

IBM IMS Database Utility Solution for z/OS
2.1

*IMS High Availability Large Database
Toolkit User's Guide*



Note:

Before using this information and the product it supports, read the information in [“Notices” on page 361.](#)

Fourth Edition (December 2021)

This edition applies to Version 2.1 of IBM IMS Database Utility Solution for z/OS IMS High Availability Large Database Toolkit (program number 5698-DUL) and to all subsequent releases and modifications until otherwise indicated in new editions.

This edition replaces SC27-8779-02.

© **Copyright International Business Machines Corporation 2002, 2021.**

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

- About this information..... vii**

- Part 1. Introduction to IMS HALDB Toolkit..... 1**

 - Chapter 1. IMS HALDB Toolkit overview..... 3
 - What's new in IMS HALDB Toolkit.....3
 - IMS HALDB Toolkit features and benefits.....6
 - Usage and restrictions.....8
 - Considerations for the IMS management of ACBs..... 9
 - Service updates and support information..... 11
 - Product documentation and updates..... 11
 - Accessibility features..... 12

- Part 2. Simulating HALDBs.....13**

 - Chapter 2. Simulating HALDB using ANALYZEPART..... 15
 - ANALYZEPART data flow..... 15
 - Simulating conversion to a HALDB..... 16
 - Simulating repartitioning of a HALDB..... 17
 - Simulating conversion or repartitioning using unloaded data sets as input..... 18
 - ANALYZEPART DD statements.....19
 - ANALYZEPART command parameters..... 22
 - ANALYZEPART examples..... 34
 - ANALYZEPART example: Specifying the number of partitions 34
 - ANALYZEPART example: Specifying the partition size..... 35
 - ANALYZEPART example: Specifying the key ranges for partitions.....35
 - ANALYZEPART example: Generating DBRC commands..... 36
 - ANALYZEPART example: Using unloaded data sets as input..... 38
 - ANALYZEPART example: Generating DBD source..... 40

- Part 3. Converting to a HALDB.....43**

 - Chapter 3. Converting to HALDB using CONVERT.....45
 - CONVERT data flow..... 45
 - Converting databases offline..... 46
 - CONVERT DD statements.....47
 - CONVERT command parameters..... 51
 - CONVERT examples..... 72
 - CONVERT example: Specifying the number of partitions 73
 - CONVERT example: Specifying the partition size..... 73
 - CONVERT example: Specifying the key ranges for partitions..... 74
 - CONVERT example: Preparing a staging data set before converting a database when the IMS management of ACBs is enabled..... 76
 - CONVERT example: Converting a database when the IMS management of ACBs is enabled..... 77
 - CONVERT example: Generating DBRC commands..... 78

- Part 4. Maintaining HALDBs..... 79**

 - Chapter 4. Maintaining HALDB using MAINTAIN..... 81
 - MAINTAIN data flow..... 81

Maintaining databases offline.....	82
MAINTAIN DD statements.....	83
MAINTAIN command parameters.....	86
How the MAINTAIN function works when adding, deleting, naming partitions, and how to use a KEYSORDR(Y) parameter.....	105
Adding or deleting partitions.....	106
How to use a KEYSORDR(Y) parameter.....	109
Assigning partition names.....	111
MAINTAIN examples.....	112
MAINTAIN example: Specifying the number of partitions	112
MAINTAIN example: Specifying the partition size.....	113
MAINTAIN example: Specifying the key ranges for partitions.....	114
MAINTAIN example: Maintaining a database when the IMS management of ACBs is enabled	116
MAINTAIN example: Generating DBRC commands.....	116

Part 5. HALDB utilities..... 119

Chapter 5. Using DBRC enhancement utilities.....	121
Backing up DBRC definitions for HALDB DBD.....	121
BACKUPDBRC DD statements.....	122
BACKUPDBRC command parameters.....	124
Cloning DBRC definitions for test environments.....	125
COPYDBRC DD statements.....	128
COPYDBRC command parameters.....	130
Copying HALDBs to a different IMS system.....	134
Copying HALDBs by using an image copy.....	134
Copying HALDBs by using DFSMSdss.....	136
Chapter 6. Using the HALDB Analyzer.....	139
CHECK DD statements.....	141
CHECK command parameters.....	144
Chapter 7. Reorganizing a PSINDEX.....	157
REORGIND DD statements.....	157
REORGIND command parameters.....	160
Chapter 8. Splitting an unload file into single partition files.....	161
IHCUSPLT DD statements.....	162
IHCUSPLT command parameters.....	164
Chapter 9. Recovering by using the ILK reset utility.....	167
RESETILK DD statements.....	168
RESETILK command parameters.....	170
Chapter 10. Healing index pointers.....	171
PTRHEAL DD statements.....	172
PTRHEAL command parameters.....	174
Chapter 11. System utilities.....	175
Rebuilding DBD source from DBDLIB.....	175
IHCUDBD DD statements.....	176
IHCUDBD command parameters.....	178
Creating a PSB list for selected DBDs.....	178
IHCWPSBL DD statements.....	179
Creating OSAM multi-volume data sets.....	180
Listing VIO and unit names.....	181

Part 6. HALDB without DBRC.....	183
Chapter 12. HALDB without DBRC.....	185
Configuring HALDB for use without DBRC.....	185
Substituting data set names by using JCL.....	186
Substituting data set names by using ISPF or batch definitions.....	187
Global tables.....	187
Data set names.....	187
Substituting data set names by using the ISPF user interface.....	188
Substituting data set names by using batch functions.....	196
Converting non-HALDB DBDs to HALDB DBDs.....	202
Step 1. Converting non-HALDB DBDs to HALDB DBDs.....	202
Step 2. Converting non-HALDB data sets to HALDB data sets.....	203
Part 7. Application support.....	205
Chapter 13. Partition selection API.....	207
Chapter 14. Testing partition selection exits.....	209
PSEXIT DD statements.....	209
PSEXIT command parameters.....	212
Chapter 15. Loading logical children (PROCOPT=L).....	215
Chapter 16. Creating a DFSHALDB statement.....	217
IHCUDFSH DD statements.....	218
IHCUDFSH command parameters.....	220
Chapter 17. Loading a single partition.....	221
HALDBLOAD DD statements.....	221
HALDBLOAD command parameters.....	223
Chapter 18. Deleting a single partition.....	225
REORGIND DD statements.....	225
REORGIND command parameters.....	228
Chapter 19. Merging two databases into one HALDB.....	229
HALDBCOPY DD statements.....	230
HALDBCOPY command parameters.....	232
Part 8. Using the ISPF user interface.....	235
Chapter 20. Setting up the environment for the ISPF user interface.....	237
Starting the ISPF user interface.....	237
Creating an IMS environment.....	238
Creating projects.....	247
Deleting an environment.....	249
Chapter 21. Processing a project.....	251
Selecting a project.....	251
Processing a project using the Project Work panel.....	253
Ask me later.....	255
Creating and submitting JCL.....	255
Using SYNC points to halt or continue to the next phase of a project.....	256
Processing a project using a partition selection exit.....	258
IHCPSEL0 exit.....	258

Using a partition selection exit for conversion.....	259
Changing the DBDs.....	261
Creating partition boundaries.....	262
Specifying additional conversion options.....	265
Chapter 22. Converting to HALDB.....	267
Considerations for converting to HALDB.....	267
Converting to HALDB using the ISPF user interface.....	267
Chapter 23. Maintaining HALDB.....	271
Splitting or consolidating HALDB partitions.....	271
Selecting DBDs for maintenance.....	272
Selecting and maintaining partitions.....	273
Chapter 24. Creating JCL statements for database utilities.....	275
Chapter 25. Other ISPF utilities.....	277
Chapter 26. Using ISPF DBRC support functions.....	279
Showing partition definitions.....	279
Cloning DBRC definitions.....	280
Copying DBRC partitions.....	282
Backing up DBRC DBD definitions.....	283
Part 9. Reference.....	285
Chapter 27. Sample reports.....	287
MSGPRINT data set.....	287
Runtime Messages report.....	287
IHCLIST data set.....	287
Collect DBDs report.....	288
Runtime Options In Effect report.....	289
Unload report.....	290
HALDB Analyzer report.....	291
Partition Selection Exit report.....	297
Chapter 28. Contents of the sample library file (SIHCSAMP).....	299
Chapter 29. Performance tips and considerations.....	303
Part 10. Troubleshooting.....	305
Chapter 30. Messages and codes.....	307
Return and abend codes.....	307
Trace file or trace panel.....	307
ISPF messages.....	308
Batch messages.....	308
Chapter 31. Gathering diagnostic information.....	359
Notices.....	361
Index.....	365

About this information

IBM® IMS Database Utility Solution for z/OS® IMS High Availability Large Database Toolkit (formerly IBM IMS High Availability Large Database Conversion and Maintenance Aid for z/OS, and hereafter referred to as IMS HALDB Toolkit) provides application enabling features and system utilities for the improved management and operation of the IMS HALDB environment.

These topics provide instructions for using IMS HALDB Toolkit.

To use the procedures in this information, you must first install IMS HALDB Toolkit as described in the *Program Directory for IMS Database Utility Solution for z/OS, GI13-4194*, and then perform the postinstallation steps as described in the *IMS Database Utility Solution: Overview and Customization, SC27-8778*.

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

- Use IMS HALDB Toolkit to set up environments
- Define and process a conversion project
- Maintain IMS HALDB Toolkit
- Use the DBRC function for HALDBs
- Interpret reports issued by IMS HALDB Toolkit
- Troubleshoot IMS HALDB Toolkit problems

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

- The z/OS operating system
- ISPF

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
- Recent updates to the user guides, referred to as "Tech docs" ("See updates to this information!")
- Technical notes from IBM Software Support, referred to as "Tech notes"
- White papers that describe product business scenarios and solutions

Part 1. Introduction to IMS HALDB Toolkit

IBM IMS Database Utility Solution for z/OS IMS High Availability Large Database (HALDB) Toolkit (also referred to as IMS HALDB Toolkit) provides application enabling features and system utilities for the improved management and operation of the IMS HALDB environment.

Topic:

- [Chapter 1, “IMS HALDB Toolkit overview,” on page 3](#)

Chapter 1. IMS HALDB Toolkit overview

IMS HALDB Toolkit provides HALDB functions that can be used for HALDB maintenance and operation tasks. Product features include application enabling features and system utilities for the improved management and operation of the IMS HALDB environment.

A High Availability Large Database (HALDB) is a partitioned full-function DL/I database. The supported database organizations are PHDAM, PHIDAM, and PSINDEX.

IMS databases are escalating in size because of regulatory compliance requirements and because businesses are serving more customers and using more suppliers. 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.

IMS HALDB Toolkit helps you to maintain 24x7 data availability. The tool's application functions enable applications to make better use of the HALDB environment. The tool's system utilities provide capabilities that can help improve HALDB serviceability.

Topics:

- [“What's new in IMS HALDB Toolkit” on page 3](#)
- [“IMS HALDB Toolkit features and benefits” on page 6](#)
- [“Usage and restrictions” on page 8](#)
- [“Considerations for the IMS management of ACBs” on page 9](#)
- [“Service updates and support information” on page 11](#)
- [“Product documentation and updates” on page 11](#)
- [“Accessibility features” on page 12](#)

What's new in IMS HALDB Toolkit

This topic summarizes the technical changes for this edition.

New and changed information is indicated by a vertical bar (|) to the left of a change. 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.

SC27-8779-03 (December 2021)

Description	Related APARs
<p>IMS HALDB Toolkit has been enhanced to support encrypted OSAM database data sets. New and updated topics include:</p> <ul style="list-style-type: none">• “Usage and restrictions” on page 8• “CONVERT command parameters” on page 51• “MAINTAIN command parameters” on page 86• New messages “IHC01190I” on page 335, “IHC01191I” on page 335, “IHC01192E” on page 335, and “IHC01193E” on page 336	PH30210
<p>Explanations of the actions that users should take when invalid or duplicate ILKs are detected have been added. For more information, see Chapter 6, “Using the HALDB Analyzer,” on page 139.</p>	PH32843
<p>The MAINTAIN function has been enhanced to support the DBRCOUT option to generate DBRC statements, and the ANALYZEPART and MAINTAIN functions have been enhanced to support the combination of KEYSORDR(Y) and PARTNUM parameters. Also, explanations about how to use a KEYSORDR(Y) parameter have been added. New and updated topics include:</p> <ul style="list-style-type: none">• “ANALYZEPART command parameters” on page 22• “ANALYZEPART example: Generating DBRC commands” on page 36• “CONVERT data flow” on page 45• “CONVERT command parameters” on page 51• “CONVERT example: Generating DBRC commands” on page 78• “MAINTAIN data flow” on page 81• “MAINTAIN command parameters” on page 86• “How to use a KEYSORDR(Y) parameter” on page 109• “MAINTAIN example: Generating DBRC commands” on page 116• Updated message “IHC01163E” on page 331 and new message “IHC01311I” on page 338	PH38866
<p>A new parameter, SORTFSZ, has been added to ANALYZEPART, CONVERT, and MAINTAIN functions to specify the estimated number of database records for sort processing. Also, a new parameter, RELOAD.SORTHIDAM, has been added to CONVERT and MAINTAIN functions to specify whether to run the sort processing before loading a HIDAM or a PHIDAM. New and updated topics include:</p> <ul style="list-style-type: none">• “ANALYZEPART DD statements” on page 19• “ANALYZEPART command parameters” on page 22• “CONVERT DD statements” on page 47• “CONVERT command parameters” on page 51• “MAINTAIN DD statements” on page 83• “MAINTAIN command parameters” on page 86	PH40762

Description	Related APARs
<p>This APAR allows a PDF or PDSE data set with a member name to be specified in the <i>dbrcout</i> DD. New and updated topics include:</p> <ul style="list-style-type: none"> • “ANALYZEPART command parameters” on page 22 • “CONVERT command parameters” on page 51 • “MAINTAIN command parameters” on page 86 • New message “IHC01213E” on page 338 	PH41737

SC27-8779-02 (October 2020)

Description	Related APARs
<p>IMS HALDB Toolkit has been enhanced to support the IMS management of ACBs for some batch functions and ISPF functions. For more information, see “Considerations for the IMS management of ACBs” on page 9.</p>	PH22310

SC27-8779-01 (December 2019)

Description	Related APARs
<p>A new parameter, GDGLIMIT, has been added to CONVERT and MAINTAIN functions. For more information, see the following topics:</p> <ul style="list-style-type: none"> • “CONVERT command parameters” on page 51 • “MAINTAIN command parameters” on page 86 	PI99707
<p>New parameters, UNLSPAC and UNLUNIT, have been added to CONVERT and MAINTAIN functions. For more information, see the following topics:</p> <ul style="list-style-type: none"> • “CONVERT command parameters” on page 51 • “MAINTAIN command parameters” on page 86 	PH00721
<p>A post conversion step to remove dynamic allocation members has been added. For more information, see the following topics:</p> <ul style="list-style-type: none"> • “Converting databases offline” on page 46 • “Converting to HALDB using the ISPF user interface” on page 267 	PH01710
<p>The ANALYZEPART function has been enhanced to simulate HALDB conversion and report the structure of the converted DBD by printing DBD source (DBDGEN utility control statements). DBD source helps you understand the structure of the converted DBD and prevent unexpected conversion failure that may occur during HALDB conversion. For more information, see “ANALYZEPART example: Generating DBD source” on page 40.</p>	PH04245
<p>IMS HALDB Toolkit has been enhanced to support the IMS management of ACBs for batch functions. For more information, see “Considerations for the IMS management of ACBs” on page 9.</p>	PH10937
<p>IMS HALDB Toolkit has been enhanced to support encrypted VSAM database data sets and encrypted image copy data sets. For more information, see the following topics:</p> <ul style="list-style-type: none"> • “CONVERT command parameters” on page 51 • “MAINTAIN command parameters” on page 86 • “COPYDBRC command parameters” on page 130 	PH11848

Description	Related APARs
Information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs have been added. For more information, see Chapter 29, “Performance tips and considerations,” on page 303.	N/A

IMS HALDB Toolkit features and benefits

IMS HALDB Toolkit helps to administer databases through a HALDB conversion with ease and efficiency. IMS HALDB Toolkit helps reduce administrative costs by easing the conversion from full-function to HALDB and assisting in transporting HALDBs to IMS test systems.

In addition, IMS HALDB Toolkit provides the following features and functions:

- Batch conversion and maintenance offline

The database to be converted must have IMS dynamic allocation member (MDA) descriptions.

- Simulation of new partition settings and simulation of conversion from full-function database to HALDB
- JCL, created by DBDLIB conversion, to convert entire DBD libraries

DBDLIB conversion uses batch conversion to create JCL for each primary database.

- Offline reorganization of PSINDEX databases, including index pointer healing and reclaiming of VSAM space
- PSINDEX records of deleted partitions removed (DELETE PARTITION)

It is not necessary to rebuild the PSINDEX by scanning all partitions.

- Performance improvement because PSINDEX records are sorted and inserted sequentially (ADD PARTITION, using LOAD processing)
- Merge identical HALDBs and combine user-partitioned databases into one multi-partitioned HALDB (MERGE HALDB)

IMS HALDB Toolkit dynamically detects the existence of the following tools and uses the tools as needed:

- IMS High Performance Image Copy for z/OS
- IMS High Performance Load for z/OS
- IMS High Performance Pointer Checker for z/OS
- IMS High Performance Unload for z/OS
- IMS Library Integrity Utilities for z/OS

If any of these tools are unavailable on the system, IMS HALDB Toolkit replaces them with an appropriate IMS utility (if they are available).

Application support

IMS HALDB Toolkit provides the following support for applications:

Dynamic DFSHALDB statement build

Dynamic management of the DFSHALDB statement is allowed by providing a key for the starting partition and a key for the ending partition.

When you specify a key range, the utility transforms the key range into a starting and ending partition. Therefore, the application does not require a change when partitions are split or consolidated.

Partition Selection API

A callable interface is provided to assign a key to a partition.

This API allows applications to split their input on a partition boundary for parallel processing.

The API returns the partition name and the partition number. The API does not require a DL/I environment.

Converting to HALDB

IMS HALDB Toolkit supports the following functions to help you convert full-function databases to HALDBs:

Simulate conversion to a HALDB

Before you convert the full-function database, simulate the HALDB partition settings to determine the most effective partition settings.

Conversion to a HALDB

You can convert to HALDB using a single step batch process.

You can alternatively convert to HALDB using the ISPF user interface to generate all required steps. Help panels are available for IMS HALDB Toolkit functions while you are in an ISPF session.

Maintaining HALDBs

IMS HALDB Toolkit supports the following functions to help you maintain HALDBs:

Simulate repartitioning of a HALDB

Before you consolidate or split partitions, simulate the new partitions to determine the most effective partition settings. This utility simulates the effect of the new partition settings with ease.

Consolidate or split partitions

As the data grows or shifts, partitions grow or shrink. This utility allows you to consolidate or split partitions with ease.

Index Pointer Healer

After reorganizing the primary database, all secondary index pointers require healing (the new self healing with HALDB). However, this task might demand extra resources that could impact performance during peak time.

This utility heals the pointer offline and at a less expensive time.

Load a single partition

Databases with secondary indexes must insert the secondary indexes in random sequence when loading. This utility delays the index insert to the end of the load process, then loads the indexes in sequence.

This method improves the elapsed time.

Delete a single partition

When a single partition is deleted, the secondary indexes must be rebuilt. This utility deletes all records from the secondary indexes that reference the deleted partition.

The entire process is recoverable and fast.

Merge HALDBs

When user partitioning (multiple identical databases on different key ranges) has been used, the conversion will first transform the databases to HALDB, and then merge them together using this process.

This task is necessary when you require secondary indexing and was not possible when using multiple databases.

Add an empty partition to the end of a database

This function is appropriate for growth that occurs mainly at the end of an existing database.

DBRC handling

IMS HALDB Toolkit supports the following functions for DBRC handling:

Cloning DBRC definitions

The clone function replicates HALDB DBRC definitions to other RECONS and allows you to exchange the high-level data set name qualifier.

Copy a HALDB to a different IMS system

The copy function transfers a production HALDB to a different IMS and allocates the target data set in that system, if the data set is not already available.

Backup DBRC definitions

The backup function saves database-related DBRC definitions. The definitions can be used as input for the batch DBRC utility (DSPURX00).

For more information, see [Chapter 12, “HALDB without DBRC,” on page 185](#).

HALDB Analyzer

IMS HALDB Toolkit supports the HALDB Analyzer utility to help you analyze HALDBs:

Analyze HALDB constructs

This function analyzes the HALDB structure and verifies that all root keys are in the correct partition, that all ILKs are valid, and that all EPS pointers can find the correct ILE. Additionally, performance-related data is collected.

This utility can be used to check the health of a HALDB.

You can provide thresholds that trigger the utility to inform you when a maintenance function is required.

Extract root keys

This utility allows the extracting of all root keys to a sequential file. A record layout is provided.

System utilities

IMS HALDB Toolkit provides the following utilities to help you with database handling tasks:

Split unload file

This utility allows you to split an unload file into single partition unload files. The reloads then can run in parallel.

The single partition unload files are standard Hierarchical Direct (HD) unload files with header and trailer statistics.

Each file contains only records for the selected partition.

Indirect list key (ILK) rebuild

This utility enables you to rebuild all ILKs and their references, and allows you to resolve conflicting ILKs.

The databases must be offline for this activity.

ACBLIB reference

This utility provides a list of all PSBs that reference a given database, and assists in online changes by identifying which PSBs require change.

Create DBD source

This utility re-creates the DBD source statements from the DBDLIB.

Usage and restrictions

There are important usage and restrictions for the IMS HALDB Toolkit product.

Logical relationships and secondary indexes

IMS HALDB Toolkit converts databases and secondary indexes with the following logical relationships:

- Unidirectional logical relationships remain as unidirectional.
- Bidirectional logical relationships with physical pairing remain as bidirectional with physical pairing.

- Bidirectional logical relationships with virtual pairing are converted to bidirectional relationships with physical pairing.
- Shared secondary indexes are converted to single secondary indexes.
- Non-unique secondary indexes are converted to unique secondary indexes by adding the /SX field to the SUBSEQ parameters of the XDFLD.

A few installations have defined bidirectional logical relationships without any pairing even though this capability is not documented in the IMS product. IMS HALDB Toolkit does not support a conversion of these relationships to HALDB.

When running the CONVERT function as a batch job, DBDs with logical relationships (except for indexes) are not allowed. To convert DBDs with logical relationships, the ISPF interface must be used because the database and all logically related databases must be unloaded before the conversion can be done. Batch CONVERT does only one unload followed by one convert at a time. The ISPF interface can be used to construct the JCL such that all unloads are to be done before the conversion.

The CONVERT function does work for DBDs with logically related secondary indexes. The CONVERT function always converts the related non-HALDB Secondary Index to a HALDB Secondary Index (PSINDEX for example). This conversion from non-HALDB Secondary Index to a HALDB Secondary Index is so that the secondary index remains usable. If the secondary index is no longer required, one must remove it from the DBD and run DBDGEN again before running the CONVERT function.

Database limitations

The following limitations apply to IMS HALDB Toolkit database conversions:

- SHISAM, HSAM, and DEDB databases cannot be converted.
- HISAM databases are converted to PHIDAM.

The MAINTAIN function does not support HALDB M-V data sets.

The MAINTAIN function processes PSINDEXes only when the PSINDEXes are offline.

Restrictions for OSAM LDSs

- The CONVERT and MAINTAIN functions do not support image copy of VSAM linear data sets (OSAM LDSs) to DASD when the CI size of the data sets is 32K.
- The MAINTAIN function does not support the mixed use of OSAM sequential data sets and VSAM linear data sets (OSAM LDSs) as input DBDS.

Considerations for the IMS management of ACBs

When the IMS management of ACBs is enabled, IMS HALDB Toolkit can refer to database definitions in the IMS catalog directory instead of the DBD library.

When running batch functions (except a function to load logical children), IMS catalog definition is retrieved from either:

- The IMS Catalog Definition exit routine (DFS3CDX0) in the STEPLIB concatenation.
- The DFSDFxxx PROCLIB member specified by the DFSDF(yyy) parameter in IHCSYSIN and the PROCLIB DD statement.

A function to load logical children and ISPF functions only support the IMS Catalog Definition exit routine (DFS3CDX0).

The following conditions must be satisfied to use IMS managed ACBs:

- IBM IMS Tools Base for z/OS 1.6 or later must be installed.
- The IMS catalog database must be registered to the RECON data sets.
- The name of the IMS catalog database must be defined in the RECON record with the following DBRC command: CHANGE RECON CATALOG(*name*).

The following libraries must be in the STEPLIB concatenation of the IMS HALDB Toolkit job:

- If the DFSMDA member with the TYPE=CATDSHLQ statement is used to specify the high-level qualifier of the IMS catalog system data sets, the library that contains the DFSMDA member must be in the STEPLIB concatenation of the IMS HALDB Toolkit job.
- The SGLXLOAD library of IBM IMS Tools Base for z/OS 1.6 or later

The following libraries must be in the ISPLLIB of the CLIST for ISPF invocation when using the ISPF user interface:

- The SGLXLOAD library of IBM IMS Tools Base for z/OS 1.6 or later
- The IMS Catalog Definition exit routine (DFS3CDX0)
- IMS.RESLIB

The following functions do not support the IMS management of ACBs:

- Batch functions: IHCUDBD, IHCWPSBL and HALDBLOAD
- HALDB without DBRC
- ISPF functions:
 - 4 Convert from Full Function to HALDB
 - 5 Rebuild old DBD
 - 6 Rebuild old dataset allocation
 - 7 Rebuild old DBRC
 - 8 UNDO conversion
 - 5 Convert entire DBD library to HALDB
 - 8 Other Utilities
 - 1 Show DBD Source
 - 2 Reassemble DBD

The following restrictions apply when the IMS catalog database is specified on the DBD parameter:

- The IMS catalog is supported only by the ANALYZEPART function and the MAINTAIN function. No other function supports the IMS catalog.
- IMS DD must be specified.

If you want to convert full-function databases in an IMS managed ACBs environment, new database definitions must exist in the IMS catalog staging data sets before running the IMS HALDB Toolkit job.

The following restrictions apply when converting full-function databases in an IMS managed ACBs environment:

- When converting full-function databases by using the ISPF user interface, you must manually issue the IMPORT DEFN SOURCE(CATALOG) command to activate the pending database definition after the conversion.

For more information about converting full-function databases, see the following topics:

- [“Converting databases offline” on page 46](#)
- [“Considerations for converting to HALDB” on page 267](#)

For more information about maintaining a database, see [“MAINTAIN example: Maintaining a database when the IMS management of ACBs is enabled” on page 116.](#)

Service updates and support information

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

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

[IBM Support: IMS Database Utility Solution 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 Notifications 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
- Recent updates to the user guides, referred to as "Tech docs" ("See updates to this information!")
- Technical notes from IBM Software Support, referred to as "Tech notes"
- 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/>

Receiving documentation updates automatically

To automatically receive automated emails that notify you when new technote documents 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 <http://www.ibm.com/support/mysupport>
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 or any other IMS Tools information, you can take one of the following actions:

- Click the Feedback button at the top of the IBM Documentation topic that you are commenting on.
- Click the Contact Us tab at the bottom of any IBM Documentation topic.
- Send an email to ibmdocs@us.ibm.com. Be sure to include the book title, topic or section title, specific text, and your comment.

To help us respond quickly and accurately, please 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 HALDB Toolkit 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. See 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.

Part 2. Simulating HALDBs

By using the ANALYZEPART function, you can simulate HALDB partition settings to determine the effective partition settings.

The ANALYZEPART function is supported in batch mode and it can be used for offline databases.

With the ANALYZEPART function, you can:

- Simulate the HALDB partition settings before you convert a full-function database to a HALDB with the CONVERT function
- Simulate the new partition settings before you perform maintenance on HALDB partitions with the MAINTAIN function

Topic:

- [Chapter 2, “Simulating HALDB using ANALYZEPART,” on page 15](#)

Chapter 2. Simulating HALDB using ANALYZEPART

Use the **ANALYZEPART** command to simulate the effect of new partition settings or conversion from a full-function database to a HALDB in batch mode.

Topics:

- [“ANALYZEPART data flow” on page 15](#)
- [“Simulating conversion to a HALDB” on page 16](#)
- [“Simulating repartitioning of a HALDB” on page 17](#)
- [“Simulating conversion or repartitioning using unloaded data sets as input” on page 18](#)
- [“ANALYZEPART DD statements” on page 19](#)
- [“ANALYZEPART command parameters” on page 22](#)
- [“ANALYZEPART examples” on page 34](#)

ANALYZEPART data flow

The following figure shows the data flow for the ANALYZEPART function.

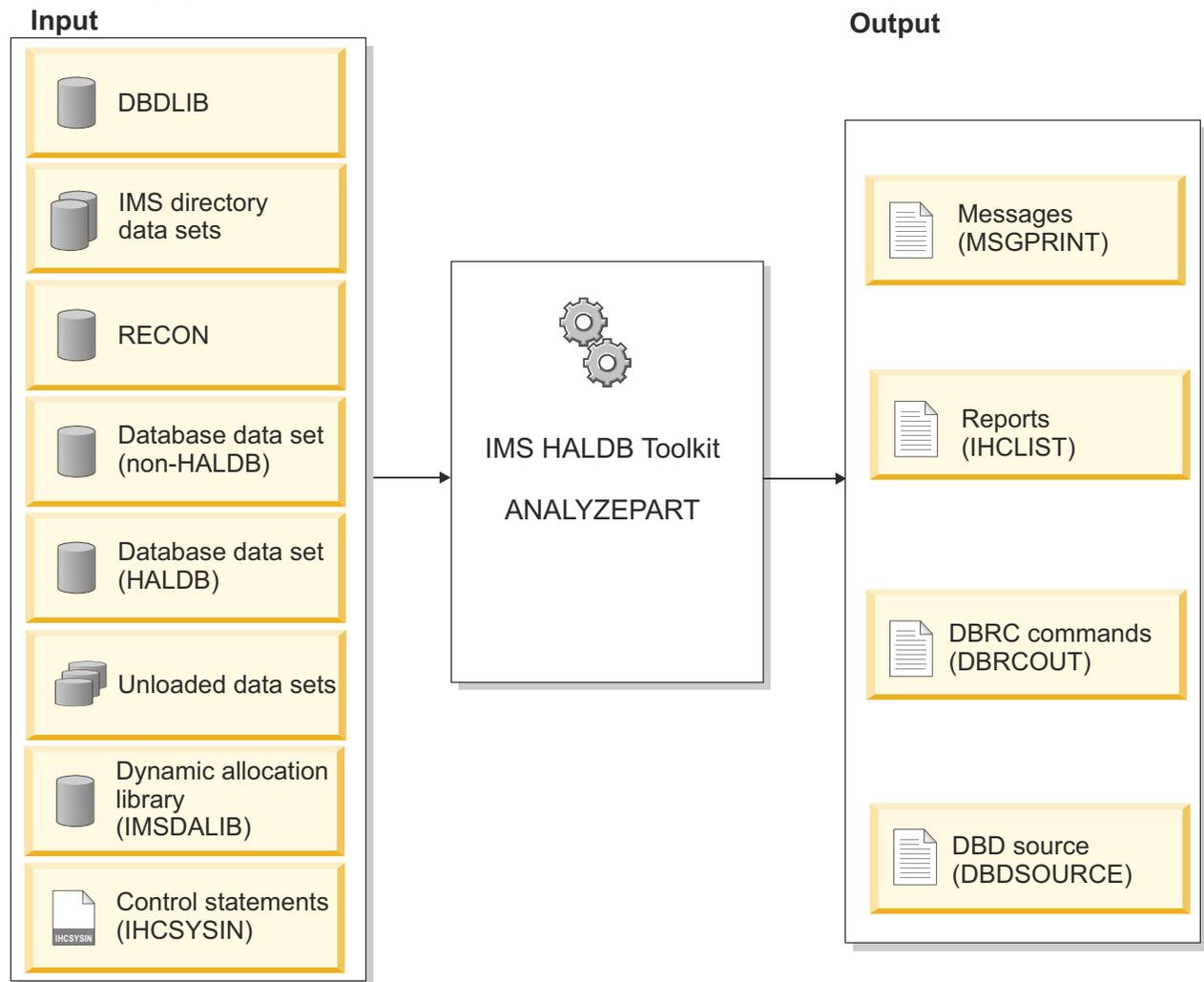


Figure 1. ANALYZEPART data flow

The simulation result is written to the Collect DBDs report in the IHCLIST data set.

- If you request to generate DBRC commands, the DBRC commands are written to the data set pointed to from the *dbrcout* DD statement.
- If you request to generate DBD source, DBDGEN utility control statements are written to the data set pointed to from the *dbdsource* DD statement.

Simulating conversion to a HALDB

You can simulate conversion from a full-function database to a HALDB offline by using the **ANALYZEPART** command.

About this task

By simulating the effect of the HALDB partition settings, you can determine the most effective partition settings before you convert a full-function database to a HALDB by using the **CONVERT** command.

For a database with logical relationships, only the database that is specified on the DBD parameter is simulated. All the logically related databases are not simulated.

Procedure

1. Locate the sample JCL members in the SIHCSAMP file, members IHCEMAIX.
2. Specify the JCL DD statements.

For a list of DD statements, see [“ANALYZEPART DD statements” on page 19](#).

3. Specify the ANALYZEPART command parameters.

For a list of ANALYZEPART command parameters, see [“ANALYZEPART command parameters” on page 22](#).

The following table lists some of the common scenarios and ANALYZEPART parameters for simulating HALDB partition settings:

Table 1. ANALYZEPART parameters for simulating conversion

Scenario	ANALYZEPART parameters	KEYSIN input
Simulate conversion to a HALDB that has four partitions	ANALYZEPART DBD(<i>xxxx</i>) - PARTNUM(4)	Not applicable
Simulate conversion to a HALDB that has 512 MB size partitions	ANALYZEPART DBD(<i>xxxx</i>) - PARTSIZE(512)	Not applicable
Simulate conversion to a HALDB using your own key boundaries	ANALYZEPART DBD(<i>xxxx</i>) - KEYS(KEYSIN)	//KEYSIN DD * <i>smaller-high-key</i> <i>middle-high-key</i> <i>last-high-key</i>

You can also refer to the following examples to code ANALYZEPART JCL statements and command parameters:

- [“ANALYZEPART example: Specifying the number of partitions” on page 34](#)
- [“ANALYZEPART example: Specifying the partition size” on page 35](#)
- [“ANALYZEPART example: Specifying the key ranges for partitions” on page 35](#)
- [“ANALYZEPART example: Generating DBRC commands” on page 36](#)
- [“ANALYZEPART example: Using unloaded data sets as input” on page 38](#)
- [“ANALYZEPART example: Generating DBD source” on page 40](#)

Related reference

Performance tips and considerations

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

Simulating repartitioning of a HALDB

You can simulate repartitioning of a HALDB offline by using the **ANALYZEPART** command.

About this task

By simulating the effect of the new partition settings, you can determine the most effective partition settings before you consolidate or split partitions by using the **MAINTAIN** command.

For a database with logical relationships, only the database that is specified on the DBD parameter is simulated. All the logically related databases are not simulated.

Procedure

1. Locate the sample JCL members in the SIHCSAMP file, members IHCEMAIx.
2. Specify the JCL DD statements.

For a list of DD statements, see [“ANALYZEPART DD statements”](#) on page 19.

3. Specify the ANALYZEPART command parameters.

For a list of ANALYZEPART command parameters, see [“ANALYZEPART command parameters”](#) on page 22.

The following table lists some of the most common functions and ANALYZEPART parameters:

Scenario	ANALYZEPART parameters	KEYSIN input
Simulate consolidation of two partitions into one using PARTNUM	ANALYZEPART DBD(<i>xxxx</i>) - PARTLIST(<i>part1,part2</i>) - PARTNUM(1)	Not applicable
Simulate splitting of one partition into two using PARTNUM	ANALYZEPART DBD(<i>xxxx</i>) - PARTITION(<i>part1</i>) - PARTNUM(2)	Not applicable
Simulate splitting of one large partition into 2048 MB size partitions using PARTSIZE	ANALYZEPART DBD(<i>xxxx</i>) - PARTITION(<i>bigpart1</i>) - PARTSIZE(2048)	Not applicable
Simulate splitting of one partition into three using your own key boundaries	ANALYZEPART DBD(<i>xxxx</i>) - PARTITION(<i>part1</i>) - KEYS(KEYSIN)	//KEYSIN DD * <i>smaller-high-key</i> <i>middle-high-key</i> <i>last-high-key</i>
Simulate repartitioning with 2048 MB size partitions for all the partitions using PARTSIZE	ANALYZEPART DBD(<i>xxxx</i>) - PARTITION(*) - PARTSIZE(2048)	Not applicable

You can also refer to the following examples to code ANALYZEPART JCL statements and command parameters:

- [“ANALYZEPART example: Specifying the number of partitions”](#) on page 34

- [“ANALYZEPART example: Specifying the partition size” on page 35](#)
- [“ANALYZEPART example: Specifying the key ranges for partitions” on page 35](#)
- [“ANALYZEPART example: Generating DBRC commands” on page 36](#)
- [“ANALYZEPART example: Using unloaded data sets as input” on page 38](#)
- [“ANALYZEPART example: Generating DBD source” on page 40](#)

Related reference

Performance tips and considerations

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

Simulating conversion or repartitioning using unloaded data sets as input

You can use unloaded data sets of a full-function database to simulate conversion from a full-function database to a HALDB, or unloaded data sets of a HALDB to simulate repartitioning of a HALDB.

About this task

Instead of supplying a full-function database or a HALDB as input for the ANALYZEPART function, you can supply unloaded data sets of a full-function database or of a HALDB and simulate the effect of database conversion or repartitioning.

Restriction: When you simulate conversion from a full-function database to a HALDB by supplying unloaded data sets as input, the ANALYZEPART function processes only the primary DBD that is specified on the DBD parameter. It does not process any secondary index databases. If DBD source generation is requested, IMS HALDB Toolkit generates DBD source for secondary index databases as well as for the primary DBD.

Procedure

1. Prepare the unloaded data sets. If you already have unloaded data sets, make sure your unloaded data sets satisfy the following requirements:
 - The ANALYZEPART function reads all data in the unloaded data sets that you specify on the DFSUINPT DD statement. If your unloaded data sets contain all the data of a HALDB and you want the ANALYZEPART function to process only some partitions, you must split the unloaded data sets so that the unloaded data sets that you specify on the DFSUINPT DD statement contain only the data of partitions that you want to process. You can do so by using the split unload file utility. For more information, see [“Example 4: Split unloaded data sets and simulate repartitioning of a HALDB” on page 39](#).
 - If the data in the unloaded data sets is masked and the original database uses unique keys, you must mask the unloaded data sets by using different unique values. The ANALYZEPART function does not check for duplicate keys. If duplicate keys exist in the unloaded data sets, the result of simulation might not be as expected.
 - If the database contains compressed segments (in other words, if the SEGM statements of the DBDGEN utility has a COMPRTN keyword), use the FABHURG1 utility of IBM IMS High Performance Unload for z/OS to create the unloaded data sets. You must specify the DECN control statement for the FABHURG1 utility to create unloaded data sets that the ANALYZEPART function can read. For more information, see the topic "FABHURG1 unload utility" in the *IMS High Performance Unload User's Guide*.
2. Locate the sample JCL members in the SIHCSAMP file, members IHCEMAIX.
3. Specify the JCL DD statements.

