPLACE) ISOLATION(CS) ENCODING(1047) -
        LIBRARY('prefix.SDSNDBRM')
   BIND PACKAGE(SPCS1047) MEMBER(DSNESM68) -
        ACTION(REPLACE) ISOLATION(CS) ENCODING(1047) -
        LIBRARY('prefix.SDSNDBRM')
   BIND PACKAGE(SPRR1047) MEMBER(DSNESM68) -
        ACTION(REPLACE) ISOLATION(RR) ENCODING(1047) -
        LIBRARY('prefix.SDSNDBRM')
   ```

   GUPI

2. If you are using a data sharing environment, you must ensure that the resource limit facility (RLF) is inactive on all members in the data sharing group before running DSNTIJSG. To do this, issue the STOP RLIMIT command for each member.
3. Ensure that all your subsystems have the same maintenance level for your DSNUGSQL DBRM.
4. Run job DSNTIJSG,

   If DSNTIJSG runs successfully, it produces a return code of 0. However, job step DSNTIJG can produce a return code of 4 if the specified access has already been granted on one or more objects.
5. If job DSNTIJSG fails or abends, ensure that the user that is specified on the JOB statement is authorized. Use the name that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1. (The RESTART parameter on the JOB statement can be useful.) Correct any other problems, and run job DSNTIJSG again.
6. If you encounter resource shortages, review the parameters in job DSNTIJUZ and make any necessary modifications. Then, stop Db2, rerun DSNTIJUZ, start Db2, and rerun DSNTIJSG from the last successful step.

What to do next

Complete the following actions:

- Alter your Db2 11 buffer pools that have frequent page reads or frequent page writes to use PGFIX YES if you have sufficient real storage available for these buffer pools. Fixing the buffer pages in real storage once and keeping them fixed avoids the processing time that Db2 needs to fix and free pages each time there is an I/O. In some cases, this processing time can be as much as 10% for I/O-intensive workloads. To use this option, issue the following command:

  GUPI

  ```
  ALTER BPOOL(bpname) VPSIZE(vpsize) PGFIX(YES)
  ```

  GUPI

  Where *bpname* is the name of the buffer pool and *vpsize* is the size of the virtual pool.
- If you use capabilities such as ODBC, JDBC, and others with Db2, you might need to run other jobs to migrate them for use with Db2 11, for example:

  - For ODBC, see .
  - For JDBC see .

Related tasks

Migrating from enabling-new-function mode to new-function mode
New-function mode can be activated any time after enabling-new-function mode processing is complete.

Related information

Migration step 22: Configure Db2 for running stored procedures and user-defined functions (optional)

This step needs to be performed during installation, and is therefore optional for migration. Before you can use user-defined functions or the following types of stored procedures, you need to perform some set-up tasks:

- External stored procedures
- Native SQL procedures that satisfy any of the following conditions:
  - Calls at least one external stored procedure, external SQL procedure, or user-defined function.
  - Defined with ALLOW DEBUG MODE or DISALLOW DEBUG MODE.
- External SQL procedures (deprecated)
- Db2-supplied stored procedures

All routines, except native SQL procedures, must run in an environment that is established by the z/OS Workload Manager (WLM). A set of Db2-supplied routines are installed by job DSNTIJRT and validated by job DSNTIJRV as part of the migration process. You can also define your own routines or use routines that are provided by a non-IBM vendor. Before you can use any stored procedures and user-defined functions, however, you need to set up WLM environments for these routines. If you plan to use certain Db2-supplied stored procedures or user-defined functions, you need to perform some additional steps.

Related information

Tailoring Db2 subsystem parameters for stored procedures during migration (optional)

Several subsystem parameters should be tailored to your Db2 environment before you use stored procedures. These parameters were set when you installed or migrated Db2. If you are satisfied with those values, you do not need to complete this step.

About this task

The subsystem parameters for stored procedures are:

- MAX_NUM_CUR
- MAX_ST_PROC
- STORMXAB
- STORTIME

Procedure

To modify the values of these subsystem parameters, complete one of the following tasks:

- Run the installation CLIST again in INSTALL or MIGRATE mode. On the installation panels, leave most of the existing values and change the following fields on their respective panels:

1. On panel DSNTIPA1, specify the input member that contains field values for your current installation.
2. On panel DSNTIPT, specify different names for the TEMP CLIST LIBRARY and SAMPLE LIBRARY fields to avoid overwriting your original libraries.
3. On panel DSNTIPX, add or change the values of the MAX ABEND COUNT, TIMEOUT VALUE, MAX OPEN CURSORS, and MAX STORED PROCS fields as appropriate.
4. On panel DSNTIPY, specify a name for the REMOTE LOCATION field. Db2 uses this name for the stored procedure sample applications.

- Edit job DSNTIJUZ to add or change values for the subsystem parameters for routines.

  This method has the following disadvantages:

  - Db2 does not use these new values for any future migrations because your DSNTID*xx* member and DSNTIJUZ parameters are not saved for future input.
  - Db2 does not generate the sample jobs for stored procedure and user-defined functions because you are not running the DSNTINST CLIST.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

DSNTIPT: Data set names panel 1
The entries on the DSNTIPT panel establish data set names for the libraries that are used in the Db2 CLIST and JCL that Db2 provides. The values that you enter on this panel are edited into all pertinent sample and installation jobs.

DSNTIPX: Routine parameters panel
The entries on this panel are used to start the stored procedures address space so that it can run stored procedures or user-defined functions.

DSNTIPY: Job editing panel
The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

Setting up Language Environment for stored procedures during migration

Language Environment (LE) is a component of the z/OS operating system that establishes a common run time environment for all applications, regardless of programming language. Db2 uses Language Environment to provide a run time environment for external stored procedures and external SQL procedures.

About this task

Language Environment provides a set of essential run time services that are available through a set of interfaces that are consistent across programming languages. These services include routines for run time message handling, condition handling, and storage management.

Language Environment provides the following advantages for Db2 stored procedures:

- Language Environment hides the differences between programming languages.
- Language Environment provides the ability to make a stored procedure resident in the stored procedure address spaces.
- Language Environment supports a large number of run time options, including those options that are needed to use tools to debug your stored procedures.

Procedure

To set up Language Environment for stored procedures:

1. Customize Language Environment by completing the instructions in z/OS Language Environment Customization.
2. Specify the Language Environment run time library in the JCL startup procedure for each WLM-managed address space for stored procedures.

   This library must be the only available run time library. Do not reference any other language run time libraries within the system link list or within the STEPLIB statements. If other language run time libraries are defined in the system link list, use STEPLIB statement overrides to exclude them.

   Multiple languages can share the same Language Environment run time library. Therefore, you do not need to specify the language-specific libraries in the JCL startup procedure of each stored procedure address space.

   Restriction: Do not use compilers (or associated run time libraries) that are no longer supported by IBM.

What to do next

After you set up Language Environment for stored procedures, you can override the Language Environment run time options for individual stored procedures. You can do this by using the RUN OPTIONS clause in the CREATE PROCEDURE statement or ALTER PROCEDURE statement. The default values for Language Environment run time options are defined by z/OS. You might have overridden some of these default values when you customized Language Environment.

Related reference

Customizing Language Environment run-time options (z/OS Language Environment Customization)

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Implementing RRS for stored procedures during migration

To use some Db2 stored procedures, you must implement Resource Recovery Services (RRS). RRS is a sync point manager program that coordinates two-phase commit processing. Db2 requires that RRS be active because WLM-managed stored procedure address spaces use the RRS attachment facility (RRSAF).

About this task

RRS records events for protected resources in log streams that are managed by a z/OS component called the system logger. The following table identifies the log streams that RRS uses, where *gname* can be your Sysplex name or any name in a non-Sysplex environment:

Table 46. Log streams that RRS uses

Log stream type	Log stream name	Content
Main unit-of-recovery log state stream	ATR.*gname*.MAIN.UR	The state of active units of recover (URs). RRS periodically moves this information into the RRS delayed UR state log when UR completion is delayed.
Delayed unit-of-recovery log state stream	ATR.*gname*.DELAYED.UR	The state of active URs, when UR completion is delayed.
Resource manager data log stream	ATR.*gname*.RM.DATA	Information about the resource managers that use RRS services.

Table 46. Log streams that RRS uses (continued)

Log stream type	**Log stream name**	**Content**
Restart log stream	ATR.*gname*.RESTART	Information, which is needed during restart, about incomplete URs. This information enables a functioning RRS instance to assume remaining incomplete work from an RRS instance that failed.
Archive log stream	ATR.*gname*.ARCHIVE	Information about completed URs. This log stream is optional, but recommended.

All of these log streams are required except for the archive log stream. RRS does not start if it is not able to connect to the required log streams.

In a Sysplex environment, these log streams are shared by the systems of the Sysplex.

Procedure

To implement RRS for stored procedures:

1. Define the RRS log streams that are to be written, either on disk or in the coupling facility by completing the following actions:

   a) If you are using the coupling facility, add definitions for the RRS structures in the CFRM policy.

   When you are use coupling facility log streams, each log stream needs to be mapped to a coupling facility structure.

   The following example shows JCL that updates the CFRM policy to add the RRS structures:

```
//DEFCFRM1 JOB MSGCLASS=X,TIME=10,MSGLEVEL=(1,1),NOTIFY=&SYSUID
//STEP1 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//SYSIN DD *
    DATA TYPE(CFRM) REPORT(YES)
    DEFINE POLICY NAME(CFRM18) REPLACE(YES)
    CF NAME(CF01)
        TYPE(009672)
        MFG(IBM)
        PLANT(02)
        SEQUENCE(000000040104)
        PARTITION(1)
        CPCID(00)
        DUMPSPACE(2048)
        CF NAME(CF02)
        TYPE(009672)
        MFG(IBM)
        PLANT(02)
................
................
................
STRUCTURE NAME(RRS_ARCHIVE_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_RMDATA_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_MAINUR_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_DELAYEDUR_1)
```

```
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
        STRUCTURE NAME(RRS_RESTART_1)
               INITSIZE(8000)
               SIZE(16000)
               PREFLIST(CF1,CF2)
               REBUILDPERCENT(5)
```

b) Define the log streams in the system logger policy by using the IXCMIAPU utility. This utility program is provided in the SYS1.MIGLIB system library.

If you are using the coupling facility, also define the structures in the system logger policy. You can map each log stream to a single structure or you can map log streams of like data types to the same structure.

Example: Defining coupling facility log streams

The following example JCL shows definitions for coupling facility structures and RRS log streams. In this case, each RRS log stream is mapped to a structure.

```
//STEP1 EXEC PGM=IXCMIAPU
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DATA TYPE(LOGR) REPORT(YES)

  DEFINE STRUCTURE NAME(RRS_ARCHIVE_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(262)

  DEFINE STRUCTURE NAME(RRS_RMDATA_1) LOGSNUM(1)
         MAXBUFSIZE(1024) AVGBUFSIZE(252)

  DEFINE STRUCTURE NAME(RRS_MAINUR_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

  DEFINE STRUCTURE NAME(RRS_DELAYEDUR_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

  DEFINE STRUCTURE NAME(RRS_RESTART_1) LOGSNUM(1)
         MAXBUFSIZE(64000) AVGBUFSIZE(158)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.ARCHIVE) STRUCTNAME(RRS_ARCHIVE_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.RM.DATA) STRUCTNAME(RRS_RMDATA_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.MAIN.UR) STRUCTNAME(RRS_MAINUR_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.DELAYED.UR) STRUCTNAME(RRS_DELAYEDUR_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)

DEFINE LOGSTREAM
NAME(ATR.SANDBOX.RESTART) STRUCTNAME(RRS_RESTART_1)
LS_DATACLAS(SHARE33)
HLQ(LOGR) MODEL(NO) LS_SIZE(1024)
LOWOFFLOAD(0) HIGHOFFLOAD(80) STG_DUPLEX(NO)
RETPD(15) AUTODELETE(YES)
/*
```

Example: Defining disk log streams

The following example JCL shows definitions for RRS log streams on disk.

```
/DEFSTREXECPGM=IXCMIAPU
//SYSPRINT DDSYSOUT=A
//SYSINDD *
   DATA TYPE(LOGR)

   DEFINE LOGSTREAM NAME(ATR.PLEX1.MAIN.UR)
      LOWOFFLOAD(60)
      HIGHOFFLOAD(80)
      DASDONLY(YES)
      HLQ(TEST)
      LS_SIZE(1024)
      LS_DATACLAS(VSAMLS)
      STG_SIZE(1024)

   DEFINE LOGSTREAM NAME(ATR.PLEX1.DELAYED.UR)
      LOWOFFLOAD(60)
      HIGHOFFLOAD(80)
      DASDONLY(YES)
      HLQ(TEST)
      LS_SIZE(960)
      LS_DATACLAS(VSAMLS)
      STG_SIZE(960)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.ARCHIVE)
     LOWOFFLOAD(0)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(960)
     LS_DATACLAS(VSAMLS)
     AUTODELETE(YES)
     RETPD(2)
     STG_SIZE(2000)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.RM.DATA)
     LOWOFFLOAD(60)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(192)
     LS_DATACLAS(VSAMLS)
     STG_SIZE(192)

  DEFINE LOGSTREAM NAME(ATR.PLEX1.RESTART)
     LOWOFFLOAD(60)
     HIGHOFFLOAD(80)
     DASDONLY(YES)
     HLQ(TEST)
     LS_SIZE(960)
     LS_DATACLAS(VSAMLS)
     STG_SIZE(960)
```

c) If you are using coupling facility log streams, compile and link-edit the changed CFRM policy.

d) If you are using coupling facility log streams, activate the updated CFRM policy in your Sysplex by using the following operator command:

```
SETXCF START,POLICY,TYPE=CFRM,POLNAME=polname
```

2. Establish the priority for RSS within the WLM policy.

   The RRS priority needs to be equal to or higher than the dispatching priority of Db2. You can use the SYSSTC service class for the RRS address space to achieve a higher dispatching priority.

3. Move the ATRRRS procedure that is supplied by IBM from SYS1.SAMPLIB to your SYS1.PROCLIB as member RRS, and make any necessary changes.

   This JCL procedure is used to start RRS.

   You can use a member name other than RRS, but the first four characters of this name must match the subsystem name that you specify in the IEFSSN*xx* member of SYS1.PARMLIB in the next step.

   The GNAME value in the procedure must match the *gname* that you specified when defining the log streams. The default value for *gname* at RRS startup is the Sysplex name.

The following example shows a sample procedure to start RRS.

```
//RRS   PROC GNAME='',CTMEM=''
//RRS   EXEC PGM=ATRIMIKE,REGION=0M,TIME=NOLIMIT,
//          PARM='GNAME=&GNAME CTMEM=&CTMEM'
//
```

4. Define RRS as a subsystem to z/OS by editing the active IEFSSN*xx* member of SYS1.PARMLIB to include the following entry:

   ```
   SUBSYS SUBNAME(RRS) /* RESOURCE RECOVERY SERVICES */
   ```

   The subsystem name can be RRS or any other name that you choose. However, the first four characters (or fewer characters if the name is shorter) must match the name of the JCL procedure to start RRS.

5. Start RRS by using the following operator command:

   ```
   START RRS
   ```

   If you subsequently need to stop RRS, use one of the following operator commands:

   - `SETRRS CANCEL`
   - `SETRRS SHUTDOWN`

   If neither of these commands stops RRS, use the `FORCE RRS,ARM` command. In this command, RRS is the subsystem name that your installation assigned to RRS in PARMLIB member IEFSSN*xx*.

Related reference

z/OS MVS Programming: Resource Recovery

Configuring and defining RRS logging requirements (z/OS MVS Programming: Resource Recovery)

Systems Programmer's Guide to Resource Recovery Services (RRS) (IBM Redbooks)

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Setting up a WLM application environment for stored procedures during migration

All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

About this task

If you use data sharing, see "Special considerations for WLM-managed stored procedures in coexistence" on page 613 for additional guidance about setting up WLM environments.

Recommendation: Use partitioned data set extended (PDSE) for load libraries that contain external modules for stored procedures. Using PDSEs might eliminate your need to stop and start the stored procedures address space due to growth of the load libraries. If a load library grows from additions or replacements, the library might need to be extended.

Procedure

To set up a WLM application environment for one or more stored procedures:

1. Gather requirements for the WLM environment. These requirements include:

   - The name of the Db2 subsystem or data sharing group where the stored procedure or user-defined function is to run.
   - The maximum number of task control blocks (TCBs) that can run concurrently in an address space that is initiated by the WLM environment. This setting, referred to as the NUMTCB, is the maximum number of procedures or functions that should run concurrently in that WLM-managed address

space. The appropriate setting depends on the requirements or limitations of the individual stored procedure or user-defined function.

  - For recommended NUMTCB values for Db2-supplied stored procedures, see "Installation information for procedures and functions that are supplied with Db2" on page 731.
  - For recommended NUMTCB values for your own stored procedures, see . If a routine allocates a large amount of memory or if the external module for the routine is not re-entrant, the NUMTCB value should be 1. If there is a need for serialization, the NUMTCB value should also be 1.
  - The WLM environment for a REXX stored procedure must have a NUMTCB setting of 1.

- Requirements for Authorized Program Facility (APF).
  - Stored procedures and user-defined functions that execute privileged instructions (for example, WLM_REFRESH) must run in a WLM environment that has an APF-authorized address space.
  - Db2 REXX stored procedures, such as DSNTPSMP, and other routines that use TSO/E and REXX facilities must run in a WLM environment that does not have an APF-authorized address space.
  - Most stored procedures can run in a WLM environment that either has or does not have an APF-authorized address space. However, running a routine in an APF-authorized environment is recommended only when doing so is necessary.
- Special data sets and DD names that are needed by the stored procedure or user-defined function. For example, all Java stored procedures implicitly require a Language Environment run time options data set to be allocated to DD name JAVAENV. Other routines might also have an explicit requirement for a work file to be allocated to a particular DD name.

2. Create a JCL startup procedure for the WLM application environment.

   Use *ssnm*WLM (where *ssnm* is the Db2 subsystem ID) as the basis for creating the new startup procedure. *ssnm*WLM is the default name of the sample JCL procedure for starting WLM-established address spaces. If you specified a name in the WLM PROC NAME field on the DSNTIPX installation panel, the sample procedure has that specified name. The sample procedure is placed in your system PROCLIB by installation job DSNTIJMV. For the DSNACICS stored procedure, DSNTIJMV also provides sample procedure *ssnm*CICS, where *ssnm* is the subsystem ID. Tailor your new startup procedure as follows:

   - Change the APPLENV value to the name of the WLM application environment that you plan to define.
   - Change the startup procedure name to an appropriate procedure name.

     Recommendation: Specify the same name for the application environment name and the procedure name. Using the same name simplifies monitoring the WLM environment definitions.
   - Change the value of DB2SSN to your Db2 subsystem name.
   - Ensure that the NUMTCB value is appropriate. If the minimum number of address spaces is specified, the NUMTCB value will be the number of task control blocks that are started in an address space.

     Recommendation: If you want to be able to easily change the NUMTCB value, specify the NUMTCB value here, and do not specify this parameter on the application environment definition panel when you define the WLM application environment. Specifying NUMTCB on the environment definition panel associates this parameter with the WLM application environment definition. Any changes to the JCL startup procedure can be made by refreshing the WLM application environment. However, changes to the WLM application environment require that you reinstall the z/OS service policy at an LPAR or sysplex level. If you specify the NUMTCB parameter for both the WLM application environment and the startup procedure, the value in the WLM application environment overrides the value in the startup procedure.
   - If the environment is one in which the cost of starting new address spaces is very high, you can use the MNSPAS parameter. The MNSPAS parameter specifies the minimum number of address spaces that are to be started and maintained. The value can be 0 through 50. The default value is 0, which means that no minimum number of address spaces is specified. If the number of address spaces is at the specified minimum, cancelling an address space causes WLM to start another one to maintain

the minimum. If you refresh a WLM environment, WLM starts a number of new address spaces as needed (or the specified minimum number) and stops the old address spaces.

If the MNSPAS parameter is specified, the NUMTCB value is the number of task control blocks that are started in an address space. If the MNSPAS parameter is not specified, the NUMTCB value is the maximum number of task control blocks that can be started in an address space.

- Edit the data set names to match your data set names.
- Ensure that the library in which the stored procedure resides is in the STEPLIB concatenation.
- Ensure that the IBM Language Environment run time library is specified in the STEPLIB concatenation, unless your system includes the Language Environment run time library in the system link list.
- If you want to run the stored procedure in a WLM environment that has an APF-authorized address space, ensure that all the libraries in the STEPLIB concatenation are defined to the Authorized Program Facility.
- Add any special DD statements that are required for the stored procedures or user-defined functions that are to run in the WLM environment.
  - If you plan to use stored procedures that use the ODBA interface to access IMS databases, make the following additional changes:
    - Add the data set name of the IMS data set that contains the ODBA callable interface code to the end of the STEPLIB concatenation. The name of this data set is usually IMS.RESLIB.
    - After the STEPLIB DD statement, add a DFSRESLB DD statement that names the IMS data set that contains the ODBA callable interface code.
  - If your routines are defined as PROGRAM TYPE SUB and use UNIX System Services (USS) syscall statements, you might need to add a NOUNDUB DD statement. By default, the USS process and its resources are cleaned up after every stored procedure and user-defined function invocation. If you need the task in this WLM environment to retain the process across subsequent invocations, add a dummy NOUNDUB DD statement. This option specifies that no cleanup will occur unless the WLM environment is refreshed. To enable this option, add the following statement to the WLM stored procedure address space startup JCL:

    ```
    //NOUNDUB DD DUMMY
    ```

    Use this option with caution because routines use the USS process that was used by the previous routine that was run under the same task. Also note that any open resources such as file descriptors remain open for the next routine that is run under the same task. Consider using this option on new workloads only if reusing the USS process is the desired behavior.

The following example shows a startup procedure for a WLM application environment for external SQL, COBOL, C, C++, PL/I, and assembler stored procedures. This startup procedure for external SQL stored procedures needs one unauthorized data set included in STEPLIB.

```
//*******************************************************************
//* JCL FOR RUNNING THE WLM-ESTABLISHED STORED PROCEDURES
//* ADDRESS SPACE
//* RGN     -- THE MVS REGION SIZE FOR THE ADDRESS SPACE.
//* DB2SSN  -- THE DB2 SUBSYSTEM NAME.
//* NUMTCB  -- THE NUMBER OF TCBS USED TO PROCESS
//*            END USER REQUESTS.
//* APPLENV -- THE MVS WLM APPLICATION ENVIRONMENT
//*            SUPPORTED BY THIS JCL PROCEDURE.
//*
//********************************************************************
//DB9AWLM PROC RGN=0K,APPLENV=WLMENV,DB2SSN=DB9A,NUMTCB=40,MNSPAS=3
//IEFPROC EXEC PGM=DSNX9WLM,REGION=&RGN,TIME=NOLIMIT,
//             PARM='&DB2SSN,&NUMTCB,&APPLENV,&MNSPAS'
//STEPLIB  DD  DISP=SHR,DSN=DB9AU.RUNLIB.LOAD
//         DD  DISP=SHR,DSN=CEE.SCEERUN
//         DD  DISP=SHR,DSN=DB9A9.SDSNEXIT
//         DD  DISP=SHR,DSN=DB9A9.SDSNLOAD
```

3. Define the application environment to WLM by using one of the following methods.

- Use the WLM administrative application (IWMARIN0) to define a new environment or copy or modify an existing one.

  a. In the first WLM panel, **Definition Menu**, enter 9 for Application Environments.

     The application environment definition panel is displayed.

  b. On the application environment definition panel, specify the appropriate action code:

     – Create a new WLM application environment.

     – Copy an existing WLM application environment.

     – Modify an existing WLM application environment.

     The appropriate panel for creating, copying or modifying the application environment is displayed.

  c. If you are creating or modifying a WLM environment, specify the appropriate options for the WLM application environment definition, using the same application environment name and procedure name that you specified for the startup procedure.

  d. After you specify the appropriate options, press Enter to create the application environment definition.

- Modify and run sample job DSNTIJRW. As provided, DSNTIJRW creates the core Db2 WLM environments, but you can modify the job to define your own WLM environments. Job DSNTIJMV copies an address space procedure for each of the Db2 core WLM environments into SYS1.PROCLIB.

4. Install the WLM service definition that contains information about the application environment by opening the WLM **Definition Menu** panel and selecting the **Install** function in the **Utilities** menu bar.
5. Activate the WLM service policy from the installed service definition by completing one of the following actions:

   - Issue the VARY WLM command as follows:

     ```
     VARY WLM,POLICY=policy-name
     ```

   - On the WLM **Definition Menu** panel, choose the **Activate service policy** option from **Utilities** menu bar.

6. Set up security for the WLM application environments and for creating stored procedures by completing the following actions:

   a) Specify which WLM-established address spaces can run stored procedures.

      If you do not complete this step, any WLM-established address space can run stored procedures.

   b) Grant access to users to create procedures in specific WLM address spaces.

   c) Grant access to users to create procedures in specific schemas. Use the GRANT statement with the CREATIN option for the appropriate schema.

   d) Grant access to users to create packages for procedures in specific collections. Use the GRANT statement with the CREATE option for the appropriate collection.

      Requirement: For native SQL procedures, the collection name for the package must be the same as the schema name.

   e) Grant access to refresh the WLM environments to the appropriate people.

   For more detail, see .

7. Ensure that the ID that is used to run the JCL startup procedure for the WLM application environment has permission to use RRSAF.

   Each time one of the Db2 WLM address spaces is started, it uses RRSAF to attach to Db2.

What to do next

When you create or alter a stored procedure, specify the WLM application environment that Db2 is to use in the WLM_ENVIRONMENT option of the CREATE or ALTER PROCEDURE statement. When you specify environments, be aware that:

- Routines that have low memory requirements and that are frequently called should not share an environment with routines that have high memory requirements and are rarely called. Otherwise, storage is wasted.
- Stored procedures can be grouped according to the authorization settings for a WLM environment.
- WLM environments should not be shared among routines that use the same DD name for different purposes.
- WLM environments should not be shared among routines if one routine allocates data sets in the environment and that routine is run only occasionally. If other routines that do not use the data sets use the environment, the data sets are kept artificially allocated, which might interfere with other tasks.

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

DSNTWLMB tool
The DSNTWLMB tool provides a batch interface for defining, installing, and activating WLM environments. You can also use DSNTWLMB to remove WLM application environments. This tool is invoked by job DSNTIJRW to create the core Db2 WLM environments.

set_dub_default (BPX1SDD, BPX4SDD) (z/OS UNIX System Services Programming): Assembler Callable Services Reference

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Using Operator Commands for Application Environments (z/OS MVS Planning: Workload Management)

Migration step 23: Set up Db2-supplied routines

Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Related tasks

Disabling Db2-supplied routines for validation
Job DSNTIJRT installs all Db2-supplied routines on your subsystem. After installation or migration, you can disable any routines that are unnecessary or unusable so the validation program can exclude it from processing.

Related reference

Installation information for procedures and functions that are supplied with Db2
Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

Related information

Setting up the Db2 core WLM environments during migration

Db2 stored procedures (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space. If you completed this task when you installed or migrated to DB2 10, you do not need to complete this task again. Continue your migration with the next step.

About this task

For Db2-supplied routines, you can use the provided definitions for core WLM environments as a starting point for defining your environments. You can also manually define the WLM environments by using the IWMARIN0 application, as described in "Setting up a WLM application environment for stored procedures during installation" on page 392.

Exception: You do not need to complete this configuration task for native SQL procedures unless they call at least one external stored procedure or external SQL procedure. This task also applies to native SQL procedures that call at least one user-defined function or that are defined with ALLOW DEBUG MODE or DISALLOW DEBUG MODE. Otherwise, this task applies to only user-defined functions, external stored procedures, external SQL procedures, and Db2-supplied stored procedures

Procedure

Run job DSNTIJRW.

Job DSNTIJRW invokes the DSNTWLMB tool to create the core WLM environments. The CLIST assigns the core WLM environment names in DSNTIJRW according to the values that are specified on panel DSNTIPR1. For detailed information about the environments that are created by DSNTIJRW, see "Core WLM environments for Db2-supplied routines" on page 739.

Related concepts

WLM management of stored procedures
Workload Manager (WLM) is a component of z/OS that manages incoming work requests for the operating system and allocates available system resources to meet these requests. Db2 for z/OS uses WLM to allocate workload requests for Db2 stored procedures.

Related reference

DSNTWLMB tool
The DSNTWLMB tool provides a batch interface for defining, installing, and activating WLM environments. You can also use DSNTWLMB to remove WLM application environments. This tool is invoked by job DSNTIJRW to create the core Db2 WLM environments.

DSNTIPR1: Parameters for Db2-supplied routines panel
The DSNTIPR1 panel enables you to establish default WLM environment names for Db2-supplied routines and to access panels for advanced configuration of these routines.

Installing Db2-supplied routines during migration

The DSNTIJRT and DSNTIJRV jobs install and validate the installation of routines that are supplied with Db2. These jobs are configured with the options that you specified on installation panel DSNTIPR1 and panels DSNTIPRA through DSNTIPRP.

Before you begin

If the RACF facility class is active and a profile was defined for MVSADMIN.WLM.POLICY, the user that runs the DSNTIJRV job requires READ access. To grant READ access to a user, an administrator must submit the following command:

```
PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(user) ACCESS(READ)
```

If the RACF OPERCMDS class is active and a profile was defined for MVS.MCSOPER.*, the user ID that runs the DSNTIJRV job requires READ access. Alternatively, you can add a discrete profile for the DSNTRVFY console that is used in this job. To add a discrete profile for the DSNTRVFY console, an administrator must complete the following steps:

1. Establish a discrete profile for MVS.MCSOPER.DSNTRVFY by issuing the following command:

   ```
   RDEFINE OPERCMDS MVS.MCSOPER.DSNTRVFY UACC(NONE)
   ```

2. Grant READ access to the user that runs the DSNTIJRV job by issuing the following command:

   ```
   PERMIT MVS.MCSOPER.DSNTRVFY CLASS(OPERCMDS) ID(user) ACCESS(READ)
   ```

3. Refresh the OPERCMDS class by issuing the following command:

   ```
   SETROPTS RACLIST(OPERCMDS)REFRESH
   ```

Resource Recovery Services (RRS) is also required for these jobs.

Important: Job DSNTIJRT defines, binds, and grants access to stored procedures and user-defined functions. The default setting for GRANT EXECUTE is PUBLIC, meaning that anyone who can access Db2 can use these stored procedures. Use the GRANT EXECUTE fields on panels DSNTIPRB through DSNTIPRP to specify different access lists when you run the installation CLISTS.

Before running job DSNTIRT, review the configuration statements under the CFIGIN DD statement to verify the settings of the WLMENV, GRANTTO, and optional PKGOWNER parameters.

Remember: If you copy Db2 library data sets from one system another, such as for installing a related test or production subsystem, ensure that you copy all of the Db2 library data sets to the same location. For example, if you copy the SDNSLOAD data set from one system to another but omit the DBRMLIB data set, the resulting mismatch can cause job DSNTIJRT to fail with SQLCODE -812.

About this task

You might have already installed these routines when on your Db2 10 subsystem. In that case, the purpose of running job DSNTIJRT in Db2 11 conversion mode is to drop any instances of the AMI-based MQ functions that are not supported in Db2 11. It also binds Db2 11 packages for Db2-supplied routines that were migrated from Db2 10. Running the job might result in other changes, such as adding routines that were available in Db2 10 but not installed on this subsystem and maintaining SQL objects that were modified during service of Db2 10.

Procedure

To install the Db2-supplied routines:

1. Run job DSNTIJRT.
2. After DSNTIJRT successfully completes, run job DSNTIJRV to validate the installation of the routines.
3. If you did not perform any of the following steps when you originally installed the Db2 subsystem, perform them for any of the following routines that you plan to begin using in Db2 11.
   - The stored procedures for XML schema support
   - The administrative task scheduler routines and administrative enablement routines
   - The CICS transaction invocation procedure
   - The common SQL API stored procedures
   - The IBM MQ user-defined functions
   - The web service user-defined functions

What to do next

After installing the Db2-supplied routines, you can choose to disable any of the routines that are unnecessary or unusable on your subsystem.

Related concepts

Configuration control statements for Db2-supplied routines
Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Related tasks

Disabling Db2-supplied routines for validation
Job DSNTIJRT installs all Db2-supplied routines on your subsystem. After installation or migration, you can disable any routines that are unnecessary or unusable so the validation program can exclude it from processing.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Related information

Job DSNTIJRT

Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

DSNTIJRT provides a *configuration control statement* for each Db2-supplied routine and the mode for processing those statements. The configuration control statement specifies the WLM environment, list of authorization IDs that are allowed to execute the routine, and optional package owner for the routine. DSNTRIN reads and validates those statements and uses them to create and customize routines and supporting objects.

Format

DSNTRIN accepts the following parameters:

DB2SSN

Identifies the Db2 subsystem on which to install and configure the Db2-supplied routines.

MODE

During SQL processing, DSNTRIN configures each routine with the WLM environment specified in the configuration control statement for that routine. Processing behavior depends on the DSNTRIN run mode, the Db2 catalog mode, and which objects already exist.

INSTALL

This is the normal operating mode. Use it when installing or migrating to Db2.

Create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the routine already exists, it is updated, if necessary, to use the WLM environment specified in the configuration control statement for that routine. If the package for a routine already exists, it is not bound again unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. If a supporting object is used by more than one routine, the object is created when one of those routines is first created.

REINSTALL

This mode behaves like INSTALL mode, except that existing Db2-supplied routines and created global temporary tables are dropped ahead of other processing. Existing related databases, table spaces, tables, and indexes are not dropped, except as discussed in the special notices section of the DSNTIJRT job prolog.

Use REINSTALL mode only if you have a specific need to drop and re-create all Db2-supplied routines. Before running the job, verify that each GRANTTO statement in DSNTIJRT specifies all users who are authorized to use that routine.

In particular, use this mode to create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the package for a routine already exists, it is not rebound unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. Existing routines and any related created global temporary tables are first dropped before they are re-created. Related databases are not dropped if they already exist, but they are created if they do not exist. If a supporting object is used by more than one routine, the object is created when one of those routines is first created. Drop processing of routines and related objects that do not exist is bypassed.

REINITIALIZE

This mode behaves like REINSTALL mode, except that existing databases, table spaces, tables, and indexes used by the Db2-supplied routines are also dropped ahead of other processing.

REINITIALIZE mode drops and reinitializes databases such as the XSR database that may contain information needed by Db2 for other processing. Therefore, use REINITIALIZE mode only when advised to do so by IBM Support. Before running the job, verify that each GRANTTO statement in DSNTIJRT specifies all users who are authorized to use that routine.

In particular, use this mode to create, bind, and grant access to the Db2-supplied routine according to the WLMENV and GRANTTO parameters of the configuration control statement. If the package for a routine already exists, it is not rebound unless the DBRM has been updated or the package has been invalidated. Create, initialize, and grant access to any related objects required by the routine, such as a database or created global temporary table. Existing routines, existing related created global temporary tables, and existing related databases are first dropped before they are re-created. After each SQL statement, a COMMIT statement is issued. If a supporting object is used by more than one routine, the object is created when one of those routines is first created.

INSTALL-PREVIEW

Simulate INSTALL mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

REINSTALL-PREVIEW

Simulate REINSTALL mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

REINITIALIZE-PREVIEW

Simulate REINITIALIZE mode without updating the system. Generated JCL with embedded DDL and bind statements is outputted to the JCLOUT DD statement.

AUTHID

DSNTRIN uses this value as the CURRENT SQLID for creating and configuring most Db2-supplied routines. DSNTRIN also uses this value as the default OWNER for binding packages for the Db2-supplied routines that do not have the PKGOWNER specified in the configuration control statement.

SECDEFID

DSNTRIN uses this value as the CURRENT SQLID setting when creating and configuring Db2-supplied routines that are defined with the SECURITY DEFINER option.

The ID that you specify for SECDEFID must be an ID that can be used as a logon ID, because WLM uses the ID to execute Db2-supplied routines that are defined with SECURITY DEFINER.

Input

DSNTRIN allocates the following DD statements for input:

DBRMLIB

Location of the DBRMs for Db2-supplied routines. This is typically the *prefix*.SDSNDBRM target library.

SYSUT1

Internal work file for the Db2 installation bind interface (DSNTRBI).

CFIGIN
Location of the configuration control statements for Db2-supplied routines.

DB2OPT
This required DD can contain the following optional parameters:

STOGROUP
Specifies a storage group to use for creating databases and table spaces that are used by the routines that are supplied with Db2. If this parameter is not specified, the default SYSDEFLT storage group is used.

INDEXSTOG
Specifies a storage group to use for creating indexes instead of the default SYSDEFLT storage group.

BP4K
Specifies an alternate 4-KB buffer pool for base table spaces that are created by DSNTRIN. The default 4-KB buffer pool is BP0.

BP8K
Specifies an alternate 8-KB buffer pool for base table spaces that are created by DSNTRIN. The default 8-KB buffer pool is BP8K0.

BP16K
Specifies an alternate 16-KB buffer pool for base table spaces that are created by DSNTRIN. The default 16-KB buffer pool is BP16K0.

BP32K
Specifies an alternate 32-KB buffer pool for base table spaces that are created by DSNTRIN. The default 32-KB buffer pool is BP32K.

LOBBP8K
Specifies an alternate 8-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 8-KB buffer pool is BP8K0.

LOBBP16K
Specifies an alternate 16-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 16-KB buffer pool is BP16K0.

LOBBP32K
Specifies an alternate 32-KB buffer pool for LOB table spaces that are created by DSNTRIN. The default 32-KB buffer pool is BP32K0.

IMS_SECURITY
The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied IMS routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 IMS routines are altered if needed to conform with the SECURITY type that is specified here.

MQ_SECURITY
The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied MQ routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 MQ routines are altered if needed to conform with the SECURITY type that is specified here.

SOAP_SECURITY
The SECURITY type (Db2, DEFINER, or USER) for the Db2-supplied web services/SOAP routines. SECURITY Db2 is assumed when this keyword is not specified. Existing Db2 SOAP routines are altered if needed to conform with the SECURITY type that is specified here.

Note: DSNTRIN does not create or activate this storage group or any of these buffer pools.

Output

DSNTRIN allocates the following DD statements for output:

SYSPRINT
Destination for echo of configuration control statements that are read and for messages that are generated during processing. Each processed routine generates at least one status message.

SYSTSPRT

Internal message file for the Db2 installation bind interface (DSNTRBI).

CFIGOUT

Destination for configuration control statements that are read by DSNTRIN. This output is useful for diagnostic purposes when DSNTRIN reports an error in a configuration control statement.

SQLOUT

Destination for DDL statements that are generated and processed by DSNTRIN. These statements are useful for diagnostic purposes.

BINDOUT

Destination for bind statements that are generated and processed by DSNTRIN. These statements are useful for diagnostic purposes.

JCLOUT

Destination for a generated sample job that is generated when one of the PREVIEW modes is specified. The job contains steps that process inline DDL and bind statements that are needed to install and configure missing, down-level, or incorrectly configured Db2-supplied routines. This DD is required if you specify a PREVIEW mode.

Example of executing DSNTRIN in INSTALL mode:

```
//DSNTRIN  EXEC PGM=DSNTRIN
//         PARM=('DB2SSN(VA1A) MODE(INSTALL) AUTHID(AUTHID) SECDEFI-
           D(ADMF001)')
//DBRMLIB  DD DISP=SHR,DSN=DSN!!0.SDSNDBRM
//SYSUT1   DD UNIT=SYSDA,SPACE=(27930,(10,5)),
//            DCB=(RECFM=FB,LRECL=133)
//SYSPRINT DD SYSOUT=*,DCB=(RECFM=FB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//CFIGOUT  DD SYSOUT=*
//SQLOUT   DD SYSOUT=*
//BINDOUT  DD SYSOUT=*
//DB2OPT   DD *
 STOGROUP(DB2_ROUTINES_GROUP)
 INDEXSTOG(DB2_INDEX_GROUP)
 BP4K(BP0)
 BP8K(BP8K0)
 BP16K(BP16K0)
 BP32K(BP32K)
 LOBBP8K(BP8K0)
 LOBBP16K(BP16K0)
 LOBBP32K(BP32K0)
 IMS_SECURITY(DB2)
 MQ_SECURITY(DB2)
 SOAP_SECURITY(DB2)

/*
//CFIGIN   DD *
  ...
SYSPROC.DSNWSPM
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)

SYSPROC.DSNWZP
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)
  ...
//*
```

Example of executing DSNTRIN in INSTALL-PREVIEW mode:

```
//DSNTRIN  EXEC PGM=DSNTRIN
//         PARM='DB2SSN(VA1A) MODE(INSTALL-PREVIEW) AUTHID(AUTHID)'
//DBRMLIB  DD DISP=SHR,DSN=DSN!!0.SDSNDBRM
//SYSUT1   DD UNIT=SYSDA,SPACE=(27930,(10,5)),
//            DCB=(RECFM=FB,LRECL=133)
//SYSPRINT DD SYSOUT=*,DCB=(RECFM=FB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//CFIGOUT  DD SYSOUT=*
//SQLOUT   DD SYSOUT=*
```

```
//BINDOUT  DD SYSOUT=*
//JCLOUT   DD DSN=USER.JCLLIB(DB2INST),DISP=SHR
//DB2OPT   DD *
 STOGROUP(DB2_ROUTINES_GROUP)
 INDEXSTOG(DB2_INDEX_GROUP)
 BP4K(BP0)
 BP8K(BP8K0)
 BP16K(BP16K0)
 BP32K(BP32K)
 LOBBP8K(BP8K0)
 LOBBP16K(BP16K0)
 LOBBP32K(BP32K0)
 IMS_SECURITY(DB2)
 MQ_SECURITY(DB2)
 SOAP_SECURITY(DB2)
/*
//CFIGIN   DD *
  ...
SYSPROC.DSNWSPM
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)

SYSPROC.DSNWZP
WLMENV(DSNWLM_NUMTCB1)
GRANTTO(PUBLIC)
  ...
//*
```

Related concepts

Configuration control statements for Db2-supplied routines
Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Installation and migration jobs that the CLIST tailors
The installation CLIST uses the values that you specify on the installation panels to tailor and load the installation or migration jobs. Each job is composed of one or more JCL procedures or job steps.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Job DSNTIJRV

Job DSNTIJRV validates the Db2-supplied routines by executing program DSNTRVFY. You should validate these routines after Db2 installation and after each phase of migration.

DSNTRVFY validates a single routine, multiple routines, or all Db2-supplied routines. DSNTRVFY produces a report that identifies routines that passed the validation and possible problem areas for routines that failed.

Authorizations

If the RACF facility class is active and a profile was defined for MVSADMIN.WLM.POLICY, the user that submits this job requires READ access.

If the RACF OPERCMDS class is active and a profile was defined for MVS.MCSOPER.*, the user ID that submits this job requires READ access. Alternatively, you can add a discrete profile for the DSNTRVFY console that is used in this job.

Format

DSNTRVFY accepts the following required parameters:

DB2SSN(*ssid*)
Identifies which Db2 subsystem to connect to for validating the Db2-supplied routines.

ROUTINE(*name*)

Identifies which Db2-supplied routine needs to be validated. The following values are supported for *name*:

- A routine name in the form of *schema-name.routine-specific-name*.
- The keyword **`DD:SYSIN`** to specify a list of routines. List the routines in the form of *schema-name.routine-specific-name* under the SYSIN DD statement with one routine per line.
- The keyword **`ALL`** to specify all Db2-supplied routines.

DSNTRVFY also accepts the following optional parameters:

AUTHID(authorization ID)

DSNTRVFY uses this value as the OWNER for BIND PACKAGE and BIND PLAN statements and as the CURRENT SQLID for issued SQL statements. If this value is not specified, the primary authorization ID is used for BIND PACKAGE, BIND PLAN, and issued SQL statements.

Output

DSNTRVFY allocates the following required DD statements for output:

SYSPRINT

Contains messages generated during verification processing. Each processed routine can generate one or more messages.

SYSTSPRT

DSNTRVFY writes bind output to SYSTSPRT if an error occurs during bind processing.

The following JCL example is for validating a single routine:

```
//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(SYSPROC.DSNUTILS)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
```

The following JCL example is for validating multiple routines:

```
//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(DD:SYSIN)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
  SYSPROC.DSNWZP
  SYSPROC.DSNACCOR
  SYSPROC.DSNUTILS
  SYSPROC.DSNUTILU
```

The following JCL example is for validating all routines:

```
//DSNTJVFY EXEC PGM=DSNTRVFY,
//         PARM='DB2SSN(VA1A) ROUTINE(ALL) AUTHID(FVTGRP2)'
//DBRMLIB  DD DSN=DB2A.SDSNDBRM,DISP=SHR
//SYSUT1   DD UNIT=SYSDA,SPACE=(32000,(30,30)),DCB=(RECFM=VB,LRECL=133)
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
```

Processing

DSNTRVFY completes the following validation:

- Verifies that the routine is defined to the SYSIBM.SYSROUTINES catalog.

- Verifies that the collection ID defined in the SYSIBM.SYSROUTINES catalog table matches the collection ID used to bind the package.
- Verifies that the routine is currently defined with the Db2-reserved WLM application environment name DSNWLM_NOT_ENABLED, indicating that it is not enabled to run on the current Db2 subsystem. If it is, then a warning message is issued and the validation is bypassed.
- Verifies if the routine can be executed on the current Db2 catalog mode.
- Verifies the APF authorization requirements.
- Verifies if the WLM application environment is defined and available for use.
- Verifies if the NUMTCB setting is valid or within the recommended range.
- Verifies if the required DD statements for some of the routines are defined.
- Verifies if the WLM environment assigned to Java routines is enabled for Java.
- Verifies security coexistence requirements (for example, some routines should run on only their own WLM application environment).
- Verifies that the selected routine can be called successfully. Certain routines such as DSNACICS, DSNAIMS, IBM MQ functions, and most debugger routines are restricted to basic validation and are not called.

During the running of this job, the following message might be issued on the system console:

```
IEFC452I  DB2UDSMD - JOB NOT RUN - JCL ERROR
```

In most cases, this message is normal and can be disregarded. If you use IBM Optim Development Studio, see Debugging stored procedures on Db2 for z/OS with Optim Development Studio, Part 2 (IBM developerWorks) for information about DB2UDSMD.

If the validation is successful, the following message is issued:

`DSNT027I DSNTRVFY VALIDATION FOR` *`schema.routine-specific-name`* `SUCCESSFUL`

If the validation fails, messages are issued to explain the reasons for failure. Examine these messages and make necessary adjustments before running the validation job again.

Input

DSNTRVFY requires the following DD statements for input:

DBRMLIB
Identifies the library where the DBRM for the DSNTRVFY program is located. This is typically the *prefix*.SDSNDBRM target library.

SYSIN
Contains the list of Db2 routines. This is required when the validation type is for multiple routines (DD:SYSIN).

SYSUT1
Work data set required for bind processing.

Limitations

The following limitations apply to the DSNTRVFY program:

- The name of the routine in the form *schema-name.routine-specific-name* is limited to 72 characters, the maximum line length in JCL.
- Only Db2 11 Db2-supplied routines are supported for validation.
- Some routines, if enabled, receive basic validation to ensure that they are defined correctly and assigned to a valid WLM application environment. However, validation will not extend to calling these routines for one or more of the following reasons:
  - Optional system support such as CICS, IMS, or IBM MQ is required.
  - External setup on a remote server or workstation is required.

- A call could introduce or modify data unexpectedly in a production environment.

The Db2-supplied routines that are restricted to basic validation are:

- DB2DEBUG.CREATE_SESSION
- DB2DEBUG.DESTROY_SESSION
- DB2DEBUG.GET_REPORT
- DB2DEBUG.LIST_SESSION
- DB2DEBUG.PUT_COMMAND
- SYSFUN.SYSTS_ENCRYPT
- SYSFUN.XSLTRANSFORM
- SYSPROC.ADMIN_COMMAND_UNIX
- SYSPROC.ADMIN_JOB_CANCEL
- SYSPROC.ADMIN_JOB_FETCH
- SYSPROC.ADMIN_JOB_QUERY
- SYSPROC.ADMIN_JOB_SUBMIT
- SYSPROC.DBG_ENDSESSIONMANAGER
- SYSPROC.DBG_INITIALIZECLIENT
- SYSPROC.DBG_RECVCLIENTREPORTS
- SYSPROC.DBG_SENDCLIENTREQUESTS
- SYSPROC.DBG_SENDCLIENTCOMMANDS
- SYSPROC.DBG_TERMINATECLIENT
- SYSPROC.DSNACICS
- SYSPROC.DSNAIMS
- SYSPROC.DSNAIMS2
- SYSPROC.DSNLEUSR
- SYSPROC.SET_MAINT_MODE_RECORD_NO_TEMPORALHISTORY
- SYSPROC.SYSTS_ALTER
- SYSPROC.SYSTS_CREATE
- SYSPROC.SYSTS_DROP
- SYSPROC.SYSTS_RESTORE
- SYSPROC.SYSTS_START
- SYSPROC.SYSTS_STOP
- SYSPROC.SYSTS_TAKEOVER
- SYSPROC.SYSTS_UPDATE
- All IBM MQ, web services, and SOAP functions (those with schema DB2MQ, DB2MQ1C, DB2MQ2C, or DB2XML)

Notes

Temporary stored procedures used by DSNTIJRV

DSNTRVFY creates, calls, and drops two temporary stored procedures. These temporary stored procedures are SYSPROC.DSNWLM_INSTALL_INFOJ and SYSPROC.DSNWLM_INSTALL_INFO. Both of these stored procedures exist only when DSNTRVFY is executing. DSNTRVFY calls SYSPROC.DSNWLM_INSTALL_INFOJ to validate the WLM environment that is assigned to each Db2-supplied Java routine. DSNTRVFY calls SYSPROC.DSNWLM_INSTALL_INFO to validate the WLM environment that is assigned to each Db2-supplied non-Java routine that runs in a WLM environment.

Using DSNTIJRV to verify 64-bit Java routines

Java on z/OS has two types of architectures: a 31-bit version and a 64-bit version. If your Java routines run in a 31-bit Java virtual machine (JVM), the startup procedure for the WLM environment in which the routines run must initialize a 31-bit environment. If you are running Java routines in a 64-bit JVM, the startup procedure for the WLM environment in which your Java routines run must initialize a 64-bit environment. The program that initializes a 31-bit WLM environment is DSNX9WLM. The program that initializes a 64-bit WLM environment is DSNX9WJM.

For example, you might use the Db2 core Java WLM environment, DSNWLM_JAVA, for your Java routines. By default, the DSNWLMJ startup procedure for DSNWLM_JAVA runs program DSNX9WLM. If your JAVA_HOME environment variable specifies the path to a 31-bit JVM, such as /usr/lpp/java/IBM/J8.0, you need to run program DSNX9WLM to initialize the WLM environment. However, if your JAVA_HOME variable specifies a path to a 64-bit JVM, such as /usr/lpp/java/8.0_64, you need to run program DSNX9WJM to initialize the WLM environment. If you switch to a 64-bit JVM for your Java stored procedures, but do not update the initialization program to DSNX9WJM, DSNTIJRV fails.

Related information

Migration step 24: Convert EXPLAIN tables to the current format

When you migrate to Db2 11, you should convert your EXPLAIN tables to the current (Db2 11) format.A table that is not in the current format has fewer columns than are available in the current release, or it has columns that have a different length or data type than expected in the current release.

About this task

Starting in Db2 11 conversion mode, statements or commands that invoke EXPLAIN processing return SQLCODE +20520 reason code 2 if an EXPLAIN table is in Db2 10 format.

Db2 returns SQLCODE -20008 reason code 2 for statements or commands that invoke EXPLAIN processing if the EXPLAIN tables are in a pre-DB2 10 format. As of Db2 10, EXPLAIN tables are required to be encoded in Unicode. If an EXPLAIN table is encoded in EBCDIC, SQLCODE -878 is returned.

Procedure

To convert EXPLAIN tables:

1. You can identify EXPLAIN tables that are in a pre-Db2 11 format by running the following query:

   GUPI

```
WITH OLD_FORMAT_EXPLAIN_TABLES (FULL_NAME) AS
( SELECT STRIP(TBCREATOR) || '.' || STRIP(TBNAME)
FROM SYSIBM.SYSCOLUMNS
WHERE TBNAME IN( 'DSN_COLDIST_TABLE'
, 'DSN_DETCOST_TABLE'
, 'DSN_FILTER_TABLE'
, 'DSN_FUNCTION_TABLE'
, 'DSN_KEYTGTDIST_TABLE'
, 'DSN_PGRANGE_TABLE'
, 'DSN_PGROUP_TABLE'
, 'DSN_PREDICAT_TABLE'
, 'DSN_PROFILE_HISTORY'
, 'DSN_PROFILE_TABLE'
, 'DSN_PTASK_TABLE'
, 'DSN_QUERY_TABLE'
, 'DSN_QUERYINFO_TABLE'
, 'DSN_SORT_TABLE'
, 'DSN_SORTKEY_TABLE'
, 'DSN_STATEMENT_CACHE_TABLE'
, 'DSN_STATEMNT_TABLE'
, 'DSN_STRUCT_TABLE'
, 'DSN_VIEWREF_TABLE'
, 'DSN_VIRTUAL_INDEXES'
, 'PLAN_TABLE'
)
GROUP BY TBCREATOR, TBNAME
```

```
HAVING (TBNAME = 'DSN_COLDIST_TABLE'
AND MAX(COLNO) < 21)
OR (TBNAME = 'DSN_DETCOST_TABLE'
AND MAX(COLNO) < 136)
OR (TBNAME = 'DSN_FILTER_TABLE'
AND MAX(COLNO) < 18)
OR (TBNAME = 'DSN_FUNCTION_TABLE'
AND MAX(COLNO) < 20)
OR (TBNAME = 'DSN_KEYTGTDIST_TABLE'
AND MAX(COLNO) < 21)
OR (TBNAME = 'DSN_PGRANGE_TABLE'
AND MAX(COLNO) < 15)
OR (TBNAME = 'DSN_PGROUP_TABLE'
AND MAX(COLNO) < 42)
OR (TBNAME = 'DSN_PREDICAT_TABLE'
AND MAX(COLNO) < 42)
OR (TBNAME = 'DSN_PROFILE_HISTORY'
AND MAX(COLNO) < 15)
OR (TBNAME = 'DSN_PROFILE_TABLE'
AND MAX(COLNO) < 15)
OR (TBNAME = 'DSN_PTASK_TABLE'
AND MAX(COLNO) < 25)
OR (TBNAME = 'DSN_QUERY_TABLE'
AND MAX(COLNO) < 16)
OR (TBNAME = 'DSN_QUERYINFO_TABLE'
AND MAX(COLNO) < 18)
OR (TBNAME = 'DSN_SORT_TABLE'
AND MAX(COLNO) < 16)
OR (TBNAME = 'DSN_SORTKEY_TABLE'
AND MAX(COLNO) < 21)
OR (TBNAME = 'DSN_STATEMENT_CACHE_TABLE'
AND MAX(COLNO) < 68)
OR (TBNAME = 'DSN_STATEMNT_TABLE'
AND MAX(COLNO) < 16)
OR (TBNAME = 'DSN_STRUCT_TABLE'
AND MAX(COLNO) < 20)
OR (TBNAME = 'DSN_VIEWREF_TABLE'
AND MAX(COLNO) < 13)
OR (TBNAME = 'DSN_VIRTUAL_INDEXES'
AND MAX(COLNO) < 150)
OR (TBNAME = 'PLAN_TABLE'
AND MAX(COLNO) < 66)
UNION
SELECT STRIP(TBCREATOR) || '.' || STRIP(TBNAME)
FROM SYSIBM.SYSCOLUMNS
WHERE TBNAME IN( 'DSN_DETCOST_TABLE'
, 'DSN_FILTER_TABLE'
, 'DSN_FUNCTION_TABLE'
, 'DSN_PGRANGE_TABLE'
, 'DSN_PGROUP_TABLE'
, 'DSN_PREDICAT_TABLE'
, 'DSN_PROFILE_HISTORY'
, 'DSN_PROFILE_TABLE'
, 'DSN_PTASK_TABLE'
, 'DSN_QUERY_TABLE'
, 'DSN_SORT_TABLE'
, 'DSN_SORTKEY_TABLE'
, 'DSN_STATEMENT_CACHE_TABLE'
, 'DSN_STATEMENT_RUNTIME_INFO'
, 'DSN_STATEMNT_TABLE'
, 'DSN_STRUCT_TABLE'
, 'DSN_VIEWREF_TABLE'
, 'DSN_VIRTUAL_INDEXES'
, 'PLAN_TABLE'
)
AND ( (NAME = 'ACCESSCREATOR' AND LENGTH <> 128)
OR (NAME = 'ACCESSNAME' AND LENGTH <> 128)
OR (NAME = 'APPLNAME' AND LENGTH <> 24)
OR (NAME = 'COLLID' AND LENGTH <> 128)
OR (NAME = 'CORRELATION_NAME' AND LENGTH <> 128)
OR (NAME = 'CREATOR' AND LENGTH <> 128)
OR (NAME = 'FUNCTION_NAME' AND LENGTH <> 128)
OR (NAME = 'FUNCTION_TEXT' AND LENGTH <> 1500)
OR (NAME = 'GROUP_MEMBER' AND LENGTH <> 24)
OR (NAME = 'HINTUSED' AND LENGTH <> 128)
OR (NAME = 'OPTHINT' AND LENGTH <> 128)
OR (NAME = 'PATH' AND LENGTH <> 2048)
OR (NAME = 'PLANNAME' AND LENGTH <> 24)
OR (NAME = 'PROGNAME' AND LENGTH <> 128)
OR (NAME = 'REMARKS' AND LENGTH <> 762)
OR (NAME = 'SCHEMA_NAME' AND LENGTH <> 128)
OR (NAME = 'SPEC_FUNC_NAME' AND LENGTH <> 128)
OR (NAME = 'TNAME' AND LENGTH <> 128)
OR (NAME = 'VERSION' AND LENGTH <> 122)
OR (NAME = 'VIEW_CREATOR' AND LENGTH <> 128)
OR (NAME = 'VIEW_NAME' AND LENGTH <> 128)
)
)
SELECT DISTINCT(FULL_NAME)
FROM OLD_FORMAT_EXPLAIN_TABLES
ORDER BY FULL_NAME;
```

GUPI

2. If the query identifies any EXPLAIN tables that are not in Db2 11 format, customize and run job DSNTIJXA.

   Job DSNTIJXA calls REXX exec DSNTXTA, which alters to the Db2 11 format all EXPLAIN tables or EXPLAIN tables that belong to the specified creator ID.

   To customize the job, provide the creator ID of the tables to migrate to the Db2 11 format, a Db2 subsystem name, and an authorization ID. To migrate all EXPLAIN tables, specify an asterisk as the creator ID.

Related information

Migration step 25: Verify views

During migration to Db2 11 conversion mode, some views might be marked with view regeneration errors. If any views are marked with view regeneration errors, you can regenerate those views again.

Procedure

GUPI To verify views:

1.
2. Issue the following query to determine which views were marked with view regeneration errors during migration:

```
SELECT CREATOR,NAME
FROM SYSIBM.SYSTABLES
WHERE TYPE = 'V'
AND STATUS = 'R'
AND TABLESTATUS = 'V'
```

3. If any views have view regeneration errors, issue the following ALTER VIEW statement:

```
ALTER VIEW view REGENERATE
```

   where *view* is the name of the view with regeneration errors.

   You can use the DSNTIAUL program to generate the ALTER VIEW statement as follows:

```
// EXEC PGM=IKJEFT01
//SYSTSPRT DD  SYSOUT=*
//SYSTSIN  DD *
  DSN SYSTEM(dsn)
    RUN PROGRAM(DSNTIAUL) PLAN(DSNTIB10) +
      LIB('prefix.RUNLIB.LOAD') PARMS('SQL')
  END
/*
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  *
  SELECT SUBSTR(
    'ALTER VIEW '
    || STRIP(CREATOR) || '.' || NAME
    || ' REGENERATE ;'
    || '                                        '
    || '                                        '
    ,1,80)
    FROM SYSIBM.SYSTABLES
    WHERE TYPE = 'V'
    AND STATUS = 'R'
    AND TABLESTATUS = 'V'

  ;
/*
//SYSPUNCH DD  DUMMY
//SYSREC00 DD  DISP=(NEW,CATLG,DELETE),
//             DSN=&SYSUID.SQLTIAUL.ALTVIEWS,
//             UNIT=SYSDA,SPACE=(TRK,(750,75),RLSE)
```

GUPI

Migration step 26: Take an image copy of the Db2 11 conversion mode catalog: DSNTIJIC

For backup purposes, create a copy of the Db2 11 conversion mode catalog and directory.

Procedure

Run the Db2 11 DSNTIJIC job.

COPY returns message DSNU1530I for each table space that has not yet been defined. These table spaces are defined as part of enabling-new-function mode.

Related information

Migration step 27: Verify your Db2 11 conversion mode system (optional)

Verify your Db2 11 conversion mode system by running some of the sample jobs from your previous release.

About this task

If all of the local Db2 objects from Db2 10 still exist (that is, if you have not run job DSNTEJ0), follow this procedure.

Procedure

To verify your Db2 11 conversion mode system:

1. Change the JOBLIB statements to point to *prefix*.SDSNLOAD.
2. Ensure that the DSN8EAE1 module that you created when you originally ran the Db2 10 sample jobs is copied to *prefix*.SDSNEXIT. DSN8EAE1 is an EDITPROC that is used by the employee sample table.
3. Edit the Db2 10 sample jobs before running them. Do not run all the sample jobs. Run only the specific jobs and job steps that are listed in the following steps.
4. Test the migration of the IVP phase 2 applications from your previous version:

    a. DSNTEJ2A: Perform all except the first two steps of job DSNTEJ2A. Expect a return code of 4 because table spaces DSN8D10U.NEWDEPT and DSN8D10U.NEWPHONE are placed in COPY-pending states.

    b. DSNTEJ2C: Issue only the RUN PROGRAM(DSN8BC3) PLAN(DSN8BH10) statement in step PH02CS04.

    c. DSNTEJ2D: Issue only the RUN PROGRAM(DSN8BD3) PLAN(DSN8BD10) statement in step PH02DS03.

    d. DSNTEJ2E: Issue only the RUN PROGRAM(DSN8BE3) PLAN(DSN8BE10) statement in step PH02ES04.

e. DSNTEJ2F: Issue only the RUN PROGRAM(DSN8BF3) PLAN(DSN8BF10) statement in step PH02FS03.

f. DSNTEJ2P: Run only step PH02PS05.

5. Test the migration of the IVP phase 3 applications from your previous version:

   a) Do not run job DSNTEJ3C or DSNTEJ3P.

   b) If you want to test the Db2 10 ISPF-CAF applications under Db2 11, place the Db2 10 SDSNSPFP panel library ahead of the Db2 11 SDSNSPFP panel library in the ISPPLIB concatenation.

      This placement is necessary so that the plans that are migrated from Db2 10 can be used. Remove the Db2 10 SDSNSPFP library from your ISPPLIB concatenation when you are finished testing the Db2 10 IVP applications under Db2 11.

What to do next

Do not run any other Db2 10 sample jobs.

Related concepts

Dynamic SQL and the ISPF/CAF application
The Phase 3 jobs of the installation or migration verification process install the ISPF/CAF sample application. This sample consists of an assembler or COBOL call attachment facility (CAF) interface, a connection manager program, and the phone application. The sample also includes the distributed application that uses DRDA access.

Related tasks

Ensure that sample objects from your previous release are available
If you no longer have the IVP jobs from your previous release, you need to run the previous release's installation CLIST to regenerate them.

Related information

Falling back to Db2 10

If you encounter serious errors after tailoring the catalog and directory for Db2 11, you can return to Db2 10. Fall back to Db2 10 is supported only if Db2 11 isDb2 11 conversion mode.

Before you begin

To fall back, your subsystem must be in Db2 11 conversion mode.

Before you fall back to your previous Db2 version, consider the implications of doing so. For details, see “Implications of falling back” on page 475.

About this task

Fallback is the process of returning to Db2 10 after migrating the catalog and directory to Db2 11, as described in “Migration step 18: Tailor Db2 11 catalog: DSNTIJTC” on page 441. It is best to fall back only if you encounter severe errors while operating in Db2 11. After fallback, the catalog remains a Db2 11 catalog.

You can fall back to Db2 10 only after successfully migrating the catalog to Db2 11 conversion mode by using job DSNTIJTC. However, you cannot fall back to Db2 10 or return to Db2 11 conversion mode after you enter Db2 11 enabling-new-function or new-function mode.

Fall back if you have a severe error while operating Db2 11 and you want to return to operation on your previous version. After fallback, the catalog remains a Db2 11 catalog.

Remigrating is the process of returning to Db2 11 conversion mode after falling back.

Procedure

To fall back to Db2 10, complete the following steps:

1. Stop Db2 11.
2. Run job DSNTIJFV to rename the cataloged procedures and reactivate Db2 10 code.
3. Reconnect TSO, IMS, and CICS to Db2 10.
4. Start Db2 10.
5. Run the Db2 10 installation verification jobs (DSNTEJ*xx*).

What to do next

You can save your Db2 11 TSO logon procedures and JCL for remigration to Db2 11.

Related tasks

Installation step 15: Tailor the Db2 catalog: DSNTIJTC
Job DSNTIJTC invokes the CATMAINT utility to tailor your Db2 11 catalog, which you must do to fully install Db2. DSNTIJTC performs site-specific tailoring of the catalog.

Migrating from enabling-new-function mode to new-function mode
New-function mode can be activated any time after enabling-new-function mode processing is complete.

Remigrating
Remigrating (returning to Db2 11 after falling back to Db2 10) is simpler than the initial migration process.

Related information

Fallback step 1: Stop Db2 11 activity

Before you can fall back, you must stop Db2 11 activity and ensure that no recovery is required on system databases.

Procedure

To stop Db2 11 work:

1. Issue the following command:

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   The QUIESCE keyword allows Db2 to complete processing of currently executing programs. This activity might require some processing time.
2. Issue the following command:

   GUPI

   ```
   -DSN1 START DB2 ACCESS(MAINT)
   ```

   GUPI

   This command allows only the installation-defined system administrators and system operators to access Db2.

   If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. Check to see that you started Db2 with the correct subsystem parameter load module.
3. Ensure that all work is complete.

- Ensure that no units of recovery remain. Issue the following command:

  GUPI

  ```
  -DSN1 DISPLAY THREAD(*) TYPE(*)
  ```

  GUPI

  Then use RECOVER INDOUBT for any indoubt threads.
- Ensure that no utility work remains. Issue the following command:

  GUPI

  ```
  -DSN1 DISPLAY UTILITY(*)
  ```

  GUPI

  Then, either allow utilities to complete before proceeding, or stop all utility processing with the following command:

  ```
  -DSN1 TERM UTILITY(*)
  ```
- Ensure that no table spaces and index spaces in the Db2 directory (DSNDB01) or the Db2 catalog (DSNDB06) have write error ranges or deferred restart states. Issue the following command:

  GUPI

  ```
  -DSN1 DISPLAY DATABASE(DSNDB01) SPACENAM(*) RESTRICT
  -DSN1 DISPLAY DATABASE(DSNDB06) SPACENAM(*) RESTRICT
  ```

  GUPI

  A user with installation-defined system administrator or system operator authority also must enter this command.

  Recover any table spaces and index spaces with write error range or deferred restart states.

4. To stop Db2, issue the following command:

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   A user with SYSADM or SYSOPR authority also must enter this command.

   If IRLM does not stop automatically when Db2 stops, stop IRLM manually. To stop IRLM, issue the following command, where *irlmproc* is the name you assigned to the IRLM startup procedure:

   ```
   STOP irlmproc
   ```

Fallback step 2: Reactivate Db2 10 code: DSNTIJFV

After you stop your Db2 11 activity, continue the fallback process by using job DSNTIJFV to reactivate the code of your previous Db2 version.

About this task

Job DSNTIJFV renames procedures to activate Db2 10 and deactivate Db2 11.

Procedure

To reactivate the code of your previous Db2 version:

1. (Optional) Tailor job DSNTIJFV.

   SYS1.PROCLIB is the default target for JCL procedures. Add statements to rename other procedures, such as your IMS, CICS, TSO logon procedures, and batch procedures.

   You might want two sets of procedures, such as DSN1*xxxx* and DSN2*xxxx*, at all times, with an alias for the current release level.
2. Run job DSNTIJFV.
3. Ensure that job DSNTIJFV completed successfully.
   - If DSNTIJFV runs successfully, it produces a return code of 0. Check that all renames executed successfully.
   - If DSNTIJFV fails or abends, rerun only the renames that failed. If some of the procedures already exist, check carefully to ensure that procedures for the two releases are not mixed.

Fallback step 3: Reconnect TSO, IMS, and CICS to Db2 10

After you reactivate your Db2 10 code during fallback, reconnect TSO, IMS, and CICS to Db2 10.

Procedure

To reconnect TSO, IMS, and CICS to Db2:

1. Re-establish your Db2 10 TSO logon procedures and JCL.
2. For CICS connections, complete one of the following actions:
   - If you overwrote the load module during migration to Db2 11, reassemble the resource control table (RCT) with the Db2 10 libraries.
   - If you did not overwrite the load module, change the STEPLIB statements in Db2 CICS jobs so that they refer to the Db2 10 libraries.
3. For IMS connections, change the STEPLIB statements in Db2 IMS jobs and address spaces so that they refer to the Db2 10 libraries

Fallback step 4: Start Db2 10

During fallback, you can start Db2 10 after you re-establish your Db2 10 TSO logon procedures, CICS connections, and IMS connections.

Procedure

To start Db2 10:

1. Start the IRLM.

   If you have not requested that Db2 automatically start the IRLM, start it before you start Db2. Use the following command, where *irlmproc* is the name that you assigned to the IRLM startup procedure:

   ```
   START irlmproc
   ```

   This is the value that you specified for the PROC NAME option on installation panel DSNTIPI.

   If you specified YES for the AUTO START option on installation panel DSNTIPI, Db2 starts the IRLM automatically.
2. GUPI Start Db2 from the z/OS console by using the following command:

   ```
   -DSN1 START DB2,PARM(DSNZPxxx)
   ```

   In this command, *-DSN1* is the subsystem command prefix that you defined for Db2, and *DSNZPxxx* is the name of the Db2 10 subsystem parameter module. If you used the default name, DSNZPARM, you can omit the PARM parameter.

If Db2 starts successfully, two to five address spaces also start. These address spaces are *ssnm*MSTR and *ssnm*DBM1, and possibly *ssnm*DIST and *irlmproc*, where *ssnm* is the Db2 subsystem name and *irlmproc* is the IRLM procedure name.

If Db2 starts successfully, the series of restart messages that you receive concludes with these two messages:

```
DSNR002I   RESTART COMPLETED
DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
```

GUPI

3. Complete one of the following actions:

Option	**Description**
If you have done distributed processing with your Db2 11 subsystem	GUPI Check message DSNR005I for the number of indoubt threads after you start Db2. If you find no indoubt threads, continue falling back as if you had not done any distributed processing. If you find indoubt threads, issue the following command: `-DSN1 DISPLAY THREAD(*) TYPE(INDOUBT)` If the number of indoubt threads that are reported in the DSNV408I messages is equal to the number of threads that are reported in the DSNR005I message, continue falling back as if you had not done any distributed processing. If fewer indoubt threads are reported by DSNV408I messages than in message DSNR005I, proceed as follows: a. Stop Db2 10. b. Determine which units of work are incomplete by scanning the Db2 recovery log with the Db2 11 DSN1LOGP utility. Use the SUMMARY option of this utility. c. Examine the DSN1LOGP output to find all the DSN1162I messages that have a COORDINATOR name in a remote location. Each of these messages identify an indoubt DBAT. Record the LUWID that is displayed in each message. d. Decide whether to commit or abort each indoubt DBAT. One way to do this is by contacting the COORDINATOR location. If it is another Db2 subsystem, use the DISPLAY THREAD command to help you decide. e. If you have not already done so during migration, apply the fallback PTF that is supplied with Db2 11. f. Start Db2 10 again. g. Issue the RECOVER INDOUBT ACTION(*correct decision*) LUWID(*luwid*) command to resolve each indoubt DBAT. GUPI
If you have not done distributed processing with your Db2 11 subsystem	Check outstanding restrictions after you start Db2. Identify databases whose uses are restricted by issuing the following command: GUPI `-DSN1 DISPLAY DATABASE(*) SPACENAM(*) RESTRICT` GUPI You can start some of these databases at this time.

4. If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. A common cause of startup failure is that the BSDS does not match the subsystem parameter values; ensure that the

startup procedure is pointing to the correct BSDS and subsystem parameter. Also, check that the subsystem parameter member that you specified (or is used by default) when you started Db2 is the one that job DSNTIJUZ built. Check the JCL for the Db2 startup procedure.

5. Optional: Start TSO. If you want to use the TSO SUBMIT command to do housekeeping and fallback verification, you must start TSO (if it is not already started).

Related information

Fallback step 5: Verify fallback

After you start Db2 10, you must complete some of your own testing to determine if the fallback was successful.

About this task

You cannot run the Db2 11 samples on Db2 10.

Procedure

To verify fallback:

1. Test the IVP phase 2 applications:
   a. DSNTEJ2A: Perform all except the first two steps of job DSNTEJ2A. Expect a return code of 4 because table spaces DSN8D10U.NEWDEPT and DSN8D10U.NEWPHONE are placed in COPY-pending states.
   b. DSNTEJ2C: Issue only the RUN PROGRAM(DSN8BC3) PLAN(DSN8BH10) statement in step PH02CS04.
   c. DSNTEJ2D: Issue only the RUN PROGRAM(DSN8BD3) PLAN(DSN8BD10) statement in step PH02DS03.
   d. DSNTEJ2E: Issue only the RUN PROGRAM(DSN8BE3) PLAN(DSN8BE10) statement in step PH02ES04.
   e. DSNTEJ2F: Issue only the RUN PROGRAM(DSN8BF3) PLAN(DSN8BF10) statement in step PH02FS03.
   f. DSNTEJ2P: Run only step PH02PS05.
2. Test the IVP phase 3 applications.

   Do not run job DSNTEJ3C or DSNTEJ3P.
3. Run the Db2 10 sample applications.
4. Test your own applications.
5. Retry the problem for which you decided to fall back.

Related tasks

Migration step 27: Verify your Db2 11 conversion mode system (optional)
Verify your Db2 11 conversion mode system by running some of the sample jobs from your previous release.

Implications of falling back

Before you fall back to your previous Db2 version, consider the implications of doing so.

Data sharing

If any member of a data sharing group needs to fall back, consider the implications for data sharing. For more information about falling back in a data sharing environment, see "Falling back in a data sharing environment" on page 631.

Frozen objects

Falling back does not undo changes that the migration process made to the catalog. Db2 uses the migrated catalog after fallback. Some objects in this catalog that have been affected by Db2 11 function might become *frozen* objects after fallback. Frozen objects are unavailable, and they are marked with the release dependency marker P. If an object is marked with a release dependency, it remains marked forever. The release dependency marker is listed in the IBMREQD column of catalog tables. The following table lists the objects that are frozen when you fall back to a previous release.

Table 47. Objects that are frozen after fallback

RELEASE DEPENDENT MARK = P
• Plans, packages, or views that use any new syntax, objects, or bind options • DBRMs that are produced by a precompile in Db2 11 with a value of V11 for the NEWFUN option and when any new Db2 11 functions are being used

Plans and packages become frozen objects when they use new SQL syntax, use new BIND options and attributes, or reference frozen objects. When plans and packages become frozen objects, the automatic rebind process is adversely affected.

GUPI After falling back, you can determine if any of your objects are frozen by issuing the following statement:

```
SELECT * FROM catalog table
WHERE IBMREQD = 'P'
```

GUPI

Automatic rebind

After fallback, if you specified YES or COEXIST for the ABIND subsystem parameter, plans or packages that are bound in Db2 11 are automatically rebound on their first execution in Db2 10. If you specified NO for the ABIND subsystem parameter, this automatic rebind fails.

The automatic rebind also fails if you try to use plans or packages that are frozen. To make available the plans and packages that were not automatically rebound on Db2 10, change the SQL statements or remove the reference to a frozen object, precompile the application programs, and explicitly bind the plans and packages on Db2 10.

Administrative task scheduler tasks

After fallback, all tasks that are managed by the administrative task scheduler in Db2 Db2 11 are not manageable by the administrative task scheduler in Db2 Db2 10 because of the higher task version. Use ADMIN_TASK_ADD in Db2 10 to delete and reinsert all tasks. You can use the ADMIN_TASK_LIST table user-defined function to read and store the characteristics of the tasks in a user table before you fall back.

Buffer pool sizes

If FRAMESIZE(4K) and PGFIX(YES) are specified for buffer pools in Db2 11 and you fall back to Db2 10, PGFIX is still set to YES and a 1 M frame size is used.

If VPSIZEMIN and VPSIZEMAX are set to non-zero values for buffer pools in Db2 11 and you fall back to Db2 10, the minimum buffer pool size is set to 75% of the VPSIZE and the maximum buffer pool size is set to 125% of the VPSIZE.

Java stored procedures

If you increase the number of concurrently running Java stored procedures in Db2 11 conversion mode, the Java WLM-managed stored procedure address space in Db2 10 might not be able to handle the increased workload after fallback.

Related concepts

Falling back and remigrating in a data sharing environment
In a data sharing environment, you can fall back from Db2 11 or remigrate one member at a time or all members at the same time.

Related information

Remigrating

Remigrating (returning to Db2 11 after falling back to Db2 10) is simpler than the initial migration process.

Before you begin

Before you remigrate, refer to because many of those considerations apply to remigrations, too. Whether each consideration applies to your subsystem depends on the type of activity that took place on your Db2 10 subsystem after falling back.

Regardless of the ABIND subsystem parameter value, plans and packages continue to run on Db2 11 as bound on Db2 10, until you explicitly rebind them on Db2 11. It is best to do so only after you are certain that Db2 11 is stable and release coexistence and fallback are no longer a concern.

Recommendation: Avoid automatic rebinds during migration and remigration. After your remigrated system is stable, you can rebind your packages with PLANMGMT(EXTENDED). If a new package does not perform adequately, you can rebind with SWITCH(PREVIOUS) to return to the old package.

Procedure

To remigrate your subsystem to Db2 11:

1. Check the integrity of your Db2 10 catalog and directory:
   - Run the DSN1COPY utility with the CHECK option on your catalog table spaces.
   - Run the CHECK DATA utility.
   - Run the queries in member DSNTESQ of *prefix*.SDSNSAMP.
2. Optional: Ensure that your Db2 10 DSNTIJIC job has been modified to copy new Db2 11 catalog table spaces, and then use DSNTIJIC to take an image copy of your Db2 10 catalog.

   This step is not required, but it is recommended.
3. Stop Db2 10.
4. Reconnect TSO, IMS, and CICS to Db2.

   Re-establish your Db2 11 logon procedures and JCL, as well as your Db2 11 CICS and IMS connections.
5. Rebuild Db2 11 cataloged procedures.

   Rename the Db2 11 procedures that were renamed by job DSNTIJFV during fallback. If job DSNTIJFV was not run, you need to rerun job DSNTIJMV. Comment out step 1 (DSNTIMP), which defines Db2 11 to z/OS, and run the job. (You do not need to define Db2 11 to z/OS a second time.)
6. Start Db2 11.

   Ensure that you are using your Db2 11 subsystem parameter load module.
7. Take an image copy of the Db2 11 catalog by using the DSNTIJIC job.
8. Verify your Db2 11 system.

Related tasks

Migration step 2: Verify the integrity of Db2 table spaces (optional)
Use the DSN1COPY and CHECK INDEX utilities to verify the integrity of the Db2 directory and catalog table spaces on the subsystem that you are migrating.

Migration step 5: Take image copies of the directory and catalog: DSNTIJIC
For backup purposes, create a copy of the catalog and directory of the system that you are migrating.

Migration step 27: Verify your Db2 11 conversion mode system (optional)
Verify your Db2 11 conversion mode system by running some of the sample jobs from your previous release.

Migrating your Db2 subsystem to new-function mode

After you migrate your Db2 subsystem to conversion mode, you must complete the migration to Db2 11 new-function mode by migrating the catalog.

About this task

Important: After you begin enabling-new-function mode, you cannot fall back to the previous release.

In a data sharing group, you complete this task only one time on a single member. Other members can be active when you complete this task, but all active members must be running in Db2 11 conversion mode.

Procedure

To migrate from conversion mode to new-function mode:

1. Migrate from conversion mode to enabling-new-function mode.

   The following table summarizes that steps of this task:

   Table 48. Overview of steps for migrating to Db2 11 enabling-new-function mode

Step	Description	Job
1	Run installation CLIST using ENFM option.	(none)
2	Take an image copy of your Db2 11 catalog.	DSNTIJIC
3	Convert the Db2 Db2 11 catalog and directory.	DSNTIJEN
4	Optionally run the CHECK INDEX utility on the catalog and directory indexes that were modified or added by job DSNTIJEN.	DSNTIJCI

   a) Run the installation CLIST with the ENFM option.

      During enabling-new-function mode processing, the CLIST generates the following installation jobs: DSNTIJCS, DSNTIJEN, DSNTIJES, DSNTIJNF, DSNTIJNG, DSNTIJNH, DSNTIJNX, and DSNTIJCV and customizes the Db2 11 IVP jobs.

   b) Create the following copies for backup purposes:

      - An image copy of the Db2 catalog and directory, using your site's backup and recovery procedure. You cannot use this image copy to do a point-in-time recovery of the catalog and directory table spaces, because of table space attribute changes during enabling-new-function mode.
      - **Optional:** A full DFDSS backup of the Db2 subsystem.

   c) Run installation job DSNTIJEN. Avoid updates to the Db2 catalog and directory while job DSNTIJEN is running.

      Important: Job DSNTIJEN converts Db2 to enabling-new-function mode, from which you cannot fall back. Do not run DSNTIJEN until you are certain that you will not need to fall back.

After job DSNTIJEN finishes, catalog migration is complete. You can then run job DSNTIJNF to move the subsystem to new-function mode.

2. Complete enabling-new-function mode processing.

   For details, see .

3. Migrate from enabling-new-function mode to new-function mode.

   Table 49. Overview of steps for migrating to Db2 11 new-function mode

Step	Description	Job
1	Enter new-function mode.	DSNTIJNF
2	Optionally, check for consistency between catalog tables by running the queries in member DSNTESQ of *prefix*.SDSNSAMP.	(none)
3	Create DSNHDECP module for new-function mode.	DSNTIJNG
4	Install Db2-supplied routines that require new-function mode.	DSNTIJRT
5	Create installation objects that are dependent on new-function mode.	DSNTIJNX
6	Validate the installation of Db2-supplied routines	DSNTIJRV
7	Run Db2 11 verification jobs.	DSNTEJ*xx*

   For details, see “Migrating from enabling-new-function mode to new-function mode” on page 484.

What to do next

After you migrate to new-function mode, you can optionally convert your resource limit facility (RLF) tables to take advantage of longer client information field sizes.

Related tasks

Migration step 5: Take image copies of the directory and catalog: DSNTIJIC
For backup purposes, create a copy of the catalog and directory of the system that you are migrating.

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Convert RLF tables to the current format
You can convert your resource limit facility (RLF) tables to take advantage of longer client information field sizes after you migrate to Db2 11 new-function mode.

Related information

Migrating from conversion mode to enabling-new-function mode

After you complete the migration process, Db2 is in Db2 11 conversion mode. During conversion mode, you cannot use any Db2 11 new functions.

Procedure

To migrate from conversion mode to Db2 11 enabling-new-function mode:

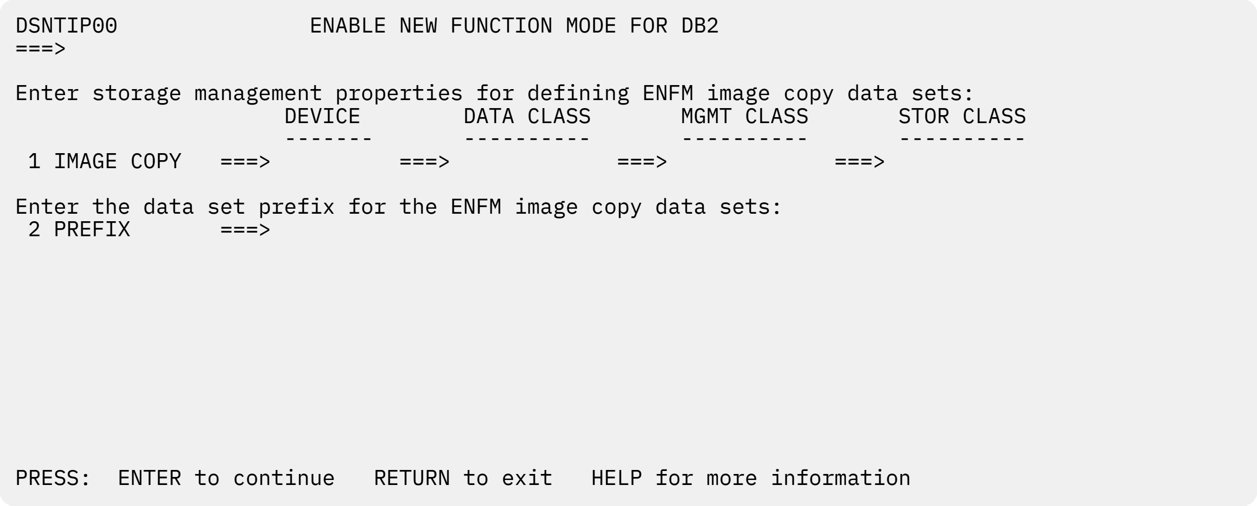
1. Run the installation CLIST again with ENFM specified for the INSTALL TYPE field on panel DSNTIPA1.

   The value of the INPUT MEMBER NAME field is the value that you specified as the output member during migration to conversion mode. In a data-sharing environment, it is the output member of the first group member to migrate to conversion mode. In Db2 11 enabling-new-function mode, the CLIST customizes the installation jobs DSNTIJEN, DSNTIJNF, DSNTIJNG, DSNTIJCS, and DSNTIJES, as well as the Db2 11 sample jobs.

2. Press ENTER to continue to panel DSNTIPT.
3. On panel DSNTIPT, choose the output SDSNSAMP data set. If you use the same data set name, it is not deleted or reallocated.

   You can only change the value of SAMPLE LIBRARY on this panel.
4. Press ENTER to continue.

   Panel DSNTIP00 is displayed.



```
DSNTIP00               ENABLE NEW FUNCTION MODE FOR DB2
===>

Enter storage management properties for defining ENFM image copy data sets:
                     DEVICE        DATA CLASS       MGMT CLASS       STOR CLASS
                     -------       ----------       ----------       ----------
 1 IMAGE COPY   ===>          ===>             ===>             ===>

Enter the data set prefix for the ENFM image copy data sets:
 2 PREFIX       ===>









PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

Figure 77. Enable new-function mode for Db2 panel: DSNTIP00

5. Review the image copy data set properties in the IMAGE COPY and PREFIX fields and update as required. The device type must be 1 - 8 alphanumeric characters. The value in the PREFIX field must follow z/OS standards for naming data sets.
6. Press ENTER to continue.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

DSNTIPT: Data set names panel 1
The entries on the DSNTIPT panel establish data set names for the libraries that are used in the Db2 CLIST and JCL that Db2 provides. The values that you enter on this panel are edited into all pertinent sample and installation jobs.

Related information

Completing enabling-new-function mode processing

You must complete several processing actions while your Db2 subsystem is in enabling-new-function mode, which is the mode between conversion mode and new-function mode. New Db2 functions are not available when your Db2 subsystem is in enabling-new-function mode.

About this task

Attention: After you begin enabling-new-function mode, you cannot fall back to your previous release. However, you can revert to Db2 11 conversion mode* if necessary.

Procedure

To complete enabling-new-function mode processing:

1. Take an image copy of the Db2 catalog and directory.

   This step must be completed before running DSNTIJEN for the first time.
2. Create shadow data sets for user-defined indexes on the Db2 catalog that reside on user-managed storage.

   You must create shadow data sets for user-defined indexes that are on user-managed storage before you run job DSNTIJEN. Db2 uses these shadow data sets in the REORG steps that convert the catalog table spaces to new-function mode. One of the queries in job DSNTIJPM identifies the affected indexes.
3. Optional: To identify which plans and packages are rendered invalid during enabling-new-function mode processing, run the following queries on your subsystem.

   These queries are commented out in the Db2 11 member DSNTESQ of *prefix*.SDSNSAMP. You can run this query from SPUFI or from a dynamic SQL program like DSNTEP2. After migration to new-function mode, you can explicitly rebind these packages or let Db2 rebind them automatically.

   PSPI

   ```
   SELECT DISTINCT DNAME
     FROM SYSIBM.SYSPLANDEP
     WHERE BNAME IN
   ('SYSCOLUMNS'  ,'SYSTABLES'     ,'SYSCOPY'     ,
    'SYSINDEXES'  ,'SYSCHECKS'     ,'SYSSTR'
    )
       AND BCREATOR IN ('SYSIBM','DSNDB06')
       AND BTYPE IN ('T','R')
     ORDER BY DNAME;

   SELECT DISTINCT COLLID, NAME, VERSION
     FROM SYSIBM.SYSPACKDEP, SYSIBM.SYSPACKAGE
     WHERE BNAME IN
   ('SYSCOLUMNS'  ,'SYSTABLES'     ,'SYSTABLESPACE'  ,'SYSPENDINGDDL',
    'SYSLGRNX'    ,'SYSUTIL'       ,'SYSUTILX'       ,'DBDR'         ,
    'SCTR'        ,'SPTR'          ,'SYSCOPY'        ,
    'SYSINDEXSPACESTATS'           ,'SYSTABLESPACESTATS',
    'SYSRTSTS'    ,'SYSINDEXES'    ,'SYSCHECKS'      ,'SYSSTR'
    )
       AND LOCATION = ' '
       AND BQUALIFIER IN ('SYSIBM','DSNDB06','DSNDB01')
       AND BTYPE IN ('T','R')
       AND COLLID = DCOLLID
       AND NAME = DNAME
       AND CONTOKEN = DCONTOKEN
     ORDER BY COLLID, NAME, VERSION;
   ```

   PSPI
4. Run job DSNTIJEN in LOCALSITE mode. If you run DSNTIJEN in REMOTESITE mode, it fails with an error message.

   Recommendations:

   - Do not manually reorganize a table space or rebuild indexes on tables in that table space before the migration job step for that table space is complete.
   - While job DSNTIJEN is running, do not issue DDL statements or issue BIND statements. However, you can continue to run business transactions.
   - Step ENFM0010 of job DSNTIJEN resets and reinitializes the SYSUTILX table space. Therefore, utilities should not be run during this step.

   If you need to restart job DSNTIJEN, you can do so at any time. Always restart the whole job; do not use step restart. Job DSNTIJEN automatically locates and resumes processing of the first table space that was not completely processed. Job steps ENFM000A and ENFM000B automatically detect and copy any Db2 catalog and directory table spaces that were left in COPY-pending or informational

COPY-pending status when DSNTIJEN previously ended. If you need to determine how much of the enabling-new-function mode process has completed, use the DISPLAY GROUP DETAIL command.

If the job fails at a table space migration step because of an unrecoverable sort program work space shortage, use one of these options:

- Increase the number of temporary data sets indicated by the SORTNUM option of the REORG TABLESPACE control statement in the failing step.
- Remove the SORTNUM and SORTDEVT options of the REORG TABLESPACE control statement, and allocate sort work (SORTWK*xx*) files in the failing step.

Expect a return code of 1 from job step ENFM0020, which converts the SYSLGRNX directory table spaces. Directory objects do not have DDL invoked, so their enabling-new-function mode conversion is different from the conversion for catalog table spaces, which uses DDL.

5. Take an image copy of the Db2 catalog and directory after job DSNTIJEN has completed processing.
6. Optional: Run job DSNTIJCI to run the CHECK INDEX utility on all the catalog and directory indexes that were modified or added by job DSNTIJEN.

Related information

Job DSNTIJEN

Job DSNTIJEN converts Db2 to enabling-new-function mode or enabling-new-function mode*.

In general, job DSNTIJEN completes the following functions:

- Saves the current RBA or LRSN in the BSDS.
- Converts SYSCOPY to a new table space, SYSTSCPY.
- Converts SYSRTSTS to two new table spaces, SYSTSISS and SYSTSTSS.
- Converts SYSSTR to four new table spaces, SYSTSCKS, SYSTSCHX, SYSTSCKD, and SYSTSSRG.
- During REORG, converts all table spaces and indexes that are processed by DSNTIJEN to use the RBA and LRSN format that is specified in the DSN6SPRM.UTILITY_OBJECT_CONVERSION setting.
- Resets and reinitializes the SYSUTILX table space in step ENFM0010. Therefore, utilities should not be run during this step.
- Changes types and lengths of existing catalog columns.

DSNTIJEN consists of the following job steps:

ENFM0000
Terminates pending DSNENFM.* utilities.

ENFM000A
Gets a list of table spaces that are in ICOPY and COPY status.

ENFM000B
Image copies table spaces that are identified in job step ENFM000A.

ENFM0001
Updates the catalog for the new release.

ENFM0010
Enabling-new-function mode for SYSUTILX.

ENFM002x
Enabling-new-function mode steps for SYSLGRNX.

ENFM003x
Enabling-new-function mode steps for SYSCOPY.

ENFM004x
Enabling-new-function mode steps for SYSRTSTS.

ENFM005x
Enabling-new-function mode steps for SYSTSIXS.

ENFM006x
Enabling-new-function mode steps for SYSTSTAB.

ENFM007x
Enabling-new-function mode steps for SYSSTR.

ENFM9800
Rebuilds catalog indexes that were placed in advisory REORG-pending (AREO*) status.

ENFM9900
Terminates pending DSNENFM.* utilities.

Job DSNTIJCI

Job DSNTIJCI is an optional job that runs the CHECK INDEX utility on each of the Db2 catalog and directory indexes that are modified or added by job DSNTIJEN. Job DSNTIJCI can be run at any time after completion of job DSNTIJEN.

Job DSNTIJCI checks all indexes in the following directory table spaces:

- DSNDB01.DBD01
- DSNDB01.SPT01
- DSNDB01.SYSDBDXA
- DSNDB01.SYSLGRNX
- DSNDB01.SYSSPUXA
- DSNDB01.SYSSPUXB
- DSNDB01.SYSUTILX

Job DSNTIJCI also checks all indexes in the following catalog table spaces:

- DSNDB06.SYSSEQ
- DSNDB06.SYSSTATS
- DSNDB06.SYSTSOBX
- DSNDB06.SYSTSCHX
- DSNDB06.SYSTSCKD
- DSNDB06.SYSTSCKS
- DSNDB06.SYSTSCPY
- DSNDB06.SYSTSISS
- DSNDB06.SYSTSIXC
- DSNDB06.SYSTSQRE
- DSNDB06.SYSTSQRS
- DSNDB06.SYSTSSFB
- DSNDB06.SYSTSSRG
- DSNDB06.SYSTSTSS
- DSNDB06.SYSTSVAD
- DSNDB06.SYSTSVAR
- DSNDB06.SYSTSVAT
- DSNDB06.SYSTSVAU

Job DSNTIJCI consists of the following job steps:

DSNCI1
Checks indexes for the Db2 catalog (DSNDB06).

DSNCI2
Checks indexes for Db2 skeleton cursor and skeleton packages table spaces.

DSNCI3
Checks indexes for Db2 database descriptor table spaces.

DSNCI4
Checks indexes for Db2 system utilities table spaces.

DSNCI5
Checks indexes for Db2 log range table spaces.

Related information

Migrating from enabling-new-function mode to new-function mode

New-function mode can be activated any time after enabling-new-function mode processing is complete.

About this task

When the Db2 subsystem is in new-function mode, all Db2 11 function is available for use. From new-function mode, you cannot fall back to Db2 10 or return to Db2 11 conversion mode. A Db2 11 new-function mode or Db2 11 enabling-new-function mode Db2 subsystem cannot coexist with a Db2 10 subsystem.

Procedure

To migrate from enabling-new-function mode to new-function mode:

1. If your shared communications area (SCA) coupling facility structure is duplexed, disable the duplexing. Job DSNTIJNF rebuilds the SCA structure after converting it to accommodate 10-byte RBA and LRSN values, and the rebuild fails if duplexing is enabled.
2. Run job DSNTIJNF.

   New-function mode begins after job DSNTIJNF completes successfully.
3. Optional: Check for consistency between catalog tables by running the queries in member DSNTESQ of *prefix*.SDSNSAMP.
4. After job DSNTIJNF completes successfully, run job DSNTIJNG.

   Job DSNTIJNG modifies the application defaults load module, *dsnhdecp*, to allow the Db2 precompiler to accept Db2 11 new-function SQL statements by default.
5. Run job DSNTIJNX.

   Job DSNTIJNX creates installation objects that are dependent on new-function mode.
6. Run job DSNTIJRT.

   Job DSNTIJRT executes DSNTRIN, which installs and customizes all Db2-supplied routines and supporting objects that were deferred until new-function mode. This job was customized when the CLIST was run in MIGRATE mode.
7. Run job DSNTIJRV.

   Job DSNTIJRV validates all Db2-supplied routines and augments existing installation verification procedures (IVPs) for specific Db2-supplied routines. It also provides a report that identifies successful validations, warnings, and failures. This job was customized when the CLIST was run in MIGRATE mode.

What to do next

Update your sample applications, such as DSNTIAUL, DSNTEP2, and DSNTEP4, and verify successful migration to Db2 11, as described in "Verifying successful migration to Db2 11" on page 487.

Any time after Db2 11 is in new function mode, you can convert the bootstrap data set (BSDS) records, Db2 catalog, and directory objects to support 10-byte RBA and LRSN fields, as described in " Convert the BSDS, Db2 catalog, and directory to 10-byte RBA and LRSN format (Optional)" on page 488.

⚠ **Attention:** In Db2 subsystems that are not data sharing members, if Db2 is already at risk of reaching the 6-byte RBA limit, it is strongly recommended that you first convert all catalog and directory objects, then convert all user objects to the 10-byte RBA format, before converting the BSDSD.

⚠ **Attention:** After the BSDS is converted to the 10-byte format, Db2 stops issuing messages to warn you about the risk of reaching the 6-byte RBA or LRSN limits. The increased size of all log records also accelerates progress toward the 6-byte RBA logging limit.

In Db2 subsystems that are not data sharing members, always convert all Db2 catalog, directory, and user objects to use the extended 10-byte RBA format before you convert the BSDS, especially if Db2 is close to reaching the logging limit for the 6-byte RBA. Failure to convert page sets to the 10-byte RBA format before Db2 reaches the 6-byte logging limit results in failed updates with reason code 00C2026D. No updates are allowed for any object that is still in the 6-byte format.

The following actions are recommended after you migrate Db2 11 to new-function mode:

- In new-function mode, specify NEWFUN=V11 in your application defaults module. In a data-sharing environment, if you use more than one application defaults module, modify and run the jobs that you use to maintain these modules to specify NEWFUN=V11.
- Alter your Db2 11 buffer pools that have frequent page reads or frequent page writes to use PGFIX YES if you have sufficient real storage available for these buffer pools. Fixing the buffer pages in real storage once and keeping them fixed avoids the processing time that Db2 needs to fix and free pages for each I/O. In some cases, this processing time can be as much as 10% for I/O intensive workloads. To use this option, issue the following command:

  GUPI

  ```
  ALTER BPOOL(bpname) VPSIZE(vpsize) PGFIX(YES)
  ```

  Where *bpname* is the name of the buffer pool and *vpsize* is the size of the virtual pool. GUPI
- If you installed or migrated QMF before migrating the Db2 subsystem, you must rerun some QMF jobs to ensure continued proper operation of QMF. For more information, see Tasks to perform when you upgrade Db2 for z/OS after you install QMF.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Job DSNTIJRV
Job DSNTIJRV validates the Db2-supplied routines by executing program DSNTRVFY. You should validate these routines after Db2 installation and after each phase of migration.

Related information

Job DSNTIJNF

Job DSNTIJNF activates new-function mode from conversion mode*, enabling-new-function mode, or enabling-new-function mode*. It also converts the shared communications area (SCA) structure to a format that accommodates 10-byte RBA and LRSN values and rebuilds the SCA.

Job DSNTIJNF contains the following job step:

ENFM9700
Verifies that the Db2 catalog and directory migration is completed and rebuilds the SCA structure.

Related concepts

Job DSNTIJNG

Job DSNTIJNG must be run during migration to new-function mode to allow the Db2 precompiler to accept Db2 11 new-function SQL statements by default.

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Job DSNTIJRV
Job DSNTIJRV validates the Db2-supplied routines by executing program DSNTRVFY. You should validate these routines after Db2 installation and after each phase of migration.

Job DSNTIJNG

Job DSNTIJNG must be run during migration to new-function mode to allow the Db2 precompiler to accept Db2 11 new-function SQL statements by default.

DSNTIJNG consists of the following job steps:

DSNTIZP
Assembles the application defaults load module, *dsnhdecp*.

DSNTIZQ
Link-edits the application defaults load module, *dsnhdecp*.

DSNTIMQ
Completes SMP/E processing for your application defaults load module. Advanced SMP/E skills are recommended for users of job step DSNTIMQ. Read the job step prolog before proceeding. If you want DSNTIJUZ to establish SMP/E GENASM entries in the Db2 system parameter (DSN6*xxxx*) macros and application defaults load module macros, uncomment job step DSNTIMQ.

Related concepts

Job DSNTIJNF
Job DSNTIJNF activates new-function mode from conversion mode*, enabling-new-function mode, or enabling-new-function mode*. It also converts the shared communications area (SCA) structure to a format that accommodates 10-byte RBA and LRSN values and rebuilds the SCA.

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Job DSNTIJRV
Job DSNTIJRV validates the Db2-supplied routines by executing program DSNTRVFY. You should validate these routines after Db2 installation and after each phase of migration.

Job DSNTIJNX

Job DSNTIJNX creates installation objects that are dependent on new-function mode.

DSNTIJNX rebinds both SPUFI packages and Db2 REXX Language Support packages with the new bind options SYSTIMESENSITIVE(YES), BUSTIMESENSITIVE(YES), and ARCHIVESENSITIVE(YES). These bind options are new in Db2 11 new-function mode.

Related information

Job DSNTIJCB

Job DSNTIJCB supports the DSNJCNVT stand-alone utility for converting the BSDS records to support 10-byte RBA and LRSN fields.

DSNTIJCB consists of the following job steps:

DSNTDEF
Activates IDCAMS to define new BSDS data sets with CLUSTER, DATA, and INDEX components under the temporary names *prefix*.BSDS01.NEW and *prefix*.BSDS02.NEW.

DSNTCNVT
Activates DSNJCNVT to read records from the existing BSDS, converts them to support the extended RBA and LRSN format, and writes them into the *prefix*.BSDS01.NEW and *prefix*.BSDS02.NEW data sets.

DSNTRENO
Renames the existing BSDS data sets to backup names, *prefix*.BSDS01.OLDFMT and *prefix*.BSDS02.OLDFMT.

DSNTRENN
Renames *prefix*.BSDS01.NEW and *prefix*.BSDS02.NEW to *prefix*.BSDS01 and *prefix*.BSDS02.

No job step can run unless all preceding job steps complete with return code 0.

When the installation CLIST customizes DSNTIJCB, it substitutes the BSDS names that are specified in fields COPY 1 NAME and COPY 2 NAME on installation panel DSNTIPH for *prefix*.BSDS01 and *prefix*.BSDS02. The fields allow each name to support names up to 30 bytes in length, so no special handling is needed to rename the existing data sets.

Related information

Verifying successful migration to Db2 11

After you activate , you can run the sample applications to verify that your migration process was successful.

Before you begin

⚠ **Attention:**

Do not run the Db2 11 IVP jobs unless your subsystems are in Db2 11 new-function mode.

Until you complete this task, continue to use sample applications such as DSNTIAUL, DSNTEP2, and DSNTEP4 from Db2 10.

Procedure

Tailor and run jobs for the sample applications, as described in Chapter 9, “Verifying successful Db2 11 installation or migration with sample applications,” on page 641.

You can select the phases that you need to run based on the attachment facilities you installed, the languages you use, and whether the sample objects exist.

Related concepts

Migrating to Db2 11
Migration is the process of upgrading from Db2 10 to Db2 11.

Dynamic SQL programs: DSNTIAD, DSNTEP2, DSNTIAUL

DSNTIAD, DSNTEP2, and DSNTIAUL are sample dynamic SQL programs and must be compiled, link-edited, and bound as usual.

Convert the BSDS, Db2 catalog, and directory to 10-byte RBA and LRSN format (Optional)

Any time after you migrate Db2 11 to new-function mode, you can optionally convert the bootstrap data set (BSDS), use the 10-byte RBA and LRSN fields. You must convert the catalog and directory to the 10-byte format before or soon after you convert the BSDS to the 10-byte format.

Before you begin

Before you can convert the BSDS, the Db2 subsystem or data sharing member must be started in Db2 11 new-function mode. For instructions, see "Migrating from enabling-new-function mode to new-function mode" on page 484.

⚠ **Attention:** In Db2 subsystems that are not data sharing members, if Db2 is already at risk of reaching the 6-byte RBA limit, it is strongly recommended that you first convert all catalog and directory objects, then convert all user objects to the 10-byte RBA format, before converting the BSDSD.

Procedure

To convert the BSDS, Db2 catalog, and directory to 10-byte RBA and LRSN format, complete the following steps:

- Run job DSNTIJCV to convert the Db2 catalog and directory table spaces and indexes to the 10-byte RBA or LRSN format.

  Do not rearrange the processing sequence and the table space groupings. The COPY and REORG steps use LISTDEF filtering to exclude table spaces that are already in extended format.

  Job DSTNIJCV is customized when you run the Db2 installation CLIST for migration, as described in Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.
- Convert the BSDS to use the extended 10-byte RBA and LRSN fields, as described in .

Related information

Convert RLF tables to the current format

You can convert your resource limit facility (RLF) tables to take advantage of longer client information field sizes after you migrate to Db2 11 new-function mode.

Before you begin

If you completed this task in a previous release, no action is necessary.

Before you convert the RLF tables for a subsystem, ensure that the subsystem is in Db2 11 new-function mode and the routines to be monitored are bound with APPLCOMPAT(V11R1).

About this task

Certain obsolete RLF table formats are deprecated, or unsupported starting in Db2 12.

- Starting in Db2 12, DSNRLST*xx* table formats and related index formats from before DB2 Version 8 format are not supported. When Db2 detects DSNRLST*xx* tables with unsupported formats, it issues message DSNT731I.
- DSNRLMT*xx* table formats and related index formats from before Db2 11 are deprecated. In Db2 11, if Db2 detects DSNRLMT*xx* tables in a deprecated format, it issues message DSNT732I, processing for the START RLIMIT command continues, and the resource limit facility starts using the deprecated objects.

Installation job DSNTIJSG contains the JCL for creating RLF tables.

The resource limit facility can activate only DSNRLMT*xx* table with the new longer lengths client information fields if migration to new-function mode is complete. The -START RLIMIT command cannot activate a resource limit specification table with the new longer lengths client information fields if Db2 is in conversion mode

Procedure

To convert RLF tables to the new format:

1. Stop the resource limit facility by issuing the following command.

   GUPI

   ```
   -STOP RLIMIT
   ```

   GUPI

2. If a DSNRLST*xx* table was never updated to the format introduced in DB2 Version 8, alter the data types for all of the following columns to VARCHAR(128).

   - AUTHID
   - RLFCOLLN
   - RLFPKG

   This step is required before migration to Db2 12.

3. Take one of the following actions to create RLF tables with the longer field lengths.

   - Alter the existing DSNRLMT*xx* table column data types for RLFEUAN, RLFEUID, and RLFEUWN to specify the new longer lengths.

     – Alter RLFEUAN to VARCHAR(255)

     – Alter RLFEUID to VARCHAR(128)

     – Alter RLFEUWN to VARCHAR(255)

     You cannot alter a subset of the listed columns. You must alter all the above columns or none.

     Important: After you change table or index definitions, consider reorganizing data to improve performance. After you change data types or column lengths by using ALTER TABLE statements, Db2 places the table space that contains the modified data in advisory REORG-pending (AREO*) status. The table space is in AREO* status because the existing data is not immediately converted to its new definition. Reorganizing the table space prevents possible performance degradation.

     Tip: When data is in REORG-pending or AREO* status, use the REORG utility with the SCOPE PENDING option to automatically reorganize partitions. With this option, you avoid identifying which partitions require reorganization and customizing the REORG control statement.

   - Create a new DSNRLMT*xx* table with the new longer lengths client information fields. Installation job DSNTIJSG contains the JCL for the creation of RLF tables.

     You can copy the data from an existing RLF table to a new table. The following example copies data from DSNRLMT01 to DSNRLMT02.

     GUPI

     ```
     INSERT INTO authid.DSNRLMT02
       ( RLFFUNC, RLFEUAN, RLFEUID, RLFEUWN, RLFIP,
         ASUTIME, RLFASUERR, RLFASUWARN, RLF_CATEGORY_B )
     SELECT
         RLFFUNC, RLFEUAN, RLFEUID, RLFEUWN, RLFIP,
         ASUTIME, RLFASUERR, RLFASUWARN, RLF_CATEGORY_B
       FROM  authid.DSNRLMT01;
     ```

     GUPI

4. Start the resource limit facility with the ID of DSNRLMT*xx* table to be used.

The following example shows that RLF is activated with DSNRLMT02. The ID in the START command is also applied to the DSNRLST*xx* table.

GUPI

```
-START RLIMIT ID=02
```

GUPI

Related tasks

Installation step 17: Define and bind Db2 objects: DSNTIJSG
Use job DSNTIJSG to bind Db2-supplied packages and plans, initialize the Db2 communications database, and create user-managed databases for the Db2 resource limit facility (RLF), Data Definition Control support, and query optimization.

Related information

Reverting to conversion mode* or enabling-new-function mode*

In Db2 11, you can revert to conversion mode* from enabling-new-function mode* or new-function mode. You can also revert to enabling-new-function mode* from new-function mode.

About this task

You can use the reversion process if you encounter problems converting from conversion mode to enabling-new-function mode or new-function mode, or to control access to new function after you migrate to new-function mode.

Related information

Reverting to conversion mode*

You can revert from Db2 11 enabling-new-function mode, enabling-new-function mode*, or new-function mode to Db2 11 conversion mode*. This action might be necessary if you encounter problems or need to control access to new function.

About this task

For example, if you encounter problems after you migrate to enabling-new-function mode, you can revert to conversion mode* until the problems are resolved.

Important: You cannot fall back to Db2 10 from conversion mode*.

Procedure

To revert to Db2 11 conversion mode*:

1. Run job DSNTIJCS.
2. In job DSNTIJNG, ensure that the DSNHDECM invocation specifies NEWFUN=V*x*, where *x* corresponds to the version from which you migrated.
3. Run job DSNTIJNG to rebuild your application defaults load module, *dsnhdecp*.

Related tasks

Moving from conversion mode* to new-function mode
From Db2 11 conversion mode*, you can resume your migration process by migrating to Db2 11 new-function mode.

Related information

Reverting to enabling-new-function mode*

If your subsystem is in new-function mode but you decide to postpone having users use new Db2 11 functions, you can return to enabling-new-function mode*. You can also revert to conversion mode*.

About this task

Important: You cannot fall back to Db2 10 after you have entered enabling-new-function or new-function mode.

Procedure

To revert to enabling-new-function mode*:

1. Run job DSNTIJES.

   Important: This job sets the Db2 mode to enabling-new-function mode.
2. In job DSNTIJNG, ensure that the DSNHDECM invocation specifies NEWFUN=V10.
3. Run job DSNTIJNG.
4. Verify that DSNHDECM specifies NEWFUN=V10.
5. If you are in a data sharing environment and you use more than one DSNHDECP module, modify and run the jobs that you use to maintain these DSNHDECP modules to specify NEWFUN=V10.

Related tasks

Reverting to conversion mode*
You can revert from Db2 11 enabling-new-function mode, enabling-new-function mode*, or new-function mode to Db2 11 conversion mode*. This action might be necessary if you encounter problems or need to control access to new function.

Related information

Returning to enabling-new-function mode or new-function mode

You can return to enabling-new-function mode if you reverted to conversion mode*. You can return to new-function mode if you reverted to conversion mode* or enabling-new-function mode*.

You can convert to new-function mode only if the Db2 subsystem was previously in enabling-new-function mode and completed enabling-new-function mode processing. In a data sharing environment, only one member must be active when you complete this task.

Related information

Moving from conversion mode* to enabling-new-function mode

From Db2 11 conversion mode*, you can resume your migration process by migrating to Db2 11 enabling-new-function mode.

Procedure

Run job DSNTIJEN.

Whether DSNTIJEN changes Db2 to enabling-new-function mode* or enabling-new-function mode depends on the state of Db2 before you reverted, as shown in the table below.

Table 50. Overview of steps for converting to Db2 11 enabling-new-function mode

If Db2 reverted to conversion mode* from...	DSNTIJEN will change Db2 to...
new-function mode	enabling-new-function mode*

Table 50. Overview of steps for converting to Db2 11 enabling-new-function mode (continued)

If Db2 reverted to conversion mode* from...	DSNTIJEN will change Db2 to...
enabling-new-function mode	enabling-new-function mode[1]
enabling-new-function mode*	enabling-new-function mode*

Note:

1. DSNTIJEN also attempts to complete enabling-new-function mode processing if it has not completed.

Related information

Moving from conversion mode* to new-function mode

From Db2 11 conversion mode*, you can resume your migration process by migrating to Db2 11 new-function mode.

Procedure

Run job DSNTIJNF.

If enabling-new-function mode processing did not complete when Db2 was previously in enabling-new-function mode, DSNTIJNF issues an error that indicates that you need to run DSNTIJEN.

Related information

Migrating from enabling-new-function mode* to new-function mode

After you revert to Db2 11 enabling-new-function mode*, you can return to Db2 11 new-function mode when you are ready.

Procedure

To return to new-function mode:

1. Run job DSNTIJNF.
2. In job DSNTIJNG, ensure that the DSNHDECM invocation specifies NEWFUN=V11.
3. Run job DSNTIJNG.
4. If you are in a data sharing environment and you use more than one application defaults load module, modify and run the jobs that you use to maintain these load modules to specify NEWFUN=V11.

Related information

Chapter 7. Automating Db2 installation or migration with z/OS Management Facility

You can use z/OSMF to automate the process of installing or migrating to Db2 11 for z/OS.

Before you begin

You must use SMP/E to load the required Db2 libraries, as described in Chapter 3, "Making the Db2 product code available," on page 29. Running the installation CLIST requires the following Db2 load libraries:

- *prefix*.SDSNCLST
- *prefix*.SDSNSPFM
- *prefix*.SDSNSPFP
- *prefix*.SDSNSAMP
- *prefix*.SDSNIVPD (only if generating z/OSMF artifacts)

For migrations to Db2 11, this process uses new and modified panels for the installation CLIST. The panels reside in the Db2 11 SDSNSPFP library. You must make the panels available to TSO, ISPF, and the Db2 11 installation CLIST. For more information, see Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.

Apply the following APARs:

- Db2 11 for z/OS APAR PI38553
- z/OSMF V2R1 APAR PI54360

About this task

By using z/OSMF, you can automate the process of migrating or installing Db2 by creating workflow definition and variable files that you can define one time for reuse across many different Db2 subsystems.

Related concepts

About workflows (z/OS Management Facility)

Installing or migrating to Db2 11

The essential steps are similar for both installing Db2 11 and migrating to Db2 11 conversion mode. From conversion mode, you must complete additional steps to migrate to Db2 11 new-function mode.

Related reference

DSNTIPA1 or DSNTILA1: Main panel

The entries on the Main panel control input to and output from the installation CLIST.

IBM z/OS Management Facility Online Help

Related information

Automating Db2 for z/OS Migration With z/OS Management Facility (white paper)

Automating Db2 installation by using z/OS Management Facility

You can use z/OSMF to automate the process of installing Db2 11 for z/OS subsystems.

Before you begin

Apply the following APARs:

- Db2 11 for z/OS APAR PI38553
- z/OSMF V2R1 APAR PI54360

You must use SMP/E to load the required Db2 libraries, as described in Chapter 3, “Making the Db2 product code available,” on page 29. Running the installation CLIST requires the following Db2 load libraries:

- *prefix*.SDSNCLST
- *prefix*.SDSNSPFM
- *prefix*.SDSNSPFP
- *prefix*.SDSNSAMP
- *prefix*.SDSNIVPD (only if generating z/OSMF artifacts)

About this task

By using z/OSMF, you can automate the process of installing Db2 by creating workflow definition and variable files that you can define one time for reuse across many different Db2 subsystems.

Procedure

To install Db2 subsystems by using z/OSMF, use the following general approach:

1. Identify an existing Db2 subsystem that is the model for your new installations, or install one as described in Chapter 5, “Installing Db2 11,” on page 359.
2. Create the workflow definition files:
   a) On the existing Db2 subsystem that is the model for the new installations, run the DSNTXAZP tool to update the CLIST defaults input member, as described in “Updating the CLIST defaults input member: job DSNTIJXZ ” on page 42.

