

IBM IMS Database Solution Pack for z/OS

Overview and Customization

2.2

SC27-9037-07



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Note:

Before using this information and the product it supports, read the information in [“Notices” on page 104](#).

Eighth Edition

This edition applies to Version 2.2 of IBM® IMS Database Solution Pack for z/OS® (program number 5655-DSP) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC27-9037-06.

About this information

IBM® IMS Database Solution Pack for z/OS® (also referred to as IMS Database Solution Pack) is a product that combines a number of IBM® products into a consolidated solution that provides a set of complete and efficient management utilities for IMS full-function databases and High Availability Large Databases (HALDBs).

IMS Database Solution Pack combines the following products into a single offering:

- IBM® IMS Database Reorganization Expert for z/OS®
- IBM® IMS Database Solution Pack for z/OS® IMS Online Reorganization Facility
- IBM® IMS Database Solution Pack for z/OS® IMS High Availability Large Database (HALDB) Toolkit
- IBM® IMS High Performance Unload for z/OS®
- IBM® IMS High Performance Load for z/OS®
- IBM® IMS High Performance Prefix Resolution for z/OS®
- IBM® IMS Index Builder for z/OS®
- IBM® IMS High Performance Image Copy for z/OS®
- IBM® IMS High Performance Pointer Checker for z/OS®
- IBM® IMS Library Integrity Utilities for z/OS®
- IBM® IMS Administration Tool for z/OS®

IMS Database Solution Pack also includes Database Repair Facility and Database Sensor.

These topics provide an overview of the products and capabilities delivered with IMS Database Solution Pack as well as some common usage scenarios to help you understand the capabilities of the product. It also includes post-SMP/E installation instructions and customization instructions which must be performed before these products can be used.

These topics are designed to help database administrators, system programmers, application programmers, and system operators perform the following tasks:

- Understand the capabilities of the functions associated with IMS Database Solution Pack
- Plan for the installation of IMS Database Solution Pack
- Migrate from previous releases of the tools that comprise IMS Database Solution Pack
- Perform the post-SMP/E installation of IMS Database Solution Pack
- Customize IMS Database Solution Pack

Before using this information, you must understand basic IMS concepts, the IMS environment, and your installation's IMS system. Therefore, IMS publications are prerequisite for all IMS Database Solution Pack products and components.

To use these topics, you should have a working knowledge of:

- The z/OS® operating system
- ISPF
- SMP/E

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

- Links to [IBM® Documentation](#) for the user guides ("HTML")
- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products

- Technical articles from IBM® Software Support
- White papers that describe product business scenarios and solutions

IMS Database Solution Pack overview

IBM® IMS Database Solution Pack for z/OS® (also referred to as IMS Database Solution Pack) combines data management tools to provide all the capabilities you need to manage your IMS full-function databases and High Availability Large Databases (HALDBs).

IMS Database Solution Pack is specifically designed to provide database administrators (DBAs) with smart solutions to database operation and maintenance tasks.

Topics:

- [“What's new in IMS Database Solution Pack” on page 8](#)
- [“What is IMS Database Solution Pack?” on page 10](#)
- [“Tools in IMS Database Solution Pack” on page 12](#)
- [“Benefits” on page 22](#)
- [“Installation requirements” on page 22](#)
- [“Service updates and support information” on page 26](#)
- [“Product documentation and updates” on page 26](#)
- [“Accessibility features” on page 28](#)

What's new in IMS Database Solution Pack

In addition to the tools and functions included in IMS Database Solution Pack 2.1, IMS Database Solution Pack 2.2 consolidates IBM® IMS Administration Tool for z/OS®.

New functions and enhancements

This section summarizes some of the major new functions and features that IMS Database Solution Pack 2.2 provides. For a complete list of new function APARs, see [IMS Database Solution Pack 2.2 new functions](#) in IBM® Documentation.

IMS 15 support

All of the tools in IMS Database Solution Pack support IMS 15.

IMS management of ACBs support

Many of the tools in IMS Database Solution Pack support the use of ACBs managed by IMS. If the IMS management of ACBs is enabled, the tools that support this function can read database definitions from the IMS catalog instead of from DBD libraries. For details, see [IBM® technote 0731745: IBM® IMS Tools and Managed ACB Support](#).

Data set encryption support

Many of the tools in IMS Database Solution Pack support data set encryption for IMS data sets. For details, see [IBM® technote 0733513: IBM® IMS Tools and Data Set Encryption Support](#).

Consolidation of IBM® IMS Administration Tool for z/OS®

IMS Administration Tool provides a comprehensive set of functions and features that can help you with the day-to-day tasks associated with managing IMS environments efficiently and effectively. For more information, see [“IBM IMS Administration Tool for z/OS” on page 20](#).

Documentation changes

This section summarizes documentation changes made to *IMS Database Solution Pack: Overview and Customization*.

New and changed information is denoted by carets (◀) and (▶) at the beginning and end of the new or changed information. Editorial changes that have no technical significance are not noted.

Revision markers follow these general conventions:

- Only technical changes are marked; style and grammatical changes are not marked.

- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If a topic is changed by more than 50%, the entire topic is marked with revision markers (so it might seem to be a new topic, even though it is not).

Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

SC27-9037-07 (March 2026)

<i>Table 1: SC27-9037-07 updates</i>	
Description	Related APARs
Documentation updates to support IBM® IMS Tools Base for z/OS® 1.8.	N/A

SC27-9037-06 (May 2024)

<i>Table 2: SC27-9037-06 updates</i>	
Description	Related APARs
Removed information related to IBM® IMS Tools Base for z/OS® 1.6.	N/A

SC27-9037-05 (October 2023)

<i>Table 3: SC27-9037-05 updates</i>	
Description	Related APARs
Removed information related to IBM® Management Console for IMS and Db2® for z/OS®.	N/A

SC27-9037-04 (July 2022)

<i>Table 4: SC27-9037-04 updates</i>	
Description	Related APARs
Documentation updates to support IBM® IMS Tools Base for z/OS® 1.7 and IMS Administration Foundation. IMS Administration Foundation activates the IMS administration web-browser interface of IBM® Unified Management Server for z/OS® to enable the management of IMS systems and resources.	N/A

SC27-9037-03 (July 2021)

<i>Table 5: SC27-9037-03 updates</i>	
Description	Related APARs
Updated the following topics to support IMS Library Integrity Utilities enhancement: <ul style="list-style-type: none"> • “IBM IMS Library Integrity Utilities for z/OS” on page 19 • “Benefits” on page 22 • “Manage IMS ACB/DBD/PSB/MFS libraries, RECON data sets, and IMS catalog” on page 31 • “LICON data sets and global option modules” on page 72 • “Activating Integrity Checker” on page 83 • “Creating an RDE to register DMB information” on page 85 	PH24779
“Configuring IMS Tools Base” on page 46 is updated.	N/A

SC27-9037-02 (June 2019)

<i>Table 6: SC27-9037-02 updates</i>	
Description	Related APARs
Topics under “Migration considerations” on page 33 are updated.	N/A

SC27-9037-01 (August 2018)

<i>Table 7: SC27-9037-01 updates</i>	
Description	Related APARs
Information to support IMS Online Reorganization Facility enhancement is added. New base configuration parameters, WFHLQ and WFUNIT, are added to “Configuring the base environment for IMS Online Reorganization Facility” on page 62.	PI89625
“Installation requirements” on page 22 has been updated.	N/A

What is IMS Database Solution Pack?

IMS is IBM®’s premier transaction and hierarchical database management system. It is the product-of-choice for critical online operational applications and data in which support for high availability, performance, capacity, integrity, and low cost are key requirements. IMS manages the world’s most mission-critical data and is integral to today’s resurgence of mainframe usage.

The total cost of ownership (TCO) of any database management system (DBMS) is comprised of more than software and hardware costs. To determine the total cost, you must factor in scalability, reliability, systems management, the cost of database professionals to program, support, and administer the DBMS, and the cost of the computing resources that are required to operate the DBMS.

IBM® IMS Tools further lower IMS’s TCO by enabling personnel who have less IMS and mainframe experience to perform common tasks, while freeing more experienced personnel to focus on complex or strategic tasks. All these benefits can be realized by implementing IBM®’s IMS Database Solution Pack.

IMS Database Solution Pack provides an effective and efficient approach for managing IMS full-function databases and HALDBs quickly and accurately. IMS Database Solution Pack can contribute to reducing the overall total cost of ownership of IMS and, in turn, improve the return on investment (ROI).

IMS Database Solution Pack provides the following solutions to simplify management of IMS databases:

- A database monitoring solution that helps to keep databases in optimal condition by automating database monitoring tasks.
- A database reorganization solution that supports two reorganization capabilities. The online reorganization capability shortens database downtime, and the smart reorganization capability automates database reorganization.
- A database optimization solution that helps DBAs analyze IMS databases and build the most effective database organization and definition.

With these solutions and other capabilities, IMS Database Solution Pack covers the entire process of database administration tasks.

Subsections:

- [“Database monitoring solution”](#) on page 10
- [“Database reorganization solution”](#) on page 11
- [“Database optimization solution”](#) on page 11

Database monitoring solution

Highly skilled IT resources are vital for keeping databases in optimal condition. Competitive businesses cannot afford for their best people to be tied up with repetitive database maintenance tasks.

The database monitoring solution is the key to autonomic database administration that not only lightens DBAs’ work load but also keeps databases safe. The database monitoring solution of IMS Database Solution Pack helps your DBAs better manage your databases.

Automating database monitoring

DBAs assess database conditions by analyzing various reports that are generated by the tools or programs used in their workshops.

With IMS Database Solution Pack's database monitoring solution, database statistics are collected automatically during DBA's daily or weekly operations, and are accumulated in a repository. The accumulated statistics are automatically evaluated from various perspectives, and DBAs are alerted if databases are in exceptional conditions. When database reorganization is needed, reorganization tasks are automatically scheduled.

Viewing database conditions graphically

Database trends are an important factor in making database maintenance and migration plans for optimal database performance. However, DBAs require time, skill, knowledge, and experience to track the trends of databases, assess database statistics, and maintain historical data.

With IMS Database Solution Pack's database monitoring solution, DBAs can use web browsers to view interactive charts that show historical data and database trends. Through this graphical web interface, DBAs can also view the structure and the source code of the databases.

This graphical web interface helps DBAs acknowledge the database conditions at a glance. Less experienced DBAs can also use the interface to learn the structure and relationships between databases.

The database monitoring solution relieves the day-to-day burden of collecting, analyzing, and managing statistics by automating the monitoring of database health.

Database reorganization solution

Keeping IMS databases reorganized helps ensure that your IMS applications perform at their optimal levels. IMS Database Solution Pack can help reduce the time that is required to keep databases in top condition, while enhancing DBAs' ability to manage IMS databases.

The database reorganization solution reduces the amount of time databases are unavailable by supporting an efficient reorganization process, and helps your DBAs reorganize databases quickly without affecting IMS transactions and applications.

The database reorganization solution covers all the necessary reorganization procedures (unload, reload, prefix resolution, prefix update, secondary index building, pointer checking, and image copy), improves DBA productivity through a single-step reorganization process, and eliminates the need for operator intervention after a reorganization finishes.

IMS Database Solution Pack supports two capabilities for database reorganization: online reorganization and offline reorganization.

Online reorganization capability that keeps downtime to a minimum

Many businesses are moving toward 24x7 operations; to do so, key databases must be available around the clock. Taking systems offline for maintenance can affect your business. In today's market, systems must be highly available because the cost of outages can be high.

The online reorganization capability provides users with full access to the database during data reorganization, improves overall database availability, and prevents or significantly reduces planned downtime. DBAs can schedule the reorganization of online databases by predefining an online reorganization window. Scheduling saves DBA resources and increases database availability.

Smart reorganization capability for automation

The smart reorganization capability provides an integrated database reorganization infrastructure for IMS databases. It analyzes databases, evaluates database statuses against policies, and, when necessary, reorganizes databases automatically.

With this capability, DBAs can:

- Achieve fast database reorganization without manual intervention.
- Detect database problems before they negatively affect business.
- Customize and define policies to ensure that each database continues to satisfy its business requirements.
- Easily access all the resources they need from central repositories.

The smart reorganization capability provides an end-to-end database reorganization solution for DBAs.

Database optimization solution

IMS databases are increasing in size to accommodate regulatory compliance requirements and because businesses are serving more customers and using more suppliers. For optimal performance, you need to tune

up or expand the structure of databases. Changing database structures require high-level IMS database skills, and involves large work loads and many other tasks.

The database optimization solution of IMS Database Solution Pack handles complex DBA tasks during different phases. This solution recommends the most effective database configuration and provides tuning methods. It also helps to keep your databases optimized for performance and enables DBAs to migrate your databases quickly by allowing them to do complex tasks with small work load.

For example, the HALDB management tool provided in IMS Database Solution Pack helps you reduce administrative costs by providing a range of services to augment the operation and ease the administration of the HALDB environment. This tool can help reduce the time and minimize the skills required to perform application support tasks and provides HALDB maintenance, modeling, and analysis capabilities.

The tool performs a diagnostic test against a HALDB and proposes or re-creates optimized partition structures. It helps to convert your IMS full-function database to a HALDB with suitable partition structures.

Tools in IMS Database Solution Pack

IMS Database Solution Pack combines IMS Tools products into a single solution to provide an effective and efficient approach for managing your IMS full-function databases and HALDBs quickly and accurately.

The following tools are included in IMS Database Solution Pack but are shipped in separate target and distribution libraries:

- IBM® IMS Database Reorganization Expert for z/OS®
- IBM® IMS High Performance Unload for z/OS®
- IBM® IMS High Performance Load for z/OS®
- IBM® IMS High Performance Prefix Resolution for z/OS®
- IBM® IMS Index Builder for z/OS®
- IBM® IMS High Performance Image Copy for z/OS®
- IBM® IMS High Performance Pointer Checker for z/OS®
- IBM® IMS Library Integrity Utilities for z/OS®
- IBM® IMS Administration Tool for z/OS®

In addition, IMS Database Solution Pack includes the following functions:

- IMS Online Reorganization Facility
- IMS HALDB Toolkit
- Database Sensor
- Database Repair Facility

IMS Online Reorganization Facility

IMS Online Reorganization Facility performs a one-step reorganization of IMS databases with minimal database availability impact.

Taking systems offline for maintenance can affect business. In today's market, systems must be highly available because the cost of outages can be too high. IMS Online Reorganization Facility enables online data reorganization, which provides users with full access to the database during a data reorganization, improves the overall database availability, and reduces planned downtime. IMS Online Reorganization Facility supports internal logical relationships, secondary indexes, and HALDBs.

To learn more about IMS Online Reorganization Facility, see the [IMS Database Solution Pack IMS Online Reorganization Facility User's Guide](#).

Integration with other IMS Tools

IMS Online Reorganization Facility can reorganize a database by using the unload and load utilities that are provided by IMS. However, reorganization becomes faster if IMS HP Unload and IMS HP Load are used instead

of the IMS utilities. Also, other tools of IMS Database Solution Pack provide additional features for database reorganization. For example, the following tools can be called by IMS Online Reorganization Facility:

- IMS Database Reorganization Expert to enable conditional reorganization based on reorganization policy evaluation
- IMS HP Prefix Resolution to resolve and update prefixes of databases that are involved in logical relationships
- IMS HP Image Copy to create image copies of reorganized databases
- IMS HP Pointer Checker to check database pointers during reorganization
- IMS Library Integrity Utilities to print hierarchy diagram of the database

The following figure shows IMS Online Reorganization Facility integration with other IMS tools and components.

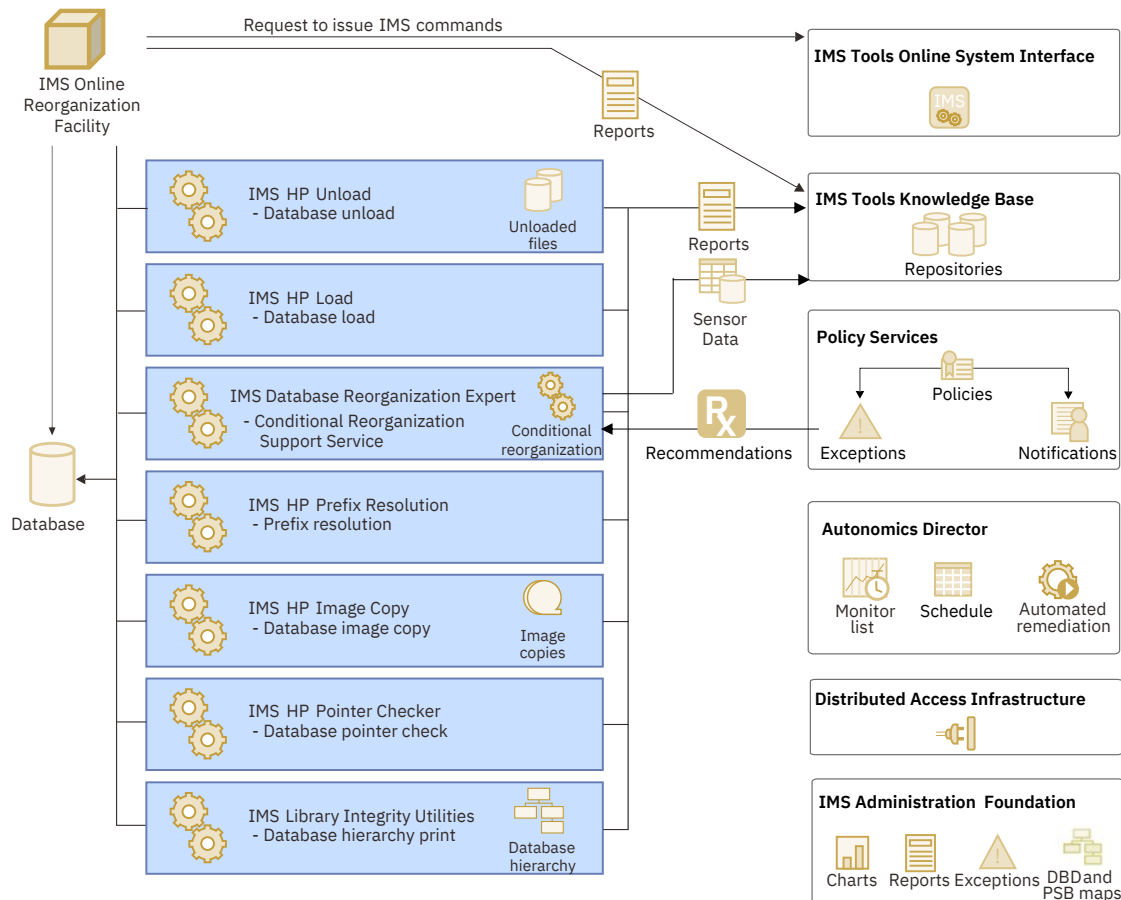


Figure 1: IMS Online Reorganization Facility integration

IMS High Availability Large Database Toolkit

IMS High Availability Large Database Toolkit (also referred to as IMS HALDB Toolkit) provides High Availability Large Database (HALDB) functions that can be used for HALDB maintenance and operation tasks.

Features of IMS HALDB Toolkit include application enabling functions and system utilities to make better use of the HALDB environment. IMS HALDB Toolkit can help reduce the time and minimize the skills that are required to perform application support tasks and provide IMS HALDB maintenance, modeling, and analysis.

To learn more about IMS HALDB Toolkit, see the [IMS Database Solution Pack IMS HALDB Toolkit User's Guide](#).

Integration with other IMS Tools

IMS HALDB Toolkit performs maintenance tasks on a database by using the utilities that are provided by IMS. However, using IMS tools that are provided in IMS Database Solution Pack adds additional features to simplify the maintenance tasks. The following tools can be called by IMS HALDB Toolkit:

- IMS Online Reorganization Facility to perform "near online" operation when maintaining partitions (splitting or consolidating HALDB partitions) or converting to a HALDB from a full-function database
- IMS HP Load for faster reload
- IMS HP Image Copy to create image copies of HALDBs
- IMS HP Pointer Checker to check database pointers in HALDBs
- IMS Library Integrity Utilities to print hierarchy diagram of the database

The following figure shows IMS HALDB Toolkit integration with other IMS tools and components.

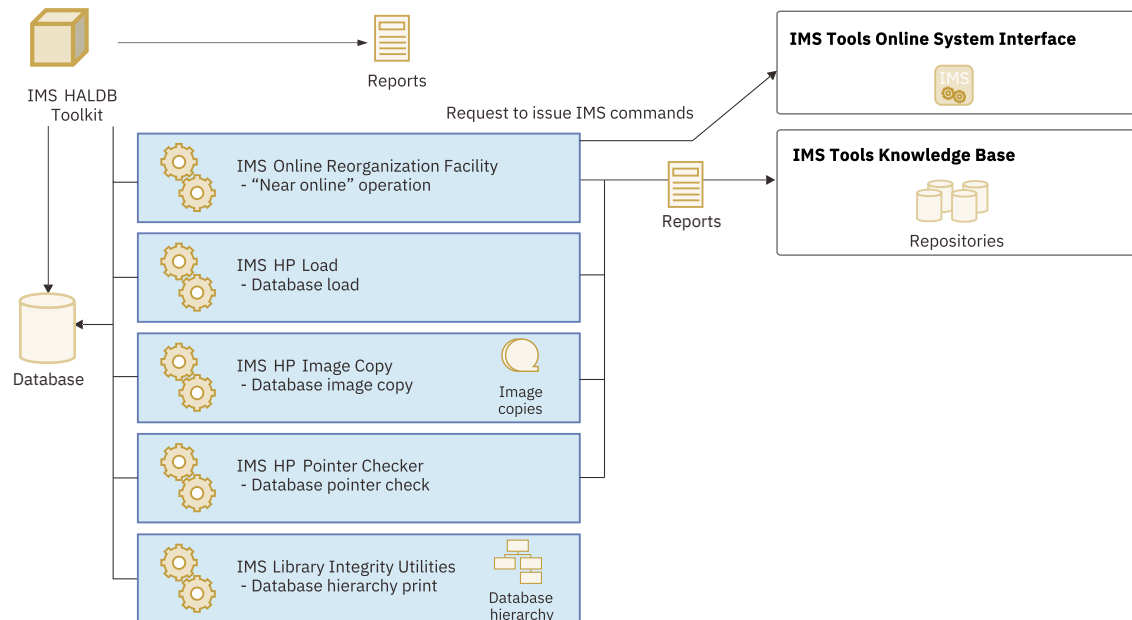


Figure 2: IMS HALDB Toolkit integration

IBM IMS Database Reorganization Expert for z/OS

IBM® IMS Database Reorganization Expert for z/OS® (also referred to as IMS Database Reorganization Expert) facilitates your reorganization scenario by releasing you from the complex database diagnosis tasks that are needed to acknowledge the database health.

When a database is diagnosed to be in need of reorganization, the product automatically runs the reorganization job, and you will receive a well-summarized report on the database status. By using IMS Database Reorganization Expert, you can reduce the amount of work and expertise that is required for database reorganization tasks and realize higher productivity with less maintenance time and training costs.

When IMS Database Reorganization Expert reorganizes a database, it internally calls IMS HP Unload and IMS HP Load. The capabilities of these two tools are also offered by IMS Database Reorganization Expert as the IPR Unload utility and the IPR Reload utility. When you need to unload or reload a database, consider using the IPR Unload utility and the IPR Reload utility over IMS HP Unload and IMS HP Load because the IPR Unload and IPR Reload utilities support consistent control statement format and support more options.

To learn more about IMS Database Reorganization Expert, see the [IMS Database Reorganization Expert User's Guide](#).

Integration with other IMS Tools

IMS Database Reorganization Expert uses IMS HP Unload and IMS HP Load to reorganize a database. Therefore, these tools must be installed together with IMS Database Reorganization Expert. Optionally, IMS Database Reorganization Expert can call the following tools of IMS Database Solution Pack to simplify reorganization tasks:

- IMS Index Builder to build indexes after database reorganization
- IMS HP Prefix Resolution to resolve and update prefixes of databases that are involved in logical relationships
- IMS HP Image Copy to create image copies of reorganized databases

- IMS HP Pointer Checker to check database pointers during reorganization
- IMS Library Integrity Utilities to print hierarchy diagram of the database
- Database Sensor to collect sensor data for monitoring and maintaining the health of the database

The following figure shows IMS Database Reorganization Expert integration with other IMS tools and components.

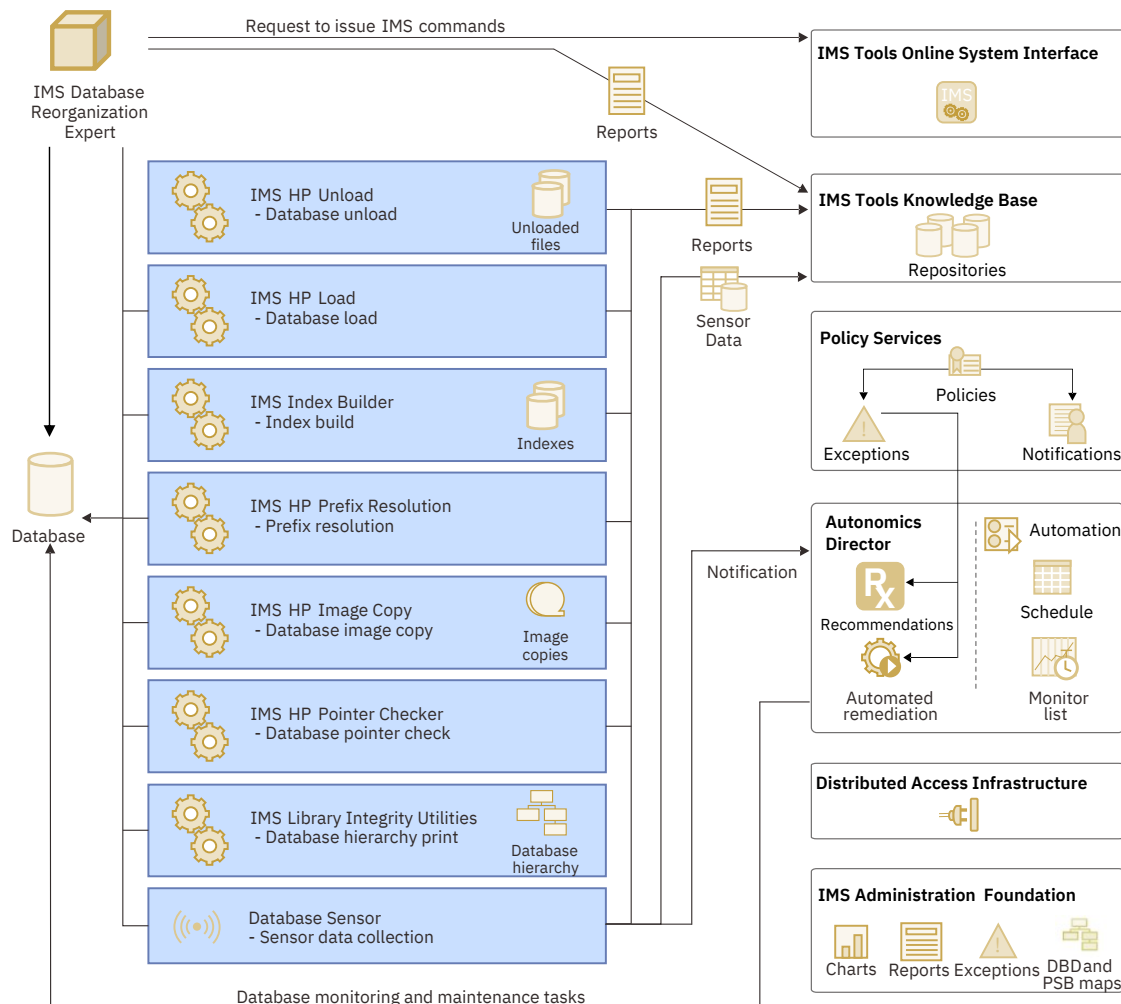


Figure 3: IMS Database Reorganization Expert integration

IBM IMS High Performance Unload for z/OS

IBM® IMS High Performance Unload for z/OS® (also referred to as IMS HP Unload) provides high speed unloading of IMS databases and improves performance of IMS data retrieval application programs by using the Unload application programming interface (API).

As processing volumes increase, more work needs to be done in a shorter period of time due to shrinking batch windows. The tool saves your time and money by reducing the CPU and elapsed time required for IMS database unloading and for running IMS data retrieval application programs. Powerful functions such as the ability to continue processing after a pointer error, a user exit facility, and a variety of unloaded record formats are provided—all with the goal of improving availability and throughput.

To learn more about IMS HP Unload, see the [IMS High Performance Unload User's Guide](#).

Integration with other IMS Tools

IMS HP Unload is designed for use with the IMS Database Reorganization Expert and IMS Online Reorganization Facility along with other high performance IMS Tools products to provide the most efficient and powerful end-to-end solution for IMS database reorganization.

IMS HP Unload can also be used as a stand-alone tool to provide high speed database unloading.

IBM IMS High Performance Load for z/OS

IBM® IMS High Performance Load for z/OS® (also referred to as IMS HP Load) provides high-speed loading of IMS databases and improves the performance of IMS database initial loading application programs by using the Load Application Programming Interface (API).

As processing volumes increase, more work needs to be done in a shorter period of time due to shrinking batch windows. This tool saves you time and money by reducing the CPU and elapsed time that is required for IMS database loading and reorganization.

To learn more about IMS HP Load, see the [IMS High Performance Load User's Guide](#).

Integration with other IMS Tools

IMS HP Load is designed for use with the IMS Database Reorganization Expert and IMS Online Reorganization Facility along with other high-performance IMS Tools products to provide the most efficient and powerful end-to-end solution for IMS database reorganization.

IMS HP Load can be used as a stand-alone tool to provide high speed database loading. It can also be called from IMS HALDB Toolkit to achieve faster database load in HALDB maintenance tasks.

IBM IMS High Performance Prefix Resolution for z/OS

IBM® IMS High Performance Prefix Resolution for z/OS® (also referred to as IMS HP Prefix Resolution) simplifies the management of IMS database environments by concurrently performing, in a single job step, the resolution and updating of pointers for logically related databases. These are must do tasks in order to correctly maintain any IMS database that is involved in logical relationships and has been loaded or reorganized.

Compared to the similar functions provided by the IMS utilities, which run these tasks in multiple job steps, IMS HP Prefix Resolution enables you to accomplish these tasks in a considerably easier and faster way by simplifying the job steps and eliminating the use of specific resources. With these advanced features, IMS HP Prefix Resolution facilitates and speeds up the tasks of database administrators (DBAs) and, enhances the availability of your system and human resources.

To learn more about IMS HP Prefix Resolution, see the [IMS High Performance Prefix Resolution User's Guide](#).