For a list of DD statements, see [“ANALYZEPART DD statements” on page 19](#).

- a) Specify a DFSUINPT DD statement and code the names of all the unloaded data sets on the statement.
 - b) Specify other JCL DD statements.
4. Specify the ANALYZEPART command parameters.
- For a list of ANALYZEPART command parameters, see [“ANALYZEPART command parameters”](#) on page 22. For examples, see [“ANALYZEPART example: Using unloaded data sets as input”](#) on page 38 and [“ANALYZEPART example: Generating DBD source”](#) on page 40.
- a) Specify the INPUT(UNLOAD) parameter. This parameter requests the ANALYZEPART function to read data from unloaded data sets.
 - b) If the unloaded data sets contain data from a HALDB, specify the partitions to simulate with the PARTLIST parameter or the PARTITION parameter. The ANALYZEPART function does not check the consistency of partitions against the unloaded data sets specified on the DFSUINPT DD statement. If there is inconsistency between the partitions and data in the unloaded data sets, the result of simulation might not be as expected.
 - c) Specify other ANALYZEPART command parameters.

Restriction: When unloaded data sets are provided as input, the ANALYZEPART function ignores the following parameters:

- Parameters related to secondary index databases (INDPART, INDPRIM, INDSIZE)
- READINT parameter

Related reference

[Performance tips and considerations](#)

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

ANALYZEPART DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **ANALYZEPART** command.

Table 3. DD statements and record format for the ANALYZEPART command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
<i>original_dbds</i>	Input	Depends on database organization	Optional
DFSUINPT	Input	Same as IMS	Conditionally required
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
IHCLIST	Output	LRECL=133	Optional

Table 3. DD statements and record format for the ANALYZEPART command (continued)

DD name	Use	Format	Need
TRACE	Output	LRECL=133	Optional
SR01MSGP	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

original_dbds

This statement is optional if the database to be processed is not a HALDB. This statement defines the database data set. One statement of this type must be present for each data set in the DBD that describes this database. The DD name must match the DD name in the DBD.

For a HIDAM database, DD statements must also exist for the data sets that represent the index. The DD statements that relate to the index must contain DD names specified in the DBD for the index database.

The data sets, if specified, must reside on DASD. If you use dynamic allocation, do not code the DD statement for the database data sets.



Attention:

- You must not specify the DD statements for HALDB data sets because HALDB data sets are registered in RECON and are always allocated dynamically.
- If the DD statement is coded, do not code DCB=BUFNO=*n* or AMP='BUFND=*n*' to request access method buffers for database data sets because HSSR Engine of IMS HP Unload allocates its own buffer pools.

DFSUINPT

This statement is required when you supply unloaded data sets as input. The statement specifies one or more data sets that contain unloaded data of a full-function database or of a HALDB.

The supported format of the unloaded data sets is HD unload format. The ANALYZEPART function processes all the data sets that are specified on this DD statement and all the data inside the data sets.

For more information about supplying unloaded data sets as input, see the following topics:

- [“Simulating conversion or repartitioning using unloaded data sets as input” on page 18](#)
- [“ANALYZEPART example: Using unloaded data sets as input” on page 38](#)

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“ANALYZEPART command parameters” on page 22](#).

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

IHCLIST

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for reports. For more information about the reports generated in this data set, see [“IHCLIST data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SR01MSGP

This statement is optional. The statement defines the message data set for sort processing.

If specified, this file is reallocated dynamically as:

```
//SR01MSGP DD SYSOUT=*.
```

This data set might be required for problem diagnosis of sort processing.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

ANALYZEPART command parameters

The following parameters are available to use with **ANALYZEPART** command simulation tasks. IMS HALDB Toolkit ignores any parameters that are unavailable for the requested process.

Subsections:

- [“ANALYZEPART command parameters” on page 22](#)
- [“ANALYZEPART command parameters for generating DBRC commands” on page 27](#)
- [“ANALYZEPART command parameters for generating DBD source” on page 33](#)

ANALYZEPART command parameters

Use the following parameters to define the conditions for simulating the database.

Table 4. ANALYZEPART command parameters

Parameter	Requirement	Description
DBD	Required	Specifies which DBD is to be simulated. If you specify a HALDB DBD, the value must be a HALDB master name and it cannot be a partition name. Format (<i>dbdname</i>) Default value None.

Table 4. ANALYZEPART command parameters (continued)

Parameter	Requirement	Description
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (ddd)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (nnn)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
INDPART	Optional	<p>Specifies the number of index partitions.</p> <p>This parameter is effective only when you simulate conversion from a full-function database to a HALDB.</p> <p>Cannot be used with INDSIZE.</p> <p>Format (1-999)</p> <p>Default value None.</p>
INDPRIM	Optional	<p>Specifies whether a secondary index is partitioned the same as the primary database.</p> <p>This parameter is effective only when you simulate conversion from a full-function database to a HALDB.</p> <p>The following restrictions apply:</p> <ul style="list-style-type: none"> • The index key must be the root segment key. • The primary database must be partitioned using the KEYS parameter. <p>Format (Y N)</p> <p>Default value N</p>

Table 4. ANALYZEPART command parameters (continued)

Parameter	Requirement	Description
INDSIZE	Optional	<p>Specifies the size of each index partition.</p> <p>This parameter is effective only when you simulate conversion from a full-function database to a HALDB.</p> <p>INDSIZE cannot be used with INDPART.</p> <p>Format (1 - 4095)</p> <p>Default value 1024</p>
INPUT	Optional	<p>Specifies that the input is unloaded data sets.</p> <p>Code the DFSUINPT DD to specify the unloaded data sets.</p> <p>Format (UNLOAD)</p> <p>Default value None.</p>
KEYLEN	Optional	<p>Specifies the length of the subkey when IHCPSEL0 is used.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following parameters and values:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen - 1</p> <p>Default value None.</p>
KEYOFF	Optional	<p>Specifies the offset within the root segment key to use when IHCPSEL0 is specified as PARTSEL.</p> <p>The offset must be at least 1. Offset 0 does not need a partition selection exit.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following parameters and values:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value None.</p>

Table 4. ANALYZEPART command parameters (continued)

Parameter	Requirement	Description
KEYS	Optional	<p>Specifies a DD statement that contains records for the high keys. KEYS cannot be used with PARTNUM or PARTSIZE.</p> <p>The KEYS parameter can be specified as a character or hexadecimal.</p> <p>Specifying KEYS results in as many partitions as there are keys specified in the file. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies that no partition is larger than 4 GB.</p> <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>If KEYSORDR(Y) is specified with KEYS, then the keys are sorted in EBCDIC order, then assigned to the partitions in name order (also EBCDIC order).</p> <p>Format (<i>ddname</i>)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PARTITION	Optional	<p>Specifies which partition is to be simulated.</p> <p>Either specify a partition name, or specify an asterisk (*) to simulate all the partitions.</p> <p>Either the PARTITION or the PARTLIST parameter must be provided when you simulate repartitioning of a HALDB. PARTITION and PARTLIST are mutually exclusive parameters.</p> <p>Do not specify this parameter when you simulate conversion from a full-function database to a HALDB.</p> <p>Format (<i>partition_name</i> *)</p> <p>Default value None.</p>
PARTLIST	Optional	<p>Specifies which partitions are to be simulated. You can specify up to 99 partition names.</p> <p>Either the PARTITION or the PARTLIST parameter must be provided when you simulate repartitioning of a HALDB. PARTITION and PARTLIST are mutually exclusive parameters.</p> <p>Do not specify this parameter when you simulate conversion from a full-function database to a HALDB.</p> <p>Format (<i>part1,part2,...,partn</i>)</p> <p>Default value None.</p>

Table 4. ANALYZEPART command parameters (continued)

Parameter	Requirement	Description
PARTNUM	Optional	<p>Specifies the number of partitions to create.</p> <p>PARTNUM cannot be used with PARTSIZE or KEYS. Specifying the PARTNUM parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>PARTNUM might not result in the exact number of partitions specified because a root segment and all of its dependent segments must be written to the same partition. Therefore, fewer than PARTNUM partitions might be created so that hierarchical integrity is preserved.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies that no partition is larger than 8 GB.</p> <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>If KEYSORDR(Y) is specified with PARTNUM, then the keys are sorted in EBCDIC order, then assigned to the partitions in name order (also EBCDIC order).</p> <p>Format (1 - 999)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PARTSEL	Optional	<p>Specifies a partition selection routine to use.</p> <p>The PARTSEL parameter must be specified with the KEYS parameter.</p> <p>IMS HALDB Toolkit provides an exit routine for partition selection (IHCPSELO). When you use the IHCPSELO exit routine, the database is partitioned using a subset of the key. If you use the IHCPSELO exit routine, you must also select the KEYOFF and KEYLEN parameters.</p> <p>Format (<i>partition_selection_routine</i>)</p> <p>Default value None.</p>
PARTSIZE	Optional	<p>Specifies the size of partitions to create.</p> <p>PARTSIZE cannot be used with PARTNUM or KEYS.</p> <p>Specifying this parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>Format (1 - 8191)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>

Table 4. ANALYZEPART command parameters (continued)

Parameter	Requirement	Description
READINT	Optional	<p>Specifies that the ANALYZEPART function reads the database with read integrity (PROCOPT=G).</p> <p>This parameter is effective only when IMS HALDB Toolkit dynamically detects the existence of IMS High Performance Unload for z/OS.</p> <p>Specify READINT(N) to simulate HALDB partitions of a database that is used by an online IMS system and that allows update access (ACCESS=UP). When READINT(N) is used, the ANALYZEPART function reads the database without read integrity (PROCOPT=GO).</p> <p> Attention:</p> <ul style="list-style-type: none"> When you specify READINT(N), IMS does not check the ownership of the segments returned. Therefore, the ANALYZEPART function might get a segment that had been updated by another program. Such a segment might cause data integrity problems, resulting in an IMS user abend, system loop, or system abend. To learn more about read without integrity, see the topic "Read without integrity" in <i>IMS Application Programming</i>. If the database is a PSINDEX that is used by an online IMS system with ACCESS=UP, READINT(N) cannot be used because the ANALYZEPART function reads the PSINDEX with read integrity (PROCOPT=G) even if you specify READINT(N). In this case, the job terminates with a database authorization failure. <p>Format (Y N)</p> <p>Default value Y</p>
SORTFSZ	Optional	<p>Specifies the estimated number of database records.</p> <p>The value is specified as FILSZ=Ex of OPTION control statement when calling sort processing.</p> <p>If SORTFSZ is not specified, IMS HALDB Toolkit estimates the number of database records.</p> <p>Format (1 - 999999999)</p> <p>Default value None.</p>

ANALYZEPART command parameters for generating DBRC commands

Use the following additional parameters to control the Database Recovery Control (DBRC) commands that IMS HALDB Toolkit generates. If you do not need to generate DBRC commands, do not use these parameters. These parameters are effective only when the DBRCOUT parameter, which specifies to generate DBRC commands, is specified.

Table 5. ANALYZEPART command parameters for generating DBRC commands

Parameter	Requirement	Description
CONST	Optional	<p>Used as a substitute for the DBD name when building partition names. See also DBDPATT, INDPATT, and FIRSTPART parameters.</p> <p>Format (constant)</p> <p>Default value None.</p>
DBDPATT	Optional	<p>Creates a partition name from the DBD.</p> <p>Format (ccccccc) where c is an asterisk (*) or a period (.)</p> <p>You can use a maximum of 6 asterisks (*) to identify the position in the DBD name. The default is 6 asterisks.</p> <p>When 6 positions are specified, only 1 character is used for the partition name, creating a limit of 36 partitions.</p> <p>If fewer than 6 positions are specified, 1 - 3 characters are used for the partition name depending on the FIRSTPART parameter.</p> <p>You can also use periods (.) to specify that certain characters of the DBD name are ignored.</p> <p>Default value (*****.)</p>
DBRCOUT	Required	<p>Specifies the name of the DD to which IMS HALDB Toolkit prints DBRC commands.</p> <p>Specify this parameter to generate DBRC commands. You must also specify the <i>dbrcout</i> DD statement in the JCL.</p> <p>You can specify SYSOUT=*, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with a member name with LRECL=80 and RECFM=F to the <i>dbrcout</i> DD.</p> <p>Format (ddname)</p> <p>Default value None.</p>

Table 5. ANALYZEPART command parameters for generating DBRC commands (continued)

Parameter	Requirement	Description
DSNDBD	Optional	<p>Specifies the suffix portion of the new data set name that you are using.</p> <p>A total of 37 characters are allowed for the entire data set name, which includes the characters used for the DSNPREF prefix and the characters used for the DSNDBD suffix.</p> <p>Format (DBD PART DBDPART)</p> <p>DBD Add the DBD name to DSNPREF.</p> <p>PART Add the partition name to DSNPREF.</p> <p>DBDPART Add the DBD name and the partition name to DSNPREF.</p> <p>Default value DBD</p>
DSNPREF	Conditionally required	<p>Specifies a high-level data set name to use when building new partition data set names.</p> <p>The DBRC DSNPREFX parameter is created from this specification and is appended with the DBD name.</p> <p>The final data set name is then appended by DBRC with the DBD file letter and the partition name.</p> <p>When you simulate conversion from a non-HALDB to a HALDB, you must specify this parameter. When you simulate repartitioning of a HALDB, this parameter is optional.</p> <p>Format (<i>dsnprefix</i>)</p> <p>Default value If omitted, the default is to copy from the existing DSNPREF.</p>
FBFF	Optional	<p>Specifies a new free block frequency factor (FBFF) to use when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default is to copy from the existing FBFF.</p>

Table 5. ANALYZEPART command parameters for generating DBRC commands (continued)

Parameter	Requirement	Description
FIRSTPART	Optional	<p>Identifies the partition name extension to be added to the name "stub" created by the DBDPATT and INDPATT parameters.</p> <p>The "stub" and the extension cannot exceed 7 characters.</p> <p>Format (ccc)</p> <p>ccc defines the character string that is used, where:</p> <p>0 Defines a string from 0-9,A-Z. The partition number is used as an index. It creates a 1-character extension.</p> <p>A Defines a string from A-Z,0-9. The partition number is used as an index. It creates a 1-character extension.</p> <p>1 Defines a string from 1-9,A-Z. The partition number is used as an index. It creates a 1 character extension.</p> <p>01 Creates a 2-character numeric extension from 01-99. The partition number is used for the extension.</p> <p>AA Creates a 2-character extension from AA to 99. For example, AA,...,AZ,A0,...,A9,BA,...,Z9,0A,...</p> <p>001 Creates a 3-character numeric extension from 001-999. The partition number is used for the extension.</p> <p>Default value</p> <ul style="list-style-type: none"> • 0, if six asterisks (*) are specified on the DBDPATT parameter or the DBDPATT parameter is not specified. • AA, if five asterisks are specified on the DBDPATT parameter.
FSPF	Optional	<p>Specifies a new free space percentage value for each interval or block (FSPF) to use when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default action is to copy from the existing FSPF.</p>

Table 5. ANALYZEPART command parameters for generating DBRC commands (continued)

Parameter	Requirement	Description
INDPATT	Optional	<p>Creates a partition name "stub" from the DBD name of a secondary index.</p> <p>This parameter is effective only when you simulate conversion from a full-function database to a HALDB.</p> <p>Format (ccccccc) where c is an asterisk (*) or a period (.)</p> <p>This parameter is similar to DBDPATT. The "*" positions of the DBD name are kept to create the "name stub."</p> <p>You can use a maximum of 6 asterisks (*) to identify the position. The default is 6 asterisks.</p> <p>Default value DBDPATT is used. If neither DBDPATT nor INDPATT is specified, the default is (*****.).</p>
INITPART	Optional	<p>DDNAME in JCL that allows parameters that are not currently specified by the product to be added to the DBRC INIT.PART command.</p> <p>IMS HALDB Toolkit uses the defaults for GENMAX, DFLTJCL, ICJCL, OICJCL, RECOVJCL, RECOVPD, RECVJCL, and NOREUSE.</p> <p>Any DBRC statements that you specify on the <i>initpart_dd</i> DD statement are included in the statements that are generated by the product. DBRC statements coded on the <i>initpart_dd</i> DD statement must conform to the syntax of the INIT.PART command. For the syntax rules, see the topic "INIT.PART command" in <i>IMS Commands</i>.</p> <p>Format (<i>initpart_dd</i>)</p> <p>Default value None.</p>

Table 5. ANALYZEPART command parameters for generating DBRC commands (continued)

Parameter	Requirement	Description
KEYSORDR	Optional	<p>This parameter is effective only for HALDBs. IMS HALDB Toolkit ignores this parameter if this parameter is specified for a non-HALDB.</p> <p>You can specify the KEYS(<i>ddname</i>) or PARTNUM parameter with KEYSORDR(Y).</p> <p>When KEYS(<i>ddname</i>) is specified, IMS HALDB Toolkit reads the high-key values from the KEYS(<i>ddname</i>), or when PARTNUM is specified, IMS HALDB Toolkit reads the high-key values that are created during analysis. IMS HALDB Toolkit then assigns the high-key values to partitions in ascending partition number order by issuing CHANGE.PART commands to DBRC. When KEYSORDR is also specified, IMS HALDB Toolkit subsequently reassigns the high-keys to the partitions, in both their individual ascending EBCDIC order, by issuing CHANGE.PART commands again.</p> <p>The CHANGE.PART commands that are issued when reassigning the high-keys are in ascending EBCDIC order of partition name, which is the same order as is presented by a DBRC LIST.DB command. KEYSORDR processing is done whether adding or deleting partitions, or changing partitions' attributes.</p> <p>This option can also be used for the single purpose of reorganizing partitions' high-keys, which is accomplished by placing unchanged high-keys in the KEYS(<i>ddname</i>).</p> <p>When the KEYSORDR option is specified, PARTITION(*) is also required.</p> <p>Format (Y N)</p> <p>Default value N</p>
OSAM	Optional	<p>This parameter is effective only for non-HALDBs. IMS HALDB Toolkit ignores this parameter if this parameter is specified for a HALDB.</p> <p>Converts VSAM to OSAM.</p> <p>Format (Y N)</p> <p>Default value N</p>
RAAINCR	Optional	<p>Increases HDAM root addressable area (RAA) by a specified number of blocks.</p> <p>Format (0 - 26777215)</p> <p>Default value None.</p>

Table 5. ANALYZEPART command parameters for generating DBRC commands (continued)

Parameter	Requirement	Description
RAPS	Optional	Specifies new PHDAM root anchor points (RAPs). Format (1 - 255) Default value If omitted, the default is to copy from the existing RAPs.

ANALYZEPART command parameters for generating DBD source

Use the following additional parameters to generate DBD source. DBD source, which are a series of DBDGEN utility statements, help you understand the structure of the converted database and prevent unexpected failures that may occur during HALDB conversion. If you do not need to generate DBD source, do not use these parameters. These parameters are effective only when the DBDSOURCE parameter, which specifies to generate DBD source, is specified.

The parameters in the following table are effective only for non-HALDBs. If any of these parameters are specified for a HALDB, IMS HALDB Toolkit ignores these parameters.

Table 6. ANALYZEPART command parameters for generating DBD source

Parameter	Requirement	Description
DBDSOURCE	Required	Generates the DBD source for the converted HALDB and places it in the specified library. You must also specify the <i>dbdsorce</i> DD statement in the JCL. The data set that you specify for <i>dbdsorce</i> DD must be a partitioned data set (PDS) or a partitioned data set extended (PDSE) with LRECL=80 and RECFM=F. SYSOUT=* cannot be specified for this data set. Format (<i>ddname</i>) Default value None.
DBDSRONLY	Optional	Generates the DBD source without simulating HALDB conversion. No reports are generated in the IHCLIST data set. Format (Y N) Default value N
DSG1	Optional	Changes a database with multiple data set groups into a database with a single data set group. Format (Y N) Default value N

Table 6. ANALYZEPART command parameters for generating DBD source (continued)

Parameter	Requirement	Description
OSAM	Optional	Converts VSAM to OSAM. Format (Y N) Default value N

ANALYZEPART examples

Use the following examples to learn what you can do with the ANALYZEPART function.

- [“ANALYZEPART example: Specifying the number of partitions” on page 34](#)
- [“ANALYZEPART example: Specifying the partition size” on page 35](#)
- [“ANALYZEPART example: Specifying the key ranges for partitions” on page 35](#)
- [“ANALYZEPART example: Generating DBRC commands” on page 36](#)
- [“ANALYZEPART example: Using unloaded data sets as input” on page 38](#)
- [“ANALYZEPART example: Generating DBD source” on page 40](#)

ANALYZEPART example: Specifying the number of partitions

If you know how many partitions you want to split the database into, you can use the PARTNUM parameter to specify this number.

To specify the number of partitions, use the sample member IHCEMAI1. The following example simulates splitting a database into two partitions:

```
//ANAPART JOB CLASS=A,MSGCLASS=X
//*-----
//*          Create partition boundary report
//*          read database and report on 2 partitions
//*-----
//S2      EXEC PGM=IHCHALDB,DYNAMNBR=999,
//          REGION=80M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//          DD DISP=SHR,DSN=your.SHPSLMD0
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//TRACE  DD DUMMY
//MSGPRINT DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
//          ANALYZEPART DBD(xxx) -
//          PARTNUM(2)
```

Figure 2. Sample JCL (IHCEMAI1) for batch using PARTNUM

If the database that you specify for the DBD parameter is a HALDB database, you must specify the PARTITION or the PARTLIST parameter. If the DBD parameter specifies a non-HALDB database, do not specify the PARTITION or the PARTLIST parameter.

For example, if you want to split a HALDB database into four partitions, change the PARTNUM value to 4 and specify the PARTITION parameter.

```
//IHCSYSIN DD *
//          ANALYZEPART DBD(xxx) -
//          PARTNUM(4) -
//          PARTITION(*)
```

ANALYZEPART example: Specifying the partition size

If you know how large you want each partition to be, you can use the PARTSIZE parameter to specify this number.

To specify the size of partitions, use the member IHCEMAI2. The following example simulates splitting a database into partitions each with a size of 1500 MB.

```
//ANAPART JOB CLASS=A,MSGCLASS=X
//*-----
//*          Create partition boundary report
//*          read database and report on partition size
//*-----
//S2      EXEC PGM=IHCHALDB,DYNAMNBR=999,
//          REGION=80M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//          DD DISP=SHR,DSN=your.SHPSLMD0
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//TRACE  DD DUMMY
//MSGPRINT DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
//          ANALYZEPART DBD(xxx) -
//          PARTSIZE(1500)
```

Figure 3. Sample JCL (IHCEMAI2) for batch using PARTSIZE

If the database that you specify for the DBD parameter is a HALDB database, you must specify the PARTITION or the PARTLIST parameter. If the DBD parameter specifies a non-HALDB database, do not specify the PARTITION or the PARTLIST parameter.

For example, if you want to repartition two partitions of a HALDB database into partitions each with a size of 2000 MB, change the PARTSIZE value to 2000 and specify the PARTLIST parameter.

```
//IHCSYSIN DD *
//          ANALYZEPART DBD(xxx) -
//          PARTSIZE(2000) -
//          PARTLIST(part1,part2)
```

ANALYZEPART example: Specifying the key ranges for partitions

If you want to assign specific key ranges to partitions, you can use the KEYS parameter to specify an input data set containing the keys. The KEYS parameter specifies the high key boundaries for each partition.

To specify the ranges for partitions, use the member IHCEMAI3. The following example simulates splitting a database into 13 partitions with each partition containing the keys up to the specified high key boundary.

```

//ANAPART   JOB CLASS=A,MSGCLASS=X
//*-----
//*          Create partition boundary report for HALDB
//*          read database and report on specific key boundaries
//*-----
//S2       EXEC PGM=IHCHALDB,DYNAMNBR=999,
//          REGION=80M
//STEPLIB  DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//          DD DISP=SHR,DSN=your.SHPSLMD0
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//TRACE    DD DUMMY
//MSGPRINT DD SYSOUT=*
//IHCLIST  DD SYSOUT=*
//*****
//*KEYSIN   DD * (documentation only)
//* your first high-order key for partition1
//* your second high-order key for partition2 and so on...
//* your highest key for last partition
//*****
//KEYSIN   DD *
A999999999
B999999999
C999999999
D999999999
E999999999
F999999999
G999999999
H999999999
I999999999
J999999999
K999999999
L999999999
M999999999
//IHCSYSIN DD *
ANALYZEPART DBD(xxx) PARTITION(*) -
            KEYS(KEYSIN)

```

Figure 4. Sample JCL (IHCEMAI3) for batch using KEYS

If the database that you specify for the DBD parameter is a HALDB database, you must specify the PARTITION or the PARTLIST parameter. If the DBD parameter specifies a non-HALDB database, do not specify the PARTITION or the PARTLIST parameter.

ANALYZEPART example: Generating DBRC commands

When you simulate repartitioning of a HALDB or conversion to a HALDB by using the **ANALYZEPART** command, you can optionally specify the DBRCOUT parameter to generate a set of DBRC commands for the Database Recovery Control (DBRC) utility (DSPURX00).

If you use the **CONVERT** or the **MAINTAIN** command to make changes to a database, IMS HALDB Toolkit automatically updates information in RECON data sets so that the changes made to the database are reflected in the RECON data sets. However, if you plan to do this without using these commands, manual tasks typically involve unloading data from the database, updating the information in RECON data sets, and reloading data back to the database. If you use the **ANALYZEPART** command, IMS HALDB Toolkit will generate a set of DBRC commands that you can use to update the information in RECON data sets.

To generate DBRC commands, add the DBRCOUT parameter to the ANALYZEPART command and the *dbrcout* DD statement, as shown in the following example:

```

//dbrcout DD SYSOUT=*
//IHCSYSIN DD *
ANALYZEPART DBD(xxx) -
            PARTLIST(part1,part2) -
            PARTNUM(3) -
            DBRCOUT(dbrcout)

```

The DBRCOUT parameter value (*dbrcout*) specifies the name of the DD to which IMS HALDB Toolkit writes the DBRC commands.

Example 1

If you want the DBRC commands printed in EBCDIC order based on the high-keys specified in the KEYSIN DD, specify the KEYSORDR(Y) parameter, the PARTITION(*) parameter, and the KEYSIN DD statement, as shown in the following example:

```
//DBRCOUT DD SYSOUT=*
//KEYSIN DD *
A999999999
B999999999
C999999999
D999999999
//IHCSYSIN DD *
ANALYZEPART DBD(xxxx) -
PARTITION(*) -
KEYS(KEYSIN) -
KEYSORDR(Y) -
DBRCOUT(DBRCOUT)
```

Example 2

If you want the DBRC commands include specific DBRC keyword values, specify the parameter values. The following parameters are supported: CONST, DBDPATT, DSNDBD, DSNPREF, FBFF, FIRSTPART, FSPF, INITPART, RAAINCR, RAPS. For more information about these parameters, see [“ANALYZEPART command parameters for generating DBRC commands” on page 27](#).

The following example specifies specific DBRC keyword values for FBFF, FSPF, and RAPS keywords.

```
//DBRCOUT DD SYSOUT=*
//IHCSYSIN DD *
ANALYZEPART DBD(xxxx) -
PARTITION(*) -
PARTNUM(3) -
FBFF(10) -
FSPF(20) -
RAPS(5) -
DBRCOUT(DBRCOUT)
```

Example 3

In the following example:

- //DBRCOUT DD SYSOUT=* specifies to print the DBRC commands to the SYSOUT stream.
- The KEYSIN DD statement and the KEYSORDR(Y) parameter specify to print the DBRC commands in EBCDIC order of the keys.
- The DBDPATT, FIRSTPART, DSNPREF, and DSNDBD parameters specify the DBRC command keyword values to be used in the DBRC commands.

```
//DBRCOUT DD SYSOUT=*
//KEYSIN DD *
A999999999
B999999999
C999999999
D999999999
//IHCSYSIN DD *
ANALYZEPART DBD(TESTDB01) -
PARTITION(*) -
KEYS(KEYSIN) -
KEYSORDR(Y) -
DBDPATT(****...) -
FIRSTPART(001) -
DSNPREF(DBSMS.DB) -
DSNDBD(PART) -
DBRCOUT(DBRCOUT)
```

Example 4

In the following example:

- //DBRCOUT DD SYSOUT=* specifies to print the DBRC commands to the SYSOUT stream.
- The PARTNUM parameter and the KEYSORDR(Y) parameter specify to print the DBRC commands in EBCDIC order of the keys.

```
//DBRCOUT DD SYSOUT=*
//IHCSYSIN DD *
  ANALYZEPART DBD(xxxx) -
              PARTITION(*) -
              PARTNUM(5) -
              KEYSORDR(Y) -
              DBRCOUT(DBRCOUT)
```

The resulting DBRC commands will look like the following example.

```
CHANGE.PART DBD(TESTDB01) PART(TEST001) -
  KEYSTRNG(A999999999) -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST001)
CHANGE.PART DBD(TESTDB01) PART(TEST002) -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST002)
INIT.PART DBD(TESTDB01) PART(TEST003) -
  KEYSTRNG(B999999999) -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST003)
```

ANALYZEPART example: Using unloaded data sets as input

If you want to use unloaded data sets as input for the ANALYZEPART function, specify the unloaded data sets on the DFSUINPT DD statement and specify the INPUT(UNLOAD) parameter.

Subsections:

- [“Example 1: Simulate conversion to a HALDB” on page 38](#)
- [“Example 2: Simulate repartitioning of a HALDB \(all partitions\)” on page 38](#)
- [“Example 3: Simulate repartitioning of a HALDB \(one partition\)” on page 39](#)
- [“Example 4: Split unloaded data sets and simulate repartitioning of a HALDB” on page 39](#)

Example 1: Simulate conversion to a HALDB

To simulate conversion of a full-function database to a HALDB, add the DFSUINPT DD statement and the INPUT(UNLOAD) parameter.

In this example:

- DFSUINPT DD statement specifies the unloaded data set.
- INPUT(UNLOAD) parameter specifies to read input data from the unloaded data set.
- PARTNUM(3) parameter specifies to convert the database into a HALDB with three partitions.

```
//DFSUINPT DD DISP=SHR,DSN=your.hd.unload.dataset
//IHCSYSIN DD *
  ANALYZEPART DBD(xxxx) -
              INPUT(UNLOAD) -
              PARTNUM(3)
```

Example 2: Simulate repartitioning of a HALDB (all partitions)

To simulate repartitioning of all the partitions in a HALDB, use the following example.

In this example:

- DFSUINPT DD statement specifies the unloaded data set. The unloaded data set contains all the data from all the partitions.
- INPUT(UNLOAD) parameter specifies to read input data from the unloaded data set.
- PARTITION(*) specifies to process all the partitions in the HALDB.
- PARTSIZE(2048) specifies to create partitions each with a size of 2048 MB.
- DBRCOUT parameter and *dbrcout* DD specify to generate DBRC commands for repartitioning.

```
//DFSUINPT DD DISP=SHR,DSN=your.hd.allpart.unload.dataset
//dbrcout DD SYSOUT=*
//IHCSYSIN DD *
ANALYZEPART DBD(xxxx) -
             INPUT(UNLOAD) -
             PARTITION(*) -
             PARTSIZE(2048) -
             DBRCOUT(dbrcout)
```

Example 3: Simulate repartitioning of a HALDB (one partition)

To simulate repartitioning of one partition into two partitions, use the following example.

In this example:

- DFSUINPT DD statement specifies the unloaded data set. The unloaded data set contains all the data of the partition.
- INPUT(UNLOAD) parameter specifies to read input data from the unloaded data set.
- PARTLIST(*part1*) specifies to process only one partition.
- PARTNUM(2) specifies to simulate repartitioning into two partitions.

```
//DFSUINPT DD DISP=SHR,DSN=your.hd.part1.unload.dataset
//IHCSYSIN DD *
ANALYZEPART DBD(xxxx) -
             INPUT(UNLOAD) -
             PARTLIST(part1) -
             PARTNUM(2)
```

Example 4: Split unloaded data sets and simulate repartitioning of a HALDB

If you have an unloaded data set that contains data of all partitions and you want to simulate only some partitions, split the unloaded data set by using the split unload file utility before you simulate repartitioning with the ANALYZEPART function.

In this example, you have an unloaded data set that contains all the data from a HALDB that has three partitions (*part1*, *part2*, and *part3*). You want to simulate repartitioning of two partitions (*part1* and *part2*).

Step 1: Splitting unloaded data set

Use the split unload file utility to split the unloaded data set into multiple unloaded data sets. This utility splits unloaded data sets into single partition unloaded data sets. For more information about the split unload file utility, see [Chapter 8, “Splitting an unload file into single partition files,” on page 161](#).

The following JCL example is for the split unload file utility. In this example:

- DFSUINPT DD statement specifies the unloaded data set that contains all the data of a HALDB that has three partitions.
- *part1Z*, *part2Z*, and *part3Z* DD statements specify the output data sets, which are single partition unloaded data set for each partition.

```
//*-----
//*
//*          Split unload file
//*          Input DD is "DFSUINPT"
//*          Output DD is partition name + "Z"
```

```

/*
/*-----
//S2      EXEC PGM=IHCHALDB,
//        REGION=80M
//STEPLIB DD DISP=SHR, DSN=your.SIHCLoad
//        DD DISP=SHR, DSN=your.SDFSRESL
//RECON1  DD DISP=SHR, DSN=your.RECON1
//RECON2  DD DISP=SHR, DSN=your.RECON2
//RECON3  DD DISP=SHR, DSN=your.RECON3
//IMS     DD DISP=SHR, DSN=your.DBDLIB
//TRACE   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//IHCSYSIN DD *
//        RUN PGM(IHCUSPLT) -
//          DBD(nnnnn) /* <=== DBD name
//DFSUINPT DD DISP=SHR, DSN=your.hd.allpart.unload.dataset
//part1Z  DD DISP=(,CATLG),UNIT=SYSDA,SPACE=(CYL,(50,20)),
//          DSN=your.hd.part1.unload.dataset
//part2Z  DD DISP=(,CATLG),UNIT=SYSDA,SPACE=(CYL,(50,20)),
//          DSN=your.hd.part2.unload.dataset
//part3Z  DD DISP=(,CATLG),UNIT=SYSDA,SPACE=(CYL,(50,20)),
//          DSN=your.hd.part3.unload.dataset
//
/*

```

Step 2: Simulate repartitioning of two partitions

Specify the unloaded data sets for part1 and part2 generated by the split unload file utility and run the ANALYZEPART function.

In this example:

- *your.hd.part1.unload.dataset* on the DFSUINPT DD contains unloaded data of partition part1.
- *your.hd.part2.unload.dataset* on the DFSUINPT DD contains unloaded data of partition part2.
- INPUT(UNLOAD) parameter specifies to read input data from the unloaded data sets.
- PARTLIST(*part1,part2*) specifies to process two partitions.
- PARTNUM(3) specifies to simulate repartitioning into three partitions.

```

//DFSUINPT DD DISP=SHR, DSN=your.hd.part1.unload.dataset
//          DD DISP=SHR, DSN=your.hd.part2.unload.dataset
//IHCSYSIN DD *
//        ANALYZEPART DBD(xxxx) -
//          INPUT(UNLOAD) -
//          PARTLIST(part1,part2) -
//          PARTNUM(3)

```

ANALYZEPART example: Generating DBD source

When you simulate conversion to a HALDB by using the **ANALYZEPART** command, you can optionally specify the DBDSOURCE parameter to generate a set of DBD sources for the Database Description (DBD) Generation (DBDGEN) utility.

If you also specify the DBDSRONLY(Y) parameter, you can generate a set of DBD sources without simulating HALDB conversion. When DBDSRONLY(Y) is specified, IMS HALDB Toolkit ignores all the parameters that are not used for generating the DBD source and creates no reports in the IHCLIST data set.

To generate DBD source, add the DBDSOURCE parameter to the ANALYZEPART command and the *dbdsorce* DD statement, as shown in the following example:

```

//dbdsorce DD DISP=(,CATLG), DSN=your.DBDSRC,
//          UNIT=SYSDA, SPACE=(TRK,(3,1,5)), DCB=(RECFM=FB, LRECL=80, BLKSIZE=8000)
//IHCSYSIN DD *
//        ANALYZEPART DBD(xxxx) -
//          PARTNUM(3) -
//          DBDSOURCE(dbdsorce)

```

The DBDSOURCE parameter value (*dbdsorce*) specifies the name of the DD to which IMS HALDB Toolkit writes the DBD sources.

Example 1

If you want to generate DBD source without simulating HALDB conversion, specify the DBDSRONLY(Y) parameter, as shown in the following example:

```
//DBDSRC DD DISP=(,CATLG),DSN=your.DBDSRC,  
//          UNIT=SYSDA,SPACE=(TRK,(3,1,5)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000)  
//IHCSYSIN DD *  
  ANALYZEPART DBD(xxxx) -  
              DBDSRONLY(Y) -  
              DBDSOURCE(DBDSRC)
```

Example 2

If you want to change a database with multiple data set groups into a database with a single data set group and convert VSAM to OSAM, specify DSG1(Y) and OSAM(Y).

For more information about these parameters, see [“ANALYZEPART command parameters for generating DBD source” on page 33](#).

```
//DBDSRC DD DISP=(,CATLG),DSN=your.DBDSRC,  
//          UNIT=SYSDA,SPACE=(TRK,(3,1,5)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000)  
//IHCSYSIN DD *  
  ANALYZEPART DBD(xxxx) -  
              PARTNUM(3) -  
              DSG1(Y) -  
              OSAM(Y) -  
              DBDSOURCE(DBDSRC)
```

Example 3

If you want to use an unload data set as input and generate DBD source, specify the INPUT(UNLOAD) and the DBDSOURCE parameters, as shown in the following example:

```
//DFSUINPT DD DISP=SHR,DSN=your.hd.unload.dataset  
//DBDSRC DD DISP=(,CATLG),DSN=your.DBDSRC,  
//          UNIT=SYSDA,SPACE=(TRK,(3,1,5)),DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000)  
//IHCSYSIN DD *  
  ANALYZEPART DBD(xxx) -  
              INPUT(UNLOAD) -  
              PARTNUM(3) -  
              DBDSOURCE(DBDSRC)
```

Part 3. Converting to a HALDB

In batch mode, you can convert to HALDB in a single step by using the **CONVERT** command. Alternatively, you can use the ISPF user interface to perform the same task.

Topic:

- [Chapter 3, “Converting to HALDB using CONVERT,” on page 45](#)

Chapter 3. Converting to HALDB using CONVERT

Use the **CONVERT** command to convert a database in batch mode. New data set allocations use the same System Managed Storage (SMS) constructs or the same volume serial when running outside of SMS.

Topics:

- “CONVERT data flow” on page 45
- “Converting databases offline” on page 46
- “CONVERT DD statements” on page 47
- “CONVERT command parameters” on page 51
- “CONVERT examples” on page 72

CONVERT data flow

The following figure shows the data flow for the CONVERT function.