   Important: The DSNTXAZP tool does not update the DSNTID*xx* CLIST input member with current settings for the following parameters or panel fields. Update the values as you complete the CLIST, or modify the values directly in the DSNTID*xx* member:

Table 51. Settings not updated by the DSNTXAZP tool

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPA2	The following fields: CATALOG ALIAS (VCATALOG) DEFINE CATALOG (VCATSTAT)

Table 51. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPA3	All fields: PERMANENT UNIT NAME (VOLSDEVT) TEMPORARY UNIT NAME (TVOLSDEVT) CLIST ALLOCATION: VOL/SER (VOLSDAT1) CLIST ALLOCATION: DATA CLASS (DATACLS1) CLIST ALLOCATION: MGMT CLASS (MGMTCLS1) CLIST ALLOCATION: STOR CLASS (STORCLS1) NON-VSAM DATA: VOL/SER (VOLSDAT2) NON-VSAM DATA: DATA CLASS (DATACLS2) NON-VSAM DATA: MGMT CLASS (MGMTCLS2) NON-VSAM DATA: STOR CLASS (STORCLS2) VSAM CATALOG, ...: VOL/SER (VOLSDAT3) VSAM CATALOG, ...: DATA CLASS (DATACLS3) VSAM CATALOG, ...: MGMT CLASS (MGMTCLS3) VSAM CATALOG, ...: STOR CLASS (STORCLS3) LOG COPY 1, BSDS 2: VOL/SER (VOLSDAT6) LOG COPY 1, BSDS 2: DATACLASS (DATACLS6) LOG COPY 1, BSDS 2: MGMTCLASS (MGMTCLS6) LOG COPY 1, BSDS 2: STOR CLASS (STORCLS6) LOG COPY 2, BSDS 1: VOL/SER (VOLSDAT7) LOG COPY 2, BSDS 1: DATA CLASS (DATACLS7) LOG COPY 2, BSDS 1: MGMT CLASS (MGMTCLS7) LOG COPY 2, BSDS 1: STOR CLASS (STORCLS7)
DSNTIPK	The following fields: WORK FILE DB (WKDBNAME) SUBGRP ATTACH (SGRPATNM)
DSNTIPG	All fields: ROUTINES CREATOR (AUTHID) SEC DEF CREATOR (SECDEFID) INSTALL SQL ID (INSSQLID) INSTALL PKG OWNER (INSPKOWN) INSTALL GRANTEE(S) (INSGRLST) IVP SQL ID (IVPSQLID) IVP PACKAGE OWNER (IVPPKOWN) IVP GRANTEE(S) (IVPGRLST)

Table 51. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPH	The following fields: COPY 1 NAME (BSDSNAM1) COPY 2 NAME (BSDSNAM2) Active logs: COPY 1 PREFIX (LOGSPRE1) Active logs: COPY 2 PREFIX (LOGSPRE2) Archive logs: COPY 1 PREFIX (ARCHPRE1) Archive logs: COPY 2 PREFIX (ARCHPRE2)
DSNTIPT	All fields: TEMP CLIST LIBRARY (NEWCL) SAMPLE LIBRARY (NEWSAMP) CLIST LIBRARY (OUTCL) APPLICATION DBRM (DBRMLIB) APPLICATION LOAD (RUNLIB) DECLARATION LIBRARY (SRCLIB) LINK LIST LIBRARY (DSNLINK) LOAD LIBRARY (DSNLOAD) JDBC AND SQLJ DLLS (DSNLOD2) MACRO LIBRARY (DSNMACS) LOAD DISTRIBUTION (DSNALOAD) EXIT LIBRARY (DSNEXIT) DBRM LIBRARY (DSNDBRM) IRLM LOAD LIBRARY (DSNIRLM) IVP DATA LIBRARY (DSNIVPD) INCLUDE LIBRARY (DSNCHDRS)
DSNTIPU	All fields: IBM LE RUNTIME LIBRARY (LERUN) IBM LE RUNTIME LIBRARY 2 (LERUN2) IBM LE LINK EDIT LIB (LELKED) IBM LE PRELINK MSG LIB (LEPLMSGL) HIGH LEVEL ASSEMBLER LIB (IASMLIB) C/CPP COMPILER MODULE (CPROG) C/CPP COMPILER LIBRARY (CCOMP) C/CPP HEADER LIBRARY (CHDRS) C/370 COMPILER MESSAGES (CMSGS) C LE PRELINKER PHASE (CPRLK) CPP LE PRELINKER PHASE (CPPPRLK) CPP CLASS LIB HEADERS (CPPHDRS) CPP AUTO CALL LIBRARY (CPPAUTCL) CPP CLASS LIBRARY (CPPCLASS) CPP PROCEDURE LIBRARY (CPPPROC)

Table 51. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPW	All fields: SYSTEM MACLIB (MACLIB) SYSTEM PROCEDURES (PROCLIB) SORT LIBRARY (SORTLIB) IMS RESLIB (RESLIB) ISPF ISPLINK MODULE (ISPLOAD) GDDM MACLIB (GDDMMACS) GDDM LOAD MODULES (GDDMLOAD) CICS LOAD LIBRARY (CICSMOD) CICS MACRO LIBRARY (CICSMAC) CICS COBOL LIBRARY (CICSCOB) CICS PL/I LIBRARY (CICSPLI) CICS EXCI LIBRARY (CICSEXCI)
DSNTIPD	All fields: DATABASES (NUMDATAB) TABLES (NUMTABLE) COLUMNS (NUMCOLUM) VIEWS (NUMVIEWS) TABLE SPACES (NUMTABSP) PLANS (NUMPLANS) PLAN STATEMENTS (NUMSTMTS) PACKAGES (NUMPKGS) PACKAGE STATEMENTS (NUMPKSTS) PACKAGE LISTS (NUMPLPL) EXECUTED STMTS (NUMSTMTE)
DSNTIP9	All fields: 4K SORT PRIMARY SPACE (S4KSPAC) 4K SORT WORK TS'S (S4KNOTS) 4K SORT WORK SEG SIZE (S4KSGSZ) 32K SORT PRIMARY SPACE (S32KSPAC) 32K SORT WORK TS'S (S32KNOTS) 32K SORT WORK SEG SIZE (S32KSGSZ) 4K TEMP PRIMARY SPACE (T4KSPAC) 4K TEMP WORK TS'S (T4KNOTS) 4K TEMP WORK SEG SIZE (T4KSGSZ) 32K TEMP PRIMARY SPACE (T32KSPAC) 32K TEMP WORK TS'S (T32KNOTS)
DSNTIPM	The following fields: SUBSYSTEM NAME (MVSNAME) COMMAND PREFIX (MVSPREF)
DSNTIPR	The following fields: DB2 LOCATION NAME (DDLOC) DB2 NETWORK LUNAME (DDLUNAM)

Table 51. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIP5	The following fields: DRDA PORT (DRDAPRT) RESYNC PORT (RESYNPRT)
DSNTIPX	The following fields: WLMENV (WLMENV)
DSNTIPR1	The following fields: All fields (WLMENV*x*).
DSNTIPRA	On panels DSNTIPRB - DSNTIPRQ: All WLM ENV NAME fields (RT*xnn*WLM)
DSNTIPY	All numbered job card information fields.

b) Run the installation CLIST, and specify the following field values of panel DSNTIPA1: `USE Z/OSMF WORKFLOW ===> YES` and `INSTALL TYPE ===> INSTALL`.

The CLIST runs with modified panels and extra panels to support generation of a z/OSMF workflow. For more information about the specific panels, see "Installation panels for installing or migrating with z/OSMF" on page 507.

c) Complete the CLIST as described in Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39. As you complete the CLIST, select each installation parameter that you want to include in the input variable file for the z/OSMF workflow.

You can more easily change values in the input variable file when you reuse the workflow for different subsystems. For each field that you do not select, the value that you specify in the panel is hardcoded into the workflow definition file.

Tip: To reduce the size and difficulty of managing your input variable files, choose only input fields that are likely to be different across different Db2 subsystems in your environment.

d) If you are installing multiple Db2 subsystems, run the CLIST again and specify the following field values on panel DSNTILA1: `USE Z/OSMF WORKFLOW ===> YES` and `INSTALL TYPE ===> UPDATE`.

The CLIST runs with an abbreviated set of panels to create input variable files for subsystems after the first subsystem.

Repeat this step for each subsystem after the first.

3. Create the workflow instances in z/OSMF.

a) Specify the path of the workflow definition file and the input variable file.

The path of the input variable file is optional, but it is best to always specify it. Otherwise, z/OSMF prompts you to provide the variable values during execution, preventing full automation of the process.

b) Specify a name for the workflow instance.

Tip: Specify a name that describes the purpose of the workflow and includes the name of the target system. For example, you might use the following name: `V10 to V11 CM non-data-sharing - DB2A`, where "DB2A" is the name of the target subsystem.

c) Assign all workflow steps to the same person to fully automate the migration process.

d) Validate the JCL job and the substituted input variables.

You can find the input variable files and the JCL jobs with the substituted input variables on the **Perform** tab for the workflow in z/OSMF.

i) Review the input variables. You can edit the values of input variables during your review, but any changes that you make apply only to this workload instance only.

ii) In the Create JOB statement step, z/OSMF prompts you to review and update the JOB statement JCL. You can specify appropriate CLASS or MSGCLASS values.

If installation or migration step requires authorization, you can also specify the USERNAME and PASSWORD. For detailed information about required authorizations see .

iii) Review the JCL including the JOB statement. You can click **Edit JCL** to make changes. However, any changes that you make apply only to this workflow instance. It is best to make any changes that apply to all instances in the JCL template before you create the instances.

4. Start running the workflow steps.

   You can run the workflow steps in z/OSMF, or by embedding z/OSMF REST services in your own automation programs.

   a) After any prerequisite manual steps are complete, select **Automatically perform the selected step, and all subsequent steps...** on the **Perform Automated Step** page.

   z/OSMF runs all subsequent steps in order until all steps complete successfully, or until an error is encountered.

   b) If errors are encountered, check the job output on the z/OSMF **Status** tab.

   The maximum return code that a step tolerates is defined the workload definition file, and it might be a return code other than 0. The maximum return code for most steps is 0 or 4.

Related concepts

About workflows (z/OS Management Facility)

Migrating to Db2 11
Migration is the process of upgrading from Db2 10 to Db2 11.

Related tasks

Installing Db2 11
Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

IBM z/OS Management Facility Online Help

Automating Db2 migration by using z/OS Management Facility

You can use z/OSMF to automate the process of migrating Db2 subsystems to Db2 11 for z/OS.

Before you begin

For migrations to Db2 11, this process uses new and modified panels for the installation CLIST. The panels reside in the Db2 11 SDSNSPFP library. You must make the panels available to TSO, ISPF, and the Db2 11 installation CLIST. For more information, see Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.

Apply the following APARs:

- Db2 11 for z/OS APAR PI38553
- z/OSMF V2R1 APAR PI54360

You must use SMP/E to load the required Db2 libraries, as described in Chapter 3, “Making the Db2 product code available,” on page 29. Running the installation CLIST requires the following Db2 load libraries:

- *prefix.*SDSNCLST
- *prefix.*SDSNSPFM
- *prefix.*SDSNSPFP
- *prefix.*SDSNSAMP
- *prefix.*SDSNIVPD (only if generating z/OSMF artifacts)

Read the white paper about this process Automating Db2 for z/OS Migration With z/OS Management Facility (white paper).

About this task

By using z/OSMF, you can automate the process of migrating Db2 by creating workflow definition and variable files that you can define one time for reuse across many different Db2 subsystems.

In summary, you run the installation CLIST with certain options to generate the artifacts that define the z/OSMF workflow, including workflow definition files and input variable files. For more information about specific sample workflow artifacts, see "Sample workflow artifacts for installation and migration with z/OS Management Facility" on page 517.

The number of workflow definition and input variable files that you create depends on the environment that you are migrating. You run the CLIST again to generate each workflow definition file. For example, to migrate a single Db2 subsystem, only DSNTIWMS and DSNTIWMN are required. For data sharing groups, you must also create the DSNITWMD workflow definition file to migrate members other than the first member to Db2 11.

Each workflow can use one or more input variable files. Each time that you run the CLIST to generate the workflow artifacts, subsystem parameters that you select are included in the generated input variable file. You can more easily change values in the input variable file when you reuse the workflow for different subsystems. Values for fields that you do not select are hardcoded into the workflow definition file. You might also create extra input variable files to support the efficient migration of several subsystems in your environment.

Procedure

To migrate to Db2 11 by using z/OSMF, use the following general approach:

1. Prepare for creating workflow definition files by running the DSNTXAZP tool to update the CLIST defaults input member, as described in "Updating the CLIST defaults input member: job DSNTIJXZ " on page 42.

   Important: The DSNTXAZP tool does not update the DSNTID*xx* CLIST input member with current settings for the following parameters or panel fields. Update the values as you complete the CLIST, or modify the values directly in the DSNTID*xx* member:

   Table 52. Settings not updated by the DSNTXAZP tool

CLIST Panel	Field Name (DSNTID*xx* entry)
DSNTIPA2	The following fields: CATALOG ALIAS (VCATALOG) DEFINE CATALOG (VCATSTAT)

Table 52. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPA3	All fields: PERMANENT UNIT NAME (VOLSDEVT) TEMPORARY UNIT NAME (TVOLSDEVT) CLIST ALLOCATION: VOL/SER (VOLSDAT1) CLIST ALLOCATION: DATA CLASS (DATACLS1) CLIST ALLOCATION: MGMT CLASS (MGMTCLS1) CLIST ALLOCATION: STOR CLASS (STORCLS1) NON-VSAM DATA: VOL/SER (VOLSDAT2) NON-VSAM DATA: DATA CLASS (DATACLS2) NON-VSAM DATA: MGMT CLASS (MGMTCLS2) NON-VSAM DATA: STOR CLASS (STORCLS2) VSAM CATALOG, ...: VOL/SER (VOLSDAT3) VSAM CATALOG, ...: DATA CLASS (DATACLS3) VSAM CATALOG, ...: MGMT CLASS (MGMTCLS3) VSAM CATALOG, ...: STOR CLASS (STORCLS3) LOG COPY 1, BSDS 2: VOL/SER (VOLSDAT6) LOG COPY 1, BSDS 2: DATACLASS (DATACLS6) LOG COPY 1, BSDS 2: MGMTCLASS (MGMTCLS6) LOG COPY 1, BSDS 2: STOR CLASS (STORCLS6) LOG COPY 2, BSDS 1: VOL/SER (VOLSDAT7) LOG COPY 2, BSDS 1: DATA CLASS (DATACLS7) LOG COPY 2, BSDS 1: MGMT CLASS (MGMTCLS7) LOG COPY 2, BSDS 1: STOR CLASS (STORCLS7)
DSNTIPK	The following fields: WORK FILE DB (WKDBNAME) SUBGRP ATTACH (SGRPATNM)
DSNTIPG	All fields: ROUTINES CREATOR (AUTHID) SEC DEF CREATOR (SECDEFID) INSTALL SQL ID (INSSQLID) INSTALL PKG OWNER (INSPKOWN) INSTALL GRANTEE(S) (INSGRLST) IVP SQL ID (IVPSQLID) IVP PACKAGE OWNER (IVPPKOWN) IVP GRANTEE(S) (IVPGRLST)

Table 52. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPH	The following fields: COPY 1 NAME (BSDSNAM1) COPY 2 NAME (BSDSNAM2) Active logs: COPY 1 PREFIX (LOGSPRE1) Active logs: COPY 2 PREFIX (LOGSPRE2) Archive logs: COPY 1 PREFIX (ARCHPRE1) Archive logs: COPY 2 PREFIX (ARCHPRE2)
DSNTIPT	All fields: TEMP CLIST LIBRARY (NEWCL) SAMPLE LIBRARY (NEWSAMP) CLIST LIBRARY (OUTCL) APPLICATION DBRM (DBRMLIB) APPLICATION LOAD (RUNLIB) DECLARATION LIBRARY (SRCLIB) LINK LIST LIBRARY (DSNLINK) LOAD LIBRARY (DSNLOAD) JDBC AND SQLJ DLLS (DSNLOD2) MACRO LIBRARY (DSNMACS) LOAD DISTRIBUTION (DSNALOAD) EXIT LIBRARY (DSNEXIT) DBRM LIBRARY (DSNDBRM) IRLM LOAD LIBRARY (DSNIRLM) IVP DATA LIBRARY (DSNIVPD) INCLUDE LIBRARY (DSNCHDRS)
DSNTIPU	All fields: IBM LE RUNTIME LIBRARY (LERUN) IBM LE RUNTIME LIBRARY 2 (LERUN2) IBM LE LINK EDIT LIB (LELKED) IBM LE PRELINK MSG LIB (LEPLMSGL) HIGH LEVEL ASSEMBLER LIB (IASMLIB) C/CPP COMPILER MODULE (CPROG) C/CPP COMPILER LIBRARY (CCOMP) C/CPP HEADER LIBRARY (CHDRS) C/370 COMPILER MESSAGES (CMSGS) C LE PRELINKER PHASE (CPRLK) CPP LE PRELINKER PHASE (CPPPRLK) CPP CLASS LIB HEADERS (CPPHDRS) CPP AUTO CALL LIBRARY (CPPAUTCL) CPP CLASS LIBRARY (CPPCLASS) CPP PROCEDURE LIBRARY (CPPPROC)

Table 52. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIPW	All fields: SYSTEM MACLIB (MACLIB) SYSTEM PROCEDURES (PROCLIB) SORT LIBRARY (SORTLIB) IMS RESLIB (RESLIB) ISPF ISPLINK MODULE (ISPLOAD) GDDM MACLIB (GDDMMACS) GDDM LOAD MODULES (GDDMLOAD) CICS LOAD LIBRARY (CICSMOD) CICS MACRO LIBRARY (CICSMAC) CICS COBOL LIBRARY (CICSCOB) CICS PL/I LIBRARY (CICSPLI) CICS EXCI LIBRARY (CICSEXCI)
DSNTIPD	All fields: DATABASES (NUMDATAB) TABLES (NUMTABLE) COLUMNS (NUMCOLUM) VIEWS (NUMVIEWS) TABLE SPACES (NUMTABSP) PLANS (NUMPLANS) PLAN STATEMENTS (NUMSTMTS) PACKAGES (NUMPKGS) PACKAGE STATEMENTS (NUMPKSTS) PACKAGE LISTS (NUMPLPL) EXECUTED STMTS (NUMSTMTE)
DSNTIP9	All fields: 4K SORT PRIMARY SPACE (S4KSPAC) 4K SORT WORK TS'S (S4KNOTS) 4K SORT WORK SEG SIZE (S4KSGSZ) 32K SORT PRIMARY SPACE (S32KSPAC) 32K SORT WORK TS'S (S32KNOTS) 32K SORT WORK SEG SIZE (S32KSGSZ) 4K TEMP PRIMARY SPACE (T4KSPAC) 4K TEMP WORK TS'S (T4KNOTS) 4K TEMP WORK SEG SIZE (T4KSGSZ) 32K TEMP PRIMARY SPACE (T32KSPAC) 32K TEMP WORK TS'S (T32KNOTS)
DSNTIPM	The following fields: SUBSYSTEM NAME (MVSNAME) COMMAND PREFIX (MVSPREF)
DSNTIPR	The following fields: DB2 LOCATION NAME (DDLOC) DB2 NETWORK LUNAME (DDLUNAM)

Table 52. Settings not updated by the DSNTXAZP tool (continued)

CLIST Panel	**Field Name (DSNTID*xx* entry)**
DSNTIP5	The following fields: DRDA PORT (DRDAPRT) RESYNC PORT (RESYNPRT)
DSNTIPX	The following fields: WLMENV (WLMENV)
DSNTIPR1	The following fields: All fields (WLMENV*x*).
DSNTIPRA	On panels DSNTIPRB - DSNTIPRQ: All WLM ENV NAME fields (RT*xnn*WLM)
DSNTIPY	All numbered job card information fields.

2. Create the workflow definition files and input variable files by running the installation CLIST and specifying `USE Z/OSMF WORKFLOW ===>` YES on panel DSNTIPA1.

   When you specify that option, panel DSNTILA1 opens, and the CLIST runs with modified and extra panels that support generation of the z/OSMF workflow artifacts.

   For more information about the specific panels that support the generation of z/OSMF workflow artifacts, see "Installation panels for installing or migrating with z/OSMF" on page 507.

   a) Create the workflow definition file for migrating the first subsystem to Db2 11 conversion mode (DSNTIWMS) by running the installation CLIST and setting the following options on panel DSNTIPA1:

      `USE Z/OSMF WORKFLOW ===> YES`
      `INSTALL TYPE ===> MIGRATE`
      `DATA SHARING ===>` YES, with option `1. Group` selected on DSNTIP0A

      As you complete the CLIST, select each subsystem parameter that you want to include in the input variable file.

      When you complete the CLIST, the DSNTIWMS workflow definition file and the DSNTIVMS input variable file are created.

   b) If you are migrating a data sharing group, create the workflow definition file for migrating other data sharing members (DSNITWMD) by running the CLIST again and setting the following options on panel DSNTILA1:

      `USE Z/OSMF WORKFLOW ===> YES`
      `INSTALL TYPE ===> MIGRATE`
      `DATA SHARING ===>` YES, with option `2. Member` selected on DSNTIP0A

      As you complete the CLIST, select each subsystem parameter that you want to include in the input variable file.

      When you complete the CLIST, the DSNITWMD workflow definition file and the DSNTIVMD input variable file are created.

   c) Create the workflow definition file for migrating to new function mode (DSNTIWMN), by running the CLIST again with the following options on panel DSNTILA1:

      `USE Z/OSMF WORKFLOW ===> YES`
      `INSTALL TYPE ===> ENFM`

      As you complete the CLIST, select each subsystem parameter that you want to include in the input variable file.

When you complete this step the DSNTIWMN workflow definition file, and the DSNTIVMN input variable files are created.

3. Create extra input variable files, as required to support the efficient migration of your environment.

   The goal is to structure the input variable files so that you can specify subsystem parameters that are common across many subsystems in a single file.

   For an example of how you might and structure and name a set of input variable files for migrating a particular environment, see "Example of migrating a data sharing group to Db2 11 by using z/OSMF" on page 506.

   Important: All input variable files must include the following variables, with supported values:

   INSTYPE=
   The installation type. The following values are accepted:

   MNDS
   Migration of a non-data-sharing subsystem to Db2 11 conversion mode.

   MDS1
   Migration of the first member of a data sharing group to Db2 11 conversion mode.

   MDSS

   MNFM
   Migration to Db2 11 new-function mode

   INDS
   Installation of a non-data-sharing Db2 subsystem.

   IDS1
   Installation of the first member of a data sharing group

   IDSS
   Adding a member to a data sharing group

   NEWSAMP2=
   NEWSAMP2 is the partitioned data that contains tailored JCL templates for the z/OSMF workflow. You must change this value if the workflow artifacts are moved to a different location.

   B=
   The indicator for line breaks in z/OSMF. Do not change or remove this variable in a generated input variable file.

4. Create the workflow instances in z/OSMF.

   a) Specify the path of the workflow definition file and the input variable file.

      The path of the input variable file is optional, but it is best to always specify it. Otherwise, z/OSMF prompts you to provide the variable values during execution, preventing full automation of the process.

   b) Specify a name for the workflow instance.

      Tip: Specify a name that describes the purpose of the workflow and includes the name of the target system. For example, you might use the following name: `V10 to V11 CM non-data-sharing - DB2A`, where "DB2A" is the name of the target subsystem.

   c) Assign all workflow steps to the same person to fully automate the migration process.

   d) Validate the JCL job and the substituted input variables.

      You can find the input variable files and the JCL jobs with the substituted input variables on the **Perform** tab for the workflow in z/OSMF.

      i) Review the input variables. You can edit the values of input variables during your review, but any changes that you make apply to this workflow instance only.

      ii) In the Create JOB statement step, z/OSMF prompts you to review and update the JOB statement JCL. You can specify appropriate CLASS or MSGCLASS values.

      If installation or migration step requires authorization, you can also specify the USERNAME and PASSWORD. For detailed information about required authorizations see .

iii) Review the JCL including the JOB statement. You can click **Edit JCL** to make changes. However, any changes that you make apply only to this workflow instance. It is best to make any changes that apply to all instances in the JCL template before you create the instances.

5. Start running the workflow steps.

   You can run the workflow steps in z/OSMF, or by embedding z/OSMF REST services in your own automation programs.

   - For a single Db2 subsystem, run the migration steps in the following order:

     a. Run DSNTIWMS to migrate to subsystem to Db2 11 conversion mode.

     b. Run DSNTIWMN to migrate the subsystem to Db2 11 new-function mode.

   - For a data sharing group, run the migration steps in the following order:

     a. Run DSNTIWMS to migrate the first member to Db2 11 conversion mode.

     b. Run DSNTIWMD to migrate each subsequent member to Db2 11 conversion mode.

     c. Run DSNTIWMN to migrate the data sharing group to Db2 11 new-function mode.

   a) Certain workflow steps, such as the pre-migration job DSNTIJPM, might need to be run repeatedly.

      For such repeated steps, you can select **Manually perfrom the selected step**. After you run the step, it is marked "Completed" in z/OSMF. However, you can still rerun this step. That is, you can take the required actions that are identified in the premigration reports, and then return to z/OSMF to repeat this step until all premigration tasks are completed.

   b) After any manual steps are complete, select **Automatically perform the selected step, and all subsequent steps...** on the **Perform Automated Step** page.

      z/OSMF runs all subsequent steps in order until all steps complete successfully, or until an error is encountered.

   c) If errors are encountered, check the job output on the z/OSMF **Status** tab.

      The maximum return code that a step tolerates is defined the workload definition file, and it might be a return code other than 0. The maximum return code for most steps is 0 or 4.

Example of migrating a data sharing group to Db2 11 by using z/OSMF

Assume that a data sharing group contains members, 12 members that for online transaction processing (OLTP) workloads, and 4 members for online analytics processing (OLAP) workloads.

- The group consists of 16 members named like DB*x*A, where *x* is numbers 1 - 9 and letters A - G.
- Twelve members, DB1A - DBCA, process OLTP workloads.
- Four members, DBDA - DBGA, process OLAP workloads.
- For migration to conversion mode, the following artifacts are used:
  - Member DB1A uses the DSNTIWMS workflow.
  - All other members use the DSNTIWMD workflow.
  - Members that process OLTP workloads share the DSNTIVTP input variable file.
  - Members that process OLAP workloads share the DSNTIVAP input variable file.
  - Every member also has an input variable file for member-specific parameters, each named like DSNTIV*x*A, where *x* corresponds to the matching character in the subsystem name.
- For migration to new-function mode, a single members uses the DSNTIWMN workflow and the DSNTVNTP input variable file.

The following table shows the members of the example data sharing group and the workflow artifacts that can be used to migrate each subsystem.

Table 53. Workflow artifacts for migrating an example 16-member data sharing group

Subsystem use	Subsystem name	Workflow files	Variables files
OLTP	DB1A	DSNTIWMS and DSNTIWMN	DSNTIV1A and DSNTVNTP
	DB2A	DSNTIWMD	DSNTIV2A
	DB3A		DSNTIV3A
	DB4A		DSNTIV4A
	DB5A		DSNTIV5A
	DB6A		DSNTIV6A
	DB7A		DSNTIV7A
	DB8A		DSNTIV8A
	DB9A		DSNTIV9A
	DBAA		DSNTIVAA
	DBBA		DSNTIVBA
	DBCA		DSNTIVCA
OLAP	DBDA		DSNTIVDA
	DBEA		DSNTIVEA
	DBFA		DSNTIVFA
	DBGA		DSNTIVGA

Related concepts

About workflows (z/OS Management Facility)

Migrating to Db2 11
Migration is the process of upgrading from Db2 10 to Db2 11.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

IBM z/OS Management Facility Online Help

Installation panels for installing or migrating with z/OSMF

If you specify USE `Z/OSMF WORKFLOW ===>` YES on panel DSNTIPA1, panel DSNTILA1 opens, and the CLIST uses a modified set of installation panels.

Panel DSNTILA1

This panel opens to replace panel DSNTIPA1 when you specify USE `Z/OSMF WORKFLOW ===>` YES. It is a variant of DSNTIPA1, but you can select certain fields to tailor the values as variables in the z/OSMF input variable files. For more information, see "DSNTIPA1 or DSNTILA1: Main panel" on page 52

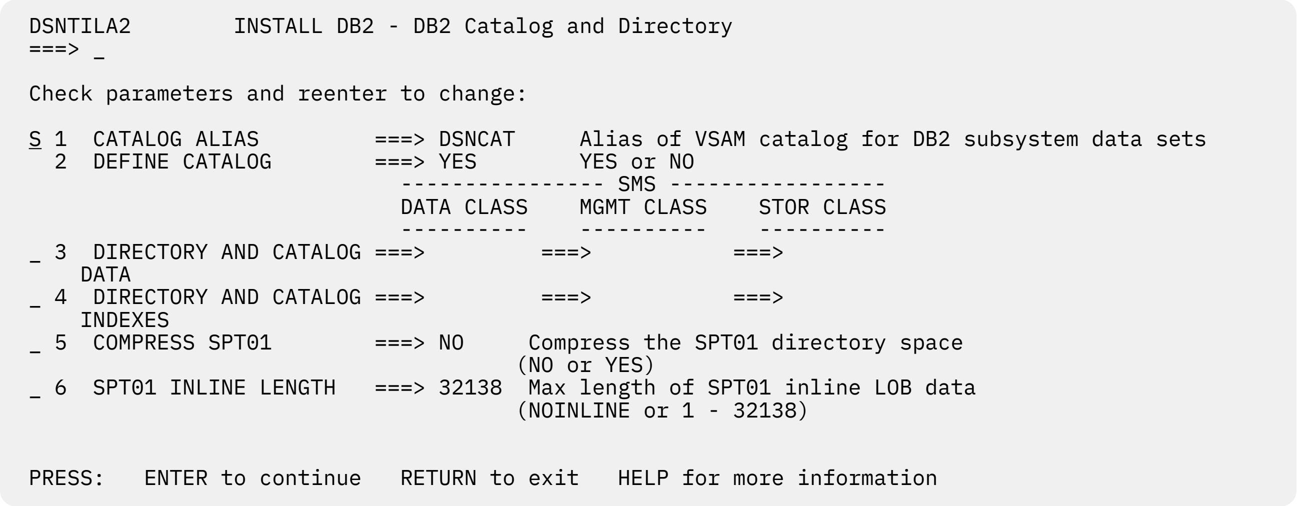
Panels DSNTIL*xx*

When you run the CLIST to prepare z/OSMF workflow definition files, the CLIST panels that normally have names like DSNTIP*xx* are replaced by corresponding panels with names like DSNTIL*xx*. Each DSNTIP*xx* panel is described under "The Db2 installation CLIST panel session" on page 50.

Each DSNTIL*xx* panel contains the same fields as the corresponding DSNTIP*xx* panel. The main difference is that you can select many panel fields to tailor the values as variables in the z/OSMF input variable file.

You can find the variable names for each panel field and subsystem parameter in "Directory of subsystem parameters, panel fields, and application default values" on page 343.

For example, the following figure shows the DSNTILA2 panel. You can select each of the panel fields except for DEFINE CATALOG, which is not eligible to be selected as an input variable. In this example, the CATALOG ALIAS field is selected as an input variable.



```
DSNTILA2        INSTALL DB2 - DB2 Catalog and Directory
===> _

Check parameters and reenter to change:

S 1  CATALOG ALIAS         ===> DSNCAT     Alias of VSAM catalog for DB2 subsystem data sets
  2  DEFINE CATALOG        ===> YES        YES or NO
                             ---------------- SMS -----------------
                             DATA CLASS    MGMT CLASS    STOR CLASS
                             ----------    ----------    ----------
_ 3  DIRECTORY AND CATALOG ===>         ===>           ===>
    DATA
_ 4  DIRECTORY AND CATALOG ===>         ===>           ===>
    INDEXES
_ 5  COMPRESS SPT01        ===> NO     Compress the SPT01 directory space
                                      (NO or YES)
_ 6  SPT01 INLINE LENGTH   ===> 32138  Max length of SPT01 inline LOB data
                                      (NOINLINE or 1 - 32138)


PRESS:   ENTER to continue   RETURN to exit   HELP for more information
```

The DSNTIL*xx* panels and fields are not described individually elsewhere. For detailed information about the panels and fields, see the descriptions of the corresponding DSNTIP*xx* panels and fields under "The Db2 installation CLIST panel session" on page 50.

Panel DSNTILM1

Contains fields for specifying that data sets for the tailored jobs, the workflow definition file, and the input variable file.

WORKFLOW DEFINITION LIBRARY
The data set that stores the generated workflow definition files and input variable files.

JCL TEMPLATE LIBRARY
The data set that stores the tailored jobs for the z/OSMF workflow.

PRIOR RELEASE SDSNLOAD LIBRARY
For migration only, the location of the SDSNLOAD library from the previous Db2 release. The field is blank because the CLIST cannot determine the name of this library. You must specify a value for this field.

PRIOR RELEASE SDSNEXIT LIBRARY
For migration of a Db2 subsystem or the first or subsequent members of a data sharing group, the name of the Db2 SDSNEXIT library from the previous Db2 release. This field cannot be blank. Its initial value is set as follows:

- The OLDEXIT setting from the current release DSNTIDXA/XB input parameter, if it is not blank.
- Otherwise, the EXIT LIBRARY field on panel DSNTIPT, which is the current release Db2 SDSNEXIT library.

You can modify this field and select this field to tailor its value as a variable in the z/OSMF variable input file. The PRIOR RELEASE SDSNEXIT LIBRARY field is only relevant when migrating a Db2 subsystem or the first or subsequent members of a data sharing group. Otherwise, this field is set to blank. You cannot modify the setting nor can you select it to tailor its value as a variable in the z/OSMF variable input file.

Panels DSNTILM3 and DSNTILM4

Contain fields for the subsystem parameters that do correspond to fields on any DSNTIP*xx* panels. For descriptions of the parameters on these panels, see "Subsystem parameters that are not on installation panels" on page 323.

You can select each panel field to specify that the value is tailored as a variable and stored in the z/OSMF input variable file.

Panel DSNTILM5

Contains parameters to tailor the following installation jobs:

- DSNTIJPM
- DSNTIJXA
- DSNTIJSA
- DSNTIJSO

Like the DSNTIL*xx* panels, you can select each panel field to specify that the value is tailored as a variable that is stored in the z/OSMF input variable file.

Panels for choosing z/OSMF workflow steps

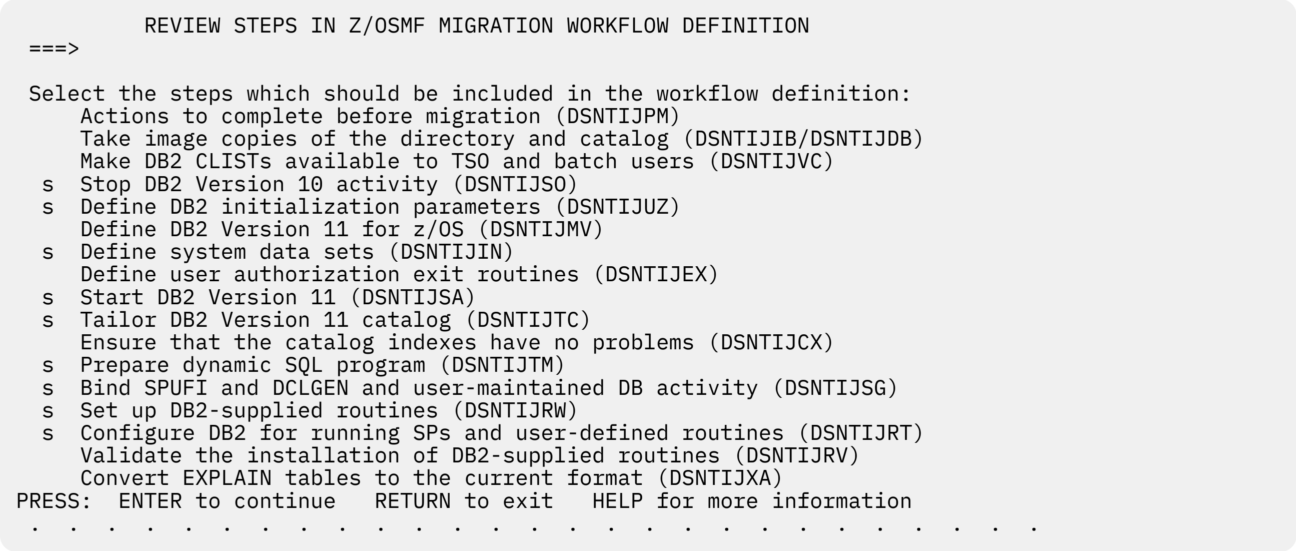
On the following scenario-specific panels you can choose the steps to include in z/OSMF workflows for completing Db2 11 installation or migration tasks.

Each such panel indicates the required and optional steps, and whether they are selected by default, for example:

s indicates a required step.
S indicates an optional step that is selected by default.
An empty selection field indicates an optional step that is not selected by default.

Panel DSNTILMS

Panel DSNTILMS is a scenario-specific panel for choosing steps for migrating a non-data sharing Db2 subsystem or the first member of a data sharing group to Db2 11.



```
          REVIEW STEPS IN Z/OSMF MIGRATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Actions to complete before migration (DSNTIJPM)
     Take image copies of the directory and catalog (DSNTIJIB/DSNTIJDB)
     Make DB2 CLISTs available to TSO and batch users (DSNTIJVC)
  s  Stop DB2 Version 10 activity (DSNTIJSO)
  s  Define DB2 initialization parameters (DSNTIJUZ)
     Define DB2 Version 11 for z/OS (DSNTIJMV)
  s  Define system data sets (DSNTIJIN)
     Define user authorization exit routines (DSNTIJEX)
  s  Start DB2 Version 11 (DSNTIJSA)
  s  Tailor DB2 Version 11 catalog (DSNTIJTC)
     Ensure that the catalog indexes have no problems (DSNTIJCX)
  s  Prepare dynamic SQL program (DSNTIJTM)
  s  Bind SPUFI and DCLGEN and user-maintained DB activity (DSNTIJSG)
  s  Set up DB2-supplied routines (DSNTIJRW)
  s  Configure DB2 for running SPs and user-defined routines (DSNTIJRT)
     Validate the installation of DB2-supplied routines (DSNTIJRV)
     Convert EXPLAIN tables to the current format (DSNTIJXA)
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

For more information about the steps, see .

Panels DSNTIPMS is shown only when you specify These panels are shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES
INSTALL TYPE ===> MIGRATE
DATA SHARING ===> NO, or DATA SHARING ===> YES with option 1 selected in the DSNTIP0B window.

Panel DSNTILMN

Panel DSNTILMN scenario-specific panel for choosing steps for completing the Db2 11 migration process.

For more information about the steps, see , beginning with “Migration step 26: Take an image copy of the Db2 11 conversion mode catalog: DSNTIJIC” on page 469.

For more information about the steps, see .

DSNTILMN is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES
INSTALL TYPE ===> MIGRATE
DATA SHARING ===> NO, or DATA SHARING ===> YES with option 1 selected in the DSNTIP0B window.

Panel DSNTILMD

A scenario-specific panel for choosing steps for migrating subsequent data sharing group members to Db2 11.

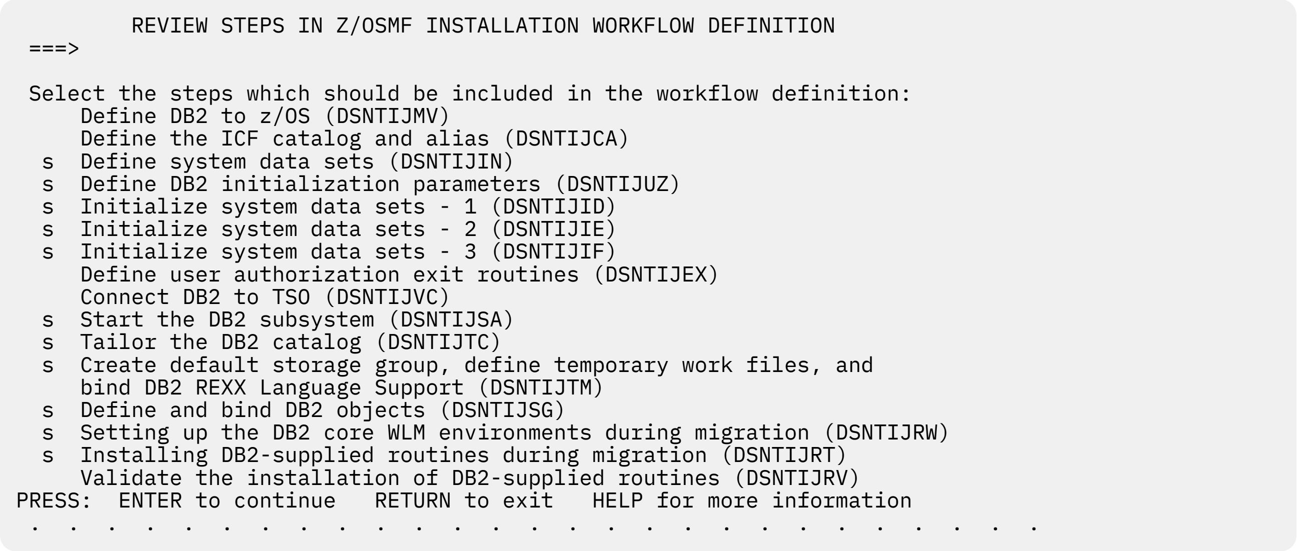
For more information about the steps, see “Migrating subsequent members of a group to Db2 11” on page 623. The workflow supports only steps that are shown in the panel.

DSNTILMD is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES
INSTALL TYPE ===> MIGRATE
DATA SHARING ===> YES with option 2 selected in the DSNTIP0B window.

Panel DSNTILMI

Panel DSNTILMIis a scenario-specific panel for choosing steps to include when installing a new Db2 subsystem.



```
         REVIEW STEPS IN Z/OSMF INSTALLATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Define DB2 to z/OS (DSNTIJMV)
     Define the ICF catalog and alias (DSNTIJCA)
  s  Define system data sets (DSNTIJIN)
  s  Define DB2 initialization parameters (DSNTIJUZ)
  s  Initialize system data sets - 1 (DSNTIJID)
  s  Initialize system data sets - 2 (DSNTIJIE)
  s  Initialize system data sets - 3 (DSNTIJIF)
     Define user authorization exit routines (DSNTIJEX)
     Connect DB2 to TSO (DSNTIJVC)
  s  Start the DB2 subsystem (DSNTIJSA)
  s  Tailor the DB2 catalog (DSNTIJTC)
  s  Create default storage group, define temporary work files, and
     bind DB2 REXX Language Support (DSNTIJTM)
  s  Define and bind DB2 objects (DSNTIJSG)
  s  Setting up the DB2 core WLM environments during migration (DSNTIJRW)
  s  Installing DB2-supplied routines during migration (DSNTIJRT)
     Validate the installation of DB2-supplied routines (DSNTIJRV)
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

For more information about the steps, see Chapter 5, “Installing Db2 11,” on page 359.

DSNTILMI is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES

INSTALL TYPE ===> INSTALL

DATA SHARING ===> NO, or DATA SHARING ===> YES with option 1 selected in the DSNTIP0A window.

Panel DSNTILMA

Panel DSNTILMA is scenario-specific panel for choosing steps for adding a Db2 subsystem to a data sharing group.

```
         REVIEW STEPS IN Z/OSMF INSTALLATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Identifying DB2 to z/OS (DSNTIJMV)
  s  Define system data sets (DSNTIJIN)
  s  Define DB2 initialization parameters (DSNTIJUZ)
  s  Initialize system data sets (DSNTIJID/DSNTIJIE/DSNTIJIF)
     Define user authorization exit routines (DSNTIJEX)
  s  Start the DB2 subsystem (DSNTIJSA)
  s  Create default storage group, define temporary work files, and
     bind DB2 REXX Language Support (DSNTIJTM)
     Back up the DB2 directory and catalog (DSNTIJIC/DSNTIJDC)


PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

For more information about the steps, see “Adding a new data sharing member” on page 595. The workflow supports only steps that are shown in the panel.

DSNTILMA is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES

INSTALL TYPE ===> INSTALL

DATA SHARING ===> YES with option 2 selected in the DSNTIP0A window.

Panel DSNTILMV

Panel DSNTILMV is a scenario-specific panel for choosing steps to include when running installation verification jobs.

```
           REVIEW STEPS IN Z/OSMF IVP WORKFLOW DEFINITION
 ===>

 Select the IVP steps which should be included in the workflow definition:
     Remove sample applications and sample schema authorizations (DSNTEJ0)
     Create and load sample tables (DSNTEJ1)
     Prepare and invoke program DSNTEP2 (DSNTEJ1L)
     Prepare and invoke program DSNTIAUL (DSNTEJ2A)


PRESS:  ENTER to continue   RETURN to exit   HELP for more information
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

For more information about the steps, see Chapter 9, “Verifying successful Db2 11 installation or migration with sample applications,” on page 641.

DSNTILMV is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES

INSTALL TYPE ===> INSTALL or MIGRATE

DATA SHARING ===>

DSNTILMU

Contains fields for specifying source and target workflow input variable files, for use when creating input variable files for installing or migrating members of a data sharing group after the first one.

This panel is shown only when you specify the following values on panel DSNTILA1:

```
USE Z/OSMF WORKFLOW ===> YES
INSTALL TYPE ===> UDPATE
```

Related concepts

About workflows (z/OS Management Facility)

Sample workflow artifacts for installation and migration with z/OS Management Facility
Db2 provides sample z/OSMF workflow artifacts for Db2 installation and migration. The artifacts include several sample workflow definition files, and an associated a set of sample JCL templates and a sample workflow input variable file for each definition file.

Sample jobs for installing and migrating with z/OSMF

The following sample jobs are used by z/OSMF workflows for automating the installation or migration of Db2 subsystems.

Job DSNTIJDC

The DSNTIJDC sample job creates image copies of the Db2 catalog and directory. It is used by z/OSMF worklflows for automating the installation or migration of Db2 subsystems.

Job DSNTIJSO

The DSNTIJSO sample job stops Db2 by calling the DSNTMVSB stand-alone program. It is used by z/OSMF worklflows for automating the installation or migration of Db2 subsystems.

Job DSNTIJSA

The DSNTIJSA sample job starts Db2 by calling the DSNTMVSB stand-alone program. It is used by z/OSMF worklflows for automating the installation or migration of Db2 subsystems.

Job DSNTIJMB

Job DSNTIJMB runs the DSNTMVSB batch program tool to issue START DB2 and STOP DB2 commands.

Related tasks

Automating Db2 installation or migration with z/OS Management Facility
You can use z/OSMF to automate the process of installing or migrating to Db2 11 for z/OS.

Related reference

DSNTMVSB tool
The DSNTIMVSB tool provides a batch interface for starting and stopping Db2. This tool is invoked by sample jobs DSNTIJSA and DSNTIJSO to support z/OSMF workflows for automating installation and migration of Db2 subsystems.

Related information

DSNTMVSB tool

The DSNTIMVSB tool provides a batch interface for starting and stopping Db2. This tool is invoked by sample jobs DSNTIJSA and DSNTIJSO to support z/OSMF workflows for automating installation and migration of Db2 subsystems.

DD statements for DSNTMVSB

The DSNTMVSB batch program allocates the following DD statements:

Input DD statements for DSNTMVSB

CMDOPT

For command and command parameters used to generate the command to be executed:

TYPE*type*
Specifies the type of command: Db2

Required.

COMMAND_PREFIX*command-prefix*

Specifies the command prefix that identifies which Db2 subsystem to direct the command to.

Required.

REMOTE_SYSTEM*remote-system*
Specifies the z/OS system in the sysplex to which the Db2 command is to be routed.

Required if the Db2 command will be routed to a z/OS system that is different from the system where the batch program DSNTMVSB is executing.

COMMAND*command*
Specifies the command to be executed: START or STOP

Required.

PARAMETERS*parameters*
Specifies the parameters of the command. START DB2 options, such as PARM(DB2AZNS), if COMMAND=START

STOP DB2 options, such as MODE(FORCE), if COMMAND=STOP

Optional.

SUBPARAMETERS*subparameters*

Specifies the subparameters of the command, represented as keyword-value pairs separated by commas:

CONSNAME=*consame*
Where *consname* is the name of the console used to issue the command. If not specified, the default is DSNTMVSB. The specified console must not already be active.

Optional.

IRLMPROC=*irlmproc*
Where *irlmproc* is the procedure name of the connected IRLM. If specified, the batch program will poll the status of the specified IRLM job and will report the end of Db2 normal termination when the IRLM job has ended within the specified *wait-timeout*.

Optional. Valid if COMMAND=STOP and SSNM keyword is not specified.

SSNM=*ssnm*
Where *ssnm* is the Db2 subsystem name. If specified, the batch program will poll the status of the specified *ssnm*MSTR job and will report the end of Db2 normal termination when the *ssnm*MSTR job has ended within the specified *wait-timeout*.

Optional. Valid if COMMAND=STOP and IRLMPROC keyword is not specified.

WAIT_TIMEOUT*wait-timeout*

Specifies the amount of time in seconds that this batch program waits for the command to complete and for the command messages to be routed to the console. It includes time spent waiting for the console to be available and polling the *irlmproc* or *ssnm*MSTR job status.

1 -900. The default value is 180 seconds.

Output DD statements used by DSNTIMVSB

SYSPRINT
For DSNTMVSB messages.

CMDOUT
For command messages.

DSNTRACE
For trace messages.

DSNTMVSB return codes

DSNTMVSB sets the following *return-code* and *command-completion-code* variables to describe the execution status of the command:

return-code

0

The batch program did not encounter any errors during processing.

command-completion-code is set to 0 or 4.

4
The batch program issued the command but was unable, within the prescribed wait time, to determine the command execution status based on the command messages retrieved. All command messages and any *ssnm*MSTR or *irlmproc* job status messages retrieved within the prescribed wait time are written to DD:CMDOUT.

command-completion-code is set to 8 or 16.

8
The batch program issued the command but was unable to determine the command execution status due to an internal error. All the command messages and any *ssnm*MSTR or *irlmproc* job status messages retrieved so far are written to DD:CMDOUT.

command-completion-code is set to 8 or 16.

12
The batch program encountered an error during processing. A message describing the error is written to SYSPRINT.

16
The batch program did not encounter any errors during processing. However, the command completed abnormally.

command-completion-code is set to 12.

command-completion-code

0

The command completed successfully.

Table 54. Details for command-completion-code 0

Command	***command-completion-code* meaning**	**Message received**
START DB2	Successful completion	DSN9022I *cmd_prefix*
STOP DB2	Successful completion	DSN9022I *cmd_prefix* If system services address space (*ssnm*MSTR) termination monitoring is requested: message '*ssnm*MSTRNOT FOUND' was found in the 'D J, *ssnm*MSTR' command output.

4

The command was not processed. For example, Db2 was already stopped when STOP DB2 was requested.

Table 55. Details for command-completion-code 4

Command	***command-completion-code* meaning**	**Message received**
START DB2	Db2 was already active when the command was issued.	DSNY003I *cmd_prefix*
STOP DB2	When the command was issued, Db2 was already stopped or Db2 was in the process of stopping and it stopped successfully.	If Db2 MSTR or IRLM address space termination monitoring is not requested, any of the following messages are received: • DSN3106I *cmd_prefix* • DSNY004I*cmd_prefix* and DSN9022I *cmd_prefix* If system services address space (*ssnm*MSTR) termination monitoring is requested, both of the following messages were received: • DSNY004I *cmd_prefix* and DSN9022I*cmd_prefix* • `'`*`ssnm`*`MSTR NOT FOUND'` in 'D J, *ssnm*MSTR' command output If IRLM address space termination monitoring is requested, both of the following messages were received: • DSNY004I *cmd_prefix* and DSN9022I*cmd_prefix* • `'irlm_job NOT FOUND'` in 'D J, 'irlm_job' command output

8

The command started but the completion status is unknown.

Table 56. Details for command-completion-code 8

Command	***command-completion-code* meaning**	**Message received**	**Expected message not received**
START DB2	Db2 is in the process of starting, but the completion status of the START DB2 command is unknown.	DSNY024I *cmd_prefix*	Any of the following messages: • DSN9023I *cmd_prefix* • DSNV086E *cmd_prefix* • DSN3104I *cmd_prefix* • DSN9022I *cmd_prefix* • DSN3100I *cmd_prefix*
STOP DB2	Db2 is in the process of stopping, but the completion status of the STOP DB2 command is unknown.	One of the following messages was received: • DSNY002I *cmd_prefix* • DSNY004I *cmd_prefix*	One of the following messages was not received: • DSN9022I *cmd_prefix* • DSN9023I *cmd_prefix* Or DSN9022I *cmd_prefix* was received along with one of the following conditions: • If system services address space (*ssnm*MSTR) termination monitoring is requested, and `'`*ssnm*`MSTR NOT FOUND'` was not found in 'D J, *ssnm*MSTR' command output • If IRLM address space (*irlmproc*) termination monitoring is requested, and `'irlm_job NOT FOUND'` is not found in 'D J, 'irlm_job' command output.

12

The command completed abnormally.

Table 57. Details for command-completion-code 16

Command	***command-completion-code* meaning**	Message received
START DB2	Abnormal completion.	One of the following messages was received: • DSN9023I *cmd_prefix* • DSNV086E *cmd_prefix* • DSN3100I *cmd_prefix* • DSN3104I *cmd_prefix* • DSN3106I *cmd_prefix* • DSN3107I *cmd_prefix*
STOP DB2	Abnormal completion.	One of the following messages was received: • DSN9023I *cmd_prefix* • DSN3107I *cmd_prefix*

16

The command output does not satisfy the conditions that are listed for *command-completion-code* 0, 4, 8, or 12.

Related tasks

Automating Db2 installation or migration with z/OS Management Facility
You can use z/OSMF to automate the process of installing or migrating to Db2 11 for z/OS.

Related reference

Job DSNTIJMB
Job DSNTIJMB runs the DSNTMVSB batch program tool to issue START DB2 and STOP DB2 commands.

Related information

Sample workflow artifacts for installation and migration with z/OS Management Facility

Db2 provides sample z/OSMF workflow artifacts for Db2 installation and migration. The artifacts include several sample workflow definition files, and an associated a set of sample JCL templates and a sample workflow input variable file for each definition file.

You can find the sample z/OSMF workflow artifacts in the *prefix*.SDSNIVPD Db2 SMP/E library.

You can find the steps of each workflow on one or more scenario-specific panels. Each workflow supports only the steps that are shown on the panel.

Required, optional, and default workflow steps

Each panel indicates the required and optional steps and whether they are selected by default, for example:

s indicates a required step.
S indicates an optional step that is selected by default.
An empty selection field indicates an optional step that is not selected by default.

DSNTIWMS and DSNTIVMS: migrate to Db2 11

The DSNTIWMS sample workflow definition file migrates a non-data sharing Db2 subsystem or the first Db2 member of a data sharing group to Db2 11 conversion mode. It uses the DSNTIVMS input variable file.

Panel DSNTILMS shows the steps of the DSNTIWMS workflow.

```
          REVIEW STEPS IN Z/OSMF MIGRATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Actions to complete before migration (DSNTIJPM)
     Take image copies of the directory and catalog (DSNTIJIB/DSNTIJDB)
     Make DB2 CLISTs available to TSO and batch users (DSNTIJVC)
  s  Stop DB2 Version 10 activity (DSNTIJSO)
  s  Define DB2 initialization parameters (DSNTIJUZ)
     Define DB2 Version 11 for z/OS (DSNTIJMV)
  s  Define system data sets (DSNTIJIN)
     Define user authorization exit routines (DSNTIJEX)
  s  Start DB2 Version 11 (DSNTIJSA)
  s  Tailor DB2 Version 11 catalog (DSNTIJTC)
     Ensure that the catalog indexes have no problems (DSNTIJCX)
  s  Prepare dynamic SQL program (DSNTIJTM)
  s  Bind SPUFI and DCLGEN and user-maintained DB activity (DSNTIJSG)
  s  Set up DB2-supplied routines (DSNTIJRW)
  s  Configure DB2 for running SPs and user-defined routines (DSNTIJRT)
     Validate the installation of DB2-supplied routines (DSNTIJRV)
     Convert EXPLAIN tables to the current format (DSNTIJXA)
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

For more information about the steps, see .

Panels DSNTIPMS is shown only when you specify These panels are shown only when you specify the following values on panel DSNTILA1:

- `USE Z/OSMF WORKFLOW ===> YES`
- `INSTALL TYPE ===> MIGRATE`
- `DATA SHARING ===> NO`, or `DATA SHARING ===>` YES with option 1 selected in the DSNTIP0B window.

DSNTIWMD and DSNTIVMD: migrate data sharing members to Db2 11

The DSNTIWMD workflow migrates subsequent members of a Db2 data sharing group to Db2 11 conversion mode. It uses the DSNTIVMD input variable file.

Panel DSNTILMD shows the steps of this workflow.

For more information about the steps, see "Migrating subsequent members of a group to Db2 11" on page 623. The workflow supports only steps that are shown in the panel.

DSNTILMD is shown only when you specify the following values on panel DSNTILA1:

- `USE Z/OSMF WORKFLOW ===> YES`
- `INSTALL TYPE ===> MIGRATE`
- `DATA SHARING ===>` YES with option 2 selected in the DSNTIP0B window.

DSNTIWMN and DSNTIVMN: migrate to Db2 11 new-function mode

The DSNTIWMN sample workflow definition file migrates a Db2 subsystem to new-function mode. It uses the DSNTIVMN input variable file.

Panel DSNTIPMN shows the steps of the DSNTIWMN workflow.

For more information about the steps, see , beginning with "Migration step 26: Take an image copy of the Db2 11 conversion mode catalog: DSNTIJIC" on page 469.

For more information about the steps, see .

DSNTILMN is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES

INSTALL TYPE ===> MIGRATE

DATA SHARING ===> NO, or DATA SHARING ===> YES with option 1 selected in the DSNTIP0B window.

DSNTIWIN and DSNTIVIN: install Db2 11

The DSNTIWIN sample workflow definition file installs a new Db2 11 subsystem.

Panel DSNTILMI shows the steps of the DSNTIWIN workflow.

```
         REVIEW STEPS IN Z/OSMF INSTALLATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Define DB2 to z/OS (DSNTIJMV)
     Define the ICF catalog and alias (DSNTIJCA)
  s  Define system data sets (DSNTIJIN)
  s  Define DB2 initialization parameters (DSNTIJUZ)
  s  Initialize system data sets - 1 (DSNTIJID)
  s  Initialize system data sets - 2 (DSNTIJIE)
  s  Initialize system data sets - 3 (DSNTIJIF)
     Define user authorization exit routines (DSNTIJEX)
     Connect DB2 to TSO (DSNTIJVC)
  s  Start the DB2 subsystem (DSNTIJSA)
  s  Tailor the DB2 catalog (DSNTIJTC)
  s  Create default storage group, define temporary work files, and
     bind DB2 REXX Language Support (DSNTIJTM)
  s  Define and bind DB2 objects (DSNTIJSG)
  s  Setting up the DB2 core WLM environments during migration (DSNTIJRW)
  s  Installing DB2-supplied routines during migration (DSNTIJRT)
     Validate the installation of DB2-supplied routines (DSNTIJRV)
PRESS:  ENTER to continue   RETURN to exit   HELP for more information
 .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .
```

For more information about the steps, see Chapter 5, “Installing Db2 11,” on page 359.

DSNTILMI is shown only when you specify the following values on panel DSNTILA1:

USE Z/OSMF WORKFLOW ===> YES

INSTALL TYPE ===> INSTALL

DATA SHARING ===> NO, or DATA SHARING ===> YES with option 1 selected in the DSNTIP0A window.

DSNITWIA and DSNTIVIA: add a new data sharing member

The DSNITIWIA sample workflow definition file adds new members to a data sharing group. It uses the DSNTIVIA input variable file.

Panel DSNTILMA shows the steps of the DSNITWIA workflow.

```
          REVIEW STEPS IN Z/OSMF INSTALLATION WORKFLOW DEFINITION
 ===>

 Select the steps which should be included in the workflow definition:
     Identifying DB2 to z/OS (DSNTIJMV)
  s  Define system data sets (DSNTIJIN)
  s  Define DB2 initialization parameters (DSNTIJUZ)
  s  Initialize system data sets (DSNTIJID/DSNTIJIE/DSNTIJIF)
     Define user authorization exit routines (DSNTIJEX)
  s  Start the DB2 subsystem (DSNTIJSA)
  s  Create default storage group, define temporary work files, and
     bind DB2 REXX Language Support (DSNTIJTM)
     Back up the DB2 directory and catalog (DSNTIJIC/DSNTIJDC)


PRESS:  ENTER to continue   RETURN to exit   HELP for more information
```

For more information about the steps, see “Adding a new data sharing member” on page 595. The workflow supports only steps that are shown in the panel.

DSNTILMA is shown only when you specify the following values on panel DSNTILA1:

```
USE Z/OSMF WORKFLOW ===> YES
INSTALL TYPE ===> INSTALL
DATA SHARING ===> YES with option 2 selected in the DSNTIP0A window.
```

Related tasks

Automating Db2 installation by using z/OS Management Facility
You can use z/OSMF to automate the process of installing Db2 11 for z/OS subsystems.

Automating Db2 migration by using z/OS Management Facility
You can use z/OSMF to automate the process of migrating Db2 subsystems to Db2 11 for z/OS.

Chapter 8. Installing, migrating, and enabling Db2 data sharing

Whether you need to install, migrate, or enable data sharing depends on the type of system that you start with and the type of system that you want to create.

Before you begin

Familiarize yourself with the following information:

- “Planning for Db2 data sharing” on page 522
- “Strategy for creating a Db2 data sharing group” on page 577
- “Preparing for Db2 11 migration in Db2 data sharing” on page 620

Procedure

Complete the appropriate task, as described in the following table.

Table 58. Data sharing options

If you have this...	And you want this...	Do this...
No system	Db2 11 data sharing	Install a new data sharing group, as described in “Installing a new data sharing group” on page 582.
A Db2 11 non-sharing Db2 subsystem	The originating member of a data sharing group	Enable Db2 data sharing, as described in “Enabling Db2 data sharing” on page 584.
One member in the group	More members in the group	Add new data sharing members, as described in “Adding a new data sharing member” on page 595.
Separate Db2 subsystems	Merged Db2 subsystems into a single group	Merge existing Db2 data into the group, as described in “Merging existing Db2 data into the group” on page 606
A Db2 10 data sharing group	A Db2 11 data sharing group	Migrate the existing data sharing group to Db2 11, as described in “ Migrating an existing data sharing group to Db2 11 conversion mode” on page 621.

Related concepts

Migrating to Db2 11
Migration is the process of upgrading from Db2 10 to Db2 11.

Related tasks

Installing Db2 11
Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Related information

Planning for Db2 data sharing

Db2 data sharing introduces special requirements for your Db2 and z/OS environments.

Related concepts

Release coexistence in Db2 data sharing

In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Related tasks

Preparing for Db2 11 migration in Db2 data sharing

When planning the migration of data sharing members to Db2 11 it is best to take certain actions to reduce or avoid unnecessary operation complexity.

Installing, migrating, and enabling Db2 data sharing

Whether you need to install, migrate, or enable data sharing depends on the type of system that you start with and the type of system that you want to create.

Related information

Parallel Sysplex requirements for Db2 data sharing

Db2 data sharing depends on hardware and software components in the z/OS Parallel Sysplex.

Coupling facility

Install and define at least one coupling facility to z/OS before enabling the Db2 data sharing function. For high availability, more than one coupling facility is required.

Data sharing member names from the subsystem parameter load module (DSNZPARM) are used to connect members to the coupling facility at Db2 startup. The first connector causes the list structure to be allocated in a coupling facility based on the preference list in the active CFRM policy.

Related tasks

Specifying the subsystem parameter load module for a member

Every member of a data sharing group must have its own unique load module for subsystem parameters (sometimes called DSNZPARM in a non-data sharing environment).

Related reference

Adding MVS systems to a sysplex

Related information

Cross-system coupling facility component of z/OS

During startup, the members of a data sharing group join one cross-system coupling facility (XCF) group, and their associated internal resource lock managers (IRLMs) join another XCF group.

The z/OS cross-system extended services (XES) also join an XCF group implicitly on behalf of the IRLM connection to the lock structure. To join a particular group, the data sharing group members and the IRLMs use the names that you specify during Db2 installation.

Db2 uses the XCF for certain intersystem communications. Use both the coupling facility and channel-to-channel connections for XCF signaling. See Adding MVS systems to a sysplex for more information about configuring the XCF.

Coupling facility structures

Db2 relies on areas of storage in the coupling facility called *structures*.

Three types of structures exist: lock, list, and cache. Each structure type has a unique function. The following figure shows a sample configuration of the coupling facility structures that are used by Db2.

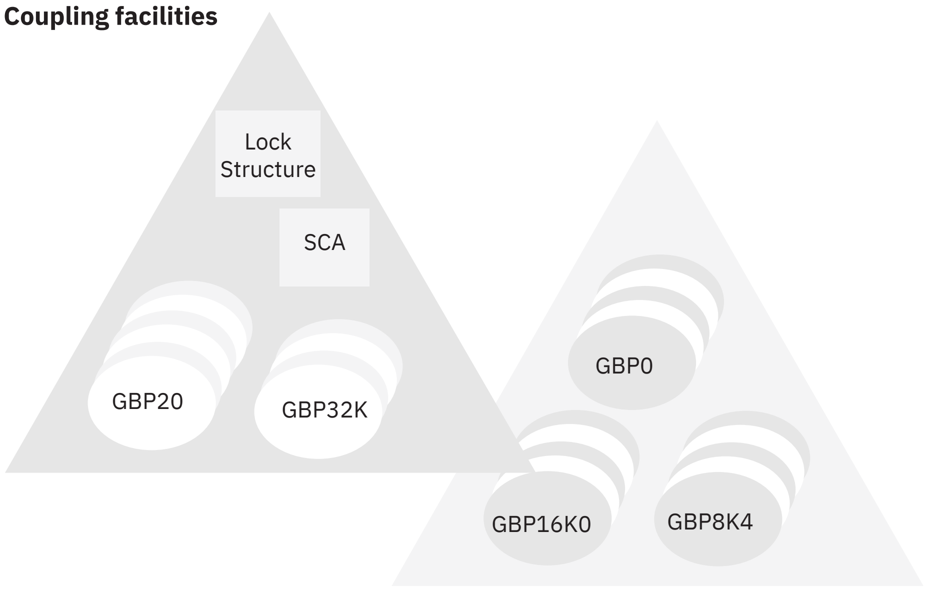


Figure 78. Coupling facility structures that are used by Db2

Members of a data sharing group use the following coupling facility structures to communicate and move data among themselves.

Lock structure

The lock structure protects shared Db2 resources (such as table spaces and pages) and enables concurrent access to those resources.

The system lock manager (SLM), a component of the z/OS cross-system extended services (XES), presents global lock information to the lock structure on behalf of each member's IRLM.

The lock structure consists of two parts: a coupling facility lock list table (called the *modified resource list*), and a coupling facility lock hash table (called the *lock table*). The modified resource list records locks that protect changed data, thereby protecting the data in case of failure. The lock table contains the lock status information and the owning members of those locks, and is used to provide global lock serialization.

List structure (SCA)

The list structure contains the Db2 *shared communications area* (SCA). Each member uses the SCA to pass control information to the rest of the members in the group. The SCA contains all database exception status conditions and other information that is necessary for recovery of the group.

Cache structures (Db2 group buffer pools)

The cache structures are used as group buffer pools (GBPs), caching shared data pages for the members. You have the following options for caching data of interest to more than one member of a group:

- Cache all data (read-only and updated)
- Cache only data that is updated
- Cache only system control pages (specific to LOB table spaces)
- Cache no data; use the group buffer pool only for cross-invalidation

One group buffer pool exists for all member buffer pools of the same name. For example, each member must have a buffer pool 0 (BP0) that contains the catalog and directory table spaces. A group buffer pool 0 (GBP0) must exist on a coupling facility for that data sharing group.

Similarly, if a member creates table space X and associates it with buffer pool 1 (BP1), X is associated with BP1 for every member because there is only one definition of X in the catalog for the entire group. To share the data in X, you must define the cache structure, group buffer pool 1 (GBP1). If you do not define the group buffer pool, a single member can update X or more than one member can read X, but there can be no inter-Db2 read/write activity for X.

Recommendation: For data that is private to each member, such as work files or user data that only one member reads, define that data to a buffer pool for non-shared page sets. For example, assume that you want to associate all non-shared page sets with buffer pool 6 (BP6). If you want only member DB2A to access a non-shared table space Y, then define Y (and any indexes) to BP6. Define BP6 with a size of 0 (zero) and then you do not need to define the coupling facility structure for group buffer pool 6. By moving private data to buffer pools that are separate from buffer pools used by shared data, you can more easily monitor, and provide for more predictable performance of, private data.

Cross-invalidation of group buffer pools

Group buffer pools use a cross-invalidation mechanism to maintain data consistency across the buffer pools of group members. Shared data pages are registered in a group buffer pool directory in each cache structure, thus enabling the coupling facility control program to cross-invalidate the copies of data pages that are held in individual member buffer pools. Cross-invalidation takes place when a member's own buffer pool does not contain the latest version of the data. In this case, the member must reread the pages from either the group buffer pool or disk, if that member needs to reference the pages again.

Related concepts

Coupling facility structure size

When a new coupling facility structure is allocated for a data sharing group, its size is usually taken from the value of the INITSIZE parameter in the CFRM policy.

Defining coupling facility structures

Before you enable Db2 data sharing, you must define coupling facility structures.

Before you begin

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

About this task

You must define one lock structure, one list structure, and at least four cache structures:

- Group buffer pool 0
- Group buffer pool 8K0
- Group buffer pool 16K0
- Group buffer pool 32K

The lock structure and list structures (SCAs) do not need to be in the same coupling facility. Individual structures cannot span coupling facilities.

Recommendation: Use a Sysplex Failure Management (SFM) policy to define the availability characteristics of the coupling facility structures for lost connectivity failures, which includes a total failure of the coupling facility.

Procedure

To define coupling facility structures:

1. Determine the following characteristics of your Db2 coupling facility structures:

   Initial size and maximum size of the structures
   The structures can be dynamically re-sized from INITSIZE up to the value in SIZE.

   Structure names
   Determine the names that you will use for the coupling facility structures.

   Availability characteristics
   You must know the preference list (PREFLIST) for rebuilding or reallocating a structure, if the coupling facility fails.

2. Use the z/OS coupling facility resource management (CFRM) policies to define these structures to the Parallel Sysplex and define a SFM policy.

   A CFRM policy determines how and where the structure resources are allocated.

   See Adding MVS systems to a sysplex for information about how to create CFRM and SFM policies.

Example

A sample CFRM policy is shown in the following figure.

```
//POLICYX  JOB MSGCLASS=Z,REGION=2000K,CLASS=A,
//             MSGLEVEL=(1,1)
//STEP1  EXEC PGM=IXCMIAPU
//STEPLIB DD DSN=SYS1.MIGLIB,DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSIN  DD *
 DATA TYPE(CFRM) REPORT(YES)
 DEFINE POLICY NAME(POLICYX) REPLACE(YES)
   STRUCTURE NAME(DSNDB0A_LOCK1)
             INITSIZE(32000)
             SIZE(64000)
             REBUILDPERCENT(5)
             PREFLIST(CF01,CF02)
   STRUCTURE NAME(DSNDB0A_GBP0)
             INITSIZE(50000)
             SIZE(100000)
             REBUILDPERCENT(5)
             DUPLEX(ALLOWED)
             PREFLIST(CF02,CF01)
   STRUCTURE NAME(DSNDB0A_GBP1)
             INITSIZE(50000)
             SIZE(100000)
             PREFLIST(CF02,CF01)
             DUPLEX (ENABLED)
   STRUCTURE NAME(DSNDB0A_SCA)
             INITSIZE(10000)
             SIZE(20000)
             REBUILDPERCENT(5)
             PREFLIST(CF01,CF02)

   CF NAME(CF01) TYPE(009674)
                 MFG(IBM)
                 PLANT(00)
                 SEQUENCE(000000040016)
                 PARTITION(1)
                 CPCID(00)
                 DUMPSPACE(1200)

   CF NAME(CF02) TYPE(009674)
                 MFG(IBM)
                 PLANT(00)
                 SEQUENCE(000000040029)
                 PARTITION(1)
                 CPCID(00)
                 DUMPSPACE(1200)
//
```

Figure 79. Sample CFRM policy

Related concepts

Coupling facility structure names
Names for coupling facility structures must conform to a strict naming convention that is based on the Db2 group name.

Duplexed structures
Running some or all of the SCA, lock, and group buffer pool structures in duplex mode is one way to achieve high availability for these structures across many types of failures, including lost connections and damaged structures.

Storage estimates for data sharing environments
As part of planning for a data sharing environment, you should estimate the storage requirements for coupling facility structures and for Db2 resources.

How to change structure sizes
You can change the size of individual structures by changing the CFRM policy.

Related tasks

Planning for coupling facility availability for data sharing

If properly configured, Db2 and IRLM can recover very quickly and with very little disruption from any kind of coupling facility failure. If coupling facilities are not properly configured, coupling facility failures can cause serious outages for users.

Related information

Authorization for Db2 to access coupling facility structures

Optionally, you can set up a facility class profile to limit access to the structures in the coupling facility.

If you do this, ensure that Db2 does have access by ensuring that the IDs that are associated with the Db2 address spaces have alter access authority to the coupling facility structures through RESOURCE(IXLSTR.*structure_name*) in SAF class CLASS(FACILITY).

If you do not create a facility class profile, the default allows any authorized user or program (supervisor state and program key mask allowing key 0-7) to issue coupling facility macros for the structure.

Sysplex timer

Install at least one Sysplex Timer in the Parallel Sysplex.

For high availability, more than one Sysplex Timer is required. The Sysplex Timer synchronizes the timestamps of the IBM System z9® or System z10® and IBM Z servers for all members of the data sharing group. Db2 data sharing uses a value that is derived from the timestamp (as seen in the log) to recover data.

Common z/OS libraries

Db2 supports a configuration with a SYS1.PARMLIB and SYS1.PROCLIB that is shared by all z/OS systems in the Parallel Sysplex. This configuration lets you add and modify systems more easily.

If you intend to have many members in the Parallel Sysplex, each Db2 and IRLM that you define to the z/OS system in the IEFSSN*xx* parmlib member **requires** a z/OS system linkage index (LX). The default number of these indexes that z/OS reserves is 165. If you place all of your Db2 and IRLM subsystem definitions in a single IEFSSN*xx* member, you might need more than 165 LXs to start the members.

If you need more than 165 LXs, use the NSYSLX option on the z/OS IEASYS*xx* parmlib member to increase this number. For more information, see z/OS MVS Initialization and Tuning Reference.

Related tasks

Naming in Db2 data sharing
By maintaining a consistent naming convention, you can simplify the process of naming the many items in a Db2 data sharing environment. You also simplify the management of name changes, as you add new members or move existing members to different systems in the future.

Connectivity requirements in a Parallel Sysplex

Db2 data sharing requires that all Db2-related resources reside on shared disks. These resources include the Db2 catalog and directory and any user data, and the integrated catalog for Db2 data sets.

Also, all the members' logs and bootstrap data sets (BSDSs) must be on shared disks for recovery purposes. A member that performs recovery must have access to the logs of other members in the group.

Recommendation: Place work files on shared disks for the following reasons:

- A member stays connected to its work file even if you need to restart the member on another processor.
- You can create or drop a work file table space from any other member in the data sharing group.

Ensure that you have physical connectivity by checking the following connections:

- Verify that one user-integrated catalog facility exists for cataloging the data sets of a data sharing group, and that you can access this catalog from each z/OS system in the Parallel Sysplex.
- Verify connectivity to the following entries from each system on which a member resides:

- A set of Db2 target libraries
- A single Db2 catalog
- A single Db2 directory
- All databases that are shared
- All log data sets
- All BSDS data sets
- All coupling facilities used by the data sharing group
- User integrated catalog facility catalogs for shared databases

Naming in Db2 data sharing

By maintaining a consistent naming convention, you can simplify the process of naming the many items in a Db2 data sharing environment. You also simplify the management of name changes, as you add new members or move existing members to different systems in the future.

About this task

You assign to names to entities during the process of installing Db2 and enabling data sharing. Some parts of a data sharing system require you to specify a valid name. Other names are generated during the installation process.

After installation, you cannot change some names, such as the group name and member names. To change names of data sharing members you must quiesce existing members and add replacement members with the new name. For more information about that process, see "Renaming data sharing members" on page 541.

Assign names to both IRLM and data sharing groups, and to members within a group. One recommendation is to make names and prefixes unique within the Parallel Sysplex. Although this uniqueness is not required for all names, it helps you avoid problems with identifying and moving entities among z/OS systems in the Parallel Sysplex.

If you are enabling the originating member of the group from an existing Db2 subsystem, you can build a naming scheme around existing names to reduce the disruption to existing applications. However, before enabling data sharing, you might want to change some names to lay the foundation for a solid naming convention. For information about the process for changing the name of the originating member, see "Renaming the originating Db2 subsystem for a new data sharing group" on page 542.

Another name to choose carefully is the catalog alias for the group. It is very difficult to change that name. To change the catalog alias for the group, you must bring the entire group down and perform the single-system procedure for every member of the group.

Procedure

Consider the following suggestions when naming various Db2 entities:

1. Name subsystems first and use the subsystem names as the basis for creating other names.

   Subsystem names are limited to four characters, making them the shortest names.

   Four-character names are also needed for the following entities:

   - Db2 group name; one per data sharing group
   - Member name; one for each Db2 subsystem in the group
   - IRLM subsystem name; one for each member of the group

   One possible naming convention is a Parallel Sysplex-wide approach to naming. This convention assigns subsystem names of the form "*ctmg*" where:

   c

   Denotes a particular collection of logically related applications or subsystems.

t

Denotes a type of resource, such as "B" for Db2 or "J" for IRLM.

m

Denotes a particular member within a data sharing group or an IRLM group. This identifier also associates a subsystem with its z/OS system for recovery when you use automatic restart.

g

Denotes a particular Db2 group.

This information uses "A" as the group identifier. Therefore, the naming scheme has a subsystem name of DB1A for the first member of the data sharing group. The second member is DB2A, and so on. The following table shows how the member identifier relates to a particular z/OS system and how the group identifier associates members across a Parallel Sysplex system. In each column are the names that are associated with a particular z/OS recovery group (z/OS2, for example). In each row are the names that are associated with the primary components of the data sharing group, such as Db2 subsystems and IRLM subsystems.

Table 59. Subsystem names in a Parallel Sysplex

z/OS1	z/OS2	z/OS3	z/OS4
DA11 (CICS)	DA21 (CICS)	DA31 (CICS)	DA41 (CICS)
DB1A (Db2)	DB2A (Db2)	DB3A (Db2)	DB4A (Db2)
DJ1A (IRLM)	DJ2A (IRLM)	DJ3A (IRLM)	DJ4A (IRLM)
DD11 (DBCTL)	DD21 (DBCTL)	DD31 (DBCTL)	DD41 (DBCTL)

2. If you enable an existing Db2 subsystem for data sharing, and existing applications already access that Db2 subsystem, consider using the name of the existing Db2 subsystem as the group attachment name. This strategy allows existing applications continue to use the data sharing member. It does not require any changes to those applications in terms of specifying a new subsystem name.
3. Use the same name for the Db2 group name, the Db2 location name, and the Db2 integrated catalog alias.

   A data sharing group uses the same catalog alias name. This catalog alias is used as the high-level qualifier for the Db2 directory (DSNDB01), catalog (DSNDB06), default database (DSNDB04), and work file database VSAM data sets.
4. Use the same names as the member name and Db2 subsystem name for each member.
5. Accept the default command prefix for each member.

Example of names for a Db2 data sharing environment

Table 60. Db2 data sharing naming example

Entity	Name
Db2 group name	DSNDB0A
ICF catalog alias	DSNDB0A
Group attachment name	DB0A
Subgroup attachment name	SBG1
Catalog and directory database names	DSNDB0A.DSNDB01 and DSNDB0A.DSNDB06
Application defaults module	DSNHDECP

Table 60. Db2 data sharing naming example (continued)

Entity	**Name**
Target libraries	DSNDB0A.SDSNCLST DSNDB0A.SDSNLINK DSNDB0A.SDSNLOAD DSNDB0A.SDSNEXIT
Network Address	DOMAIN DSNDB0A.svl.ibm.com AND PORT 446
Group DRDA Port	446
Group Secure DRDA Port	448
Location name	STLEC1
Generic LU name	USIBMSY.SYEC1GLU
Parallel Sysplex domain name	DSNDB0A.svl.ibm.com
Group IPv4 Address	1.1.1.1
Group IPv6 Address	1.1.1.1.1.1.1.1
Member name	DB#A
Db2 subsystem name	DB#A
Location alias name	ALIAS1
Member LU name	LUDB2LA
Member domain name	DSNDB0A.svl.ibm.com
Network address	DOMAIN DSNDB0A.svl.ibm.com AND PORT 5001
Resync Port	5001
Member IPv4 Address	2.2.2.2
Member IPv6 Address	2.2.2.2.2.2.2.2
Command prefix	-DB#A
Work file database	WRKDB#A
Load module for subsystem parameters	DSNZP0#A
Member BSDS names	DSNDB0A.DB#A.BSDS01 DSNDB0A.DB#A.BSDS02
Active log data set prefixes	DSNDB0A.DB#A.LOGCOPY1 DSNDB0A.DB#A.LOGCOPY2
Archive log data set prefixes	DSNDB0A.DB#A.ARC1 DSNDB0A.DB#A.ARC2
SCA and group buffer pool connection names	DB2_DB#A

Table 60. Db2 data sharing naming example (continued)

Entity	Name
Procedure names	DB#AMSTR DB#ADBM1 DB#ADIST DB#ASPAS
XCF member name	DB0A
IRLM group name	DXRDB0A
IRLM subsystem name	DJ#A
IRLM procedure name	DB#AIRLM
IRLM member ID	Number 1-12 corresponding to #
IRLM XCF member name	DXRDB0A$$DJ#A12
Lock structure connection name	DXRDB0A$$DJ#A12
Cache structure (group buffer pools)	DSNDB0A_GBP0
Lock structure	DSNDB0A_LOCK1
List structure (shared communications area)	DSNDB0A_SCA

What to do next

Consider a convention for names for distributed processing. Those naming conventions are probably be part of a much broader convention. See your network administrator for more information about choosing names for distributed access.

Data sharing group names

Group names are shared by all members of the data sharing group. Db2 group names include the generic LU name, group attachment name, location name, and coupling facility structure names.

The following names are considered group names:

Db2 group name

The name that encompasses the entire data sharing group. The coupling facility structure names are based on this name.

The Db2 group name must be unique within the Parallel Sysplex. If you use this name as a basis for the location name, the Db2 group name must be unique within the network.

This name can be up to eight characters long, it must begin with an alphabetic character, and it can consist of the characters A-Z, 0-9, $, #, and @. An example of a Db2 group name is DSNDB0A.

Restrictions: To avoid names that IBM uses for its XCF groups, do not begin Db2 group names with the letters A-I unless the first three characters are DSN. Do not use the string SYS as the first three characters, and do not use the string UNDESIG as the group name.

Important: Never reuse a Db2 group name, even if a data sharing group that previously used the name no longer exists. Some data sharing information, such as the Db2 group name, is retained in the Parallel Sysplex couple data set (CDS). To determine what Db2 group names exist, execute the z/OS command DISPLAY XCF,GROUP.

ICF catalog alias

The name of the Integrated Catalog Facility (ICF) catalog alias that you must place in the z/OS master catalog. This name can be up to 8 characters long, and it should be the same as the Db2 group name. An example of an ICF catalog alias name is DSNDB0A.

Group attachment name

The name that is used by the TSO/batch attachment, the call attachment facility (CAF), DL/I batch, utilities, and the Resource Recovery Services attachment facility (RRSAF) as a "generic" attachment name. This name can be up to four characters long. An example of a group attachment name is DB0A.

Subgroup attachment name

The name that is used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections requests to identify which subgroup attachment to use. This name can be up to four characters long. An example of a subgroup attachment name is SBG1.

Catalog and directory database names

All Db2 subsystems in the group share the same catalog and directory. Examples of the catalog and directory database names are *catalias*.DSNDB01 and *catalias*.DSNDB06.

Application defaults module>

The name of the module that contains the application programming defaults. This module resides in SDSNEXIT. The name can be up to eight characters long. DSNHDECP is an example module name.

Target libraries

Target libraries can be shared among Db2 group members or can be replicated. Example names for target libraries are *catalias*.SDSNCLST, *catalias*.SDSNLINK, *catalias*.SDSNLOAD, and *catalias*.SDSNEXIT.

Network Address

The group DVIPA and port number. It can be an IPv4 address, an IPv6 address, or both.

DRDA port number

The port number that is used by the distributed data facility (DDF) to accept incoming SQL connection requests, if the data sharing group uses TCP/IP. 446 is the recommended DRDA port.

Secure DRDA port number

The secure port identifies the TCP/IP port number that is used by DDF to accept inbound secure DRDA connection requests.

Location name

The name that is used when the data sharing group processes distributed requests. The group is treated as a single location by remote requesters. Requesters use this name in their SQL applications. This name can be up to 16 characters long.

Generic LU name

This name lets remote requesters configure their systems to treat the data sharing group as a single LU. This name can be up to eight characters long.

Parallel Sysplex domain name

This name lets you take advantage of workload balancing for TCP/IP connections.

Group IPv4 address

GRPIPV4 identifies a constant IPv4 address to be associated with the data sharing group for which this DDF is a member.

Group IPv6 address

GRPIPV6 identifies a constant IPv6 address to be associated with the data sharing group for which this DDF is a member.

Related concepts

Group attachment names and subgroup attachment names

Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

Related information

Group attachment names and subgroup attachment names

Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

A group attachment name acts as a generic name for all the members of a data sharing group. Subgroup attachment names can be used to specify a subset of members within a group attachment and provide more organization and control over connection requests. To specify subgroup attachment names, you must use Db2 11 early code.

Specify the group attachment name and subgroup attachment name for a subsystem in member IEFSSN*xx*. You can let the Db2 installation process do this for you by specifying the names on installation panel DSNTIPK, or you can update the member yourself. If you use the DSNTIPK panel, the installation CLIST places the specified names in the IEFSSN*xx* member and in the DSNHDECP load module for the group. Specify the group attachment name and subgroup attachment name at a convenient time (during a planned IPL, for example).

The following rules apply to group attachment and subgroup attachment names:

- A subgroup attachment cannot have the same name as a group attachment.
- Neither the group attachment nor the subgroup attachment should have the same name as a Db2 member.
- If you specify a subgroup attachment name, you must also specify a group attachment name. A subgroup attachment must belong to one, and only one group attachment.
- A member can belong to one subgroup attachment at most and does not need to belong to a subgroup attachment.

The group attachment name and subgroup attachment name are included in the output for the command DISPLAY GROUP.

Even if you have not yet enabled data sharing, the group attachment name and subgroup attachment name is active after you IPL the system. An active group attachment name and subgroup attachment name in a non-data sharing environment is not a problem. Until you are ready to move to data sharing, continue to specify the Db2 subsystem name in your TSO and batch jobs. When you are ready to move to data sharing, you can change those jobs to specify a group attachment name and subgroup attachment name without the need for an IPL.

How Db2 chooses a subsystem name

When you submit a job on a z/OS system, Db2 treats the name that you specified on the Db2 connection request as a subsystem name, a group attachment name, or a subgroup attachment name. Db2 first assumes that the name is a subsystem name and attaches to that subsystem if either of the following is true:

- The subsystem is started.
- The subsystem is not started, and NOGROUP was specified in the Db2 connection request. NOGROUP indicates that group attachment or subgroup attachment processing is not to be considered. If RETRY was specified in the command, Db2 tries to attach the subsystem again in 30 seconds. The value of RETRY determines the number of times that Db2 re-attempts to attach.

Db2 assumes that the name on the Db2 connection request is a group attachment name or subgroup attachment name if no qualifying subsystem is found and either of the following is true:

- No subsystem with the name in the command is defined.
- A subsystem with that name is not started, the group attachment name or subgroup attachment name is the same as its subsystem name, and NOGROUP was not specified in the Db2 connection request.

When Db2 assumes that the name is a group attachment name or subgroup attachment name, it performs the following actions:

- Constructs a list of Db2 subsystems that are defined to this z/OS.

To create the list, Db2 adds each subsystem during subsystem initialization. At IPL time, subsystems are initialized in the order in which they appear in member IEFSSN*xx* if the MVS Subsystem Interface (SSI) is running on a single processor. If the MVS SSI is running on multiple processors in parallel, the subsystems are placed in the group attachment name list in the order that they complete initialization. In this case, the order of the list is unpredictable. If you add a subsystem with the z/OS SETSSI command, that subsystem is added to the list at that time.

- Tries to attach to the subsystems in the list in random order until it finds one that is started on this z/OS. However, if RANDOMATT=NO has been specified for a Db2 subsystem, that subsystem is excluded from the random search.
- Searches for any available Db2 subsystem within the group or subgroup, including those that specify RANDOMATT=NO, if the random search finds no available Db2 subsystems or if RANDOMATT=NO is specified for all subsystems. Search order is defined according to the order in which z/OS subsystem initialization completes for each Db2 subsystem. If you want to direct work to certain Db2 subsystems, set the RANDOMATT subsystem parameter to YES on those subsystems. If you want to direct work away from certain Db2 subsystems, set the RANDOMATT subsystem parameter to NO on those subsystems.

If the name on the Db2 connection request is not a group attachment name or subgroup attachment name, a "not started" message is returned.

If you need to prevent a batch workload from running on a Db2 subsystem that is intended for high-performance online transactions, specify RANDOMATT=NO for the online subsystems and RANDOMATT=YES for the batch workload subsystems. In that case, the batch jobs use the group attachment name or subgroup attachment name, and the online subsystem does not.

Alternatively, to achieve non-randomized group attachments or subgroup attachments, as in Version 8 of Db2, specify RANDOMATT=NO for all members of the group.

When a subsystem and a group attachment name or subgroup attachment name are the same

When you begin moving to data sharing, ensure that your IEFSSN*xx* definitions are correct and Db2 connection requests are coded to get the results that you intend. You should especially ensure that the definitions are correct when the group attachment name or subgroup attachment name is the same as a subsystem name. Incorrect IEFSSN*xx* definitions might be troublesome if you have inactive subsystems that are still defined but not used.

Assume you have the following subsystem definitions on a z/OS system:

```
DB2A,DSN3INI,'DSN3EPX,-DB2A,S'  ←Inactive subsystem
DB1A,DSN3INI,'DSN3EPX,-DB1A,S,DB2A'  ←Active subsystem
```

The jobs that are submitted on this z/OS system try to connect to the name DB2A. Db2 tries to connect to subsystem DB2A before considering group attachment processing. However, because DB2A is not started and it lacks a group attachment name, Db2 does not invoke group attachment processing and find DB1A as you might have intended. To avoid this situation, include the group attachment name in the definition of DB2A, or remove entry IEFSSN*xx* for subsystem DB2A if it is obsolete. With DB2A defined as the group attachment name for subsystem DB2A, Db2 tries to attach to DB1A after it discovers that DB2A is not started.

Alternatively, you might want a job to connect to a specific subsystem, but it connects to another subsystem in the group instead.

Assume that you have the following subsystem definitions on a z/OS system:

```
DB1A,DSN3INI,'DSN3EPX,-DB1A,S,DB1A'.  ←Inactive subsystem
DB2A,DSN3INI,'DSN3EPX,-DB2A,S,DB1A'.  ←Inactive subsystem
DB3A,DSN3INI,'DSN3EPX,-DB3A,S,DB1A'.  ←Active subsystem
```

Notice that DB1A is specified as a subsystem and also as the group attachment name for all three subsystems.

The jobs are submitted on this system with a Db2 connection request that specifies the name DB1A and omits the NOGROUP keyword. Db2 tries to connect to subsystem DB1A, but does not. Instead, Db2 invokes group attachment processing and eventually connects to DB3A, the first active subsystem with the group attachment name. You might have intended that the job connect only to DB1A. To ensure that Db2 connects to subsystem DB1A and no other subsystem, specify NOGROUP in the Db2 connection request to disable group attachment processing. Specify the RETRY keyword in the request to indicate the number of times, at 30-second intervals, that Db2 will try to connect to DB1A again.

Related tasks

Registering the command prefixes, member group attachment name, and subgroup attachment name
Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Member names

Member names include the individual Db2 member (subsystem) name and its associated z/OS subsystem name, procedure names, and BSDS and log names. Member names must be unique within the data sharing group or, in certain cases, the z/OS Parallel Sysplex.

The following names are considered member names:

Member name
The name of an individual member of a data sharing group. A member name can be up to eight characters long, and it can consist of the characters A-Z, 0-9, $, #, and @. Db2 uses this name to form its z/OS cross-system coupling facility (XCF) member name. This name must be unique within the data sharing group. If the member name is also used as the high level qualifier for the member's data sets (BSDS, logs, and so on), member names must be unique within the z/OS Parallel Sysplex. This is because the z/OS Parallel Sysplex can have a shared master catalog. An example of a member name is DB1A.

Db2 subsystem name
The name of a Db2 subsystem that is a member of a data sharing group. This name is used by all the attachment interfaces. A Db2 subsystem name can be up to four characters long, and it must be unique within the Parallel Sysplex. The member name and the Db2 subsystem name should be the same. An example of a Db2 subsystem name is DB1A.

Location alias name
This name can represent one, several, or all members of a data sharing group. A location alias name enables you to define subsets of data sharing group members. Subsetting gives you the ability to limit the members to which DRDA requesters can connect.

Member LU name
The network name of an individual member of a data sharing group. A logical unit (LU) name must be unique both within the group and within the network. This name can be up to eight characters long.

Member domain name
This name lets Db2 handle indoubt thread resolution for TCP/IP connections.

Network Address
The member DVIPA and port number. It can be either an IPv4 address, an IPv6 address, or both. The TCP/IP port number that is used by the distributed data facility (DDF) to accept incoming DRDA two-phase commit resynchronization requests, if the data sharing group uses TCP/IP. Each member of a data sharing group listens on a unique resynchronization port.

Member IPv4 Address
A constant IPv4 address to be associated with the data sharing member.

Member IPv6 Address
A constant IPv6 address to be associated with the data sharing member.

Command prefix
The prefix that directs commands entered at a z/OS console to a particular member of a data sharing group. The command prefix can be up to eight characters long and the first character must be a special character. The default prefix is the concatenation of the hyphen character (-) with the Db2 subsystem name.

This string is specified as a parameter on the IEFSSN*xx* subsystem definition. An example of a command prefix is -DB1A. You can have blanks between the command prefix and the command.

Do not assign a command prefix that is used by another Db2 subsystem or that can be interpreted as belonging to more than one Db2 subsystem or z/OS application. Specifically, do not specify a multiple-character command prefix that is a subset or a superset of another command prefix starting from the first character. For example, it is invalid to assign a hyphen (-) to one Db2 subsystem and '-DB2A' to another Db2 subsystem. Similarly, it is invalid to assign '?Db2' to one Db2 subsystem and '?DB2A' to another Db2 subsystem. It is valid, for example, to assign '-DB2A' and '-DB3A' to different Db2 subsystems.

Work file database

The name of the work file database that is associated with a member of the data sharing group. Each member has its own work file database. In a non-data sharing environment, a Db2 subsystem's work file database is called DSNDB07. In a data sharing environment, although one member of the group can have a work file database with the name DSNDB07, you might want to create one with a more meaningful name, such as WRKDB1A, for member DB1A. This name can be up to eight characters long.

Work file data sets have names of the format *catalias*.DSNDBC.*mworkdb*.DSN*kknn*.*y*0001.A001, where *y* can be either I or J.

Restriction: You cannot specify a work file database name that begins with DSNDB unless the name is DSNDB07.

Load module for subsystem parameters

The name of the load module that contains a member's subsystem parameters. Each member has its own subsystem parameters. The load module resides in SDSNEXIT. The name is specified as a parameter on *mssn*MSTR procedure.

The load module name can be up to eight characters long. An example name is DSNZP01A, a naming convention that you can use to associate member DB1A with DSNZP01A.

Choosing names for member data sets: When choosing names for member data sets, remember that data set names beginning with *membname* must have a master catalog alias to point to the catalog where the data sets are cataloged. The Db2 installation process does not create this catalog alias. One way to handle this is to begin member data set names with *catalias* and a member-related qualifier. For example, member data set names could take the form *catalias.membname.xxxxx*. This format eliminates the need to have a master catalog alias for *membname*.

Member BSDS names

The names of bootstrap data sets (BSDS) belonging to a member of a data sharing group. The catalog alias can be added as the first qualifier. These names can be up to 33 characters long. Example BSDS names are DSNDB0A.DB1A.BSDS01 and DSNDB0A.DB1A.BSDS02.

Active log data set prefixes

The prefixes of active log data sets belonging to a member of a data sharing group. The catalog alias can be added as the first qualifier. These prefixes can be up to 30 characters long. Example active log data set prefixes are DSNDB0A.DB1A.LOGCOPY1 and DSNDB0A.DB1A.LOGCOPY2.

Archive log data set prefixes

The prefixes of archive log data sets belonging to a member of a data sharing group. The catalog alias can be added as the first qualifier. These prefixes can be up to 35 characters long unless you want the data sets timestamped. If they are timestamped, these prefixes can be up to only 19 characters long. Use the TIMESTAMP ARCHIVES parameter of installation panel DSNTIPH to specify whether you want the date and time qualifiers to be added to the archive log data set prefix.

Example archive log data set prefixes are DSNDB0A.DB1A.ARC1 and DSNDB0A.DB1A.ARC2.

SCA and group buffer pool connection names

The connection name is generated by Db2. You see it only in certain commands (z/OS D XCF,STRUCTURE and the Db2 connection list display of DISPLAY GROUPBUFFERPOOL). The connection name can be up to 16 characters long. An example connection name is DB2_*membername*.

Procedure names

The procedure names are generated from the member subsystem name at installation. The names can be up to eight characters long. Example procedure names are *mssn*MSTR, *mssn*DBM1, *mssn*DIST, and *mssn*SPAS.

XCF member name

This is the same as the member name for Db2; thus, a maximum of eight characters is used.

Related tasks

Choosing names for the local subsystem
You define the names for the local subsystem and its VTAM password to Db2 by using the installation panels, or by using the change log inventory utility.

Registering the command prefixes, member group attachment name, and subgroup attachment name
Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Related reference

COMMAND PREFIX field
The value of the COMMAND PREFIX field specifies the Db2 subsystem command prefix. When the prefix appears at the beginning of a command that is entered at a z/OS operator's console, z/OS passes the command to Db2 for processing. The command prefix is used in the Db2 entry of member IEFSSN*xx* of SYS1.PARMLIB.

Related information

IRLM names

Each member of a data sharing group has its own IRLM. The IRLM group name, subsystem name, and member ID are parameters on the IRLM startup procedure.

This means that every IRLM in the group must have a separate IRLM procedure. The following figure shows the relationship between Db2 group names and IRLM group names.

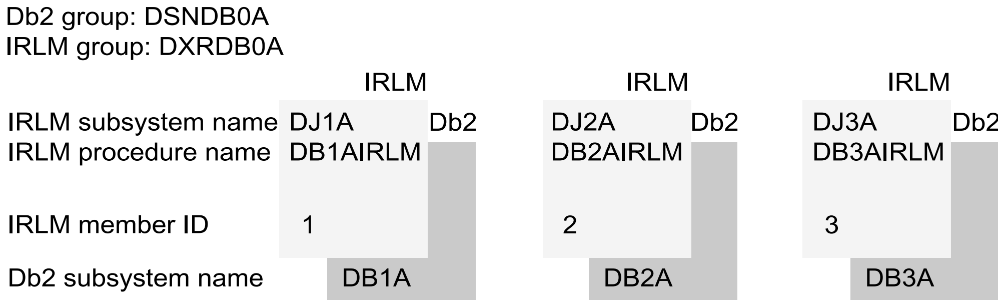


Figure 80. Relationship between Db2 and IRLM group names

You must choose the following IRLM names before installing Db2:

IRLM group name
The name that encompasses the entire IRLM group. This name can be up to eight characters long and can consist of the characters A-Z, 0-9, $, #, and @. The group name must begin with an alphabetic character. The name must be unique across the Parallel Sysplex.

Restriction: To avoid names that IBM uses for its XCF groups, do not begin with the letters A-I unless the first three characters are DXR. Do not use the string SYS as the first three characters, and do not use the string UNDESIG as your group name.

The IRLM group name is a parameter (IRLMGRP=) on each member's IRLM procedure. An example IRLM group name is DXRDB0A, a naming convention that you can use to associate member DB0A with DXRDB0A.

IRLM subsystem name
Each IRLM must have a subsystem name that must be unique within the data sharing group and can be up to four characters long and. This name is a parameter on the IRLM procedure.

A sample subsystem name is DJ1A. The "1A" characters indicate that this IRLM is paired with the member DB1A.

IRLM procedure name
Each member of a data sharing group knows its IRLM by the procedure and subsystem names saved in that member's installation parameter load module. The IRLM procedure name can be up to eight characters long.

Recommendation: Use the member subsystem name followed by "IRLM." An example IRLM procedure name is DB1AIRLM.

IRLM member ID
This ID uniquely names an IRLM within a group. It is a parameter on the IRLM procedure and must be unique within the data sharing group. It is a number between 1 and 255 (inclusive).

The following names also apply to IRLMs:

IRLM XCF member name
This name can be up to 16 characters long. An example IRLM XCF member name is *xxxxxxxx*$*issnNNN*, where *xxxxxxxx* is the IRLM group name, *issn* is the IRLM subsystem ID, and *NNN* is the IRLM member ID. Dollar signs ($) are used as padding. This name is generated at startup time.

Lock structure connection name
The connection name is the same as the IRLM XCF member name. It is generated by IRLM. You see it only as the output of certain commands (such as z/OS D XCF,STRUCTURE). In some cases, the connection name can be of the format *xxxxxxxx#issnNNN*.

Related information

Coupling facility structure names

Names for coupling facility structures must conform to a strict naming convention that is based on the Db2 group name.

Sample names are shown in the following table:

Table 61. Sample names of coupling facility structures

Structure type	Example name
Cache structure (group buffer pools)	DSNDB0A_GBP0
Lock structure	DSNDB0A_LOCK1
List structure (shared communications area)	DSNDB0A_SCA

Group buffer pool names

Use a name of the following format on the CFRM policy to define the group buffer pool to the coupling facility. The name can be up to 16 characters long.

```
groupname_GBPxxxx
```

Where GBP*xxxx* is the name of the group buffer pool; the following restrictions apply:

- 4 KB group buffer pools are named GBP0, GBP1, ..., GBP49
- 8 KB group buffer pools are named GBP8K0, GBP8K1, ..., GBP8K9
- 16 KB group buffer pools are named GBP16K0, GBP16K1, ..., GBP16K9
- 32 KB group buffer pools are named GBP32K, GBP32K1, ..., GBP32K9

Requirement: You must define GBP0, GBP8K0, GBP16K0, and GBP32K. You must also define any other group buffer pools that you need for your particular data sharing setup.

When Db2 duplexes a group buffer pool structure, the same structure name is used for both the primary and secondary structures. A duplexed structure requires a single CFRM policy structure definition, with one structure name.

Lock structure name

Use a name of the following format on the CFRM policy to define the lock structure to the coupling facility. The name can be up to 16 characters long.

```
groupname_LOCK1
```

Shared communications area

Use a name of the following format on the CFRM policy to define the SCA to the coupling facility. The name can be up to 16 characters long.

```
groupname_SCA
```

Renaming data sharing members

Strictly speaking, the renaming of existing data sharing members is not supported. However, you can change the names of your data sharing group members by replacing the members that you want to rename.

Before you begin

Changing member names in your data sharing group Db2 data sharing members is an activity that requires careful planning. For more information, see “Naming in Db2 data sharing” on page 529.

Procedure

To change the names of existing members of a data sharing group:

1. Define the correct profile names for the DSNR class. Make sure that RACF definitions are in place to handle the new subsystem names. Add the correct names to the following tables:
   - The RACF router table. For more information, see The RACF router table (z/OS Security Server RACF System Programmer's Guide).
   - The started procedures table (ICHRIN03), if used. For more information, see and The started procedures table (ICHRIN03) (z/OS Security Server RACF System Programmer's Guide).
2. Replicate existing PERMIT commands to allow users and groups to access the new profiles.
3. Quiesce the member that you want to rename, as described in .
4. Add a member with the new name, as described in “Adding a new data sharing member” on page 595.

Related concepts

Planning for Db2 data sharing
Db2 data sharing introduces special requirements for your Db2 and z/OS environments.

Related tasks

Renaming the originating Db2 subsystem for a new data sharing group
When you enable Db2 data sharing, you can rename the Db2 subsystem that becomes the originating member and reuse the original subsystem name as the group attach name. The result is that existing jobs and other workloads can continue to connect to the group instead of the subsystem, without modifications to the jobs or applications.

Renaming the originating Db2 subsystem for a new data sharing group

When you enable Db2 data sharing, you can rename the Db2 subsystem that becomes the originating member and reuse the original subsystem name as the group attach name. The result is that existing jobs and other workloads can continue to connect to the group instead of the subsystem, without modifications to the jobs or applications.

Before you begin

Renaming a Db2 subsystem and renaming members in a data sharing group require careful planning. Also, because every installation has a different configuration, this procedure might not be complete for your environment.

Tip: Rename the originating subsystem during the process for enabling Db2 data sharing because Db2 must be stopped when you complete this process.

About this task

The following procedure describes an approach to changing the name of the Db2 subsystem that becomes the originating member of a new data sharing group. It is a variation of the process for enabling data sharing, as described in "Enabling Db2 data sharing" on page 584.

The examples change the name of member DB2P to DB1A, which conforms to the naming convention used in other examples in the Db2 data sharing information

Procedure

To rename the originating member when enabling data sharing, complete the following steps:

1. Define the correct profile names for the DSNR class. Make sure that RACF definitions are in place to handle the new subsystem names. Add the correct names to the following tables:
   - The RACF router table. For more information, see The RACF router table (z/OS Security Server RACF System Programmer's Guide).
   - The started procedures table (ICHRIN03), if used. For more information, see and The started procedures table (ICHRIN03) (z/OS Security Server RACF System Programmer's Guide).
2. Replicate existing PERMIT commands to allow users and groups to access the new profiles.
3. Run the installation CLIST, as described in "Running the CLIST for enabling data sharing" on page 584, and update the following values (you cannot change the subsystem name on the installation panels):
   a) On installation panel DSNTIPH, modify the archive prefix names to include the member name; for example: `DB2PCAT.DB1A.ARCLG1`
   b) Specify the old subsystem name (for example: DB2P) as the group attachment name.
4. Modify the IEFSSN*xx* member for this subsystem to include the group attachment name.

   Tip: To avoid having to modify JCL for all your jobs, use the existing subsystem name as the group attachment name.

This step is necessary to ensure that there are no problems when the call attachment and TSO attachment facilities try to use the group attachment name.

For example, if the existing IEFSSN*xx* member looks like this:

```
DB2P,DSN3INI,'DSN3EPX,?'
```

Change it to look like this:

```
DB2P,DSN3INI,'DSN3EPX,?,S,DB2P'
```

5. Add new IEFSSN*xx* definitions for the new name and prefix by taking one of the following actions:

   - Modify the names to the IEFSSN*xx* member and IPL z/OS. For example:

     ```
     DB1A,DSN3INI,'DSN3EPX,-DB1A,S,DB2P'
     ```

     The command prefix -DB1A is not a subset or a superset of the DB2P command prefix. For example, ?DB1A is not valid in this context.

   - Use the z/OS command SETSSI to set the definitions without an IPL. For example:

     ```
     SETSSI ADD,SUBNAME=DB1A,INITRTN=DSN3INI,INITPARM='DSN3EPX,-DB1A,S,DB2P'
     ```

     If you use this alternative, you must also add the new name and prefix to the IEFSSN*xx* member before the next IPL.

   You can leave the old IEFSSN*xx* definitions in place until you complete the process of enabling data sharing. However, it is best to remove them after you finish enabling data sharing. The change does not take effect until the next IPL of z/OS. However, you can use an SETSSI command to delete the obsolete definition until the next IPL, for example:

   ```
   SETSSI DELETE,SUBNAME=DB2P,FORCE
   ```

6. Stop Db2 and ensure that all work is stopped:

   a) Issue a STOP DB2 command with the MODE(QUIESCE) option.

   b) Restart Db2 in ACCESS(MAINT) mode.

   c) Issue a -DISPLAY THREAD(*) TYPE(*) command to identify indoubt threads. Then use the -RECOVER INDOUBT command for any indoubt threads.

   d) Issue a -DISPLAY UTILITY(*) command to identify unterminated utilities. Then use the -DSN1 TERM UTILITY(*) command to terminate all utilities.

   e) Stop Db2 with the MODE(QUIESCE) option.

7. Rename the BSDS and active log data sets with the new prefix, like `DB2PCAT.DB1A.BSDS01`.

8. Modify and run job DSNTIJIN to alter the active log data sets to specify `SHAREOPTIONS(2 3)`. Before running the job, verify that the AMS ALTER statements there specify the new name for the active log data sets.

9. Update the BSDS with the renamed log data sets. Include the same RBA ranges as the original active log data sets:

   a) Run the utility print log map (DSNJU004) to obtain the start and end RBAs.

   b) Run the utility change log inventory (DSNJU003) to delete the active logs with the old names.

   c) Run the utility change log inventory (DSNJU003) to add the renamed active logs with the correct ranges. You do not need to add the archive log data sets. The archive log data sets that you specified on panel DSNTIPH replace them.

10. If necessary, increase the size of the BSDS.

11. Run job DSNTIJUZ to assemble and link-edit the new subsystem parameter data set (DSNZP*xxx*) and DSNHDECP modules. This job also modifies the BSDS and establish the subsystem as the first member of the group. Before running the job, verify the following settings:

    - Job step DSNTIZA: Subsystem parameter module assembly DSN6GRP.MEMBNAME:

  - The member name; for example: DB1A
  - DSN6ARVP.ARCPFX1 and DSN6ARVP.ARCPFX2: The archive log data set name prefixes; for example: DB2PCAT.DB1A.ARCHLOG1
  - DSN6SPRM.ADMTPROC: The name of the Db2 Administrative Scheduler address space procedure; for example: DB1AADMT
- Job step DSNTIZP: Application programming default (DSNHDECP) module assembly DSNHDECM.SSID: The group attach name; for example: DB2P
- Job step DSNTLOG: Change log inventory:
  - The names of the BSDS; for example: DB2PCAT.DB1A.BSDS01
  - The GROUPMEM parameter; for example: GROUPMEM=DB1A

12. If necessary, increase the size of the SYSLGRNX table space.
13. Rename the startup procedures. For example, change DB2PMSTR to DB1AMSTR. Do not forget to change the BSDS names to the new names in the *ssnm*MSTR startup procedure.
14. Modify the IRLM startup procedure for the member.
    a) Change the SCOPE parameter setting from LOCAL to GLOBAL.
    b) Set the IRLMGRP parameter to the name that is to be used for the IRLM group. This name must be different from the Db2 group name.
15. Verify that CICS can connect to the new Db2 subsystem. There are several ways of doing this, depending on which level of CICS you are running.

    For example, you might use one of the following techniques:

    - Change the CICS DB2CONN to use the new Db2 subsystem name, reassemble, and link-edit.
    - Modify the JCL for CICS to include the new subsystem name on the INITPARM.
16. Verify that IMS can connect to the new Db2 subsystem.
17. Start Db2 by issuing a START DB2 command.

What to do next

Complete the process for enabling data sharing, by continuing with the step described in "Creating the default storage group and defining temporary work files: DSNTIJTM" on page 593.

After data sharing is enabled, remove old definitions from the IEFSSN*xx* member, as described at the end of step 5.

Planning for availability in a data sharing environment

When planning your data sharing configuration for the high availability, the primary concerns are the physical protection of the coupling facility, the structures in the coupling facility, and network connectivity. The SCA and lock structure are both necessary for the data sharing group to function.

About this task

To plan for high availability of your data sharing group, take the following actions:

Procedure

1. Duplexing the group buffer pool and store the SCA and lock structures in failure-isolated coupling facilities as described in "Planning for coupling facility availability for data sharing" on page 546.
2. Define a dynamic virtual IP address (DVIPA) for the Db2 group and a DVIPA for each Db2 member in the group.

   DVIPA addressing gives you the ability to assign a specific virtual IP address to a data sharing group and to each member of the group. This address is independent of any specific TCP/IP stack within the Parallel Sysplex. Even if a member is moved to another z/OS system, as in the case of a failure or maintenance, the member remains accessible and retains the same virtual IP address.

- To achieve the highest level of application availability at the database level, route connections using the Db2 Universal JDBC Driver or Db2 Connect Server with connection concentrator and Sysplex Workload Balancing support enabled. To route all connections through a Db2 Connect Server with Sysplex support enabled, you must first configure the Db2 group and each Db2 member to use DVIPA. The Db2 Connect Server then manages the connections to the group using the DVIPAs.
- To support JTA and JTS distributed transactions, the Db2 Universal JDBC Driver and the WebSphere® Application Server can be used to coordinate commits against a data sharing group. If using the Db2 Universal JDBC Driver, group and member DVIPA need to be configured in order to recover indoubt threads after a system failure.

Automatic restart of z/OS

The purpose of automatic restart is to reduce the amount of time that a particular system is down.

When Db2 or IRLM stops abnormally, the surviving z/OS systems analyze the situation to determine whether z/OS failed too, and where Db2 or IRLM should be restarted. If z/OS did not fail, then Db2 or IRLM is restarted on the same z/OS image. If z/OS failed, then Db2 or IRLM is restarted on another z/OS image.

Automatic Restart Manager (ARM) is the component of z/OS that manages automatic restarts.

Advantage of automatic restart

When Db2 and IRLM restart automatically, locks that are held by failed members are released quickly.

Applications that are running on other members can then access data for which the failed member is holding incompatible locks. Consider using automatic restart in conjunction with the RETAINED LOCK TIMEOUT option of installation panel DSNTIPI.

You must install Db2 with a command prefix scope of "started" to take advantage of automatic restart.

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Related tasks

Registering the command prefixes, member group attachment name, and subgroup attachment name
Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Automatic restart policies

You control how automatic restart works by using z/OS automatic restart policies.

When the automatic restart function is active, the default action (for both sharing and non-sharing Db2 subsystems and IRLMs) is to restart the subsystems when they fail. If this default action is not what you want, you must create a policy that defines the action that you want to be taken.

Creating an automatic restart policy

If the default action of restarting Db2 and IRLM is the action that you want, you do not need to create an automatic restart policy.

Before you begin

If you do want to change the default restart behavior of Db2 or IRLM, you need to know the automatic restart element name.

In a data sharing group, the Db2 element name is the Db2 group name concatenated with the member name (such as DSNDB0ADB1A).

For IRLM, the element name is the IRLM group name concatenated with the IRLM subsystem name and three-character member ID (such as DXRDB0ADJ1A001).

You can also specify a pattern-matching character (such as DSNDB0A*) if you want to use a single policy statement for all members in the group.

About this task

Db2 startup can be a little faster when z/OS Automatic Recovery Manager (ARM) restarts IRLM because this activity is done in parallel. Db2 does not have to start IRLM and wait. However, if you do not want IRLM to automatically restart after a failure, you can modify the IRLM element.

You can also tailor the restart policy to use restart light. Restart light enables Db2 to restart with a minimal storage footprint to quickly release retained locks and then terminate normally. It is not recommended for a restart in place, but it is recommended for a cross-system restart in the event of a failed z/OS system. It is primarily intended to restart Db2 temporarily on another z/OS system that does not have the capacity to sustain a Db2 and IRLM pair.

Procedure

Create an ARM policy with one or both of the following specifications as needed for your system.

- To specify that Db2 or IRLM is not to be restarted after a failure:

  Include RESTART_ATTEMPTS(0) in the policy for that Db2 or IRLM element. For IRLM, you can also use the MODIFY irlmproc,ABEND command, as shown below, to stop IRLM and unregister it from ARM when it comes down. Unregistering prevents IRLM from automatically restarting after you bring it down.