Integration with other IMS Tools

IMS HP Prefix Resolution can be used as a stand-alone tool, or it can be called by IMS Database Reorganization Expert and IMS Online Reorganization Facility during database reorganization. When IMS HP Prefix Resolution is called in a database reorganization job, it resolves and updates prefixes of databases that are involved in logical relationships after the database is reorganized.

IBM IMS Index Builder for z/OS

IBM® IMS Index Builder for z/OS® (also referred to as IMS Index Builder) provides improved technology for the recovery, maintenance, and addition of IMS indexes and eliminates the need to image copy index data sets for recovery and backup purposes.

IMS Index Builder allows you to rebuild IMS indexes rather than recover or reorganize them using the traditional unload and reload processes used for the primary data store. This eliminates the need to image copy indexes, means faster recovery and reorganization times, and allows for adding new indexes quickly without the need to reorganize the primary databases. IMS Index Builder provides an easy-to-use, one-step procedure for building all IMS index types including primary, secondary, and indirect list data sets.

To learn more about IMS Index Builder, see the [IMS Index Builder User's Guide](#).

Integration with other IMS Tools

IMS Index Builder can be used as a stand-alone tool or it can be called by IMS Database Reorganization Expert.

The following figure shows IMS Index Builder integration with other IMS tools and components.

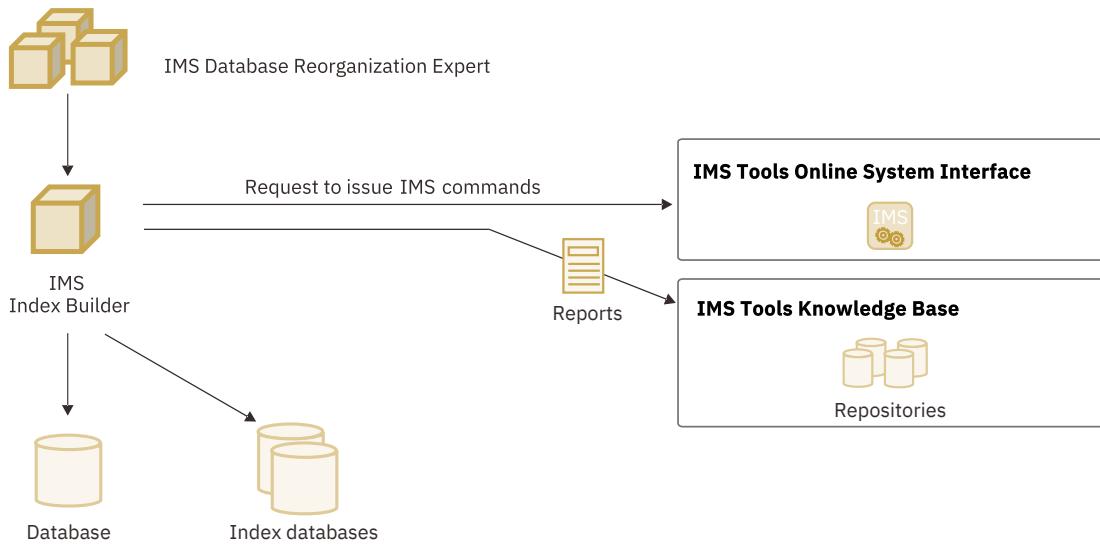


Figure 4: IMS Index Builder integration

IBM IMS High Performance Image Copy for z/OS

IBM® IMS High Performance Image Copy for z/OS® (also referred to as IMS HP Image Copy) enables you to quickly back up and recover database data sets by providing support for advanced copying features.

Using image copies to create backup data is essential to the timely recovery of databases after a loss of data or a programming error. However, taking data offline can reduce user productivity and negatively impact your business. IMS HP Image Copy provides rapid image copy features that reduce the amount of time that database data sets are unavailable. These features enable automated operation that takes the database offline before taking a batch image copy and restarts it after the process. IMS HP Image Copy helps you speed recovery time by supporting quick copy and restarting methods, and allows your users to become more productive and avoid expensive losses from missed business opportunities.

To learn more about IMS HP Image Copy, see the [IMS High Performance Image Copy User's Guide](#).

Integration with other IMS Tools

The Image Copy function of IMS HP Image Copy integrates with many IMS tools. For example, you can have the Image Copy function activated within a reorganization job to create an image copy of the reorganized database. Also, the Image Copy function can internally call the database pointer check process of IMS HP Pointer Checker and the sensor data collection process of Database Sensor.

The following figure shows IMS HP Image Copy integration with other IMS tools and components.

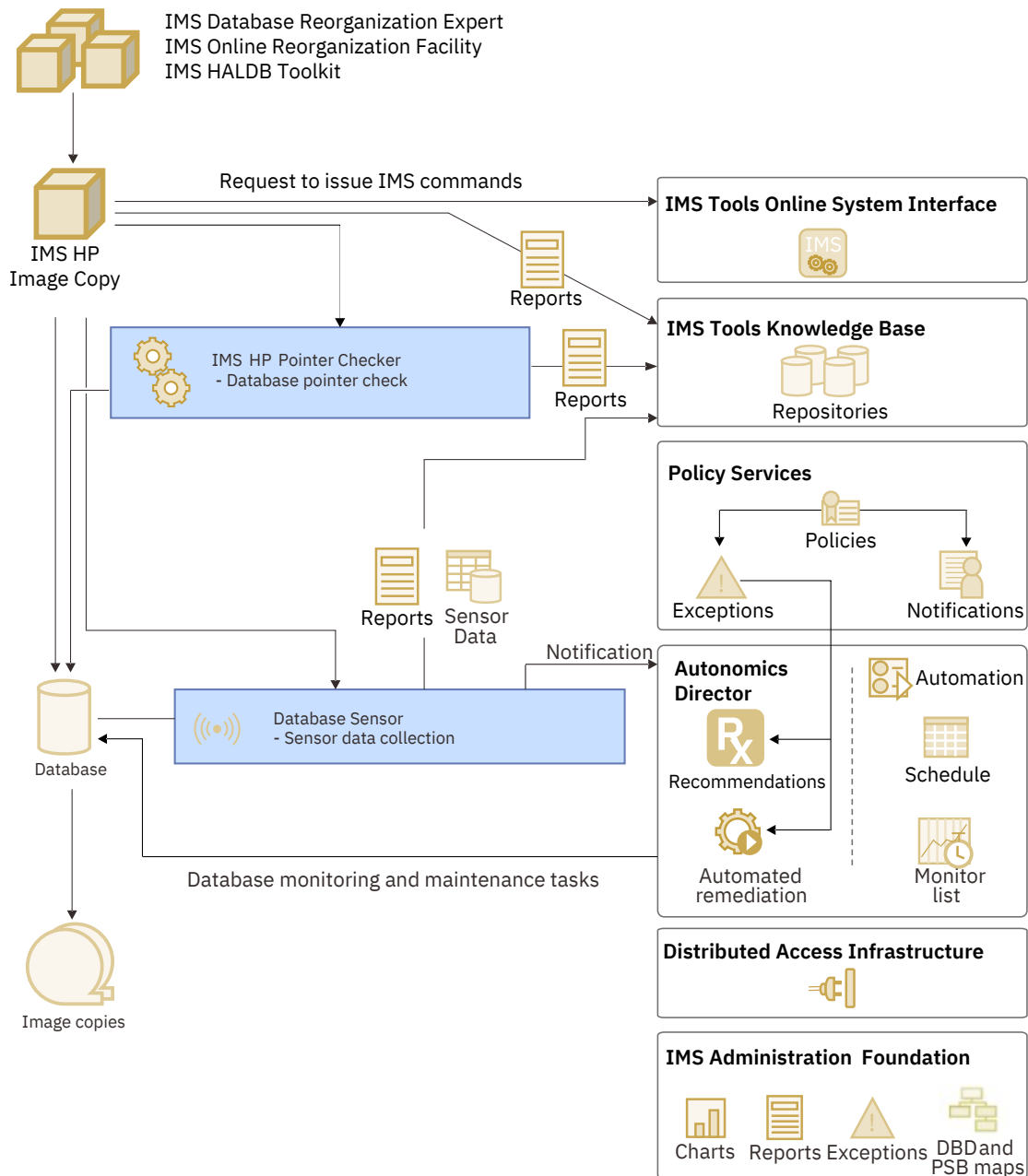


Figure 5: IMS HP Image Copy integration

IBM IMS High Performance Pointer Checker for z/OS

IBM® IMS High Performance Pointer Checker for z/OS® (also referred to as IMS HP Pointer Checker) provides a number of utilities designed to help ensure IMS databases are operational, tuned, repaired, and ready for use.

The product reports space utilization, and detects and reports physical and logical direct pointer problems in IMS full-function databases. These reports pinpoint both the errors and their locations within the database. Data is also collected for analysis and report by several utilities provided by this product.

To learn more about IMS HP Pointer Checker, see the [IMS High Performance Pointer Checker User's Guide](#).

Integration with other IMS Tools

The database pointer check process of IMS HP Pointer Checker can be run in a stand-alone HD Pointer Checker job or be called from IMS HP Image Copy. IMS HP Pointer Checker can call the sensor data collection process of Database Sensor to collect sensor data. The DBD/PSB/ACB Mapper utility and the DBD/PSB/ACB Reversal utility of IMS Library Integrity Utilities can be called in IMS HP Pointer Checker jobs to print database hierarchy or print IMS DBDGEN and IMS PSBGEN utility control statements.

The following figure shows IMS HP Pointer Checker integration with other IMS tools and components.

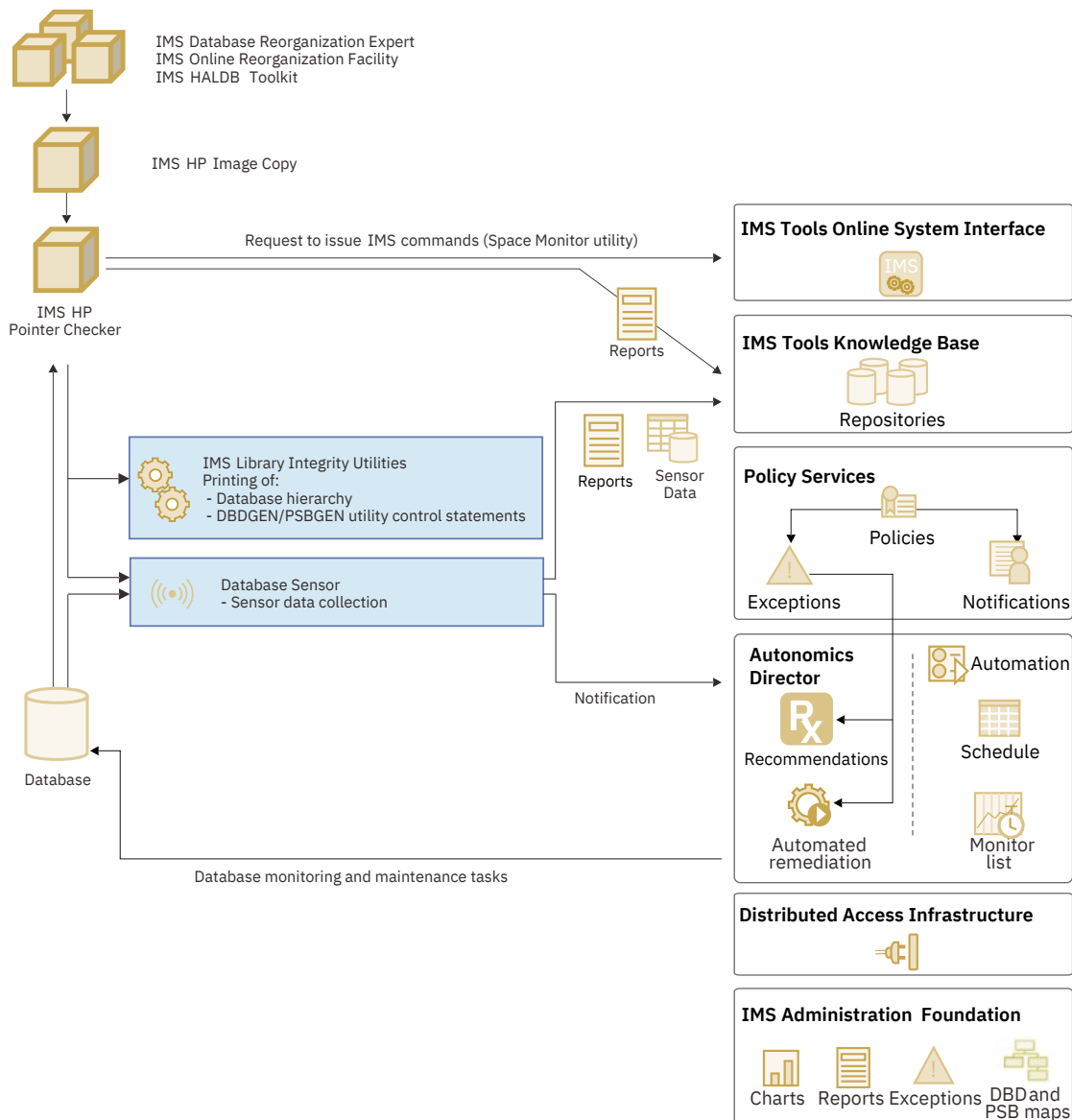


Figure 6: IMS HP Pointer Checker integration

IBM IMS Library Integrity Utilities for z/OS

IBM® IMS Library Integrity Utilities for z/OS® (also referred to as IMS Library Integrity Utilities) provides a set of utilities designed to validate, compare, map, recover, report, and regenerate a number of IMS libraries needed for operations.

Supported libraries include the ACB (application control block), DBD (database description), PSB (program specification block), MFS (Message Format Service) libraries, libraries containing DFSMDA members, IMS catalog, IMS directory, and RECON (recovery control) data sets. The utilities are used in conjunction with database maintenance tasks and migration operations, and to prevent accidental misuse in production.

To learn more about IMS Library Integrity Utilities, see the [IMS Library Integrity Utilities User's Guide](#).

IMS Library Integrity Utilities also provides the DBD/PSB Map Viewer, which is an IMS Library Integrity Utilities extension for IMS Administration Foundation. This extension enables the DBD and PSB Map feature for IMS Administration Foundation. The DBD and PSB Map feature displays graphical visualization of database segment tree structures, program specifications, and DBD and PSB macro source statements. You can also use the cross reference feature to list logical DBDs and PSBs that refer to a specific DBD.

Integration with other IMS Tools

IMS Library Integrity Utilities provides many utilities for maintaining IMS libraries. All the utilities are used as stand-alone utilities. However, the DBD/PSB/ACB Mapper utility can be called in IMS Database Reorganization Expert jobs, IMS Online Reorganization Facility jobs, and IMS HALDB Toolkit jobs to print database hierarchy.

The DMB verification function of the Integrity Checker utility uses RDEs (registered DMB entries) to prevent database corruptions caused by accidental misuse of ACBs or DBDs. When a DMB verification-enabled database is initially loaded or reorganized by one of the following IMS tools, the Integrity Checker automatically creates an RDE for the database:

- IMS Database Reorganization Expert
- IMS HP Load
- IMS Online Reorganization Facility

IMS Library Integrity Utilities extends the functions of IMS Administration Tool. IMS Library Integrity Utilities enables database and application administration, such as viewing, adding, changing, and deleting IMS objects. It also enables comprehensive reporting of IMS objects, such as DBDs and PSBs, and validation of IMS objects, such as DBDLIB/PSBLIB, ACBLIB, and IMS catalog.

To use the DBD and PSB Map feature in IMS Administration Foundation, see the [Unified Management Server User Guide](#).

IBM IMS Administration Tool for z/OS

IBM® IMS Administration Tool for z/OS® (also referred to as IMS Administration Tool) provides a comprehensive set of functions and features that can help you with the day-to-day tasks associated with managing IMS environments efficiently and effectively.

The tool is designed to operate as a centralized task management control center. The single user interface provides access to functions that can simplify complex tasks associated with managing IMS databases, applications, and IMS systems. The tool can increase the efficiency of data center resources and reduce the negative impact that data changes can have on your databases.

Core functions include:

- Assist in the administration and security of IMS databases and applications
- Help manage the IMS catalog
- Generate JCL to run IMS utilities
- Query data interactively
- Issue IMS commands and view responses

To learn more about IMS Administration Tool, see the [IMS Administration Tool User's Guide and Reference](#).

Integration with other IMS Tools

IMS Administration Tool integrates with and enhances the entire IMS Tools family of products.

Database Sensor

Database Sensor collects statistics about IMS databases and stores them as *sensor data* in the Sensor Data repository of IMS Tools Knowledge Base. Sensor data can be used for monitoring and maintaining the health, performance, and recoverability of the database.

To learn more about Database Sensor, see the [IMS Solution Packs Data Sensor User's Guide](#).

Integration with other IMS Tools

Database Sensor can be run as a stand-alone job, or can be called in the following utility jobs:

- IMS Database Reorganization Expert
- IMS HP Image Copy
- IMS HP Pointer Checker
- IMS Online Reorganization Facility

You can use IMS Administration Foundation to view graphical visualization and charting of sensor data, exceptions that are detected by the policy evaluations, and recommendations for resolving database exceptions.

The following figure shows Database Sensor integration with other IMS tools and components.

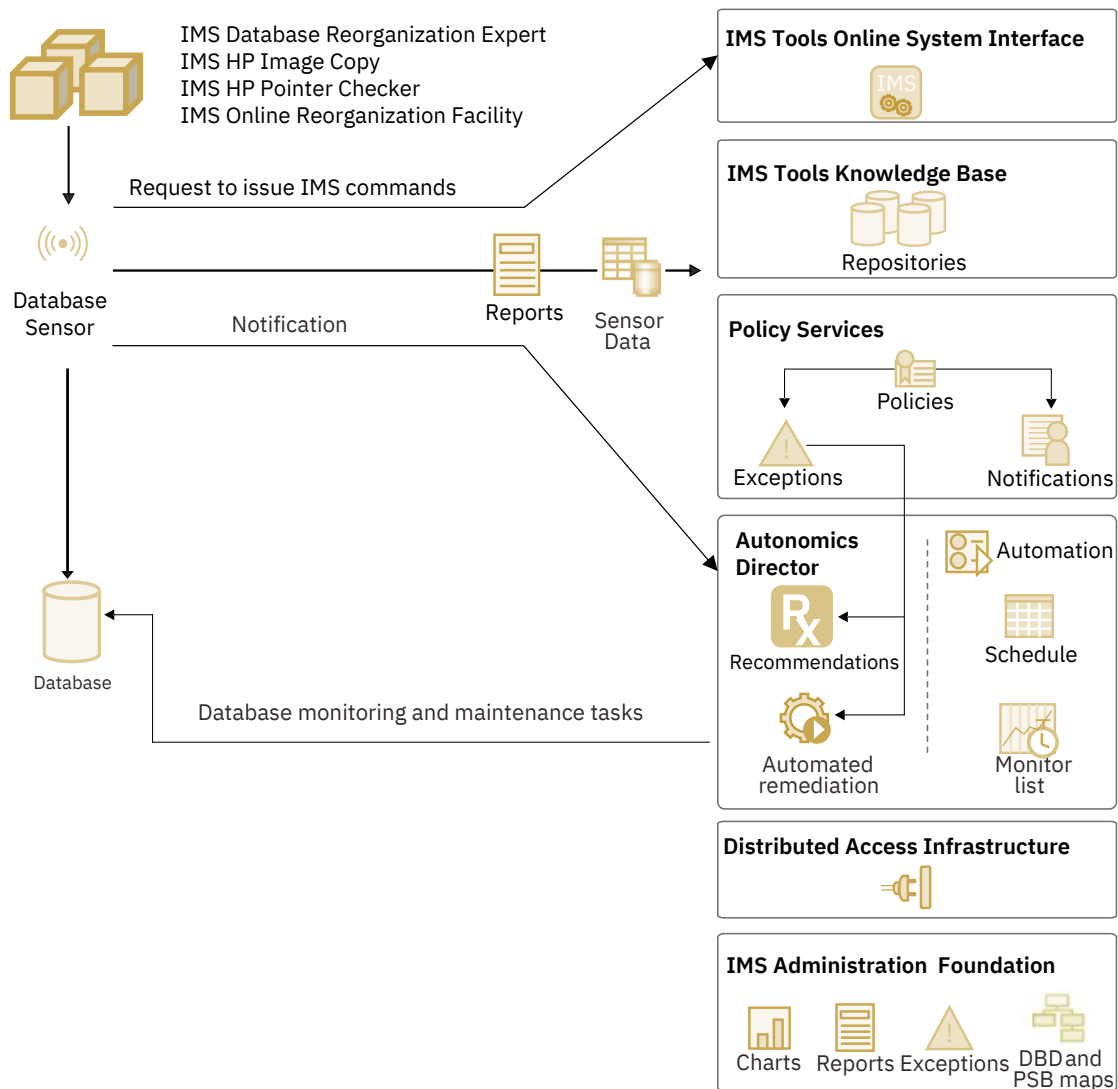


Figure 7: Database Sensor integration

Database Repair Facility

Database Repair Facility is a powerful tool to repair VSAM and OSAM organized IMS databases that contain pointer or data errors. It can be run both interactively for VSAM and OSAM data sets or in batch mode for VSAM only data sets that are either IMS and non IMS data sets.

The interactive capabilities of Database Repair Facility let you make the repair in a short time, which means that the affected database need be taken offline only for a brief period. In this way, Database Repair Facility enhances not only the integrity but also the availability of IMS databases.

To learn more about Database Repair Facility, see the [IMS Database Repair Facility for IMS Solution Packs User's Guide](#).

Integration with other IMS Tools

Database Repair Facility is generally used as a stand-alone tool to repair databases. However, to repair corrupted HALDB partition reorganization numbers and duplicate ILKs in HALDBs, the ILK Repair utility of Database Repair Facility requires output from the HD Pointer Checker utility of IMS HP Pointer Checker.

Benefits

IMS Database Solution Pack helps you simplify and accelerate the database maintenance tasks for IMS full-function databases and HALDBs.

IMS Database Solution Pack provides a complete set of tools that help IMS DBAs in every phase of database management. The tools are high performance, easy-to-use, and powerful, and include capabilities for database reorganization, data backup, health check, verification, tuning, monitoring, and optimization of IMS databases.

IMS Database Solution Pack provides the following benefits:

- The high performance reorganization tools can save time and money by reducing the CPU and elapsed time required for IMS database reorganization tasks, and for the IMS database retrieval and initial loading application programs by providing the APIs.
- IMS Online Reorganization Facility reorganizes online databases without affecting IMS transactions and applications.
- IMS Database Reorganization Expert further reduces time and resource requirements by enabling unload, load, index build, and backup tasks to run concurrently, and by eliminating I/Os for intermediate data sets. It also enhances the productivity of DBAs by making the reorganization processes simpler and easier, and by minimizing manual interventions.
- IMS Database Reorganization Expert saves online system resources by evaluating the database with user-specified criteria, and running the reorganization job only when reorganization is determined to be effective for the database.
- IMS Index Builder eliminates the need to image copy and log updates to IMS index data sets by providing a quick and efficient method for rebuilding indexes. It also provides the ability to add new indexes to existing IMS databases as needed.
- IMS HP Image Copy reduces the unavailability time of databases by providing rapid image copy features, parallel processing, and minimized manual interventions. It also reduces operational and media costs by compressing and stacking the image copies.
- IMS HP Pointer Checker helps ensure that your database pointers are error free. Used in conjunction with Database Repair Facility, it helps you detect and correct database errors quickly and repair them with minimum downtime to your IMS environment.
- IMS Library Integrity Utilities enhances the productivity of DBAs by providing utilities that effectively manage IMS ACB, DBD, PSB, MFS libraries, libraries containing DFSMDA members, IMS catalog, IMS directory, and RECON data sets in database maintenance tasks and migration operations. It also avoids application downtime by preventing database corruption that might occur from accidental misuse of IMS libraries in production.
- Provides a graphical view of IMS databases and program specifications through IMS Administration Foundation. Database segment tree structures, program specifications, and source code can be reviewed to simplify database administration tasks. The graphical interface can be used as an educational tool for new DBAs to learn about databases.
- IMS Administration Tool provides a comprehensive set of functions and features to assist the DBAs with tasks associated with managing IMS environments.
- With the automated sensor data collection and exception detection that are provided by Autonomics Director and IMS Database Solution Pack, you can save time and resources in monitoring and tuning IMS full-function databases.
- With the graphical web interface that is provided by IMS Administration Foundation, you can analyze your IMS environment to rapidly identify database exceptions and tuning opportunities.
- IMS HALDB Toolkit efficiently diagnoses HALDB structures and suggests effective database structures.

Installation requirements

The tools that are provided in IMS Database Solution Pack have dependencies on IMS and require the tools provided in IBM® IMS Tools Base for z/OS® (also referred to as IMS Tools Base).

Installation requirements

|<IMS Database Solution Pack requires z/OS® 2.5 (5650-ZOS) or later.>|

In addition, IMS Database Solution Pack requires IBM® IMS Tools Base for z/OS® 1.7 (5655-V93) or later. IBM® IMS Tools Base for z/OS® must be installed into the same SMP/E CSI zone as IMS Database Solution Pack.

Operational requirements

An operational requisite is defined as a product that is required and must be present or a product that is not required but should be present on the system in order for this product to operate all or some of its functions.

IMS Database Solution Pack operates with the following IMS versions:

- |<IMS 15.3 (5635-A06) or later>|
- |<IMS Database Value Unit Edition 15.3 (5655-DS5) or later>|

To use IMS Database Reorganization Expert, IMS High Performance Load and IMS High Performance Unload must be installed.

To use IMS High Performance Pointer Checker, Database Repair Facility must be installed.

Common tool requirements

The following common tools, which are provided in IMS Tools Base, are used by IMS Database Solution Pack:

- Autonomics Director
- Distributed Access Infrastructure
- IMS Tools Common Services
This tool is a prerequisite for running IMS Tools functions in IMS-managed ACBs environment.
- IMS Tools Knowledge Base
- Policy Services

These common tools are not distributed with IMS Database Solution Pack but are instead distributed with IMS Tools Base. IMS Tools Base must be installed and configured before IMS Database Solution Pack can be used.

|<IMS Tools Base also provides IMS Administration Foundation, which is a browser-based graphical user interface that extends the capabilities of IBM® Unified Management Server for z/OS® to manage IMS systems and resources. To enable the graphical user interface of IMS Administration Foundation, one of the following product combinations is required:

Product combination 1

- IBM® IMS Tools Base for z/OS® 1.8
- IBM® Unified Management Server for z/OS® 1.2.0.14 or later and its prerequisite software

IBM® Unified Management Server for z/OS® 1.2 is included as a component of IBM® IMS Tools Base for z/OS® 1.8.

Product combination 2

- IBM® IMS Tools Base for z/OS® 1.7
- IBM® Unified Management Server for z/OS® 1.2.0.0 or later and its prerequisite software

>|

Conditional operational requirements

A conditional operational requisite identifies the following products that are not required for the basic function but are needed at run time for the tool to utilize specific functions.

Tool	Function	Required product
Database Sensor	Stand-alone Database Sensor function	IMS Database Reorganization Expert

Tool	Function	Required product
Database Repair Facility	Process through TSO terminals	The Interactive System Productivity Facility (ISPF), which is included in z/OS®
IMS Online Reorganization Facility	Online reorganization	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program The following tools that are provided in IMS Database Solution Pack: <ul style="list-style-type: none"> • IMS HP Unload • IMS HP Load • IMS HP Image Copy
	Conditional reorganization	IMS Database Reorganization Expert
	Integrated Database Sensor function	IMS Database Reorganization Expert
	Enable all the functions of IMS Online Reorganization Facility	The following tools that are provided in IMS Database Solution Pack: <ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HP Prefix Resolution • IMS HP Pointer Checker • IMS Library Integrity Utilities
	Control IMS online applications with IMS Program Restart Facility during reorganization	IMS Program Restart Facility
IMS HALDB Toolkit	Any functions of HALDB Toolkit	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program
	Enable all the functions of IMS HALDB Toolkit	The following tools that are provided in IMS Database Solution Pack: <ul style="list-style-type: none"> • IMS HP Load • IMS HP Image Copy • IMS HP Pointer Checker • IMS Library Integrity Utilities
	<i>Near online</i> operations for splitting or consolidating HALDB partitions (maintain partitions) or converting to a HALDB from an IMS full-function database	IMS Online Reorganization Facility
	Process through TSO terminals	The Interactive System Productivity Facility (ISPF), which is included in z/OS®

Tool	Function	Required product
IMS Database Reorganization Expert	Enable all the functions of IMS Database Reorganization Expert	The following tools that are provided in IMS Database Solution Pack: <ul style="list-style-type: none"> • IMS Index Builder • IMS HP Image Copy • IMS HP Prefix Resolution • IMS HP Pointer Checker • IMS Library Integrity Utilities
IMS HP Image Copy	HDPC Hash Pointer Check function	IMS HP Pointer Checker
	DEDB Hash Pointer Check function	IMS Fast Path Solution Pack
	Integrated Database Sensor function	IMS Database Reorganization Expert
IMS HP Load	PSSR function	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program
	Language Environment® interface for user exit routines written in COBOL or PL/I	Language Environment® (LE), which is included in z/OS®
IMS HP Pointer Checker	<ul style="list-style-type: none"> • HD Pointer Checker utility • HD Tuning Aid utility • Space Monitor utility 	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program
	DB Historical Data Analyzer utility (to display charts on TSO terminals)	The Interactive System Productivity Facility (ISPF) and the Graphical Data Display Manager (GDMM®), which are included in z/OS®
	DBD Decode and DBD Mapping options of HD Pointer Checker utility	IMS Library Integrity Utilities
	Integrated Database Sensor function	IMS Database Reorganization Expert
IMS HP Unload	Language Environment® interface for user exit routines written in COBOL or PL/I	Language Environment® (LE), which is included in z/OS®
IMS Index Builder	Index build processing	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program
IMS Library Integrity Utilities	<ul style="list-style-type: none"> • ACBLIB Analyzer utility • Integrity Checker utility 	The DFSORT program, which is included in z/OS®, or a functionally equivalent sort program

Tool	Function	Required product
	DBD and PSB Map feature	IMS Administration Foundation of Unified Management Server
IMS Administration Tool	Process through TSO terminals	The Interactive System Productivity Facility (ISPF), which is included in z/OS®
	To use the IMS Administration Tool web user interface	IMS Administration Foundation of Unified Management Server
	Object management	IMS Library Integrity Utilities

Service updates and support information

Service updates and support information for this product, including software fix packs, PTFs, frequently asked questions (FAQs), technical articles, troubleshooting information, and downloads, are available from the web.