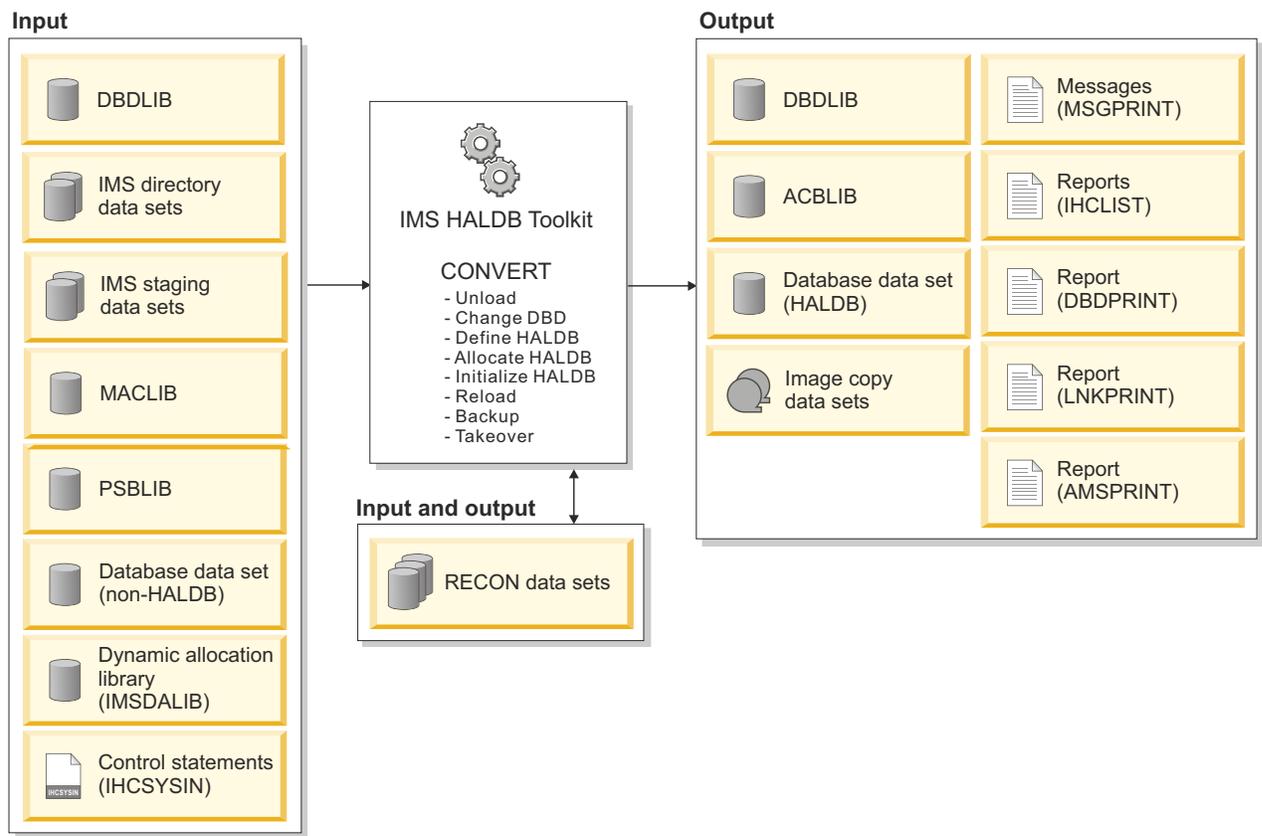


Figure 5. CONVERT data flow

The CONVERT function performs all of the following processes in a single job step:

- Unload
- Change DBD
- Define HALDB
- Allocate HALDB
- Initialize HALDB

- Reload
- Backup
- Takeover

Converting databases offline

You can convert full-function databases offline by using the **CONVERT** command.

About this task

Databases must be offline to use this method. You must manually /DBR your databases before running the conversion job.

When the IMS management of ACBs is enabled:

- New database definitions must exist in the IMS catalog staging data sets before running the IMS HALDB Toolkit job.
- The shadow database is unloaded by using the active database definition obtained from the IMS catalog directory data sets, then reloaded by using the pending database definition obtained from the IMS catalog staging data sets.

Restriction: Databases with logical relationships (except for indexes) are not supported.

Procedure

1. When the IMS management of ACBs is enabled, prepare the IMS catalog staging data sets. You can refer to the examples in [“CONVERT example: Preparing a staging data set before converting a database when the IMS management of ACBs is enabled”](#) on page 76.
2. Locate the sample JCL for this task in the SIHCSAMP file, member IHCECVTN.
3. Specify the JCL DD statements.
For a list of DD statements, see [“CONVERT DD statements”](#) on page 47.
4. Specify the CONVERT command parameters.
For a list of CONVERT command parameters, see [“CONVERT command parameters”](#) on page 51.

Specify the ONLINE parameter as ONLINE(N). ONLINE(N) is the default if you do not specify this parameter. The following parameters are required to perform offline conversion:

```
//IHCSYSIN DD *
CONVERT DBD(xxx) ONLINE(N)...
```

You can also refer to the following examples to code CONVERT JCL statements and command parameters:

- [“CONVERT example: Specifying the number of partitions ”](#) on page 73
 - [“CONVERT example: Specifying the partition size”](#) on page 73
 - [“CONVERT example: Specifying the key ranges for partitions”](#) on page 74
 - [“CONVERT example: Converting a database when the IMS management of ACBs is enabled”](#) on page 77
5. Manually /DBR your databases before running the conversion job.
 6. After the conversion process is complete and you are certain that you will not need to revert the database to its non-HALDB state:
 - You can delete any DFSMDA members for the old database.
 - If the Integrity Checker utility of IMS Library Integrity Utilities is active in your environment, you can delete the RDE for the old database by using the LICON utility.

Example

The following example shows the sample JCL for batch offline conversion:

```
//JOBNAME JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//* SAMPLE JCL FOR CONVERT ONLINE(N) - "OFFLINE BATCH MODE"
//*
//* Your databases must be registered to DBRC
//* Your databases must be dbi'd/stopped prior to executing this job
//*****
//S2 EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad <=== your hcma loadlib
// DD DISP=SHR,DSN=your.SDFSRESL <=== ims reslib
// DD DISP=SHR,DSN=your.SHPSLMD0 <=== ims tools loadlib
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL <=== ims reslib
//MACLIB DD DISP=SHR,DSN=your.SDFSMAc <=== ims maclib
//IMS DD DISP=SHR,DSN=your.dbdlib <=== ims dbdlib
//IMSDALIB DD DISP=SHR,DSN=your.mdalib <=== ims mdalib
//SYSPRINT DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//DBDPRINT DD SYSOUT=*
//LNKPRINT DD SYSOUT=*
//AMSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
 CONVERT ONLINE(N) -
   DBDPATT(*****...) DSNPREF(DBSMS.DB) -
   DBD(***x) -
   PARTNUM(2) -
   ICMID(3) -
   ICHLQ(DBSMS.DB.IC) -
   ICTRLR(2) -
   IC.COMP(Y) -
   IC.COMPRTN(FABJCMp2) -
   PTRCHECK(Y)
```

Figure 6. Sample JCL (IHCECVTN) for batch conversions (Online(N))

Related reference

[Performance tips and considerations](#)

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

CONVERT DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **CONVERT** command.

Table 7. DD statements and record format for the CONVERT command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
MACLIB	Input	Same as IMS	Required
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input/Output	Same as IMS	Optional
PSBLIB	Input	Same as IMS	Required when ACBGEN(Y)

Table 7. DD statements and record format for the CONVERT command (continued)

DD name	Use	Format	Need
IMSACB	Output	Same as IMS	Required when ACBGEN(Y)
<i>original_dbds</i>	Input	Depends on database organization	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
IHCLIST	Output	LRECL=133	Optional
DBDPRINT	Output	LRECL=133	Required
LNKPRINT	Output	LRECL=133	Required
AMSPRINT	Output	LRECL=133	Required
TRACE	Output	LRECL=133	Optional
SR01MSGP	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

MACLIB

This statement is required. The statement specifies the MACLIB data set for DBDGEN.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

original_dbds

This statement is optional. This statement defines the database data set. One statement of this type must be present for each data set in the DBD that describes this database. The DD name must match the DD name in the DBD.

For a HIDAM database, DD statements must also exist for the data sets that represent the index. The DD statements that relate to the index must contain DD names specified in the DBD for the index database.

The data sets, if specified, must reside on DASD. If you use dynamic allocation, do not code the DD statement for the database data sets.



Attention: If this DD statement is coded, do not code DCB=BUFNO=*n* or AMP='BUFND=*n*' to request access method buffers for database data sets because HSSR Engine of IMS HP Unload allocates its own buffer pools.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“CONVERT command parameters” on page 51](#).

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

IHCLIST

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for reports. For more information about the reports generated in this data set, see [“IHCLIST data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

DBDPRINT

This statement is required. The statement defines the output data set for the assemble step of DBDGEN.

The data set can reside on DASD, or it can be routed through the output job.

LNKPRINT

This statement is required. The statement defines the output data set for the link step of DBDGEN.

The data set can reside on DASD, or it can be routed through the output job.

AMSPRINT

This statement is required. The statement defines the output data set for the IDCAMS utility.

The data set can reside on DASD, or it can be routed through the output job.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SR01MSGP

This statement is optional. The statement defines the message data set for sort processing.

If specified, this file is reallocated dynamically as:

```
//SR01MSGP DD SYSOUT=*.
```

This data set might be required for problem diagnosis of sort processing.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

IMSACB

This statement is required when ACBGEN(Y). The statement describes the staging ACBLIB where IMS HALDB Toolkit generates the new ACBs for the converted DBDs.

This data set must reside on DASD.

PSBLIB

This statement is required when ACBGEN(Y). The statement describes the PSB library to rebuild all PSBs in the ACB library that reference the DBD to be converted.

CONVERT command parameters

The following parameters are available to use with **CONVERT** command conversions.

IMS HALDB Toolkit ignores any parameters that are unavailable for the requested process.

Table 8. CONVERT command parameters

Parameter	Requirement	Description
ACBGEN	Optional	<p>Specifies to run the ACBGEN process during the takeover phase.</p> <p>When IMS manages the ACBs (ACBMGMT=CATALOG), ACBGEN(N) is forced.</p> <p>Format (Y N)</p> <p>Default value N</p>
BYTELIM	Optional	<p>Specifies a new maximum-insert-byte for the DBD.</p> <p>Format (1 - 16777215)</p> <p>Default value If omitted, the default action is to copy from the existing DBD.</p>
CONST	Optional	<p>Used as a substitute for the DBD name when building partition names. See also DBDPATT, INDPATT, and FIRSTPART parameters.</p> <p>Format (constant)</p> <p>Default value None.</p>
DATACLAS	Optional	<p>Specifies the name of the data class for the new SMS-managed databases and image copy data sets that IMS HALDB Toolkit dynamically allocates.</p> <p>Format (dataclass)</p> <p>Default value</p> <ul style="list-style-type: none">• For database data sets: If omitted, the default action is to copy from existing data sets.• For image copy data sets: None.

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
DATACLSL	Optional	<p>Specifies the name of the data class for the new SMS-managed ILDS data sets that IMS HALDB Toolkit dynamically allocates.</p> <p>If the database data sets of the primary database, from which the ILDS data sets are created, are encrypted OSAM data sets and have the Extended Addressability attribute, you must specify a data class without the Extended Addressability attribute for the ILDS data sets.</p> <p>If the database data sets, from which the ILDS data sets are created, do not have the Extended Addressability attribute, this parameter is ignored.</p> <p>Format (<i>dataclas</i>)</p> <p>Default value If omitted, the default action is to copy from existing data sets.</p>
DBD	Required	<p>Specifies which full-function database is to be converted.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DBDBACKUP	Optional	<p>Backs up the existing DBD to a specified library.</p> <p>This parameter includes a DDNAME that must be included in the JCL.</p> <p>When IMS manages the ACBs (ACBMGMT=CATALOG), this parameter is ignored.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>
DBDCOPY	Optional	<p>Copies the new DBD to your DBD library.</p> <p>If NEWDBD is not specified, DBDCOPY is set to Y.</p> <p>When IMS manages the ACBs (ACBMGMT=CATALOG), DBDCOPY(N) is forced.</p> <p>Format (Y N)</p> <p>Default value Y</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
DBDPATT	Optional	<p>Creates a partition name from the DBD.</p> <p>Format (ccccccc) where c is an asterisk (*) or a period (.). You can use a maximum of 6 asterisks (*) to identify the position in the DBD name. The default is 6 asterisks. When 6 are specified, only 1 character is used for the partition name, which creates a limit of 36 partitions. If fewer than 6 positions are specified, 1 - 3 characters are used for the partition name depending on the FIRSTPART parameter. You can also use periods (.) to ignore certain characters of the DBD name.</p> <p>Default value (*****.)</p>
DBDSOURCE	Optional	<p>Generates the DBD source for the converted HALDB and places it in the specified library.</p> <p>This parameter includes a DDNAME that must be included in the JCL.</p> <p>The data set that you specify for <i>dbdsorce</i> DD must be a partitioned data set (PDS) or a partitioned data set extended (PDSE) with LRECL=80 and RECFM=F. SYSOUT=* cannot be specified for this data set.</p> <p>Format (ddname)</p> <p>Default value None.</p>
DBRCBACK	Optional	<p>Backs up the existing DBRC to a specified library.</p> <p>This parameter includes a DDNAME that must be included in the JCL.</p> <p>The data set that you specify for <i>dbrcback</i> DD must be a partitioned data set (PDS) or a partitioned data set extended (PDSE) with LRECL=80 and RECFM=F. SYSOUT=* cannot be specified for this data set.</p> <p>Format (ddname)</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
DBRCOUT	Optional	<p>Specifies the name of the DD to which IMS HALDB Toolkit prints DBRC commands.</p> <p>Specify this parameter to generate DBRC commands. You must also specify the <i>dbrcout</i> DD statement in the JCL.</p> <p>You can specify <i>SYSOUT=*</i>, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with a member name with <i>LRECL=80</i> and <i>RECFM=F</i> to the <i>dbrcout</i> DD.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies <i>CATALOG=Y</i>, <i>ACBMGMT=CATALOG</i>, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
DSG1	Optional	<p>Changes a database with multiple data set groups into a database with a single data set group.</p> <p>Format (Y N)</p> <p>Default value N</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
DSNDBD	Optional	<p>Specifies the suffix portion of the new data set name that you are using.</p> <p>A total of 37 characters are allowed for the entire data set name, which includes the characters used for the DSNPREF prefix and the characters used for the DSNDBD suffix.</p> <p>Format (DBD PART DBDPART)</p> <p>DBD Add the DBD name to DSNPREF.</p> <p>PART Add the partition name to DSNPREF.</p> <p>DBDPART Add the DBD name and the partition name to DSNPREF.</p> <p>Default value DBD</p>
DSNPREF	Required	<p>Specifies a high-level data set name to be used when building new partition data set names.</p> <p>The DBRC DSNPREFX parameter is created from this specification and appended with the DBD name. The final data set name is then appended by DBRC with the DBD file letter and the partition number.</p> <p>Format (<i>dsnprefx</i>)</p> <p>Default value None.</p>
FBFF	Optional	<p>Specifies a new free block frequency factor (FBFF) to be used when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default action is to copy from the existing FBFF.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
FIRSTPART	Optional	<p>Identifies the partition name extension to be added to the name "stub" created by the DBDPATT and INDPATT parameters.</p> <p>The "stub" and the extension cannot exceed 7 characters.</p> <p>Format (ccc)</p> <p>ccc defines the character strings that are used, where:</p> <p>0 Defines a string from 0-9,A-Z. The partition number is used as an index. It creates a 1-character extension.</p> <p>A Defines a string from A-Z,0-9. The partition number is used as an index. It creates a 1-character extension.</p> <p>1 Defines a string from 1-9,A-Z. The partition number is used as an index. It creates a 1-character extension.</p> <p>01 Creates a 2-character numeric extension from 01-99. The partition number is used for the extension.</p> <p>AA Creates a 2-character extension from AA to 99. For example, AA,...,AZ,A0,...,A9,BA,...,Z9,0A,...</p> <p>001 Creates a 3-character numeric extension from 001-999. The partition number is used for the extension.</p> <p>Default value</p> <ul style="list-style-type: none"> • 0, if six asterisks (*) are specified on the DBDPATT parameter or the DBDPATT parameter is not specified. • AA, if five asterisks are specified on the DBDPATT parameter.
FSPF	Optional	<p>Specifies a new free space percentage value per interval or block (FSPF) to be used when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default action is to copy from the existing FSPF.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
GDGLIMIT	Optional	<p>Specifies the maximum number of GDG (generation data group) data sets that can be associated with the GDG. This value is used only when the GDG base does not exist and a GDG is created during the job.</p> <p>IMS HALDB Toolkit uses the value specified for this parameter when a GDG is requested for image copy data sets.</p> <p>If you specify one of the following parameters, the existence of a GDG base is verified before the image copy data set is allocated:</p> <ul style="list-style-type: none"> • ICTRLR(1) to request that image copy data sets are GDGs • &GDG is specified on the IC1DSN or IC2DSN parameter to request that image copy data sets are GDGs <p>If a GDG base does not exist, IMS HALDB Toolkit automatically defines one using the GDGLIMIT parameter value to control the number of generations to keep.</p> <p>Format (1 - 255)</p> <p>Default value 20</p>
IC.COMP	Optional	<p>Used for IMS High Performance Image Copy processing. This parameter specifies whether compression is used.</p> <p>If the copy is a standard image copy, this parameter is ignored.</p> <p>Format (Y N)</p> <p>Default value N</p>
IC.COMPRTN	Optional	<p>Used for IMS High Performance Image Copy processing. If IC.COMP(Y) is used, this parameter specifies the name of a compression routine.</p> <p>If the copy is a standard image copy, this parameter is ignored.</p> <p>Format (<i>comprtn</i>)</p> <p>Default value FABJCOMP1</p>
IC.VIC	Optional	<p>Specifies whether a virtual image copy is taken.</p> <p>Specify Y to activate IC.VIC and suppress the creation of image copies for all PSINDEXes. A NOTIFY.UIC is used instead.</p> <p>Format (Y N)</p> <p>Default value N</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
IC.VICDSN	Optional	<p>Activated only when IC.VIC(Y) is also specified.</p> <p>Specifies a string of up to 44 characters that are used as UDATA for the NOTIFY.UIC. The string must conform to z/OS and IMS data set name rules.</p> <p>Format (<i>dsname</i>)</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
IC1DSN	Optional	<p>This parameter provides an alternative to using the ICHLQ, ICID, ICMID, and ICTRLR parameters to specify the data set name for an image copy.</p> <p>Format (<i>dsname</i>)</p> <p>The data set name can contain variables. To specify a variable, use an ampersand (&). The following variables are supported:</p> <p>&JOBNAME Name of this job.</p> <p>&DBD The DBD name. This value changes to the first partition name when not all partitions are processed.</p> <p>&DDNAME The DD name of the database data set.</p> <p>&DATE1 This variable is substituted as <i>Dyyyyddd</i>.</p> <p>&DATE2 This variable is substituted as <i>Dddyyyy</i>.</p> <p>&DATE3 This variable is substituted as <i>Dddmmyy</i>.</p> <p>&DATE4 This variable is substituted as <i>Dmmdyy</i>.</p> <p>&DATE5 This variable is substituted as <i>Dyymmdd</i>.</p> <p>&TIME1 This variable is substituted as <i>Thhmmss</i>.</p> <p>&TIME2 This variable is substituted as <i>Thhmm</i>.</p> <p>&GDG The identifier for the GDG data set.</p> <p>If specified, &GDG must be the last value on the IC1DSN parameter.</p> <p>where:</p> <ul style="list-style-type: none"> • <i>yyyy</i> is the 4-digit year • <i>yy</i> is the last 2 digits of the year • <i>mm</i> is the month • <i>ddd</i> is the day of the year • <i>dd</i> is the day of the month • <i>hh</i> is the hour (24-hour clock) local time • <i>mm</i> is the minute • <i>ss</i> is the second <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
IC2DSN	Optional	<p>Specifies the secondary image copy data set name. To create the data set name, use the same method that is described for the IC1DSN keyword.</p> <p>You must specify a unique data set name.</p> <p>Format (<i>dsname</i>)</p> <p>Default value None.</p>
ICHLQ	Optional	<p>Specifies the high-level qualifier for the image copy data sets.</p> <p>Format (<i>ichlq</i>)</p> <p>Default value If omitted, the action defaults to DSNPREF.</p>
ICID	Optional	<p>Used to override the default (IC1 or IC2) for the suffix qualifier for dual image copy data sets.</p> <p>Format (1 2) or (Y N)</p> <p>Y is equivalent to 1, and N is equivalent to 2.</p> <p>Default value 1</p>
ICMID	Optional	<p>Specifies the mid-level data set qualifier for image copy data sets.</p> <p>Format (1 - 4)</p> <p>The ICMID parameter specifications render the following mid-level data set qualifiers:</p> <p>ICMID(1) <i>dbdname.ddname.</i></p> <p>ICMID(2) <i>dbdname.</i></p> <p>ICMID(3) <i>ddname.</i></p> <p>ICMID(4) None.</p> <p>Default value 3</p>
ICNUM	Optional	<p>Specifies single or dual image copies.</p> <p>Format (1 2)</p> <p>Default value 1</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
ICOFF	Optional	<p>Specifies that no image copies are to be taken, and turns off the ICNEEDED parameter.</p> <p>Format (Y N)</p> <p>Default value N</p>
ICTRLR	Optional	<p>Specifies whether to use another final suffix qualifier for image copy data sets.</p> <p>Format (1 - 6)</p> <p>The ICTRLR parameter specifications render the following final suffix qualifiers:</p> <p>ICTRLR(1) GDG</p> <p>ICTRLR(2) Dyymmdd.Thhmmss</p> <p>ICTRLR(3) Dmmdyy.Thhmmss</p> <p>ICTRLR(4) Dddmmyy.Thhmmss</p> <p>ICTRLR(5) None.</p> <p>ICTRLR(6) Dyyddd.Thhmmss</p> <p>Default value 2</p>
ICVOLCT	Optional	<p>Use this keyword to specify the number of volumes to allocate for image copy data sets.</p> <p>If an image copy data set requires more space than is available on a single volume, specify a value larger than 1.</p> <p>The ICVOLCT value is applied to all image copy data sets that are dynamically defined in the IMS HALDB Toolkit job.</p> <p>Format (1 - 20)</p> <p>Default value 1</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
IMSID	Optional	<p>Specifies the IMS ID to use when updating the IMS Library Integrity Utilities partition description.</p> <p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (nnnn)</p> <p>Default value If omitted, the default is obtained from the current SDFSRESL (DFSVC000).</p>
INDPART	Optional	<p>Specifies the number of index partitions.</p> <p>Cannot be used with INDSIZE.</p> <p>Format (1 - 999)</p> <p>Default value None.</p>
INDPATT	Optional	<p>Creates a partition name "stub" from the DBD name of a secondary index.</p> <p>Format (ccccccc) where c is an asterisk (*) or a period (.)</p> <p>This parameter is similar to DBDPATT. The "*" positions of the DBD name are kept to create the "name stub."</p> <p>You can use a maximum of 6 asterisks (*) to identify the position. The default is 6 asterisks.</p> <p>Default value DBDPATT is used. If neither DBDPATT nor INDPATT is specified, the default is (*****.).</p>
INDPRIM	Optional	<p>Specifies whether a secondary index is partitioned the same as the primary database.</p> <p>The following restrictions apply:</p> <ul style="list-style-type: none"> • The index key must be the root segment key. • The primary database must be partitioned using the KEYS parameter. <p>Format (Y N)</p> <p>Default value N</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
INDSIZE	Optional	<p>Specifies the size of each index partition.</p> <p>Cannot be used with INDPART.</p> <p>Format (1 - 4095)</p> <p>Default value 1024</p>
INITDB	Optional	<p>DDNAME in JCL that allows parameters to be added to the DBRC INIT.DB command, which are not currently specified by the product.</p> <p>This parameter can be specified in stream or in a data set.</p> <p>If no parameters are added, the defaults for the Global Service Group (GSG) are used.</p> <p>If specified, this parameter requires a DDNAME which must be included in the JCL.</p> <p>Any DBRC statements that you specify on the <i>initdb_dd</i> DD statement are included in the statements that are generated by the product. DBRC statements coded on the <i>initdb_dd</i> DD statement must conform to the syntax of the INIT.DB command. For the syntax rules, see the topic "INIT.DB command" in <i>IMS Commands</i>.</p> <p>Format (<i>initdb_dd</i>)</p> <p>Default value None.</p>
INITPART	Optional	<p>DDNAME in JCL that allows parameters to be added to the DBRC INIT.PART command, which are not currently specified by the product.</p> <p>IMS HALDB Toolkit uses the defaults for GENMAX, DFLTJCL, ICJCL, OICJCL, RECOVJCL, RECOVPD, RECVJCL, and NOREUSE.</p> <p>Any DBRC statements that you specify on the <i>initpart_dd</i> DD statement are included in the statements that are generated by the product. DBRC statements coded on the <i>initpart_dd</i> DD statement must conform to the syntax of the INIT.PART command. For the syntax rules, see the topic "INIT.PART command" in <i>IMS Commands</i>.</p> <p>Format (<i>initpart_dd</i>)</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
KEYLABEL	Optional	<p>Specifies the encryption key label for encrypting dynamically allocated database data sets and image copy data sets.</p> <p>The key label can be up to 64 bytes.</p> <p>Format (<i>keylabel</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
KEYLEN	Optional	<p>Specifies the length of the subkey when IHCPSEL0 is used.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value None.</p>
KEYOFF	Optional	<p>Specifies the offset within the root segment key to be used when IHCPSEL0 has been specified as PARTSEL.</p> <p>The offset must be at least 1.</p> <p>Offset 0 does not need a partition selection exit.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
KEYS	Optional	<p>Specifies a DD statement which contains records for the high keys; cannot be used with PARTNUM or PARTSIZE.</p> <p>This parameter can be specified as a character or hexadecimal.</p> <p>Specifying KEYS results in as many partitions as there are keys specified in the file. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies that no partition is larger than 4 GB.</p> <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>Format (<i>ddname</i>)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
MGMTCLAS	Optional	<p>Specifies a new SMS management class.</p> <p>Format (<i>mgmtclas</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
NEWDBD	Optional	<p>Specifies the DDNAME of the data set that contains the changed HALDB DBDs. This parameter is a DDNAME, which must be included in the JCL.</p> <p>If NEWDBD is not specified, a temporary data set is used. DBDCOPY is then reset to Y.</p> <p>When IMS manages the ACBs (ACBMGMT=CATALOG), this parameter is ignored.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>
ONLINE	Optional	<p>Specifies whether the batch conversion is to be performed while the databases remain online.</p> <p>ONLINE(Y) is not supported by IMS Database Utility Solution.</p> <p>Format (Y N)</p> <p>Default value N</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
OSAM	Optional	<p>Converts VSAM to OSAM.</p> <p>Format (Y N)</p> <p>Default value N</p>
OVFLINCR	Optional	<p>Increases HDAM overflow area by a number of blocks.</p> <p>Format (0 - 9999999)</p> <p>Default value None.</p>
PARTNUM	Optional	<p>Specifies the number of partitions to be created.</p> <p>PARTNUM cannot be used with PARTSIZE or KEYS. Specifying this parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>PARTNUM might not result in the exact number of partitions specified because a root segment and all of its dependent segments must be written to the same partition. Therefore, fewer than PARTNUM partitions might be created so that hierarchical integrity is preserved.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies that no partition is larger than 4 GB.</p> <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>Format (1 - 999)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PARTSEL	Optional	<p>Specifies a partition selection routine to be used.</p> <p>This parameter must be used with the KEYS parameter.</p> <p>IMS HALDB Toolkit provides an exit for partition selection (IHCPSEL0). When you use this exit, the database is partitioned using a subset of the key.</p> <p>If you use IHCPSEL0, you must also select the KEYOFF and KEYLEN parameters.</p> <p>Format (<i>partition_selection_routine</i>)</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
PARTSIZE	Optional	<p>Specifies the size of partitions that are created.</p> <p>PARTSIZE cannot be specified with PARTNUM or KEYS.</p> <p>Specifying the PARTSIZE parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>Format (1 - 8191)</p> <ul style="list-style-type: none"> • For a VSAM, 1 - 4095. • For a VSAM with the OSAM(Y) parameter, 1 - 8191. • For an OSAM, 1 - 8191. <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PTRCHECK	Optional	<p>Performs pointer checking during image copy.</p> <p>This parameter is ignored when using the standard IMS image copy.</p> <p>Format (Y N)</p> <p>Default value N</p>
RAAINCR	Optional	<p>Increases HDAM root addressable area (RAA) by a specified number of blocks.</p> <p>Format (0 - 26777215)</p> <p>Default value None.</p>
RAPS	Optional	<p>Specifies new PHDAM root anchor points (RAPs).</p> <p>Format (1 - 255)</p> <p>Default value If omitted, the default action is to copy from the existing RAPs.</p>
RELOAD.DBIOBUF	Optional	<p>Used for IMS High Performance Load processing. Specifies the number of tracks for the access method (VSAM or BSAM) buffers that are used for one database data set group when the database is read or written to.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (1 - 999)</p> <p>Default value 30</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
RELOAD.DBRLBUF	Optional	<p>Used for IMS High Performance Load processing. Specifies the number of database buffers (the number of tracks) to be used for one database data set group when the database is read or written to.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (1 - 999)</p> <p>Default value 45</p>
RELOAD.FRSPC	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load secures free space according to the specification of the FRSPC parameter in DBD.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.HPIO	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load uses the High Performance I/O Driver for output database data sets.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.OADSPR	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load reduces the usage of data space when processing the overflow area by using the High Performance I/O driver or by using an OVERFLOW DD. This specification is valid only for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
RELOAD.RAAFORMAT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load is to format HDAM or PHDAM RAA blocks regardless of the number of blocks used. Once the overflow area is used, this parameter is ignored and the entire RAA is formatted. This specification is valid only for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.SEARCH	Optional	<p>Used for IMS High Performance Load processing. Specifies the limit value for a space search algorithm that finds a segment that does not fit in its home block. This specification is valid for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (0 - 999)</p> <p>Default value 0</p>
RELOAD.SORT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether to run the physical sequential sort processing before loading. This specification is valid only for HDAM and PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>
RELOAD.SORTHIDAM	Optional	<p>Used for IMS High Performance Load processing. Specifies whether to run the sort processing before loading a HIDAM or a PHIDAM.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
RELOAD.USEREXIT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load invokes a user exit routine.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (<i>user_exit</i>)</p> <p>Default value None.</p>
SORTFSZ	Optional	<p>Specifies the estimated number of database records.</p> <p>The value is specified as FILSZ=Ex of OPTION control statement when calling sort processing.</p> <p>If SORTFSZ is not specified, IMS HALDB Toolkit estimates the number of database records.</p> <p>Format (1 - 999999999)</p> <p>Default value None.</p>
STORCLAS	Optional	<p>Specifies the name of the storage class for the new SMS-managed databases and image copy data sets that IMS HALDB Toolkit dynamically allocates.</p> <p>Format (<i>storclas</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
TAKEOVER.FILE	Optional	<p>Saves the takeover statements (DBRC and IDCAMS) to a specified data set.</p> <p>You can specify SYSOUT=*, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with LRECL=80 and RECFM=F.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
UNLSPAC	Optional	<p>Specifies a 4-digit numeric space allocation value for temporary data set allocations, for example, the unload file. Specify a numeric value for the number of cylinders to allocate to each temporary data set.</p> <p>If the number of cylinders to allocate to each temporary data set is omitted, IMS HALDB Toolkit determines the optimal value.</p> <p>The number of data sets that are allocated is determined by IMS HALDB Toolkit.</p> <p>Format (0 - 3000)</p> <p>Default value None.</p>
UNLUNIT	Optional	<p>Specifies any valid direct-access 8-character unit name for temporary data set allocations, for example, the unload file. These files are temporary files that default to SYSALLDA, unless otherwise specified.</p> <p>Format (<i>unitname</i>)</p> <p>Default value SYSALLDA</p>
VOLALLO	Optional	<p>Used to override the space allocation when creating the database data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p>nn The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLO is ignored.</p> <p>pppp The number of cylinders for the primary allocation. The maximum is 2000.</p> <p>ssss The number of cylinders for the secondary allocation. The maximum is 2000.</p> <p>Default value</p> <ul style="list-style-type: none"> • <i>nn</i>: 0 • <i>pppp</i>: 300 • <i>ssss</i>: 300

Table 8. CONVERT command parameters (continued)

Parameter	Requirement	Description
VOLALLOL	Optional	<p>Used to override the space allocation when creating the ILDS data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p>nn The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLOL is ignored.</p> <p>pppp The number of cylinders for the primary allocation.</p> <p>ssss The number of cylinders for the secondary allocation.</p> <p>Default value</p> <ul style="list-style-type: none">• <i>nn</i>: 0• <i>pppp</i>: None.• <i>ssss</i>: None.
VOLALLOX	Optional	<p>Used to override the space allocation when creating the primary index data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p>nn The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLOX is ignored.</p> <p>pppp The number of cylinders for the primary allocation.</p> <p>ssss The number of cylinders for the secondary allocation.</p> <p>Default value</p> <ul style="list-style-type: none">• <i>nn</i>: 0• <i>pppp</i>: None.• <i>ssss</i>: None.

CONVERT examples

Use the following examples to learn what you can do with the CONVERT function.

- [“CONVERT example: Specifying the number of partitions ” on page 73](#)
- [“CONVERT example: Specifying the partition size” on page 73](#)
- [“CONVERT example: Specifying the key ranges for partitions” on page 74](#)
- [“CONVERT example: Preparing a staging data set before converting a database when the IMS management of ACBs is enabled” on page 76](#)

- [“CONVERT example: Converting a database when the IMS management of ACBs is enabled” on page 77](#)
- [“CONVERT example: Generating DBRC commands” on page 78](#)

CONVERT example: Specifying the number of partitions

If you know how many partitions you intend to convert to, you can use the PARTNUM parameter to specify this number.

To specify the number of partitions, use the sample member IHCECVT1. The following example converts a database into two partitions:

```
//JOBNAME      JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*           SAMPLE JCL FOR CONVERT - using PARTNUM method
//*
//* Your databases must be registered to DBRC
//* You must /dbr your databases prior to executing this job
//* unless you use ONLINE(Y) and have Online Reorg installed
//*****
//S2          EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB    DD DISP=SHR,DSN=your.SIHCLoad <=== your hcma loadlib
//           DD DISP=SHR,DSN=your.SDFSRESL <=== ims reslib
//           DD DISP=SHR,DSN=your.SHPSLMD0 <=== ims tools loadlib
//DFSRESLB   DD DISP=SHR,DSN=your.SDFSRESL <=== ims reslib
//MACLIB     DD DISP=SHR,DSN=your.SDFSMAc <=== ims maclib
//IMS        DD DISP=SHR,DSN=your.dbdlib <=== ims dbdlib
//IMSDALIB   DD DISP=SHR,DSN=your.mdalib <=== ims mdalib
//SYSPRINT   DD SYSOUT=*
//MSGPRINT   DD SYSOUT=*
//DBDPRINT   DD SYSOUT=*
//LNKPRINT   DD SYSOUT=*
//AMSPRINT   DD SYSOUT=*
//SYSUDUMP   DD SYSOUT=*
//IHCLIST    DD SYSOUT=*
//IHCSYSIN   DD *
  CONVERT    ONLINE(N) -
            PARTNUM(2) -
            DBDPATT(*****...) DSNPREF(DBSMS.DB) -
            DBD(xxx) -
            ICMID(3) -
            ICHLQ(DBSMS.DB.IC) -
            ICTRLR(2) -
            IC.COMP(Y) -
            IC.COMPRTN(FABJCMP2) -
            PTRCHECK(Y)
```

Figure 7. Sample JCL (IHCECVT1) for batch using PARTNUM

CONVERT example: Specifying the partition size

If you know how large you want each partition to be, you can use the PARTSIZE parameter to specify this number.

To specify the size of partitions, use the member IHCECVT2. The following example converts a database into partitions each with a size of 2048 MB.

```

//JOBNAME    JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*          SAMPLE JCL FOR CONVERT - using PARTSIZE method
//*
//* Your databases must be registered to DBRC
//* You must /dbr your databases prior to executing this job
//* unless you use ONLINE(Y) and have Online Reorg installed
//*****
//S2        EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB   DD DISP=SHR,DSN=your.SIHCLoad    <=== your hcma loadlib
//          DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//          DD DISP=SHR,DSN=your.SHPSLMD0    <=== ims tools loadlib
//DFSRESLB  DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//MACLIB    DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//IMS       DD DISP=SHR,DSN=your.dbdlib      <=== ims dbdlib
//IMSDALIB  DD DISP=SHR,DSN=your.mdalib     <=== ims mdalib
//SYSPRINT  DD SYSOUT=*
//MSGPRINT  DD SYSOUT=*
//DBDPRINT  DD SYSOUT=*
//LNKPRINT  DD SYSOUT=*
//AMSPRINT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//IHCLIST   DD SYSOUT=*
//IHCSYSIN  DD *
//          CONVERT ONLINE(N) -
//          PARTSIZE(2048) -
//          DBDPATT(*****...) DSNPREF(DBSMS.DB) -
//          DBD(***x) -
//          ICMID(3) -
//          ICHLQ(DBSMS.DB.IC) -
//          ICTRLR(2) -
//          IC.COMP(Y) -
//          IC.COMPRTN(FABJCMP2) -
//          PTRCHECK(Y)

```

Figure 8. Sample JCL (IHCECVT2) for batch using PARTSIZE

CONVERT example: Specifying the key ranges for partitions

If you want to assign specific key ranges to partitions, you can use the KEYS parameter to specify an input data set containing the keys. The KEYS parameter specifies the high key boundaries for each partition.