  ```
  MODIFY irlmproc,ABEND,NODUMP
  ```

  However, if a member's AUTO START option of installation panel DSNTIPI has a value of YES, and if z/OS restarts Db2 automatically, Db2 restarts IRLM, too.

- To have Db2 restarted in a light mode (restart light):

  Modify the ARM policy for the Db2 group to specify LIGHT(YES) or LIGHT(NOINDOUBTS) within the RESTART_METHOD(SYSTERM) keyword for the Db2 element name. For example:

  ```
  RESTART_METHOD(SYSTERM,STC,'cmdprfx STA DB2,LIGHT(YES)')
  ```

Planning for coupling facility availability for data sharing

If properly configured, Db2 and IRLM can recover very quickly and with very little disruption from any kind of coupling facility failure. If coupling facilities are not properly configured, coupling facility failures can cause serious outages for users.

About this task

When planning your data sharing configuration for high availability, the primary concerns are physical protection of the coupling facility, protection of the structures in the coupling facility, and the network connectivity. The SCA and lock structure are both necessary for the group to function.

Multiple coupling facilities are always required for high availability because a single coupling facility is single point of failure for the data sharing group. With multiple coupling facilities, you can specify that structures be allocated in the secondary coupling facility, if the primary coupling facility is damaged. You can also consider duplexing SCA, lock, and group buffer pool structures. With duplexing, a secondary structure is always on standby in another coupling facility. This secondary structure is ready to take over if the primary structure fails or if a connectivity failure occurs. If you have three or more coupling facilities, you can even maintain duplexing while performing maintenance on one of the coupling facilities.

For more information about the different types of coupling facility failures, and how to recover from them, see .

Procedure

To ensure the highest availability for Db2 data sharing and reduce the time and effort for recovering from failures, use the following practices, which are listed in priority order, to configure the coupling facilities:

1. Duplex the group buffer pool so that Db2 can switch to the secondary structure if the primary structure fails.

   The performance cost of duplexed group buffer pools is negligible in most cases, and the availability benefits are very high. Although the loss of a group buffer pool does not require a group restart, availability for users and important applications requires that data in a group buffer pool be available as quickly as possible after a failure. Duplexing group buffer pool structures assures minimal impact from failures. Duplexing can also help you to avoid hours of recovery time, which are often required to recover simplexed group buffer pool structures.

   Duplexing the SCA and lock structure is not as important for high availability because these structures can be rebuilt dynamically on an alternate coupling facility, if the coupling facility that contains the SCA and lock structure fails. However, if the SCA and lock structure are not duplexed, the coupling facility that contains these structures should be failure isolated as described below. If failure isolation is not possible for the SCA and lock structures, use the following approaches to duplex the structures:

   - Use system-managed duplexing for the SCA structure. It has a performance cost, but the usage pattern of this structure might make it tolerable.
   - Use asynchronous duplexing for the lock structure. It has a performance cost, but it is less than the cost of system-managed duplexing.

   For more information about duplexing, see "Duplexed structures" on page 551.
2. Isolate failures by configuring multiple coupling facilities, and physically separate each coupling facility on a separate central processor complex (CPC) from all z/OS sysplex members, including any Db2 data sharing members that use the coupling facility.

   A *failure-isolated* coupling facility resides in a central processor complex (CPC) that does not also contain any data sharing member that is connected to structures in that coupling facility.

   By separating the SCA and lock structures from the systems that use them, you can minimize the chances of performing a lengthy group restart after a lengthy outage because Db2 uses information in the lock structure and SCA for *damage assessment* to determine which databases must be recovered for quick recovery of group buffer pools. If you lose the lock structure or SCA at the same time as one or more group buffer pools, Db2 waits until the lock structure and SCA are rebuilt before doing damage assessment.

   If the SCA and lock structure reside in a *non-failure-isolated* coupling facility (a coupling facility that contains the SCA and lock structure and resides in a CPC that also contains a member of that data sharing group), the CPC becomes a single point of failure. If the CPC fails, the entire data sharing group comes down. Duplexing the SCA and lock structure, or keeping the SCA and lock structure in a failure-isolated coupling facility, avoids this single point of failure.

   Also, consider putting the lock structure and SCA in a coupling facility that does not contain important cache structures (such as group buffer pool 0). You are less likely to lose the SCA, lock structure, and the group buffer pool at the same time if you carefully separate these structures by placing them in different coupling facilities.
3. Use non-volatile coupling facilities that use uninterruptible power supply equipment.

   If a coupling facility is configured to be non-volatile (using the proper power backup, such as a battery backup), volatility is generally a transient state that might occur, if for example you remove the battery. If you lose power to a non-volatile coupling facility, the coupling facility enters power save mode and saves the data that is contained in the structures. When power is returned, you do not need to do a group restart nor recover the data from the structures.

When a coupling facility is in a volatile state, data in the coupling facility is not saved in the event of a power failure. The following messages indicate that a coupling facility is in a vulnerable state.

- DSNB302I or DSNB301I for group buffer pools.
- DXR141I for the LOCK1 structure.
- DSN7507I or DSN7509I for the SCA structure.

4. Take the following actions for simplexed structures:

   - Specify system weights in an active system failure management (SFM) policy. Unless you do this, it is not possible to automatically rebuild simplexed coupling facility structures. If the SCA and lock structure cannot be rebuilt, Db2 abnormally terminates the members affected by the loss of those structures, or the loss of connectivity to those structures. If the group buffer pool cannot be rebuilt, which is only attempted when a subset of members lose connectivity, those members disconnect from the group buffer pool.
   - Specify a REBUILDPERCENT value specified in the CFRM policy for all Db2-related structures. In general, specify a low REBUILDPERCENT value to allow for automatic rebuild when a member loses connectivity. For more information, see "Specifying when structure rebuilds occur after connectivity is lost" on page 550.
   - Configure adequate storage in an alternate coupling facility to rebuild or reallocate structures as needed. For rebuild, z/OS uses the current size structure of the CFRM policy on the alternate coupling facility to allocate storage. If z/OS cannot allocate enough storage to rebuild the SCA or lock structure, the rebuild fails. If it cannot allocate enough storage for the group buffer pool, Db2 must write the changed pages to disk instead of rebuilding them into the alternate group buffer pool.

5. Enable automatic recovery for the group buffer pool. For more information, see "Automatic recovery requirements for group buffer pools" on page 551.
6. To prepare for channel failures, consider using dual channels between each CPC and a coupling facility.

   Without dual channels (sometimes called *links*), a channel failure is more likely to occur than a failure in the coupling facility. Losing connectivity to the SCA or lock structure can bring that particular member down, unless you specify duplexing or an alternative coupling facility in the CFRM policy preference list.

Results

The following table summarizes how Db2 recovers from structure and connectivity failures for different structures and configurations.

Failure type	Recovery if duplexed	Recovery if simplexed
Group buffer pool structure	The failing structure is deallocated, and processing continues with the running structure. This recovery is usually fast and unnoticeable.	Recovery from the log can occur manually, as the result of a START DATABASE command, or if the group buffer pool is defined with the AUTOREC(YES) option, it can occur automatically.
SCA and lock structure	The failing structure is deallocated, and processing continues on the running structure.	Db2 uses information that is contained in its virtual storage to quickly rebuild the structures. Recovery of a simplexed SCA is usually fast and has a minimal impact on performance. Recovery of a simplexed lock structure is also fast in normal cases, but the performance impact depends on the number of held locks at the time of the failure.

Failure type	Recovery if duplexed	Recovery if simplexed
		Db2 can rebuild a simplexed SCA and lock structure in the same coupling facility or in an alternate coupling facility, assuming that the following conditions are true: • You specified the alternate coupling facility in the CFRM policy preference list. • You allocated enough storage in the alternate coupling facility to rebuild the structures there. If Db2 fails to rebuild the SCA and lock structure from virtual storage, all active members in the group terminate abnormally, and you must perform a group restart to recover the necessary information from the logs.
Connectivity	Db2 switches to the structure with good connectivity	Db2 rebuilds simplexed structures on the alternate coupling facility that is specified in the CFRM policy. Recovery of a simplexed SCA is fast and has little or no impact on performance. The performance of the recovery of a lock structure depends on the number of modify locks in the lock structure at failure time, but it is also fast in most cases. However, recovery of simplexed group buffer pool structures is very disruptive to the system. In rebuilding these structures, Db2 attempts to allocate storage on the alternate coupling facility. Db2 uses the current size of the structure for the initial size of the structure on the alternate coupling facility. If Db2 cannot allocate the storage for the SCA or lock structure, the rebuild fails. If z/OS cannot allocate the storage for the group buffer pools, the changed pages are written to disk.

For more information about recovering from coupling facility failures, see .

Related concepts

Duplexed structures
Running some or all of the SCA, lock, and group buffer pool structures in duplex mode is one way to achieve high availability for these structures across many types of failures, including lost connections and damaged structures.

Allocating a Structure in a Coupling Facility (z/OS MVS Programming: Sysplex Services Reference)

Related reference

Managing coupling facility resources (z/OS MVS Setting Up a Sysplex)

Specifying when structure rebuilds occur after connectivity is lost

The *rebuild threshold* is a percentage that you specify for the REBUILDPERCENT parameter in the CFRM policy. z/OS uses the REBUILDPERCENT value to determine whether to initiate a structure rebuild in the case of a loss of connectivity to the coupling facility that contains the structure.

About this task

The percentage is based on the Sysplex failure management (SFM) weights of all the systems that have active connections to a structure at the time. (A connection is considered active even if connectivity is lost.) You also specify weights on the SFM policy.

Db2 calculates the total weight of:

- All systems that have active connections but that lost connectivity to the structure (A)
- All systems that have active connections to the structure (B)

z/OS then divides A by B and compares the result to the REBUILDPERCENT value. (In the case of multiple connections to a structure from a single z/OSsystem, that system is counted only once. Multiple connections from a single z/OS system exist, for example, when two members reside on the same z/OSsystem.)

Procedure

Specify REBUILDPERCENT values in your CFRM policy.

Recommendation: If you have high availability requirements, specify a small REBUILDPERCENT value, and allow the system to rebuild the structure. Specify a larger REBUILDPERCENT value only if you prefer to have a member lose the use of a structure rather than temporarily disrupt all of the members that were using the structure so that the structure can be rebuilt.

Example

All z/OS systems in an eight-member Parallel Sysplex are of equal weight (10), and six of the systems have active connections to the group buffer pool. *A* equals the total weight of all systems that lose connectivity to the group buffer pool. *B* equals the total weight of all systems that have active connections to the group buffer pool. If two of the six systems lose connectivity, the value of *A* is 20, and the value of *B* is 60.

z/OS determines whether to initiate a rebuild as follows:

- If (*A*/*B*) × 100 is greater than or equal to the REBUILDPERCENT value, Db2 rebuilds the structure.
- Otherwise, Db2 does not rebuild the structure. Instead, the affected members disconnect from the group buffer pool.

In this example, (20/60) × 100 is equal to 33. If the value of REBUILDPERCENT is 35, z/OS does not initiate a rebuild.

What to do next

You can monitor a performance class 20 trace (IFCIDs 0267 and 0268) to determine how long a rebuild of a structure takes and the reason for the rebuild.

You can also examine the messages that are returned to the console to monitor a rebuild. The reasons for a rebuild can include:

- Lost connectivity
- Operator command
- Duplexing is being established

Related reference

Updating a CFRM Policy (z/OS MVS Setting Up a Sysplex)

Automatic recovery requirements for group buffer pools

Automatic recovery is faster than manual recovery because Db2 can optimize internal processing of the recovery.

For automatic recovery to be initiated for a group buffer pool, all of the following conditions must be true:

- AUTOREC (YES) is specified for the group buffer pool.
- At least one member is actively connected at the time that the group buffer pool failed. This member must have successfully completed damage assessment.

Db2 never initiates automatic recovery during restart.

For a duplexed group buffer pool, Db2 can use automatic recovery if both instances of the group buffer pool are damaged. Automatic recovery is not needed for group buffer pools that are defined as GBPCACHE (NO).

You can enable automatic recovery with the AUTOREC option of the ALTER GROUPBUFFERPOOL command.

Related information

Duplexed structures

Running some or all of the SCA, lock, and group buffer pool structures in duplex mode is one way to achieve high availability for these structures across many types of failures, including lost connections and damaged structures.

Important: Although the SCA and lock structure can run in duplex mode, you should run them in simplex mode. When duplexed, the SCA and lock structure can cause a significant impact on performance. Also, because the SCA and lock structure can be quickly rebuilt, duplexing them does not add significant availability.

Important: If you decide to duplex the SCA and lock structure, you must duplex both structures to achieve the availability benefits. Duplexing only the SCA or only the lock structure does not provide any benefit.

How group buffer pool duplexing works

With a duplexed group buffer pool structure, two allocations of the same structure use one connection from each member.

Each structure allocation must be in a different coupling facility. z/OS prefers to place the structures in coupling facilities that are failure-isolated from one another.

Recommendation: Ensure that at least one of the group buffer pool structures is in a non-volatile coupling facility. If power is lost to both coupling facilities and both coupling facilities are volatile, you must recover the group buffer pool from the logs.

Characteristics of primary and secondary structures

z/OS commands let you stop and start duplexing, and let you choose which of the duplexed structures is the primary and which is the secondary.

The *primary structure* is the one from which changed data is cast out to disk. Db2 also uses the primary structure to read data, keep track of page-registration, and perform cross-invalidation of pages in the buffer pools of individual members. When changed data is written to the primary structure, it is also written to the *secondary structure*. Db2 uses the secondary structure as a backup. After data is cast out to disk from the primary structure, the data is deleted from the secondary structure.

From a z/OS perspective, duplexing is really an extended rebuild, so z/OS documentation and commands sometimes call the primary structure the *old* structure, and refer to the secondary structure as the *new* structure.

Coupling facility storage considerations for duplexing
When planning for storage, make the primary and secondary group buffer pool structures the same size.

If your system is properly configured for high availability using a simplexed group buffer pool, you usually do not need extra coupling facility storage for duplexing. For simplexed structures, you must reserve enough spare capacity in the coupling facilities to be able to absorb the structures of any failed coupling facility. With duplexed structures, instead of reserving storage in case of a coupling facility failure, that storage is used by the secondary group buffer pool.

For example, assume that you have 2 coupling facilities, each with 1 GB of memory, for a total of 2 GB of memory. Ensure that the total size of the structures across the 2 coupling facilities does not exceed 1 GB (50% of the total coupling facility storage).

If you configure three or more coupling facilities, you might need an additional coupling facility for duplexing.

Duplexing requirements

To achieve high availability for SCA, lock, and group buffer pool structures across many types of failures, three conditions must be met.

For duplexing to work, the following conditions must be true:

- The CFRM policy preference list for the group buffer pool structure that you want to duplex must contain at least two coupling facilities with a CFLEVEL of 5 or higher. All members of the data sharing group must have physical connectivity to both coupling facilities in which the primary and secondary structures reside.

  If you are going to do automatic reduplexing, you need three coupling facilities that are physically connected to members of the data sharing group.
- At least one member must be actively connected to the group buffer pool structure.
- The group buffer pool must be defined with GBPCACHE(YES), the default.

Related reference

Updating a CFRM Policy (z/OS MVS Setting Up a Sysplex)

Options for duplexing

Options for the CFRM policy allow, enable, or disable duplexing.

The following options are available in the CFRM policy for duplexing of the group buffer pool, SCA, and lock.

Table 62. Duplexing options in the CFRM policy

Option	Valid for	Description
DUPLEX(ENABLED)	SCA, group buffer pool, lock	Automatically starts duplexing.
DUPLEX(ALLOWED)	SCA, group buffer pool, lock	Allows duplexing. You must use a command to start duplexing.
DUPLEX(DISABLED)	SCA, group buffer pool, lock	Disables duplexing

Related reference

Updating a CFRM Policy (z/OS MVS Setting Up a Sysplex)

Related information

Performance implications of duplexing

The process of establishing duplexing can be somewhat disruptive because access to the group buffer pool structure is quiesced while the secondary structure is allocated. Also, changed pages are copied from the primary structure to the secondary structure (or cast out to disk).

Transactions that need access to the group buffer pool structure during this process are suspended until the process is complete. Because of this disruption, you need to establish duplexing at a time of low activity on the system. How long the process takes depends on how many pages are copied to the secondary group buffer pool structure.

In general, more processor and elapsed time is needed to do duplexed group buffer pool structure writes and castout processing than to do simplexed group buffer pool structure writes and castout processing. Workloads that are more update-intensive will probably experience a slight increase in host CPU usage when duplexing is activated. In most cases, the majority of the CPU increase occurs in the Db2 address space. Duplexing can cause a slight increase in the transaction elapsed time. Read performance is unaffected by duplexing.

The statistics and accounting trace classes contain information about structure duplexing.

Estimating the effect of duplexing on CPU usage

When you enable duplexing, you will see an increase in the CPU usage in the coupling facility that contains the secondary structure. Duplexing should have little or no impact on the CPU usage in the coupling facility that contains the primary structure.

Procedure

To estimate approximately how much the coupling facility CPU usage will increase when you establish duplexing:

1. Determine the amount of coupling facility CPU usage that the simplexed primary structure consumes.
2. Divide the result in half to determine how much coupling facility CPU usage the duplexed secondary structure will consume.

Duplexing rebuild status

When a group buffer pool structure is duplexed, it is considered to be in an extended rebuild status called a duplexing rebuild.

This activity is reported in IFCIDs 0267 and 0268, along with other reasons for rebuilding.

Db2 resource availability considerations

Several options for the catalog and directory, for data in group buffer pools, and for Db2 restart can be used for data that requires high-availability.

Db2 resource availability considerations for a data sharing group are basically the same as for a single Db2 subsystem.

Critical Db2 data

Critical Db2 data should be placed behind high-availability storage controllers, such as the IBM Enterprise Storage Server®. Consider placing the catalog and directory behind a 3990 control unit with dual-write capability for hardware duplexing. Another possibility is to use storage controllers with high-availability characteristics (such as controllers that use RAID technology) for critical Db2 data.

Group buffer pool data

Assign data that require high availability to group buffer pools that reside on non-volatile coupling facilities. Use group buffer pool duplexing, which has minimal impact on performance and can avoid hours of recovery time.

Data availability at restart

For faster restarts, take more frequent checkpoints. Checkpoint frequency is the most important factor in Db2 restart time.

If your installation sometimes has problems with units of recovery (URs) that take a long time to back out after a failure, make plans to reroute work to other members of the group. Another solution is to postpone backout processing for those long-running URs until Db2 is up and receiving new work.

Related information

XA support for a Sysplex by the IBM Data Server Driver for JDBC and SQLJ

WebSphere Application Server and the IBM Data Server Driver for JDBC and SQLJ can be used to coordinate distributed transactions using XA protocols supported by DRDA.

This type of XA support is only available for transaction managers that use a single-transport processing model. In a single-transport model, a transaction, over a single transport (physical connection), is tied to a member from xa_start to xa_end. The transaction end is followed immediately by xa_prepare(readonly), xa_prepare plus xa_commit or xa_rollback, or xa_rollback. All of this must occur within a single application process. An example of a transaction manager that uses this model is IBM WebSphere Application Server.

Support for the single-transport processing model also includes indoubt transaction recovery where member information for each recoverable transaction is retrieved through xa_recover, which allows xa_commit or xa_rollback to be directed at the specified member.

Important: When a global transaction runs, locks are shared among branches of the global transaction only if those branches run on the same data sharing member. When Sysplex workload balancing is enabled, there is no guarantee that all branches run on the same data sharing member. As a result, an application that uses global transactions and Sysplex workload balancing might experience deadlocks or timeouts.

To use XA support with client applications, you need to set up dynamic virtual IP addresses. A dynamic IP address needs to be configured for the Db2 group, and one address must be set up for each Db2 member in the group. For XA recovery to be processed on any member after failure, information on indoubt XIDs must be obtained from the SCA. The SCA contains the list of indoubt XIDs for the entire group, as well as each member's DVIPA and the resync port of the member that owns the indoubt thread. XA recovery returns the list of all prepared or heuristically committed threads for the entire group back to the XA Transaction Manager (TM). The IBM Data Server Driver for JDBC and SQLJ uses the information to send the commit decision to the owning member, when the XA TM recovers, and then commits or rolls back indoubt XIDs.

For the recovery process to function properly, you must set up the group DVIPA. the following figure illustrates how the XA recovery process, that is described above, works. After a system failure, XA recover requires the list of indoubt transactions identified by XA XIDs, to be returned to the group. In this example, if member DB1G fails, DB1G will leave an indoubt thread. The state of the thread, as well as related XIDs, is contained in the log of the DB1G member. The DB1G indoubt thread XID is also contained in the group's XA indoubt list, in the SCA. When WebSphere tries to recover from the system failure, the IBM Data Server Driver for JDBC and SQLJ sends the XA Recover command to any member of the group. The member then returns the group's list of indoubt XIDs from reading the XA indoubt list in the SCA. When WebSphere commits or rollbacks the indoubt thread, the IBM Data Server Driver for JDBC and SQLJ sends the decision to member DB1G, which resolves the indoubt thread.

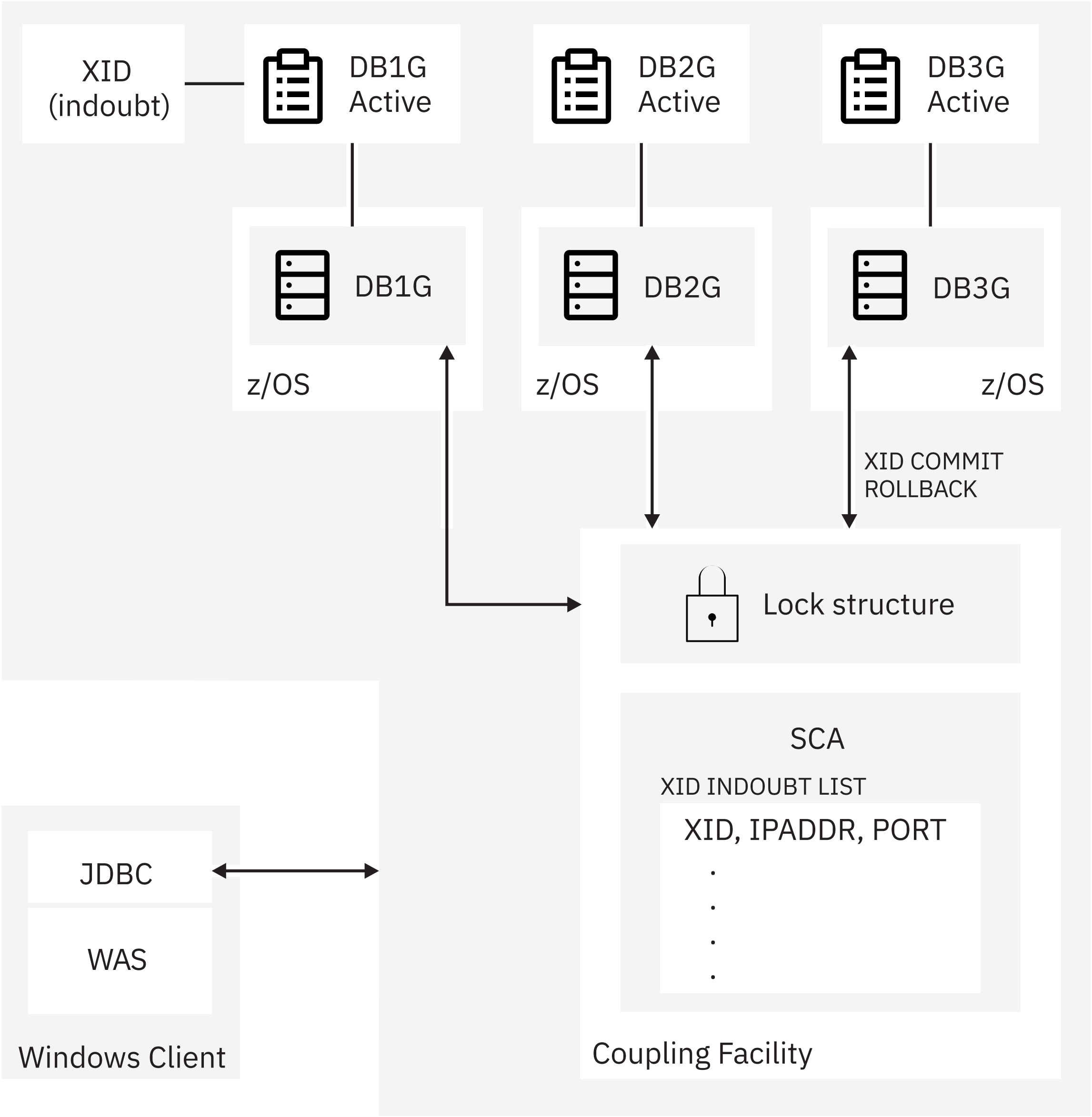


Figure 81. The XA recovery process

Related information

Storage estimates for data sharing environments

As part of planning for a data sharing environment, you should estimate the storage requirements for coupling facility structures and for Db2 resources.

Precise estimates for the sizes of coupling facility structures are hard to provide. Every environment is different, and storage allocation is affected by the processor model and the level of coupling facility control code. Use the information in this section to estimate initial size (INITSIZE) values. Depending on how much your workload varies, consider specifying a larger value for SIZE.

For duplexed structures, the SIZE and INITSIZE parameter values apply to both instances of the structure.

The information in this section assumes that all page sets in a particular group buffer pool are defined with the same GBPCACHE attribute. You can put page sets with different GBPCACHE attributes in the same group buffer pool, but you must adjust the formulas accordingly.

Coupling facility structure size

When a new coupling facility structure is allocated for a data sharing group, its size is usually taken from the value of the INITSIZE parameter in the CFRM policy.

After the structure is allocated, you can dynamically change its size with the following z/OS command:

```
SETXCF START,ALTER,SIZE=newsize,STRNAME=strname
```

The new SIZE value cannot be greater than the SIZE value in the CFRM policy, but it can be smaller than the INITSIZE value. If the coupling facility has enough space, z/OS increases (or decreases) the size of the structure to the new size; the INITSIZE value of the policy remains unchanged.

In most cases, Db2 uses the new SIZE value for any subsequent allocations of the structure instead of the INITSIZE value in the CFRM policy. Any of the following subsequent allocations can use the new SIZE value:

- A group buffer pool or SCA is deallocated and then reallocated
- A secondary structure is allocated for a duplexed group buffer pool, SCA, or lock structure, if duplexing is started after the size of the primary structure was dynamically changed
- Any structure is rebuilt with the following z/OS command:

  ```
  SETXCF START,REBUILD,STRNAME=strname
  ```

The new size is recorded across a restart of Db2 and is used for all subsequent allocations until one of the following events occurs:

- A CFRM policy is started, and the policy has a different INITSIZE value than the size of the structure that was dynamically changed with the SETXCF START,ALTER command
- Another SETXCF START,ALTER command is issued to dynamically change the size of the structure

Exception: If a lock structure is deallocated and all the members are down, the INITSIZE value is used. This is a consideration for disaster recovery or for situations where data sharing groups are cloned. During normal operation of a data sharing group, you are unlikely to encounter this situation.

Recommendations for coupling facility sizes

Coupling facility structures contain some static control structures. When a structure is initially allocated, these static structures are allocated to accommodate the potential size of the coupling facility structure. In other words, the size of the static structures is proportional to the maximum size (the value of the SIZE parameter) of the coupling facility structure. If the SIZE value is much larger than the INITSIZE value, a large percentage of the initial structure's size might be used for these static structures, leaving you with little usable storage space in the structure.

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

In general, specify a SIZE value that is larger than the INITSIZE value, but limit the SIZE value in the following ways:

- Not more than two to three times the INITSIZE value for the SCA and lock structure.
- 1.2 - 1.5 times the INITSIZE value for group buffer pools, but not be more than two times the INITSIZE value. For example, if the INITSIZE value for a group buffer pool is 100 MB, specify a SIZE value of 200 MB or less.

Related concepts

Coupling facility structures
Db2 relies on areas of storage in the coupling facility called *structures*.

Group buffer pool sizes
The two parts of a group buffer pool are data pages and directory entries. You can specify the ratio of data pages to directory entities in a group buffer pool, or you can use the Db2 default ratio.

Lock structure size
The coupling facility lock structure contains two parts: a lock entry table and a list of update locks.

SCA list structure size
The *shared communications area (SCA)* is a list structure in the coupling facility. Your storage estimate for your data sharing group should include an estimate of SCA size.

The CFSizer tool

The *coupling facility structure sizer (CFSizer)* tool simplifies the task of estimating coupling facility structure storage sizes based on information about your existing or planned Db2 data sharing configuration. It uses your inputs to calculate the SIZE and INITSIZE values for the CFRM policy.

To prepare to use the CFSizer tool, collect the following information about your existing or planned Db2 data sharing environment:

Structure	Information to collect
IRLM LOCK structure	• Lock rate in maximum locks per second • Number of systems expected to be active in the sysplex at the same time • Number of table spaces for all databases managed by the data sharing group • Maximum number of users • Maximum number of connectors • Whether asynchronous duplexing is used
SCA LIST structure	• Total number of databases • Total number of tables
Group buffer pool	• Page size • Number of buffers • GBPCACHE type

To access the CFSizer tool for Db2 data sharing, go to https://www.ibm.com/support/pages/cfsizer and select the DB2 option.

After you decide what your structure sizes are, you can include those values in the CFRM policy definition. For more information about creating the CFRM policies, see "Defining coupling facility structures" on page 526.

Related concepts

Coupling facility structure size
When a new coupling facility structure is allocated for a data sharing group, its size is usually taken from the value of the INITSIZE parameter in the CFRM policy.

Group buffer pool sizes
The two parts of a group buffer pool are data pages and directory entries. You can specify the ratio of data pages to directory entities in a group buffer pool, or you can use the Db2 default ratio.

Lock structure size
The coupling facility lock structure contains two parts: a lock entry table and a list of update locks.

SCA list structure size
The *shared communications area (SCA)* is a list structure in the coupling facility. Your storage estimate for your data sharing group should include an estimate of SCA size.

Related tasks

Allowing a structure to be altered automatically (z/OS MVS Setting Up a Sysplex)

Related reference

Adding MVS systems to a sysplex

Managing coupling facility resources (z/OS MVS Setting Up a Sysplex)

Group buffer pool sizes

The two parts of a group buffer pool are data pages and directory entries. You can specify the ratio of data pages to directory entities in a group buffer pool, or you can use the Db2 default ratio.

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

Data pages

Data pages (sometimes called *data entries*) reside in the group buffer pool. The size of a data page is the same as the page size supported by the corresponding Db2 buffer pools (4 KB, 8 KB, 16 KB, or 32 KB).

If you are caching changed data only, you need enough space to cache changed data plus extra space for pages that are frequently referenced. By caching those frequently referenced pages in the group buffer pool, you can decrease the amount of time it takes for any member to refresh that page in its member buffer pool because you avoid the disk I/O.

If you choose GBPCACHE NONE or GBPCACHE SYSTEM, no user data pages are actually stored in the group buffer pool. However, with GBPCACHE SYSTEM, space map pages for LOBs are cached in the coupling facility.

Directory entries

A directory entry specifies the location and status of a page image somewhere in the data sharing group, whether the image is in the group buffer pool or in one of the member buffer pools. Only one directory entry exists for any given page, no matter how many places that page is cached.

The size of a directory entry is approximately 400 bytes, but it varies somewhat based on the size of the data pages and the CFLEVEL you are using.

Specifying a ratio

The amount of space that is allocated for a group buffer pool is determined by the ratio of directory entries to data pages. When you originally define a structure in the CFRM policy for a group buffer pool, you specify its total size. For Db2, the ratio defaults to five directory entries per data page. Later, you can change the ratio with the ALTER GROUPBUFFERPOOL command. The new value that you define takes effect when the group buffer pool is rebuilt or reallocated.

For group buffer pools that are defined with GBPCACHE(NO), ratios are ignored because no data is actually stored in the group buffer pool.

When possible, both a formula and a general guideline are provided to help you estimate the initial sizes and ratios of your group buffer pools. (The exception is for GBPCACHE ALL group buffer pools, for which only a general guideline is provided.)

The formula is not too complex and is likely to be more accurate, assuming that you are fairly confident of the values for the variables in the formulas. Otherwise, use the general guidelines and then adjust your values from there.

Related reference

zSeries Processor Resource/Systems Manager Planning Guide

Related information

Storage estimate for group buffer pools that cache changed data

The size of a group buffer pool is related to the amount of sharing and the amount of updating. You can use a formula to estimate the storage size of group buffer pools that cache changed data.

An estimate must be based on the total amount of member buffer pool storage multiplied by a percentage based on the amount of update activity. As data sharing and updating increases, more pages must be cached in the group buffer pool, and more directory entries are needed to track inter-Db2 interest.

Formula

The following is a formula for estimating storage for group buffer pools that cache changed data:

```
Data_entries = U * D * R
Data(MB)     = Data_entries * P / 1024
Dir_entries  = Data_entries + (U * VP)
Dir(MB)      = 1.1 * Dir_entries * 0.2 / 1024
GBP(MB)      = Data(MB) + Dir(MB)
RATIO        = Dir_entries / Data_entries
```

Where:

U

The estimated degree of data sharing:

1

A high amount of sharing with a lot of update activity

0.7

A moderate amount of sharing with a moderate amount of update activity

0.5

A low amount of sharing with a low amount of update activity

D

The number of data pages written to disk per second for all members during peak activity. Do not use the number of pages written to the group buffer pool; D must be a count of distinct pages. To determine this value, use the field QBSTPCO from IFCID 0002 (the PAGES CASTOUT field of the buffer pool section of the IBM OMEGAMON for Db2 Performance Expert on z/OS Statistics report.)

R

The average page residency time in the group buffer pool, in seconds. This value is application-dependent, but you can assume that the typical range is 30 to 180 seconds. If you have no information about residency time, use 120.

Tip: Make *R* large enough so that other members can refresh an invalidated local copy of a changed page. When a changed page is written to the group buffer pool, it invalidates local copies of the page in other members. The changed page needs to remain resident in the group buffer pool long enough for other members to refresh the page.

P
The page size (4 KB, 8 KB, 16 KB, or 32 KB).

VP
The number of data pages defined for the virtual pool (the sum across all of the members).

0.2
The approximate size of a directory entry, in KB.

1.1
The additional storage needed for coupling facility control structures.

Example

Assume that you have a two-member data sharing group for which you have determined the following information:

- The degree of data sharing is very high (U=1).
- 500 disk writes per second occur across both members (D=500).
- No information exists about the page residency time (R=120).
- The page size is 4 KB (P=4).
- Member 1 is configured with a virtual pool of 80000 buffers.
- Member 2 is configured with a virtual pool of 40000 buffers (VP=120000).

The following calculation is used:

```
Data_entries = 1 * 500 * 120 = 60000
Data(MB)     = 60000 * 4 / 1024 = 234 MB
Dir_entries  = 60000 + (1 * 120000) = 180000
Dir(MB)      = 1.1 * 180000 * 0.2 / 1024 = 38 MB
GBP(MB)      = 234 MB + 38 MB = 272 MB
RATIO        = 180000  /60000 = 3.0
```

The preceding calculation indicates that the group buffer pool should be defined with an INITSIZE of 272 MB. Use the ALTER GROUPBUFFERPOOL command to change RATIO to 3.

General guideline

For installation planning purposes, you should use the following general guideline as an initial estimate for the size of a Db2 group buffer pool for table spaces, indexes, or partitions that cache only changed data (GBPCACHE(CHANGED)):

Add the local buffer pool storage for this buffer pool number across all the members of the group. Then, multiply this amount by one of these workload factors:

Factor	Condition
10%	For light sharing with a low amount of updating activity
20%	For medium sharing with a moderate amount of update activity
40%	For a high amount of sharing with a lot of update activity

You can run a trace for IFCID 0002 to obtain an estimate of the amount of data sharing in your system. Calculate the "degree of data sharing" by dividing QBGLGG, the number of get pages for group buffer pool-dependent objects, by QBSTGET, the number of get pages. A value that is less than 25% is considered to be light data sharing, a value between 25% and 75% is medium data sharing, and a value greater than 75% is high data sharing.

Remember that the type of workload you run can influence the amount of storage you use. For example, if you have "hot spots" in which updates to a single page are frequent rather than spread throughout the table space, you might need less storage for caching.

Example

Assume that the total buffer pool storage for all the members of the group is 400 MB, and you expect a medium amount of read/write sharing in the environment. The following calculation is an estimate for the size of a group buffer pool when GBPCACHE(CHANGED):

```
400 MB x 20% = 80 MB
```

Storage estimate for caching all data

For installation planning purposes, you can use an initial size estimate of a group buffer pool that caches read-only pages with changed pages (GBPCACHE(ALL)).

Calculate the sum of the local buffer pool storage for this buffer pool number (virtual only) across all members in the group. Then, multiply this amount by one of these workload factors:

Factor	Condition
50%	Less than half of the table spaces, indexes, or partitions specify GBPCACHE ALL
75%	Half of the table spaces, indexes, or partitions specify GBPCACHE ALL
100%	75% of more of the table spaces, indexes, or partitions specify GBPCACHE ALL for a high sharing environment

Example

Assume that the local buffer pool storage on all members of the group adds up to 200 MB. Half of the page sets that come into the pool are defined as GBPCACHE(ALL). The following calculation is an estimate for the size of a group buffer pool when GBPCACHE(ALL):

```
200 MB x 75% = 150 MB
```

Storage estimate for caching no data

For planning purposes, you can use a formula to estimate the size of group buffer pools that cache no data.

The following is a formula for estimating storage for group buffer pools that cache no data (GBPCACHE(NO)):

```
  Dir_entries  = U * VP
  Dir(MB)      = 1.1 * Dir_entries*0.2/1024
  GBP(MB)      = Dir(MB)
  RATIO        = n/a
```

If the group buffer pool itself is defined with GBPCACHE(NO), the ratio is ignored.

In summary, the variables are:

U
: The estimated degree of data sharing.

P
: The page size (4 KB, 8 KB, 16 KB, or 32 KB).

VP
: The number of data pages defined for the virtual pool (the sum across all the members).

Example

Assume that you have a two-member data sharing group for which you have determined the following information:

- The degree of data sharing is very high (U=1).
- Member 1 is configured with a virtual pool of 80000 buffers.
- Member 2 is configured with a virtual pool of 40000 buffers (VP=120000).

The following calculation is used:

```
Dir_entries  = 1 * 120000 = 120000
Dir(MB)      = 1.1 * 120000 * 0.2/1024 = 25 MB
GBP(MB)      = 25 MB
```

The preceding calculation indicates that the group buffer pool should be defined with an INITSIZE of 25 MB. Use the command ALTER GROUPBUFFERPOOL to change the GBPCACHE attribute to NO. If you put GBPCACHE NONE page sets in a GBPCACHE(YES) group buffer pool, the calculation becomes more complicated. You do this because the RATIO is observed and you are probably going to waste a lot of space on unneeded data entries.

Related concepts

Storage estimate for group buffer pools that cache changed data
The size of a group buffer pool is related to the amount of sharing and the amount of updating. You can use a formula to estimate the storage size of group buffer pools that cache changed data.

Storage estimate for caching LOB space maps (GBPCACHE SYSTEM)

For planning purposes, you can use a formula to estimate storage for group buffer pools that cache LOB space map data.

The following is a formula for estimating storage for group buffer pools that cache LOB space map data:

```
Data_entries = (U * D / 10) * R
Data(MB)     = Data_entries * P / 1024
Dir_entries  = Data_entries + (U * VP)
Dir(MB)      = 1.1 * Dir_entries * 0.2 / 1024
GBP(MB)      = Data(MB) + Dir(MB)
RATIO        = MIN(Dir_entries / Data_entries, 255)
```

In summary, the variables are:

U
The estimated degree of data sharing.

D
The number of data pages that are written to disk per second for all members during peak activity. Do not use the number of pages that are written to the group buffer pool; D must be a count of distinct pages. To determine this value, use the field QBSTPWS from IFCID 0002 (the PAGES WRITTEN field of the buffer pool section of the IBM OMEGAMON for Db2 Performance Expert on z/OS Statistics report).

10
An estimate of the LOB system pages that are written for every LOB data page.

P
The page size (4 KB, 8 KB, 16 KB, or 32 KB).

R
The average page residency time in the group buffer pool in seconds.

VP
The number of data pages that are defined for the virtual pool (the sum across all the members).

Example

Assume that you have a two-member data sharing group for which you have determined the following information:

- The degree of data sharing is moderate (U=.7).
- 10 disk writes per second occur across both members during peak activity (D=10).
- The space map page is resident in the group buffer pool page for 120 seconds (R=120).
- The page size is 32 KB (P=32).
- Member 1 is configured with a virtual pool of 20000 buffers.
- Member 2 is configured with a virtual pool of 10000 buffers (VP=30000).

The following calculation is used:

```
Data_entries = ((.7 * 10)/ 10) * 120 = 84
Data(MB)     = 84 * 32 / 1024 = 2.6 MB
Dir_entries  = 84 + (.7 * 30000) = 21084
Dir(MB)      = 1.1 * 21084 * 0.2 / 1024 = 4.5 MB
GBP(MB)      = 2.6 MB + 4.5 MB = 7.1 MB
RATIO        = MIN (21084 / 84, 255)  = 251
```

The preceding calculation indicates that the group buffer pool should be defined with an INITSIZE of 7.1 MB. The ratio is less than the maximum value, so use the command ALTER GROUPBUFFERPOOL to change the ratio to 251.

Related concepts

Storage estimate for group buffer pools that cache changed data
The size of a group buffer pool is related to the amount of sharing and the amount of updating. You can use a formula to estimate the storage size of group buffer pools that cache changed data.

Related information

PR/SM formulas for calculating sizes of group buffer pools

You can use Processor Resource/System Manager (PR/SM) formulas to calculate the sizes of group buffer pools.

You can also calculate group buffer pool sizes by using the coupling facility allocation formulas for cache structures found in 32,13: zSeries Processor Resource/Systems Manager Planning Guide. The following table contains information that is used in those formulas. The size of cache structures in Db2 can vary greatly based on the amount of data for which inter-Db2 read/write interest exists at any given time. You probably need to monitor the use of the group buffer pools and adjust their sizes accordingly.

Table 63. Information for calculating cache structure sizes

Parameter	Db2 Value	Explanation
MSC	**1**	Maximum storage class
MCC	**1024**	Maximum castout class
MDAS	Dependent on page size being cached: **1** for 4 KB pages **2** for 8 KB pages **4** for 16 KB pages **8** for 32 KB pages	Maximum data area size
DAEX	**4**	Data area element characteristic
AAI	**0**	Adjunct assignment indicator
R_de	Set on ALTER GROUPBUFFERPOOL. Default is **5**. See the table below for more information on determining this value.	The directory portion of the directory-to-data ratio

Table 63. Information for calculating cache structure sizes (continued)

Parameter	Db2 Value	Explanation
R_data	Set on ALTER GROUPBUFFERPOOL command. See the table below for more information on determining this value.	The data object portion of the target directory-to-data ratio

The following table contains information about the formulas used to determine R_data and R_de. *N* is the RATIO entered on the ALTER GROUPBUFFERPOOL command. If *N* has a decimal point, all digits after the first decimal place are ignored. For example, 5.67 is treated as 5.6.

Table 64. Formulas for determining R_data and R_de.

Page Size	N has no decimal point	N has decimal point
4 KB R_de	N	N×10
4 KB R_data	1	10
8 KB R_de	N	N×10
8 KB R_data	2	20
16 KB R_de	N	N×10
8 KB R_data	4	40
32 KB R_de	N	N×10
32 KB R_data	8	80

Related information

Lock structure size

The coupling facility lock structure contains two parts: a lock entry table and a list of update locks.

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

The *lock entry table* is used to determine if inter-Db2 read/write interest exists on a particular hash class. *Hash classes* are resources that hash to a particular place in the lock table. The second part is a list of the update locks that are currently held (sometimes called a *modify lock list* or *record list table*). You can control the division of the lock structure storage between these two components by using the IRLMPROC or by using an IRLM MODIFY command. If you do not specify how the structure is to be split, IRLM attempts to divide it with a 1:1 ratio between lock table entry (LTE) and record list entry (RLE) storage.

The total size of the lock structure must be large enough to limit hash contention, which prevents performance problems. The lock structure must also be large enough to prevent failures that result from a lack of record table storage to write a MODIFY entry (RLE). Proper specification for the number of LTEs can help avoid hash contention.

IRLM reserves 10% of the record table entries for "must complete" functions (such as rollback or commit processing), so that a shortage of storage does not cause a member to fail. However, if storage runs short in the record table, there can be an impact on availability (transactions are terminated), response time, and throughput.

The z/OS system can automatically alter the size of a lock structure in the coupling facility if it needs storage space. The ALLOWAUTOALT option in the CFRM policy specifies whether system-initiated automatic alters are to be allowed for a structure.

If no competing resource is using the coupling facility, consider specifying ALLOWAUTOALT(YES) to enable the lock structure to change as the workload grows. However, if you use this setting, other resources can force the IRLM lock structure size to decrease. This situation can cause an IRLM out-of-storage condition in the lock table and an abend.

If you need the lock structure to be stable, specify ALLOWAUTOALT(NO). If you do not specify ALLOWAUTOALT, the default value of NO is used.

Related information

Lock entry size parameter

The LOCK ENTRY SIZE parameter on installation panel DSNTIPJ determines the amount of space required for lock contention control information (that is, individual entries in the lock table).

The lock entry size and the number of lock table entries of the first IRLM to join the group determines the whole group's storage size for the lock table and the lock table entry width. The default is 2 bytes, which is probably the size you want, unless you immediately create a data sharing group of seven or more members. By restricting each lock entry to 2 bytes, you maximize the amount of RLE space available from the define structure size.

Related reference

LOCK ENTRY SIZE field
The value of the LOCK ENTRY SIZE field specifies the initial size, in bytes, of individual lock entries in the lock table portion of the lock structure.

Storage estimate for the lock structure

For installation planning purposes, the initial size of the lock structure is based on how much updating you do.

Recommendation: If you do not specify a value for the LTE parameter in the IRLMPROC procedure, choose a value for INITSIZE that is a power of 2. This enables IRLM to allocate the coupling facility storage so that half is used for lock table entries and the remainder is used for record table entries. If a 1:1 split occurs and total size is not a power of 2, you might experience a severe shortage of space for the record table entries, resulting in Db2 or IRLM failures. Those failures occur because the number of lock table entries requested during connection to the group must be a power of 2. The record table is susceptible to storage shortages if the structure is too small or if the allocation of the lock table leaves too little storage for the record table.

When you specify a value for the LTE parameter in the IRLMPROC procedure, or when you issue the MODIFY *irlmproc* SET,LTE=*nnnn* command, you should monitor XES contention rates to determine the optimum value for your normal operating environment. If the contention rates appear to be too high, increase the LTE parameter value to the next power of 2. Remember, any increase in the size of the lock table causes a corresponding decrease in the record table, unless the structure size is also increased.

If you have little contention and want more storage available for record table entries, decrease the LTE parameter value by a power of two. Anytime the number of lock table entries is decreased, you should monitor contention rates for a period of time.

Because structure allocation is done during connection, any change that is made to the LTE parameter value does not take effect unless the lock structure is reallocated. You can reallocate the lock structure in one of the following ways:

- Rebuild the lock structure. This is the simpler method.
- Terminate the group, force deallocation of the lock structure, and restart the group.

The LTE parameter value of the first IRLM to connect to the newly allocated structure dictates the coupling facility structure sizes that are used by the group.

The following table shows initial size value recommendations.

Table 65. Recommendations for lock structure size

INITSIZE	SIZE	Condition
32 MB	64 MB	For light sharing with a low amount of updating, or for a single-member data sharing group
64 MB	128 MB	For medium sharing with a moderate amount of update activity
128 MB	256 MB	For a high amount of sharing with a lot of update activity

SCA list structure size

The *shared communications area (SCA)* is a list structure in the coupling facility. Your storage estimate for your data sharing group should include an estimate of SCA size.

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

The SCA contains the following information:

- Member names
- BSDS names
- Database exception status conditions about object in the database
- Recovery information, such as log data set names and the list of indoubt XA transactions

The following table shows how to estimate the size of the SCA. The SCA size can be specified in 1 KB increments.

Table 66. Estimating storage for the SCA

Site size	Databases	Tables	INITSIZE	SIZE
Small	50	1000	16 MB	32 MB
Medium	200	4000	32 MB	64 MB
Large	400	10,000	64 MB	128 MB
Extra Large	600	50,000	128 MB	256 MB

Running out of space in the SCA can cause Db2 to fail. Because much of the space in the SCA is taken up with exception information, you can reclaim space by correcting database exception conditions. Each indoubt XID entry takes approximately 250 bytes. The additional SCA storage required to be reserved is dependent on the total number of database access threads (DBATs) that can be active for the data sharing group.If the data sharing group supports XA transactions, be sure to reserve additional space in the SCA for the indoubt transaction ID (XID) list. (DRDA XA protocol support enables Db2 servers to participate in WebSphere coordinated two-phase commit transactions that have multiple connections to more than one data source.) After a failure, indoubt XA transactions are resolved by WebSphere, or you can reclaim space by resolving indoubt XA transactions manually.

Related concepts

Coupling facility structures
Db2 relies on areas of storage in the coupling facility called *structures*.

Related information

How to change structure sizes

You can change the size of individual structures by changing the CFRM policy.

Then you should rebuild the structures by using the z/OS command SETXCF `START,REBUILD,STRNAME=`*`strname`*. Be aware that:

- The coupling facility size does not increase unless at least one Db2 subsystem is active when this command is issued.
- This command does not work on structures that are actively being duplexed.

z/OS attempts to reallocate a new instance of the structure in the same coupling facility if that coupling facility has enough storage space. If there is not enough space, z/OS looks at the preference list and uses the specified alternate coupling facility. After the space is allocated, Db2 rebuilds the information into the new structure. Any transactions that need the structure must wait until the rebuild is complete. It is best to plan a rebuild when other activity in the system is low.

Dynamic changes to structure sizes

If the affected structure is allocated in a coupling facility with CFLEVEL greater than 0, you can dynamically increase the structure sizes up to a maximum limit specified on the CFRM policy by using the z/OS command SETXCF START,ALTER.

The advantages to this method are:

- Db2 can access the structures while a change is taking place.
- Less coupling facility storage is required because Db2 does not need to allocate enough space for a whole new structure. It dynamically adds or deletes storage from the existing structure.
- The command works on duplexed structures.

Related concepts

Storage estimates for data sharing environments
As part of planning for a data sharing environment, you should estimate the storage requirements for coupling facility structures and for Db2 resources.

Related reference

Updating a CFRM Policy (z/OS MVS Setting Up a Sysplex)

Related information

Automatic changes to structure sizes

z/OS can automatically alter a coupling facility structure when the structure reaches an installation-defined or default percent-full threshold, as determined by structure full monitoring.

The alter process can change the size of the structure, reapportion the objects within the structure, or both. This function works the same in data sharing environments as it does in non-data sharing environments. See Adding MVS systems to a sysplex for complete information about allowing structures to be altered automatically.

IRLM storage size

For data sharing, plan for additional IRLM storage to accommodate data sharing-specific locks called *P-locks*.

Tip: You can use the coupling facility structure sizer (CFSizer) tool to help you calculate CF structure storage sizes for Db2 data sharing. For more information, see "The CFSizer tool " on page 557.

P-locks are held on open page sets and on database descriptors (DBDs), skeleton cursor tables (SKCTs), and skeleton package tables (SKPTs). Unlike transaction locks, storage for P-locks is held even when no transaction activity exists; therefore they consume storage even with no transaction activity.

Plan also for the extra storage that IRLM needs to build retained locks in case other members fail. The following table shows the variables that you need to take into account.

Table 67. Variables that are used to estimate additional IRLM storage

Variable	Description	Calculation

X	P-locks [1]	N = (MAX_OPEN_DATA_SETS × 500)
		X = (N + (N × .40)

Y	Ability to hold update-retained locks for a failed member	Depends on the update intensity of the workload. Start with the following: Y = .25(X)(X)

Note:

1. The formula is based on the assumption that more than one P-lock might be held on a page set occasionally (such as for castout activity), and an estimate of about 40% for P-locks on the EDM pool objects and for short-lived page P-locks. If you know that the EDM pool has relatively few objects in it, you can use a lower percentage for that value. Estimate the maximum number of open data sets or use the value that is specified for the subsystem parameter DSMAX.

Related concepts

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related reference

DSMAX field (DSMAX subsystem parameter)
The DSMAX subsystem parameter specifies the maximum number data sets that can be open at one time.

Related information

IRLM priority setting

If IRLM priority is too low, storage might not be freed as quickly, and IRLM might run out of storage.

The IRLM address space priority, though it should remain high, should be lower than XCFAS.

Related information

IRLM storage use

Use the z/OS command MODIFY irlmproc,STATUS,STOR to see how much storage IRLM is using.
Related information

Storage estimate for the EDM pool in a data sharing environment

If you are planning to use data sharing, you should consider additional storage requirements for the EDM pool.

General guideline

You can use the storage estimates for your capacity planning.

For data sharing, you might need to increase your storage estimate by about 10% because of the way Db2 cross-invalidates database descriptors (DBDs). This percentage is just an estimate; the actual amount of the increase depends on how often you create, drop, and alter objects in the data sharing group.

Cross-invalidating items in the EDM pool

Db2 does not have a backup EDM pool in the coupling facility for invalidating objects in the EDM pool (DBDs, cursor tables, and more) because these objects are modified less frequently than database data. So, there is one EDM pool for each member. When a DBD changes, Db2 uses XCF messages to notify other members which are also using that DBD that new transactions should use the new DBD, which is read into the EDM pool. Thus, it is possible that one transaction is using the new DBD while other, currently running transactions are still using the old DBD. In other words, more than one copy of a DBD can exist in the EDM pool.

Reducing the storage impact

For CREATE, ALTER, or DROP statements, the DBD is not modified until a COMMIT is issued. You can significantly reduce the number of EDM versions by issuing CREATE, ALTER, or DROP statements within a single COMMIT scope. However, the exclusive lock on the DBD is held until the COMMIT.

Related concepts

Default database storage requirements
The size of the default database depends on column lengths, page sizes, and index column lengths. The estimated size of your data, multiplied by 2, usually provides an adequate planning estimate for the default database size.

Related tasks

Calculating EDM pool sizes
The environmental descriptor manager (EDM) controls areas of virtual storage that hold cached objects. These areas are called pools, and thus the term *EDM pool* is frequently used to describe these areas of virtual storage.

Before you enable Db2 data sharing

You must take certain actions to prepare your environment for Db2 data sharing.

Related concepts

Disabling and re-enabling Db2 data sharing
Disabling Db2 data sharing is a complex procedure and is very disruptive. Do not attempt to disable Db2 data sharing without a thorough understanding of the process.

Related tasks

Enabling Db2 data sharing
The enabling process allows an existing Db2 subsystem to be the originating member of a data sharing group; it does not allow you to change the subsystem name.

Migrating an existing data sharing group to Db2 11 conversion mode
If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

Related information

Connecting CICS to Db2 (optional)

Before you enable data sharing, connect CICS to each member. The CICS attachment facility command, DSNC STRT, lets you override the subsystem name on startup.

About this task

To connect Db2 to CICS, you must regenerate several CICS tables with additional entries. Coordinate this connection with your CICS support group.

Related information

Connecting Db2 to IMS (optional)

Before you enable data sharing, attach IMS to every member that runs IMS applications. IMS must include a separate member SSM for every member Db2.

About this task

Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

1. Make Db2 load modules available to IMS.
2. Define Db2 to IMS.
3. Define new programs and transactions to IMS.
4. Prepare IMS applications for Db2.
5. Depending on your site, you might also need to:
    - Define Db2 plans for IMS applications.
    - Generate a user language interface.

Registering the command prefixes, member group attachment name, and subgroup attachment name

Before you enable data sharing, register the command prefix for a member, the group attachment name, and the subgroup attachment name for the group.

Procedure

Use parameter library member IEFSSN*xx*. For example:

```
SUBSYS SUBNAME(ssname) INITRTN(DSN3INI)
   INITPARM('DSN3EPX,cmd-prefix<,scope<,group-attach<,subgroup-attach>>>')
```

By default, the subsystem definition does not include the subgroup attachment name. If you specify a value for SUBGRP NAME on installation panel DSNTIPK, the installation CLIST appends the name to the subsystem definition.

Recommendation: When you register the 1- to 8-character command prefix in parameter library member IEFSSN*xx* and specify the scope of the prefix, choose a scope of started (S). This specification lets all z/OS systems in a single PARMLIB member IEFSSN*xx* use all z/OS systems in the Parallel Sysplex. It also simplifies the task of moving a member from one system to another; you can stop Db2 on onez/OS system and start it on another. You do not need to re-IPL the system.

Results

The following sample definitions are examples of what might appear in the shared parameter library SYS1.PARMLIB:

```
DB1A,DSN3INI,'DSN3EPX,-DB1A,S,DB0A'
DB2A,DSN3INI,'DSN3EPX,-DB2A,S,DB0A,SBG1'
DB3A,DSN3INI,'DSN3EPX,-DB3A,S,DB0A,SBG1'
DB4A,DSN3INI,'DSN3EPX,-DB4A,S,DB0A,SBG2'
```

What to do next

If you need to change the command prefix parameters, you must change entry IEFSSN*xx* and re-IPL the host system. For example, if you want to change the command prefix scope from system-wide to Parallel

Sysplex-wide, and you want to register the prefix at Db2 startup, change the M in the entry to S before you re-IPL.

If you want to use multiple-character command prefixes, make sure that your automation programs can handle multiple-character prefixes in messages before you change the prefixes.

Related concepts

Group attachment names and subgroup attachment names
Group and subgroup attachments are used by TSO, CAF, RRSAF, JDBC, ODBC, and Db2 utilities connections to find active Db2 subsystems.

Related tasks

Migration step 13: Define Db2 11 to z/OS: DSNTIJMV
Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS, including updating members of SYS1.PARMLIB and SYS1.PROCLIB.

Increasing the size of the BSDS

Data sharing causes additional records to be written to the BSDS for member information.

About this task

Recommendations: To prevent the BSDS from expanding into secondary extents, change the size of the primary space allocation to 1500 records. This change is necessary only for members that have followed the recommended migration path from a previous Db2 version without altering that record size. New installations and member installations already do this for you.

Procedure

To increase the space allocation for the BSDS:

1. Rename existing BSDSs.
2. Define larger BSDSs with the original names.
3. Copy the renamed BSDSs into the new BSDSs.

Results

You can do this using access method services. To see the definition that is used for the BSDSs, see the installation job DSNTIJIN.

Increasing the size of the SYSLGRNX table space

The SYSLGRNX directory table space contains the relative byte address (RBA) ranges showing when data sets are open for updating.

About this task

Because more members open and close data sets in a data sharing configuration, this table space is likely to grow with the addition of each new member to the data sharing group. And if you choose to copy indexes, this table space can grow even more.

Consider increasing the frequency with which you remove rows from this table space, or increasing the size. To see the definition used for SYSLGRNX, see installation job DSNTIJIN.

Procedure

To increase the space allocation for SYSLGRNX, use access method services:

1. Stop the table space.
2. Rename the existing SYSLGRNX data set.
3. Define a larger SYSLGRNX data set with the original name.

4. Using only DSN1COPY, copy the contents of the renamed data set into the new SYSLGRNX data set.
5. Restart the table space.

Database design recommendation

You should partition table spaces as much as possible and use as much separation of I/O as possible.

Define table spaces and indexes with GBPCACHE CHANGED: It is unlikely that members that are processing a large query will repeatedly read the same pages, so those pages do not need to be cached in the group buffer pool. Define the relevant table spaces and indexes with GBPCACHE CHANGED (the default).

Related information

Application design planning for data sharing

Particular considerations apply to applications for use in Db2 data sharing environments.

CACHE option of CREATE SEQUENCE statement

The CACHE option of the CREATE SEQUENCE statement is a performance and tuning option that directs Db2 to preallocate a specified number of sequential values in memory.

GUPI Sequence objects provide unique, sequential, and numeric values to Db2 applications. Applications can use sequence numbers for a variety of purposes, including the avoidance of concurrency and performance problems that can result when applications generate their own sequence numbers. Unlike application-generated sequences, Db2 sequence objects allow multiple transactions to concurrently increment the sequence number, and Db2 guarantees that each sequential value is unique. Db2 does not wait for a transaction that has incremented a sequence to commit before allowing the sequence to be incremented by another transaction. No retained locks are held to prevent access to the sequence.

Every time a cache is allocated, the SYSIBM.SYSSEQUENCES table is updated and a forced log record is written for the update. Using ORDER or NO CACHE will result in a SYSIBM.SYSSEQUENCES table update and the associated forced log write every time a new value is generated by Db2. Specifying CACHE provides faster access to the sequence since values are assigned from the cache. It also reduces the number of SYSIBM.SYSSEQUENCES updates and the associated forced log records. The SYSIBM.SYSSEQ table space is defined with the MAXROWS(1) attribute in order to minimize page P-lock contention in a data sharing environment as the SYSIBM.SYSSEQUENCES table gets updated.

Db2 always generates sequence numbers in order of request. However, when a sequence is shared across multiple members of a data sharing group, each Db2 member allocates its own cache of unique consecutive numbers for the sequence. Therefore, in situations where transactions from different members are requesting the next sequence number from the same sequence, values assigned for the sequence across multiple Db2 members may not be in strict numeric order.

For example, assume that members DB2A and DB2B share a sequence named SEQ1 that starts with 1, increments by 1, and has cache = 20.

If the transaction that is associated with DB2A makes the first request for a sequence number, DB2A allocates a cache of 20 values (from 1 to 20) and the value of 1 is provided to the application. If the transaction that is associated with DB2B makes the next request for a sequence number, DB2B allocates its own cache of 20 values (from 21 to 40) and the value of 21 is provided to the application.

Assuming that sequence number requests continue to arrive from the transactions that are associated with members DB2A and DB2B in this manner (one from DB2A and then one from DB2B), the values assigned for that sequence are 1, 21, 2, 22, 3, 23, and so on. Although the numbers are in sequence within each Db2, the numbers assigned across multiple Db2 members are not in strict numeric sequence.

In a data sharing environment, using the ORDER or NO CACHE option ensures that the values assigned to a sequence which is shared by applications across multiple Db2 members are in strict numeric order. In a data sharing environment, if ORDER is specified, then NO CACHE is implicit even if CACHE n is specified.

In a non-data sharing environment, the numbers are always assigned in strict numerical order, even if NO ORDER is specified; so specifying ORDER or NO CACHE is not necessary.

Important: Specifying ORDER or NO CACHE in a data sharing environment, or NO CACHE in a non-data sharing environment, is not recommended because it will result in a SYSIBM.SYSSEQUENCES table update and the associated forced log record for each value generated by Db2. This can lead to an excessive amount of log write I/Os, which can drastically reduce the log write bandwidth.

GUPI

Related information

Applications using CICSPlex System Manager

CICSPlex® System Manager (CICSPlex SM) is a system-management tool that lets you manage several Customer Information Control System (CICS) systems as if they were one.

The dynamic transaction routing program that is supplied with CICSPlex SM balances the enterprise workload dynamically across the available application owning regions. CICSPlex SM lets you manage a variable workload without operator intervention and maintains consistent response times. It can do this because it routes transactions away from busy regions and from those that are failing or likely to fail, which improves throughput and conceals problems from users.

Storm-drain effect

In some situations, your Db2 applications must be sensitive to a resource-unavailable condition.

For example, assume that a database is stopped for planned maintenance, and that the application receives SQLCODE -904 from the system and ends normally. If your application ignores the SQLCODE -904 message, CICSPlex SM might continue to route work to the stopped system because it appears to complete its work rapidly. This is sometimes called the *storm-drain* effect.

When both of the following conditions are true, the storm drain effect can occur:

- The CICS attachment facility is down.
- You are using INQUIRE EXITPROGRAM to avoid AEY9 abends.

Again, because there has not been an abend, it appears as if work completes rapidly at that subsystem.

How a CICS exit routine can avoid the storm-drain effect

You can write a resource manager interface program exit routine, XRMIOUT, to avoid the storm drain effect caused by SQLCODE -904 (resource unavailable). This exit routine does not avoid the storm-drain problem caused by using INQUIRE EXITPROGRAM to avoid AEY9 abends.

About this task

GUPI Using XRMIOUT, you can intercept the return from the resource manager. The exit routine can determine whether:

- The resource manager is Db2.
- SQLCODE -904 is in the SQL communication area (SQLCA).

If these conditions exist, abend the transaction instead of ending the transaction normally.

To determine if Db2 is the resource manager, compare 'DSNCSQL' with the value stored at the address that is included with the UEPTRUEN parameter that is passed to XRMIOUT, as shown in the following figure.

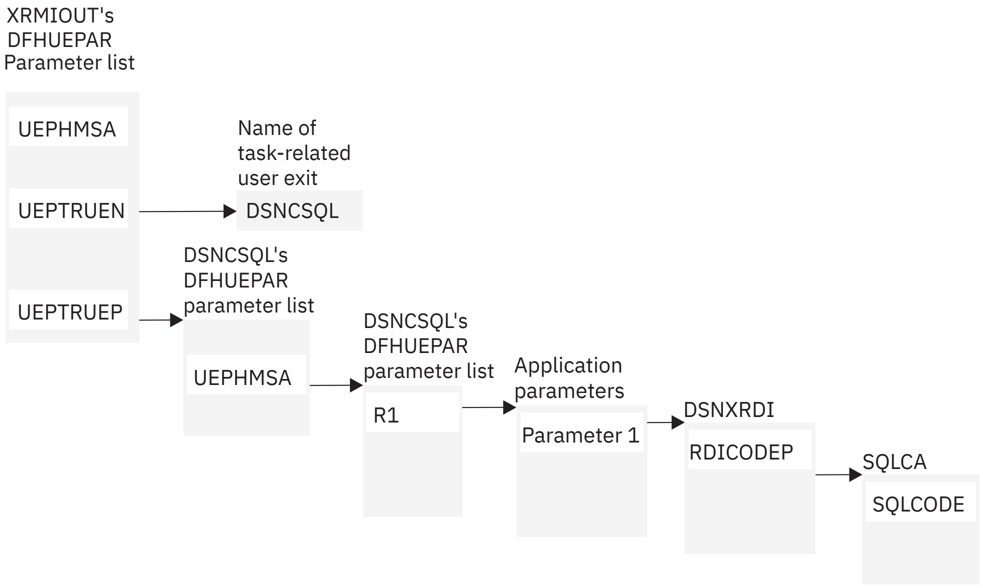


Figure 82. Pointers to resource manager name and SQLCODE

Procedure

To find the SQLCODE:

1. Find UEPTRUEP in the DFHUEPAR parameter list that is passed to XRMIOUT. UEPTRUEP contains the address of the DFHUEPAR parameter list that is passed to DSNCSQL.
2. Find UEPHMSA in DSNCSQL's DFHUEPAR parameter list. UEPHMSA points to the register save area that contains the application's registers.
3. Find register 1 in the register save area. Register 1 contains the address of the application parameters.

   The DSNXRDI macro maps the application parameters that are passed by the precompiler to Db2. The mapping macro is contained in the data set library prefix.SDSNMACS.
4. Find RDICODEP in the DSNXRDI structure. RDICODEP contains the address of the SQL communication area (SQLCA).
5. Find the SQLCODE.

   GUPI

Related reference

Exit XRMIOUT (CICS Transaction Server for z/OS)

Related information

A CICS enhancement that avoids the storm-drain effect

The CICS Transaction Server for z/OS helps you avoid the storm-drain effect. With the CICS Transaction Server for z/OS, you do not need to use XRMIOUT to check for resource unavailable conditions.

CICS Transaction Server for z/OS also lets you benefit from the INQUIRE EXITPROGRAM command without causing the storm-drain effect.

Related information

INQUIRE EXITPROGRAM (CICS Transaction Server for z/OS)

Order-dependent transactions

In limited cases, one transaction, called an originating transaction, updates Db2 data with INSERT, UPDATE, or DELETE. Before completing phase 1 of the commit process, the originating transaction spawns a second transaction that is dependent on the updates of the first transaction. These types of transactions are referred to as *order-dependent transactions*.

Description of the problem

In some situations, a dependent transaction can encounter a "row not found" condition that does not occur in non-data sharing environments. Even in non-data sharing environments, dependent transactions need to tolerate the "row not found" condition in cases where the originating transactions roll back.

When the problem might occur

The "row not found" condition can occur if all of the following conditions are true:

- The originating transaction spawns a dependent transaction before it completes phase 1 of the commit process.
- The dependent transaction runs on a different member than the member on which the originating transaction runs.

  Because each member has its own local buffer pools, the uncommitted buffered pages that are updated by the originating transaction are not immediately visible to the dependent transaction.
- The dependent transaction attempts to access a row that was updated by the originating transaction.
- The dependent transaction is not bound with an isolation level of repeatable read.

Preventing the problem

To prevent these periodic "row not found" situations, consider using the IMMEDWRITE(YES) option of the BIND and REBIND commands for plans or packages that spawn dependent transactions that might run on other members. You can also use the IMMEDWRI subsystem parameter. IMMEDWRITE(YES) means that Db2 writes the page as soon as the buffer update completes. Db2 writes the data to one of the following structures or devices:

- The group buffer pool
- Disk storage for GBPCACHE NO group buffer pools
- Disk storage for GBPCACHE NONE page sets
- Disk storage for GBPCACHE SYSTEM page sets

The IMMEDWRI parameter (IMMEDIATE WRITE field on installation panel DSNTIP8) can override the value of the IMMEDWRITE bind option on a data sharing member. The following table illustrates the implied hierarchy when using the IMMEDWRI subsystem parameter and the IMMEDWRITE option of the BIND and REBIND commands.

Table 68. The implied hierarchy of the immediate write option

IMMEDWRITE bind option	IMMEDWRI subsystem parameter	Value at run time
NO	NO	NO
NO	YES	YES
YES	NO	YES
YES	YES	YES

Note: YES always has precedence whether it is defined by the subsystem parameter or the bind option. Updated pages that are group buffer pool-dependent are written at, or before, phase 1 of the commit process.

The following alternatives can help solve the order-dependent transaction problem:

- Ensure that the originating transaction does not schedule the dependent transaction until the originating transaction has completed phase 1 of commit.
- Run the dependent transaction with an isolation level of repeatable read.
- If the dependent transaction is currently running with an isolation level of cursor stability AND CURRENTDATA(NO), changing it to use CURRENTDATA(YES) can sometimes solve the problem.
- Add statement retry logic to handle the return of a "row not found" condition.
- Run the dependent transaction on the same member as the originating transaction.

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Binds of plans and packages that move to a new machine

You do not need to rebind a plan or package to run it on a data sharing group.

However, if you are moving to a new machine that has different performance characteristics (moving from a System/390® microprocessor to a z/Series microprocessor cluster, for example), it is to your advantage to rebind plans and packages on the machine on which they will be running.

Related information

Strategy for creating a Db2 data sharing group

When you create a data sharing group, add one member at a time. You can install a new Db2 for the first member (the *originating member*), or you can enable an existing Db2 subsystem as the originating member.

Before you begin

Familiarize yourself with the information in "Planning for Db2 data sharing" on page 522.

About this task

Enabling Db2 data sharing is a big step. Carefully plan your strategy because data sharing is difficult to disable after it is enabled. Disabling should only be considered if your long-term plans are to disable data sharing. During migration, test other major new capabilities in the new release on a single system before enabling data sharing, and then build and try a test data sharing group. When you are ready to begin a move to production, you must avoid having to fall back to the previous release.

Tip: Db2 target library and distribution library data sets can be shared among all members of a data sharing group. Sharing these libraries reduces the effort of installing and maintaining the different members of the data sharing group. Sharing libraries can also help ensure that members are using the same exit routines. Also, sharing libraries simplifies the tasks of defining a new member to a data sharing group. The member installation process supports sharing of the libraries.

Procedure

Follow this general strategy for creating a data sharing group:

1. Build and try a test data sharing group. Here is one approach to testing your data sharing group:
   a) Install Db2 11 as a single system, and test it with dummy data, or copies of production data, in order to test some of the new capabilities. Run old applications and begin new application development work. In the meantime, prepare the hardware and define the coupling facility structures to enable data sharing.
   b) Enable data sharing on the test system.

      You have a single-system data sharing group at this point, and this can help you find any initial configuration problems. Make sure that old applications work in this environment.
   c) Install additional members in the test group. Run applications from different members in the group to fully exercise the group buffer pools and cross-system locking.
2. Move to production.

   When you are ready to move to production complete the following steps:
   a) If your originating member is not already migrated to Db2 11, migrate it from Db2 10 to Db2 11.

      Recommendation: Wait until your system is stable before enabling data sharing . You can enable data sharing on your existing release and then migrate to Db2 11, but it is not recommended, particularly if you plan to migrate soon. If you are in the process of migrating, wait until Db2 11 enters new-function mode before you move to the data sharing mode.
   b) Verify that the your Db2 11 system is stabilized in new-function mode. Once the system is stabilized, you can begin using new functions.
   c) Tune applications to contain the level of locking and lock contention rates.

      To reduce the effects of locking contention in a data sharing environment, first control locking costs in a non-data sharing environment. This gives you a baseline from which to perform further tuning after the move to data sharing.

d) Enable data sharing on the originating member, and run applications on this one-member data sharing group.

e) Install additional members as needed.

Related information

Subsystem parameters and application defaults in a data sharing environment

In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

Specifying the subsystem parameter load module for a member

Every member of a data sharing group must have its own unique load module for subsystem parameters (sometimes called DSNZPARM in a non-data sharing environment).

About this task

The load module for subsystem parameters is built by job DSNTIJUZ and stored in the *prefix*.SDSNEXIT target library. Every member must use a different name for its parameter load module because the *prefix*.SDSNEXIT target library can be shared among all members of the data sharing group. The installation process requires that you provide the name of the load module for a member.

Recommendation: Name each member's load module using the convention DSNZP*xxx*, where *xxx* includes the number in the member name and the group identifier. For example, DB1A's subsystem parameter load module could be named DSNZP01A.

The subsystem parameter load module name for a member is an optional parameter on the EXEC statement in the JCL procedure that is used to start the system services address space (*ssnm*MSTR). This optional parameter provides support for an operator (or automated operations) not specifying the subsystem parameter load module name when starting a member.

Procedure

Specify the load module name in the EXEC statement of the *ssnm*MSTR JCL procedure in SYS1.PROCLIB as follows:

```
//IEFPROC EXEC PGM=DSNYASCP,PARM='ZPARM(DSNZPxxx)',...
```

Related tasks

Tailoring Db2 11 installation and migration jobs with the CLIST
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

The scope and uniqueness of Db2 subsystem parameters in data sharing

Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

The values of most parameters do not need to be unique. Recommendations are offered for some of these parameters. In the following tables, the parameter is indicated by the name of the corresponding installation panel field. However, some of the parameters do not reside in the DSNZP*xxx* load module.

Parameter values that must be different on each member

The list below shows the values of the installation panel fields that must be different for every member of a data sharing group. You specify values for these fields when a member is installed, migrated, or updated.

- Active Logs: COPY 1 PREFIX
- Active Logs: COPY 2 PREFIX
- Archive Logs: COPY 1 PREFIX (ARCPFX1 parameter)
- Archive Logs: COPY 2 PREFIX (ARCPFX2 parameter)
- Bootstrap Data Sets : COPY 1 NAME
- Bootstrap Data Sets : COPY 2 NAME
- COMMAND PREFIX
- Db2 NETWORK LUNAME
- MEMBER IDENTIFIER
- MEMBER NAME
- PARAMETER MODULE
- PROC NAME
- RESYNC PORT
- SUBSYSTEM NAME
- SUBSYSTEM SEQUENCE
- SUBSYSTEM NAME (IRLM)
- WORK FILE DB

Parameter values that must be the same on every member

The list below shows the installation panel fields that must have the same values for every member of the data sharing group.

- APPL COMPAT LEVEL
- AUTH EXIT CACHE REFR
- AUTH EXIT CHECK
- CATALOG ALIAS
- COMPRESS_SPT01 parameter in macro DSN6SPRM
- DEL CF STRUCTS
- DBADM CREATE AUTH
- Db2 LOCATION NAME
- DESCRIBE FOR STATIC
- DIRECTORY AND CATALOG DATA
- DIRECTORY AND CATALOG INDEXES
- DRDA PORT
- EVALUATE UNCOMMITTED
- EXTENDED SECURITY
- GROUP ATTACH
- GROUP NAME
- INDEX SPACE ALLOCATION
- IRLM XCF GROUP NAME
- INSTALL DD CONTROL SUPT

- LIKE BLANK INSIGNIFICANT
- MAX UTILS PARALLELISM
- MINIMUM DIVIDE SCALE
- OBJECT CREATE FORMAT
- PAD INDEXES BY DEFAULT
- PERCENT FREE FOR UPDATE
- REAL TIME STATS
- REVOKE DEP PRIV
- SECURE PORT
- SITE TYPE
- SKIP UNCOMM INSERTS
- STATISTICS FEEDBACK
- STATISTICS HISTORY
- STATISTICS ROLLUP
- SYSTEM ADMIN 1
- SYSTEM ADMIN 2
- SYSTEM OPERATOR 1
- SYSTEM OPERATOR 2
- SECURITY ADMIN 1
- SEC ADMIN 1 TYPE
- SECURITY ADMIN 2
- SEC ADMIN 2 TYPE
- SEPARATE SECURITY
- TABLE SPACE ALLOCATION
- TEMPLATE TIME
- TCP/IP ALREADY VERIFIED
- TRACKER SITE
- UNICODE IFCIDS
- UTILITY OBJECT CONVERSION
- VARY DS CONTROL INTERVAL

Other recommendations

The table below shows the installation panel fields that can have the same or different values for members of a data sharing group.

Table 69. Recommended values for installation panel fields

Installation panel field (parameter) name	Recommendation
DEALLOC PERIOD	Do not archive to tape. If you must, however, you should specify 0 for this parameter unless you intend to run all RECOVER jobs from the same member. Specifying a deallocation delay means that the tape is not available to any other member until the deallocation time expires.

Table 69. Recommended values for installation panel fields (continued)

Installation panel field (parameter) name	Recommendation
DEFAULT 4-KB BUFFER POOL FOR USER DATA DEFAULT 8-KB BUFFER POOL FOR USER DATA DEFAULT 16-KB BUFFER POOL FOR USER DATA DEFAULT 32-KB BUFFER POOL FOR USER DATA DEFAULT BUFFER POOL FOR USER LOB DATA DEFAULT BUFFER POOL FOR USER XML DATA	For consistent results when creating objects on different members, make this default the same on all members.
DEFAULT BUFFER POOL FOR USER INDEXES	For consistent results when creating objects on different members, make this default the same on all members.
DEVICE TYPE 1DEVICE TYPE 2	Archive the first copy of the log to disk.
DISABLE EDM RTS	For consistent results, make the value of this subsystem parameter the same on all members.
EDM LIMIT BELOW THE BAR	If you are migrating from a previous version, change the default value of 0 to the EDMPOOL value that you used in your previous version.
IMMEDIATE WRITE (IMMEDWRI parameter)	
READ COPY2 ARCHIVE	This option should have the same value (either YES or NO) for all members of the group. Otherwise, the parameter, as it is set on the member that owns the archive log data set, determines which copy is used.
READ TAPE UNITS	Do not archive to tape. If you must, however, it is vital that you have enough tape units allocated to the member doing the recovery to merge the archive logs from **all** members in the group that have updated the object being recovered. Thus, if there are eight members in the group, make sure you specify at least eight on this panel for each member.
RECORDING MAX	All members should use the maximum value of 10000, making it easier to transfer a workload from one member to another.
RETAINED LOCK TIMEOUT	If you have automatic restart, or some other restart automation that quickly restarts failed members, choose a non-zero value for this parameter.
START IRLM CTRACE	Diagnostic traces should be activated for all members of the group. The negligible performance overhead is outweighed by the benefit of easier problem resolution. Only those systems that have reached the limits of processor capacity should consider not automatically activating these traces.

Related concepts

Order-dependent transactions
In limited cases, one transaction, called an originating transaction, updates Db2 data with INSERT, UPDATE, or DELETE. Before completing phase 1 of the commit process, the originating transaction spawns a second transaction that is dependent on the updates of the first transaction. These types of transactions are referred to as *order-dependent transactions*.

Related reference

Directory of subsystem parameters, panel fields, and application default values
Subsystem, installation panel fields, and application default values are settings that apply to an entire Db2 subsystem. Most but not all subsystem parameters correspond to installation panel fields. Also, some panel fields do not correspond to a subsystem parameter.

Subsystem parameters that are not on installation panels

Some subsystem parameters are defined by job DSNTIJUZ and are not associated with fields on any installation panels.

Related information

Updating subsystem parameters for a member

No group-wide subsystem parameters can be updated; however, you can update the subsystem parameters for an individual member.

Procedure

Specify the following installation option on the DSNTIPA1 installation panel:

```
INSTALL TYPE ===> UPDATE
```

This option updates parameters for the member.

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Related reference

DSNTIPA1 or DSNTILA1: Main panel
The entries on the Main panel control input to and output from the installation CLIST.

Application defaults parameters

An application defaults load module, *dsnhdecp*, is generated as part of installing or migrating Db2. In a data sharing environment, this module is generated only for the first member that is installed or migrated.

If you provide a separate *dsnhdecp* module for each member, use the same *dsnhdecp* settings (except for the SSID parameter) for all members of the data sharing group. If you provide a separate *dsnhdecp* module for each member, after Db2 enters new-function mode, identify the jobs that you use to maintain those *dsnhdecp* modules. You must modify those jobs to specify NEWFUN=V11, and then run those jobs.

Related concepts

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Installing a new data sharing group

Although you can install and immediately enable Db2 data sharing on a new Db2 11 member, you should do so only in low-risk situations. The recommended approach is to migrate to, or install, a Db2 11 member, use it for a while, and then enable data sharing.

Before you begin

Familiarize yourself with the following information:

- “Planning for Db2 data sharing” on page 522
- “Strategy for creating a Db2 data sharing group” on page 577

About this task

If you decide to install and immediately enable data sharing on a new Db2 11 member, that member becomes the *originating member* of the data sharing group. This member's Db2 catalog is used as the Db2 catalog for the entire data sharing group.

Procedure

To install a new data sharing group:

1. Run the installation CLIST as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39. Then on installation panel DSNTIPA1, specify the following values.

   ```
   INSTALL TYPE ===> INSTALL
   DATA SHARING ===> YES
   ```

2. On installation panel DSNTIP0A, specify option 1 to indicate the group data sharing function.

   ```
   | DSNTIP0A                       |
   |                                |
   |  DATA SHARING FUNCTION:        |
   |                                |
   |  Select one.                   |
   |          1 1. Group            |
   |            2. Member           |
   |            3. Enable           |
   ```

3. On installation panel DSNTIPK, specify:

   ```
   GROUP NAME   ===> group name
   MEMBER NAME  ===> originating member name
   ```

   Verify that the *originating member name* is unique within the z/OS Parallel Sysplex. Installation job DSNTIJMV edits the *ssnm*MSTR startup procedure with the group name and member name you specify here.
4. Complete the installation panels and specify all of the parameters.
5. Complete the installation of Db2 by following the installation steps in Chapter 5, “Installing Db2 11,” on page 359.
6. Run the installation verification procedures (IVP).

Related concepts

Subsystem parameters and application defaults in a data sharing environment
In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Related tasks

Naming in Db2 data sharing
By maintaining a consistent naming convention, you can simplify the process of naming the many items in a Db2 data sharing environment. You also simplify the management of name changes, as you add new members or move existing members to different systems in the future.

Enabling Db2 data sharing
The enabling process allows an existing Db2 subsystem to be the originating member of a data sharing group; it does not allow you to change the subsystem name.

Related reference

DSNTIPA1 or DSNTILA1: Main panel

The entries on the Main panel control input to and output from the installation CLIST.

DATA SHARING field (DSHARE subsystem parameter)
The DSHARE subsystem parameter controls whether the data sharing function is to be used.

Enabling Db2 data sharing

The enabling process allows an existing Db2 subsystem to be the originating member of a data sharing group; it does not allow you to change the subsystem name.

Before you begin

Familiarize yourself with the following information:

- "Planning for Db2 data sharing" on page 522
- "Strategy for creating a Db2 data sharing group" on page 577

About this task

Important: If you use a product that uses IFCID 0306 to read log data, consult the documentation for that product for information about disabling and re-enabling data sharing.

Tip: You can use a variation of this process to rename data sharing members. For more information, see "Renaming data sharing members" on page 541.

Important: If the RBA for a non data sharing Db2 subsystem reaches or exceeds the hard or soft limit, you must either convert all table spaces and indexes to the 10-byte format or use the RBA reset procedure. Enabling data sharing is not sufficient to resolve the problem.

Procedure

To enable Db2 data sharing, complete the following tasks:

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Related tasks

Installing Db2 11
Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Migration step 9: Stop Db2 10 activity
Before making Db2 11 conversion mode operational, ensure that all work is stopped on the Db2 10 subsystem.

Running the CLIST for enabling data sharing

The process of enabling data sharing involves running some of the installation jobs. Before you run the installation jobs, tailor them to your environment by running the installation CLIST.

About this task

The enabling CLIST tailors the following jobs:

- DSNTEJ0
- DSNTEJ1
- DSNTEJ1L
- DSNTEJ1P
- DSNTEJ1S
- DSNTEJ1T
- DSNTEJ1U
- DSNTEJ2A
- DSNTEJ2C
- DSNTEJ2D
- DSNTEJ2E
- DSNTEJ2F
- DSNTEJ2H
- DSNTEJ2P
- DSNTEJ2U
- DSNTJE3C
- DSNTEJ3M
- DSNTEJ3P
- DSNTEJ4C
- DSNTEJ4P
- DSNTEJ5A
- DSNTEJ5C
- DSNTEJ5P
- DSNTEJ6
- DSNTEJ6D
- DSNTEJ6O
- DSNTEJ6P
- DSNTEJ6R
- DSNTEJ6S
- DSNTEJ6T
- DSNTEJ6U
- DSNTEJ6V
- DSNTEJ6W
- DSNTEJ6Z
- DSNTEJ61
- DSNTEJ62
- DSNTEJ63
- DSNTEJ64
- DSNTEJ65
- DSNTEJ66
- DSNTEJ67
- DSNTEJ7
- DSNTEJ71
- DSNTEJ73
- DSNTEJ75
- DSNTEJ76
- DSNTEJ77
- DSNTEJ78
- DSNTESA
- DSNTESC
- DSNTESD
- DSNTESE
- DSNTESH
- DSNTIJCB
- DSNTIJDE
- DSNTIJFT
- DSNTIJGF
- DSNTIJIN
- DSNTIJMV
- DSNTIJTM
- DSNTIJUZ
- DSNTIJVC
- DSN8ES1
- DSN8ES2

The enabling CLIST also edits the DB2I CLISTs.

Procedure

To tailor the installation jobs for enabling data sharing:

1. Invoke the installation CLIST as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.
2. On installation panel DSNTIPA1 specify the following field values.

```
INSTALL TYPE       ===> INSTALL
DATA SHARING       ===> YES

INPUT MEMBER NAME  ===> input member for originating member
OUTPUT MEMBER NAME ===> new output member
```

3. On installation panel DSNTIP0A, specify option 3 to enable data sharing.

```
| DSNTIP0A                        |
|                                 |
|  DATA SHARING FUNCTION:         |
|                                 |
|  Select one.                    |
|          3 1. Group             |
|            2. Member            |
|            3. Enable            |
```

4. On installation panel DSNTIPK, specify:

```
GROUP NAME  ===> group name
MEMBER NAME ===> originating member name
```

   Verify that the *originating member name* is unique within the z/OS Parallel Sysplex. Installation job DSNTIJMV edits the *ssnm*MSTR startup procedure with the group name and member name that you specify here.

5. Complete the remaining installation panels, specifying parameters according to the Db2 subsystem parameters guidelines.

Related concepts

Subsystem parameters and application defaults in a data sharing environment

In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Stopping Db2 activity

Before running any installation jobs to enable data sharing, ensure that all work is stopped on the subsystem that you chose to be the originating member.

Procedure

To stop work on Db2:

1. Issue the following command, where *-DSN1* is the subsystem command prefix that is defined for Db2.

   You must have system administrator (SYSADM) or system operator (SYSOPR) authority to issue this command.

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   The QUIESCE keyword allows Db2 to complete the processing of programs that are currently executing. This might require some processing time.
2. Issue the following command to allow only the system administrators and system operators that were defined during installation to access Db2:

   GUPI

   ```
   -DSN1 START DB2 ACCESS(MAINT)
   ```

   GUPI

   If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. For example, if the bootstrap data set (BSDS) does not match the subsystem parameter values, ensure that the correct jobs were run for DSNTIJUZ. Ensure that you started Db2 with the correct subsystem parameter option.
3. Follow these steps to ensure that all Db2 10 work is stopped:

   - Make sure no units of recovery remain. Issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY THREAD(*) TYPE(*)
     ```

     GUPI

     Then use -DSN1 RECOVER INDOUBT for any indoubt threads.
   - Ensure that all utilities are completed or terminated. To ensure that no utility work remains, issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY UTILITY(*)
     ```

GUPI

After you have determined the utilities that are running, you can let them complete processing or you can terminate the utility. To stop all utilities, issue the following command:

```
-DSN1 TERM UTILITY(*)
```

- Ensure that no table spaces and index spaces in the Db2 directory (DSNDB01) or the Db2 catalog (DSNDB06) have write error ranges or deferred restart states. To determine existing restrictions, issue the following commands:

  GUPI

  ```
  -DSN1 DISPLAY DATABASE(DSNDB01) SPACENAM(*) RESTRICT
  -DSN1 DISPLAY DATABASE(DSNDB06) SPACENAM(*) RESTRICT
  ```

  GUPI

  You must have system administrator or system operator authority (specified on installation panel DSNTIPP1) to issue this command.

  Recover any table spaces and index spaces that have write error ranges or deferred restart states by using the RECOVER utility.

4. Stop Db2by issuing the following command:

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   A user with installation system administrator (installation SYSADM) or installation system operator (installation SYSOPR) authority must enter this command.

Related information

Identifying Db2 to z/OS: DSNTIJMV

Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS. These steps include updating members of SYS1.PARMLIB and SYS1.PROCLIB and creating Language Environment options data sets for the Db2 core WLM environment for Java routines.

Before you begin

Tip: Edit the updates directly in SYS1.PARMLIB instead of submitting the updates in the DSNTIJMV step. For SYS1.PROCLIB, submit the procedure-update section of job DSNTIJMV. Before you make the updates, read the following information and examine job DSNTIJMV to study the updates that it makes. Then use an editor such as ISPF/PDF to make the updates to SYS1.PARMLIB.

About this task

Do not overwrite the entries for Db2 and IRLM in the program properties table (PPT). Note that PPT entries should no longer be defined in SYS1.PARMLIB(SCHED*xx*). Default entries are supplied in the SYS1.LINKLIB(IEFSDPPT) load module, which is provided by z/OS. For details of the PPT entries, see Program properties table (PPT) (MVS Initialization and Tuning Reference).

Procedure

To define Db2 to z/OS:

1. Run job DSNTIJMV.

If job DSNTIJMV runs successfully, it produces return codes of 0.

2. Review the content of the Language Environment options data set and adjust the following environment variables as needed. The data set is created by DSNTIJMV and must be allocated by the JAVAENV DD of the address space procedure for the Db2 core WLM environment for Java routines.
   - _CEE_ENVFILE if present, must be set to the name and path of the environment variable file that was created by job step DSNTIJR.
   - JVMPROPS needs to be set to the name and path of the JVM startup options file that was created by job step DSNTIJS.
   - DB2_BASE and JCC_HOME need to be set to the names of the HFS directories that you selected for the Db2 for z/OS and JCC product classes.

What to do next

z/OS requirements: Each Db2 and each IRLM that you define to z/OS in the IEFSSN*xx* PARMLIB member requires a z/OS system linkage index (LX). The default number of these indexes that z/OS reserves is 165. If you place all of your Db2 and IRLM subsystem definitions in a single IEFSSN*xx* member, you might need more than 165 LXs; otherwise, your subsystems might not start. If you need more than 165 LXs, use the NSYSLX option on the z/OS IEASYS*xx* PARMLIB member to increase this number.

For later diagnosis of IRLM problems, also ensure that the following requirements are met:

- Specify the IRLM dump formatting modules DXRRLM50, DXRRLM55, and DXRRLS55 in a BLSCUSER member in a data set that is in the system's PARMLIB concatenation.
- Copy the DXRRL186, DXRRLFTB, DXRRLM50, DXRRLM55, and DXRRLS55 modules from the IRLM SDXRRESL data set to a data set in the system's link list. Or, add the SDXRRESL data set to the system's link list in a PROG*xx* member of a data set in the system's PARMLIB concatenation. If you use more than one level of IRLM, you will need to use a STEPLIB concatenation when using IPCS to process dumps that are taken for the levels whose modules are not in the link list.

Additional changes to SYS1.PARMLIB and SYS1.PROCLIB: Because different sites have different requirements for identifying Db2 to z/OS, job DSNTIJMV cannot anticipate all the necessary updates. For this reason, the updates that job DSNTIJMV makes to SYS1.PARMLIB and SYS1.PROCLIB might be incomplete. You might have additional procedures of your own to rename. You can complete these updates either by making the updates directly in SYS1.PARMLIB and SYS1.PROCLIB, or by editing DSNTIJMV.

Related information

Altering the current active log data sets: DSNTIJIN

When job DSNTIJIN is tailored for enabling a Db2 subsystem to become the originating member of a new data sharing group, it does not define any data sets. It only alters the member’s active log data sets to use SHAREOPTIONS (2 3).

Procedure

Run job DSNTIJIN.

If DSNTIJIN runs successfully, it produces return codes of 0. Check any VSAM messages carefully.

Related information

Defining Db2 initialization parameters: DSNTIJUZ

Job DSNTIJUZ generates the Db2 data-only load module DSNHMCID, the application defaults load module (*dsnhdecp*), and the subsystem parameter module. The application defaults load module is the name that was specified for the APPL DEFAULTS field on installation panel DSNTIPO3. The subsystem parameter module is the name that was specified for the PARAMETER MODULE field on installation panel DSNTIPO3.

About this task

Job DSNTIJUZ also executes the change log inventory utility (DSNJU003), which updates the bootstrap data set (BSDS) to enable Db2 data sharing.

Procedure

To define Db2 initialization parameters:

1. Verify that data sets that are allocated by the SYSLMOD DD statements of this job are also allocated by the STEPLIB DD statements of the DSNMSTR address space for Db2.
2. Insert the DSPREFIX value after SDSNLOAD.
3. Run job DSNTIJUZ.

   If you want DSNTIJUZ to establish SMP/E GENASM entries in the Db2 system parameter (DSN6*xxxx*) and application defaults module macros, you need to uncomment job step DSNTIMQ. Advanced SMP/E skills are recommended for users of job step DSNTIMQ. Read the job step prolog before proceeding. You might receive message GIM65001 when you run steps DSNTLOG and DSNTIMQ, or you might receive a return code of 4 when you run step DSNTIMQ. You can ignore these messages.
4. If job DSNTIJUZ fails or abends, correct the problem and rerun the job.

Related reference

PARAMETER MODULE field
The value of the PARAMETER MODULE field specifies the member name of the load module that is to be used for Db2 subsystem parameters.

APPL DEFAULTS field
The value of the APPL DEFAULTS field specifies the member name of the load module that is to be used for Db2 application default values.

Recording Db2 data to SMF (optional)

When you enable Db2 data sharing, you can specify whether Db2 statistical, accounting, and audit trace data is to be collected.

Procedure

To specify the data that is to be collected:

1. Choose from the following options:

Option	Description
To have Db2 collect statistical information	Accept the default (YES class 1) for the SMF STATISTICS option on installation panel DSNTIPN. To collect statistical information for deadlock or timeout, specify class 3. To collect information about DDF error conditions, specify class 4.
To have Db2 collect accounting information	Accept the default (1) or specify * (all classes) for the SMF ACCOUNTING option on installation panel DSNTIPN.
To have Db2 collect auditing information	Specify * (all classes) for the AUDIT TRACE option on installation panel DSNTIPN.

   In all cases, Db2 invokes a trace, passing the data it collects to the System Management Facility (SMF) of z/OS.

   Db2 also passes performance data to SMF whenever an accounting, statistics, or audit trace is successfully started or stopped. Db2 can also record other performance data. After you complete the installation process, you can use commands to have Db2 record performance data for subsystem events.

2. If, during installation, you requested that Db2 pass accounting and statistics data to SMF, update the SMFPRM*xx* member of SYS1.PARMLIB as follows:
   - Specify the ACTIVE parameter.
   - Specify STC,NODETAIL for the SUBSYS parameter.
   - Specify the proper TYPE subparameter of the SYS and SUBSYS parameters.

What to do next

During Db2 execution, you can use the SMF SET or SS command to alter the SMF parameters. For example, you can record the statistics trace class 1 IFCIDs 0001, 0002, and 0202 (SMF record type 100); accounting trace class 1 IFCIDs 0003 and 0239 (SMF record type 101); and all other Db2 trace records (SMF record type 102) to SMF. To record this information, issue the following command:

```
SYS(TYPE(100:102))
```

For Db2 to pass data to SMF, you must allocate an adequate supply of SMF buffers. The default buffer settings are probably insufficient.

You can specify SMF buffering on the VSAM BUFSP parameter of the Access Method Services DEFINE CLUSTER statement. Do not use the default settings if Db2 data is sent to SMF. Specify CISZ(4096) and BUFSP(81920) on the DEFINE CLUSTER statement for each SMF VSAM data set. These values for CISZ and BUFSP are the minimum requirement for Db2. You might need higher values for CISZ and BUFSP, depending on the requirements of all your z/OS subsystems.

You can also code an IEFU84 SMF exit routine to process the records that are produced.

Related reference

z/OS MVS Initialization and Tuning Guide

Related information

z/OS MVS Initialization and Tuning Reference

Connecting Db2 to TSO

If you are enabling data sharing, connect Db2 to TSO after you define the initialization parameters. This step is necessary only if you specified a group attachment name.

About this task

Access to TSO is required to support the interactive component of Db2 (DB2I). Access to TSO also allows batch applications to access Db2 when those batch programs are executed under the TSO terminal monitor program (TMP).

Procedure

To attach Db2 to TSO:

1. Make Db2 load modules available to TSO and batch users.
2. Make Db2 CLISTs available to TSO and batch users.
3. Make PL/I options available (if applicable).
4. Make panels, messages, and load modules available to ISPF and TSO.
5. Connect the DB2I panels to the ISPF Main Panel.

Related tasks

Make Db2 load modules available to TSO and batch users

As part of installation, you must make Db2 load modules available to TSO and batch users. If *prefix*.SDSNEXIT and *prefix*.SDSNLOAD are not included in your LNKLST*xx*, you can skip this step.

Make Db2 CLISTs available to TSO and batch users (DSNTIJVC)
To connect Db2 to TSO, you must make Db2 CLISTs available to TSO and batch users by running the DSNTIJVC job.

Ensure that PL/I options are available
If you are using PL/I, ensure that the options that your Db2 programmers use are included in the compiler.

Make DB2I panels, messages, and load modules available to ISPF and TSO
During installation, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

Connect DB2I panels to the ISPF main panel
You can connect the DB2I panels to the standard ISPF panels that are already installed on your system.

Defining Db2 to z/OS for enabling data sharing

After you run job DSNTIJMV, you might need to define Db2 in SYS1.PARMLIB. This step is only necessary if you are changing the command prefix, or adding or changing the group attachment name.

Before you begin

Run job DSNTIJMV, as described in .

About this task

Job DSNTIJMV creates new subsystem definitions in the IEFSSN*xx* member.

Procedure

Do an initial program load (IPL) of z/OS.

You must do this action to apply any Db2 or IRLM subsystem parameter changes in the IEFSSN*xx* member.

After the IPL for z/OS completes, message DSN3100I is displayed on the z/OS console, stating that Db2 is ready for the START command.

Alternatively, to apply any Db2 or IRLM subsystem parameter changes until the next IPL, you can use SETSSI commands to delete the subsystem, and add a subsystem with the modified parameters.

For example, the first command below deletes subsystem DSN1. The second command adds a new subsystem named DSN1 that has these characteristics:

- Command prefix -DSN
- Command prefix scope S (started)
- Group attachment name DB0A

```
SETSSI DELETE,SUB=DSN1,FORCE
SETSSI ADD,SUB=DSN1,INITRTN=DSN3INI,INITPARM='DSN3EPX,-DSN,S,DB0A'
```

What to do next

Start Db2, as described in "Starting the Db2 subsystem" on page 592.

Related information

Starting the Db2 subsystem

During the process of enabling data sharing, start the Db2 subsystem after you define Db2 to z/OS.

Procedure

To start Db2:

1. Start the IRLM, if you have not requested that Db2 automatically start the IRLM.

   You must start IRLM before you start Db2.

   Use the following command:

   ```
   START irlmproc
   ```

   where *irlmproc* is the name that you specified for the PROC NAME option on IRLM Panel 1 (DSNTIPI).

   If you specified YES for the AUTO START option on IRLM Panel 1 (DSNTIPI), Db2 starts the IRLM automatically.

2. Start Db2 from the z/OS console.

   The simplest form of the following command is:

   ```
   -DSN1 START DB2
   ```

   where *-DSN1* is the subsystem command prefix that you defined for Db2.

   When you issue the START DB2 command with this command format, Db2 uses the subsystem parameter module that is specified in the *ssnm*MSTR start-up JCL procedure in SYS1.PROCLIB.

   If you need to change the name of the subsystem parameter module, you can edit the *ssnm*MSTR JCL member in SYS1.PROCLIB. Alternatively, you can override the default subsystem parameter module name by using the PARM option, as follows:

   ```
   -DSN1 START DB2,PARM(DSNZPxxx)
   ```

   If you have not run job DSNTIJRT, and the administrative task scheduler starts, the administrative task scheduler issues error message DSNA679I to report SQLCODE -805 until you run job DSNTIJRT. The administrative task scheduler starts if you specified an address space procedure name in the ADMIN SCHEDULER field on installation panel DSNTIPX.

   If Db2 starts successfully, some or all of the following address spaces start, where *ssnm* is the Db2 subsystem name.

   - The system services address space (*ssnm*MSTR)
   - The database services address space (*ssnm*DBM1)
   - The IRLM address space (*irlmproc*), where *irlmproc* is the IRLM procedure name
   - Possibly, the DDF address space (*ssnm*DIST)
   - Possibly, the administrative task scheduler stored procedure address space (*ssnm*ADMT)

   If Db2 starts successfully, the series of RESTART messages that you receive concludes with these two messages:

   ```
   DSNR002I   RESTART COMPLETED
   DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
   ```

   When you start Db2 11 for the first time, Db2 issues message DSNT501I with reason code 00C900A6. This message is expected. When you run job DSNTIJTC, which is required to complete the tailoring of the Db2 catalog, the cause of this message is corrected. Job DSNTIJTC is described in a later installation step.

After you start Db2, identify unusual conditions for databases with the command:

```
-DSN1 DISPLAY DATABASE(*) SPACENAM(*) RESTRICT
```

If Db2 does not start successfully, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. Ensure that the DSNTIJID, DSNTIJIE, DSNTIJIF, DSNTIJIN, and DSNTIJUZ jobs ran correctly. Also, verify that the subsystem parameter member that you specified (or allowed by default) when you started Db2 is the one that is built by job DSNTIJUZ. Check the JCL for the Db2 startup procedure.

If you use distributed data facility, you must define VTAM before DDF can start. However, you do not need to have TCP/IP configured to start DDF. In addition, transactions such as those from DDF or CICS may fail because work files have not yet been defined.

3. Optional: Start TSO.

   After Db2 starts, it is available to TSO. If you want to use the TSO SUBMIT command to do housekeeping and installation verification, you must start TSO (if it is not already started).

Creating the default storage group and defining temporary work files: DSNTIJTM

After you start Db2 as part of the process for enabling data sharing, you must create the default storage group for user-defined Db2 tables that are not specifically assigned to a storage group. You must also define the database for temporary work files.

Procedure

Run job DSNTIJTM.

If job DSNTIJTM runs successfully, it produces the return codes that are shown in the following table:

Table 70. DSNTIJTM return codes

Step	PROCSTEP	Return code
DSNTIAS	IKJEFT01	0000
DSNTICR	IKJEFT01	0000
DSNTIST	IKJEFT01	0000

Results

The SYSDEFLT storage group is the default storage group, and it is used for your database, table space, and table definitions that are not related to a specific storage group. By default, it is also used for the work file database and for work file table spaces that are created during Db2 installation and migration. When DSNTIJTM creates the SYSDEFLT storage group, it completes the following grants:

- Grants use of the default buffer pool and storage group to PUBLIC or the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG.
- Grants use of the SYSDEFLT storage group to PUBLIC or to the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG. This access is necessary to give users the ability to implicitly create table spaces in the default database.
- Grants authority to create tables and table spaces in the default database to PUBLIC or to the authorization IDs that you specified in the INSTALL GRANTEE(S) field of panel DSNTIPG.

What to do next

For data sharing installations, the work file database name is the name that was specified in the WORK FILE DB field on installation panel DSNTIPK. After creating the work file database, the DSNTIJTM job creates the work file table spaces as specified on installation panel DSNTIP9.

You can increase the number of additional temporary work file table spaces by increasing the values in the work file table space fields on panel DSNTIP9, particularly if you expect a large amount of sorting at your site. Additional temporary work file table spaces can improve Db2 performance by reducing device contention among applications. These additional work files also can be used for sorting indexes on large tables during index creation.

You can choose to have job DSNTIJTM create these additional table spaces, or you can create them after you run DSNTIJTM. To create additional work file table spaces after you run job DSNTIJTM, use the DSNTWFG exec in job step DSNTIST. See the comment block for job step DSNTIST for information about the parameters for DSNTWFG.

If you do not run the installation CLIST, customize DSNTIJTM or the DSNTWFG exec to create at least one 4 KB and one 32 KB work file table space.

Creating an image copy of the Db2 directory and catalog: DSNTIJIC (optional)

If you decide to image copy the Db2 directory and catalog, use the DSNTIJIC job that was generated during the installation or migration of the originating member. You do not need to make an image copy of the Db2 catalog or user data sets for recovery because Db2 uses image copies that were made before you enabled data sharing.

Procedure

To create an image copy of the directory and catalog:

1. Examine job DSNTIJIC for the following information:
   - The tape unit name. The job lists the tape unit name as TAPE. If this is incorrect for your site, correct it. The name TAPE is also the unit name for the default archive log data sets.
   - Expiration date or retention period. You can add a retention period or an expiration date to the job.
   - The user on the JOB statement. Ensure that the user is authorized. If Db2 is started under ACCESS(MAINT), this must be the same user that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1.
2. Run job DSNTIJIC.

   The DSNTIJIC job contains a list of all the Db2 directory and catalog table spaces. When you run job DSNTIJIC, it invokes the Db2 image copy utility to copy these table spaces to tape. Having copies of table spaces enables you to recover the Db2 catalog and Db2 directory in case of a failure.
3. If the DSNTIJIC job fails or abends, verify that no problems exist with the tape setup for image copy. If you find no problems with the tape setup, examine the utility job output (JOBLOG) or the console log for problems. For example, look for I/O errors or incorrect sizes.

What to do next

Run the DSNTIJIC job periodically, perhaps daily or weekly, to reduce the amount of time required for recovering the directory or catalog. The copied data and log data sets are needed for recovery.

During the ISPF tailoring session, you named one or two IDs to have installation SYSADM authority. One of these users can now grant various levels of authority to other users. You can use SPUFI or a job similar to DSNTIJSG to perform the authorization. To grant SYSOPR authority to all primary and secondary user IDs that issue Db2 commands from the z/OS console or TSO SDSF, issue the following statement in SPUFI:

```
GRANT SYSOPR TO userid
```

Verifying that enabling data sharing was successful (optional)

If you ran the complete set of installation verification procedure (IVP) sample jobs after you migrated to Db2 11, you should not need to run these jobs again.

About this task

When you start the originating member, Db2 checks your coupling facility, group, and member definitions and verifies that data sharing is enabled. You can also verify that the group has been correctly established by issuing the Db2 command DISPLAY GROUP after the originating member has completed startup.

Procedure

Run the verification jobs that are described in Chapter 9, “Verifying successful Db2 11 installation or migration with sample applications,” on page 641.

Adding a new data sharing member

After you install a new data sharing group or enable an existing Db2 subsystem for data sharing, you can add new data sharing members. Always add a member as a new installation. After being added to the group, the new member uses the Db2 catalog of the originating member.

About this task

When adding a new member to a group, you might need to make changes during installation to allow more XCF groups, or more XCF members per group. Or, you might need to "widen" the locks in the IRLM lock structure (for example, if the structure was initially allocated with a maximum of seven members, and the eighth member is joining the group).

Db2 does not have an automatic way to "merge" catalogs and resolve naming conflicts. If you have applications that currently run on several existing Db2 subsystems, your migration plan might include procedures for moving the relevant data and applications from those Db2 subsystems onto one or more of the group members. Your migration plan should also include procedures for resolving any catalog naming conflicts that result.

Related concepts

Merging existing Db2 data into the group
Although Db2 cannot automatically merge catalogs, you can merge existing Db2 subsystems into a data sharing group. Consider carefully a decision to merge existing Db2 subsystems.

Related tasks

Installing Db2 11
Installing Db2 involves running the installation jobs, connecting the facilities that allow TSO, batch, IMS, and CICS to access Db2 resources, and preparing Db2 for use. After you complete the installation steps, your Db2 subsystem will be in new-function mode. In new-function mode, all Db2 11 function is available for use.

Related information

IEFSSNxx (subsystem definitions) - keyword parameter form (MVS Initialization and Tuning Reference)

Running the CLIST for adding a new member

The process of adding a new data sharing member involves running some of the installation jobs. Before you run the installation jobs, tailor them to your environment by running the installation CLIST.

About this task

Jobs that the add-member CLIST tailors:

DSNTIJIN
DSNTIJTM
DSNTIJMV
DSNTIJUZ
DSNTIJID
DSNTIJFT
DSNTIJDE
DSNTIJGF
DSNTIJCB

Procedure

To tailor the installation jobs for adding a new member:

1. Invoke the installation CLIST as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.
2. On installation panel DSNTIPA1, specify the following values:

   ```
   INSTALL TYPE ===> INSTALL
   DATA SHARING ===> YES
   .
   .
   INPUT MEMBER NAME  ===> originating member's output PDS member
   OUTPUT MEMBER NAME ===> new member's output PDS member
   ```

3. On installation panel DSNTIP0A, specify option 2 for adding a member.

   ```
   | DSNTIP0A                        |
   |                                 |
   |  DATA SHARING FUNCTION:         |
   |                                 |
   |  Select one.                    |
   |          2 1. Group             |
   |            2. Member            |
   |            3. Enable            |
   ```

4. On installation panel DSNTIPK, specify a new member name:

   ```
   MEMBER NAME ===> new member name
   ```

   Verify that the *new member name* is unique within the z/OS Parallel Sysplex. Installation job DSNTIJMV edits the *ssnm*MSTR startup procedure with the member name that you specify on panel DSNTIPK.
5. Complete the installation panels, specifying parameters according to the Db2 subsystem parameters guidelines.

   Recommendation: Rename the tailored SDSNSAMP data set for each member. This data set contains tailored JCL for each member, including jobs that are used for disabling and re-enabling data sharing, if that should ever become necessary. If you do not rename the SDSNSAMP data set, it is overwritten when you install a new member. Rename the data set by choosing a new name for the *prefix*.NEW.SDSNSAMP data set on installation panel DSNTIPT. For example, use *prefix*.*member_name*.SDSNSAMP.

Related concepts

Subsystem parameters and application defaults in a data sharing environment
In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

The Db2 installation CLIST panel session

The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Identifying Db2 to z/OS: DSNTIJMV

Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS. These steps include updating members of SYS1.PARMLIB and SYS1.PROCLIB and creating Language Environment options data sets for the Db2 core WLM environment for Java routines.

Before you begin

Tip: Edit the updates directly in SYS1.PARMLIB instead of submitting the updates in the DSNTIJMV step. For SYS1.PROCLIB, submit the procedure-update section of job DSNTIJMV. Before you make the updates, read the following information and examine job DSNTIJMV to study the updates that it makes. Then use an editor such as ISPF/PDF to make the updates to SYS1.PARMLIB.

About this task

Do not overwrite the entries for Db2 and IRLM in the program properties table (PPT). Note that PPT entries should no longer be defined in SYS1.PARMLIB(SCHED*xx*). Default entries are supplied in the SYS1.LINKLIB(IEFSDPPT) load module, which is provided by z/OS. For details of the PPT entries, see Program properties table (PPT) (MVS Initialization and Tuning Reference).

Procedure

To define Db2 to z/OS:

1. Run job DSNTIJMV.

   If job DSNTIJMV runs successfully, it produces return codes of 0.
2. Review the content of the Language Environment options data set and adjust the following environment variables as needed. The data set is created by DSNTIJMV and must be allocated by the JAVAENV DD of the address space procedure for the Db2 core WLM environment for Java routines.
   - _CEE_ENVFILE if present, must be set to the name and path of the environment variable file that was created by job step DSNTIJR.
   - JVMPROPS needs to be set to the name and path of the JVM startup options file that was created by job step DSNTIJS.
   - DB2_BASE and JCC_HOME need to be set to the names of the HFS directories that you selected for the Db2 for z/OS and JCC product classes.

What to do next

z/OS requirements: Each Db2 and each IRLM that you define to z/OS in the IEFSSN*xx* PARMLIB member requires a z/OS system linkage index (LX). The default number of these indexes that z/OS reserves is 165. If you place all of your Db2 and IRLM subsystem definitions in a single IEFSSN*xx* member, you might need more than 165 LXs; otherwise, your subsystems might not start. If you need more than 165 LXs, use the NSYSLX option on the z/OS IEASYS*xx* PARMLIB member to increase this number.

For later diagnosis of IRLM problems, also ensure that the following requirements are met:

- Specify the IRLM dump formatting modules DXRRLM50, DXRRLM55, and DXRRLS55 in a BLSCUSER member in a data set that is in the system's PARMLIB concatenation.
- Copy the DXRRL186, DXRRLFTB, DXRRLM50, DXRRLM55, and DXRRLS55 modules from the IRLM SDXRRESL data set to a data set in the system's link list. Or, add the SDXRRESL data set to the system's link list in a PROG*xx* member of a data set in the system's PARMLIB concatenation. If you use more than one level of IRLM, you will need to use a STEPLIB concatenation when using IPCS to process dumps that are taken for the levels whose modules are not in the link list.

Additional changes to SYS1.PARMLIB and SYS1.PROCLIB: Because different sites have different requirements for identifying Db2 to z/OS, job DSNTIJMV cannot anticipate all the necessary updates. For this reason, the updates that job DSNTIJMV makes to SYS1.PARMLIB and SYS1.PROCLIB might be incomplete. You might have additional procedures of your own to rename. You can complete these updates either by making the updates directly in SYS1.PARMLIB and SYS1.PROCLIB, or by editing DSNTIJMV.

Related information

Defining system data sets: DSNTIJIN

When job DSNTIJIN is tailored for adding a new member, it defines the new BSDS and active log data sets for that member to use SHAREOPTIONS (2 3). It does not define catalog and directory data sets.

Procedure

To define system data sets:

1. Check the DEFINE CLUSTER statements in job DSNTIJIN to ensure that they allocate adequate disk space for your system.

   Recommendation: For recovery purposes, place system data sets such as the Db2 recovery log and the VSAM catalog on different disk volumes. Because these data sets are used frequently, do not migrate them by using DFSMShsm.
2. Run job DSNTIJIN.

   If DSNTIJIN runs successfully, it produces return codes of 0 for all DEFINE statements and steps. Check any VSAM messages carefully.
3. If job DSNTIJIN fails or abends, run the DSNTIJDE job for the member to delete its BSDS and active log data sets. Then rerun the DSNTIJIN job for the member to re-create those data sets.

Related information

Defining Db2 initialization parameters: DSNTIJUZ

Job DSNTIJUZ generates the subsystem parameter (DSNZP*xxx*) module. The subsystem parameter module is the name that was specified for the PARAMETER MODULE field on installation panel DSNTIPO3.

Procedure

To define Db2 initialization parameters:

1. Verify that data sets that are allocated by the SYSLMOD DD statements of this job are also allocated by the STEPLIB DD statements of the DSNMSTR address space for Db2.
2. Insert the DSPREFIX value after SDSNLOAD.
3. Run job DSNTIJUZ.

   If you want DSNTIJUZ to establish SMP/E GENASM entries in the Db2 system parameter (DSN6*xxxx*) and application defaults module macros, you need to uncomment job step DSNTIMQ. Advanced SMP/E skills are recommended for users of job step DSNTIMQ. Read the job step prolog before proceeding. You might receive message GIM65001 when you run steps DSNTLOG and DSNTIMQ, or you might receive a return code of 4 when you run step DSNTIMQ. You can ignore these messages.
4. If job DSNTIJUZ fails or abends, correct the problem and rerun the job.

Related reference

PARAMETER MODULE field

The value of the PARAMETER MODULE field specifies the member name of the load module that is to be used for Db2 subsystem parameters.

APPL DEFAULTS field
The value of the APPL DEFAULTS field specifies the member name of the load module that is to be used for Db2 application default values.

Initializing system data sets: DSNTIJID

If you are adding a new data sharing member, you must initialize its BSDS and active log data sets after you define them and the member's Db2 initialization parameters.

Procedure

Run job DSNTIJID.

- If the job runs successfully, it produces a return code of 0. Otherwise, check for and resolve error conditions that might be reported by VSAM messages.
- If the job fails or abends, rerun jobs DSNTIJDE, DSNTIJIN, DSNTIJUZ, and DSNTIJID for that member.

Results

Job DSNTIJID records the active log data set names to the BSDS, formats the active log data sets, and initializes the Db2 directory table spaces and indexes.

Defining user authorization exit routines: DSNTIJEX (optional)

When you add a new data sharing member, you should not have to make changes to the Db2 exit routines. However, if the new member is using its own separate load module or exit library, you must define the exit routines in the new library.

Procedure

To define user authorization exit routines:

1. Modify job DSNTIJEX to reference the correct library.
2. Run job DSNTIJEX.

   If job DSNTIJEX runs successfully, it produces return codes of 4.

Related information

Recording Db2 data to SMF (optional)

When you add a Db2 data sharing member, you can specify whether Db2 statistical, accounting, and audit trace data is to be collected.

Procedure

To specify the data that is to be collected:

1. Choose from the following options:

Option	Description
To have Db2 collect statistical information	Accept the default (YES class 1) for the SMF STATISTICS option on installation panel DSNTIPN. To collect statistical information for deadlock or timeout, specify class 3. To collect information about DDF error conditions, specify class 4.

Option	Description
To have Db2 collect accounting information	Accept the default (1) or specify * (all classes) for the SMF ACCOUNTING option on installation panel DSNTIPN.
To have Db2 collect auditing information	Specify * (all classes) for the AUDIT TRACE option on installation panel DSNTIPN.

In all cases, Db2 invokes a trace, passing the data it collects to the System Management Facility (SMF) of z/OS.

Db2 also passes performance data to SMF whenever an accounting, statistics, or audit trace is successfully started or stopped. Db2 can also record other performance data. After you complete the installation process, you can use commands to have Db2 record performance data for subsystem events.

2. If, during installation, you requested that Db2 pass accounting and statistics data to SMF, update the SMFPRM*xx* member of SYS1.PARMLIB as follows:
   - Specify the ACTIVE parameter.
   - Specify STC,NODETAIL for the SUBSYS parameter.
   - Specify the proper TYPE subparameter of the SYS and SUBSYS parameters.

What to do next

During Db2 execution, you can use the SMF SET or SS command to alter the SMF parameters. For example, you can record the statistics trace class 1 IFCIDs 0001, 0002, and 0202 (SMF record type 100); accounting trace class 1 IFCIDs 0003 and 0239 (SMF record type 101); and all other Db2 trace records (SMF record type 102) to SMF. To record this information, issue the following command:

```
SYS(TYPE(100:102))
```

For Db2 to pass data to SMF, you must allocate an adequate supply of SMF buffers. The default buffer settings are probably insufficient.

You can specify SMF buffering on the VSAM BUFSP parameter of the Access Method Services DEFINE CLUSTER statement. Do not use the default settings if Db2 data is sent to SMF. Specify CISZ(4096) and BUFSP(81920) on the DEFINE CLUSTER statement for each SMF VSAM data set. These values for CISZ and BUFSP are the minimum requirement for Db2. You might need higher values for CISZ and BUFSP, depending on the requirements of all your z/OS subsystems.

You can also code an IEFU84 SMF exit routine to process the records that are produced.

Related reference

z/OS MVS Initialization and Tuning Guide

Related information

z/OS MVS Initialization and Tuning Reference

Establishing subsystem security: DSNTIJRA (optional)

Db2 can control access to data within a Db2 subsystem. Db2 also works with outside security systems, such as RACF, that control access to the Db2 subsystem.

About this task

Most of the tasks to establish subsystem security for a data sharing group need to be completed only after the originating member is installed. For other members, you must set up only the security of the administrative task scheduler of those members.

Procedure

Customize and run job DSNTIJRA to complete the following tasks for each member of the group:

- Define the administrative task scheduler started task module to RACF program control
- Define the administrative task scheduler as a trusted context in RACF

Related information

Connecting Db2 to IMS (optional)

Connecting Db2 to IMS is an optional part of adding a new data sharing member. Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

1. Make Db2 load modules available to IMS.
2. Define Db2 to IMS.
3. Define new programs and transactions to IMS.
4. Prepare IMS applications for Db2.
5. Depending on your site, you might also need to:
   - Define Db2 plans for IMS applications.
   - Generate a user language interface.

Related tasks

Connecting the IMS attachment facility
Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Connecting CICS to Db2 (optional)

When you add a new member, you have the option of connecting CICS to the member.

About this task

To connect Db2 to CICS, you must regenerate several CICS tables with additional entries. Coordinate this connection with your CICS support group.

Related tasks

Defining the CICS Db2 connection

Defining Db2 to z/OS for adding data sharing members

After you run job DSNTIJMV, you must define Db2 in SYS1.PARMLIB.

Before you begin

Enable data sharing on the originating member, as described in "Enabling Db2 data sharing" on page 584.

About this task

Job DSNIJMV creates new subsystem definitions in the IEFSSN*xx* member of the SYS1.PARMLIB library.

Procedure

Complete one of the following actions:

- IPL z/OS.

  During thez/OS IPL, message DSN3100I appears on the z/OS console, stating that Db2 is ready for the START DB2 command.
- Use the z/OS command SETSSI to dynamically add the new Db2 and IRLM subsystems. For example, the following two commands can be used to add subsystems for Db2 and IRLM to MVS3:

  ```
  RO MVS3,SETSSI ADD,SUB=DB3A,INITRTN=DSN3INI,INITPARM='DSN3EPX,-DB3A,S,DB0A'
  RO MVS3,SETSSI ADD,SUB=DJ3A
  ```

  Recommendation: Add z/OS to the IEFSSN*xx* member so that it can be used on a subsequent IPL.

Related tasks

Strategy for creating a Db2 data sharing group
When you create a data sharing group, add one member at a time. You can install a new Db2 for the first member (the *originating member*), or you can enable an existing Db2 subsystem as the originating member.

Related reference

z/OS SETSSI Command (MVS System Commands)

Related information

Starting the Db2 subsystem

During the process of adding a data sharing member, start the Db2 subsystem after you define Db2 to z/OS.

Procedure

To start the Db2 member:

1. Start the IRLM, if you have not requested that Db2 automatically start the IRLM.

   You must start IRLM before you start Db2.

   Use the following command:

   ```
   START irlmproc
   ```

   where *irlmproc* is the name that you specified for the PROC NAME option on IRLM Panel 1 (DSNTIPI).

   If you specified YES for the AUTO START option on IRLM Panel 1 (DSNTIPI), Db2 starts the IRLM automatically.
2. Start Db2 from the z/OS console.

   Use the following command:

   ```
   -DSN1 START DB2
   ```

   where (-DSN1) is the subsystem command prefix that you defined for Db2.

   Db2 uses the subsystem parameter module that is specified in the start-up JCL procedure in SYS1.PROCLIB:

   ```
   //IEFPROC EXEC PGM=DSNYASCP,PARM='ZPARM(DSNZPxxx)', ...
   ```

   where *DSNZPxxx* is the value that you specified for the PARAMETER MODULE field on installation panel DSNTIPO3.

   If you need to change the name of the *DSNZPxxx* module, you can edit SYS1.PROCLIB. Alternatively, you can override the *DSNZPxxx* name by using the PARM option as follows:

   ```
   -DSN1 START DB2,PARM(DSNZPxxx)
   ```

If you have not run yet job DSNTIJRT on any member of the group, and the administrative task scheduler for this member starts, the administrative task scheduler issues error message DSNA679I to report SQLCODE -805 until you run job DSNTIJRT. The administrative task scheduler starts if you specified an address space procedure name in the ADMIN SCHEDULER field on installation panel DSNTIPX.

If Db2 starts successfully, two to five address spaces also start. These address spaces are *ssnm*MSTR and *ssnm*DBM1, possibly *ssnm*DIST, possibly *ssnm*ADMT, and *irlmproc*, where *ssnm* is the Db2 subsystem name, *ssnm*ADMT is the Db2 administrative task scheduler procedure name, and *irlmproc* is the IRLM procedure name.

If Db2 starts successfully, the series of RESTART messages that you receive concludes with these two messages:

```
DSNR002I   RESTART COMPLETED
DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
```

After you start Db2, identify unusual conditions for databases with the command:

```
-DSN1 DISPLAY DATABASE(*) SPACENAM(*) RESTRICT
```

If Db2 does not start successfully, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. Ensure that the DSNTIJID, DSNTIJIN, and DSNTIJUZ jobs ran correctly. Also, verify that the subsystem parameter member that you specified (or allowed by default) when you started Db2 is the one that is built by job DSNTIJUZ. Check the JCL for the Db2 startup procedure.

If you use distributed data facility, you must define VTAM before DDF can start. However, you do not need to have TCP/IP configured to start DDF. In addition, transactions such as those from DDF or CICS may fail because work files have not yet been defined.

3. Optional: Start TSO.

   After Db2 starts, it is available to TSO. If you want to use the TSO SUBMIT command to do housekeeping and installation verification, you must start TSO (if it is not already started).

Results

Transactions that run on a new member might initially fail because work files are not defined until you run that member’s job DSNTIJTM.

Creating the default storage group, defining temporary work files, and binding Db2 REXX Language Support: DSNTIJTM

After you start Db2 when you add a data sharing member, you must activate its buffer pools and create its work file database.

Procedure

Run job DSNTIJTM.

If job DSNTIJTM runs successfully, it produces the return codes that are shown in the following table:

Table 71. DSNTIJTM return codes

Step	PROCSTEP	Return code
DSNTIAB	(none)	0000
DSNTIAS	(none)	0000
DSNTICR	(none)	0000
DSNTIST	(none)	0000

Results

DSNTIJTM defines the new member's initial buffer pools according to the sizes that are specified on installation panels DSNTIP1 and DSNTIP2. It also creates the work file database for the new member according to the values that you specified on panel DSNTIP9.

DSNTIJTM also provides some cleanup to ease reruns.

What to do next

For data sharing installations, the work file database name is the name that was specified in the WORK FILE DB field on installation panel DSNTIPK. After creating the work file database, the DSNTIJTM job creates the work file table spaces as specified on installation panel DSNTIP9.

You can increase the number of additional temporary work file table spaces by increasing the values in the work file table space fields on panel DSNTIP9, particularly if you expect a large amount of sorting at your site. Additional temporary work file table spaces can improve Db2 performance by reducing device contention among applications. These additional work files also can be used for sorting indexes on large tables during index creation.

You can choose to have job DSNTIJTM create these additional table spaces, or you can create them after you run DSNTIJTM. To create additional work file table spaces after you run job DSNTIJTM, use the DSNTWFG exec in job step DSNTIST. See the comment block for job step DSNTIST for information about the parameters for DSNTWFG.

If you do not run the installation CLIST, customize DSNTIJTM or the DSNTWFG exec to create at least one 4 KB and one 32 KB work file table space.

Related concepts

Work file database storage requirements
The work file database is used as storage for processing SQL statements that require working storage.

Creating an image copy of the Db2 directory and catalog: DSNTIJIC

After you add a data sharing member, you need to create a backup copy of the Db2 directory and catalog. Use the DSNTIJIC job that was generated during the installation or migration of the originating member to create the image copy.

Procedure

To create an image copy of the directory and catalog:

1. Run job DSNTIJIC.

   The DSNTIJIC job contains a list of all the Db2 directory and catalog table spaces. When you run job DSNTIJIC, it invokes the Db2 image copy utility to copy these table spaces to tape. Having copies of table spaces enables you to recover the Db2 catalog and Db2 directory in case of a failure.
2. If the DSNTIJIC job fails or abends, verify that no problems exist with the tape setup for image copy. If you find no problems with the tape setup, examine the utility job output (JOBLOG) or the console log for problems. For example, look for I/O errors or incorrect sizes.

What to do next

Run the DSNTIJIC job periodically, perhaps daily or weekly, to reduce the amount of time required for recovering the directory or catalog. The copied data and log data sets are needed for recovery.

Related information

Verifying that adding a data sharing member was successful

When you complete the procedure to add a new data sharing member, you should verify that the member was added successfully.

Procedure

Run the verification jobs that are described in Chapter 9, “Verifying successful Db2 11 installation or migration with sample applications,” on page 641.

What to do next

After you successfully add all the data sharing members for the group, you should Test the data sharing group.

Convert BSDS records of the new member to 10-byte format

The BSDS of each new member is initialized in the 6-byte pre-Db2 11 format. You can optionally convert the BSDS to a new format that supports 10-byte RBA and LRSN fields.

Before you begin

Before you can convert the BSDS, the Db2 subsystem or data sharing member must be started in Db2 11 new-function mode. For instructions, see “Migrating from enabling-new-function mode to new-function mode” on page 484.

About this task

In data sharing, you must convert the BSDS for each Db2 member separately.

Procedure

1. Stop Db2.
2. Run job DSNTIJCB.

   Db2 runs the DSNJCNVT conversion utility to convert the bootstrap data set records to support 10-byte RBA and LRSN fields. For more information, see .
3. Start Db2.

What to do next

If you have not already done so, first convert all page sets for the Db2 catalog, directory, and , as described in “ Convert the BSDS, Db2 catalog, and directory to 10-byte RBA and LRSN format (Optional)” on page 488. . Then convert all user objects to support the 10-byte RBA and LRSN, as described in . After Db2 reaches the hard logging limit, you might not be able to convert the catalog and directory page sets.

You must continuously monitor the RBA and LRSN values until all catalog, directory, and user objects are converted to the 10-byte RBA or LRSN format. Failure to convert page sets before the 6-byte soft logging limit is reached results in failed updates with reason code 00C2026D, and any objects still in the 6-byte format become read-only. RBA or LRSN values greater than x'F00000000000' indicate that your system is at risk of reaching the 6-byte logging limit.

For more information the RBA and LRSN logging limits, see . For instructions for converting page sets to the 10-byte format, see .

Ensuring that the WLM address space is defined and available

After you verify that the data sharing member was added successfully, you must ensure that the WLM address space for the member is defined and available.

About this task

When the WLM address space is defined correctly and available, the WLM address spaces can start without errors when connections land on any member of the group.

Procedure

Update the JCL startup procedure for the WLM application environment by using one of the following methods:

- Add the WLM application environments that are specific for each member of the group.
- Modify existing definitions to work for any member of the group.

Related concepts

Special considerations for WLM-managed stored procedures in coexistence
The WLM-managed stored procedure address space (WLM-SPAS) that processes a stored procedure or UDF program always connects to the Db2 member that processes the SQL call request. Therefore, the Db2 code that is executed in the WLM-SPAS must match the Db2 release of the database services address space (*ssnm*DBM1), or an error occurs.

Merging existing Db2 data into the group

Although Db2 cannot automatically merge catalogs, you can merge existing Db2 subsystems into a data sharing group. Consider carefully a decision to merge existing Db2 subsystems.

Merging is a very complicated process. It involves not only the physical issue of moving data, but also many other management issues, including:

- Naming conventions for users, plans, packages, databases, tables, views, and more
- Authorization techniques
- Backup and recovery conventions
- Availability practices

Before you consider merging existing Db2 subsystems into a single data sharing group, ask yourself the following question: Why are the Db2 subsystems separate now?

Merging subsystems

You can merge existing Db2 subsystems into a single Db2 data sharing group.

Procedure

To merge existing subsystems into a single Db2 data sharing group, complete the following steps:

1. Choose one of the subsystems to be the originating member.
2. Move data and data definitions from the other Db2 subsystems to the subsystem that you designated as the originating member.

   For more information, see "Moving data that you are merging" on page 607.

   Tip: Use a location alias, remote applications do not have to change aliases during the merging processes. Remote applications use a location name to access the Db2 subsystem. You can define the previous location names of each subsystem as location alias names for the group. After the subsystems are merged, remote applications continue to connect, without changes to the location names in the applications. For more information, see .

3. Enable data sharing on the originating member, as described in “Enabling Db2 data sharing” on page 584.
4. Add the other Db2 subsystems as members of the data sharing group, as described in “Adding a new data sharing member” on page 595.

Merging data

If you have an application that is currently running on independent Db2 subsystems, you might decide that the application will work well in a data sharing group.

In that case, you must move the data and merge the catalog definitions for that data from the independent Db2 subsystems into the data sharing group. Because the Db2 subsystems still exist, you cannot reuse their subsystem names when installing the subsystems as new members into the data sharing group.

Db2 does not provide an automated way to move catalog definitions from an independent Db2 subsystem into the catalog of the data sharing group. If you have procedures and tools to move applications from test to production, or to handle merging databases from enterprise reorganizations or mergers, those same procedures can be used to move applications into the data sharing group.

Existing distributed applications

If you move existing data to the data sharing group, it is likely that the location name of objects will change.

Existing distributed applications that remotely reference an object by its three-part name must be changed to reference the new name. Aliases that exist on that table must also be dropped and re-created with the new location name.

Applications that contain explicit SQL CONNECT statements that reference an old location name must be modified. Any Db2 plan that uses an old location name for the CURRENTSERVER keyword must be bound again.

Moving data that you are merging

In the context of Db2 data sharing, a *target* refers to the Db2 subsystem to which you are moving data (the data sharing group). A *source* refers to the Db2 subsystem from which you are moving data.

Procedure

To move data that you are merging:

1. Decide the method that you will use to move data.

   Three options are outlined below; you can use a combination of the specified methods. Each of the methods assumes that the objects that are to be created in the target system are created with the exact DDL that is used in the source system. Descriptions of methods 1, 2, and 3 are referred to throughout the procedure, and are described in detail below.

   - **Method 1: Unload and Reload**: The data that is to be moved is unloaded from the source Db2 subsystem and loaded into the target data sharing group by using the Db2 online utilities, UNLOAD and LOAD. This approach is the most simple because tables are created without concern for object IDs, and data is unloaded or reloaded using conventional techniques. The major disadvantage of this method is that it is the slowest of the three methods, in terms of performance. The unload and reload methods operate against rows of a table, whereas the other techniques operate against pages or data sets as their level of granularity. Additionally, this method requires two to three times the disk space that the other methods require, depending on how you unload or reload (source, target and intermediate unload).
   - **Method 2: DSN1COPY with OBID translation**: The data that is to be moved is copied from the source system to the target system using the Db2 offline utility DSN1COPY. DSN1COPY is usually faster than unload and reload because it moves pages of data, rather than rows. This method is more complicated because the object IDs in the source data will need to be translated.

- **Method 3: Use Db2 VSAM data sets from the source system in the target system**: The VSAM data sets that are used to hold the table space and index space data from the source system are used in the target system, without copying any data. Because this method does not require copying the data, it is the fastest of the three methods, in terms of performance. It is, however, the most complicated. Another advantage of this method is that it requires less disk space than the other methods; this method is generally used for very large table or index spaces. Method 3 assumes that all of the disk volumes in the source system used by objects being moved by this method are shared and accessible with the target system.

2. Choose a catalog that belongs to one of the Db2 subsystems to be the "original" catalog for the data sharing group.

   This Db2 subsystem is considered the originating member of the group.

   You should consider many different factors when choosing which Db2 subsystem to be the originating member of the group. For example, it makes sense to choose the member with the most database objects as the originating member in order to minimize the number of objects that you move.

   However, if all Db2 subsystems are mostly equivalent, and you are not planning to use DSN1COPY, consider the log RBA values of the existing subsystems. Compare the end-of-log RBAs with the high-order 10 bytes (for 10-byte RBAs) or 6 bytes (for 6- byte RBAs) of the time-of-day clock timestamp on each of their systems. This value is called the *truncated timestamp*. The usual case is that the RBA is less than the truncated timestamp. In this case, any Db2 subsystem is chosen as the originating member.

   In the event that the current end-of-log RBA in any of the existing Db2 subsystems is higher than the truncated timestamp value at the time you are ready to enable sharing, you have the following choices:

   - Choose the Db2 subsystem that has the highest RBA as the originating member.
   - Use DSN1COPY with the RESET option to reset the log RBAs in each data and index page to 0 when you move databases from other Db2 subsystems to the data sharing group.

3. Resolve name conflicts among the objects and authorization IDs in the data sharing group.
4. Create the objects on the target subsystem.

   When creating objects while you are using methods 1 or 2 to move the data, the CREATE statements can be entered in any order. Db2 assigns new OBIDs for these objects.

   If you are using method 3, you must perform the following steps:

   a. Consider creating the data sets with the minimum size settings to save space. The actual target system VSAM data sets created by the DDL execution are not used because the VSAM data sets that are from the source system are used instead. By choosing to create the objects with minimum sizes, you eventually need to issue ALTER TABLESPACE and ALTER INDEX statements to change the PRIQTY and SECQTY after the CREATE. If, however, you are using the same high-level qualifier for the source and target systems (which is not recommended), you must create the objects with DEFINE NO, and take additional steps later. DEFINE NO is needed when keeping the same high-level qualifier, because the VSAM data set name would be identical in the source and target systems. In this case, Db2 would not be able to define the data set on the target system during the create processing because the data set already exists.

   b. Query the SYSIBM.SYSTABLES table in the Db2 catalog on the source subsystem to get the table OBID for tables that are within the databases that are being moved. Additionally for both the source and target systems, the DBID and PSID are needed for table spaces (from SYSIBM.SYSTABLESPACE) and the DBID and ISOBID are needed for indexes (from SYSIBM.SYSINDEXES). These will be used to build REPAIR jobs to modify these IDs in the header page, and potentially the first space map page in a later step.

   c. Use the OBID clause on the CREATE TABLE statement on the target subsystem to specify an OBID that is the same as the table OBID on the source subsystem. Verify that the OBID that you specify is available. If an OBID is being used for another object within the same database, such as an index or referential constraint, Db2 does not allow you to create the table with the specified OBID.

Recommendation: To help guarantee the availability of OBIDs for all tables within a database, defer the creation of all indexes and referential constraints until all tables are created. All CREATE TABLE statements must have the OBID clause to guarantee that they are assigned the correct OBID. If an explicit table space name is specified, then the CREATE TABLESPACE statement must come immediately before the first CREATE TABLE statement for that table space. This helps prevent a group of CREATE TABLESPACE statements from using up OBIDs that are needed for the tables.

For methods two or three, the objects in the target system will be created with several assumptions that might require the additional steps that are outlined below:

- The VSAM data sets for each new object are created using the 'I' prefix for each of the data sets. It is possible that on the source system online REORG has executed, causing the data sets to have a 'J' prefix. If this is the case, you will need to code the DSN1COPY for method two, to have the correct 'J' data set designation or rename the data set back to the 'I' prefix for method three in a later step. You should query the source catalog for column IPREFIX in SYSIBM.SYSTABLEPART for table spaces, and SYSIBM.SYSINDEXPART for indexes, to find any 'J' prefix objects.
- If any of the index names involved in the move are greater than eight characters in length, Db2 generates a unique INDEXSPACE name to be used in naming the VSAM data set. The INDEXSPACE name generated will most likely be different in the source and target systems. You should query the source and target catalogs to get a list of the INDEXSPACE names for the indexes that have a name greater than eight characters (found in SYSIBM.SYSINDEXES). These will be used in a later step.

5. On the source Db2 subsystem, run the REORG utility on any table spaces for which a table alteration has occurred with no subsequent REORG.

   If you are unsure if a table meets this criteria, query SYSIBM.SYSTABLES for those tables in which CREATEDTS does not equal ALTEREDTS. However, there is no way to tell from the Db2 catalog what kind of ALTER was performed and whether it would have affected this process. By comparing the CREATEDTS and ALTEREDTS, you will at least gather a list of candidates. If all rows have CREATEDTS equal to ALTEREDTS, running the REORG utility is unnecessary.

6. Move the data choosing one of the three methods that match the ones listed above:

   - **Method 1: Unload / Reload**:

     a. Start the objects on the source system in RO mode.

     b. Execute the UNLOAD utility on the source system to unload the data to a sequential file.

     c. Execute the LOAD utility on the target system to load the data that was unloaded when performing the step listed above.

   - **Method 2: DSN1COPY with OBID translation** :

     a. Stop the object, for both table space and index, on the source and target systems.

     b. Execute DSN1COPY with OBID translation and the RESET option to copy the data from the source system to the target system. If the online REORG utility has been run, be sure to code the proper I/J data set names in the DSN1COPY job. Also, if any indexes were created with names greater than eight characters long you will need to incorporate the INDEXSPACE name differences retrieved in an earlier step.

     c. Start the objects on the target systems R/W.

   - **Method 3: Use Db2 VSAM data sets from source system in the target system**:

     a. Stop the table spaces and index spaces in the target system.

     b. If the high level qualifier (HLQ) is not changing between the source and target systems, which is not recommended, then perform the following steps on the target system. Note that this process assumes that the objects were created in the target system with DEFINE NO utility.

        i) Change SPRMCTU in the DSN6SPRM macro to one. This enables the catalog to be updated. Also, change DLDFREQ to zero, which disables the down level detection. You must note the original value, because you will change DLDFREQ back to the original value in a later step. Assemble the changed zparm and restart the target system to pick up the change.

ii) Using SQL, update the SPACE column from SYSIBM.SYSTABLEPART and SYSIBM.SYSINDEXPART from -1 to 0 for the table and index spaces that you are moving using method three.

iii) Run the REPAIR DBD REBUILD utility for the databases created earlier. This step is needed because the above step changed the SPACE value in the Db2 catalog from -1 to 0, but the value is also in the DBD. This means that when the REPAIR DBD REBUILD utility is run, it will take the information from the catalog and rebuild the DBD in the directory, making Db2 think that the data set has already been defined.

Note: Do not try to access the tables at this point. Both systems will think that the data set is theirs, but only one system will actually be able to access the data set. The REPAIR DBD REBUILD utility only should be executed after all table spaces and index spaces that are being moved by method three for a particular database, have their catalogs updated via SQL.

iv) Change SPRMCTU back to zero, and then DLDFREQ to the previous value it was assigned. Next, reassemble the zparm and recycle the target system so it recognizes the change.

c. Delete the target system VSAM data sets for the table spaces and indexes, unless they were created with DEFINE NO, because the HLQ did not change.

d. Use the REPAIR utility on the source system to change the identifiers in the page set header page, or header pages, if you have a partitioned page set, to match the new identifiers on the target subsystem.

   The identifiers consist of two, 2-byte fields, HPGDBID and HPGPSID. You must locate and replace these identifiers with the new DBID and PSID of the target system as follows:

   – For non-partitioned page sets, locate and replace the 4-byte fields starting at X'0C', which begins on page zero.
   – For partitioned page sets, locate and replace the 4-byte fields starting at X'0C' on page zero for each partition.

e. If the table space that you are working with is segmented and compressed, and a dictionary exists, you must also run the REPAIR utility on the source system to change the OBID in the first space map page.

f. Stop the object, for table space and index, on the source system.

g. If the HLQs of the source and target systems are different, you must run the IDCAMS ALTER statements. Running the IDCAMS ALTER statements changes the HLQ of the VSAM data sets from the source system to be the new HLQ of the target system. If the HLQ is changing, then the VSAM data sets of the target system must be first deleted before running IDCAMS ALTER. Additionally, if you know from completing one of the previous steps that the online REORG utility has been executed on the source system, make sure that you change any ‘J' data sets to match the target system. The target system should have all ‘I' data sets, as they were newly created. Also, if any indexes were created with names greater than eight characters long, you will need to incorporate the INDEXSPACE name differences retrieved in an earlier step.

h. Start the table spaces and index spaces in the target system.

i. Use the REPAIR utility with the LEVELID option to reset the level indicator of the page sets to a neutral value on the target system.

j. Stop the object, for table space and index, on the source system.

7. You now have the option to drop the database objects on the source subsystem. If you do not choose to drop the objects at this point, and used method three to move data while keeping the same HLQ for the data sets, then you should consider altering the VCAT name in the source system to a different invalid value. You should alter the VCAT name so that the source Db2 does not try to open the data set that is now in use by the target system.
8. Take full image copies of all data. This is the earliest time at which data recovery can occur after the merge.
9. Run the RUNSTATS utility on the target system.

10. Bind all plans and packages on the target subsystem that were bound on the source subsystem. Bind any plans and packages on the target subsystem that have changed because of name conflict resolution. Grant the appropriate authorizations to all plans and packages.

Related information

Running REPAIR to modify OBID for a compression dictionary

Additional invocations of the REPAIR utility might be necessary if you use Db2 VSAM data sets from the source system to move data that you are merging in the target system and the table space is segmented and compressed.

About this task

If the segmented, compressed table space has a dictionary, the space map page that contains the dictionary has an OBID that is the same as the table space that was modified in the header page when you moved and merged your data. The OBID in the space map must be modified to match the new value in the header page.

Procedure

To modify the OBID in the space map to match the new value in the header page:

1. Use the DSN1PRNT utility to view the data set header page and space map.
   The following is an example from DSN1PRNT with the FORMAT option. On the header page, or page zero, you will see something similar to the output displayed in the following figure:

```
PAGE: # 00000000
-----------------------------------------------------------------------------------
HEADER PAGE:  PGCOMB='10'X  PGLOGRBA='BC8DB9277831'X  PGNUM='00000000'X  PGFLAGS='38'X
HPGOBID='018E0002'X  HPGHPREF='000000B4'X  HPGCATRL='00'X  HPGREL='D3'X  HPGZLD='D3'X
```

   Figure 83. Sample header page of DSN1PRNT command with the FORMAT option.

   The following figure shows the first space map page, or page 1:

```
FIRST PART OF SEGMENTED SPACE MAP:
SEG 0001   000000020002C0 FFFF
SEG 0002   00000003000280 FFFF
SEG 0003   00000004000280 FFFF
SEG 0004   00000000000280 FFFF
SEG 0005   000000060003C0 3333
SEG 0006   00000007000380 3333
SEG 0007   00000008000380 3333
SEG 0008   00000009000380 3333
SEG 0009   0000000A000380 3333
SEG 000A   0000000B000380 3333
SEG 000B   0000000C000380 3333
SEG 000C   0000000D000380 3333
SEG 000D   0000000E000380 3333
SEG 000E   00000000000380 3300
```

   Figure 84. Sample output from first space map page of DSN1PRNT command with FORMAT option.

   In the header page, HPGOBID is the DBID concatenated with the OBID. In the first figure above, HPGOBID is X'018E0002', so the DBID is X'018E' and the OBID is 0002'X. You can see that same OBID in the first four segments in the space map page, or bytes 5 and 6, following the segment number.

   If you run DSN1PRNT on pages 0 and 1, and you do not see the same OBID in the space map page as the one listed on the header page, it means that the dictionary is not yet built. If the dictionary is not built, you only see the table segments (segments X'5' thru X'E' shown above). If this is the case, you do not need to modify the OBID and you can stop this task.

2. Use the REPAIR utility to modify the OBIDs in the space map to match the new OBID in the header page. Only the segments that match the OBID in the old header page must be modified. The remaining segments are for the table and do not need to be modified.

   In the second figure above, you can see that the first four segments need to be modified and that the table OBID is X'0003'.

   The number of segments that need to be modified is dependent on the SEGSIZE value of the table space. The following table shows the offset of the OBIDs that need to be modified for each SEGSIZE.

Table 72. The offset of OBIDs that need to be modified in order of SEGSIZE

SEGSIZE	Offset of OBIDs to REPAIR
4	X'20' X'29' X'32' X'3B'
8	X'20' X'2B'
12	X'20' X'2D'
16–64	X'20'

Release coexistence in Db2 data sharing

In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Db2 11 supports coexistence with data sharing members on Db2 10 as long as all Db2 11 members remain in conversion mode. Release coexistence begins when you migrate the first data sharing member to Db2 11. You must successfully migrate the first data sharing member to Db2 11 before attempting to migrate the other data sharing members.

Important: Apply the for fallback SPE () and stop and restart Db2 10 for every subsystem or data sharing member that you plan to migrate to Db2 11. For data sharing, every member must be started in Db2 10 after the fallback SPE is applied. After migration to Db2 11 new-function mode, any active members that did not start in Db2 10 with the fallback SPE applied prevent Db2 11 from starting. See "Required maintenance for Db2 11 installation or migration" on page 3.

For maximum availability, you can migrate the members to Db2 11 one member at a time. When developing your migration plan, remember that most new functions that are introduced in Db2 11 are not available to any members of the group until all members are migrated to Db2 11 new-function mode.

If you do not require continuous availability, consider shutting down the group during the migration to avoid the coexistence environment. If you must run in coexistence, plan to migrate the members in as short a time as possible to minimize the operational complexity.

Plan migrations for periods of low activity because of the locks used by the catalog migration utility (CATMAINT). These locks make parts of the Db2 catalog are unavailable during migration of the first member. The locks used varies from release to release, depending on the catalog parts that require modification.

Coexistence considerations are similar to those that you need to understand for the fallback environment. For example, objects that are frozen in fallback are generally not accessible from a Db2 10 member.

Db2 11 migration modes

The Db2 11 migration process is designed to be accomplished in phases.

- Migrating a member to Db2 11 initially puts that member into conversion mode. In this mode, no new Db2 11 function is available for use.
- To make new function available, you must put the group through the enabling new-function mode process. Before attempting this process, confirm that all members are running Db2 11. The enabling new-function mode process can only begin if all members are running Db2 11.
- When the enabling new-function mode process completes successfully, the group enters Db2 11 new-function mode, in which all new Db2 11 function is available for use.

From either Db2 11 enabling-new-function mode or from Db2 11 new-function mode, members cannot return to Db2 11 conversion mode, nor fall back to the previous release. The only way to recover to a previous catalog level is to perform a point-in-time recovery of both the catalog and directory.

TSO, CAF, and RRSAF logon procedures

You can attach to either release of Db2 with your existing TSO, CAF, or RRSAF logon procedures without changing the load libraries for your applications. After you migrate completely to the latest level of Db2, you must update those procedures and jobs to point to the latest level of Db2 load libraries. If you forget to update those procedures and jobs before migrating to any release subsequent to Db2 11, those procedures and jobs can no longer work in that subsequent release.

64-bit JVMs for Java stored procedures

Db2 11 supports the use of 64-bit JVMs for running Java stored procedures. However, in a coexistence environment, only 31-bit JVMs can be used on subsystems within the data sharing group.

Related tasks

Preparing for Db2 11 migration in Db2 data sharing
When planning the migration of data sharing members to Db2 11 it is best to take certain actions to reduce or avoid unnecessary operation complexity.

Related information

Special considerations for WLM-managed stored procedures in coexistence

The WLM-managed stored procedure address space (WLM-SPAS) that processes a stored procedure or UDF program always connects to the Db2 member that processes the SQL call request. Therefore, the Db2 code that is executed in the WLM-SPAS must match the Db2 release of the database services address space (*ssnm*DBM1), or an error occurs.

When running in a data sharing group, each member has a different database services address space (*ssnm*DBM1). This means that the Db2 code in the WLM-SPAS will have to match more than one Db2 release level. This can cause a problem when you want to use a single JCL definition for the procedure name listed in the WLM definition.

To define one JCL procedure to reference Db2 code data sets at different release levels, use a simple data set and alias naming convention. If the procedure library is shared throughout the SYSPLEX, this allows for a single JCL definition for the Procedure Name that is listed in the WLM definition.

In the following example, the DB2SSN parameter is used as a part of the data set name in STEPLIB. This allows redirection to a data set name based on the SSN of the member that is invoking the stored procedure or UDF.

In the WLM definition:

```
Application Environment Name . : DB2GROUP1
Description  . . . . . . . . . . GROUP 1 APPS
Subsystem Type . . . . . . . . . DB2
Procedure Name . . . . . . . . . DB2AWLM1
Start Parameters . . . . . . . . DB2SSN=&IWMSSNM
                                 ----------------------------------------

Limit on starting server address spaces for a subsystem instance:
1   1.  Managed by WLM
    2.  Single address space per system
    3.  Single address space per Sysplex
```

The special keyword &IWMSSNM in the WLM definition causes WLM to send the subsystem name as the DB2SSN parm when the address space is started. In the WLM-SPAS JCL:

```
//DB2AWLM1 PROC RGN=0M,DB2SSN=,NUMTCB=1,APPLENV=DB2GROUP1
//IEFPROC EXEC PGM=DSNX9WLM,REGION=&RGN,TIME=NOLIMIT,
//        PARM='&DB2SSN,&NUMTCB,&APPLENV'
//STEPLIB  DD  DISP=SHR,DSN=DSNT2.&DB2SSN..SDSNEXIT
//         DD  DISP=SHR,DSN=DSNT2.&DB2SSN..SDSNLOAD
//         DD  DISP=SHR,DSN=DSNT2.&DB2SSN..SDSNLOD2
//         DD  DISP=SHR,DSN=DSNT2.RUNLIB.LOAD
```

If one subsystem name is DT21 then the following alias can be used to redirect the library name to a release-specific library for that member. This would allow you to have a single release-specific library for a data sharing group.

```
DSNT2.DT21.SDSNLOAD                                                  *ALIAS
```

As members are migrated, the ALIAS can be changed to reflect the new release that the member is running.

Determining the release of a data sharing group in coexistence

When the first data sharing member starts Db2 11, the catalog is considered to be at that level, even though not all members of the group have migrated. This means that the *catalog level* for the group is Db2 11.

Procedure

Issue the DISPLAY GROUP command.

The catalog level is shown near the top of the display.

Related information

Determining the function level of an IRLM group in coexistence

IRLM communicates coexistence information by using function levels. A *function level* is an ever-increasing number that each IRLM can use to tell other IRLMs in the group what level of function it supports.

About this task

The group function level is the **minimum** of the individual IRLM function levels for all IRLMs that can coexist. An IRLM that tries to join a data sharing group is prevented from doing so by active members that cannot coexist with the new IRLM's function level.

When the function level for the group changes, that change is serialized by IRLM with lock structure rebuilds. In most cases, however, the lock structure does not actually do a full rebuild. The first phase of the rebuild is enough to quiesce the work and cause the function level change to occur. These "partial" rebuilds take place when an IRLM joins the group and if that activity causes the group function level to change. For example, if the IRLM group is currently at function level n, and the IRLM member that wants to join the group is at n-1, the partial rebuild occurs to lower the group function level.

Procedure

Enter the following command:

GUPI

```
MODIFY irlmproc,STATUS,ALLI
```

Examples

Example 1

Assume a data sharing group exists with three members running Db2 Db2 11 in conversion mode and one member running Db2 10. Issuing the MODIFY *irlmproc*,STATUS,ALLI command from one of the three Db2 11 members produces output that is similar to the following output:

```
DXR103I QR21002 STATUS 622
        IRLMS PARTICIPATING IN DATA SHARING GROUP FUNCTION LEVEL=2.029
        IRLM_NAME IRLMID STATUS LEVEL SERVICE MIN_LEVEL MIN_SERVICE
          PR21*    001     UP   3.029 PM28625   1.022     PM28625
          QR21     002     UP   2.029 PM28625   1.022     PM28625
          SRLM     004     UP   3.029 PM28625   1.022     PM28625
          TRLM     005     UP   3.029 PM28625   1.022     PM28625
    DXR103I End of display
```

GUPI

The IRLMs in the preceding example are at group function level 2.029, which is the lowest level of any of the individual members (QR21). The MIN_LEVEL field shows the minimum level with which this IRLM can coexist. MIN_SERVICE indicates the service or release that corresponds with that MIN_LEVEL.

GUPI

Example 2

Assume the same data sharing group as described in the previous example. Issuing the MODIFY *irlmproc*, STATUS,ALLI command from the Db2 10 member produces output that is similar to the following output:

```
DXR103I DJ3A003 STATUS
         IRLMS PARTICIPATING IN DATA SHARING GROUP FUNCTION LEVEL=022
         IRLM_NAME IRLMID STATUS LEVEL SERVICE MIN_LEVEL MIN_SERVICE
           DJ1A     001    UP      094 HIR2220     022     HIR2220
           DJ2A     002    UP      094 HIR2220     022     HIR2220
           DJ3A     003    UP      022 PQ52360     012     PN90337
     DXR103I End of display
```

GUPI

Call attachment and TSO attachment in coexistence

While operating in a coexistence environment, you can attach to either Db2 release with your existing TSO logon procedures or with JCL.

After you migrate all members of the group to Db2 11, update those procedures and jobs to point to the Db2 11 load libraries.

Automatic binds in coexistence

Changes to package structures that are introduced in Db2 11 are not available to members of the group that have not migrated. You must plan accordingly when developing your migration plan.

Important: To reduce coexistence problems, rebind all packages and plans that can run in Db2 10, but cannot run without an automatic rebind in Db2 11. To identify those packages, run job DSNTIJPM, and examine the premigration reports on package copies and plans that are not supported after migration to Db2 12. For details, see “Run premigration queries (DSNTIJPM)” on page 419.

Important: Apply APAR PI87675 to eliminate the possibility of repeating automatic remigration binds during release coexistence.

Migration-related *automatic binds* (also called "autobinds") occur in Db2 11 because it cannot use runtime structures from a plan or package that was last bound in a release earlier than DB2 9. Plans and packages that were bound in Db2 10 can run in Db2 11, without the risk of migration-related autobinds. However, plans and packages that are bound in Db2 11 cannot run on Db2 10 members without an autobind in Db2 10.

If the autobinds are allowed to occur, they are inevitably disruptive for rolling online migrations, or any time that different releases coexist in data sharing environments. During and after migration, such autobinds can result in costly problems, including performance regression and even application outages.

Autobinds occur the first time that any plan or package runs in Db2 11, which means that the autobinds, and resulting problems and application outages, can occur well after a migration window. That is, such problems and resulting outages can occur any time in the "first impression" window in Db2 11, which is any time until the plan or package first runs in Db2 11.

The best approach is to bind all packages and plans that might be subject to migration-related autobinds in Db2 10 with good performance before you start the migration to Db2 11. Doing so reduces the risk of the following problems that can result from autobinds:

- Application failures because of contention between releases. For any migration that brings into release coexistence, autobinds might fail for plans or packages that are in use by a Db2 10 member, causing applications to fail on the Db2 11 member.

  Successful autobinds on Db2 11 in a coexistence environment also create a package or plan that Db2 10 members cannot run without another autobind. The autobind might also fail if the plan or package is in use by a Db2 11 member.
- Application failures, when autobinds fail for access control authorization exit users because the authorization ID for the autobind has insufficient privileges, compared to the owner of the package or the plan.
- Difficult to resolve performance regressions. For packages, a migration-related autobind also destroys the current package. If the autorebind succeeds but introduces an access path regression, REBIND SWITCH is not possible. Any performance regression that occurs in Db2 11 might also occur in Db2 10.

For more information about avoiding automatic binds during or after the Db2 11 migration process, see “Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11” on page 419.

The migration process binds new packages in Db2 11, including packages for Db2-supplied stored procedures, user defined functions, and tools such as SPUFI and the Db2 REXX language support. Data sharing members in the Db2 11 load and execute those programs from the Db2 11 SDSNLOAD library. Data sharing members on Db2 10 continue to load this packages from the SNDSNLOAD library for Db2 10.

If you must rebind some of your application packages in Db2 11 while coexistence with Db2 10 continues, you must consider how to handle the resulting binds and automatic rebinds while the different releases coexist.

Related concepts

Release coexistence in Db2 data sharing
In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Related tasks

Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11

By taking appropriate actions in Db2 10 well before migration to Db2 11, you can minimize the risk of disruptive automatic binds of application plans and packages during and after migration to Db2 11.

Related reference

AUTO BIND field (ABIND subsystem parameter)
The ABIND subsystem parameter specifies whether Db2 automatically rebinds packages and plans in certain situations at run time.

Related information

Recommendations for BIND in coexistence

If DSN is at Db2 11 and the member that is named in the DSN command is at Db2 10, using certain bind options causes a BIND or REBIND subcommand to be rejected.

If you are migrating from Db2 10, the following options cause BIND and REBIND commands to be rejected:

- APREUSE(WARN)
- ARCHIVESENSITIVE(YES|NO)
- BUSTIMESENSITIVE(YES|NO)
- DBPROTOCOL(DRDACBF)
- DESCSTAT(NO|YES)
- SYSTIMESENSITIVE(YES|NO)

To avoid problems, make sure that the member that is named in the DSN subcommand matches the load libraries that are used for the DSN command.

Related concepts

Automatic binds in coexistence
Changes to package structures that are introduced in Db2 11 are not available to members of the group that have not migrated. You must plan accordingly when developing your migration plan.

Related tasks

Rebind old plans and packages in Db2 10 to avoid disruptive autobinds in Db2 11
By taking appropriate actions in Db2 10 well before migration to Db2 11, you can minimize the risk of disruptive automatic binds of application plans and packages during and after migration to Db2 11.

Related information

Recommendations for utilities in coexistence

Until all members of the data sharing group are running Db2 11, avoid using any of the new utility functions that are available in Db2 11. However, as long as you use utility options that are supported in Db2 10, utilities can attach to either a Db2 10 or Db2 11 member.

Important: In data sharing release coexistence, you must restart a utility on a member on the same Db2 release as the member where the utility job was originally submitted. The same utility ID (UID) must be used to restart the utility. That UID is unique within a data sharing group. However, if Db2 fails, you must restart Db2 on either the same or another z/OS system before you restart the utility.

The utilities batch program (DSNUTILB) is split into multiple load modules: a release-independent load module called DSNUTILB, multiple release-dependent modules DSNUT101 or DSNUT111, and multiple utility-dependent load modules. To operate in a mixed-release data sharing environment, you must have DSNUT101 (if applicable), and DSNUT111. And you must have all utility-dependent load modules and their aliases for the utilities that you have purchased available to the utility jobs that operate across the data sharing group. The following examples show how you can make these load modules available.

Changing STEPLIB in DSNUPROC

The recommended method for making the release-dependent modules available for utility jobs is to change the STEPLIB in DSNUPROC to include the other release, as in the following example:

```
//DSNUPROC PROC LIB='DSN1110.SDSNLOAD',
//         SYSTEM=DSN,
//         SIZE=0K,UID='',UTPROC=''
//DSNUPROC EXEC PGM=DSNUTILB,REGION=&SIZE,
//         PARM='&SYSTEM,&UID,&UTPROC'
//STEPLIB  DD   DSN=&LIB,DISP=SHR;
//         DD   DSN=DSN1010.SDSNLOAD,DISP=SHR <— coexistence
//SYSPRINT DD   SYSOUT=*
//UTPRINT  DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//*DSNUPROC PEND        REMOVE * FOR USE AS INSTREAM PROCEDURE
```

Cross-copy into load libraries

Another approach, which is not recommended for long-term use, is to cross-copy the release-dependent modules into the load libraries of the other release. For example, copy DSNUT101 into the Db2 11 load libraries, and copy DSNUT111 and all applicable utility-dependent load modules into the Db2 10 load libraries. The problem with this approach is that you must repeat this procedure every time you apply maintenance to these modules. Thus, as with coexistence in general, this approach is only for short-term use.

The following shows sample JCL to perform the cross-copy:

```
//
CROSCOPY PROC D111TPRE='DSN1110',
//            D101TPRE='DSN1010',
//            RGN=4096K,SOUT='*'
//* ****************************************************************
//*    FOR EXECUTION OF IEBCOPY - DB2 POST-INSTALLATION             ***
//* ****************************************************************
//COPY     EXEC PGM=IEBCOPY,REGION=&RGN
//SYSUT3   DD  UNIT=SYSDA,SPACE=(CYL,(5,1))
//SYSUT4   DD  UNIT=SYSDA,SPACE=(CYL,(5,1))
//* **************  DB2 TARGET LIBRARIES  *****************************
//*
//D101LOAD DD  DSN=&D101TPRE..SDSNLOAD,DISP=OLD
//D111LOAD DD  DSN=&D111TPRE..SDSNLOAD,DISP=OLD
//*
//         PEND
//COEXIST  EXEC PROC=DSNTIJCO
//SYSIN    DD *
  COPYMOD INDD=((D111LOAD,R)),OUTDD=D101LOAD
   SELECT MEMBER=(DSNUT111)     <-- add any utility-dependent modules here
  COPYMOD INDD=((D101LOAD,R)),OUTDD=D111LOAD
   SELECT MEMBER=(DSNUT101)
```

Related information

Load module names for running purchased utilities in coexistence

Each utility that you purchase has a separate load module that is associated with one of 20 load modules.

When a utility is executed, it is loaded by using its load module, which is listed in the following table. By including in the link list the load module name for those utilities that you want, you can run in coexistence mode without specifying a STEPLIB in the JCL.

Table 73. Db2 11 utility features

Feature	Load Module Names
CATMAINT	DSNU11LA
CHECK	DSNU11LB

Table 73. Db2 11 utility features (continued)

Feature	Load Module Names
COPY	DSNU11LC
DIAGNOSE [1]	DSNU11LD
LISTDEF	DSNU11LE
LOAD	DSNU11LF
MERGECOPY	DSNU11LG
MODIFY	DSNU11LH
OPTIONS	DSNU11LI
QUIESCE	DSNU11LJ
REBUILD	DSNU11LK
RECOVER	DSNU11LL
REORG	DSNU11LM
REPAIR	DSNU11LN
REPORT	DSNU11LO
RUNSTATS	DSNU11LP
STOSPACE	DSNU11LQ
TEMPLATE	DSNU11LR
UNLOAD	DSNU11LS
COPYTOCOPY	DSNU11LT
EXEC SQL	DSNU11LU
BACKUP SYSTEM and RESTORE SYSTEM	DSNU11LV

[1] Use this utility only under the direction of IBM Support.

Table 74. Core utility load modules that are shipped with the base

DSNU11LA	DSNU11LD	DSNU11LE	DSNU11LI
DSNU11LJ	DSNU11LN	DSNU11LO	DSNU11LR

Recommendation for group restart in coexistence

If a group restart is necessary while the data sharing group is running in a coexistence environment, issue the START command only for Db2 11 members.

Do not start the Db2 10 members until the Db2 11 members have completed forward log recovery. If a Db2 10 member performs the group restart for a Db2 11 member, Db2 10 adds pages to the logical page list during the peer-forward recovery phase when it tries to apply redo log records against a release-dependent object.

IRLM service and release coexistence

As you apply IRLM service to members of a data sharing group, some members run with the newer service level, and some run with the older service level.

A mix of service levels can raise issues that you must consider.

When the IRLM subsystems in the group are at different service levels, the group function level for IRLM is the lowest IRLM function level. All IRLM subsystems in the group are functional, but any enhancements or fixes that were made at the higher function levels are not available.

Related tasks

Determining the function level of an IRLM group in coexistence
IRLM communicates coexistence information by using function levels. A *function level* is an ever-increasing number that each IRLM can use to tell other IRLMs in the group what level of function it supports.

Preparing for Db2 11 migration in Db2 data sharing

When planning the migration of data sharing members to Db2 11 it is best to take certain actions to reduce or avoid unnecessary operation complexity.

Procedure

To prepare for migration to Db2 11 in data sharing, complete the following steps:

- Before you migrate to Db2 11, read the information about release incompatibilities and make any necessary changes.

  For more information, see .
- Plan to minimize the amount of time that Db2 11 operates in release coexistence with members on Db2 10.

  For more information about release coexistence in Db2 data sharing, see "Release coexistence in Db2 data sharing" on page 612.
- Before you migrate to Db2 11 conversion mode, ensure that maintenance through the Db2 11 fallback SPE is applied to all started Db2 members.

  If the fallback SPE is not on all active group members, Db2 11 does not start but issues a message. If you have quiesced members in your data sharing group, you do not need to apply the fallback SPE to the quiesced member.
- Start only one Db2 member for migration processing.

  During the migration, other group members can be active. However, other active group members may experience delays or timeouts if they attempt to access catalog objects that are locked by migration or enabling-new-function mode processing. After migration completes on the first member, you can migrate the other data sharing group members.
- To prepare for possible fallback from Db2 11 conversion mode, keep the subsystem parameter load module that is used by the version that you are migrating from.
- After all members have migrated to Db2 11 conversion mode, remain in that mode until your data sharing group has processed a full range of typical work.

  The amount of time that a data sharing group needs to remain in Db2 11 conversion mode depends on the size of the data sharing group and the complexity of its typical work.

Related concepts

Planning for Db2 data sharing
Db2 data sharing introduces special requirements for your Db2 and z/OS environments.

Release coexistence in Db2 data sharing
In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Related tasks

Installing, migrating, and enabling Db2 data sharing

Whether you need to install, migrate, or enable data sharing depends on the type of system that you start with and the type of system that you want to create.

Migrating an existing data sharing group to Db2 11 conversion mode
If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

Migrating an existing data sharing group to Db2 11 conversion mode

If you have a Db2 10 Db2 data sharing group, and you want a Db2 11 data sharing group, you can migrate to the newer release.

Before you begin

Prepare your data sharing group for migration, as described in "Preparing for Db2 11 migration in Db2 data sharing" on page 620.

During the migration to Db2 11, other group members can be active, but they might experience delays or timeouts if they attempt to access catalog objects that are being updated or that are locked by migration processing. Before beginning the migration process, confirm that Db2 10 is at the proper service level. Also, check your coupling facilities to ensure that the appropriate service levels are installed. Having the wrong service levels installed can result in data corruption. No specific service level requirements exist for CFLEVELs other than 12, but CF levels 13 and 14 are recommended for additional function. Use the z/OS **D CF** command to display the service levels for IBM coupling facilities.

Important: Migration to Db2 11 is only supported from Db2 10.

Important: Apply the for fallback SPE () and stop and restart Db2 10 for every subsystem or data sharing member that you plan to migrate to Db2 11. For data sharing, every member must be started in Db2 10 after the fallback SPE is applied. After migration to Db2 11 new-function mode, any active members that did not start in Db2 10 with the fallback SPE applied prevent Db2 11 from starting. See "Required maintenance for Db2 11 installation or migration" on page 3.

Before you start to migrate your data sharing group:

- Read the information about migration considerations in .
- Read the information in .

Related concepts

The scope and uniqueness of Db2 subsystem parameters in data sharing
Although various parameters affect the operation of only a single member, some parameters must have the same value on all the members. For example, each catalog alias name must be the same. Other parameter values must be different on each member. For example, each member specifies a different BSDS name.

Migrating the first member of a group to Db2 11

You must first complete the migration of one member of the data sharing group to Db2 11 before starting any other members at Db2 11. You may choose any member as the first member to migrate to the new release.

About this task

The DB2I CLISTs are edited when the first member of a data sharing group migrates to Db2 11. The sample jobs are edited when the first member migrates to Db2 11, and they are also edited as part of preparation for enabling-new-function mode for the group.

Jobs tailored by they CLIST

Jobs that are marked with an asterisk (*) are modified only when you migrate the first member of a data sharing group.

DSNTIJCB
DSNTIJCX*
DSNTIJEX*
DSNTIJIC*
DSNTIJFT
DSNTIJFV
DSNTIJGF
DSNTIJIN*
DSNTIJMV
DSNTIJPD*
DSNTIJPM
DSNTIJSG*
DSNTIJVC*
DSNTIJTC*
DSNTIJTM
DSNTIJUZ
DSNTIJRT*
DSNTIJRV*
DSNTIJRW*

Procedure

Important: Follow these directions carefully. The first member of the data sharing group uses DSNTIDXA as its input member name. If you use SAP, specify DSNTIDXB, the SAP-specific CLIST input member, instead of DSNTIDXA. A subsequent member must use a previous member's output member name as its input member name.

To migrate the first member of a data sharing group to Db2 11:

1. Make a plan to migrate the data sharing group in as short a time period as possible. Migrating an existing data sharing group requires careful planning.
2. Apply maintenance through the Db2 11 fallback SPE to all active members.

   Important: Apply the for fallback SPE () and stop and restart Db2 10 for every subsystem or data sharing member that you plan to migrate to Db2 11. For data sharing, every member must be started in Db2 10 after the fallback SPE is applied. After migration to Db2 11 new-function mode, any active members that did not start in Db2 10 with the fallback SPE applied prevent Db2 11 from starting. See "Required maintenance for Db2 11 installation or migration" on page 3.

   Db2 11 members cannot start if any one of the active Db2 10 members does not have the fallback SPE applied.

   In case fallback becomes necessary, keep the subsystem parameter load module that is used by Db2 10.
3. For the first member to migrate, specify the following settings on installation panel DSNTIPA1:

   ```
   INSTALL TYPE ===> MIGRATE
   DATA SHARING ===> YES
   .
   DATA SET(MEMBER)NAME ===> this member's output member from Version 10
   .
   INPUT MEMBER NAME  ===> DSNTIDXA or DSNTIDXB
   OUTPUT MEMBER NAME ===> this member's output PDS member
   ```
4. On installation panel DSNTIP0B, specify option 1 to indicate that this is the first member of the group to migrate.

   ```
   | DSNTIP0B                            |
   |                                     |
   |  FIRST MEMBER OF GROUP TO MIGRATE?  |
   |                                     |
   |  Select one.                        |
   |          1 1. Yes                   |
   |            2. No                    |
   ```
5. Complete the installation panels. Specify parameters according to the Db2 subsystem parameters guidelines.

6. Complete all of the steps to migrate to Db2 11 conversion mode.

Related concepts

Subsystem parameters and application defaults in a data sharing environment
In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

Migrating subsequent members of a group to Db2 11

After you complete the migration of one member of a data sharing group to Db2 11, you can migrate subsequent members of the group.

About this task

To migrate subsequent members of a group to Db2 11, complete these tasks for each member:

Related tasks

Starting inactive data sharing group members from earlier releases in Db2 11
After migration to Db2 11, you might be able to activate data sharing group members that were last started in earlier Db2 releases.

Running the CLIST for migrating data sharing members

The process of migrating data sharing members to Db2 11 involves running some of the migration jobs. Before you run the migration jobs, tailor them to your environment by running the installation CLIST.

Before you begin

Be sure to complete the process of migrating the first member of the group before you begin to migrate subsequent members to Db2 11.

Procedure

To tailor the installation jobs for migrating data sharing members:

1. Invoke the installation CLIST as described in Chapter 4, “Tailoring Db2 11 installation and migration jobs with the CLIST,” on page 39.
2. On panel DSNTIPA1, specify the following fields.

```
INSTALL TYPE ===> MIGRATE
DATA SHARING ===> YES
.
DATA SET(MEMBER)NAME ===> this member's output member from Version 10
.
INPUT MEMBER NAME  ===> first member's output PDS member
OUTPUT MEMBER NAME ===> this member's output PDS member
```

3. On panel DSNTIP0B, specify 2 on to indicate that this is not the first member of the group to migrate.

```
| DSNTIP0B                             |
|                                      |
|  FIRST MEMBER OF GROUP TO MIGRATE?   |
|                                      |
|  Select one.                         |
|          2 1. Yes                    |
|            2. No                     |
```

4. Complete the installation panels, specifying parameters according to the Db2 subsystem parameters guidelines.

Related concepts

Subsystem parameters and application defaults in a data sharing environment

In a data sharing environment, you must consider the scope of subsystem parameters before setting the values for each member. Also consider the subsystem parameter load module and the application defaults load module that you will specify for each member.

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Connecting Db2 to IMS (optional)

Connecting Db2 to IMS is an optional part of migrating existing data sharing members to a new release. Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

1. Make Db2 load modules available to IMS.
2. Define Db2 to IMS.
3. Define new programs and transactions to IMS.
4. Prepare IMS applications for Db2.
5. Depending on your site, you might also need to:
   - Define Db2 plans for IMS applications.
   - Generate a user language interface.

Related tasks
Connecting the IMS attachment facility
Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Connecting CICS to Db2 (optional)

Connecting CICS to Db2 is an optional part of migrating members in a data sharing group. Connecting Db2 to CICS requires that you regenerate several CICS tables with additional entries.

About this task

A macro is supplied with CICS to define the connection between CICS and Db2 by using a resource control table (RCT).

Ensure that you coordinate the attachment facility connection with your CICS support group.

Procedure

To connect the CICS attachment facility:

1. Recalculate space requirements for the CICS attachment facility.
2. Define your CICS attachment facility parameters using the RCT.
3. Update the CICS system tables.
4. Update the CICS initialization JCL.
5. Coordinate Db2 and CICS security if necessary.
6. Prepare new CICS applications for Db2 if necessary.

Related tasks
Defining the CICS Db2 connection

Stopping Db2 activity

Before running any installation jobs to migrate a data sharing member, ensure that all work is stopped on the subsystem.

Procedure

To stop work on Db2:

1. Issue the following command, where *-DSN1* is the subsystem command prefix that is defined for Db2.

   You must have system administrator (SYSADM) or system operator (SYSOPR) authority to issue this command.

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   The QUIESCE keyword allows Db2 to complete the processing of programs that are currently executing. This might require some processing time.
2. Issue the following command to allow only the system administrators and system operators that were defined during installation to access Db2:

   GUPI

   ```
   -DSN1 START DB2 ACCESS(MAINT)
   ```

   GUPI

   If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. For example, if the bootstrap data set (BSDS) does not match the subsystem parameter values, ensure that the correct jobs were run for DSNTIJUZ. Ensure that you started Db2 with the correct subsystem parameter option.
3. Follow these steps to ensure that all Db2 10 work is stopped:

   - Make sure no units of recovery remain. Issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY THREAD(*) TYPE(*)
     ```

     GUPI

     Then use -DSN1 RECOVER INDOUBT for any indoubt threads.
   - Ensure that all utilities are completed or terminated. To ensure that no utility work remains, issue the following command:

     GUPI

     ```
     -DSN1 DISPLAY UTILITY(*)
     ```

     GUPI

     After you have determined the utilities that are running, you can let them complete processing or you can terminate the utility. To stop all utilities, issue the following command:

     ```
     -DSN1 TERM UTILITY(*)
     ```
   - Ensure that no table spaces and index spaces in the Db2 directory (DSNDB01) or the Db2 catalog (DSNDB06) have write error ranges or deferred restart states. To determine existing restrictions, issue the following commands:

GUPI

```
-DSN1 DISPLAY DATABASE(DSNDB01) SPACENAM(*) RESTRICT
-DSN1 DISPLAY DATABASE(DSNDB06) SPACENAM(*) RESTRICT
```

GUPI

You must have system administrator or system operator authority (specified on installation panel DSNTIPP1) to issue this command.

Recover any table spaces and index spaces that have write error ranges or deferred restart states by using the RECOVER utility.

4. Stop Db2by issuing the following command:

   GUPI

   ```
   -DSN1 STOP DB2 MODE(QUIESCE)
   ```

   GUPI

   A user with installation system administrator (installation SYSADM) or installation system operator (installation SYSOPR) authority must enter this command.

Related information

Defining Db2 initialization parameters: DSNTIJUZ

Job DSNTIJUZ generates the Db2 data-only subsystem parameter module DSNZP*xxx*, the application defaults load module (*dsnhdecp*), and the data-only load module DSNHMCID. For migrating members, job DSNTIJUZ only contains a subset of the steps that are contained in the DSNTIJUZ job for the first migrated member. The application defaults load module, *dsnhdecp*, is not reassembled for each subsequent migrating member.

Procedure

To define the Db2 initialization parameters:

1. Save your Db2 10 subsystem parameter module so that it is available in case you need to fall back.
2. Run job DSNTIJUZ.

Results

The DSNTINST CLIST performs calculations by using the values that you specified for some of the parameter values that you entered on the panels. These calculations appear in the macro descriptions.

Establishing subsystem security: DSNTIJRA (optional)

Db2 lets you control access to data within Db2. Db2 also works together with outside security systems, such as RACF, that control access to the Db2 subsystem.

About this task

Because your Db2 11 subsystem reuses the data objects from your Db2 10 subsystem, you have probably already supplied the protection that those objects need. However, you probably want to protect the new (Db2 11) Db2 data objects.

Procedure

To establish subsystem security:

1. Customize job DSNTIJRA, as described in the job prolog.

2. Run job DSNTIJRA.

   Job DSNTIJRA defines the administrative task scheduler started task module to RACF program control and defines the administrative task scheduler as a trusted context in RACF. DSNTIJRA is intended for the site security administrator, and can be run any time prior to installing or migrating to Db2 11.
3. If you have a Db2 data sharing environment, customize and run DSNTIJRA for each member of the group.

Related information

Defining Db2 to z/OS: DSNTIJMV

Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS, including updating members of SYS1.PARMLIB and SYS1.PROCLIB.

Before you begin

Tip: For SYS1.PROCLIB, submit the procedure-update section of DSNTIJMV as necessary. However, before you make the updates, read the information about DSNTIJMV, and examine DSNTIJMV to study the updates that it makes. Edit the updates directly in SYS1.PARMLIB instead of submitting the updates in the DSNTIJMV job.

About this task

For migrating data sharing members, job DSNTIJMV contains a subset of the steps that are contained in the DSNTIJMV job that is used for the first migrating member. The steps to update the IEAAPF*xx* and LNKLST*xx* members and the steps to update the language procedures are not included in the job for migrating subsequent members.

Procedure

Run job DSNTIJMV.

If job DSNTIJMV runs successfully, it produces return codes of 0. Because a rename can fail without setting the return code, verify all renames.

What to do next

Because different sites have different requirements for identifying Db2 to z/OS, DSNTIJMV cannot anticipate all the necessary updates. For this reason, the updates that job DSNTIJMV makes in SYS1.PARMLIB and SYS1.PROCLIB are incomplete. You might have additional procedures of your own to rename, or you might have to provide procedures for both releases, using alias names to indicate the current release. If you changed the Db2 subsystem name, the names of the Db2 address space startup procedures also change. If you made any changes to your Db2 10 procedures (such as data set names), make similar changes to the Db2 11 procedures. You can complete these updates either by making the updates directly in SYS1.PARMLIB and SYS1.PROCLIB or by editing DSNTIJMV.

Before starting Db2, check the private area sizes in the SYS1.PROCLIB update section to ensure that you have enough user private area.

Also, examine the size of the private area on the Db2 startup procedures. If necessary, modify them to satisfy the requirements for EDM pool size, buffers, numbers of open data sets, and the amount of available private address space.

Related reference

z/OS SETSSI Command (MVS System Commands)

z/OS SETPROG Command (MVS System Commands)

Related information

Refresh the z/OS definition of Db2

As part of the migration to Db2 11, you must refresh how Db2 is defined to z/OS.

Before you begin

Run job DSNTIJMV, as described in "Defining Db2 to z/OS: DSNTIJMV" on page 627.

About this task

This migration task is necessary to apply, for new Db2 and IRLM subsystem parameter definitions.

Procedure

If you changed Db2 or IRLM subsystem parameters during the migration, do an initial program load (IPL) of z/OS.

You must do this action to apply any Db2 or IRLM subsystem parameter changes in member IEFSSN*xx*.

After the IPL for z/OS completes, message DSN3100I is displayed on the z/OS console, stating that Db2 is ready for the START command.

What to do next

Start Db2, as described in "Starting Db2 11" on page 628.

Related concepts

DSNTIJMV actions
Job DSNTIJMV updates SYS1.PARMLIB and SYS1.PROCLIB to help identify Db2 to z/OS. It also creates Language Environment options data sets for the Db2 core WLM environment for Java routines.

Related information

Starting Db2 11

During migration to Db2 11, start the Db2 subsystem after you run job DSNTIJMV and IPL z/OS.

Procedure

To start Db2:

1. Start the IRLM.

   If you have not requested that Db2 automatically start the IRLM, you should start it before you start Db2. Use the following command, where *irlmproc* is the name that you assigned to the IRLM startup procedure:

   ```
   START irlmproc
   ```

   The *irlmproc* is the value that you specified for the PROC NAME option on installation panel DSNTIPI.

   If you specified YES for the AUTO START option on installation panel DSNTIPI, Db2 starts the IRLM automatically.

2. Start Db2 from the z/OS console with the following command, where -DSN1 is the subsystem command prefix that you defined for Db2, and *DSNZPxxx* is the name of the Db2 initialization parameter module:

   ```
   -DSN1 START DB2 PARM(DSNZPxxx)
   ```

   If you omit the PARM parameter, and you specified a value in the PARAMETER MODULE field on installation panel DSNTIPO3, that value is used as the parameter module name. If you did not specify a parameter module on panel DSNTIPO3, Db2 uses the default, DSNZPARM.

If you did not run job DSNTIJRT when you migrated the first member of the group and the administrative task scheduler starts, the administrative task scheduler issues error message DSNA679I to report SQLCODE -805 until you run job DSNTIJRT. The administrative task scheduler starts if you specified an address space procedure name in the ADMIN SCHEDULER field on installation panel DSNTIPX.

If Db2 starts successfully, some or all of the following address spaces start, where *ssnm* is the Db2 subsystem name.

- The system services address space (*ssnm*MSTR)
- The database services address space (*ssnm*DBM1)
- The IRLM address space (*irlmproc*), where *irlmproc* is the IRLM procedure name
- Possibly, the DDF address space (*ssnm*DIST)
- Possibly, the administrative task scheduler stored procedure address space (*ssnm*ADMT)

If Db2 starts successfully, the series of RESTART messages that you receive concludes with these two messages:

```
DSNR002I   RESTART COMPLETED
DSN9022I   DSNYASCP '-DSN1 START DB2' NORMAL COMPLETION
```

If Db2 does not start properly, it usually abends with a reason code that indicates where the error occurred. To find the error, check the set of definitions for the associated resource. A common cause of startup failure is that the BSDS does not match the subsystem parameter values; ensure that the correct job was run for DSNTIJUZ. Also, check that the subsystem parameter member that you specified (or used by default) when you started Db2 is the one that the DSNTIJUZ job built. Check the JCL for the Db2 startup procedure.

3. If you want to use the TSO SUBMIT command to do housekeeping and migration verification, start TSO (if it is not already started).
4. If you did not enable primary user IDs to issue Db2 commands from the z/OS console or TSO SDSF when you first installed the subsystem, take one of the following actions:

   - Grant SYSOPR authority to all primary user IDs that issue Db2 commands from the z/OS console or TSO SDSF. Issue the following command:

     ```
     GRANT SYSOPR TO userid
     ```

   - Define RACF classes to authorize Db2 commands. Use the following statements:

     ```
     SETR CLASSACT(DSNADM)
     RDEFINE DSNADM DSN1.SYSOPR UACC(NONE)
     SETR RACLIST(DSNADM) REFRESH
     PERMIT DSN1.SYSOPR CLASS(DSNADM) ID(userid) ACCESS(READ)
     SETR RACLIST(DSNADM) REFRESH
     ```

Related information

Creating additional work file table spaces (optional)

During migration, you have the option of specifying on installation panel DSNTIP9 that additional work file table spaces are to be created for that member.

Procedure

Run job DSNTIJTM.

Verifying your Db2 11 system in conversion mode (optional)

Verify your Db2 11 conversion mode system by running some of the sample jobs from the previous release.

About this task

If all of the local Db2 objects from Db2 10 still exist (that is, if you have not run job DSNTEJ0), follow this procedure.

Procedure

To verify your Db2 11 conversion mode system:

1. Change the JOBLIB statements to point to *prefix*.SDSNLOAD.
2. Ensure that the DSN8EAE1 module that you created when you originally ran the Db2 10 sample jobs is copied to *prefix*.SDSNEXIT. DSN8EAE1 is an EDITPROC that is used by the employee sample table.
3. Edit the Db2 10 sample jobs before running them. Do not run all the sample jobs. Run only the specific jobs and job steps that are listed in the following steps.
4. Test the migration of the IVP phase 2 applications from your previous version:
   a. DSNTEJ2A: Perform all except the first two steps of job DSNTEJ2A. Expect a return code of 4 because table spaces DSN8D10U.NEWDEPT and DSN8D10U.NEWPHONE are placed in COPY-pending states.
   b. DSNTEJ2C: Issue only the RUN PROGRAM(DSN8BC3) PLAN(DSN8BH10) statement in step PH02CS04.
   c. DSNTEJ2D: Issue only the RUN PROGRAM(DSN8BD3) PLAN(DSN8BD10) statement in step PH02DS03.
   d. DSNTEJ2E: Issue only the RUN PROGRAM(DSN8BE3) PLAN(DSN8BE10) statement in step PH02ES04.
   e. DSNTEJ2F: Issue only the RUN PROGRAM(DSN8BF3) PLAN(DSN8BF10) statement in step PH02FS03.
   f. DSNTEJ2P: Run only step PH02PS05.
5. Test the migration of the IVP phase 3 applications from your previous version:
   a) Do not run job DSNTEJ3C or DSNTEJ3P.
   b) If you want to test the Db2 10 ISPF-CAF applications under Db2 11, place the Db2 10 SDSNSPFP panel library ahead of the Db2 11 SDSNSPFP panel library in the ISPPLIB concatenation.

      This placement is necessary so that the plans that are migrated from Db2 10 can be used. Remove the Db2 10 SDSNSPFP library from your ISPPLIB concatenation when you are finished testing the Db2 10 IVP applications under Db2 11.

What to do next

Do not run any other Db2 10 sample jobs.

Related tasks

Ensure that sample objects from your previous release are available
If you no longer have the IVP jobs from your previous release, you need to run the previous release's installation CLIST to regenerate them.

Falling back and remigrating in a data sharing environment

In a data sharing environment, you can fall back from Db2 11 or remigrate one member at a time or all members at the same time.

Related concepts

Release coexistence in Db2 data sharing

In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Falling back in a data sharing environment

If you need to fall back to Db2 10, you can fall back one member of the data sharing group at a time. Other members can continue to run while one member is falling back.

Before you begin

If all members have already been migrated to the new release, and you fall back one member at a time, the group is running in coexistence mode after the first member falls back.

Procedure

To fall back to Db2 10:

1. Stop Db2 on the member that is falling back or stop Db2 on all members if you are falling back all members at once.
2. Run job DSNTIJFV to reactivate Db2 10 for that member or for all members.
3. Reconnect TSO, IMS, CICS to Db2 10.
4. Start Db2 10:
   a) Enter the command **`START DB2`**:
      i) Check for indoubt units of recovery.
      ii) Check for outstanding restrictive states.
5. Verify Db2 10.
6. Repeat steps 1 through 5 for each member (or all members) of the data sharing group.

Related concepts

Release coexistence in Db2 data sharing
In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Related tasks

Creating an automatic restart policy
If the default action of restarting Db2 and IRLM is the action that you want, you do not need to create an automatic restart policy.

Remigrating in a data sharing environment

You can remigrate one member at a time or all members of a data sharing group.

Before you begin

Before you remigrate, refer to because many of those considerations apply to remigrations, too. Whether each consideration applies to your subsystem depends on the type of activity that took place on your Db2 10 subsystem after falling back.

Regardless of the ABIND subsystem parameter value, plans and packages continue to run on Db2 11 as bound on Db2 10, until you explicitly rebind them on Db2 11. It is best to do so only after you are certain that Db2 11 is stable and release coexistence and fallback are no longer a concern.

Recommendation: Avoid automatic rebinds during migration and remigration. After your remigrated system is stable, you can rebind your packages with PLANMGMT(EXTENDED). If a new package does not perform adequately, you can rebind with SWITCH(PREVIOUS) to return to the old package.

Procedure

To remigrate your subsystem to Db2 11:

1. Check the integrity of your Db2 10 catalog and directory:
   - Run the DSN1COPY utility with the CHECK option on your catalog table spaces.
   - Run the CHECK DATA utility.
   - Run the queries in member DSNTESQ of *prefix*.SDSNSAMP.
2. Optional: Ensure that your Db2 10 DSNTIJIC job has been modified to copy new Db2 11 catalog table spaces, and then use DSNTIJIC to take an image copy of your Db2 10 catalog.

   This step is not required, but it is recommended.
3. Stop Db2 10.
4. Reconnect TSO, IMS, and CICS to Db2.

   Re-establish your Db2 11 logon procedures and JCL, as well as your Db2 11 CICS and IMS connections.
5. Rebuild Db2 11 cataloged procedures.

   Rename the Db2 11 procedures that were renamed by job DSNTIJFV during fallback. If job DSNTIJFV was not run, you need to rerun job DSNTIJMV. Comment out step 1 (DSNTIMP), which defines Db2 11 to z/OS, and run the job. (You do not need to define Db2 11 to z/OS a second time.)
6. Start Db2 11.

   Ensure that you are using your Db2 11 subsystem parameter load module.
7. Take an image copy of the Db2 11 catalog by using the DSNTIJIC job.
8. Verify your Db2 11 system.

Related concepts

Release coexistence in Db2 data sharing
In *release coexistence*, applications can continue to access Db2 data while you migrate the members of the data sharing group. However, you must weigh the benefit of continuous availability against the operational costs of running in coexistence. Most new capabilities and enhancements in Db2 11 remain unavailable during coexistence, and additional system management considerations apply.

Related tasks

Falling back in a data sharing environment
If you need to fall back to Db2 10, you can fall back one member of the data sharing group at a time. Other members can continue to run while one member is falling back.

Re-enabling Db2 data sharing
Re-enabling Db2 data sharing involves a subset of the original tasks that were required to enable data sharing. You cannot use the enabling process of installation to re-enable Db2 data sharing.

Migrating a data sharing group to new-function mode

After all active members of a data sharing group are running in Db2 11 conversion mode, you can migrate the group to new-function mode. You cannot use new Db2 11 facilities until the group is in new-function mode.

Before you begin

Before completing the migration, ensure that all active members are running in Db2 11 conversion mode.

About this task

Unlike migrating to conversion mode, you migrate the data sharing group to new-function mode by completing a group-wide process on a single member. Other members of the data sharing group can be active when you complete these steps, but all active members must be running in Db2 11 conversion mode. You can migrate members that remain inactive during this process to the new release at a later time.

The only exception is converting BSDS records to support extended 10-byte RBA and LRSN formats, which is an optional task that is repeated for each member. This task is described in more detail in the instructions for migrating to new-function mode.

You must continuously monitor the RBA and LRSN values until all catalog, directory, and user objects are converted to the 10-byte RBA or LRSN format. Failure to convert page sets before the 6-byte soft logging limit is reached results in failed updates with reason code 00C2026D, and any objects still in the 6-byte format become read-only. RBA or LRSN values greater than x'F00000000000' indicate that your system is at risk of reaching the 6-byte logging limit.

Procedure

Complete the following tasks on a single member: .

Related tasks

Starting inactive data sharing group members from earlier releases in Db2 11
After migration to Db2 11, you might be able to activate data sharing group members that were last started in earlier Db2 releases.

Starting inactive data sharing group members from earlier releases in Db2 11

After migration to Db2 11, you might be able to activate data sharing group members that were last started in earlier Db2 releases.

About this task

When you migrate a data sharing group to new function mode, all active members of the data sharing group must be running in Db2 11 conversion mode. However, members that remain inactive when you complete that step can be migrated to Db2 11 and started in the data sharing group at later time.

Procedure

To start data sharing members that were last started in a previous Db2 release:

1. If the inactive member was deactivated, reactivate it by following the instructions in .
2. Convert the BDSD to the format supported by Db2 11. For example, you might need to complete the following conversions:
   a) If the member was last started in a Db2 release before DB2 9, run the DSNJCNVB utility to convert the BSDS of the inactive member.

      If the inactive member was never started in the data sharing group after DB2 Version 7, you must use the DSNJCNVB job from a DB2 9 or a newer release to complete this step.

   b) If the member was last started in a release before Db2 12, and BSDS of the inactive data sharing member has not been converted to use the extended RBA and LRSN fields, run the DSNJCNVT utility complete the conversion.

   You must run the DSNJCNVB utility before you complete this step.

   If the member was last started in a release earlier than Db2 11, the BSDS conversion must be completed. You can use the DSNJU004 (print log map) utility to determine whether the BSDS for that member has already been converted to support the extended format. If the output contains the following message, the BSDS conversion is required: `DSNJCNVT CONVERSION PROGRAM HAS NOT RUN DDNAME=SYSUT`*x*

3. Migrate the inactive member to each earlier Db2 release before by following the instructions for those releases, and then migrate the inactive member to Db2 11 by following the instructions in "Migrating subsequent members of a group to Db2 11" on page 623.
4. Optional: If the data sharing group uses the expanded RBA and LRSN fields in the BSDS, run the DSNJCNVT utility to convert the BSDS of the inactive member.

   You can use the DSNTIJCB sample job to run the utility. You must run the DSNJCNVB utility before you complete this step.
5. Start the inactive member.
6. Restart active members so that they can record the updated status of the reactivated member.

Related tasks

Convert the BSDS, Db2 catalog, and directory to 10-byte RBA and LRSN format (Optional)
Any time after you migrate Db2 11 to new-function mode, you can optionally convert the bootstrap data set (BSDS), use the 10-byte RBA and LRSN fields. You must convert the catalog and directory to the 10-byte format before or soon after you convert the BSDS to the 10-byte format.

Related reference

Job DSNTIJCB
Job DSNTIJCB supports the DSNJCNVT stand-alone utility for converting the BSDS records to support 10-byte RBA and LRSN fields.

Related information

Testing the data sharing group

When you installed Db2, sample objects were created in job DSNTEJ1. The DSNTESD member of *prefix*.SDSNSAMP contains SQL statements that refer to these objects. Use these SQL statements to test group buffer pool caching, global lock serialization, and concurrency in the data sharing group.

Perform these tests after installing several data sharing members.

Testing group buffer pool caching

You can use SQL statements in member DSNTESD to verify that the group buffer pool caching operates correctly.

Procedure

To verify that the group buffer pool operates correctly:

1. Run SPUFI on more than one data sharing member, using member DSNTESD as the input data set.

   Specify AUTOCOMMIT=YES on the SPUFI panel.

   Run SPUFI on the different members serially, a few seconds apart if possible. (The runs must be close enough together to avoid having Db2 close the page set because of infrequent updates. The amount of time before Db2 switches the page set from read-write to read-only after the last update is specified by the PCLOSET subsystem parameter setting. See "RO SWITCH TIME field (PCLOSET subsystem parameter)" on page 244. The PCLOSEN subsystem parameter setting can also cause the data set to switch to read-only, based on the number of consecutive checkpoints. See .

   By running the SQL statements serially, Db2 detects inter-Db2 read/write interest on the table space and index and uses the group buffer pool.
2. Verify that ITEM_COUNT increases by five after each run.
3. Issue the following command to determine whether the table space and index are using the group buffer pool:

GUPI

```
DIS DB(DSN8D11A) SPACENAM(DSN8S11S,XPARTS) LOCKS
```

GUPI

If the P-lock state is IX or SIX, then the table space and index are group buffer pool dependent, which is the correct state.

4. Issue the following command to display the statistics for GBP0:

   GUPI

   ```
   DIS GBPOOL(GBP0) GDETAIL
   ```

   GUPI

   In the group detail statistics, look for non-zero values in the READS and WRITES values of the display. This indicates that Db2 is using the group buffer pool successfully for caching.

Testing global lock serialization

Use the SQL statements in member DSNTESD to verify that locks are acquired and released correctly across multiple data sharing members.

Procedure

To test global lock serialization:

1. Run SPUFI, using member DSNTESD as input, on **member 1**.

   Specify AUTOCOMMIT=NO.

   Because you have inserted data into DSN8B10.PARTS but have not committed, **member 1** holds global locks.
2. Run SPUFI, using member DSNTESD as input, on **member 2**.

   Specify AUTOCOMMIT=NO.

   Because **member 1** holds global locks, **member 2** must wait to perform the insert.
3. In less than one minute, commit on **member 1**.

   (If you wait too long to commit, **member 2** will experience a lock timeout.)

   The global locks should be released, and **member 2** should be able to proceed. Verify that ITEM_COUNT has increased by five.

Testing concurrency

You can use the SQL statements in member DSNTESD to test concurrency within the data sharing group.

Procedure

To test concurrency:

1. Run SPUFI concurrently on different data sharing members.

   Specify AUTOCOMMIT=YES.

   Global locking ensures that inserts to DSN8B10.PARTS are coordinated across data sharing members.
2. Verify that ITEM_COUNT increases by five each time the run completes successfully.

Disabling and re-enabling Db2 data sharing

Disabling Db2 data sharing is a complex procedure and is very disruptive. Do not attempt to disable Db2 data sharing without a thorough understanding of the process.

Do not make disabling Db2 data sharing part of your contingency plans for handling recovery situations. For temporary bypasses to data sharing problems, try moving to one-way data sharing, which involves stopping all but one member and having that member perform the work for the group. If one-way data sharing does not work, your data sharing problem might be resolved by performing a group restart.

The disabling procedure is included in this section for completeness, but it should rarely be used. Situations in which it might be necessary to disable Db2 data sharing are:

- You made a strategic decision to move away from a data sharing environment.
- One-way data sharing is not working.

Restriction: Before you disable data sharing, the group must be running in Db2 11 new-function mode. You cannot disable data sharing from conversion mode or enabling-new-function mode.

After you disable Db2 data sharing, only one member of the data sharing group can access the previously shared data. That member is called the *surviving member*. Before you disable data sharing, the BSDS records of the surviving member must support 10-byte RBA and LRSN fields, and all page sets must be converted to extended format. For details, see .

If you plan to re-enable data sharing for a group, do not change any group-wide information in the BSDS of the surviving member. Group-wide information includes the catalog alias name and the database password. It also includes the DDF name and password information, even if you do not plan to use DDF when you re-enable Db2 data sharing. If you change any of this information, you need to change the information in every member's BSDS before you start the group.

Related information

Disabling data sharing

You should only disable data sharing with caution and with a thorough understanding of the process and results. Very few situations create a need to disable Db2 data sharing, such as if you have data sharing problems and one-way data sharing does not work.

Before you begin

To disable data sharing in Db2 11, your subsystems must be in new-function mode. If you migrated to Db2 11, do not attempt to disable data sharing prior to new-function mode.

The BSDS for the surviving member of the group must be converted to support 10-byte RBA and LRSN fields and all page sets must be converted to extended format. For details, see .

About this task

The procedure to disable data sharing ensures that the most recent versions of all pages are externalized from the group buffer pool to disk. Db2 does not use the group buffer pool after data sharing is disabled. You must ensure that data is written to disk, or else you lose data when you start Db2 after disabling data sharing.

Important: Other members' logs are not available to the surviving member after you disable data sharing.

You must also ensure that there is no need to recover data from information that is contained in other members' logs after you disable data sharing. To prevent the surviving member from applying inconsistent updates during recovery processing, a cold start is required to disable data sharing.

Important: Do not attempt to go through the installation process to re-enable data sharing after you have disabled it.

Procedure

To disable data sharing and return to a non-data-sharing environment:

1. Decide which member will be the surviving member of the group. The surviving member is the only member that can access previously shared data.

   If you have not already done so, run job DSNTIJCB to convert the BSDSs for the surviving member to the 10-byte RBA and LRSN format and start the member at least once with the BSDSs in the new format. Do not run job DSNTIJCB prior to Db2 11 new-function mode.
2. Stop all members by entering the following command for each member of the data sharing group:

   GUPI

   ```
   STOP DB2 MODE(QUIESCE)
   ```

   GUPI
3. Start the surviving member in maintenance mode by using the following command:

   GUPI

   ```
   START DB2 ACCESS(MAINT)
   ```

   GUPI
4. Make sure that data is consistent.

   Enter the following commands from the surviving member of the group. Do not proceed to the next step until all problems are resolved.

   - DISPLAY GROUP

     Ensure that the status of the surviving member is ACTIVE and that the status of all other members is QUIESCED. If the status of a non-surviving member is not QUIESCED, take the following actions, depending on the member's status:

     – If the member's status is FAILED, restart and then stop the member.

     – If the member has castout problems, indoubt units of recovery, or outstanding resynchronization problems, start that member in maintenance mode and fix the problem.
   - DISPLAY UTILITY(*)

     If any utility work remains for any member of the group, restart that member with ACCESS(MAINT) and either stop the utility or let it finish.
   - DISPLAY DATABASE(*) SPACENAM(*) RESTRICT

     If any restricted table spaces or index spaces (such as write error ranges, recovery pending status, or logical page list entries) exist, recover them from the surviving member.
5. Stop the surviving member by using the following command:

   GUPI

   ```
   STOP DB2 MODE(QUIESCE)
   ```

   GUPI
6. Stop any IRLMs that have not stopped by using the following command:

   GUPI

   ```
   STOP irlmproc
   ```

GUPI

7. Dismantle the data sharing group.

   a) Enter the following command to display the structures for the data sharing group:

   ```
   D XCF,STRUCTURE,STRNAME=grpname*
   ```

   b) For all structures that are still allocated (STATUS:ALLOCATED) and that still have connections (which appear as FAILED PERSISTENT), enter the following command to force the connections off of those structures:

   ```
   SETXCF FORCE,CONNECTION,STRNAME=strname,CONNAME=ALL
   ```

   Important: If your site is running z/OS with APAR OA02620 applied, you do not need to force failed-persistent connections off of the lock structure. When you forcibly deallocate the lock structure (see the next step), the system deletes failed-persistent connections to the structure for you.

   c) Delete all the Db2 coupling facility structures by using the following command for each structure:

   ```
   SETXCF FORCE,STRUCTURE,STRNAME=strname
   ```

   d) Edit the JCL in job DSNTIJGF to point to the correct BSDS data sets.

   DSNTIJGF is a change log inventory job that sets up the surviving member for a cold start.

   Important: Do not change the hex values that appear in the change log inventory CRESTART control statement. They are not real RBA values.

   e) Run job DSNTIJGF.

   After you run this job, do not try to restart any of the non-surviving members. None of those members can start successfully.

8. Change the IRLM procedure to SCOPE=LOCAL.
9. Start the surviving member with ACCESS(MAINT).

   Specify the old DSNZP*xxx* from the non-data sharing environment, where the DSHARE subsystem parameter is set to NO. If you do not have the old DSNZP*xxx* or if the surviving member is not the originating member, reassemble the surviving member's subsystem parameters with DSHARE=NO in the invocation of the DSN6GRP macro. Also, comment out all steps from the DSNTIJUZ job except for those that reassemble and link-edit the subsystem parameters.

   When you start Db2 after running DSNTIJGF, respond with Y to a cold start prompt (message DSNJ246I on the z/OS console).

   This is a cold start because Db2 increases the log RBA to a value higher than any LRSN used while sharing data. From this point on, your RBAs look like LRSNs.

10. Edit and run job DSNTIJFT, if necessary, to ensure that the surviving member's work file database is DSNDB07.

    The surviving member must use DSNDB07 as its work file database. If the work file database for the surviving member is not DSNDB07, drop that work file database and run job DSNTIJFT.

11. Verify that the surviving member works by running a subset of the Db2 11 installation verification sample jobs.
12. To establish a new recovery point, take a full or incremental image copy or non-Db2 backup of all data.

    Run job DSNTIJIC to image copy the Db2 catalog and directory.

    Recommendation: Perform this step as soon as possible after data sharing is disabled.

13. Stop and restart Db2 for normal unrestricted access.

What to do next

After disabling Db2 data sharing, you can continue to use the group attachment name or subgroup attachment name. The group attachment name or subgroup attachment name does not need to be changed to the surviving member's subsystem ID.

Related concepts

Data recovery after disabling Db2 data sharing

After Db2 data sharing is disabled, you cannot recover to the current point or to a previous point in time if that recovery depends on any portion of the log that was made before you disabled data sharing.

Related tasks

Verifying successful Db2 11 installation or migration with sample applications

You can use the Db2 Db2 11 sample applications to verify either installation or migration to new-function mode. These sample applications are also called installation verification procedures (IVPs).

Data recovery after disabling Db2 data sharing

After Db2 data sharing is disabled, you cannot recover to the current point or to a previous point in time if that recovery depends on any portion of the log that was made before you disabled data sharing.

Therefore, if the table space is updated between the time of the copy and the time you disabled data sharing, Db2 does not let you use that copy as the basis for recovery. This is why you should create a new recovery point as soon as possible after you have disabled data sharing.

Re-enabling Db2 data sharing

Re-enabling Db2 data sharing involves a subset of the original tasks that were required to enable data sharing. You cannot use the enabling process of installation to re-enable Db2 data sharing.

About this task

The following output from the original Db2 data sharing enabling procedure remains intact after disabling Db2 data sharing and does not need to be re-created or re-specified:

- Data sharing subsystem parameters (output from the CLIST processing when enabling data sharing)
- XCF definitions
- Coupling facility definitions
- RACF definitions
- Db2 catalog and directory

Procedure

To re-enable Db2 data sharing:

1. Edit the JCL in job DSNTIJGF.

   DSNTIJGF is a change log inventory job that sets up the BSDS of the surviving member for data sharing.
2. Run job DSNTIJGF.
3. Change the IRLM procedure to SCOPE=GLOBAL.
4. Start the surviving member with the subsystem parameters that were used when data sharing was originally enabled.

   During startup, you are asked to start all other members that were not quiesced at the time that you disabled Db2 data sharing. You must start all these members.
5. Edit and run job DSNTIJFT on the surviving member to re-create the work file database for data sharing.

   See the directions in the prologue of job DSNTIJFT for information about editing this job to re-enable Db2 data sharing.

Chapter 9. Verifying successful Db2 11 installation or migration with sample applications

You can use the Db2 Db2 11 sample applications to verify either installation or migration to new-function mode. These sample applications are also called installation verification procedures (IVPs).

Before you begin

⚠ **Attention:**

Do not run the Db2 11 IVP jobs unless your subsystems are in Db2 11 new-function mode.

Until you complete this task, continue to use sample applications such as DSNTIAUL, DSNTEP2, and DSNTEP4 from Db2 10.

About this task

Recommendations:

- During verification, run all sample applications under the same user ID. This user ID must have SYSADM authority. Otherwise, errors might occur.
- Run the IVP jobs with Db2 started in unrestricted mode because restricted mode (ACCESS(MAINT)) does not allow use of stored procedures and user-defined functions.
- If you are installing a data sharing group, run the IVP jobs after you install or migrate the originating system. You do not need to run the IVP jobs after you enable the originating system or after you install a new data sharing member.
- You must use the same compiler for each job. For example, if you use IBMCOB for DSNTEJ2C, you must use IBMCOB for all COBOL verification programs.
- After you designate a client and server subsystem, run all verification jobs on the same client and server subsystems.

Procedure

To verify a successful installation or migration:

1. For testing purposes, identify one local subsystem to act as the client and one remote subsystem to act as the server. Both subsystems must be at Db2 11.

   Although not recommended, the client and server subsystem can be the same if a remote subsystem is not available for testing.
2. Ensure that the client subsystem is specified in the Db2 LOCATION NAME field of installation panel DSNTIPR.
3. Ensure that the server subsystem is specified in the REMOTE LOCATION field of installation panel DSNTIPY.
4. Identify the IVP jobs that you need to run based on the attachment facilities you installed, the languages you use, and whether the sample objects exist.
5. Edit the sample jobs as necessary based on the information that is provided for the jobs.
6. Run the necessary IVP jobs.

What to do next

When you complete the verification procedure, save the verification objects. You will need them when you migrate to the next release of Db2.

Related tasks

Enabling Db2 data sharing
The enabling process allows an existing Db2 subsystem to be the originating member of a data sharing group; it does not allow you to change the subsystem name.

Migration step 27: Verify your Db2 11 conversion mode system (optional)
Verify your Db2 11 conversion mode system by running some of the sample jobs from your previous release.

Installation step 23: Verify successful installation of Db2 11
You can run the sample applications to verify that your installation process was successful.

Verifying successful migration to Db2 11
After you activate , you can run the sample applications to verify that your migration process was successful.

Installation verification phases and programs

In each phase of the installation verification procedure (IVP), you must run specific programs. These programs need to be run sequentially by phase because the output of some jobs is used as input for subsequent jobs.

The IVP consist of eight phases: seven verification phases and one cleanup phase that drops sample objects (Phase 0). Each of the seven verification phases tests one or more Db2 functions or attachment facilities. Certain phases of the verification procedure might not apply to the environment in which your Db2 subsystem operates, so you might not need to complete all phases. In some cases, the steps and return codes differ when you run the fallback release and Db2 11 phases. These differences are noted under the proper phase.

Run Phase 0 (job DSNTEJ0) only if you want to remove all the verification processing that you have completed so that you can begin the verification procedure again. Phases 1-3 test the TSO and batch environments, including user-defined functions. Phase 4 is for IMS users only, and Phase 5 is for CICS users only. Phase 6 sets up the sample tables and stored procedures for distributed processing. Phase 7 tests the LOB feature with sample tables, data, and programs.

prefix.SDSNSAMP contains the program source.

Each phase consists of one or more batch jobs and some phases also consist of online activities. You run the same jobs regardless of whether you are installing Db2 for the first time or migrating your Db2 11 catalog to new-function mode. The installation CLIST tailored and loaded these jobs into *prefix*.NEW.SDSNSAMP, which you created during your installation or migration to new-function mode. The verification jobs use source code and data from the untailored *prefix*.SDSNSAMP library. Most Db2 sample objects have unique names to differentiate them from objects of previous releases. This allows sample programs for multiple releases to coexist. The JCL that is provided for IMS sets up transaction identifiers for the sample applications.

The following table shows the programs and jobs that are run in each phase of the verification procedure. These jobs are designed to run with minimal interaction on your part. However, before running these jobs, you should make any modifications that are suggested in the information about each job.

Table 75. Relationship of IVP phases to programs

Phase	Job	Program	Description
0	DSNTEJ0	DSNTIAD	Remove sample applications and sample schema authorizations
1	DSNTEJ1	DSNTIAD	Create tables
		DSN8CA	Assembler interface to call attach facility
		DSN8EAE1	Edit exit routine
		DSN8HUFF	Huffman compression exit routine

Table 75. Relationship of IVP phases to programs (continued)

Phase	Job	Program	Description
		DSNUTILB	Utilities
	DSNTEJ1L	DSNTEP2	Dynamic SQL program
	DSNTEJ1P	DSNTEP2	Dynamic SQL program
	DSNTEJ1S[1]	DSNHSP	See note 1
	DSNTEJ1T[2]	DSNUPROC	See note 2
	DSNTEJ1U	DSNTIAD	Create Unicode table
		DSNUTILB	Load Unicode table
		DSNTEP2	Select Unicode table
2	DSNTEJ2A	DSNTIAD	Grant execution
		DSNTIAUL	Unload and load tables
		DSNUTILB	Utilities
	DSNTEJ2C	DCLGEN	Generate declarations
		DSNTIAD	Grant execution
		DSN8BC3	COBOL phone application
	DSNTEJ2D	DSNTIAD	Grant execution
		DSN8BD3	C phone application
	DSNTEJ2E	DSN8MDG	Prepare error message routine
		DSN8BECL	Prepare classes used by C++ phone application
		DSNTIAD	Grant execution
		DSN8BE3	C++ phone application
	DSNTEJ2F	DSNTIAD	Grant execution
		DSN8BF3	Fortran phone application
	DSNTEJ2H	DSN8EDXR	Sample application to format and display an XML record
		DSN8EDXU	Sample application to format and update an existing XML record
		DSN8EDXI	Sample application to insert an XML record
		DSN8EDXD	Sample application to delete an XML record
	DSNTEJ2P	DCLGEN	Generate declarations
		DSNTIAD	Grant execution
		DSN8BP3	PL/I phone application
	DSNTEJ2U	DSNTIAD	Register sample user-defined functions
		DSN8DUAD	C program for ALTDATE function (current date)

Table 75. Relationship of IVP phases to programs (continued)

Phase	Job	Program	Description
		DSN8DUCD	C program for ALTDATE function (given date)
		DSN8DUAT	C program for ALTTIME function (current time).
		DSN8DUCT	C program for ALTTIME function (given time)
		DSN8DUCY	C program for CURRENCY function
		DSN8DUTI	C program for TABLE_NAME, TABLE_SCHEMA, and TABLE_LOCATION functions
		DSN8EUDN	C++ program for DAYNAME function
		DSN8EUMN	C++ program for MONTHNAME function
		DSNTEP2	Dynamic SQL program
		DSN8DUWF	User-defined table function sample
		DSN8DUWC	C program on client for user-defined table function sample
3		SPUFI	Sample SPUFI input
	DSNTEJ3C	DSNTIAD	Grant execution
		DSN8CC	COBOL interface to call attachment facility
		DSN8SCM	COBOL connection manager
		DSN8SC3	COBOL phone application
		DSN8HC3	COBOL organization application
	DSNTEJ3M	DSNTIAD	Drop sample MQT objects, create sample MQT objects, grant authority to MQT objects, and populate sample MQT tables
		DSNUTILB	Produce statistics for MQT
		DSNTEP2	Process EXPLAINs on sample MQT tables
	DSNTEJ3P	DSNTEP2	Dynamic SQL application
		DSNTIAD	Grant execution
		DSN8SPM	PL/I connection manager
		DSN8SP3	PL/I phone application
4	DSNTEJ4C	DSNTIAD	Grant execution
		DSN8IC*x*	Organization application
		DSN8MC*x*	Copy code
	DSNTEJ4P	DSNTIAD	Grant execution
		DSN8IP*x*	Organization, project applications
		DSN8MP*x*	Copy code

Table 75. Relationship of IVP phases to programs (continued)

Phase	Job	Program	Description
5	DSNTEJ5A	DSNTIAC	CICS SQLCA formatter front-end
	DSNTEJ5C	DSNTIAD	Grant execution
		DSN8CC*x*	Organization application
		DSN8MC*x*	Copy code
	DSNTEJ5P	DSNTIAD	Grant execution
		DSN8CP*x*	Organization, project applications
		DSN8MP*x*	Copy code
6	DSNTEJ6	DSNTIAD	Update location column in the department table to the sample location entered at installation time
	DSNTEJ6D	DSN8ED1	Compile, link-edit, bind, and run a sample application program that calls a stored procedure
	DSNTEJ6O	DSN8DTS1, DSN8DTS2	Create and run sample for IBM Text Search for Db2 for z/OS
	DSNTEJ6P	DSN8EP1	Invoke the sample stored procedure
	DSNTEJ6R	DSN8ED8	Compile, link-edit, bind, and run a sample application that calls DSNUTILU, the Db2 Utilities Unicode parser stored procedure
	DSNTEJ6S	DSN8EP2	Create sample stored procedure
	DSNTEJ6T	DSN8ED2	Register, prepare, and bind the stored procedure sample application
	DSNTEJ6U	DSN8EPU	Compile, link-edit, bind, and run a sample application that calls DSNUTILS, a stored procedure for executing Db2 utilities
	DSNTEJ6V	DSN8EE0	C++ class that calls DSNTIAR
		DSN8EE1	C++ class that calls DSNUTILS
		DSN8EE2	C++ client for DSN8EE1
	DSNTEJ6W	DSN8ED6	Call the WLM_REFRESH stored procedure
	DSNTEJ6Z	DSN8ED7	C class that calls ADMIN_INFO_SYSPARM stored procedure
	DSNTEJ61	DSN8EC1	Create sample ODBA stored procedure
	DSNTEJ62	DSN8EC2	Invoke sample ODBA stored procedure
	DSNTEJ63	DSN8ES1	Run sample external SQL procedure that calculates employee earnings.
	DSNTEJ64	DSN8ED3	Call the sample external SQL procedure, DSN8ES1 from a client
	DSNTEJ65	DSN8ED4	Call the external SQL procedure processor, DSNTPSMP

Table 75. Relationship of IVP phases to programs (continued)

Phase	Job	Program	Description
		DSN8ES2	Run external SQL procedure that calculates employee bonuses
		DSN8ED5	Call external SQL procedure, DSN8ES2
	DSNTEJ66	DSN8ES3	Create and alter a sample native SQL procedure
		DSN8ED9	Prepare and execute a sample caller of the sample native SQL procedure
7	DSNTEJ7	DSNTIAD	Create sample LOB table
		DSNTIAD	Create synonyms, grant access to LOB tables
		DSNUTILB	Load sample LOB table
		DSNUTILB	Produce statistics for LOB table spaces
	DSNTEJ71	DSNTIAD	Grant access to plans
		DSN8DLPL	Populate sample LOB table with BLOB data
		DSN8DLTC	Verify contents of LOB table
	DSNTEJ73	DSNTIAD	Grant access to plans
		DSN8DLRV	C employee resume application
	DSNTEJ75	DSNTIAD	Grant access to plans
		DSN8DLPV	C employee photo application
	DSNTEJ76	DSN8CLPL	Create COBOL LOB sample table
		DSN8CLTC	Create synonyms, grant access to COBOL LOB tables
	DSNTEJ77	DSN8CLRV	Load sample COBOL LOB table
	DSNTEJ78	DSN8CLPV	Produce statistics for COBOL BLOB table spaces

Notes:

1. Job DSNTEJ1S, which contains the sample JCL to run the schema processor, is not a part of the sample applications to verify installation.
2. Job DSNTEJ1T, which adds rows to SYSIBM.SYSSTRINGS for character conversion purposes, is not a part of the sample applications to verify installation.

Related concepts

Printing options for the sample application listings
The source statements that are contained in *prefix*.SDSNSAMP can be printed using ISPF facilities, IEBPTPCH, or local facilities.

Related tasks

Falling back to Db2 10

If you encounter serious errors after tailoring the catalog and directory for Db2 11, you can return to Db2 10. Fall back to Db2 10 is supported only if Db2 11 isDb2 11 conversion mode.

Related information

Planning for verification

Before performing any of the verification phases, you must make certain decisions about your verification strategy.

About this task

Db2 system administrators and system administrators for ISPF, TSO, batch, IMS, and CICS must be involved in these decisions.

Procedure

To prepare for verification

- Determine the verification phases that you plan to perform.

  Examine the description of each verification phase in this topic, and determine which phases apply to your needs.
- Identify any phases that you want to modify before you perform them.

  Verification is designed to run with little interaction on your part. This topic does not discuss how to modify any of the phases, but you can adapt any of the seven phases to your needs. If this is your intent, identify and describe any modifications you plan to make.
- Establish additional testing steps to complete the verification.

  The verification phases and the jobs that you run to perform them are valuable tools for testing Db2. They are not a substitute for a thorough subsystem test. You must plan and perform your own additional testing to complete the verification. To help you assess which additional tests might be necessary, examine the sample applications that are provided with Db2.
- Start any Db2 databases that are not currently started.

COBOL options to use with the installation verification procedures

The Db2 COBOL samples can be run with some compiler options, which control compilation.

IBM tested these options, which are shown in the table below.

If you have a problem executing the Db2 COBOL samples, ensure that your compiler options are consistent with the Enterprise COBOL options in the table below. Remember that if you are using CICS, the options that you need to use depend on the CICS environment. To verify that you are using the correct options in your CICS environment, refer to COBOL programming restrictions and requirements.

Table 76. Enterprise COBOL options

- ADV
- BUFSIZE(4096)
- DATA(31)
- FLAG(I)
- INTDATE(ANSI)
- LANGUAGE(EN)
- LINECOUNT(60)
- NOADATA
- NOAWO
- NOCMPR2
- NOCOMPILE(S)
- NOCURRENCY
- NODBCS
- NODECK
- NODUMP
- NODYNAM
- NOEXIT
- NOFASTSRT
- NOFLAGMIG
- NOFLAGSTD
- NOIDLGEN
- NOLIB
- NOLIST
- NOMAP
- NONAME
- NONUMBER
- NOOFFSET
- NOOPTIMIZE
- NOSEQUENCE
- NOSSRANGE
- NOTERM[1] or TERM[2]
- NOTEST
- NOTYPECHK
- NOVBREF
- NOWORD
- NOXREF
- NUMPROC(NOPFD)
- OBJECT
- OUTDD(SYSOUT)
- PGMNAME(LONGUPPER)
- QUOTE
- RENT[3]
- RMODE(AUTO)
- SIZE(MAX)
- SOURCE
- SPACE(1)
- TRUNC(STD)
- ZWB

Note:

[1] Refers to jobs DSNTEJ2C, DSNTEJ3C, and DSNTEJ4C only.

[2] Refers to job DSNTEJ5C only.

[3] See the CICS documentation for actual options to use.

For more detailed instructions, see Enterprise COBOL for z/OS and Language Environment Programming Guide (z/OS Language Environment Programming Guide).

Related information

C and C++ language options to use with the installation verification procedures

The Db2 C and C++ samples can be run with some compiler options.

These options, which were tested by IBM, are shown in the following tables.

If you have a problem executing the Db2 C and C++ samples, ensure that your compiler options are consistent with the options in the following tables.

Table 77. C language options

- NOAGGR
- NOALIAS
- ARGPARSE[1]
- NOCHECKOUT[2]
- NOCSECT
- NODECK
- NODLL
- NOSSCOMM
- NOUPCONV
- NOEVENTS
- EXECOPS
- NOEXPMAC
- NOEXPORTALL
- FLAG(I)
- NOGONUMBER
- HALT(16)[1]
- START
- XREF
- NOHWOPTS
- NOINLINE[3]
- LIST
- NOLOCALE
- NOLONGNAME
- NOLSEARCH
- MAXMEM(2000)[4]
- TARGET(LE)
- NOMEMORY
- NESTINC(255)
- OBJECT
- NOOE[1]
- NOOFFSET
- NOOPTIMIZE
- PLIST(HOST[1]
- TERMINAL
- NOPPONLY
- REDIR[1]
- NORENT
- NOSEARCH
- NOSHOWINC
- SOURCE
- SPILL(128)[4]
- NOTEST[5]

Table 77. C language options (continued)

Note:

- [1] This option is used by IBM C/C++ for z/OS.
- [2] NOPPTRACE, PPCHECK, GOTO, ACCURACY, PARM, NOENUM, NOEXTERN, TRUNC, INIT, NOPORT, GENERAL.
- [3] AUTO, NOREPORT, 100, 1000.
- [4] This option is used only by IBM AD/Cycle C/370 V1R2.
- [5] SYM, BLOCK, LINE, NOPATH.

The table below contains the C++ language options.

Table 78. C++ language options

ARGPARSE
NOATTRIBUTE
NOCSECT
EXECOPS
NOEXPMAC
NOEXPORTALL
FLAG(I)
NOGONUMBER
NOINFO
NOINLRPT
LANGLVL(EXTENDED)
NOLIST
NOLOCALE
LONGNAME
MARGINS
NESTINC(255)
OBJECT
NOOE
NOOFFSET
OPTIMIZE(0)
PLIST(HOST)
NOPPONLY
REDIR
NOSHOWINC
NOSOM
SOMEINIT
NOSOMGS
SOURCE
NOSRCMSG
START
TARGET(LE)
TERMINAL
NOTEST
XREF
HALT(16)
MEMORY
NOSEQUENCE
TEMPINC

The installation CLIST customizes C++ compiler parameters in sample job DSNTEJ2E if you have specified C++ for MVS/ESA V3R2 or a subsequent release on panel DSNTIPU.

PL/I options to use with the installation verification procedures

The Db2 PL/I samples can be run with some compiler options, which control compilation.

These options, which were tested by IBM, are shown in the table below.

If you have a problem executing the Db2 PL/I samples, ensure that your compiler options are consistent with these options.

Table 79. Enterprise PL/I options

CHARSET(60,EBCDIC)
NOATTRIBUTES
NOGONUMBER
NOINTERRUPT
NONUMBER
NOTERMINAL
SIZE(506756)
LINECOUNT(55)
NOCOMPILE(S)
NOGOSTMT
NOLIST
NOOFFSET
NOXREF
SOURCE
LMESSAGE
NOCOUNT
NOGRAPHIC
NOMAP
NOOPTIMIZE
OBJECT
STMT
MARGINS(2,72,0)
NOESD
NOIMPRECISE
NOMARGINI
NOSTORAGE
ODECK
NOAGGREGATE
NOFLOW
NOINCLUDE
NONEST
NOSYNTAX(S)
SEQUENCE(73,80)

Phase 0: Deleting the sample objects (DSNTEJ0)

Phase 0 consists of one job, DSNTEJ0. It frees all plans, drops all objects, and deletes data sets so that Phase 1 can be run again.

Run Phase 0 (job DSNTEJ0) only if you want to remove all the verification processing that you have done so far so that you can begin the verification procedure again. When you complete the verification procedure, save the verification objects; you need them when you migrate to the next release of Db2.

If a sample application abends while running a utility, ensure that the utility is terminated before attempting to rerun the job.

Even when DSNTEJ0 runs successfully, some of the FREE, DROP, and DELETE commands often fail because the object was not created earlier. You can ignore these errors, even though they might generate return codes of 8 or 12. Check other errors.

If DSNTEJ0 runs successfully, it produces the return codes that are shown in the table below.

Table 80. DSNTEJ0 return codes

Step	PROCSTEP	Return code
PH00S01		0000, 0008, or 0012
PH00S02		0000, 0004, or 0008
PH00S03	DSNUPROC	0004 or 0008
PH00S04		0000, 0004, or 0008
PH00S05		0000, 0004, or 0008
PH00S06		0000, 0004, or 0008
PH00S07		0000, 0004, or 0008
PH00S08		0000, 0004, or 0008

If this job fails or abends, ensure that the user that is specified on the JOB statement is an authorized ID. If the name that you specified for either SYSTEM ADMIN 1 or SYSTEM ADMIN 2 on installation panel DSNTIPP1 is a primary authorization ID, use this name. If the sample authorization exit routine and RACF are installed, and if the SYSTEM ADMIN 1 and SYSTEM ADMIN 2 are known to Db2 as secondary authorization IDs, you can run these jobs under a user ID in either of these RACF groups. Then correct any other problems, and rerun the job from the last successful step.

If the subsystem data sets were deleted before the Db2 sample objects are deleted, you must delete the data sets by using access method services commands or TSO commands. In all of the following examples, *vcatalog* is the catalog alias name that you specified for the CATALOG ALIAS field on installation panel DSNTIPA2. The *y* is either I or J.

The following access method services commands, which can be executed under TSO, delete the Db2 11 sample data sets:

```
DELETE 'vcatalog.DSNDBD.DSN8D11A.*.y0001.*'
DELETE 'vcatalog.DSNDBC.DSN8D81L.*.y0001.*'
DELETE 'vcatalog.DSNDBD.DSN8D11P.*.y0001.*'
DELETE 'vcatalog.DSNDBC.DSN8D11U.*.y0001.*'
DELETE 'vcatalog.DSNDB04.STAFF.y0001.A001'
DELETE 'vcatalog.DSNDB04.TESTSTUF.y0001.A001'
DELETE 'vcatalog.DSNDBC.DSN8D81E.*.y0001.*'
DELETE 'vcatalog.DSNDBC.DSN8D81Y.*.y0001.*'
DELETE 'vcatalog.DSNDBC.DSN8D81X.*.y0001.*'
```

Related information

Phase 1: Creating and loading sample tables

Phase 1 of installation or migration verification consists of four jobs: DSNTEJ1, DSNTEJ1L, DSNTEJ1P, and DSNTEJ1U.

DSNTEJ1 invokes program DSNTIAD, which creates objects during the verification procedure. Run DSNTIEJ1 before running any other sample jobs.

DSNTEJ1L and DSNTEJ1P prepare and invoke program DSNTEP2, which lists the contents of the sample tables. The difference between the jobs is that DSNTEJ1P requires the PL/I compiler and allows you to customize DSNTEP2.

DSNTEJ1U creates, populates, and tests a sample Unicode database.

Job DSNTEJ1

Job DSNTEJ1 creates all objects that are to be used by the sample verification jobs. Run this job before any other verification job.

If reason code 00C9008A continues to occur, do one of the following:

- Restart Db2 and run the job again.
- If you are using a partitioned data set (PDS) for the DSNEXIT data set, run IEBCOPY to compress the data set when no application is using the DSNEXIT data set.

The job consists of the following steps.

Table 81. Steps in job DSNTEJ1

Step	Function
1-4	Creates all objects (storage group, databases, table spaces, tables, indexes, and views) that are used by the samples.
5	Drops synonyms.
6	Creates synonyms and grants authorization on objects to PUBLIC. This step creates synonyms for the sample tables, indexes, and views, so that the currently running authorization ID can execute the sample application and grant appropriate authority. The sample dynamic SQL program DSNTIAD processes the Db2 object definitions in this step and several others.
7	Uses the ASMCL procedure to create DSN8EAE1, an edit exit routine.
8	Assembles and link-edits DSNHUFF.
9	Assembles and link-edits DSN8FPRC, a sample field procedure.
10	Prepares the sample call attachment facility assembler interface. You must link-edit ISPLINK, the ISPF interface module, with this CAF sample load module. To do this, ensure that the link-edit SYSLIB statement that retrieves the ISPF load module library in procedure DSNHASM is not commented out.
11	Creates the sample utility list.
12	Loads the programming-related tables by using the LOAD utility.
13	Loads the sample tables by using the LOAD utility.
14	Checks data for referential integrity.
15	Establishes a quiesce point by using both log and image copies.
16	Makes an image copy of all the sample tables by using the COPY utility.
17	Establishes another quiesce point by using only image copies.
18	Reorganizes a table space and compiles statistics on all table spaces by using the REORG and RUNSTATS utilities.
19	Performs a REORG TABLESPACE with SHRLEVEL CHANGE.
20	Loads the sample tables by using the LOAD utility.
21	Sets the CURRENT RULES register and adds a check constraint using ALTER TABLE.
22	Checks data for referential integrity.
23	Checks data for check integrity.

Table 81. Steps in job DSNTEJ1 (continued)

Step	Function
24-27	Performs the operations in steps 15-18 except for the REORG on partition 3 of the Employee table space.
28	Unloads data from a partitioned table.
29	Reduces the partition key on the fourth partition of table space DSN8S81E.
30	Processes an online schema change to add a fifth partition to table space DSN8S81E.
31	Reorganizes a partitioned table space.
32	Performs various online schema changes, including lengthening a character field and converting an integer field to a decimal field.
33	Reorganizes table spaces DSN8S91R and DSN8S91S to reset advisory REORG-pending (AREO) status.

If DSNTEJ1 runs successfully, it produces the return codes that are shown in the following table.

Table 82. DSNTEJ1 return codes

Step	PROCSTEP	Return code
PH01S01		0000
PH01S02		0000
PH01S03		0000
PH01S04		0000
PH01S05		0000
PH01S06		0000
PH01S07	ASM LKED	0000 0000
PH01S08	ASM LKED	0000 0000
PH01S09	ASM LKED	0000 0000
PH01S10	PC ASM LKED	0004 0000 0000
PH01S11	IEBGENER	0000
PH01S12	DSNUPROC	0000
PH01S13	DSNUPROC	0004
PH01S14	DSNUPROC	0000
PH01S15	DSNUPROC	0000
PH01S16	DSNUPROC	0000

Table 82. DSNTEJ1 return codes (continued)

Step	PROCSTEP	Return code
PH01S17	DSNUPROC	0000
PH01S18	DSNUPROC	0000 or 0004
PH01S19	DSNUPROC	0000
PH01S20	DSNUPROC	0004
PH01S21		0004
PH01S22	DSNUPROC	0004
PH01S23		0000
PH01S24	DSNUPROC	0000
PH01S25	DSNUPROC	0000
PH01S26	DSNUPROC	0000
PH01S27	DSNUPROC	0000
PH01S28	DSNUPROC	0000
PH01S29		0000 or 0004
PH01S30		0000
PH01S31	DSNUPROC	0000
PH01S32		0000
PH01S33	DSNUPROC	0000

Db2 issues the following message for every SQL statement, except for the drop synonym and insert statements:

```
DSNT400I SQLCODE = 0, SUCCESSFUL EXECUTION
```

If the synonyms in the DROP SYNONYM statements are not defined, SQL return codes of -204 result. The INSERT statements violate a check constraint on the EMP table. This results in an SQL return code of -545.

Job DSNTEJ1L

DSNTEJ1L link-edits the DSNTEP2 object deck (DSNTEP2L) to create an executable load module DSNTEP2.

DSNTEJ1L link-edits the DSNTEP4 object deck (DSNTEP4L) to create an executable load module DSNTEP4.

DSNTEJ1L also binds and runs programs DSNTEP2 and DSNTEP4. DSNTEP2 lists the sample database tables and views. DSNTEP2 is a dynamic PL/I program that accepts SQL statements. DSNTEP2 produces a listing of the results of SELECT statements. DSNTEP4 is identical to DSNTEP2, except that it uses multi-row fetch.

Job DSNTEJ1L requires the Language Environment link-edit and run time libraries. DSNTEJ1L does not require the PL/I compiler.

If DSNTEJ1L runs successfully, it produces the return codes that are shown in the table below.

Table 83. DSNTEJ1L return codes

Step	PROCSTEP	Return code
PH01PS01		0000
PH01PS02		0000 or 0004
PH01PS03		0000
PH01PS04		0000 or 0004

You can compare the output from this job with the sample output for DSNTEJ1L, which is found in member DSN8TJ1L in your *prefix*.SDSNIVPD data set.

If you run DSNTEJ1P before DSNTEJ1L, you can expect step PH01PS02 of job DSNTEJ1L to produce a return code of 0004 and the following message:

```
SQLWARNING ON GRANT   COMMAND, EXECUTE FUNCTION
  RESULT OF SQL STATEMENT:
  DSNT404I SQLCODE = 562, WARNING:  A GRANT OF A PRIVILEGE WAS IGNORED
           BECAUSE THE GRANTEE ALREADY HAS THE PRIVILEGE FROM THE GRANTOR
```

If either DSNTEJ1 or DSNTEJ1L fails or abends, ensure that the user that is specified in the JOB statements is an authorized ID. If the name that you specified for either SYSTEM ADMIN 1 or SYSTEM ADMIN 2 on installation panel DSNTIPP1 is a primary authorization ID, use this name. If the sample authorization exit routine and RACF are installed, and if the SYSTEM ADMIN 1 and SYSTEM ADMIN 2 are known to Db2 as secondary authorization IDs, you can run these jobs under a user ID in either of these RACF groups.

Then, correct any other problems. Before rerunning DSNTEJ1, run DSNTEJ0 to drop the sample data. If you rerun DSNTEJ1L, rerun it from the last successful step.

Related information

Job DSNTEJ1P

DSNTEJ1P precompiles, compiles, and link-edits PL/I program DSNTEP2. This program then lists the sample database tables and views. It is a dynamic PL/I program that accepts SQL statements. It produces a listing of the results of SELECT statements.

Tip: If you already ran job DSNTEJ1L, you do not need to run DSNTEJ1P because these jobs produce the same results. The major difference is that DSNTEJ1P uses the PL/I compiler and allows you to customize DSNTEP2 and DSNTEP4.

If you do run job DSNTEJ1P after job DSNTEJ1L, and you previously bound the packages that were produced by job DSNTEJ1L at multiple sites, you also need to bind the packages that are produced by job DSNTEJ1P at the same sites. Otherwise, you will receive SQLCODE -805 errors when you use DSNTEP2 or DSNTEP4 to access data at the remote sites.

If DSNTEJ1P runs successfully, it produces the return codes that are shown in the table below.

Table 84. DSNTEJ1P return codes

Step	PROCSTEP	Return code
PH01PS01	PPLI PC PLI PLKED LKED	0000 0000 0000 0004 0000
PH01PS02		0000 or 0004

Table 84. DSNTEJ1P return codes (continued)

Step	PROCSTEP	Return code
PH01PS03	PPLI PC PLI PLKED LKED	0000 0000 0000 0004 0000
PH01PS04		0000 or 0004

You can compare the output from this job with the sample output for DSNTEJ1P, which is found in member DSN8TJ1P in your *prefix*.SDSNIVPD data set.

If you run DSNTEJ1L before DSNTEJ1P, you can expect step PH01PS02 of job DSNTEJ1P to produce a return code of 0004 and the following message:

```
SQLWARNING ON GRANT   COMMAND, EXECUTE FUNCTION
  RESULT OF SQL STATEMENT:
  DSNT404I SQLCODE = 562, WARNING:  A GRANT OF A PRIVILEGE WAS IGNORED
           BECAUSE THE GRANTEE ALREADY HAS THE PRIVILEGE FROM THE GRANTOR
```

If either DSNTEJ1 or DSNTEJ1P fails or abends, ensure that the user that is specified in the JOB statements is an authorized ID. If the name that you specified for either SYSTEM ADMIN 1 or SYSTEM ADMIN 2 on installation panel DSNTIPP1 is a primary authorization ID, use this name. If the sample authorization exit routine and RACF are installed, and if the SYSTEM ADMIN 1 and SYSTEM ADMIN 2 are known to Db2 as secondary authorization IDs, you can run these jobs under a user ID in either of these RACF groups.

Then, correct any other problems. Before rerunning DSNTEJ1, run DSNTEJ0 to drop the sample data. If you rerun DSNTEJ1P, rerun it from the last successful step.

Related information

Job DSNTEJ1U

DSNTEJ1U creates a database, table space, and table with Unicode CCSID.

DSNTEJ1U loads data into the table from a data set that contains a full range of characters in an EBCDIC Latin-1 code page, which results in a mix of single and double-byte characters in the Unicode table. It then runs DSNTEP2 to select and display the data in hex format.

If DSNTEJ1U runs successfully, it produces the return codes that are shown in the table below.

Table 85. DSNTEJ1U return codes

Step	PROCSTEP	Return code
PH01US01		0000
PH01US02		0000
PH01US03	DSNUPROC	0000
PH01US04		0000

Phase 2: Testing the batch environment

Phase 2 of the installation or migration verification process consists of several jobs. Run the jobs to test the program preparation procedures for various languages.

If any of the Phase 2 jobs fail or abend, be sure that the user that is specified in the JOB statements is authorized. Use the name that you specified for either the SYSTEM ADMIN 1 option or the SYSTEM ADMIN 2 option on installation panel DSNTIPP1. Then correct any other problems, and rerun the jobs from the last successful step.

Job DSNTEJ2A

DSNTEJ2A tests the assembler program preparation procedures.

This job prepares and invokes program DSNTIAUL, which demonstrates the use of dynamic SQL in assembler to unload the data from tables or views. It also generates LOAD utility statements so the data can be loaded into another table. DSNTEJ2A then uses the LOAD utility to put data into copies of the unloaded tables.

If DSNTEJ2C runs successfully, it produces the return codes that are shown in the table below.

Table 86. DSNTEJ2A return codes

Step	PROCSTEP	Return code
PREPUNL	PC ASM LKED	0000 0000 or 0004 0000 or 0004
BINDUNL		0000
DELETE		0000
CREATE		0000
UNLOAD		0000
EDIT		0000
LOAD	DSNUPROC	0004

You can compare the output from this job with the sample output for DSNTEJ2A found in member DSN8TJ2A in your *prefix*.SDSNIVPD data set.

Related information

Job DSNTEJ2C

Job DSNTEJ2C tests the COBOL program preparation procedures. This job runs the phone application.

The phone application processes a table of telephone numbers, executing various types of SELECT statements and producing the corresponding listings. It can also update a phone number.

If DSNTEJ2C runs successfully, it produces the return codes that are shown in the following table.

Table 87. DSNTEJ2C return codes

Step	PROCSTEP	Return code
PH02CS01		0000

Table 87. DSNTEJ2C return codes (continued)

Step	PROCSTEP	Return code
PH02CS02	PC COB PLKED“1” on page 657 LKED	0004 0000 or 0004 0004 0000 or 0004
PH02CS03	PC COB PLKED“1” on page 657 LKED	0000 0000 or 0004 0004 0000
PH02CS04		0000

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

You can compare the output from this job with the sample output for DSNTEJ2C found in member DSN8TJ2C in your *prefix*.SDSNIVPD data set.

Related concepts

COBOL options to use with the installation verification procedures
The Db2 COBOL samples can be run with some compiler options, which control compilation.

Related tasks

Working with the phone application scenario
The phone application retrieves information from a phone directory and updates employee phone numbers.

Job DSNTEJ2D

Job DSNTEJ2D tests the C program preparation procedures.

You must have sequence numbering on to run this job from an ISPF session. The C job runs only the phone application.

If DSNTEJ2D runs successfully, it produces the return codes that are shown in the table below.

Table 88. DSNTE2D return codes

Step	PROCSTEP	Return code
PH02DS01	PC C PLKED LKED	0004 0000 0000 or 0004 0004
PH02DS02	PC C PLKED LKED	0000 0000 0000 or 0004 0000 or 0004
PH02DS03		0000

You can compare the output from this job with the sample output for DSNTEJ2D found in member DSN8TJ2D in your *prefix*.SDSNIVPD data set.

Related concepts

Job DSNTEJ2C
Job DSNTEJ2C tests the COBOL program preparation procedures. This job runs the phone application.

Job DSNTEJ2E

Job DSNTEJ2E tests the C++ program preparation procedures.

You must have sequence numbering on to run this job from an ISPF session. The C++ job runs only the phone application.

If DSNTEJ2E runs successfully, it produces the return codes that are shown in the table below.

Table 89. DSNTE2E return codes

Step	PROCSTEP	Return code
PH02ES01	PC C PLKED LKED	0004 0000 0000 or 0004 0004
PH02ES02	PC CP PLKED LKED	0000 0000 0000 or 0004 0004
PH02ES03	PC CP PLKED LKED	0004 0000 0000 or 0004 0000
PH02ES04		0000

You can compare the output from this job with the sample output for DSNTEJ2E found in member DSN8TJ2E in your *prefix*.SDSNIVPD data set.

Related concepts

Job DSNTEJ2C
Job DSNTEJ2C tests the COBOL program preparation procedures. This job runs the phone application.

Job DSNTEJ2F

Job DSNTEJ2F tests the Fortran program preparation procedures.

The FORTRAN job runs only the phone application.

If DSNTEJ2F runs successfully, it produces the return codes that are shown in the table below.

Table 90. DSNTE2F return codes

Step	PROCSTEP	Return code
PH02FS01	PC ASM LKED	0004 0000 0004

Table 90. DSNTE2F return codes (continued)

Step	PROCSTEP	Return code
PH02FS02	PC FORT LKED	0000 0000 0000
PH02FS03		0000

You can compare the output from this job with the sample output for DSNTEJ2F found in member DSN8TJ2F in your *prefix*.SDSNIVPD data set.

Related concepts

Job DSNTEJ2C
Job DSNTEJ2C tests the COBOL program preparation procedures. This job runs the phone application.

Job DSNTEJ2H

Job DSNTEJ2H tests the XML program preparation procedures.

If this job runs successfully, it produces the following return codes:

Table 91. DSNTEJ2H return codes

Step	PROCSTEP	Return code
PH02HS01	PC C PLKED LKED	0000 0000 0004 0000
PH02HS02	PC C PLKED LKED	0000 0000 0004 0000
PH02HS03	PC C PLKED LKED	0000 0000 0004 0000
PH02HS04	PC C PLKED LKED	0000 0000 0004 0000
PH02HS05		0000
PH02HS06		0000
PH02HS07		0000
PH02HS08		0000
PH02HS09		0000

Job DSNTEJ2P

Job DSNTEJ2P tests the PL/I program preparation procedures.

The PL/I job runs the phone application.

If DSNTEJ2P runs successfully, it produces the return codes that are shown in the table below.

Table 92. DSNTEJ2P return codes

Step	PROCSTEP	Return code
PH02PS01		0000
PH02PS02	PPLI PC PLI PLKED LKED	0000 0004 0000 0004 0004
PH02PS03	PPLI PC PLI PLKED LKED	0000 0000 0000 0004 0000
PH02PS04		0000
PH02PS05		0000

You can compare the output from this job with the sample output for DSNTEJ2P found in member DSN8TJ2P in your *prefix*.SDSNIVPD data set.

Job DSNTEJ2U

DSNTEJ2U prepares and tests several sample user-defined functions and a driver program that exercises the user-defined functions.

In order for the installation CLIST to generate job DSNTEJ2U, you must complete the following steps during installation:

- Specify that the host has access to C/C++ for z/OS on installation panel DSNTIPU.
- Specify the name of the default WLM environment on installation panel DSNTIPX.

The sample user-defined functions are:

Function
Description

ALTDATE
Returns the current date in a user-specified format or converts a user-specified date from one format to another.

ALTTIME
Returns the current time in a user-specified format or converts a user-specified time from one format to another.

CURRENCY
Formats a floating point number as a currency value.

DAYNAME
Returns the day of the week for a user-specified date in ISO format.

MONTHNAME
Returns the month for a user-specified date in ISO format.

TABLE_LOCATION
Returns the location name of a table, view, or undefined object found after resolving aliases for a user-specified object.

TABLE_NAME
Returns the name of a table, view, or undefined object found after resolving aliases for a user-specified object.

TABLE_SCHEMA
Returns the schema name of a table, view, or undefined object found after resolving aliases for a user-specified object.

WEATHER
Returns sample weather data obtained from a TSO data set by way of demonstrating the usefulness of a user-defined function table function.

If you do not have C++ installed, skip steps PH02US08 and PH02US09. Also remove all statements that refer to DAYNAME and MONTHNAME from part DSNTESU in the *prefix*.SDSNSAMP library.

Job DSNTEJ2U consists of the steps that are listed in the table below.

Table 93. Steps in job DSNTEJ2U

Step	Function
1	Drops all specific sample user-defined functions.
2	Creates and registers all sample user-defined functions. Grants EXECUTE authority to PUBLIC for the sample user-defined functions.
3-10	Prepares the eight external programs used by specific user-defined functions.
11	Binds the package for the TABLE_NAME, TABLE_SCHEMA, and TABLE_LOCATION functions. These are the only sample functions that issue SQL statements. This step also grants EXECUTE authority on these two samples to PUBLIC.
12	Invokes DSNTEP2 to exercise the sample user-defined functions.
13	Prepares DSN8DUWF, the external module for the sample user defined table function, WEATHER.
14	Prepares DSN8DUWC, a sample client function for statically invoking the WEATHER user-defined table function.
15	Binds the package and plan for DSN8DUWC and grants the necessary authorities.
16	Invokes DSN8DUWC.

If DSNTEJ2U runs successfully, it produces the return codes that are shown in the table below.

Table 94. DSNTEJ2U return codes

Step	PROCSTEP	Return code
PHO2US01		0000
PH02US02		0000 or 0004

Table 94. DSNTEJ2U return codes (continued)

Step	PROCSTEP	Return code
PH02US03 - PH02US07	PC C PLKED LKED	0004 0000 0004 0000
PH02US08 - PH02US09	PC CP PLKED LKED	0004 0000 0004 0000
PH02US10	PC C PLKED LKED	0000 0000 0004 0000
PH02US11		0000
PH02US12		0004
PH02US13	PC C PLKED LKED	0004 0000 0004 0000
PH02US14	PC C PLKED LKED	0000 0000 0004 0000
PH02US15		0000 or 0004
PH02US16		0000

You can compare the output from this job with the sample output for DSNTEJ2U found in member DSN8TJ2U in your *prefix*.SDSNIVPD data set.

Related reference

DSNTIPU: Data set names panel 2
The entries on panels DSNTIPU and DSNTIPW establish data set names for other product libraries. The values that you enter on these panels are edited into sample and installation jobs. Accept the default values for products that you do not have. Jobs for those particular products should not be run.

DSNTIPX: Routine parameters panel
The entries on this panel are used to start the stored procedures address space so that it can run stored procedures or user-defined functions.

Related information

Phase 3: Testing SPUFI, DRDA access, dynamic SQL, and TSO

Phase 3 of the installation or migration verification process allows you to test SPUFI (SQL Processor Using File Input) and DRDA access. You can also run dynamic SQL statements, run the phone application in TSO, and bind packages at the local and remote locations.

SPUFI is a facility of Db2I. You can only run SPUFI under ISPF. You can run dynamic SQL whether or not you have ISPF.

Related tasks

Testing SPUFI
During Phase 3 of the installation or migration verification process, you can test SPUFI to ensure that it is working properly.

Testing SPUFI

During Phase 3 of the installation or migration verification process, you can test SPUFI to ensure that it is working properly.

Procedure

To test SPUFI:

1. Log on to TSO.
2. Enter ISPF (this might be done for you, depending on your site's standard practice).
3. On the DB2I defaults panel, change the Db2 name to the Db2 subsystem name you entered on panel DSNTIPM during installation. Then select DB2I on the ISPF Primary Option Menu.
4. Select SPUFI on the DB2I menu.
5. Enter the library name '*prefix*.NEW.SDSNSAMP(DSNTESA)' as input to SPUFI on line 1, the DATASET NAME parameter.

   If your site uses the comma as a decimal point, the library name entered must be for the tailored version of job DSNTESA that was modified by the installation CLIST.
6. Define an output data set name on line 4, the output DATASET NAME parameter of the panel.

   This allows you to review the output.
7. Press ENTER, and examine the results.

   These SQL statements require a significant amount of Db2 processing; you could have to wait for the output.
8. Run steps 5, 6, and 7 three times:

   - Once with member DSNTESA, which uses a set of SQL statements to create a short-lived table space and table.
   - Once with member DSNTESC, which creates objects that support EXPLAIN information.
     If you are migrating from Db2 10, DSNTESC is customized by the installation CLIST to migrate your Db2 10 PLAN_TABLE, DSN_FUNCTION_TABLE, DSN_STATEMNT_TABLE, and DSN_STATEMENT_CACHE_TABLE to Db2 11 using a schema name of DSN8B10. If these Db2 10 tables have a different schema name, edit DSNTESC to use your schema name. Migration of these tables from a prior release should not be performed more than once. Also, some table spaces that are created by DSNTESC specify non-default buffer pools, BP8K1 and BP16K1. Verify that these buffer pools are enabled on Db2 before you process this DDL.
   - Once with member DSNTESE, which retrieves the EXPLAIN information.

What to do next

If any step fails or abends, be sure that the Db2 subsystem name is specified in the NAME field on the DB2I Defaults panel.

If you must drop either a Db2 10 or Db2 11 PLAN_TABLE, remove the appropriate comments from the job to issue the DROP statements.

Also, make sure that the user ID that you are using is authorized. If the name that you specified for either the SYSADM or SYSADM2 subsystem parameter is a primary authorization ID, use this name. If the sample authorization exit and RACF are installed, and both SYSADM and SYSADM2 are known to Db2 as secondary authorization IDs, you can run these jobs under a user ID in either of these RACF groups. Then, correct any other problems and rerun the scenario from the last successful step.

Related concepts

Dynamic SQL statements: DSNTESA, DSNTESQ
prefix.SDSNSAMP library members DSNTESA and DSNTESQ contain dynamic SQL statements to help verify the success of an installation or migration.

Related information

Dynamic SQL and the ISPF/CAF application

The Phase 3 jobs of the installation or migration verification process install the ISPF/CAF sample application. This sample consists of an assembler or COBOL call attachment facility (CAF) interface, a connection manager program, and the phone application. The sample also includes the distributed application that uses DRDA access.

Job DSNTEJ1 prepares the assembler interface, and job DSNTEJ3C prepares the COBOL interface. The connection manager program and the phone application each exist in COBOL and PL/I. Job DSNTEJ3C prepares the COBOL version; job DSNTEJ3P prepares the PL/I version. The distributed application using DRDA access is written in COBOL.

Related concepts

COBOL options to use with the installation verification procedures
The Db2 COBOL samples can be run with some compiler options, which control compilation.

Jobs DSNTEJ3C and DSNTEJ3P

Job DSNTEJ3C prepares a COBOL ISPF/CAF sample application and job DSNTEJ3P prepares a PL/I ISPF/CAF sample application.

To prepare for the distributed sample application, job DSNTEJ3C binds a package at the local (client) and remote (server) subsystems. For concurrent installations at two Db2 locations, designate one location as the client and the other location as the server. Both the client and server subsystems must be running Db2 11. Because DSNTEJ3C does a remote bind, you must set up your client and server systems for remote communication before running this job. The sample jobs DSNTEJ1 and DSNTEJ2C or DSNTEJ2P must have been run on the server subsystem.

PH03CS06, the last job step of DSNTEJ3C, binds the sample organization application at a server Db2 subsystem if the following conditions are met. If these conditions are not met, job step PH03CS06 is removed by the installation CLIST.

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY and it does not match the name that is specified in the Db2 LOCATION NAME field of panel DSNTIPR.

If DSNTEJ3C runs successfully, it produces the return codes that are shown in the following table.

Table 95. DSNTEJ3C return codes

Step	PROCSTEP	Return code
PH03CS01	PC COB PLKED"1" on page 665 LKED	0004 0000 or 0004 0004 0000
PH03CS02	PC COB PLKED"1" on page 665 LKED	0004 0000 or 0004 0004 0000
PH03CS03	PC COB PLKED"1" on page 665 LKED	0000 0004 0004 0000
PH03CS04	PC COB PLKED"1" on page 665 LKED	0000 or 0004 0000 or 0004 0004 0000
PH03CS05		0000 or 0004
PH03CS06		0000 or 0004

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

Step PH03CS06 can give a return code of 0004 if sample job DSNTEJ1 was not run on the remote system. For testing, you should run job DSNTEJ1 on the remote system.

If job DSNTEJ3P runs successfully, it produces the return codes that are shown in the following table.

Table 96. DSNTEJ3P return codes

Step	PROCSTEP	Return code
PH03PS01	PPLI PC PLI PLKED LKED	0000 0004 0000 0004 0000
PH03PS02	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0000
PH03PS03		0000

Related concepts

Connecting distributed database systems

You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

Related reference

DSNTIPY: Job editing panel
The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.

Job DSNTEJ3M

Job DSNTEJ3M creates, populates, and processes a database that demonstrates the use of Db2 materialized query tables (MQTs).

Before you run job DSNTEJ3M, you must create a PLAN_TABLE. To create this table, specify the member DSNTESC as an input data set name to SPUFI.

If DSNTEJ3M runs successfully, it produces the return codes that are shown in the table below.

Table 97. DSNTEJ3M return codes

Step	PROCSTEP	Return code
PH03MS00		0000
PH03MS01		0000
PH03MS02		0000
PH03MS03		0000 or 0004
PH03MS04		0000
PH03MS05		0000
PH03MS06		0000
PH03MS07		0000

Starting an application in an ISPF/TSO environment

You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Procedure

To start an application in a TSO environment:

1. Enter a CALL command for option 6 of the ISPF primary option menu.
2. To start the COBOL phone sample version of the connection manager, enter the following command:

```
CALL 'prefix.RUNLIB.LOAD(DSN8SCM)'
```

3. To start the PL/I phone sample version of the connection manager, enter the following command:

```
CALL 'prefix.RUNLIB.LOAD(DSN8SPM)'
```

After you enter one of these commands, Db2 displays the sample applications panel, which is shown in the following figure.

```
            DB2 SAMPLE APPLICATIONS MENU
===>

Select one of the following options and press enter.

 1  COBOL PHONE SAMPLE     (DB2 ISPF COBOL Application)
 2  PL/I  PHONE SAMPLE     (DB2 ISPF PL/I  Application)
 3  COBOL ORGANIZATION     (DB2 ISPF COBOL Application)

 4  C   EMPLOYEE RESUME    (DB2 ISPF C Application)
 5  C   EMPLOYEE PHOTO     (DB2 ISPF & GDDM C Application)

 6  COBOL EMPLOYEE RESUME  (DB2 ISPF COBOL Application)
 7  COBOL EMPLOYEE PHOTO   (DB2 ISPF & GDDM COBOL Application)

SPECIFY DB2 SUBSYSTEM NAME ===> DSN

PRESS:   END TO EXIT
```

Figure 85. Initial panel of the ISPF/CAF application

Choosing option 1 or 2 on the sample applications panel during Phase 3 invokes either the COBOL or the PL/I version of the phone application. Choosing option 3 on the sample applications panel during Phase 6 invokes the COBOL organization application, which uses DRDA access to distributed data.

Choosing options 4, 5, 6, and 7 on the sample applications panel during Phase 7 invokes the "Employee Resume" and "Employee Photo" applications, which processes LOB data. Options 4 and 5 access the C language sample applications, and options 6 and 7 access the COBOL language sample applications. You must run job DSNTEJ73 before you can access option 4. You must run job DSNTEJ75 before you can access option 5. You must run job DSNTEJ77 before you can access option 6. You must run job DSNTEJ78 before you can access option 7.

Related tasks

Working with the distributed organization application scenario
The distributed organization application scenario shows how to work with department and employee data in a distributed environment.

Working with the employee resume and photo scenarios
The LOB sample application extends the existing Db2 sample employee database by adding a new table for storing employee resumes and photographs as CLOB and BLOB entries.

Make DB2I panels, messages, and load modules available to ISPF and TSO
During migration, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

Working with the phone application scenario
The phone application retrieves information from a phone directory and updates employee phone numbers.

Phase 4: Testing the IMS environment

Phase 4 of the installation or migration verification process installs the sample IMS transactions for both COBOL and PL/I.

In the PL/I version, the phone application discussed in Phase 2 is also installed as an online transaction.

Related tasks

Working with the phone application scenario
The phone application retrieves information from a phone directory and updates employee phone numbers.

Jobs DSNTEJ4C and DSNTEJ4P

Job DSNTEJ4C is for COBOL; DSNTEJ4P is for PL/I. Both jobs complete the same functions.

Jobs DSNTEJ4C and DSNTEJ4P complete the following tasks:

- Precompile, compile, and link-edit the IMS online applications.
- Bind the IMS online applications.
- Create the message format service (MFS) panels for the online applications.
- Run the required PSBGEN and ACBGEN.

Select the proper job and define the applications and transactions to IMS. Member DSN8FIMS in *prefix*.SDSNSAMP contains information to assist in the definition step.

The verification transactions are single mode, single segment, and nonconversational.

Recommendation: Use SSM error option R because the program handles any errors. A resource translation table is not required.

Invoke the transaction by using the FORMAT command. The programs accept several lines of input on the first panel and display the results after you press ENTER.

If DSNTEJ4C runs successfully, it produces the return codes that are shown in the following table.

Table 98. DSNTEJ4C return codes

Step	PROCSTEP	Return code
PH04CS01	PC COB PLKED"1" on page 668 LKED	0004 0000 0004 0004
PH04CS02	PC COB PLKED"1" on page 668 LKED	0000 0000 0004 0004
PH04CS03	PC COB PLKED"1" on page 668 LKED	0000 0000 0004 0004
PH04CS04		0000
PH04CS05		0000
PH04CS06	S1 S2	0000 0004
PH04CS07	S1 S2	0000 0004
PH04CS08	C L	0000 0000
PH04CS09	G	0000

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

For DSNTEJ4C, the warning code that is expected from the precompiler step PH04CS01 is:

```
DB2 SQL PRECOMPILER     MESSAGES
DSNH0531 W   NO SQL STATEMENTS WERE FOUND
```

If DSNTEJ4P runs successfully, it produces the return codes that are shown in the following table.

Table 99. DSNTEJ4P return codes

Step	PROCSTEP	Return Code
PH04PS01	PPLI PC PLI PLKED LKED	0000 0004 0004 0004 0004
PH04PS02	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH04PS03	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH04PS04	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH04PS05	PPLI PC PLI PLKED LKED	0000 0004 0004 0004 0004
PH04PS06	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH04PS07	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH04PS08		0000
PH04PS09		0000

Table 99. DSNTEJ4P return codes (continued)

Step	PROCSTEP	Return Code
PH04PS10	S1 S2	0000 0004
PH04PS11	S1 S2	0000 0004
PH04PS12	S1 S2	0000 0000 or 0004
PH04PS13	S1 S2	0000 0000 or 0004
PH04PS14	S1 S2	0000 0000 or 0004
PH04PS15	S1 S2	0000 0000 or 0004
PH04PS16	C L	0000 0000
PH04PS17	G	0000
PH04PS18	C L	0000 0000
PH04PS19	G	0000
PH04PS20	C L	0000 0000
PH04PS21	G	0000

For DSNTEJ4P, the warning code expected from the precompiler step PH04PS01 is:

```
DB2 SQL PRECOMPILER     MESSAGES
DSNH0531 W   NO SQL STATEMENTS WERE FOUND
```

If either job DSNTEJ4C or job DSNTEJ4P fails or abends, rerun the jobs from the last successful step.

Related concepts

COBOL options to use with the installation verification procedures
The Db2 COBOL samples can be run with some compiler options, which control compilation.

Starting an application in an IMS environment

After logging on to IMS, you can start the organization application or project application.

Procedure

Enter an IMS FORMAT command

The FORMAT commands are:

- /FORMAT DSN8IPGO, which starts the PL/I organization version
- /FORMAT DSN8ICGO, which starts the COBOL organization version.

When you enter either of these two commands, the panel that is shown in the following figure is displayed.

```
   MAJOR SYSTEM ...: O          ORGANIZATION
   ACTION .........:
   OBJECT .........:
   SEARCH CRITERIA.:
   DATA ...........:
```

Figure 86. Organization version of FORMAT command display

When the following command is entered, the panel that is shown in the figure below is displayed.

```
/FORMAT DSN8IPFO
```

starts the PL/I projects version.

```
   MAJOR SYSTEM ...: P          PROJECTS
   ACTION .........:
   OBJECT .........:
   SEARCH CRITERIA.:
   DATA ...........:
```

Figure 87. Project version of FORMAT command display

Using the phone application in IMS

When you use IMS, information is interactively processed.

Procedure

Clear the screen and type in a FORMAT command. The FORMAT command that starts PL/I phone application is:

```
/FORMAT DSN8IPNO
```

When the FORMAT command is entered, the panel that is shown in the following figure is displayed.

```
---------------------------- TELEPHONE DIRECTORY ----------------------------


                          LAST  NAME ==>

                          FIRST NAME ==>


LAST NAME           :  *  FOR LIST OF ENTIRE DIRECTORY
                       %  FOR GENERIC LIST (EX. K% = ALL  K - NAMES)
FIRST NAME(OPTIONAL):  %  FOR GENERIC LIST
```

Figure 88. Starting the phone application

Phase 5: Testing the CICS environment

Phase 5 of the installation or migration verification process tests the CICS environment. Phase 5 installs the sample applications for COBOL and PL/I, and it prepares the CICS SQLCA formatter front-end.

Job DSNTEJ5A

Job DSNTEJ5A assembles and link-edits DSNTIAC, the CICS SQLCA formatter front-end. DSNTEJ5A also assembles and link-edits the RCT and optionally adds the sample definitions to the CSD.

Use DSNTIAC as an alternative to DSNTIAR when you want CICS services to do storage handling and program loading. If you are using CICS Version 4 or CICS Transaction Server 1.1, you need to modify job DSNTEJ5A to use steps DSN8FRCT and DSN8FRDO. You might need to tailor step DSN8FRDO for your system.

If DSNTEJ5A runs successfully, it produces the return codes that are shown in the table below.

Table 100. DSNTEJ5A return codes

Step	PROCSTEP	Return code
PH05AS01		0000
PH05AS02		0000
PH05AS03		0000

Jobs DSNTEJ5C and DSNTEJ5P

Job DSNTEJ5C installs the sample application transactions in COBOL and prepares the organization application. Job DSNTEJ5P installs the transactions in PL/I and prepares the organization, project, and phone applications.

Both phase 5 jobs perform the following functions:

- Compile and link-edit the CICS online applications
- Bind the CICS online applications
- Create the BMS maps for the online applications.

Select the proper job, and define transactions, programs, and BMS maps to CICS.

prefix.SDSNSAMP members DSN8FPPT, DSN8FPCT, and DSN8FRCT contain the respective PPT, PCT, and RCT entries required for the phase 5 applications. These members help you perform the definition step. Make sure that the subsystem ID (SUBID) in the RCT entry matches your Db2 subsystem ID.

If DSNTEJ5C runs successfully, it produces the return codes that are shown in the following table.

Table 101. DSNTEJ5C return codes

Step	PROCSTEP	Return code
MAPG	ASSEM	0000
MAPD	ASSEM	0000
DSNH		0000 or 0004
BIND		0000
MAPGP	ASSEM	0000
MAPGL		0000
MAPDP	ASSEM	0000
MAPDL		0000

If DSNTEJ5C fails or abends, rerun the job from the last successful step. To receive more prepare-time detail from DSNTEJ5C, change the parameters TERM(LEAVE) and PRINT(LEAVE) to TERM(TERM) and PRINT(TERM).

If DSNTEJ5P runs successfully, it produces the return codes that are shown in the following table.

Table 102. DSNTEJ5P return codes

Step	PROCSTEP	Return code
PH05PS01	ASSEM	0000
PH05PS02	ASSEM	0000
PH05PS03	ASSEM	0000
PH05PS04	ASSEM	0000
PH05PS05	ASSEM	0000
PH05PS06		0004
PH05PS07	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS08		0004
PH05PS09	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS10		0004
PH05PS11	PPLI PC PLI PLKED LKED	0004 0000 0004 0004 0004
PH05PS12		0004
PH05PS13	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS14	ASSEM	0000
PH05PS15	ASSEM	0000
PH05PS16		0004

Table 102. DSNTEJ5P return codes (continued)

Step	PROCSTEP	Return code
PH05PS17	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS18		0004
PH05PS19	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS20		0004
PH05PS21	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0004
PH05PS22		0000 or 0004
PH05PS23		0000
PH05PS24	ASSEM	0000
PH05PH25		0000
PH05PS26	ASSEM	0000
PH05PH27		0000
PH05PS28	ASSEM	0000
PH05PH29		0000
PH05PS30	ASSEM	0000
PH05PH31		0000
PH05PS32	ASSEM	0000
PH05PH33		0000
PH05PS34	ASSEM	0000
PH05PH35		0000
PH05PS36	ASSEM	0000
PH05PH37		0000

If DSNTEJ5P fails or abends, rerun the job from the last successful step. You might find it convenient to break up DSNTEJ5P and run only the unsuccessful steps.

Related concepts

COBOL options to use with the installation verification procedures

The Db2 COBOL samples can be run with some compiler options, which control compilation.

Related information

Starting an application in a CICS environment

After logging on to CICS, you can start an organization application or project application in the CICS environment.

Procedure

Enter a CICS transaction code.

The CICS transaction codes are:

- D8PP, which starts the PL/I project version
- D8PS, which starts the PL/I organization version
- D8CS, which starts the COBOL organization version.

When these transaction codes are entered, the panels that are shown in the following two figures are displayed.

```
              ACTION SELECTION
MAJOR SYSTEM ...: O          ORGANIZATION
ACTION .........:
OBJECT .........:
SEARCH CRITERIA.:
DATA ...........:
SELECT AN ACTION FROM FOLLOWING LIST

   A     ADD (INSERT)
   D     DISPLAY (SHOW)
   E     ERASE (REMOVE)
   U     UPDATE (CHANGE)
```

Figure 89. Initial panel for the organization application in CICS

```
              ACTION SELECTION
MAJOR SYSTEM ...: P          PROJECTS
ACTION .........:
OBJECT .........:
SEARCH CRITERIA.:
DATA ...........:
SELECT AN ACTION FROM FOLLOWING LIST

   A     ADD (INSERT)
   D     DISPLAY (SHOW)
   E     ERASE (REMOVE)
   U     UPDATE (CHANGE)
```

Figure 90. Initial panel for the project application in CICS

Related concepts

The sample application panels
When you run the interactive sample applications, the sample application panels require you to enter information such as the action you want to complete.

Using the phone application in CICS

When you use CICS, information is interactively processed.

Procedure

Clear the screen and type in the transaction code:

```
D8PT
```

You can change the transaction codes when you install Db2. Check with your system administrator to find out if they have been changed from those shown.

Using CICS storage-handling facilities

You can use the CICS storage-handling facilities when you run the CICS sample applications.

Procedure

To use the CICS storage-handling facilities when running the CICS sample applications:

1. Change your DSNTIAR calls to DSNTIAC calls in DSN8MC*xx* and DSN8MP*xx*.

   The calls should look like this:

   ```
   CALL DSNTIAC(EIB,COMMAREA,SQLCA,MSG,LRECL)
   ```

2. Define DSNTIAC and DSNTIA1 in the CSD.
3. Rerun job DSNTEJ5C or job DSNTEJ5P.

Phase 6: Accessing data at a remote site

You can use phase 6 of the Db2 installation or migration verification process to verify that the features of DRDA access are working correctly, to prepare and call sample stored procedures, and to prepare and execute sample callers of certain Db2-supplied stored procedures.

During this optional phase, you test accessing data at a remote site by using the DRDA access application (job DSNTEJ6 in conjunction with job DSNTEJ3C).

You can use the following jobs to test creating and calling stored procedures at either the local site or a remote site.

DSNTEJ6S and DSNTEJ6P
Tests the stored procedure without result set sample

DSNTEJ6T and DSNTEJ6D
Tests the stored procedure with result set sample

DSNTEJ61 and DSNTEJ62
Tests the stored procedure for IMS Open Database Access

DSNTEJ63 and DSNTEJ64
Tests the external SQL procedure batch sample

DSNTEJ65
Tests the external SQL procedures processor invocation sample

DSNTEJ66
Tests the stored procedure that prepares a sample native SQL procedure and caller

You can use the following jobs to test calling Db2-supplied stored procedures at the local site:

DSNTEJ6U, DSNTEJ6R, and DSNTEJ6V
Tests the stored procedure for invoking utilities

DSNTEJ6W
Tests the stored procedure for invoking WLM_REFRESH

DSNTEJ6Z
Tests the stored procedure for formatting the IFCID 106 trace record to obtain current Db2 configuration settings

ISPF panel requirements

The installation CLIST prepares samples DSNTEJ6, DSNTEJ6S, DSNTEJ6P, DSNTEJ6T, DSNTEJ6D, DSNTEJ6Z, DSNTEJ61, DSNTEJ62, DSNTEJ63, DSNTEJ64, DSNTEJ65 and DSNTEJ66 only if you specify COMMAND or AUTO in the DDF STARTUP OPTION field of panel DSNTIPR. If you specify NO, the installation CLIST does not prepare these samples. In this case, you should not try to run these samples.

The installation CLIST prepares the stored procedures samples only if you specify a sample WLM environment name in the WLM ENVIRONMENT field on panel DSNTIPX. If you replace the default value with blanks in the WLM ENVIRONMENT field, you cannot start the sample WLM-established stored procedures address space until you update the subsystem parameter.

The installation CLIST tailors the phase 6 sample jobs according to the information that you specify in the REMOTE LOCATION field of panel DSNTIPY. The guidelines for this field are:

- If the field is blank, the installation CLIST only customizes phase 6 sample jobs DSNTEJ63, DSNTEJ64, DSNTEJ65, DSNTEJ66, DSNTEJ6R, DSNTEJ6U, DSNTEJ6V, DSNTEJ6W, and DSNTEJ6Z. Jobs DSNTEJ63, DSNTEJ64, DSNTEJ65, and DSNTEJ66 use the local location name when the REMOTE LOCATION field is blank. Jobs DSNTEJ6R, DSNTEJ6U, DSNTEJ6V, DSNTEJ6W, and DSNTEJ6Z do not use a remote location name.
- If the value in the field is the same as the location name for the Db2 subsystem that you are installing (DB2 LOCATION NAME field of panel DSNTIPR), the stored procedures samples are prepared and customized for local use. However, the DRDA access sample is not prepared, including job DSNTEJ6 and the DRDA access component of job DSNTEJ3C.
- If the value in the field is different from the DB2 LOCATION NAME field, the installation CLIST prepares the phase 6 samples assuming that the remote location is the server and that the local system is the client.

The following table summarizes the ISPF panel values that are required for the installation CLIST to prepare the phase 6 sample jobs.

Table 103. IVP phase 6 job requirements. The installation CLIST only customizes the phase 6 sample jobs if certain fields on the ISPF panels meet requirements.

Job name	Requires COMMAND or AUTO in the DDF STARTUP OPTION field of panel DSNTIPR?	Requires a name in the REMOTE LOCATION field of panel DSNTIPY?	Requires a name in the WLM ENVIRONMENT field of panel DSNTIPX?
DSNTEJ6	Yes	Yes	No
DSNTEJ6S	Yes	Yes	Yes
DSNTEJ6P	Yes	Yes	Yes
DSNTEJ6T	Yes	Yes	Yes
DSNTEJ6D	Yes	Yes	Yes
DSNTEJ6R	No	No	Yes
DSNTEJ6U	No	No	No
DSNTEJ6V	No	No	No
DSNTEJ6W	No	No	Yes
DSNTEJ6Z	Yes	No	Yes
DSNTEJ61	Yes	Yes	Yes
DSNTEJ62	Yes	Yes	Yes
DSNTEJ63	Yes	No	Yes

Table 103. IVP phase 6 job requirements. The installation CLIST only customizes the phase 6 sample jobs if certain fields on the ISPF panels meet requirements. *(continued)*

Job name	Requires COMMAND or AUTO in the DDF STARTUP OPTION field of panel DSNTIPR?	Requires a name in the REMOTE LOCATION field of panel DSNTIPY?	Requires a name in the WLM ENVIRONMENT field of panel DSNTIPX?
DSNTEJ64	Yes	No	Yes
DSNTEJ65	Yes	No	Yes
DSNTEJ66	Yes	No	Yes

Testing multiple subsystems

If you are installing and testing two Db2 subsystems concurrently, you must designate one as the server and the other as the client. If you change these designations during your testing, your results will be unpredictable. Verify that your VTAM APPL statement has the parameter SYNCLVL=SYNCPT defined. This setting allows updates at several locations.

DRDA access sample

The distributed sample application that uses DRDA access is executed as part of Phase 6 of the installation or migration verification process.

The application is prepared in Phase 3 as part of DSNTEJ3C. Before this application can be run correctly as a DRDA access sample, you must run job DSNTEJ6 at both the local and remote sites to tailor the DEPT sample table for use in a distributed environment.

To set up your samples testing for concurrent installations at two Db2 locations, follow these guidelines:

- Designate one location as the requester (the client) and the other location as the server.
- Run the client version of DSNTEJ6 at the client site only; do **not** run the client version of DSNTEJ6 at the server.
- Edit the server version of DSNTEJ6 at the remote server site; do **not** run the server version of DSNTEJ6 at the client.
- GUPI Locate the following text in the server version of DSNTEJ6 within step PH06S01:

```
UPDATE DEPT SET LOCATION = (your remote location name) WHERE DEPTNO = 'F22';
UPDATE DEPT SET LOCATION = (your location name) WHERE LOCATION = '  ';
```

  This text should be replaced with:

```
UPDATE DEPT SET LOCATION = (your location name) WHERE DEPTNO = 'F22';
UPDATE DEPT SET LOCATION = (your remote location name) WHERE LOCATION = '  ';
```

  GUPI

Job DSNTEJ6

Job DSNTEJ6 consists of a single step that updates the location column in the sample DEPT table at the client and server Db2 subsystems.

The employees in department F22 are recorded as working at the server location that was entered in the REMOTE LOCATION field of panel DSNTIPY. All other employees are recorded as working at the client location.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.

- You specified a name in the REMOTE LOCATION field of panel DSNTIPY and it does not match the name specified in the DB2 LOCATION NAME field of panel DSNTIPR

Before you run DSNTEJ6, ensure that the server Db2 subsystem's DSNTEJ1 job has been run on the server Db2 subsystem. Run the client Db2 subsystem's DSNTEJ6 job only on the server Db2 subsystem.

If DSNTEJ6 runs successfully, it produces the return code that is shown in the table below.

Table 104. DSNTEJ6 return codes

Step	PROCSTEP	Return code
PH06S01		0000

Related tasks

Starting an application in an ISPF/TSO environment in phase 6
You must have access to ISPF load module libraries in order to run the ISPF/CAF sample application.

Related reference

DSNTIPR: Distributed data facility panel 1
The entries on the DSNTIPR panel control the starting of the distributed data facility (DDF). The entries on the DSNTIPR panel also specify location names that are used to connect another Db2 subsystem.

DSNTIPY: Job editing panel
The entries on the DSNTIPY panel specify values and information about job statements for the installation and sample application jobs.

Starting an application in an ISPF/TSO environment in phase 6

You must have access to ISPF load module libraries in order to run the ISPF/CAF sample application.

Procedure

To start the sample application:

1. Enter a CALL command from option 6 of the ISPF primary option menu.
2. To start the COBOL sample version of the connection manager, enter the following:

   ```
   CALL 'prefix.RUNLIB.LOAD(DSN8SCM)'
   ```

   After you enter this command, Db2 displays the sample applications panel. Choosing option 3 on the sample applications panel during Phase 6 invokes the COBOL organization application, which uses DRDA access for distributed data.

Related tasks

Working with the distributed organization application scenario
The distributed organization application scenario shows how to work with department and employee data in a distributed environment.

Starting an application in an ISPF/TSO environment in phase 6
You must have access to ISPF load module libraries in order to run the ISPF/CAF sample application.

Make DB2I panels, messages, and load modules available to ISPF and TSO
During migration, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

Stored procedure samples

Db2 provides a set of stored procedure sample applications. These sample applications demonstrate different ways that a stored procedure can be used by a client to issue Db2 commands to a Db2 server.

Most of these applications prepare and run two programs. One program prepares a stored procedure, and one program executes a client program that calls the stored procedure and returns some response.

Db2 provides the following stored procedure samples:

- A sample stored procedure without a result set
- A sample stored procedure with a result set
- Samples that invoke the following utilities stored procedures:
  - DSNUTILS
  - DSNUTILU
- A sample that invokes the stored procedure WLM_REFRESH, which refreshes the WLM environment
- A sample that invokes the stored procedure ADMIN_INFO_SYSPARM, which lists the settings of subsystem parameters
- A sample stored procedure that uses IMS Open Database Access (ODBA) support
- Two samples of external SQL procedures
- Sample stored procedures for tracing native SQL procedures. Those stored procedures write text to a message buffer and read the next text from the message buffer.

All of these samples are part of the installation verification samples, which are located in *prefix*.NEW.SDSNSAMP. The installation CLIST tailored and loaded these jobs during your installation or migration to new-function mode.

To edit any of these sample jobs, specify the appropriate fields on the installation panels. Using the installation panels is the only method that you can use to edit these jobs.

Before you run the sample stored procedures, ensure that you have completed one of the following tasks:

- Configure Db2 for running stored procedures and user-defined functions during installation
- Configure Db2 for running stored procedures and user-defined functions during migration

Related concepts

Installation verification phases and programs
In each phase of the installation verification procedure (IVP), you must run specific programs. These programs need to be run sequentially by phase because the output of some jobs is used as input for subsequent jobs.

Stored procedure sample without result set

Db2 provides a sample stored procedure that uses the instrumentation facility interface (IFI) to issue Db2 commands. The sample stored procedure also returns the responses to the calling program in a parameter.

This sample application consists of two jobs: DSNTEJ6S and DSNTEJ6P. These jobs are part of the installation verification samples, which are located in *prefix*.NEW.SDSNSAMP. The installation CLIST tailored and loaded these jobs during your installation or migration to new-function mode.

Requirements: You must satisfy the following requirements when running these jobs:

- Run job DSNTEJ6S before job DSNTEJ6P.
- Ensure that the PL/I product is installed on your client and server systems.
- Ensure that Language Environment is installed.

This application prepares and runs the following programs:

- A stored procedure that uses the IFI to issue Db2 commands.
- A client program that receives Db2 command text and calls the stored procedure to issue the commands. When the program receives the responses from the stored procedure in a parameter that is passed back, it prints the results.

For concurrent installations at two Db2 locations, perform the following actions:

- Run the server version of DSNTEJ6S on the server system only; do **not** run the client version of DSNTEJ6S on the server.

- Run the client version of DSNTEJ6P on the client system only; do **not** run the server version of DSNTEJ6P on the client.

Job DSNTEJ6S

Job DSNTEJ6S compiles and link-edits the sample stored procedure DSN8EP2. DSNTEJ6S also updates the SYSIBM.SYSROUTINES catalog table with information about the stored procedure.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

If you have SQL statements in your stored procedure, you must remove the comment character in the JCL from the step that binds the stored procedure package.

You must run job DSNTEJ6S on the server Db2 subsystem.

If DSNTEJ6S runs successfully, it produces the return codes that are shown in the table below.

Table 105. DSNTEJ6S return codes

Step	PROCSTEP	Return code
PH06SS01		0000
PH06SS02		0000
PH06SS03	PPLI PC PLI PLKED LKED	0000 0004 0004 0004 0000

If SQLCODE -592 is received during the execution of DSNTEJ6T, ensure that SPA is active.

Job DSNTEJ6P

Job DSNTEJ6P compiles, link-edits, binds, and runs a sample program, DSN8EP1, which calls the sample stored procedure that is created by job DSNTIJ6S.

The sample caller first connects to the location that is specified in the REMOTE LOCATION field of panel DSNTIPY. If the remote location name is the same as the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the local Db2 subsystem is used as both the client and server.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

Before you run DSNTEJ6P, ensure that DSNTEJ6S has been run on the server Db2 subsystem to create the sample stored procedure.

If DSNTEJ6P runs successfully, it produces the following return codes.

Table 106. DSNTEJ6P return codes

Step	PROCSTEP	Return code
PH06PS01	PPLI PC PLI PLKED LKED	0000 0000 0004 0004 0000
PH06PS02		0004
PH06PS03		0000

Output from a successful execution of DSNTEJ6P lists each Db2 command that was executed, followed by the messages that were generated by the Db2 command processor.

You can compare the output from this job with the sample output for DSNTEJ6P, which is in member DSN8TJ6P of your *prefix*.SDSNIVPD data set.

Stored procedure sample with result set

Db2 provides a sample stored procedure that uses the instrumentation facility interface (IFI) to issue Db2 commands. The sample stored procedure also returns the responses to the calling program in a result set.

This sample application consists of two jobs: DSNTEJ6T and DSNTEJ6D. These jobs are part of the installation verification samples, which are located in *prefix*.NEW.SDSNSAMP. The installation CLIST tailored and loaded these jobs during your installation or migration to new-function mode.

Requirements: You must satisfy the following requirements when running these jobs:

- Run job DSNTEJ6T before job DSNTEJ6D.
- Ensure that C for z/OS is installed.
- Ensure that Language Environment is installed.

This application prepares and runs the following programs:

- A stored procedure that uses the IFI to issue Db2 commands.
- A client program that receives Db2 command text and calls the stored procedure to issue the commands. When the program receives the responses from the stored procedure in a result set, it prints the results.

For concurrent installations at two Db2 locations, perform the following actions:

- Run the server version of job DSNTEJ6T on the server side only; do **not** run it on the client side.
- Run the client version of job DSNTEJ6D on the client side only; do **not** run it on the server side.

Job DSNTEJ6T

Job DSNTEJ6T registers, prepares, and binds the sample stored procedure DSN8ED2 on the server. DSNTEJ6T also defines a created temporary table to receive the IFI output that is returned as a result set.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

You must run job DSNTEJ6T on the server Db2 subsystem.

If DSNTEJ6T runs successfully, it produces the return codes that are shown in the table below.

Table 107. DSNTEJ6T return codes

Step	PROCSTEP	Return code
PH06TS01		0000
PH06TS02		0000
PH06TS03	PC C PLKED LKED	0004 0000 0004 0000
PH06TS04		0000 or 0004

If SQLCODE -592 is received during the execution of DSNTEJ6T, ensure that SPA is active.

Job DSNTEJ6D

Job DSNTEJ6D compiles, link-edits, binds, and runs sample program DSN8ED1, which calls the sample stored procedure that is created by job DSNTEJ6T.

The sample caller first connects to the location that is specified in the REMOTE LOCATION field of panel DSNTIPY. If the remote location name is the same as the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the local Db2 subsystem is used as both the client and server.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

Before you run DSNTEJ6D, ensure that DSNTEJ6T has been run on the server Db2 subsystem to create the sample stored procedure.

If DSNTEJ6D runs successfully, it produces the return codes that are shown in the table below.

Table 108. DSNTEJ6D return codes

Step	PROCSTEP	Return code
PH06DS01	PC C PLKED LKED	0000 0000 or 0004 0000 or 0004 0000
PH06DS02		0004
PH06DS03		0000

Output from a successful execution of DSNTEJ6D lists each Db2 command that was executed, followed by the messages that were generated by the Db2 command processor.

You can compare the output from this job with the sample output for DSNTEJ6D, which is in member DSN8TJ6D of your *prefix*.SDSNIVPD data set.

Sample callers of utilities stored procedures

You can use the Db2-supplied utilities stored procedures to run Db2 utilities from Db2 application programs by using the SQL CALL statement.

The following utilities stored procedures are supplied with Db2:

- DSNUTILS (deprecated)
- DSNUTILU

When called, the utilities stored procedures perform the following actions:

1. Dynamically allocates the specified data sets
2. Creates the utility input stream (SYSIN)
3. Invokes Db2 utilities (DSNUTILB)
4. Deletes all rows currently in the created temporary table (SYSIBM.SYSPRINT)
5. Captures the utility output stream (SYSPRINT)
6. Puts the output into the created temporary table (SYSIBM.SYSPRINT)

The utilites stored procedures must run as a WLM-managed stored procedure.

Related information

Job DSNTEJ6U

Job DSNTEJ6U compiles, link-edits, binds, and runs sample PL/I program DSN8EPU, which invokes the DSNUTILS stored procedure to execute a utility.

Job DSNTEJ6U uses the local Db2 subsystem as both the client and the server subsystem.

The installation CLIST always edits this job.

Before running job DSNTEJ6U, ensure that DSNUTILS has been created as part of the installation or migration process.

Recommendation: Use the DSNWLM_UTILS core WLM environment for DSNUTILS.

If DSNTEJ6U completes successfully, it produces the return codes that are shown in the table below.

Table 109. DSNTEJ6U return codes

Step	PROCSTEP	Return code
PH06US01	PPLI	0000
	PC	0000
	PLI	0000
	PLKED	0004
	LKED	0000
PH06US02		0000
PH06US03		0000

Output from a successful execution of DSNTEJ6U lists the parameters specified followed by the messages generated by the Db2 DIAGNOSE DISPLAY MEPL utility.

You can compare the output from this job with the sample output for DSNTEJ6U found in member DSN8TJ6U in your *prefix*.SDSNIVPD data set.

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines

Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Related information

Job DSNTEJ6R

Job DSNTEJ6R compiles, link-edits, binds, and runs sample C program DSN8ED8, which invokes the DSNUTILU stored procedure to execute a utility.

For convenience on TSO, the utility control statement that is input to DSN8ED8 is encoded in EBCDIC and converted to Unicode before being passed to DSNUTILU.

Job DSNTEJ6R uses the local Db2 subsystem as both the client and the server subsystem.

The installation CLIST edits this job only if you specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

Before running job DSNTEJ6R, ensure that DSNUTILU has been created as part of the installation or migration process.

Recommendation: Use the DSNWLM_UTILS core WLM environment for DSNUTILU.

If DSNTEJ6R completes successfully, it produces the return codes that are shown in the table below.

Table 110. DSNTEJ6R return codes

Step	PROCSTEP	Return code
PH06RS00		0000
PH06RS01	PC	0000
	C	0000
	PLKED	0004
	LKED	0000
PH06RS02		0000 or 0004
PH06RS03		0000

Output from a successful execution of DSNTEJ6R lists the parameters specified followed by the messages generated by the Db2 DIAGNOSE DISPLAY MEPL utility.

You can compare the output from this job with the sample output for DSNTEJ6U found in member DSN8TJ6U in your *prefix*.SDSNIVPD data set.

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Related information

Job DSNTEJ6V

Job DSNTEJ6V compiles, link-edits, binds, and runs sample C++ program DSN8EE1, which invokes the DSNUTILS stored procedure to execute a utility.

Job DSNTEJ6V uses the local Db2 subsystem as both the client and the server subsystem.

The installation CLIST edits this job only if the following conditions are met:

- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You indicated on panel DSNTIPU that an IBM C++ compiler is installed.

Before running job DSNTEJ6V, ensure that DSNUTILS has been created as part of the installation or migration process.

Recommendation: Use the DSNWLM_UTILS core WLM environment for DSNUTILS.

If DSNTEJ6V completes successfully, it produces the return codes that are shown in the table below.

Table 111. DSNTEJ6V return codes

Step	PROCSTEP	Return code
PH06VS01	PC	0004
	CP	0000
	PLKED	0004
	LKED	0004
PH06VS02	PC1	0000
	CP1	0000
	PC2	0004
	CP2	0000
	PLKED	0004
	LKED	0000
PH06VS03		0000 or 0004
PH06VS04		0000

A successful execution of DSNTEJ6V unloads rows and columns from the PROJ sample table.

You can compare the output from this job with the sample output for DSNTEJ6V found in member DSN8TJ6V in your *prefix*.SDSNIVPD data set.

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Related information

Job DSNTEJ6W

Job DSNTEJ6W is a JCL job that creates and initializes a sample SAF resource profile. DSNTEJ6W also prepares, binds, and executes DSN8ED6.

DSN8ED6 is a C language caller of the WLM_REFRESH stored procedure. It accepts the WLM environment name and, optionally, the subsystem ID and an SQLID to be in effect when WLM_REFRESH is invoked.

If a name is specified in the WLM ENVIRONMENT field on installation panel DSNTIPX, the installation CLIST customizes DSNTEJ6W to run in and recycle that WLM environment.

DSNTEJ6W also includes commented-out job steps that show:

- How to prepare the DSNTWR external module from the DSNTWRS sample source code.

- How to prepare the DSNTWRE module from the DSNTWRE sample source code. DSNTWRE is used by DSNTWR.

Do not uncomment and run these jobs unless you maintain a customized copy of DSNTWRS or DSNTWRE. If you do not customize the source code, use the Db2-supplied DSNTWR and DSNTWRE modules in the *prefix*.SDSNLOAD library and the package that is bound by installation job DSNTIJRT.

Job DSNTEJ6W uses the local Db2 subsystem as both the client and the server subsystem.

Before running job DSNTEJ6W, ensure that WLM_REFRESH has been created as part of the installation or migration process. If you are not authorized to create special resource profiles, have your system security administrator perform the first step of this job. The SQLID that is used to run DSNTEJ6W needs READ access to this profile.

If DSNTEJ6W completes successfully, it produces the return codes that are shown in the table below.

Table 112. DSNTEJ6W return codes

Step	PROCSTEP	Return code
PH06WS00"1" on page 687	PC	0004
	ASM	0000
	LKED	0000
PH06WS01"1" on page 687	PC	0000
	ASM	0000
	LKED	0000
PH06WS02"1" on page 687		0000
PH06WS03	PC	0000
	C	0000
	PLKED	0004
	LKED	0000
PH06WS04		0000 or 0004
PH06WS05		0000 or 0004

Notes:

1. Return codes for PH06WS00, PH06WS01 and PH06WS02 are generated only if the job steps are uncommented.

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Related information

Job DSNTEJ6Z

Job DSNTEJ6Z generates a report of current subsystem parameter settings. This report is generated by DSN8ED7, a C-language caller of stored procedure ADMIN_INFO_SYSPARM. You must have MONITOR1 privileges to run ADMIN_INFO_SYSPARM.

Job DSNTEJ6Z uses the local Db2 subsystem as both the client and the server subsystem.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

Before running job DSNTEJ6Z, ensure that ADMIN_INFO_SYSPARM has been created as part of the installation or migration process.

If DSNTEJ6Z completes successfully, it produces the return codes that are shown in the table below.

Table 113. DSNTEJ6Z return codes

Step	PROCSTEP	Return code
PH06ZS01	PC	0000
	C	0000
	PLKED	0004
	LKED	0000
PH06ZS02		0000 or 0004
PH06ZS03		0000

A successful execution of DSNTEJ6Z provides a report as shown in the figure below.

```
 DSN8ED7: Sample DB2 Configuration Setting Report Generator

 Macro    Parameter  Current     Description/         Install   Fld
 Name     Name       Setting     Install Field Name   Panel ID  No.
 ____________________________________________________________________
 DSN6SYSP AUDITST    0000000000  AUDIT TRACE          DSNTIPN      1
 DSN6SYSP CONDBAT    0000010000  MAX REMOTE CONNECTED DSNTIPE      4
 DSN6SYSP CTHREAD    00200       MAX USERS            DSNTIPE      2
 DSN6SYSP PCLOSEN    00010       RO SWITCH CHKPTS     DSNTIPL1     8
...
```

Figure 91. DSNTEJ6Z report format

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Sample ODBA stored procedure

IMS Open Database Access (ODBA) support enables a Db2 stored procedure to directly connect to an IMS DBCTL system and issue DL/I calls to access IMS databases.

This sample ODBA stored procedure application consists of two jobs: DSNTEJ61 and DSNTEJ62. These jobs are part of the installation verification samples, which are located in *prefix*.NEW.SDSNSAMP. The installation CLIST tailored and loaded these jobs during your installation or migration to new-function mode.

Requirements: You must satisfy the following requirements when running these jobs:

- Run job DSNTEJ61 before DSNTEJ62.
- Ensure that Enterprise COBOL for z/OS is installed.
- Ensure that Language Environment is installed.
- Start a WLM-established stored procedure address space to run DSNTEJ61 and DSNTEJ62. You need to update the startup procedure for the WLM-established stored procedure address space to add the ODBA data set names to the STEPLIB and DFSRESLB concatenations. An example of a data set name for ODBA is IMSVS.RESLIB.

Related information

Job DSNTEJ61

Job DSNTEJ61 prepares sample stored procedure DSN8EC1, which uses ODBA. DSN8EC1 can add, update, delete, and display telephone directory records from the IMS sample database, DFSIVD1. DSN8EC1 shows how the AERTDLI API is used to issue IMS DL/I calls.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

Before running job DSNTEJ61, read the dependencies information of the job prolog to verify that the server site is correctly configured and has a connection to an IMS subsystem.

If DSNTEJ61 runs successfully, it produces the return codes that are shown in the table below.

Table 114. DSNTEJ61 return codes

Step	PROCSTEP	Return code
PH061S01		0000
PH061S02		0000
PH061S03	PC COB PLKED"1" on page 689 LKED	0004 0000 0004 0000

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

Related concepts

Job DSNTEJ62

Job DSNTEJ62 prepares and invokes the sample client program DSN8EC2, which calls stored procedure DSN8EC1 multiple times to add, delete, and display telephone directory records. DSN8EC1 is created by job DSNTEJ61.

Job DSNTEJ62

Job DSNTEJ62 prepares and invokes the sample client program DSN8EC2, which calls stored procedure DSN8EC1 multiple times to add, delete, and display telephone directory records. DSN8EC1 is created by job DSNTEJ61.

The sample caller first connects to the location that is specified in the REMOTE LOCATION field of panel DSNTIPY. If the remote location name is the same as the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the local Db2 subsystem is used as both the client and server.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.
- You specified a name in the REMOTE LOCATION field of panel DSNTIPY. The name can match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR.

Before running DSNTEJ62, complete the manual editing that is described in the dependencies information in the job prolog.

If DSNTEJ62 runs successfully, it produces the return codes that are shown in the table below.

Table 115. DSNTEJ62 return codes

Step	PROCSTEP	Return code
PH062S01	PC COB PLKED“1” on page 690 LKED	0000 0000 0004 0000
PH062S02		0000 or 0004
PH062S03		0000

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

Related concepts

Job DSNTEJ61
Job DSNTEJ61 prepares sample stored procedure DSN8EC1, which uses ODBA. DSN8EC1 can add, update, delete, and display telephone directory records from the IMS sample database, DFSIVD1. DSN8EC1 shows how the AERTDLI API is used to issue IMS DL/I calls.

Sample SQL procedures

Db2 for z/OS provides applications for external SQL procedures and native SQL procedures.

The applications for external SQL procedures are:

- DSNTEJ63
- DSNTEJ64
- DSNTEJ65

C and Language Environment are required for jobs DSNTEJ63, DSNTEJ64, and DSNTEJ65.

The applications for native SQL procedures are:

- DSNTEJ66

Related information

Job DSNTEJ63

Job DSNTEJ63 prepares the sample external SQL procedure, DSN8ES1, which accepts a department number and returns salary and bonus data.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

If a remote location was specified in the REMOTE LOCATION field of panel DSNTIPY, job DSNTEJ63 should be run on the remote server subsystem.

Before running DSNTEJ63, you should manually edit the job as described in the dependencies information in the job prolog.

If DSNTEJ63 runs successfully, it produces the return codes that are shown in the following table.

Table 116. DSNTEJ63 return codes

Step	PROCSTEP	Return code
PH063S01		0000
PH063S02	PC PCC C PLKED LKED	0004 0004 0000 0004 0000
PH063S03		0000 or 0004

Job DSNTEJ64

Job DSNTEJ64 prepares and executes DSN8ED3, which is a sample routine that calls the sample external SQL procedure, DSN8ES1. DSN8ES1 was created by job DSNTIJ63.

The sample caller first connects to the location that is specified in the REMOTE LOCATION field of panel DSNTIPY. If the remote location name is the same as the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the local Db2 subsystem is used as both the client and server.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

Before running job DSNTEJ64, ensure that job DSNTEJ6S was run on the server subsystem. Also run job DSNTEJ63 before running job DSNTEJ64. Before running DSNTEJ64, you should manually edit the job as described in the dependencies information in the job prolog.

If DSNTEJ64 runs successfully, it produces the return codes that are shown in the following table.

Table 117. DSNTEJ64 return codes

Step	PROCSTEP	Return code
PH064S01	PC C PLKED LKED	0000 0000 0004 0000
PH064S02		0000 or 0004
PH064S03		0000

You can compare the output from this job to the sample output for DSNTEJ64, which is found in member DSN8TJ64 in data set named *prefix*.SDSNIVPD.

Job DSNTEJ65

Job DSNTEJ65 prepares and runs a sample application that calls the SYSPROC.DSNTPSMP stored procedure processor to create a sample external SQL procedure. The sample external SQL procedure is created at the location that is specified in the REMOTE LOCATION field of panel DSNTIPY.

Job DSNTEJ65 then prepares and runs a sample application that calls the external SQL procedure. The sample caller first connects to the location that is specified in the REMOTE LOCATION field of panel DSNTIPY.

If a remote location is specified in the REMOTE LOCATION field name on installation panel DSNTIPY, ensure that both Db2 REXX language support and the DSNTPSMP stored procedure are available at that location. If the remote location name is the same as the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the local Db2 subsystem is used as both the client and server.

The major components of job DSNTEJ65 are as follows:

- DSNWLM_REXX is the WLM core environment for DSNTPSMP.
- DSN8ED4 is a sample C program that calls the Db2 external SQL procedures processor.
- DSN8ES2 is a sample external SQL procedure that calculates employee bonuses.
- DSN8ED5 is a sample C program that calls the external SQL procedure DSN8ES2.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

Before running job DSNTEJ65, ensure that DSNTPSMP has been created as part of the installation or migration process.

Recommendation: DSNTPSMP requires that the default EBCDIC CCSID that is used by Db2 also be compatible with the C compiler. Do not run DSNTEJ65 if the default EBCDIC CCSID for Db2 is not compatible with the C compiler. Using an incompatible CCSID results in compile-time errors. Examples of incompatible CCSIDs include 290, 930, 1026, and 1155.

If DSNTEJ65 runs successfully, it produces the return codes that are shown in the following table.

Table 118. DSNTEJ65 return codes

Step	PROCSTEP	Return code
PH065S01	PC C PLKED LKED	0000 0000 0004 0000
PH065S02		0000 or 0004
PH065S03		0000 or 0004
PH065S04		0000 or 0004
PH065S05	PC C PLKED LKED	0000 0000 0004 0000
PH065S06		0000 or 0004
PH065S07		0000

You can compare the output from this job to the sample output for DSNTEJ65, which is found in member DSN8TJ65 in the data set named *prefix*.SDSNIVPD.

Related tasks

Installation step 20: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects.

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Job DSNTEJ66

Job DSNTEJ66 creates a sample native SQL procedure. It also prepares and executes a sample caller of that SQL procedure on the local Db2 subsystem. It then modifies the SQL procedure slightly, activates the change on the local subsystem, and executes the sample caller to call the updated SQL procedure.

Specifically, job DSNTEJ66 completes the following actions:

- Creates a sample native SQL procedure called DSN8.DSN8ES3 that generates and returns a CREATE PROCEDURE statement for a given stored procedure.
- Prepares and executes a sample caller of DSN8ES3 called DSN8ED9.
- Illustrates how to use ALTER PROCEDURE... ADD VERSION to create a version V2 of DSN8ES3 that does the same thing as the original version but also adds a terminating semicolon at the end of the generated CREATE PROCEDURE statement.
- Illustrates how to use ALTER ACTIVATE to make version V2 the active version of DSN8ES3.
- If you specify a remote Db2 subsystem in the REMOTE LOCATION field and it does not match the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, additional job steps do the following:
  - Deploys the sample native SQL procedure on the remote Db2 subsystem.

- Binds the sample caller on the remote Db2 subsystem and execute it to call the native SQL procedure at that site.

If the REMOTE LOCATION field is blank or matches the name that is specified in the DB2 LOCATION NAME field of panel DSNTIPR, the deploy-related steps are removed from DSNTEJ66 by the installation CLIST.

As part of the setup for deploying DSN8ES3 on a remote server, the DSNTEP2 application needs to be able to connect to the remote site.

The installation CLIST edits this job only if the following conditions are met:

- You specified AUTO or COMMAND in the DDF STARTUP OPTION field of panel DSNTIPR.
- You specified a name in the WLM ENVIRONMENT field of panel DSNTIPX.

Before running DSNTEJ66, perform the manual editing described in the dependencies information in the job prolog. You must also manually tailor DSN8WLMP, the sample WLM startup procedure for DSNTPSMP. If DSNTEJ66 runs successfully, it produces the return codes that are shown in the table below.

Table 119. DSNTEJ66 return codes

Step	PROCSTEP	Return code
PH066S01		0000
PH066S02		0000
PH066S03		0000
PH066S04	PC C PLKED LKED	0000 0000 0004 0000
PH066S05		0000 or 0004
PH066S06		0000
PH066S07		0000
PH066S08		0000
PH066S09		0000
PH066S10		0000
PH066S11		0000
PH066S12		0000 or 0004
PH066S13		0000
PH066S14		0000
PH066S15		0000 or 0004
PH066S16		0000

You can compare the output from this job to the sample output for DSNTEJ66, which is found in member DSN8TJ66 in the data set named *prefix*.SDSNIVPD.

Job DSNTEJ67

Job DSNTEJ67 shows how to convert sample external SQL procedure DSN8.DSN8ES2 to a sample native SQL procedure called DSN8.DSN8ES2. The conversion is performed by the Db2 precompiler and various Db2 sample REXX services that are provided in member DSN8ERL1.

Before running job DSNTEJ67, you must successfully run job DSNTEJ65 to create DSN8.DSN8ES2 through the Db2 SQL procedure processor, DSNTPSMP. See the job DSNTEJ67 prolog for information about adapting this job to convert other SQL procedures that are created through DSNTPSMP.

Table 120. DSNTEJ67 return codes

Step	PROCSTEP	Return code
PH067S00		0000
PH067S01		0000
PH067S02		0000
PH067S03		0000
PH067S04		0000 or 0004

Phase 7: Accessing LOB data

Phase 7 of the installation or migration verification process is an optional phase that demonstrates how to set up and use a Db2 LOB application. This phase creates an extension to the Employee sample database to manage employee resumes and photo images.

You run these jobs in this phase:

- DSNTEJ7: Creates and loads the employee resume and photo table.
- DSNTEJ71, DSNTEJ76: Uses LOB locators to populate the photo images, then validates that the resume and photo data is stored correctly.
- DSNTEJ73, DSNTEJ77: Prepares an ISPF application for viewing employee resume data.
- DSNTEJ75, DSNTEJ78: Prepares a GDDM application for viewing employee photo images.

Jobs DSNTEJ75 and DSNTEJ78 are not tailored by the installation CLIST unless you specify non-blank values for GDDM MACLIB and GDDM LOAD MODULES on panel DSNTIPW.

After you run these jobs, you can use ISPF and GDDM to view the sample employee resume and photo data.

Job DSNTEJ7

Job DSNTEJ7 demonstrates how to create a LOB table with all the accompanying LOB table spaces, auxiliary tables, and indexes. DSNTEJ7 also demonstrates how to use the Db2 LOAD utility to load a LOB table.

Job DSNTEJ7 consists of the following steps:

Step	Function
1	Drops sample LOB objects
2	Creates sample Employee Resume and Photo LOB table
3	Creates aliases for the table, then grants access to it
4	Uses the Db2 LOAD utility to populate the table
5	Generates run time statistics on the table

If DSNTEJ7 runs successfully, it produces the return codes that are shown in the table below.

Table 121. DSNTEJ7 return codes

JOBSTEP	PROCSTEP	Return Code
PH07S01		0000
PH07S02		0000
PH07S03		0000 or 0004
PH07S04	DSNUPROC	0000
PH07S05	DSNUPROC	0000
PH07S06		0000
PH07S07		0000

Job DSNTEJ71 (optional)

Job DSNTEJ71 compiles, link-edits, and binds two sample applications that manipulate LOB data.

The DSN8DLPL sample application demonstrates how to use LOB locators to populate a LOB column. The DSN8DLTC sample application validates the contents of the LOB table, verifying that it was populated correctly.

In previous releases, you had to run job DSNTEJ71 to populate LOB columns that were greater than 32 KB. In Db2 11, the LOAD utility populates all columns of the sample LOB table, so job DSNTEJ71 is optional.

If DSNTEJ71 runs successfully, it produces the return codes that are shown in the table below.

Table 122. DSNTEJ71 return codes

JOBSTEP	PROCSTEP	Return Code
PH071S01	PC C PLKED LKED	0000 0000 0004 0000
PH071S02	PC C PLKED LKED	0000 0000 0004 0000
PH071S03		0000
PH071S04		0000
PH071S05		0000

You can compare the output from this job with the sample output for DSNTEJ71 found in member DSN8TJ71 in your *prefix*.SDSNIVPD data set.

Job DSNTEJ73

Job DSNTEJ73 compiles the DSN8DLRV sample application. DSN8DLRV demonstrates how to use built-in functions like POSSTR and SUBSTR to traverse a CLOB column and extract data from it.

DSN8DLRV is written in C language and linked with ISPF and Db2 Call Attach Facility. The package name and plan name are both DSN8LR*vr*, where *vr* is the Db2 version and release.

If DSNTEJ73 runs successfully, it produces the return codes that are shown in the table below.

Table 123. DSNTEJ73 return codes

JOBSTEP	PROCSTEP	Return Code
PH073S01	PC C PLKED LKED	0004 0000 0004 0000
PH073S02	PC C PLKED LKED	0000 0000 0004 0000
PH073S03		0000 or 0004

Related tasks

Starting an application in an ISPF/TSO environment in phase 7
You must have access to ISPF load module libraries to run the Employee Resume and Photo sample applications.

Job DSNTEJ75

Job DSNTEJ75 runs sample program DSN8DLPV, which demonstrates how to manipulate BLOB data (employee photo images).

This job is not edited by the CLIST unless the GDDM MACLIB and GDDM LOAD MODULES fields on panel DSNTIPW are non-blank.

DSN8DLPV is a C language program that is linked with ISPF, GDDM and the Db2 Call Attach Facility. The package name and plan name are both DSN8LP*vr*, where *vr* is the Db2 version and release. To run DSN8DLPV you must include the GDDM load module library (SADMMOD) in the logon procedure or in the ISPLLIB concatenation.

If DSNTEJ75 runs successfully, it produces the return codes that are shown in the table below.

Table 124. DSNTEJ75 return codes

JOBSTEP	PROCSTEP	Return Code
PH075S01	PC C PLKED LKED	0000 0000 0004 0000
PH075S02		0000 or 0004

Related tasks

Starting an application in an ISPF/TSO environment in phase 7

You must have access to ISPF load module libraries to run the Employee Resume and Photo sample applications.

Job DSNTEJ76

Job DSNTEJ76 compiles, link-edits, and binds two sample COBOL applications that manipulate LOB data.

The DSN8CLPL sample application demonstrates how to use LOB locators to populate a LOB column that is larger than 32 KB. The DSN8CLTC sample application validates the contents of the LOB table, verifying that it was populated correctly.

If DSNTEJ76 runs successfully, it produces the return codes that are shown in the table below.

Table 125. DSNTEJ76 return codes

JOBSTEP	PROCSTEP	Return code
PH076S01	PC COB PLKED“1” on page 698 LKED	0000 0000 0004 0000
PH076S02	PC COB PLKED“1” on page 698 LKED	0000 0000 0004 0000
PH076S03		0000 or 0004
PH076S04		0000
PH076S05		0000

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

After running DSNTEJ76, you can compare the output with the sample output for DSNTEJ76 found in member DSN8TJ76 in your *prefix*.SDSNIVPD data set.

Job DSNTEJ77

Job DSNTEJ77 compiles the DSN8CLRV sample COBOL application. DSN8CLRV demonstrates how to use built-in functions, such as POSSTR and SUBSTR, to traverse a CLOB column and extract data from it.

DSN8CLRV is written in the COBOL language and linked with ISPF and Db2 Call Attach Facility. The package name and plan name are both DSN8CR*vr*, where *vr* is the Db2 version and release.

To run DSN8CLRV, you must run the first step of job DSNTEJ73 to compile DSN8SDM.

If DSNTEJ77 runs successfully, it produces the return codes that are shown in the table below.

Table 126. DSNTEJ77 return codes

JOBSTEP	PROCSTEP	Return Code
PH077S01	PC COB PLKED“1” on page 699 LKED	0000 0000 0004 0000

Table 126. DSNTEJ77 return codes (continued)

JOBSTEP	PROCSTEP	Return Code
PH077S02		0000 or 0004

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

Related tasks

Starting an application in an ISPF/TSO environment in phase 7
You must have access to ISPF load module libraries to run the Employee Resume and Photo sample applications.

Job DSNTEJ78

Job DSNTEJ78 runs sample COBOL program DSN8CLPV, which demonstrates how to manipulate BLOB data (employee photo images).

This job is not edited by the CLIST unless the GDDM MACLIB and GDDM LOAD MODULES fields on panel DSNTIPW are non-blank.

DSN8CLPV is a COBOL language program linked with ISPF, GDDM and the Db2 Call Attach Facility. The package name and plan name are both DSN8CP*vr*, where *vr* is the Db2 version and release. To run DSN8CLPV you must include the GDDM load module library (SADMMOD) in the logon procedure or in the ISPLLIB concatenation.

If DSNTEJ78 runs successfully, it produces the return codes that are shown in the table below.

Table 127. DSNTEJ78 return codes

JOBSTEP	PROCSTEP	Return Code
PH078S01	PC COB PLKED"1" on page 699 LKED	0000 0000 0004 0000
PH078S02		0000 or 0004

Note:

1. The PLKED step does not exist in the job if the value of the COBOL LE PRELINKER PHASE field is set to NO.

Related tasks

Starting an application in an ISPF/TSO environment in phase 7
You must have access to ISPF load module libraries to run the Employee Resume and Photo sample applications.

Starting an application in an ISPF/TSO environment in phase 7

You must have access to ISPF load module libraries to run the Employee Resume and Photo sample applications.

Procedure

To start the application:

1. Enter a CALL command from option 6 of the ISPF primary option menu.

2. To start the Employee Resume and Photo sample applications, enter the following:

   ```
   CALL 'prefix.RUNLIB.LOAD(DSN8SDM)'
   ```

   After you enter this command, Db2 displays the sample applications panel.

   Choosing option 4 or option 6 on the sample applications panel during Phase 7 invokes the "Employee Resume" sample application, which processes CLOB data. Choosing option 5 or option 7 on the sample applications panel during Phase 7 invokes the "Employee Photo" sample application, which processes BLOB data.

Related tasks

Working with the employee resume and photo scenarios
The LOB sample application extends the existing Db2 sample employee database by adding a new table for storing employee resumes and photographs as CLOB and BLOB entries.

Starting an application in an ISPF/TSO environment
You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Make DB2I panels, messages, and load modules available to ISPF and TSO
During migration, to connect the Db2 Interactive facility (DB2I) to TSO, you must make panels, messages, and load modules available to ISPF and TSO.

The sample applications

After you run the installation verification jobs, you can use the sample applications to test and verify your new installation or migration.

The names of the sample applications have changed for Db2 11. Check to make sure you have the authority to run the Db2 11 sample programs.

Brief scenarios describe how to display, update, add, and delete information using the sample applications. Another scenario describes how to view or change information using a combination of organization and project applications. This scenario contains problem-solving exercises based upon creating and staffing a new department with new projects.

The output from the installation verification steps discussed here appears in your *prefix*.SDSNIVPD data set.

Related information

Printing options for the sample application listings

The source statements that are contained in *prefix*.SDSNSAMP can be printed using ISPF facilities, IEBPTPCH, or local facilities.

Most of the Db2 sample applications are contained in *prefix*.SDSNSAMP. The modules making up the SQLCA formatter routine (DSNTIAR, DSNTIAC, DSNTIA1, and DSNTIAM) are not in the *prefix*.SDSNSAMP library. They are provided in object form in *prefix*.SDSNLOAD.

You might not want to print all members of *prefix*.SDSNSAMP because some of the members are large and contain unprintable data. An alternative is to precompile and compile the wanted program by specifying a cross-reference to the precompiler and compiler. This provides a cross-reference for program variables and is current.

The sample application panels

When you run the interactive sample applications, the sample application panels require you to enter information such as the action you want to complete.

You are prompted for the following information when you run the interactive sample applications.

Sample Applications	Distributed Sample Applications
• MAJOR SYSTEM • ACTION • OBJECT • SEARCH CRITERIA • DATA	• ACTION • OBJECT • SEARCH CRITERIA • LOCATION • DATA

Regard these categories as a family of values that are used together to specify a task that is to be performed. For MAJOR SYSTEM, ACTION, OBJECT, and SEARCH CRITERIA, a character code of one or two characters is used as a form of shorthand to indicate the criteria that you want. The system provides a list of these codes with their meanings. A valid location name of 1 to 16 characters must be used for LOCATION. The value for DATA must be consistent with the data type and length of SEARCH CRITERIA.

MAJOR SYSTEM

MAJOR SYSTEM specifies the major application area. In the sample application, there are two major systems: organization and project. These major systems are implemented in separate transactions to keep the plan sizes reasonable. If you are running the Db2 distributed sample program, organization is the only system; therefore, this criterion is not used.

ACTION

ACTION specifies what you want to do with the object (specified on another line of the panel). You can display, update, add (insert), or erase (delete) information about the specified object.

OBJECT

OBJECT specifies the object about which you want information. Normally, the action is associated with the object. Examples of objects are information about an employee (EM) or information about the relationship among departments (DS).

Objects can be specified with the following codes for the organization application:

DE

Department—general department and manager information for department specified

DS

Department structure—hierarchy information for department specified

EM

Employee—information concerning employee specified.

Objects can be specified with the following codes for the project application:

PS

Project structure—information on projects and subprojects

AL

Activity listing—information concerning the different activities that makes up a project

PR

Project—general project information

AS

Activity staffing—information about the employees staffed for activities of specified projects

AE

Activity estimate—information concerning the estimated staffing and time requirements of specified projects.

You are able only to add, update, or erase information about the selected object, although you can search and display based on other criteria. Items that are added or updated can be changed on the screen. Other fields are protected.

SEARCH CRITERIA

SEARCH CRITERIA helps to locate the specific item of information upon which to act.

The following codes can be specified for the search criteria field for the organization application:

DI
Department number

DN
Department name

EI
Employee number

EN
Employee name

MI
Manager number

MN
Manager name.

The following codes can be specified for the search criteria for the project application:

DI
Department number

DN
Department name

EI
Employee number

EN
Employee name

PI
Project number

PN
Project name

RI
Responsible person number

RN
Responsible person name.

LOCATION
LOCATION is used only for the distributed application. It describes the location where the action is to take place. If this criterion is left blank, then the local location is assumed.

DATA
DATA further identifies the search criteria target. The data value specified must be consistent with the data type and length of the search criteria code. If the search criterion is an employee name (**EN**), manager name (**MN**), or responsible person name (**RN**), the value of data must be a person's last name.

Data values can be specified by using either primary selection or secondary selection. *Primary selection* is the data value itself. Only one set of data values fulfills the request. *Secondary selection* allows multiple sets of data values to fulfill the request. A brief summary of the sets of data values appear on the screen. Each summary has an associated line number. To display additional information about a certain line, enter the line number in the DATA field. Secondary selection allows the application to display a set of values and then provides a prompt to select a specific DATA value. For example, you can display information about a department (**DE**) (the OBJECT) with a department number (**DI**) (the SEARCH CRITERIA) with a **DATA** value of D11.

Related concepts

Connecting distributed database systems
You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

DATA field values on the sample application panels

When you run the interactive sample applications, you must use the sample application panels to enter information about the task that you want to complete. Information that is entered in the DATA field on the sample application panels is used with the SEARCH CRITERIA field to define a search.

Allowable combinations of values on the sample application panels

The codes on the sample application panels cannot be combined indiscriminately.

For instance, manager number (MI) is a valid search criterion for a department (DE), but employee number (EI) and project number (PI) cannot be used to locate a department.

You can retrieve data by having the panels prompt you for the proper values. It is not necessary to enter the values one line at a time. If you already know all the values you want, they can be entered at the same time. If the values are only partially entered, you must start with ACTION and enter each value in sequence, not skipping over any values. For example, if you know all the values except OBJECT, only ACTION can be entered. You are prompted for OBJECT. Then you can enter OBJECT, SEARCH CRITERIA, and DATA.

DATA field values on the sample application panels

When you run the interactive sample applications, you must use the sample application panels to enter information about the task that you want to complete. Information that is entered in the DATA field on the sample application panels is used with the SEARCH CRITERIA field to define a search.

The values available for DATA are not limited to a select few as are the values for ACTION and OBJECT. There is a wider choice of DATA values and a variety of ways to express them.

If you know only part of a DATA value (for example, you know the department number begins with D), you can specify it as a *pattern*. The pattern can contain any character string with a special meaning, such as:

- The underscore character, _, represents any single character.
- The percent character, %, represents any string of zero or more characters.

These two special characters can be used in conjunction with other characters to specify a DATA value. The following table demonstrates three ways to use these characters to create a DATA value.

Table 128. Searching for data values

Data Value	Search Criteria	Description
%SMITH%	EN (Employee name)	Searches for any last name that contains the word SMITH; for example, BLACKSMITH, SMITHSONIAN, or NESMITHA
E_1	DI (Department number)	Searches for any department number with E in position 1 and 1 in position 3; for example, E71, E21, or EB1
%	Any	All values qualify

The values entered on the SEARCH CRITERIA and DATA fields can choose only one item to be displayed. However, the more usual case is that several items are displayed as a list. When this is the case, a secondary selection can be made by choosing the line number of the item of interest.

Function keys on the sample application panels

The bottom line of each sample application panel displays the function keys that are active for that panel.

Function key 2—Resend: If the panel is blanked out (for example, you pressed the CLEAR key) or you want to refresh the panel, press function key 2 to return (resend) the display you were viewing to the terminal.

Function key 3—End To terminate the application, press function key 3 to clear the screen and continue with other transactions.

Function key 8—Next: Sometimes a display of information is too large to fit on one panel. Press function key 8 to scroll forward (the lines move upward).

Function key 10—Left: Press function key 10 to move the field of vision up one level in the department structure. For instance, in the organization application, Department E01 is shown on the left, and its subdepartments are shown on the right. When you press function key 10, the screen scrolls so that Department E01 is moved from the left side of the panel to the right side and the department to which it reports appears on the left. All other departments that report to the department now on the left also appear along with Department E01 on the right. Function key 10 performs this function only for IMS and CICS samples.

Related tasks

Working with the organization application scenario
The organization application scenario shows how to display a list of departments within an organization and the structure of one of these departments.

Working with scenarios

Work with the scenarios for using the sample applications. The method for invoking these applications depends on the environment that you are working in.

About this task

When an application runs, many areas on the display panel might be highlighted. The data that you enter might not be highlighted, depending on the type of panel that is displayed.

Related tasks

Starting an application in an ISPF/TSO environment in phase 6
You must have access to ISPF load module libraries in order to run the ISPF/CAF sample application.

Starting an application in a CICS environment
After logging on to CICS, you can start an organization application or project application in the CICS environment.

Starting an application in an IMS environment
After logging on to IMS, you can start the organization application or project application.

Starting an application in an ISPF/TSO environment
You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Working with the project application scenario

The project application scenario demonstrates how to view details of a project and update activities that are associated with a project.

About this task

For example, you can find the person responsible for a project and list the activities that are assigned to one of its subprojects. Phase 4 (IMS) and Phase 5 (CICS) prepare the programs that you execute.

Procedure

Enter the following values on the first panel of the project application:

- On the MAJOR SYSTEM line, enter P for project.
- On the ACTION line, enter D for display.
- On the OBJECT line, enter PS for project structure.
- On the SEARCH CRITERIA line, enter PI for project ID.

- On the DATA line, enter MA2100 as the project ID.

The following example panel shows the selected project and its corresponding subprojects.

```
              PROJECT STRUCTURE
MAJOR SYSTEM ...: P          PROJECTS
ACTION .........: D          DISPLAY (SHOW)
OBJECT .........: PS         PROJECT STRUCTURE
SEARCH CRITERIA.: PI         PROJECT ID
DATA ...........: MA2100

PROJECT ID & NAME                      SUBPROJECT ID & NAME
 RESPONSIBLE ID & NAME                  RESPONSIBLE ID & NAME

MA2100  WELD LINE AUTOMATION            MA2110  W L PROGRAMMING
 000010  CHRISTINE I HAAS                000060  IRVING F STERN

                                        PL2100  WELD LINE PLANNING
                                         000020  MICHAEL L THOMPSON


PFK: 02=RESEND 03=END 08=NEXT 10=LEFT
```

Figure 92. Project application—viewing a project structure

Updating an activity

You can use the project application to update an activity information for a project, such as the estimated start date.

About this task

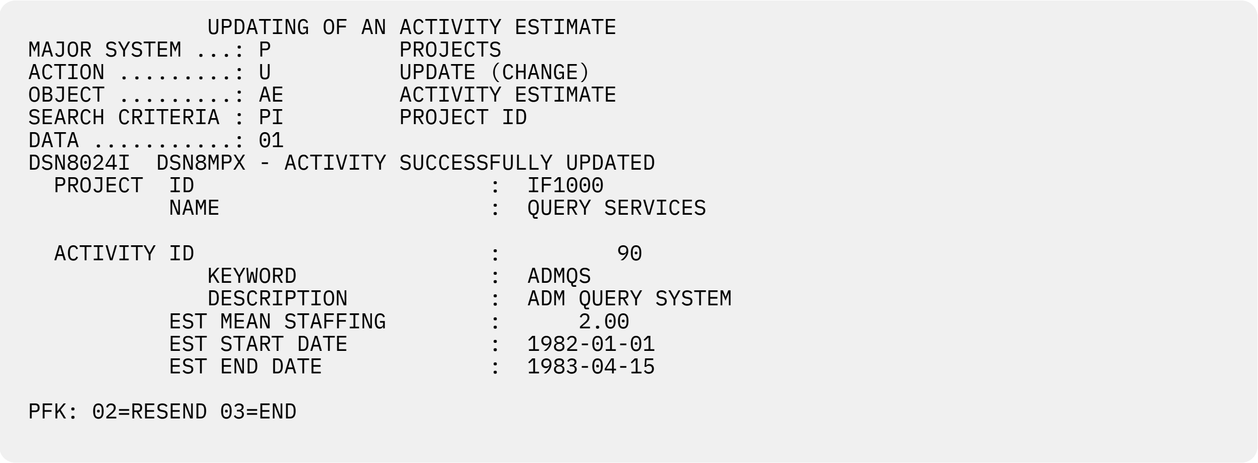
Suppose that you want to update activity information for a project with ID IF1000.

Procedure

To update the activity:

1. Enter the following values:
   - On the MAJOR SYSTEM, enter P for project.
   - On the ACTION line, enter U for update.
   - On the OBJECT line, enter AE for activity estimate.
   - On the SEARCH CRITERIA line, enter PI for project ID.
   - On the DATA line, enter IF1000 as the project ID.
2. Press the ENTER key, and a list of project IF1000 activities appears on the panel.
3. Choose the activity to be updated. For instance, if you want to update the first activity listed, enter 1 as the DATA value and press the ENTER key. The next panel shows information about the estimated mean staffing requirements of this activity as well as the start and completion dates.
4. To change information about the estimated end date, enter data over the existing information displayed on that input line.
5. After you have verified the change, press ENTER.

   The next panel displays the updated information, as shown in the following figure:



```
              UPDATING OF AN ACTIVITY ESTIMATE
MAJOR SYSTEM ...: P          PROJECTS
ACTION .........: U          UPDATE (CHANGE)
OBJECT .........: AE         ACTIVITY ESTIMATE
SEARCH CRITERIA : PI         PROJECT ID
DATA ...........: 01
DSN8024I  DSN8MPX - ACTIVITY SUCCESSFULLY UPDATED
  PROJECT  ID                        :  IF1000
           NAME                      :  QUERY SERVICES

  ACTIVITY ID                        :         90
              KEYWORD                :  ADMQS
              DESCRIPTION            :  ADM QUERY SYSTEM
           EST MEAN STAFFING         :      2.00
           EST START DATE            :  1982-01-01
           EST END DATE              :  1983-04-15

PFK: 02=RESEND 03=END
```

Figure 93. Project application—changes accepted

6. To terminate the project application, press the PF3 key.

   The APPLICATION TERMINATED message is displayed.

What to do next

If you are using CICS, clear the screen and enter a new transaction code. If you are using IMS, clear the screen and enter a new transaction code or a /FORMAT command.

Working with the organization application scenario

The organization application scenario shows how to display a list of departments within an organization and the structure of one of these departments.

About this task

This application is executed in Phase 4 for IMS and Phase 5 for CICS.

Procedure

To display a list of departments and the structure of one of the departments:

1. After you enter the appropriate transaction code, you see the first panel of the project application. Enter the following values:

   - On the MAJOR SYSTEM, enter O for organization.
   - On the ACTION line, enter D for display.
   - On the OBJECT line, enter DS for department structure.
   - On the SEARCH CRITERIA line, enter DI for department number.
   - On the DATA line, enter %, which enables you to display a list of all the departments.

   Each department entry is numbered on the far left side of the panel as shown in the figure below.

```
              DEPARTMENT ADMINISTRATIVE STRUCTURE SELECTION
MAJOR SYSTEM ...: O          ORGANIZATION
ACTION .........: D          DISPLAY (SHOW)
OBJECT .........: DS         DEPARTMENT STRUCTURE
SEARCH CRITERIA.: DI         DEPARTMENT ID
DATA ...........: %
SELECT A DEPARTMENT FROM FOLLOWING LIST BY SPECIFYING THE LINE NUMBER
NO  D/ID  DEPARTMENT NAME                        M/ID     MANAGER NAME
01  A00   SPIFFY COMPUTER SERVICES DIV.        000010   CI HAAS
02  B01   PLANNING                               000020   ML THOMPSON
03  C01   INFORMATION CENTER                     000030   SA KWAN
04  D01   DEVELOPMENT CENTER
05  D11   MANUFACTURING SYSTEMS                  000060   IF STERN
06  D21   ADMINISTRATION SYSTEMS                 000070   ED PULASKI
07  E01   SUPPORT SERVICES                       000050   JB GEYER
08  E11   OPERATIONS                             000090   EW HENDERSON
09  E21   SOFTWARE SUPPORT                       000100   TQ SPENSER
PFK:  02=RESEND 03=END 08=NEXT
```

Figure 94. Organization application—viewing a list of departments

2. To retrieve further information, specify a line number as a data value. This method is called secondary selection. Secondary selection provides prompts to aid in finding the information to be displayed, added, erased, or updated. If only one entry possibility exists, secondary selection is not offered.
   For example, to view the structure of Department E01, specify a data value of 7 on the DATA entry line (7 is the line number of the entry for Department E01). The result of entering the data value of 7 is a display of Department E01 and its departments as shown in the figure below. The department manager for E01 is listed on the left, and the departments of E01 are listed on the right. Employees of E01 are listed below the subdepartments of E01.

```
              DEPARTMENT ADMINISTRATIVE STRUCTURE
MAJOR SYSTEM ...: O          ORGANIZATION
ACTION .........: D          DISPLAY (SHOW)
OBJECT .........: DS         DEPARTMENT STRUCTURE
SEARCH CRITERIA.: DI         DEPARTMENT ID
DATA ...........: 07

DEPARTMENT ID & NAME                   SUBDEPARTMENT ID, NAME & MANAGER
 MANAGER ID & NAME                     EMPLOYEE ID & NAME
E01  SUPPORT SERVICES                   E11  OPERATIONS
 000050  JOHN B GEYER                    000090  EILEEN W HENDERSON

                                        E21  SOFTWARE SUPPORT
                                         000100  THEODORE Q SPENSER

                                         000050  JOHN B GEYER

PFK:  02=RESEND 03=END 08=NEXT 10=LEFT
```

Figure 95. Organization application—viewing a department structure

Starting a new operation

You can use the organization application to start a new operation such as displaying or updating a department structure.

Procedure

Choose one of the following actions:

- Move the cursor to the D on the ACTION line and retain the D or change it to a different action (add, erase, or update). Follow the displayed options to perform your selected action.
- Alternatively, you can leave the organization application by pressing the PF3 key. If you are using CICS, enter the transaction code. If you are using IMS, clear the screen and enter the /FORMAT command to select the project application. In either case, to proceed with a different operation, select a different ACTION, OBJECT, and so forth.

Adding a new department

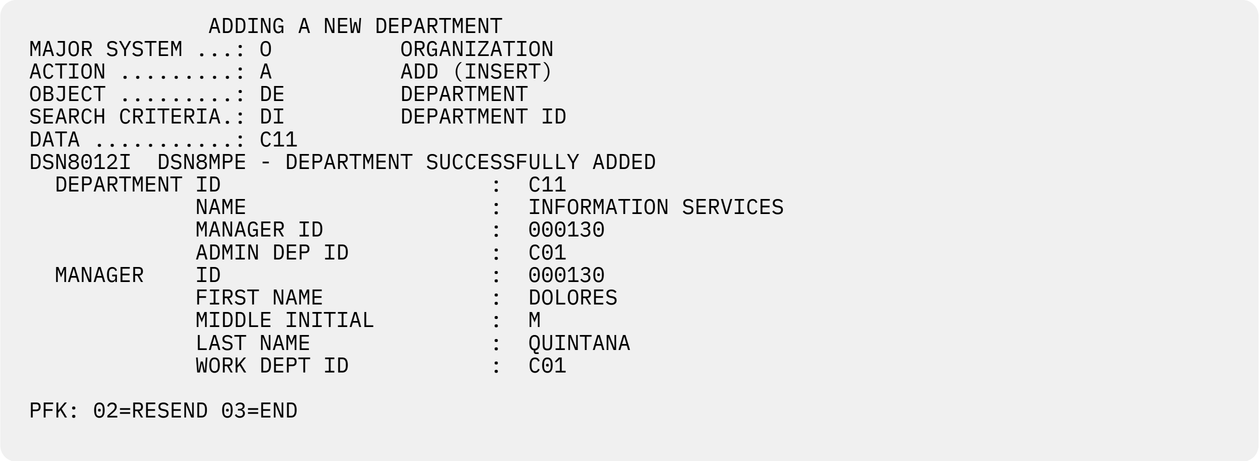
You can use the organization application to add a new department and specify information about the department.

Procedure

To add a department to the organization:

1. Start the organization application and enter the following values:
   - On the MAJOR SYSTEM line, enter O for organization
   - On the ACTION line, enter A for add (insert)
   - On the OBJECT line, enter DE for the department that is to be added
   - On the SEARCH CRITERIA line, enter DI for department ID
   - On the DATA line, enter C11, the specific department number
2. Next, you can enter the details of the new department. The four department fields are department number, department name, manager number, and administration department number. Enter the following values:
   - INFORMATION SERVICES for department name
   - 000130 for manager number
   - C01 for the administration department number

   Press ENTER to display the panel shown in the figure below. The panel shows the successful addition of the new department.



```
              ADDING A NEW DEPARTMENT
MAJOR SYSTEM ...: O          ORGANIZATION
ACTION .........: A          ADD (INSERT)
OBJECT .........: DE         DEPARTMENT
SEARCH CRITERIA.: DI         DEPARTMENT ID
DATA ...........: C11
DSN8012I  DSN8MPE - DEPARTMENT SUCCESSFULLY ADDED
  DEPARTMENT ID                     :  C11
             NAME                   :  INFORMATION SERVICES
             MANAGER ID             :  000130
             ADMIN DEP ID           :  C01
  MANAGER    ID                     :  000130
             FIRST NAME             :  DOLORES
             MIDDLE INITIAL         :  M
             LAST NAME              :  QUINTANA
             WORK DEPT ID           :  C01

PFK: 02=RESEND 03=END
```

Figure 96. Organization application—adding a department

Related tasks

Starting a new operation
You can use the organization application to start a new operation such as displaying or updating a department structure.

Deleting an entry

You can use the organization application to delete an entry from the department table.

About this task

Deleting an entry from the department table is a function of the organization major system.

Procedure

To delete an entry from the department table:

1. Replace the following values on the panel that is on your screen:

   ,

   - On the MAJOR SYSTEM line, enter O for organization.
   - On the ACTION line, enter E for erase.
   - On the OBJECT line, enter DE for department.
   - On the SEARCH CRITERIA line, enter DI for department ID.
   - On the DATA line, enter C11 for department name.
2. Press ENTER to display the panel shown in the figure below.

```
              ERASING A DEPARTMENT
MAJOR SYSTEM ...: O          ORGANIZATION
ACTION .........: E          ERASE (REMOVE)
OBJECT .........: DE         DEPARTMENT
SEARCH CRITERIA.: DI         DEPARTMENT ID
DATA ...........: C11
PRESS ENTER TO ERASE A DEPARTMENT
  DEPARTMENT ID                    :  C11
             NAME                  :  INFORMATION SERVICES
             MANAGER ID            :  000130
             ADMIN DEP ID          :  C01
  MANAGER    ID                    :  000130
             FIRST NAME            :  DOLORES
             MIDDLE INITIAL        :  M
             LAST NAME             :  QUINTANA
             WORK DEPT ID          :  C01

PFK: 02=RESEND 03=END
```

Figure 97. Organization application—deletion successful

3. Press ENTER again to verify the erase action. The following message appears on the panel:

```
DSN8013I    csect DEPARTMENT SUCCESSFULLY ERASED
```

Related tasks

Starting a new operation
You can use the organization application to start a new operation such as displaying or updating a department structure.

Transferring an employee

The procedure for transferring one employee to another department and replacing that employee involves several steps.

About this task

In this scenario, John B. Geyer (manager of the department for Support Services) is transferred to the staff of Spiffy Computer Service Division. Bruce Adamson is assigned as manager of Support Services.

To move Adamson into his new position as manager of Support Services, you must determine his employee number. Transferring an employee is a function of the organization major system.

Procedure

To transfer an employee to another department:

1. Start the organization application and enter the following values:

   - On the MAJOR SYSTEM, enter O for organization.

- On the ACTION line, enter D for display.
- On the OBJECT line, enter EM for employee.
- On the SEARCH CRITERIA line, enter EN for employee name.
- On the DATA line, enter ADAMSON as the specific employee name.

2. Press ENTER to display the panel showing that Adamson's employee number is 000150.
3. The next step is for you to change the manager number for the Support Services department to Adamson's number, 000150. But first you must find the Support Services department. To do this, change ACTION to U (update), OBJECT to DE (department), and SEARCH CRITERIA to DN (department name). Change DATA to %SUPPORT% to specify any department with the word SUPPORT in it.
4. Press ENTER, and a list of departments with support in their name is displayed. Support Services has line number 01. Enter this number at DATA. (The leading zero is not needed.)
5. Press ENTER to display the next panel. The only values that can be changed are department name, manager ID, and administration department ID. Enter Adamson's employee number in the Support Services department after MANAGER ID. At this point, the data on the manager still pertains to Geyer.
6. Press ENTER to display the panel that shows Adamson as manager of Support Services. The work department ID shown (D11) is still Adamson's old number. To change Adamson's work department ID, enter EM for OBJECT, enter EI for SEARCH CRITERIA, and change the employee number to 000150 for DATA.
7. Press ENTER to display the employee information on Adamson. Now that information on Adamson can be updated. The fields that can be changed are employee first name, middle initial, last name, and work department ID. Enter the middle initial for Adamson, which was not in the database, and the department number E01. Press ENTER, and the information on Adamson is updated, including his new department number.
8. The final step is to move Geyer to the correct department. Change the SEARCH CRITERIA and DATA to EN and GEYER, respectively. Press ENTER to obtain the next panel. The employee ID, name, and work department ID can be changed on this panel. However, the only change necessary in this case is to change Geyer's work department ID to his new one, A00. The panel in the figure below shows the completed entry.

```
              UPDATING AN EMPLOYEE
MAJOR SYSTEM ...: O         ORGANIZATION
ACTION .........: U         UPDATE (CHANGE)
OBJECT .........: EM        EMPLOYEE
SEARCH CRITERIA.: EN        EMPLOYEE NAME
DATA ...........: GEYER
DSN8004I  DSN8MPF - EMPLOYEE SUCCESSFULLY UPDATED
  DEPARTMENT ID                    :  A00
             NAME                  :  SPIFFY COMPUTER SERVICE DIV.
             MANAGER ID            :  000010
             ADMIN DEP ID          :  A00
  EMPLOYEE   ID                    :  000050
             FIRST NAME            :  JOHN
             MIDDLE INITIAL        :  B
             LAST NAME             :  GEYER
             WORK DEPT ID          :  A00

PFK: 02=RESEND 03=END
```

Figure 98. Organization application—employee data update completed

9. To terminate the application and return to the beginning of the operation, press the PF3 key.

Related tasks

Starting a new operation

You can use the organization application to start a new operation such as displaying or updating a department structure.

Working with the phone application scenario

The phone application retrieves information from a phone directory and updates employee phone numbers.

About this task

The phone application is used in phase 2 (batch mode), phase 3 (CAF), and interactively in phase 4 (IMS) and phase 5 (CICS).

The phone directory consists of data from a combination (join) of the employee table (DSN8B10.EMP) and the department table (DSN8B10.DEPT). This joined view is called VPHONE. The program also uses a second view called VEMPLP to update the employee table, which does not affect a view that joins tables.

The phone application is designed to operate in batch and interactively in ISPF/TSO, IMS, and CICS. The following table describes the environments in which each phone application operates and the language in which each is written.

Table 129. Phone programs

Environment	Language	Name
ISPF/TSO	COBOL	DSN8SC3
ISPF/TSO	PL/I	DSN8SP3
IMS	PL/I	DSN8IP3
CICS	PL/I	DSN8CP3
batch	COBOL	DSN8BC3
batch	Fortran	DSN8BF3
batch	PL/I	DSN8BP3
batch	C	DSN8BD3

Related tasks

Starting an application in an ISPF/TSO environment
You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Viewing or changing an employee's telephone number

A couple of panels are used to view or change an employee's telephone number in the sample telephone application. These panels are the same, regardless of whether IMS or CICS is used.

Procedure

To view or change an employee's telephone number:

1. On the first panel of the telephone application, enter the first and last name of the employee whose telephone number you want to view or change. To see an entire listing of employee numbers, put an * next to the LAST NAME input line. If only part of a first or last name is known, use the percent character (%) to qualify the list of names to appear in the directory. For example, entering K% on the LAST NAME input line calls a list of the telephone numbers of all employees whose last name begins with a K. Similarly, the first name can be qualified.

   To keep this sample program as simple as possible and to allow updating, scrolling is not used with the IMS and CICS versions. Scrolling is used with the ISPF/CAF version. Only the first panel of selected names and phone numbers can be displayed. The second panel is the Telephone Directory itself. The employee telephone number is highlighted. To update an employee telephone number, type over the highlighted number and press ENTER. To update a phone number listed under the name Heather A Nicholls, specify NICHOL% when you are not sure if there are one or two ls in Nicholls.

```
------------------------- TELEPHONE DIRECTORY --------------------



                            LAST  NAME ==> _

                            FIRST NAME ==>





LAST NAME               *  FOR LIST OF ENTIRE DIRECTORY
                        %  FOR GENERIC LIST (EX. K% = ALL  K - NAMES)
FIRST NAME(OPTIONAL)    %  FOR GENERIC LIST
```

Figure 99. Telephone application—first display

2. Press ENTER to display the panel on which the phone number is highlighted.
3. If you want to change a phone number, type over the number to be changed. You can type over as many numbers as are listed in the display. For example, suppose that you want to change the phone number from 1793 to 1795. After you press ENTER, you get a message confirming the updated phone number. The panel in the following figure shows the updated panel.

```
--------------------------- TELEPHONE DIRECTORY --------------------

 FIRST NAME MID LAST NAME  PHONE  EMPL WORK WORKDEPT
           INIT              NO    NO  DEPT NAME

HEATHER  A      NICHOLLS     1795 000140 C01 INFORMATION CENTER
.
.
.
```

Figure 100. Telephone application—updated display

Using the phone application under batch

The sample batch phone applications are provided in Fortran (DSN8BF3), COBOL (DSN8BC3), C (DSN8BD3), and PL/I (DSN8BP3).

Procedure

Create a data set that contains information about the phone number that is to be updated.

This data set works in combination with another data set that contains JCL for processing information. The first data set consists of card images in the format that is shown in the following table.

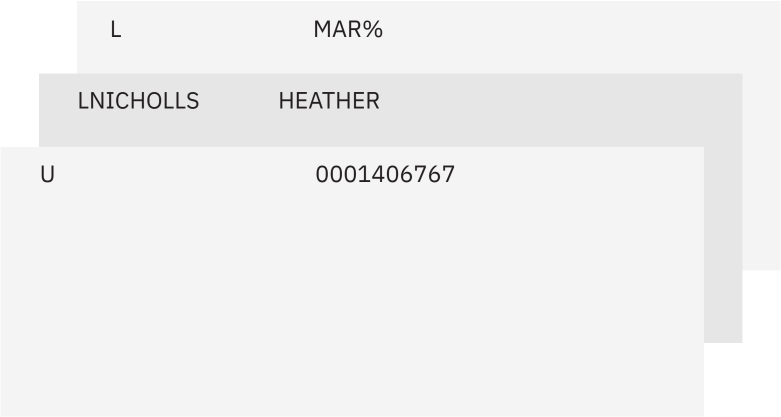
Table 130. Format of phone application data set

Column	Description
1	ACTION—U for update, L for list
2	Employee last name
17	Employee first name
29	Employee number
35	New phone number

The ACTION code in this card image indicates whether an employee number is to be updated (U) or listed (L). When updating an employee phone number, only the employee number and the new phone number are specified in the data set. When listing phone numbers, the last name must be specified. Specifying the first name is optional. The * and % can be used with the ACTION code just as they are used with the panels.

Example

The following figure shows an example of an update data set and a list data set. Each time a number is listed or updated, a new data set is created containing a card image like the one in the following figure. The first card in the data set shows the phone number of employee number 000140 being updated (U) to 6767. The second card shows a list (L) for Heather Nicholls. The last card shows a list (L) of all employees whose first names begin with the letters MAR. The example shows the letters MAR followed by a % in the first name column to indicate that only those employees whose first names begin with MAR are to be listed.



```
    L                         MAR%
LNICHOLLS          HEATHER
U                                  0001406767
```

Figure 101. Example of a card image data set

The data set that contains the JCL for processing information is supplied with Db2 and is contained in DSNTEJ2P, which is part of *prefix*.SDSNSAMP. The figure below shows the data set that contains the JCL with the card image data sets embedded.

```
//PH02PS05 EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//REPORT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//CARDIN DD *
U                           0001406767
LNICHOLLS       HEATHER
L               MAR%
//SYSTSIN DD *
 DSN SYSTEM(DSN)
 RUN  PROGRAM(DSN8BP3) PLAN(DSN8BP11) LIB('prefix.RUNLIB.LOAD')
 END
```

Figure 102. The job control language data set

The complete data set can be submitted to the system either through a card reader or from a terminal through TSO. The figure below contains an example of the batch output.

```
---------------------------- TELEPHONE DIRECTORY ------------------------

LAST NAME FIRST NAME INITIAL PHONE  EMPLOYEE WORK WORK
                             NUMBER NUMBER   DEPT DEPT NAME

QUINTANA  DOLORES       M    6767   000130   C01  INFORMATION CENTER
NICHOLLS  HEATHER       A    1793   000140   C01  INFORMATION CENTER
SCOUTTEN  MARILYN       S    1682   000180   D11  MANUFACTURING SYSTEMS
PEREZ     MARIA         L    9001   000270   D21  ADMINISTRATIVE SYSTEMS
```

Figure 103. Example of the phone application batch output

Working with the distributed organization application scenario

The distributed organization application scenario shows how to work with department and employee data in a distributed environment.

About this task

The scenario shows how to display a department structure, display department information, and update a department at a local location. It also shows how to erase and add an employee at a remote location. This application is executed in Phase 6. The application accesses distributed data with DRDA access.

The department information (DEPT table) is shared by all locations. If you make changes to DEPT table at one location, the DEPT tables at the other locations are updated at the same time. The employee information (EMP table) is unique to each location, containing only the employees that work at that particular location.

After you enter the appropriate transaction code, you see the first panel of the organization application.

Displaying department structure at the local location

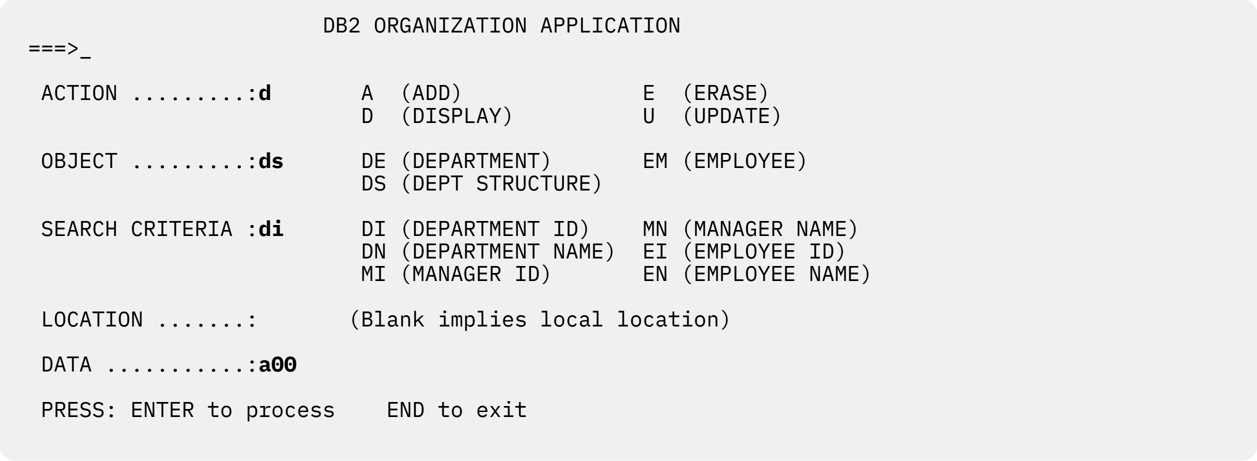
You can use the distributed organization sample application to display department structure at the local location.

Procedure

To display a department structure:

1. Enter the following values in the distributed organization sample application:
   - On the ACTION line, enter D for display.

- On the OBJECT line, enter DS for department structure.
- On the SEARCH CRITERIA line, enter DI for department number.
- On the LOCATION line, leave blank, indicating local location.
- On the DATA line, enter A00 for department number.

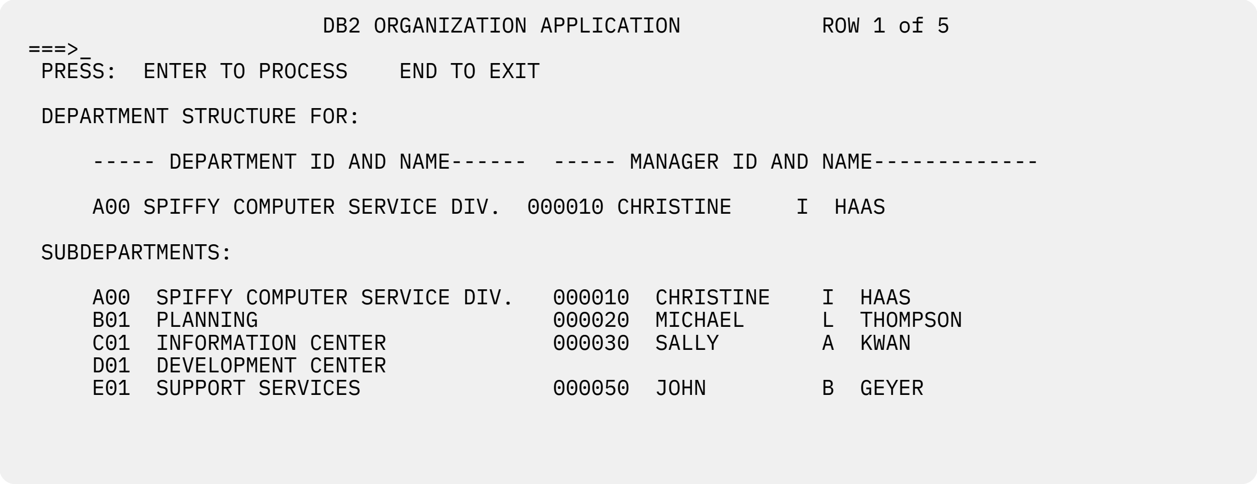


```
                       DB2 ORGANIZATION APPLICATION
===>_

 ACTION .........:d       A  (ADD)              E  (ERASE)
                          D  (DISPLAY)          U  (UPDATE)

 OBJECT .........:ds      DE (DEPARTMENT)       EM (EMPLOYEE)
                          DS (DEPT STRUCTURE)

 SEARCH CRITERIA :di      DI (DEPARTMENT ID)    MN (MANAGER NAME)
                          DN (DEPARTMENT NAME)  EI (EMPLOYEE ID)
                          MI (MANAGER ID)       EN (EMPLOYEE NAME)

 LOCATION .......:       (Blank implies local location)

 DATA ...........:a00

 PRESS: ENTER to process    END to exit
```

Figure 104. Starting the distributed organization application

2. Press the ENTER key.

   The panel below shows the structure of the department requested.



```
                       DB2 ORGANIZATION APPLICATION           ROW 1 of 5
===>_
 PRESS:  ENTER TO PROCESS    END TO EXIT

 DEPARTMENT STRUCTURE FOR:

     ----- DEPARTMENT ID AND NAME------  ----- MANAGER ID AND NAME-------------

     A00 SPIFFY COMPUTER SERVICE DIV.  000010 CHRISTINE     I  HAAS

 SUBDEPARTMENTS:

     A00  SPIFFY COMPUTER SERVICE DIV.   000010  CHRISTINE    I  HAAS
     B01  PLANNING                       000020  MICHAEL      L  THOMPSON
     C01  INFORMATION CENTER             000030  SALLY        A  KWAN
     D01  DEVELOPMENT CENTER
     E01  SUPPORT SERVICES               000050  JOHN         B  GEYER
```

Figure 105. Displaying department structure

3. Press ENTER or END to exit.

Displaying department information at the local location

You can use the distributed organization sample application to display department structure at the local location.

Procedure

To display department information:

1. Enter the following values in the distributed organization sample application:

   - On the ACTION line, enter D for display.
   - On the OBJECT line, enter DE for department.
   - On the SEARCH CRITERIA line, enter DI for department number.

- On the LOCATION line, leave blank, indicating local location.
- On the DATA line, enter A00 for department number.

```
                       DB2 ORGANIZATION APPLICATION
===>_

 ACTION .........:d        A  (ADD)              E  (ERASE)
                           D  (DISPLAY)          U  (UPDATE)

 OBJECT .........:de       DE (DEPARTMENT)       EM (EMPLOYEE)
                           DS (DEPT STRUCTURE)

 SEARCH CRITERIA :di       DI (DEPARTMENT ID)    MN (MANAGER NAME)
                           DN (DEPARTMENT NAME)  EI (EMPLOYEE ID)
                           MI (MANAGER ID)       EN (EMPLOYEE NAME)

 LOCATION .......:         (Blank implies local location)

 DATA ...........:a00

 PRESS: ENTER to process    END to exit
```

Figure 106. Starting the distributed organization application

2. Press the ENTER key.

   The panel below shows the department information that was requested.