To find service updates and support information, see the following website:

[IBM® Support: IMS Database Solution Pack for z/OS®](#)

Product documentation and updates

IMS Tools information is available at multiple places on the web. You can receive updates to IMS Tools information automatically by registering with the IBM® My Support service.

Information on the web

Always refer to the IMS Tools Product Documentation web page for complete product documentation resources:

<https://www.ibm.com/support/pages/node/712955>

The IMS Tools Product Documentation web page includes:

- Links to [IBM® Documentation](#) for the user guides ("HTML")
- PDF versions of the user guides ("PDF")
- Program Directories for IMS Tools products
- Technical articles from IBM® Software Support
- White papers that describe product business scenarios and solutions

IBM® Redbooks® publications that cover IMS Tools are available from the following web page:

<http://www.redbooks.ibm.com>

The IBM® Information Management System website shows how IT organizations can maximize their investment in IMS databases while staying ahead of today's top data management challenges:

<https://www.ibm.com/software/data/ims>

Product publications

For detailed information about tools and components of IMS Database Solution Pack and related products, refer to the publication libraries of the individual products.

IMS Administration Tool for z/OS® 1.1

User's Guide and Reference, SC27-9011

IMS Database Reorganization Expert for z/OS® 4.1

User's Guide, SC19-1137

IMS Database Repair Facility for IMS Solution Packs

User's Guide, SC19-2916

IMS Database Solution Pack for z/OS® 2.2 IMS HALDB Toolkit

User's Guide, SC27-9038

IMS Database Solution Pack for z/OS® 2.2 IMS Online Reorganization Facility

User's Guide, SC27-9039

IMS High Performance Image Copy for z/OS® 4.2

User's Guide, SC19-2756

IMS High Performance Load for z/OS® 2.1

User's Guide, SC18-9222

IMS High Performance Pointer Checker for z/OS® 3.1

User's Guide, SC19-2401

IMS High Performance Prefix Resolution for z/OS® 3.1

User's Guide, SC18-9230

IMS High Performance Unload for z/OS® 1.2

User's Guide, SC27-0936

IMS Index Builder for z/OS® 3.1

User's Guide, SC18-9101

IMS Library Integrity Utilities for z/OS® 2.2

User's Guide, SC19-3979

IMS Program Restart Facility for z/OS® 2.2

User's Guide, SC19-3985

IMS Solution Packs Data Sensor

User's Guide, SC19-3283

All the information about these tools and common tools (IMS Tools Base and IMS Administration Foundation) can be found in [IBM Documentation](#).

Receiving documentation updates automatically

To automatically receive automated emails that notify you when new technical articles are released, when existing product documentation is updated, and when new product documentation is available, you can register with the IBM® My Notifications service. You can customize the service so that you receive information about only those IBM® products that you specify.

To register with the My Notifications service:

1. Go to <https://www.ibm.com/support/mynotifications>
2. Enter your IBM® ID and password, or create one by clicking **register now**.
3. When the My Notifications page is displayed, click **Subscribe** to select those products that you want to receive information updates about. The IMS Tools option is located under **Software > Information Management**.
4. Click **Continue** to specify the types of updates that you want to receive.
5. Click **Submit** to save your profile.

How to send your comments

Your feedback is important in helping us provide the most accurate and highest quality information. If you have any comments about this information, see [How to provide feedback](#) in IBM® Documentation.

When you provide feedback, include as much information as you can about the content you are commenting on, where we can find it, and what your suggestions for improvement might be.

Accessibility features

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

The major accessibility features in IMS Database Solution Pack enable users to perform the following activities:

- Use assistive technologies such as screen readers and screen magnifier software. Consult the assistive technology documentation for specific information when using it to access z/OS® interfaces.
- Customize display attributes such as color, contrast, and font size.
- Operate specific or equivalent features by using only the keyboard. Refer to the following publications for information about accessing ISPF interfaces:
 - *z/OS® ISPF User's Guide, Volume 1*
 - *z/OS® TSO/E Primer*
 - *z/OS® TSO/E User's Guide*

These guides describe how to use ISPF, including the use of keyboard shortcuts or function keys (PF keys), include the default settings for the PF keys, and explain how to modify their functions.

Scenarios: Managing IMS full-function databases and HALDBs

Typical scenarios demonstrate how IMS Database Solution Pack can help you manage your IMS full-function databases and HALDBs.

Topics:

- [“Monitor database space utilization” on page 29](#)
- [“Prevent application performance degradation and attain better free space usage” on page 30](#)
- [“Backup databases” on page 30](#)
- [“Analyze, diagnose, and repair databases” on page 30](#)
- [“Manage IMS ACB/DBD/PSB/MFS libraries, RECON data sets, and IMS catalog” on page 31](#)
- [“Store tool reports in a central repository for better search” on page 31](#)
- [“Automate sensory data collection and exception detection” on page 32](#)
- [“Aggregate information about database resources on a graphical user interface” on page 32](#)

Monitor database space utilization

IMS Database Solution Pack, along with IMS Tools Base components, provides a space monitoring solution.

IBM® IMS Tools Base for z/OS® IMS Tools Knowledge Base provides an infrastructure for common information repositories for IMS system management. It provides centralized management of various types of repositories.

The reports that are generated by the IMS Database Solution Pack products can be stored in a repository. You can search historical copies of those reports by database name, date and time, or other search criteria.

Threshold criteria for detecting database exceptions and recommendations can also be defined and stored in a repository. These resources are used by the Smart Reorg utility of IMS Database Reorganization Expert and IMS Online Reorganization Facility to provide the conditional reorganization capability. Jobs with this capability enabled collect database statistics data and store the data in the Sensor Data repository. The data is evaluated against the threshold criteria to decide whether to reorganize the database.

Two components of IMS Database Solution Pack take advantage of the Sensor Data repository: IMS High Performance Pointer Checker and IMS High Performance Image Copy. You can generate sensor data as a by-product of running your normal IMS HP Pointer Checker and IMS HP Image Copy jobs. This functionality is called the Integrated Database Sensor function.

Additionally, IMS Database Solution Pack includes Stand-alone Database Sensor, whose sole function is to collect and print sensor data. These components, when used together with IBM® IMS Tools Base for z/OS® Autonomics Director and IMS Administration Foundation features of IBM® Unified Management Server for z/OS®, provide a comprehensive database space monitoring environment.

For more information, see the following publications:

- [IMS Solution Packs Data Sensor User's Guide](#)
- [IMS Tools Base Autonomics Director User's Guide and Reference](#)
- [IMS Tools Base IMS Tools Knowledge Base User's Guide and Reference](#)
- [IMS Tools Base Policy Services User's Guide and Reference](#)
- [Unified Management Server User Guide](#)
- [IMS Solution Packs IMS Database Space Tuning Guide](#)

Prevent application performance degradation and attain better free space usage

The more you add, update, and delete records in your IMS database, the more frequently you must reorganize the database to restore data clustering and distribute free space evenly. Otherwise, performance will suffer. Reorganizing a database can require significant time, and usually involves taking the database offline.

IMS Database Solution Pack provides a complete set of high performance tools to unload, load, reorganize, build indexes for, back up, verify, and report on IMS full-function databases.

You can use the following stand-alone high-performance tools to cover each task required for database reorganization:

- IMS HP Unload provides high speed database unloading and other capabilities that are not found in IMS base utilities.
- IMS HP Load provides high speed database loading and other capabilities that are not found in IMS base utilities.
- IMS Index Builder provides capability to rebuild indexes avoiding the need to copy and reorganize.
- IMS HP Prefix Resolution provides high speed database prefix resolution and update for logically related databases.

You can combine these multiple tasks into a single job step to obtain higher performance in batch database reorganization by using IMS Database Reorganization Expert. This tool provides an integrated database reorganization infrastructure for controlling the process in a fast and efficient manner by running unload, load, index building, and image copy tasks concurrently. In addition, this tool provides an advanced function that automates and reduces complex decision making tasks required for the DBAs.

Backup databases

Using image copies to create backup data is essential to the timely recovery of databases after a loss of data or a programming mistake. However, taking data offline can reduce user productivity and negatively impact your business.

IMS Database Solution Pack provides IMS HP Image Copy to help you speed recovery time by supporting quick copy and restarting methods, and allows your system users to become more productive and avoid expensive losses from missed business opportunities.

This tool helps you by:

- Providing rapid image copy features that reduce the unavailability of database data sets.
- Enabling you to run the image copy process automatically after a database is reorganized when used with IMS Database Reorganization Expert or IMS Online Reorganization Facility.

Analyze, diagnose, and repair databases

IMS HP Pointer Checker helps you efficiently manage many database reorganization activities. When used regularly, IMS HP Pointer Checker helps ensure that your database pointers are error free by alerting you when it's time to perform a database reorganization.

This utility provides important information that helps to reduce the time spent handling diagnostics and repairs. These reports reveal errors and their locations within the database, facilitating system tuning and optimization. When IMS HP Pointer Checker is used in conjunction with Database Repair Facility (a powerful tool that can interactively and rapidly repair VSAM- and OSAM-organized IMS databases containing pointer or data errors), their synergy creates a powerful set of productivity aids that helps you detect and correct database errors quickly and repair them with minimum downtime to your IMS environment. These tools help you maintain the data availability you need to help your business thrive.

Manage IMS ACB/DBD/PSB/MFS libraries, RECON data sets, and IMS catalog

Database administration and change management are the core responsibilities of DBAs. If not managed correctly, they can monopolize data center resources, waste valuable time, and can result in the generation of unwanted errors.

In managing the database administration and change management process, DBAs are faced with many challenges like how do I:

- Ensure that I complete all of the necessary steps when making a change?
- Manage and track the changes to the definitions of my database objects?
- Propagate changes to other database environments quickly?
- Prevent accidental misuse in production?

The answers to these questions are provided by IMS Library Integrity Utilities. This tool helps you by providing the features and functions that enable you to manage your ACB libraries, DBD libraries, PSB libraries, MFS libraries, libraries containing DFSMDA members, IMS catalog, IMS directory, and RECON data sets. These features and functions include:

- The IMS Advanced ACB Generator utility, which contains additional features and functions to help you manage your IMS ACB libraries more effectively and provides a high-speed generation process.
- The Consistency Checker utility, which helps you ensure that the necessary definitions in your IMS subsystem have been created.
- The Integrity Checker utility, which protects your databases from corruption caused by using the wrong IMS control blocks for access.
- The Multiple Resource Checker utility, which helps you identify the resources that contain different definitions across multiple sets of RECON data sets or DBDLIBs, PSBLIBs, and ACBLIBs.
- The Catalog Manager utility, which helps you ensure that the DBDs and PSBs in the IMS catalog are maintained correctly by validating the consistency of DBDs and PSBs in the ACB libraries with those in the IMS catalog.
- The MDA Reversal utility, which converts DFSMDA members back into DFSMDA macros and generates a report that contains a list of DFSMDA members.

Store tool reports in a central repository for better search

DBAs use many utilities to maintain the health of their databases. But how do they manage the reports that were generated by these utilities? Through their daily database maintenance tasks, various types of reports might be generated and accumulated. Managing and searching these accumulated reports can be cumbersome.

Many of the IMS Tools products that are provided in IMS Database Solution Pack can store their reports in a central repository that is managed by IBM® IMS Tools Base IMS Tools Knowledge Base.

IMS Tools Knowledge Base helps you locate the target report for a specific database quickly and easily:

- You can use the IMS Tools Knowledge Base ISPF user interface to manage and display the stored reports.
- The ISPF user interface provides a powerful report search capability that uses indexes that were added to the stored reports. Each report that is stored in the repository is assigned predefined search indexes that are associated with the resource that was processed during the product job. The index information includes the database DBD name, the partition name, the DD name, the date and time, the job name and the job step name, and the user ID under which the job was submitted.
- You can access the historical reports on respective database resources through the ISPF interface.

Automate sensory data collection and exception detection

Typically, identifying database tuning opportunities requires highly skilled DBA expertise that involves analyzing detailed analysis reports, identifying exceptional states of the databases, and determining the best approach to recover the databases in good condition.

IBM® IMS Tools Base for z/OS® Autonomics Director assists you in identifying and performing the functions that are needed to maintain the health of IMS full-function databases.

The Autonomics Director scenario is based on sensor data that is derived as a by-product of IMS HP Pointer Checker and IMS HP Image Copy jobs. The sensor data can also be collected by Stand-alone Database Sensor.

Autonomics Director with IMS Database Solution Pack provides:

- Automatic and consistent collection of sensor data related to database state
- Automatic and consistent analysis of database state against user-defined threshold criteria
- Generation of recommended actions for subject databases and database groups based on user-defined policies and thresholds

Aggregate information about database resources on a graphical user interface

Analyzing the figures in analysis reports and identifying the state of databases can be a complicated task that requires a tremendous amount of a DBA's time and effort.

The IMS Administration Foundation features of IBM® Unified Management Server for z/OS® consolidate key IMS statistics into an intuitive, graphical web interface.

You can view aggregate information for customizable groups of databases as well as the following types of detailed information for individual databases:

- Graphical charts that show historical sensor data that is collected by IMS Tools
- Database exceptions that are detected by Autonomics Director through the automated analysis of database state and recommended resolutions
- Various reports that are generated by IMS Tools

If you use the DBD and PSB Map feature in IMS Administration Foundation, you can also view the following information:

- Graphical view of the database segment tree structure
- Graphical view of the program specification
- DBD and PSB source statements
- Relation between DBDs and logical DBDs, and DBDs and PSBs (cross reference feature)

The cross reference feature helps you identify how DBDs and PSBs are related to each other. You can use this feature to identify and analyze the following resources:

- Logical DBDs that refer to a specific DBD
- PSBs that refer to a specific DBD or a logical DBD
- Source DBDs that each PCB of PSB refers to

Migration considerations

If you have one or more of the products that are included in IMS Database Solution Pack installed on your system or if you have an earlier release of IMS Database Solution Pack, complete the migration tasks.

This release of IMS Database Solution Pack includes the following tools:

- IBM® IMS Database Reorganization Expert for z/OS® 4.1
- IBM® IMS High Performance Unload for z/OS® 1.2
- IBM® IMS High Performance Load for z/OS® 2.1
- IBM® IMS High Performance Prefix Resolution for z/OS® 3.1
- IBM® IMS High Performance Image Copy for z/OS® 4.2
- IBM® IMS High Performance Pointer Checker for z/OS® 3.1
- IBM® IMS Index Builder for z/OS® 3.1
- IBM® IMS Library Integrity Utilities for z/OS® 2.2
- IBM® IMS Administration Tool for z/OS® 1.1

IMS Database Solution Pack also includes the following components:

- IMS Online Reorganization Facility
- IMS High Availability Large Database (HALDB) Toolkit
- Database Sensor
- Database Repair Facility

Product and component changes in version 2.2

Product and component changes in IMS Database Solution Pack 2.2 from version 2.1 are as follows:

- Provides IBM® IMS Administration Tool for z/OS® 1.1.

Topics:

- [“Migrating from an earlier release of IMS Database Solution Pack” on page 33](#)
- [“Migrating from IMS Database Utility Solution” on page 35](#)
- [“Migrating from individual products” on page 36](#)

Migrating from an earlier release of IMS Database Solution Pack

If you have been using an earlier release of IMS Database Solution Pack, complete the following steps to migrate to IMS Database Solution Pack 2.2.

Procedure

1. Determine the SMP/E CSI zone to install IMS Database Solution Pack 2.2.
IMS Database Solution Pack 2.2 can be installed in the same SMP/E CSI zone that is used for the earlier release of IMS Database Solution Pack that you have been using or in a different SMP/E CSI zone.
2. If you plan to install IMS Database Solution Pack in the same SMP/E CSI zone, complete the following steps.
 - a. Create a backup copy of all SMP/E data sets, target libraries, and distribution libraries.
Installing IMS Database Solution Pack 2.2 into the same SMP/E CSI zone replaces existing IMS Database Solution Pack resources with 2.2 resources. Make sure you create a backup copy of all the data sets and libraries.
 - b. If you plan to reuse all the data sets that you have been using with an earlier release of IMS Database Solution Pack in IMS Database Solution Pack 2.2 environment, ensure that all the

required libraries, which are described in the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942, exist.

The required size of data sets in IMS Database Solution Pack 2.2 can be larger than the size required in earlier releases. See the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942, and determine the required size for the data sets. If the size of the data sets is insufficient, increase the size.

3. If any of the following started tasks or servers are running, stop it:
 - IMS Tools Base: IMS Tools Knowledge Base
 - IMS Tools Base: Autonomics Director (IAV*)
 - IMS Tools Base: Distributed Access Infrastructure TCP server
 - IMS Tools Base: Distributed Access Infrastructure TAS (Tools Access Server)
 - IMS Tools Base: Distributed Access Infrastructure subordinate TAS (SOT)
 - UMS server (Unified Management Server instance)
4. Install the latest version of IBM® IMS Tools Base for z/OS® in the target SMP/E CSI zone. For SMP/E installation procedure, see the *Program Directory for IBM® IMS Tools Base for z/OS®*, GI10-8819. IMS Database Solution Pack 2.2 requires IMS Tools Base for z/OS® 1.7 or later. IMS Tools Base must be installed before IMS Database Solution Pack 2.2 can be installed.
5. Install IMS Database Solution Pack 2.2 by following the instructions in the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942.
If you are installing IMS Database Solution Pack 2.2 into the same SMP/E CSI zone as where the earlier release of IMS Database Solution Pack is installed, you do not need to install the tools that you already installed with the earlier release of IMS Database Solution Pack. However, you must install the following tools to replace with new modules and to install the new tool provided by IMS Database Solution Pack 2.2:
 - IMS Database Solution Pack IMS Online Reorganization Facility
 - IMS Database Solution Pack IMS HALDB Toolkit
 - IMS Database Solution Pack Database Sensor
 - IMS Administration Tool for z/OS® 1.1
 - IMS Library Integrity Utilities for z/OS® 2.2

Note: Install IMS Library Integrity Utilities 2.2 only if you are migrating from version 1 of IMS Database Solution Pack. Installing IMS Library Integrity Utilities 2.2 will replace IMS Library Integrity Utilities 2.1 modules.

6. Apply maintenance to all the tools and components of IMS Tools Base and IMS Tools that you use and make sure that they are at the latest maintenance level.
7. If you plan to use IMS Administration Tool, see [“Migration considerations: IMS Administration Tool” on page 35](#) and plan for IMS Administration Tool configuration.
8. Migrate the IMS Tools Base components by using IMS Tools Setup.
Migration of IMS Tools Base components can be achieved by using IMS Tools Setup. IMS Tools Setup is a function that helps you quickly and efficiently perform the required post-SMP/E-installation customization process for IMS Tools solution pack products.

For instructions, see the topic [“Migration and fallback”](#) in the *IMS Tools Base Configuration Guide*. IMS Tools Setup also covers migration and customization of IMS Database Solution Pack products.

If you need to customize IMS Database Solution Pack products manually, follow the steps in [“Customizing IMS Database Solution Pack” on page 46](#) after you migrate IMS Tools Base components. Some of the customization steps that were done when you customized an earlier release of IMS Database Solution Pack can be bypassed. However, because IMS Database Solution Pack 2.2 provides new functions and features, review all the customization steps and complete the steps that are required for your environment.

Migration considerations: IMS Administration Tool

In addition to the tools in IMS Database Solution Pack 2.1, IMS Database Solution Pack 2.2 provides IBM® IMS Administration Tool for z/OS®. The following list contains some items that you must be aware and additional steps that are required if you are migrating to IMS Database Solution Pack 2.2 and planning to use IMS Administration Tool for the first time.

Product registration

To use IMS Administration Tool, product registration must be done for all IMS Tools products that participate in the IMS environment with IMS Administration Tool. Product registration will be guided while you use IMS Tools Setup to customize IMS Administration Tool.

Required IMS Tools servers

The following servers are required for an IMS Administration Tool environment:

- IMS Tools Knowledge Base server
- Autonomics Director server
- Distributed Access Infrastructure TCP server
- Distributed Access Infrastructure TAS (Tools Access Server)

Attention: When doing maintenance or migration, during initial setup with IMS Tools Setup, you are prompted to consider how you will be doing maintenance. You should always consider using a set of IMS Tools Knowledge Base server, Autonomics Director server, Distributed Access Infrastructure TCP server, and Distributed Access Infrastructure TCP server based on the IMS subsystems that you typically maintain together. Otherwise, if these servers are shared across different environments, this would require that all of those IMS subsystems have maintenance or migration done at the same time.

ISPF and GUI setup

Because IMS Database Solution Pack 2.2 provides IMS Administration Tool and other enhancements, it has more libraries compared to IMS Database Solution Pack 2.1. These additional libraries might affect your ISPF and GUI environments and you might need to modify CLIST members and other resources to update your ISPF and GUI environments. For a list of libraries, see [“Gathering the data set names of IMS Database Solution Pack and IMS Tools Base” on page 40](#). For more information about ISPF and GUI configuration, see the [IMS Administration Tool User’s Guide and Reference](#).

Migrating from IMS Database Utility Solution

If you have been using IMS Database Utility Solution, complete the following steps to migrate to IMS Database Solution Pack 2.2.

Procedure

1. Determine the SMP/E CSI zone to install IMS Database Solution Pack 2.2. IMS Database Solution Pack 2.2 can be installed in the same SMP/E CSI zone that is used for IMS Database Utility Solution or in a different SMP/E CSI zone.
2. If you plan to install IMS Database Solution Pack in the same SMP/E CSI zone, complete the following steps.
 - a. Create a backup copy of all SMP/E data sets, target libraries, and distribution libraries. Installing IMS Database Solution Pack 2.2 into the same SMP/E CSI zone replaces IMS Database Utility Solution resources with IMS Database Solution Pack 2.2 resources. Make sure you create a backup copy of all the data sets and libraries.
 - b. If you plan to reuse all the data sets that are used in IMS Database Utility Solution in IMS Database Solution Pack 2.2 environment, ensure that all the required libraries, which are described in the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942, exist. The required size of data sets in IMS Database Solution Pack 2.2 can be larger than the size required in IMS Database Utility Solution. See the *Program Directory for IBM® IMS Database*

Solution Pack for z/OS® 2.2, GI10-8942, and determine the required size for the data sets. If the size of the data sets is insufficient, increase the size.

3. If any of the following started tasks or servers are running, stop it:
 - IMS Tools Base: IMS Tools Knowledge Base
 - IMS Tools Base: Autonomics Director (IAV*)
 - IMS Tools Base: Distributed Access Infrastructure TCP server
 - IMS Tools Base: Distributed Access Infrastructure TAS (Tools Access Server)
 - IMS Tools Base: Distributed Access Infrastructure subordinate TAS (SOT)
 - UMS server (Unified Management Server instance)
 4. Install the latest version of IBM® IMS Tools Base for z/OS® in the target SMP/E CSI zone. For SMP/E installation procedure, see the *Program Directory for IBM® IMS Tools Base for z/OS®, GI10-8819*. IMS Database Solution Pack 2.2 requires IMS Tools Base for z/OS® 1.7 or later. IMS Tools Base must be installed before IMS Database Solution Pack 2.2 can be installed.
 5. Install IMS Database Solution Pack 2.2 by following the instructions in the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2, GI10-8942*.
If you are installing IMS Database Solution Pack 2.2 into the same SMP/E CSI zone as IMS Database Utility Solution, you do not need to install the tools that you already installed with IMS Database Utility Solution. However, you must install the following tools:
 - IMS Database Solution Pack IMS Online Reorganization Facility
 - IMS Database Solution Pack IMS HALDB Toolkit
 - IMS Database Solution Pack Database Sensor
 - IMS Administration Tool for z/OS® 1.1
- If you are migrating from version 1 of IMS Database Utility Solution, you must also install the following tools:
- IMS Library Integrity Utilities for z/OS® 2.2
 - IMS High Performance Pointer Checker for z/OS® 3.1
6. Apply maintenance to all the tools and components of IMS Tools Base and IMS Tools that you use and make sure that they are at the latest maintenance level.
 7. If you plan to use IMS Administration Tool, see [“Migration considerations: IMS Administration Tool” on page 35](#) and plan for IMS Administration Tool configuration.
 8. Migrate the IMS Tools Base components by using IMS Tools Setup.
Migration of IMS Tools Base components can be achieved by using IMS Tools Setup. IMS Tools Setup is a function that helps you quickly and efficiently perform the required post-SMP/E-installation customization process for IMS Tools solution pack products.

For instructions, see the topic [“Migration and fallback”](#) in the *IMS Tools Base Configuration Guide*. IMS Tools Setup also covers migration and customization of IMS Database Solution Pack products.

If you need to customize IMS Database Solution Pack products manually, follow the steps in [“Customizing IMS Database Solution Pack” on page 46](#) after you migrate IMS Tools Base components. Some of the customization steps that were done when you customized IMS Database Utility Solution can be bypassed. However, because IMS Database Solution Pack 2.2 provides new functions and features, review all the customization steps and complete the steps that are required for your environment.

Migrating from individual products

If you have been using one or more of the products included in IMS Database Solution Pack, complete the following steps to migrate to the IMS Database Solution Pack 2.2 environment.

Procedure

1. Determine the SMP/E CSI zone to install IMS Database Solution Pack 2.2.

IMS Database Solution Pack 2.2 can be installed in the same SMP/E CSI zone that is used for the existing product or in a different SMP/E CSI zone.

2. If you plan to install IMS Database Solution Pack in the same SMP/E CSI zone, create a backup copy of all SMP/E data sets, target libraries, and distribution libraries.
Installing IMS Database Solution Pack 2.2 into the same SMP/E CSI zone replaces resources of the existing products with IMS Database Solution Pack 2.2 resources. Make sure you create a backup copy of all the data sets and libraries.
3. Install the latest version of IBM® IMS Tools Base for z/OS® in the target SMP/E CSI zone. For SMP/E installation procedure, see the *Program Directory for IBM® IMS Tools Base for z/OS®*, GI10-8819.
IMS Database Solution Pack 2.2 requires IMS Tools Base for z/OS® 1.7 or later. IMS Tools Base must be installed before IMS Database Solution Pack 2.2 can be installed.
4. Install IMS Database Solution Pack 2.2 by following the instructions in the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942.
5. Apply maintenance to all the tools and components of IMS Tools Base and IMS Tools that you use and make sure that they are at the latest maintenance level.
6. Migrate the IMS Tools Base components by using IMS Tools Setup.
The individual products that you have been using may previously required older versions of IMS Tools Knowledge Base, IMS Tools Online System Interface, and IMS Tools Generic Exits than what is required by this release of IMS Database Solution Pack. These common tools, along with several other tools are now delivered with IMS Tools Base.

Migration of IMS Tools Base components can be achieved by using IMS Tools Setup. IMS Tools Setup is a function that helps you quickly and efficiently perform the required post-SMP/E-installation customization process for IMS Tools solution pack products.

For instructions, see the topic "[Migration and fallback](#)" in the *IMS Tools Base Configuration Guide*. IMS Tools Setup also covers migration and customization of IMS Database Solution Pack products.

All the components of IMS Tools Base are compatible with earlier releases of IMS Tools Knowledge Base, IMS Tools Online System Interface, and IMS Tools Generic Exits.

If you need to customize IMS Database Solution Pack products manually, follow the steps in "[Customizing IMS Database Solution Pack](#)" on page 46 after you migrate IMS Tools Base components. Some of the customization steps that were done when you customized individual IMS Tools can be bypassed. However, because IMS Database Solution Pack 2.2 provides new functions and features, review all the customization steps and complete the steps that are required for your environment.

Installing IMS Database Solution Pack

Before you install IMS Database Solution Pack, you must first complete the SMP/E installation of IMS Tools Base.

Complete the SMP/E installation of the products in the following order:

1. [“Installing the required common tools from IMS Tools Base” on page 38](#)
2. [“Installing the components of IMS Database Solution Pack” on page 38](#)
3. [“Gathering the data set names of IMS Database Solution Pack and IMS Tools Base” on page 40](#)
4. [“Verifying the installation” on page 43](#)

Installing the required common tools from IMS Tools Base

Many of the tools included in IMS Database Solution Pack require the use of the common tools that are included in IMS Tools Base.

The following common tools integrate with the tools in IMS Database Solution Pack:

- Autonomics Director
- Distributed Access Infrastructure
- IMS Tools Common Services
- IMS Tools Knowledge Base
- Policy Services

To perform the SMP/E installation, see the *Program Directory for IBM® IMS Tools Base for z/OS®*, GI10-8819. This process allocates and downloads the target and distribution libraries and performs the SMP/E installation of the tools included in IMS Tools Base.

Optionally, you can install IMS Administration Foundation, which activates the IMS administration web-browser interface of IBM® Unified Management Server for z/OS® to enable the management of IMS systems and resources. To install IMS Administration Foundation, install IBM® Unified Management Server for z/OS® by following the instructions in the *Program Directory for IBM® Unified Management Server for z/OS®*, GI13-5914, and then follow the instructions in the *Program Directory for IBM® IMS Tools Base for z/OS®*, GI10-8819.

After you install IMS Tools Base, continue with the installation of IMS Database Solution Pack before customizing the tools included in IMS Tools Base.

Installing the components of IMS Database Solution Pack

Install the IMS Database Solution Pack libraries provided to you by IBM®.

The tools of IMS Database Solution Pack are shipped in separate target and distribution libraries.

To perform the SMP/E installation, see the *Program Directory for IBM® IMS Database Solution Pack for z/OS® 2.2*, GI10-8942.

The following table lists the data sets of the target libraries distributed in IMS Database Solution Pack.