To specify the ranges for partitions, use the member IHCECVT3. The following example converts a database into two partitions with each partition containing the keys up to the specified high key boundary.

```

//JOBNAME   JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*          SAMPLE JCL FOR CONVERT - using KEYS method
//*
//* Your databases must be registered to DBRC
//* You must /dbr your databases prior to executing this job
//*****
//S2        EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB   DD DISP=SHR,DSN=your.SIHCLoad    <=== your hcma loadlib
//          DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//          DD DISP=SHR,DSN=your.SHPSLMD0    <=== ims tools loadlib
//DFSRESLB  DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//MACLIB    DD DISP=SHR,DSN=your.SDFSMAc    <=== ims maclib
//IMS       DD DISP=SHR,DSN=your.dbdlib     <=== ims dbdlib
//IMSDALIB  DD DISP=SHR,DSN=your.mdalib     <=== ims mdalib
//SYSPRINT  DD SYSOUT=*
//MSGPRINT  DD SYSOUT=*
//DBDPRINT  DD SYSOUT=*
//LNKPRINT  DD SYSOUT=*
//AMSPRINT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//IHCLIST   DD SYSOUT=*
//*****
//*KEYSIN   DD * (documentation only)
//* your first high-order key for partition1
//* your second high-order key for partition2 and so on...
//* your highest key for last partition
//*****
//KEYSIN    DD *
M999999999
Z999999999
//IHCSYSIN DD *
  CONVERT  ONLINE(N) -
           KEYS(KEYSIN) -
           DBDPATT(*****...) DSNPREF(DBSMS.DB) -
           DBD(***x) -
           ICMID(3) -
           ICHLQ(DBSMS.DB.IC) -
           ICTRLR(2) -
           IC.COMP(Y) -
           IC.COMPRTN(FABJcMP2) -
           PTRCHECK(Y)

```

Figure 9. Sample JCL (IHCECVT3) for batch using KEYS

CONVERT example: Preparing a staging data set before converting a database when the IMS management of ACBs is enabled

This example shows JCL statements to prepare a staging data set before converting a database in an IMS managed ACBs environment.

```
//*****
//*      Generate HALDB DBD source
//*****
//STEP1  EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB DD DISP=SHR,DSN=IMSTOOLS.SIHCLoad <=== hcma loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SHPSLMD0 <=== ims tools loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SGLXLOAD <=== ims tools base loadlib
//        DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//        DD DISP=SHR,DSN=IMS.MDALIB <=== ims mdalib
//DFSRESLB DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//PROCLIB DD DISP=SHR,DSN=IMS.PROCLIB <=== ims proclib
//MSGPRINT DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
    ANALYZEPART DBD(***x) -
                DBDSRCONLY(Y) -
                DBDSOURCE(dbdsource) -
                DFSDF(CAT)
//dbdsource DD DISP=(,CATLG),DSN=your.DBDSRC.NEW,
//          UNIT=SYSDA,SPACE=(TRK,(3,1,5)),
//          DCB=(RECFM=FB,LRECL=80,BLKSIZE=8000)
/*
//*****
//*      DBDGEN
//*****
//STEP2  EXEC DBDGEN,M=***x
//C.SYSIN DD DISP=SHR,DSN=your.DBDSRC.NEW(***x)
/*
//*****
//*      ACBGEN
//*****
//STEP3  EXEC PGM=DFSRR00,PARM='UPB,'
//STEPLIB DD DISP=SHR,DSN=IMS.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=IMS.SDFSRESL
//IMS DD DISP=SHR,DSN=IMS.PSBLIB
//        DD DISP=SHR,DSN=IMS.DBDLIB.NEW
//IMSACB DD DISP=SHR,DSN=IMS.ACBLIB
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
    BUILD DBD=(***x)
/*
//*****
//*      IMS Catalog Populate utility
//*      Create staging data set
//*****
//STEP4  EXEC PGM=DFS3PU00,
//          PARM=(DLI,DFS3PU00,DFSCP001,,,,,,,,,Y,N,,,,,,,,,
//          ,,'DFSDF=001')
//STEPLIB DD DISP=SHR,DSN=IMS.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=IMS.SDFSRESL
//IMS DD DISP=SHR,DSN=IMS.PSBLIB
//        DD DISP=SHR,DSN=IMS.DBDLIB
//PROCLIB DD DISP=SHR,DSN=IMS.PROCLIB
//SYSABEND DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//IEFRDER DD DSN=&&IMSLOG1,DISP=(NEW,DELETE),
//          DCB=(RECFM=VB,LRECL=4092,BLKSIZE=4096,BUFNO=5),
//          SPACE=(CYL,(1,5)),UNIT=SYSDA
//IEFRDER2 DD DSN=&&IMSLOG2,DISP=(NEW,DELETE),
//          DCB=(RECFM=VB,LRECL=4092,BLKSIZE=4096,BUFNO=5),
//          SPACE=(CYL,(1,5)),UNIT=SYSDA
//DFSVSAMP DD *
VSRBF=32768,4
IOBF=(32K,4)
/*
//IMSACB01 DD DISP=SHR,DSN=IMS.ACBLIB
//SYSIN DD *
    MANAGEDACBS=STAGE
/*
```

Figure 10. Sample JCL stream to prepare a staging data set before converting a database in an IMS managed ACBs environment

Step 1: Generate HALDB DBD source

- To generate DBD source for the converted HALDB, specify the DBDSOURCE parameter to the ANALYZEPART command.
- The DFSDF(CAT) parameter in IHCSYSIN and the PROCLIB DD statement specify the DFSDFCAT PROCLIB member that contains the IMS catalog definition.
- If you include the IMS Catalog Definition exit routine (DFS3CDX0) in the STEPLIB concatenation, you do not need to specify the DFSDF parameter and the PROCLIB DD statement.
- The SGLXLOAD library of IBM IMS Tools Base must be in the STEPLIB concatenation.
- The library containing the DFSMDA member with TYPE=CATDSDLQ statement must be in the STEPLIB concatenation if the DFSMDA member is used to specify the high-level qualifier of the IMS catalog system data sets.
- The IMS DD statement is not needed.

Step 2: Run the DBDGEN utility

- Run the DBDGEN utility by using the DBD source generated in step 1 as input.
- You can use a temporary DBDLIB.

Step 3: Run the ACBGEN utility

- Run the ACBGEN utility to generate ACB members, which will be used as input for the IMS Catalog Populate utility.

Step 4: Create a staging data set

- To create a staging data set, run the IMS Catalog Populate utility. For details, see the topic "IMS Catalog Populate utility (DFS3PU00)" in *IMS System Utilities*.

CONVERT example: Converting a database when the IMS management of ACBs is enabled

This example shows JCL statements to convert a database in an IMS managed ACBs environment.

```
//S2      EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB DD DISP=SHR,DSN=IMSTOOLS.SIHCLoad <=== hcma loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SHPSLMD0 <=== ims tools loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SGLXLOAD <=== ims tools base loadlib
//        DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//        DD DISP=SHR,DSN=IMS.MDALIB <=== ims mdalib
//DFSRESLB DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//PROCLIB DD DISP=SHR,DSN=IMS.PROCLIB <=== ims proclib
//MACLIB  DD DISP=SHR,DSN=IMS.SDFSMAC <=== ims maclib
//SYSPRINT DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//DBDPRINT DD SYSOUT=*
//LNKPRINT DD SYSOUT=*
//AMSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
  CONVERT ONLINE(N) -
    PARTNUM(2) -
    DBDPATT(*****...) DSNPREF(DBSMS.DB) -
    DBD(####) -
    ICMID(3) -
    ICHLQ(DBSMS.DB.IC) -
    ICTRLR(2) -
    IC.COMP(Y) -
    IC.COMPRTN(FABJCOMP2) -
    PTRCHECK(Y) -
    DFSDF(CAT)
```

Figure 11. Sample JCL stream to convert a database in an IMS managed ACBs environment

- The DFSDF(CAT) parameter in IHCSYSIN and the PROCLIB DD statement specify the DFSDFCAT PROCLIB member that contains the IMS catalog definition.

- If you include the IMS Catalog Definition exit routine (DFS3CDX0) in the STEPLIB concatenation, you do not need to specify the DFSDF parameter and the PROCLIB DD statement.
- The SGLXLOAD library of IBM IMS Tools Base must be in the STEPLIB concatenation.
- The library containing the DFSMDA member with TYPE=CATDSDLQ statement must be in the STEPLIB concatenation if the DFSMDA member is used to specify the high-level qualifier of the IMS catalog system data sets.
- The IMS DD statement is not needed.

CONVERT example: Generating DBRC commands

When you convert a database to a HALDB by using the CONVERT command, you can optionally specify the DBRCOUT parameter to save a set of DBRC commands, which are issued during the Takeover phase, for the Database Recovery Control (DBRC) utility (DSPURX00).

To generate DBRC commands, add the DBRCOUT parameter to the CONVERT command and the *dbrcout* DD statement, as shown in the following example:

```
//dbrcout DD SYSOUT=*
//IHCSYSIN DD *
  CONVERT DBD(xxxx) -
          DSNPREF(DBSMS.DB) -
          ICHLQ(DBSMS.IC) -
          PARTNUM(5) -
          DBRCOUT(dbrcout)
```

The DBRCOUT parameter value (*dbrcout*) specifies the name of the DD to which IMS HALDB Toolkit writes the DBRC commands.

Out of the DBRC commands issued during the Takeover phase, the following can be used as output DD specified in the DBRCOUT parameter:

- DELETE.DB
- INIT.DB
- INIT.PART

The resulting DBRC commands will look like the following example.

```
DELETE.DB DBD(TESTDB01)
/*RESTART*/
/*RC0*/
INIT.DB DBD(TESTDB01) -
  SHARELVL(0) -
  TYPHALDB
INIT.PART DBD(TESTDB01) PART(TEST001) -
  KEYSTRNG(A999999999) -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST001)
INIT.PART DBD(TESTDB01) PART(TEST002) -
  KEYSTRNG(B999999999) -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST002)
INIT.PART DBD(TESTDB01) PART(TEST003) -
  KEYSTRNG(X'FF') -
  BLOCKSZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST003)
```

Part 4. Maintaining HALDBs

In batch mode, you can perform maintenance on HALDB partitions by using the **MAINTAIN** command. Use the **MAINTAIN** command to consolidate, split, and reorganize partitions.

Instead of using the **MAINTAIN** command in batch mode, you can alternatively use the ISPF user interface to perform the same tasks.

By using batch mode, you can:

- Merge two HALDBs into one, which provides the capability to resolve user partitioning
- Provide a way to delete single partitions without rebuilding secondary indexes

Topic:

- [Chapter 4, “Maintaining HALDB using MAINTAIN,” on page 81](#)

Chapter 4. Maintaining HALDB using MAINTAIN

Use the **MAINTAIN** command to perform maintenance tasks on a database in batch mode.

Topics:

- “MAINTAIN data flow” on page 81
- “Maintaining databases offline” on page 82
- “MAINTAIN DD statements” on page 83
- “MAINTAIN command parameters” on page 86
- “How the MAINTAIN function works when adding, deleting, naming partitions, and how to use a KEYSORDR(Y) parameter” on page 105
- “MAINTAIN examples” on page 112

MAINTAIN data flow

The following figure shows the data flow for the MAINTAIN function.

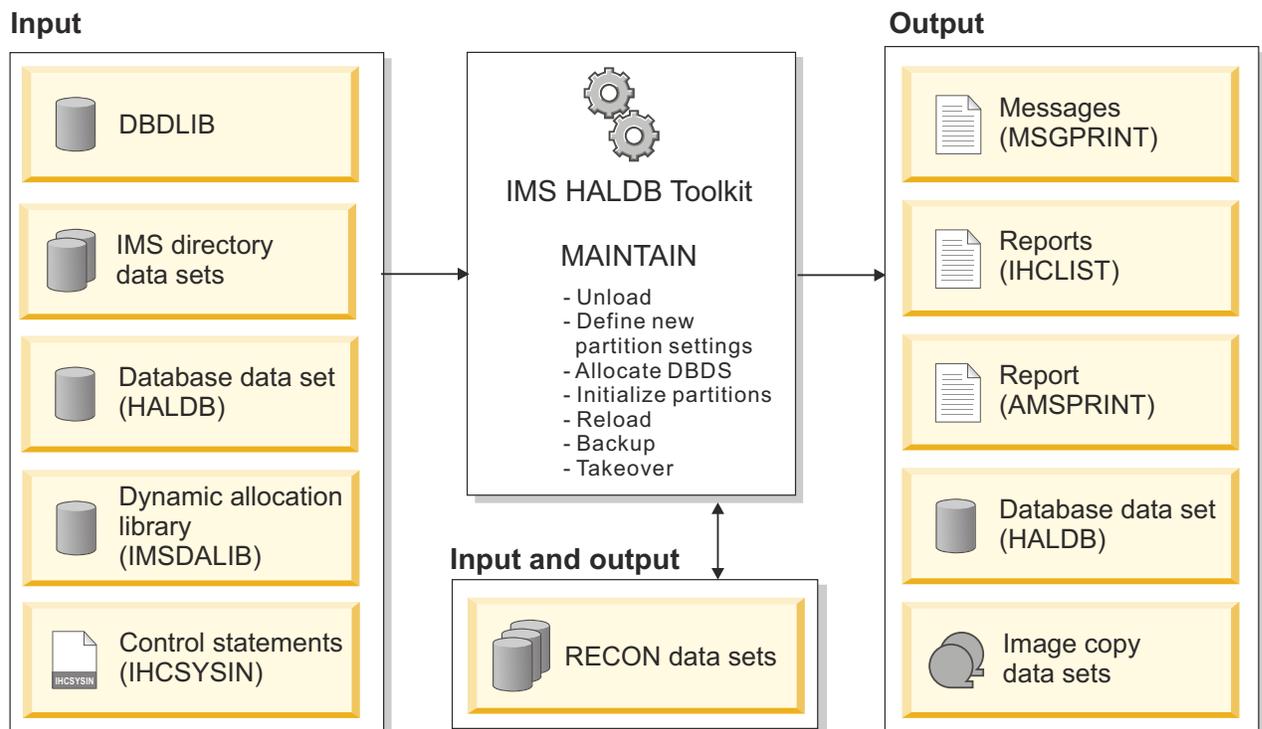


Figure 12. MAINTAIN data flow

The MAINTAIN function performs all of the following processes in a single job step:

- Unload
- Define new partition settings
- Allocate DBDS
- Initialize partitions
- Reload
- Backup

- Takeover

Maintaining databases offline

You can maintain HALDBs offline by using the **MAINTAIN** command and the batch process.

About this task

Alternatively, you can use the ISPF user interface to perform the same offline maintenance tasks.

Restriction: Databases with logical relationships (except for indexes) are not supported.

Procedure

1. Take the databases offline manually.

Databases must be offline before beginning any maintenance task.

2. Specify the JCL DD statements.

For a list of DD statements, see “[MAINTAIN DD statements](#)” on page 83.

3. Specify the MAINTAIN command parameters.

For a list of MAINTAIN command parameters, see “[MAINTAIN command parameters](#)” on page 86.

You can perform several functions by using the **MAINTAIN** command. The following table lists some of the most common functions:

Table 9. Common MAINTAIN functions

Scenario	MAINTAIN parameters	KEYSIN input
Consolidate two partitions into one using PARTNUM	MAINTAIN DBD(<i>xxxx</i>) - PARTLIST(<i>part1,part2</i>) - PARTNUM(1)	Not applicable
Consolidate all partitions into one using one key (highest key)	MAINTAIN DBD(<i>xxxx</i>) - PARTITION(*) - KEYS(<i>keysin</i>)	//KEYSIN DD * <i>highest-key</i>
Split one partition into two using PARTNUM	MAINTAIN DBD(<i>xxxx</i>) - PARTITION(<i>part1</i>) - PARTNUM(2)	Not applicable
Split one large partition into 2048 MB size partitions using PARTSIZE	MAINTAIN DBD(<i>xxxx</i>) - PARTITION(<i>bigpart2</i>) - PARTSIZE(2048)	Not applicable
Split one partition into three using your own key boundaries	MAINTAIN DBD(<i>xxxx</i>) - PARTITION(<i>part1</i>) - KEYS(KEYSIN)	//KEYSIN DD * <i>smaller-high-key</i> <i>middle-high-key</i> <i>last-high-key-part1</i>
Add, change, or delete partitions such that four partitions result, and that their high-keys are assigned in EBCDIC order based on the high-keys found in KEYSIN	MAINTAIN DBD(<i>xxxx</i>) PARTITION(*) - KEYS(KEYSIN) KEYSORDR(Y)	//KEYSIN DD * A999 G999 M999 Z999

Table 9. Common MAINTAIN functions (continued)

Scenario	MAINTAIN parameters	KEYSIN input
Reorganize one partition without any changes	MAINTAIN DBD(<i>xxxx</i>) - PARTITION(<i>part3</i>) - PARTNUM(1)	Not applicable

You can also refer to the following examples to code MAINTAIN JCL statements and command parameters:

- [“MAINTAIN example: Specifying the number of partitions” on page 112](#)
- [“MAINTAIN example: Specifying the partition size” on page 113](#)
- [“MAINTAIN example: Specifying the key ranges for partitions” on page 114](#)
- [“MAINTAIN example: Maintaining a database when the IMS management of ACBs is enabled” on page 116](#)
- [“MAINTAIN example: Generating DBRC commands” on page 116](#)

Related reference

[How the MAINTAIN function works when adding, deleting, naming partitions, and how to use a KEYSORDR\(Y\) parameter](#)

Learn how the MAINTAIN function adds, deletes, names partitions, and how to use a KEYSORDR(Y) parameter.

[Performance tips and considerations](#)

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

MAINTAIN DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **MAINTAIN** command.

Table 10. DD statements and record format for the MAINTAIN command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input/Output	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
IHCLIST	Output	LRECL=133	Optional
AMSPRINT	Output	LRECL=133	Required
TRACE	Output	LRECL=133	Optional
SR01MSGP	Output	LRECL=133	Optional

Table 10. DD statements and record format for the MAINTAIN command (continued)

DD name	Use	Format	Need
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

Even if IMS High Performance Load modules are found in the combined load library of IMS solution pack in the STEPLIB concatenation, when the MAINTAIN function processes PSINDEXEs, the function uses DFSURGL0 (HD Reorganization Reload utility) in this library to reload PSINDEXEs.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“MAINTAIN command parameters” on page 86](#).

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

IHCLIST

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for reports. For more information about the reports generated in this data set, see [“IHCLIST data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

AMSPRINT

This statement is required. The statement defines the output data set for the IDCAMS utility.

The data set can reside on DASD, or it can be routed through the output job.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SR01MSGP

This statement is optional. The statement defines the message data set for sort processing.

If specified, this file is reallocated dynamically as:

```
//SR01MSGP DD SYSOUT=*
```

This data set might be required for problem diagnosis of sort processing.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend,

this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

MAINTAIN command parameters

The following parameters are available to use with **MAINTAIN** command maintenance tasks.

IMS HALDB Toolkit ignores any parameters that are unavailable for the requested process.

Table 11. MAINTAIN command parameters

Parameter	Requirement	Description
BYTELIM	Optional	<p>Specifies a new maximum-insert-byte for the DBD.</p> <p>Format (1 - 16777215)</p> <p>Default value If omitted, the default action is to copy from the existing DBD.</p>
CONST	Optional	<p>Used as a substitute for the DBD name when building partition names. See also DBDPATT and FIRSTPART parameters.</p> <p>Format (<i>constant</i>)</p> <p>Default value None.</p>
DATACLAS	Optional	<p>Specifies the name of the data class for the new SMS-managed databases and image copy data sets that IMS HALDB Toolkit dynamically allocates.</p> <p>Format (<i>dataclass</i>)</p> <p>Default value</p> <ul style="list-style-type: none">• For database data sets: If omitted, the default action is to copy from existing data sets.• For image copy data sets: None.
DBD	Required	<p>Specifies which HALDB DBD is to be maintained.</p> <p>The value must be a HALDB master name and it cannot be a partition name.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
DBDPATT	Optional	<p>Creates a partition name from the DBD.</p> <p>Format (ccccccc) where <i>c</i> is an asterisk (*) or a period (.). You can use a maximum of 6 asterisks (*) to identify the position in the DBD name. The default is 6 asterisks. When 6 positions are specified, only 1 character is used for the partition name, creating a limit of 36 partitions. If fewer than 6 positions are specified, 1 - 3 characters are used for the partition name depending on the FIRSTPART parameter. You can also use periods (.) to specify that certain characters of the DBD name are ignored.</p> <p>Default value (*****.)</p>
DBRCOUT	Optional	<p>Specifies the name of the DD to which IMS HALDB Toolkit prints DBRC commands.</p> <p>Specify this parameter to generate DBRC commands. You must also specify the <i>dbrcout</i> DD statement in the JCL.</p> <p>You can specify SYSOUT=*, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with a member name with LRECL=80 and RECFM=F to the <i>dbrcout</i> DD.</p> <p>Format (ddname)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (ddd)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
DSNDBD	Optional	<p>Specifies the suffix portion of the new data set name that you are using.</p> <p>A total of 37 characters are allowed for the entire data set name, which includes the characters used for the DSNPREF prefix and the characters used for the DSNDBD suffix.</p> <p>Format (DBD PART DBDPART)</p> <p>DBD Add the DBD name to DSNPREF.</p> <p>PART Add the partition name to DSNPREF.</p> <p>DBDPART Add the DBD name and the partition name to DSNPREF.</p> <p>Default value DBD</p>
DSNPREF	Required	<p>Specifies a high-level data set name to use when building new partition data set names.</p> <p>The DBRC DSNPREFX parameter is created from this specification and is appended with the DBD name.</p> <p>The final data set name is then appended by DBRC with the DBD file letter and the partition name.</p> <p>Format (<i>dsnprefix</i>)</p> <p>Default value None.</p>
FBFF	Optional	<p>Specifies a new free block frequency factor (FBFF) to use when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default is to copy from the existing FBFF.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
FIRSTPART	Optional	<p>Identifies the partition name extension to be added to the name "stub" created by the DBDPATT parameter.</p> <p>The "stub" and the extension cannot exceed 7 characters.</p> <p>Format (ccc)</p> <p>ccc defines the character string that is used, where:</p> <p>0 Defines a string from 0-9,A-Z. The partition number is used as an index. It creates a 1-character extension.</p> <p>A Defines a string from A-Z,0-9. The partition number is used as an index. It creates a 1-character extension.</p> <p>1 Defines a string from 1-9,A-Z. The partition number is used as an index. It creates a 1 character extension.</p> <p>01 Creates a 2-character numeric extension from 01-99. The partition number is used for the extension.</p> <p>AA Creates a 2-character extension from AA to 99. For example, AA,...,AZ,A0,...,A9,BA,...,Z9,0A,...</p> <p>001 Creates a 3-character numeric extension from 001-999. The partition number is used for the extension.</p> <p>Default value</p> <ul style="list-style-type: none"> • 0, if six asterisks (*) are specified on the DBDPATT parameter or the DBDPATT parameter is not specified. • AA, if five asterisks are specified on the DBDPATT parameter.
FSPF	Optional	<p>Specifies a new free space percentage value for each interval or block (FSPF) to use when defining a partition.</p> <p>Format (0 - 99)</p> <p>Default value If omitted, the default action is to copy from the existing FSPF.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
GDGLIMIT	Optional	<p>Specifies the maximum number of GDG (generation data group) data sets that can be associated with the GDG. This value is used only when the GDG base does not exist and a GDG is created during the job.</p> <p>IMS HALDB Toolkit uses the value specified for this parameter when a GDG is requested for image copy data sets.</p> <p>If you specify one of the following parameters, the existence of a GDG base is verified before the image copy data set is allocated:</p> <ul style="list-style-type: none"> • ICTRLR(1) to request that image copy data sets are GDGs • &GDG is specified on the IC1DSN or IC2DSN parameter to request that image copy data sets are GDGs <p>If a GDG base does not exist, IMS HALDB Toolkit automatically defines one using the GDGLIMIT parameter value to control the number of generations to keep.</p> <p>Format (1 - 255)</p> <p>Default value 20</p>
IC.COMP	Optional	<p>Used for IMS High Performance Image Copy processing. This parameter specifies whether compression is used.</p> <p>If the copy is a standard image copy, this parameter is ignored.</p> <p>Format (Y N)</p> <p>Default value N</p>
IC.COMPRTN	Optional	<p>Used for IMS High Performance Image Copy processing. If IC.COMP(Y) is used, this parameter specifies the name of a compression routine.</p> <p>If the copy is a standard image copy, this parameter is ignored.</p> <p>Format (<i>comprtn</i>)</p> <p>Default value FABJCOMP1</p>
IC.VIC	Optional	<p>Specifies whether a virtual image copy is taken.</p> <p>Specify Y to activate IC.VIC and suppress the creation of image copies for all PSINDEXes. A NOTIFY.UIC is used instead.</p> <p>Format (Y N)</p> <p>Default value N</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
IC.VICDSN	Optional	<p>Activated only when IC.VIC(Y) is also specified.</p> <p>Specifies a string of up to 44 characters that is used as UDATA for the NOTIFY.UIC.</p> <p>The string must conform to z/OS and IMS data set name rules.</p> <p>Format (<i>dsname</i>)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
IC1DSN	Optional	<p>This parameter provides an alternative to using the ICHLQ, ICID, ICMID, and ICTRLR parameters to specify the data set name for an image copy.</p> <p>Format (<i>dsname</i>)</p> <p>The data set name can contain variables. To specify a variable, use an ampersand (&). The following variables are supported:</p> <p>&JOBNAME Name of this job.</p> <p>&DBD The DBD name. This value changes to the first partition name when not all partitions are processed.</p> <p>&DDNAME The DD name of the database data set.</p> <p>&DATE1 This variable is substituted as <i>Dyyyyddd</i>.</p> <p>&DATE2 This variable is substituted as <i>Dddyyyy</i>.</p> <p>&DATE3 This variable is substituted as <i>Dddmmyy</i>.</p> <p>&DATE4 This variable is substituted as <i>Dmmdyy</i>.</p> <p>&DATE5 This variable is substituted as <i>Dyymmdd</i>.</p> <p>&TIME1 This variable is substituted as <i>Thhmss</i>.</p> <p>&TIME2 This variable is substituted as <i>Thhmm</i>.</p> <p>&GDG The identifier for the GDG data set.</p> <p>If specified, &GDG must be the last value on the IC1DSN parameter.</p> <p>where:</p> <ul style="list-style-type: none"> • <i>yyyy</i> is the 4-digit year • <i>yy</i> is the last 2 digits of the year • <i>mm</i> is the month • <i>ddd</i> is the day of the year • <i>dd</i> is the day of the month • <i>hh</i> is the hour (24-hour clock) local time • <i>mm</i> is the minute • <i>ss</i> is the second <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
IC2DSN	Optional	<p>Specifies the secondary image copy data set name. To create the data set name, use the same method that is described for the IC1DSN keyword.</p> <p>You must specify a unique data set name.</p> <p>Format (<i>dsname</i>)</p> <p>Default value None.</p>
ICHLQ	Optional	<p>Specifies the high-level qualifier (HLQ) for the image copy data sets.</p> <p>Format (<i>ichlq</i>)</p> <p>Default value If omitted, defaults to DSNPREF.</p>
ICID	Optional	<p>Used to override the default (IC1 or IC2) for the suffix qualifier for dual image copy data sets.</p> <p>Format (1 2) or (Y N)</p> <p>Y is equivalent to 1, and N is equivalent to 2.</p> <p>Default value 1</p>
ICMID	Optional	<p>Specifies the mid-level data set qualifier for image copy data sets.</p> <p>Format (1 - 4)</p> <p>The ICMID parameter specifications render the following mid-level data set qualifiers:</p> <p>ICMID(1) <i>dbdname.ddname.</i></p> <p>ICMID(2) <i>dbdname.</i></p> <p>ICMID(3) <i>ddname.</i></p> <p>ICMID(4) None.</p> <p>Default value 3</p>
ICNUM	Optional	<p>Specifies single or dual image copies.</p> <p>Format (1 2)</p> <p>Default value 1</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
ICOFF	Optional	<p>Specifies that no image copies are to be taken, and turns off the ICNEEDED parameter.</p> <p>Format (Y N)</p> <p>Default value N</p>
ICTRLR	Optional	<p>Specifies whether to use another final suffix qualifier for image copy data sets.</p> <p>Format (1 - 6)</p> <p>The ICTRLR parameter specifications render the following final suffix qualifiers:</p> <p>ICTRLR(1) GDG</p> <p>ICTRLR(2) <i>Dyymmdd.Thhmmss</i></p> <p>ICTRLR(3) <i>Dmmdyy.Thhmmss</i></p> <p>ICTRLR(4) <i>Dddmmyy.Thhmmss</i></p> <p>ICTRLR(5) None.</p> <p>ICTRLR(6) <i>Dyyddd.Thhmmss</i></p> <p>Default value 2</p>
ICVOLCT	Optional	<p>Use this keyword to specify the number of volumes to allocate for image copy data sets.</p> <p>If an image copy data set requires more space than is available on a single volume, specify a value larger than 1.</p> <p>The ICVOLCT value is applied to all image copy data sets that are dynamically defined in the IMS HALDB Toolkit job.</p> <p>Format (1 - 20)</p> <p>Default value 1</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
IMSID	Optional	<p>Specifies the IMS ID to use when updating the IMS Library Integrity Utilities partition description.</p> <p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (nnnn)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
INITPART	Optional	<p>DDNAME in JCL that allows parameters that are not currently specified by the product to be added to the DBRC INIT.PART command.</p> <p>IMS HALDB Toolkit uses the defaults for GENMAX, DFLTJCL, ICJCL, OICJCL, RECOVJCL, RECOVPD, RECVJCL, and NOREUSE.</p> <p>Any DBRC statements that you specify on the <i>initpart_dd</i> DD statement are included in the statements that are generated by the product. DBRC statements coded on the <i>initpart_dd</i> DD statement must conform to the syntax of the INIT.PART command. For the syntax rules, see the topic "INIT.PART command" in <i>IMS Commands</i>.</p> <p>Format (<i>initpart_dd</i>)</p> <p>Default value None.</p>
KEYLABEL	Optional	<p>Specifies the encryption key label for encrypting dynamically allocated database data sets and image copy data sets.</p> <p>The key label can be up to 64 bytes.</p> <p>Format (<i>keylabel</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
KEYLEN	Optional	<p>Specifies the length of the subkey when IHCPSEL0 is used.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following parameters and values:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
KEYOFF	Optional	<p>Specifies the offset within the root segment key to use when IHCPSELO is specified as PARTSEL.</p> <p>The offset must be at least 1. Offset 0 does not need a partition selection exit.</p> <p>For example, to partition by country, using a country code that is 3 characters in position 7-9 of your key, specify the following parameters and values:</p> <pre>KEYLEN(3) KEYOFF(6)</pre> <p>Format (<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value None.</p>
KEYS	Optional	<p>Specifies a DD statement that contains records for the high keys.</p> <p>KEYS cannot be used with PARTNUM or PARTSIZE.</p> <p>The KEYS parameter can be specified as a character or hexadecimal.</p> <p>Specifying KEYS results in as many partitions as there are keys specified in the file. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies that no partition is larger than 4 GB.</p> <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>If KEYSORDR(Y) is specified with KEYS, then the keys are sorted in EBCDIC order, then assigned to the partitions in name order (also EBCDIC order).</p> <p>Format (<i>ddname</i>)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
KEYSORDR	Optional	<p>You can specify the KEYS(<i>ddname</i>) or PARTNUM parameter with KEYSORDR(Y).</p> <p>When KEYS(<i>ddname</i>) is specified, IMS HALDB Toolkit reads the high-key values from the KEYS(<i>ddname</i>), or when PARTNUM is specified, IMS HALDB Toolkit reads the high-key values that are created during analysis. IMS HALDB Toolkit then assigns the high-key values to partitions in ascending partition number order by issuing CHANGE.PART commands to DBRC. When KEYSORDR is also specified, IMS HALDB Toolkit subsequently reassigns the high-keys to the partitions, in both their individual ascending EBCDIC order, by issuing CHANGE.PART commands again.</p> <p>The CHANGE.PART commands that are issued when reassigning the high-keys are in ascending EBCDIC order of partition name, which is the same order as is presented by a DBRC LIST.DB command. KEYSORDR processing is done whether adding or deleting partitions, or changing partitions' attributes.</p> <p>This option can also be used for the single purpose of reorganizing partitions' high-keys, which is accomplished by placing unchanged high-keys in the KEYS(<i>ddname</i>).</p> <p>When the KEYSORDR option is specified, PARTITION(*) is also required.</p> <p>For more information, see “How to use a KEYSORDR(Y) parameter” on page 109.</p> <p>Format (Y N)</p> <p>Default value N</p>
MGMTCLAS	Optional	<p>Specifies a new SMS management class.</p> <p>Format (<i>mgmtclas</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
NOOSAM8G	Optional	<p>Specifies to change the maximum capacity of OSAM data sets from 8 GB of data to 4 GB of data.</p> <p>NOOSAM8G(Y) is applicable only for OSAM data sets of PHDAM or PHIDAM database. The database must be registered as OSAM8G in the RECON data sets.</p> <p>If you specify NOOSAM8G(Y), you must also specify PARTITION(*).</p> <p>Format (Y N)</p> <p>Default value N</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
ONLINE	Optional	<p>Specifies whether the batch maintenance is to be performed while the databases remain online.</p> <p>ONLINE(Y) is not supported by IMS Database Utility Solution.</p> <p>Format (Y N)</p> <p>Default value N</p>
OVFLINCR	Optional	<p>Increases HDAM overflow area by a number of blocks.</p> <p>Format (0 - 99999999)</p> <p>Default value None.</p>
PARTITION	Optional	<p>Specifies which partition is to be maintained.</p> <p>Either specify a partition name, or specify an asterisk (*) to process all the partitions.</p> <p>PARTLIST and PARTITION are mutually exclusive.</p> <p>Format (<i>partition_name</i> *)</p> <p>Default value None.</p>
PARTLIST	Optional	<p>Specifies which partitions are to be maintained. You can specify up to 99 partition names.</p> <p>PARTLIST and PARTITION are mutually exclusive.</p> <p>Format (<i>part1,part2,...,partn</i>)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
PARTNUM	Optional	<p>Specifies the number of partitions to create.</p> <p>PARTNUM cannot be used with PARTSIZE or KEYS. Specifying the PARTNUM parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>PARTNUM might not result in the exact number of partitions specified because a root segment and all of its dependent segments must be written to the same partition. Therefore, fewer than PARTNUM partitions might be created so that hierarchical integrity is preserved.</p> <p>If the number of partitions has been specified, IMS HALDB Toolkit verifies the size of partitions as follows:</p> <ul style="list-style-type: none"> • For a VSAM or OSAM HALDB whose maximum data capacity is 4 GB, no partition is larger than 4 GB. • For an OSAM HALDB whose maximum data capacity is 8 GB, no partition is larger than 8 GB. <p>If the high keys are created during analysis, there must be at least as many database records as there are requested partitions.</p> <p>If KEYSORDR(Y) is specified with PARTNUM, then the keys are sorted in EBCDIC order, then assigned to the partitions in name order (also EBCDIC order).</p> <p>Format (1 - 999)</p> <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PARTSEL	Optional	<p>Specifies a partition selection routine to use.</p> <p>The PARTSEL parameter must be specified with the KEYS parameter.</p> <p>IMS HALDB Toolkit provides an exit routine for partition selection (IHCPSELO). When you use the IHCPSELO exit routine, the database is partitioned using a subset of the key. If you use the IHCPSELO exit routine, you must also select the KEYOFF and KEYLEN parameters.</p> <p>Format (<i>partition_selection_routine</i>)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
PARTSIZE	Optional	<p>Specifies the size of partitions to create.</p> <p>PARTSIZE cannot be used with PARTNUM or KEYS.</p> <p>Specifying this parameter causes IMS HALDB Toolkit to find the high keys. The specifications are analyzed to determine whether the requested partitioning is feasible.</p> <p>Format (1 - 8191)</p> <ul style="list-style-type: none"> • For a VSAM or OSAM HALDB whose maximum data capacity is 4 GB, 1 - 4095. • For an OSAM HALDB whose maximum data capacity is 8 GB, 1 - 8191. <p>Default value If none of the parameters PARTNUM, PARTSIZE, or KEYS are specified, the default setting PARTSIZE(2048) is used.</p>
PTRCHECK	Optional	<p>Performs pointer checking during image copy.</p> <p>This parameter is ignored when the standard IMS image copy is used.</p> <p>Format (Y N)</p> <p>Default value N</p>
RAAINCR	Optional	<p>Increases HDAM root addressable area (RAA) by a specified number of blocks.</p> <p>Format (0 - 26777215)</p> <p>Default value None.</p>
RAPS	Optional	<p>Specifies new PHDAM root anchor points (RAPs).</p> <p>Format (1 - 255)</p> <p>Default value If omitted, the default is to copy from the existing RAPs.</p>
RELOAD.DBIOBUF	Optional	<p>Used for IMS High Performance Load processing. Specifies the number of tracks for the access method (VSAM or BSAM) buffers that are used for one database data set group when the database is read or written to.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (1 - 999)</p> <p>Default value 30</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
RELOAD.DBRLBUF	Optional	<p>Used for IMS High Performance Load processing. Specifies the number of database buffers (the number of tracks) to be used for one database data set group when the database is read or written to.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (1 - 999)</p> <p>Default value 45</p>
RELOAD.FRSPC	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load secures free space according to the specification of the FRSPC parameter in DBD.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.HPIO	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load uses the High Performance I/O Driver for output database data sets.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.OADSPR	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load reduces the usage of data space when processing the overflow area by using the High Performance I/O driver or by using an OVERFLOW DD. This specification is valid only for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
RELOAD.RAAFORMAT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load is to format HDAM or PHDAM RAA blocks regardless of the number of blocks used. Once the overflow area is used, this parameter is ignored and the entire RAA is formatted. This specification is valid only for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value YES</p>
RELOAD.SEARCH	Optional	<p>Used for IMS High Performance Load processing. Specifies the limit value for a space search algorithm that finds a segment that does not fit in its home block. This specification is valid for HDAM or PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (0 - 999)</p> <p>Default value 0</p>
RELOAD.SORT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether to run the physical sequential sort processing before loading. This specification is valid only for HDAM and PHDAM databases.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>
RELOAD.SORTHIDAM	Optional	<p>Used for IMS High Performance Load processing. Specifies whether to run the sort processing before loading a HIDAM or a PHIDAM.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (YES NO)</p> <p>Default value NO</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
RELOAD.USEREXIT	Optional	<p>Used for IMS High Performance Load processing. Specifies whether IMS HP Load invokes a user exit routine.</p> <p>If the load is a standard HD Load, this parameter is ignored.</p> <p>For details, see the <i>IMS High Performance Load User's Guide</i>.</p> <p>Format (<i>user_exit</i>)</p> <p>Default value None.</p>
SORTFSZ	Optional	<p>Specifies the estimated number of database records.</p> <p>The value is specified as FILSZ=Ex of OPTION control statement when calling sort processing.</p> <p>If SORTFSZ is not specified, IMS HALDB Toolkit estimates the number of database records.</p> <p>Format (1 - 999999999)</p> <p>Default value None.</p>
STORCLAS	Optional	<p>Specifies the name of the storage class for the new SMS-managed databases and image copy data sets that IMS HALDB Toolkit dynamically allocates.</p> <p>Format (<i>storclas</i>)</p> <p>Default value</p> <ul style="list-style-type: none"> • For database data sets: If omitted, the default action is to copy from existing data sets. • For image copy data sets: None.
TAKEOVER.FILE	Optional	<p>Saves the takeover statements (DBRC and IDCAMS) to a specified data set.</p> <p>You can specify SYSOUT=*, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with LRECL=80 and RECFM=F.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
UNLSPAC	Optional	<p>Specifies a 4-digit numeric space allocation value for temporary data set allocations, for example, the unload file. Specify a numeric value for the number of cylinders to allocate to each temporary data set.</p> <p>If the number of cylinders to allocate to each temporary data set is omitted, IMS HALDB Toolkit determines the optimal value.</p> <p>The number of data sets that are allocated is determined by IMS HALDB Toolkit.</p> <p>Format (0 - 3000)</p> <p>Default value None.</p>
UNLUNIT	Optional	<p>Specifies any valid direct-access 8-character unit name for temporary data set allocations, for example, the unload file. These files are temporary files that default to SYSALLDA, unless otherwise specified.</p> <p>Format (<i>unitname</i>)</p> <p>Default value SYSALLDA</p>
VOLALLO	Optional	<p>Used to override the space allocation when creating the database data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p><i>nn</i> The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLO is ignored.</p> <p><i>pppp</i> The number of cylinders for the primary allocation. The maximum is 2000.</p> <p><i>ssss</i> The number of cylinders for the secondary allocation. The maximum is 2000.</p> <p>Default value</p> <ul style="list-style-type: none"> • <i>nn</i>: 0 • <i>pppp</i>: 300 • <i>ssss</i>: 300

Table 11. MAINTAIN command parameters (continued)

Parameter	Requirement	Description
VOLALLOL	Optional	<p>Used to override the space allocation when creating the ILDS data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p>nn The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLOL is ignored.</p> <p>pppp The number of cylinders for the primary allocation.</p> <p>ssss The number of cylinders for the secondary allocation.</p> <p>Default value</p> <ul style="list-style-type: none"> • <i>nn</i>: 0 • <i>pppp</i>: None. • <i>ssss</i>: None.
VOLALLOX	Optional	<p>Used to override the space allocation when creating the primary index data sets.</p> <p>Format (<i>nn,pppp,ssss</i>)</p> <p>nn The number of volumes to be used. This parameter is for SMS controlled allocations.</p> <p>If <i>nn</i> is greater than 1, candidate volumes are defined. If <i>nn</i> is zero, VOLALLOX is ignored.</p> <p>pppp The number of cylinders for the primary allocation.</p> <p>ssss The number of cylinders for the secondary allocation.</p> <p>Default value</p> <ul style="list-style-type: none"> • <i>nn</i>: 0 • <i>pppp</i>: None. • <i>ssss</i>: None.