```
                       DB2 ORGANIZATION APPLICATION
===>_

                            DISPLAY A DEPARTMENT

  DEPARTMENT ID                      :  A00
             NAME                    :  SPIFFY COMPUTER SERVICE DIV.
             MANAGER ID              :  000010
             ADMIN DEP ID            :  A00
             LOCATION                :

  MANAGER    ID                      :  000010
             FIRST NAME              :  CHRISTINE
             MIDDLE INITIAL          :  I
             LAST NAME               :  HAAS
             WORK DEPT ID            :  A00


 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 107. Displaying department information

3. Press ENTER or END to exit.

Updating a department at the local location

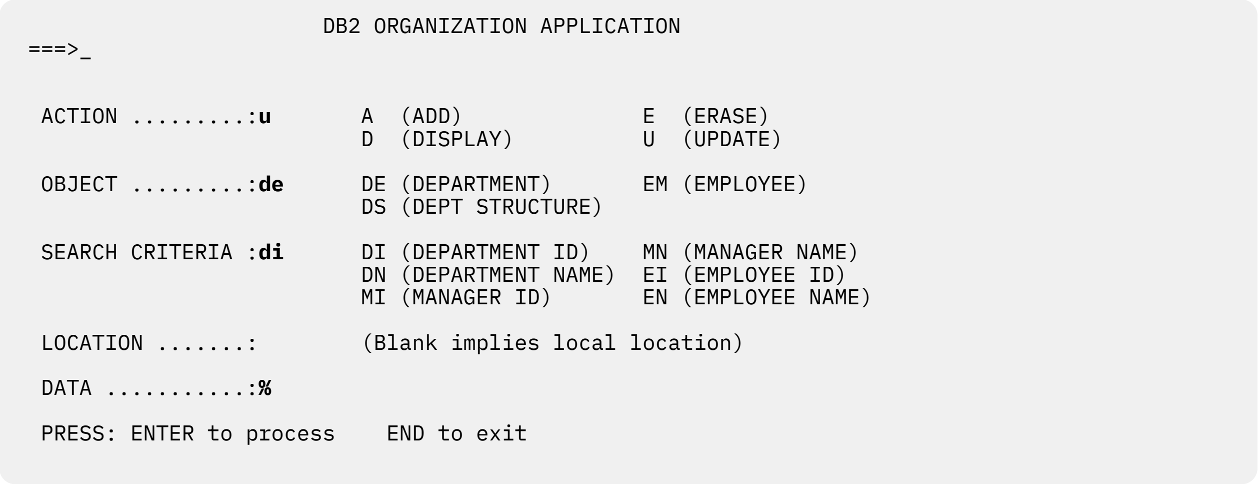
You can use the distributed organization sample application to update department information at the local location.

Procedure

To update department information:

1. Enter the following values in the distributed organization sample application:

   - On the ACTION line, enter u for update.
   - On the OBJECT line, enter de for department.
   - On the SEARCH CRITERIA line, enter di for department number.
   - Leave the LOCATION line blank, indicating local location.
   - On the DATA line, enter %, which displays a list of all the departments.

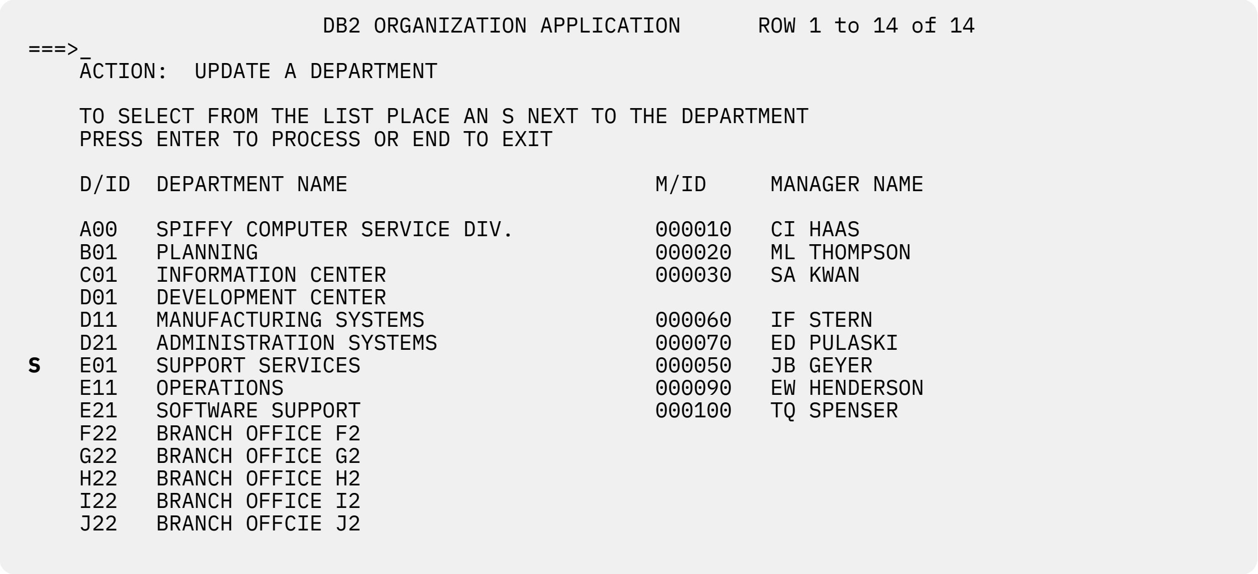


```
                       DB2 ORGANIZATION APPLICATION
===>_


 ACTION .........:u       A  (ADD)              E  (ERASE)
                          D  (DISPLAY)          U  (UPDATE)

 OBJECT .........:de      DE (DEPARTMENT)       EM (EMPLOYEE)
                          DS (DEPT STRUCTURE)

 SEARCH CRITERIA :di      DI (DEPARTMENT ID)    MN (MANAGER NAME)
                          DN (DEPARTMENT NAME)  EI (EMPLOYEE ID)
                          MI (MANAGER ID)       EN (EMPLOYEE NAME)

 LOCATION .......:        (Blank implies local location)

 DATA ...........:%

 PRESS: ENTER to process    END to exit
```

Figure 108. Starting the distributed organization application

2. Press the ENTER key.

   The panel below lists the departments that can be updated. Select the department to be updated by inserting an S in the left margin by the department number.

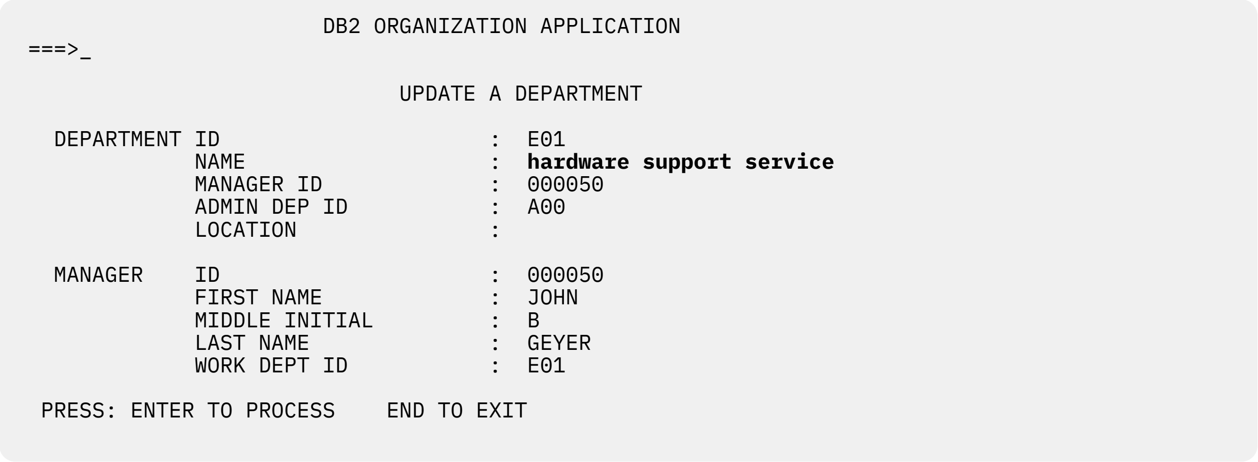


```
                       DB2 ORGANIZATION APPLICATION      ROW 1 to 14 of 14
===>_
    ACTION:  UPDATE A DEPARTMENT

    TO SELECT FROM THE LIST PLACE AN S NEXT TO THE DEPARTMENT
    PRESS ENTER TO PROCESS OR END TO EXIT

    D/ID  DEPARTMENT NAME                        M/ID     MANAGER NAME

    A00   SPIFFY COMPUTER SERVICE DIV.           000010   CI HAAS
    B01   PLANNING                               000020   ML THOMPSON
    C01   INFORMATION CENTER                     000030   SA KWAN
    D01   DEVELOPMENT CENTER
    D11   MANUFACTURING SYSTEMS                  000060   IF STERN
    D21   ADMINISTRATION SYSTEMS                 000070   ED PULASKI
S   E01   SUPPORT SERVICES                       000050   JB GEYER
    E11   OPERATIONS                             000090   EW HENDERSON
    E21   SOFTWARE SUPPORT                       000100   TQ SPENSER
    F22   BRANCH OFFICE F2
    G22   BRANCH OFFICE G2
    H22   BRANCH OFFICE H2
    I22   BRANCH OFFICE I2
    J22   BRANCH OFFCIE J2
```

Figure 109. Selecting a department to be updated

3. Press the ENTER key.

   The panel below displays the information relevant to the selected department. Enter the information you want to update on this panel; in this case, enter the name of the department.

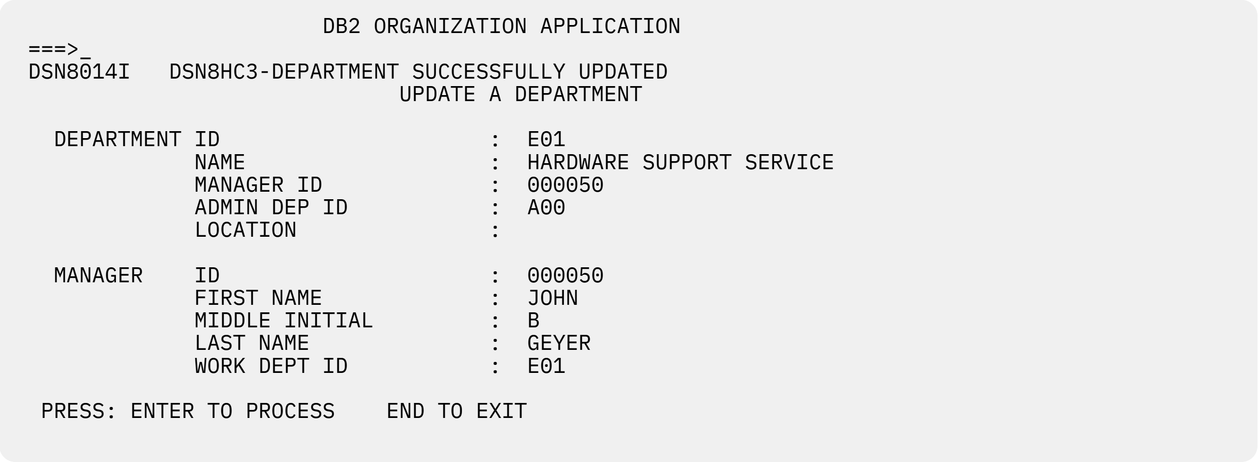


```
                       DB2 ORGANIZATION APPLICATION
===>_

                             UPDATE A DEPARTMENT

  DEPARTMENT ID                     :  E01
             NAME                   :  hardware support service
             MANAGER ID             :  000050
             ADMIN DEP ID           :  A00
             LOCATION               :

  MANAGER    ID                     :  000050
             FIRST NAME             :  JOHN
             MIDDLE INITIAL         :  B
             LAST NAME              :  GEYER
             WORK DEPT ID           :  E01

 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 110. Updating a department

4. Press the ENTER key to process the updated information.

   A message appears on this panel that states the update was successful.



```
                       DB2 ORGANIZATION APPLICATION
===>_
DSN8014I   DSN8HC3-DEPARTMENT SUCCESSFULLY UPDATED
                             UPDATE A DEPARTMENT

  DEPARTMENT ID                     :  E01
             NAME                   :  HARDWARE SUPPORT SERVICE
             MANAGER ID             :  000050
             ADMIN DEP ID           :  A00
             LOCATION               :

  MANAGER    ID                     :  000050
             FIRST NAME             :  JOHN
             MIDDLE INITIAL         :  B
             LAST NAME              :  GEYER
             WORK DEPT ID           :  E01

 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 111. Update successfully processed

5. Press ENTER to return to the previous panel or END to exit.

   If you return to the previous panel, you can now select another department to update, or press ENTER or END to exit. The same message appears on this panel, indicating the update was successful.

```
                       DB2 ORGANIZATION APPLICATION      ROW 1 to 14 of 14
===>_
DSN8014I   DSN8HC3-DEPARTMENT SUCCESSFULLY UPDATED
    ACTION:  UPDATE A DEPARTMENT

    TO SELECT FROM THE LIST PLACE AN S NEXT TO THE DEPARTMENT
    PRESS ENTER TO PROCESS OR END TO EXIT

    D/ID  DEPARTMENT NAME                        M/ID     MANAGER NAME

    A00   SPIFFY COMPUTER SERVICE DIV.           000010   CI HAAS
    B01   PLANNING                               000020   ML THOMPSON
    C01   INFORMATION CENTER                     000030   SA KWAN
    D01   DEVELOPMENT CENTER
    D11   MANUFACTURING SYSTEMS                  000060   IF STERN
    D21   ADMINISTRATION SYSTEMS                 000070   ED PULASKI
    E01   HARDWARE SUPPORT SERVICE               000050   JB GEYER
    E11   OPERATIONS                             000090   EW HENDERSON
    E21   SOFTWARE SUPPORT                       000100   TQ SPENSER
    F22   BRANCH OFFICE F2
    G22   BRANCH OFFICE G2
    H22   BRANCH OFFICE H2
    I22   BRANCH OFFICE I2
    J22   BRANCH OFFICE J2
```

Figure 112. Department successfully updated

Adding an employee at a remote location

You can use the distributed organization sample application to add information for employees at remote locations.

Procedure

To add an employee at a remote location:

1. Enter the following values:
   - On the ACTION line, enter a for add.
   - On the OBJECT line, enter em for employee.
   - On the SEARCH CRITERIA line, enter `ei` for employee number.
   - On the LOCATION line, enter your server location for the remote location.
   - On the DATA line, enter the employee ID of the employee to be added (`sj0100` in the example below).

```
                       DB2 ORGANIZATION APPLICATION
===>_


 ACTION .........:a       A  (ADD)              E  (ERASE)
                          D  (DISPLAY)          U  (UPDATE)

 OBJECT .........:em      DE (DEPARTMENT)       EM (EMPLOYEE)
                          DS (DEPT STRUCTURE)

 SEARCH CRITERIA :ei      DI (DEPARTMENT ID)    MN (MANAGER NAME)
                          DN (DEPARTMENT NAME)  EI (EMPLOYEE ID)
                          MI (MANAGER ID)       EN (EMPLOYEE NAME)

 LOCATION .......:your server location  (Blank implies local location)

 DATA ...........:sj0100

 PRESS: ENTER to process    END to exit
```

Figure 113. Starting the distributed organization application

2. Press the ENTER key.

The panel below allows you to enter information only about the employee. The department information on the panel is protected. Enter the necessary information about the employee.

```
                       DB2 ORGANIZATION APPLICATION
===>_

                            ADD     AN EMPLOYEE

  DEPARTMENT ID                     :
             NAME                   :
             MANAGER ID             :
             ADMIN DEP ID           :
             LOCATION               :

  EMPLOYEE   ID                     :  SJ0100
             FIRST NAME             :  W
             MIDDLE INITIAL         :
             LAST NAME              :  WALTERS
             WORK DEPT ID           :  F22


 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 114. Employee to be added

3. Press the ENTER key to process or END to exit. If you press the ENTER key, a message appears on the panel indicating that the employee has been added.

```
                       DB2 ORGANIZATION APPLICATION
===>_
DSN8002I    DSN8HC3-EMPLOYEE SUCCESSFULLY ADDED
                            ADD     AN EMPLOYEE

  DEPARTMENT ID                     :  F22
             NAME                   :  SPIFFY COMPUTER SERVICE DIV.
             MANAGER ID             :
             ADMIN DEP ID           :  E01
             LOCATION               :  SAN_JOSE

  EMPLOYEE   ID                     :  SJ0100
             FIRST NAME             :  W
             MIDDLE INITIAL         :
             LAST NAME              :  WALTERS
             WORK DEPT ID           :  F22


 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 115. Employee successfully added

4. Press the ENTER key to return to the selection panel or END to exit.

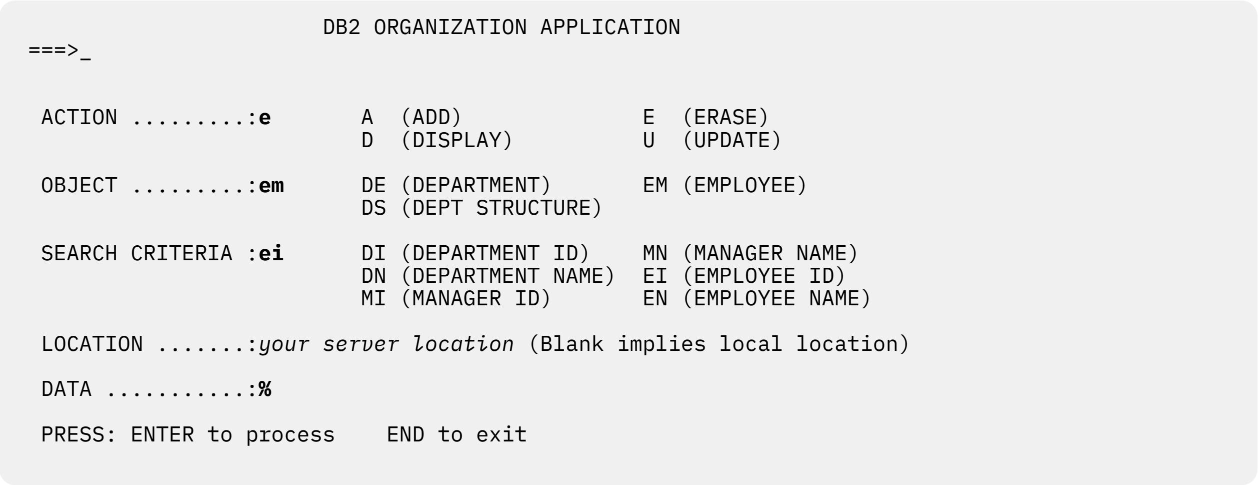
Erasing an employee at a remote location

You can use the distributed organization sample application to erase information for employees at remote locations.

Procedure

To erase an employee at a remote location:

1. Enter the following values in the distributed organization sample application:
   - On the ACTION line, enter e for erase.
   - On the OBJECT line, enter em for employee.
   - On the SEARCH CRITERIA line, enter ei for employee number.
   - On the LOCATION line, enter your server location for the remote location.
   - On the DATA line, enter %, which displays a list of all the employees.

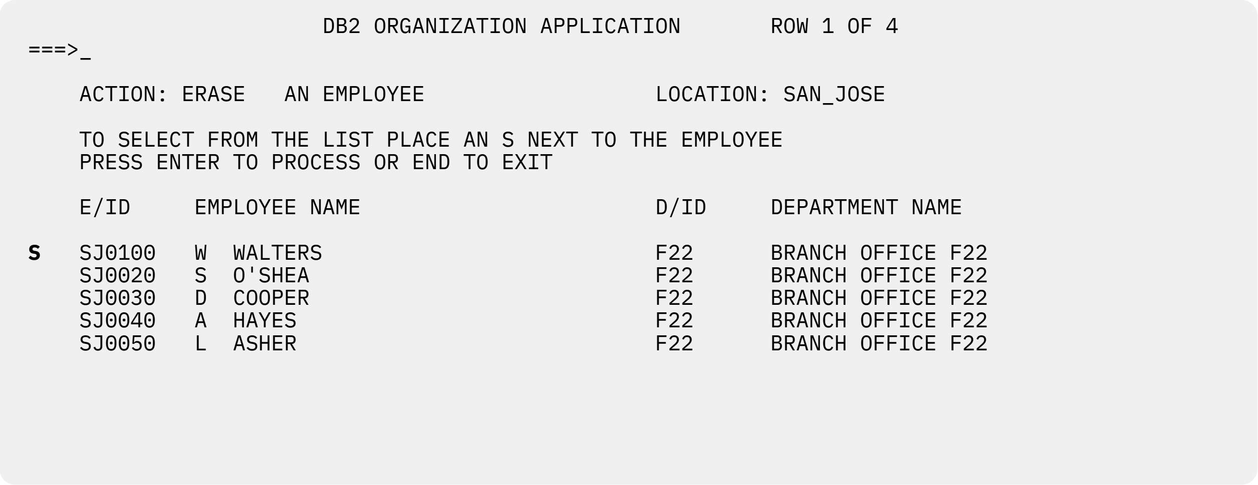


```
                       DB2 ORGANIZATION APPLICATION
===>_

 ACTION .........:e       A  (ADD)              E  (ERASE)
                          D  (DISPLAY)          U  (UPDATE)

 OBJECT .........:em      DE (DEPARTMENT)       EM (EMPLOYEE)
                          DS (DEPT STRUCTURE)

 SEARCH CRITERIA :ei      DI (DEPARTMENT ID)    MN (MANAGER NAME)
                          DN (DEPARTMENT NAME)  EI (EMPLOYEE ID)
                          MI (MANAGER ID)       EN (EMPLOYEE NAME)

 LOCATION .......:your server location (Blank implies local location)

 DATA ...........:%

 PRESS: ENTER to process    END to exit
```

Figure 116. Starting the distributed organization application

2. Press the ENTER key.

   The panel below lists the employees that can be erased. Select the employee to be erased by inserting an S in the left margin by the employee ID.

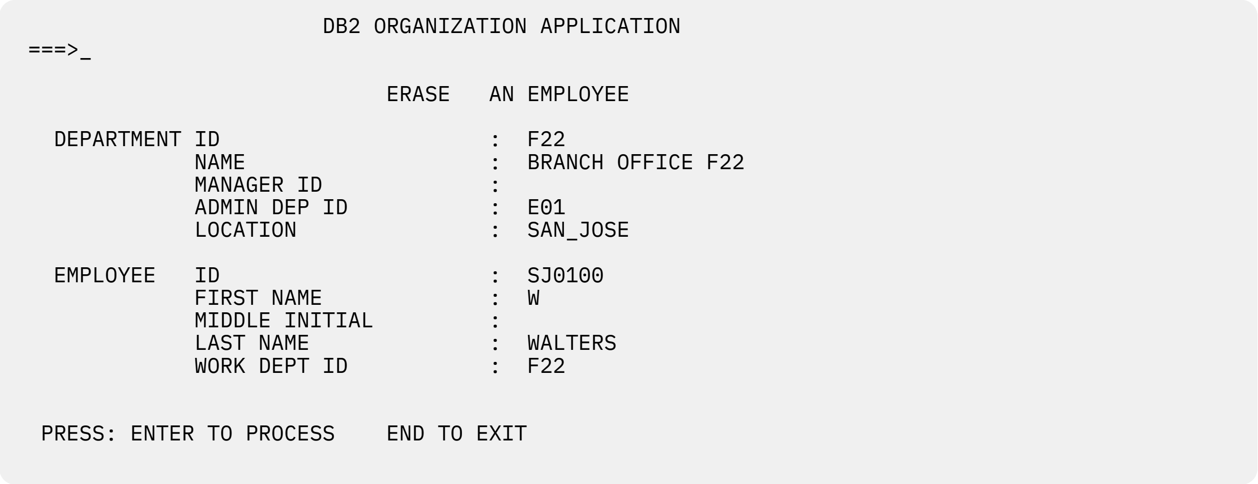


```
                       DB2 ORGANIZATION APPLICATION       ROW 1 OF 4
===>_

    ACTION: ERASE   AN EMPLOYEE                  LOCATION: SAN_JOSE

    TO SELECT FROM THE LIST PLACE AN S NEXT TO THE EMPLOYEE
    PRESS ENTER TO PROCESS OR END TO EXIT

    E/ID     EMPLOYEE NAME                       D/ID     DEPARTMENT NAME

S   SJ0100   W  WALTERS                          F22      BRANCH OFFICE F22
    SJ0020   S  O'SHEA                           F22      BRANCH OFFICE F22
    SJ0030   D  COOPER                           F22      BRANCH OFFICE F22
    SJ0040   A  HAYES                            F22      BRANCH OFFICE F22
    SJ0050   L  ASHER                            F22      BRANCH OFFICE F22
```

Figure 117. Selecting an employee at a remote location

3. Press the ENTER key.

   The panel below displays the information relevant to the selected employee that is to be erased.

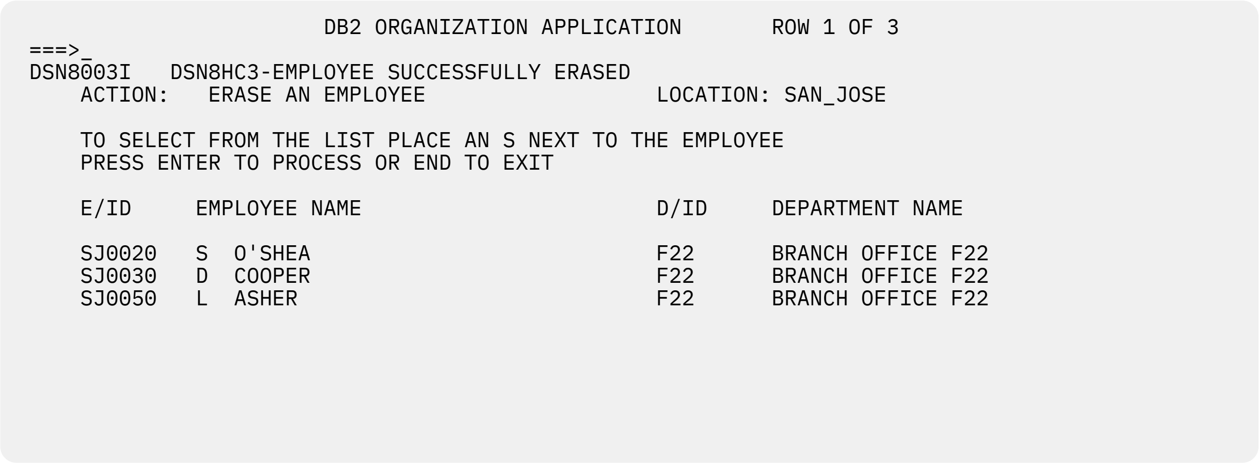


```
                       DB2 ORGANIZATION APPLICATION
===>_

                            ERASE   AN EMPLOYEE

  DEPARTMENT ID                     :  F22
             NAME                   :  BRANCH OFFICE F22
             MANAGER ID             :
             ADMIN DEP ID           :  E01
             LOCATION               :  SAN_JOSE

  EMPLOYEE   ID                     :  SJ0100
             FIRST NAME             :  W
             MIDDLE INITIAL         :
             LAST NAME              :  WALTERS
             WORK DEPT ID           :  F22


 PRESS: ENTER TO PROCESS    END TO EXIT
```

Figure 118. Employee to be erased

4. Press the ENTER key to erase the employee information.

   A message appears on the panel stating the employee has been successfully erased. You can now erase another employee or press ENTER or END to exit.



```
                      DB2 ORGANIZATION APPLICATION       ROW 1 OF 3
===>_
DSN8003I   DSN8HC3-EMPLOYEE SUCCESSFULLY ERASED
    ACTION:   ERASE AN EMPLOYEE                  LOCATION: SAN_JOSE

    TO SELECT FROM THE LIST PLACE AN S NEXT TO THE EMPLOYEE
    PRESS ENTER TO PROCESS OR END TO EXIT

    E/ID     EMPLOYEE NAME                       D/ID     DEPARTMENT NAME

    SJ0020   S  O'SHEA                           F22      BRANCH OFFICE F22
    SJ0030   D  COOPER                           F22      BRANCH OFFICE F22
    SJ0050   L  ASHER                            F22      BRANCH OFFICE F22
```

Figure 119. Employee at a remote location erased

Working with the employee resume and photo scenarios

The LOB sample application extends the existing Db2 sample employee database by adding a new table for storing employee resumes and photographs as CLOB and BLOB entries.

About this task

The supporting JCL, application objects, and input data for this table are provided.

The purpose of the LOB sample application is to:

- Provide an IVP for LOB functions.
- Demonstrate how to:
  - Use DDL to create LOB objects.
  - Use the Db2 LOAD utility to populate LOB columns of 32K bytes or less.
  - Create an application program to populate LOB columns of greater than 32K bytes.
  - Use LOB locators and related functions to manipulate LOBs without materializing the data.

The LOB sample application consists of a batch portion and an optional online portion. The batch portion verifies that LOB objects can be created, populated, and successfully read by using locators and supporting functions. The online portion demonstrates further techniques for using and manipulating LOB data.

The batch portion of the LOB sample application consists of the following jobs: DSNTEJ7, DSNTEJ71, DSNTEJ73, DSNTEJ75, DSNTEJ76, DSNTEJ77, and DSNTEJ78.

The optional online portion of the LOB sample application adds two additional scenarios to the existing three scenarios that are provided in IVP phase 3. These scenarios include the following user activities:

1. Invoking the Db2 sample connection manager to display the Db2 ISPF sample application menu, DSN8SSM.
2. Selecting and viewing sample employee resumes by using option 4 of DSN8SSM.
3. Selecting and viewing sample employee photo images by using option 5 of DSN8SSM.

Application programs for the LOB sample are written in the C and COBOL languages. The resume viewer requires ISPF. The photo viewer requires ISPF and GDDM.

Related concepts

Phase 7: Accessing LOB data
Phase 7 of the installation or migration verification process is an optional phase that demonstrates how to set up and use a Db2 LOB application. This phase creates an extension to the Employee sample database to manage employee resumes and photo images.

Using the resume application in the LOB application scenario

You can view employee resumes with the resume application in the LOB application scenario.

About this task

The LOB application begins with the initial panel of the ISPF/CAF application.

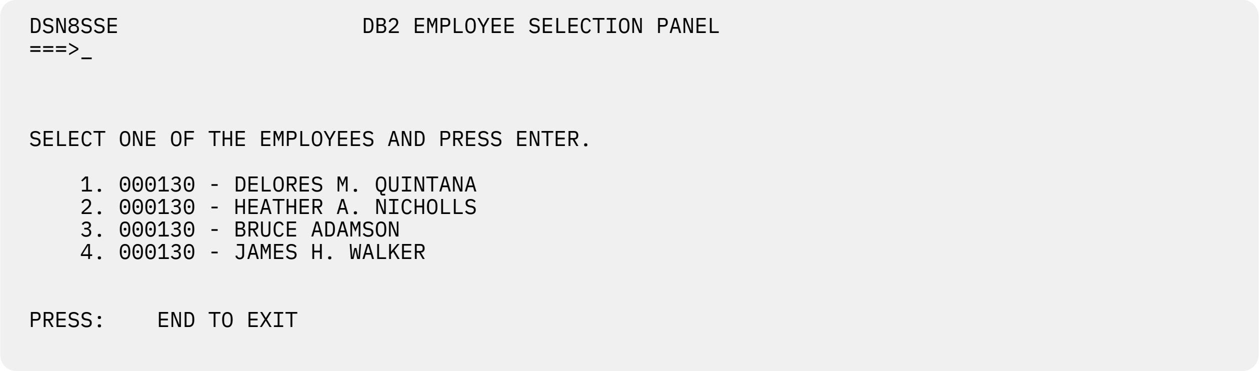
Procedure

To view employee resumes:

1. From the Db2 Sample Application Menu, DSN8SSM, select one of the following options:

   - If you ran job DSNTEJ73, select option 4.
   - If you ran job DSNTEJ77, select option 6.

   DSN8DLRV and DSN8CLRV show the following panels for selecting and viewing sample employee resumes until you press the END key to exit ISPF.

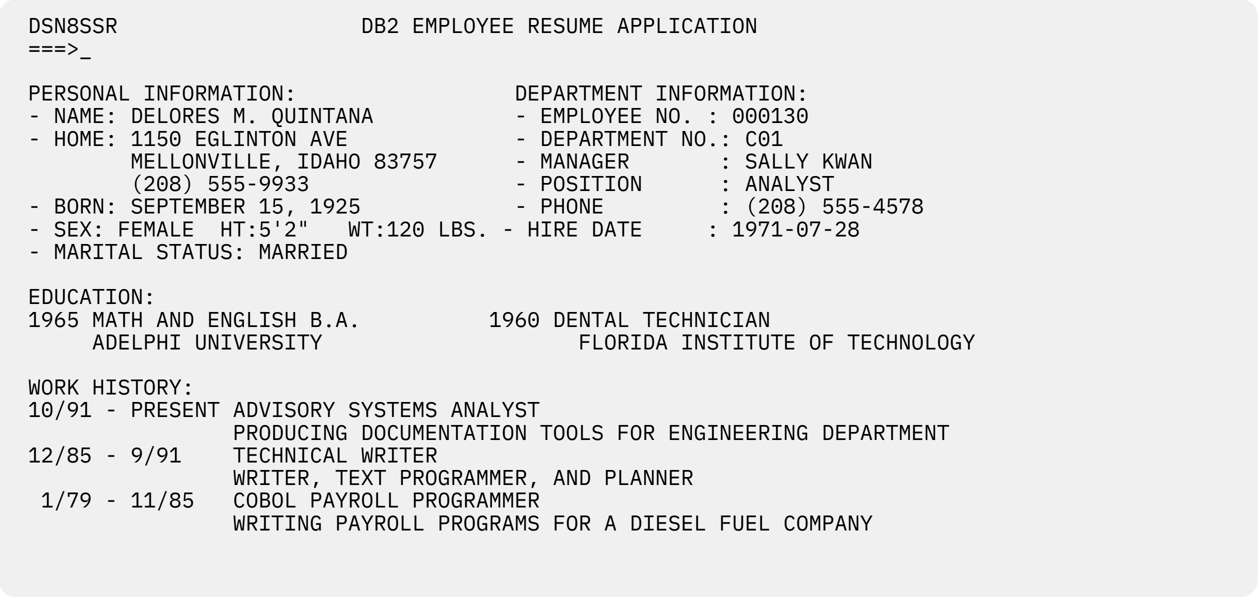


```
DSN8SSE                   DB2 EMPLOYEE SELECTION PANEL
===>_



SELECT ONE OF THE EMPLOYEES AND PRESS ENTER.

    1. 000130 - DELORES M. QUINTANA
    2. 000130 - HEATHER A. NICHOLLS
    3. 000130 - BRUCE ADAMSON
    4. 000130 - JAMES H. WALKER


PRESS:    END TO EXIT
```

   Figure 120. Db2 Employee Selection Panel

2. Select from the list of available resumes that are displayed on ISPF panel DSN8SSE.

   The employee serial numbers and names are hard-coded into the panel because the data for this sample is predetermined. The formatted resume is displayed on ISPF panel DSN8SSR:



```
DSN8SSR                   DB2 EMPLOYEE RESUME APPLICATION
===>_

PERSONAL INFORMATION:                 DEPARTMENT INFORMATION:
- NAME: DELORES M. QUINTANA           - EMPLOYEE NO. : 000130
- HOME: 1150 EGLINTON AVE             - DEPARTMENT NO.: C01
        MELLONVILLE, IDAHO 83757      - MANAGER       : SALLY KWAN
        (208) 555-9933                - POSITION      : ANALYST
- BORN: SEPTEMBER 15, 1925            - PHONE         : (208) 555-4578
- SEX: FEMALE  HT:5'2"   WT:120 LBS. - HIRE DATE     : 1971-07-28
- MARITAL STATUS: MARRIED

EDUCATION:
1965 MATH AND ENGLISH B.A.          1960 DENTAL TECHNICIAN
     ADELPHI UNIVERSITY                    FLORIDA INSTITUTE OF TECHNOLOGY

WORK HISTORY:
10/91 - PRESENT ADVISORY SYSTEMS ANALYST
                PRODUCING DOCUMENTATION TOOLS FOR ENGINEERING DEPARTMENT
12/85 - 9/91    TECHNICAL WRITER
                WRITER, TEXT PROGRAMMER, AND PLANNER
 1/79 - 11/85   COBOL PAYROLL PROGRAMMER
                WRITING PAYROLL PROGRAMS FOR A DIESEL FUEL COMPANY
```

Figure 121. Db2 Employee Resume Application

This panel is designed around the sample data. It is assumed that all resume information for an employee will fit predictably and no handling for special cases is provided. The "Interests" section of the resume is not presented because of space constraints on the panel.

Related tasks

Starting an application in an ISPF/TSO environment
You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Using the photo application in the LOB application scenario

You can view employee photos with the photo application in the LOB application scenario.

About this task

The LOB application begins with the initial panel of the ISPF/CAF application. This LOB application requires that you include the GDDM load module library (SADMMOD) in your logon procedure or in the ISPLLIB concatenation.

Procedure

1. From the Db2 Sample Application Menu, DSN8SSM, select one of the following options to look at employee photos through GDDM:

   - If you ran job DSNTEJ75, select option 5.
   - If you ran job DSNTEJ78, select option 8.

   DSN8DLPV and DSN8CLPV show the following panel for selecting and viewing sample employee photos until you press the END key to exit ISPF.

```
DSN8SSE                  DB2 EMPLOYEE SELECTION PANEL
===>_



SELECT ONE OF THE EMPLOYEES AND PRESS ENTER.

    1. 000130 - DELORES M. QUINTANA
    2. 000130 - HEATHER A. NICHOLLS
    3. 000130 - BRUCE ADAMSON
    4. 000130 - JAMES H. WALKER


PRESS:    END TO EXIT
```

Figure 122. Db2 Employee Selection Panel

2. Select from the list of available photos by that are displayed on ISPF panel DSN8SSE.

Related tasks

Starting an application in an ISPF/TSO environment
You must have access to ISPF load module libraries to run the ISPF/CAF sample application.

Sample LOB table: EMP_PHOTO_RESUME

The LOB sample application uses the EMP_PHOTO_RESUME table. The sample jobs create, load, and manipulate the table.

Table 131. EMP_PHOTO_RESUME table

Column Name:	EMPNO	EMP_ROWID	PSEG_PHOTO	BMP_PHOTO	RESUME
Type:	CHAR(6) NOT NULL	ROWID	BLOB(500K)	BLOB(100K)	CLOB(5K)
Description:	Employee number	Row identifier	Employee photo (PSEG)	Employee photo (BMP)	Employee resume
Values:	000130	#####	Delores M. Quintana	Delores M. Quintana	Delores M. Quintana
Values:	000140	#####	Heather A Nicholls	Heather A Nicholls	Heather A Nicholls
Values:	000150	#####	Bruce Adamson	Bruce Adamson	Bruce Adamson
Values:	000190	#####	James H. Walker	James H. Walker	James H. Walker

Edit exit routine

The edit exit routine encodes the salary column to protect the confidentiality of the employee's salary.

The edit exit routine is prepared in Phase 1. It works with the employee table (DSN8B10.EMP) and is written in assembler language.

The name of the edit exit routine is DSN8EAE1. When the employee table (DSN8B10.EMP) is changed by either an update or an add, the edit exit routine encodes the salary amount that goes into the SALARY column. When the SALARY column is read from the employee table, the amount is decoded. The encoding and decoding of the salary column protects the confidentiality of the employee's salary.

Huffman compression exit routine

IBM supplies a sample edit routine that compresses data using the Huffman algorithm.

Before using any data compression routine, understand its limitations and consider tailoring it to your particular table. For the restrictions and concerns that apply to the IBM sample, see the comments provided with the code. The routine is called DSN8HUFF and resides in library *prefix*.SDSNSAMP. IBM supplies a sample edit routine that compresses data using the Huffman algorithm.

Sample field procedure

A sample field procedure is prepared in Phase 1 of the installation or migration verification process. This procedure causes values in a CHAR(6) column to be ordered in the ASCII sorting sequence.

Dynamic SQL statements: DSNTESA, DSNTESQ

prefix.SDSNSAMP library members DSNTESA and DSNTESQ contain dynamic SQL statements to help verify the success of an installation or migration.

DSNTESA

The SQL statements in DSNTESA are run dynamically by SPUFI. DSNTESA is used in Phase 3 of the verification process.

The first group of statements in DSNTESA create a temporary work file table space and defines a created temporary table. The INSERT statements fill the table with names, midterm scores, and final examination results, and the SELECT statement then does a check of the averages. The UPDATE statements assign a grade according to the formula in the first UPDATE statement: 60% for the final and 40% for the midterm. The next SELECT statement produces the entire table. The ROLLBACK statement removes the table space and the table within it.

GUPI

The following statements make some administrative queries on the system tables:

- The following SELECT statements find all the plans and packages that are owned by the current user, and the date they were bound.

```
SELECT NAME, BINDDATE
    FROM SYSIBM.SYSPLAN
    WHERE CREATOR = USER;
```

```
SELECT COLLID, NAME, VERSION, BINDTIME
    FROM SYSIBM.SYSPACKAGE
    WHERE OWNER = USER;
```

- The following SELECT statements find the plans and packages that require a bind or rebind before they can be run, and the plans and packages that are automatically rebound the next time they are run.

```
SELECT NAME, CREATOR, BINDDATE, VALID, OPERATIVE
    FROM SYSIBM.SYSPLAN
    WHERE OPERATIVE = 'N' OR VALID = 'N';
```

```
SELECT COLLID, NAME, VERSION, BINDTIME, VALID
    FROM SYSIBM.SYSPACKAGE
    WHERE OPERATIVE = 'N' OR VALID = 'N';
```

- The following SELECT statements find all objects required for the current user's programs.

```
SELECT DNAME, BTYPE, BCREATOR, BNAME
    FROM SYSIBM.SYSPLANDEP
    WHERE BCREATOR = USER
    ORDER BY DNAME, BTYPE, BCREATOR, BNAME;
```

```
SELECT DCOLLID, DNAME, BTYPE, BQUALIFIER, BNAME
    FROM SYSIBM.SYSPACKDEP
    WHERE BQUALIFIER = USER
    ORDER BY DCOLLID, DNAME, BTYPE, BQUALIFIER, BNAME;
```

- The second SELECT from SYSTABLES provides information about all the DEPT tables regardless of the owner.

```
SELECT *
   FROM SYSIBM.SYSTABLES
   WHERE NAME = 'DEPT';
```

- The SELECT from SYSCOLUMNS supplies a description of the fields of the DSN8B10.DEPT table. This information can also be provided by DCLGEN, and, within a program, the DESCRIBE statement gives this same information.

```
SELECT NAME, COLTYPE, LENGTH, SCALE, NULLS, REMARKS, COLNO
   FROM SYSIBM.SYSCOLUMNS
   WHERE TBNAME= 'DEPT' AND TBCREATOR = 'DSN8610'
   ORDER BY COLNO;
```

- The following SELECT statements find the kinds of authority a user can have. Determining which tables a specific user can access is relatively complicated because of the various authorities. If the user has SYSADM authority, any table can be accessed.

```
SELECT * FROM SYSIBM.SYSPLANAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSPACKAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSUSERAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSDBAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSTABAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSCOLAUTH WHERE GRANTEE = USER;
SELECT * FROM SYSIBM.SYSRESAUTH WHERE GRANTEE = USER;
```

- The final four SELECT statements show the tables and views that can be accessed directly by the current user, those that can be accessed using a plan, and those that are accessed using the database authority.

```
SELECT TCREATOR, TTNAME, STNAME, GRANTOR
   FROM SYSIBM.SYSTABAUTH
   WHERE GRANTEE = USER;
SELECT BNAME, BTYPE, GRANTOR, NAME
   FROM SYSIBM.SYSPLANAUTH, SYSIBM.SYSPLANDEP
   WHERE GRANTEE = USER
      AND NAME = DNAME
      AND EXECUTEAUTH ¬= ' '
      AND (BTYPE = 'T' OR BTYPE = 'V');
SELECT DCOLLID, BNAME, BTYPE, BQUALIFIER, BNAME
   FROM SYSIBM.SYSPACKAUTH, SYSIBM.SYSPACKDEP
      WHERE GRANTEE = USER
         AND COLLID = DCOLLID
         AND NAME = DNAME
         AND EXECUTEAUTH ¬= ' '
         AND (BTYPE = 'T' OR BTYPE = 'V');
SELECT NAME, CREATOR, TYPE, DBNAME, TSNAME
   FROM SYSIBM.SYSTABLES
      WHERE DBNAME IN
        (SELECT NAME FROM SYSIBM.SYSDBAUTH
           WHERE GRANTEE = USER
           AND DBADMAUTH ¬= ' ');
```

GUPI

DSNTESQ

DSNTESQ contains a set of queries to check consistency between catalog tables.

The SQL statements are in a format available for input to SPUFI and DSNTEP2. If SPUFI is not bound when you want to execute these queries, you can use DSNTEP2 from your previous Db2 version.

Before running these queries, you should run the CHECK DATA and CHECK INDEX utilities.

DSNTESQ contains SQL that creates copies of the catalog using segmented table spaces. In some cases, the queries in DSNTESQ run faster when run on copies of the catalog instead of the actual catalog because the copies have additional indexes. If you plan to use the copies of the catalog, use the comment lines in DSNTESQ for guidance.

Dynamic SQL programs: DSNTIAD, DSNTEP2, DSNTIAUL

DSNTIAD, DSNTEP2, and DSNTIAUL are sample dynamic SQL programs and must be compiled, link-edited, and bound as usual.

SPUFI is a part of the distributed product. An installation job is used to bind it. It can be used only with ISPF.

Related information

Chapter 10. Configuring additional capabilities for Db2 for z/OS

After you complete the installation or migration process, you can work with additional capabilities of Db2 such as stored procedures and remote communication.

Installation information for procedures and functions that are supplied with Db2

Db2 supplies a number of stored procedures and user defined functions that job DSNTIJRT defines and binds during installation or migration.

For supplied routines, job DSNTIJRW creates the core WLM environments that are listed in the following table. If you decide to set up your own WLM application environments, use the following table to help you group the supplied routines into the appropriate environments. If your system resources are constrained, you might need to choose a lower NUMTCB value than the recommended one.

For more information about each of the stored procedures that are provided with Db2, see .

Supplied routine	Schema name	Recommended value of NUMTCB	Core WLM environment	Does the routine have to run in an APF-authorized environment?	Does the routine have to be program-controlled?
ADMIN_COMMAND_DB2	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_COMMAND_DSN	SYSPROC	1	DSNWLM_REXX	No	No
ADMIN_COMMAND_MVS	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_COMMAND_UNIX	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	No	Yes
ADMIN_DS_BROWSE	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_DS_DELETE	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_DS_LIST	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_DS_RENAME	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_DS_SEARCH	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_DS_WRITE	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_EXPLAIN_MAINT	SYSPROC	40 - 60	DSNWLM_GENERAL	No	
ADMIN_INFO_HOST	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_INFO_SMS	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
ADMIN_INFO_SQL	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_INFO_SSID	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_INFO_SYSLOG	SYSPROC	1	DSNWLM_REXX	No	No
ADMIN_INFO_SYSPARM	SYSPROC	1	DSNWLM_NUMTCB1	No	No
ADMIN_JOB_CANCEL	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	Yes	Yes
ADMIN_JOB_FETCH	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	Yes	Yes
ADMIN_JOB_QUERY	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	Yes	Yes
ADMIN_JOB_SUBMIT	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	No	Yes
ADMIN_TASK_ADD	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_TASK_CANCEL	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_TASK_LIST	DSNADM	40 - 60	DSNWLM_GENERAL	No	No

Supplied routine	Schema name	Recommended value of NUMTCB	Core WLM environment	Does the routine have to run in an APF-authorized environment?	Does the routine have to be program-controlled?
ADMIN_TASK_OUTPUT	DSNADM	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_TASK_REMOVE	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_TASK_STATUS	DSNADM	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_TASK_UPDATE	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_UPDATE_SYSPARM	SYSPROC	1	DSNWLM_REXX	No“1” on page 734	No
ADMIN_UTL_EXECUTE	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	Yes
ADMIN_UTL_MODIFY	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_UTL_MONITOR	SYSPROC	40 - 60	DSNWLM_PGM_CONTROL	Yes	Yes
ADMIN_UTL_SCHEDULE	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ADMIN_UTL_SORT	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
ALTER_JAVA_PATH	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
BSON2JSON	SYSTOOLS	20	DSNWLM_GENERAL“2” on page 734	No	No
CREATE_SESSION	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
DB2_INSTALL_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
DB2_REMOVE_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
DB2_REPLACE_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
DB2_UPDATEJARINFO	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
DBG_ENDSESSIONMANAGER	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_INITIALIZECLIENT	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_LOOKUPSESSIONMANAGER	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_PINGSESSIONMANAGER	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_RECVCLIENTREPORTS	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_RUNSESSIONMANAGER	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
DBG_SENDCLIENTCOMMANDS	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_SENDCLIENTREQUESTS	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DBG_TERMINATECLIENT	SYSPROC	5 - 20	DSNWLM_DEBUGGER	No	No
DEBUGGERLEVEL	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
DESTROY_SESSION	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
DSN_WLM_APPLENV	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
DSNACCOR	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
DSNACCOX	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
DSNACICS	SYSPROC	40	DSNWLM_CICS	Yes	No
DSNAHVPM	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
DSNAIMS	SYSPROC	40	DSNWLM_GENERAL	Yes	No
DSNAIMS2	SYSPROC	40	DSNWLM_GENERAL	Yes	No
DSNTBIND	SYSPROC	1	DSNWLM_REXX	No	No
DSNLEUSR	SYSPROC	1	DSNWLM_NUMTCB1	Yes	No
DSNTPSMP	SYSPROC	1	DSNWLM_REXX	No“1” on page 734	No
DSNUTILS	SYSPROC	1	DSNWLM_UTILS	Yes	No

Supplied routine	Schema name	Recommended value of NUMTCB	Core WLM environment	Does the routine have to run in an APF-authorized environment?	Does the routine have to be program-controlled?
DSNUTILU	SYSPROC	1	DSNWLM_UTILS	Yes	No
DSNWSPM	SYSPROC	1	DSNWLM_NUMTCB1	Yes	No
DSNWZP	SYSPROC	1	DSNWLM_NUMTCB1	Yes	No
GET_CONFIG	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
GET_MESSAGE	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
GET_REPORT	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
GET_SYSTEM_INFO	SYSPROC	1	DSNWLM_NUMTCB1	Yes	No
INSTALL_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
JSON2BSON	SYSTOOLS	20	DSNWLM_GENERAL“2” on page 734	No	No
JSON_LEN	SYSTOOLS	40 - 60	DSNWLM_GENERAL	No	No
JSON_TABLE	SYSTOOLS	40 - 60	DSNWLM_GENERAL	No	No
JSON_TYPE	SYSTOOLS	40 - 60	DSNWLM_GENERAL	No	No
JSONVAL	SYSIBM	40 - 60		No	No
LIST_SESSION	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
MQREAD	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQREADALL	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQREADALLCLOB	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQREADCLOB	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQRECEIVE	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQRECEIVEALL	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQRECEIVEALLCLOB	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQRECEIVECLOB	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
MQSEND	DB2MQ	≥ 10	DSNWLM_MQSERIES	No	No
PUT_COMMAND	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
QUERY_SESSION	DB2DEBUG	5 - 20	DSNWLM_DEBUGGER	No	No
REMOVE_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
REPLACE_JAR	SQLJ	40 - 60	DSNWLM_GENERAL	No	No
SET_PLAN_HINT	SYSPROC	40 - 60	DSNWLM_GENERAL	No	No
SOAPHTTPC	DB2XML	≥ 10	DSNWLM_WEBSERVICES	No	No
SOAPHTTPNC	DB2XML	≥ 10	DSNWLM_WEBSERVICES	No	No
SOAPHTTPNV	DB2XML	≥ 10	DSNWLM_WEBSERVICES	No	No
SOAPHTTPV	DB2XML	≥ 10	DSNWLM_WEBSERVICES	No	No
SQLCAMESSAGE	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLCOLPRIVILEGES	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLCOLUMNS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLFOREIGNKEYS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLFUNCTIONCOLS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLFUNCTIONS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLGETTYPEINFO	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLPRIMARYKEYS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No

Supplied routine	Schema name	Recommended value of NUMTCB	Core WLM environment	Does the routine have to run in an APF-authorized environment?	Does the routine have to be program-controlled?
SQLPROCEDURECOLS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLPROCEDURES	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLPSEUDOCOLUMNS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLSPECIALCOLUMNS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLSTATISTICS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLTABLEPRIVILEGES	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLTABLES	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SQLUDTS	SYSIBM	40 - 60	DSNWLM_GENERAL	No	No
SYSTS_ALTER	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_CREATE	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_DROP	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_ENCRYPT	SYSFUN	2 - 8“3” on page 734	DSNWLM_JAVA	No	No
SYSTS_RESTORE	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_START	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_STOP	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_TAKEOVER	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
SYSTS_UPDATE	SYSPROC	10 - 40	DSNWLM_GENERAL	No	No
WLM_REFRESH	SYSPROC	40 - 60	DSNWLM_GENERAL	Yes	No
WLM_SET_CLIENT_INFO	SYSPROC	> 1	DSNWLM_GENERAL	No	No
XSLTRANSFORM	SYSFUN	2 - 8“3” on page 734	DSNWLM_JAVA	No	No
XSR_ADDSCHEMADOC	SYSPROC	40 - 60	DSNWLM_XML	Yes	No
XSR_COMPLETE	SYSPROC	2 - 8“3” on page 734	DSNWLM_JAVA	No	No
XSR_REGISTER	SYSPROC	40 - 60	DSNWLM_XML	Yes	No
XSR_REMOVE	SYSPROC	40 - 60	DSNWLM_XML	Yes	No

Notes:

1. This routine cannot run in an APF-authorized environment.
2. If you encounter storage-consumption issues for this routine, consider isolating it in a separate WLM environment. For more information, see .
3. If you are running your Java stored procedures in 64-bit JVMs, the recommended NUMTCB is 25. You cannot run XSR_COMPLETE in a 64-bit Java virtual machine (JVM).

Routine setup information in DSNTID*xx*

To install the Db2-supplied routines, job DSNTIJRT uses setup information that is stored in the CLIST defaults input member (DSNTID*xx*). Each Db2-supplied routine is represented by a different name in DSNTID*xx*. The following table shows the mapping between each DSNTID*xx* name and Db2-supplied routine. The left column contains the DSNTID*xx* name and the right column contains the routine name. The *xxx* in the DSNTID*xx* names represent the letters that specify the WLM environment name, the grant execute list, and the package owner. For example, RTB01*xxx* represents RTB01WLM, RTB01ACL, and RTB01PKO.

Table 132. Mapping between DSNTIDxx variables and Db2-supplied routines

DSNTID*xx* variable	**Stored procedure name**
RTB01*xxx*	DSNWSPM
RTB02*xxx*	DSNWZP
RTC01*xxx*	DSNUTILS
RTC02*xxx*	DSNUTILU
RTD01*xxx*	DSNACCOR
RTD02*xxx*	DSNACCOX
RTE01*xxx*	DSNLEUSR
RTF01*xxx*	DSNTBIND
RTF02*xxx*	DSNTPSMP
RTF03*xxx*	WLM_REFRESH
RTG01*xxx*	ALTER_JAVA_PATH
RTG02*xxx*	DB2_INSTALL_JAR
RTG03*xxx*	DB2_REMOVE_JAR
RTG04*xxx*	DB2_REPLACE_JAR
RTG05*xxx*	DB2_UPDATEJARINFO
RTG06*xxx*	INSTALL_JAR
RTG07*xxx*	REMOVE_JAR
RTG08*xxx*	REPLACE_JAR
RTH01*xxx*	CREATE_SESSION
RTH02*xxx*	DEBUGGERLEVEL
RTH03*xxx*	DESTROY_SESSION
RTH04*xxx*	GET_REPORT
RTH05*xxx*	LIST_SESSION
RTH06*xxx*	PUT_COMMAND
RTH07*xxx*	QUERY_SESSION
RTH08*xxx*	DBG_ENDSESSIONMANAGER
RTH09*xxx*	DBG_INITIALIZECLIENT
RTH10*xxx*	DBG_LOOKUPSESSIONMANAGER
RTH11*xxx*	DBG_PINGSESSIONMANAGER
RTH12*xxx*	DBG_RECVCLIENTREPORTS
RTH13*xxx*	DBG_RUNSESSIONMANAGER
RTH14*xxx*	DBG_SENDCLIENTCOMMANDS
RTH15*xxx*	DBG_SENDCLIENTREQUESTS
RTH16*xxx*	DBG_TERMINATECLIENT

Table 132. Mapping between DSNTIDxx variables and Db2-supplied routines (continued)

DSNTID*xx* variable	**Stored procedure name**
RTI03*xxx*	XSLTRANSFORM
RTI04*xxx*	XSR_ADDSCHEMADOC
RTI05*xxx*	XSR_COMPLETE
RTI06*xxx*	XSR_REGISTER
RTI07*xxx*	XSR_REMOVE
RTJ01*xxx*	SYSTS_CREATE
RTJ02*xxx*	SYSTS_DROP
RTJ03*xxx*	SYSTS_ENCRYPT
RTJ04*xxx*	SYSTS_RESTORE
RTJ05*xxx*	SYSTS_START
RTJ06*xxx*	SYSTS_STOP
RTJ07*xxx*	SYSTS_TAKEOVER
RTJ08*xxx*	SYSTS_UPDATE
RTJ09*xxx*	SYSTS_ALTER
RTK01*xxx*	SQLCAMESSAGE
RTK02*xxx*	SQLCOLPRIVILEGES
RTK03*xxx*	SQLCOLUMNS
RTK04*xxx*	SQLFOREIGNKEYS
RTK05*xxx*	SQLFUNCTIONCOLS
RTK06*xxx*	SQLFUNCTIONS
RTK07*xxx*	SQLGETTYPEINFO
RTK08*xxx*	SQLPRIMARYKEYS
RTK09*xxx*	SQLPROCEDURECOLS
RTK10*xxx*	SQLPROCEDURES
RTK11*xxx*	SQLSPECIALCOLUMNS
RTK12*xxx*	SQLSTATISTICS
RTK13*xxx*	SQLTABLEPRIVILEGES
RTK14*xxx*	SQLTABLES
RTK15*xxx*	SQLUDTS
RTL01*xxx*	ADMIN_COMMAND_DB2
RTL02*xxx*	ADMIN_COMMAND_DSN
RTL03*xxx*	ADMIN_COMMAND_UNIX
RTL04*xxx*	ADMIN_DS_BROWSE
RTL05*xxx*	ADMIN_DS_DELETE

Table 132. Mapping between DSNTIDxx variables and Db2-supplied routines (continued)

DSNTID*xx* variable	**Stored procedure name**
RTL06*xxx*	ADMIN_DS_LIST
RTL07*xxx*	ADMIN_DS_RENAME
RTL08*xxx*	ADMIN_DS_SEARCH
RTL09*xxx*	ADMIN_DS_WRITE
RTL10*xxx*	ADMIN_INFO_HOST
RTL11*xxx*	ADMIN_INFO_SSID
RTL12*xxx*	ADMIN_JOB_CANCEL
RTL13*xxx*	ADMIN_JOB_FETCH
RTL14*xxx*	ADMIN_JOB_QUERY
RTL15*xxx*	ADMIN_JOB_SUBMIT
RTL17*xxx*	ADMIN_TASK_ADD
RTL18*xxx*	ADMIN_TASK_LIST
RTL19*xxx*	ADMIN_TASK_REMOVE
RTL20*xxx*	ADMIN_TASK_STATUS
RTL21*xxx*	ADMIN_UTL_SCHEDULE
RTL22*xxx*	ADMIN_UTL_SORT
RTL23*xxx*	ADMIN_TASK_CANCEL
RTL24*xxx*	ADMIN_TASK_OUTPUT
RTL25*xxx*	GET_CONFIG
RTL26*xxx*	GET_MESSAGE
RTL27*xxx*	GET_SYSTEM_INFO
RTL28*xxx*	ADMIN_INFO_SYSPARM
RTL29*xxx*	WLM_SET_CLIENT_INFO
RTL30*xxx*	ADMIN_UTL_EXECUTE
RTL31*xxx*	ADMIN_UTL_MODIFY
RTL32*xxx*	ADMIN_UTL_MONITOR
RTL33*xxx*	DSN_WLM_APPLENV
RTL34*xxx*	ADMIN_TASK_UPDATE
RTL35*xxx*	ADMIN_INFO_SMS
RTL36*xxx*	ADMIN_INFO_SQL
RTL37*xxx*	ADMIN_INFO_SYSLOG
RTL38*xxx*	ADMIN_UPDATE_SYSPARM
RTL40*xxx*	SET_PLAN_HINT
RTL41*xxx*	ADMIN_COMMAND_MVS

Table 132. Mapping between DSNTIDxx variables and Db2-supplied routines (continued)

DSNTID*xx* variable	**Stored procedure name**
RTL42*xxx*	ADMIN_EXPLAIN_MAINT
RTM05*xxx*	DSNAHVPM
RTN01*xxx*	DSNACICS
RTN02*xxx*	DSNAIMS
RTN03*xxx*	DSNAIMS2
RTO02*xxx*	MQREAD
RTO03*xxx*	MQREADALL
RTO04*xxx*	MQREADALLCLOB
RTO05*xxx*	MQREADCLOB
RTO06*xxx*	MQRECEIVE
RTO07*xxx*	MQRECEIVEALL
RTO08*xxx*	MQRECEIVEALLCLOB
RTO09*xxx*	MQRECEIVECLOB
RTO10*xxx*	MQSEND
RTP01*xxx*	SOAPHTTPC
RTP02*xxx*	SOAPHTTPNC
RTP03*xxx*	SOAPHTTPNV
RTP04*xxx*	SOAPHTTPV

Related tasks

Migration step 23: Set up Db2-supplied routines
Installation jobs are provided for the setup of all Db2-supplied routines and supporting objects that are provided with the Db2 base product.

Installing Db2-supplied routines during installation
The DSNTIJRT and DSNTIJRV jobs install and validate the installation of Db2-supplied routines. These jobs are configured with the options that you specified on installation panel DSNTIPR1 and panels DSNTIPRA through DSNTIPRP.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Related information

WLM management of stored procedures

Workload Manager (WLM) is a component of z/OS that manages incoming work requests for the operating system and allocates available system resources to meet these requests. Db2 for z/OS uses WLM to allocate workload requests for Db2 stored procedures.

When Db2 receives a request to run a stored procedure, WLM determines whether additional resources are needed to process the request. For example, WLM might determine that a new WLM-managed address space is needed. WLM makes this determination by evaluating whether the work for a service class is meeting the goals that you set. WLM also evaluates whether the work queues are becoming too large. WLM then examines the system resource utilization as part of the algorithm to decide if another address space should be started. In many cases, a sudden increase in incoming work is handled by existing WLM address spaces, and task control blocks (TCBs) remove work from the queues. Consequently, an address space can handle more concurrent stored procedures or user-defined functions than the number that is specified by NUMTCB in the application environment definition.

Requirement: All Db2 stored procedures (except native SQL procedures) must run in WLM-managed address spaces.

A *WLM application environment* starts and manages WLM address spaces that are to be used by stored procedures. You can either create your own WLM application environments or use existing ones, and each stored procedure must be assigned to a WLM application environment. You can assign more than one stored procedure to each WLM application environment, but you might want to separate them for various resource management reasons. The stored procedures that are assigned to a WLM application environment do not need to be written in the same high-level language. However, for different performance reasons, you might decide to separate stored procedures into different application environments by language.

You define application environments for stored procedures as part of your WLM service policy. You also need to define a JCL procedure that WLM is to use to start the address spaces. You store this procedure in PROCLIB. The application environment definition in your policy contains the name of this startup procedure in PROCLIB. If too few address spaces are available to meet the policy goal, WLM starts another server address space if the service policy definition allows it.

Related concepts

MVS Planning: Workload Management

Related tasks

Setting up a WLM application environment for stored procedures during installation
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Setting up a WLM application environment for stored procedures during migration
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Core WLM environments for Db2-supplied routines

Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Use job DSNTIJRW to define each of these environments with the parameters below, including any changes that are applicable to your site. Alternatively, you can use the provided IWMARIN0 ISPF tool to define these environments. These Db2 core WLM environments are intended as a starting point, not as the optimal environments in which to run the Db2-supplied routines. Over time, you will identify routines for your site that function best in a separate WLM environment.

Installation job DSNTIJMV creates an address space procedure for each of the core WLM environments. The WLM environment address space names have the form *ssnm*WLM*suffix*, where *ssnm* is the Db2 subsystem name specified on panel DSNTIPM in the SUBSYSTEM NAME field, and *suffix* is a character that differentiates the various WLM environments. Running DSNTIJMV adds these procedures to the system PROCLIB that you specified on panel DSNTIPW in the SYSTEM PROCEDURES field.

In the description of each environment below, the following terms are used:

NUMTCB
The maximum number of procedures or functions that can run concurrently in the WLM-established stored procedure address space. The NUMTCB setting for the environment is the maximum appropriate setting for at least one of the routines that should be run in that environment. Other routines that run in the environment may tolerate a higher NUMTCB setting.

APF-authorized
Whether the external module for one or more routines that are recommended to run in the environment must run under control of the z/OS authorized program facility (APF). "Yes" means that all libraries allocated by the STEPLIB DD must be APF-authorized. "No" means that at least one library allocated by the STEPLIB DD is not APF-authorized. Not all routines that are recommended to run in an APF-authorized environment necessarily require APF authorization. ADMIN_UPDATE_SYSPARM and DSNTPSMP must run in an environment that is not APF-authorized.

Special DDs
Any special data sets, libraries, or work files that are required by at least one of the routines that are recommended to run in the environment. These are in addition to the standard requirement of STEPLIB DD.

WLM environments

DSNWLM_DEBUGGER
This environment is appropriate for stored procedures that are provided for the Unified Debugger tool. Job DSNTIJMV creates an address space procedure for DSNWLM_DEBUGGER that is called DSNWLMD. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMD.

DSNWLM_DEBUGGER has the following characteristics:

NUMTCB	10
APF-authorized	No
Special DDs:	This DD is optional: • PSMDEBUG which is commented out in normal use. Uncomment it to activate debug tracing.
Other considerations:	• This environment might have a high refresh rate when debug diagnostics are activated. • The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_DSNACICS
This environment is appropriate for DSNACICS, the Db2 CICS transaction invocation stored procedure. Job DSNTIJMV creates an address space procedure for DSNWLM_DSNACICS that is called DSNWLMC. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMC.

DSNWLM_DSNACICS has the following characteristics:

NUMTCB	40
APF-authorized	Yes
Special DDs:	This DD is optional: • DSNDUMP, which is commented out in normal use. Uncomment it to cause DSNACICS to generate an SVC dump when DSNACICS will generate an error message. When this DD is used, allocate it to output class for system dumps.

Other considerations:

- The CICS SDFHEXCI library must be allocated by the STEPLIB DD.
- The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_GENERAL

This environment is appropriate for most Db2-supplied routines. Job DSNTIJMV creates an address space procedure for DSNWLM_GENERAL that is called DSNWLMG. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMG.

DSNWLM_GENERAL has the following characteristics:

NUMTCB	40
APF-authorized	Yes
Special DDs:	None
Other considerations:	The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_JAVA

This environment is appropriate for most Db2-supplied Java routines. Job DSNTIJMV creates an address space procedure for DSNWLM_JAVA that is called DSNWLMJ. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMJ.

DSNWLM_JAVA has the following characteristics:

NUMTCB: 5

APF-authorized: No

Special DDs: These DDs are required:

- JAVAENV allocates a data set that contains Language Environment run time options for Java stored procedures. The presence of this DD statement indicates to Db2 that the WLM environment is for Java routines. For an interpreted Java routine, this data set must contain the environment variable JAVA_HOME. This environment variable indicates to Db2 that the WLM environment is for interpreted Java routines. JAVA_HOME also specifies the highest-level directory in the set of directories that contain the Java SDK.
- JSPDEBUG allocates a data set in which Language Environment puts run time diagnostics.

Example:

```
//JAVAENV DD DISP=SHR,DSN=WLMIJAV.JSPENV
//JSPDEBUG DD SYSOUT=*
```

Other considerations: By default, the DSNWLMJ startup procedure for DSNWLM_JAVA runs program DSNX9WLM, which is the WLM address space initialization program for a 31-bit JVM. If your JAVA_HOME variable specifies a path to a 64-bit JVM, such as /usr/lpp/java/8.0_64, you need to change DSNX9WLM in the EXEC statement to DSNX9WJM. For more information, see .

The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside. If you are running your Java stored procedures in 64-bit JVMs, the recommended NUMTCB is 25.

DSNWLM_MQSERIES

This environment is appropriate for running Db2 IBM MQ functions. Job DSNTIJMV creates an address space procedure for DSNWLM_MQSERIES that is called DSNWLMM. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMM.

DSNWLM_MQSERIES has the following characteristics:

NUMTCB	10
APF-authorized	No
Special DDs:	None

Other considerations:

- IBM MQ run time libraries must be allocated by the STEPLIB DD if they are not included in the system link list. Example:

```
//STEPLIB DD DISP=SHR,DSN=prefix.RUNLIB.LOAD
//        DD DISP=SHR,DSN=prefix.SCEERUN
//        DD DISP=SHR,DSN=prefix.SDSNEXIT
//        DD DISP=SHR,DSN=prefix.SDSNLOAD
//* Uncomment the following if not included in the LINKLIST
//*       DD DISP=SHR,DSN=prefix.SCSQLOAD
//*       DD DISP=SHR,DSN=prefix.SCSQAUTH
//*       DD DISP=SHR,DSN=prefix.SCSQANL
```

- The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_NUMTCB1

This environment is for Db2-supplied routines that must run serially. If a routine must run serially, it cannot share a task control block (TCB) with another routine. Routines that should run in this environment require a maximum TCB setting of 1 but have no other special DD requirements. Job DSNTIJMV creates an address space procedure for DSNWLM_NUMTCB1 that is called DSNWLM1. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLM1.

DSNWLM_NUMTCB1 has the following characteristics:

NUMTCB	1
APF-authorized	Yes
Special DDs:	None
Other considerations:	The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_PGM_CONTROL

This environment is appropriate for Db2-supplied routines that are registered to RACF program control or an equivalent and can therefore be loaded only with other similar routines. Job DSNTIJMV creates an address space procedure for DSNWLM_PGM_CONTROL that is called DSNWLMP. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMP.

DSNWLM_PGM_CONTROL has the following characteristics:

NUMTCB	40
APF-authorized	Yes
Special DDs:	None
Other considerations:	The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_REXX

This environment is primarily appropriate for the ADMIN_UPDATE_SYSPARM and DSNTPSMP stored procedures. However, it can be shared with the other Db2-supplied REXX stored procedures: DSNTBIND, ADMIN_COMMAND_DSN, and ADMIN_INFO_SYSLOG. Job DSNTIJMV creates an address space procedure for DSNWLM_REXX that is called DSNWLMR. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMR.

DSNWLM_REXX has the following characteristics:

NUMTCB	1
APF-authorized	No
Special DDs:	See "Special DDs for DSNWLM_REXX" on page 743.
Other considerations:	• The TSO/E DYNAMNBR parameter must indicate the number of system resources the system should hold for possible reuse. • The STEPLIB DD must allocate at least one library that is not APF-authorized. • The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

Special DDs for DSNWLM_REXX

DSNWLM_UTILS

This environment is appropriate for Db2 utilities stored procedures, which require special DD allocations. These routines require a maximum NUMTCB setting of 1. Job DSNTIJMV creates an address space procedure for DSNWLM_UTILS that is called DSNWLMU. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMU.

DSNWLM_UTILS has the following characteristics:

NUMTCB	1
APF-authorized	Yes
Special DDs:	These DDs are required: • UTPRINT allocates a data set for messages from the sort program. • RNPRIN01 allocates a data set for messages from the sort program. This DD is required only if you plan to invoke RUNSTATS and collect distribution statistics. • STPRIN01 allocates a data set for messages from the sort program. This DD is required when a utility is directed to collect frequency statistics on at least one data-partitioned secondary index or when TABLESPACE TABLE COLGROUP FREQVAL is specified. • DSSPRINT allocates a data set for messages when making concurrent copies. • SYSIN allocates a work file for temporarily storing utility input statements • SYSPRINT allocates a work file for temporarily storing utility output messages. Example:

```
//UTPRINT  DD SYSOUT=*
//RNPRIN01 DD SYSOUT=*
//STPRIN01 DD SYSOUT=*
//DSSPRINT DD SYSOUT=*
//SYSIN DD UNIT=SYSDA,SPACE=(4000,(20,20),,,ROUND)
//         DCB=(RECFM=V,LRECL=32708)
//SYSPRINT DD UNIT=SYSDA,SPACE=(4000,(20,20),,,ROUND)
```

Other considerations:	The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

DSNWLM_WEBSERVICES

This environment is appropriate for running Db2 web services and SOAP functions. Job DSNTIJMV creates an address space procedure for DSNWLM_WEBSERVICES that is called DSNWLMW. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMW.

DSNWLM_WEBSERVICES has the following characteristics:

NUMTCB
: 10

APF-authorized
: No

Special DDs:
: This DD is required:

- WSERROR allocates an HFS file for diagnostic output from the Db2 web services functions.

Example:

```
//WSERROR DD PATH='/tmp/wsc.err',
//           PATHOPTS=(ORDWR,OCREAT,OAPPEND),
//           PATHMODE=(SIRUSR,SIWUSR,SIRGRP,
//           SIWGRP,SIROTH,SIWOTH)
```

Ensure that "PATH" specifies a valid path name and that the specified directory structure exists.

Other considerations:

- The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.
- The default timeout to read data from WS provider is 2 seconds. If you need to increase the timeout value, redefine the UDFs with the following run time options:

```
RUN OPTIONS 'POSIX(ON),XPLINK(ON),ENVAR("DB2SOAP_TIMEOUT=X")'
```

where *X* is a number that specifies the timeout value in seconds.

DSNWLM_XML

This environment is appropriate for Db2-supplied XML processing routines that require large amounts of memory. Job DSNTIJMV creates an address space procedure for DSNWLM_XML that is called DSNWLMX. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMX.

DSNWLM_XML has the following characteristics:

NUMTCB	40
APF-authorized	Yes
Special DDs:	None
Other considerations:	The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

Related concepts

Configuration control statements for Db2-supplied routines

Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Related tasks

Setting up a WLM application environment for stored procedures during installation

All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Setting up a WLM application environment for stored procedures during migration
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

DSNTWLMB tool

The DSNTWLMB tool provides a batch interface for defining, installing, and activating WLM environments. You can also use DSNTWLMB to remove WLM application environments. This tool is invoked by job DSNTIJRW to create the core Db2 WLM environments.

Authorization

If the RACF facility class is active and a profile has been defined for the MVSADMIN.WLM.POLICY facility class, the user of this tool needs the following access:

- ACCESS(READ) for action WLMINFO

  ```
  PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(user) ACCESS(READ)
  ```

- ACCESS(UPDATE) for action ADD, ADD_ACTIVATE, ACTIVATE

  ```
  PERMIT MVSADMIN.WLM.POLICY CLASS(FACILITY) ID(user) ACCESS(UPDATE)
  ```

Parameter descriptions

The batch program accepts the following parameters:

ACTION(*action-type*)
Identifies the type of action that is to be performed. This parameter is required and it supports the following values:

ACTIVATE
The batch program activates a WLM service policy.

ADD
The batch program installs a new WLM application environment to an existing WLM service definition without activating a service policy. The new WLM application environment becomes available on the next activation of a WLM policy.

ADD_ACTIVATE
The batch program installs a new WLM application environment to an existing WLM service definition and activates a WLM service policy to enable the new WLM application environment.

REMOVE
The batch program removes a WLM application environment from an existing WLM service definition, and installs the modified service definition without activating it.

REMOVE_ACTIVATE
The batch program removes a WLM application environment from an existing WLM service definition, installs the modified service definition, and activates it.

REMOVE_IF_EXISTS
The same as `REMOVE`, except that if the WLM application environment to be removed does not exist, the return code is 4 (warning), instead of 8 (error).

REMIFEXISTS_ACTIVATE
The same as `REMOVE_ACTIVATE`, except that if the WLM application environment to be removed does not exist, the return code is 4 (warning), instead of 8 (error).

WLMINFO
The batch program queries the existing WLM service definition and returns basic information.

POLICY(*policy-ID*)

Identifies the WLM service policy that is to be activated. This parameter is required if any of the following actions are specified:

- ACTIVATE
- ADD_ACTIVATE
- REMOVE_ACTIVATE
- REMIFEXISTS_ACTIVATE

The service policy ID can be 1 – 8 characters or "ACTIVE". If "ACTIVE" is specified as the policy ID, the current active service policy is used.

SYSIN parameters

If the specified action is ADD or ADD_ACTIVATE, additional input is required from SYSIN to provide details about the WLM environment that is to be installed. The additional information can be entered from the SYSIN DD statement. The parameters can be entered on one line (up to 72 characters per line) or multiple lines, and they should be separated by one or more spaces.

If *action-type* is REMOVE, REMOVE_ACTIVATE, REMOVE_IF_EXISTS, or REMIFEXISTS_ACTIVATE, the WLMNAME parameter is required. Other SYSIN parameters are not valid with these action types.

The following parameters are supported under SYSIN DD:

WLMNAME(*name*)

The defined name for an application environment. The name can be 1 – 32 characters and cannot begin with "SYS". This is a required parameter.

DESCRIPTION(*description*)

A 32 character area that describes the application environment. This parameter can be set to an empty value. For example:

```
DESCRIPTION()
```

PROCNAME(*procedure-name*)

Defines the JCL procedure that WLM uses to start server address spaces for the application environment. This is a required parameter.

STARTPARM(*start-up-parameters*)

Contains the parameters that WLM uses to start the JCL procedure. The parameters can be up to 115 characters, or it can be set to an empty value. If the parameters include the subsystem name, you can use the symbol &IWMSSNM to cause WLM to substitute the subsystem name instead of directly typing the subsystem name. This is useful because multiple instances of the subsystem with different names can use the application environment. For example:

```
STARTPARM(DB2SSN=&IWMSSNM,APPLENV=WLMENV1,NUMTCB=1)
```

WLMOPT(WLM_MANAGED|SINGLE_SERVER)

Tells WLM whether it should limit the number of server address spaces that are created. For a single system, the WLM_MANAGED option means that any number of servers can be created for the subsystem on the system where it is connected to Workload Manager. In a sysplex, WLM_MANAGED means that servers can be created for the subsystem on any number of systems in the sysplex. If multiple Db2 subsystems are on a system, WLM will create one server for each Db2 subsystem that calls the routines.

The SINGLE_SERVER option means that only one address space can exist per system. For Db2-supplied routines, you can set a limit of one address space per system if this limit is required by the routine. For example, if a server address space requires exclusive use of a resource, only a single address space can exist. Use this option if a stored procedure cannot execute concurrently in multiple address spaces. This option should be used if a stored procedure is to be run in debug mode and writes to a trace. A limit of one address space per sysplex does not apply to Db2-supplied routines.

This parameter can be set to an empty value and will default to WLM_MANAGED.

Related tasks

Setting up a WLM application environment for stored procedures during migration
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Setting up a WLM application environment for stored procedures during installation
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Sample SQL statements for installing Db2-supplied routines

Sample member DSNTESR contains the data definition language that is used by job DSNTIJRT.

Run job DSNTIJRT to create Db2-supplied routines. Sample member DSNTESR contains a full set of the data definition language that is processed by DSNTIJRT. DSNTESR contains statements to create and grant access to Db2-supplied routines, related objects, and the commands for binding packages.

Configuration control statements for Db2-supplied routines

Configuration control statements supply the basic input for the DSNTRIN program, which installs and configures all routines that Db2 supplies.

Configuration control statements consist of a routine's schema and name (for stored procedures) or specific name (for user-defined functions), followed by customizable parameters. You can manually customize these parameters, but to save your settings and facilitate future migrations, specify changes using the Db2 routines: Advanced configuration options installation panels, which are accessed from the DSNTIPR1 panel.

Parameters

The following parameters are used in configuration control statements:

WLMENV
The name of the WLM environment for running the routine. The default environment depends on the routine.

GRANTTO
The authorization IDs allowed to execute the routine and use any associated tables or created global temporary tables. Separate multiple IDs with commas. Do not use blanks. The default is PUBLIC, which allows everyone to execute the routine.

PKGOWNER
The authorization ID to own the routine's package. The specified owner must have the privileges required to execute the SQL statements contained in the routine. If this parameter is specified for a routine that does not have a package, the parameter is ignored. If this optional parameter is not specified, the default package owner is the primary ID used to run DSNTRIN.

Statement format

The general form of a configuration control statement is:

```
schema.routine-name
 WLMENV(wlm-environment-name)
 GRANTTO(auth-ID1,...,auth-IDn)
 PKGOWNER(package-owner)
```

Statement rules

The following rules apply to configuration control statements:

- Statements must reside in records having a fixed-block record format with a logical record length of 80 (same as JCL).
- Only columns 1 - 72 of each record are inspected. Columns 73 - 80 are ignored.
- Statement elements are delimited by one or more blank characters.
- Statement elements cannot contain embedded blanks.
- Statements are delimited by one or more blank lines.
- A statement can be continued on multiple input records. A statement element can be continued by breaking it at column 72 of one record and resuming it at column 1 of the next record.
- An asterisk in column 1 of a record indicates a comment line and the content is ignored.
- Comment lines cannot begin after column 1.
- Comments and statement elements cannot be on the same line.
- Comment lines can be embedded within a statement.
- The routine must be specified as the schema name followed by a period and the routine name.
- The WLMENV parameter is required and must directly follow the *schema.routine name*.
- The GRANTTO parameter is required and must directly follow the WLMENV parameter.
- The PKGOWNER parameter is optional. If specified, it must follow the GRANTTO parameter.

Examples

The following examples are valid configuration control statements:

```
* Configuration statements for the Utilities stored procedures follow:
SYSPROC.DSNUTILS
WLMENV(WLMENV_DSNUTIL)
*
* A comment line within the statement is legal
*
  GRANTTO(PUBLIC)
  PKGOWNER(ALFA)

* Notice the all-blank line above to delineate the two statements
SYSPROC.DSNUTILU
  WLMENV(WLMENV_DSNUTIL)
*
* Here is an example of wrapping an element to the next line
  GRANTTO(ALFA,BRAVO,CHARLIE,DELTA,ECHO,FOXTROT,GOLF,HOTEL,INDIA,JULIETT
E,KILO,LIMA)
*
* PKGOWNER is commented-out below so the OWNER parm will be excluded
*          from the BIND PACKAGE statement
* PKGOWNER(ALFA)
```

The following examples are invalid configuration control statements that violate the statement rules:

```
* Configuration statement for the WLM refresh stored procedure follows:
* - Error 1: The statement must start with schema.routine-name
WLM_REFRESH
* - Error 2: Comments can't start after column 1
 * This is not a valid comment
* - Error 3: Comments and elements can't be in the same line
  WLMENV(WLMENV_APFAUTH) * This is an invalid place to put a comment
* - Error 4: GRANTTO argument contains blanks
  GRANTTO( ALFA, BRAVO, CHARLIE, DELTA, ECHO, FOXTROT )
* - Error 5: PKGOWNER is present but has no argument
  PKGOWNER()
*
* - Error 6: The statements are not separated by a blank line
SYSPROC.DSNTPSMP
* - Error 7: The statement does not have a WLMENV parm
* - Error 8: The statement contains a blank line
```

```
GRANTTO(HOTEL)
```

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Disabling Db2-supplied routines for validation

Job DSNTIJRT installs all Db2-supplied routines on your subsystem. After installation or migration, you can disable any routines that are unnecessary or unusable so the validation program can exclude it from processing.

Procedure

Assign DSNWLM_NOT_ENABLED as the WLM environment of the routine.

The DSNTRVFY validation program does not validate routines that are defined with DSNWLM_NOT_ENABLED as the WLM environment name.

Example

For example, if CICS is not installed, assign DSNWLM_NOT_ENABLED as the WLM environment of SYSPROC.DSNACICS by using the following statement:

GUPI

```
ALTER PROCEDURE SYSPROC.DSNACICS WLM ENVIRONMENT DSNWLM_NOT_ENABLED
```

GUPI

Setting up support for external SQL procedures

If you plan to create external SQL procedures by using DSNTPSMP or IBM Data Studio, you need to complete some additional setup. Alternatively, you can write your own JCL to create external SQL procedures, in which case you do not need to perform this setup.

Before you begin

Deprecated function: External SQL procedures are deprecated and not as fully supported as native SQL procedures. For best results, create native SQL procedures instead. For more information, see and .

About this task

DSNTPSMP is a REXX stored procedure that you can use to create and prepare external SQL procedures. DSNTPSMP is also used by IBM Data Studio to create external SQL procedures. When DSNTPSMP is invoked, Db2 uses the DSNTPSMP REXX EXEC, which is in the *prefix*.SDSNCLST data set.

Procedure

To set up support for external SQL procedures:

1. If DSNTPSMP does not already exist, run job DSNTIJRT to create this stored procedure.
2. Install Db2 REXX Language Support.
3. Set up a WLM environment in which to run DSNTPSMP and create a WLM startup procedure.

   Recommendation: If you do not have a WLM environment defined to run DSNTPSMP, use the core WLM environment DSNWLM_REXX.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related tasks

Installation step 16: Create default storage group, define temporary work files, and bind Db2 REXX Language Support: DSNTIJTM
You must create the default storage group that is for user-defined Db2 tables that are not specifically assigned to a storage group. You must also define the database that is for temporary work files, and bind Db2 REXX Language Support.

Setting up a WLM application environment for stored procedures during installation
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Setting up a WLM application environment for stored procedures during migration
All stored procedures and user-defined functions (except native SQL procedures) must run in WLM-managed stored procedure address spaces. You must assign each stored procedure to a WLM application environment, which routes the stored procedure work to the appropriate WLM-managed address space.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Related information

Additional steps for enabling the stored procedures and objects for XML schema support

Db2 for z/OS provides several stored procedures that you can call in your application programs to perform XML schema registration and removal.

Before you begin

GUPI Before you complete this step, set up WLM application environments for the stored procedures for XML support, and either install the Db2-supplied routines during migration or install the Db2-supplied routines during installation.

About this task

Db2 provides the following stored procedures for XML schema support:

- SYSPROC.XSR_REGISTER
- SYSPROC.XSR_ADDSCHEMADOC
- SYSPROC.XSR_COMPLETE
- SYSPROC.XSR_REMOVE

Db2 provides the following tables for XML schema support:

- SYSIBM.XSRANNOTATIONINFO
- SYSIBM.XSRCOMPONENT
- SYSIBM.XSROBJECTCOMPONENTS
- SYSIBM.XSROBJECTHIERARCHIES
- SYSIBM.XSROBJECTGRAMMAR
- SYSIBM.XSROBJECTPROPERTY

- SYSIBM.XSROBJECTS
- SYSIBM.XSRPROPERTY

Procedure

Install Java support.

The XSR_COMPLETE stored procedure is a Java stored procedure and therefore requires Java support.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

XML processing routines panel: DSNTIPRI
The DSNTIPRI panel allows you to modify configuration options for XSL transform and XML schema processing routines.

Related information

Additional steps for enabling the function for XSLTRANSFORM routines support

Db2 for z/OS provides a function that you can call in your application programs to transform XML documents with XSL transformation processing.

Before you begin

GUPI Before you complete this step, set up WLM application environments for Java routines, and either install the Db2-supplied routines during migration or install the Db2-supplied routines during installation.

About this task

Db2 provides the following function for XSL transform support:

- SYSFUN.XSLTRANSFORM

Procedure

Install Java support.

The XSLTRANSFORM function is a Java stored procedure and therefore requires Java support.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

XML processing routines panel: DSNTIPRI

The DSNTIPRI panel allows you to modify configuration options for XSL transform and XML schema processing routines.

Related information

Additional steps for enabling the administrative task scheduler and administrative enablement routines

The administrative task scheduler routines are Db2-supplied routines that enable you to schedule work. The administrative enablement routines are Db2-supplied routines that enable you to execute administrative work immediately.

Before you begin

Before you complete these steps, set up WLM application environments for the administrative task scheduler and administrative enablement routines, and either install the Db2-supplied routines during migration or install the Db2-supplied routines during installation.

Recommendation: If you do not have a WLM environment defined to run these routines, use Db2 core WLM environment DSNWLM_GENERAL, except as follows:

- ADMIN_COMMAND_DSN - Use DSNWLM_REXX
- ADMIN_COMMAND_UNIX - Use DSNWLM_PGM_CONTROL
- ADMIN_INFO_SYSLOG - Use DSNWLM_REXX
- ADMIN_INFO_SYSPARM - Use DSNWLM_NUMTCB1
- ADMIN_JOB_CANCEL - Use DSNWLM_PGM_CONTROL
- ADMIN_JOB_FETCH - Use DSNWLM_PGM_CONTROL
- ADMIN_JOB_QUERY - Use DSNWLM_PGM_CONTROL
- ADMIN_JOB_SUBMIT - Use DSNWLM_PGM_CONTROL
- ADMIN_UPDATE_SYSPARM - Use DSNWLM_REXX
- ADMIN_UTL_MONITOR - Use DSNWLM_PGM_CONTROL

About this task

The following routines are administrative task scheduler routines:

- ADMIN_TASK_ADD
- ADMIN_TASK_CANCEL
- ADMIN_TASK_LIST
- ADMIN_TASK_OUTPUT
- ADMIN_TASK_REMOVE
- ADMIN_TASK_STATUS
- ADMIN_TASK_UPDATE

The following routines are administrative enablement routines:

- ADMIN_COMMAND_DB2
- ADMIN_COMMAND_DSN
- ADMIN_COMMAND_MVS
- ADMIN_COMMAND_UNIX
- ADMIN_DS_BROWSE
- ADMIN_DS_DELETE
- ADMIN_DS_LIST

- ADMIN_DS_RENAME
- ADMIN_DS_SEARCH
- ADMIN_DS_WRITE
- ADMIN_EXPLAIN_MAINT
- ADMIN_INFO_HOST
- ADMIN_INFO_SMS
- ADMIN_INFO_SQL
- ADMIN_INFO_SSID
- ADMIN_INFO_SYSLOG
- ADMIN_INFO_SYSPARM
- ADMIN_JOB_CANCEL
- ADMIN_JOB_FETCH
- ADMIN_JOB_QUERY
- ADMIN_JOB_SUBMIT
- ADMIN_UPDATE_SYSPARM
- ADMIN_UTL_EXECUTE
- ADMIN_UTL_MODIFY
- ADMIN_UTL_MONITOR
- ADMIN_UTL_SCHEDULE
- ADMIN_UTL_SORT

Procedure

To enable the administrative task scheduler and administrative enablement routines:

1. In the JCL for starting the WLM-established address space for running the stored procedures whose load module must reside in an APF-authorized library, ensure that all libraries in the STEPLIB DD concatenation are APF-authorized.

2. Take the following steps, which are required because the started task module, DSNADMT0, of the administrative task scheduler switches users by using the pthread_security_np() function of z/OS UNIX System Services:

   a) Ensure that the started task user (STARTUID) has READ access to the BPX.SERVER FACILITY class profile by taking the action that is recommended in the following table.

      The action that you take depends on whether the BPX.SERVER is defined and whether the STARTUID is a superuser.

      Table 133. Ensuring that the STARTUID has READ access to the BPX.SERVER FACILITY class profile

Is the BPX.SERVER in FACILITY class defined?	Is the STARTUID a superuser?	Actions to take
No	No	1. Define the BPX.SERVER class profile in the FACILITY class. 2. Permit STARTUID READ access to this profile.
No	Yes	No action required

Table 133. Ensuring that the STARTUID has READ access to the BPX.SERVER FACILITY class profile (continued)

Is the BPX.SERVER in FACILITY class defined?	**Is the STARTUID a superuser?**	**Actions to take**
Yes	n/a	Permit STARTUID READ access to resource profile BPX.SERVER in the FACILITY class.

b) Ensure that the scheduler program is program controlled by taking one of the following actions:

- Define the scheduler program to RACF program control, by customizing and running job step DSNADSR in job DSNTIJRA.
- Define the BPX.DAEMON.HFSCTL class profile in the FACILITY class, and permit STARTUID READ access to this profile.

3. If the BPX.DAEMON facility class is active and the BPX.DAEMON.HFSCTL facility class is not defined, perform the following actions for the stored procedures that must be registered to RACF program control.

   The stored procedures that require RACF program control are:

   - ADMIN_COMMAND_UNIX
   - ADMIN_JOB_CANCEL
   - ADMIN_JOB_FETCH
   - ADMIN_JOB_QUERY
   - ADMIN_JOB_SUBMIT

   a) Customize and run job step DSNADER in job DSNTIJRA to define the security environment for these stored procedures. You need to uncomment job step DSNADER before you run job DSNTIJRA. You do not need to run any other job steps in job DSNTIJRA.

   b) Ensure that you have a WLM environment for these stored procedures that meets the following requirements:

   - The WLM-established stored procedure address space loads only controlled programs.
   - In the JCL for starting the WLM-established address space for running these stored procedures, ensure that all libraries in the STEPLIB DD concatenation are APF-authorized.
   - The name of this environment must match the WLMENV parameter value in the configuration control statement for each stored procedure in job DSNTIJRT.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Db2 administration routines panel: DSNTIPRL
The DSNTIPRL panel allows you to modify configuration options for routines that are to be used for administration.

Related information

Additional steps for enabling the CICS transaction invocation procedure

The CICS transaction invocation stored procedure, DSNACICS, invokes CICS server programs.

Before you begin

Before you complete these steps, either install the Db2-supplied routines during migration or install the Db2-supplied routines during installation.

Procedure

To enable the CICS transaction invocation procedure:

1. Optional: Set up a WLM application environment specifically for running DSNACICS.

   Although DSNACICS can run in a WLM address space with other stored procedures, DSNACICS performs better if it runs in its own address space.

   Recommendation: If you do not have a WLM environment defined to run this routine, use Db2 core WLM environment DSNWLM_CICS.
2. Create or modify the JCL startup procedure for the stored procedure address space for running DSNACICS.

   If you ran installation job DSNTIJMV, such a sample startup procedure has been created in your SYS1.PROCLIB data set. The generic name of the procedure is DSNWLMC. The CICS data set names in the procedure are based on the values that you specified on panel DSNTIPW. If needed, you can modify this startup procedure.

   If you did not run installation job DSNTIJMV or the part of it that creates this startup procedure, run the job now. You can also use the sample startup procedure in the job as a model to create your own startup procedure.

Related concepts

Job DSNTIJRT
Job DSNTIJRT installs and configures Db2-supplied routines by executing program DSNTRIN.

Related tasks

Migration step 13: Define Db2 11 to z/OS: DSNTIJMV
Job DSNTIJMV completes some of the steps that are required to identify Db2 to z/OS, including updating members of SYS1.PARMLIB and SYS1.PROCLIB.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

DSNTIPW: Data set names panel 3
The entries on the DSNTIPW panel establish data set names for the libraries of other products in your system. The values that are entered on this panel are edited into all pertinent sample and installation jobs.

Related information

Additional steps for enabling the common SQL API stored procedures

You can use the common SQL API stored procedures to retrieve information about the data server configuration, the short message text for an SQL code, and system information. These stored procedures are used primarily by tools.

Before you begin

Before you complete these steps, either install the Db2-supplied routines during migration or install the Db2-supplied routines during installation. To create the GET_CONFIG stored procedure with the correct security attributes, job DSNTIJRT must be run by a user ID with SYSOPR and MONITOR1 privileges.

Job DSNTIJRT installs and configures these stored procedures, but you must complete additional steps before you use them.

If GET_SYSTEM_INFO will be called to return the ICF catalog information about Db2 data sets, the user who defines the stored procedure must have MONITOR1 and DISPLAY privileges. If GET_SYSTEM_INFO will be called to return catalog attributes or ICF catalog information about Db2 data sets, the user who defines the stored procedure must have READ access to the OPERCMDS resource MVS.MCSOPER.DSNADMGS. If MVS.MCSOPER.DSNADMGS does not exist, the user must have READ access to the OPERCMDS resource MVS.MCSOPER.*. Otherwise, catalog attributes information will not be returned from GET_SYSTEM_INFO. To give the user that defines the procedures access to the RACF OPERCMDS class, the RACF security administrator must:

1. If the OPERCMDS class is not active, issue the following SETROPTS command to activate the OPERCMDS class:

   ```
   SETROPTS CLASSACT(OPERCMDS)
   ```

2. If the generic profile for OPERCMDS is not active, issue the following SETROPTS command to activate it:

   ```
   SETROPTS GENERIC(OPERCMDS)
   ```

3. Issue the RDEFINE command to establish a profile for MVS.MCSOPER.*console-name*. In this example, *console-name*=DSNADMGS:

   ```
   RDEFINE OPERCMDS MVS.MCSOPER.DSNADMGS UACC(NONE)
   ```

4. Give the user ID access to the class. In this example, the user ID is USER001:

   ```
   PERMIT MVS.MCSOPER.DSNADMGS CLASS(OPERCMDS) ID(USER001) ACCESS(READ)
   ```

5. Issue the SETROPTS RACLIST command to refresh the OPERCMDS reserve class:

   ```
   SETROPTS RACLIST(OPERCMDS) REFRESH
   ```

Before you complete the additional steps to enable the common SQL API stored procedures, set up WLM application environments for them to run in. These stored procedures run in WLM-established stored procedures address spaces.

The common SQL API stored procedures are:

- SYSPROC.GET_CONFIG
- SYSPROC.GET_MESSAGE
- SYSPROC.GET_SYSTEM_INFO
- SYSPROC.SET_PLAN_HINT

GET_SYSTEM_INFO must run in a separate WLM environment from DSNUTILS or DSNUTILU.

Procedure

In the JCL for starting the WLM-established address space for running the GET_SYSTEM_INFO stored procedure, ensure that all libraries in the STEPLIB DD concatenation are APF-authorized.

What to do next

Restriction: To run the GET_CONFIG and GET_SYSTEM_INFO stored procedures, Db2 must be started with subsystem parameters of LOBVALA=4096 KB or higher and LOBVALS=4096 MB or higher.

Related information

Additional steps for enabling IBM MQ user-defined functions

Before applications can call the IBM MQ user-defined functions, you must enable the user-defined functions.

Before you begin

If you want to use the MQI-based MQ functions, you must install IBM MQ Version 6 or later.

About this task

The MQ functions in the DB2MQ1C, DB2MQ2C, DB2MQ1N, and DB2MQ2N schemas are no longer supported because they use AMI, which is no longer supported. These functions are:

- GETCOL
- MQPUBLISH
- MQREAD
- MQREADALL
- MQREADALLCLOB
- MQREADCLOB
- MQRECEIVE
- MQRECEIVEALL
- MQRECEIVEALLCLOB
- MQRECEIVECLOB
- MQSEND
- MQSUBSCRIBE
- MQUNSUBSCRIBE

The schema for the following functions is now DB2MQ.

- MQREAD
- MQREADALL
- MQREADALLCLOB
- MQREADCLOB
- MQRECEIVE
- MQRECEIVEALL
- MQRECEIVEALLCLOB
- MQRECEIVECLOB
- MQSEND

Related reference

Systems Programmer's Guide to Resource Recovery Services (RRS) (IBM Redbooks)
Systems Programmer's Guide to: Workload Manager (IBM Redbooks)
IBM MQ library

Moving from previous versions of the IBM MQ user-defined functions

During installation or migration, the current versions of some IBM MQ user-defined functions are installed under schema DB2MQ by job DSNTIJRT.

About this task

The following user-defined functions have new versions:

- MQREAD
- MQREADALL
- MQREADALLCLOB
- MQREADCLOB
- MQRECEIVE
- MQRECEIVEALL
- MQRECEIVEALLCLOB
- MQRECEIVECLOB
- MQSEND

Recommendation: Code new applications to use the functions in schema DB2MQ. The functions in schemas DB2MQ1C, DB2MQ2C, DB2MQ1N, and DB2MQ2N are no longer supported.

Converting from the AMI-based MQ functions to the MQI-based MQ functions

The MQI-based MQ functions use two tables, SYSIBM.MQSERVICE_TABLE and SYSIBM.MQPOLICY_TABLE, instead of Application Messaging Interface (AMI) configuration files. You need to bind the new functions, create the tables, and convert the contents of the AMI configuration files to rows in the MQ tables.

About this task

Job DSNTIJRT binds the new functions and creates the tables. You need to manually convert the contents of the AMI configuration files.

Procedure

To manually move the AMI configuration file data to the MQ tables:

1. Map sub-elements and attributes under the <ServicePoint> element to columns in SYSIBM.MQSERVICE_TABLE as indicated in the following table.

Table 134. How elements and attributes under the <ServicePoint> element map to columns in the SYSIBM.MQSERVICE_TABLE table

Element	Attribute of element	Column	Example
<ServicePoint>	longDescription	DESC_LONG	`<ServicePoint longDescription="" shortDescription="" ..xmi.label="DB2.DEFAULT.SERVICE">`
	shortDescription	DESC_SHORT	
	xmi.label	SERVICENAME	
<ServicePoint_queueName>	value	INPUTQUEUE	`<ServicePoint_queueName .. value="DB2MQ_DEFAULT_Q"/>`

Table 134. How elements and attributes under the <ServicePoint> element map to columns in the SYSIBM.MQSERVICE_TABLE table (continued)

Element	Attribute of element	Column	Example
<ServicePoint_queueMgrName>	value	QUEUEMANAGER	`<ServicePoint_queueMgrName .. value="MQND"/>`

2. Map sub-elements and attributes under the <Policy> element to columns in SYSIBM.MQPOLICY_TABLE as indicated in the following table.

Table 135. How elements and attributes under the <Policy> element map to columns in the SYSIBM.MQPOLICY_TABLE table

Element	Attribute of element	Value of attribute	Column	Value of column	Example
<Policy>	longDescription	*value*	DESC_LONG	*value*	`<Policy longDescription="" shortDescription="" .. xmi.label= "DB2.DEFAULT.POLICY">`
	shortDescription		DESC_SHORT		
	xmi.label		POLICYNAME		
<GeneralAttributes_syncpoint>	value	Yes	SYNCPOINT	Y	`<GeneralAttributes_syncpoint .. value="Yes"/>`
		No		N	
<SendAttributes_priority>	value	AsTransport	SEND_PRIORITY	-1	`<SendAttributes_priority .. value="AsTransport"/>`
<SendAttributes_persistence>	value	AsTransport	SEND_PERSISTENCE	Q	`<SendAttributes_persistence .. value="AsTransport"/>`
		Yes		Y	
		No		N	
<SendAttributes_expiry>	value	Unlimited	SEND_EXPIRY	-1	`<SendAttributes_expiry .. value="Unlimited"/>`
<SendAttributes_retryCount>	value	*n*	SEND_RETRY_COUNT	*n*	`<SendAttributes_retryCount .. value="0"/>`
<SendAttributes_retryInterval>	value	*n*	SEND_RETRY_INTERVAL	*n*	`<SendAttributes_retryInterval .. value="1000"/>`
<SendAttributes_newCorrelId>	value	Yes	SEND_NEW_CORRELID	Y	`<SendAttributes_newCorrelId .. value="No"/>`
		No		N	
<SendAttributes_responseCorrelId>	value	MessageID	SEND_RESPONSE_CORRELID	C	`<SendAttributes_responseCorrelId .. value="MessageID"/>`
		CorrelID		P	

Table 135. How elements and attributes under the <Policy> element map to columns in the SYSIBM.MQPOLICY_TABLE table (continued)

Element	Attribute of element	Value of attribute	Column	Value of column	Example
<SendAttributes _exceptionAction>	value	DLQ	SEND_EXCEPTION _ACTION	Q	`<SendAttributes _exceptionAction .. value="DLQ"/>`
		Discard		D	

<SendAttributes _reportType Exception>, <SendAttributes _reportData>	value, value[1]	No	SEND_REPORT _EXCEPTIONDESC _LONG	N	`<SendAttributes _reportTypeException .. value="No"/>`
					`<SendAttributes _reportData .. value="Report"/>`

		Yes, Report		E	
		Yes, Report _With_Data		D	
		Yes, Report _With_Full_Data		F	

<SendAttributes _reportTypeCOA>, <SendAttributes _reportData>	value, value[1]	No	SEND_REPORT _COA	N	`<SendAttributes _reportTypeCOA .. value="No"/>`
					`<SendAttributes _reportData .. value="Report"/>`

		Yes, Report		C	
		Yes, Report _With_Data		D	
		Yes, Report _With_Full_Data		F	

<SendAttributes _reportTypeCOD>, <SendAttributes _reportData>	value, value[1]	No	SEND_REPORT _COD	N	`<SendAttributes _reportTypeCOD .. value="No"/>`
					`<SendAttributes _reportData .. value="Report"/>`

		Yes, Report		C	
		Yes, Report _With_Data		D	
		Yes, Report _With_Full_Data		F	

<SendAttributes _reportTypeExpiry>, <SendAttributes _reportData>	value, value[1]	No	SEND_REPORT _EXPIRY	N	`<SendAttributes _reportTypeExpiry .. value="No"/>`
					`<SendAttributes _reportData .. value="Report"/>`

		Yes, Report		E	
		Yes, Report _With_Data		D	
		Yes, Report _With_Full_Data		F	
<ReceiveAttributes _waitInterval>	value	*n*	RCV_WAIT _INTERVAL	*n*	`<ReceiveAttributes _waitInterval .. value="60"/>`
<ReceiveAttributes _convert>	value	Yes	RCV_CONVERT	Y	`<ReceiveAttributes _convert .. value="Yes"/>`
		No		N	

Table 135. How elements and attributes under the <Policy> element map to columns in the SYSIBM.MQPOLICY_TABLE table (continued)

Element	Attribute of element	Value of attribute	Column	Value of column	Example
<ReceiveAttributes _acceptTruncated Messages>	value	Yes	RCV_ACCEPT _TRUNC_MSG	Y	`<ReceiveAttributes _acceptTruncated Messages .. value="Yes"/>`
		No		N	
<ReceiveAttributes _openShared>	value	Yes	RCV_OPEN _SHARED	S	`<ReceiveAttributes _openShared .. value="Yes"/>`
		No		E	

Note:

1. The two values are used in conjunction to determine the column value.

Starting the queue manager

To enable IBM MQ user-defined functions, start the queue manager after you create and configure the broker domain.

Procedure

To start the queue manager:

1. Issue the following command from the z/OS console, where *<command-prefix-string>* is the command prefix string for the IBM MQ subsystem:

   ```
   <command-prefix-string> START QMGR
   ```

   For example, if the command prefix string for your IBM MQ subsystem is –MQND, issue this command:

   ```
   –MQND START QMGR
   ```

2. To check whether the queue manager is available, issue the following command from the TSO Command Processor panel, which is option 6 of the ISPF/PDF primary options menu:

   ```
   CSQOREXX
   ```

Customizing the WLM application environment for running IBM MQ user-defined function support

To run the Db2 MQ user-defined functions, you must configure a WLM environment and the corresponding WLM startup procedure.

Procedure

Configure the following WLM environment.

DSNWLM_MQSERIES

This environment is appropriate for running Db2 IBM MQ functions. Job DSNTIJMV creates an address space procedure for DSNWLM_MQSERIES that is called DSNWLMM. The name and library name of this procedure change according to the Db2 subsystem name that is specified on panel DSNTIPM. For example, if the subsystem name is VA1A, the procedure is named VA1AWLMM.

DSNWLM_MQSERIES has the following characteristics:

NUMTCB	10
APF-authorized	No
Special DDs:	None

Other considerations:

- IBM MQ run time libraries must be allocated by the STEPLIB DD if they are not included in the system link list. Example:

```
//STEPLIB DD DISP=SHR,DSN=prefix.RUNLIB.LOAD
//        DD DISP=SHR,DSN=prefix.SCEERUN
//        DD DISP=SHR,DSN=prefix.SDSNEXIT
//        DD DISP=SHR,DSN=prefix.SDSNLOAD
//* Uncomment the following if not included in the LINKLIST
//*       DD DISP=SHR,DSN=prefix.SCSQLOAD
//*       DD DISP=SHR,DSN=prefix.SCSQAUTH
//*       DD DISP=SHR,DSN=prefix.SCSQANL
```

- The STEPLIB DD must include DSN=*prefix*.SDSNEXIT or other library where the authorization exit modules (DSN3@ATH and DSN3@SGN) reside.

Related reference

Core WLM environments for Db2-supplied routines
Definitions for core WLM environments are provided as recommended initial environments for running Db2-supplied routines. You can use Db2 core WLM environments to model additional WLM environments as you tune your subsystem for maximum performance of the Db2-supplied routines that you use.

Related information

Verifying the Db2 and IBM MQ setup

After you set up the IBM MQ environment, you can verify that it is set up correctly by running Db2 jobs.

Procedure

Customize and run job DSNTEJMQ to verify that your IBM MQ environment is set up correctly for invoking Db2 IBM MQ user-defined functions. Instructions for customizing this job are in the job prolog. Job DSNTEJMQ defines a local queue and invokes each of the IBM MQ functions through DSNTEP2.

Enabling Db2 web services

Web services are sets of business functions that applications or other web servers invoke over the Internet by using standard HTTP or HTTPS requests.

Additional steps for enabling web service user-defined functions

Enabling the web service user-defined functions allows you to specify a complete SOAP message as input, so you receive the complete SOAP messages from the web service provider's response.

Before you begin

Before you complete these steps, set up WLM application environments for web service user-defined functions.

Recommendation: For web service functions, use the DSNWLM_WEBSERVICES core WLM environment.

About this task

During installation or migration, the following web service user-defined functions were installed by job DSNTIJRT:

- DSNWSCVV

- DSNWSCVC
- DSNWSCCV
- DSNWSCCC

Procedure

To set up the web service user-defined functions:

1. The default timeout to read data from a web service provider is two seconds. Increase the timeout value by redefining the web service user-defined functions with the key and value pair DB2SOAP_TIMEOUT=*X* in the ENVAR parameter values, where *X* is a number that specifies the timeout value in seconds.
2. If you want to use SOAP Version 1.2, include the key and value pair DB2SOAP_VERSION=SOAP_12 in the ENVAR parameter values. By default, Db2 uses SOAP Version 1.1. If you specify any other value for DB2SOAP_VERSION besides SOAP_12, SOAP Version 1.1 is assumed.

   If your subsystem uses SOAP Version 1.1 and SOAP Version 1.2, you must define two sets of SOAP user-defined functions: one without ENVAR("DB2SOAP_VERSION=SOAP_12"), and one with ENVAR("DB2SOAP_VERSION=SOAP_12").
3. If you want to receive SOAP error messages, specify the ENVAR option RETURN_ERROR=YES.

   If RETURN_ERROR=NO or the option is not specified and an error occurs, the web service provider returns a SOAP response to the client with an HTTP return code set other than 200. In this case, the user-defined functions end with SQLCODE=-443 and the complete HTTP response that was sent by web service provider is stored in the WSERROR DD file, as specified in the WLM startup procedure. The file contains the actual bytes that are sent by the web service provider.

   If you specify RETURN_ERROR=YES, the SOAPHTTP user-defined function writes the HTTP content to the WSERROR DD file when the HTTP status code is not 200. It also builds a new XML document with an error element node that contains an "httprc" attribute around the SOAP response, as follows:

   ```
   <error httprc="{HTTP status code}">
         {SOAP response}
   </error>
   ```

   The XML document is returned without issuing SQLCODE -443. Your applications must check for a root element node of error to determine if an HTTP error is returned. If an HTTP error is returned, the applications must process the SOAP response to handle the error.
4. If you do not use the DSNWLM_WEBSERVICES core WLM environment, add the following DD card to the WLM startup procedure where the user-defined functions are defined.

   ```
   // WSERROR DD PATH='<HFS filename>',
   // PATHOPTS=(ORDWR,OCREAT,OAPPEND),
   // PATHMODE=(SIRUSR,SIWUSR,SIRGRP,SIWGRP,SIROTH,SIWOTH)
   ```

   where *<HFS filename>* is the name of an HFS, such as /tmp/wsc.err.

   If the response is in Unicode, you can browse the file on an MVS system by issuing the following command:

   ```
   iconv -f UTF-8 -t IBM-1047 < tmp/wsc.err
   ```

   You can store the contents in EBCDIC by saving it to another file by issuing the following command:

   ```
   iconv -f UTF-8 -t IBM-1047 < wsc.txt > wsc_ebcdic.txt
   ```

   You can also FTP the file in BINARY mode to a workstation and open it using a text editor.

Related reference

AT-TLS policy statements (z/OS Communications Server: IP Configuration Reference)

Related information

Supported web service calls

The web service user-defined functions support unsecured web services, HTTP Basic Authorized web services, and HTTPS Secured web services.

1. Unsecured web services

   For unsecured web services, the HTTP request that contains SOAP is sent in clear text to the web service provider, where no authentication is performed. The endpoint URL that is specified during invocation of the web service user-defined functions has the following form:

   ```
   http://[hostname[:port]/[path]
   ```

2. HTTP Basic Authorized web services

   For HTTP Basic Authorized web services, the specified user and password is encoded in Base64 and sent as part of an HTTP Header. The HTTP request that contains SOAP is sent in clear text to the web service provider, where it authenticates the supplied user and password before processing the request. The endpoint URL that is specified during invocation of the web service user-defined functions has the following form:

   ```
   http://[user[:password]@]hostname[:port]/[path]
   ```

3. HTTPS Secured web services

   For HTTPS Secured web services, as part of the HTTPS protocol, the complete HTTP request that contains SOAP is encrypted and sent to the web service provider. The endpoint URL that is specified during invocation of the web service user-defined functions has the following form:

   ```
   https://[hostname[:port]/[path]
   ```

Enabling the web service user-defined function support for HTTPS

Support for HTTPS in the web service user-defined functions uses Application Transparent Transport Layer Security (AT-TLS). AT-TLS is based on z/OS System SSL, and it transparently implements Transport Layer Security (TLS) protocols in the TCP layer of the stack.

About this task

SSL connections make use of public/private key mechanisms (PKI) for authenticating each side of the SSL session and agreeing on bulk encryption keys to be used for the SSL session. To use PKI, public/private key pairs must be generated. In addition, X.509 certificates (which contain public keys) might need to be created, or certificates must be requested, received, and managed.

System SSL supports the following two methods for managing PKI private keys and certificates:

- A z/OS shell-based program called gskkyman. gskkyman creates, fills in, and manages a z/OS file that contains PKI private keys, certificate requests, and certificates. This z/OS file is called a key database and, by convention, has a file extension of .kdb.
- The z/OS Security Server (RACF) RACDCERT command. RACDCERT installs and maintains PKI private keys and certificates in RACF.

Procedure

To enable support for HTTPS and AT-TLS:

1. Specify the TTLS parameter on the TCPCONFIG statement in PROFILE.
2. To protect TCP/IP connections, you can configure the RACF EZB.INITSTACK.sysname.tcpname resource in the SERVAUTH class to block all stack access except for the user IDs that are permitted to use the resource.

   Refer to member EZARACF in sample data set hlq.SEZAINST where hlq is the high level qualifier data set name for TCPIP data sets.
3. Configure AT-TLS policy rules.

The policy agent provides AT-TLS policy rules to the TCP/IP stack. Each rule defines a set of security conditions that the policy agent compares to the conditions at the connection that it is checking. When the policy agent finds a match, it assigns the connection to the actions that are associated with the rule.

4. Create a client keyring for each client with necessary certification authority certificates.

   The name of the client keyring should match the name that is provided for the keyring in the policy configuration file.

   If the web service user-defined functions are defined with Db2 security, the authorization ID that is associated with the WLM-established address space where the user-defined functions are defined must have all the necessary permissions to access the keyring.
5. Stop and start TCP/IP stacks.
6. Start the policy agent. Verify that message EZZ4248E is released from the console.

Results

Setup is complete and you can run the web service user-defined functions with HTTPS.

Enabling Db2 as a web service provider

Enabling Db2 as a web service provider allows you to create web services on z/OS with your Db2 data and applications.

About this task

Db2 for z/OS as a web service provider has the following prerequisites:

- Enable JDBC (legacy or universal) in Db2.
- Install WebSphere Application Server Version 5 or later on z/OS.
- Ensure that the WebSphere Application Server library contains the following two files:
  - mail.jar
  - activation.jar

  If mail.jar is not present, download JavaMail Version 1.2 or later. If activation.jar is not present, download JavaBeans Activation Framework Version 1.0.1 or later.

To use Db2 Web Services Object Runtime Framework (WORF), you need to make the run time services available to WebSphere Application Server (WAS). By default, WORF is installed in the HFS directory:

```
/usr/lpp/db2b10_worf/
```

The base installationdirectory contains the `lib/` subdirectory that contains the run time JAR file `worf.jar`. To begin using WORF, copy `worf.jar`, `mail.jar`, and `activation.jar` to a WAS shared library directory that you have already set up and restart WAS.

WORF provides a sample web application in the following directory:

```
lib/services.war
```

The application contains sample Document Access Definition Extension (DADX) files that define sample Db2 web services.

Procedure

To set up this application with sample DADX files:

1. Follow the instructions in the job prolog to customize and run job DSNTEJWS, which is located in the *prefix*.SDSNSAMP directory. DSNTEJWS creates the Db2 tables that are used by the sample application.

2. The sample application is set up to use universal JDBC driver connectivity to connect to a z/OS Db2 server. Configure WAS with JDBC providers that make use of universal JDBC driver and perform the following steps:

   a) Copy `services.war` to a temporary directory.

   b) Extract `services.war` by issuing the following command:

   ```
   jar -xvf services.war
   ```

   c) Open the `group.properties` files, which are located in the following directories:

   ```
   WEB-INF/classes/groups/dxx_sample
   WEB-INF/classes/groups/dxx_travel
   ```

   Modify the dbDriver, dbURL userID, and password fields to have the following values:

   ```
   dbDriver=com.ibm.db2.jcc.DB2Driver
   dbURL=jdbc:db2://server:port/database
   userID=DB2 userid
   password=DB2 userid password
   ```

   d) Compress the files by issuing the following command:

   ```
   jar -cvf services.war *
   ```

3. Use a web browser to connect to your WAS Administrative Console.
4. Under "Applications", select "Install New Application".
5. Select the "Server Path" option, and type the location of the `services.war` file in the text box.

   If you installed WORF in the default location, the server path is:

   ```
   /usr/lpp/db2b10_worf/lib/services.war
   ```

6. Enter a context root for the application (for example, services). Click "Next".
7. On the following screens, respond as necessary for your local setup. You can accept the default settings.
8. On the last screen, click "Finish". Click "Save to Master Configuration" to apply your changes.