Type	Name	Description	Local DSN name
CLIST	SATYCEXEC	Executable CLIST members for IMS Administration Tool	
	SFABCLIB	Executable CLIST members for Database Repair Facility	
	SHPSCLIB	Executable CLIST members for IMS HP Pointer Checker	

Type	Name	Description	Local DSN name
	SIHCSKEL	Executable CLIST members for IMS HALDB Toolkit	
LMOD	SATYLOAD	Executable load library for IMS Administration Tool	
	SFABLMDO	Executable load library for Database Repair Facility	
	SHPSLMDO	Executable load library for IMS Database Solution Pack	
	SHRFLOAD	Executable load library for IMS Online Reorganization Facility	
	SIHCLOAD	Executable load library for IMS HALDB Toolkit	
	SIULMOD	Executable load library for IMS Index Builder	
MAC	SHPSMACO	Distributed product macros	
	SHRFMACS	Distributed product macro for IMS Online Reorganization Facility	
	SIHCMACS	Distributed product macro for IMS HALDB Toolkit	
MESSAGE	SATYMENU	ISPF messages for IMS Administration Tool	
	SFABMLIB	ISPF messages for Database Repair Facility	
	SHPSMLIB	ISPF messages for IMS HP Pointer Checker	
	SIHCMESG	ISPF messages for IMS HALDB Toolkit	
PANEL	SATYPENU	ISPF panels for IMS Administration Tool	
	SFABPLIB	ISPF panels for Database Repair Facility	
	SHPSPLIB	ISPF panels for IMS HP Pointer Checker	
	SIHCPANL	ISPF panels for IMS HALDB Toolkit	
SAMPLE	SATYBASE	SMP/E JCL members for installation	
	SATYSAMP	Sample JCL and macro members for IMS Administration Tool	
	SHPSBASE	SMP/E JCL members for installation	
	SHPSJCLO	IVP and customization JCL members	
	SHPSAMP	Sample JCL members, exit codes, and cataloged procedures	
	SIHCBASE	SMP/E JCL members for installation	
	SIUBASE	SMP/E JCL members for installing IMS Index Builder	
	SIUCNTL	Sample JCL members for IMS Index Builder	
	SIUPROC	Sample cataloged procedures for IMS Index Builder	
	SHRFBASE	SMP/E JCL members for installation	
SHRFSAMP	Sample JCL members for IMS Online Reorganization Facility		

Type	Name	Description	Local DSN name
	SIHCSAMP	Sample JCL members for IMS HALDB Toolkit	
TABLE	SATYTENU	Control table for IMS Administration Tool	
File system path	SHPSIHFS	File system path for IMS Library Integrity Utilities Maps to: <i>pathprefix</i> /usr/lpp/InstallationManagerRepository/H27P220/IBM/	

Gathering the data set names of IMS Database Solution Pack and IMS Tools Base

After you installed IMS Tools Base and IMS Database Solution Pack, record your data set names.

Fill in the following tables with the data set names for modifying the procedures and JCL members.

Subsections:

- [“Data set names of IMS Database Solution Pack” on page 40](#)
- [“Data set names of IMS Tools Base” on page 42](#)
- [“Data set names of IMS libraries” on page 42](#)
- [“Data set names of other libraries” on page 43](#)
- [“Data set names of your program libraries” on page 43](#)

Data set names of IMS Database Solution Pack

IMS Database Solution Pack provides the libraries that are summarized in the following tables.

The SHPSxxxx libraries include the data sets for the following IMS Database Solution Pack tools and resources:

- IMS Database Reorganization Expert
- IMS HP Image Copy
- IMS HP Load
- IMS HP Pointer Checker
- IMS HP Prefix Resolution
- IMS HP Unload
- IMS Library Integrity Utilities
- Database Sensor
- IMS Database Solution Pack macro library
- IMS Database Solution Pack sample JCL library

Name	Description	Your data set name
SHPSLMD0	Executable load module library	
SHPSBASE	SMP/E JCL members for installation	
SHPSJCL0	Sample JCL members	
SHPSSAMP	Sample cataloged procedures, JCL skeletons, sample JCL members	
SHPSMAC0	Distributed product macros	
SHPSCLIB	Executable CLIST members	

Name	Description	Your data set name
SHPSMLIB	ISPF messages	
SHPSPLIB	ISPF panels	

The SIIUxxxx libraries include the data sets for IMS Index Builder.

<i>Table 11: Data set names of IMS Index Builder (SIIUxxxx library)</i>		
Name	Description	Your data set name
SIIUBASE	SMP/E JCL members for installation	
SIIULMOD	Executable load module library for IMS Index Builder	
SIIUCNTL	Sample JCL members for IMS Index Builder	
SIIUPROC	Sample cataloged procedures for IMS Index Builder	

The SHRFxxxx libraries include the data sets for IMS Online Reorganization Facility.

<i>Table 12: Data set names of IMS Online Reorganization Facility (SHRFxxxx library)</i>		
Name	Description	Your data set name
SHRFBASE	SMP/E JCL members for installation	
SHRFLOAD	Executable load module library for IMS Online Reorganization Facility	
SHRFMACS	Distributed product macro for IMS Online Reorganization Facility	
SHRFSAMP	Sample JCL members for IMS Online Reorganization Facility	

The SIHCxxxx libraries include the data sets for IMS HALDB Toolkit.

<i>Table 13: Data set names of IMS HALDB Toolkit (SIHCxxxx library)</i>		
Name	Description	Your data set name
SIHCBASE	SMP/E JCL members for installation	
SIHCLOAD	Executable load module library for IMS HALDB Toolkit	
SIHCSKEL	Executable CLIST member for IMS HALDB Toolkit	
SIHCMESG	ISPF messages for IMS HALDB Toolkit	
SIHCPANL	ISPF panels for IMS HALDB Toolkit	
SIHCMACS	Distributed product macro for IMS HALDB Toolkit	
SIHCSAMP	Sample JCL members for IMS HALDB Toolkit	

The SFABxxxx libraries include the data sets for Database Repair Facility.

<i>Table 14: Data set names of Database Repair Facility (SFABxxxx library)</i>		
Name	Description	Your data set name
SFABLMD0	Executable load module library for Database Repair Facility	
SFABCLIB	Executable CLIST members for Database Repair Facility	

Name	Description	Your data set name
SFABMLIB	ISPF messages for Database Repair Facility	
SFABPLIB	ISPF panels for Database Repair Facility	

The SATYxxxx libraries include the data sets for IMS Administration Tool.

<i>Table 15: Data set names of IMS Administration Tool (SATYxxxx library)</i>		
Name	Description	Your data set name
SATYBASE	SMP/E JCL members for installation	
SATYCEXE	Executable CLIST members for IMS Administration Tool	
SATYLOAD	Executable load module libraries for IMS Administration Tool	
SATYMENU	ISPF messages for IMS Administration Tool	
SATYPENU	ISPF panels for IMS Administration Tool	
SATYSAMP	Sample JCL members and macros for IMS Administration Tool	
SATYTENU	Table data for IMS Administration Tool	

Data set names of IMS Tools Base

The following table summarizes the libraries of IMS Tools Base.

<i>Table 16: Data set names of IMS Tools Base</i>		
Name	Description	Your data set name
SAIILINK	Executable load module library for Distributed Access Infrastructure	
SFOILOAD	Executable load module library for IMS Tools Online System Interface and IMS Tools Common Pauser	
SGLXLOAD	Executable load module library for IMS Tools Generic Exits	
SHKTLOAD	Executable load module library for Autonomics Director, IMS Tools Knowledge Base, and Policy Services	
SHKTCEXE	Executable CLIST and REXX members for Autonomics Director, IMS Tools Knowledge Base, Policy Services, and IMS Tools Setup	

Data set names of IMS libraries

The following table summarizes the IMS resources.

<i>Table 17: Data set names of IMS resources</i>	
Name	Your data set name
IMS SDFSRESL	
IMS SDFS MAC	
IMS SMP/E CSI data set	

Name	Your data set name
IMS PROCLIB	
DBDLIB	
PSBLIB	
ACBLIB	
MDALIB	
USERLIB (see Note)	
RECON1	
RECON2	
RECON3	

Note: USERLIB is the load module library where your randomizer, segment compression exits, user exit routines, and other resources exist.

Data set names of other libraries

The following table summarizes other resources.

<i>Table 18: Data set names of other resources</i>	
Name	Your data set name
GDDM® (SADMMOD)	
ISPF (SISPLPA)	
ISPF (SISPLOAD)	
LE (SCEELKED)	
MVS™ PROCLIB	

Data set names of your program libraries

Use the following table to record the program libraries in which your user exit modules, site default modules, and base configuration modules are stored.

<i>Table 19: Data set names of your program libraries</i>	
Description	Your data set name

Verifying the installation

After completing all the installation requirements, run the installation verification procedure (IVP) job for IMS Database Solution Pack.

The IVP member is HPSAIVP in the SHPSBASE data set. This IVP job checks IMS Database Solution Pack and its individual products, and verifies that all installation tasks have been completed successfully and that you are ready to configure the tools of IMS Database Solution Pack. Edit the member by following the instructions within the member and run the job.

Initial product customization using IMS Tools Setup

IMS Tools Setup is a function that helps you quickly and efficiently perform the required post-SMP/E installation customization process for IMS Tools solution pack products. IMS Tools Setup is provided by IBM® IMS Tools Base.

What does IMS Tools Setup do?

After the selected IMS Tools solution pack products have been installed into SMP/E data sets, IMS Tools Setup provides a process to simplify the initial configuration that is required to begin using the products. IMS Tools Setup generates JCL members that you then submit as jobs, or perform as tasks, to complete the customization process.

IBM® IMS Tools Base components are also configured and customized during the IMS Tools Setup process. IBM® IMS Tools Base provides important supporting components and infrastructure that are required for the operation of many IMS Tools functions, such as storage repositories, autonomics, and interaction with IMS.

The goal of IMS Tools Setup is to greatly ease the time and effort it takes to have IMS Tools products up and running in your environment.

IMS Tools Setup is intended only for initial product installations, first-time users, and product evaluations. IMS Tools Setup is not intended for maintenance purposes.

IMS Tools products that can use IMS Tools Setup

The following IMS Tools products and solution packs can use IMS Tools Setup for initial configuration:

- IBM® IMS Tools Base for z/OS®
- IBM® IMS Database Solution Pack for z/OS®
- IBM® IMS Fast Path Solution Pack for z/OS®
- IBM® IMS Recovery Solution Pack for z/OS®
- IBM® IMS Database Utility Solution for z/OS®
- IBM® IMS Administration Tool for z/OS®
- IBM® IMS Cloning Tool for z/OS®
- IBM® IMS Program Restart Facility for z/OS®

Starting IMS Tools Setup

The IMS Tools Setup function (HKTQSETU) can be found in IBM® IMS Tools Base. You can start the function by running the following REXX EXEC:

```
EXEC 'smpehlq.SHKTCEXE(HKTQSETU)' 'HLQ(smpehlq)'
```

where *smpehlq* is the high-level qualifier for the IMS Tools Base SMP/E data sets.

The IMS Tools Setup ISPF panels provide an organized and logical approach to the customization tasks. The panels explain the operation and sequence of each member that is generated in the CUSTJCL data set. The correct JCL job and task operation order is very important.

Each panel contains embedded panel-context and individual field-context Help information. All information about using IMS Tools Setup is contained in the embedded Help. There is no separate user guide.

While using the IMS Tools Setup function to install IMS Tools products or to migrate your products from an earlier release to a later release, you need to specify the names of the libraries, or data sets, that are required for each IMS Tools product. Use the worksheets in the topic "[Data set names for IMS Tools Setup](#)" in the *IMS Tools Base Configuration Guide* to make a summary of the data set names that will be used in your environment.

Completing IMS Tools Setup

After you run the HKTQSETU REXX EXEC, you can refer to the \$\$READ member in the generated *hlq.CUSTJCL* data set to view summary information about the JCL members that were generated. Additionally, all individual *hlq.CUSTJCL* members contain detailed descriptions of the functions for each job.

Each of the generated JCL members begin with the number sign (#) and are named in the logical sequence of operation. Any members ending with the at sign (@) require manual steps. You must begin with the first ~~#####~~ member and submit the JCL job or perform the task. After that job or task completes, you continue on to the next member and submit that JCL job or perform that task, and so forth.

The first few members are all SYSPROG related (APF, LPA, SSN, MVSPPT), followed by security related members, TCP/IP administration, DBA related members, and others.

You must process all members in the correct order to complete the full customization task properly.

Each JCL member has its own descriptive comment section that explains what the member does and which group it might belong to.

Customizing IMS Database Solution Pack

Before using any of the tools that are included in IMS Database Solution Pack, all the tools must be customized. Use the following topics to manually customize tools in IMS Database Solution Pack. These topics also cover customization of common tools that are included in IMS Tools Base for z/OS®.

Customization checklist

Use the following checklist to customize the tools and components for IMS Database Solution Pack.

<i>Table 20: Customization checklist</i>	
Status	Task
	1. “Configuring IMS Tools Base” on page 46
	2. “APF authorizing the program libraries” on page 51
	3. “Performing security-related tasks” on page 51
	4. “Obtaining XCF group names for IMS Tools Base servers” on page 58
	5. “Updating sample procedures and JCL” on page 58
	6. “Setting up Unified Management Server for IMS Administration Foundation” on page 62
	7. “Setting up IMS Online Reorganization Facility” on page 62
	8. “Setting up IMS HALDB Toolkit” on page 69
	9. “Setting up the Integrity Checker utility of IMS Library Integrity Utilities” on page 70
	10. “Setting up IMS Administration Tool” on page 98
	11. “Setting up the ISPF interfaces” on page 99

Configuring IMS Tools Base

Identify the IMS Tools Base components that will be required in your environment and configure the components.

About this task

Many of the tools included in IMS Database Solution Pack integrate with the components that are included in IMS Tools Base. The following IMS Tools Base components might be used in your IMS Database Solution Pack environment.

Autonomics Director

Autonomics Director provides automation of IMS database monitoring based on an understanding of the current state of your IMS databases. Autonomics Director must be configured if you want Database Sensor to send a sensor data collection notification to Autonomics Director. Autonomics Director will use this notification as a trigger to start analyzing and generating recommendations for the database.

Distributed Access Infrastructure

Distributed Access Infrastructure acts as a gateway for communication between distributed platforms and z/OS®. It operates in a z/OS® environment and uses a TCP Server, the Tools Access Server (TAS), and the Subordinate TAS (SOT) to provide distributed clients access to IMS Tools through TCP/IP socket communication. Distributed Access Infrastructure is used for the following purposes:

- Provide TCP gateway for various IMS Tools services that are provided by IMS Administration Foundation. Those services include:
 - Viewing exceptions monitored by using Autonomics Director monitor list
 - Viewing sensor data history in trend charts
 - Viewing IMS Tools utility reports

- Viewing source statements and tree structures defined in DBDs and PSBs
- Handle ISPF client requests for specific IMS Administration Tool functions.

Distributed Access Infrastructure must be configured to use IMS Administration Foundation or the ISPF interface of IMS Administration Tool.

IMS Tools Common Services

IMS Tools Generic Exits provides the ability to define multiple IMS exits and enable them to be called within the IMS control region. One of the exits supported is the Partner Product exit routine (DFSPUE0). This exit is required to use IMS Tools Online System Interface.

IMS Tools Online System Interface is a command interface that allows IMS Tools to interface with all supported versions of IMS.

IMS Tools Knowledge Base

IMS Tools Knowledge Base is the foundational infrastructure that provides a centralized information management environment for IMS Tools products and Policy Services. IMS Tools Knowledge Base allows you to store, manage, and access resources (such as reports, sensor data, policies, rules, notification lists, and decoded DBDs) that are generated or used by any tool product that has been enabled and registered to participate in an IMS Tools Knowledge Base information management environment. IMS Tools Knowledge Base must be configured if you want to store reports and sensor data in central repositories, use autonomics capabilities provided by Autonomics Director, use the JCL generation capability of IMS Administration Tool, or use the graphical web interface of IMS Administration Foundation.

Policy Services

Policy Services is a core IMS Tools technology that can monitor specific database state by evaluating the sensor data collected by an IMS Tools product, and by providing a response to any conditions that exceed the threshold values specified for this state. Policy Services must be configured if you plan to use the Conditional Reorganization Support Service in Smart Reorg utility jobs of IMS Database Reorganization Expert or IMS Online Reorganization Facility jobs, or if you plan to use Database Sensor.

Procedure

1. Identify which IMS Tools Base components will be used in your environment.

The following table shows the IMS Tools Base components and whether they are supported by each tool of IMS Database Solution Pack. IMS Tools Base components that are not listed in the table are not used by the tools of IMS Database Solution Pack. To learn how the components of IMS Tools Base can be used with IMS Tools products, see "[IMS Tools Base overview](#)".

Table 21: IMS Tools Base components

IMS Tools	Autonomics Director	Distributed Access Infrastructure	IMS Tools Common Services	IMS Tools Knowledge Base	Policy Services
IMS Online Reorganization Facility	Optional	Optional	Required	Optional	Optional
IMS HALDB Toolkit	-	-	Optional <<(See Note)>>	-	-
IMS Database Reorganization Expert	Optional	Optional	Optional <<(See Note)>>	Optional	Optional
IMS HP Unload	-	Optional	Optional	Optional	-
IMS HP Load	-	Optional	Optional <<(See Note)>>	Optional	-
IMS HP Prefix Resolution	-	Optional	Optional <<(See Note)>>	Optional	-
IMS Index Builder	-	Optional	Optional <<(See Note)>>	Optional	-
IMS HP Image Copy	Optional	Optional	Optional <<(See Note)>>	Optional	Optional
IMS HP Pointer Checker	Optional	Optional	Optional <<(See Note)>>	Optional	Optional
IMS Library Integrity Utilities	-	-	Optional <<(See Note)>>	-	-

IMS Tools	Autonomics Director	Distributed Access Infrastructure	IMS Tools Common Services	IMS Tools Knowledge Base	Policy Services
IMS Library Integrity Utilities extension (DBD and PSB Map feature)	-	Required	-	Required	-
IMS Administration Tool	-	Required	Required	Required	-
Database Sensor	Optional	Optional	Optional <<(See Note)>>	Required	Optional
Database Repair Facility	-	-	-	-	-

Note: | <<Required when IMS-managed ACBs are used.>>|

- Follow the instructions in the topic "[Configuration checklist for IMS Tools Base components](#)" in the *IMS Tools Base Configuration Guide* to configure the IMS Tools Base components that you identified in step "1" on page 47. The following considerations and additional information help you configure the IMS Tools Base components for use with IMS Database Solution Pack.

IMS Tools Knowledge Base

Register IMS Tools products to IMS Tools Knowledge Base to enable the following functions:

- Store product reports in the IMS Tools Knowledge Base repository
- Collect and store sensor data for sensor data evaluation
- IMS autonomics capabilities
- JCL generation of IMS Administration Tool

For more information about configuring IMS Tools Knowledge Base and registering IMS Tools products, see the *IMS Tools Base Configuration Guide*.

Autonomics Director

While you configure Autonomics Director, you will be guided to create skeleton JCL for Database Sensor. You can use the sample skeleton JCL, BBESJCL2, in the SHPSSAMP library to do so.

IMS Tools Common Services

Important: If you plan to use IMS Online Reorganization Facility, instead of completing the steps in the *IMS Tools Base Configuration Guide* to configure IMS Tools Generic Exits, complete the steps in "[Configuring IMS exit routines for IMS Online Reorganization Facility](#)" on page 48.

Configuring IMS exit routines for IMS Online Reorganization Facility

If you plan to use IMS Online Reorganization Facility, you must configure IMS exit routines for IMS Online Reorganization Facility.

About this task

You can configure IMS exit routines by using IMS Tools Generic Exits of IMS Tools Base or by using IMS refreshable exit routines.

- "[Configuring IMS exit routines by using IMS Tools Generic Exits](#)" on page 49
- "[Configuring IMS exit routines by using IMS refreshable exit routines](#)" on page 50

Configuring IMS exit routines by using IMS Tools Generic Exits

To configure IMS exit routines by using IMS Tools Generic Exits of IMS Tools Base, you must install and configure the IMS Tools Generic Partner Exit interface and the IMS Tools Generic Logger Exit interface. Both of them are distributed as part of the IMS Tools Generic Exits. The IMS Tools Generic Partner Exit interface allows multiple exit routines to be called during IMS initialization, while the IMS Tools Generic Logger Exit interface allows multiple exit routines to be called during IMS logger execution.

About this task

As part of the installation and configuration for the IMS Tools Generic Partner Exit, you might have already performed part of the following steps. If you have not completed some of these steps yet, complete them now.

In this task, you will configure the environment for the following exit routines:

- The Generic Partner exit routine that is provided by IMS Online Reorganization Facility (HRFOPPUE)
- The Generic Partner exit routine that is provided by the IMS Tools Online System Interface (FOIPPUE1)
- The Generic Logger exit routine that is provided by IMS Online Reorganization Facility (HRFFLGX0)

The executable load libraries of IMS Tools Generic Exits, the IMS Tools Online System Interface, and IMS Online Reorganization Facility must be APF-authorized. The APF-authorization procedures will be guided in the subsequent tasks.

Procedure

1. Create a unique GPR*ssid*0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. *ssid* is the 4-character IMS subsystem identifier.
Add the following lines to each GPR*ssid*0 member:

```
EXITDEF (TYPE (PARTNER) EXITNAME (HRFOPPUE)
         LOADLIB (your_SHRFLOAD))
EXITDEF (TYPE (PARTNER) EXITNAME (FOIPPUE1)
         LOADLIB (your_SFOILOAD))
```

Where *your_SHRFLOAD* and *your_SFOILOAD* are the data set names of the SHRFLOAD and SFOILOAD libraries.

2. Create a unique GLX*ssid*0 member for each IMS system in which you plan to use IMS Online Reorganization Facility. *ssid* is the 4-character IMS subsystem identifier.
Add the following lines to each GLX*ssid*0 member:

```
EXITDEF (TYPE (LOGR) EXITNAME (HRFFLGX0)
         LOADLIB (your_SHRFLOAD))
```

Where *your_SHRFLOAD* is the data set name of the SHRFLOAD library.

3. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for IMS Tools Generic Exits, the IMS Tools Online System Interface, and IMS Online Reorganization Facility.

What to do next

For detailed instructions on how to add GPR*ssid*0 and GLX*ssid*0 members, see the [IMS Tools Base IMS Tools Common Services User's Guide and Reference](#).

Important:

- If you use any other user-defined or vendor partner exit that does not support IMS Tools Generic Exits, you must ensure that the libraries that contain the DFSPPE0 and DFSFLGX0 exits are concatenated ahead of the SGLXLOAD and those exits must pass control to the next exit in the STEPLIB so that IMS Tools Generic Exits get control.
- The IMS Tools Generic Exits load library, SGLXLOAD, must be in front of the IMS Tools Online System Interface load library, SFOILOAD, in the IMS control region //STEPLIB concatenation.

- The IMS Online Reorganization Facility library, SHRFLOAD, must be in front of the IMS SDFSRESL in the IMS control region //STEPLIB concatenation.
- The same maintenance level of IMS Online Reorganization Facility must exist in the //STEPLIB concatenations of all IMS control regions that share the same RECON data sets.

Configuring IMS exit routines by using IMS refreshable exit routines

To configure IMS exit routines by using IMS refreshable exit routines, you must configure the Logger user exit (LOGWRT) and Partner Product user exit (PPUE) routines. IMS refreshable exit routines allow multiple exit routines of the same type to be called in sequence.

About this task

In this task, you will configure the environment for the following exit routines:

- The Logger user exit routine (LOGWRT) that is provided by IMS Online Reorganization Facility (HRFFLGX0)
- The Partner Product user exit routine (PPUE) that is provided by IMS Online Reorganization Facility (HRFOPPUE)
- The Partner Product user exit routine (PPUE) that is provided by the IMS Tools Online System Interface (FOIPPUE1)

The executable load libraries of IMS Tools Online System Interface and IMS Online Reorganization Facility must be APF-authorized.

Procedure

1. Add the following Logger user exit definition to the IMS PROCLIB member DFSDFxxx:

```
EXITDEF=(TYPE=LOGWRT,EXITS=(HRFFLGX0))
```

2. Add the following Partner Product user exit definition to the IMS PROCLIB member DFSDFxxx:

```
EXITDEF=(TYPE=PPUE,EXITS=(FOIPPUE1,HRFOPPUE))
```

3. Update your IMS control region JCL to include in the //STEPLIB concatenation the executable load libraries for the IMS Tools Online System Interface and IMS Online Reorganization Facility.

What to do next

For detailed instructions on how to add the user exit definitions, see the topic "DFSDFxxx member of the IMS PROCLIB data set" in *IMS System Definition*.

Important:

- IMS refreshable exit routines allow multiple exit routines of the same type to be called in sequence. However, any one of the exit routines in the sequence can bypass the remaining subsequent exit routines and return control to the IMS system by setting the SXPLCNXT exit parameter to SXPL_CALLNXTN. You must ensure that none of the exit routines bypass the exit routines provided by IMS Online Reorganization Facility and IMS Tools Online System Interface.
- The IMS Online Reorganization Facility library, SHRFLOAD, must be in front of the IMS SDFSRESL in the IMS control region //STEPLIB concatenation.
- The same maintenance level of IMS Online Reorganization Facility must exist in the //STEPLIB concatenations of all IMS control regions that share the same RECON data sets.

APF authorizing the program libraries

You must make certain changes to your MVS™ system to allow IMS Database Solution Pack to operate with the required level of authority.

About this task

Before using any of the tools in IMS Database Solution Pack, you must ensure that all the authorizations are set up correctly for your environment. The following libraries require authorized program facility (APF) authorization:

- The library that contains the IMS Database Solution Pack executable modules
- All tools that are part of IMS Database Solution Pack that are not in the SHPSLMD0 library
- The libraries of related common tools of IMS Tools Base
- The libraries that contain the user exit modules, site default table modules, and base configuration modules, if they exist

Procedure

1. Add the required libraries to your MVS™ APF list.
Add the libraries in the following table to your MVS™ APF list and any other library that is specified in the STEPLIB of each batch utility job or IMS control region.

Library	Descriptions
SAIILINK	Distributed Access Infrastructure
SATYLOAD	IMS Administration Tool
SFOILOAD	IMS Tools Online System Interface
SGLXLOAD	IMS Tools Generic Exits
SHKTLOAD	Autonomics Director, IMS Tools Knowledge Base, Distributed Access Infrastructure, and Policy Services
SHPSLMD0	IMS Database Solution Pack
SHRFLOAD	IMS Online Reorganization Facility
SIHCLOAD	IMS HALDB Toolkit
SIULMOD	IMS Index Builder

2. Complete either of the following steps to activate the updated APF list:
 - To temporarily APF-authorize the libraries, use the SETPROG APF system command. For more information, see *z/OS® MVS™ System Commands*.
 - To permanently APF-authorize the libraries, add the libraries to the APF statement in the PROGxx member of SYS1.PARMLIB and re-IPL the system. For more information, see the *z/OS® MVS™ Initialization and Tuning Reference*.

Performing security-related tasks

IMS Database Solution Pack requires specific RACF® and security settings. You must ensure that all products have the necessary security authorizations in order for them to operate correctly.

Data spaces

Data spaces are used by IMS HP Load and IMS HP Image Copy under certain conditions.

Your environment might restrict the use of data spaces. If your site restricts which tools can create and use data spaces, you must authorize the following two products to allow the tool to function properly.

The following information pertains to the tools that use data spaces and the parameters that you can use to control their use.

IMS HP Load

IMS HP Load uses data spaces to reorganize the database records in the overflow part of the DBDS and to resolve long synonym chains after the database is reorganized.

The minimum amount of space that is used is 128 KB for each database. If IMS HP Load needs more data spaces, it obtains an additional 128 KB each time.

IMS HP Image Copy

IMS HP Image Copy uses data spaces only when it is called within IMS Database Reorganization Expert jobs that process secondary index databases with Type-A Image Copy processing.

IMS HP Image Copy uses data spaces to share control data among address spaces. Specifically, it uses data spaces to hold data that is being processed or to pass data between multiple address spaces. IMS HP Image Copy keywords control the use of the data spaces.

The amount of space used is 128 KB plus an additional 8 KB for each DBDS that is being processed.

If your site restricts which tools can create and use data spaces, you must authorize the load module library of IMS HP Image Copy (SHPSLMD0) to allow the tool to function properly.

Address spaces

IMS Index Builder and IMS HP Image Copy use the multiple address space architecture.

A common example is the user or job scheduler initiating the master address space (MAS) by submitting a set of saved JCL. The MAS then initiates one or more subordinate address spaces (SAS) to perform the requested processing. In some cases, the SAS also initiates other subordinate address spaces.

IMS Index Builder address space considerations

IMS Index Builder executes in a multiple address space environment. The main job can be submitted by the user or a job scheduler, or initiated as a started task.

The job name is determined by the user. The authority is obtained from the user ID that is associated with the job. IMS Index Builder can then initiate either of the following subordinate address spaces types, depending on the processing that is being performed:

IIUSORTS

The IMS Index Builder sort subordinate address space that is initiated as a started task. The name of the started task, by default, is IIUSORTS. However, the name can be changed in the IIURPRMS customization module by using the IIURDFLT SORTP parameter.

By default, IMS Index Builder uses the IIUBSRT procedure, found in the system procedure library to create the JCL for this started task. This procedure name can be overridden in the IIURPRMS customization module using the IIURSORT parameter. However, changing this procedure affects all the created address spaces.

IIUSCANS

The IMS Index Builder scan address space which is initiated as a started task. The name of the started task, by default, is IIUSCANS. However, the name can be changed in the IIURPRMS customization module using the IIURDFLT SCAN parameter.

By default, IMS Index Builder uses the IIUBSRT procedure, found in the system procedure library to create the JCL for this started task. This procedure name can be overridden in the IIURPRMS customization module using the IIURSORT parameter. However, changing this procedure affects all the created address spaces.

IIUAPIFC

The IMS Index Builder API address space. This address space is initiated as a started task when the Parallel Reorganization Service of IMS Database Reorganization Expert initiates IMS Index Builder. The name of the started task, by default, is IIUAPIFC. However, the name can be changed in the IIURPRMS customization module by using the IURDFLT APIP parameter.

IMS Index Builder uses the same procedure for creating both the IIUAPIFC and IIUSORTS address spaces.

All started tasks that are created by IMS Index Builder run with the same authority as the main job that was initiated. When IMS Index Builder initiates a started task, code that is executing in that address space creates a security control block that matches the one associated with the main job. This control block is swapped in the new address space so that it has the same level of authority as the main job. However, there is a short time in which the started task is running with default authority. For details on this situation and potential problems, see [“Authorizing IMS Index Builder subordinate address space” on page 57](#).

The user ID that is associated with the IMS Index Builder job needs the following authority to the listed data sets:

- CONTROL access to the RECON data sets
- READ access to database data sets
- ALTER access to index data sets

IMS HP Image Copy address space considerations

IMS HP Image Copy executes in a multiple address space environment. The main job can be submitted by the user or a job scheduler, or initiated as a started task.

About this task

Advanced Image Copy Services of IMS HP Image Copy schedules the DFSMSDss program (server) and uses its application programming interface (API). The DFSMSDss server runs in a different address space from the address space of IMS HP Image Copy. When a batch job starts, it starts the DFSMSDss server address space. The server remembers which job started the server. While the server is running, it accepts other connections until the originating job ends. At the end of the originating job, the job notifies the server that it has finished and this notification alerts the server that it can stop. Until the DFSMSDss address space is stopped, the address space is reused by the DFSMSDss API.

You can also start the DFSMSDss server within IMS HP image Copy jobs. When the server is started, the server can be used by other applications that run in the same system.

Tip: The DFSMSDss server address space simplifies the running of multiple jobs. Therefore, consider starting the DFSMSDss server address space in the system whenever possible.