How the MAINTAIN function works when adding, deleting, naming partitions, and how to use a KEYSORDR(Y) parameter

Learn how the MAINTAIN function adds, deletes, names partitions, and how to use a KEYSORDR(Y) parameter.

Adding or deleting partitions

When adding partitions (splitting partitions) or deleting partitions (merging partitions), the MAINTAIN function processes the partitions according to the following rules:

- If the high key of an existing partition matches one of the new high keys, IMS HALDB Toolkit keeps that existing partition unchanged.
- IMS HALDB Toolkit assigns new high keys to partitions in ascending order, firstly to the new partitions (if created) and then to the existing partitions that have no high keys assigned. When there are multiple existing partitions with no high keys assigned, IMS HALDB Toolkit assigns high keys to the partitions in ascending order of the original high keys.
- IMS HALDB Toolkit deletes unnecessary partitions in ascending order of the original high keys.

The following examples demonstrate specific cases to help you understand the changes that the MAINTAIN function makes to partitions.

Example 1: Splitting one partition

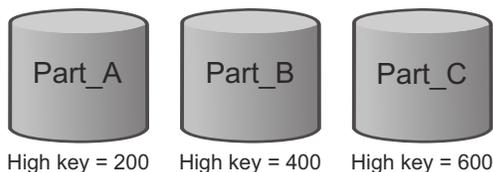
HALDB PHDOA has three partitions; Part_A (high key is 200), Part_B (high key is 400), and Part_C (high key is 600). You want to split partition Part_B into two partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOA) PARTITION(Part_B) PARTNUM(2)
```

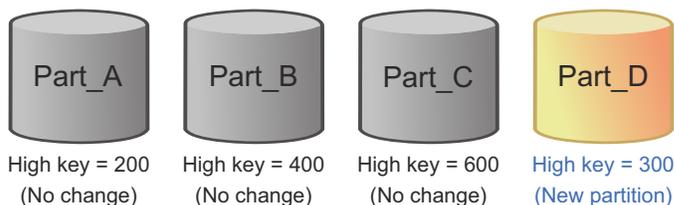
In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Creates a new partition, Part_D.
2. Calculates the new high keys for splitting partition Part_B and resulted with high keys of 300 and 400.
3. Checks whether the existing partition (in this case Part_B) has one of the new high keys. IMS HALDB Toolkit detected that Part_B has the high key of 400 so it keeps Part_B unchanged.
4. Assigns the new high key of 300 to the new partition Part_D.

Original partitions



New partitions



Example 2: Splitting multiple partitions

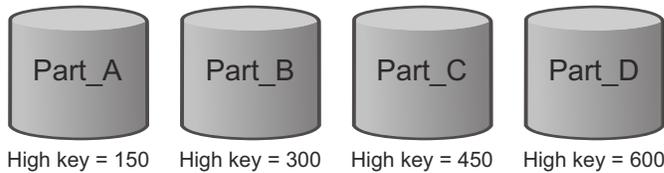
HALDB PHDOB has four partitions; Part_A (high key is 150), Part_B (high key is 300), Part_C (high key is 450), and Part_D (high key is 600). You want the HALDB PHDOB to have six partitions instead of four partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOB) PARTITION(*) PARTNUM(6)
```

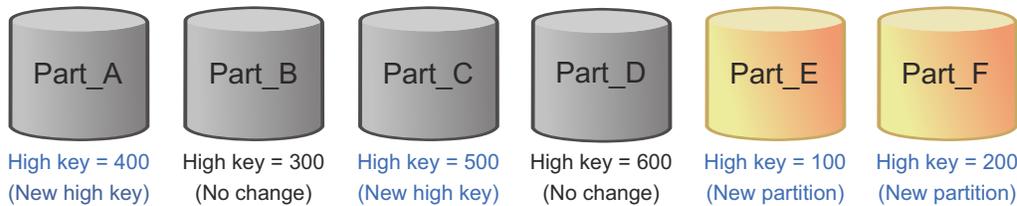
In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Creates two new partitions, Part_E and Part_F.
2. Calculates the new high keys for repartitioning and resulted with high keys of 100, 200, 300, 400, 500, and 600.
3. Checks whether any of the existing partitions has one of the new high keys. It detected that Part_B has the high key of 300 and Part_D has the high key of 600 so it keeps these two partitions unchanged.
4. Assigns a high key to each of the remaining partitions in ascending order of the high keys, starting with the new partition; high key 100 to Part_E and high key 200 to Part_F. Then it assigns the remaining high keys to the existing partitions that have no high keys assigned; high key 400 to Part_A and high key 500 to Part_C.

Original partitions



New partitions



Example 3: Merging multiple partitions into one partition

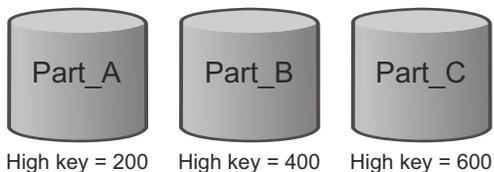
HALDB PHDOC has three partitions; Part_A (high key is 200), Part_B (high key is 400), and Part_C (high key is 600). You want the HALDB PHDOC to have only one partition instead of three partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOC) PARTITION(*) PARTNUM(1)
```

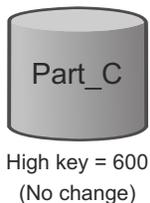
In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Checks whether any of the existing partitions has the new high key, which is 600. It detected that Part_C has the high key of 600 so it keeps Part_C unchanged.
2. Deletes the other two partitions.

Original partitions



New partition



Example 4: Merging multiple partitions into fewer partitions

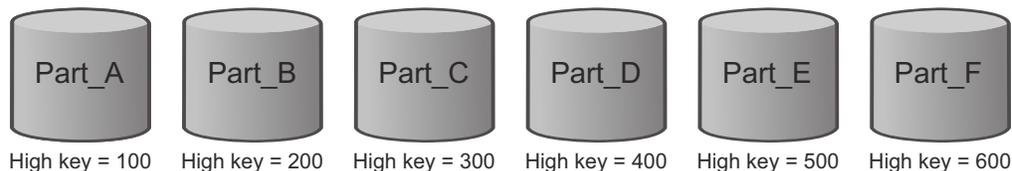
HALDB PHDOD has six partitions; Part_A (high key is 100), Part_B (high key is 200), Part_C (high key is 300), Part_D (high key is 400), Part_E (high key is 500), and Part_F (high key is 600). You want the HALDB PHDOD to have four partitions instead of six partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOD) PARTITION(*) PARTNUM(4)
```

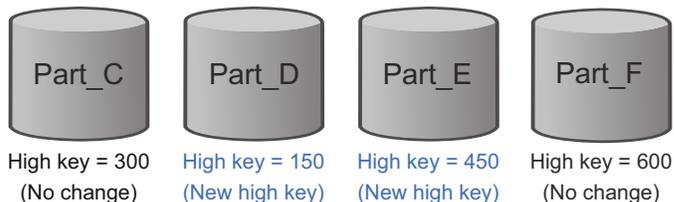
In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Calculates the new high keys for the partitions and resulted with high keys of 150, 300, 450, and 600.
2. Checks whether any of the existing partitions has one of the new high keys. It detected that Part_C has the high key of 300 and Part_F has the high key of 600 so it keeps these two partitions unchanged.
3. Deletes two partitions in ascending order of original high keys. In this case, Part_A, which had a high key of 100, and Part_B, which had a high key of 200.
4. Assigns the remaining high keys to each of the remaining partitions in ascending order of the high keys; high key 150 to Part_D and high key 450 to Part_E.

Original partitions



New partitions



How to use a KEYSORDR(Y) parameter

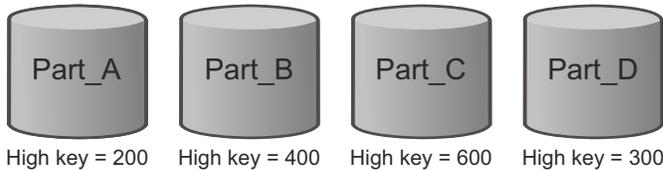
After splitting or merging partitions, as shown in the examples in [“Adding or deleting partitions”](#) on page 106, you can reassign the high keys in ascending EBCDIC order of partition name by specifying the KEYSORDR(Y) parameter. The PARTITION(*) parameter that specifies all partitions and the KEYS(ddname) or PARTNUM parameter are required to use the KEYSORDR(Y) parameter.

Example 1: After splitting one partition

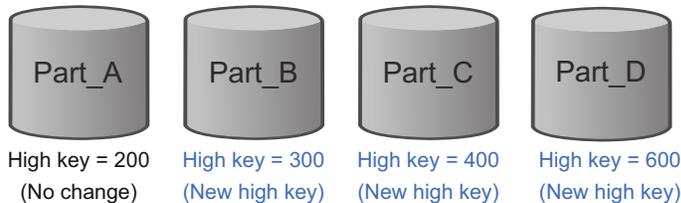
After splitting one partition, as shown in Example 1 in [“Adding or deleting partitions”](#) on page 106, you can reassign the high keys in ascending EBCDIC order by specifying the MAINTAIN command as follows:

```
//IHCSYSIN DD *
  MAINTAIN -
            DBD(PHDOA) -
            PARTITION(*) -
            KEYS(KEYSIN) -
            KEYSORDR(Y) -
            DSNPREF(DBSMS.DB) -
            ICHLQ(DBSMS.IC) -
            . . .
//KEYSIN DD *
200
300
400
600
```

Original partitions



New partitions



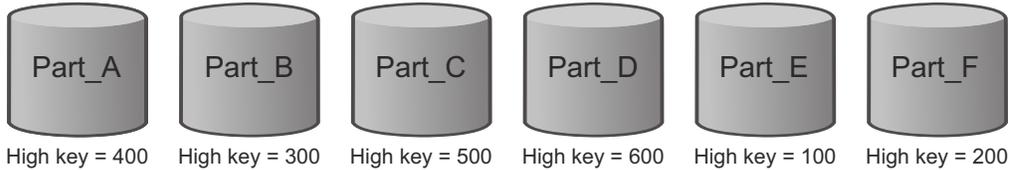
Example 2: After splitting multiple partitions

After splitting multiple partitions, as shown in Example 2 in [“Adding or deleting partitions”](#) on page 106, you can reassign the high keys in ascending EBCDIC order by specifying the MAINTAIN command as follows:

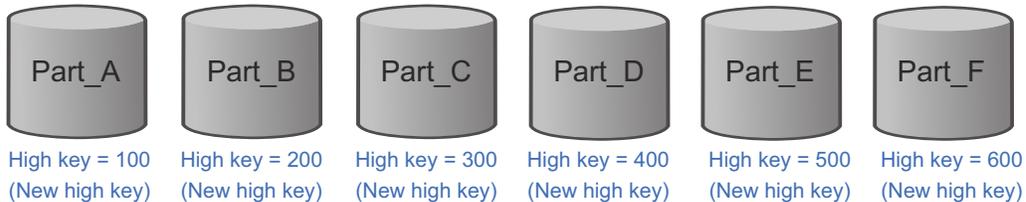
```
//IHCSYSIN DD *
  MAINTAIN -
            DBD(PHDOB) -
            PARTITION(*) -
            KEYS(KEYSIN) -
            KEYSORDR(Y) -
            DSNPREF(DBSMS.DB) -
            ICHLQ(DBSMS.IC) -
            . . .
//KEYSIN DD *
100
200
300
400
```

500
600

Original partitions



New partitions



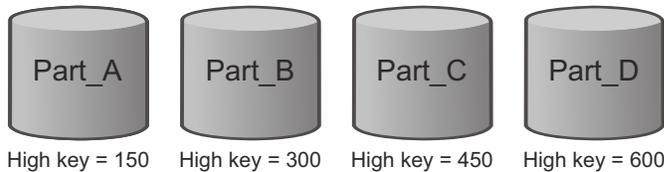
Examples 3 and 4 demonstrate cases where you want to split partitions and reassign the high keys in ascending EBCDIC order at the same time.

Example 3: Splitting multiple partitions and reassigning high keys in ascending EBCDIC order of partition name (when high keys for KEYS(ddname) are known)

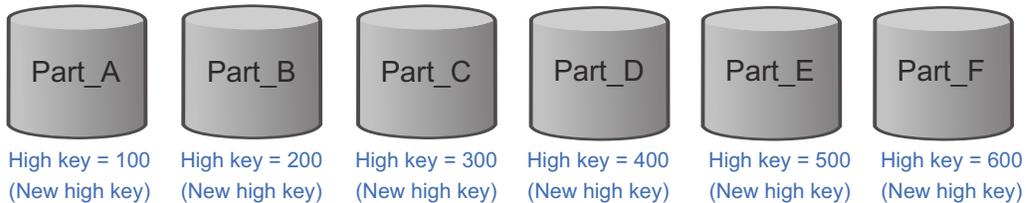
You can split multiple partitions, as shown in Example 2 in [“Adding or deleting partitions”](#) on page 106, and reassign the high keys in ascending EBCDIC order, as shown in Example 2 of this topic, at the same time by specifying the MAINTAIN command as follows:

```
//IHCSYSIN DD *  
  MAINTAIN -  
           DBD(PHDOB) -  
           PARTITION(*) -  
           KEYS(KEYSIN) -  
           KEYSORDR(Y) -  
           DSNPREF(DBSMS.DB) -  
           ICHLQ(DBSMS.IC) -  
           ....  
//KEYSIN DD *  
100  
200  
300  
400  
500  
600
```

Original partitions



New partitions



Example 4: Splitting multiple partitions and reassigning high keys in ascending EBCDIC order of partition name (when high keys for KEYS(ddname) are not known)

When the high keys for the KEYS(ddname) parameter are not known, run the MAINTAIN function by specifying the number of partitions that you want to split to the PARTNUM parameter instead of the KEYS(ddname) parameter.

```
//IHCSYSIN DD *
  MAINTAIN -
            DBD(PHDOE) -
            PARTITION(*) -
            PARTNUM(6) -
            KEYSORDR(Y) -
            DSNPREF(DBSMS.DB) -
            ICHLQ(DBSMS.IC) -
            ...
```

See Example 3 of this topic for details on original and new partitions.

Assigning partition names

The MAINTAIN function does not change the names of existing partitions. It only assigns names to new partitions.

New partition names are determined based on the CONST, DBDPATT, and FIRSTPART parameters and the current partition ID in the RECON data sets. For more information about these parameters, see [“MAINTAIN command parameters” on page 86](#).

The following examples demonstrate how IMS HALDB Toolkit assigns partition names when the FIRSTPART parameter is specified.

Example 1: Assigning partition names when FIRSTPART(01)

HALDB PHDOE has five partitions; PHDOE01, PHDOE02, PHDOE03, PHDOE04, and PHDOE05. The value of CURRENT PARTITION ID in RECON is 5 (index=5). You want to split partition PHDOE01 into three partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOE) DBDPATT(*****...) PARTITION(PHDOE01) PARTNUM(3) FIRSTPART(01)
```

In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Creates two new partitions.

2. Reads the DBDPAT(*****...) parameter and uses the first five letters (PHDOE) of the DBD name for the first five characters of the new partition names.
3. Reads the FIRSTPART(01) parameter and obtains the value of CURRENT PARTITION ID from RECON, which is 5. Adds two character numeric extension of 06 and 07 to the end of the new partition names.
4. The two new partitions have the names of PHDOE06 and PHDOE07 respectively.

Example 2: Assigning partition names when FIRSTPART(AA)

HALDB PHDOF has five partitions; PHDOFAA, PHDOFAB, PHDOFAC, PHDOFAD, and PHDOFAE. The value of CURRENT PARTITION ID in RECON is 5 (index=5). You want to split partition PHDOFAA into three partitions so you specify the MAINTAIN command as follows:

```
MAINTAIN DBD(PHDOF) DBDPATT(*****...) PARTITION(PHDOFAA) PARTNUM(3) FIRSTPART(AA)
```

In this case, IMS HALDB Toolkit processes the partitions as follows:

1. Creates two new partitions.
2. Reads the DBDPAT(*****...) parameter and uses the five letters (PHDOF) of the DBD name for the first five characters of the new partition names.
3. Reads the FIRSTPART(AA) parameter and obtains the value of CURRENT PARTITION ID from RECON, which is 5. Adds two character extension of AF and AG to the end of the new partition names.
4. The two new partitions have the names of PHDOFAF and PHDOFAG respectively.

MAINTAIN examples

Use the following examples to learn what you can do with the MAINTAIN function.

- [“MAINTAIN example: Specifying the number of partitions ” on page 112](#)
- [“MAINTAIN example: Specifying the partition size” on page 113](#)
- [“MAINTAIN example: Specifying the key ranges for partitions” on page 114](#)
- [“MAINTAIN example: Maintaining a database when the IMS management of ACBs is enabled” on page 116](#)
- [“MAINTAIN example: Generating DBRC commands” on page 116](#)

MAINTAIN example: Specifying the number of partitions

If you know how many partitions you intend to maintain, you can use the PARTNUM parameter to specify this number.

To specify the number of partitions, use the sample member IHCEMTN1. The following example splits a database into four partitions:

```

//JOBNAME    JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*          SAMPLE JCL FOR MAINTAIN - using PARTNUM method
//*
//*          SPLITS PARTB AND PARTC INTO 4 PARTITIONS
//* Your old HALDB databases/partitions must be registered to DBRC
//* You must /dbr the affected partitions prior to executing this job
//* unless you use ONLINE(Y) and have Online Reorg installed
//*****
//S2        EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB   DD DISP=SHR,DSN=your.SIHCLoad    <=== your hcma loadlib
//          DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//          DD DISP=SHR,DSN=your.SHPSLMD0    <=== ims tools loadlib
//DFSRESLB  DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//IMS       DD DISP=SHR,DSN=your.dbdlib      <=== ims dbdlib
//IMSDALIB  DD DISP=SHR,DSN=your.mdalib      <=== ims mdalib
//SYSPRINT  DD SYSOUT=*
//MSGPRINT  DD SYSOUT=*
//AMSPRINT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//IHCLIST   DD SYSOUT=*
//IHCSYSIN  DD *
  MAINTAIN  ONLINE(N) -
            PARTNUM(4) -
            DBD(masterdbd) -
            PARTLIST(partb,partc) -
            DBDPATT(*****...) DSNPREF(DBSMS.DB) -
            ICMID(3) -
            ICHLQ(DBSMS.DB.IC) -
            ICTRLR(2) -
            IC.COMP(Y) -
            IC.COMPRTN(FABJCOMP2) -
            PTRCHECK(Y)

```

Figure 13. Sample JCL (IHCEMTN1) for batch using PARTNUM

MAINTAIN example: Specifying the partition size

If you know how large you want each partition to be, you can use the PARTSIZE parameter to specify this number.

To specify the size of partitions, use the member IHCEMTN2. The following example splits a database into partitions each with a size of 2048 MB.

```

//JOBNAME    JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*          SAMPLE JCL FOR MAINTAIN - using PARTSIZE method
//*
//*          SPLITS PARTC INTO AS MANY 2048 SIZED PARTITIONS
//* Your old HALDB databases/partitions must be registered to DBRC
//* You must /dbr the affected partitions prior to executing this job
//* unless you use ONLINE(Y) and have Online Reorg installed
//*****
//S2        EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB   DD DISP=SHR,DSN=your.SIHCLoad    <=== your hcma loadlib
//          DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//          DD DISP=SHR,DSN=your.SHPSLMD0    <=== ims tools loadlib
//DFSRESLB  DD DISP=SHR,DSN=your.SDFSRESL    <=== ims reslib
//IMS       DD DISP=SHR,DSN=your.dbdlib      <=== ims dbdlib
//IMSDALIB  DD DISP=SHR,DSN=your.mdalib     <=== ims mdalib
//SYSPRINT  DD SYSOUT=*
//MSGPRINT  DD SYSOUT=*
//AMSPRINT  DD SYSOUT=*
//SYSUDUMP  DD SYSOUT=*
//IHCLIST   DD SYSOUT=*
//IHCSYSIN  DD *
  MAINTAIN  ONLINE(N) -
            PARTSIZE(2048) -
            DBD(masterdbd) -
            PARTITION(partc) -
            DBDPAT(*****...) DSNPREF(DBSMS.DB) -
            ICMID(3) -
            ICHLQ(DBSMS.DB.IC) -
            ICTRLR(2) -
            IC.COMP(Y) -
            IC.COMPRTN(FABJCOMP2) -
            PTRCHECK(Y)

```

Figure 14. Sample JCL (IHCEMTN2) for batch using PARTSIZE

MAINTAIN example: Specifying the key ranges for partitions

If you want to assign specific key ranges to partitions, you can use the KEYS parameter to specify an input data set containing the keys. The KEYS parameter specifies the high key boundaries for each partition.

To specify the ranges for partitions, use the member IHCEMTN3. The following example splits the partition that is specified on the PARTITION parameter into 13 partitions with specific key ranges.

```

//JOBNAME   JOB NAME,000,CLASS=A,MSGCLASS=X
//*****
//*        SAMPLE JCL FOR MAINTAIN - using KEYS method
//*
//*        SPLITS the first partition into specific key-boundaries
//*        (note:  the first partition had a high key of M999999999
//*        and has records for all key ranges)
//*  Your old HALDB databases/partitions must be registered to DBRC
//*  You must /dbr the affected partitions prior to executing this job
//*  unless you use ONLINE(Y) and have Online Reorg installed
//*****
//S2        EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB  DD DISP=SHR,DSN=your.SIHCLoad    <=== your hcma loadlib
//          DD DISP=SHR,DSN=your.SDFSRESL   <=== ims reslib
//          DD DISP=SHR,DSN=your.SHPSLMD0   <=== ims tools loadlib
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL   <=== ims reslib
//IMS      DD DISP=SHR,DSN=your.dbdlib      <=== ims dbdlib
//IMSDALIB DD DISP=SHR,DSN=your.mdalib     <=== ims mdalib
//SYSPRINT DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//AMSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCLIST  DD SYSOUT=*
//*****
//*KEYSIN   DD * (documentation only)
//* your first high-order key for partition1
//* your second high-order key for partition2 and so on...
//* your highest key for last partition
//*****
//KEYSIN    DD *
A999999999
B999999999
C999999999
D999999999
E999999999
F999999999
G999999999
H999999999
I999999999
J999999999
K999999999
L999999999
M999999999
//IHCSYSIN DD *
  MAINTAIN ONLINE(N) -
           KEYS(KEYSIN) -
           DBD(masterdbd) -
           PARTITION(parta) -
           DBDPATT(*****...) DSNPREF(DBSMS.DB) -
           ICMID(3) -
           ICHLQ(DBSMS.DB.IC) -
           ICTRLR(2) -
           IC.COMP(Y) -
           IC.COMPRTN(FABJCOMP2) -
           PTRCHECK(Y)

```

Figure 15. Sample JCL (IHCEMTN3) for batch using KEYS

MAINTAIN example: Maintaining a database when the IMS management of ACBs is enabled

This example shows JCL statements to maintain a database in an IMS managed ACBs environment.

```
//S2      EXEC PGM=IHCHALDB,DYNAMNBR=999,REGION=80M
//STEPLIB DD DISP=SHR,DSN=IMSTOOLS.SIHCLoad <=== hcma loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SHPSLMD0 <=== ims tools loadlib
//        DD DISP=SHR,DSN=IMSTOOLS.SGLXLOAD <=== ims tools base loadlib
//        DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//        DD DISP=SHR,DSN=IMS.MDALIB <=== ims mdalib
//DFSRESLB DD DISP=SHR,DSN=IMS.SDFSRESL <=== ims reslib
//PROCLIB DD DISP=SHR,DSN=IMS.PROCLIB <=== ims proclib
//SYSPRINT DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//AMSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCLIST DD SYSOUT=*
//IHCSYSIN DD *
  MAINTAIN ONLINE(N) -
           PARTNUM(4) -
           DBD(masterdbd) -
           PARTLIST(partb,partc) -
           DBDPATT(*****...) DSNPREF(DBSMS.DB) -
           ICMID(3) -
           ICHLQ(DBSMS.DB.IC) -
           ICTRLR(2) -
           IC.COMP(Y) -
           IC.COMPRTN(FABJCOMP2) -
           PTRCHECK(Y) -
           DFSDF(CAT)
```

Figure 16. Sample JCL stream to maintain a database in an IMS managed ACBs environment

- The DFSDF(CAT) parameter in IHCSYSIN and the PROCLIB DD statement specify the DFSDFCAT PROCLIB member that contains the IMS catalog definition.
- If you include the IMS Catalog Definition exit routine (DFS3CDX0) in the STEPLIB concatenation, you do not need to specify the DFSDF parameter and the PROCLIB DD statement.
- The SGLXLOAD library of IBM IMS Tools Base must be in the STEPLIB concatenation.
- The library containing the DFSMDA member with TYPE=CATDSDLQ statement must be in the STEPLIB concatenation if the DFSMDA member is used to specify the high-level qualifier of the IMS catalog system data sets.
- The IMS DD statement is not needed.

MAINTAIN example: Generating DBRC commands

When you repartition a HALDB by using the MAINTAIN command, you can optionally specify the DBRCOUT parameter to save a set of DBRC commands, which are issued during the Takeover phase, for the Database Recovery Control (DBRC) utility (DSPURX00).

To generate DBRC commands, add the DBRCOUT parameter to the MAINTAIN command and the *dbrcout* DD statement, as shown in the following example:

```
//dbrcout DD SYSOUT=*
//IHCSYSIN DD *
  MAINTAIN DBD(xxxx) -
           DSNPREF(DBSMS.DB) -
           ICHLQ(DBSMS.IC) -
           PARTITION(*) -
           PARTNUM(5) -
           DBRCOUT(dbrcout)
```

The DBRCOUT parameter value (*dbrcout*) specifies the name of the DD to which IMS HALDB Toolkit writes the DBRC commands.

Out of the DBRC commands issued during the Takeover phase, the following can be used as output DD specified in the DBRCOUT parameter:

- DELETE.DB
- INIT.DB
- INIT.PART

The resulting DBRC commands will look like the following example.

```
CHANGE.PART DBD(TESTDB01) PART(TEST001) -
  KEYSTRNG(A999999999) -
  BLOCKSIZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST001)
CHANGE.PART DBD(TESTDB01) PART(TEST002) -
  BLOCKSIZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST002)
INIT.PART DBD(TESTDB01) PART(TEST003) -
  KEYSTRNG(B999999999) -
  BLOCKSIZE(8192) -
  FBFF(10) -
  FSPF(20) -
  DSNPREFIX(DBSMS.DB.TEST003)
```

Part 5. HALDB utilities

JCL for HALDB utilities can be created from the examples in the sample library file, or through the ISPF user interface.

The topics in this section describe how to use the sample JCL provided in the SIHCSAMP file. The sample member is named for each specific utility.

A comment is made if an equivalent ISPF-generated JCL option is available for the utility. See the ISPF section of this reference for ISPF-related information.

Topics:

- [Chapter 5, “Using DBRC enhancement utilities,” on page 121](#)
- [Chapter 6, “Using the HALDB Analyzer,” on page 139](#)
- [Chapter 7, “Reorganizing a PSINDEX,” on page 157](#)
- [Chapter 8, “Splitting an unload file into single partition files,” on page 161](#)
- [Chapter 9, “Recovering by using the ILK reset utility,” on page 167](#)
- [Chapter 10, “Healing index pointers,” on page 171](#)
- [Chapter 11, “System utilities,” on page 175](#)

Chapter 5. Using DBRC enhancement utilities

DBRC maintains information that is required for database recoveries, generates recovery control (RECON) statements, verifies recovery input, maintains a separate change log for database data sets, and supports sharing of IMS databases and areas by multiple IMS subsystems.

IMS HALDB Toolkit provides several DBRC enhancement utilities to support HALDB movement between multiple RECONS.

Topics:

- [“Backing up DBRC definitions for HALDB DBD” on page 121](#)
- [“Cloning DBRC definitions for test environments” on page 125](#)
- [“Copying HALDBs to a different IMS system” on page 134](#)

Backing up DBRC definitions for HALDB DBD

The DBRC definitions backup utility allows you to save the current DBRC definition of a HALDB to a sequential file.

About this task

You would perform a backup each time before you make changes. In this case, you want to change the partition layout.

The utility creates DBRC statements that can be used as input for the batch DBRC utility (DSPURX00).

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCEDBBK.
2. Specify the JCL DD statements.
For a list of DD statements, see [“BACKUPDBRC DD statements” on page 122](#).
3. Specify the BACKUPDBRC command parameters.
For the DBD parameter, you must specify the DBD for the HALDB (primary or index).
For other parameters, see [“BACKUPDBRC command parameters” on page 124](#).

Example

The following example shows the sample JCL for backing up DBRC definition for HALDB DBD:

```

//JOBNAME   JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          BACKUP DBRC DEFINITION FOR DB
//*
//*-----
//S2       EXEC PGM=IHCHALDB,
//          REGION=80M
//STEPLIB  DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.recon.mdalib
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//TRACE    DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//          BACKUPDBRC DBD(ddddd) - /* specify HALDB DBD
//          INCLIND(Y) - /* include secind
//          INCLIC(Y) - /* include batch IC
//          TODD(OUTDBRC) /* specify output DDname
//OUTDBRC  DD SYSOUT=*

```

Figure 17. JCL for backing up DBRC definition for HALDB DBD

BACKUPDBRC DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **BACKUPDBRC** command.

Table 12. DD statements and record format for the BACKUPDBRC command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
DBRCOUT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“BACKUPDBRC command parameters”](#) on page 124.

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see “MSGPRINT data set” on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

DBRCOUT

This statement is required if TODD(*ddname*) parameter is not specified. The statement defines the output data set for generating DBRC statements.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

BACKUPDBRC command parameters

The following table summarizes the **BACKUPDBRC** command parameters.

Table 13. BACKUPDBRC command parameters

Parameter	Requirement	Description
DBD	Required	Specifies the name of the HALDB DBD. Format (<i>dbdname</i>) Default value None.
DFSDF	Optional	Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog. The specified member is used when the following two conditions are met: <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog. Format (<i>ddd</i>) Default value None.

Table 13. BACKUPDBRC command parameters (continued)

Parameter	Requirement	Description
IMSID	Optional	IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine. Format (nnnn) Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).
INCLIC	Optional	Specifies whether to include the non-fuzzy image copies. Format (Y N) Default value Y
INCLIND	Optional	Specifies whether to include the secondary index. Format (Y N) Default value Y
TODD	Optional	Specifies the output file where the DBRC statements are written. You must specify either the TODD(<i>ddname</i>) parameter in the IHCSYSIN DD statement or the DBRCOUT DD statement in the JCL. Format (<i>ddname</i>) Default value None.

Cloning DBRC definitions for test environments

In a test environment, the clone DBRC definitions utility allows you to ease DBRC problems by cloning DBRC definitions to an alternate RECON.

About this task

The utility replicates HALDB DBRC definitions to other RECONS and allows you to exchange the high-level data set name qualifier.

You must have your own data sets for testing the batch program, or testing online programs with IMS Batch Terminal Simulator. This requires you to have your own RECONS.

When batch jobs are run with DBRC active, you must accommodate recovery and authorization issues as well. For example, if an application program fails, the database is flagged by DBRC to indicate the need for some recovery action. This utility helps eliminate those problems.

To use this utility, include the sample JCL in your test JCL.

Alternatively, you can create the JCL by using the ISPF user interface.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCECLON.
2. Specify the JCL DD statements.
For a list of DD statements, see [“COPYDBRC DD statements” on page 128.](#)
3. Specify the COPYDBRC command parameters.
For a list of COPYDBRC command parameters, see [“COPYDBRC command parameters” on page 130.](#)
4. Include the sample JCL in your test JCL.

Example

In the following sample JCL:

- *the.other*.RECON is the RECON for the programmer.
- *your*.RECON is the RECON to be copied from.
- *your*.DBDLIB is the DBD library for the DBD.

```

//*-----
//*
//*          Clone DBRC definitions to alternate RECON
//*
//*-----
//*
//*          Allocate RECON datasets
//*-----
//ALLO EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
DELETE the.other.RECON1
DELETE the.other.RECON2
DELETE the.other.RECON3
SET MAXCC=0
DEFINE CLUSTER(NAME(the.other.RECON1) VOL(volser) KEYS(32 0) -
  CISZ(8192) RECSZ(8100 8192) CYLINDERS(2 2) -
  FREESPACE(30,10) INDEXED SHR(3 3) SPEED)
DEFINE CLUSTER(NAME(the.other.RECON2) VOL(volser) KEYS(32 0) -
  CISZ(8192) RECSZ(8100 8192) CYLINDERS(2 2) -
  FREESPACE(30,10) INDEXED SHR(3 3) SPEED)
DEFINE CLUSTER(NAME(the.other.RECON3) VOL(volser) KEYS(32 0) -
  CISZ(8192) RECSZ(8100 8192) CYLINDERS(2 2) -
  FREESPACE(30,10) INDEXED SHR(3 3) SPEED)
//*-----
//*
//*          Create HALDB statements
//*-----
//CRE EXEC PGM=IHCHALDB,
// REGION=60M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
// DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS DD DISP=SHR,DSN=your.DBDLIB
//RECON1 DD DISP=SHR,DSN=your.RECON1
//RECON2 DD DISP=SHR,DSN=your.RECON2
//RECON3 DD DISP=SHR,DSN=your.RECON3
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
COPYDBRC DBD(nnnnn) -
  DSNPREF(new.hlq) -
  DSNDBD(DBD) -
  INCLIND(YES) -
  TODD(DBRCOUT)
/*
//DBRCOUT DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA
//*-----
//*
//*          INIT.RECON
//*-----
//INITRCN EXEC PGM=DSPURX00,REGION=50M,COND=(4,LE)
//STEPLIB DD DISP=SHR,DSN=your.SDFSRESL
//RECON1 DD DISP=SHR,DSN=the.other.RECON1
//RECON2 DD DISP=SHR,DSN=the.other.RECON2
//RECON3 DD DISP=SHR,DSN=the.other.RECON3
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS DD DISP=SHR,DSN=your.DBDLIB
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
INIT.RECON NOFORCER CATDS TAPEUNIT(3480)
/*

```

Figure 18. Sample JCL from member IHCECLON (Part 1 of 2)

```

//*-----
//*          APPLY TO OTHER DBRC
//*-----
//DBRC      EXEC PGM=IHCUUTIL,
//          REGION=60M
//STEPLIB   DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB  DD DISP=SHR,DSN=your.SDFSRESL
//RECON1    DD DISP=SHR,DSN=the.other.RECON1
//RECON2    DD DISP=SHR,DSN=the.other.RECON2
//RECON3    DD DISP=SHR,DSN=the.other.RECON3
//IMS       DD DISP=SHR,DSN=your.DBDLIB
//TRACE     DD DUMMY
//SYSPRINT  DD SYSOUT=*
//MSGPRINT  DD SYSOUT=*
//SYSIN     DD DISP=(OLD,DELETE),DSN=*.CRE.DBRCOUT
//IHCSYSIN  DD *
//          RUN   PGM(IHCYDBR0)
//

```

Figure 19. Sample JCL from member IHCECLON (Part 2 of 2)

COPYDBRC DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **COPYDBRC** command.

Table 14. DD statements and record format for the COPYDBRC command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```

//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib

```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“COPYDBRC command parameters” on page 130](#).

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

COPYDBRC command parameters

The following table summarizes the **COPYDBRC** command parameters.

Table 15. COPYDBRC command parameters

Parameter	Requirement	Description
COPYIC	Optional	Specifies whether to create NOTIFY.IC statements. COPYIC and DFDSS parameters are mutually exclusive. Format (Y N) Default value N
DATACLAS	Optional	Represent the SMS constructs to be used for the IDCAMS statements. Format (<i>dataclas</i>) Default value If omitted, the default action is to copy from existing data sets.
DBD	Required	Specifies the name of the HALDB DBD. Format (<i>dbdname</i>) Default value None.
DELDDB	Optional	Specifies whether to create DELETE.DB statements. Format (Y N) Default value Y

Table 15. COPYDBRC command parameters (continued)

Parameter	Requirement	Description
DFDSS	Optional	<p>Specifies whether to create DFDSS statements for the new data sets.</p> <p>DFDSS parameter is mutually exclusive with COPYIC and IDCAMS parameters.</p> <p>Format (Y N)</p> <p>Default value N</p>
DFDSSOUT	Conditionally required	<p>Specifies the file name that will contain the DFDSS statements.</p> <p>You must specify this parameter if DFDSS(Y).</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>

Table 15. COPYDBRC command parameters (continued)

Parameter	Requirement	Description
DSNDBD	Optional	<p>Specifies the suffix portion of the new dsname you are using.</p> <p>A total of 37 characters are allowed for the entire dsname, which includes the characters used for the DSNPREF prefix and the characters used for the DSNDBD suffix.</p> <p>Format (NONE DBD PART DBDPART)</p> <p>NONE Do not add a suffix to DSNPREF.</p> <p>DBD Add the DBD name to DSNPREF.</p> <p>PART Add the partition name to DSNPREF.</p> <p>DBDPART Add the DBD name and the partition name to DSNPREF.</p> <p>Default value DBDPART</p>
DSNPREF	Required	<p>Specifies the prefix portion of the new dsname you are using.</p> <p>A total of 37 characters are allowed for the entire dsname, which includes the characters used for the DSNPREF prefix and the characters used for the DSNDBD suffix.</p> <p>Format (<i>dsnprefix</i>)</p> <p>Default value None.</p>
IDCAMS	Optional	<p>Specifies whether to create IDCAMS statements for the new data sets.</p> <p>IDCAMS and DFDSS parameters are mutually exclusive.</p> <p>Format (Y N)</p> <p>Default value N</p>
IDCOUT	Conditionally required	<p>Specifies the file name that will contain the IDCAMS statements.</p> <p>You must specify this parameter if IDCAMS(Y) or DFDSS(Y).</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>

Table 15. COPYDBRC command parameters (continued)

Parameter	Requirement	Description
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
INCLIND	Optional	<p>Specifies whether to include the secondary index.</p> <p>Format (Y N)</p> <p>Default value Y</p>
KEYLABEL	Optional	<p>Specifies the encryption key label to be used in IDCAMS processing.</p> <p>The key label can be up to 64 bytes.</p> <p>Format (<i>keylabel</i>)</p> <p>Default value If omitted, the default action is to copy from existing data sets.</p>
STORCLAS	Optional	<p>Represent the SMS constructs to be used for the IDCAMS statements.</p> <p>Format (<i>storclas</i>)</p> <p>Default value If omitted, the default action is to copy from existing data sets.</p>
TODD	Required	<p>Specifies the output file where the DBRC statements are written. This file will be the input to the DBRC utility.</p> <p>Format (<i>ddname</i>)</p> <p>Default value None.</p>
VOLSER	Conditionally required	<p>Specifies the volume serial to be used for IDCAMS. This parameter is required for non-SMS allocation.</p> <p>Format (<i>volume</i>)</p> <p>Default value None.</p>

Copying HALDBs to a different IMS system

You can copy HALDBs to different IMS systems by using either image copies or DFSMSdss.