What to do next

To load the application:

1. On the WAS Administrative Console's main page, under "Applications", select "Enterprise Applications". Select the application and click "Start" to load the application.
2. After the application loads, point a browser to your server with the context root that you chose (for example, http://*server*:*port*/services/). The welcome page lists the sample DADX files that are provided in `services.war`. To test the services, click on the links.

Enabling Db2 as a web service consumer

Enabling Db2 as a web service consumer allows you to receive web service data in your Db2 applications.

Before you begin

Db2 for z/OS as a web service consumer has the following prerequisites:

- Install IBM XML Toolkit for z/OS 1.10
- Configure TCP/IP

About this task

Installation job DSNTIJMV contains sample startup procedure DSNWLM, which you can use as a model for your startup procedures. You must modify the startup procedure only if the web services routines are not defined to the DSNWLM_WEBSERVICES core WLM environment.

Procedure

To enable Db2 as a web service consumer:

1. Change the following items in each startup procedure:
   a) Change the procedure name from DSNWLM to the procedure name that you specified when you set up the WLM application environment.
   b) Change the value of APPLENV to the name of the WLM application environment that you set up for the web services consumer user-defined functions. The name of this environment must match the WLMENV parameter value in the configuration control statement for each stored procedure in job DSNTIJRT.
   c) Change the value of DB2SSN to your Db2 subsystem name.
   d) Add the data set name of the XML Toolkit load library (XPLINKed version) to the STEPLIB concatenation. If you used the default data set names when you installed the XML Toolkit, the load library data set name is *userid*.SIXMLOD1.
   e) Ensure that the Db2 SDSNLOD2 library is added to the STEPLIB.
2. After you set up the WLM application environment, create a JCL startup procedure for the stored procedure address space.

Creating REST user-defined functions

A set of sample user-defined functions can be installed with Db2 to allow applications to access REST-based services through SQL. The basic REST scalar functions provide access to web-hosted content. Additional helper functions are available to provide URL encoding and decoding and Base64 encoding and decoding

Before you begin

Ensure that you have the following prerequisites before you create the sample REST user-defined functions:

- Java JDK 5.0 or later

  The REST user-defined functions are implemented in Java and require this minimum JDK level.
- TCP/IP

  The REST user-defined functions require a functioning TCP/IP setup and access to the Internet.
- A Java WLM environment

  You can use the WLM environment that is supplied with Db2 for Java routines, DSNWLM_JAVA, or any existing Java WLM environment. By default, the jar file for the Db2 REST functions, db2restudf.jar, is installed in the same class path as other Java routines that are supplied with Db2: /usr/lpp/db2b10/base. If you installed db2restudf.jar in a different path, verify that this path is specified in the Language Environment variable file that is used by the WLM environment.

About this task

This task describes how to create the basic REST user-defined functions that are provided with Db2. It also describes how to optionally set up the REST user-defined functions to use SSL and how to enable HTTP proxy support for the REST user-defined functions.

Tip: The sample HTTP user-defined functions are intended to be used within Db2 SQL applications to access remote non-Db2 REST-based services through SQL statements. Do not confuse them with Db2 native REST services, which supports using a REST-based interface to interact with Db2 data from web, mobile, and cloud applications.

Procedure

To create and configure connections for the sample REST user-defined functions:

1. Modify job DSNTIJRF or the createUDFzOS.sql script in the db2restudf.jar file to specify the name of the WLM environment that you set up for the REST user-defined functions.
2. Run job DSNTIJRF or the createUDFzOS.sql script.
3. Optional: Enable SSL connections to use a key database or to use a RACF keyring.
   - To enable SSL connections to use a key database, specify the following settings in the file that you specified for JVMPROPS in the Language Environment options data set:
     - -Djavax.net.ssl.keyStore=/wlmjvm/keystore.jks
     - -Djavax.net.ssl.trustStore=/wlmjvm/keystore.jks
     - -Djavax.net.ssl.trustStorePassword=*password*
     - -Djavax.net.ssl.keyStorePassword=*password*
   - To enable SSL connections to use a RACF key ring, follow these steps:
     a. Create a key ring for the RACF user ID that is associated with the stored procedure address space in which the REST user-defined functions run.

        To create a key ring named RESTKEYRING for user ID RESTUSR, issue this command:

        ```
        RACDCERT ADDRING(RESTKEYRING) ID(RESTUSR)
        ```

     b. Add certificates to the key ring.

        To add a certificate to RESTKEYRING, issue this command:

        ```
        RACDCERT ID(RESTUSR) CONNECT(ID(RESTUSR) LABEL('RESTCERT') RING(RESTKEYRING))
        ```

     c. In the file that you specified for JVMPROPS in the Language Environment options data set, specify the following settings:

Property	Value
javax.net.ssl.trustStore	Path to the key ring, in the format `safkeyring://racf-id/ring-id` *racf-id* is the RACF user ID that is associated with the stored procedure address space. *ring-id* is the name of the RACF key ring.
javax.protocol.handler.pkg	com.ibm.crypto.provider
javax.net.ssl.trustStoreType	JCERACFKS

        To set up SSL connections that use the RESTKEYRING key ring, set these properties:

        - -Djavax.net.ssl.trustStore=safkeyring://RESTUSR/RESTKEYRING
        - -Djavax.protocol.handler.pkgs=com.ibm.crypto.provider
        - -Djavax.net.ssl.trustStoreType=JCERACFKS
4. Optional: Enable HTTP proxy support.

   Set the following properties in the file that you specified for JVMPROPS in the Language Environment options data set:

   - http.proxyHost

- http.proxyPort
- http.proxyUser
- http.proxyPassword
- http.nonProxyHosts

In this properties file, specify `-D`*`property`*`=`*`value`* for each configuration property.

For example, the following settings can be used:

- -Dhttp.proxyHost=myProxyHost.com
- -Dhttp.proxyPort=8090
- -Dhttp.proxyUser=user
- -Dhttp.proxyPassword=secret
- -Dhttp.nonProxyHosts=*.ibm.com|wikipedia.org|...

Related reference

IBMJCECCA (IBM SDK, Java Technology Edition)

Related information

Sample SQL procedures for tracing native SQL routines

A set of sample SQL procedures that trace native SQL routines can be installed with Db2.

The trace SQL procedures and supporting objects are:

DSN8.CREATE_DGTT
An SQL procedure that creates declared temporary table SESSION.DBMS_BUFFER, which contains the trace message buffer.

DSN8.DISABLE
An SQL procedure that disables the SQL routine trace message buffer.

DSN8.ENABLE
An SQL procedure that enables the SQL routine trace message buffer.

DSN8.GET_LINE
An SQL procedure that returns a single line from the SQL routine trace message buffer. The returned data does not include an end-of-line character sequence.

DSN8.GET_LINES
An SQL procedure that returns one or more lines from the SQL routine trace message buffer, and stores the lines in an array. The returned data does not include end-of-line character sequences.

DSN8.NEW_LINE
An SQL procedure that writes an end-of-line character sequence to the SQL routine trace message buffer.

DSN8.PUT
An SQL procedure that writes a line to the SQL routine trace message buffer, without an end-of-line character sequence.

DSN8.PUT_LINE
An SQL procedure that writes a line to the SQL routine trace message buffer, with an end-of-line character sequence.

DSN8.DBMS_ENABLE
A global variable that is used to test whether the SQL routine trace message buffer is enabled.

DSN8.GRPHICARR
A user-defined array type that can be used to define the array into which the output from DSN8.GET_LINES is written.

Run the provided installation job DSNTEJTR to create the SQL procedures for tracing native SQL routines. See the DSNTEJTR job prolog for instructions on how to customize the job for your site.

Related information

Sample IBM InfoSphere BigInsights user-defined functions

A set of sample user-defined functions can be installed with Db2 to allow applications to access IBM InfoSphere® BigInsights® data through SQL.

The IBM InfoSphere BigInsights user-defined functions read data in the Hadoop Distributed File System (HDFS), and submit Jaql queries.

Related information

Creating sample IBM BigInsights user-defined functions

You can customize and run job DSNTEJBI to create the sample IBM BigInsights user-defined functions.

Before you begin

Ensure that you have the following prerequisites before you create the sample IBM BigInsights user-defined functions:

- IBM BigInsights 3.0, with HDFS
- A supported z/OS C++ compiler
- A WLM environment for web services

  You can use the WLM environment that is supplied for web service user-defined functions, DSNWLM_WEBSERVICES, or any WLM environment with similar attributes. DSNWLM_WEBSERVICES is the default WLM environment for the IBM BigInsights user-defined functions. If you use another WLM environment, you need to update the WLM environment name in the CREATE FUNCTION statements for those user-defined functions.

Procedure

To create the sample IBM BigInsights user-defined functions:

1. Modify job DSNTEJBI to as indicated in the job prolog.
2. Run job DSNTEJBI.

Related concepts

Job DSNTEJBI
DSNTEJBI defines and prepares the IBM InfoSphere BigInsights sample user-defined functions..

Job DSNTEJBI

DSNTEJBI defines and prepares the IBM InfoSphere BigInsights sample user-defined functions..

The installation CLIST does not customize job DSNTEJBI. Follow the instructions in the DSNTEJBI prolog to manually customize the job.

The IBM InfoSphere BigInsights sample user-defined functions are:

Function	Description
HDFS_READ	Reads data from a delimiter-separated file in the Hadoop Distributed File System (HDFS).
JAQL_SUBMIT	Invokes an IBM InfoSphere BigInsights Jaql query.

Job DSNTEJBI contains the steps that are listed in the table below.

Table 136. Steps in job DSNTEJBI

Step	Function
1	Drops the SYSFUN.HDFS_READ and SYSFUN.JAQL_SUBMIT user-defined functions.“1” on page 771
2	Drops the SYSFUN.HDFS_READ and SYSFUN.JAQL_SUBMIT user-defined functions.
3	Grants access to the SYSFUN.HDFS_READ and SYSFUN.JAQL_SUBMIT user-defined functions.
4	Prepares program DSN8GLIB, which contains functions for accessing generic table functions.“1” on page 771
5	Prepares program DSN8HLIB, which contains functions for HTTP access.“2” on page 771
6	Prepares program DSN8HDFS, the external module for user-defined function SYSFUN.HDFS_READ.“1” on page 771
7	Prepares program DSN8JAQL, the external module for user-defined function SYSFUN.JAQL_SUBMIT.“1” on page 771

Note:

1. This is an optional step. You need to uncomment this step before you can run it.
2. This is an optional step that is required only if you run either of the steps that follow it. You need to uncomment this step before you can run it.

If DSNTEJBI runs successfully, it produces the return codes that are shown in the table below.

Table 137. DSNTEJBI return codes

Step	PROCSTEP	Return code
TEJBIS01		0000
TEJBIS02		0000 or 0004
TEJBIS03		0000 or 0004
TEJBIS04	PC CP PLKED LKED	0004 0000 0004 0000
TEJBIS05	PC CP PLKED LKED	0004 0000 0004 0000
TEJBIS06	PC CP PLKED LKED	0004 0000 0004 0000

Table 137. DSNTEJBI return codes (continued)

Step	PROCSTEP	Return code
TEJBIS07	PC CP PLKED LKED	0004 0000 0004 0000

Related information

The IBM Data Server Driver for JDBC and SQLJ

If you plan to run JDBC or SQLJ applications in z/OS UNIX System Services that access Db2 for z/OS data servers, you need to install the current version of the IBM Data Server Driver for JDBC and SQLJ.

Java stored procedures and user-defined functions are examples of Java programs that run in z/OS UNIX System Services and access Db2 for z/OS data servers.

You must install Db2 for z/OS or migrate to the current version of Db2 for z/OS before you install the IBM Data Server Driver for JDBC and SQLJ.

See and its subtopics for details.

Connecting the IMS attachment facility

Connecting Db2 to IMS requires coordination with your company's group that supports IMS systems.

Procedure

To connect the IMS attachment facility:

- Make Db2 load modules available to IMS.
- Define Db2 to IMS.
- Define new programs and transactions to IMS.
- Depending on your site, you might also need to:
  - Define Db2 plans for IMS applications.
  - Generate a user language interface.

What to do next

An IMS system definition might be required to complete the steps to connect Db2 to IMS. If RACF is installed, you also need to define the IMS-to-Db2 connection to RACF.

Related information

Making Db2 load modules available to IMS

As part of connecting Db2 to IMS, you must make the Db2 load modules available to IMS.

About this task

If you have already included the *prefix*.SDSNLOAD library in your LNKLST*xx*, you can skip this step. Db2 10 modules will be available through normal z/OS module search.

Procedure

To make Db2 load modules available to IMS:

- If Db2 load libraries are not included in your LNKLST*xx*, add STEPLIB statements to your startup procedures.
- Add *prefix*.SDSNLOAD to the DFSESL DD statement.
- If any IMS region connects to more than one release of Db2, then you must ensure that the Db2 load library that is used for that region is compatible with each release. The IMS attachment facility is upward compatible, but not downward compatible. This means that you should use the oldest release of the Db2 load library for the IMS region.
  - If all the data sets referred to in the JOBLIB or STEPLIB statement for an IMS region are APF-authorized, then add the DD statement for *prefix*.SDSNLOAD to the JOBLIB or STEPLIB statement. If the DYNAM option of COBOL is being used, the IMS RESLIB DD statement must precede the reference to *prefix*.SDSNLOAD in the JOBLIB or STEPLIB statement.
  - Add the ddname DFSESL DD statement for *prefix*.SDSNLOAD. All libraries specified on the DFSESL DD statement must be APF-authorized. The DFSESL DD statement is not required by Db2 DL/I batch support. IMS requires that an IMS RESLIB DD statement also be referenced by the DFSESL DD statement, as in the following:

```
//DFSESL     DD      DSN=ims_reslib,DISP=SHR
//           DD      DSN=prefix.SDSNLOAD,DISP=SHR
```

Defining Db2 to IMS

To define Db2 to IMS, the Db2 identification must be defined to the control region and the DL/I batch region. Optionally, you can also define the Db2 identification to each dependent region that accesses the Db2 subsystem.

Procedure

To define Db2 to IMS:

1. Name an SSM member in IMS.PROCLIB by concatenating the value of the IMSID field of the IMS IMSCTRL macro (one to four alphanumeric characters) with any name (one to four alphanumeric characters) defined by your site.

   Each SSM entry in IMS.PROCLIB defines at least one connection from an IMS region to at least one different z/OS subsystem. One SSM member can be shared by all of the IMS regions, or a specific member can be defined for each region. This record contains as many entries as there are connections to external subsystems. Each entry is an 80-character blocked or deblocked record. Fields are keyword or positional and are delimited by commas. The fields in this record are:

   SST=,SSN=,LIT=,ESMT=,RTT=,REO=,CRC=

   where:

   SST=DB2
   Identifies a required one-to eight-character name that defines the external subsystem type. It must be set to DB2 for IMS to connect to Db2.

   SSN=
   Identifies a required one-to four-character Db2 subsystem name. This name must be the name you specified for SUBSYSTEM NAME on installation panel DSNTIPM. The default is DSN1.

   LIT=
   Identifies a required four-character alphanumeric option, specifying the language interface token (LIT) supplied to IMS. The IMS-supplied language interface module (DFSLI000) requires a value of **SYS1** for this option.

ESMT=

Identifies a required one-to eight-character alphanumeric option specifying the external subsystem module table. This module specifies which attachment modules must be loaded by IMS. **DSNMIN10** is the required value for this field.

RTT=

Identifies an optional one to eight character alphanumeric name of the user-generated resource translation table (RTT). This table maps the IMS application names into Db2 plan names. If this entry is omitted, the Db2 plan name is the IMS application load module name.

REO=

Identifies the optional one-character region error option to be used if an IMS application attempts to reference a non-operational external subsystem or if resources are unavailable at create thread time. If Db2 detects the unavailable resource condition during normal SQL processing, a -904 SQLCODE is returned to the application.

R

Passes a SQL return code to the application, indicating that the request for Db2 services failed (default). The most commonly returned SQL codes are -922, -923, and -924. However, there might be other SQL codes returned to the application.

When the first connection to Db2 cannot be established, a SQL return code is not returned. Instead, the application is terminated with an abend code U3047.

Q

Abends the application with an abend code U3051, backs out activity to the last commit point, does a PSTOP of the transaction, and re-queues the input message. This option only applies when an IMS application attempts to reference a non-operational external subsystem or if the resources are unavailable at create thread time. If Db2 detects the unavailable resource condition during normal SQL processing, a -904 SQLCODE is returned to the application.

A

Abends the application with an abend code of U3047 and discards the input message. This option only applies when an IMS application attempts to reference a non-operational external subsystem or if the resources are unavailable at create thread time. If Db2 detects the unavailable resource condition during normal SQL processing, a -904 SQLCODE is returned to the application.

If Db2 is not active or the connection cannot be established when the first SQL call is made from the application program (such as Db2 unavailable, Db2 quiescing, or Db2 terminating), the action you take depends on the region error option specified. SQL codes of -922, -923, or -924 might be returned to the application if option R is specified.

You can change the default for an application if a resource translation table entry is generated for that application.

CRC=

Identifies a command recognition character used by IMS to identify Db2 commands entered from an IMS terminal with the /SSR command. Any character is valid for the CRC except the period (.), slash (/), or comma (,). The default CRC is the hyphen (-).

These options apply to DL/I batch only:

CONNECTION_NAME=

Represents the name of the job step that is the coordinator for Db2 activity. The connection name is optional. The connection name defaults are:

Table 138. Default connection names for DL/I batch

Type of Application	Default Connection Name
Batch job	Job name
Started task	Started task name

Table 138. Default connection names for DL/I batch (continued)

Type of Application	Default Connection Name
TSO user	TSO authorization ID

   If a batch job fails, you must use a separate job to restart the batch job. The connection name used in the restart job must be the same as the name used in the batch job that failed. Or, if the default connection name is used, the restart job must have the same job name as the batch update job that failed.

   Db2 requires unique connection names for Db2 DL/I batch support. If two applications try to connect with the same connection name, then the second application is not allowed to connect to Db2. CONNECTION_NAME can be 1 to 8 characters long.

   PLAN=
   Identifies a Db2 plan name. If you do not specify a plan name, the application program module name is checked against the optional resource translation table. If a match is found, the translated name is used as the Db2 plan name. If no match is found, the application program module name is used as the plan name. PLAN can be 1-8 characters long.

   Important: If you use the External Subsystem Attach Facility (ESAF) and the IBM Data Server Driver for JDBC and SQLJ to connect to a Db2 subsystem, a set of JDBC driver packages with a collection name that matches the application program module name (PSB name) must exist. If no packages with a matching collection name exist, you need to bind a set of driver packages with the -collection parameter value set to the application program module name. See for information on binding JDBC driver packages.

   PROG=
   Identifies the name of the application program that is to be loaded and to receive control. PROG is required and can be 1-8 characters long.

2. Provide support for entering Db2 commands through IMS by defining the command recognition character (CRC) in the SSM member of the IMS control region. If the /SSR command is entered through the z/OS console, the AUTHID WTOR needs to be granted the appropriate authority. If the /SSR command is entered through an IMS terminal, the IMS LTERM name or the signon ID (if active) needs to be granted the appropriate authority.

   The /SSR command format is:

   ```
   /SSR crc DB2 command
   ```

   as in

   ```
   /SSR -DISPLAY THREAD (*)
   ```

3. Specify the SSM EXEC parameter in the startup procedure of the IMS control, MPP, BMP, or DL/I batch region. The SSM is concatenated with the IMSID to form a member name in IMS.PROCLIB. The IMSID comes from the IMSID option of the IMSCTRL generation macro or the IMSID option in the control region startup procedure.

   For DL/I batch regions, you can specify the Db2 connection parameters in the DDITV02 data set instead of an SSM member. The DDITV02 data set and an SSM member have the same format.

   If you specify the SSM for the IMS control region, any dependent region running under the control region can attach to the Db2 subsystem named in the IMS.PROCLIB member specified by the SSM parameter. The IMS.PROCLIB member name is the IMS ID (IMSID=*xxxx*) concatenated with the one to four characters specified in the SSM EXEC parameter. The IMS ID is the IMSID parameter of the IMSCTRL generation macro.

   IMS allows you to define as many external subsystem connections as are required. More than one connection can be defined for different Db2 subsystems. All Db2 connections must be within the same z/OS system. For a dependent region, you can specify a dependent region SSM or use the one specified for the control region. You can specify different region error options (REOs) in the dependent region

SSM member and the control region SSM member. The following table shows the different possibilities of SSM specifications.

Table 139. SSM specifications options

SSM for Control Region	SSM for Dependent Region	Action	Comments
No	No	None	No external subsystem can be connected
No	Yes	None	No external subsystem can be connected.
Yes	No	Use the control region SSM	Applications scheduled in the region can access external subsystems identified in the control region SSM. Exits and control blocks for each attachment are loaded into the control region address space.
Yes	Yes (NULL entry)	No SSM is used for the dependent region	Applications scheduled in this region can access DL/I databases only. Exits and control blocks for each attachment are loaded into the control region address space and each dependent region address space.
Yes	Yes	Check the dependent region SSM with the control region SSM.	Applications scheduled in this region can access only external subsystems identified in both SSMs. Exits and control blocks for each attachment are loaded into the control region and the dependent region address space.

No specific parameter exists to control the maximum number of SSM specification possibilities.

Related concepts

System definition

Related tasks

Defining Db2 plans for IMS applications (optional)
The application plan defines the Db2 resources that an application accesses.

Related information

Defining new programs and transactions to IMS

You can define new programs and transactions that access Db2 resources to your IMS system.

About this task

Coordinate with your IMS support group to install the programs and transactions for Phase 4 of the verification process.

Programs and transactions already defined to IMS can use SQL without any additional definition to IMS.

Related tasks

Verifying successful Db2 11 installation or migration with sample applications

You can use the Db2 Db2 11 sample applications to verify either installation or migration to new-function mode. These sample applications are also called installation verification procedures (IVPs).

Defining Db2 plans for IMS applications (optional)

The application plan defines the Db2 resources that an application accesses.

About this task

The application plan is identified by its plan name. Each IMS application is associated with a plan name.

The default is to have the Db2 plan name the same as the IMS application program load module name. If you assigned a different name to the plan, you need a resource translation table (RTT). If you chose an error option different from the REO default, you also need an RTT. Db2 provides the DSNMAPN macro in *prefix*.SDSNMACS to generate an RTT. After it is assembled, the table must be link-edited as REENTRANT with RMODE=24 into any authorized library that is concatenated with the library from which IMS loads the Db2 IMS attach modules.

The format of DSNMAPN macro is shown in the following table.

Table 140. DSNMAPN macro format

Macro	Option	Meaning
DSNMAPN	APN=	IMS application name
	,PLAN=	Associated Db2 plan name
	[,OPTION=]	Specific entry error option R, Q, or A. See REO in the SSM entry.
	[,END=]	Indicates last entry (YES/NO). NO is the default.

Related concepts

IMS attachment facility macro (DSNMAPN)
The DSNMAPN macro is required when the IMS application load module name is different than the name of its related IBM Db2 application plan. The macro is also required if the error option is different than the ERR value that is specified on the IMS SSM entry.

Related information

IMS language interface module

You must generate a user language interface only if you intend to access two Db2 subsystems from the same dependent region.

To provide this access, the subsystem member (SSM) must contain one entry for each subsystem. Each entry contains a different subsystem ID and its associated language interface token (LIT). IMS provides the DFSLI macro to generate additional language interface modules with unique LITs. The general format of the macro is shown in the table below.

Table 141. DFSLI macro format and meaning

Macro	Option	Meaning
DFSLI	TYPE	Specifies the type of subsystem that can be accessed through this language interface module. Db2 is the only value supported by this option

Table 141. DFSLI macro format and meaning (continued)

Macro	Option	Meaning
	LIT	Defines a name (called LIT) to relate a language interface module with an entry in the SSM for the dependent region

When an IMS application issues a Db2 request, IMS knows the target subsystem by the LIT used in the request. For example, consider the case of a dependent region accessing two Db2 subsystems (DSN1 and DSN2):

- You generate a language interface with LIT=SYS2 (DFSLI001).
- You define two entries in the SSM member. The first entry points to DSN1 with LIT=SYS1; the second points to DSN2 with LIT=SYS2.
- You link-edit applications accessing the DSN1 subsystem with the IMS-provided language interface (DFSLI000).
- You link-edit applications accessing the DSN2 subsystem with the user-generated language interface (DFSLI001).

Even though a region can communicate with two or more Db2 subsystems, an IMS application can access only one—the Db2 subsystem referred to in the language interface that is link-edited. You can alter the SSM to route application requests to a different Db2 subsystem.

IMS attachment facility macro (DSNMAPN)

The DSNMAPN macro is required when the IMS application load module name is different than the name of its related IBM Db2 application plan. The macro is also required if the error option is different than the ERR value that is specified on the IMS SSM entry.

Macro statements are assembled in *prefix*.SDSNMACS and must be link-edited as REENTRANT with RMODE=24 into the Db2 library *prefix*.SDSNLOAD. The module name must be specified on the IMS SSM entry for the Db2 subsystem. The name must be specified as in the RTT entry for the SSM member defining the connection of this region. IMS loads the RTT module into the dependent region address space.

Note:

1. The macro name must be followed by one or more blanks before options are coded.
2. Multiple options must be separated by commas (with no blanks).

label **DSNMAPN**

DSNMAPN is the name of the macro. It must be coded exactly as it appears here, and it must be separated from any optional options by one or more blanks.

For *label*, substitute the CSECT name of your module. This name must match the name of the module specified to the linkage editor. *Label* is optional except for the first invocation of the DSNMAPN macro. The last invocation requires END=YES.

APN=*program-name*

Specifies the name of an application load module scheduled by IMS. For *program-name*, substitute an application name of up to eight characters.

PLAN=*plan-name*

Specifies an application plan name that is used (instead of the default application name) when a thread is created. For *plan-name*, substitute an application plan name of up to eight characters.

OPTION=R|Q|A

Specifies the action taken when an application program call cannot be performed because there is some problem in communication between the application program and the Db2 subsystem or if resources are unavailable. The value can be R, Q, or A.

If OPTION is not specified, the region error option (REO) is used.

R

Specifies that a return code is returned to the application to indicate that the request for Db2 services failed.

Q

Specifies that the transaction is abnormally terminated with an abend code U3051, activity is backed out to the last commit point, and the input message is re-queued.

A

Specifies that the transaction is abended with an abend code of U3047, and the input message is deleted.

Default: R

END=NO|YES

Specifies whether this is the last DSNMAPN macro invocation. The value can be NO or YES.

NO

Specifies that this is not the last DSNMAPN macro invocation.

YES

Specifies that this is the last DSNMAPN macro invocation.

Default: NO

The last DSNMAPN macro invocation must be followed by the specification END=YES.

Usage notes

- To enter more than one application name (with its corresponding plan name and OPTION specification), you must use multiple invocations of the DSNMAPN macro. The first invocation requires the label; the last invocation requires END=YES.
- Invocations must be in ascending order by application name. If they are not, an MNOTE macro error is generated.

Related tasks

Defining Db2 plans for IMS applications (optional)
The application plan defines the Db2 resources that an application accesses.

Connecting distributed database systems

You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

After you install Db2, you can install support for a communications network.

If you plan to use the distributed data facility (DDF), become familiar with the DDF function and the kind of network communications that you want to use to communicate with this Db2 subsystem.

Depending on the network communications that you use, you must install z/OS UNIX System Services TCP/IP support, Virtual Telecommunications Access Method (VTAM), or both.

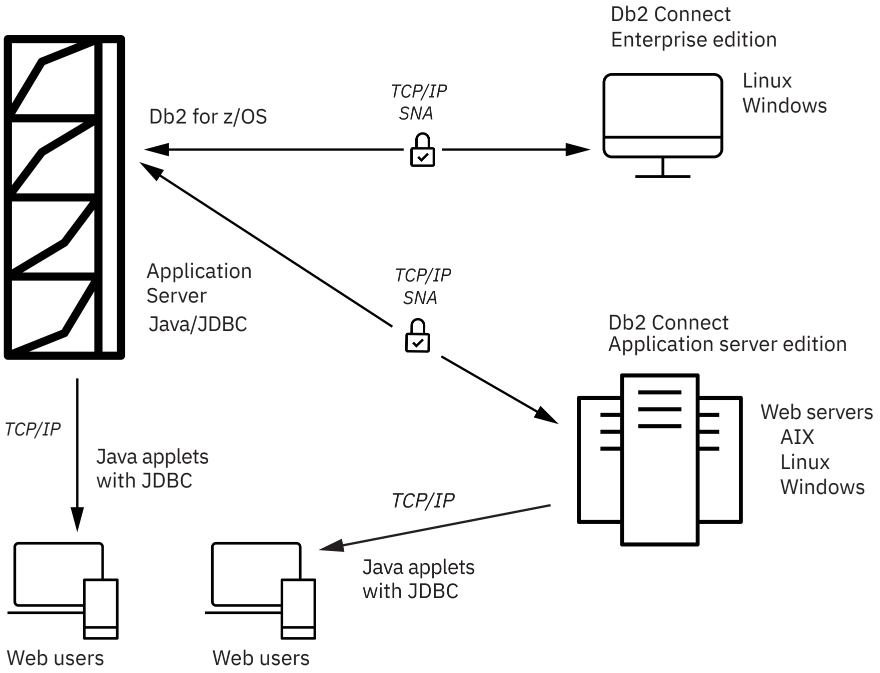
Tip: TCP/IP is the recommended communication protocol for communication with Db2. Although SNA communication remains supported in Db2 11, SNA communication (including the VTAM interface) is deprecated, and support might be removed in the future. You can disable SNA communication by setting the value of the DB2 TCP/IP IPNAME setting. See .

In Db2 11, you can set up DDF not to activate SNA/APPC support. Therefore, in Db2 11, DDF does not require VTAM to be installed. However, you might need to install VTAM for other reasons.

Communications protocols for DDF

DDF uses TCP/IP or SNA to communicate with other systems.

The following figure shows the connectivity options that you have with DDF in Db2.



Role of the communications database (CDB)

When sending a request, Db2 uses the LINKNAME column of the SYSIBM.LOCATIONS catalog table of the communications database (CDB) to determine which protocol to use.

To receive TCP/IP requests, you must select a DRDA port and a resynchronization port on installation panel DSNTIP5. TCP/IP uses the server's port number to pass network requests to the correct Db2 subsystem.

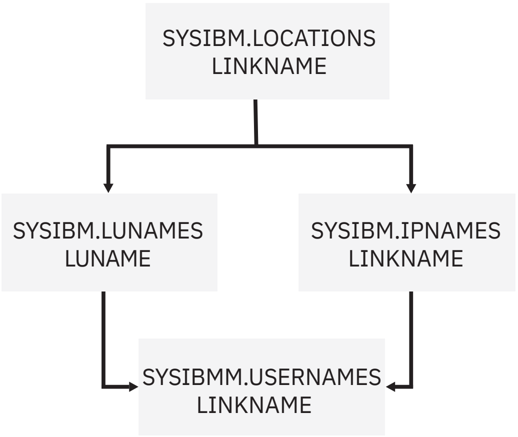


Figure 123. The LINKNAME column of SYSIBM.LOCATIONS determines protocol

To receive VTAM requests, you must specify an LUNAME on installation panel DSNTIPR.

If the value in the LINKNAME column is found in the SYSIBM.IPNAMES table, TCP/IP is used for DRDA connections. If the value is found in SYSIBM.LUNAMES table, SNA is used. If the same name is in both SYSIBM.LUNAMES and SYSIBM.IPNAMES, TCP/IP communication is used.

⚠ **Attention:** A requester cannot connect to a given location using both SNA and TCP/IP protocols. For example, if your SYSIBM.LOCATIONS table specifies a LINKNAME of LU1, and LU1 is defined in both the SYSIBM.IPNAMES and SYSIBM.LUNAMES table, TCP/IP is the only protocol used to connect to LU1 from this requester for DRDA connections.

DDF installation options

The installation options for DDF are described on these installation panels:

- “DSNTIPR: Distributed data facility panel 1 ” on page 254
- “DSNTIP5: Distributed data facility panel 2” on page 261

Use these options to define, among other things:

- Whether you want DDF to start automatically when Db2 starts
- Important names for this Db2 subsystem, including the IPNAME and the LOCATION name, which must be the same for all data sharing members.

  If you plan to use SNA communication with VTAM, you must define an LU name and NETID. Db2 as a requester generates the unit of work using NETID and LUNAME.
- Thread management options
- Security options
- TCP/IP port numbers
- Control of the number of DRDA query blocks that can flow on a network request that was specified with OPTIMIZED FOR n ROWS where *n* exceeds the number of rows that fit in a single query block.

If you do not plan on using SNA/APPC communications, you can set up DDF to not activate its SNA/APPC support. To set up DDF to not activate its SNA/APPC support, give the Db2 subsystem an IPNAME value by updating the BSDS DDF record. Setting up DDF to not activate its SNA/APPC support is not supported by the Db2 installation option panels. Db2 TCP/IP communications uses the IPNAME value and a character representation of the TCP/IP resync port (RESPORT) hexadecimal value to identify units of work.

Testing the connections

You should test systems with each other to ensure that their communications setups are correct. If you are testing with another Db2 for z/OS, enter the location name of that other site in field REMOTE LOCATION of installation panel DSNTIPY. The remote location must also have DDF installed and active and must have run the first sample job, DSNTEJ1.

Related concepts

Customize VTAM for Db2
For Db2 to provide the best performance for distributed database systems, you probably need to customize VTAM.

Related tasks

Connecting systems with TCP/IP
TCP/IP (which stands for *Transmission Control Protocol/Internet Protocol*) is a standard communication protocol for network communications. Previous versions of Db2 supported TCP/IP requesters, although additional software and configuration was required.

Connecting systems with VTAM (deprecated)

Virtual Telecommunications Access Method (VTAM) is a program that you can use to control remote Db2 communication.

Related reference

SNA Network Implementation Guide

IBM Tivoli NetView for z/OS (Installation: Getting Started)

Related information

The DRDA database protocol

Applications can use the Distributed Relational Database Architecture™ (DRDA) protocol to control remote access.

With DRDA, the application connects to a server at another location and executes packages that have been previously bound at that server. The application uses a CONNECT statement, a three-part name, or an alias to access the server.

Queries can originate from any system or application that issues SQL statements as a *requester* in the formats required by DRDA.

For two-phase commit using Systems Network Architecture (SNA) connections, Db2 supports both presumed abort and presumed nothing protocols that are defined by DRDA. If you are using TCP/IP, Db2 uses the sync point manager that is defined in the documentation for DRDA Level 3.

Related concepts

Types of Two-Phase Commit (z/OS MVS Programming: Resource Recovery)

Related information

DRDA Volume 1: Distributed Relational Database Architecture (Open Group Library - Data Management Standards)

DRDA Volume 3 "Distributed Data Management Architecture" (Open Group Library - Data Management Standards)

Connecting systems with TCP/IP

TCP/IP (which stands for *Transmission Control Protocol/Internet Protocol*) is a standard communication protocol for network communications. Previous versions of Db2 supported TCP/IP requesters, although additional software and configuration was required.

About this task

Tip: TCP/IP is the recommended communication protocol for communication with Db2. Although SNA communication remains supported in Db2 11, SNA communication (including the VTAM interface) is deprecated, and support might be removed in the future. You can disable SNA communication by setting the value of the DB2 TCP/IP IPNAME setting. See .

In a TCP/IP network, the domain name (IP address) and port number (service name) uniquely identify a Db2 subsystem in the . The domain name and the server port number (service name) of the database server must be defined in the communications database (CDB) at a requesting Db2 so that the Db2 subsystem can connect to a remote location. If you use a port number in the CDB to access a remote Db2 location, the port number must be defined to TCP/IP.

The domain name must be defined to the TCP/IP host so that a Db2 subsystem can accept connections from remote locations. Port numbers are never used by a Db2 subsystem that accepts connections. Optionally, you can protect the port number that Db2 uses when acting as a server within TCP/IP from being used by any other task or job in the subsystem. When DDF is started, the Db2 subsystem binds itself to its designed port.

TCP/IP terminology for Db2 for z/OS

The following terms are used for TCP/IP communication in Db2 for z/OS.

IP address

Uniquely identifies a host within the TCP/IP network. This is sometimes called an internet address. A Db2 subsystem resides on a TCP/IP host. The IP address can take two forms. The first form is a 32 bit address that displays in dotted decimal format where `X'05041020'` displays as `5.4.16.32`. The second form is a 128-bit address that displays in colon-hexadecimal format, such as `FEDC:BA98:7654:3210:FEDC:BA98:7654:3210`.

Domain name

The fully qualified name that identifies an IP address. This can be used instead of the IP address. An example of a domain name is `stlmvs1.stl.ibm.com`. Some software refers to *stlmvs1* as the host name and `stl.ibm.com` as the domain name. Db2 allows the network administrator to identify a host using a domain name.

Domain name server (DNS)

Manages a distributed directory of domain names and related IP addresses. Domain names can be translated into IP addresses and you can find a domain name associated with a given IP address. Db2 uses the *gethostbyname* service to get a list of IP addresses for a given domain name.

Port

Identifies an application executing in a host. For example, a port number identifies a Db2 subsystem to TCP/IP. A port number is a two byte integer value that is displayed in decimal format. This number identifies the application within a TCP/IP instance. A port number of `X'01D2'` displays as 466. There are three basic kinds of TCP/IP ports:

Well-known ports	Port numbers between 1 - 1023 that are reserved in the TCP/IP architecture for a specific TCP/IP application. Some typical well-known port numbers are: • FTP is port number 21 • Telnet is port number 23 • DRDA relational database is port number 446
Ephemeral ports	Port numbers that are dynamically assigned to a client process by the client TCP/IP instance. Db2 uses an ephemeral port when it is acting as the DRDA requester. This ephemeral port is associated with the requester for the life of the thread or connection.
Server ports	Port numbers that are used when a TCP/IP program does not have a well-known port number, or another instance of the server program is already installed using the well-known port number. As a requester, Db2 defaults to using the DRDA relational database well-known port number to connect to a server location. We suggest that your Db2 subsystem be defined with the DRDA well-known port number of 446. However, the network administrator can assign a server port to the Db2 subsystem. If two different Db2 subsystems reside on the same host, acting as two different locations (a non-data-sharing group), each Db2 subsystem must have a unique port. In this case, only one Db2 subsystem can use the DRDA well-known port number.

Service name

Another way to refer to a port number. A network administrator can assign a service name for a remote location instead of using the port number.

Limitations of TCP/IP communication

TCP/IP does not have the built-in security features that SNA has, such as SNA partner LU verification.

Because IP addresses are not as reliable as LU names, DDF support for TCP/IP differs from support for SNA in these ways:

- Inbound name translation is not supported.

- Inbound security requirements cannot be established on individual clients, so the TCPALVER subsystem parameter defines the minimum security requirements for all TCP/IP clients. For more information, see "TCP/IP ALREADY VERIFIED field (TCPALVER subsystem parameter)" on page 262.
- You cannot use the CDB for *come from* checking of TCP/IP clients.

Procedure

To enable TCP/IP communication between DRDA partners and Db2, complete the following steps. You do not have to complete the following steps in exact order, but steps 1 - 3 should be completed before the other steps.

1. Prepare the Language Environment run time library by completing one of the following actions.
   - Concatenate the Language Environment library in the z/OS link list, which does not require the library to be APF-authorized. This is the standard method. If you choose this method, remove the Language Environment library concatenation from the DDF JCL procedure.
   - Include the Language Environment library in a STEPLIB concatenation for the DDF JCL procedure. The Language Environment library must be APF-authorized to be added to the DDF JCL procedure. The Db2 installation automatically adds the library to the DDF STEPLIB concatenation.
2. Enable DDF for UNIX System Services as described in "Enabling Db2 to access TCP/IP services in z/OS UNIX System Services" on page 786.
3. Define the Db2 subsystem to TCP/IP as described in "Db2 configuration with TCP/IP" on page 788.
4. Populate the communications database as described in "Populating the communications database for use with TCP/IP" on page 791.
5. Start TCP/IP support by starting DDF. For more information, see "Starting TCP/IP support" on page 794.
6. Optional: Tune TCP/IP to help protect Db2 from outages. Specify a small value for the TCP/IP keep-alive timer. which is specified by the TCPKPALV subsystem parameter. Five minutes or less is best. See "TCP/IP KEEPALIVE field (TCPKPALV subsystem parameter)" on page 264.

   If the network fails between the server's reply and the next client request, TCP/IP waits until the keep-alive timer expires, then notifies the Db2 subsystem of the failure.

   The server thread hangs while the timer is running. Do not use the timer default of ENABLE because it results in a value of 2 hours, which means that threads can hang for up to 2 hours. A hanging thread can cause unpredictable results, depending on what resources it has locked.

   If you are connecting to a location whose LINKNAME is associated with a row in the table SYSIBM.IPNAMES and it has a domain name in the IPADDR field, *gethostbyname* can return a list of IP addresses associated with the LINKNAME. When trying to connect to this location, Db2 will try each of these IP addresses in a round-robin fashion (starting with the first address) until the connection is successful, or the attempt to connect to each IP address has timed out.
7. Specify security requirements for TCP/IP. For more information, see .

What to do next

If you do not plan to communicate with remote sites with SNA/APPC, update the BSDS DDF record with an IPNAME value. The Db2 TCP/IP communications use the IPNAME value and a character representation of the TCP/IP resync port (RESPORT) hexadecimal value to identify units of work. If the BSDS DDF record does not contain an IPNAME value, you must define VTAM to Db2 because Db2 TCP/IP communications uses the VTAM network ID and LUNAME to identify units of work.

DDF enables TCP/IP communication with partners withDRDA Level 3 support and earlier. Clients must have the updated versions of Db2 Connect or any DRDA requester or server that supports the latest DRDA database protocols. TCP/IP connectivity lets you connect DDF to clients on multiple platforms directly.

Related information

Enabling Db2 to access TCP/IP services in z/OS UNIX System Services

Db2 uses the assembler callable interface of z/OS UNIX System Services to perform TCP/IP services.

About this task

Any address space that needs to use z/OS UNIX System Services must have a z/OS user ID that is defined with an OMVS segment, and can also have a z/OS group name. The user ID associated with the *ssnm*DIST started task and *ssnm*DBM1 started task requires an OMVS segment for DDF functions and system profile functions.

The standard way to assign a z/OS user ID and a z/OS group name to a started address space is to use the z/OS Security Server (RACF) STARTED resource class. This method enables you to dynamically assign a z/OS user ID by using commands instead of requiring an IPL to have the assignment take effect.

The alternative method to assign a z/OS user ID and a z/OSgroup name to a started address space is to change the RACF started procedures table, ICHRIN03. For more information about this approach, see .

Procedure

To enable Db2 address spaces to access TCP/IP services in z/OS UNIX System Services, complete the following steps:

1. Use either of the following z/OS Security Server (RACF) commands to assign an OMVS segment to a z/OS user ID, where *user-ID* is the z/OS user ID for the Db2 address space and *nnn* is any valid, unique identifier. If you set *nnn* to 0, the process has UNIX System Services superuser authorization.

   -
     ```
     ADDUSER user-ID OMVS(UID(nnn))...
     ```

   -
     ```
     ALTUSER user-ID OMVS(UID(nnn))...
     ```

   You should either set the MAXFILEPROC parameter to at least 131072 or grant superuser authority to the *user-ID*. Because setting the MAXFILEPROC parameter within the active BPXPRM*nnn* z/OS PARMLIB member to 131072 affects the entire system, any z/OS UNIX System Services process can open 131072 files or sockets concurrently.
2. During initialization, DDF calls z/OS UNIX System Services to obtain the maximum number of socket descriptors that can be opened concurrently. The value is defined by the MAXFILEPROC parameter in the active z/OS UNIX System Services (BPXPRM*nnn*) of the z/OS PARMLIB. If the defined value is less than 131072, DDF invokesz/OS UNIX System Services to raise it to 131072, which requires the DDF user ID to have superuser authority. DDF executes as an authorized program and is protected against unauthorized use of this privilege. If you do not want to set the system-wide MAXFILEPROC parameter to 131072 and do not want to grant superuser authority to the DDF user ID, you can explicitly authorize the DDF user ID to raise the limit to 131072 by using one of the following RACF commands, where *user-ID* is thez/OS user ID and *nnn* is any valid, unique identifier:

   -
     ```
     ADDUSER user-ID OMVS(UID(nnn) FILEPROCMAX(131072))...
     ```

   -
     ```
     ALTUSER user-ID OMVS(UID(nnn) FILEPROCMAX(131072))...
     ```
3. If you also want to assign a z/OS group name to the address space, assign an OMVS segment to the z/OS group name by using one of the following RACF commands, where *group-name* is the z/OS group name and *nnn* is any valid, unique identifier

   -
     ```
     ADDGROUP group-name OMVS(GID(nnn))...
     ```

   -
     ```
     ALTGROUP group-name OMVS(GID(nnn))...
     ```
4. If you actively administer the STARTED resource class, issue the following RACF commands to assign a z/OS user ID and a z/OS group name to the address space started procedure, where `VB1ADIST.*` is the addresssapce started procedure, *user-ID* is the z/OS user ID, and *group-name* is the z/OS group name. DDF requires only a z/OS user ID. A z/OS group name is optional.

```
RDEFINE STARTED (VB1ADIST.*) STDATA(USER(user-ID) GROUP(group-name)) ...
RALTER STARTED (VB1ADIST.*) STDATA(USER(user-ID) GROUP(group-name)) ...
```

Requirement: The profile name that you specify in the RACF command must be in the generic format; that is, the profile name must end with a period followed by an asterisk (`.*`).

5. Issue the following RACF command so that the changed profile takes effect:

```
SETROPTS RACLIST(STARTED) REFRESH
```

6. When a member-specific dynamic VIPA (VIPARANGE DVIPA) is specified in the Db2 BSDS using the DSNJU003 keywords IPv4 or IPv6, DDF internally activates the DVIPA using the SIOCSVIPA/SIOCSVIPA6 IOCTL. However, you must either grant superuser authority to the DDF user ID or define a security profile for MODDVIPA under the SERVAUTH class to authorize the DDF user ID to execute the SIOCSVIPA/SIOCSVIPA6 IOCTL. You can define the security profile using RACF as follows:

```
RDEFINE SERVAUTH (EZB.MODDVIPA.sysname.tcpname)UACC(NONE)
PERMIT EZB.MODDVIPA.sysname.tcpname ACCESS(READ) CLASS(SERVAUTH) ID(USER1)
```

- *sysname* is the name of the MVS system where the ID runs the MODDVIPA utility or issues the SIOCSVIPA/SIOCSVIPA6 IOCTL.
- *tcpname* is the job name of the TCP/IP started task.
- *USER1* is the DDF user ID that is being permitted to run the MODDVIPA utility (and thus the SIOCSVIPA/SIOCSVIPA6 IOCTL).

If this security profile is created, the user ID must be permitted to access this profile. Otherwise, the SIOCSVIPA/SIOCSVIPA6 IOCTL (and thus the MODDVIPA utility) fails with a "permission denied" error, regardless of superuser authority.

Also note that when using RACF, you might need to refresh these profiles before they take effect. Use the following RACF command to refresh these profiles:

```
SETROPTS RACLIST(SERVAUTH) REFRESH
```

7. Db2 for z/OS utilizes a TCP/IP DROP API through the EZBNMIFR callable service (NMI), and Db2 requires that RACF security profiles be defined to permit Db2 to successfully utilize this API. You must issue a RACF PERMIT command to enable *ssnm*DIST_*userid* CONTROL access to the MVS.VARY.TCPIP.DROP command for the OPERCMDS class, where *ssnm*DIST_*userid* is the user ID that is associated with the *ssnm*DIST started task.

Example (where the *ssnm*DIST_*userid* is SYS0):

```
  RDEFINE OPERCMDS MVS.VARY.TCPIP.DROP OWNER(SYS0) UACC(NONE)
  PERMIT MVS.VARY.TCPIP.DROP CLASS(OPERCMDS) ID(SYS0) ACCESS(CONTROL)
```

Failure to provide this permission might result in a ICH408I message similar to the following:

```
ICH408I USER(ssnmDIST_userid) ...
MVS.VARY.TCPIP.DROP CL(OPERCMDS) ...
```

For more information, see EZBNMIFR: Configuration and enablement (z/OS Communications Server: IP Programmer's Guide and Reference).

Related information

Methods for associating started procedures with RACF identities (z/OS Security Server RACF System Programmer's Guide)

The STARTED class (z/OS Security Server RACF Security Administrator's Guide)

The started procedures table (ICHRIN03) (z/OS Security Server RACF System Programmer's Guide)

Db2 configuration with TCP/IP

The Db2 subsystem uses different TCP/IP ports to do different tasks.

- As a requester, Db2 uses an ephemeral port. You do not need to specify this port.
- As a server processing TCP/IP connection requests for DRDA SQL applications, Db2 uses a server port or the well-known port, 446, which is used for relational database communications.
- A server resynchronization port is used for processing 2-phase commit resynchronization requests.

This requires some planning because the port number is used to pass the network requests to the appropriate Db2 subsystem. Each location must have a unique port number.

The figure below shows some typical z/OS system configurations.

- SYSTEM1 contains only one Db2 subsystem, so the DRDA well-known port (446) can be assigned to Db2. In the example, port number 5020 is assigned for 2-phase commit resynchronization.
- SYSTEM2 contains two Db2 subsystems, so it is impossible to assign the port numbers 446 and 5020 to both Db2 subsystems because TCP/IP can only support one server at each port number. The problem is resolved by assigning the 446 and 5020 port numbers to DB2C, and port numbers 5021 and 5022 to DB2D.

Be sure to consider the impact of future system consolidations. If SYSTEM1 and SYSTEM2 are consolidated so that DB2A, DB2C, and DB2D run on a single z/OS system, you must take special precautions because DB2A and DB2C have the same TCP/IP port numbers. You can resolve this conflict by changing the port numbers of either DB2A or DB2C to eliminate the duplicate port numbers.

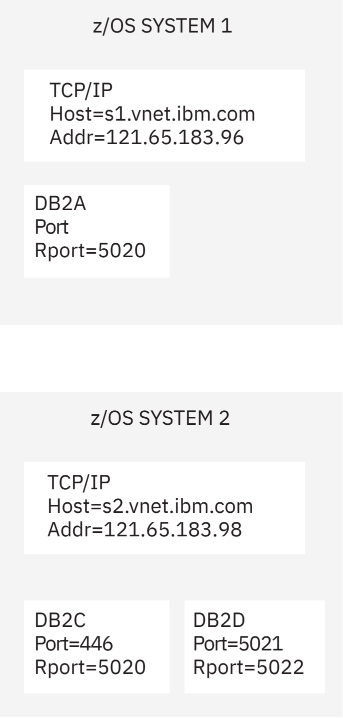


Figure 124. Typical z/OS configurations

Related information

Customizing the TCP/IP data sets or files

To use TCP/IP, you must customize your TCP/IP data sets or files.

Before you begin

UNIX System Services should already be installed. For required maintenance levels, see .

Procedure

To customize your TCP/IP data sets or files:

1. Find the high level qualifier (*hlq*) value in the `resolve/tcpip.data` file that z/OS UNIX applications use in their TCP/IP stacks.

   This data set defines the high level qualifier, which is added to the beginning of other data set names used by TCP⁄IP.

2. Find the *hlq*.TCPPARMS(PROFILE) data set.

   This data set contains the PORT statement used to make DRDA and resync port reservations. The following example shows a sample *hlq*.TCPPARMS(PROFILE) entry for SYSTEM2:

   ```
   PORT  446  TCP  DB2CDIST          ; DRDA SQL port for DB2C
   PORT 5020  TCP  DB2CDIST          ; Resync port for DB2C

   PORT 5021  TCP  DB2DDIST          ; DRDA SQL port for DB2D
   PORT 5022  TCP  DB2DDIST          ; Resync port for DB2D
   ```

   This example assumes that *DB2CDIST* and *DB2DDIST* are the Db2 started procedure names.

3. Define the TCP/IP host names that Db2 needs to know.

   The local host name **must** be defined before DDF is started. All domain names referenced in the table SYSIBM.IPNAMES **must** be defined. You define the host names by configuring the *hlq*.HOSTS.LOCAL data set, the */etc/hosts* file in the hierarchical file system (HFS), or the domain name server (DNS).

   After the *hlq*.HOSTS.LOCAL data set is configured, you have to execute the utility MAKESITE. This utility generates the *hlq*.HOSTS ADDRINFO and the *hlq*.HOSTS.SITEINFO data sets that are used to translate between domain names and IP addresses. MAKESITE generates under the userid that issued the MAKESITE. Therefore, those files have to be moved to the high level qualifier that represents TCP⁄IP. The host name for the local Db2 subsystem must be defined in at least one of these places.

   You can also run the MAKESITE command with the HLQ parameter. You can set the HLQ parameter to the high level qualifier of the stack that you obtained in step 1. If you use the HLQ parameter, the *hlq*.HOSTS ADDRINFO and the *hlq*.HOSTS.SITEINFO data sets are created and updated under the correct high level qualifier, so you do not have to move the data sets from under the userid high level qualifier to the TCP⁄IP high level qualifier.

   If domain names are present in the CDB (in field IPADDR of table SYSIBM.IPNAMES), they must be defined in the z/OS data sets, the HFS or the DNS.

   Recommendation: To support a Parallel Sysplex environment, use Dynamic Virtual IP Addresses (VIPA). To configure a Db2 subsystem to perform Dynamic VIPA routing, specify the Db2 group Dynamic VIPA on the TCP/IP PORT statement for the DRDA PORT number. This Dynamic VIPA must be the same for all Db2 members in the data sharing group. All clients must use the Dynamic VIPA to route requests to the Db2 group. To Db2 member-specific Dynamic VIPA is specified on the TCP/IP RESYNC PORT number in the TCP/IP profile data set for each Db2 member of the sysplex.

   The following example shows a sample *hlq*.TCPPARMS(PROFILE) entry for SYSTEM2:

   ```
   PORT 446  TCP  DB2DIST  BIND  db2_sysplex_VIPA        ;DRDA SQL port for DB2
   PORT 5001 TCP  DB2DIST  BIND  member_specific_VIPA    ;RESYNC port for DB2
   ```

4. Define the TCP⁄IP service names that Db2 needs to know.

   Configure the *hlq*.ETC.SERVICES data set or the */etc/services* file in the HFS. If service names are present in the CDB (in field PORT of table SYSIBM.LOCATIONS), they must be defined in the z/OS data set or the HFS.

   The following example shows a sample *hlq*.ETC.SERVICES entry:

   ```
   DRDA        446/tcp             ; DRDA databases
   ```

Related concepts

Db2 configuration with TCP/IP

The Db2 subsystem uses different TCP/IP ports to do different tasks.

Related tasks

Configuring the base TCP/IP system

Related information

Configuration files for the TCP/IP stack (z/OS Communications Server: IP Configuration Guide)

Modifying the change log inventory job for using TCP/IP

If you want to use TCP/IP, the DDF statement of the change log inventory job (DSNJU003) must specify values for the parameters PORT and RESPORT.

Procedure

Specify the PORT and RESPORT parameters in the DDF statement of DSNJU003.

The parameter PORT is the TCP/IP port number that DDF uses to accept incoming DRDA connection requests. The parameter RESPORT is the TCP/IP port number that DDF uses to accept incoming DRDA 2-phase commit resynchronization requests. The values for these parameters must be decimal numbers between 0 and 65534, where 0 indicates that TCP⁄IP support is being deactivated. The non-zero value for PORT must not be the same as the non-zero value for RESPORT.

For data sharing, all members of the Db2 data sharing group must have the same value for PORT. RESPORT must be uniquely assigned to each Db2 member so that no two Db2 members use the same TCP/IP port for 2-phase commit resynchronization. The parameters PORT and RESPORT can be changed on any Db2 member by running the utility change log inventory. After running the utility, you must stop and then restart Db2. Because PORT is the same for all members of the Db2 group, this process has to be repeated on every member of the group when PORT is changed.

If you use Dynamic VIPA to support a Parallel Sysplex environment, specify the Db2 group Dynamic VIPA on the TCP/IP PORT statement for the DRDA PORT number.

You can define an alias location for all or selected members of a data sharing group by using the ALIAS parameter.

Remember, a zero value for either PORT or RESPORT is the same as deactivating TCP/IP support in Db2.

You can also specify an IPv4 address and an IPv6 address for the subsystem in the DDF statement of the change log inventory utility (DSNJU003). Specifying an IPv4 and an IPv6 address keeps the subsystem IP addresses constant, regardless of the z/OS system where the subsystem is started. The IP address moves with the Db2 subsystem. In data sharing environments, a constant IPv4 address and a constant IPv6 address can be assigned to represent the entire group.

Related information

Identifying the source IP address of a Db2 requester

In most cases, to configure Db2 for z/OS outbound remote communications that use TCP/IP with other DRDA servers, you do not need to know the source IP address of the Db2 requester, which is chosen by the TCP/IP stack. However, you do need to know the source IP address that is chosen by the TCP/IP stack of a Db2 requester in the following situations:

- When the DRDA servers that are being targeted by that Db2 requester have implemented trusted context definitions
- When the DRDA servers that are being targeted by that Db2 requester have implemented system monitoring profiles that are dependent on the remote location's IP address

Note that the IP address and domain name that Db2 displays when it is started is not the IP address that will be used as a source IP address from this Db2 requester. When an application requests that an outbound TCP connection be established with a remote server at a specific IP address, the TCP/IP stack will provide the source IP address of the connection.

TCP/IP uses an established sequence to select the source IP address for outbound requests. For an explanation of this sequence and to determine how to identify the source IP address of a Db2 for z/OS requester, see How TCP/IP selects a source IP address.

For outbound TCP/IP communications that originate from a Db2 for z/OS requester, the selection sequence employed by the TCP/IP stack starts at step 6.

Populating the communications database for use with TCP/IP

If you plan to use Db2 only as a server, you do not need to populate the CDB.

About this task

GUPI

For example, Spiffy's USIBMSTODb21 subsystem works as a server for many requesters. It is not necessary for Spiffy to register those requesters in the Db2 CDB.

However, if you intend to request data, you need to enter port numbers or service names in field PORT of table SYSIBM.LOCATIONS, and IP addresses or domain names in field IPADDR of table SYSIBM.IPNAMES. The LINKNAME in table SYSIBM.LOCATIONS is used to search tables SYSIBM.IPNAMES and SYSIBM.LUNAMES.

Updates to the following tables take place whenever a new remote connection is requested, without any need to stop and restart DDF:

- SYSIBM.LOCATIONS
- SYSIBM.IPNAMES
- SYSIBM.IPLIST

If you use RACF PassTickets, the LINKNAME must match the following values at the remote site:

- LUNAME

  If the remote site is a Db2 subsystem that is defined with only an LUNAME value and no GENERIC LU name value or IPNAME value.
- GENERIC

  If the remote site is a Db2 subsystem that is defined with a GENERIC LU name value in addition to an LUNAME value, but no IPNAME value.
- IPNAME

  If the remote site is a Db2 subsystem that is defined with an IPNAME value, which triggers the DDF on the remote Db2 subsystem to activate TCP/IP communications support only.

Procedure

- Insert rows into the SYSIBM.LOCATIONS table.

  The LOCATIONS table contains the port number or service name that is used to connect to remote locations. The LINKNAME column of the LOCATIONS table corresponds to a row in the IPNAMES table.

  The LOCATIONS table has the following columns that relate to TCP/IP:

  DBALIAS VARCHAR(128) NOT NULL

  The name that is associated with the server. This name is used to access a remote database server. If DBALIAS is blank, the location name is used to access the remote database server. This column does not change database object names that are sent to the remote by using a location qualifier. Use the DBALIAS column to access data at two or more different remote locations when those remote locations have the same name.

LOCATION CHAR(16)
The unique network location name, or DRDA RDBNAM, that is assigned to a remote or local system. You must provide location names for any systems from which you request data. This column is the primary key for this table.

LINKNAME CHAR(8)
Identifies the TCP/IP attributes that are associated with this location. For each specified LINKNAME, you must have a row in SYSIBM.IPNAMES whose LINKNAME matches the value that is specified in this column. Because this table is used for outbound requests, you must provide a LINKNAME or your requests fail. Do not enter blanks in this column.

PORT CHAR(32)
If blank, the default port, 446, is used for TCP/IP communications. Otherwise, the value can be either of the following values:

- The port number of the remote database server. The number must be one to five characters and left-justified.
- A TCP/IP service name. The service name is converted to a TCP/IP port number with the *getservbyname* socket call.

For example, Spiffy's USIBMSTODB21 location expects a LOCATIONS table that looks like the table below. The location USIBMSTODB21 uses the default DRDA PORT, 446.

Table 142. Spiffy's LOCATIONS table

LOCATION	LINKNAME	PORT
USIBMSTODB21	LUDB21	
USIBMSTODB22	LUDB22	
USIBMSTOSQL1	LUSQLDS	1234
USIBMSTOSQL2	LUSQLDS	DRDA

For example, add the second row with this statement:

```
INSERT INTO SYSIBM.LOCATIONS (LOCATION, LINKNAME)
  VALUES ('USIBMSTODB22','LUDB22');
```

Because no port number is specified, location USIBMSTODB22 uses the default DRDA port number 446.

Tip: You do not need a row for the local Db2 in the IPNAMES and LOCATIONS tables. For example, Spiffy's USIBMSTODB21 subsystem does not require a row that shows its own LINKNAME and location name.

- Insert rows into the SYSIBM.IPLIST table.

  The IPLIST table contains a list of multiple IP addresses that are specified for a given location.

  IPLIST has the following columns:

LINKNAME CHAR(8) NOT NULL
This column is associated with the value of the LINKNAME column in SYSIBM.LOCATIONS and SYSIBM.IPNAMES. The values of the other columns in the SYSIBM.IPNAMES row apply to the server that is identified by the LINKNAME column in this row.

IPADDR VARCHAR(256) NOT NULL
This column contains an IPv4 or IPv6 address or domain name of a remote TCP⁄IP host of the server. If using WLM domain name server workload balancing, this column must contain the member-specific domain name. If you use dynamic VIPA workload balancing, this column must contain the member-specific dynamic VIPA address.

- An IPv4 address must be left justified and is represented as a dotted-decimal address. An example of an IPv4 address is *9.112.46.111*.

- An IPv6 address must be left justified and is represented as a colon-hexadecimal address. An example of an IPv6 address is *2001:0DB8:0000:0000:0008:0800:200C:417A*, which can also be expressed in compressed form as *2001:DB8::8:800:200C:417A*.
- A domain name is converted to an IP address by the domain name server where a resulting IPv4 or IPv6 address is determined. An example of a domain name is *stlmvs1.svl.ibm.com*. The *gethostbyname* socket call is used to resolve the domain name.

IBMREQD CHAR(1) NOT NULL WITH DEFAULT 'N'
This columns indicates whether the row came from the basic machine-readable material (MRM) tape: N=no, Y=yes

- Insert rows into the SYSIBM.IPNAMES table.

  The IPNAMES table defines the outbound security and host names that are used to connect to other systems through TCP/IP.

  IPNAMES has the following columns:

  LINKNAME CHAR(8)
  This value matches that specified in the LINKNAME column of the associated row in SYSIBM.LOCATIONS.

  SECURITY_OUT CHAR(1)
  Defines the security option that is used when local Db2 SQL applications connect to any remote server associated with this TCP⁄IP host. The default, A, means that outgoing connection requests contain an authorization ID without a password.

  USERNAMES CHAR(1)
  This column is used for outbound requests to control translations of authorization IDs. The values 'O' or 'B' are valid for TCP⁄IP connections.

  IPADDR VARCHAR(254)
  This column contains an IPv4 or IPv6 address or domain name of a remote TCP⁄IP host.

  - An IPv4 address must be left justified and is represented as a dotted-decimal address. An example of an IPv4 address is *9.112.46.111*.
  - An IPv6 address must be left justified and is represented as a colon-hexadecimal address. An example of an IPv6 address is *2001:0DB8:0000:0000:0008:0800:200C:417A*, which can also be expressed in compressed form as *2001:DB8::8:800:200C:417A*.
  - A domain name is converted to an IP address by the domain name server where a resulting IPv4 or IPv6 address is determined. An example of a domain name is *stlmvs1.svl.ibm.com*. The *gethostbyname* socket call is used to resolve the domain name.

- Insert rows into the SYSIBM.USERNAMES table.

  The USERNAMES table contains information that is needed for outbound translation only.

  Remember: Inbound ID translation and *come from* checking are not done for TCP/IP requesters.

  The USERNAMES table has the following columns:

  TYPE CHAR(1)
  Whether the row is for outbound translation. The value 'O' is valid for TCP/IP connections.

  AUTHID CHAR(8)
  Authorization ID to translate. If blank, it applies to all authorization IDs.

  LINKNAME CHAR(8)
  Identifies the TCP/IP network location associated with the row. A blank indicates it applies to all TCP/IP partners. For nonblank values, this value must match the LINKNAME value in SYSIBM.IPNAMES.

  NEWAUTHID CHAR(8)
  The translated value of AUTHID.

PASSWORD CHAR(8)
The password to accompany an outbound request. This column is ignored if RACF PassTickets, or already verified USERIDs are used.

What to do next

After you populate these tables, you can write queries that access data at a remote system.

GUPI

Related information

Starting TCP/IP support

Before you start DDF, ensure that z/OS UNIX System Services and TCP/IP are started. Also ensure that the local host information is set up correctly in the TCP/IP configuration files.

About this task

Important: When using dynamic VIPA, the IP addresses that have been assigned to Db2 by the TCP/IP profile must be registered with the DNS.

Procedure

Start DDF.

DDF executes the following steps when it is started:

a. Establishes the TCP/IP listener by opening sockets for the DRDA SQL, Secure SQL, and resync ports to accept connections from remote locations.

b. Obtains the host name that is specified in TCPIP.DATA. The host name is used to register with WLM and, in some cases, to obtain the IP address. You can specify the IP address that Db2 should use for communication with its partners as follows:

- Note that Db2 11 is an IPv6 system and does not use gethostid to obtain the IP addresses because gethostid does not support IPv6. You can instead specify the address in the domain name server (DNS), if one is present, or in a local host file. You can specify an IPv4 address, an IPv6 address, or both, which should be mapped to the host name that is specified in TCPIP.DATA. Db2 obtains the user-specified IP addresses by resolving the host name.
- If you want DDF to accept connections only on a specific IP address (IPv4 or IPv6), specify the IP address on the SQL port in the TCP/IP profile by using the BIND keyword. For example, use the following configuration, where 446 is the SQL port and *Vx* is either an IPv4 or IPv6 address:

  ```
  PORT
  446 TCP DB2ADIST BIND Vx
  ```

  With this method, Db2 only accepts connections on the specified IP address. Moreover, this method is not supported with secure SQL port. If your subsystem is running in data sharing mode, you must also specify an IP address on the DRDA resync port. For more details, see .
- The most recommended place to specify the IP address is in the DDF communication record of the bootstrap data set (BSDS) by using the DSNJU003 utility. For example:

  ```
  //SAMPLE    EXEC PGM=DSNJU003
  //SYSIN    DD *
    DDF IPV4=1.2.3.4,
        IPV6=1::2
  ```

  The advantage of this approach is that Db2 accepts connections not only on the specified IP address, but on any IP address that is active on the TCP/IP stack. Additionally, connections are accepted on both secure and non-secure SQL ports. Db2 also resolves the host name to an IP address through a name server or local host file to fill up any IP address that is not specified in the BSDS. For example, if the BSDS specified IPv4 but not IPv6, Db2 would try to obtain the IPv6 address by resolving the host name.

Important: IP addresses should not be specified simultaneously in both the Db2 BSDS and TCP/IP PORT statement. Binding to a specific IP address and binding to any IP address (INADDR_ANY) are mutually exclusive, and DDF TCP/IP services will not be available until the IP addresses are specified in only one place.

c. Obtains the domain name by resolving the IPv6 address, if one is specified, or the IPv4 address through a name server or the local host file. If you use data sharing, member domain names are obtained by resolving member IP addresses, and group domain names are obtained by resolving group IP addresses.

Important: Whether you use data sharing or not, Db2 11 uses the domain name that you specify in the name server, if one is present, or in a local host file, without further modifying or qualifying the name.However, DDF tolerates the absence of a domain name, when the IP address is specified in the Db2 BSDS.

To determine the host IP address and domain name, issue a DISPLAY DDF command. The IPADDR field of the DSNL085I message displays the IPv4 and IPv6 addresses, if any, that are associated with the host.

```
DSNL081I STATUS=STARTD
DSNL082I LOCATION            LUNAME            GENERICLU
DSNL083I STLEC1              USIBMSY.SYEC1DB2  -NONE
DSNL084I TCPPORT=446   SECPORT=0     RESPORT=5001
DSNL085I IPADDR=::9.30.113.198
DSNL085I IPADDR=2001:DB8::8:800:200C:417A
DSNL099I DSNLTDDF DISPLAY DDF REPORT COMPLETE
```

Until the local host information is available, DDF TCP/IP services are not available to local and remote applications. If a failure occurs obtaining the local host information, DDF periodically attempts to get the local host information until successful or until DDF is stopped. DDF tolerates the absence of a domain name as long as an IP address is specified in the Db2 BSDS.

d. Listens and accepts connection requests on SQL, secure SQL, and resync ports.

Related information

Initializing a TCP stack for use with a VIPA

During initialization of a TCP stack for use with a virtual IP address (VIPA), the PROFILE.TCPIP configuration should contain the HOME list with the VIPA. The HOME list should be followed by the PRIMARYINTERFACE statement pointing at the appropriate VIPA that is to be used by Db2.

About this task

Recommendation: Do not change the stack's HOME list or the PRIMARYINTERFACE while DDF is started.

Procedure

Use the VARY OBEY command to change the PRIMARYINTERFACE and the stack's HOME list.

This command can be used while the stack is running without recycling the stack. If a new HOME list is specified with the VARY OBEY file, the PRIMARYINTERFACE should also be specified.

Initializing a TCP stack for use with both IPv4 and IPv6 addresses

To use both IPv4 and IPv6 addresses, Db2 requires TCP/IP dual-mode stack support. Dual-mode stack support allows IPv4 address communication with IPv4 partners, and IPv6 address communication with IPv6 partners.

About this task

If you need only IPv4 address communication, an IPv4-only stack environment is sufficient because Db2 detects if the stack supports IPv6, and if not, Db2 allows communication with IPv4 addresses only.

Procedure

To enable TCP/IP for IPv4/IPv6 dual-mode stack:

1. Modify the BPXPRMxx member to define two NETWORK statements, one for AF_INET, and another for AF_INET6.

   The following example shows two NETWORK statements in the BPXPRMxx member:

   ```
   FILESYSTYPE TYPE(INET) ENTRYPOINT(EZBPFINI)
   NETWORK DOMAINNAME(AF_INET)
           DOMAINNUMBER(2)
           MAXSOCKETS(12000)
           TYPE(INET)
   NETWORK DOMAINNAME(AF_INET6)
           DOMAINNUMBER(19)
           MAXSOCKETS(13000)
           TYPE(INET)
   SUBFILESYSTYPE NAME(TCPIP) ENTRYPOINT(EZBPFINI)
           TYPE(INET)
   ```

   Separate MAXSOCKETS values are supported. The IPv6 default will be the IPv4 specified value.

2. To verify that TCP/IP is configured to support a dual-mode environment, enter a d `tcpip,,netstat,`home command on the z/OS console. Look for the INTFNAME field that has a value of LOOPBACK6 and verify that the associated ADDRESS field has a compressed colon-hexadecimal IPv6 address of ::1.

   The following example shows that TCP/IP is configured to support both IPv4 and IPv6:

   ```
   d tcpip,,netstat,home
     EZD0101I NETSTAT CS V1R5 TCPIP 034
     HOME ADDRESS LIST:
     LINKNAME: CTC1LINK
       ADDRESS: 9.30.115.135
         FLAGS: PRIMARY
     LINKNAME: LOOPBACK
       ADDRESS: 127.0.0.1
         FLAGS:
     INTFNAME: LOOPBACK6
       ADDRESS: ::1
         TYPE: LOOPBACK
         FLAGS:
     3 OF 3 RECORDS DISPLAYED
   ```

Related reference

z/OS Communications Server: IPv6 Network and Application Design Guide

Two-phase commit for TCP/IP clients

Db2 supports two types of two-phase commit for TCP/IP clients.

- The DRDA client coordinates the two-phase commit. If a failure occurs during the commit process, Db2 might need to resynchronize with the DRDA client.
- The DRDA client gives responsibility for the resynchronization to Db2. The client sends Db2 a list of server LOCATION names, domain names, and resync IP addresses that are part of the client's unit of work. Db2 Connect uses this support by allowing Db2 to act as its Transaction Manager

Database (TM_DATABASE), thereby eliminating the need to have a local database to manage the two-phase commit process. If a failure occurs during the two-phase commit process, Db2 might need to resynchronize with one or more of the server locations sent by the client.

Db2 uses the port specified on the RESYNC PORT field of installation panel DSNTIP5 for two-phase commit resynchronization. Db2 begins resynchronization using the partner's IP address and LOCATION name, and the RESYNC PORT obtained at the time of initial connection. If the partner's IP address changed, the resynchronization fails. For example, if the partner was Db2 for z/OS, the IP address can change when the automatic restart manager (ARM) restarts a data sharing member on a different CPC. The IP address can also change when an z/OS adapter fails and virtual IP addresses were not used.

If the IP address fails, Db2 uses the partner's domain name to determine the IP address for resynchronization. DRDA requesters receive the port number and domain name to be used for two-phase commit resynchronization from the server during DRDA connect processing.

No CDB definition is required to do resynchronization.

Multiple TCP/IP stacks and Db2

Running multiple TCP/IP stacks does not provide performance advantages over a single TCP/IP stack, which can provide high levels of scalability and performance by itself. Running multiple stacks requires more private and ECSA memory consumption and some additional processor consumption. It is also a much more complicated environment to manage from an administrative perspective.

Although multiple TCP/IP stacks are not recommended for Db2, multiple stacks might be appropriate for your installation. A possible scenario for using multiple TCP/IP stacks could be where a single Db2 system must connect to multiple networks that have distinct security characteristics (for example, intranet and internet) and strict separation is required. The firewall on the external stack can be configured to forward only selected traffic internally, while the internal stack does what is indicated with internal traffic, including forwarding to the external stack. Second, a denial-of-service attack on the stack that handles external traffic would not affect the stack that handles internal traffic, so two stacks offer an element of resistance to attack.

Multiple TCP/IP stacks for multiple Db2 subsystems

The TCP Server Bind Control allows multiple Db2 subsystems to use the same port number within the same z/OS image. This configuration allows multiple Db2 subsystems that bind to any IP address (also known as INADDR_ANY in sockets API terms) and the same port number on the same stack to be bound to separate IP addresses.

For example, consider two Db2 subsystems in a data sharing group where both have the same LOCATION and same DRDA PORT. A new 'BIND *ipaddr*' parameter is added to the PORT statement. When Db2 (identified by job name *ssnm*DIST) issues a bind to the port number in the PORT statement and to INADDR_ANY, the bind is restricted to the IP address specified on the PORT statement for that Db2 subsystem. This allows two Db2 subsystems to share the same stack by limiting them to different single IP addresses (virtual IP addresses are recommended). This allows them to be reached by any physical connectivity that can get to the stack.

One TCP/IP stack for multiple Db2 subsystems

z/OS UNIX System Services provides a way to configure each Db2 subystem to use a single transport stack. This configuration allows each Db2 subsystem to be restricted to a single stack. Each is reachable by any IP address that is owned by the selected stack, but not by other IP addresses.

This approach allows multiple Db2 subsystems that bind to any IP address (also known as INADDR_ANY in sockets API terms) and the same port number on the same stack to be bound to separate IP addresses. For example, consider two Db2 subsystems in a data sharing group where both have the same LOCATION and same DRDA PORT. A new 'BIND ipaddr' parameter is added to the PORT statement. When Db2 (identified by job name *ssnm*DIST) issues a bind to the port number in the PORT statement and to INADDR_ANY, the bind is restricted to the IP address specified on the PORT statement for that Db2 subsystem. This allows two Db2 subsystems to share the same stack by limiting them to different single

IP addresses (virtual IP addresses are recommended). This allows them to be reached by any physical connectivity that can get to the stack.

Related reference

PORT statement (z/OS Communications Server: IP Configuration Reference)

Connecting systems with VTAM (deprecated)

Virtual Telecommunications Access Method (VTAM) is a program that you can use to control remote Db2 communication.

About this task

Tip: TCP/IP is the recommended communication protocol for communication with Db2. Although SNA communication remains supported in Db2 11, SNA communication (including the VTAM interface) is deprecated, and support might be removed in the future. You can disable SNA communication by setting the value of the DB2 TCP/IP IPNAME setting. See .

Remote communications terminology:

Logical unit (LU)
A source of requests entering the network and a receptor of replies from the network. For example, a particular Db2 is an LU.

Session
A logical connection between two LUs. Multiple sessions can run on a single physical connection.

Conversation
A dialog that uses a session to transfer information between transaction programs, such as Db2 to Db2. A single session can support multiple conversations, but only one at a time.

To prepare Db2 for communication using VTAM and the distributed data facility (DDF), complete the following steps. You can complete steps 1, 2, and 3 after installing Db2. Steps 6 through 8 are optional.

- **Step 1: Customize VTAM for Db2**

  To make monitoring of the network easier, consider installing NetView®.

- **Step 2: Choose names and a password**

  You need to choose two names for the local Db2 subsystem: a location name and a logical unit name (LU name).

  A *location name* distinguishes a specific database management system in a network, so applications use this name to direct requests to your local Db2 subsystem. Other systems use different terms for a location name. For example, Db2 Connect calls this the *target database name*. The DRDA term, *RDBNAM*, is used to refer to non-Db2 systems' relational database names.

  An *LU name* is the name by which VTAM recognizes this subsystem in the network. You might need to know the LU names of other systems that can request data from the local Db2 subsystem, or you can use a default LU name of eight blanks.

  If you plan to request data from other systems, you need the LU names *and* location names for those serving systems. Most of the time, system administrators and operators need to know both names, because they can use both names in various commands, and Db2 uses both names in messages.

  In addition to the names mentioned above, you can choose an optional password to validate your local Db2 subsystem to VTAM. If the z/OS system on which Db2 is running is part of an z/OS Parallel Sysplex, you can choose a generic LU name to define a Db2 group to remote locations.

- **Step 3: Define the Db2 subsystem to VTAM**

  Use the VTAM APPL statement to make the Db2 subsystem known to VTAM. You must include the APPL definitions in the VTAM SYS1.VTAMLST library at VTAM startup.

  Also use the VTAM MODEENT statement to define default session modes. You must include mode tables in the VTAM SYS1.VTAMLIB library at VTAM startup.

Sample VTAM definitions are provided in the data set DSN8VTAM in SDSNSAMP and in examples throughout this topic.

- **Step 4: Populate the communications database**

  The Db2 catalog includes the communications database (CDB), which contains several tables that hold information about your connections with remote systems. You must populate some of these tables before you can request data from those remote systems. If this Db2 system only services data requests, you do not have to populate the CDB; you can use the default values.

- **Step 5: Start VTAM to use Db2**

  When you start VTAM to use Db2, you must be sure that the proper definitions are in the VTAM libraries VTAMLST and VTAMLIB.

- **Step 6: Tune the system**

  This is an optional step, which you can do after you have established communications between two or more systems. The procedure outlined up to this point gives you default values for your Db2 modes and your class of service. Although the defaults are probably adequate for your preliminary testing, you can change them to improve performance in the network, or to assign different modes to different application plans.

  When VTAM links two nodes, it establishes a session. The number of available sessions can have a significant impact on performance; therefore, you might need to modify your session limit values. Also, large amounts of Db2 data travelling through the network can severely affect VTAM storage, and you might need to tune buffer storage.

  You can also tune the system by changing mode options. A *mode* describes various characteristics of a session, such as the maximum number of bytes sent at one time. Modes can point to a *class of service* table, which ranks the available virtual routes for this mode with respect to preference of use and paths through the network. Essentially, the class of service table allows you to assign different network priorities to your modes.

- **"Step 7: Create Aliases"**

  This is an optional step. Each Db2 location can create aliases for the tables it wants to access, using DRDA, at the other Db2 locations.

- **"Step 8: Provide Authorization for an Appropriate Level of Security"**

Related concepts

Sample VTAM definitions to connect two Db2 subsystems
Sample VTAM definitions are provided to give you some guidance on setting up your network to connect two Db2 subsystems. The samples are not intended to give you information about all the options.

Related tasks

Calculating session limits
You can calculate session limit values for DRDA access.

Calculating VTAM I/O buffer pool (IOBUF) storage
You can estimate VTAM buffer pool storage when you use the distributed data facility of Db2. Every *path information unit* (PIU) that enters or leaves VTAM resides in one or more IOBUF buffers.

Related reference

IBM Tivoli NetView for z/OS (Installation: Getting Started)

Generic resources (SNA Network Implementation Guide)

Implementing a VTAM network (SNA Network Implementation Guide)

Tuning VTAM for your environment (SNA Network Implementation Guide)

Related information

Customize VTAM for Db2

For Db2 to provide the best performance for distributed database systems, you probably need to customize VTAM.

Before you customize VTAM, consider the communication needs of your Db2 connections. Because you could allow your Db2 subsystem to send large amounts of data through the network, reexamine the capacity of your existing network. In some cases, portions of your existing network might need additional communication hardware to provide the required capacity.

Related reference

SNA Network Implementation Guide

Choosing names and a password

When you connect a Db2 subsystem to VTAM, you must choose names for your local Db2 subsystem and, possibly, a VTAM password for it. You might also need to know the names of remote systems in the network.

Choosing names for the local subsystem

You define the names for the local subsystem and its VTAM password to Db2 by using the installation panels, or by using the change log inventory utility.

Procedure

Choose the following names for the local Db2 subsystem:

- A unique name by which the other systems in the network can recognize your subsystem. The name can have from 1 to 16 characters and is called the *location name*. (Db2 Connect refers to this as the *target database name*.) Make sure that the local location name is different from the name of every other system in the network, no matter where it is physically located.

  You must share the location name with the other systems that need to send SQL requests to this one.

  The location name should not change even if the network changes. Therefore, tightly control the allocation of location names. To ensure uniqueness, you use an IBM-registered SNA NETID as the first six bytes of your location name. If location names are not unique, you have to change many programs and tables if your network is later joined with another network using the same location name.

  The IBM recommendation for the NETID is the following format:

  - The first two bytes are the country code as defined in ISO standard ISO 3166. These codes include the uppercase letters A through Z.
  - The next four bytes are the enterprise code of the registering enterprise. This might already be registered with IBM as your SNA NETID. The enterprise code can include the uppercase letters A through Z, the numbers 0 through 9, and the underscore character (_).

  To register your SNA NETID, see your IBM representative.

- A name by which VTAM can recognize the local subsystem. It must be either a unique name or, in some cases, a generic name.

  - The *unique* name must be unique within the network of connected systems, can have from 1 to 8 characters, and is called the *LU name*. The LU name and the location name of a subsystem can be identical, but this is not recommended; LU names are unique only within a network, and networks can change. You must share the LU name with any system that requests data from your local subsystem. Later, you enter this name in the VTAM APPL statement.
  - If the z/OS system on which Db2 is running is part of an z/OS sysplex, you can use a *generic* 8-character name to represent a group of VTAM LU names. The generic name might be useful if your network is in a transitional period, and you want to use generic names to reference network nodes.

Specify the generic LU name in the field Db2 GENERIC LUNAME on installation panel DSNTIPR. Use column GENERIC of SYSIBM.LUNAMES to indicate that you want to use the generic LU name for CNOS processing and SQL requests to a particular server.

- Server location aliases. You can use the Change Log Inventory utility to define up to eight aliases for a location. Applications can use these alias names to refer to the local Db2 subsystem or data sharing group.

  Aliases are most useful in a data sharing environment in which two or more Db2 subsystems are migrated to a single data sharing group. In this case, you can define the old location for each subsystem as an alias for the location name of the group. Remote applications that refer to the old location names do not need to change.

  Use the Print Log Map utility to print all location alias names that are defined for a Db2 subsystem.

  You can set up multiple server location aliases as locations on the z/OS requester to restrict which members an application will use when accessing a data sharing group. The z/OS requester must be using the IPLIST or LULIST table to route connections to the data sharing group.

Related tasks

Defining the Db2 subsystem to VTAM
You need to use an APPL definition statement and a MODEENT macro to define the Db2 subsystem to VTAM. Samples of both the APPL and MODEENT macros are in the DSN8VTAM sample data set.

Using the change log inventory utility to update the BSDS
The DDF statement of the change log inventory utility can be used to insert or update information that is stored in the bootstrap data set.

Related information

Choosing a password for the local subsystem

Choosing a VTAM password is optional. Db2 does not require you to use a password as long as you have not included one in the VTAM APPL statement.

Procedure

To set a local subsystem password:

- Enter the password by using the PRTCT option of the VTAM APPL statement. The password can have from one to eight EBCDIC characters.

  This password is not transmitted through the network, so there is no need to share the password with the other systems.

Related information

Names that you need from the remote systems

If you plan to have your Db2 subsystem request data from other systems, you need the LU names and location names for those serving systems.

Location names and LU names: When you populate the communications database (CDB) in the local Db2, you must know the location names (or DRDA RDBNAMs) and LU names of remote servers. The remote servers are the systems from which this Db2 system is to request data. The local Db2 system does not need location names of requesters. However, you need to know the LU names of the requesters if you intend to change default communication options.

Db2 does not receive DRDA RDBNAM from requesters other than Db2 for z/OS. If Db2 does not have an RDBNAM, it displays LU names in messages, display output, and trace output. To help you distinguish between location names and LU names in those cases, the LU name is enclosed in less-than (<) and greater-than (>) brackets.

When your systems begin communicating, you and others involved in working with distributed systems need to be aware of the LU name to DRDA RDBNAM mappings. When you have obtained the necessary names, enter them in the CDB.

Transaction program names (TPNs): If a server is not a Db2 for z/OS, it might have an additional name that uniquely identifies it. In LU 6.2, this is known as a *transaction program name* (TPN), and can be from 1 to 64 characters long. When a Db2 for z/OS subsystem communicates with other Db2 for z/OS subsystems, you do not need to supply TPN values. The Db2 subsystems automatically choose the correct TPN values.

When a TPN is necessary: You might need to supply TPN values when a Db2 subsystem requests data from a server that is not a Db2 for z/OS subsystem. For cases where the server does not accept the default TPN for DRDA access, enter into your CDB the TPN chosen by that server. For Db2 for VM, for example, the TPN is the SQL database machine ID.

TPN values accepted by Db2 for z/OS: A requester that is not Db2 for z/OS must use either the TPN name X'07F6C4C2' or DB2DRDA, which are the only values Db2 recognizes when it accepts a request from another system. Some requesters enter the TPN as two separate fields: a 1-byte prefix (X'07') and a 3-byte suffix ('6DB').

Related tasks

Populating the communications database for use with TCP/IP
If you plan to use Db2 only as a server, you do not need to populate the CDB.

Names that Spiffy Computer Company chose

Spiffy has chosen location names and LU names, some of which are used in the provided examples.

Table 143. Spiffy's location names, LU names, and transaction program names (TPNS)

Location Name	LU Name	TPN	Comments
USIBMSTODB21	LUDB21		Db2 *
USIBMSTODB22	LUDB22		Db2
USIBMSTOSQL1	LUSQLDS	TPNSQLDS1	Db2 for VM production system
USIBMSTOSQL2	LUSQLDS	TPNSQLDS2	Db2 for VM test system

Note: *USIBMSTODB21 plans to accept requests from many Windows requesters.

Defining the Db2 subsystem to VTAM

You need to use an APPL definition statement and a MODEENT macro to define the Db2 subsystem to VTAM. Samples of both the APPL and MODEENT macros are in the DSN8VTAM sample data set.

The APPL statement

A VTAM APPL definition statement defines the VTAM options for the Db2 subsystem and includes it in a major node.

With VTAM, you can use a model application program definition for Db2. With a model definition, you use wild card characters for the application name (LU name).

Spiffy uses the statement in the table below for the USIBMSTODB21 Db2 subsystem:

```
LUDB21 APPL    APPC=YES,                                               X
               ATNLOSS=ALL,                                            X
               AUTH=(ACQ),                                             X
               AUTOSES=1,                                              X
               DMINWNL=25,                                             X
               DMINWNR=25,                                             X
               DSESLIM=50,                                             X
               MODETAB=DB2MODES,                                       X
               PRTCT=D02DN,                                            X
               SECACPT=ALREADYV,                                       X
               SRBEXIT=YES,                                            X
               SYNCLVL=SYNCPT,                                         X
               VERIFY=NONE,                                            X
               VPACING=2
```

Figure 125. Example of a VTAM APPL definition statement

For your convenience, the APPL statement example is provided in data set DSN8VTAM, in the sample library, SDSNSAMP.

The topics that follow describe the APPL options that Spiffy uses and a few more in which you might be interested. Not all APPL options are described.

Related reference

VTAM Application Program Major Node (SNA Resource Definition Reference)

Options for which you must choose values

For some options in your APPL statement, you must supply a specific value; for others, Db2 suggests values that are not the VTAM default values.

In your APPL statement, you must code values for the following options:

name

The 1 to 8 character LU name you chose. For their USIBMSTODB21 Db2 system, Spiffy uses LUDB21.

AUTOSES

The number of contention winner sessions that VTAM is to activate automatically between this Db2 and another system on a given mode before Db2 requests a conversation to be created.

Contention occurs when two LUs want to allocate a conversation at the same time in the same session. In order to resolve contention situations, VTAM denotes one LU as the contention winner and one as the contention loser. The winner automatically prevails and is allowed to allocate its conversation. The loser must wait to allocate its conversation.

The default is 0. The suggested value is 1 or greater to ensure that VTAM informs Db2 if a session is inactivated.

Too large a number can take up storage and create resources that are not used. A small number can result in a one-time delay to bring up additional sessions when they are needed by an application.

DMINWNL

The minimum number of parallel sessions in which, if there is contention for a conversation, this local Db2 subsystem is the winner.

The suggested value is one-half the value of DSESLIM, described below.

DMINWNR

For the same situation as described for DMINWNL, the number of sessions in which the remote system is the winner. The suggested value is one-half the value of DSESLIM, described below.

DSESLIM

The default maximum number of sessions allowed for this Db2 subsystem as it communicates with any other system on a given mode. For performance reasons, the Db2 suggested value for DSESLIM is the maximum number of sessions that can possibly be in use on any mode. For example, assume you have 5 modes for which the following maximum numbers of sessions could be active: 10, 12, 20, 30, 40. In this case, DSESLIM should be 40.

Because calculating a precise value for this number can be rather difficult if you do not know exactly how many applications run on a specific mode, Spiffy chooses 50. They can modify this option later if they have problems obtaining enough sessions, or if they find they are requesting sessions that they never need.

You can use DSESLIM to control the number of sessions that this subsystem can issue or receive. For example, to avoid overloading this subsystem with requests from remote application processes, you can assign a low number to DSESLIM to limit the number of simultaneous remote requests issued by a given partner and mode.

Use the CONVLIMIT column of the LUMODES table in the CDB to override this value for specific cases.

MODETAB

The name of the VTAM logon mode table you use to define Db2 session modes. Only modes defined in this table are eligible for conversations created by the local Db2. If you leave this blank, Db2 uses the default mode table shipped with VTAM (ISTINCLM). Spiffy decides to set up a separate mode table and chooses the name DB2MODES. Db2 cannot use either the default mode table or the one you set up yourself until you make entries into the table.

PRTCT

If you decided to use a password, this is that password. Later, you must store the same password in the bootstrap data set (BSDS), entering it through installation panels or the change log inventory utility.

If you prefer not to use a password, omit this option. The installation panels and the change log inventory utility do not require you to enter a password.

SECACPT

The level of conversation-level security allowed.

Recommendation: Use ALREADYV, which gives you the most flexibility in determining your security. You can use the CDB to determine levels of security on a more granular basis.

In general, SECACPT=CONV should not be used because in many cases, it does not allow already verified conversations for DRDA access.

VERIFY

Whether you want SNA partner LU verification. The default, VERIFY=NONE, means that any system can connect with yours. Because Spiffy is setting up a small, restricted network, it chooses the default for now.

Use VERIFY=REQUIRED to activate partner LU verification. This means that you let RACF and VTAM check the identity of an LU that is attempting to connect with yours.

Db2 has no dependency on the value you choose.

VPACING

The maximum number of messages that another system can send to this local Db2 subsystem during a conversation before waiting to receive a pacing response. The suggested value is 2.

These message sizes are determined by the RUSIZES option of the MODEENT macro. VPACING and RUSIZES, together with some overhead, determine the amount of storage required for the pacing window.

Related concepts

CNOS processing in Db2

The distributed data facility of Db2 can request to alter the number of sessions with another system for a specific VTAM logon mode. This automatic process is called *change number of sessions* (CNOS).

Session-level pacing

Session-level pacing is the mechanism by which the receiver of data (Db2, in this case) can control the pace at which the sender sends data (in the form of RUs).

The MODEENT macro

A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

Related tasks

Calculating session limits
You can calculate session limit values for DRDA access.

Update SYSIBM.LUMODES with conversation limits
Use SYSIBM.LUMODES to provide VTAM with conversation limits for specific LU name and mode name combinations.

Related reference

LU 6.2 Security (SNA Network Implementation Guide)

Related information

Options that you must code exactly as given
In some cases, Db2 requires particular values of APPL options.

For the following options, you must code the values exactly as shown; they are *not* the VTAM defaults:

APPC=YES
Tells VTAM that Db2 uses APPC conversation verbs.

AUTH=(ACQ)
Determines the Db2 system authority to use certain VTAM functions.

SRBEXIT=YES
Tells VTAM that Db2 uses service request block (SRB) processing in its exit routines.

SYNCLVL=SYNCPT
Tells VTAM that Db2 supports two-phase commit. Other systems communicating with this Db2 use this indication to determine if Db2 supports the updating of many locations in one unit of work.

Coding SYNCLVL=SYNCPT does not preclude the support of partner LUs that do not support two-phase commit. Db2 still supports the non-two-phase process.

Options that must use VTAM defaults
Some options in your APPL statement require you to use the VTAM default values. You do not need to code these options.

Db2 must use the VTAM default values for the following options:

HAVAIL=NO
Indicates whether an XRF session can be supported. Db2 requires the default, NO.

PARSESS=YES
Specifies that parallel sessions are allowed. This defaults to YES when APPC=YES.

ENCR=NONE
Specifies information about specific cryptographic requirements. There is no support for encryption in this release of VTAM for LU 6.2 applications; therefore, this must be NONE.

SONSCIP=NO
Specifies information about SCIP exit routines. Db2 does not have SCIP exit routines; this must be NO.

VTAMFRR=NO
Specifies whether a VTAM functional recovery routine is in effect when control is returned to Db2. Db2 uses its own recovery routines; this must be NO.

Other options of interest
In most cases, you can reasonably use the VTAM default values for the APPL statement at first.

You can change these values later. The options are listed below in case you have some reason to not use the default values.

ACBNAME
The LU name for the Db2 subsystem. If the ACBNAME is different from the APPL name and both the originating and destination LUs are in the same VTAM domain, do not refer to the ACBNAME in a CDB definition. If the ACBNAME is not the same as the APPL name, VTAM may encounter name conflicts.

DDRAINL
Whether the local Db2 subsystem wants to accept permission to drain its allocation requests if a change-number-of-sessions (CNOS) request is received that specifies that draining is allowed. The suggested value is the default, NALLOW (do not allow draining).

DRESPL
Whether the local Db2 is responsible for deactivating sessions when it receives a CNOS request specifying the local Db2 as the responsible system. The suggested value is the default, NALLOW (do not be responsible).

EAS
The approximate number of concurrent sessions for this Db2 subsystem. For performance reasons, it is better to estimate slightly high. The VTAM default is 509.

LMDENT
The number of entries to be used for a hash table of other systems. The suggested value is the approximate number of other systems in the network. In the scenario, Spiffy decides to use the default value of 19.

MAXPVT
The maximum additional amount of private area storage that can be used by VTAM within the DDF address space (*ssnm*DIST) for the session-related control blocks and messages for Db2. Specifying 0 indicates an unbounded amount; this is the VTAM default.

OPERCNOS
The ability to have a VTAM operator display and set VTAM session limits for a given LUNAME and MODENAME.

- Use ALLOW to enable a VTAM operator to change session limits dynamically without stopping DDF or changing the CONVLIMIT column of the SYSIBM.LUMODES table.
- Use NALLOW, the default, to make sure VTAM operators are not able to dynamically change session limits for Db2.

Options that are ignored by Db2
Some options for VTAM APPL statements are not applicable to Db2. Do not code these options in your APPL statement.

The following options are not applicable to Db2 :

ASLENT	ATNLOSS	MDLTAB	SSCPFM
ASLTAB	MDLENT	POAQNAM	USSTAB

The MODEENT macro

A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

This is the table that you named in the MODETAB option of the APPL statement.

You can create your own log mode table or add mode names to the default mode table, ISTINCLM, which is shipped with VTAM. If you decide to add your modes to ISTINCLM, you can find that table in SYS1.SAMPLIB.

Spiffy uses the Db2 default modes at first, but also sets up a separate mode table for modes that are used by Db2 for distributed data processing. This table can then be populated with additional modes as they are needed.

Related concepts
The APPL statement

A VTAM APPL definition statement defines the VTAM options for the Db2 subsystem and includes it in a major node.

Default VTAM modes

Use the MODEENT macro to enter each default mode into your mode table. When this table is complete, you must assemble and link-edit it into SYS1.VTAMLIB.

The following modes are the default modes:

- SNASVCMG is an optional mode. It is reserved for use by VTAM for CNOS processing and exists in the VTAM default log mode table. Because SNASVCMG is reserved for use by VTAM, do not enter it as a mode name in the CDB. If you have decided to set up a separate mode table for Db2, you can, if you choose, copy the SNASVCMG mode entry into your Db2 mode table, or just use it as it exists in the ISTINCLM mode table.
- IBMRDB is a recommended mode entry because it is used as a default for DRDA access whenever you do not explicitly assign a mode to a session. It does *not* exist in the default table; to use it as a default you must add it to your mode table.

Related concepts

CNOS processing in Db2

The distributed data facility of Db2 can request to alter the number of sessions with another system for a specific VTAM logon mode. This automatic process is called *change number of sessions* (CNOS).

Related information

User-defined tables and data filter (SNA Resource Definition Reference)

Sample mode entries

The sample mode entries for IBMRDB contain some options that are necessary for dependent LUs to request VTAM sessions.

These options are listed in the following table.

COMPROT	PRIPROT	TSPROF	SECPROT
FMFPROF	PSERVIC	TYPE	

The samples in the figure below work for both dependent and independent LUs. However, if you have no dependent LUs, it is not necessary to re-assemble your existing mode table with the above options. For your convenience, a sample MODEENT is included in data set DSN8VTAM, in SDSNSAMP.

The ENCR option is ignored by LU 6.2 and is thus not included in the Db2 samples.

```
DB2MODES MODETAB
IBMRDB   MODEENT LOGMODE=IBMRDB,     DB2 DEFAULT MODE FOR APP-DIR ACC  X
               TYPE=0,             NEGOTIABLE BIND                     X
               SSNDPAC=X'02',      SECONDARY SEND PACING COUNT         X
               SRCVPAC=X'00',      SECONDARY RECEIVE PACING COUNT      X
               RUSIZES=X'8989',    RUSIZES IN-4096 OUT-4096            X
               FMPROF=X'13',       LU6.2 FM PROFILE                    X
               TSPROF=X'07',       LU6.2 TS PROFILE                    X
               PRIPROT=X'B0',      LU6.2 PRIMARY PROTOCOLS             X
               SECPROT=X'B0',      LU6.2 SECONDARY PROTOCOLS           X
               COMPROT=X'50A5',    LU6.2 COMMON PROTOCOLS              X
               PSERVIC=X'060200000000000000122F00'    LU6.2 LU TYPE
         MODEEND
         END
```

Figure 126. Sample mode entries

MODEENT options

When you define your Db2 subsystem to VTAM, you can specify mode values. As you choose these values, be aware that partner systems can have different values. VTAM negotiates different values to limits that are acceptable to both systems when the session is established for the mode.

The options that are used in the MODEENT macro have the following meanings.

name

The *name* option (IBMDB2LM and IBMRDB in the examples) is optional and has no function in the specification of a logon mode table.

LOGMODE

Specifies the logon mode name that is to be used as a key for the session options in this table entry. This logon mode name corresponds to mode name columns in the CDB.

TYPE

TYPE=0 indicates that Db2 is using a negotiable BIND, which is required for communicating with dependent LUs.

SRCVPAC

Specifies the secondary receive pacing count. The Db2 suggested value is X'00'.

SSNDPAC

Specifies the secondary send pacing count. The Db2 suggested value is any nonzero number. Do not use 0; this turns off pacing, which can result in problems with IOBUF storage.

RUSIZES

Specifies the maximum length of data in bytes that can be sent and received in one *request/response unit* (RU). It is read as two numbers, each having two hexadecimal digits. The first number is for the send amount. The second number is for the receive amount. The suggested value of X'8989' means that VTAM sends a maximum of 4096 bytes (8×2^9) across at one time, but there is no limit to how much total information can be sent.

FMPROF

This constant specifies the function management profile that is required for LU 6.2.

TSPROF

This constant specifies the transmission services profile that is required for LU 6.2.

PRIPROT

This constant specifies the primary LU protocols that are used in LU 6.2.

SECPROT

This constant specifies the secondary LU protocols that are used in LU 6.2.

COMPROT

This constant specifies the common LU protocols that are used in LU 6.2.

PSERVIC

This constant specifies this LU as an LU type 6.2.

Some of the above options can have a profound effect on performance because of their impact on pacing.

The ENCR option is not included in the sample above because it is ignored by LU 6.2.

Related concepts

Session-level pacing
Session-level pacing is the mechanism by which the receiver of data (Db2, in this case) can control the pace at which the sender sends data (in the form of RUs).

Populating the communications database

If you plan to use Db2 only as a server, you do not need to populate the CDB; default values are used. However, if you intend for Db2 to act as a requester, you need to insert one row for each remote system into SYSIBM.LOCATIONS and SYSIBM.LUNAMES.

About this task

For example, Spiffy's USIBMSTODB21 subsystem works as a server for many Windows requesters. It is not necessary for Spiffy to register all those requesters in the Db2 CDB.

You do not need to populate table SYSIBM.LULIST unlessDb2 is acting as a requester of data that resides in a data sharing group.

After you populate these tables, you can write queries that access data at a remote system.

Procedure

- Add rows to the SYSIBM.LOCATIONS table.

  When you issue an SQL CONNECT statement, the LOCATION column of the SYSIBM.LOCATIONS table correlates the location name (or DRDA RDBNAM) with the VTAM LU name. If necessary, the location name is also correlated with the transaction program names (TPNs). The following SYSIBM.LOCATIONS table columns relate to VTAM:

  DBALIAS VARCHAR(128) NOT NULL

  The name that is associated with the server. This name is used to access a remote database server. If DBALIAS is blank, the location name is used to access the remote database server. This column does not change database object names that are sent to the remote site using a location qualifier. Use the DBALIAS column to access data at two or more different remote locations when those remote locations have the same name. The LOCATION specifies where the database is in the network, and the DBALIAS is used to access the database server. This column does not change database object names that are executed in the application using the LOCATION. All fully qualified table names must reference the server's LOCATION name or one of its server LOCATION alias names, otherwise the SQL statement will fail because the table does not exist.

  LOCATION CHAR(16)

  The unique network location name, or DRDA RDBNAM, assigned to a system, remote or local. You must provide location names for any systems that you request data from. This column is the primary key for this table. If the remote LU exists in the same VTAM domain, specify the APPL name, not the ACBNAME. DBALIAS can override this name.

  LINKNAME CHAR(8)

  Identifies the VTAM attributes associated with this location. For each LINKNAME specified, you must have a row in SYSIBM.LUNAMES whose LUNAME matches the value specified in this column. Because this table is used for outbound requests, you must provide an LUNAME or your requests fail. Do not enter blanks in this column.

  TPN VARCHAR(64)

  This column is used to enter a transaction program name (TPN) for SNA conversations with non-Db2 systems. You only need to use this column if you are sending or receiving SQL requests from systems using non-default TPNs.

  For example, Spiffy's USIBMSTODB21 location wants a LOCATIONS table that looks like the following table.

  Table 144. Spiffy's LOCATIONS table

LOCATION	LINKNAME	TPN
USIBMSTODB21	LUDB21	
USIBMSTODB22	LUDB22	
USIBMSTOSQL1	LUSQLDS	TPNSQLDS2
USIBMSTOSQL2	LUSQLDS	TPNSQLDS1

  To add the second row, Spiffy can issue the following statement:

  ```
  INSERT INTO SYSIBM.LOCATIONS (LOCATION, LINKNAME)
    VALUES ('USIBMSTODB22','LUDB22');
  ```

  Tip: No row is needed for the local Db2 in the LUNAMES and LOCATIONS tables. For example, Spiffy's USIBMSTODB21 subsystem does not require a row that shows its own LU name and location name. However, for convenience, Spiffy decides to populate one LUNAMES table and one LOCATIONS table and to duplicate them entirely at each location. As a result, each table contains a row for its own LU name or location name.

- Insert rows into the SYSIBM.LUNAMES table.

The LUNAMES table defines the security and mode requirements for conversations with other systems. Decisions about how to populate this table depend on how you intend to use Db2.

- If you use this system only as a server, Db2 can use a blank in the LUNAME column as a default. Db2 uses the values in the default row as defaults for LUs that are not explicitly defined in LUNAMES. If you do not have a row with a blank in the LUNAME column, Db2 rejects client connections that do not explicitly state a valid LUNAME. The DSNTIJSG installation job creates the default row in table SYSIBM.LUNAMES.
- If this Db2 requests data from other systems, you need to provide LU names for those systems. If the remote LU exists in the same VTAM domain, specify the APPL name, not the ACBNAME.

The LUNAMES table has the following columns:

LUNAME CHAR(8)

The LU name of the remote system. The default of 8 blanks indicates that this row is used for serving the requests of any system that is not specifically listed in the LUNAMES table. For example, because USIBMSTODB21 acts strictly as a server for many Windows requesters, Spiffy leaves the LUNAME column blank for those requesters and uses default values for the entire row.

However, you must provide LU names for any remote system that uses different values from the defaults.

SYSMODENAME CHAR(8)

This column is ignored for DRDA access conversations.

SECURITY_IN CHAR(1)

Defines the security options that are accepted by this Db2 subsystem when an SNA client connects to Db2. The default, A, means that an incoming connection request is accepted if it includes any of these:

- A user ID
- A user ID and password
- A user ID and RACF PassTicket
- A Kerberos security ticket.

SECURITY_OUT CHAR(1)

Defines the security option that is used when local Db2 SQL applications connect to any remote server associated with this LUNAME. The default, A, means that outgoing connection requests contain an authorization ID without a password.

ENCRYPTPSWDS CHAR(1)

For now, Spiffy uses a blank to indicate no encryption of passwords.

MODESELECT CHAR(1)

Determines whether to use the default mode or to choose a mode from the MODESELECT table. Spiffy uses a blank to use the default IBMRDB mode for conversations using DRDA access.

USERNAMES CHAR(1)

This column is used for inbound and outbound requests to control authorization ID translation.

Spiffy uses a blank to indicate that no authorization IDs are translated, and also that no passwords are sent to the server.

GENERIC CHAR(1)

A Y in this column indicates that a generic LU name is to be used for CNOS processing and SQL requests sent to the partner LU. A value of N or a blank indicates that the name specified in the LUNAME column is to be used.

For example, Spiffy's USIBMSTODB21 location wants a LUNAMES table that looks like the following table.

Table 145. Spiffy's SYSIBM.LUNAMES table. The row of blanks is a default row that Spiffy intends to use for Windows requesters in its initial testing.

LUNAME	SYSMODENAME	USERSECURITY[1]	ENCRYPTPSWDS	MODESELECT	USERNAMES
LUDB21					
LUDB22					
LUSQLDS					
(blanks)					

Note:

1. USERSECURITY refers to SECURITY_IN AND SECURITY_OUT

Spiffy can use an SQL INSERT statement to add the appropriate rows. For example, they add the LU name for USIBMSTODB22 with this statement:

```
INSERT INTO SYSIBM.LUNAMES (LUNAME)
  VALUES ('LUDB22');
```

- Add rows in the SYSIBM.USERNAMES table.

  The SYSIBM.USERNAMES table contains information that is needed for outbound and inbound ID translation and also for "come from" checking. For more information, see .

Related tasks

Associating applications with modes
As you tune your system, you can assign certain applications, such as a high-priority job, to the mode that is best suited for that job.

Related information

Starting VTAM to use Db2

You do not need to code any special VTAM start options to use Db2, but you can tailor start option values for Db2 communications.

About this task

You must start VTAM before starting DDF.

Two VTAM libraries must contain definitions for Db2:

- SYS1.VTAMLST contains the definitions that define Db2 as a VTAM application.
- SYS1.VTAMLIB contains mode table definitions used by DDF. This must be an APF-authorized library, or in a concatenation of APF-authorized libraries.

Procedure

You can use the following VTAM command, assuming that the member DB2APPLS contains definitions for Db2:

```
V NET,ACT,ID=DB2APPLS
```

Related concepts

The MODEENT macro

A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

Related tasks

Starting the Domain (SNA Network Implementation Guide)

Defining the Db2 subsystem to VTAM
You need to use an APPL definition statement and a MODEENT macro to define the Db2 subsystem to VTAM. Samples of both the APPL and MODEENT macros are in the DSN8VTAM sample data set.

Related reference

VTAM Start Options (SNA Resource Definition Reference)

Tuning the VTAM system

As you begin testing with the Db2 distributed data facility, you probably need to modify VTAM options and CDB values to handle certain potential problems.

About this task

You should consult a VTAM communications expert to tune your network. Consider the following tasks when tuning VTAM for DDF.

- Controlling buffer storage

  By sending large amounts of data through the network, Db2 can cause problems with your VTAM I/O buffer pool.
- Controlling pacing

  You probably need to tune your pacing options if your VTAM buffers become overloaded with data that is sent to this local Db2.
- Modifying default session limits

  Consider modifying session limits if you have problems obtaining enough sessions to handle your distributed workload efficiently.
- Modifying class of service

  Specifying a class of service can help you assign priorities to your network applications.
- Associating applications with modes

  Tuning the system can require that you add new modes to your log mode table so that there is a greater variety of classes of service available for your sessions. This variety allows you to have more flexibility in tuning the system for specific uses. This topic tells you how to associate specific sessions with modes.

Before you begin tuning the network, you must understand the relationship between VTAM options and associated values in the CDB for Db2. The table below summarizes the relationship.

Table 146. Relationship between the CDB for Db2 and VTAM macros

Macro Name	Option	CDB table.column	Relationship
APPL	*name*	LOCATIONS.LINKNAME LUNAMES.LUNAME LUMODES.LUNAME MODESELECT.LUNAME USERNAMES.LINKNAME LULIST.LINKNAME	The LU name used in VTAM communication. This name maps 1:1 to the system's location name in LOCATIONS.
APPL	DSESLIM	LUMODES.CONVLIMIT	CONVLIMIT overrides session limits specified with DSESLIM. Session limit values are used in CNOS processing.

Table 146. Relationship between the CDB for Db2 and VTAM macros (continued)

Macro Name	Option	CDB table.column	Relationship
MODEENT	LOGMODE	LUMODES.MODENAME	LUMODES creates session limits for *specific* LU name and mode name combinations.
MODEENT	LOGMODE	MODESELECT.MODENAME	MODESELECT maps authorization IDs and plans to specific modes.

Related information

Controlling buffer storage

VTAM uses buffer pools for control blocks, network traffic data, and channel programs. A shortage of buffer pools can have an adverse effect on VTAM CPU time, storage consumption, and the ability to serve Db2 requests.

Procedure

To control buffer storage:

- Monitor VTAM buffer pools by using one of the following methods:
  - The VTAM command DISPLAY NET,BFRUSE
  - A VTAM trace, obtained by entering the following z/OS MODIFY command:

    ```
    F procname,TRACE,TYPE=SMS,ID=VTAMBUF
    ```

    Procname in the command is the VTAM start procedure name. The data is collected by the generalized trace facility (GTF).
- Use any of the following methods to prevent shortages of these VTAM buffers (IOBUFs):

  Increase the number of IOBUF buffers

  The IOBUF pool definition is one of the VTAM start options. You can enter the IOBUF option from the z/OS console, or you can include it at VTAM startup in SYS1.VTAMLST in member ATCSTRxx.

  Tuning the IOBUF pool encompasses both base allocation and dynamic expansion values. At installation, you can specify a base allocation for the IOBUF pool (in number of buffers) and a dynamic expansion (in number of buffers). When storage runs short in the buffer pool, VTAM temporarily expands the IOBUF pool by the dynamic expansion value, based on a trigger which you can also specify in VTAM definitions. Recommendation: Set a maximum size for the IOBUF pool size using the *xpanlim* start option for the buffer pool. If you turn off pacing accidentally, *xpanlim* prevents Db2 from causing VTAM to grab unlimited amounts of storage.

  Decrease the session level pacing count

  Pacing is vital for controlling the potentially large amounts of data that are transferred around the network.

  Decrease the number of concurrent conversations

  You can reduce the number of concurrent conversations by reducing the number of sessions.

  Decrease the request unit (RU) size

  The RUSIZES option is part of the mode entry statement.

  Because reducing the number of sessions and the RUSIZES value can adversely affect performance, you should first consider increasing IOBUF buffers and decreasing the session pacing count.

Related concepts

Session-level pacing
Session-level pacing is the mechanism by which the receiver of data (Db2, in this case) can control the pace at which the sender sends data (in the form of RUs).

The MODEENT macro
A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

Related tasks

Calculating VTAM I/O buffer pool (IOBUF) storage
You can estimate VTAM buffer pool storage when you use the distributed data facility of Db2. Every *path information unit* (PIU) that enters or leaves VTAM resides in one or more IOBUF buffers.

Related reference

Buffer pools (SNA Network Implementation Guide)

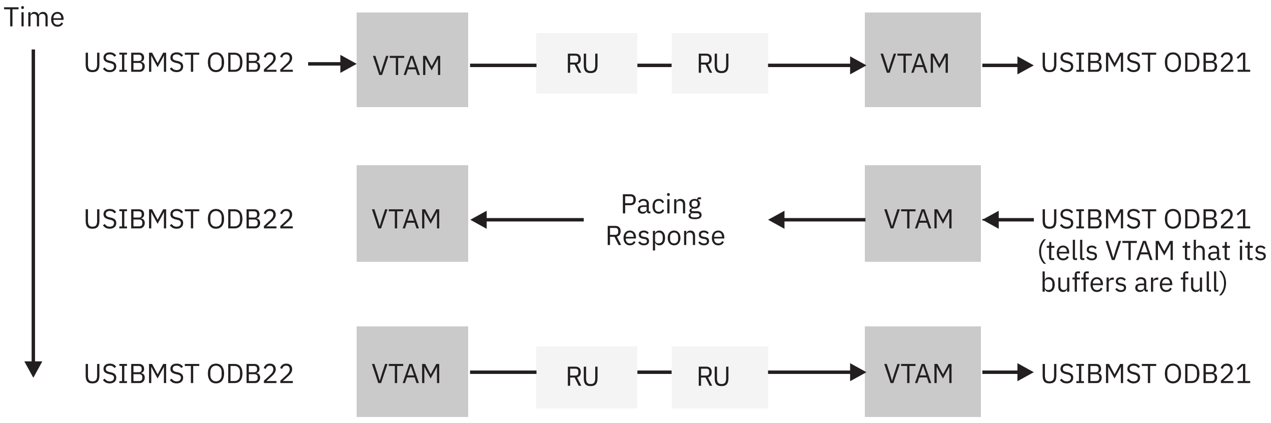
Session-level pacing

Session-level pacing is the mechanism by which the receiver of data (Db2, in this case) can control the pace at which the sender sends data (in the form of RUs).

The pacing size is the number of RUs that VTAM sends across the line at one time, and you can set that value by using the VPACING option of the VTAM APPL definition statement. You set the RU size in the MODEENT macro. The receiving VTAM stores these RUs in its IOBUF pool; it uses pacing so that its buffers do not become flooded with data.

The pacing process works as shown in the following figure. The system at the sending side (assume it is USIBMSTODB22) passes data to its VTAM system. VTAM formats the data into RUs and sends those RUs across the network. If, for example, the pacing size is 2, then it sends two RUs. A 29-byte network header is sent with each RU.

After the USIBMSTODB22 VTAM system sends the specified number of RUs, it does not send any more data on this session until it receives a pacing response from the VTAM system at USIBMSTODB21. The USIBMSTODB21 VTAM system does not send a response until VTAM transfers the data into the Db2 buffers.



More data is sent across.

Although it is generally true that the receiving system can control inbound pacing, both communicating systems negotiate final pacing values.

Related concepts

The APPL statement
A VTAM APPL definition statement defines the VTAM options for the Db2 subsystem and includes it in a major node.

The MODEENT macro
A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

Related reference

Session-level pacing (SNA Network Implementation Guide)

Recommendation for APPL pacing option
The VPACING option of the APPL statement determines the maximum number of RUs that another LU can send, on a session, to this LU. When the maximum number of RUs is sent, the other LU waits to receive a pacing response.

Specify a nonzero value for this option unless you want to turn off all pacing for all sessions that are affected by this option.

Recommendation: Start with a value of 2 for both communicating systems. This pacing size is the same in both directions for all modes.

The VPACING value is used with the RUSIZES option of the MODEENT macro to control the pacing window size. Thus, if VPACING is 2 and RUSIZES is 4–KB (X'8989'), then about 2 × 4KB = 8KB are sent before waiting to receive a pacing response. You should verify that your VTAM buffer pools are large enough to accommodate the chosen pacing and RU sizes.

Related tasks

Calculating VTAM I/O buffer pool (IOBUF) storage
You can estimate VTAM buffer pool storage when you use the distributed data facility of Db2. Every *path information unit* (PIU) that enters or leaves VTAM resides in one or more IOBUF buffers.