Procedure

To start the DFSMSDss server address space within an IMS HP Image Copy job, follow these steps:

1. Create the following started task procedure and add it to SYS1.PROCLIB.

```

//*****
//* THIS PROCEDURE WILL CREATE AN APPROPRIATE DFSMSDSS CROSS      *
//* MEMORY SERVER TO BE USED WITH APPLICATIONS THAT INVOKE CROSS  *
//* MEMORY REQUESTING THE DEFAULT DFSMSDSS SERVER NAME.          *
//*                                                                *
//* TO USE, ENTER THE FOLLOWING AT A CONSOLE:                      *
//* START DFSMSDSS,PROG=ADRXMAIB                                    *
//*                                                                *
//* WHEN THE DFSMSDSS CROSS MEMORY SERVER IS NO LONGER REQUIRED    *
//* ISSUE THE FOLLOWING MODIFY COMMAND:                             *
//* F DFSMSDSS,STOP                                               *
//*                                                                *
//*****
//DFSMSDSS PROC  PROG=IEFBR14
//IEFPROC EXEC  PGM=&PROG,REGION=0M,TIME=1440,DYNAMNBR=1635

```

2. Start the DFSMSDss server address space by using either of the following methods:

- Issue the following command:

```
S DFSMSDSS,PROG=ADRXMAIB
```

- Add the procedure as a started task in your IPL procedure.

3. When the DFSMSDss server address space is started, run the IMS HP Image Copy jobs.

- When your IMS HP Image Copy jobs end, and if you want to stop the server address space, issue the following command:

```
F DFSMSDSS,STOP
```

Defining RACF (or equivalent security) authorization for IMS commands

You must define RACF® (or equivalent security software) authorizations for Database Sensor, IMS Database Reorganization Expert, IMS HP Image Copy, and IMS HP Pointer Checker to operate.

About this task

The Database Sensor, IMS Database Reorganization Expert, IMS HP Image Copy, IMS HP Pointer Checker functions allow you to execute IMS commands through a batch job. IMS commands must be secured with RACF® or other equivalent security software to control access to who can issue IMS commands. There are three different options for securing IMS commands through this feature. The information about IMS command authorization is defined in the IMS Tools Base IMS Tools Knowledge Base RECONID record.

Procedure

- In the **IMSCMD Security** field, which is located in the RECONID record, specify the type of security that you want to implement by entering one of these values:

NONE

No security authorization is performed. This value is intended for test environments only and should not be used in a secured environment. The security level of NONE allows anyone to issue any supported IMS command.

APPL

The RACF® application (APPL) resource class is used for command security checking. This method uses the application resource class (APPL) to protect the IMS commands. The **RACF Class** field in the RECONID record indicates the specific application resource name, within the RACF® APPL class, that is used for securing the IMS commands.

When you use the APPL resource class method, you must first define the application resource name (*applname* in the next example) to RACF®. Define the application resource name to RACF® by using the RDEFINE command, as shown in this example:

```
RDEFINE APPL applname UACC(NONE) AUDIT(NONE)
```

After you have defined the application resource name, your RACF® administrator can permit users either READ or UPDATE levels of command authorization by using the PERMIT command, as shown in this example:

```
PERMIT applname CLASS(APPL) ID(userid) ACCESS(READ|UPDATE)
```

The *userid* specifies a particular RACF® user or RACF® group. ACCESS specifies either read-level access or update-level access. Read-level access allows a user to issue IMS commands that display IMS system information, and update-level access allows users to issue IMS commands that alter IMS system resources. The next table indicates which IMS commands are allowed and the corresponding level of access that is required to run them.

IMS

The IMS resource class is used for command security checking. This method uses the same IMS command security class that is used by the online IMS system. The **RACF Class** field in the RECONID record indicates the RACF® security class that is used for securing IMS commands. This value must match the one that you specified to IMS using the **RCLASS=** keyword on the SECURITY macro. This method allows you to use the same security class that is used by your online IMS control region.

Commands and required access levels for RACF® APPL resource class authority

During the customization process, you will need to issue various commands. Make sure that your user ID has the required authority to issue these commands.

IMS commands and their corresponding required access levels for RACF® APPL resource class authority are shown here.

IMS commands

The following table summarizes the IMS commands that are used in product jobs and the access levels that are required to issue the commands.

<i>Table 23: IMS commands</i>		
Command	Access level required	Product
/CHECKPOINT	Update	IMS Online Reorganization Facility
/DBDUMP	Update	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS Index Builder • IMS HP Image Copy
/DBRECOVERY	Update	<ul style="list-style-type: none"> • IMS HP Image Copy • IMS Online Reorganization Facility
/DISPLAY	Read	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS Index Builder • IMS HP Image Copy • IMS Online Reorganization Facility
/START	Update	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS Index Builder • IMS HP Image Copy • IMS Online Reorganization Facility
/STOP	Read	IMS Online Reorganization Facility
QUERY	Read	IMS HP Image Copy
UPDATE	Update	IMS HP Image Copy

DBRC API requests and DBRC commands

The following table summarizes the DBRC API requests and the DBRC commands that are used in product jobs.

<i>Table 24: DBRC API requests and DBRC commands</i>	
DBRC API request or command	Product
DBRC API - AUTH	IMS Index Builder
DBRC API - QUERY	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HALDB Toolkit • IMS HP Image Copy • IMS HP Load • IMS HP Pointer Checker • IMS Index Builder • IMS Library Integrity Utilities • IMS Online Reorganization Facility

DBRC API request or command	Product
DBRC API - RELBUF	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HALDB Toolkit • IMS HP Image Copy • IMS HP Load • IMS HP Pointer Checker • IMS Index Builder • IMS Library Integrity Utilities • IMS Online Reorganization Facility
DBRC API - STARTDBRC/STOPDBRC	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HALDB Toolkit • IMS HP Image Copy • IMS HP Load • IMS HP Pointer Checker • IMS Index Builder • IMS Library Integrity Utilities • IMS Online Reorganization Facility
DBRC command - CHANGE	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HALDB Toolkit • IMS HP Image Copy • IMS Index Builder • IMS Online Reorganization Facility
DBRC command - INIT/DELETE	IMS HALDB Toolkit
DBRC command - LIST	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HP Image Copy • IMS HP Pointer Checker • IMS Index Builder • IMS Library Integrity Utilities
DBRC command - NOTIFY	<ul style="list-style-type: none"> • IMS Database Reorganization Expert • IMS HALDB Toolkit • IMS HP Image Copy • IMS Index Builder • IMS Online Reorganization Facility

For the access levels that are required to issue these requests and commands, see the following topics:

- Topics about DBRC security in *IMS System Administration*
- Topics about DBRC API security features in *IMS System Programming APIs*

To set RACF® control information for these IMS commands, DBRC API requests, and DBRC commands, see *IMS Commands*.

Defining RACF authority to dynamically allocate and catalog data sets

Set up the RACF® authority to dynamically allocate and catalog data sets beginning with the high-level qualifier that you specified in the JCL and PROC members.

Here are some examples:

- Database data sets
- Index data sets
- Image copy data sets
- Work data sets

Setting up security for IMS Index Builder

Setting up security for IMS Index Builder includes three tasks: Authorizing IMS Index Builder subordinate address space, granting READ access to the IMS Index Builder load library for the user ID, and granting ALTER work file access to the IMS Index Builder users.

Authorizing IMS Index Builder subordinate address space

You must authorize the IMS Index Builder subordinate address space to run under a security system. Before using the subordinate address space, make sure that you have established proper security authorization and access.

About this task

The subordinate address space's user ID is obtained in two phases, as described in the following steps:

Procedure

1. Before the IMS Index Builder code is dispatched in the subordinate address space and has the opportunity to set its security identity, the operating system attempts to use the user ID from the profile definitions in the security system's STARTED class as the user ID for these started tasks. If you use the IMS Index Builder default job names, you can use the following RDEFINE to specify the user ID. The STARTED class is RACLIST'ed and must be refreshed after you make updates.

```
RDEFINE STARTED IIU*.* STDATA(USER(userid))
SETROPTS RACLIST(STARTED) REFRESH
```

You can also use the started procedures module ICHRIN03 to associate started procedures and jobs with user IDs, instead of using the **RDEFINE STARTED** command.

If you use the IIURPRMS module to override the default job names, you must define the STARTED class profiles that correspond to the installation names.

2. After the IMS Index Builder code is dispatched in the subordinate address space, IMS Index Builder processing determines the user ID under which the master address space runs. The subordinate address space changes its own initial user ID to match that of the master address space. Once this change occurs, the subordinate address space runs with the same security authorities as the master.

Granting READ access to the IMS Index Builder load library for the user ID

You must grant READ access to the IMS Index Builder load library SIIULMOD for the user ID.

Defining the IMS Index Builder load library to the security system with UACC(READ) is recommended so that all user IDs have access to the STEPLIB. If you do not want to define UACC(READ), you must set READ access to the load library for the user ID or for the group associated with the STARTED class profile, and also for the user ID under which the master address space runs.

Granting ALTER work file access to the IMS Index Builder users

Depending on which processing mode IMS Index Builder uses, IMS Index Builder can use stripe data sets to pass records between its address spaces. The stripe data sets exist only for the duration of that particular IMS Index Builder run.

When stripe data sets are used, the user ID associated with the master address space requires ALTER access to these data sets. You associate ALTER access to the stripe data sets by defining an IIU.STRIPE.* DATASET profile with UACC(ALTER). If your installation security policies do not allow UACC(ALTER), you must add each user that executes IMS Index Builder to this DATASET profile's access list with ALTER access.

By default, stripe data sets are allocated with the high-level qualifiers IIU.STRIPE. You can override this default by using the IIURDFLT CLASS setting in the IIURPRMS parameter module. However, if you override the default high-level qualifiers, you must define a DATASET profile corresponding to the installation's qualifiers.

Obtaining XCF group names for IMS Tools Base servers

You must obtain the XCF group names for the IMS Tools Base server groups to set up JCL streams, cataloged procedures, and site default options for IMS Database Solution Pack tools.

XCF group name for the IMS Tools Knowledge Base servers

The XCF group name for the IMS Tools Knowledge Base servers must be specified in the JCL streams for IMS Database Solution Pack tools to use one of the following services of IMS Tools Base directly from tools' jobs:

- IMS Tools Knowledge Base report repository service
- Policy Services
- Autonomics Director

For example, specify the ITKBSRVR parameter in the PROC control statement of IMS HP Pointer Checker. You can set default values for the runtime options by using the Installation Default Option to make the specification applied to all the run of IMS HP Pointer Checker jobs, without specifying them in each JCL stream.

XCF group name for the Autonomics Director servers

The XCF group name for the Autonomics Director servers must be specified in the JCL streams for IMS Database Solution Pack tools to use the sensor data notification service from various database sensor functions of the tools.

For example, specify the ADXCFGRP parameter in the PROC control statement of IMS HP Pointer Checker. You can set default values for the runtime options by using the installation default option to make the specification applied to all the run of IMS HP Pointer Checker jobs, without specifying them in each JCL stream.

XCF group name for the IMS Tools Online System Interface server tasks

The XCF group name for the IMS Tools Online System Interface server tasks must be specified in the JCL streams for IMS Database Solution Pack tools to issue IMS commands from the tools' jobs.

For example, specify the TOSIXCFGRP=*grpname* parameter in the HPSIN input of IMS Database Reorganization Expert, where *grpname* is the 5-character XCF group name.

Updating sample procedures and JCL

Update the required sample members in the SHPSSAMP library and sample PROC in the SIIUPROC library.

Updating the required sample members in the SHPSSAMP library

Create or modify the required sample members in the SHPSSAMP library for IMS Database Solution Pack.

Each sample member has instruction on how to customize each member.

Copy and modify the necessary PROC and JCLPDS members to your IMS PROCLIB, system PROCLIB, or JCLPDS data sets.

The following tables summarize the sample members that are used to implement each product distributed in the IMS Database Solution Pack sample library SHPSSAMP.

Subsections:

- [“Database Sensor sample members” on page 59](#)
- [“IMS HP Unload sample members” on page 59](#)
- [“IMS HP Load sample members” on page 59](#)
- [“IMS HP Image Copy sample members” on page 60](#)
- [“IMS HP Pointer Checker sample members” on page 60](#)
- [“IMS Library Integrity Utilities sample members” on page 61](#)

Database Sensor sample members

The following table summarizes the sample members for IMS Database Solution Pack Database Sensor.

<i>Table 25: IMS Database Solution Pack Database Sensor sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
BBESJCL1	Stand-alone Database Sensor sample JCL Note: You can use this JCL to verify Database Sensor installation.	JCL
BBESJCL2	Stand-alone Database Sensor sample skeleton JCL Note: You can use this JCL to run Database Sensor automatically by using the scheduling functions of Autonomics Director. See the topic " Customizing skeleton JCL for full-function (and HALBD) DB Sensor " in the <i>IMS Tools Base Configuration Guide</i> .	JCL
BBESDFL1	Database Sensor procedure to generate a site default table (Database Sensor Site Default Generation utility)	PROC
BBESDFL2	Database Sensor procedure to report the contents of the site default table (Database Sensor Site Default Generation utility)	PROC

IMS HP Unload sample members

The following table summarizes the sample members for IMS HP Unload.

<i>Table 26: IMS HP Unload sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
FABHDBB	IMS HP Unload DBB region procedure	PROC
FABHDB2	IMS HP Unload DLI region procedure	PROC
FABHDLI	IMS HP Unload DLI region procedure	PROC
FABHULU	IMS HP Unload ULU region procedure	PROC
FABIRGEN	IMS HP Unload Asm/Link procedure to generate Sequential Subset Randomizer	PROC

IMS HP Load sample members

The following table summarizes the sample members for IMS HP Load.

<i>Table 27: IMS HP Load sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
FABSPSSI	IMS HP Load procedure to invoke Physical Sequence Sort Reload	PROC
FABSPSSR	IMS HP Load procedure to invoke Physical Sequence Sort Reload	PROC

IMS HP Image Copy sample members

The following table summarizes the sample members for IMS HP Image Copy.

<i>Table 28: IMS HP Image Copy sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
FABJICD1	Defaults for GENJCL.IC	Input
FABJICD2	Defaults for GENJCL.IC	Input
FABJICS0	Skeleton JCL for GENJCL.IC	JCLPDS
FABJRVGR	Skeleton JCL for GENJCL.RECOV	JCLPDS

IMS HP Pointer Checker sample members

The following table summarizes the sample members for IMS HP Pointer Checker.

<i>Table 29: IMS HP Pointer Checker sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
FABKSPMP	IMS HP Pointer Checker procedure to invoke Space Monitor.	PROC
FABPP	IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers. This procedure uses a PSB. The work data sets are defined in the procedure.	PROC
FABPPA	IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers. This procedure uses a PSB. The job runs in the DBB region by using ACBLIB. HD Pointer Checker dynamically allocates the work data sets.	PROC
FABPPD	IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers. This procedure uses a DBD. The work data sets are not defined in the procedure; HD Pointer Checker dynamically allocates them.	PROC
FABPPTA	IMS HP Pointer Checker procedure to invoke HD Pointer Checker and HD Tuning Aid to check pointers and root-segment locations. This procedure uses a PSB.	PROC

Sample member	Description	Type
FABPC	IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers. This procedure uses a PSB. The work data sets are defined in the procedure. Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.	PROC
FABPCD	IMS HP Pointer Checker procedure to invoke HD Pointer Checker to check pointers. This procedure uses a DBD. The work data sets are not defined in the procedure; HD Pointer Checker dynamically allocates them. Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.	PROC
FABPCTA	IMS HP Pointer Checker procedure to invoke HD Pointer Checker and HD Tuning Aid to check pointers and root-segment locations. This procedure uses a PSB. Use this procedure if you want Database Sensor to store sensor data or Space Monitor to monitor IMS online full-function databases while checking pointers.	PROC
FABTIMS	IMS HP Pointer Checker procedure to invoke HD Tuning Aid under IMS.	PROC
FABTMVS	IMS HP Pointer Checker procedure to invoke HD Tuning Aid for MVS™ batch.	PROC

IMS Library Integrity Utilities sample members

The following table summarizes the sample member for IMS Library Integrity Utilities.

<i>Table 30: IMS Library Integrity Utilities sample members in the SHPSSAMP library</i>		
Sample member	Description	Type
FABLPGEN	IMS Library Integrity Utilities procedure to generate LIU global option module	PROC

Updating the required sample PROC in the SIIUPROC library

Copy the required sample PROC in the SIIUPROC library to your IMS PROCLIB or system PROCLIB data sets and modify the member.

<i>Table 31: Sample PROC in the SIIUPROC library</i>			
Sample member	Product	Description	Type
IIUBSRT	IMS Index Builder	Sort address space procedure	PROC

Setting up Unified Management Server for IMS Administration Foundation

If you have installed IBM® Unified Management Server for z/OS®, you can configure and activate IMS Administration Foundation features. These features provide a subset of the functions that were available in IBM® Management Console for IMS and Db2® for z/OS®, and they also include additional capabilities for IMS catalogs, such as IMS catalog queries and DDL representations of DBDs and PSBs.

About this task

The IMS Administration Foundation features that are activated by IMS Tools Base and IMS Database Solution Pack include viewing charts based on sensor data, database exceptions, reports, graphical view of database or program structures, and DBD and PSB source statements and their DDL representations. The graphical user interface is provided by IBM® Unified Experience for z/OS® that runs as an application for Zowe virtual desktop.

The IBM® Unified Management Server for z/OS® provides a web service infrastructure and a unified user interface that consolidate information from IMS subsystems and Db2® subsystems on a sysplex.

At least one Unified Management Server server instance must be set up on each sysplex and on top of a Zowe infrastructure running on the sysplex.

Procedure

- |<If you installed IBM® IMS Tools Base for z/OS® 1.8 and plan to use only the IMS Administration Foundation features on IBM® Unified Management Server for z/OS®, follow the instructions in the [IMS Administration Foundation Installation and Configuration Guide](#). >|
- If you installed IBM® IMS Tools Base for z/OS® 1.7 or also plan to use the features of Db2 Tools products for IBM® Unified Management Server for z/OS®, follow the instructions in the [Unified Management Server User Guide](#).

Setting up IMS Online Reorganization Facility

IMS Online Reorganization Facility provides the function to reorganize databases with minimal downtime. If you want to use IMS Online Reorganization Facility, you must configure the base environment, and enable any pause features that you plan to use.

About this task

To configure IMS Online Reorganization Facility, complete the following tasks:

1. [“Configuring the base environment for IMS Online Reorganization Facility” on page 62](#)
2. [“Enabling the BMP pause feature” on page 65](#)
3. [“Enabling the CICS and ODBA applications pause feature” on page 67](#)

Configuring the base environment for IMS Online Reorganization Facility

To configure IMS Online Reorganization Facility, create the restart data set and the base configuration module.

About this task

To run IMS Online Reorganization Facility, you must create the following resources:

- The restart data set, which saves information for restarting jobs
- The base configuration module, which defines the base configuration parameters

The sample members in these steps are provided in the SHRFSAAMP library.

Procedure

1. Edit the sample member HRFCINST.
The following figure shows the HRFCINST job. This job creates the restart data set.

NAME HRFSETOP(R)
//

- a. Define the information about the restart data set and the XCF group names to be used. The following parameters specify these resources:

<i>Table 32: Parameters for the restart data set and the XCF group names</i>	
Parameter	Description
RSTRTDSN	Required. Specifies the name of the restart data set to be used. Specify the name of the restart data set that you created in steps “1” on page 62 and “2” on page 63.
TOIGROUP	Required. Specifies the XCF group name for the IMS Tools Online System Interface. The group name must begin with TOI, and the rest of the name must be the same as the XCFGROUP name that is specified in the FOIssidP members, which you created while configuring IMS Tools Base.
XCFGROUP	Required. Specifies the XCF group name to use for communication between IMS control regions and IMS Online Reorganization Facility batch jobs. You can specify up to 8 characters of the group name. This name must be different from the TOIGROUP parameter value and unique within the sysplex.

- b. Define the allocation information for the temporary RECON data set. The following allocation parameters are used to create the temporary RECON data set:

<i>Table 33: Allocation parameters for RECON data sets</i>	
Parameter	Description
RECON	Required. Specifies the temporary RECON data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with either a DBD or HALDB partition name plus a timestamp.
RCDATAAC	Optional. Specifies the DATACLAS for the temporary RECON data set.
RCMGMTCLAS	Optional. Specifies the MGMTCLAS for the temporary RECON data set.
RCSTORCLAS	Optional. Specifies the STORCLAS for the temporary RECON data set.
RCVOL	Required for non-SMS environments. Specifies the volume serial number for the temporary RECON data set.

- c. Define the allocation information for the temporary log data set. The following allocation parameters are used to create the temporary log data set:

<i>Table 34: Allocation parameters for log data set</i>	
Parameter	Description
LOGHLQ	Required. Specifies the temporary log data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with either a DBD or HALDB partition name plus a timestamp.
LOGDATAAC	Optional. Specifies the DATACLAS for the temporary log data set.

Parameter	Description
LOGMGMTCLAS	Optional. Specifies the MGMTCLAS for the temporary log data set.
LOGSTORCLAS	Optional. Specifies the STORCLAS for the temporary log data set.
LOGUNIT	Required for non-SMS environments. Specifies the unit name for the temporary log data set.

- d. Define the allocation information for the work data set.
The following allocation parameters are used to create the work data set:

<i>Table 35: Allocation parameters for work data set</i>	
Parameter	Description
WFHLQ	Optional. Specifies the work data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with an internal name that is generated from the timestamp.
WFUNIT	Required for non-SMS environments when WFHLQ is specified. Specifies the unit name for the work data set.

- Run the HRFCCNFG job to create the base configuration module HRFSETOP.
- Add the base configuration module to the STEPLIB DD concatenation of IMS control region JCL, then recycle all the affected control regions. You do not need to restart the systems. You receive the following initialization messages from IMS Online Reorganization Facility and from the IMS Tools Online System Interface component in each IMS control region that shares the same RECON data sets.

```

HRF01000I Logger exit initializing
HRF01503I Joined XCF group xcfgroup as member ssid
HRF01000I Logger exit initialized
...
HRF01536I Online Reorg Facility Vx.x mm/dd/yy nn.nn
HRF01500I Online Reorg Facility initialization for ssid completed
...
FOI100I TOOLS ONLINE INTERFACE ENABLED; XCF GROUP=toigroup, CMD SECURITY=NO ssid

```

What to do next

The base configuration parameters that are defined in the base configuration module can be changed later. For more information, see the topic "[Customizing the base environment](#)" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

Enabling the BMP pause feature

If you plan to use IMS Online Reorganization Facility for databases that are used by long-running BMPs, you must enable the BMP pause feature for any BMPs that access the databases during the reorganization process.

About this task

Based on your environment, you can select from the following configuration types when you enable the BMP pause feature:

- Changing BMP jobs and having IMS Online Reorganization Facility manage BMP pauses.
- Not changing BMP jobs and having IMS Online Reorganization Facility manage BMP pauses.
- Having IMS Program Restart Facility manage BMP pauses.

Important: IMS Program Restart Facility can also manage BMP pauses. If IMS Program Restart Facility is installed, complete the steps in “Enabling BMP pauses with IMS Program Restart Facility” on page 67.

For more information about the BMP pause feature, see the topic "[BMP pause feature](#)" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

Enabling BMP pauses by modifying BMP application jobs

If you can make changes in the JCL of the BMP jobs and you want IMS Online Reorganization Facility to manage BMP pauses, add the required module to the IMS SDFSRESL data set.

About this task

In this configuration, module DFSRRC99 is added to the IMS SDFSRESL data set.

The sample members in these steps are provided in the SHRFSAAMP library.

Procedure

1. Follow the instructions in the sample member HRFBCPJ1 and submit the job.
This JCL adds the DFSRRC99 module to the IMS SDFSRESL data set. This module is a clone of the DFSRRC00 module and is called by the HRFRCXX region controller of IMS Online Reorganization Facility.
2. **Optional:** If you want to maintain the DFSRRC99 module by using SMP/E, follow the instructions in the sample member HRFBCPM1 and apply it.
This USERMOD installs the JCLIN input for linking DFSRRC99. After this USERMOD is applied, SMP/E applies maintenance to both modules, DFSRRC00 and DFSRRC99. If you do not apply this USERMOD, any IMS maintenance updates for DFSRRC00 are not applied to DFSRRC99.
3. Change the JCL of the BMP jobs to invoke the HRFRCXX region controller in the IMS Online Reorganization Facility library.
Add the IMS Online Reorganization Facility library to the STEPLIB, and change the EXEC statements to invoke the HRFRCXX region controller module. For example:

```
//BMP      EXEC PGM=HRFRCXX,  
//          REGION=80M, PARM='BMP, ...  
//STEPLIB DD DISP=SHR, DSN=DBSP.SHRFLOAD  
//          DD DISP=SHR, DSN=IMS.SDFSRESL
```

Enabling BMP pauses without modifying BMP application jobs

If you do not want to make changes in the JCL of the BMP jobs and you want IMS Online Reorganization Facility to manage BMP pauses, add the required modules to the IMS SDFSRESL data set.

Before you begin

Important: In this configuration, the DFSRRC00 region controller of IMS is replaced with the HRFRCXX region controller of IMS Online Reorganization Facility. Before you start this task, consider the effect on other applications.

About this task

In this configuration, the following modules are added to the IMS SDFSRESL data set:

- DFSRRC99
- HRFRCXX (as DFSRRC00)
- HRFRCnn (nn is a numeric value)
- HRFOARCO
- HRFYOFnn (nn is a numeric value)

The sample members in these steps are provided in the SHRFSAAMP library.

Procedure

1. Follow the instructions in the sample member HRFCBPJ2 and submit the job.
This JCL adds the following modules to the IMS SDFSRESL data set:
 - DFSRRC99 module. This module is a clone of the DFSRRC00 module and is called by the HRFRRCXX region controller of IMS Online Reorganization Facility.
 - HRFRRCXX region controller module. This module is added as DFSRRC00.
 - Other required modules.
2. **Optional:** If you want to maintain the DFSRRC99 module by using SMP/E, follow the instructions in the sample member HRFCBPM1 and apply it.
This USERMOD installs the JCLIN input for linking DFSRRC99. After this USERMOD is applied, SMP/E applies maintenance to both modules, DFSRRC00 and DFSRRC99. If you do not apply this USERMOD, any IMS maintenance updates for DFSRRC00 are not applied to DFSRRC99.
3. **Optional:** If you want to maintain the IMS Online Reorganization Facility modules that are added to IMS SDFSRESL data set by using SMP/E, follow the instructions in the sample member HRFCBPM2 and apply it.
This USERMOD installs the JCLIN input for linking IMS Online Reorganization Facility modules. After this USERMOD is applied, SMP/E applies maintenance to the IMS Online Reorganization Facility modules and to the IMS Online Reorganization Facility modules that are added to the IMS SDFSRESL data set. If you do not apply this USERMOD, IMS Online Reorganization Facility maintenance updates are not applied to the IMS Online Reorganization Facility modules in the IMS SDFSRESL data set.

Enabling BMP pauses with IMS Program Restart Facility

If you want IMS Program Restart Facility to manage BMP pauses, add the required modules to the IMS SDFSRESL data set. Complete these steps only if IMS Program Restart Facility is installed.

About this task

In this configuration, the following modules are added to the IMS SDFSRESL data set:

- HRFOARCO
- HRFYOFnn (nn is a numeric value)

The sample members in these steps are provided in the SHRFSAAMP library.

Procedure

1. Follow the instructions that are provided by IMS Program Restart Facility.
See the topic "[Configuring IMS Program Restart Facility](#)" in the *IMS Program Restart Facility User's Guide*.
2. Follow the instructions in the sample member HRFCBPJ3 and submit the job.
This JCL adds the BMP pause API module of IMS Online Reorganization Facility (HRFOARCO) and other required modules to the IMS SDFSRESL data set. IMS Program Restart Facility dynamically detects the HRFOARCO module and calls the module when the module is found in the IMS SDFSRESL data set.
3. **Optional:** If you want to maintain the IMS Online Reorganization Facility modules that are added to the IMS SDFSRESL data set by using SMP/E, follow the instructions in the sample member HRFCBPM3 and apply it.
This USERMOD installs the JCLIN input for linking IMS Online Reorganization Facility modules. If you do not apply this USERMOD, IMS Online Reorganization Facility maintenance updates are not applied to the IMS Online Reorganization Facility modules in the IMS SDFSRESL data set.

Enabling the CICS and ODBA applications pause feature

If you plan to use IMS Online Reorganization Facility for databases that are used by CICS® or ODBA applications, you must enable the CICS® and ODBA applications pause feature for any CICS® and ODBA applications that access the databases during the reorganization process.

About this task

Based on your environment, you can select from the following methods to enable the CICS® and ODBA applications pause feature:

- Creating the required module in a load library other than the IMS SDFSRESL data set.
- Modifying the IMS SDFSRESL data set.

The CICS® and ODBA applications pause feature is independent of the BMP pause feature. You can use the CICS® and ODBA applications pause feature even if you are using IMS Program Restart Facility or IMS Recovery Solution Pack: Database Recovery Facility: Extended Functions to pause BMP applications.

For more information about the CICS® and ODBA applications pause feature, see the topic "[CICS® and ODBA applications pause feature](#)" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

Enabling CICS and ODBA applications pauses without modifying the IMS SDFSRESL data set

If you do not want to modify the IMS SDFSRESL data set, generate the required module in a different load library in the STEPLIB of IMS control region.

About this task

In this configuration, the DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to a load library that precedes the IMS SDFSRESL in the STEPLIB DD concatenation of IMS control region JCL.

Procedure

1. Edit the sample member HRFCAPJ1, which is in the SHRFSAAMP library, by following the instructions in the JCL.
2. Run the HRFCAPJ1 job.
The DFSDBCTG module that is customized by IMS Online Reorganization Facility is created.
3. Add the DFSDBCTG module to a library that precedes the IMS SDFSRESL in the STEPLIB DD concatenation of IMS control region JCL, then recycle all the affected control regions. You do not need to restart the systems.

Enabling CICS and ODBA applications pauses by modifying the IMS SDFSRESL data set

If you can allow a modification in the IMS SDFSRESL data set, add the required module to the IMS SDFSRESL data set.

Before you begin

Use SMP/E to apply and accept IMS maintenance, and ensure that IMS is at the latest maintenance level.

Important: In this configuration, the DBCTL composite load module of IMS, DFSDBCTG, is replaced with the one customized by IMS Online Reorganization Facility. Before you start this task, consider the effects on other applications.

About this task

In this configuration, the DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to the IMS SDFSRESL data set. In this task, you create a USERMOD by using IMS Online Reorganization Facility and apply that USERMOD to IMS.