In this topic:

- [“Copying HALDBs by using an image copy” on page 134](#)
- [“Copying HALDBs by using DFSMSdss” on page 136](#)

Copying HALDBs by using an image copy

The HALDB copy utility allows you to copy a HALDB, using the latest non-fuzzy image copy, to a different IMS.

About this task

The utility transfers a production HALDB to a different IMS and allocates the target data set in that system, if the data set is not already available.

This task is typically performed when a problem is discovered in the production database, where the database cannot be kept offline until the error in the application has been identified and resolved.

This utility performs the following operations:

- Copies the most recent HALDB definitions across to a different RECON by changing the *hlq* portion of the data set name.
- Creates the necessary allocation statements.
- Registers all non-fuzzy image copies to the new RECON.

After these operations have been performed, you can run a recovery using the new RECON.

Alternatively, you can create the JCL by using the ISPF user interface.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCECOPY.
2. Specify the JCL DD statements.
For a list of DD statements, see [“COPYDBRC DD statements” on page 128](#).
3. Specify the COPYDBRC command parameters.

For a list of COPYDBRC command parameters, see [“COPYDBRC command parameters” on page 130](#).

Example

```
//*-----  
//*  
//*          Copy a database to different RECON  
//*          Once this is complete, do GENJCL.RECOV for that RECON  
//*-----  
//CRE      EXEC PGM=IHCWHALD,  
//          REGION=60M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//IMS      DD DISP=SHR,DSN=your.DBDLIB  
//RECON1   DD DISP=SHR,DSN=your.RECON1  
//RECON2   DD DISP=SHR,DSN=your.RECON2  
//RECON3   DD DISP=SHR,DSN=your.RECON3  
//TRACE    DD SYSOUT=*  
//MSGPRINT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//SYSOUT   DD SYSOUT=*  
//IHCSYSIN DD *  
COPYDBRC DBD(nnnnn) -  
          DSNPREF(new.hlq) -  
          DSNDBD(DBD) -  
          INCLIND(YES) -  
          COPYIC(YES) -  
          IDCAMS(YES) -  
          IDCOUT(IDCOUT) -  
          DATACLAS(DCL) -  
          STORCLAS(STOCL) -  
          VOLSER(VOL001) -  
          TODD(DBRCOUT)  
  
/*  
//DBRCOUT DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA  
//IDCOUT  DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA  
/*-----  
/*          APPLY TO OTHER DBRC  
/*-----  
//DBRC     EXEC PGM=IHCYUTIL,  
//          REGION=60M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//RECON1   DD DISP=SHR,DSN=the.other.RECON1  
//RECON2   DD DISP=SHR,DSN=the.other.RECON2  
//RECON3   DD DISP=SHR,DSN=the.other.RECON3  
//IMS      DD DISP=SHR,DSN=your.DBDLIB  
//TRACE    DD DUMMY  
//SYSPRINT DD SYSOUT=*  
//MSGPRINT DD SYSOUT=*  
//SYSIN    DD DISP=(OLD,DELETE),DSN=*.CRE.DBRCOUT  
//IHCSYSIN DD *  
          RUN PGM(IHCYDBR0)  
/*-----  
/*          ALLOCATE NEW FILES  
/*-----  
//IDC      EXEC PGM=IDCAMS,DYNAMNBR=99,  
//          REGION=50M,COND=(4,LE)  
//SYSPRINT DD SYSOUT=*  
//SYSIN    DD DISP=(OLD,DELETE),DSN=*.CRE.IDCOUT  
//
```

Figure 20. Sample JCL from member IHCECOPY

Copying HALDBs by using DFSMSdss

You can use DFSMSdss to copy a HALDB to a different IMS.

About this task

Using DFSMSdss works like image copy recovery. The target RECON must reflect any deleted partitions and you must /DBR the database.

You can create the partition definition for the target RECON and create the DFSMSdss commands that are necessary to make the copy.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEDFDS.
2. Specify the JCL DD statements.
For a list of DD statements, see [“COPYDBRC DD statements” on page 128](#).
3. Specify the COPYDBRC command parameters.
For a list of COPYDBRC command parameters, see [“COPYDBRC command parameters” on page 130](#).
4. Make sure that the target RECON reflects any deleted partitions.
5. Run /DBR on the database.

Example

```
//*-----  
//*  
//*          Copy a database to different RECON  
//*          The copy function is done via DFDSS  
//*-----  
//CRE      EXEC PGM=IHCWHALD,  
//          REGION=60M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//IMS      DD DISP=SHR,DSN=your.DBDLIB  
//RECON1   DD DISP=SHR,DSN=your.RECON1  
//RECON2   DD DISP=SHR,DSN=your.RECON2  
//RECON3   DD DISP=SHR,DSN=your.RECON3  
//MSGPRINT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//SYSOUT   DD SYSOUT=*  
//IHCSYSIN DD *  
COPYDBRC DBD(nnnnn) -  
          DSNPREF(new.hlq) -  
          DSNDBD(DBD) -  
          INCLIND(YES) -  
          DFDSS(YES) -  
          DFDSSOUT(DSSOUT) -  
          IDCOUT(IDCOUT) -  
          TODD(DBRCOUT)  
/*  
//DBRCOUT DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA  
//DSSOUT  DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA  
//IDCOUT  DD DISP=(,PASS),SPACE=(TRK,(1,1)),UNIT=SYSALLDA  
/*-----  
/*          APPLY TO OTHER DBRC  
/*-----  
//DBRC     EXEC PGM=IHCYUTIL,  
//          REGION=60M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//RECON1   DD DISP=SHR,DSN=the.other.RECON1  
//RECON2   DD DISP=SHR,DSN=the.other.RECON2  
//RECON3   DD DISP=SHR,DSN=the.other.RECON3  
//IMS      DD DISP=SHR,DSN=your.DBDLIB  
//TRACE    DD DUMMY  
//SYSPRINT DD SYSOUT=*  
//MSGPRINT DD SYSOUT=*  
//SYSIN    DD DISP=(OLD,DELETE),DSN=*.CRE.DBRCOUT  
//IHCSYSIN DD *  
RUN      PGM(IHCYDBR0)
```

Figure 21. Sample JCL from member IHCEDFDS (Part 1 of 2)

```
//*-----  
/*          Delete target datasets  
/*-----  
//DEL      EXEC PGM=IDCAMS,DYNAMNBR=99,  
//          REGION=50M,COND=(4,LE)  
//SYSPRINT DD SYSOUT=*  
//SYSIN    DD DISP=(OLD,DELETE),DSN=*.CRE.IDCOUT  
/*-----  
/*          Use DFDSS to copy  
/*-----  
//IDC      EXEC PGM=ADRDSSU,DYNAMNBR=99,  
//          REGION=50M,COND=(4,LE)  
//SYSPRINT DD SYSOUT=*  
//SYSIN    DD DISP=(OLD,DELETE),DSN=*.CRE.DSSOUT  
//          DD *  
          TGTALLOC(SOURCE) -  
          TOL(ENQF) -  
          ADMINISTRATOR -  
          VOL(ANY) -  
          WAIT(2,2) SHR  
/*
```

Figure 22. Sample JCL from member IHCEDFDS (Part 2 of 2)

Chapter 6. Using the HALDB Analyzer

The HALDB Analyzer utility checks the health of a HALDB by verifying HALDB constructs within a database and its indexes.

About this task

The utility analyzes the HALDB structure and verifies that all root keys are in the correct partition, that all ILKs are valid, and that all EPS pointers will find the correct ILE. Additional performance-related data is also collected.

The HALDB Analyzer monitors specific HALDB components. You can provide thresholds that trigger the utility to issue critical warnings when these components are not performing properly. These components include:

Partition selection

A root segment in a partition is not found in the same partition when searched by partition selection.

Randomizer error

A call to the randomizer using an existing root segment does not return a zero return code. This warning is performed for the standard IMS randomizer (DFSHDCnn) only.

Duplicate ILKs

There should not be any duplicate ILKs.

Missing ILEs

EPS pointer requires pointer healing, but there is no corresponding ILE.

A return code of 8 is set when any of these situations is detected.

Invalid ILKs

The ILK of a segment is invalid.

A return code of 4 is set when invalid ILKs are detected.

When invalid ILKs are detected:

- Run IMS High Performance Pointer Checker as necessary and make sure that no errors are detected.
- Invalid ILKs do not immediately indicate the database failure. If no errors other than invalid ILKs are detected, you can continue to use the database because invalid ILKs do not cause immediate problems. However, if you continuously reorganize the database or run the HTK MAINTAIN function as is, ILKs might become duplicated. To prevent duplicated ILKs, consider performing the following tasks:

1. Resolve invalid ILKs.

To resolve invalid ILKs, use either of the following methods to reset ILKs:

- Method 1: Unload and reset ILKs by using the HTK RESETILK function, then reload. For more information about the HTK RESETILK function, see [Chapter 9, “Recovering by using the ILK reset utility,” on page 167](#).
- Method 2: Unload all partitions, then reload by IMS HP Load with the REPAIRILK=YES option. For more information about the REPAIRILK=YES option of IMS HP Load, see the *IMS High Performance Load User's Guide*.

You must process all partitions in either method. Also, you must rebuild the PSINDEX.

2. Specify the REORGV parameter on the INIT.RECON command or the CHANGE.RECON command.

Invalid ILKs might be detected if the database was being used without the HALDB reorganization number verification function of IMS and if you changed, by using functions such as HTK MAINTAIN, a high key that defines a boundary between partitions of the HALDB. If you need

to change a high key for partitions, it is recommended that you specify the REORGV parameter on the INIT.RECON command or the CHANGE.RECON command to prevent invalid ILKs.

The HALDB reorganization number verification function of IMS is activated by specifying the REORGV parameter on the INIT.RECON command or the CHANGE.RECON command. If the REORGV parameter is not specified on these commands, the default (the HALDB reorganization number verification function of IMS deactivated) is used.

- If ILK validation is not required, specify VERIFYILK(N). However, consider validating ILKs by specifying VERIFYILK(Y) if either or both of the following conditions are met:
 1. If a HALDB has secondary indexes (PSINDEXes).
 2. If the database was being used without the HALDB reorganization number verification function of IMS. Also, after performing one or more of the following tasks:
 - Initialized the partitions of the HALDB after the partitions were used
 - Added partitions to the HALDB
 - Changed a high key that defines a boundary between partitions of the HALDB

When duplicated ILKs are detected:

- To resolve duplicate ILKs, reset ILKs. For details on how to reset ILKs, see the explanations for invalid ILKs.

Performance and administration parameters allow you to set threshold levels for the components being monitored by the HALDB Analyzer.

The threshold values for performance and administration parameters are set as percentage numbers from 0 to 100, unless otherwise stated.

The parameters produce two levels of warning operands:

Normal warning level

The warning level operand notifies you of a problem situation, but allows you some time to resolve the problem.

Critical warning level

The critical level operand informs you that an immediate action needs to be taken to correct the problem.

A value of 0 in any operand suppresses the notification. However, the report still shows the data. There are no default settings for the parameters. When the keyword is omitted, no threshold warning is issued.

Procedure

1. Locate the sample JCL for the HALDB Analyzer utility in the SIHCSAMP file, member IHCEANA.
2. Specify the JCL DD statements.
For a list of DD statements, see [“CHECK DD statements” on page 141](#).
3. Specify the CHECK command parameters.
For a list of CHECK command parameters, see [“CHECK command parameters” on page 144](#).

Example

```
//*-----  
//*  
//*      Analyze HALDB  
//*  
//*-----  
//S2      EXEC PGM=IHCHALDB,  
//        REGION=80M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad  
//        DD DISP=SHR,DSN=your.SDFSRESL  
//RECON1  DD DISP=SHR,DSN=your.RECON1  
//RECON2  DD DISP=SHR,DSN=your.RECON1  
//RECON3  DD DISP=SHR,DSN=your.RECON1  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//IMS     DD DISP=SHR,DSN=your.DBDLIB  
//TRACE   DD SYSOUT=*  
//MSGPRINT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//IHCSYSIN DD *  
CHECK DBD(PHD02) -  
MINROOT(500) -  
VERIFYILK(Y) -  
VERIFYILE(Y) -  
KEYS(KEYSOUT) -  
SPACE(300,2500) -  
4GBWARN(3000,3500) -  
EXTENT(20,40) -  
ROOTOVFL(1,30) -  
ROOTHOME(2,20) -  
SPLIT(5,10) -  
PTRHEAL(20,80) -  
AVGFSE(1,30) -  
RAPUSE(60,80)  
//KEYSOUT DD DISP=(,PASS),SPACE=(CYL,(1,1)),UNIT=SYSDA,  
//        DSN=&&KEYS  
//
```

Figure 23. JCL member IHCEANA

CHECK DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **CHECK** command.

Table 16. DD statements and record format for the CHECK command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
IHCLIST	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload  
//          DD DISP=SHR,DSN=imstools  
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“CHECK command parameters” on page 144](#).

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

IHCLIST

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for reports. For more information about the reports generated in this data set, see [“IHCLIST data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

CHECK command parameters

The following table summarizes the **CHECK** command parameters.

Table 17. CHECK command parameters

Parameter	Requirement	Description
4GBWARN	Optional	<p>Sets the warning level for used space. None of the data sets can use more than 4 GB (gigabytes). When the data set tries to go beyond this limit, an abend 844 will occur. This is not the high allocation point, but rather the high use point. This point can be indicated by the threshold setting.</p> <p>4GBWARN and 8GBWARN are mutually exclusive.</p> <p>Format (<i>lll,hhh</i>)</p> <p>lll Sets the low threshold. Specify a number (in MB) in the range of 0 - 4095. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hhh Sets the high threshold. Specify a number (in MB) in the range of 0 - 4095. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: 4GBWARN (2500 , 3500)</p> <p>Resolution When the partition grows too large, you should split it into two partitions.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
8GBWARN	Optional	<p>Sets the warning level for used space. None of the data sets can use more than 8 GB (gigabytes). When the data set tries to go beyond this limit, an abend 844 will occur. This is not the high allocation point, but rather the high use point. This point can be indicated by the threshold setting.</p> <p>4GBWARN and 8GBWARN are mutually exclusive.</p> <p>Format (<i>llll,hhhh</i>)</p> <p>llll Sets the low threshold. Specify a number (in MB) in the range of 0 - 8191. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hhhh Sets the high threshold. Specify a number (in MB) in the range of 0 - 8191. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: 8GBWARN (6500, 7500)</p> <p>Resolution When the partition grows too large, you should split it into two partitions.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
AVGFSE	Optional	<p>Describes the number of free space elements (FSE) per block. This parameter can indicate that a reorganization is needed.</p> <p>An FSE describes a portion of free space in a block. There should only be one FSE that describes one large chunk of free space. However, after any update activity, that free space can become multiple smaller pieces. This is especially true with compressed segments.</p> <p>Format (<i>lll,hhh</i>)</p> <p>lll Sets the low threshold for the number of FSEs per block. Specify a number in the range of 0 - 999. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hhh Sets the high threshold for the number of FSEs per block. Specify a number in the range of 0 - 999. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage The low and high values are dependent on the segment size. You want to set this value smaller with large segments. A recommended setting is: AVGFSE (5 , 10)</p> <p>Resolution A reorganization will return the free space back to one block.</p>
DBD	Required	<p>Specifies the name of the HALDB DBD.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (ddd)</p> <p>Default value None.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
EXTENT	Optional	<p>Indicates the extent number that triggers a warning.</p> <p>The maximum number of extents allowed depends on the data management type.</p> <p>VSAM The maximum number of extents per data set is 251. The maximum number of extents per volume is 123.</p> <p>OSAM The maximum number of extents per data set depends on the version of IMS; approximately 120 for IMS 14 and later. The maximum number of extents per volume is 16.</p> <p>When no more extents are possible, an attempt to obtain a new one creates an out-of-space condition, which leads to an 844 IMS abend. The purpose of the EXTENT parameter settings is to prevent this occurrence.</p> <p>Format (<i>lll,hhh</i>)</p> <p>lll Sets the low threshold. Specify a number in the range of 0 - 251. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hhh Sets the high threshold. Specify a number in the range of 0 - 251. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: EXTENT (25 , 35)</p> <p>Resolution Consider dividing this partition into two partitions using the functions provided with this utility. If the space usage is not very high, adjust the primary and the secondary space parameter to allow fewer extents.</p> <p>It is also possible that your SMS pool volumes are heavily split, so that each space request must be satisfied using multiple extents. In this situation, your volumes should be maintained.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSV000).</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
KEYS	Optional	<p>The designated ddname will receive a file containing the root keys.</p> <p>Format (ddname)</p> <p>Default value None.</p> <p>Usage Use this parameter if you want to perform a root key analysis; otherwise, do not specify this parameter.</p> <p>The KEYS file is created upon request only. The file only exists when the KEYS parameter has been specified.</p> <p>The following example shows the layout of the file:</p> <pre>PID DS XL2 Current partition id REORGNO DS XL2 Current reorg number SEGRBA DS XL4 Current RBA (data portion if split) TARGPID DS XL2 Target partition id RMRESULT DS XL4 Randomizer result KEY DS 0C Start of root key</pre>
MINROOT	Optional	<p>Defines the minimum amount of root segments in the database for the segment-oriented thresholds. If there are less than the specified root segments, some warnings are suppressed. This is because the percentage values do not perform well with small databases. The thresholds are suppressed for ROOTHOME, ROOTOVFL, SPLIT, and PTRHEAL.</p> <p>Format (nnnnnn)</p> <p>Default value 0</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
PTRHEAL	Optional	<p>Indicates the amount of EPS pointer (PSINDEX ONLY) that needs pointer healing. The secondary index EPS pointer is not maintained when reorganizing the primary database (or a partition). In this situation, pointer healing (updating the direct pointer from the index to its target) must be done when the pointer is used. The ILDS data set is used.</p> <p>This process creates many I/Os. Therefore, it is recommended that you have all pointers healed. This parameter can help you decide when to perform this task.</p> <p>Format (<i>ll, hh</i>)</p> <p>ll Sets the low threshold. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hh Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: PTRHEAL (20, 60)</p> <p>Resolution You can use the pointer healer function provided by IMS HALDB Toolkit or rebuild the indexes using an index builder utility.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
RAPUSE	Optional	<p>Indicates the usage of root anchor points (RAPs) in a PHDAM database. This parameter is used only for PHDAM. RAP usage is very dependent on the randomizing module. This parameter is designed for DFSHDC40, but can be used for others as well. A performance criteria for DFSHDC40 is that it should have more RAPs than root segments. This condition leads to RAPs not being used. The RAPUSE parameter monitors this usage.</p> <p>Format (<i>ll, hh</i>)</p> <p>ll Sets the low threshold. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hh Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: RAPUSE (60, 80)</p> <p>Resolution The randomizing parameter must be changed. See ROOTHOME for details.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
ROOTHOME	Optional	<p>Indicates the number of root segments that are not in home block. This parameter is effective for PHDAM only. It is ignored for PHIDAM.</p> <p>PHDAM has a randomizing module that addresses a root anchor point (RAP). The root segment is chained off. For performance reasons, the root segment should be residing in the same block. However, this is not always the case. This parameter allows you to set thresholds on how many root segments are not in that block.</p> <p>Format (<i>ll, hh</i>)</p> <p>ll Sets the low threshold. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hh Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage Do not allow too many roots in the home block. A recommended setting is: ROOTHOME (10 , 30)</p> <p>Resolution The randomizing parameter must be changed. In most cases, you must increase the RAASIZE.</p> <p>You might also have too many RAPs per block. In this case, decrease the RAPs per block and increase the RAASIZE accordingly. Remember that the randomizing parameter is defined with the partition, so you must perform this task using the DBRC utility and CHANGE.PART. You can use the MAINTAIN function to resolve this.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
ROOTOVFL	Optional	<p>Indicates how many root segments are in overflow. This parameter applies to PHDAM only. It is like the ROOTHOME parameter. However, this situation occurs when many new root segments are inserted. All roots in the overflow area are also reflected by ROOTHOME, but these roots could be brought back by a simple reorganization.</p> <p>Format (<i>ll, hh</i>)</p> <p>ll Sets the low threshold. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hh Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Resolution The resolution is to change the randomizing parameter for the indicated partition.</p>
SPACE	Optional	<p>Sets thresholds for partition size. This parameter can be used to make decisions about partitions.</p> <p>Format (<i>llll, hhhh</i>)</p> <p>llll Sets the lowest preferred partition size. Specify a number (in MB) in the range of 0 - 8191. You will get a warning when the partition size is smaller than this value. If you specify a value of 0, this warning is suppressed.</p> <p>hhhh Sets the high partition size. Specify a number (in MB) in the range of 0 - 8191. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: SPACE (512, 3500)</p> <p>Resolution When a partition is too small, you might want to combine it with the left or right (or both) neighboring partition. The IMS HALDB Toolkit provides the functionality to do this. When a partition becomes too large, it should be split into two partitions.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
SPLIT	Optional	<p>Indicates how many of the split segments are split to a different block. A variable length segment could be split into the prefix and the data portion. This can happen during an update when the size of the data increases, but there is not enough room to update this in place. The prefix portion cannot be moved and needs to stay in place.</p> <p>The data portion is now stored at a different location and is pointed to by an additional pointer in the prefix. This becomes a problem when the different location is in a different block. That situation will cause an additional I/O when retrieving the segment.</p> <p>The parameter threshold settings address this specific situation. The parameter is active for each segment type that has variable length or is compressed.</p> <p>Format (<i>ll, hh</i>)</p> <p><i>ll</i> Sets the low threshold for all segments of a segment type that is split to a different block. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p><i>hh</i> Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Usage A recommended setting is: SPLIT(5,20)</p> <p>Resolution A reorganization will resolve this problem.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
SYNONYM	Optional	<p>Indicates the number of root segment occurrences in the synonym chain. This parameter is effective for PHDAM only. It is ignored for PHIDAM.</p> <p>Format (<i>ll, hh</i>)</p> <p>ll Sets the low threshold. Specify a percentage number in the range of 0 - 99. You will get a warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>hh Sets the high threshold. Specify a percentage number in the range of 0 - 99. You will get a critical warning when this value is exceeded. If you specify a value of 0, this warning is suppressed.</p> <p>Default value None.</p> <p>Resolution The randomizing parameter must be changed. In most cases, you must increase the RAASIZE.</p> <p>You might also have too few RAPs per block. In this case, increase the RAPs per block and increase the RAASIZE accordingly. Remember that the randomizing parameter is defined with the partition, so you must perform this task using the DBRC utility and CHANGE.PART. You can use the MAINTAIN function to resolve this.</p>
VERIFYILE	Optional	<p>When EPS pointers are present, they might require pointer healing. Pointer healing requires that the targeted partition has an ILE (a record in the ILDS) to be used for healing. If this record is not there, the situation is the equivalent of a pointer error.</p> <p>Format (Y N)</p> <p>Default value N</p> <p>Usage This condition should be checked regularly.</p>

Table 17. CHECK command parameters (continued)

Parameter	Requirement	Description
VERIFYILK	Optional	<p>In HALDB, each segment has a unique indirect list key (ILK) that can never be the same for the same segment type in the entire database. The pointer healing process relies on this uniqueness. This condition should be treated like a pointer, so its verification is important. The function provided will check for duplicate and invalid ILK.</p> <p>Format (Y N)</p> <p>Default value N</p> <p>Usage This condition should be checked regularly.</p>

Chapter 7. Reorganizing a PSINDEX

The reorganize PSINDEX utility helps you reorganize a partitioned secondary index (PSINDEX) to improve space management due to heavy update activity, where the number of CI splits and CA splits would be high.

About this task

The following tasks can be performed by this utility:

- Reclaim space
- Reclaim split indexes
- Remove deleted index records

Although this reorganization task could be performed with IDCAMS REPRO, the task would not be registered with DBRC.

The following example shows another way to use the REORGIND command to reorganize a PSINDEX:

```
REORGIND DBD(dbdname) PARTITN(psindex_partition_name)
```

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEREOI.
For a list of DD statements, see [“REORGIND DD statements” on page 157](#).
2. Specify the JCL DD statements.
For a list of REORGIND command parameters, see [“REORGIND command parameters” on page 160](#).

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          Reorg partition
//*-----
//REO EXEC PGM=IHCHALDB,
//      REGION=60M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//      DD DISP=SHR,DSN=your.SDFSRESL
//RECON1 DD DISP=SHR,DSN=your.RECON1
//RECON2 DD DISP=SHR,DSN=your.RECON2
//RECON3 DD DISP=SHR,DSN=your.RECON3
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS DD DISP=SHR,DSN=your.DBDLIB
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//REORGIND DBD(SH022)
/*
```

Figure 24. Sample JCL for reorganizing a PSINDEX

REORGIND DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **REORGIND** command.

Table 18. DD statements and record format for the REORGIND command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“REORGIND command parameters”](#) on page 160.

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

REORGIND command parameters

The following table summarizes the **REORGIND** command parameters.

Table 19. REORGIND command parameters

Parameter	Requirement	Description
DBD	Required	<p>Specifies the name of a primary DBD or a PSINDEX.</p> <p>If you specify a primary DBD, PARTITN must not be specified. All PSINDEX partitions for the specified primary DBD are reorganized.</p> <p>If you specify a PSINDEX DBD, you can specify a partition. If a partition is not specified or specified with an asterisk (*), then all partitions of that PSINDEX are reorganized.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
PARTITN	Optional	<p>Specifies the name of the PSINDEX partition. If the DBD is PSINDEX, the default name value is an asterisk (*).</p> <p>This parameter is invalid when a primary DBD is specified.</p> <p>Format (<i>psindex_partition_name</i> *)</p> <p>Default value *</p>

Chapter 8. Splitting an unload file into single partition files

The split unload file utility allows you to split or consolidate an unload file into single partition unload files. The reloads then can run in parallel.

About this task

A HALDB unload file can contain data from multiple partitions. As the data grows or shifts, partitions grow or shrink. When reloading partitions, it would be faster to reload each partition in parallel.

The single partition unload files are standard Hierarchical Direct (HD) unload files with header and trailer statistics. Each file contains only records for the selected partition.

This utility separates the HALDB unload file on the partition boundary and maintains the unload header and trailer records for each file.

The sample JCL for this utility is in the SIHCSAMP file, member IHCESPLT.

You must specify the DBD and the unload file you want to split.

The DD name for the single partition HD unload files are constructed using the partition name appended with a Z. These files are required.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCESPLT.
2. Specify the JCL DD statements.
For a list of DD statements, see [“IHCUSPLT DD statements” on page 162](#).
3. Specify the IHCUSPLT command parameters.
For a list of IHCUSPLT command parameters, see [“IHCUSPLT command parameters” on page 164](#).

Example

In the following example, each partition unload file is named PARTxxZ.

```

//JOBNAME   JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          Split unload file
//*          Input DD is "DFSUINPT"
//*          Output DD is partition name + "Z"
//*-----
//S2       EXEC PGM=IHCHALDB,
//          REGION=80M
//STEPLIB  DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//RECON1   DD DISP=SHR,DSN=your.RECON1
//RECON2   DD DISP=SHR,DSN=your.RECON2
//RECON3   DD DISP=SHR,DSN=your.RECON3
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//TRACE    DD SYSOUT=*
//SYSABEND DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//IHCSYSIN DD *
//          RUN      PGM(IHCUSPLT) -
//          DBD(nnnnn) /* <=== DBD name
//DFSUINPT DD DISP=SHR,DSN=your.hd.unload.dataset
//PART01Z  DD DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(50,20)),
//          DSN=&&PART01
//PART02Z  DD DISP=(,PASS),UNIT=SYSDA,SPACE=(CYL,(50,20)),
//          DSN=&&PART02

```

Figure 25. Sample JCL member IHCSPLT

IHCUSPLT DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **IHCUSPLT** command.

Table 20. DD statements and record format for the IHCUSPLT command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
DFSUINPT	Input	Same as IMS	Required
IHCSYSIN	Input	LRECL=80	Required
<i>partition_nameZ</i>	Output		Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit

- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

DFSUINPT

This statement is required. The statement defines the unload file you want to split.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“IHCUSPLT command parameters”](#) on page 164.

partition_nameZ

These statements are required. Each of these statements defines the HD unload file for each partition. The DD names for the single partition HD unload files are constructed using the partition name appended with a Z.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

IHCUSPLT command parameters

The following table summarizes the **IHCUSPLT** command parameters.

Table 21. IHCUSPLT command parameters

Parameter	Requirement	Description
DBD	Required	Specifies the name of a primary DBD. Format (<i>dbdname</i>) Default value None.

Table 21. IHCUSPLT command parameters (continued)

Parameter	Requirement	Description
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (ddd)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (nnn)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>

Chapter 9. Recovering by using the ILK reset utility

Recovery is the process of rebuilding databases after a system failure. IMS HALDB Toolkit provides the ILK utility to help you recover from the database rebuild process.

About this task

In a HALDB, an indirect list entry key (ILK) is a unique token that is assigned to a segment in PHDAM and PHIDAM databases when the segment is created. Eight bytes in length and stored in the prefix of the segment, the ILK uniquely identifies every segment in PHDAM and PHIDAM databases.

The ILK reset utility enables you to rebuild all ILKs and their references, and allows you to resolve conflicting ILKs.

The ILK reset utility resets the ILK of each segment. The utility offers a solution when duplicate or invalid ILKs are encountered. Run this utility when the HALDB Analyzer detects invalid ILKs.

This utility does not support logical relations. It creates an HD unload file, which contains the new ILKs. This file can be used as input to reload.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEILK.
2. Specify the JCL DD statements.
For a list of DD statements, see [“RESETILK DD statements” on page 168](#).
3. Specify the RESETILK command parameters.
For a list of RESETILK command parameters, see [“RESETILK command parameters” on page 170](#).
4. Make sure that an index builder utility is available because secondary indexes must be rebuilt.
5. Take the databases offline.

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*      Reset ILK
//*      A new HD unload file is created containing
//*      new ILKs. Reload database using this unload file.
//*      Secondary indexes must be rebuild
//*
//*-----
//S2      EXEC PGM=IHCHALDB,
//          REGION=50M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//RECON1  DD DISP=SHR,DSN=your.RECON1
//RECON2  DD DISP=SHR,DSN=your.RECON2
//RECON3  DD DISP=SHR,DSN=your.RECON3
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//TRACE   DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//          RESETILK DBD(ddddd)
//DFSURGU1 DD UNIT=SYSDA,DISP=(,PASS),
//          DSN=&&UNL,SPACE=(CYL,(1,1))
//
```

Figure 26. Sample ILK reset JCL

RESETILK DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **RESETILK** command.

Table 22. DD statements and record format for the RESETILK command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCYSIN	Input	LRECL=80	Required
DFSURGU1	Output		Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload  
//          DD DISP=SHR,DSN=imstools  
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“RESETILK command parameters” on page 170](#).

DFSURGU1

This statement is required. The statement defines a new HD unload file for storing new ILKs.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

RESETILK command parameters

The following table summarizes the **RESETILK** command parameters.

Table 23. RESETILK command parameters

Parameter	Requirement	Description
DBD	Required	<p>Specifies the name of a primary DBD.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>

Chapter 10. Healing index pointers

After reorganizing the primary database, all secondary index pointers require healing. HALDB can handle this situation with its self-healing feature. Indexes can provide direct access to data, which otherwise can be found only by scanning the entire database.

About this task

HALDB identifies the new direct pointer by using the indirect list data set (ILDS) and replaces the invalid pointer with the current pointer. This process is called pointer healing.

However, this task might demand extra resources that can affect performance during peak time.

The index pointer healer utility allows you to heal index pointers offline and at a less expensive time. The utility allows you to replace, or heal, all index pointers that have become invalid after a database reorganization. The utility updates the index using the ILDS, which is an efficient process because it works sequentially.

When the primary database (or its partitions) is reorganized, the secondary indexes are not rebuilt. However, the target segment in the primary database has moved to a different place (the relative byte address or RBA). This condition makes the direct pointer in the index invalid.

Pointer healing takes place only when required (for example, when the secondary index is used to locate the target). This process requires many I/Os. It is recommended that you avoid pointer healing during peak transaction time.

The following conditions apply to using the index pointer healer utility:

- The primary database must not be open for update.
- The secondary indexes must be offline.

Alternatively, you can create the JCL by using the ISPF user interface.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEIXHL.
2. Specify the JCL DD statements.
For a list of DD statements, see [“PTRHEAL DD statements” on page 172](#).
3. Specify the PTRHEAL command parameters.
For a list of PTRHEAL command parameters, see [“PTRHEAL command parameters” on page 174](#).
4. Make sure that the primary database is closed for update.
5. Make sure that the secondary indexes are offline.

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//* Pointer healing for secondary indexes
//* for index DBD specified.
//*
//*-----
//S2 EXEC PGM=IHCHALDB,
// REGION=50M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
// DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//RECON1 DD DISP=SHR,DSN=your.RECON1
//RECON2 DD DISP=SHR,DSN=your.RECON2
//RECON3 DD DISP=SHR,DSN=your.RECON3
//IMS DD DISP=SHR,DSN=your.DBDLIB
//TRACE DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
PTRHEAL DBD(nnnnn)
```

Figure 27. Sample Index Pointer Healer JCL

PTRHEAL DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **PTRHEAL** command.

Table 24. DD statements and record format for the PTRHEAL command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“PTRHEAL command parameters”](#) on page 174.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

PTRHEAL command parameters

The following table summarizes the **PTRHEAL** command parameters.

Table 25. PTRHEAL command parameters

Parameter	Requirement	Description
DBD	Required	Specifies the PSINDEX DBD name. Format (<i>dbdname</i>) Default value None.
DFSDF	Optional	Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog. The specified member is used when the following two conditions are met: <ul style="list-style-type: none"> • IMS manages the ACBs (ACBMGMT=CATALOG). • The IMS Catalog Definition exit routine (DFS3CDX0) is not used. Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog. Format (<i>ddd</i>) Default value None.
IMSID	Optional	IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine. Format (<i>nnnn</i>) Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).

Chapter 11. System utilities

IMS HALDB Toolkit provides several utilities to help you with database handling tasks.

Topics:

- [“Rebuilding DBD source from DBDLIB” on page 175](#)
- [“Creating a PSB list for selected DBDs” on page 178](#)
- [“Creating OSAM multi-volume data sets” on page 180](#)
- [“Listing VIO and unit names” on page 181](#)

Rebuilding DBD source from DBDLIB

The rebuild DBD source utility rebuilds DBD source statements from DBDLIB. If you are not sure that your DBD source reflects the DBDLIB, you can use this utility to rebuild the DBD source. The DBDLIB contains the most recent DBD description.

About this task

DBD source statements are compiled to create the DBD description in DBDLIB. The rebuild DBD source utility reverses that process.

A database description (DBD) is the collection of macro parameter statements that define the characteristics of a database, such as the database's organization and access method, the segments and fields in a database record, and the relationship between types of segments.

The output from this job is written to the OUTPUT file.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEDBD.
2. Specify the JCL DD statements.
For a list of DD statements, see [“IHCUBDD DD statements” on page 176](#).
3. Specify the IHCUBDD command parameters.
For a list of IHCUBDD command parameters, see [“IHCUBDD command parameters” on page 178](#).

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          Rebuild DBD source
//*
//*-----
//S2      EXEC PGM=IHCHALDB,
//          REGION=50M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD
//          DD DISP=SHR,DSN=your.SDFSRESL
//RECON1  DD DISP=SHR,DSN=your.RECON1
//RECON2  DD DISP=SHR,DSN=your.RECON2
//RECON3  DD DISP=SHR,DSN=your.RECON3
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//TRACE   DD DUMMY
//MSGPRINT DD SYSOUT=*
//OUTPUT  DD SYSOUT=*
//IHCSYSIN DD *
//          RUN PGM(IHCUBDD) -
//              DBD(ddddd)           <=== specify DBD name
```

Figure 28. Sample JCL member IHCEDBD

IHCUBD DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **IHCUBD** command.

Table 26. DD statements and record format for the IHCUBD command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
IMS	Input	Same as IMS	Required
IMSDALIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
OUTPUT	Output	LRECL=133	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload  
//          DD DISP=SHR,DSN=imstools  
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

IMS

This statement is required. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“IHCUBD command parameters” on page 178](#).

OUTPUT

This statement is required. The statement defines the output data set for storing the rebuilt DBD source.

The output file can be allocated as SYSOUT=* or PDS.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

IHCUBD command parameters

The following table summarizes the **IHCUBD** command parameters.

Table 27. IHCUBD command parameters

Parameter	Requirement	Description
DBD	Required	Specifies the DBD name. Format (<i>dbdname</i>) Default value None.

Creating a PSB list for selected DBDs

A program specification block (PSB) is a control block that describes databases and logical message destinations used by an application program. A PSB consists of one or more program communication blocks (PCB).

About this task

A program communication block (PCB) is an IMS control block that describes an application program's interface to and view of an IMS database or, additionally for message processing and batch message processing programs, to the source and destinations of messages. PCBs are defined by the user during PSB generation.

The show PSB utility can be used to create a list of program specification blocks (PSB) that reference a given database, and assists in online changes by identifying which PSBs require change.

The references to both the DBDs and the PSBs reside in the application control block (ACB) library. The ACB library is used during online and database batch (DBB) region type execution of IMS.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEACBL.
2. Specify the JCL DD statements.
For a list of DD statements, see [“IHCWPSBL DD statements” on page 179](#).
3. Edit the list of the DBD names on the DBDLIST DD.

Results

The list of PSB names can be found in the MSGPRINT file.