Recommendation for MODEENT pacing options
The MODEENT macro contains several pacing options.

PSNDPAC
This does not apply to Db2; therefore, you can ignore this option.

SSNDPAC
This option is really a flag that you set to either 0 (off) or nonzero (on). When 0, outbound pacing for sessions is disabled, which can lead to severe problems with IOBUF storage.

Recommendation: Specify a nonzero value for this option.

SRCVPAC
If 0, which is the recommended value, the VPACING option of the VTAM APPL statement controls both the send and receive pacing for all sessions in all modes. A value of 0 makes it easier for you to predict pacing results and makes it easier to maintain your pacing definitions.

If nonzero, VPACING controls pacing in one direction, and SRCVPAC controls it in another. LU 6.2 protocols make it difficult to predict which option is in control at any given time.

Related concepts

The MODEENT macro

A VTAM link between two systems is a *session*. For every session, a defined set of characteristics called a *mode* must exist in a VTAM table called a *log mode table*.

Modifying class of service

You can define the transmission priority and paths between systems with entries in a class of service (COS) table.

About this task

Each entry in the table is associated with a list of routes to be used with a particular class. For example, you might want to place interactive sessions on a faster route than a batch job.

Procedure

Use the COS option of the MODEENT macro.

When you specify a name of a COS entry in the mode description, you select the list of routes that you want to be used for the session. When VTAM establishes the session, it chooses the first available route in the list of routes that you tell it to use for that class.

If you do not specify a COS name, the mode gets the default list of routes from VTAM.

Associating applications with modes

As you tune your system, you can assign certain applications, such as a high-priority job, to the mode that is best suited for that job.

About this task

GUPI

You can also use a specific mode assignment for an application that uses many conversations. You can assign such an application to a mode that allows more conversations than the VTAM DSESLIM value you entered in the APPL statement.

To associate a specific mode with a particular session, you need to update or insert rows into three tables in the CDB: LUNAMES, LUMODES, and MODESELECT.

GUPI

Related concepts

When updates to CDB values take effect for VTAM (SNA) connections
Any table in the CDB can be updated while DDF is active.

Update LUNAMES to associate modes with LU names
The LUNAMES table associates a mode with each remote system that the local subsystem can send a query to.

About this task

GUPI

You can specify the following type of connections in this table:

SQL processing conversations
For DRDA access, an SQL processing conversation is established. The mode name for SQL processing conversations is determined by the MODESELECT table of the CDB. If the MODESELECT column of LUNAMES table is blank or contains N, then the default mode (IBMRDB) is used. If it contains a Y, then MODESELECT is searched.

GUPI

Related tasks

Populating the communications database for use with TCP/IP
If you plan to use Db2 only as a server, you do not need to populate the CDB.

Update SYSIBM.LUMODES with conversation limits
Use SYSIBM.LUMODES to provide VTAM with conversation limits for specific LU name and mode name combinations.

About this task

GUPI

Populating SYSIBM.LUMODES is optional; if you do not specify mode names in this table, the VTAM defaults are used. The table is unlike the DSESLIM option of the VTAM APPL definition statement, which provides the default session limits for *all* LU name and mode name combinations. The primary key for this table is formed by the LU name and mode name combination. Only one entry with the same LU name and mode name is allowed.

LUMODES is accessed for negotiation of session limits with a remote Db2 for a specific mode. This negotiation is called *change number of sessions* (CNOS).

Example

For example, suppose Spiffy wants to allocate 75 sessions instead of 50 (the value in DSESLIM) for conversations to USIBMSTODB22, using the mode named LOC2MODE. They can use the INSERT statement below to update the value in the CONVLIMIT column to 75. The new session limit takes effect the next time DDF is started, or in the initial connection to this LU for this mode.

```
INSERT INTO SYSIBM.LUMODES VALUES ('LUDB22','LOC2MODE',75,'N');
```

CNOS processing negotiates a value that is the lesser of the number of sessions available at either system for that mode. Therefore, USIBMSTODB22 must also increase its CONVLIMIT value to at least 75.

See “CNOS processing in Db2” on page 822 for an example of how CNOS processing works.

Columns of the LUMODES table:

LUNAME CHAR(8)
Again, this is the LU name of the other system. This column is a foreign key of the LUNAMES table; thus, all LU names defined in this table must be defined in LUNAMES. When you delete an LU name from the LUNAMES table, all associated rows in LUMODES are deleted.

MODENAME CHAR(8)
The name of the logon mode description in the VTAM logon mode table that VTAM uses when creating a conversation to support the request from the local Db2 for data from another system. The mode named here must exist in the mode table used by Db2 before a conversation can be created between USIBMSTODB21 and USIBMSTODB22.

CONVLIMIT SMALLINT
The maximum number of conversations to be concurrently active between this Db2 subsystem and the other system for this mode. This number overrides the number in the DSESLIM option of the VTAM APPL definition statement during CNOS processing..

GUPI

Related concepts

CNOS processing in Db2

The distributed data facility of Db2 can request to alter the number of sessions with another system for a specific VTAM logon mode. This automatic process is called *change number of sessions* (CNOS).

Update SYSIBM.MODESELECT to associate plans with modes
SYSIBM.MODESELECT correlates authorization IDs and plan names with mode names. The primary key for this table is the combination of AUTHID, LUNAME, and PLANNAME.

About this task

GUPI

Only one entry with the same AUTHID, LUNAME, and PLANNAME is allowed.

Use this table to make sure that certain authorization IDs using certain plans always have a predefined class of service suited for that operation. For example, the USIBMSTODB21 location might want to work with USIBMSTODB22 to set up a high performance mode for DBADM to run queries to USIBMSTODB22. After the following statement is committed, all subsequent threads to USIBMSTODB22 use mode DB2MODE1 to process SQL processing conversations:

```
INSERT INTO SYSIBM.MODESELECT VALUES ('DBADM',' ','LUDB22','DB2MODE1');
```

Populating this table is optional. If the remaining columns are blank for any given LU name, then the mode name applies to all authorization IDs for all PLANNAMEs accessing the given LU name.

Columns of the MODESELECT table:

AUTHID CHAR(8)
The authorization ID of the request for data from another system. A blank AUTHID indicates that the specified mode name applies to all authorization IDs. Blank is the default.

PLANNAME CHAR(8)
The plan name associated with the request for data from another system. A blank plan name indicates that the specified mode name applies to all plan names. Blank is the default.

LUNAME CHAR(8)
The LU name to which the specific mode name applies. This column is a foreign key of the LUNAMES table; therefore, all LU names defined in this table must be defined in LUNAMES.

MODENAME CHAR(8)
The name of the logon mode description in the VTAM logon mode table that is used when creating a conversation to support the request for data from another system. If this column is blank, the default mode (IBMDB2LM or IBMRDB) is used.

How an SQL processing conversation mode is chosen:

The MODESELECT table of the CDB is used to choose a mode for an SQL processing conversation (if the MODESELECT column of the LUNAMES table contains Y for this LU name). The table below shows the search order of the MODESELECT table.

Table 147. Precedence search order for MODESELECT table of CDB

AUTHID	PLANNAME	Result
Name	Name	The MODENAME applies to the named AUTHID for the named PLANNAME accessing the named LU.
Name	Blank	The MODENAME applies to the named AUTHID for all PLANNAMEs accessing the named LU.
Blank	Name	The MODENAME applies to all AUTHIDs for the named PLANNAME accessing the named LU.
Blank	Blank	The MODENAME applies to all AUTHIDs for all PLANNAMEs accessing the named LU.

If the MODESELECT column of the LUNAMES table contains Y for a particular LU name and no row is found for that LU name in the MODESELECT table, then you receive a negative SQL return code when trying to access the system at that LU.

Plan name for remote bind operations: If you want to specify a particular mode for remote bind operations, use the plan name DSNBIND in MODESELECT.

GUPI

When updates to CDB values take effect for VTAM (SNA) connections

Any table in the CDB can be updated while DDF is active.

The changes take effect as follows:

- Updates to LUMODES take effect the next time DDF is started, or on the initial session to a given LUMODE combination.
- Updates to LUNAMES, LOCATIONS, and LULIST take effect as follows:
  - If DDF has not yet tried to communicate with a particular remote location, rows added to LUNAMES and LOCATIONS take effect when DDF attempts to communicate with that location.
  - If DDF has already attempted communication with a particular location, rows added to LUNAMES and LOCATIONS take effect the next time DDF is started.
- Updates to USERNAMES and MODESELECT take effect at the next thread access.
- Deletion of rows from any CDB table takes effect the next time DDF is started.

In all cases, existing conversations continue to operate as the table specified before the update.

Recommendation: If you are switching from TCP/IP to VTAM connections, stop and start DDF after you modify the CDB tables.

Important: The process of modifying the CDB, particularly MODESELECT and USERNAMES, can interfere with DDF access to the tables. This could potentially cause deadlocks and timeouts, which cause the attempted access to the remote system to fail.

Calculating session limits

You can calculate session limit values for DRDA access.

About this task

You might have to derive a precise figure for your session limits (DSESLIM). For example, if you specify a very large number for your session limits and you are running short of space, it might help to calculate a number closer to what you actually need.

Procedure

For DRDA access, determine the maximum number of concurrently active applications that use the mode to and from the remote system.

Example

For example, suppose location A has a maximum of 3 DRDA access applications that can run concurrently on Mode1 to other locations. Also suppose that a maximum of 10 DRDA access applications can be incoming to location A on Mode1. In this case, Mode1 should support 13 sessions for DRDA access applications.

Calculating VTAM I/O buffer pool (IOBUF) storage

You can estimate VTAM buffer pool storage when you use the distributed data facility of Db2. Every *path information unit* (PIU) that enters or leaves VTAM resides in one or more IOBUF buffers.

About this task

A PIU is composed of a 26-byte transmission header, a 3-byte request/response header, and the request/response unit (RU) that contains VTAM application data. You define the length of the RU in a mode entry, using the RUSIZES option.

Procedure

To calculate the maximum number of buffers that are required for the local Db2 subsystem:

1. Calculate the number of buffers that each PIU occupies, and call it PIUBUF.

   ```
   PIUBUF = CEILING(( 29 + RUSIZE ) / BUFSIZE)
   ```

   RUSIZE is the length of the RU in bytes. It is assumed to be the same for both session directions. BUFSIZE is the value you specified in the IOBUF pool definition.

   Assume you have a buffer size of 441 bytes, and an RUSIZE of 4096. With these values, PIUBUF would be 10 ((29+4096) / 441, rounded up).

   For channel-to-channel (CTC) and NCP connections, you need to be concerned with the VTAM MAXBFRU value. For CTC connections, MAXBFRU is the number of 4KB buffers allocated to hold the PIUs sent over the channel. If your RU size is 4096 and you allow 29 bytes for the header, then you need to allocate at least 2 4KB buffers. Thus, you need a MAXBFRU value of at least 2.

   When you route data through NCP, MAXBFRU is the number of VTAM IOBUF buffers allocated to hold the PIUs sent to the NCP, which means MAXBFRU must be at least as large as PIUBUF.
2. Calculate the maximum number of IOBUF buffers used by a session, and call it SESSBUF.

   ```
   SESSBUF = PACECNT × PIUBUF
   ```

   PACECNT stands for pacing count. For this example, assume that pacing is the same in both directions, and it is the same for all modes.

   If pacing is set to 2, then SESSBUF is 20.
3. Calculate the maximum number of sessions that can be active for all modes to all systems and call it SESCNT. Calculate the maximum for each mode, then add those results to get SESCNT.
4. Calculate the maximum number of VTAM buffers used by Db2, and call this DB2BUF.

   The formula for DB2BUF is based on a worst case scenario, because it assumes that all sessions are used by concurrent conversations.

   ```
   DB2BUF = SESCNT × SESSBUF
   ```

   If you assume that the maximum number of sessions that can be active is 50 (SESCNT), then 1000 is the number of IOBUF entries required by Db2 in a worst case scenario.
5. Calculate actual VTAM buffer storage consumption used by Db2, and call it STORAGE.

   ```
   STORAGE = DB2BUF × (BUFSIZE + 71)
   ```

   Each buffer includes 71 bytes for VTAM internal headers.

   So, to continue the above example, an upper value of real storage is estimated as follows:

   ```
   1000 × (441 + 71) = 500KB
   ```

Related concepts

Session-level pacing

Session-level pacing is the mechanism by which the receiver of data (Db2, in this case) can control the pace at which the sender sends data (in the form of RUs).

Definitions for channel-connected Db2 subsystems
When determining your channel-to-channel definitions, remember that MAXBFRU must be large enough to handle the largest PIU.

NCP-connected Db2 subsystems
The Advanced Communications Facility/Network Control Program (ACF/NCP) is a product that you can use to generate a network control program load module. The network control program load module is loaded from the host into a communications controller.

Related tasks

Calculating session limits
You can calculate session limit values for DRDA access.

CNOS processing in Db2

The distributed data facility of Db2 can request to alter the number of sessions with another system for a specific VTAM logon mode. This automatic process is called *change number of sessions* (CNOS).

This topic contains a brief overview of the process as it relates to Db2; it should help you understand the messages that CNOS processing generates.

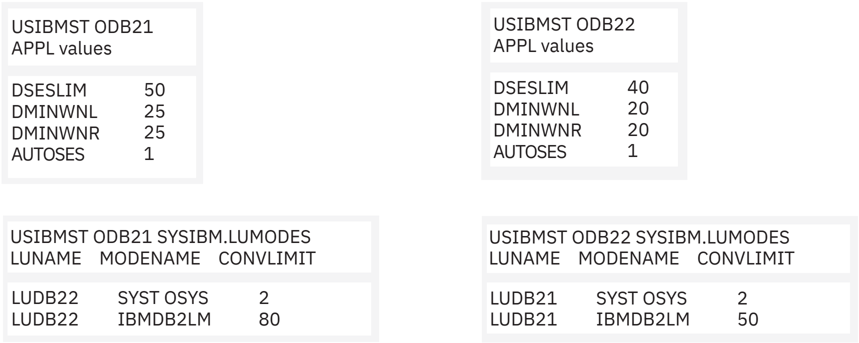
When sessions are started: The AUTOSES option of the VTAM APPL determines whether, and how many, sessions are started at the time CNOS is negotiated. If AUTOSES is 0, then the sessions are not started at CNOS negotiation time; they are started as they are needed. AUTOSES should generally not be 0, because then Db2 is not informed if CNOS fails, and you receive a "resource unavailable" SQL code with the first SQL request to the remote system.

If AUTOSES is not 0, then sessions are started as follows:

- If AUTOSES is equal to or less than the number of contention winner sessions for a specific Db2 subsystem, then the number of sessions that are automatically started at CNOS negotiation is equal to AUTOSES.
- If AUTOSES is greater than the number of contention winner sessions for a specific Db2 subsystem, only the contention winner sessions are automatically started at CNOS negotiation.

Each LU has its own value for the number of contention winner sessions to start. The total number of sessions started on behalf of a CNOS negotiation request is the sum of the sessions started at each site.

Example: Suppose the Db2 subsystems at USIBMSTODB21 and USIBMSTODB22 have the following values in their VTAM APPL statements and LUMODES tables:



USIBMST ODB21
APPL values

DSESLIM	50
DMINWNL	25
DMINWNR	25
AUTOSES	1

USIBMST ODB22
APPL values

DSESLIM	40
DMINWNL	20
DMINWNR	20
AUTOSES	1

USIBMST ODB21 SYSIBM.LUMODES

LUNAME	MODENAME	CONVLIMIT
LUDB22	SYST OSYS	2
LUDB22	IBMDB2LM	80

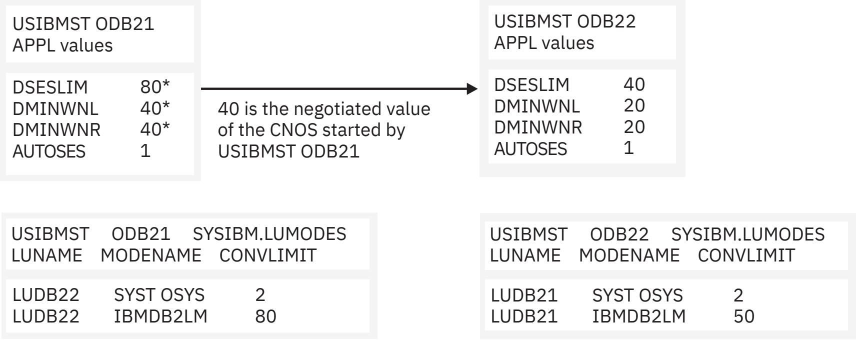
USIBMST ODB22 SYSIBM.LUMODES

LUNAME	MODENAME	CONVLIMIT
LUDB21	SYST OSYS	2
LUDB21	IBMDB2LM	50

Assume that USIBMSTODB21's DDF is started first. CNOS processing fails because USIBMSTODB22's DDF has not yet started, and you get a message at the console. When USIBMSTODB22's DDF is started, CNOS processing can begin. The CNOS negotiation process is as follows:

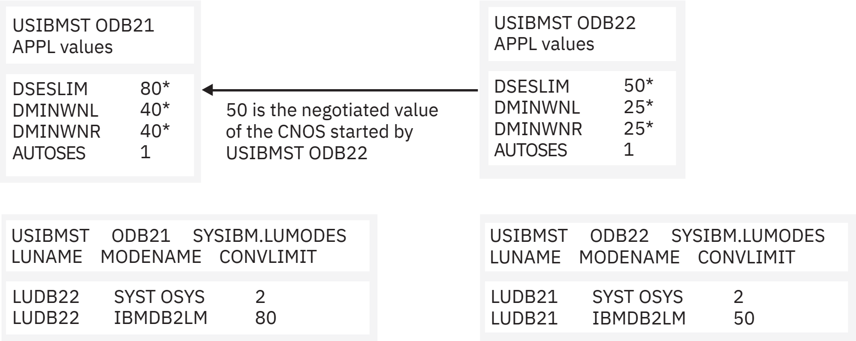
1. USIBMSTODB21 has a DSESLIM value of 50, and a CONVLIMIT value of 80. For this first step in the CNOS negotiation, the CONVLIMIT value overrides the DSESLIM value, so USIBMSTODB21 sends an initial CNOS value of 80 to USIBMSTODB22. During this initial negotiation step, the LUMODES information for USIBMSTODB22 is not yet used. USIBMSTODB22 replies to USIBMSTODB21 with its DSESLIM value of 40, which is less than the initial CNOS value of 80. An initial negotiated value of 0

to 40 sessions is therefore established. A second and final negotiation, as described in step “2” on page 823, is then initiated by USIBMSTODB22. The following image shows the result of the CNOS negotiation that was started by USIBMSTODB21. Overridden values are noted with asterisks (*).



After the number of sessions is negotiated, both systems begin starting the number of sessions that are specified in their respective AUTOSES options. VTAM does not start all 40 sessions unless the two AUTOSES values total up to 40 or greater. Instead, VTAM delays starting the other sessions until they are needed.

2. Everything up to this point occurred because USIBMSTODB21 initiated CNOS, resulting in an initial negotiation of 0 to 40 sessions. Now, as shown in the following figure, USIBMSTODB22 initiates a second CNOS negotiation back to USIBMSTODB21 because USIBMSTODB22's LUMODES table has a CNOS limit specified by the CONVLIMIT value of 50. USIBMSTODB21's VTAM sees that Db2 allows up to 80 sessions, so VTAM sends the CNOS reply message back to USIBMSTODB22 with an unchanged value of 50. USIBMSTODB22's CONVLIMIT value of 50 is compared with USIBMSTODB21's overridden value of 80 from the previous CNOS, and a final value of 40 to 50 sessions is negotiated. The following image shows the CNOS negotiation from USIBMSTODB22 to USIBMSTODB21. Overridden values are noted with asterisks (*).



If the new negotiated value is smaller than the number already started by USIBMSTODB21, VTAM terminates the number of sessions that makes up the difference. If the CONVLIMIT value at USIBMSTODB22 is 20, for example, VTAM terminates 20 sessions on behalf of the request from USIBMSTODB22 because the lowest negotiated value always wins. If a session is currently being used by a conversation, the session is terminated as soon as the conversation is deallocated.

Related reference

Managing Sessions (z/OS Communications Server: SNA Programmer's LU 6.2 Guide)

Sample VTAM definitions to connect two Db2 subsystems

Sample VTAM definitions are provided to give you some guidance on setting up your network to connect two Db2 subsystems. The samples are not intended to give you information about all the options.

This set of definitions includes the basic definitions you need to connect two Db2 subsystems. Additional options for channel-to-channel and Network Control Program (NCP) connections are covered as well.

Basic VTAM definitions

Some basic definitions are required for all VTAM connections.

These definitions are listed below.

```
*********************************************************************
**      APPL STATEMENT FOR SYSTEM 1                                 *
*********************************************************************
DB1APPL  APPL APPC=YES,                                             X
         ATNLOSS=ALL,                                               X
         AUTH=(ACQ),                                                X
         AUTOSES=1,                                                 X
         DSESLIM=20,                                                X
         DMINWNL=10,                                                X
         DMINWNR=10,                                                X
         PRTCT=DB1PWD,                                              X
         SECACPT=ALREADYV,                                          X
         EAS=509,                                                   X
         MODETAB=DB2MODES,                                          X
         PARSESS=YES,                                               X
         SRBEXIT=YES,                                               X
         SYNCLVL=SYNCPT,                                            X
         VPACING=2
```

```
*********************************************************************
**      APPL STATEMENT FOR SYSTEM 2                                 *
*********************************************************************
DB2APPL  APPL APPC=YES,                                             X
         ATNLOSS=ALL,                                               X
         AUTH=(ACQ),                                                X
         AUTOSES=1,                                                 X
         DSESLIM=20,                                                X
         DMINWNL=10,                                                X
         DMINWNR=10,                                                X
         PRTCT=DB2PWD,                                              X
         SECACPT=ALREADYV,                                          X
         EAS=509,                                                   X
         MODETAB=DB2MODES,                                          X
         PARSESS=YES,                                               X
         SRBEXIT=YES,                                               X
         SYNCLVL=SYNCPT,                                            X
         VPACING=2
```

```
**********************************************************************
**    LOGMODE TABLE FOR SYSTEM 1 TO SYSTEM 2 CONNECTIONS
**********************************************************************
DB2MODES MODETAB
*********************************************************************
*     LU6.2 SERVICES MANAGER BASE MODE FOR APPC/VTAM
*********************************************************************
SNASVCMG MODEENT LOGMODE=SNASVCMG,                                  X
                 FMPROF=X'13',                                      X
                 TSPROF=X'07',                                      X
                 PRIPROT=X'B0',                                     X
                 SECPROT=X'B0',                                     X
                 PSERVIC=X'060200000000000000000300',               X
                 COMPROT=X'D0B1',                                   X
                 RUSIZES=X'8585',                                   X
                 ENCR=B'0000'
*********************************************************************
```

```
**********************************************************************
** DB2 DEFAULT FOR SYSTEM 1 AND SYSTEM 2 DRDA ACCESS                **
**********************************************************************
IBMRDB MODEENT LOGMODE=IBMRDB,                                       X
               TYPE=0,                                               X
               PSNDPAC=X'00',                                        X
               SSNDPAC=X'02',                                        X
               SRCVPAC=X'00',                                        X
               RUSIZES=X'8989',                                      X
               FMPROF=X'13', LU6.2 FM PROFILE                        X
               TSPROF=X'07', LU6.2 TS PROFILE                        X
               PRIPROT=X'B0', LU6.2 PRIMARY PROTOCOLS                X
               SECPROT=X'B0', LU6.2 SECONDARY PROTOCOLS              X
               COMPROT=X'50A5', LU6.2 COMMON PROTOCOLS               X
               PSERVIC=X'060200000000000000122F00' LU6.2 LU TYPE
```

```
***********************************************************************
** ATCSTRTA VTAM START OPTIONS FOR SYSTEM 1, INCLUDES IOBUF
***********************************************************************
  CONFIG=TA,                                                          X
  SSCPID=53,MAXSUBA=150,HOSTSA=53,                                    X
  SSCPNAME=SSCP004,NETID=USIBMSY,                                     X
  IOBUF=(328,441,20,,64,48,768)
***********************************************************************
** ATCSTRTB VTAM START OPTIONS FOR SYSTEM 2, INCLUDES IOBUF
***********************************************************************
  CONFIG=TB,                                                          X
  SSCPID=54,MAXSUBA=150,HOSTSA=54,                                    X
  SSCPNAME=SSCP00E,NETID=USIBMSY,                                     X
  IOBUF=(328,441,20,,64,48,768)
```

Figure 127. Basic VTAM definitions

Related reference

VTAM Application Program Major Node (SNA Resource Definition Reference)

VTAM Start Options (SNA Resource Definition Reference)

VTAM Logon Mode Table (SNA Resource Definition Reference)

Definitions for channel-connected Db2 subsystems

When determining your channel-to-channel definitions, remember that MAXBFRU must be large enough to handle the largest PIU.

Because Db2 is sending 4096 bytes, you need enough 4KB buffers to accept 4096 + 29 bytes (the 29 bytes is for the network header). Thus MAXBFRU must be at least 2 in our example.

In many cases, the Db2 RU size is larger than any other PIUs used on existing CTCs, which can mean you must examine your MAXBFRU values on existing CTC definitions. If the values are too small, you get an SNA X'800A' sense code, indicating that the PIU was truncated during transmission.

```
***********************************************************************
**       CTC DEFINITIONS FOR SYSTEM 1                                 *
***********************************************************************
DB1CTC   VBUILD TYPE=CA          CTC MAJOR NODE DEFINITION
DB1GRPB  GROUP  LNCTL=CTCA,      CTCA LINE TYPE                       X
                MIH=YES,REPLYTO=10.0
DB1CTCL  LINE   ADDRESS=(500),   CTC ADDRESS FOR THIS LINE            X
                DELAY=0,         CTC DELAY                            X
                MAXBFRU=8,       MAX BUFFER USED                      X
                ISTATUS=ACTIVE    INITIAL STATUS IS ACTIVE
DB1CTCP  PU     ISTATUS=ACTIVE
```

```
***********************************************************************
**       CTC DEFINITIONS FOR SYSTEM 2                                 *
***********************************************************************
DB2CTC   VBUILD TYPE=CA          CTC MAJOR NODE DEFINITION
DB2GRPB  GROUP  LNCTL=CTCA,      CTCA LINE TYPE                       X
                MIH=YES,REPLYTO=10.0
DB2CTCL  LINE   ADDRESS=(500),   CTC ADDRESS FOR THIS LINE            X
                DELAY=0,         CTC DELAY                            X
                MAXBFRU=8,       MAX BUFFER USED                      X
                ISTATUS=ACTIVE    INITIAL STATUS IS ACTIVE
DB2CTCP  PU     ISTATUS=ACTIVE
```

```
***********************************************************************
**       PATH - NETWORK ROUTES FOR SYSTEM 1                           *
***********************************************************************
MVSDB2   PATH DESTSA=2,ER1=(2,1),VR1=1,                               X
              VRPWS10=(2,30),VRPWS11=(2,30),VRPWS12=(2,30)
***********************************************************************
**       PATH - NETWORK ROUTES FOR SYSTEM 2                           *
***********************************************************************
MVSDB1   PATH DESTSA=1,ER1=(1,1),VR1=1,                               X
              VRPWS10=(2,30),VRPWS11=(2,30),VRPWS12=(2,30)
```

```
***********************************************************************
**      CDRSC DEFINITIONS FOR SYSTEM 1                                *
***********************************************************************
         VBUILD TYPE=CDRSC
DB2APPL  CDRSC CDRM=DB2CDRM,ISTATUS=ACTIVE
***********************************************************************
**      CDRSC DEFINITIONS FOR SYSTEM 2                                *
***********************************************************************
         VBUILD TYPE=CDRSC
DB1APPL CDRSC CDRM=DB1CDRM,ISTATUS=ACTIVE
```

```
***********************************************************************
**      CDRM DEFINITIONS FOR SYSTEM 1 AND 2 (SAME DEFINITION USED)    *
***********************************************************************
         VBUILD TYPE=CDRM
DB1CDRM CDRM SUBAREA=1,ISTATUS=ACTIVE,CDRSC=OPT
DB2CDRM CDRM SUBAREA=2,ISTATUS=ACTIVE,CDRSC=OPT
```

```
***********************************************************************
**    ATCCONTA - NETWORK CONFIGURATION LIST FOR SYSTEM 1              *
***********************************************************************
DB1PATH,DB1CTC,DB1RSC,DB1APPLS,DBCDRMS
***********************************************************************
**    ATCCONTB - NETWORK CONFIGURATION LIST FOR SYSTEM 2              *
***********************************************************************
DB2PATH,DB2CTC,DB2RSC,DB2APPLS,DBCDRMS
```

Figure 128. Channel-to-channel (CTC) definitions

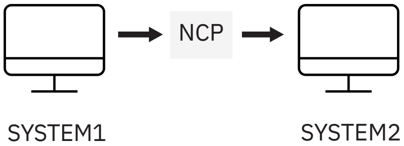
NCP-connected Db2 subsystems

The Advanced Communications Facility/Network Control Program (ACF/NCP) is a product that you can use to generate a network control program load module. The network control program load module is loaded from the host into a communications controller.

The network control program controls the lines and devices attached to it. It transfers data to and from the devices and handles any errors that occur, including retries after line errors.

A communications controller can be locally attached to a host via a channel, or it can be link-attached to another communications controller that is channel-attached.

Our sample definitions are used for the following setup:


NCP
SYSTEM1
SYSTEM2

When you are defining your NCP connections, remember the following:

- MAXBFRU must be large enough to handle the biggest PIU that is sent to the NCP. In our example, Db2 is sending 4125 bytes per PIU (4096 + a 29-byte network header). Given an IOBUF buffer size of 441 bytes, MAXBFRU must therefore be at least 10 (10 × 441 = 4410, which is greater than 4125).
- The MAXDATA option must also be large enough to handle biggest PIU (RUSIZE + 29 bytes).

If Db2 is using existing NCP definitions, you should make sure your MAXBFRU and MAXDATA options are large enough. If these values are too small, you get an SNA X'800A' sense code, indicating that the PIU was truncated during transmission.

```
***********************************************************************
*        PCCU SPECIFICATION - FOR SYSTEM 1                            *
***********************************************************************
PCCU1    PCCU  CUADDR=C02,         3745 BLOCK CHANNEL                 X
               AUTOSYN=YES,                                           X
               AUTODMP=NO,                                            X
               AUTOIPL=NO,                                            X
               BACKUP=YES,                                            X
               DELAY=0,                                               X
               DUMPDS=DUMPDS,      DUMP DATA SET                      X
               CDUMPDS=CDUMPDS,    CSP DUMP DATA SET                  X
               MDUMPDS=MDUMPDS,    MOSS DUMP DATA SET                 X
               INITEST=NO,         NO 3745 INITIAL TESTS AT LOAD TIME X
               MAXDATA=4302,       = BFRS*TRANSFR - 18                X
               OWNER=HOST1,                                           X
               SUBAREA=3,          HOST SUBAREA                       X
               VFYLM=YES
```

```
***********************************************************************
*        PCCU SPECIFICATION - FOR SYSTEM 2                            *
***********************************************************************
PCCU2    PCCU  CUADDR=C02,         3745 BLOCK CHANNEL                 X
               AUTOSYN=YES,                                           X
               AUTODMP=NO,                                            X
               AUTOIPL=NO,                                            X
               BACKUP=YES,                                            X
               DELAY=0,                                               X
               DUMPDS=DUMPDS,      DUMP DATA SET                      X
               CDUMPDS=CDUMPDS,    CSP DUMP DATA SET                  X
               MDUMPDS=MDUMPDS,    MOSS DUMP DATA SET                 X
               INITEST=NO,         NO 3745 INITIAL TESTS AT LOAD TIME X
               MAXDATA=4302,       = BFRS*TRANSFR - 18                X
               OWNER=HOST2,                                           X
               SUBAREA=4,          HOST SUBAREA                       X
               VFYLM=YES
```

```
***********************************************************************
*        BUILD MACRO SPECIFICATIONS                                   *
***********************************************************************
ACFNCPBD BUILD BFRS=(240),         NCP BUFFER SIZE,# EP BUFFERS       X
               BRANCH=1000,                                           X
               CATRACE=(YES,10),                                      X
               CSMHDR=27F5C711C3F0405C40C8C4D9405C,                   X
               CSMHDRC=40E3C5E7E3405C5C,                              X
               CSMSG=5C5C40E5E3C1D440E2C8E4E3C4D6E6D540,              X
               CSMSGC=6040C8C1E240C2C5C7E4D5405C5C,                   X
               DIALTO=60,          WAIT 1 MIN FOR AUTOCALL ANSWER     X
               DR3270=NO,          NO DYNAMIC RECONFIG                X
               DSABLTO=3.0,        TIME TO DETECT DSR DROP            X
               ENABLTO=2.2,        TIME TO DETECT DSR AFTER ENABLE    X
               LOADLIB=NCPLOAD,    LIBRARY FOR ACF/NCP LOAD MODULE    X
               LTRACE=8,           UP TO 8 LINES CONCURRENTLY TRACED  X
               MAXSSCP=8,          NUMBER OF SSCPS IN SESSION         X
               MAXSUBA=63,         MUST BE SAME AS IN ATCSTRXX        X
               MEMSIZE=4M,         AMOUNT OF MEMORY                   X
               MODEL=3745,         3745 MODEL 410                     X
               NETID=BCR1,         3745 MODEL 410                     X
               NEWNAME=DDBLC0,     LOAD MODULE NAME                   X
               PUNAME=DDB,                                            X
               NPA=YES,            NPA WILL NOT COLLECT DATA          X
               OLT=NO,             INCLUDE ONLINE TEST FACILITY-OLTEP X
               PRTGEN=NOGEN,       DON'T PRINT ASSEMBLED STATEMENTS   X
               PWROFF=NO,                                             X
               SLODOWN=15,         SLOWDOWN AFTER 15% BUFFERS AVAIL   X
               SUBAREA=26,         NCP SUBAREA                        X
               TRACE=(YES,10),     10-16 BYTE ADDRESS TRACE ENTRIES   X
               TRANSFR=18,         =(4096+51)/BFRS--ROUNDED UP        X
               TRCPIU=2000,        SIZE OF LINE AND SIT TRACE         X
               TYPGEN=NCP,                                            X
               TYPSYS=MVS,         MVS OPERATING SYSTEM               X
               USGTIER=5,          NCP USAGE TIER - REQUIRED          X
               VERSION=V5R3,                                          X
               XBREAK=NONE
```

```
**********************************************************************
**                                                                  **
*        SYSCNTRL OPTIONS - REQUIRED BY VTAM                         *
**                                                                  **
**********************************************************************
         SYSCNTRL OPTIONS=(ENDCALL,MODE,RCNTRL,RCOND,RECMD,RIMM,     X
               SESSION,NAKLIM,LNSTAT,SSPAUSE,XMTLMT,BHSASSC,STORDSP)
**********************************************************************
HOST2    HOST  BFRPAD=0,           VTAM REQUIREMENT FOR OS           X
               INBFRS=18,          INITIAL BUFFERS FOR EACH RECEIVE  X
               MAXBFRU=10,         < BASENO IN IOBUF FOR VTAM        X
               SUBAREA=4,                                            X
               UNITSZ=441          = BUFSIZE IN IOBUF FOR VTAM

HOST1    HOST  BFRPAD=0,           VTAM REQUIREMENT FOR OS           X
               INBFRS=18,          INITIAL BUFFERS FOR EACH RECEIVE  X
               MAXBFRU=10,         < BASENO IN IOBUF FOR VTAM        X
               SUBAREA=3,                                            X
               UNITSZ=441          = BUFSIZE IN IOBUF FOR VTAM
```

```
**********************************************************************
*             PATH STATEMENTS                                        *
**********************************************************************
          PATH DESTSA=3,           SYS1                              X
               ER4=(3,1),          SYS1

          PATH DESTSA=4,           SYS2                              X
               ER4=(4,1),          SYS2
```

```
********************************************************************
*                                                                  *
*   HOST 1 CHANNEL ADAPTER                                         *
*                                                                  *
*   LINE ADDR = 0; PHYSICAL POSITION = 5.                        *
********************************************************************
DDBCA5   GROUP LNCTL=CA,                                             X
               ISTATUS=INACTIVE    STOP VTAM FROM ACT CHAN LINK

DDBL05   LINE  ADDRESS=0,         1ST CA PHYSICAL POSITION 1         X
               CA=TYPE6,          3745 CHANNEL ADAPTER TYPE          X
               CASDL=120,         TIME ALLOWED TO BLOCK INBOUND DATA X
               DELAY=0,           CHAN ATTN DELAY                    X
               DYNADMP=NONE,      NO EP SUBCHANNELS TO DUMP          X
               INBFRS=18,         # BUFS FOR EACH TRANSFER TO HOST   X
               NPACOLL=YES,       NPA WILL COLLECT DATA ON CHANNEL   X
               TIMEOUT=120        INTERVAL BEFORE CHANNEL DISCONTACT

DDBP05   PU    PUTYPE=5,          INTERMEDIATE SUBAREA FUNCTION      X
               TGN=1              MUST BE 1 FOR PUTYPE5
```

```
**********************************************************************
*                                                                    *
*   HOST 2 CHANNEL ADAPTER                                           *
*   LINE ADDR = 2; PHYSICAL POSITION = 7.                          *
**********************************************************************
DDBCA7   GROUP LNCTL=CA,                                             X
               STATUS=INACTIVE    ACT CHAN LINK

DDBL07   LINE  ADDRESS=2,         3RD CA PHYSICAL POSITION 3         X
               CA=TYPE6,          3745 CHANNEL ADAPTER TYPE          X
               CASDL=120,         TIME ALLOWED TO BLOCK INBOUND DATA X
               DELAY=0,           CHAN ATTN DELAY                    X
               DYNADMP=NONE,      NO EP SUBCHANNELS TO DUMP          X
               INBFRS=18,         #BUFS FOR EACH TRANSFER TO HOST    X
               NPACOLL=YES,       NPA WILL COLLECT DATA ON CHANNEL   X
               TIMEOUT=120        INTERVAL BEFORE CHANNEL DISCONTACT
```

```
DDBP07 PU      PUTYPE=5,          INTERMEDIATE SUBAREA FUNCTION      X
               TGN=1              MUST BE 1 FOR PUTYPE5
```

Figure 129. Network control program (NCP) definitions

Using the change log inventory utility to update the BSDS

The DDF statement of the change log inventory utility can be used to insert or update information that is stored in the bootstrap data set.

Procedure

Use the options of the DDF statement of the change log inventory utility as follows.

- To update any value, you need to use only the option for that value. To insert new values, you need values for LOCATION, LUNAME, and any other values that you want to specify.

  Value
  Option for inserting or updating

  Location alias
  ALIAS *names*

  This value is optional. You can add or delete aliases by respecifying the ALIAS names. The new list of names replaces the existing list.

  Location name
  LOCATION=*name*

  LU name
  LUNAME=*name*

  Generic LU name
  GENERIC=*name*

  Password
  PASSWORD=*password*

  This value is optional, depending on whether you entered a password in the VTAM APPL statement

  TCP/IP connection port
  PORT=*number*

  This value is optional. If you specify a value, it must be nonzero and different from the value of RESPORT. You can delete the port by entering 0.

  TCP/IP resync port
  RESPORT=*number*

  This value is optional. If you specify a value, it must be nonzero and different from the value of PORT. You can delete the port by entering 0.

- To delete either a generic LU name, a password, or an alias, use one of these keywords:

  Value
  Statement for deleting

  Generic LU name
  NGENERIC

  Password
  NOPASSWD

  Alias
  NOALIAS

Related information

Installing the Unified Debugger session manager on a z/OS system

The session manager can handle communications between a debug client, such as the debug client of IBM Data Studio, and a Db2 for z/OS data server. The session manager can run on the client on which the Unified Debugger is installed, or on a z/OS system. For better performance when you debug Db2 for z/OS routines, you can install the session manager on a z/OS system.

Before you begin

Ensure that the session manager file, `db2dbgm.jar`, was installed on the z/OS system during the Db2 for z/OS installation process. It should be in following HFS directory: `/usr/lpp/db2b10/base/lib`.

About this task

The session manager that you install on a z/OS system is compatible with all currently supported versions of Db2 for z/OS. However, this could change in the future.

Procedure

To install the session manager on a z/OS system, follow these steps:

1. Create the JCL for a started task that runs the session manager, in a member named DB2UDSMD in the system PROCLIB. See the comments in the example for the values that you need to change.

   Important: The started task must be named DB2UDSMD.

```
//UDBG3 JOB CLASS=A,
// MSGCLASS=H,MSGLEVEL=(1,1), REGION=4096K,
// USER=STDTSKID,PASSWORD=STDTSKPW
//*---------------------------------------------------------------------
//* This job creates the started task JCL for DB2UDSMD. You can then
//* launch the Unified Debugger session manager on z/OS with a
//* START command.
//* - Change STDTSKID and STDTSKPW to the user ID and password that
//*   are associated with the started task.
//*   The ID that is associated with the started task is defined in
//*   the RACF STARTED class profile DB2UDSMD.**
//*---------------------------------------------------------------------
//*---------------------------------------------------------------------
//* This step uses IEBUPDTE to write a JCL member into your system
//* PROCLIB.
//* - Change SYS1.PROCLIB to the name of your system PROCLIB.
//*---------------------------------------------------------------------
//WRITEJCL EXEC PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSUT2 DD DISP=SHR,DSN=SYS1.PROCLIB
//SYSIN DD DATA
./ ADD NAME=DB2UDSMD
//DB2UDSMD PROC PORT=4553,TIMEOUT=60
//*
//* DB2UDSMD starts the Unified Debugger session manager daemon for
//* UNIX System Services.
//* Change the default PORT and TIMEOUT values to valid values
//* for your z/OS system. You can override these values when
//* you issue the START command for the DB2UDSMD started task.
//*
//* This JCL assumes that no .profile file exists for the user
//* ID under which the started task runs.
//*
//* Environment settings (PATH, CLASSPATH) come from the
//* file that is specified by the STDENV DD statement.
//* - Change /u/stdtskid/DB2UDSMDenvironment to the path and
//*   file name for the environment file.
//* - Change the paths in the STDOUT and STDERR to the appropriate
//*   paths for your UNIX System Services installation.
//*   Ensure that the user ID under which the started task runs
//*   has the privileges to write to STDOUT and STDERR.
//DB2UDSMD EXEC PGM=BPXBATCH,DYNAMNBR=128,REGION=0M,TIME=1440,
// PARM='SH date;java com.ibm.db2.psmd.mgr.Daemon -timeout
// &TIMEOUT -port &PORT -log /dev/null;date'
//STDOUT DD PATH='/tmp/DB2UDSMD.stdout',
// PATHOPTS=(OWRONLY,OCREAT,OAPPEND,OTRUNC),
// PATHMODE=(SIRUSR,SIWUSR,SIRGRP,SIROTH)
//STDERR DD PATH='/tmp/DB2UDSMD.stdout',
// PATHOPTS=(OWRONLY,OCREAT,OAPPEND,OTRUNC),
// PATHMODE=(SIRUSR,SIWUSR,SIRGRP,SIROTH)
//STDENV DD PATH='/u/stdtskid/DB2UDSMDenvironment',
// PATHOPTS=ORDONLY
// PATHOPTS=ORDONLY
./ ENDUP
/*
```

2. Define the DB2UDSMD started task to RACF, by customizing and running JCL similar to this example:

```
//UDBG1 JOB ...
//*-------------------------------------------------------------------
//* A security administrator runs this job to define the started task
//* for the Unified Debugger session manager to RACF. The job
//* performs these steps:
//* 1. Defines an OMVS segment for the user ID that is associated
//*    with the started task. This step is necessary because the
//*    started task runs a Java program from OMVS. In the ALTUSER
//*    statement:
//*    - Change STDTSKID to the user ID that is associated with
//*      the started task.
//*    - Change /u/stdtskid to the current working directory for
//*      the user's process when the started task issues the OMVS
//*      command.
//* 2. Adds a profile for the started task, which is named
//*    DB2UDSMD.** to the RACF database.
//*    In the RDEFINE statement, change STDTSKID to the user ID
//*    that is associated with the started task.
//* 3. Activates the started task definition in current memory.
//*-------------------------------------------------------------------
//RACFDEF EXEC PGM=IKJEFT01,DYNAMNBR=20
//SYSTSPRT DD SYSOUT=A
//SYSTSIN DD *
ALTUSER STDTSKID OMVS( UID(5) HOME('/u/stdtskid') PROGRAM('/bin/sh') )
RDEFINE STARTED DB2UDSMD.** STDATA(USER(STDTSKID))
SETROPTS RACLIST(STARTED) REFRESH
END
```

3. Create the file in the home directory of the user ID under which the DB2UDSMD started task runs. The file must specify at least the settings for the ENV, PATH, and CLASSPATH parameters.

```
//UDBG2 JOB ...
//*---------------------------------------------------------------------
//* Create a file in HFS to hold the environment settings that are used
//* when the Unified Debugger session manager runs as a started task
//* on z/OS.
//*
//* Replace /u/stdtskid with the path that is associated with the
//* home directory of the user ID under which the started task runs.
//* You can use DB2UDSMDenvironment for the environment file name,
//* or change the name to something else. The environment file path
//* and name need to be the same as those specified in the JCL for
//* the session manager started task.
//*---------------------------------------------------------------------
//OCOPY EXEC PGM=IKJEFT01,DYNAMNBR=30
//SYSTSPRT DD SYSOUT=*
//HFSOUT DD PATH='/u/stdtskid/DB2UDSMDenvironment',
// PATHOPTS=(OWRONLY,OCREAT,OAPPEND,OTRUNC),
// PATHMODE=(SIRUSR,SIWUSR,SIRGRP,SIROTH)
//INLINE DD *
#----------------------------------------------------------------------
# Environment settings for running the Unified Debugger session manager:

# The _BPX_BATCH_SPAWN=NO and _BPX_SHAREAS=YES settings
# cause the JVM to run in the same address
# space as the z/OS UNIX shell. Doing this avoids launching two
# additional address spaces for the started task.
#
# The ENV variable value identifies the file that contains the
# location of the environment variable settings. For the session
# manager, set the location to this file. Replace
# /u/stdtskid/DB2UDSMDenvironment with the path and file name
# for this file.
#
# The PATH variable value identifies the path name where
# the Java runtime environment binaries and the system binaries
# are located.
#
```

```
# The CLASSPATH variable value identifies the location of the
# session manager db2dbgm.jar file.
#
# The JAVA_COMPILER=NONE setting disables the JIT compiler.
# The started task runs the session manager only once, so
# disabling the JIT compiler saves space.
#----------------------------------------------------------------------
_BPX_BATCH_SPAWN=NO
_BPX_SHAREAS=YES
ENV=/u/stdtskid/DB2UDSMDenvironment
PATH=/usr/lpp/java170/J7.0/bin:/bin
CLASSPATH=/usr/lpp/db2b10/base/lib/db2dbgm.jar
JAVA_COMPILER=NONE
//SYSTSIN DD *
OCOPY INDD(INLINE) OUTDD(HFSOUT) TEXT
```

4. Start the session manager on z/OS to ensure that it was installed correctly, by completing the following steps:

   a) Issue the following command on the z/OS console.

   ```
   START DB2UDSMD,TIMEOUT=1
   ```

   b) Wait several minutes. During that time, the following events occur:

      i) The started task is launched.

      ii) The session manager program begins.

      iii) The session manager waits for activity for one minute.

      iv) The session manager shuts down.

5. Review the contents of the HFS file that is assigned to STDOUT in the started task JCL.

   The following example shows output when the test is successful. The args array contains three keyword and value pairs that indicate:

   - The period after which the session manager times out if there is no activity
   - The port number of the session manager's network address
   - The path name of the file that contains the session manager trace, the timeout, port values, and the location of the log.

   ```
   args[0]: -timeout
   args[1]: 1
   args[2]: -port
   args[3]: 4553
   args[4]: -log
   args[5]: /dev/null
   Code Level: 070418
   Debug Session Manager started on IP: 9.30.114.205 - port: 4553
   idleTimeOut: 1
   ```

6. Specify in the IBM Data Studio routine debugger preferences that you want to use the session manager that is on the z/OS system by selecting the option "Run the session manager on each connected server."

   The port number must match the port number that you specify when you start the DB2UDSMD started task. If you do not specify a port number when you start DB2UDSMD, the port number that you specify in the routine debugger preferences must match the default port number in the DB2UDSMD started task JCL.

   The port number can identify a session manager anywhere on the network. A session manager is associated with a z/OS system or LPAR, and not with a specific Db2 for z/OS subsystem or data sharing group.

7. Optional: Set up additional session managers.

   A single debug session can connect to only a single session manager. However, you can follow these steps to connect to another session managers on the same z/OS system.

   a) In the IBM Data Studio routine debugger preferences, specify a different port to which you want the Unified Debugger to connect.

b) Start DB2UDSMD with the port number that you specified in the previous step.

```
START DB2UDSMD,PORT=4558
```

To set up additional session managers on different LPARs, follow these steps:

a) Create the JCL for a started task that runs the session manager, in a member named DB2UDSMD in the system PROCLIB of the LPAR.

b) In the IBM Data Studio routine debugger preferences, specify a port to which you want the Unified Debugger to connect.

c) Start DB2UDSMD with the port number that you specified in the previous step.

Related information

Db2 for z/OS Stored Procedures: Through the CALL and Beyond (IBM Redbooks)

Installing a second Db2 subsystem on the same operating system

If you are considering installing a second Db2 subsystem on the same operating system, first see the implications of a second Db2 subsystem.

Implications of a second Db2 subsystem

The primary consideration in planning for a second Db2 subsystem is its purpose. Using a second subsystem has a substantial impact on your environment.

Second Db2 subsystems are not uncommon; organizations use a second Db2 subsystem to:

- Run separate service levels or releases of the code. This can provide more extensive testing of preventive service or a new Db2 release before use with a production system. Separate levels or releases of Db2 on the same system must have separate libraries.
- Separate test and production activities. This setup can improve Db2 performance and availability for production.

  For example, suppose the processor that runs your production subsystem fails. If your test subsystem is on another processor, you can stop the test subsystem and start the production subsystem on that processor. This only works if the requisite Db2 data sets are on shared storage devices and you have used global resource serialization (GRS) (or an equivalent) to protect the production Db2 data sets.
- Prevent access by one class of users to certain data. If this is your primary purpose, reconsider the Db2 authorization scheme.
- Run an application that requires different subsystem parameter settings from other applications or other environments.
- Isolate an application from other applications.

The table below lists other implications of a second Db2 subsystem.

Table 148. Considerations for installing a second Db2 subsystem

Considerations	Decisions that you need to make
Libraries	A single, shared library or separate libraries
RACF protection	Resource and ID for the two subsystems
Db2 logging	BSDS, active, and archive log space requirements
Database space requirements	Db2 directory, Db2 catalog, and user data
Performance	Processor and main storage use

Table 148. Considerations for installing a second Db2 subsystem (continued)

Considerations	Decisions that you need to make
Distributed data facility requirements	• Location names, logical unit names, and network passwords must be coordinated with remote Db2 subsystems • In a non-data sharing environment, each Db2 subsystem needs a unique TCP/IP port and resync port.
Common service area (CSA) requirement	Db2 and the IRLM
Shared storage devices	Giving different names to active and archive log data sets, or including those data sets in the GRS inclusion list
ERLY code	Choose a level of ERLY code that is appropriate for all Db2 subsystems.

Each subsystem must have a separate *prefix*.SDSNEXIT library. Sharing the *prefix*.SDSNSAMP library requires coordination to avoid overlaying parameter members.

Related concepts

Active log data sets storage requirements
Active log data sets record significant events and data changes. Active log data sets are periodically offloaded to archive log data sets. Storage requirements for active log data sets depend on the frequency of data updates and of offloads to archive log data sets.

Connecting distributed database systems
You can use the distributed data facility (DDF) of Db2 to access data that is held by other data management systems. You can also use DDF to make your Db2 data accessible to other systems.

Virtual storage requirements for Db2 address spaces
Db2 uses several types of private address spaces, and each type requires storage.

Related tasks

Loading Db2 libraries for a second Db2 subsystem
If you are installing a second Db2 subsystem on the same operating system, you might need to create separate libraries for each subsystem.

Enabling multiple Db2 subsystems to share disk storage
If you use a non-data sharing environment, you can enable multiple Db2 subsystems to share disk storage. If you use a data sharing environment, the logs must be on shared disk storage.

Related information

Loading Db2 libraries for a second Db2 subsystem

If you are installing a second Db2 subsystem on the same operating system, you might need to create separate libraries for each subsystem.

About this task

If the systems have different code releases or different service levels, they must have separate libraries.

Procedure

To load libraries for a second Db2 subsystem:

1. Separately plan the space for each library.
2. Load the libraries, using different prefixes for each library and for the SMP/E data sets or separate SMP/E zones.

Tailoring installation jobs for a second Db2 subsystem

Before installing a second Db2 subsystem on the same operating system, change the parameter values that are to be used by the installation jobs during the installation.

Procedure

Use the installation CLIST to change parameter values as described in the previous table, as described in Chapter 4, "Tailoring Db2 11 installation and migration jobs with the CLIST," on page 39.

You must change the parameter values listed in the following table. For any parameters that are not in the list, check the values and make appropriate changes.

Table 149. Parameters to change when installing the second subsystem

Installation panel	Action
DSNTIPA1	For separate libraries, change LIBRARY DATA SET NAME PREFIX and DATA SET NAME PREFIX.
DSNTIPA2	You must change CATALOG ALIAS. You can change the values for the DATA CLASS, MGMT CLASS, and STOR CLASS fields.
DSNTIPA3	You can change the values for the VOL/SER, DATA CLASS, MGMT CLASS, and STOR CLASS fields.
DSNTIPI	Change SUBSYSTEM NAME.
DSNTIPP	Change ICF catalog to match the new ICF catalog. Change all passwords.
DSNTIPM	Change SUBSYSTEM NAME and SUBSYSTEM PREFIX.
DSNTIPL	Change data set names and prefixes.
DSNTIPA	Change data set names and prefixes.
DSNTIPS	Change data set names and prefixes.
DSNTIPR	Change names and password.
DSNTIPC	Check values of DSMAX, EDMPOOL, EDMSTMTC, EDMDBDC, SRTPOOL, and MAXRBLK; no other changes can be made.

Related concepts

The Db2 installation CLIST panel session
The installation CLIST displays a series of ISPF panels that prompt you to supply parameter values or accept the supplied default values. In most cases, the fields on the ISPF panels correspond with Db2 subsystem parameters.

Installing a second Db2 subsystem

When you install a second Db2 subsystem, some installation jobs are optional, some jobs are required, and some jobs are required under certain circumstances.

Procedure

To install a second subsystem:

1. Optional: Run job DSNTIJSS

   You can use job DSNTIJSS to create an SMS environment for the Db2 catalog and directory data sets. Data sets for the Db2 catalog and directory are managed by Db2 and must be SMS-managed. The SMS environment that you use for Db2 catalog and directory data sets must be established before you begin installation or migration to Db2 11. The SMS environment must include a data class for allocating the data sets in extended format and using extended addressability.

2. Run job DSNTIJCA if you are defining a new ICF catalog.
3. Run job DSNTIJMV.

   Add another subsystem name and subsystem recognition character to IEFSSN*xx*. LNKLST*xx* modifications are needed only for separate libraries.

   For separate libraries, add STEPLIB statements to the precompile and bind steps for program preparation. Add STEPLIB statements for the Db2 offline utilities. Choose a naming convention for any new procedures, and change those as needed.

   For a single library, you must add the exit module data set (*prefix*.SDSNEXIT) to the STEPLIB statement to contain your changed subsystem parameter. Put this data set first in the STEPLIB concatenation.
4. Run job DSNTIJIN.

   It allocates the following data sets, which contain the sample DBRMs and programs:

   prefix.DBRMLIB.DATA
   prefix.SRCLIB.DATA
   prefix.RUNLIB.LOAD

   Two subsystems cannot share these data sets. If undetected sharing occurs, data could be lost. If you use the same library prefix for both subsystems, change the name of the data sets, unless you do not need them on the first subsystem. Subsequent jobs overwrite them, and then the packages that are bound in the first subsystem do not work with the new load modules.
5. Run job DSNTIJUZ without changes if you use separate libraries. For a single library, provide a separate *prefix*.SDSNEXIT data set for each subsystem.

   The default SSID displayed by certain panels and procedures is the same for every subsystem. Ensure that the correct subsystem is specified in these cases.
6. Run jobs DSNTIJID, DSNTIJIE, and DSNTIJIF to initialize the Db2 data sets.

What to do next

If you are using RACF, you can define new user profiles and IDs to provide a separate level of security for each Db2 subsystem.

Related information

Connecting the TSO attachment facility to a second Db2 subsystem

After you install a second Db2 subsystem on the same operating system, you should connect the TSO attachment facility to that subsystem.

Procedure

To connect the TSO attachment facility:

1. Add STEPLIB statements to the logon procedure if you are using a separate library for the second subsystem or you are managing two different SDSNEXIT data sets. The STEPLIB statement must be authorized using the authorized program facility (APF).

   A Db2 logon procedure can use only one set of Db2 libraries.
2. Concatenate the CLISTs by updating the SYSPROC library if you decide to have a separate library for the second subsystem.
3. Concatenate the DB2I panels by updating the ISPPLIB library if you decide to have a separate library for the second subsystem.

4. Concatenate messages by updating the ISPMLIB library if you decide to have a separate library for a second subsystem.
5. Update the ISPF primary option panel (ISR@PRIM) if you decide to have a separate library for the second subsystem.
6. Grant authorization on both subsystems as necessary.
7. Specify the new subsystem name on the Db2I defaults panel as required.

Connecting the IMS attachment facility to a second Db2 subsystem

After you install a second Db2 subsystem on the same operating system, you should connect the IMS attachment facility to that subsystem.

Procedure

To connect the IMS attachment facility:

1. For separate libraries, change the STEPLIB DD statement in your startup procedure to refer to the new libraries.
2. For separate libraries, change the DFSESL DD statement in your startup procedure to refer to the new libraries.
3. Define a new subsystem name, language interface token (LIT), and command recognition character (CRC).
4. Define a new language interface and reassemble.
5. In the linkage editor JCL, specify the library that contains the new language interface.

Preparing a second Db2 subsystem for use

After you have installed a second Db2 subsystem on the same operating system, you must run some jobs that prepare the subsystem for use.

Procedure

To prepare your second Db2 subsystem for use:

1. IPL z/OS.

   This step is required for any SYS1.PARMLIB changes. Alternatively, you can use the SETSSI, SETPROG APF, and SETPROG LNKLST commands to define the subsystem to z/OS until the next IPL.
2. Start Db2 by using the new command prefix (formerly called the subsystem recognition character) that you named during the installation process.
3. Run job DSNTIJTC.
4. Run job DSNTIJTM.

   If you use the same library prefix for both subsystems, change the name of the data sets listed below, unless you do not need them on the first subsystem. Subsequent jobs write information in these data sets and prevent use of the new load module DSNTIAD on the second subsystem with the previously bound plan DSNTIA91 on the first subsystem.

   prefix.DBRMLIB.DATA
   prefix.RUNLIB.LOAD
5. Run job DSNTIJSG.
6. Optional: Run job DSNTIJRW to define core WLM environments for Db2-supplied stored procedures and user-defined functions.
7. Run job DSNTIJRT to install all Db2-supplied routines.
8. Run job DSNTIJRV to validate the Db2-supplied routines after they have been installed.
9. Optional: Run job DSNTIJIC to copy the catalog.

10. Verify your installation process.

    See "Verifying your installation process for a second Db2 subsystem" on page 840 for more information.

Related reference

z/OS SETPROG Command (MVS System Commands)
z/OS SETSSI Command (MVS System Commands)

Verifying your installation process for a second Db2 subsystem

After you have installed a second Db2 subsystem and prepared it for use, you should verify a successful installation before you use the subsystem.

Procedure

Run select phases of the sample application jobs, which are named DSNTEJ*xx*.

Select the phases that you need based on the attachment facilities that you installed, the languages that you use, and whether the sample objects exist.

If you use the same library prefix for both subsystems, change the name of the data sets listed below, unless you do not need them on the first subsystem. Subsequent jobs overwrite information in these data sets and prevent use of the new load modules of sample programs on the second subsystem with the previously bound sample plans on the first subsystem.

prefix.DBRMLIB.DATA
prefix.SRCLIB.DATA
prefix.RUNLIB.LOAD

Related tasks

Verifying successful Db2 11 installation or migration with sample applications
You can use the Db2 Db2 11 sample applications to verify either installation or migration to new-function mode. These sample applications are also called installation verification procedures (IVPs).

Enabling multiple Db2 subsystems to share disk storage

If you use a non-data sharing environment, you can enable multiple Db2 subsystems to share disk storage. If you use a data sharing environment, the logs must be on shared disk storage.

Procedure

To share disk storage among Db2 subsystems and avoid problems with your active and archive log data sets:

- Ensure that each subsystem has unique log data set names. This prevents situations like the following:

  Subsystem A on operating system 1 and subsystem B on operating system 2 share the same z/OS catalog name, and their log data set names are the same. You start subsystem B while subsystem A is still running on operating system 1. This causes log data sets to be allocated for subsystem A, even though they already exist.
- Use GRS, or an equivalent, and include your active and archive log data sets in the GRS inclusion list. This prevents situations like the following:

  Subsystem A on operating system 1 and subsystem B on operating system 2 share disk storage, and the active log is in a shared disk volume. Subsystem B fails. You attempt to start subsystem B, but you accidentally start subsystem A on operating system 2, even though it is still running on operating system 1. This causes log data sets to be allocated for subsystem A, even though they already exist.

Data loading from remote locations

You can use an SQL cursor with the LOAD utility to load data from a remote location.

Before loading data, you must bind the DSNUT111 package at each location from which you want to load data. A local package for DSNUT111 is bound by installation job DSNTIJSG when you install or migrate to a new version of Db2 for z/OS.

Special packages and plans for SPUFI

Special packages and plans for SPUFI are required in some situations.

Running SPUFI at remote systems

You can use SPUFI to connect to and then execute SQL statements at a remote location.

Procedure

GUPI To run SPUFI at a remote location:

1. Ensure that DDF is started on the Db2 subsystem where SPUFI runs.
2. Bind the SPUFI packages on each target remote location that is not a Db2 for z/OS server, or on each target remote Db2 for z/OS location where the SPUFI packages have not been bound.

   For example, use the following commands:

   ```
   BIND PACKAGE (location_name.DSNTIAP) MEMBER(DSNTIAP)
                ACTION(ADD) ENCODING(EBCDIC) LIB('prefix.SDSNDBRM')

   BIND PACKAGE (location_name.DSNESPCS) MEMBER(DSNESM68)
                ACTION(ADD) ISOLATION(CS) ENCODING(EBCDIC) LIB('prefix.SDSNDBRM')

   BIND PACKAGE (location_name.DSNESPRR) MEMBER(DSNESM68)
                ACTION(ADD) ISOLATION(RR) ENCODING(EBCDIC) LIB('prefix.SDSNDBRM')

   BIND PACKAGE (location_name.DSNESPUR) MEMBER(DSNESM68)
                ACTION(ADD) ISOLATION(UR) ENCODING(EBCDIC) LIB('prefix.SDSNDBRM')
   ```

   If a BIND PACKAGE command fails because the package already exists, verify that the time and date formats that are returned by the existing packages are satisfactory. If they are, the existing packages can be used without any change to the package list in the SPUFI plans. However, if you need to change the time and date formats that are returned by the existing packages, you must bind new packages with different collection identifiers that have been agreed to by the database server.

   For example, if the collection identifiers are PRIVATCS and PRIVATRR, the commands for doing a remote bind are as follows:

   ```
   BIND PACKAGE (location_name.PRIVATCS) MEMBER(DSNESM68)
                ACTION(ADD) ISOLATION(CS) LIB('prefix.SDSNDBRM')

   BIND PACKAGE (location_name.PRIVATRR) MEMBER(DSNESM68)
                ACTION(ADD) ISOLATION(RR) LIB('prefix.SDSNDBRM')
   ```

3. Bind the SPUFI plans to include the packages for all target remote locations, including other Db2 for z/OS servers. To include all locations, use an asterisk as the location name of the collection ID.

   For example, use the following commands:

   ```
   BIND PLAN(DSNESPCS) -
        PKLIST(*.DSNESPCS.DSNESM68, -
               *.DSNTIAP.DSNTIAP) -
        ISO(CS) CURRENTDATA(YES) ENCODING(EBCDIC) ACTION(REPLACE)
   BIND PLAN(DSNESPRR) -
        PKLIST(*.DSNESPRR.DSNESM68, -
               *.DSNTIAP.DSNTIAP) -
        ISOLATION(RR) ENCODING(EBCDIC) ACTION(REPLACE)
   BIND PLAN(DSNESPUR) -
        PKLIST(*.DSNESPUR.DSNESM68, -
   ```

```
             *.DSNTIAP.DSNTIAP) -
      ISOLATION(UR) ENCODING(EBCDIC) ACTION(REPLACE)
```

The SPUFI plans at the Db2 system must be rebound because the location name parameter (which is usually optional) must be explicitly specified for the remote access functions to construct the correct package name. (SPUFI does not use the SQL statement SET CURRENT PACKAGESET.) The location name entry in the package list must precede any pattern-matching character entry. For example, the package list for the DSNESPCS plan is as follows:

```
PKLIST(location_name.PRIVATCS.DSNESM68, -
       *.DSNESPCS.DSNESM68, -
      *.DSNTIAP.DSNTIAP)
```

The package list for the DSNESPRR plan is as follows:

```
PKLIST(location_name.PRIVATRR.DSNESM68, -
       *.DSNESPRR.DSNESM68, -
      *.DSNTIAP.DSNTIAP)
```

The package list for the DSNESPUR plan is as follows:

```
PKLIST(location_name.PRIVATUR.DSNESM68, -
       *.DSNESPUR.DSNESM68, -
      *.DSNTIAP.DSNTIAP)
```

GUPI

Making SPUFI work with different terminal CCSIDs

In some cases, a terminal CCSID might be different from the SPUFI CCSID. If the terminal CCSID cannot be changed to the SPUFI CCSID, consider creating additional SPUFI packages and plans that specify the terminal CCSID encoding.

About this task

You can then use the SPUFI default panels to use the plans with the special CCSID encoding instead of the Db2-supplied plans (DSNESPCS, DSNESPRR, and DSNESPUR).

Procedure

Suppose that when you install Db2, you create the SPUFI plans and packages using ENCODING(EBCDIC), and the default subsystem CCSID for EBCDIC data, as specified on installation panel DSNTIPF in the EBCDIC CCSID field. Most of the people in your organization use this CCSID as their terminal CCSID, so they do not encounter errors. However, a large group of Db2 application programmers code in the C language and prefer CCSID 1047 as their terminal CCSID. You can prevent this group from corrupting Db2 data and receiving errors by completing the following tasks:

a) Bind SPUFI packages and plans specifically for users who require a terminal CCSID setting of 1047.

For example, your commands might look like the following commands:

GUPI

```
BIND PACKAGE(TIAP1047) MEMBER(DSNTIAP) -
     ACTION(REPLACE) ISOLATION(CS) ENCODING(1047) -
     LIBRARY('prefix.SDSNDBRM')
BIND PACKAGE(SPCS1047) MEMBER(DSNESM68) -
     ACTION(REPLACE) ISOLATION(CS) ENCODING(1047) -
     LIBRARY('prefix.SDSNDBRM')
BIND PLAN(SPCS1047) -
     PKLIST(SPCS1047.DSNESM68 -
            TIAP1047,DSNTIAP) -
     ISOLATION(CS) ENCODING(1047) ACTION(REPLACE)
BIND PACKAGE(SPRR1047) MEMBER(DSNESM68) -
     ACTION(REPLACE) ISOLATION(RR) ENCODING(1047) -
     LIBRARY('prefix.SDSNDBRM')
BIND PLAN(SPRR1047) -
```

```
     PKLIST(SPRR1047.DSNESM68 -
            TIAP1047,DSNTIAP) -
     ISOLATION(RR) ENCODING(1047) ACTION(REPLACE)
BIND PACKAGE(SPUR1047) MEMBER(DSNESM68) -
     ACTION(REPLACE) ISOLATION(UR) ENCODING(1047) -
     LIBRARY('prefix.SDSNDBRM')
BIND PLAN(SPUR1047) -
     PKLIST(SPUR1047.DSNESM68 -
            TIAP1047,DSNTIAP) -
     ISOLATION(UR) ENCODING(1047) ACTION(REPLACE)
```

GUPI

b) Grant access to the new packages and plans to the target user group.

c) Instruct users who use terminal CCSID 1047 to specify the following settings in the SPUFI default panels:

- In panel DSNESP02, specify YES for CHANGE PLAN NAMES.
- In panel DSNESP07, specify SPCS1047 in the CS ISOLATION PLAN field, SPRR1047 in the RR ISOLATION PLAN field, and SPUR1047 in the UR ISOLATION PLAN field.

The programmers who require CCSID 1047 can now use SPUFI without receiving an error message.

Setting up the Db2 command line processor

You can use the Db2 command line processor to issue SQL statements, bind DBRMs that are stored in HFS files, and call stored procedures. The Db2 command line processor on Db2 for z/OS is a Java application that runs under z/OS UNIX System Services.

Before you begin

Before you begin setting up the Db2 command line processor, ensure that your system has the following features:

- Java 1.7 or later.
- IBM Data Server Driver for JDBC and SQLJ.

  For information on installing this feature, see .
- Db2 metadata stored procedures installed and authorized. To install and authorize the Db2 metadata stored procedures, run the installation job DSNTIJRT. To check if the Db2 metadata stored procedures were successfully installed and activated, run the validation job DSNTIJRV.

Procedure

To set up the Db2 command line processor, complete the following steps:

1. Modify the CLASSPATH variable in your .profile file to include the `clp.jar` file.

   If you install the Db2 command line processor into the `/usr/lpp/db2b10_base` directory, you can issue the following command to modify your CLASSPATH variable:

   ```
   export CLASSPATH=$CLASSPATH:/usr/lpp/db2b10_base/lib/clp.jar
   ```

2. Optional: Define the CLPPROPERTIESFILE environment variable in your `.profile` file to include the full path name where the properties file is located.

   You can create your own properties file with any name. A sample properties file is in the directory where the command line processor is installed. If you install the command line processor into the `/usr/lpp/db2b10_base` directory, you can issue the following command to define the CLPPROPERTIESFILE environment variable in your .profile file:

   ```
   export CLPPROPERTIESFILE=/usr/lpp/db2b10_base/samples/clp.properties
   ```

   If the CLPPROPERTIESFILE environment variable is undefined, the command line processor uses default values for all options when it is invoked.

3. Optional: Define an alias for starting the Db2 command line processor in your `.profile` file:
   For example:

   ```
   alias db2="java com.ibm.db2.clp.db2"
   ```

Results

Additional instructions for setting up the Db2 command line processor are available in the readme file. By default, the Db2 command line processor readme file (README_CLP) is installed into the `/usr/lpp/db2b10_base` directory.

Related information

Creating database objects that support query acceleration

If you use an accelerator, you must create a database, table spaces, tables, and indexes for the accelerator to use.

Before you begin

1. Apply or verify that you have applied the PTF for APAR PI91467 (UI54612) and for APAR PI19468 (UI54615). For a data sharing group, these PTFs must be applied on all members of the group.
2. After the PTFs for PI91467 have been applied, restart Db2 or, for a data sharing group, restart each member of the group.

Procedure

To create database objects for use by an accelerator:

1. Configure and run the DSNTIJAS sample job in the SDSNSAMP library to create the objects that are required for an accelerator.

   After you run DSNTIJAS:

   - The SYSACCEL.SYSACCELERATORS and SYSACCEL.SYSACCELERATEDTABLES tables are created. The accelerator will populate these tables with a server definition and the associated IP address.
   - The SYSACCEL.SYSACCELERATEDPACKAGES table and its indexes are created. This table and its indexes will be populated by Db2 during a bind operation that specifies the QUERYACCELERATION bind option. They are not used by the accelerator.
   - The SYSACCEL.SYSACCELERATEDTABLESAUTH table and its index are created for federation support. This table and its index will be populated by the IBM Db2 Analytics Accelerator for z/OS SYSPROC.ACCEL_GRANT_TABLES_REFERENCE and SYSPROC.ACCEL_REVOKE_TABLES_REFERENCE stored procedures.
2. Restrict access to the SYSACCEL.SYSACCELERATORS, SYSACCEL.SYSACCELERATEDTABLES, and SYSACCEL.SYSACCELERATEDPACKAGES tables that were created by job DSNTIJAS.

   The SYSACCEL.SYSACCELERATORS and SYSACCEL.SYSACCELERATEDTABLES tables are used by Db2 to control the acceleration behavior of the accelerator servers that are defined for the Db2 subsystem.

   The SYSACCELERATEDPACKAGES table is used by Db2 to control the acceleration behavior of static SQL queries in a Db2 package.

Related information

IBM Db2 Analytics Accelerator for z/OS documentation

Migrating query acceleration tables to universal table spaces

This topic provides instructions for migrating query acceleration tables from a single segmented table space (SYSACCEL) to individual universal table spaces (UTSs).

Before you begin

Attention: Before you migrate the acceleration tables to universal tables spaces, make sure that an accelerator has already been defined on your system. If you do not already have an accelerator defined on your system, defer this migration task until an accelerator has been defined.

About this task

Migrating the query acceleration tables to individual UTSs is optional and can be deferred. However, if you are experiencing frequent timeout issues on the query acceleration tables, you should consider migrating.

If you choose to migrate the query acceleration tables from a single segmented table space to individual UTSs, you must complete all three of the following subtasks:

1. Complete the pre-migration steps, which are documented in this topic.
2. Run job DSNTIJAM, which migrates the tables.
3. Complete the post-migration steps, which are also documented in this topic.

Procedure

Complete the following pre-migration steps:

1. Apply the PTF for APAR PI91467 (UI54612) and for APAR PI19468 (UI54615), or verify that these PTFs are applied.

   In a Db2 data sharing group, these PTFs must be applied on all members of the group.
2. After the PTFs for APAR PI91467 are applied, restart Db2 or, for a data sharing group, restart each member.
3. Verify that the following Db2 query acceleration tables are present in the DSNACCEL.SYSACCEL table space and that they are at same level as APAR PI77826 (UI48595):

   - SYSACCEL.SYSACCELERATORS
   - SYSACCEL.SYSACCELERATEDTABLES
   - SYSACCEL.SYSACCELERATEDPACKAGES
   - SYSACCEL.SYSACCELERATEDTABLESAUTH

   Also, verify that column 13 of the SYSACCEL.SYSACCELERATEDTABLES table is the REMOTELOCATION column.
4. Drop, re-create, and rename any user-defined table spaces in the DSNACCEL database that are named SYSTSACC, SYSTSACT, SYSTSACP, or SYSTSATA.

   These names are reserved for the new UTSs in which the Db2 query acceleration tables will reside.
5. Drop any user-defined objects in table space DSNACCEL.SYSACCEL, and re-create them in another table space.

   When you run the DSNTIJAM job to migrate the query acceleration tables, the DSNACCEL.SYSACCEL table space and all of its objects will be dropped and re-created. However, only the following query acceleration tables and indexes will be re-created in the appropriate table space:

   - SYSACCEL.SYSACCELERATORS
   - SYSACCEL.SYSACCELERATEDTABLES
   - SYSACCEL.SYSACCELERATEDPACKAGES
   - SYSACCEL.SYSACCELERATEDTABLESAUTH
   - SYSACCEL.DSNACC01

- SYSACCEL.DSNACT01
- SYSACCEL.DSNACP01
- SYSACCEL.DSNACP02
- SYSACCEL.DSNATA01

Therefore, if you created any user-defined objects in the DSNACCEL.SYSACCEL table space other than the ones in the previous list, you must drop and re-create them in another table space.

6. Rename any table that has the same name as the following tables.

   These names are reserved for the intermediate query acceleration tables that will be used during migration.

   - SYSACCEL.SYSACCELERATOR1
   - SYSACCEL.SYSACCELERATEDTABLE1
   - SYSACCEL.SYSACCELERATEDPACKAGE1
   - SYSACCEL.SYSACCELERATEDTABLESAUTH1
7. Rename any index that has the same name as the following indexes.

   These names are reserved for the indexes of the intermediate query acceleration tables that will be used during migration.

   - SYSACCEL.DSNACC1
   - SYSACCEL.DSNACT1
   - SYSACCEL.DSNACP1
   - SYSACCEL.DSNACP2
   - SYSACCEL.DSNATA1
8. Save any dependencies and authorization records for the following Db2 query acceleration objects so that you can re-create them after migration.

   These dependencies can include views, triggers, and masks, as well as authorizations, referential integrity definitions, check constraints, history versioning, and comments.

   - SYSACCEL.SYSACCELERATORS
   - SYSACCEL.DSNACC01
   - SYSACCEL.SYSACCELERATEDTABLES
   - SYSACCEL.DSNACT01
   - SYSACCEL.SYSACCELERATEDPACKAGES
   - SYSACCEL.DSNACP01
   - SYSACCEL.DSNACP02
   - SYSACCEL.SYSACCELERATEDTABLESAUTH
   - SYSACCEL.DSNATA01

   Additionally, if the DSN6SPRM.ABIND subsystem parameter is set to NO, identify all packages that are dependent on the DSNACCEL.SYSACCEL table space. You must explicitly rebind these packages after you complete the migration.

   Attention: Because the DSNACCEL.SYSACCEL table space will be dropped during migration, failure to complete this step prior to running DSNTIJAM can result in the loss of administrative control of the accelerator and render it unusable and not easily recoverable.
9. Set the Db2 DSN6SPRM.QUERY_ACCEL_OPTIONS subsystem parameter to a value of 98, which is a special serviceability option that indicates that the migration of the query acceleration tables is in progress. For a data sharing group, set this subsystem parameter to 98 for each member of the data sharing group. Setting this subsystem parameter to 98 eliminates interference from other Db2 workloads.

   a) Create a temporary copy of your current customized copy of the DSNTIJUZ job.

    b) Edit the temporary copy of DSNTIJUZ and set the QUERY_ACCEL_OPTIONS parameter to a value of 98. If necessary, remember to add a continuation character in column 72.
    c) Run the first two steps of the temporary DSNTIJUZ job.
    d) After the job completes, issue the -SET SYSPARM command, or stop and restart Db2 to enable this change.
    e) Delete the temporary copy of DSNTIJUZ.

10. Issue the STOP ACCEL command (all query offload), stop all query accelerator data maintenance (incremental update and stored procedure jobs), and disconnect Data Studio from the database. For a data sharing group, complete these steps for each member of the data sharing group.

What to do next

After you successfully complete the pre-migration steps, customize and run the DSNTIJAM job to migrate the table spaces, and confirm that it completes with a return code of 0. Then, return to this topic and complete the following post-migration steps to re-enable query acceleration.

1. Run the AQTTIJSP job with the MODE(INSTALL) parameter.
2. Reset the DSN6SPRM.QUERY_ACCEL_OPTIONS subsystem parameter back to its original value to indicate that the migration of the query acceleration tables is no longer in progress:
    a. Run the first two steps of your original customized copy of job DSNTIJUZ.
    b. After the job completes, either issue the -SET SYSPARM command or stop and restart Db2 to enable this change.
3. Re-create the dependencies and authorization records that you saved in step "8" on page 846 of the per-migration steps.

    If the DSN6SPRM.ABIND subsystem parameter is set to NO, explicitly rebind the packages that you identified in step "8" on page 846.
4. Issue the START ACCEL command, start all query accelerator data maintenance (incremental update and stored procedure jobs), and reconnect to Data Studio. For a data sharing group, complete these steps for each member of the data sharing group.

Related information

IBM Db2 Analytics Accelerator for z/OS documentation

Chapter 11. Working with international data

Db2 handles different character sets in distributed data through character conversions.

Character conversion concepts

Character data that is transmitted from one DBMS to another might need to be converted to a different coded character set.

In different database management systems (DBMSs), character data can be represented by different encoding schemes. Within an encoding scheme, there are multiple coded character set identifiers (CCSIDs). EBCDIC, ASCII, and Unicode are ways of encoding character data.

The Unicode character encoding standard is a character encoding scheme that includes characters from almost all living languages of the world. Db2 supports two implementations of the Unicode encoding scheme: UTF-8 (a mixed-byte form) and UTF-16 (a double-byte form).

All character data has a CCSID. Character conversion is described in terms of CCSIDs of the source and of the target. When you install Db2, you must specify a CCSID for Db2 character data in either of the following situations:

- You specify AUTO or COMMAND for the DDF STARTUP OPTION field on panel DSNTIPR.
- Your system will have any ASCII data, Unicode data, EBCDIC mixed character data, or EBCDIC graphic data. In this case, you must specify YES in the MIXED DATA field of panel DSNTIPF, and the CCSID that you specify is the mixed data CCSID for the encoding scheme.

The CCSID that you specify depends on the national language that you use.

Db2 performs most character conversion automatically, based on system CCSIDs, when data is sent to Db2 or when data is stored in Db2. If character conversion must occur, Db2 uses the following methods:

1. Db2 searches the catalog table SYSIBM.SYSSTRINGS.
2. Db2 uses z/OS Unicode Conversion Services.

If Db2 or z/OS Unicode Conversion Services does not provide a conversion for a certain combination of source and target CCSIDs, you receive an error message. If the conversion is incorrect, you might get an error message or unexpected output. To correct the problem, you need to understand the rules for assigning source and target CCSIDs in SQL operations.

Related concepts

System-coded character set identifiers
To support character conversion, the IBM Distributed Relational Database Architecture (DRDA) uses CCSIDs to label the various character representation schemes.

Unicode support in Db2
Unicode is a universal encoding scheme for written characters and text that enables the exchange of data internationally. Unicode provides a character set standard that can be used all over the world.

Related reference

Character conversion (z/OS: Unicode Services User's Guide and Reference)

Related information

System-coded character set identifiers

To support character conversion, the IBM Distributed Relational Database Architecture (DRDA) uses CCSIDs to label the various character representation schemes.

The CCSID is a two-byte binary number that uniquely identifies one or more pairs of character sets and code pages. The coded character set defines how bit configurations are mapped for character data.

The CCSID of character strings at your site is determined by the CCSID that you specify on installation panel DSNTIPF.

The correct CCSID is the number that identifies the coded character set that is supported by your I/O devices, local applications such as IMS and QMF, and remote applications such as CICS Transaction Server.

Attention: If this CCSID is not correct, character conversion produces incorrect results.

Related reference

DSNTIPF: Application programming defaults panel 1
The entries on the DSNTIPF panel and the DSNTIP4 panel define application programming default values. These values are used as default values by the program preparation panels, the program preparation CLIST (DSNH), and the precompiler. These values can also be used as default values by other programs, such as QMF.

Related information

Unicode support in Db2

Unicode is a universal encoding scheme for written characters and text that enables the exchange of data internationally. Unicode provides a character set standard that can be used all over the world.

Unicode uses an encoding scheme that provides code points for approximately 100,000 characters. An extension called UTF-16 allows for encoding as many as a million more characters. Unicode provides the ability to encode all characters used for the written languages of the world. Unicode treats alphabetic characters, ideographic characters, and symbols equivalently because it specifies a numeric value and a name for each of its characters. Unicode includes punctuation marks, mathematical symbols, technical symbols, geometric shapes, and dingbats.

Db2 provides the following Unicode encoding forms:

- UTF-8: Unicode Transformation Format, 8-bit encoding form that is designed for ease of use with existing ASCII-based systems.
- UTF-16: Unicode Transformation Format, 16-bit encoding form that is designed to provide code values for over a million characters and a superset of UCS-2. UCS-2 is a universal character set and is coded in 2 octets, which means that characters are represented in 16 bits per character.

Unicode CCSIDs: The Unicode CCSID field of panel DSNTIPF is pre-filled with 1208. Db2 chooses the CCSIDs for double-byte and single-byte values (1200 for DBCS and 367 for SBCS). CCSID 1200 corresponds to UTF-16 and CCSID 367 is for 7-bit ASCII.

Customizing support for Unicode

You must customize z/OS Unicode support to use Unicode data in Db2.

Before you begin

Ensure that the conversion environment is active. The steps for this process can be found in z/OS Support for Unicode: Using Unicode Services. Db2 can use the conversion services of z/OS support for Unicode only when the conversion environment is active. The infrastructure provides tools to create a conversion image. When the image is loaded into a common data space, the conversion environment is activated, and the conversion services are ready to be used by Db2.

Procedure

To customize support for Unicode:

1. Customize the job card.

The jobs in *hlq*.SCUNJCL, as shipped by IBM, have placeholders for values on the JOB statement, such as in the following example:

```
//$JOBPREF$$JOBNAME$ JOB ($ACCOUNT$), '$USER$',
//     NOTIFY=$NOTIFY$,MSGCLASS=$MC$,MSGLEVEL=$ML$,
//     TIME=$TI$,CLASS=$CL$,REGION=$REGION0M$
```

Use the REXX EXEC CUNRUCST in *hlq*.SCUNREXX to customize these values. When you run the REXX EXEC CUNRUALL, the values that you specify are supplied on all of the JCL images. You can choose to customize your system by displaying Japanese messages or displaying English messages with modified date and time formats. You can set up the z/OS Message Service to specify how you want messages to be displayed.

2. Set up the conversion image.

   The following example is the sample JCL member in *hlq*.SCUNJCL (CUNJIUTL):

```
//CUNMIUTL EXEC PGM=CUNMIUTL
//SYSPRINT DD   SYSOUT=*
//TABIN    DD   DISP=SHR.DSN=hlq.SCUNTBL
//SYSIMG   DD   DSN=hlq.IMAGES(CUNIMG00),DISP=SHR
//SYSIN    DD   *
   /*******************************************
    * INPUT STATEMENTS FOR THE IMAGE GENERATOR *
    ********************************************/
      CASE NORMAL;          /* ENABLE TOUPPER AND TOLOWER */
      CONVERSION 1047,850;  /* EBCDIC -> ASCII */
      CONVERSION 850,1047;  /* ASCII -> EBCDIC */
/*
```

In the preceding example, the two CONVERSION statements provide conversion between the EBCDIC code page 1047 and the ASCII code page 850 in both directions.

The DD names that are passed to CUNMIUTL are described as follows:

SYSPRINT
A listing that shows the processed setups and error messages, if applicable.

TABIN
Conversion tables for character conversion and case conversion. They are supplied by IBM; in this example, they are in data set *hlq*.SCUNTBL. The image transforms the conversion tables into an internal format and stores them in the conversion image.

SYSIMG
Output is a single image of the entire conversion environment. The conversion image is built according to the specification in the SYSIN DD name. The conversion image resides in either a sequential data set or a member of a partitioned data set with a fixed-block 80-byte format. In this example, the image resides in the partitioned data set member *hlq*.IMAGES(CUNIMG00).

SYSIN
Two types of statements are recognized in this DD statement: case conversion, which is identified by the CASE control statement, and character conversion, which is identified by the CONVERSION control statement.

CASE control statement:
Case conversion is defined as converting Unicode characters (for example, UTF-8) to their uppercase equivalent or their lowercase equivalent. In the preceding example, CASE NORMAL is specified, which means basic case conversion is provided. This basic case conversion is based on the UnicodeData.txt file that is provided by the Unicode consortium. It does not include special casing as described in the SpecialCasing.txt file that is provided by the Unicode consortium. Special casing typically includes characters that have significant differences in the case-based appearance. For example, the German "hard S", which appears as a flat B, appears as "SS" in uppercase German text. Because Db2 does not use the case conversion service, you do not need to specify a conversion.

CONVERSION control statement:
Character conversion is also referred to as conversion between specified CCSIDs. An application such as Db2 invokes the CUNLCNV function to convert characters between the

specified code pages. You must identify the conversions that are possible on the CONVERSION control statement.

Important: Specify CONVERSION statements for Db2 as follows:

```
CONVERSION xxx,yyy,ER;
CONVERSION yyy,xxx,ER;
```

Many code page conversions are possible. However, when identifying the conversion that Db2 is to use, you need be concerned only with conversion for the national languages that you use and with conversion from these code pages to and from all Unicode CCSIDs.

Example: If you use an EBCDIC CCSID of 37 and an ASCII CCSID of 819, you need to use the following conversions:

```
CONVERSION 37,367,ER;
CONVERSION 37,1208,ER;
CONVERSION 37,1200,ER;
CONVERSION 367,37,ER;
CONVERSION 1208,37,ER;
CONVERSION 1200,37,ER;

CONVERSION 819,367,ER;
CONVERSION 819,1208,ER;
CONVERSION 819,1200,ER;
CONVERSION 367,819,ER;
CONVERSION 1208,819,ER;
CONVERSION 1200,819,ER;
```

Multiple conversion tables might be available for converting one CCSID to another. A technique search order can be used to specify which table should be used. The technique search order consists of up to eight technique characters. If you specify more than one technique character, the image generator tries to find a matching table for the leftmost technique character in the sequence of the technique-search-order. If one is not found, the search continues with the second one, and so on. Especially for mixed conversion, use more than one technique character because one of the subconversions might exist only in round-trip mode, and one might exist only in an enforced subset. In this case, a technique search order of 'RE' or 'ER' would be required. Technique search order is optional. If you do not specify a technique search order, RECLM is used.

Language products such as Enterprise Cobol might use the RECLM technique search order, while Db2 uses the ER technique search order. Therefore, you might also need to add the RECLM conversions, such as these:

```
CONVERSION 1047,850,RECLM;  /* EBCDIC -> ASCII */
CONVERSION 850,1047,RECLM;  /* ASCII -> EBCDIC */
```

The important technique characters for Db2 are E (enforced subset) and R (round-trip). Enforced subset conversions map only those characters from one CCSID to another that have a corresponding character in the second CCSID. All other characters are replaced by a substitution character. Round-trip conversions between two CCSIDs assure that all characters making the 'round trip' arrive as they were originally, even if the receiving CCSID does not support a given character. Round-trip conversions ensure that code points that are converted from CCSID A to CCSID B, and back to CCSID A are preserved, even if CCSID B is not capable of representing these code points.

After performing these steps, you should now have an updated CUNJIUTL JCL member.

3. Submit the batch job in the CUNJIUTL member.

   At completion, the batch job writes its output to the SYSPRINT DD (that is, SYSOUT in this example). Expect a return code of zero from the CUNJIUTL program. If you receive anything other than return code zero, refer to Return code meanings. This information helps you correct environmental, syntactical, and semantic errors that might occur.

4. After generating the conversion image, copy it to SYS1.PARMLIB or any other data set in the logical PARMLIB concatenation.

In this example, you copy *hlq*.IMAGES(CUNIMG00) to SYS1.PARMLIB(CUNIMG00).

5. Calculate the storage that is needed for a conversion image.

   When the conversion image is created on disk, you need to determine the amount of virtual storage that the image is to occupy. You specify this number as the number of pages on the REALSTORAGE parameter in the CUNUNI*xx* PARMLIB member that you create in the next step. The REALSTORAGE parameter protects the system from a shortage of main storage caused by loading a conversion image that exceeds the amount of available storage. The minimum value for the REALSTORAGE parameter depends on how the image is activated.

   - If the image is activated during IPL, the needed storage is the size of the image plus one page.
   - If the image is activated using the SET UNI command (PARMLIB member with keyword IMAGE), the needed storage is the size of the currently active image plus the size of the new conversion image.

   If you set up a conversion environment before or if you are not activating a conversion environment during IPL, you must determine the amount of storage that the currently active image occupies. To do this, issue the following command:

   ```
   D UNI,STORAGE
   ```

   The system displays the number of active pages.

   To determine the storage that the new conversion image occupies, find the CUN1017I message in the SYSPRINT log that was created in the previous step. This message indicates the number of pages that are required for the new conversion image. For example:

   ```
   CUN1017I GENERATED IMAGE SIZE 291 PAGES........
   ```

   As an alternative, specify a REALSTORAGE value of zero, which indicates that unlimited storage is available. In this case, a value of 524 287 pages is used.

6. Create the PARMLIB member CUNUNI*xx* (PARMLIB member for activating a conversion environment).

   Normally the member is created in SYS1.PARMLIB, but in this case, you create it in another data set in the logical PARMLIB concatenation. This example uses SYS1.PARMLIB.

   The *xx* can be any two alphanumeric characters, or the special characters @, #, or $. This example uses 00. Here is the sample PARMLIB member in SYS1.PARMLIB(CUNUNI00):

   ```
   REALSTORAGE 292;
   IMAGE CUNIMG00;
   ```

   Because CUNMIUTL requires 291 pages, and an additional page is required during IPL, the REALSTORAGE statement indicates that 292 pages of real storage are required.

   The IMAGE parameter indicates that the system searches in SYS1.PARMLIB (or a data set in the logical concatenation) member CUNIMG00 for the conversion image.

   You can create a PARMLIB member to delete a current conversion environment.

7. Take one of the following actions:

   - Edit IEASYSxx.

     This parameter specifies one or more CUNUNI*xx* PARMLIB members that contain the keywords that configure the conversion environment. Each suffix *xx* identifies one CUNUNI*xx* member in the PARMLIB concatenation. If several PARMLIB members are specified, they are concatenated in the specified sequence. The concatenated contents is handled internally as a single member. This means that the lines are numbered consecutively, and error messages about syntax errors refer to the concatenated text. Restrictions for keywords apply for the entire concatenated text.
   - Check parameter MAXCAD in IEASYSxx. It limits the amount of common data spaces in a system. If MAXCAD is specified, consider that z/OS support for Unicode creates up to two common data spaces.

8. Initialize the conversion environment with an IPL.

9. After the system is initialized, you can use the DISPLAY UNI system command to show the current z/OS Unicode status or use the SET UNI system command to change the conversion environment.

Related concepts

Calling the character conversion services (z/OS: Unicode Services User’s Guide and Reference)

Related reference

Creating a Unicode Services environment (z/OS: Unicode Services User’s Guide and Reference)

EBCDIC and ASCII support

Db2 supports both EBCDIC and ASCII encoding of data.

If you specify MIXED DATA = NO on panel DSNTIPF, you can use any compatible SBCS CCSID in the EBCDIC CCSID and ASCII CCSID fields. The first table below lists a selection of common SBCS CCSIDs that might be used as source or target CCSIDs for EBCDIC or ASCII data. Db2 does not support the storing of data into all of these CCSIDs. That is, not all of the numbers listed in the first table below are supported as target CCSIDs in conversion. When you choose CCSIDs, you should choose an EBCDIC CCSID and an ASCII CCSID that are listed in the same row in the first table below.

To determine which combinations Db2 supports with SYSSTRINGS, issue the following SQL statement:

GUPI

```
SELECT * FROM SYSIBM.SYSSTRINGS;
```

GUPI

If you specify MIXED DATA=NO on installation panel DSNTIPF, specify an SBCS CCSID from the second table below in the EBCDIC CCSID field on DSNTIPF. You must specify a SBCS CCSID from the third table below in the ASCII CCSID field on DSNTIPF. Mixed character data and graphic data cannot be defined on a system when you specify MIXED DATA=NO.

If you specify MIXED DATA=YES on installation panel DSNTIPF, specify a mixed data CCSID from the second table below in the EBCDIC CCSID field on DSNTIPF. You must specify a mixed CCSID from the third table below in the ASCII CCSID field. The second and third tables below show the associated CCSIDs that Db2 assigns for SBCS and DBCS data when you specify a specific MCCSID.

Then specify a mixed CCSID from the third table in the ASCII CCSID field on DSNTIPF. By specifying a CCSID for mixed data (an MCCSID), you also receive system CCSIDs for SBCS and DBCS (graphic) data.

In the second and third tables, four CCSIDs are listed for Japanese to allow for all possible combinations of two single-byte code pages and two double-byte character sets. The difference between the single-byte code pages is in the code points for lowercase Latin letters and Katakana characters. In the code page for Japanese (Extended English, SCCSID 1027), lowercase letters have the same code points as other EBCDIC code pages.

In these tables, the terms are used as follows:

SCCSID
single-byte coded character set identifier

MCCSID
mixed coded character set identifier

GCCSID
graphic coded character set identifier

Table 150. Single-byte coded character set identifiers (CCSIDs)

Country or national language	EBCDIC	ASCII PC	ASCII AIX®	ASCII Windows
Australia (U.S. English)	37/1140*	437	819	1252/5348*
Austria (German)	273/1141*	850/858*	819	1252/5348*

Table 150. Single-byte coded character set identifiers (CCSIDs) (continued)

Country or national language	EBCDIC	ASCII PC	ASCII AIX®	ASCII Windows
Belarus (Cyrillic)	1025			1251/5347*
Belgium	500/1148*	850/858*	819	1252/5348*
Bosnia and Herzegovina (Cyrillic)	1025			1251/5347*
Bosnia and Herzegovina (Latin)	870	852	912	1250/5346*
Brazil (U.S. English)	37/1140*	850/858*	819	1252/5348*
Bulgaria (Cyrillic Multilingual)	1025			1251/5347*
Canada (U.S. English)	37/1140*	850/858*	819	1252/5348*
Croatia	870	852	912	1250/5346*
Czech Republic	870	852	912	1250/5346*
Denmark	277/1142*	850/858*	819	1252/5348*
Finland (Swedish)	278/1143*	850/858*	819	1252/5348*
France	297/1147*	850/858*	819	1252/5348*
Germany	273/1141*	850/858*	819	1252/5348*
Greece	875 or 423	869	813	1253/5349*
Hungary	870	852	912	1250/5346*
Iceland	871/1149*	850/858*	819	1252/5348*
International Latin-1	500/1148*			
Israel	424	862	916	1255/5351*
Italy	280/1144*	850/858*	819	1252/5348*
Latin America (Spanish)	284/1145*	850/858*	819	1252/5348*
FYR Macedonia	1025			1251/5347*
Netherlands (U.S. English)	37/1140*	850/858*	819	1252/5348*
New Zealand (U.S. English)	37/1140*	437	819	1252/5348*
Norway	277/1142*	850/858*	819	1252/5348*
Poland	870	852	912	1250/5346*
Portugal (U.S. English)	37/1140*	850/858*	819	1252/5348*
Russia (Cyrillic)	1025			1251/5347*
Serbia and Montenegro (Cyrillic)	1025			1251/5347*

Table 150. Single-byte coded character set identifiers (CCSIDs) (continued)

Country or national language	EBCDIC	ASCII PC	ASCII AIX®	ASCII Windows
Serbia and Montenegro (Latin)	870	852	912	1250/5346*
Spain	284/1145*	850/858*	819	1252/5348*
Sweden	278/1143*	850/858*	819	1252/5348*
Switzerland	500 /1148*	850/858*	819	1252/5348*
Thailand	838			
Turkey (Latin 5)	1026	857	920	1254/5350*
United Kingdom	285/1146*	850/858*	819	1252/5348*
U.S.A. (U.S. English)	37/1140*	437	819	1252/5348*
Note: * This number represents the equivalent CCSIDs using the euro symbol.				

Table 151. EBCDIC double-byte coded character set identifiers (CCSIDs)

National language	MCCSID	SCCSID	GCCSID	User-defined characters
Japanese (Extended Katakana)	930	290	300	4370
Japanese (Katakana-Kanji)	1390	8482	16684	6205
Japanese (Extended Katakana)	5026	290	4396	1880
Japanese (Extended English)	939	1027	300	4370
Japanese (Latin-Kanji)	1399	5123	16684	6205
Japanese (Extended English)	5035	1027	4396	1880
Korean	933	833	834	1880
Korean	1364	13121	4930	1880
Simplified Chinese	935	836	837	1880
Simplified Chinese	1388	13124	4933	1880
Traditional Chinese	937	28709	835	6204
Traditional Chinese	1379	28709	1378	628
Traditional Chinese	5475	28709	5474	628
Traditional Chinese	1371	1159	9027	6204

Table 152. ASCII double-byte coded character set identifiers (CCSIDs)

National language	MCCSID	SCCSID	GCCSID	User-defined characters
Japanese	932	897	301	1880
Japanese (Extended)	942	1041*	301	1880
Japanese (Open environment)	943	1041*	941	1880
Japanese (HP)	5039	1041*	1351	940
Korean	949	1088	951	1880
Korean (EUC)	970	367	971	1880
Korean	1363	1126	1362	1880
Simplified Chinese	1381	1115	1380	1880
Simplified Chinese (EUC)	1383	367	1382	
Simplified Chinese	1386	5210	1385	1880
Traditional Chinese	938	904	927	6204
Traditional Chinese	948	1043	927	6204
Traditional Chinese (IBM Big-5)	950	1114	947	

Note: * The SCCSID 1041 is a superset of SCCSID 897.

Implications of character conversions

Some character conversions have implications that you should be aware of. For example, when a character string is converted to another encoding scheme, the converted string might have a different length from the source string. In this case, the conversion is an *expanding conversion* or a *contracting conversion*.

Expanding conversions: An *expanding conversion* occurs when the length of the converted string is greater than that of the source string. For example, an expanding conversion occurs when an ASCII mixed data string that contains DBCS characters is converted to EBCDIC mixed data. Because of the addition of shift characters, an error occurs when an expanding conversion is performed on a fixed-length input host variable that requires conversion from ASCII mixed data to EBCDIC mixed data. The solution is to use a varying-length string variable with a maximum length that is sufficient to contain the expansion. Expanding conversions also can occur when string data is converted to or from Unicode.

Contracting conversions: A *contracting conversion* occurs when the length of the converted string is smaller than that of the source string. For example, a contracting conversion occurs when an EBCDIC mixed data string that contains DBCS characters is converted to ASCII mixed data due to the removal of shift characters. Contracting conversions also can occur when string data is converted to or from Unicode.

Euro symbol support

Db2 enables users to migrate to CCSIDs that support the euro symbol. This support is limited to conversion from specific CCSIDs that do not define the euro symbol to specific CCSIDs that define the euro symbol.

⚠ **Attention:** If you want to migrate to CCSIDs that support the euro symbol, contact IBM Software Support. Altering CCSIDs without specific guidance from IBM Support is strongly discouraged.

The tables below list the ASCII and EBCDIC CCSIDs that can be converted to CCSIDs that support the euro symbol. In most cases, the euro symbol replaces an existing code point, such as the International

Currency Symbol (ICS). Unicode UTF-8 (1208) and UTF-16 (1200) support the euro symbol. Unicode SBCS data (367) does not support the euro symbol.

The CCSIDs that you can modify are listed according to the encoding scheme. The first table below lists the EBCDIC CCSIDs, and the second table below lists the ASCII CCSIDs.

Table 153. EBCDIC CCSID values that convert to euro CCSIDs

CCSIDs without euro symbol	CCSIDs with euro symbol
37	1140
273	1141
277	1142
278	1143
280	1144
284	1145
285	1146
297	1147
500	1148
871	1149

Table 154. ASCII CCSID values that convert to euro CCSIDs

CCSIDs without euro symbol	CCSIDs with euro symbol
850	858
1250	5346
1251	5347
1252	5348
1253	5349
1254	5350
1255	5351
1256	5352
1257	5353
874	4970

You cannot convert other CCSIDs to CCSIDs that support the euro symbol. All databases and all table spaces within an encoding scheme should be altered at the same time.

If you migrate to a euro-enabled CCSID on Db2 and you have Db2 Connect clients, you should set the DB2CONNECT_ENABLE_EURO_CODEPAGE environment variable on the client side.

Related tasks

Updating subsystem parameter and application default values

You can dynamically update the value of some subsystem parameters while Db2 is running. For other subsystem parameters, you must stop and restart Db2 to change the values.

How an entry in SYSIBM.SYSSTRINGS works with character conversion

The catalog table SYSIBM.SYSSTRINGS contains information about character conversion. Each row in the table describes a conversion from one coded character set to another.

The following columns in SYSSTRINGS are relevant to character conversion.

INCCSID
The source CCSID of a character conversion.

OUTCCSID
The target CCSID of a character conversion.

TRANSTYPE
The type of conversion:

SS
SBCS data to SBCS data

SM
SBCS data to EBCDIC MIXED data

MS
EBCDIC MIXED data to SBCS (EBCDIC and ASCII) data

PS
ASCII MIXED data to SBCS (EBCDIC and ASCII) data

GG
GRAPHIC data to GRAPHIC data

PM
ASCII MIXED data to EBCDIC MIXED data

MM
EBCDIC MIXED data to EBCDIC MIXED data

MP
EBCDIC MIXED to ASCII MIXED data

PP
ASCII MIXED to ASCII MIXED data

SP
SBCS (ASCII and EBCDIC) to ASCII MIXED data

ERRORBYTE
Specifies the byte that is used in the conversion table (TRANSTAB) as an error indicator. For example, if ERRORBYTE is X'3E', that byte is used in the conversion table to indicate that no conversion is defined for code points that map to X'3E'. Null indicates the absence of an error indicator.

SUBBYTE
Specifies the byte that is used in the conversion table (TRANSTAB) as a substitution character. For example, if SUBBYTE is X'3F', that byte is used in the conversion table as a substitute for code points that map to X'3F'. A warning occurs when a code point maps to the value of SUBBYTE. Null indicates the absence of a substitution character.

TRANSPROC
The name of a module or a blank string. If IBMREQD is N, a non-blank value of TRANSPROC is the name of a user-provided conversion procedure. If IBMREQD is Y, a non-blank value of TRANSPROC is the name of a Db2 module that contains DBCS conversion tables.

IBMREQD
Y indicates that the row is provided by IBM. N indicates that the row has been inserted by the user.

TRANSTAB
A 256-byte conversion table or an empty string.

Each row of SYSSTRINGS contains information about the conversion of character strings from the coded character set that is identified by INCCSID to the coded character set that is identified by OUTCCSID. The conversion function is automatically invoked when a conversion from the coded character set that is identified by the INCCSID column to the coded character set that is identified by the OUTCCSID column is required.

For example, the row of SYSSTRINGS in which the value of INCCSID is 500 and the value of OUTCCSID is 37 describes the conversion from CCSID 500 to CCSID 37. The row in which the value of INCCSID is 37 and the value of OUTCCSID is 500 describes the conversion from CCSID 37 to CCSID 500.

Db2 enforces a distinction between IBM-supplied rows and user-provided rows with the following constraints:

- Rows with IBMREQD=Y cannot be updated or deleted.
- Rows with IBMREQD=N can be inserted, updated, and deleted.
- The same pair of CCSIDs can be in two rows, if one is in an IBM-supplied row and the other is in a user-provided row. In this case, the user-provided row is used for the character conversion.

The following table lists the types of rows that are possible in SYSSTRINGS.

Table 155. Types of rows in SYSSTRINGS

The value of TRANSPROC is	The value of TRANSTAB is	The value of IBMREQD is	The result is
blank	an empty string	–	No conversion is performed.
not blank	–	NO	Conversion is performed by the conversion procedure module name identified in the TRANSPROC column
blank	not empty	–	Conversion is performed by the Db2 module using the conversion table identified in TRANSTAB

Be aware of the following rules for SYSSTRINGS entries:

- An INSERT, UPDATE, DELETE, or LOAD is allowed only if IBMREQD=N.
- The values in the INCCSID and OUTCCSID columns must be in the range 1 - 65533.
- For any given row, the INCCSID and OUTCCSID columns cannot contain the same value.
- The value in the TRANSTYPE column must be SS, SM, MS, PS, MM, PM, GG, MP, PP, or SP.
- For any given row, the ERRORBYTE and SUBBYTE columns cannot contain the same nonnull value.
- The TRANSPROC column must either be blank or contain a string that conforms to the rules for z/OS program names.
- The length that is specified in the TRANSTAB column must be either 0 or 256.

Related reference

z/OS XL C Support for the double-byte character set (XL C/C++ Programming Guide)

Conversion-related changes that require remote packages to be rebound

Certain conversion-related changes at the local DBMS or at a remote DBMS might force the rebinding of a package.

These include the following changes:

- The system CCSID at the remote DBMS was changed. In this case, always rebind the package.

- The system CCSID at the local DBMS was changed. This could happen, for example, if the wrong system CCSID was specified during installation. If so, string constants in static SQL statements might have been converted incorrectly during the binding of the package. Rebinding corrects the conversion. Other problems might also arise as a result of the change. In most cases, you should rebind the package.
- The subtype of a character column is changed at the remote DBMS. The pertinent changes are from BIT to either SBCS or MIXED, and from SBCS or MIXED to BIT. The change was probably made by modifying the FOREIGNKEY column of the SYSIBM.SYSCOLUMNS table in the remote system catalog. Alternatively, the change might have occurred if the table was dropped and re-created with a different subtype (BIT to either SBCS or MIXED, or either SBC or MIXED to BIT) after the application was bound. A statement that refers to a column with a modified subtype might fail with an SQLCODE of -333. If this occurs, rebind the package containing the statement.

Locales for uppercase and lowercase conversion of EBCDIC data

Rules for uppercase and lowercase usage vary according to language and country. A *locale* defines the subset of a user's environment that depends on language and cultural conventions.

Db2 uses the information that is associated with a locale to execute UPPER, LOWER, and TRANSLATE functions in a culturally correct manner. A locale consists of two components: the first component represents a specific language and country, and the second component is a CCSID.

Example: In the locale, Fr_CA.IBM-1047, Fr_CA represents the language and country (French Canadian), and IBM-1047 is the associated CCSID.

The symbol for euro currency is supported through the modifier @EURO.

Example: To display results in euro dollars instead of French Francs, specify Fr_FR@EURO.

Db2 uses the SCEELKED and SCEERUN Language Environment (LE) libraries. Both libraries are PDS libraries and are for non-XPLINK linkage only. If you need to customize the locales using Language Environment libraries, see Internationalization: Locales and Character Sets (XL C/C++ Programming Guide).

The following table shows a partial list of locales that are supplied with z/OS C/C++. For a more complete list of locales, see Compiled locales (LE locales) (XL C/C++ Programming Guide).

Table 156. Examples of locales supplied with z/OS C/C++. Excerpt of table from z/OS C/C++ Programming Guide

Locale	Language	Country	Code set	Load module name
De_CH.IBM-500	German	Switzerland	IBM-500	EDC$DCEO
De_CH.IBM-1047	German	Switzerland	IBM-1047	EDC$DCEY
De_DE.IBM-273	German	Germany	IBM-273	EDC$DDEB
De_DE.IBM-1047	German	Germany	IBM-1047	EDC$DDEY
Fr_CA.IBM-037	French	Canada	IBM-037	EDC$FCEA
Fr_CA.IBM-1047	French	Canada	IBM-1047	EDC$FCEY
It_IT.IBM-280	Italian	Italy	IBM-280	EDC$ITEG
It_IT.IBM-1047	Italian	Italy	IBM-1047	EDC$ITEY
Ja_JP.IBM-290	Japanese	Japan	IBM-290	EDC$JAEL
Ja_JP.IBM-930	Japanese	Japan	IBM-930	EDC$JAEU
Ja_JP.IBM-939	Japanese	Japan	IBM-939	EDC$JAEV
Ja_JP.IBM-1027	Japanese	Japan	IBM-1027	EDC$JAEX

Setting up z/OS to allow uppercase and lowercase conversion of Unicode and ASCII data

If you want to use the UPPER or LOWER built-in functions to process Unicode and ASCII data, you must complete additional setup. You must also complete additional setup if you want to use uppercase or lowercase conversions for characters other than A - Z or a - z.

Procedure

Add control statements to the configuration of z/OS Support for Unicode services.

Example

Assume that your EBCDIC CCSID is 37 and your ASCII CCSID is 819, and that you have defined the following conversions:

```
CONVERSION 37,367,ER;
CONVERSION 37,1208,ER;
CONVERSION 37,1200,ER;
CONVERSION 367,37,ER;
CONVERSION 1208,37,ER;
CONVERSION 1200,37,ER;
CONVERSION 819,367,ER;
CONVERSION 819,1208,ER;
CONVERSION 819,1200,ER;
CONVERSION 367,819,ER;
CONVERSION 1208,819,ER;
CONVERSION 1200,819,ER;
```

Modify your conversion image as follows:

```
CASE NORMAL;   /* normal casing */
CASE SPECIAL;  /* additional locale-independent casing */
CASE LOCALE;   /* additional locale-dependent casing */
CONVERSION 37,367,ER;
CONVERSION 37,1208,ER;
CONVERSION 37,1200,ER;
CONVERSION 367,37,ER;
CONVERSION 1208,37,ER;
CONVERSION 1200,37,ER;
CONVERSION 819,367,ER;
CONVERSION 819,1208,ER;
CONVERSION 819,1200,ER;
CONVERSION 367,819,ER;
CONVERSION 1208,819,ER;
CONVERSION 1200,819,ER;
```

The three additional CASE statements provide the necessary infrastructure for the UPPER and LOWER functions to process Unicode data according to the Unicode Standard.

Appendix A. Db2 application provisioning, development, and deployment (DevOps) solutions

Application developers can use these solutions to use DevOps practices to provision, develop, test, and deploy Db2 for z/OS database applications, with automation based on business rules.

With these solutions, you can enable application developers to provision a database schema with or without data on development and test environments, and use templates to roll out the database schema changes for the application changes to one or more target environments in parallel. You can also enable them to use continuous integration and continuous delivery for application changes on the Db2 for z/OS platform.

Some capabilities in these solutions require other IBM offerings, such as Db2 DevOps Experience for z/OS, UrbanCode® Deploy (UCD), and z/OS Management Facility (z/OSMF). These solutions are delivered in separate parts that support different user roles and activities.

Related reference

IBM z/OS Management Facility Online Help

Related information

IBM Db2 DevOps Experience for z/OS

UrbanCode Deploy

Db2 DevOps Experience for z/OS UCD plugin

The Db2 DevOps Experience for z/OS UCD plugin adds steps in UCD to for using the capabilities of Db2 DevOps Experience for z/OS and to integrate with deployment flows in UCD.

The Db2 DevOps Experience for z/OS UCD plugin requires Db2 DevOps Experience for z/OS V1.1.0 with APARs PH1159 and PH11598, or higher. For an overview of its capabilities, see Db2 DevOps Experience features and benefits.

The Db2 DevOps Experience for z/OS UCD plugin for UCD includes the following steps for applications that are defined in Db2 DevOps Experience for z/OS.

- Provision a Db2 schema instance of an application
- Deprovision a Db2 schema instance of an application
- Analyze schema changes on a Db2 schema instance
- Apply schema changes on a Db2 schema instance of an application
- Promote schema changes from a Db2 schema instance to the golden master copy of an application
- Sync up schema changes from the golden master copy to a Db2 schema instance of an application

To download the plugin, see UrbanCode: Db2 DevOps Experience plugin.

Related information

IBM Db2 DevOps Experience for z/OS

Db2 for z/OS UCD template

The Db2 for z/OS UCD template shows examples of Db2 application provisioning and deployment, including deployment of database schema and stored procedure changes, Db2 native REST services, packages and DBRMs, invoking of Db2 utilities and commands, and integrating with the Db2 DevOps Experience for z/OS UCD plugin in UCD.

The template contains sample artifacts, processes to prepare the artifacts, environments, and an application which associates the artifacts, which demonstrate how you can use UrbanCode Deploy (UCD) to provision and deploy Db2 for z/OS database applications.

The Db2 for z/OS UCD template requires Db2 DevOps Experience for z/OS V1.1.0 with APARs PH1159 and PH11598, or higher and the Db2 DevOps Experience for z/OS UCD plugin to enable the following activities in UCD.

- Provisioning a database schema instance for an application
- Deprovisioning a database schema instance for an application
- Deploying database schema changes, including the following tasks:
  - Comparing and analyzing the data objects in the committed schema changes against those in the target environments to derive the delta and to generate deployment plan with all necessary operations required to apply the changes.
  - Reviewing and approval of deployment plans, which is optional and can be skipped.
  - Applying the changes to the target environments.
  - Notifying users of events and schema changes through UCD capability.

You can also use the Db2 for z/OS UCD template template to enable the following activities in UCD.

- Running Db2 utilities and commands, such as for binding packages, unloading and loading data, and so forth.
  - Accepting the input of existing bind cards for binding packages.
  - Supporting default bind options with the ability to overwrite the default bind options on certain target environments
- Provisioning a database schema with DDL input
- Deploying Db2 native REST services with executable SQL text, bind options, and grant statements as inputs
- Dropping deployed REST services
- Running SQL statements including CALL statements and CLP commands in batch mode, with the Db2 command line processor with RACF passticket

To download the Db2 for z/OS UCD template which includes a white paper that contains detailed configuration and usage instructions, see UrbanCode: Db2 for z/OS Package.

Related reference

IBM z/OS Management Facility Online Help

Related information

IBM Db2 DevOps Experience for z/OS

UrbanCode Deploy

z/OSMF templates for Db2 schema provisioning

You can use the z/OSMF templates for Db2 schema provisioning to provision and deprovision Db2 for z/OS schemas for database as a service (DBaaS) in private cloud environments.

The z/OSMF templates for Db2 schema provisioning support the following database schema provisioning as a service activities:

- Provisioning an empty database.
- Provisioning a sample database schema.

When used with IBM Db2 DevOps Experience for z/OS V1.1 with APAR UI63018, or later versions, the z/OSMF templates for Db2 schema provisioning also support the following activities:

- Provisioning a database schema like an existing source environment without data.
- De-provisioning to destroy the provisioned database schema.

When used with Db2 Administration Tool for z/OS V11.2 with APARs PI67731, PI72396, and PI76054 or later versions, and Db2 Cloning Tool for z/OS V3.2 with APAR PH00169, or later versions, the z/OSMF templates for Db2 schema provisioning also support the following activities.

- Provisioning a database schema like an existing source environment, with or without data, with support for the following activities:
  - Refreshing data in a schema by copying it from the source environment.
  - Taking snapshots of the provisioned database schema, with or without data.
  - Restoring the provisioned database schema to a previous snapshot.
  - De-provisioning to destroy the provisioned database schema and snapshots.

To download the z/OSMF templates for Db2 schema provisioning and customization instructions, see https://github.com/IBM/Db2ZTools/tree/master/DevOps/Db2SchemaServices.

Related reference

IBM z/OS Management Facility Online Help

Information resources for Db2 for z/OS and related products

You can find the online product documentation for Db2 for z/OS in IBM Documentation.

IBM Documentation is the home of all online product documentation for Db2 for z/OS and related products, including PDF format manuals.

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Glossary

The glossary is available in IBM Documentation

For definitions of Db2 for z/OS terms, see .

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