Important: If you use this method to enable the CICS® and ODBA applications pause feature, be aware of the following considerations:

- Never accept the USERMOD created by IMS Online Reorganization Facility.
- After the USERMOD is applied, you must follow these steps when you apply IMS maintenance:
 - a. Remove the USERMOD by using the SMP/E RESTORE command.
 - b. Apply IMS maintenance.
 - c. Rerun from Step “3” on page 69 to create a new USERMOD and apply that USERMOD.

The sample members in these steps are provided in the SHRFSAMP library.

Procedure

1. If you have ever added the required module for CICS® and ODBA applications pauses to the IMS SDFSRESL data set, follow the instructions in the sample member HRFCAPJ3 to remove the old USERMOD from IMS.
2. Edit the sample member HRFCAPJ2 by following the instructions in the JCL.
3. Run the HRFCAPJ2 job.
The job creates a USERMOD for the DBSDBCTG module, and then performs SMP/E RECEIVE and APPLY for the generated USERMOD. The DFSDBCTG module that is customized by IMS Online Reorganization Facility is added to the IMS SDFSRESL data set.
4. Recycle all the affected control regions. You do not need to restart the systems.

Setting up IMS HALDB Toolkit

IMS HALDB Toolkit provides functions to maintain HALDBs and to convert IMS full-function databases to HALDBs. If you want to use IMS HALDB Toolkit, you must create the base configuration module for IMS HALDB Toolkit.

About this task

IMS HALDB Toolkit uses temporary RECON data sets and a temporary DBD library for some functions. The base configuration module defines the allocation parameters for creating these resources when IMS HALDB Toolkit is started.

Procedure

1. Edit the sample member, IHCCSET, which is provided in the SIHCSAMP library.
The following figure shows the IHCCSET job. This job creates the base configuration module for IMS HALDB Toolkit.

```
//IHCCSET JOB
//C EXEC PGM=ASMA90,
// PARM='LIST,RENT,DECK,NOOBJ'
//SYSPRINT DD SYSOUT=*
//SYSLIB DD DSN=SYS1.MACLIB,DISP=SHR
// DD DSN=DBSP.SIHCSAMP,DISP=SHR
//SYSUT1 DD SPACE=(CYL,(2,2)),UNIT=SYSDA
//SYSPUNCH DD DSN=&&OBJ,SPACE=(CYL,(1,1)),
// UNIT=SYSDA,DISP=(MOD,PASS),
// DCB=(BLKSIZE=2400,LRECL=80,RECFM=FB)
//SYSIN DD *
WSET0 IHXSET0 RECON=your.TEMP.RECON,
RCVOL=rcvol,
RCDATAC=*,
RCSTORC=*,
DBDDSN=your.TEMP.DBDLIB,
DBDVOL=dbdvol,
DBDCLAS=*,
DBSCLAS=*
END
//L EXEC PGM=HEWL,PARM='XREF,LIST',COND=(4,LE,C)
//SYSPRINT DD SYSOUT=*
//SYSLIB DD DISP=SHR,DSN=DBSP.SIHCLoad
```

```
//SYSLMOD DD DISP=SHR,DSN=DBSP.SIHCLoad
//SYSUT1 DD SPACE=(CYL,(5,2)),
// UNIT=SYSDA
//SYSLIN DD DSN=&&OBJ,DISP=(OLD,DELETE)
// DD *
NAME IHCWSET0(R)
//
```

- a. Define the allocation information for the temporary RECON data set.
The following allocation parameters are used to create the temporary RECON data set. Depending on your SMS definition, you might use only a subset of these parameters. However, if you are not using SMS, you must specify a volume serial number.

<i>Table 36: Allocation parameters for RECON data sets</i>	
Parameter	Description
RECON	Required. Specifies the temporary RECON data set name high-level qualifier. You can specify up to 26 characters of the data set name. This parameter will be appended internally with the DBD name plus a timestamp.
RCVOL	Required for non-SMS environments. Specifies the volume serial number for the temporary RECON data set.
RCDATAAC	Optional. Specifies the DATACLAS for the temporary RECON data set.
RCSTORC	Optional. Specifies the STORCLAS for the temporary RECON data set.

- b. Define the allocation information for the temporary DBD library.
The following allocation parameters are used to create the DBD library:

<i>Table 37: Allocation parameters for DBD library</i>	
Parameter	Description
DBDDSN	Required. Specifies the temporary DBDLIB data set name high-level qualifier. You can specify up to 26 characters of the data set name.
DBDVOL	Required for non-SMS environments. Specifies the volume serial number for the temporary DBDLIB.
DBDCLAS	Optional. Specifies the DATACLAS for the temporary DBDLIB data set.
DBSCLAS	Optional. Specifies the STORCLAS for the temporary DBDLIB data set.

2. Run the IHCCSET job.
HLASM and the LINKAGE editor create the base configuration module.
3. Add the base configuration module to the STEPLIB DD concatenation of IMS HALDB Toolkit runtime JCL.
Ensure that the executable load libraries of IMS HALDB Toolkit are APF-authorized.

Setting up the Integrity Checker utility of IMS Library Integrity Utilities

The Integrity Checker utility of IMS Library Integrity Utilities prevents accidental misuse of ACBs or DBDs in your production environment. If you want to use the Integrity Checker utility, you must configure the utility.

Before you begin

Before you set up the Integrity Checker utility, see the topic "[Integrity Checker overview](#)" in the *IMS Library Integrity Utilities User's Guide* and learn how the utility prevents database corruptions and how it works.

Planning for Integrity Checker configuration

Before you activate the DMB verification function of Integrity Checker, you must understand the resources used by Integrity Checker and design the most suitable Integrity Checker configuration for your IMS environment.

After you design your Integrity Checker configuration, activate Integrity Checker by completing the instructions in [“Activating Integrity Checker” on page 83](#).

Use the following topics to design the Integrity Checker configuration:

- [“LIU load module library customization” on page 71](#)
- [“LICON data sets and global option modules” on page 72](#)
- [“Integrity Checker configuration requirements” on page 72](#)
- [“Runtime options and environments” on page 78](#)
- [“Historical data maintained in LICON data sets” on page 79](#)
- [“Considerations for activating Integrity Checker” on page 80](#)

LIU load module library customization

The IMS Library Integrity Utilities load module library (also referred to as LIU load module library) must be customized to use Integrity Checker.

The DMB verification function of Integrity Checker is triggered by IMS jobs (IMS online, application, IMS standard utility, and IMS Tools utility jobs) that access databases. Therefore, unlike other IMS Tools programs that run with JCL in which the EXEC PGM= parameter specifies the utility program name to execute, Integrity Checker must be customized to automatically start DMB verification when a database is accessed.

The DMB verification process runs as part of the DBRC authorization process. Therefore, instead of coding JCL statements, you must customize the LIU load module data set (SHPSLMD0 data set) to work with DBRC module DSPCRTR0.

Important: In IMS Library Integrity Utilities 2.1 and earlier, alias name DSPCRTR0 was assigned for the FABLRTR0 module by default, but in IMS Library Integrity Utilities 2.2 and later, the alias name is not assigned. You must customize the LIU load module library.

Methods for customizing the LIU load module library

Integrity Checker supports two methods for customizing the LIU load module data set. Compare the two methods and determine the best method for your environment.

Method 1: Defining alias name DSPCRTR0 for FABLRTR0 (recommended method)

Module FABLRTR0 is the program load module that is stored in the LIU load module library. Module DSPCRTR0 is the DBRC router module, which is one of the DBRC authorization modules.

If alias name DSPCRTR0 is defined for the FABLRTR0 module, and the LIU load module library precedes the IMS resident library (SDFSRESL data set) in the STEPLIB DD in JCL and procedures of IMS jobs, when a database is accessed by such jobs, instead of the DBRC module DSPCRTR0, the FABLRTR0 module starts and activates DMB verification. To apply this method, the LIU load module library must be APF-authorized.

- Advantage: You can use the standard SMP/E methods to apply program temporary fixes (PTFs) for both IMS Library Integrity Utilities and IMS.
- Disadvantage: You must modify the STEPLIB DD statement in JCL and procedures of all IMS jobs that access databases.

Method 2: Merging Integrity Checker load modules into the IMS resident library (SDFSRESL)

If all the Integrity Checker modules (FABL* members) in the LIU load module library are merged into the IMS SDFSRESL data set, when a database is accessed, the FABLRTR0 module, which is link-edited to the DBRC module DSPCRTR0 module, starts and activates DMB verification. Before the modules are merged, the FABLRTR0 module and DBRC module DSPCRTR0 must be link-edited to create one DSPCRTR0 module, and the module entry point must be set to FABLRTR0. Before the modules are merged, a backup of the IMS SDFSRESL data set must be created.

- **Advantage:** You do not need to modify the STEPLIB DD statement in each JCL and procedure of IMS jobs that access databases.
- **Disadvantage:** When you apply PTFs for IMS Library Integrity Utilities and IMS, the following additional steps are required:
 - For IMS Library Integrity Utilities, after you apply a PTF, you must merge the members again.
 - For IMS, if the PTF updates the DSPCRTR0 module, you must restore the DSPCRTR0 module before you apply the PTF. After you apply the PTF, create a backup of the SDFSRESL data set, and then link-edit FABLRTR0 and DSPCRTR0 again.

Integrity Checker supports multiple versions of IMS with one module. Therefore, with either method, if the version of IMS is supported by IMS Library Integrity Utilities, the same LIU load module data set can be used.

LICON data sets and global option modules

LICON data sets and global option modules are unique resources that are required by Integrity Checker.

LICON data sets

LIU Integrity control data sets (LICON data sets) are KSDS data sets that are the repositories for *registered DMB entries* (RDEs). RDEs contain database management block (DMB) information that is used in DMB verification. In the LICON data sets, RDEs are stored as KSDS records. At least one LICON data set must be defined and initialized.

Integrity Checker obtains the DMB information that IMS used to load the database, stores the information in the RDE as the correct DMB information, and refers to that DMB information to verify the DMB information obtained from the DBDLIB, ACBLIB, or IMS directory that is referenced by IMS jobs.

In addition to the DMB information, RDEs contain the following information:

- Runtime options that are applied to DMB verification.
- Timestamp of the last database access made by load utility programs, unload utility programs, and utilities or application programs with an update intent in the PSB.

When a DBD is updated, Integrity Checker updates the corresponding RDE accordingly.

In addition to the RDE that contains the latest DMB information, Integrity Checker also maintains historical copies of RDEs. You can use those copies to review the DBD information before a DBD change, or when you restore DBDs, you can use the copies to restore RDEs.

Global option modules

Global option modules are the configuration definition modules of Integrity Checker. Each global option module defines the LICON data set and the runtime options that are applied to DMB verification. IMS Library Integrity Checker does not provide global option modules, so you must create at least one global option module.

IMS Library Integrity Utilities provides the FABLPGEN program for creating global option modules. The LICON data set name and runtime options are defined through FABLPGIN macro control statements of the FABLPGEN program.

After running the FABLPGEN program, the source code must be assembled and link-edited to a load module. The created global option module must be stored in the LIU load module library.

Integrity Checker configuration requirements

Because DMB verification works within DBRC authorization processing, DBRC must be active in your IMS environment. The number of LICON data sets and global option modules in an Integrity Checker configuration depends on how the DBRC environment is configured.

The basic rules for designing an Integrity Checker configuration are as follows:

- One LICON data set must be created for each set of RECON data sets. (A set consists of RECON1, RECON2, and RECON3.)
- Global option modules contain the names of the LICON data sets. Therefore, if your environment requires multiple LICON data sets, you must prepare the same number of global option modules.

- Global option modules must be named using the following naming convention:

LIU@INST

The default name for the global option module. If your environment requires only one LICON data set, use this name.

LIU@*imsid*

If your environment requires multiple LICON data sets, use this format. For *imsid*, use the IMS ID of each IMS subsystem.

When multiple global option modules exist, Integrity Checker determines the global option module to use from the IMS ID. If no corresponding global option module is found for an IMS ID, Integrity Checker uses the default module LIU@INST. Even if the corresponding global option module is found, if some options are not defined in that module, the options that are defined in LIU@INST are applied. If LIU@INST is not found or some options are not defined in the LIU@INST, the system default values are used.

Tip: At sign (@) is a code-page-dependent character. If you are working in an environment where you cannot use the at sign (@), name the modules LIUGINST or LIUG*imsid*.

Use the following examples to design an Integrity Checker configuration for your environment.

- [“Single IMS subsystem configuration example” on page 73](#)
- [“Multiple IMS subsystems configuration example: Data-sharing environment” on page 74](#)
- [“Multiple IMS subsystems configuration example: Non-data-sharing environment” on page 75](#)
- [“Multiple IMS subsystems configuration example: Multiple data-sharing environments” on page 76](#)
- [“Multiple IMS subsystems configuration example: XRF complex” on page 77](#)

As a rule, the same runtime options must be defined for each LICON data set. To simplify the explanations, these examples are cases where one global option module refers to one LICON data set.

Tip: Certain runtime options can have different values within one LICON data set. To define different runtime option values, instead of assigning alias names for global option modules as shown in the examples, create one global option module for each IMS ID. For more information about the runtime options, see [“Global option module generation macro” on page 92](#).

For IMS environments that are not explained in these examples, such as IMSplex, the basic rules are the same. For any IMS environment, you can follow these basic rules to design Integrity Checker configuration:

- One LICON data set for one set of RECON data sets
- One global option module for one LICON data set

Single IMS subsystem configuration example

The following figure shows the simplest configuration.

In this environment, one IMS subsystem is used and one set of RECON data sets is used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 1
- Number of global option modules: 1

Because only one global option module is required, the name of the global option module is LIU@INST.

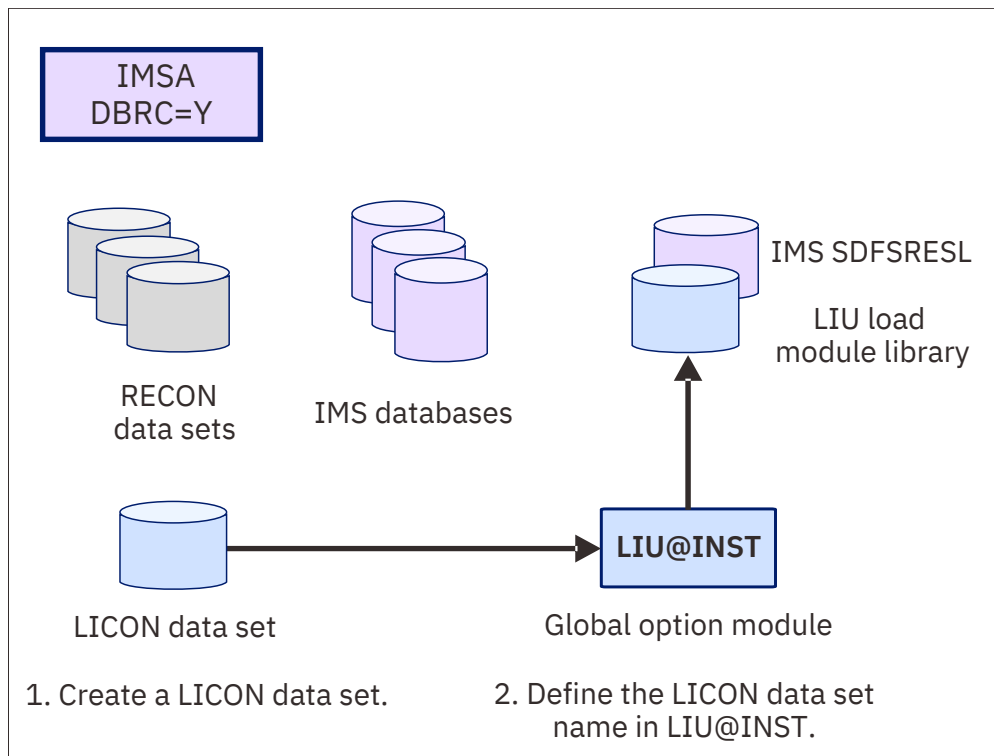


Figure 8: Integrity Checker configuration for a single IMS subsystem

Multiple IMS subsystems configuration example: Data-sharing environment

The following figure illustrates a configuration where two IMS subsystems share databases.

In this environment, two IMS subsystems are used and one set of RECON data sets is used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 1
- Number of global option modules: 1

Because only one global option module is required, the name of the global option module is LIU@INST.

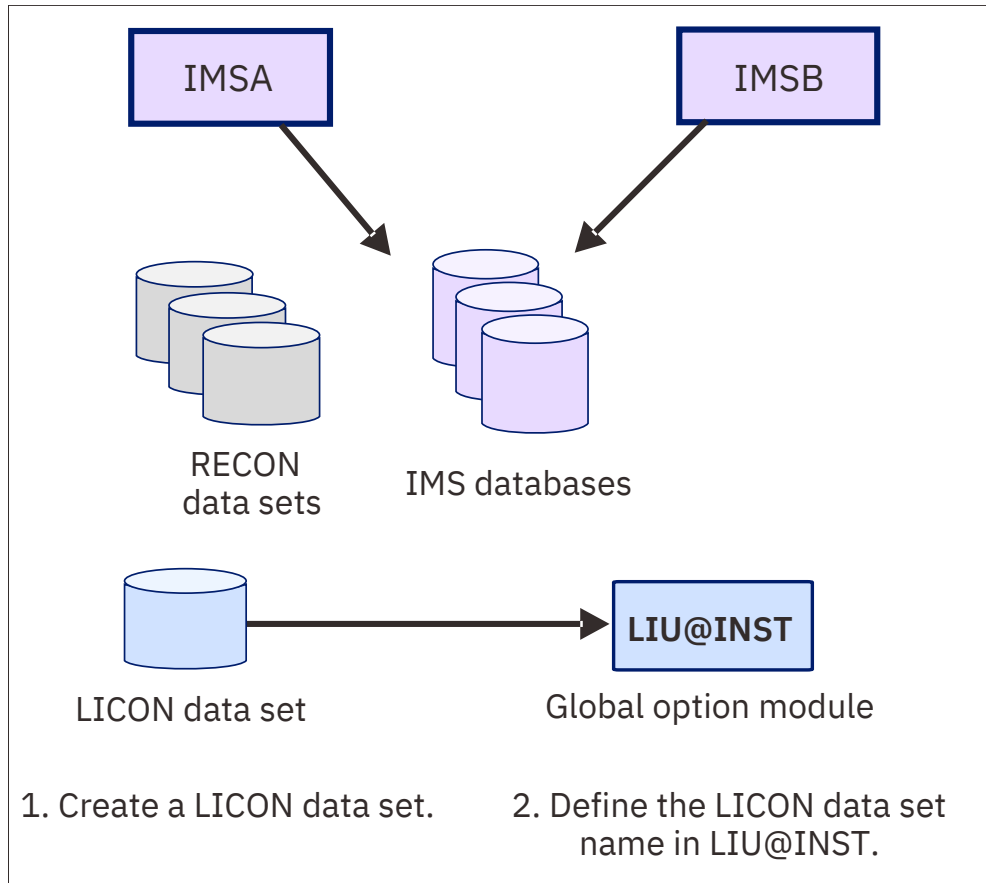


Figure 9: Integrity Checker configuration in a data-sharing environment

Multiple IMS subsystems configuration example: Non-data-sharing environment

The following figure illustrates a configuration where two IMS subsystems use a different set of databases. In such an environment, a LICON data set must be created for each IMS subsystem. Each LICON data set requires one global option module.

In this environment, two IMS subsystems are used and two sets of RECON data sets are used, so the Integrity Checker resources that are required in this environment are as follows:

- Number of LICON data sets: 2
- Number of global option modules: 2

Because two global option modules are required, the names of the global option modules are LIU@IMSA for IMS subsystem IMSA, and LIU@IMST for IMS subsystem IMST.

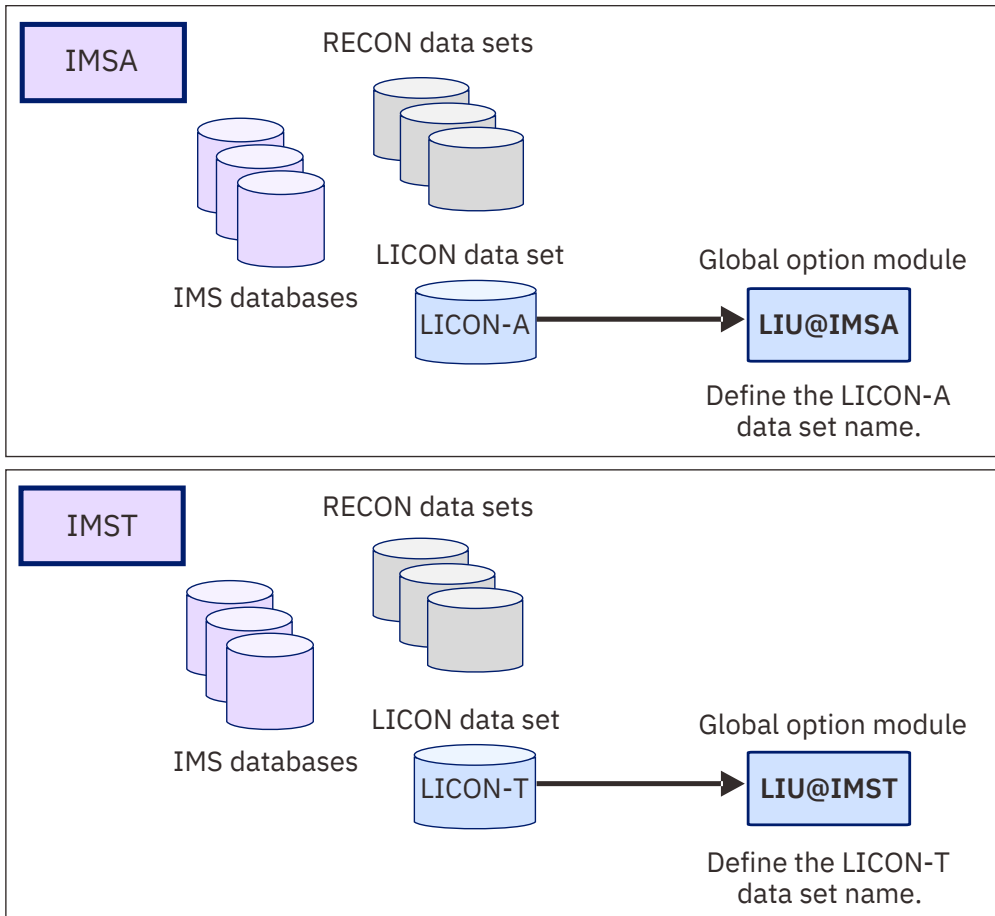


Figure 10: Integrity Checker configuration in a non-data-sharing environment

Multiple IMS subsystems configuration example: Multiple data-sharing environments

The following figure illustrates a configuration for multiple data-sharing environments. In each data-sharing environment, two IMS subsystems use the same set of databases. In such environments, a LICON data set must be created for each data-sharing environment.

Generally, when four IMS subsystems exist, four global option modules are required. However, as shown in the figure, if you create a global option module for each LICON data set and define an alias name for each global option module, you can design the Integrity checker configuration with two global option modules.

Create global option module LIU@IMSA for IMS subsystem IMSA, and then define alias name LIU@IMSB for LIU@IMSA so that IMS subsystem IMSB can also use LIU@IMSA. Do the same for IMS subsystems IMSC and IMSD.

Tip: If you create two global option modules (LIU@IMSA and LIU@IMSB), the LICON data set names and the runtime options must be the same between the two global option modules. By assigning an alias name and sharing a global option module, the same values are automatically applied; you can prevent errors that might be caused by inconsistency.

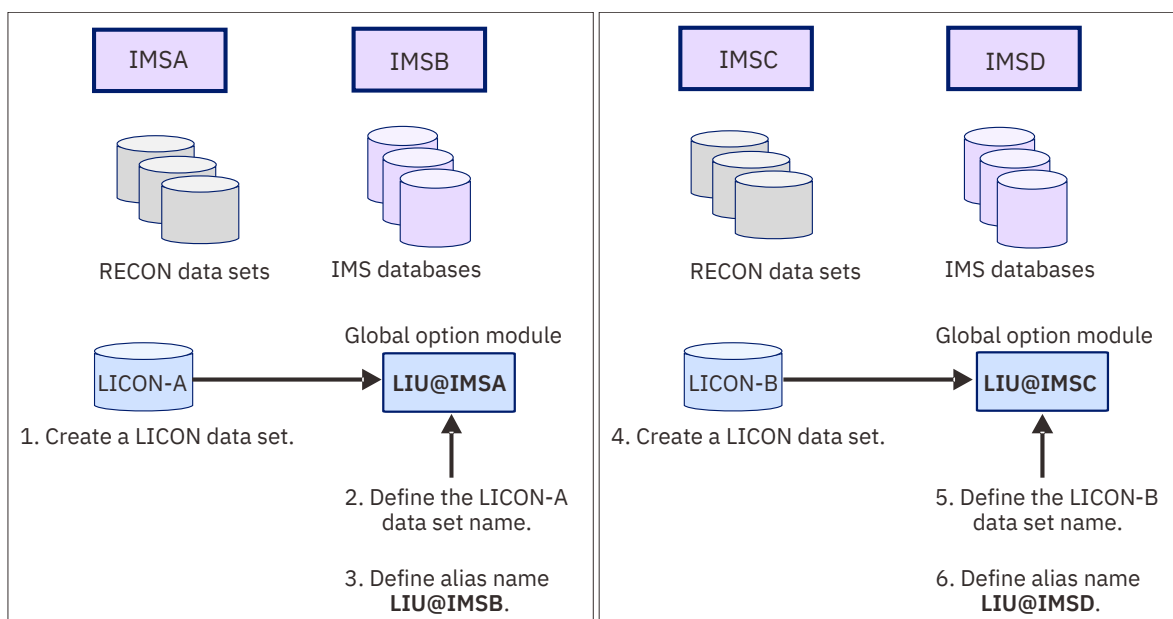


Figure 11: Integrity Checker configuration in multiple data-sharing environments

Multiple IMS subsystems configuration example: XRF complex

To use Integrity Checker in an XRF complex, the active IMS subsystems and the alternate IMS subsystems must use the same LICON data set. If they use different LICON data sets, the change log of the DMB is not inherited during takeover, and Integrity Checker might not detect the DMB inconsistency or might deny DBRC authorization even though the correct DBDLIB or ACBLIB is used.

If the number of active IMS subsystems is one, the number of required LICON data set is also one. The name of the global option module is LIU@INST.

If multiple active IMS subsystems exist, define a LICON data set for each set of RECON data sets, and create one global option module for each LICON data set.

For example, in an XRF complex shown in the following figure, create a global option module for each active IMS subsystem. Create LIU@IMS1 and LIU@IMS3, and then assign alias name LIU@IMS4 for LIU@IMS3.

Then, to apply the same runtime options to the active IMS subsystems and the alternate IMS subsystems, assign alias to the global option modules so that the alternate IMS subsystems can also use the same global option modules.

Specifically, IMS subsystems IMS1 and IMS2 are in a same XRF complex, so the two subsystems must use the same LICON data set. Therefore, assign alias name LIU@IMS2 for LIU@IMS1. IMS subsystems IMS5 and IMS6 are alternate IMS subsystems for IMS3 and IMS4, so all these subsystems must use the same LICON data set. Therefore, assign alias names LIU@IMS5 and LIU@IMS6 for LIU@IMS3.

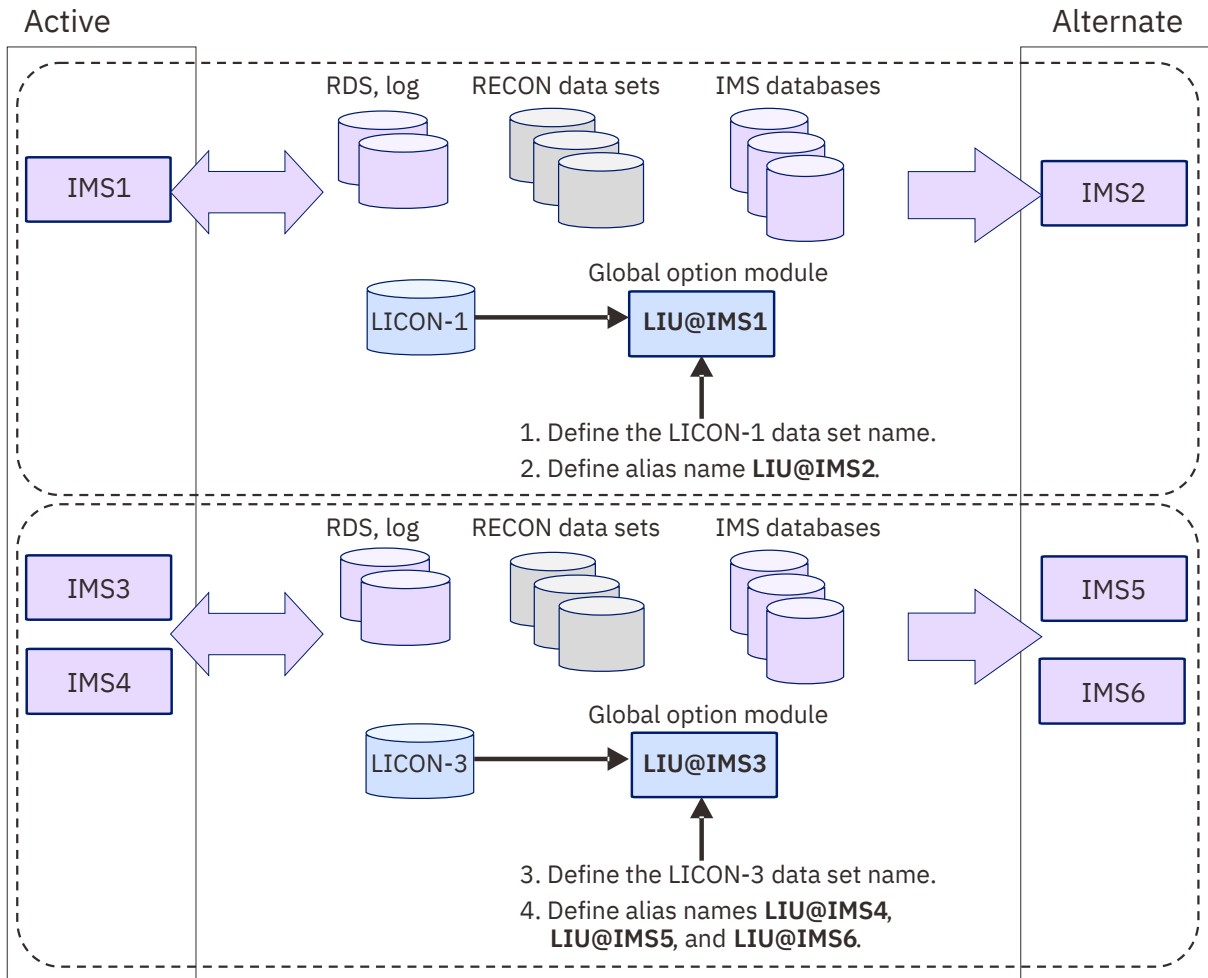


Figure 12: Integrity Checker configuration in an XRF complex

Runtime options and environments

RDEs contain runtime options for DMB verification. Some runtime options can be defined differently for each IMS processing environment.