Example

```
//JOBNAME JOB 0,000,CLASS=A,MSGCLASS=X
//*****
//* SHOW PSBS FROM ACBLIB FOR SPECIFIED DBD(S)
//*****
//PSBS EXEC PGM=IHCYUTIL,
// REGION=50M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD
// DD DISP=SHR,DSN=your.SDFSRESL
//IMS DD DISP=SHR,DSN=your.DBD.LIBRARY
//IMSACB DD DISP=SHR,DSN=your.ACBLIB
//TRACE DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
// RUN PGM(IHCWPSBL)
//DBDLIST DD *
DBDNAME1 <=== specify DBD name
DBDNAME2
/*
```

Figure 29. Sample JCL member IHCEACBL

IHCWPSBL DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **IHCWPSBL** command.

Table 28. DD statements and record format for the IHCWPSBL command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
IMS	Input	Same as IMS	Required
IMSACB	Input	Same as IMS	Required
IHCSYSIN	Input	LRECL=80	Required
DBDLIST	Input	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
// DD DISP=SHR,DSN=imstools
// DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.

- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

IMS

This statement is required. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

IMSACB

This statement is required. The statement defines the ACB library that contains the DBD that the DBDLIST DD statement specifies.

This data set must reside on DASD.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

DBDLIST

This statement is required. This statement defines the DBDs. To specify multiple DBDs, write one DBD name on each line.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

Creating OSAM multi-volume data sets

This utility creates the additional VTOC records on the subsequent volumes using the secondary allocation. Overflow Sequential Access Method (OSAM) is an IMS data management access method that combines selected characteristics of BSAM and BDAM. OSAM is used by the following IMS database access methods: HIDAM and HDAM if VSAM is not used. OSAM is also used by some of the online pool management routines.

About this task

The OSAM multi-volume utility allows you to create OSAM multi-volume data sets using the **ALLOCATE** command in TSO/IDCAMS.

You do not need to create OSAM multi-volume data sets for z/OS Storage Management Subsystem (SMS) managed data sets. This utility is appropriate only for non-SMS data sets.

The **ALLOCATE** command creates the catalog entries for all specified volumes, but only builds a VTOC record on the first volume. IMS OSAM does not allow this and will end abnormally.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEOSAM.
2. Edit the JCL as necessary.

Example

```
//JOBNAME  JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          OSAM MULTI VOLUME UTILITY
//*          MAKE SURE THAT ALL VOLUMES HAVE A VTOC
//*          NOT REQUIRED WHEN SMS
//*-----
//MVOL    EXEC PGM=IHCYOSAM
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//MSGPRINT DD SYSOUT=*
//SYSIN   DD *
dsname1           <=== specify your DSN
dsname2
```

Figure 30. Sample JCL member IHCEOSAM

Listing VIO and unit names

It is possible for an installation parameter to ask you for non-VIO (virtual I/O) unit names. This list DASD unit names utility shows all unit names that do not reflect device types (such as 3390) and marks those that are defined as VIO.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEUNIT.
2. Edit the JCL as necessary.

Results

The list of unit names can be found in the MSGPRINT file.

Example

```
//JOBNAME  JOB 0,000,CLASS=A,MSGCLASS=X
//*****
//*          LIST  DASD UNIT NAMES
//*****
//UNIT     EXEC PGM=IHCYUTIL,
//          REGION=50M
//STEPLIB  DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//TRACE    DD SYSOUT=*
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
RUN       PGM(IHCWEDTI)
```

Figure 31. Sample JCL member IHCEUNIT

Part 6. HALDB without DBRC

The HALDB without DBRC feature provides the ability to perform data set name substitutions outside of DBRC. This feature is intended for use in test installations.

You can also convert non-HALDB DBDs and data sets to HALDB DBDs and data sets.

Topic:

- [Chapter 12, “HALDB without DBRC,” on page 185](#)

Chapter 12. HALDB without DBRC

You can use this feature to perform HALDB data set name substitutions outside of DBRC. It is intended for use in test installations. The feature can process multiple database data sets with one definition.

You can substitute HALDB data set names by using either of the following methods:

- Substituting data set names by specifying the DD statements in the JCL.
- Modifying the global table definitions by using the ISPF user interface or batch definitions.

You can also convert non-HALDB DBDs and data sets to HALDB DBDs and data sets by using the ISPF user interface.

When you use the HALDB without DBRC utility, the database is treated as if it is not registered to DBRC.

The underlying HALDB structure comes from the RECON. This RECON could be the same RECON that is used in the associated online system or the RECON for that online system in a test environment. The RECON holds the HALDB definitions, such as partition names and numbers, key ranges, and file attributes. The HALDB without DBRC utility does not update the RECON, it only refers to it to obtain the HALDB definitions.

All the functions of IMS HALDB Toolkit, except for the HALDB without DBRC function, use DBRC (DBRC=Y). In a HALDB environment without DBRC, all IMS utilities that rely on the RECON content are not usable. However, the backup and recovery utilities continue to work.

Topics:

- [“Configuring HALDB for use without DBRC” on page 185](#)
- [“Substituting data set names by using JCL” on page 186](#)
- [“Substituting data set names by using ISPF or batch definitions” on page 187](#)
- [“Converting non-HALDB DBDs to HALDB DBDs” on page 202](#)

Configuring HALDB for use without DBRC

You can configure HALDB without DBRC to perform data set name substitutions by modeling them after the DD statements that are provided in the JCL or by using the ISPF interface or batch definitions.

Before you begin

In the IMS batch JCL, the DBRC parameter in the parameter string must be set to Y to obtain the partition information from the RECON.



CAUTION:

- DSPCTR0, DFSISVIO, and IHCUTIDD, which are customized modules of IMS HALDB Toolkit, must reside on a different library from the library where other IMS Tools product modules reside.
- You must not concatenate the library that contains DSPCTR0, DFSISVIO, and IHCUTIDD modules to the STEPLIB statement of IMS online (DBRC region) JCL.
- Remember to back up the database as necessary. The HALDB without DBRC utility processes the database as if it is not registered to RECON and therefore no recovery point is created.

About this task

During the configuration, set the JCLALLO parameter in the IHCEDBRI member to indicate whether you want to substitute data set names by modeling them after the DD statements in the JCL or by using the ISPF user interface or batch definitions to modify the global tables.

Procedure

To substitute data set names by using the ISPF user interface or batch definitions, complete the following steps:

1. Add the DBRCNODD=YES | NO parameter to the IHCEDBRI member by choosing one of the following options:
 - To deactivate DBRC for this particular run only, add DBRCNODD=YES and specify the following DD statement: `//$DBRCNO DD DUMMY`.
 - To deactivate DBRC entirely, add DBRCNODD=NO. If necessary, you can temporarily disable this bypass by specifying the following statement: `//$DBRCYY DD DUMMY`.
2. Add the JCLALLO=YES | NO parameter to the IHCEDBRI member by choosing one of the following options:
 - To create rules for substituting HALDB data set names by using the ISPF or batch definitions, add JCLALLO=NO.
 - To substitute data set names by specifying JCL, add JCLALLO=YES.
3. Run SIHCSAMP member IHCEDBRI.
The information KSDS is created, and its data set name is saved in a program.



CAUTION: Make sure you create the IHCUTIDD module in a library that is different from where other IMS Tools product libraries exist.

4. Run SIHCSAMP member IHCEDBRC. IHCEDBRC generates modules DSPCRTR0 and DFSISVIO.



CAUTION: Make sure you create DSPCRTR0 and DFSISVIO modules in a library that is different from where other IMS Tools product libraries exist.

This step re-links the DBRC module DSPCRTR0 to add the intercept module. The module can reside in the IMS RESLIB, but for testing purposes, add it to the output data set (*your_output_dataset* in IHCEDBRC) and not to the IMS HALDB Toolkit library.

5. Concatenate the output data sets generated by IHCEDBRI and IHCEDBRC to the STEPLIB DD. These data sets must be concatenated before IMS RESLIB.
6. For ISPF users: Copy the CLIST IHCCNOTY into your CLIST library.
The CLIST contains the ISPF invocation. You must adjust the data set names to your names. You can change the CLIST name after you copy it into your CLIST library.

Substituting data set names by using JCL

You can substitute data set names by adding DD statements to the JCL.

Procedure

To substitute data set names by using JCL:

Add a DD statement for each HALDB that is used.

The following example shows the valid form for the DD statements that you add.

```
//haldbdn DD DISP=SHR,DSN=your.first.partition.A00001
```

All other partition data sets must use the same dsname prefix, *your.first.partition*. The HALDB master DBD name must be haldbdn. If you have a PSINDEX, each index must be specified.

Results

Data set names are modeled after the DD statements that you specified in the JCL.

Substituting data set names by using ISPF or batch definitions

You can create data set naming rules by using the ISPF user interface or batch update.

If you are unfamiliar with JCL or batch scripts, you can use the ISPF interface to gain an understanding of the types of rules you can create.

In this topic:

- [“Substituting data set names by using the ISPF user interface” on page 188](#)
- [“Substituting data set names by using batch functions” on page 196](#)

Global tables

The HALDB without DBRC feature includes three preinstalled global tables. You can use the ISPF interface or batch update to modify these tables to create rules for substituting HALDB data set names.

These global tables are used when special tables do not exist. Each global table has one row defined by the key "*Global." These rows cannot be deleted because they function as a fallback for row selection errors. However, these rows might be the only rows you need, and they can be modified.

The following global tables are preinstalled:

SYSTEM table

Each row in the SYSTEM table defines a certain system. If you need different user definitions per system, the SYSTEM table can have a user table assigned. If the global DBD table cannot be used for certain DBDs, it can have a DBD table assigned to it.

USER table

Each row in the USER table defines a certain user. Use it only if the global user row is not sufficient. If special definitions for that user and that DBD are required, the user row can have a DBD table attached to it.

DBD table

Each row in the DBD table defines a certain DBD. This row is required only if the data set name creation rule is kept at the DBD level. A DBD table can be assigned to a user, a system, or a system and a user.

Data set names

Data set names are created by modeling them after DD statements in the JCL or by using the ISPF user interface or batch update to modify table definitions that are identified by the IMS system (IMSID), the user (USERID), and the DBD.

Data set names in HALDB are specified by using the DSNPREFIX parameter in DBRC, which is limited to 37 characters.

You can use any combination of the following five elements to create the DSNPREFIX parameter:

HLQ

The high-level qualifier. It can contain up to 37 characters.

SYS

The name of the system. It can contain up to eight characters.

USR

The name of the user. It can contain up to eight characters. You can specify whether to use the content of the USR field, the TSO user ID, or a TSO user ID that is created by using a pattern.

DBD

The name of the DBD. It can contain up to eight characters.

PART

The name of the partition. It can contain up to seven characters.

Here is an example of the DSNPREFIX parameter:

```
Rule=HLQ,SYS,DBD
HLQ=DB.PROD
SYS=IMSA
DBD=DI21PART
DSNPREFX = DB.PROD.IMSA.DI21PART
```

You conduct data set substitution at the DBD level. The rule for creating data set names is the same for all partitions of the same DBD.

Substituting data set names by using the ISPF user interface

You can use the ISPF user interface to create rules for substituting HALDB data set names.

To use the ISPF user interface, begin by opening the **IMS HALDB Toolkit** panel, as shown in the following figure.

```
----- IMS HALDB Toolkit -----
Command ==>

          Select Function                                Current Settings
          1 System Setup                                SYSTEM...: IVP1
          2 Maintain SYSTEMS                            USER....: CKOE1
          3 Maintain USERS                               Version..: 1100
          4 Convert DBD
          5 Convert Datasets
```

Figure 32. IMS HALDB Toolkit panel

You can use the ISPF user interface to do the following tasks:

- [“Modifying the system definition” on page 188](#)
- [“Modifying the system selection method” on page 190](#)
- [“Maintaining the RECON table” on page 191](#)
- [“Maintaining the IMSID table” on page 192](#)
- [“Specifying the level where rules are active” on page 193](#)
- [“Maintaining SYSTEMS” on page 194](#)
- [“Specifying the USER for creating data set names” on page 194](#)
- [“Maintaining USERS” on page 195](#)

Modifying the system definition

You can modify the system definition to change the IMS libraries and DBD libraries.

Procedure

To modify the system definition, complete the following steps:

1. On the **IMS HALDB Toolkit** panel, specify option **1**, System Setup.
The **System Setup** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>>

                          System Setup

Select function

1 System definition
2 System selection method, current is IMSID
3 Maintain RECON table
4 Maintain IMSID table

```

Figure 33. **System Setup** panel

- Specify option **1**, System definition.

The **System definition** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>>

System definition
1 Specify IMS libraries
2 Specify DBD libraries

```

Figure 34. **System definition** panel

- Specify **1**, Specify IMS libraries.

The **Update IMS Libraries** panel is displayed, as shown in the following figure. The specified IMS libraries are used as default settings and are required for specific functions.

```

----- IMS HALDB Toolkit -----
Command ==>>

                          Update IMS libraries

MACLIB   your.SDFSMAC

RESLIB   your.SDFSRESL

MDALIB   your.MDALIB

```

Figure 35. **Update IMS libraries** panel

- Verify or update the IMS libraries and press **Enter**.

You can specify the following DD names:

MACLIB

Specifies the MACLIB data set. Use MACLIB2 to specify an additional macro library.

RESLIB

Specifies the RESLIB data set. Use RESLIB2 and RESLIB3 if you need a concatenation to the RESLIB.

MDALIB

Specifies the MDALIB data set. Use MDALIB2 if you have more than one MDALIB. MDALIB might hold the RECON data set that contains the HALDB layout that you will use

The **System definition** panel is displayed again.

- On the **System definition** panel, specify option **2**, Specify DBD libraries.

The **Update DBD libraries** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                Update DBD libraries

Non HALDB DBD libraries
    your.nothaldb.DBDLIB

HALDB DBD library
    your.haldb.DBDLIB

```

Figure 36. **Update DBD libraries** panel

6. Verify or update the DBD libraries and press **Enter**.

The DBD libraries contain the non-HALDB and the HALDB DBDs. To convert multiple data sets, both libraries must be available.

Results

The system definition is updated with the IMS libraries and DBD libraries that you specified.

Modifying the system selection method

You can use a system selection method other than the default setting by modifying the system selection method.

About this task

The default setting for the system selection method is IMSID. In this setting, an IMSID selects the system row. Selecting a system row assigns a key for the system table. If the system table does not have a key, the default setting is the global key. After the system row has been selected, all other table selections are made based on that table.

To use a system selection method other than IMSID, complete the following steps:

Procedure

1. On the **IMS HALDB Toolkit** panel, specify option **1**, System Setup.

The **System Setup** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                System Setup

Select function

1 System definition
2 System selection method, current is  IMSID
3 Maintain RECON table
4 Maintain IMSID table

```

Figure 37. **System Setup** panel

2. Specify option **2**, System selection method.

The **System Selection Method** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ===>

                          System Setup

System selection method, current is IMSID
1 RECON
2 IMSID
3 FILE
4 User exit (IHCUTIX1)

```

Figure 38. **System Selection Method** panel

- Specify one of the four following options to locate the system row in the system table. These options are used to define the rules for naming data sets.

RECON

If you select RECON, you must create a table that assigns RECON data set names to a system row by its name.

IMSID

If you select IMSID, you must create a matching table that assigns an IMSID to the name of a system row. If the table does not contain an assignment for the specified IMSID, the IMSID is used to locate the system row.

FILE

If you select FILE, you must provide a DD statement that has a record that contains the name of the system table row.

User exit

If you cannot use one of the other three methods, select User exit. The user exit provides the system name.

Results

The system selection method is updated so that the method that you selected will locate the system row and assign a key for the system table.

What to do next

You can maintain the RECON table and the IMSID table or specify the level where the rules are active.

Maintaining the RECON table

You can display, add, update, or delete a RECON.

Procedure

To display, add, update, or delete a RECON, complete the following steps:

- On the **IMS HALDB Toolkit** panel, specify option **1**, System Setup. The **System Setup** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ===>

                          System Setup

Select function

1 System definition
2 System selection method, current is IMSID
3 Maintain RECON table
4 Maintain IMSID table

```

Figure 39. **System Setup** panel

2. Specify option **3**, Maintain RECON table.

The **System Selection by RECON data set name** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                System Selection by RECON dataset name  
  
        Select Function  
  
        1 Display RECON  
        2 Add new RECON  
        3 Update RECON  
        4 Delete RECON  
  
                Current SYSTEM: IVP1  
                Current USER..: CKOE1
```

Figure 40. **System Selection by RECON data set name** panel

3. Specify the appropriate option to display, add, update, or delete a RECON.

Maintaining the IMSID table

You can display, add, update, or delete an IMSID.

Procedure

To display, add, update, or delete an IMSID, complete the following steps:

1. On the **IMS HALDB Toolkit** panel, specify option **1**, System Setup.

The **System Setup** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                System Setup  
  
        Select function  
  
        1 System definition  
        2 System selection method, current is  IMSID  
        3 Maintain RECON table  
        4 Maintain IMSID table
```

Figure 41. **System Setup** panel

2. Specify option **4**, Maintain IMSID table.

The **System Selection by IMSID** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                System Selection by IMSID  
  
        Select Function  
  
        1 Display IMSID  
        2 Add new IMSID  
        3 Update IMSID  
        4 Delete IMSID  
  
                Current SYSTEM: IVP1  
                Current USER..: CKOE1
```

Figure 42. **System Selection by IMSID** panel

3. Specify whether you want to display, add, update, or delete an IMSID.

Specifying the level where rules are active

You can specify whether the rules for creating the DSNPREFIX parameter are active on the SYSTEM level, the USER level, or the DBD level.

Procedure

1. On the **IMS HALDB Toolkit** panel, select option **2**, Maintain SYSTEMs.

The **SYSTEM Definition** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----
Command ==>

                SYSTEM Definition

                Select Function

                Current SYSTEM: IVP1

1  Select SYSTEM
2  Display SYSTEM
3  Add new SYSTEM
4  Update SYSTEM
5  Delete SYSTEM

6  Set IMS libraries
7  Set DBD libraries
8  Maintain DBD list
```

Figure 43. **SYSTEM Definition** panel

2. Select option **2**, Display SYSTEM.

The panel for the **SYSTEM Definition** of the SYSTEM you selected is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----
Command ==>

                SYSTEM Definition for IVP1

System description.....: test

System status
  Y Intercept active
System settings
  Y DSNPREFIX is substituted
  Y DSNPREFIX is created by DSNRULES
    Y Rules are on SYSTEM level
    Rules are on USER level
    Rules are on DBD level

Dataset name (DSNPREFIX) creation rules:
SYS.....: IMSP
HLQ.....: DBSMS.CKIHC
Rule.....: HLQ DBD (HLQ,SYS,USER,DBD,PART)
Result...: DBSMS.CKIHC.dbd.A00001
```

Figure 44. **SYSTEM Definition of the selected SYSTEM** panel

On this panel, the SYSTEM status indicates whether the SYSTEM you selected and the dsname substitution are active.

3. Specify a Y next to the level where you want the rules for creating a data set name to be active.

You can specify the SYSTEM level, the USER level, or the DBD level. In the previous figure, the rules are active on the SYSTEM level.

In the previous figure, the rules use the HLQ and the name of the DBD to create the DSNPREFIX parameter.

Results

The DSNPREFIX parameter is created based on the rules that are specified and the level where those rules are active.

Maintaining SYSTEMS

You can select, add, update, and delete SYSTEMS.

About this task

The systems are kept in the SYSTEM table. Each row in the table represents a system. Systems are selected by searching the SYSTEM table for the name of the system. If the name of the system is not found, the global system row, which is represented by "*Global," is selected. All other table selections are based on the selected system.

Procedure

1. On the **IMS HALDB Toolkit** panel, select option **2**, Maintain SYSTEMS.

The **SYSTEM Definition** panel is displayed, as shown in the following figure. You are automatically connected to the SYSTEM that you previously selected.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                SYSTEM Definition  
  
        Select Function                                Current SYSTEM: IVP1  
  
1  Select SYSTEM  
2  Display SYSTEM  
3  Add new SYSTEM  
4  Update SYSTEM  
5  Delete SYSTEM  
  
6  Set IMS libraries  
7  Set DBD libraries  
8  Maintain DBD list
```

Figure 45. **SYSTEM Definition** panel

2. Specify the appropriate option to select, add, update, or delete a SYSTEM.

Specifying the USER for creating data set names

You can specify whether you want to use the content of the USR field, a TSO user ID, or a TSO user ID that is generated by a pattern as the USER.

Procedure

1. On the **IMS HALDB Toolkit** panel, select option **3**, Maintain USERS.

The **USER Definition** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                USER Definition

                Select Function

                Current SYSTEM: IVP1
                Current USER..: CKOE1

1  Select USER
2  Display USER
3  Add new USER
4  Update USER
5  Delete USER

6  Maintain DBD list

```

Figure 46. **USER Definition** panel

2. Select option **2**, Display USER.

The panel for the **USER Definition** of the USER that you selected is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                USER Definition for CKOE1

User name .....: Test User

USER (for DSNPREFIX) creation rules:
  Use USR field
  Use TSO Userid ( CKOE1  )
  Y Create from TSO Userid using pattern
  ****

Dataset name (DSNPREFIX) creation rules:
  USR.....: CKOE
  HLQ.....: DBSMS.CKIHC
  Rule.....: HLQ SYS USER DBD PART (HLQ,SYS,USER,DBD,PART)
  Result....: DBSMS.CKIHC.IMSP.CKOE.dbd.part.A00001

```

Figure 47. **USER Definition of the selected USER** panel

3. Specify a Y next to the method that you want to use to create the USER field when you build the data set name.

You can create the USER field by choosing one of the following methods:

Use USR field

The definition of the USR field.

Use TSO User ID

The current USER.

Create from TSO User ID using pattern

A user ID that is generated by a pattern.

In the previous figure, the USER field is created by using a TSO user ID that is generated by a pattern.

In the previous figure, the rule uses all five elements to create the DSNPREFIX parameter.

Maintaining USERS

You can select, add, update, and delete USERS.

Procedure

To select, add, update, and delete USERS, complete the following steps:

1. On the **IMS HALDB Toolkit** panel, select option **3**, Maintain USERS.

The **USER Definition** panel is displayed, as shown in the following figure. You are automatically connected to the current user.

```

----- IMS HALDB Toolkit -----
Command ==>

                USER Definition

                Select Function

                Current SYSTEM: IVP1
                Current USER..: CKOE1

1  Select USER
2  Display USER
3  Add new USER
4  Update USER
5  Delete USER

6  Maintain DBD list

```

Figure 48. **USER Definition** panel

2. Specify the appropriate option to select, add, update, or delete a USER.

Substituting data set names by using batch functions

You can use batch update to create rules for substituting HALDB data set names.

In batch update, each table is identified by the NAME parameter, and the data comes from an input file that is specified by the FILE parameter. You can do the following tasks, which use the same input file:

- ADD
- DELETE
- UPDATE

The SYSTEM parameter and the USER parameter specify the association of the table rows. An asterisk in parentheses (*) defines a row as global.

The samples contain comment rows to help you align parameters. These rows begin with an asterisk and are followed by a field name. You enter data directly underneath these rows, starting at the asterisk.

The rule for constructing data set names is defined as 12345, where:

- 1** Identifies the high-level qualifier (HLQ).
- 2** Identifies the name of the system.
- 3** Identifies the name of the user.
- 4** Identifies the name of the DBD.
- 5** Identifies the name of the partition.

The SIHCSAMP file provides members IHCESAM1 to IHCESAM6. These sample members provide example JCL for specifying rules for creating the DSNPREFIX parameter and adding a row to each table.

SIHCSAMP member	Description
IHCESAM1	Adds a system to the SYSTEM table. For more information, see “Adding a system to the SYSTEM table” on page 197.

SIHCSAMP member	Description
IHCESAM2	Adds a user to the USER table of SYSTEM IVP1. For more information, see “Adding an IMS ID to the IMSID table of SYSTEM IVP1” on page 199.
IHCESAM3	Adds an IMS ID to the IMSID table of SYSTEM IVP1. For more information, see “Adding a row to the DBD table” on page 200.
IHCESAM4	Adds a row to the DBD table. For more information, see “Adding a user to the USER table of SYSTEM IVP1” on page 198.
IHCESAM5	Adds DD names to the DBDLIB table of SYSTEM IVP1. For more information, see “Adding DD names to the DBDLIB table of SYSTEM IVP1” on page 200.
IHCESAM6	Adds DD names to the IMSLIB table of SYSTEM IVP1. For more information, see “Adding DD names to the IMSLIB table of SYSTEM IVP1” on page 201.

Adding a system to the SYSTEM table

You can add a system to the SYSTEM table by modifying the member IHCESAM1 in the SIHCSAMP file.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM1.
2. Modify the following parameters:

SYSID

The ID of the system. In the example, IVP1 is the specified SYSID.

SYSNAM

The name of the system, which is used to create the data set name. In the example, IMSP is the specified SYSNAM. You can also specify IVP1.

RULE

The rules that are used to create the DSNPREFIX parameter. In the example, 14 is specified. According to these rules, the DSNPREFIX parameter is created from the HLQ and the name of the DBD.

A

Indicates whether the system is activated. In the example, Y is specified, indicating that the SYSTEM is activated. You can specify Y or N.

HLQ

The high-level qualifier that is used to create the DSNPREFIX parameter. In the example, DBSMS.CKIHC is specified as the HLQ.

DESCR

The description of the system. In the example, test is specified as the DESCR.

Example

```
//S2      EXEC  PGM=IHCHALDB,
//        REGION=80M,DYNAMNBR=99
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//        DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//TRACE   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//TABLE   NAME(SYSTEM) FILE(DD1) FUNCTION(ADD)
//DD1     DD *
*
*SYSID   *SYSNAM *RULE   A
IVP1     IMSP    14      * *HLQ
                        Y DBSMS.CKIHC      *DESCR
                        test
```

Figure 49. Sample JCL for the SYSTEM table

Adding a user to the USER table of SYSTEM IVP1

You can add a user to the USER table of SYSTEM IVP1 by modifying the member IHCESAM2 in the SIHCSAMP file.

About this task

The rule for creating the user name is also used for creating the data set name, even when the data set name creation level is not on the USER level.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM2.
2. Modify the following parameters:

UID

The name of the user ID. TEST1 is specified as the UID.

RULE

The rules that are used to create the DSNPREFIX parameter. According to these rules, the DSNPREFIX parameter is created from the HLQ, the system, the user, the DBD, and the partition name.

U

The indicator that determines the content of the USER field when the data set name is created. You can specify one of the following values:

R

Uses the USR field.

D

Uses the UID field.

P

Uses a pattern to create the portion of the user ID. P is specified as the content of the USER field.

HLQ

The high-level qualifier that is used to create the DSNPREFIX parameter. DBSMS.CKIHC is specified as the HLQ.

Important: Do not change this field if it is used at this level for creating the data set name.

USR

The definition of the user TEST is specified as the USR.

Important: Do not change this field if it is used at this level for creating the data set name.

USER NAME

The name of the user. Test User is specified as the USER NAME.

Example

```
//S2      EXEC PGM=IHCHALDB,
//
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//        DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//TRACE    DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
TABLE     NAME(USER) FILE(DD2) FUNCTION(ADD) SYSTEM(IVP1)
//DD2     DD *
*
*UID      *PATTERN*RULE   U
*TEST1   ****          12345  * *HLQ
*                               *USR   *USER NAME
*                               *TEST  *Test User
```

Figure 50. Sample JCL for the USER table

Adding an IMS ID to the IMSID table of SYSTEM IVP1

You can add an IMS ID to the IMSID table of SYSTEM IVP1 by modifying the member IHCESAM3 in the SIHCSAMP file.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM3.
2. Modify the following parameters:

IMSID

The name of the IMS ID. In the example, CKCK is specified as the IMSID.

SYSID

The name of the system ID. In the example, IVP1 is specified as the SYSID.

DESCR

The description of the IMS ID. In the example, Same IMS data sets as IVP1 is specified as the DESCR.

Example

```
//S2      EXEC PGM=IHCHALDB,
//
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//        DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//TRACE    DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
TABLE     NAME(IMSID) FILE(DD3) FUNCTION(ADD)
//DD3     DD *
*IMSID   *SYSID          *DESCR
*CKCK    IVP1           *Same IMS datasets as IVP1
```

Figure 51. Sample JCL for the IMSID table

Adding a row to the DBD table

You can add a row to the DBD table by modifying the member IHCESAM4 in the SIHCSAMP file.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM4.
2. Modify the following parameters:

DBD

The name of the DBD. In the example, PHD02 is specified as the DBD.

RULE

The rules for creating the data set name. In the example, 1234 is specified as the RULE. According to the rule for constructing data set names, the DSNPREFIX parameter is created from the HLQ, the system, the user, and the name of the DBD.

HLQ

The name of the high-level qualifier. In the example, DBSMS .CKIHC is specified as the HLQ.

Example

```
//S2      EXEC  PGM=IHCHALDB,
//          REGION=80M,DYNAMNBR=99
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS      DD DISP=SHR,DSN=your.DBDLIB
//TRACE    DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
TABLE     NAME(DBD)      FILE(DD3) FUNCTION(ADD) SYSTEM(*) USER(*)
//DD3     DD *
*DBD      *RULE          *HLQ
PHD02     1234          DBSMS.CKIHC
```

Figure 52. Sample JCL for the DBD table

Adding DD names to the DBDLIB table of SYSTEM IVP1

You can add DD names to the DBDLIB table of SYSTEM IVP1 by modifying the member IHCESAM5 in the SIHCSAMP file.

About this task

If you want to assign the DBDs to more than one system, repeat the TABLE command with the name of a different system. If all systems have the same DBDLIBs, assign the different SYSTEM name to the global table.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM5.
2. Modify the following parameter:

DDNAME

This name is fixed. You can specify DDs of the non-HALDB as DBDLIB1 to DBDLIB5. However, you must specify the DD of the HALDB DBDLIB as DBDLIBH. In the example, DBDLIB1 is specified as the DD of the non-HALDB DBDLIB, and DBDLIBH is specified as the DD of the HALDB DBDLIB.

Example

```
//S2      EXEC PGM=IHCHALDB,
//        REGION=80M,DYNAMNBR=99
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//        DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//TRACE   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//        TABLE NAME(DBDLIB) FILE(DDDD) FUNCTION(ADD) SYSTEM(IVP1)
//DDDD   DD *
*DDNAME *DSN
DBDLIB1 your.DBDLIB
DBDLIBH your.haldb.DBDLIB
```

Figure 53. Sample JCL for the DBDLIB table

Adding DD names to the IMSLIB table of SYSTEM IVP1

You can add DD names to the IMSLIB table of SYSTEM IVP1 by modifying the member IHCESAM6 in the SIHCSAMP file.

Procedure

1. Locate the sample JCL in the SIHCSAMP file, member IHCESAM6.
2. Modify the following parameters:

DDNAME

Only the following DD names are allowed:

MACLIB

Specifies the MACLIB data set. Use MACLIB2 to specify an additional macro library for DBDGEN.

RESLIB

Specifies the RESLIB data set. Use RESLIB2 and RESLIB3 if you need a concatenation to the RESLIB.

MDALIB

Specifies the MDALIB data set. Use MDALIB2 to specify more than one MDALIB.

Example

```
//S2      EXEC PGM=IHCHALDB,
//        REGION=80M,DYNAMNBR=99
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//        DD DISP=SHR,DSN=your.SDFSRESL
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMSDALIB DD DISP=SHR,DSN=your.MDALIB
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//TRACE   DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//        TABLE NAME(IMSLIB) FILE(DDIM) FUNCTION(ADD) SYSTEM(IVP1)
//DDIM   DD *
*DDNAME *DSN
MACLIB  your.SDFSMAC
RESLIB  your.SDFSRESL
MDALIB  your.MDALIB
```

Figure 54. Sample JCL for the IMSLIB table

Converting non-HALDB DBDs to HALDB DBDs

You can use the ISPF user interface to convert non-HALDB DBDs to HALDB DBDs, and later convert non-HALDB data sets to HALDB data sets.

Step 1. Converting non-HALDB DBDs to HALDB DBDs

You must convert non-HALDB DBDs to HALDB DBDs before you can convert non-HALDB data sets to HALDB data sets.

About this task

To convert non-HALDB DBDs to HALDB DBDs, complete the following steps:

Procedure

1. On the **IMS HALDB Toolkit** panel, select option **4**, Convert DBD.

The **Update DBD libraries** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                Update DBD libraries  
  
Non HALDB DBD libraries  
    your.DBDLIB  
  
  
HALDB DBD library  
    your.haldb.DBDLIB
```

Figure 55. **Update DBD libraries** panel

2. Verify the DBD libraries or modify them, and press **Enter**.

The **Update IMS libraries** panel is displayed, as shown in the following figure.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                Update IMS libraries  
  
MACLIB    your.SDFSMA  
  
RESLIB    your.SDFSRESL  
  
  
MDALIB    your.MDALIB
```

Figure 56. **Update IMS libraries** panel

3. Verify the IMS libraries or modify them, and press **Enter**.

The **DBD Conversion** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>>

                DBD Conversion

DBD name.....: MYDBD
Convert VSAM to OSAM.....: N
Convert to single dataset..: N

```

Figure 57. **DBD Conversion** panel

4. Specify the name of the HALDB DBD that you want to convert.
5. Specify whether you want to convert from VSAM to OSAM or to a single data set.
You can select both types of conversions, neither type of conversion, or just one type of conversion.
6. Press **Enter** to begin the conversion.

Results

The source of the specified DBD in the non-HALDB library is rebuilt in HALDB format. Then, the source is recompiled and the HALDB DBD is saved in the specified HALDB DBD library.

What to do next

Keep the non-HALDB DBDs and the HALDB DBDs because you will need them to convert non-HALDB data sets to HALDB data sets.

Step 2. Converting non-HALDB data sets to HALDB data sets

To convert non-HALDB data sets to HALDB data sets, you need data set names for the non-HALDB.

Before you begin

Before you convert non-HALDB data sets to HALDB data sets, you must convert non-HALDB DBDs to HALDB DBDs. Also, you must register the definitions of the converted HALDB DBDs to the RECON data sets.

About this task

You can load the database with an application program. However, you also must create the HALDB data sets.



Attention: After you convert non-HALDB data sets to HALDB data sets, do not delete the non-HALDB DBD because you might want to convert the data sets from other users later. However, conduct new testing with the new HALDB DBDLIB.

You do not need JCL for the new data sets because they are dynamically allocated.

Procedure

To convert non-HALDB data sets to HALDB data sets:

1. On the **IMS HALDB Toolkit** panel, select option **5** and press **Enter**.
The **Update IMS libraries** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                                Update IMS libraries

MACLIB   your.SDFSMAC

RESLIB   your.SDFSRESL

MDALIB   your.MDALIB

```

Figure 58. **Update IMS libraries** panel

2. Verify the IMS libraries or modify them, and press **Enter**.

The **Update DBD libraries** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                                Update DBD libraries

Non HALDB DBD libraries
    your.DBDLIB

HALDB DBD library
    your.haldb.DBDLIB

```

Figure 59. **Update DBD libraries** panel

3. Verify the DBD libraries or modify them, and press **Enter**.

The **Dataset Conversion** panel is displayed, as shown in the following figure.