How the runtime options are specified

The runtime options are commonly used across the environment that uses the global option module. The global default values that are applied to the options when creating new RDEs can be specified for each database.

The runtime options are defined in the global option module. You can specify the following runtime options:

- The data set name of the LICON data set
- DMB verification method (single-step or double-step)
- Routing codes and descriptor codes of Integrity Checker messages
- Option values to control the processing of Integrity Checker
- Global default values for the options used in creating new RDEs:
 - DMB verification option
 - Database access record option
 - Number of expired RDEs to maintain

You specify the option values in the global option module by using the global option module generation macro. The option values that you specify are copied to the RDE when an RDE is created.

Generally, you can use the option values without changing them, but by using the LICON utility, you can change the option values in RDEs after they are created. By changing the values, you can apply different options for each database. For more information about these options, see [“Global option module generation macro” on page 92](#).

How the runtime options are applied

Some runtime options can be set differently for each environment that Integrity Checker operates. Such options are referred to as *DMB verification options*.

DMB verification options control the processing and the action taken when a DMB mismatch is found. You can specify the options for each of the following IMS processing environments:

- Online IMS subsystem
- Batch program
- User load program
- Batch image copy utility
- Database recovery utility

For each environment, you can specify:

- Whether to activate DMB verification.
- Whether DMB verification sets a nonzero return code for the database authorization request to deny it, or only issues a warning message and registers the DMB to the LICON data set.

Using these options, you can control the behavior of DMB verification differently in each environment.

Recommendation: In all environments, set the option to deny the database authorization request when a DMB mismatch is found. By setting this option, you can prevent database corruption when an incorrect DBDLIB or ACBLIB is used.

Attention: Use the option *Only issue a warning message and register the DMB to the LICON data set* with caution. Use this option only when you intend to change the DBD, and you want the updated DBD reflected in the RDE so that the new DMB information is used in future DMB verifications. When this option is used, database corruption caused by use of an incorrect DBDLIB or ACBLIB cannot be prevented.

For example, if you want to use the DBD that is specified by a user load program for future DMB verifications, but you want to restrict DBD changes in other environments, you can have Integrity Checker issue a warning message and update the RDE in the user load program jobs, but deny database authorization when a DMB mismatch is found in other environments.

Historical data maintained in LICON data sets

Integrity Checker stores historical copies of RDEs in the LICON data sets. RDEs record database access logs for database update, load, and unload applications.

Historical copies of DBD definition

Integrity Checker maintains historical copies of RDEs. Each of these copies contains a part of the database description (DBD) that is used in DMB verifications. Whenever a DBD is changed, Integrity Checker creates a new RDE that contains the latest DMB information. The historical copies of RDEs can be used to track the changes made to DBDs.

The content of the current RDE and historical copies of RDEs can be printed in reports. You can use the reports to examine the information in DBDs, review the changes made to DBDs, or to compare the difference between the current DBD and the DBDs used in the past.

To print the content of an RDE in a report, use the LIST.DB command of the LICON utility. For more information, see the following topics:

- To print a report, see the topic "[LIST.DB command](#)" in the *IMS Library Integrity Utilities User's Guide*.
- For report field descriptions, see the topic "[Output from Integrity Checker](#)" in the *IMS Library Integrity Utilities User's Guide*.

Database access recording option

Integrity Checker records the timestamp of the last database access that is made by update, load, and unload applications in the RDE together with the IMS subsystem name. Such information can be printed in a report, which can be used as evidence in database auditing.

To record database accesses, make the specifications in the RDE by using the global option module or the LICON utility. To use the database access recording option, specify the option for each of the following database access types:

Database access	Access type identified by Integrity Checker
Load utility	Load access
Reorganization utility	Load access
Unload utility	Unload access
Recovery utility	Update access
Utility or application program with the PCB processing option (PROCOPT) of A, I, R, or D	Update access

For instructions to specify these options, see the following topics:

- To set the options in the global option module, see "[Global option module generation macro](#)" on page 92.
- To update the options in RDEs, see the topic "[INIT.DB command](#)" in the *IMS Library Integrity Utilities User's Guide*.

When Integrity Checker is activated in an IMS online environment, Integrity Checker records access information only for the first database authorization request, and the recorded time is not updated while the IMS online environment is active. To have the recorded information updated while the IMS online environment is active, the ACCESS parameter of the DATABASE macro statement must specify UP or EX (during the system definition stage), or the parameter for the /START DB ACCESS= command must specify UP or EX.

Restrictions: The database access recording option can be used for the utilities or the application programs that are supported by Integrity Checker. However, the following restrictions apply:

- This option is not effective for online reorganization functions or online reorganization utilities that are provided by IMS or IMS Tools.
- For a database access through the High-Speed DEDB Direct Reorganization utility, Integrity Checker identifies the database access type as a database update.
- Database access for load or unload operations is recorded only when the operations are done by IMS standard utilities or IMS Tools utilities.
- If a utility or an application program ends with an error after the Integrity Checker DMB verification process ends successfully, the database access information that is recorded in the RDE is updated in the same way as when the utility or the application program ended successfully, even though the utility or application program ended with an error.
- For index databases or secondary index databases that have no PCBs, Integrity Checker does not record database access information in the RDEs except when the database operation is done by IMS Database Reorganization Expert.

Considerations for activating Integrity Checker

Before you activate Integrity Checker, review these considerations.

Cases where DMB verification is not done

DMB verification is not done in certain environments or for certain application jobs. For more information, see the topic "[Restrictions: Cases where DMB verification is not done](#)" in the *IMS Library Integrity Utilities User's Guide*.

Size of the LICON data sets

Before creating LICON data sets, you can estimate the required storage for the LICON data sets. For more information, see "[Estimating the size of the LICON data set](#)" on page 81.

LICON data set serialization consideration

If you want more than one MVS™ system to access the LICON data set, you must serialize the LICON data set. To access the LICON data set from more than one MVS™ system, Global Resource Serialization (GRS) or a similar global enqueue product must be installed. For more information, see "[Serializing the LICON data set](#)" on page 86.

RACF® security considerations

If you want to protect the LICON data sets with RACF® or if you plan to use Integrity Checker in IMS Database Recovery Facility jobs, you must modify RACF® security. For more information, see "[Setting up RACF security](#)" on page 86.

Considerations when you alter the definition of an online HALDB or an online DEDB

When you alter the definition of an online HALDB database or an online DEDB database with the following IMS command or IMS utility, you must temporarily stop the DMB verification process.

- Use the INITIATE OLREORG command (with the ALTER option) and the online change (OLC) function to alter the definition of an online HALDB database.
- Use the DEDB Alter utility (DBFUDA00) to alter the definition of an online DEDB database.

After you alter the definition, restart the DMB verification process with new RDEs. Without these steps, the DMB verification process uses the old definitions to verify the DMBs. Therefore, the DMB verification process might deny database authorization requests that use correct IMS control blocks.

For detailed instructions, see the following topics in the *IMS Library Integrity Utilities User's Guide*:

- "[Altering the definition of a DMB verification-enabled online HALDB by using the HALDB alter function](#)"
- "[Altering the definition of a DMB verification-enabled online DEDB by using the DEDB Alter utility \(DBFUDA00\)](#)"

Consideration when you change the maximum size of OSAM data sets for a HALDB

When you change the maximum size of OSAM data sets for a HALDB from 4 GB to 8 GB or 8 GB to 4 GB, you must use the LICON utility and manually create RDEs to reflect the change for the DMB verification process. For more information, see the topic "[Changing the maximum OSAM data set size for a DMB verification-enabled HALDB](#)" in the *IMS Library Integrity Utilities User's Guide*.

Estimating the size of the LICON data set

Before you create LICON data sets, you can estimate the required storage for the LICON data sets.

About this task

Two methods are available for estimating the LICON data set size. The first method is more complicated but results in a precise data set size. The other method is simpler, but results in only an approximate data set size. You can use the simpler estimation method if the number of database segments is less than 20.

Tips:

- To accommodate any future increase in the number of databases, partitions, or DEDB areas, make the LICON data set size larger than the value that you calculate. For example, when you allocate a LICON data set, increase the calculated primary allocation size by 10% to 20%, and increase the secondary allocation size by approximately 10% of the primary allocation size.
- When you create multiple LICON data sets, you can create them on the same volume or on different volumes.

Procedure

- For each LICON data set, use one of the following methods to estimate the data set size:

Estimating the precise LICON data set size

Use the following formula to calculate the precise LICON data set size:

$$\text{LICON data set size} = \text{total_size_required_for_full-function_databases} \\ + \text{total_size_required_for_HALDBs} \\ + \text{total_size_required_for_DEDBs}$$

total_size_required_for_full-function_databases

The total size of all the full-function databases that are to be processed.

For each full-function database, calculate the required size by using the following formula:

$$(450 + 32 * \text{number_of_DSGs} + 52 * \text{number_of_segments} \\ + 180 * \text{access_info_size}) * 16$$

Note: DSG stands for data set group.

total_size_required_for_HALDBs

The total size of all the HALDB partitions that are to be processed.

For each HALDB partition, calculate the required size by using the following formula:

$$(450 + 32 * \text{number_of_DSGs} + 52 * \text{number_of_segments} \\ + 180 * \text{access_info_size}) * 16$$

total_size_required_for_DEDBs

The total size of all the DEDB areas that are to be processed.

For each DEDB area, calculate the required size by using the following formula:

$$(220 + 48 * \text{number_of_segments} + 180 * \text{access_info_size}) * 16$$

Notes:

- If you do not enable the database access recording option (activated by the RECUPD, RECLD, or RECL keyword in the global option module), *access_info_size* is 0. When this option is enabled, *access_info_size* increases by 1 for each keyword that you specify. For example, if you enable the RECUPD option (one keyword), *access_info_size* is 1. If you enable RECUPD and RECLD options (two keywords), *access_info_size* is 2. For instructions to activate this option, see [“Global option module generation macro” on page 92](#).
- For these formulas, the units are in bytes.
- Each formula is multiplied by 16 for storing histories of database definitions.

Estimating the approximate LICON data set size

Use the following formula to calculate the approximate LICON data set size:

$$\text{LICON data set size} = (32 * \text{number_of_full-function_databases} \\ + 32 * \text{number_of_HALDB_partitions} \\ + 16 * \text{number_of_DEDB_areas}) \text{ KB}$$

number_of_full-function_databases

The number of full-function databases (excluding HALDBs) that are to be processed.

number_of_HALDB_partitions

The number of HALDB partitions that are to be processed.

number_of_DEDB_areas

The number of DEDB areas that are to be processed.

Activating Integrity Checker

Activating Integrity Checker involves preparing the global option modules, LICON data sets, and LIU load modules, and other steps.

Before you begin

Before you activate Integrity Checker, plan an Integrity Checker configuration for your environment, as described in [“Planning for Integrity Checker configuration” on page 71](#).

About this task

To activate Integrity Checker, you first prepare the global option modules and the LICON data sets. Then, by using the DBD library, ACB library, or IMS directory, register the DMB information for your databases in the LICON data set. When this registration is done, customize the LIU load modules by using either of the following methods:

- Create an alias of the DSPCRTR0 module and add DD statements to JCL or procedures of DBRC, IMS batch application, IMS utility, and IMS Tools (recommended method).
- Merge load modules into the IMS SDFSRESL library.

Finally, activate Integrity Checker by restarting IMS online and running IMS batch applications, IMS utilities, and IMS Tools jobs.

In both IMS batch and online environments, the steps to activate Integrity Checker are the same. These steps can be applied when you reactivate Integrity Checker after Integrity Checker is deactivated.

Procedure

- To activate Integrity Checker, complete the following steps:
 - a. [“Setting up the global option modules” on page 83](#)
 - b. [“Setting up the LICON data sets” on page 84](#)
 - c. [“Setting up RACF security” on page 86](#)
 - d. [“Customizing LIU load modules” on page 88](#)
 - e. [“Configuring for a BPE-based DBRC environment” on page 91](#)
 - f. [“Verifying that Integrity Checker is activated” on page 92](#)
 - g. [“Restarting IMS online and running IMS batch application, IMS utility, and IMS Tools jobs” on page 92](#)

Setting up the global option modules

Create global option modules and, optionally, assign alias names to the global option modules. At least one global option module must be present when Integrity Checker is started because Integrity Checker uses it to obtain the name of the LICON data set that it uses.

Before you begin

See [“Integrity Checker configuration requirements” on page 72](#) and determine the number of global option modules to create. Also, determine whether to share a global option module across multiple IMS subsystems.

Procedure

1. Create global option modules.

To create global option modules, use the FABLPGEN procedure and provide the control statements by using the SYSIN input stream. The FABLPGEN procedure is in the SHPSSAMP data set. For an instruction, see [“Global option module generation macro” on page 92](#).

Tip: To avoid activating Integrity Checker until all of your installation activities are complete, have no global option modules created.

Related reading: The topic "[Options applied to RDEs when multiple global option modules exist with different effective ranges](#)" in the *IMS Library Integrity Utilities User's Guide*.

2. If you want more than one IMS subsystems to use a set of options that are defined in a single global option module, use the linkage editor to assign an alias name to the global option module. In a database sharing environment where multiple IMS subsystems share databases, the LICON data set and option values that are defined in the global option module must be the same across the IMS subsystems. Assigning aliases is beneficial in such an environment as well as in XRF environments.

Use the following job to assign an alias name to the global option module.

```
//LKED JOB
//L EXEC PGM=IEWL,PARM='XREF,LIST'
//SYSPRINT DD SYSOUT=*
//SYSUT1 DD UNIT=(SYSDA,SEP=(SYSLMOD,SYSLIN)),
// SPACE=(1024,(100,10),RLSE),DISP=(,DELETE)
//SYSLMOD DD DISP=SHR,DSN=HPS.SHPSLMD0
//SYSLIN DD *
INCLUDE SYSLMOD(LIU@IMSA) /* Global option module for IMSID=IMSA */
ALIAS LIU@IMSB /* Alias for IMSID=IMSB */
NAME LIU@IMSA /* Original name for IMSID=IMSA */
/*
```

Setting up the LICON data sets

Define and initialize LICON data sets, create RDEs to register the correct DMB information, and serialize the LICON data sets. At least one LICON data set must be present to activate Integrity Checker.

Before you begin

See "[Integrity Checker configuration requirements](#)" on page 72 to determine the number of LICON data sets to create.

Procedure

- The following steps describe how to set up a single LICON data set. If more than one LICON data set is required for your environment, complete the following steps for each LICON data set.
 - a. "[Defining and initializing the LICON data set](#)" on page 84
 - b. "[Creating an RDE to register DMB information](#)" on page 85
 - c. "[Serializing the LICON data set](#)" on page 86

Defining and initializing the LICON data set

Define the LICON data set by using the DEFINE cluster command, and initialize it by using the INIT.LICON command of the LICON utility.

Procedure

1. Define the LICON data set by using the DEFINE CLUSTER command. Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the DEFLICON step of the sample JCL, which defines the LICON data set.

Specify the values for the following parameters. For the CYL parameter, specify the size that you calculated in "[Estimating the size of the LICON data set](#)" on page 81.

```
//DEFLICON EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DELETE (imshlq.licondsn) CLUSTER ERASE PURGE
SET MAXCC=0
DEFINE CLUSTER (NAME(imshlq.licondsn) -
INDEXED -
KEY (44 0) -
SHR(3 3) -
NOREUSE -
VOL (liconvol) -
CYL (pri sec) -
RECSZ (4096 32760) -
FREESPACE (xx xx) -
DATA(NAME(imshlq.licondsn.DATA)) -
INDEX(NAME(imshlq.licondsn.INDEX))
/*
```

2. Initialize the LICON data set by using the INIT.LICON command of the LICON utility. Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the INILICON step of the sample JCL, which initializes the LICON data set.

Add the load module data sets that contain the global option module and the LIU load module library to the STEPLIB concatenation.

```
//INILICON EXEC PGM=FABLIU00
//STEPLIB DD DISP=SHR,DSN=HPS.SHPSLMD0
// DD DISP=SHR,DSN=IMSVS.SDFSRESL
//FABLPRNT DD SYSOUT=*
//FABLIN DD *
INIT.LICON
/*
```

Creating an RDE to register DMB information

Create an RDE to register the correct DMB information by using the LICON utility.

About this task

This task is optional because if you do not create an RDE with the LICON utility, Integrity Checker creates an RDE automatically when the database is accessed for the first time after Integrity Checker is activated. In this case, Integrity Checker creates an RDE for each database that is accessed while IMS is online. Therefore, the performance of IMS online processing might decline depending on the number of databases. Consider creating RDEs manually by using the LICON utility to avoid performance degradation.

If you want Integrity Checker to create RDEs automatically, you can skip this task.

Procedure

- Use the LICON utility to create an RDE. Ensure that you provide the following information with the JCL statements:
 - Specify the DBD library, the ACB library, or the IMS directory that contains the DMB information to be used in DMB verifications.
 - To verify the user exit routine, add the data set that contains the user exit routine to be used in DMB verifications to the STEPLIB concatenation.

Provide the INIT.DB command in the FABLIN input stream. The RDE is created in the LICON data set that is specified by the global option module found in the STEPLIB concatenation.

The following JCL example is for the LICON utility. INIT.DB DBD(*) specifies that an RDE is created for every DBD member in the DBD library IMSVS.DBDLIB.

```
//LICJOB JOB
// EXEC PGM=FABLIU00
//STEPLIB DD DISP=SHR,DSN=HPS.SHPSLMD0
// DD DISP=SHR,DSN=IMSVS.SDFSRESL
```

```
//DBDLIB DD DISP=SHR,DSN=IMSVS.DBDLIB
//FABLPRNT DD SYSOUT=*
//FABLIN DD *
INIT.DB DBD(*)
/*
```

Serializing the LICON data set

If you want more than one MVS™ system to access the LICON data set, you must serialize the LICON data set. This step is optional.

Procedure

- To access the LICON data set from more than one MVS™ system, you must install Global Resource Serialization (GRS) or a similar global enqueue product. GRS processes the resource as a global resource. The global enqueue product must propagate the enqueues to all MVS™ hosts. If the enqueues are not propagated to all hosts that have access to the LICON data set, the data set becomes corrupted and unusable.

The LICON data set is enqueued with the following parameters at the SYSTEMS level:

<i>Table 39: Enqueuing parameters for LICON data set</i>	
Parameter	Value
QNAME	'FABLICON'
RNAME	The name of the LICON data set

Setting up RACF® security

You can optionally set up RACF® security to protect LICON data sets. If you plan to activate Integrity Checker in IMS Database Recovery Facility jobs and if DBRC command and API request authorization support is enabled with RACF®, ensure that appropriate permission is given to users.

Procedure

- Complete the following steps to set up RACF® security:
 - [“Setting up security for LICON data sets” on page 86](#)
 - [“Setting up security for IMS Database Recovery Facility jobs” on page 87](#)

Setting up security for LICON data sets

If you want to protect the LICON data sets with RACF®, complete this step. This step is optional.

About this task

The following procedure provides a brief overview of the security setting for LICON data sets.

For more information about the security setting of the started tasks, see the topics that describe how to associate started procedures and jobs with user IDs in the *z/OS® Security Server RACF® System Programmers Guide* and in the *z/OS® Security Server RACF® Security Administrators Guide*.

Procedure

- To use RACF® to protect the LICON data sets, define data set profiles for the LICON data sets. Also, because LICON data sets are accessed in each environment, consider the following requirements in both IMS online environment and batch environment.

IMS online environment

For IMS online processing, access to the LICON data set is done by the DBRC region. In this case, the DBRC region must be assigned a user ID, preferably by using the RACF® STARTED class. This assignment can also be done by using the RACF® started task table (ICHRIN03) or the USER= and

PASSWORD= values on the DBRC job or the task JCL. Give UPDATE access authority to the LICON data set for the user ID assigned to the DBRC region. The following list contains an example of the statements that are used to create and enable LICON data set protection by using RACF®.

```
AG licongrp
AU liconusr DFLTGRP(licongrp)
RDEF STARTED dbrcrgn.* STDATA( USER(liconusr) GROUP(licongrp))
ADDSD liuhlq.licon UACC(NONE)
PE liuhlq.licon ID(licongrp) ACCESS(UPDATE)
```

AG *licongrp*

Creates a RACF® group named *licongrp*.

AU *liconusr* DFLTGRP(*licongrp*)

Creates a RACF® user ID of *liconusr* and assigns the default group *licongrp*.

RDEF STARTED *dbrcrgn. STDATA(USER(*liconusr*) GROUP(*licongrp*))**

Defines the STARTED class profile, which will assign the user ID to the *dbrcrgn* procedure. This statement assumes that the PDS member name of the procedure that is started is *dbrcrgn*. This statement assigns user ID *liconusr* to the started procedure.

ADDSD *liuhlq.licon* UACC(NONE)

Defines a data set profile for the LICON data set.

PE *liuhlq.licon* ID(*licongrp*) ACCESS(UPDATE)

Gives the *licongrp* group UPDATE access to the LICON data set.

Batch environment

The user ID created for the DBRC online region cannot be used because jobs can be submitted by many different users. The user ID will be used if the ID is correctly assigned through the use of the RACF® STARTED class by coding entries for job names in the STARTED class and associating those entries with the user ID. However, the STARTED class is used only when the batch jobs are started with the MVS™ START command. Jobs submitted to a JES reader will not invoke a call to the STARTED class. Therefore, they might not be assigned a user ID that allows appropriate access to the LICON data set. In this case, all users authorized to run batch jobs must be identified and connected to a group that has UPDATE access to the LICON data set.

Setting up security for IMS Database Recovery Facility jobs

If you plan to activate Integrity Checker in IMS Database Recovery Facility jobs, complete this step.

Procedure

- When you activate Integrity Checker in an IMS Database Recovery Facility job, Integrity Checker uses the DBRC command utility and the DBRC API. If you protect the DBRC command and DBRC API request authorization support with RACF® by permitting appropriate user access to the profiles, you must permit appropriate users of jobs to use the following DBRC commands and DBRC API requests:

DBRC command

LIST.RECON

DBRC API requests

- STARTDBRC
- STOPDBRC
- RELBUF
- QUERY,TYPE=DB
- QUERY,TYPE=PART

For more information about the RACF® settings for DBRC commands and DBRC API requests, see the topic "DBRC security" in *IMS System Administration*.

Customizing LIU load modules

Customize the LIU load modules to activate Integrity Checker.

Before you begin

See "[LIU load module library customization](#)" on page 71 to determine which method you use to customize the LIU load modules.

Procedure

- Customize the LIU load modules by using either of the following methods:
 - "[Method 1. Customizing LIU load modules by creating alias name DSPCRTR0](#)" on page 88
 - "[Method 2. Customizing LIU load modules by merging into the IMS SDFSRESL library](#)" on page 90

Method 1. Customizing LIU load modules by creating alias name DSPCRTR0

Create an alias name DSPCRTR0, APF-authorize the LIU load module library, and add DD statements to JCL and procedures of DBRC, IMS batch applications, IMS utilities, and IMS tools.

Procedure

1. Create alias name DSPCRTR0 by link-editing the FABLRTR0 load module. Complete this step if either of the following conditions apply:
 - You are activating Integrity Checker for the first time.
 - You removed the alias name DSPCRTR0 by completing the steps in the topic "[Deactivating Integrity Checker when IMS Library Integrity Utilities is installed as a component of an IMS tools solution pack](#)" in the *IMS Library Integrity Utilities User's Guide* and you want to reactivate Integrity Checker.
If you are reactivating Integrity Checker and the DSPCRTR0 alias that was created in the last activation still exists, you can skip this step.

You can use the following JCL example to create alias name DSPCRTR0. This JCL is in the SHPSJCL0 library, member FABLALSC.

When the job ends, confirm that the return code is 0.

```
//FABLALSC JOB
//*-----
/* STEP1: Add the alias DSPCRTR0
//*-----
//LINK EXEC PGM=IEWL,REGION=0M,
// PARM='SIZE=(880K,64K),LET,LIST,NCAL,RENT,REFR,XREF'
/* IEWL = IEWBLink
/*
//SYSPRINT DD SYSOUT=*
//SYSLMOD DD DISP=OLD,DSN=LIU.SHPSLMD0 LIU target load module lib
//SYSUT1 DD UNIT=SYSDA,SPACE=(CYL,(10,1))
/* CAUTION!!!
/* SPECIFY SHPSLMD0 TO THE INCLUDE STATEMENT.
/* IF YOU SPECIFY AHPSMOD0 TO THE INCLUDE STATEMENT,
/* THE NON-ACCEPTED CHANGES WILL BE DELETED.
//SYSLIN DD *
ENTRY FABLRTR0
INCLUDE SYSLMOD(FABLRTR0)
ALIAS DSPCRTR0
NAME FABLRTR0(R)
/*
```

2. APF-authorize the LIU load module library. The LIU load module library and the load module data sets that contain the global option modules must be APF-authorized.

3. Add DD statements to JCL and procedures of DBRC, IMS batch applications, IMS utilities, and IMS tools. You must add DD statements to JCL and cataloged procedures for all the jobs that you want to activate Integrity Checker in. These JCL and procedures include those for DBRC, IMS batch applications, IMS utilities, and IMS Tools jobs that update IMS databases.

Important: For integrity, ensure that all JCL and procedures that might change databases meet the following STEPLIB DD requirements.

Add the following DD statements:

STEPLIB DD

Add the load module data sets that contain the global option module and the LIU load module library to the STEPLIB concatenation.

The LIU load module library must be concatenated before the IMS load module library and must be APF-authorized.

If you want Integrity Checker to detect changes in the logic of IMS user exits, which include randomizing routines, segment edit/compression exit routines, and HALDB or DEDB partition selection exit routines, also include the exit load modules in the STEPLIB concatenation. Integrity Checker does not check the user exit load modules in the LPA, ELPA, or LNKLST.

FABLPRNT DD

Optionally, you can specify the FABLPRNT DD statement in your procedures. This statement causes Integrity Checker to generate messages in the DD.

If this statement is specified, Integrity Checker writes messages into this DD in addition to issuing the WTO macro. Each message contains a timestamp in its prefix, and you can easily identify the messages in relation to the authorization request from your application programs.

FABLSNAP DD

Optionally, you can specify the FABLSNAP DD statement in your online DBRC procedure. This statement causes Integrity Checker to generate diagnostic information for the VSAM control blocks when Integrity Checker gets a VSAM error. For DL/I batch jobs, you do not need to specify this DD statement because the jobs issue an abend dump when they get a VSAM error.

The following figures show examples of the procedures.

Figure 13: Example of DBRC procedure for a non-BPE-based DBRC region

```
//          PROC RGN=64M,DPTY=' (14,15) ',SOUT=A,
//          IMSID=SYS3,SYS2=,IMSPLEX=
//IEFPROC EXEC PGM=DFSMVRC0,REGION=&RGN,
//          DPTY=&DPTY,PARM=' DRC,&IMSID,IMSPLEX=&IMSPLEX '
//*****
//*
//STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR      <<---- STEPLIB DD
//          DD DSN=IMS.&SYS2.SDFSRESL,DISP=SHR
//PROCLIB DD DSN=IMS.&SYS2.PROCLIB,DISP=SHR
//JCLOUT DD SYSOUT=(A,INTRDR)
//JCLPDS DD DSN=IMS.&SYS2.PROCLIB,DISP=SHR
//SYSUDUMP DD SYSOUT=&SOUT
//SYSABEND DD SYSOUT=&SOUT
//FABLPRNT DD SYSOUT=&SOUT                  <<---- FABLPRNT DD
//FABLSNAP DD SYSOUT=&SOUT                  <<---- FABLSNAP DD
```

Figure 14: Example of DBRC procedure for a BPE-based DBRC region

```
//DBRC     PROC RGN=0M,SOUT=A,
//          RESLIB='IMS.SDFSRESL',
//          BPECFG=BPECONFIG,
//          DBRCINIT=000,
//          IMSID=IMS1,
//          PARM1='BPEINIT=DSPBINI0'
//*
//DBRCPROC EXEC PGM=BPEINI00,REGION=&RGN,
//          PARM='BPECFG=&BPECFG,DBRCINIT=&DBRCINIT,IMSID=&IMSID,&PARM1'
//*
```

```

//STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR <<---- STEPLIB DD
// DD DSN=&RESLIB,DISP=SHR
// DD DSN=SYS1.CSSLIB,DISP=SHR
//PROCLIB DD DSN=IMS.PROCLIB,DISP=SHR
//SYSPRINT DD SYSOUT=&SOUT
//SYSUDUMP DD SYSOUT=&SOUT
//JCLOUT DD SYSOUT=(A,INTRDR)
//JCLPDS DD DSN=IMS.PROCLIB,DISP=SHR
//SYSABEND DD SYSOUT=&SOUT
//FABLPRNT DD SYSOUT=&SOUT <<---- FABLPRNT DD
//FABLSNAP DD SYSOUT=&SOUT <<---- FABLSNAP DD

```

Figure 15: Example of DLIBATCH procedure

```

// PROC MBR=TEMPNAME,PSB=,BUF=7,
// SPIE=0,TEST=0,EXCPVR=0,RST=0,PRLD=,
// SRCH=0,CKPTID=,MON=N,LOGA=0,FMTO=T,
// IMSID=,SWAP=,DBRC=,IRLM=,IRLMNM=,
// BKO=N,IOB=,SSM=,APARM=,
// RGN=4M,
// SOUT=A,LOGT=2400,SYS2=,
// LOCKMAX=,GSGNAME=,TMINAME=,
// IMSPLEX=
//G EXEC PGM=DFSRR00,REGION=&RGN,
// PARM=(DLI,&MBR,&PSB,&BUF,
// &SPIE&TEST&EXCPVR&RST,&PRLD,
// &SRCH,&CKPTID,&MON,&LOGA,&FMTO,
// &IMSID,&SWAP,&DBRC,&IRLM,&IRLMNM,
// &BKO,&IOB,&SSM,'&APARM',
// &LOCKMAX,&GSGNAME,&TMINAME,
// &IMSPLEX)
//STEPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR <<---- STEPLIB DD
// DD DSN=IMS.&SYS2.SDFSRESL,DISP=SHR
// DD DSN=IMS.&SYS2.PGMLIB,DISP=SHR
//DFSRESLB DD DSN=IMS.&SYS2.SDFSRESL,DISP=SHR
//IMS DD DSN=IMS.&SYS2.PSBLIB,DISP=SHR
// DD DSN=IMS.&SYS2.DBDLIB,DISP=SHR
//PROCLIB DD DSN=IMS.&SYS2.PROCLIB,DISP=SHR
//IEFRDER DD DSN=IMSLOG,DISP=(,KEEP),VOL=(,,99),
// UNIT=(&LOGT,,DEFER),
// DCB=(RECFM=VB,BLKSIZE=4096,
// LRECL=4092,BUFNO=2)
//IEFRDER2 DD DSN=IMSLOG2,DISP=(,KEEP),VOL=(,,99),
// UNIT=(&LOGT,,DEFER,SEP=IEFRDER),
// DCB=(RECFM=VB,BLKSIZE=4096,
// LRECL=4092,BUFNO=2)
//SYSUDUMP DD SYSOUT=&SOUT,
// DCB=(RECFM=FBA,LRECL=121,BLKSIZE=605),
// SPACE=(605,(500,500),RLSE,,ROUND)
//IMSMON DD DUMMY
//FABLPRNT DD SYSOUT=&SOUT <<---- FABLPRNT DD

```

Method 2. Customizing LIU load modules by merging into the IMS SDFSRESL library

Back up the IMS SDFSRESL library, and then merge the LIU load modules into the IMS SDFSRESL library.

Procedure

1. Back up the IMS SDFSRESL library.
When program temporary fixes (PTFs) are released for the DSPCRTR0 module, you must restore the DSPCRTR0 module from the backup to apply the PTFs. Therefore, before merging LIU load modules, you must create a backup of the IMS SDFSRESL library. The backup is also required to deactivate Integrity Checker.
2. Use SMP/E to apply and accept IMS and IMS Library Integrity Utilities maintenance, and ensure that both are at the latest maintenance level.
3. Run the FABLUMD1 job that is in the SHPSJCL0 JCL library.
This job updates the SMP/E CSI of IMS. It runs SMP/E RECEIVE/APPLY of USERMOD to install the FABLRTRO module into the IMS SDFSRESL library. The FABLUMD1 job is shown in [“JCL example to install the FABLRTRO module into the IMS SDFSRESL library”](#) on page 91.
4. Merge the LIU load modules (FABL* members) in the target library SHPSLMD0 into the IMS SDFSRESL library.

If this step is not done, when Integrity Checker is activated, an ABENDU0109 load failure occurs for the required LIU load modules.

JCL example to install the FABLRTR0 module into the IMS SDFSRESL library

```
//FABLUMD1 JOB
//*-----
/** STEP1: SMP/E RECEIVE/APPLY usermod ZZLIU01 to IMS CSI
//*-----
//STEP1 EXEC procedure name of IMS SMP/E job
/**
/**
//AHPSMOD0 DD DISP=SHR,DSN=LIU.AHPSMOD0
/**
//SMPPTFIN DD DATA,DLM=@@
++USERMOD(ZZLIU01) /* LIU R2 USERMOD */
REWORK(2004058) /* */
/* */
/* OPTIONAL LIU USERMOD FOR IMS-DBRC FMIDS. */
/* APPLY THIS USERMOD TO IMS-DBRC SMP/E CSI ONLY IF YOU WANT TO */
/* INSTALL LIU-MODIFIED VERSION OF DSPCRTR0 INTO YOUR IMS SMP/E */
/* CSI. */
/* */
/* BEFORE APPLYING THIS USERMOD, ALL MAINTENANCE FOR IMS-DBRC */
/* DSPCRTR0 MUST BE ACCEPTED OR RESTORED. */
/* */
++VER(P115) /* IMS SYSTEM ID/FMID */
FMID(FMID of IMS) /* */
/* */
++JCLIN CALLLIBS /* JCLIN FOR LIU MODULES */
/* */
//LINK EXEC PGM=IEWL,REGION=0M,
// PARM='SIZE=(880K,64K),LET,LIST,NCAL,RENT,REFR,XREF'
//SYSPRINT DD SYSOUT=A
//AHPSMOD0 DD DISP=OLD,DSN=LIU.AHPSMOD0
//ADFSLOAD DD DISP=OLD,DSN=IMS.ADFSLOAD
//SYSLMOD DD DISP=OLD,DSN=IMS.SDFSRESL
//SYSUT1 DD UNIT=SYSDA,SPACE=(CYL,(10,1))
//SYSLIN DD *
INCLUDE AHPSMOD0(FABLRTR0)
INCLUDE ADFSLOAD(DSPCRTR0)
ENTRY FABLRTR0
NAME DSPCRTR0(R)
/*
++MOD (FABLRTR0) LKLIB(AHPSMOD0) /* LIU MODULE MOD ENTRY */
@@
//SMPCNTL DD *
SET BDY (GLOBAL).
RECEIVE S (ZZLIU01) SYSMODS.
SET BDY (TZONE name of IMS).
APPLY S (ZZLIU01).
/*
```

Configuring for a BPE-based DBRC environment

To activate Integrity Checker in an IMS online environment that has a BPE-based DBRC region, you must configure the members of the IMS PROCLIB data set. This step is required only when a BPE-based DBRC is used.

Procedure

1. Set up the BPE configuration parameter member.
Specify the DBRC user exit list member by using the EXITMBR statement in the BPE configuration parameter member. The BPE configuration parameter member is specified by the BPECFG= keyword in the DBRC procedure that is used for the BPE-based DBRC region in which you want to activate Integrity Checker.

You can skip this step if the EXITMBR statement for the DBRC user exit list member already exists.

The following example specifies the EXITMBR statement in a BPE configuration parameter member:

```
#
# User exit list PROCLIB member specification
#
EXITMBR=(member_name,DBRC) /* DBRC user exit list member */
```

For more information about the EXITMBR statement, see the topic "BPE configuration parameter member of the IMS PROCLIB data set" in *IMS System Definition*.

2. Set up the DBRC user exit list member.
Specify the Integrity Checker load module FABLBINO on the EXITDEF statement. The FABLBINO module must be specified as a DBRC Request exit in the DBRC user exit list member. The DBRC user exit list member is specified by the EXITMBR statement for DBRC in the BPE configuration parameter member.
 - When you have two or more DBRC user exits, the FABLBINO module must be specified as the first member on the EXITDEF statement.
 - Do not specify the ABLIM parameter on the EXITDEF statement.

The following example specifies the Integrity Checker load module on the EXITDEF statement:

```
*****
* DBRC USER EXIT LIST PROCLIB MEMBER *
*****
#-----#
# DEFINE a DBRC request user exit. #
#-----#
EXITDEF (TYPE=REQUEST, EXITS=(FABLBINO), COMP=DBRC)
```

For information about the EXITDEF statement, see the topic "BPE exit list members of the IMS PROCLIB data set" in *IMS System Definition*.

Verifying that Integrity Checker is activated

IMS Library Integrity Utilities provides sample JCL for verifying successful activation of Integrity Checker. You can modify the sample JCL and then use it to ensure that Integrity Checker is running correctly.

About this task

This task is optional. Complete this task only if you want to ensure that Integrity Checker is activated.

Procedure

- In the SHPSJCL0 library, locate sample JCL member FABLIVP3. Modify the sample JCL by following the instructions in the sample JCL and submit the JCL. Ensure that the job ends without errors.

Restarting IMS online and running IMS batch application, IMS utility, and IMS Tools jobs

When you have done all the steps, you are ready to restart IMS online to activate the DMB verification process.

Procedure

1. Restart IMS online and run IMS batch application jobs, IMS utility jobs, and IMS Tools jobs.
2. Confirm that the DMB verification process is activated by locating the following WTO message:

```
FABL0114I LIU INTEGRITY CHECKER ACTIVATED. IMS VERSION IS version
```

Global option module generation macro

Use the global option module generation macro to create global option modules.

Creating global option modules

To activate Integrity Checker, create at least one global option module that contains the name of the LICON data set. If you want to change the default options of Integrity Checker globally, specify them when you create this module.

About this task

IBM® does not supply global option modules. You must create at least one global option module before invoking Integrity Checker.

Procedure

- To create a global option module, determine the type of the global option module, then use the FABLPGEN procedure (provided in the SHPSSAMP data set) to create it. Runtime options can be defined by using the SYSIN control statements. There are two levels of global option modules that can be categorized by their effective range: installation level and IMS subsystem level.

Installation level

To set values that will be effective at the installation level, create a global option module named LIU@INST. The values in this module apply to all the databases that are defined in the IMS environment.

IMS subsystem level

To set values that will be effective at the IMS subsystem level, create a global option module named LIU@*imsid*, where *imsid* is the 4-character ID of the IMS subsystem. The values that you set in this module apply to all the databases that are defined to that IMS subsystem. In accordance with the options assignment rule, they override the values that are set in the LIU@INST module.

Tip: If you want more than one IMS subsystems to use a set of options that are defined in a single global option module, create a global option module for the IMS subsystem level and use the linkage editor to assign an alias to that global option module.

In a database sharing environment where more than one IMS subsystem shares databases, the LICON data set and option values defined in the global option module must be the same across the IMS subsystems. Assigning an alias is beneficial in such a case as well as in XRF environments. For information about how to assign an alias name, see [“Setting up the global option modules” on page 83](#).

In environments where a LICON data set is used across multiple IMS subsystems, assigning an alias name for the global option module to apply the same runtime options for all IMS IDs is a good practice. However, if you want to set runtime options for each IMS ID, instead of assigning an alias name to the global option module, you can create one global option module for each IMS ID. In such a case, except for certain control statement keywords, the keyword parameters must be the same. You can set different parameters for the following control statement keywords:

- VERIFY=
- MSGROUT=
- MSGDESC=
- VERIFLMT=
- RDEBUILD=
- INITERR=

When you create global option modules, name the modules LIU@*xxxx*. At sign (@) is a code-page-dependent character. If you are working in an environment where you cannot use the at sign (@), name the modules LIUG*xxxx*. Use either format for all the global option modules consistently because maintaining both LIU@*xxxx* and LIUG*xxxx* modules can cause confusion. If Integrity Checker finds both LIU@*imsid* and LIUG*imsid* in the same effective range level, Integrity Checker ignores LIUG*imsid* and uses LIU@*imsid*.

JCL requirements for the FABLPGEN program

The following JCL requirements must be met to create a global option module with the FABLPGEN program.

Subsections:

- [“EXEC statement” on page 94](#)
- [“DD statements” on page 94](#)
- [“Control statement keywords” on page 94](#)
- [“Example” on page 98](#)

EXEC statement

The EXEC statement must be in the following form.

```
//stepname EXEC FABLPGEN,MBR=module,SOUT=x
```

MBR=

Specifies the name of the global option module. *module* is LIU@INST, LIUGINST, LIU@*imsid*, or LIUG*imsid*.

SOUT=

Specifies the SYSOUT class to be used for SYSPRINT DD.

DD statements

Code the following DD statements to identify the source of input and the placement of output information:

SYSLIB DD

This statement specifies the macro library (SHPSMACO) provided by IMS Library Integrity Utilities, or one of IMS tools solution packs. This library contains the FABLPGEN macro.

SYSIN DD

This statement specifies the input control statement stream.

SYSMOD DD

This statement specifies the output data set for global option modules. If you merge the Integrity Checker load modules into the IMS SDFSRESL library, specify the IMS SDFSRESL library for this DD statement. Otherwise, specify the Integrity Checker load module library for this DD statement. You can create global option modules in a different library. If you do so, concatenate that library to the STEPLIB DD in JCL and cataloged procedures for all the jobs from which you want to activate Integrity Checker.

Control statement keywords

The control statement formats are as follows:

FABLPGEN

The IBM® supplied macro for use in defining the global option module. The syntax of the parameter specifications of this macro is the same as the syntax of an ordinary assembler macro statement. You must specify the statement label for the FABLPGEN macro. For the statement label, specify the name of the global option module, which is LIU@INST, LIUGINST, LIU@*imsid*, or LIUG*imsid* (in the example in [“Figure: JCL for creating a global option module LIU@INST” on page 98](#), LIU@INST beginning at column 1.)

LICON=

Specifies the name of the LICON data set. No system default value is provided for this parameter.

VERIFY=

Specifies the method for verifying the DMBs; either SNGL or DBLE. SNGL specifies single-step verification and DBLE specifies double-step verification. The system default value for this parameter is SNGL. You can choose either of the following two options for how Integrity Checker verifies the DMB of a full-function database against the DMB information registered in the RDE. Specify your choice in the global option module.

Single-step verification

Integrity Checker verifies all elements at once. This method is more reliable than the double-step method, but slower.

Double-step verification

Integrity Checker verifies the version ID of the DMB in the first step. Version ID is the 13-character timestamp of when the DBD was created or the character string that is specified on the VERSION= keyword of the DBD statement that was supplied for DBDGEN. If the version IDs are not the same, Integrity Checker proceeds to the next step to verify other elements. This method is faster than the single-step method, but less reliable.

For DEDBs, single-step verification is always applied.

Recommendation: Specify single-step verification. If you experience a performance problem, consider using double-step verification.

MSGROUT=

Specifies the message routing codes for write-to-operator (WTO) messages issued by Integrity Checker. You can specify values in the range of 1 - 16. The system default value for this parameter is (2,7,11).

MSGDESC=

Specifies the message descriptor codes for write-to-operator (WTO) messages issued by Integrity Checker. The system default value for this parameter is (7).

VERIFYLMT=

Specifies the maximum number of the mismatch messages to be issued for a DMB. For example, specifying 3 means Integrity Checker does not issue more than three mismatch messages for a DMB. You can specify any number in the range of 0 - 99. 0 specifies that verification is to be done but no mismatch message issued. 99 specifies that the number of messages is unlimited. The system default value for this parameter is 10.

RDEBUILD=

Specifies whether Integrity Checker automatically creates an RDE. The system default value for this parameter is Y.

Y

If no current RDE exists for a DEDB area, a non-HALDB full-function database, or a HALDB partition, Integrity Checker automatically creates an RDE during the first access to it.

N

Even when no current RDE exists for a DEDB area, a non-HALDB full-function database, or a HALDB partition, Integrity Checker does not create an RDE during the first access to it.

INITERR=

Specifies whether Integrity Checker abnormally ends, or issues a warning message and stops its processing, when the initialization of Integrity Checker fails. The system default value for this parameter is A.

This option is not effective in an IMS online subsystem that has a BPE-based DBRC region. If you specify this option for such an environment, Integrity Checker stops processing, and the IMS online subsystem continues processing.

A

If the initialization of Integrity Checker fails, it ends abnormally together with the IMS online subsystem that has a non-BPE-based DBRC region or the IMS batch job.

W

If the initialization of Integrity Checker fails, it issues a warning message and stops its processing. The IMS online subsystem or the IMS batch job continues processing without the Integrity Checker function. However, Integrity Checker ends abnormally if errors occur before the effective value for this option is decided. Such errors are load failures of the following modules:

- FABLRTR x (x : 8, 9, A, B, C, or D)
- FABLWMO
- FABLAIO
- Global option module

CHECKON=

Specifies the verification option for online IMS subsystems. The system default value for this parameter is (Y,D). You can specify the following options:

Y

Check. If you specify Y, you can specify either of the following parameters:

D

If a mismatch is found, deny authorization to use the database.

W

Issue a warning message and create a new RDE.

N

Do not check.

CHECKBAT=

Specifies the verification option for batch jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y

Check. If you specify Y, you can specify either of the following parameters:

D

If a mismatch is found, deny authorization to use the database.

W

Issue a warning message and create a new RDE.

N

Do not check.

CHECKLD=

Specifies the verification option for user load program jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y

Check. If you specify Y, you can specify either of the following parameters:

D

If a mismatch is found, deny authorization to use the database.

W

Issue a warning message and create a new RDE.

N

Do not check.

CHECKIC=

Specifies the verification option for batch image copy jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y

Check. If you specify Y, you can specify either of the following parameters:

D

If a mismatch is found, deny authorization to use the database.

W

Issue a warning message and create a new RDE.

N

Do not check.

CHECKRV=

Specifies the verification option for database recovery jobs. The system default value for this parameter is (Y,D). You can specify the following options:

Y

Check. If you specify Y, you can specify either of the following parameters:

D

If a mismatch is found, deny authorization to use the database.

W

Issue a warning message and create a new RDE.

N

Do not check.

CHKRAND=

Specifies whether to verify changes in randomizing routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y

Check.

N

Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKCOMP=

Specifies whether to verify changes in segment edit/compression routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y

Check.

N

Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKPSEL=

Specifies whether to verify changes in HALDB partition selection exit routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y

Check.

N

Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

CHKFPSEL=

Specifies whether to verify changes in DEDB partition selection exit routines by checksum. The system default value for this parameter is N. You can specify the following options:

Y

Check.

N

Do not check.

If CHECKON, CHECKBAT, CHECKLD, CHECKIC, or CHECKRV is set to Y, this specification is effective in each IMS environment.

GENMAX=

Specifies the maximum number of expired RDEs to be kept in the LICON data set for use in recoveries. The system default value for this parameter is 0 (do not keep expired RDEs). A maximum of 15 RDE copies can be kept.

RECUPD=

Specifies whether to record database update access information. The system default value for this parameter is N. You can specify the following options:

Y

Record.

N

Do not record.

RECLD=

Specifies whether to record database load access information. The system default value for this parameter is N. You can specify the following options:

Y

Record.

N

Do not record.

RECU=

Specifies whether to record database unload access information. The system default value for this parameter is N. You can specify the following options:

Y

Record.

N

Do not record.

Example

Sample JCL is in the SHPSJCL0 library, member FABLINIT. The following figure shows the CREGOM step of the sample JCL, which creates global option module LIU@INST.

The name of a global option module can be LIU@INST, LIU@*imsid*, LIUGINST, or LIUG*imsid*. Replace LIU@INST in the JCL example to create a module with one of these names.

Figure 16: JCL for creating a global option module LIU@INST

```
//CREGOM EXEC FABLPGEN,MBR=LIU@INST,SOUT=A
//C.SYSLIB DD DISP=SHR,DSN=HPS.SHPSMAC0
//C.SYSIN DD *
LIU@INST FABLPGEN VERIFY=SNGL,          single step verification           X
          MSGROUT=(2,7,11),            WTO message routing codes           X
          MSGDESC=(7),                  WTO message descriptor codes        X
          VERIFYLMT=5,                  max number of mismatch messages     X
          CHECKON=(Y,D),                 verification option - online         X
          CHECKBAT=(Y,D),                verification option - batch          X
          CHECKLD=(Y,D),                 verification option - load           X
          CHECKIC=(Y,D),                 verification option - image copy     X
          CHECKRV=(Y,D),                 verification option - recovery       X
          GENMAX=3,                      max number of expired RDE kept      X
          LICON=imshlq.licondsn
          END
/*
//L.SYSLMOD DD DISP=SHR,DSN=HPS.USERLIB(&MBR)
```

Setting up IMS Administration Tool

IMS Administration Tool provides a comprehensive set of functions and features that can help you with the day-to-day tasks associated with managing IMS environments efficiently and effectively. If you want to use IMS Administration Tool, you must complete configuration for IMS Administration Tool.

Procedure

- The configuration steps are described in the [IMS Administration Tool User's Guide and Reference](#). Follow these steps and complete the configuration for IMS Administration Tool.

Setting up the ISPF interfaces

Three components of IMS Database Solution Pack provide ISPF interfaces: IMS HALDB Toolkit, IMS HP Pointer Checker (DB Historical Data Analyzer utility), and Database Repair Facility.

About this task

- If you want to use IMS HALDB Toolkit as an ISPF application or use the ISPF interface of IMS HALDB Toolkit, you must set up the ISPF interface. For instructions, see [“Setting up the ISPF interface for IMS HALDB Toolkit” on page 99](#).
- If you want to use the DB Historical Data Analyzer utility in the TSO/ISPF environment, you must set up the ISPF interface of IMS HP Pointer Checker. For instructions, see [“Setting up the ISPF interface for DB Historical Data Analyzer \(IMS HP Pointer Checker\)” on page 101](#).

The ISPF interface of Database Repair Facility can be used without customization.

Setting up the ISPF interface for IMS HALDB Toolkit

If you want to run IMS HALDB Toolkit as an ISPF application, you must define a VSAM KSDS data set to prepare the ISPF environment definition data set, and then configure your CLIST file to start the ISPF panel of IMS HALDB Toolkit.

Procedure

1. Locate the sample JCL, IHCKSDS, in the SHICSAMP data set and modify the JCL statements. This sample JCL creates and initializes a VSAM KSDS data set for the ISPF environment definition data set, and creates an ISPF base environment module that defines the name of the ISPF environment definition data set.
 - a. To create and initialize the VSAM KSDS data set, change *your_ksds_data_set* to the VSAM KSDS data set name for your environment.

```
//*=====
/*          Define Environment KSDS data set
/*=====
//S1      EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN   DD *
DELETE  your_ksds_data_set
SET MAXCC=0
DEFINE CLUSTER(NAME(your_ksds_data_set) -
              INDEXED KEYS(16,0) RECSZ(2026,4080) -
              CISZ(4096) VOL(yyyyyy) CYLINDER(3 1) )
/*=====
/*          Initialize Environment KSDS data set
/*=====
//S2      EXEC PGM=IHCYUTIL
//STEPLIB DD DISP=SHR,DSN=$dbsp.SIHCLOAD
//TRACE   DD DUMMY
//MSGPRINT DD SYSOUT=*
//KSDSDD  DD DISP=SHR,DSN=your_ksds_data_set
//IHCSYSIN DD *
          RUN      PGM(IHCYKSDS)
//
```

- b. To create an ISPF base environment module that defines the name of the ISPF environment definition data set, modify the JCL statements as follows:
 - Change *ISPF_environment_definition_data_set* to your ISPF environment definition data set name, which is the name of the VSAM KSDS data set that you specified in Step [a](#).
 - Change *your_program_library* to the program library that you want the ISPF base environment module to be created.

```
//C      EXEC PGM=ASMA90,
//          PARM='LIST,RENT,DECK,NOOBJ'
//SYSPRINT DD SYSOUT=*
//SYSLIB  DD DSN=SYS1.MACLIB,DISP=SHR
```

```

//SYSUT1 DD SPACE=(CYL,(2,2)),UNIT=SYSDA
//SYSPUNCH DD DSN=&&OBJ,SPACE=(CYL,(1,1)),
// UNIT=SYSDA,DISP=(MOD,PASS),
// DCB=(BLKSIZE=2400,LRECL=80,RECFM=FB)
//SYSIN DD *
=====
* Environment definition dataset name
=====
MACRO
ENVIR &DSN=
IHCWENVR CSECT
IHCWENVR AMODE 31
IHCWENVR RMODE ANY
DC CL44'&DSN'
MEND

* +-----+
* | Environment KSDS dataset name
* +-----+
ENVIR DSN=ISPF_environment_definition_data_set
END

/*
//L EXEC PGM=HEWL,PARM='XREF,LIST',COND=(4,LE,C)
//SYSPRINT DD SYSOUT=*
//SYSLIB DD DISP=SHR,DSN=$dbsp.SIHCLOAD
//SYSLMOD DD DISP=SHR,DSN=your_program_library
//SYSUT1 DD SPACE=(CYL,(5,2)),
// UNIT=SYSDA
//SYSLIN DD DSN=&&OBJ,DISP=(OLD,DELETE)
// DD *
NAME IHCWENVR(R)
//

```

c. Submit the job.

2. Make sure that all users who work with IMS HALDB Toolkit have update authority for the ISPF environment definition data set.
3. Configure the CLIST file so that it starts the ISPF panel interface of IMS HALDB Toolkit. The sample CLIST file is provided as IHCCHAL in SIHSSAMP.

Copy the sample CLIST file to your ISPF CLIST library and modify it.

```

PROC 0
ISPEXEC CONTROL ERRORS RETURN
/*-----*/
/* Allocate ISPF libraries */
/*-----*/
ISPEXEC LIBDEF ISPLLIB DATASET ID('your_ispf_clist_library'), +
($dbsp.SIHCLOAD')
ISPEXEC LIBDEF ISPPLIB DATASET ID('$dbsp.SIHCSPANL')
ISPEXEC LIBDEF ISPMLIB DATASET ID('$dbsp.SIHCMESSG')
ISPEXEC LIBDEF ISPSLIB DATASET ID('$dbsp.SIHCSEKEL')
/*-----*/
/* Run DFSHALDB EXEC */
/*-----*/
ISPEXEC SELECT CMD(IHCWISPF) NEWAPPL(IHC) PASSLIB
SET &RC = &LASTCC
IF &RC /= 0 THEN DO
WRITE 'RETURN CODE IS &RC '
END
/*-----*/
/* Deallocate ISPF libraries */
/*-----*/
ISPEXEC LIBDEF ISPSLIB
ISPEXEC LIBDEF ISPMLIB
ISPEXEC LIBDEF ISPPLIB
ISPEXEC LIBDEF ISPLLIB
END
//

```

4. Issue the following command to ensure that the IMS HALDB Toolkit ISPF main panel starts:

```
ex 'your_ISPF_CLIST_data_set_name(IHCCHAL)'
```

Setting up the ISPF interface for DB Historical Data Analyzer (IMS HP Pointer Checker)

The ISPF interface of the DB Historical Data Analyzer utility must be customized before it can be used. To use the ISPF interface, complete the following steps.

Procedure

Complete these steps to set up the DB Historical Data Analyzer ISPF interface:

1. Modify the logon procedure.
 - a. Ensure that the Graphical Data Display Manager (GDDM®) library can be accessed as a PDS library by the TSO terminal user.
Unless the GDDM® target library is specified as a link library, you must change the existing, or define a new, TSO logon procedure to contain a STEPLIB DD statement that refers to the GDDM® program library (GDDMLOAD). For more information, see the GDDM® products documentation.
 - b. Concatenate the IMS HP Pointer Checker data sets for panels and messages with the corresponding ISPF/PDF data sets. Also, allocate the IMS HP Pointer Checker data set for programs in the ISPF link library (ddname ISPLLIB) in your TSO logon procedure.
For example, specify as follows:

```
//ISPLIB DD DSN=HPS.SHPSMLIB,DISP=SHR
//      DSN=ISP.SISPMENU,DISP=SHR
//ISPLIB DD DSN=HPS.SHPSPLIB,DISP=SHR
//      DSN=ISP.SISPMENU,DISP=SHR
//ISPLIB DD DSN=HPS.SHPSLMD0,DISP=SHR
```

- c. If you use ISPPALT and ISPMALT for DBCS, allocate the IMS HP Pointer Checker data set to ISPPALT and ISPMALT.

For more information about ISPF, see the *z/OS® ISPF User's Guide, Volume 1*.

You can also allocate these data sets by coding appropriate TSO ALLOCATE commands. By using this method, you do not need to modify your TSO logon procedure. In this case, you must allocate the data sets before you invoke ISPF.

2. Modify the command list (CLIST).
DB Historical Data Analyzer provides a sample command list (CLIST) to allocate data sets and to invoke DB Historical Data Analyzer. This sample CLIST is named FABGCMDO and is provided in the SHPSCLIB data set. You might need to copy this sample CLIST to your command procedure data set and modify it to meet your installation requirements.
3. Modify the ISPF/PDF Primary Option Menu panel.
You can modify the ISPF Primary Option Menu panel (ISR@PRIM) to add an entry so that you can invoke DB Historical Data Analyzer by a selection code.

The following sample ISPF Primary Option Menu has been modified to invoke DB Historical Data Analyzer by selecting option D. This option starts processing by invoking a command procedure. The FABGCMDO CLIST can be used to start the dialog processing.

```
%----- ISPF/PDF PRIMARY OPTION MENU -----
%OPTION ==>_ZCMD
%
% 0 +ISPF PARMS - Specify terminal and user parameters +USERID - &ZUSER
% 1 +BROWSE - Display source data or output listings +TIME - &ZTIME
% 2 +EDIT - Create or change source data +TERMINAL - &ZTERM
% 3 +UTILITIES - Perform utility functions +PF KEYS - &ZKEYS
% 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 +LM UTILITIES- Perform library administrator utility functions
% 9 +IBM PRODUCTS- Additional IBM program development products
% C +CHANGES - Display summary of changes for this release
% D +DBHDA - Invoke DB Historical Data Analyzer dialog
% 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       */
  VPUT (ZHTOP,ZHINDEX) PROFILE
)PROC
&ZQ = &Z
IF (&ZCMD = ' '
  &ZQ = TRUNC(&ZCMD, '.')
  IF (&ZQ = ' '
    .MSG = ISRU000
    &ZSEL = TRANS( &ZQ
      0, 'PANEL(ISPOPTA)'
      1, 'PGM(ISRBRO) PARM(ISRBRO01)'
      2, 'PGM(ISREDIT) PARM(P,ISREDM01)'
      3, 'PANEL(ISRUTIL)'
      4, 'PANEL(ISRFPA)'
      5, 'PGM(ISRJB1) PARM(ISRJPA) NOCHECK'
      6, 'PGM(ISRPTC)'
      7, 'PGM(ISRYXDR) NOCHECK'
      8, 'PANEL(ISRLPRIM)'
      9, 'PANEL(ISRDIIS)'
      C, 'PGM(ISPTUTOR) PARM(ISR00005)'
      D, 'CMD(FABGCMD0)'
      T, 'PGM(ISPTUTOR) PARM(ISR00000)'
      , , , ,
      X, 'EXIT'
      *, '?' )
    &ZTRAIL = .TRAIL
  )END
)END

```

Troubleshooting

Use these topics to diagnose and correct problems that you experience with IMS Database Solution Pack.

While you customize IMS Database Solution Pack, IMS Database Solution Pack components issue messages to help you track progress and to inform you when errors occur. For an explanation of the messages, refer to the corresponding product's user guide. See [“Product documentation and updates” on page 26](#).

Topics:

- [“Gathering diagnostic information” on page 103](#)

Gathering diagnostic information

Before you report a problem with IMS Database Solution Pack to IBM® Software Support, you need to gather the appropriate diagnostic information.

Procedure

- Provide the following information for all IMS Database Solution Pack problems:
 - A clear description of the problem and the steps that are required to re-create the problem.
 - The version of IMS and the version of the operating system that you are using.
 - A complete log of the job.
 - The maintenance level of the product or the component.
If the product in error supports the Diagnostics Aid program, run the Diagnostics Aid program to generate a Load Module/Macro APAR Status report. Provide the report when you contact IBM® Software Support. For information about creating a Load Module/Macro APAR Status report, see the documentation of the individual products.

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