```

----- IMS HALDB Toolkit -----
Command ==>

                                Dataset Conversion

Specify DBD.....: HD09
Non HALDB DBDLIB....: your.DBDLIB
                    :
                    :
                    :
HALDB DBDLIB.....: your.haldb.DBDLIB

```

Figure 60. **Dataset Conversion** panel

4. Specify the name of the HALDB DBD.

The JCL that is required to transform the non-HALDB data sets to HALDB data sets is generated.

Important: For the non-HALDB data sets, you must include the DD statements, including those DD statements for secondary indexes. If data sets are missing, you are prompted to specify the DD statements.

Part 7. Application support

IMS HALDB Toolkit provides functions that enable IMS batch applications to make better use of the HALDB environment.

Topics:

- [Chapter 13, “Partition selection API,” on page 207](#)
- [Chapter 14, “Testing partition selection exits,” on page 209](#)
- [Chapter 15, “Loading logical children \(PROCOPT=L\),” on page 215](#)
- [Chapter 16, “Creating a DFSHALDB statement,” on page 217](#)
- [Chapter 17, “Loading a single partition,” on page 221](#)
- [Chapter 18, “Deleting a single partition,” on page 225](#)
- [Chapter 19, “Merging two databases into one HALDB,” on page 229](#)

Chapter 13. Partition selection API

The partition selection API provides a callable interface to assign a key to a partition.

This API allows applications to split their input on a partition boundary for parallel processing. The API returns the partition name and the partition number. The API does not need to run in a DL/I environment.

You can use the partition selection API with an application that processes partitions in parallel. When an application wants to process partitions in parallel, there might be a need to split the application's input on partition boundaries.

However, the application does not know those boundaries, especially when those boundaries can be changed. The partition selection API resolves this problem by receiving the database root segment key and returning the partition name and number.

Invoking the partition selection API

The following definition specifications are required to invoke the partition selection API:

- Define HANDLE as a 4-byte binary field
- Define PARTNAME as an 8-byte character field
- Define PARTNUM as a 2-byte binary field
- Define RETCODE as a 4-byte binary field
- Define RSNCODE as a 4-byte binary field

The application must be linked as AMODE 31.

API calls

The following calls are appropriate for the partition selection API:

Initial (one time) call

CALL IHCUAPI using ("INIT",HANDLE,RETCODE,RSNCODE,*dbdname*)

The API sets HANDLE to be used in subsequent calls.

Selection call

CALL IHCUAPI using ("SEL",HANDLE,RETCODE,RSNCODE,*yourkey*,PARTNAME,PARTNUM)

The caller provides *yourkey*.

The API returns PARTNAME and PARTNUM.

Termination (last) call

CALL IHCUAPI using ("TERM",HANDLE,RETCODE,RSNCODE)

RETCODE and RSNCODE are returned for each call.

Return and reason codes

Table 29. Return and reason codes

Return code	Reason code	Explanation
0	N/A	Function complete

Table 29. Return and reason codes (continued)

Return code	Reason code	Explanation
16	256	Invalid function Must be INIT,SEL,TERM
	257	Invalid DBD The specified DBD is not a valid DBD
	258	Not a HALDB The specified DBD is not HALDB
	259	No handle The HANDLE is not valid
	260	Partition not found The key does not belong to any partition
	261	Invalid TCB TERM call has a different TCB than INIT
	512-599	Internal error Contact IBM Software Support

Chapter 14. Testing partition selection exits

The test partition selection exit utility allows testing of partition selection exits without requiring the DBD to be previously converted to HALDB.

About this task

Additionally, the distribution results of a partition selection exit can be tested. The DBD can currently be HALDB.

The input for this utility is an HD unload file. This file must have DFSURGU1 as the ddname.

The output of this utility is a distribution list.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEPSEL.

2. Specify the JCL DD statements.

For a list of DD statements, see [“PSEXIT DD statements” on page 209](#).

3. Specify the PSEXIT command parameters.

For a list of PSEXIT command parameters, see [“PSEXIT command parameters” on page 212](#).

Example

```
/*-----  
/*  
/*          Test partition selection exit  
/*  
/*-----  
//PEXIT EXEC PGM=IHCHALDB,  
//          REGION=50M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLOAD  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL  
//IMS DD DISP=SHR,DSN=your.DBDLIB  
//RECON1 DD DISP=SHR,DSN=your.RECON1  
//RECON2 DD DISP=SHR,DSN=your.RECON2  
//RECON3 DD DISP=SHR,DSN=your.RECON3  
//DFSURGU1 DD DISP=SHR,DSN=your.unload.file  
//MSGPRINT DD SYSOUT=*  
//SYSUDUMP DD SYSOUT=*  
//IHCSYSIN DD *  
PSEXIT DBD(nnnn) - /* <=== specify DBD  
PARTNUM(n) - /* <=== no. of partitions  
KEYLEN(xx) - /* <=== for IHCPSEL0  
KEYOFF(xx) - /* <=== for IHCPSEL0  
PSNAME(IHCPSEL0) /* <=== partition select  
//KEYS DD * /* <=== partition high keys  
AAAA  
KKKK  
JJJJ
```

Figure 61. Sample JCL member IHCEPSEL

PSEXIT DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **PSEXIT** command.

Table 30. DD statements and record format for the PSEXIT command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
DFSURGU1	Input	Same as IMS	Required
IHCSYSIN	Input	LRECL=80	Required
KEYS	Input	LRECL=80	Optional
MSGPRINT	Output	LRECL=133	Optional
IHCLIST	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

DFSURGU1

This statement is required. The statement defines the DBD unload file that the DBD parameter specifies.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“PSEXIT command parameters” on page 212](#).

KEYS

This statement is required for selection exits that require a string for partition selection. If the selection routine does not need keys or strings, use the PARTNUM parameter instead.

The statement defines the KEYS file that contains a list of keys. Use this statement with the KEYLEN and the KEYOFF parameters.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

IHCLIST

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for reports. For more information about the reports generated in this data set, see [“IHCLIST data set” on page 287](#).

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

PSEXIT command parameters

The following table summarizes the **PSEXIT** command parameters.

Table 31. PSEXIT command parameters

Parameter	Requirement	Description
DBD	Required	<p>Specifies the name of the DBD to be tested. The unload file (DFSURGU1) must be for the specified DBD.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>

Table 31. PSEXIT command parameters (continued)

Parameter	Requirement	Description
KEYLEN	Optional	<p>Specifies the length of the subkey when the IHCPSEL0 selection exit is used. IHCPSEL0 allows you to select a subset of the key. You can use the exit to specify the offset within the key (KEYOFF) and the length of the key portion (KEYLEN).</p> <p>Example</p> <p>In the following example, the root key is 8 bytes. Position 5 and 6 have the state code. You want to separate the DB by state. You would specify KEYLEN(2) KEYOFF(5) and provide the state codes in the KEYS file. For example:</p> <pre>//KEYS DD * AL AZ WY</pre> <p>Format</p> <p>(<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value</p> <p>None.</p>
KEYOFF	Optional	<p>Specifies the offset within the root segment key to use when the IHCPSEL0 selection exit is used. IHCPSEL0 allows you to select a subset of the key. You can use the exit to specify the offset within the key (KEYOFF) and the length of the key portion (KEYLEN).</p> <p>Example</p> <p>In the following example, the root key is 8 bytes. Position 5 and 6 have the state code. You want to separate the DB by state. You would specify KEYLEN(2) KEYOFF(5) and provide the state codes in the KEYS file. For example:</p> <pre>//KEYS DD * AL AZ WY</pre> <p>Format</p> <p>(<i>nnn</i>) where <i>nnn</i> is 1 to root keylen -1</p> <p>Default value</p> <p>None.</p>
PARTNUM	Optional	<p>Specifies the number of partitions required.</p> <p>This parameter must be specified only for selection routines that do not need keys or strings. Specify the strings for all other selection routines in the KEYS file. The number of keys in the KEYS file defines the number of partitions. For more information about the KEYS file, see “KEYS” on page 211.</p> <p>Format</p> <p>(1 - 999)</p> <p>Default value</p> <p>None.</p>

Table 31. PSEXIT command parameters (continued)

Parameter	Requirement	Description
PSNAME	Required	Specifies the name of the partition selection exit you have written. Format (<i>exit_name</i>) Default value None.

Chapter 15. Loading logical children (PROCOPT=L)

A logical child is a segment that has a physical parent and a logical parent.

A logical relationship allows for a different view of segments in a database by providing a new set of pointers (LP,LT,LCH). HALDB only uses the LP equivalent as an EPS pointer. The LP-EPS pointer requires the ILK of the logical parent, which is not known at that time.

HALDB does not allow loading of logical child segments because there is no WF1 work file, and the extended pointer set (EPS) of the logical parent and the paired segment are unavailable at load time.

WF1 is the work file created during reorganization reload or by a database load application.

In addition, load segments in the hierarchy below the logical child segment (variable intersection data) are not allowed.

IMS HALDB Toolkit improves this situation by allowing these load segments with the following restrictions:

- The logical child segment must contain the LPCK in the IO area.
- The application will receive a BB status code.

The segments (1 child and dependents) are inserted later.

- JCL is structured as follows:
 - Step 1 is the load program. File DFSURWF1 is used to store the delayed segments.
 - Step 2 is prefix update. This step inserts all delayed segments. All WF1 data sets created by step 1 must be included in the DFSURWF3 file.
- You must change your JCL as follows:
 - Use IHCWRC00 instead of DFSRRC00 to accommodate steps 1 and 2
 - Include the SIHCLOAD target load library in the STEPLIB
- When the IMS management of ACBs is enabled:
 - The IMS Catalog Definition exit routine (DFS3CDX0) must be specified in the STEPLIB concatenation in both steps 1 and 2. The DFSDF and IMSID parameters are not supported.
 - IMS HALDB Toolkit ignores the IMS DD statement.

At the end of the load (prefix update), all databases are labeled *IC needed* unless they are defined as NONRECOV.

Chapter 16. Creating a DFSHALDB statement

The DFSHALDB create utility provides dynamic management of the DFSHALDB statement by providing a key for the starting partition and a key for the ending partition.

About this task

Batch applications can process a subset of a HALDB. To accomplish this task, the applications must specify a DFSHALDB DD statement and a parameter statement that specifies the program communication block (PCB), the starting partition, and the number of consecutive partitions.

When the partition structure changes, this statement must be modified. The DFSHALDB create utility makes this change obsolete.

When you specify a key range, the utility transforms the key range into a starting and ending partition. Therefore the application does not require a change when partitions are split or consolidated.

This utility runs as an additional step in front of the specified application.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEDFSH.

2. Specify the JCL DD statements.

For a list of DD statements, see [“IHCUDFSH DD statements” on page 218](#).

3. Specify the IHCUDFSH command parameters.

For a list of IHCUDFSH command parameters, see [“IHCUDFSH command parameters” on page 220](#).

You must specify the DBD and the PCB to be used in the RUN command.

Example

```
//*-----  
//*  
//*      Create a DFSHALDB statement from keys.  
//*      The file (DFSHALDB) must be used in  
//*      the subsequent IMS step.  
//*  
//*-----  
//S2      EXEC PGM=IHCHALDB,  
//          REGION=80M  
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad  
//          DD DISP=SHR,DSN=your.SDFSRESL  
//RECON1  DD DISP=SHR,DSN=your.RECON1  
//RECON2  DD DISP=SHR,DSN=your.RECON2  
//RECON3  DD DISP=SHR,DSN=your.RECON3  
//IMS     DD DISP=SHR,DSN=your.DBDLIB  
//TRACE   DD SYSOUT=*  
//SYSABEND DD SYSOUT=*  
//MSGPRINT DD SYSOUT=*  
//IHCSYSIN DD *  
  RUN     PGM(IHCUDFSH) -  
          DBD(nnnnn) -          /* <=== DBD name  
          PCB(2)                /* <=== PCB number  
//KEYS    DD *  
08001000 <=== low key  
98008000 <=== high key  
//DFSHALDB DD DISP=(,PASS),UNIT=SYSDA,SPACE=(TRK,1),  
//          DSN=&&DFSHAL
```

Figure 62. JCL for creating a DFSHALDB statement

IHCUDFSH DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **IHCUDFSH** command.

Table 32. DD statements and record format for the IHCUDFSH command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
KEYS	Input	LRECL=80	Required
DFSHALDB	Output	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload  
//          DD DISP=SHR,DSN=imstools  
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“IHCUDFSH command parameters”](#) on page 220.

KEYS

This statement is required. The statement specifies the low and the high key. The utility refers to the key range and transforms the key range into a starting and ending partition.

DFSHALDB

This statement is required. The statement defines a file to be used in a subsequent step.

Specify the following line:

```
//DFSHALDB DD DSN=&&HAL,DISP=(OLD,DELETE)
```

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

IHCUDFSH command parameters

The following table summarizes the **IHCUDFSH** command parameters.

Table 33. IHCUDFSH command parameters

Parameter	Requirement	Description
DBD	Required	<p>Defines the DBD.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
PCB	Required	<p>Defines the PCB number.</p> <p>Format (<i>pcb_number</i>)</p> <p>Default value None.</p>

Chapter 17. Loading a single partition

Databases with secondary indexes must insert the secondary indexes in random sequence when loading.

About this task

You can improve performance (elapsed time) when loading partitions that contain secondary indexes by using the load a single partition utility. The utility delays the insertion of secondary indexes until the end of the load process, at which point it sorts the indexes and loads the indexes sequentially.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCELOAD.
2. Specify the JCL DD statements.
For a list of DD statements, see [“HALDBLOAD DD statements” on page 221](#).
3. Specify the HALDBLOAD command parameters.
For a list of HALDBLOAD command parameters, see [“HALDBLOAD command parameters” on page 223](#).

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
//*
//*          LOAD a single partition
//*
//*-----
//DROPP    EXEC PGM=IHCHALDB,
//          REGION=60M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//RECON1  DD DISP=SHR,DSN=your.RECON1
//RECON2  DD DISP=SHR,DSN=your.RECON2
//RECON3  DD DISP=SHR,DSN=your.RECON3
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
HALDBLOAD DBD(dbdname) PARTITION(partname) -
          PSB(psbname) -
          PCB(1) -
          PGM(pgmname)
/*
```

Figure 63. JCL for delaying the load of a single partition containing secondary indexes

HALDBLOAD DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **HALDBLOAD** command.

Table 34. DD statements and record format for the HALDBLOAD command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Required

Table 34. DD statements and record format for the HALDBLOAD command (continued)

DD name	Use	Format	Need
IMSDALIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
PGMLIB	Input	RECFM=U	Optional
IHCSYSIN	Input	LRECL=80	Required
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

PGMLIB

This statement is optional. The statement defines the APF-authorized application program. You can use either STEPLIB or PGMLIB to specify the application program.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“HALDBLOAD command parameters”](#) on page 223.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

HALDBLOAD command parameters

The following table summarizes the **HALDBLOAD** command parameters.

Table 35. HALDBLOAD command parameters

Parameter	Requirement	Description
DBD	Required	Specifies the master DBD name. Format (<i>dbdname</i>) Default value None.

Table 35. HALDBLOAD command parameters (continued)

Parameter	Requirement	Description
PARTITION	Required	Specifies the partition name to be loaded. Format (<i>partname</i>) Default value None.
PCB	Optional	Specifies the PCB. You can specify a PCB name, or a PCB number as specified in the PSB. Format (<i>pcbname</i> <i>nnn</i>) Default value If omitted, the default is to use the first PCB for the DBD with PROCOPT=L
PGM	Required	Specifies the program name to load the partition. Format (<i>pgmname</i>) Default value None.
PSB	Required	Specifies the name of the PSB to be used to load the partition. Format (<i>psbname</i>) Default value None.

Chapter 18. Deleting a single partition

The drop partition utility provides an alternative approach for correcting a pointer error after a single database partition is deleted.

About this task

When a single partition is deleted, all secondary indexes for the primary database are invalid. The indexes now contain records for non-existent segments. This condition is known as a pointer error. The secondary indexes must be corrected. You can correct the indexes by rebuilding the indexes using an index builder tool (such as IMS Index Builder).

You could alternatively remove those index records that point to the deleted partition. The drop partition utility provides this solution. This process is recoverable and fast and might be more efficient than rebuilding the indexes.

Alternatively, you can create the JCL by using the ISPF user interface.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEDROP.
2. Specify the JCL DD statements.
For a list of DD statements, see [“REORGIND DD statements” on page 225](#).
3. Specify the REORGIND command parameters.
For a list of REORGIND command parameters, see [“REORGIND command parameters” on page 228](#).

Example

```
//JOBNAME JOB 00,000,CLASS=A,MSGCLASS=X
//*-----
/*
/*          Drop partition
/*
/*-----
//DROPEXEC PGM=IHCHALDB,
//          REGION=60M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//          DD DISP=SHR,DSN=your.SDFSRESL
//RECON1  DD DISP=SHR,DSN=your.RECON1
//RECON2  DD DISP=SHR,DSN=your.RECON2
//RECON3  DD DISP=SHR,DSN=your.RECON3
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS     DD DISP=SHR,DSN=your.DBDLIB
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IHCSYSIN DD *
//          REORGIND DBD(PHD02) DROP(PHD02)
/*
```

Figure 64. JCL for deleting a single partition

REORGIND DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **REORGIND** command.

Table 36. DD statements and record format for the REORGIND command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required

Table 36. DD statements and record format for the REORGIND command (continued)

DD name	Use	Format	Need
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```
//STEPLIB DD DISP=SHR,DSN=ihcload
//          DD DISP=SHR,DSN=imstools
//          DD DISP=SHR,DSN=reslib
```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“REORGIND command parameters”](#) on page 228.

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see [“MSGPRINT data set”](#) on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

REORGIND command parameters

The following table summarizes the **REORGIND** command parameters.

Table 37. REORGIND command parameters

Parameter	Requirement	Description
DBD	Required	<p>Specifies the master DBD name.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (<i>ddd</i>)</p> <p>Default value None.</p>
DROP	Required	<p>Specifies the name of the partition to be removed.</p> <p>Format (<i>partname</i>)</p> <p>Default value None.</p>
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>

Chapter 19. Merging two databases into one HALDB

The merge DBD utility allows you to merge identical HALDBs, or combine user-partitioned databases into one multi-partitioned HALDB.

About this task

The following requirements for this utility and task apply:

- Both DBDs must currently be HALDB
- No secondary index is allowed
- No logical relationships are allowed
- Both DBDs must be identical

If compression is used, the compression exit must support both DBDs.

- If you use your own partition selection exit, ensure that it is supported by IMS HALDB Toolkit, or use the supplied exit, IHCPSELO

The partition string is copied to the target ("to") DBD.

- DBDs must use high keys that reflect their data

IMS HALDB Toolkit must be able to merge the partition definition into one DBD without changing defined high keys.

IMS HALDB Toolkit verifies that key ranges do not conflict. If they conflict, the merge process stops. However, because the merge is performed using temporary RECONS, the database will not have been changed. During post-processing, the DBRC is updated. The source ("from") DBD is deleted, and its partitions become part of the target DBD.

You must perform an image copy of the new partitions while the source DBD is offline, unless the source partitions are to be added to the end of the target DBD. In that case, the source DBD might be kept online.

When user partitioning (multiple identical databases on different key ranges) has been used, the conversion first transforms the databases to HALDB, and then merges them together using this process.

This task is necessary when you require secondary indexing that was not possible when using multiple databases.

Procedure

1. Locate the sample JCL for this utility in the SIHCSAMP file, member IHCEMERG.
2. Specify the JCL DD statements.

For a list of DD statements, see [“HALDBCOPY DD statements” on page 230](#).

3. Specify the HALDBCOPY command parameters.

For a list of HALDBCOPY command parameters, see [“HALDBCOPY command parameters” on page 232](#).

Example

The following example shows the JCL for merging user-partitioned HALDBs into one HALDB.

```

//*-----
//*
//*      Merge two identical HALDBs
//*
//*-----
//MERGE  EXEC PGM=IHCHALDB,
//      REGION=60M
//STEPLIB DD DISP=SHR,DSN=your.SIHCLoad
//      DD DISP=SHR,DSN=your.SDFSRESL
//RECON1 DD DISP=SHR,DSN=your.RECON1
//RECON2 DD DISP=SHR,DSN=your.RECON2
//RECON3 DD DISP=SHR,DSN=your.RECON3
//DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
//IMS DD DISP=SHR,DSN=your.DBDLIB
//MSGPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSPRINT DD SYSOUT=*
//IHCSYSIN DD *
HALDBCOPY  TODBD(todbd) FROMDBD(frdbd)

```

Figure 65. Sample JCL for merging two DBDs into one DBD

HALDBCOPY DD statements

DD statements are used to identify the source of input and the placement of output information.

The following table shows DD statements and record format for the **HALDBCOPY** command.

Table 38. DD statements and record format for the HALDBCOPY command

DD name	Use	Format	Need
STEPLIB	Input	Same as IMS	Required
DFSRESLB	Input	Same as IMS	Optional
IMS	Input	Same as IMS	Optional
IMSDALIB	Input	Same as IMS	Optional
PROCLIB	Input	Same as IMS	Optional
RECONx	Input	Same as IMS	Optional
IHCSYSIN	Input	LRECL=80	Required
SYSPRINT	Output	LRECL=133	Optional
MSGPRINT	Output	LRECL=133	Optional
TRACE	Output	LRECL=133	Optional
SYSUDUMP	Output	LRECL=133	Optional

STEPLIB

This statement is required. The library data sets pointed to from the STEPLIB DD statement must always be APF-authorized, even if a DFSRESLB DD statement is provided. Authorized library data sets include:

- IMS HALDB Toolkit load library
- IMS utilities that are available for IMS HALDB Toolkit
- IMS RESLIB library
- Any other libraries

The libraries can appear in any order.

```

//STEPLIB DD DISP=SHR,DSN=ihcload
//      DD DISP=SHR,DSN=imstools
//      DD DISP=SHR,DSN=reslib

```

where:

- *ihcload* is the name of the library that contains the IMS HALDB Toolkit load modules.
- *imstools* is the optional name of the library that contains the IMS reorganization utilities load modules.
- *reslib* is the name of the library that contains the IMS load modules.

If you do not specify an IMSDALIB DD statement in the JCL, you must specify the MDALIB in the STEPLIB for dynamic allocation purposes.

DFSRESLB

This statement is optional. The statement points to an authorized library that contains IMS SVC modules.

IMS HALDB Toolkit dynamically allocates this DD if you do not provide it.

IMS

This statement is required only if the IMS management of ACBs is not enabled. The statement describes the library that contains the DBDs of the database that you are processing.

This data set must reside on DASD.

When the IMS management of ACBs is enabled, IMS HALDB Toolkit ignores the IMS DD statement.

IMSDALIB

This statement is optional. The statement specifies a partitioned data set or data sets that contain the dynamic allocation members for the database data sets of non-HALDB and the RECON data sets.

If DBRC is active and the IMSDALIB DD statement is coded, IMSDALIB is always referred to by DBRC, and DBRC determines the data sets to be allocated for each RECON DD.

For the database data sets of non-HALDB, IMSDALIB is referred to only when the dynamic allocation for the original data sets is requested. Dynamic allocation of the database data sets is attempted in the following order:

1. Dynamic allocation members in the IMSDALIB concatenation
2. Dynamic allocation members in JOBLIB or STEPLIB concatenation

PROCLIB

This statement is optional. The statement points to the IMS.PROCLIB data set. If DFSDF(*ddd*) is specified in the IHCSYSIN data set, you must specify this DD statement and ensure that the DFSDF*ddd* member exists in the IMS.PROCLIB data set.

RECONx

These statements are optional. The statements define the database recovery control (DBRC) RECON data sets. RECON data sets dictate which databases and IMS online systems to use during the processing.



Attention: If you specify IMSDALIB DD dynamic allocation, do not use these RECON DD statements. If you used JCL to allocate RECON1 as a spare data set, you must restart the database.

IHCSYSIN

This statement is required. The statement defines a control statement or data set that contains control statements that specify the functions of IMS HALDB Toolkit.

For more information about the format of IHCSYSIN DD statements, see [“HALDBCOPY command parameters” on page 232](#).

SYSPRINT

This statement is optional. The statement defines the statistics output data set and output from other utilities that are executed under the control of IMS HALDB Toolkit.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide it.

MSGPRINT

This statement is optional. The statement defines the IMS HALDB Toolkit output data set for progress messages issued during the job. For more information, see “MSGPRINT data set” on page 287.

The data set can reside on DASD, or it can be routed through the output job. IMS HALDB Toolkit dynamically allocates this data set if you do not provide this DD statement.

TRACE

This statement is optional. The statement defines the output data set that IMS HALDB Toolkit uses to write diagnostic trace records. This data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job. If you do not provide this DD statement, it is dynamically allocated to SYSOUT by IMS HALDB Toolkit.

SYSUDUMP

This statement is required only if a dump is requested by IBM Software Support. The statement defines a dump data set. If the IMS HALDB Toolkit detects an error and ends with a U0999 abend, this dump is not necessary. However, if any other system or user abend occurs, this data set might be required for problem diagnosis.

This data set can reside on DASD, or it can be routed through the output job.

HALDBCOPY command parameters

The following table summarizes the **HALDBCOPY** command parameters.

Table 39. HALDBCOPY command parameters

Parameter	Requirement	Description
DFSDF	Optional	<p>Specifies the 3-character suffix of the DFSDFxxx member of the IMS PROCLIB data set that contains the settings and attributes of the IMS catalog.</p> <p>The specified member is used when the following two conditions are met:</p> <ul style="list-style-type: none">• IMS manages the ACBs (ACBMGMT=CATALOG).• The IMS Catalog Definition exit routine (DFS3CDX0) is not used. <p>Ensure that the CATALOG section of the DFSDFxxx member specifies CATALOG=Y, ACBMGMT=CATALOG, and the alias name for the IMS catalog.</p> <p>Format (ddd)</p> <p>Default value None.</p>
FROMDBD	Required	<p>Specifies the DBD, including all partitions, to be merged into the TODBD.</p> <p>Format (dbdname)</p> <p>Default value None.</p>

Table 39. HALDBCOPY command parameters (continued)

Parameter	Requirement	Description
IMSID	Optional	<p>IMSID must be specified when the IMS catalog is enabled by the IMS Catalog Definition exit routine and IMSID is referred to in the exit routine.</p> <p>Format (<i>nnnn</i>)</p> <p>Default value If omitted, the value is obtained from the current SDFSRESL(DFSVC000).</p>
TODBD	Required	<p>Specifies the DBD to receive all partitions specified in the FROMDBD.</p> <p>Format (<i>dbdname</i>)</p> <p>Default value None.</p>

Part 8. Using the ISPF user interface

You can create the JCL for many of the IMS HALDB Toolkit batch utilities by using the ISPF user interface.

Topics:

- [Chapter 20, “Setting up the environment for the ISPF user interface,” on page 237](#)
- [Chapter 21, “Processing a project,” on page 251](#)
- [Chapter 22, “Converting to HALDB,” on page 267](#)
- [Chapter 23, “Maintaining HALDB,” on page 271](#)
- [Chapter 24, “Creating JCL statements for database utilities,” on page 275](#)
- [Chapter 25, “Other ISPF utilities,” on page 277](#)
- [Chapter 26, “Using ISPF DBRC support functions,” on page 279](#)

Chapter 20. Setting up the environment for the ISPF user interface

The JCL for many of the IMS HALDB Toolkit utilities can be created using the ISPF user interface.

Topics:

- [“Starting the ISPF user interface” on page 237](#)
- [“Creating an IMS environment” on page 238](#)
- [“Creating projects” on page 247](#)
- [“Deleting an environment” on page 249](#)

Starting the ISPF user interface

You can use the CLIST to start the ISPF user interface.

Before you begin

Before you run IMS HALDB Toolkit as an ISPF application, you must perform a one-time setup task. Ensure that the steps in the topic "Setting up the ISPF interface for IMS HALDB Toolkit" in the *IMS Database Utility Solution: Overview and Customization* have been completed.

Procedure

- Issue the following command to start the ISPF user interface:

```
ex 'your.CLIST(IHCCHAL)'
```

- When the IMS management of ACBs is enabled, issue the following command to start the ISPF user interface:

```
ex 'your.CLIST(IHCCHALC)'
```

The IMS HALDB Toolkit main menu panel is displayed:

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
  _  Select Function                               Current Settings  
                                           Environment:  
                                           Version: IMS 14  Tool 1100  
  
  0  Setup Utilities  
  
  1  Add-Delete-Change Environment  
  2  Select an Environment  
  3  Projects in Progress  
  
  4  Convert from Full Function to HALDB  
  5  Convert entire DBD library to HALDB  
  6  Split or Consolidate HALDB Partitions  
  
  7  Database Utilities  
  8  Other Utilities  
  9  DBRC for HALDB
```

Figure 66. Main menu panel

Creating an IMS environment

You create an IMS environment to keep conversion projects and definitions for different IMS systems in one place. Help is available for each panel.

About this task

An IMS environment consists of library definitions such as RESLIB, DBDLIB, MDALIB and, perhaps, RECON. Projects are connected to an environment.

Environments typically have names such as TEST or PROD. There is no limit to the number of environments you can create. An environment must be completely defined before it can be used by a project.

Databases can belong to multiple IMS systems. However, only one RECON should represent a database.

Parameters and data sets are uniquely defined for each IMS environment, and most parameters can have an ask-me-later setting. This setting allows you to delay a decision until it is needed and applicable.

Procedure

1. Start the ISPF user interface.

The IMS HALDB Toolkit main menu is displayed.

```
----- IMS HALDB Toolkit -----
Command ==>

  _  Select Function                               Current Settings
                                           Environment:
                                           Version: IMS 14  Tool 1100

  0  Setup Utilities

  1  Add-Delete-Change Environment
  2  Select an Environment
  3  Projects in Progress

  4  Convert from Full Function to HALDB
  5  Convert entire DBD library to HALDB
  6  Split or Consolidate HALDB Partitions

  7  Database Utilities
  8  Other Utilities
  9  DBRC for HALDB
```

Figure 67. Main menu panel

2. Select option 1 from the Main Menu and press **Enter**.

The **Environment Maintenance** panel is displayed.

```
----- IMS HALDB Toolkit -----
Command ==>

                          Environment Maintenance

                          Select Function

                          1  Display Environment(s)
                          2  Add a new Environment
                          3  Delete Environment(s)
                          4  Change Environment Settings
```

Figure 68. **Environment Maintenance** panel

3. To add a new environment, select option 2 from the **Environment Maintenance** panel and press **Enter**.

The **Define a New Environment** panel is displayed:

```
----- IMS HALDB Toolkit -----
Command ==>

                Define a new Environment

Environment Name: PROD
Description:      Production IMS
```

Figure 69. Define a New Environment panel

4. Enter an environment name and a description that provides useful information. Press **Enter**.

The **Project Definition Settings** panel is displayed.

You can now define project-related definitions that are specific to the environment.

```
----- IMS HALDB Toolkit -----
Command ==>

                Project Definition Settings

Project Method:      2  1 Partitioning evaluation separate
                   2  2 Partitioning evaluation during UNLOAD

JCL Generation:     1  1 Single JOBs for each phase
                   2  2 One multi-step JOB (after evaluation)

Delete old Database: 1  1 No
                   2  2 Yes, before allocation of new
                   3  3 Yes, after reload
                   4  4 Yes, at the end of the project
```

Figure 70. Project Definition Settings panel

5. On this panel make the following specifications:

- Whether to perform partitioning evaluation separately or during the unload process
- How you would prefer JCL to be generated (as a single JOB for each phase or as one multi-step JOB)
- Whether you would like the data sets of the database that is being converted, to be deleted. If the data sets are to be deleted, specify at which stage the deletion occurs.

When you have finished specifying all of the panel information, press **Enter**.

The **Data sets** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

          Datasets
RESLIB   :   your.SDFSRESL
          :
          :
          :
          :
          :
          :
          :
MACLIB   :   your.SDFSMAC
LOADLIB  :   your.SIHCLOAD

DFSVSAMP :   your.JCL
          Member name: VSAMP

MDALIB   1:   your.MDALIB
          2:

RECON MDA located in:  4      1 RESLIB
                              2 MDALIB 1
                              3 MDALIB 2
                              4 Specify RECON datasets

```

Figure 71. **Data sets** panel

- From the **Data Sets** panel, specify the data sets to use when generating the JCL.

When the IMS management of ACBs is enabled, the following libraries must be specified in the RESLIB:

- The SGLXLOAD library of IBM IMS Tools Base for z/OS 1.6 or later
- The IMS Catalog Definition exit routine (DFS3CDX0)

```

----- IMS HALDB Toolkit -----
Command ==>

          Datasets
RESLIB   :   your.SDFSRESL
          :   your.SGLXLOAD
          :   your.pgmlib
          :
          :
          :
          :
MACLIB   :   your.SDFSMAC
LOADLIB  :   your.SIHCLOAD

DFSVSAMP :   your.JCL
          Member name: VSAMP

MDALIB   1:   your.MDALIB
          2:

RECON MDA located in:  4      1 RESLIB
                              2 MDALIB 1
                              3 MDALIB 2
                              4 Specify RECON datasets

```

Figure 72. **Data sets** panel when the IMS management of ACBs is enabled

If the RECONS are not located in either the RESLIB or MDALIB data sets, you can specify them explicitly with option 4. Otherwise, the **Specify RECON Data set names** panel is skipped.

- If you selected option 4 to specify RECON data sets, the **Specify RECON Data Set Names** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

Specify RECON Data set names:
RECON1 your.RECON1
RECON2 your.RECON2
RECON3 your.RECON3

```

Figure 73. **Specify RECON Data Set Names** panel

8. Specify the RECON data set names to use and press **Enter**.

The **DBD Libraries** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

DBD Libraries

DBDLIB 1:  your.DBDLIB
        2:
        3:
        4:
        5:
        6:
        7:
        8:
        9:

```

Figure 74. **DBD Libraries** panel

9. Specify the DBD load libraries to use and press **Enter**.

When the IMS management of ACBs is enabled, do not specify the DBD load libraries to use and press **Enter**.

```

----- IMS HALDB Toolkit -----
Command ==>

DBD Libraries

DBDLIB 1:
        2:
        3:
        4:
        5:
        6:
        7:
        8:
        9:

```

Figure 75. **DBD Libraries** panel when the IMS management of ACBs is enabled

The **DBD Conversion Rules** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                DBD Conversion Rules

Multi DSG:          2      1 To single DSG
                   2      2 Leave as-is
                   3      3 Ask during Conversion

Convert VSAM to OSAM: 2      1 Yes
                   2      2 No
                   3      3 Ask during Conversion

Change DBD name:    2      1 Yes
                   2      2 No

Selection Exit:     2      1 Yes
                   2      2 No
                   3      3 Ask during Conversion

Heal Index Pointer  1      1 Yes
                   2      2 No
                   3      3 Ask during Conversion

```

Figure 76. **DBD Conversion Rules** panel

10. Specify the conversion rules to use, and press **Enter**.

The **Save Source Statements** panel is displayed.

Press the HELP key for explanation of items on the panel.

```

----- IMS HALDB Toolkit -----
Command ==>

                Save Source Statements

DBD Source:         1      1 No
                   2      2 Yes
   Source File:

IDCAMS Source:     1      1 No
                   2      2 Yes
                   3      3 Yes, but no DELETE file

Member Name:       3      1 DBD Name
                   2      2 Partition Name
                   3      3 DD Name

Del File:
Def File:

```

Figure 77. **Save Source Statements** panel

11. Specify where you would like to save the generated DBD source and the IDCAMS source statements, and press **Enter**.

The **Primary DBD Partitioning Rules** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                Primary DBD Partitioning Rules

Partitions:      2      1 Fixed Number of Partitions      1
                  2      2 Fixed Partition Size (MB)      2048
                  3      3 Ask during Conversion
                  4      4 Specify High Keys

PDB Conversion:  2      1 Use existing Keys or Partitions
                  2      2 Create new Partition boundaries
                  3      3 Ask during Conversion

Additional Partitioning Layouts to be created?
                  2      1 Yes
                  2      2 No, use the one created during Collect

Combine Database records:
                  5000 (number of database records)

```

Figure 78. **Primary DBD Partitioning Rules** panel

12. Specify conversion rules for the primary DBD, and press **Enter**.

The **PSINDEX Definition Rules** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                PSINDEX Definition Rules

                2      1 Fixed Number of Partitions
                          Partition Number      1

                2      2 Fixed Partition Size
                          Size (MB)      1024

                * Ask during Conversion

                4 Same high keys as the primary DBD
                  (Index is the ROOT key)
                  (Primary DBD must specify keys)
                  (Defaults to "2" if index
                   not the root key)

```

Figure 79. **PSINDEX Definition Rules** panel

13. Specify the conversion rules for secondary index DBDs, and press **Enter**.

The **Partition Naming Rules** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                          Partition Naming Rules

Partition Name:  1      1  DBD name (up to 6) appended by
                   1   1  0-9,A-Z
                   2   2  A-Z
                   3   3  1-9,A-Z
                   4   4  01-99
                   5   5  AA-99      (...AZ,A0,...A9,BA,...)
                   6   6  001-999
                   3   3  Ask for partition name during Conversion
                   4   4  Ask for constant (6 char) during Conversion
DBD pattern:     5   5  DBD pattern *****.. Prim
                   *****.. Index
                   (Example: ..***.***) and append rule

Partition DSN:   1      1  High-level qualifier and DBD name
                   2   2  High-level qualifier and Partition name
                   Specify High-level qualifier:
                   DBSMS.DBIHC
                   3   3  Ask during Conversion

```

Figure 80. **Partition Naming Rules** panel

14. Specify the naming rules for partition names and partition data set names, and press **Enter**.

The **Space Allocation Rules for PHDAM and PHIDAM** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                          Space Allocation Rules
                          for PHDAM and PHIDAM

HDAM RAA Size:     1      1  Clone from DBD
                   2   2  (1) and increase 10 percent
                   3   3  Ask during Conversion

Overflow Size:     1      1  Clone from original data set
                   2   2  (1) and increase 10 percent
                   3   3  Ask during Conversion

Byte limit:        1      1  Same as old DBD
                   2   2  None
                   3   3  Ask during Conversion

SMS Allocation:    2      1  Yes DATACLAS:_____ STORCLAS:_____
                   2   2  No, ask for Volume serial
                   3   3  Yes,SMS via Data set Name
                   4   4  Yes, clone from original data set

```

Figure 81. **Space Allocation Rules for PHDAM and PHIDAM** panel

15. Specify space allocation rules for both PHDAM and PHIDAM, and press **Enter**.

The **Space Allocation Rules for PSINDEX Data Sets** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                Space Allocation Rules
                for PSINDEX Data Sets

Free Space per CI:  1      1  Copy from old Index
                   2      2  Set to 10 percent
                   3      3  Ask during Conversion

Free Space per CA:  1      1  Copy from old Index
                   2      2  Set to 10 percent
                   3      3  Ask during Conversion

Data set Allocation: 2      1  Fit to current need
                   2      2  Add 10 percent
                   3      3  Ask during Conversion

SMS Allocation:     3      1  Yes DATACLAS:_____ STORCLAS:_____
                   2      2  No, ask for Volume serial
                   3      3  Yes, no SMS parameter
                   4      4  Yes, copy from original data set

CI Size:           4      (1, 2, 4, 6, 8, 12) in Kbytes

```

Figure 82. *Space Allocation Rules for PSINDEX Data Sets* panel

16. Specify space allocation rules for HALDB secondary indexes, and press **Enter**.

The **Space Allocation Rules for ILDS Data Sets** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                Space Allocation Rules
                for ILDS datasets

Free Space per CI:  1      1  Do not specify
                   2      2  Set to 10 percent
                   3      3  Ask during Conversion

Free Space per CA:  1      1  Do not specify
                   2      2  Set to 10 percent
                   3      3  Ask during Conversion

Dataset Allocation: 2      1  Round to full Cylinder
                   2      2  Add 10 percent
                   3      3  Ask during Conversion

SMS Allocation:     3      1  Yes DATACLAS:_____ STORCLAS:_____
                   2      2  No, ask for Volume serial
                   3      3  Yes, no SMS parameter

CI Size:           8      (1, 2, 4, 6, 8, 12) in Kbytes

```

Figure 83. *Space Allocation Rules for ILDS Data Sets* panel

17. Specify space allocation rules for HALDB ILDS data sets, and press **Enter**.

The **JCL Defaults** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                                JCL Defaults

JOB statement:
//JOBNAME JOB 0,USR,MSGCLASS=X
//*
//*
//*

                                Allocation Rules for UNLOAD file

Set the maximum database size to use disk allocation
Database Size Limit(MB):      200
Unit name for tape allocation: TAPE
RETPD.....: 030
Volume count: 99
Unit name for disk allocation: SYSDA
Use REGION=0M? (Y|N)         N

```

Figure 84. **JCL Defaults** panel

- Specify the JOBCARD JCL defaults and the allocations rules to use during the unload process and press **Enter**.

The **Utility Setup for UNLOAD** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                                Utility Setup for UNLOAD

1 Select Unload type
1 Standard IMS (DFSURGU0)
2 High Performance Unload

1 Select Data set Name Rule for Unload File
1 High Level Qualifier.dbd.timestamp
2 High Level Qualifier.dbd.GDG
Specify High Level Qaulifier:
your.hlg
3 Prompt for Data set Name

Specify HP Unload program library:
your.SHPSLMD0

```

Figure 85. **Utility Setup for UNLOAD** panel

- Specify the specific rules to use for the UNLOAD utility and press **Enter**.

The **Utility Setup for RELOAD** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                                Utility Setup for RELOAD

1 Select Reload type
1 Standard IMS (DFSURGU0)
2 High Performance Reload

Specify STEPLIB for High Performance Reload:
your.SHPSLMD0

```

Figure 86. **Utility Setup for RELOAD** panel

20. Specify the specific rules to use for the RELOAD utility and press **Enter**.

The **Utility Setup for BACKUP** panel is displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
Utility Setup for BACKUP  
  
1 Select Backup type  
1 Standard IMS (DFSUDMP0)  
2 HP Image Copy (FABJMAIN)  
  
1 Select No. of copies (1 or 2)  
  
1 Select Data set Name Rule  
1 High Level Qualifier.dbd.ddname.IC.timestamp  
2 High Level Qualifier.ddname.IC.timestamp  
3 High Level Qualifier.dbd.ddname.IC.GDG  
4 High Level Qualifier.ddname.IC.GDG  
Specify High Level qualifier:  
  your.hlq  
5 Use the one created by GENJCL.IC  
  
Specify Data set Name for Product Library:  
  your.SHPSLMD0
```

Figure 87. **Utility Setup for BACKUP** panel

21. Specify the specific rules to use for the image copy utility and press **Enter**.

Results

After you have completed all panels, a dialog box displays indicating that the environment was successfully created.

If the environment was successfully created, press **Enter** and the first panel for creating a project will be displayed.

You can create the project now or later.

Creating projects

After defining an environment, you can create one or more conversion projects which are associated with that environment.

About this task

Note: If you have just added an environment, you should already be on the **Convert Full function to HALDB** panel.

Procedure

1. Select option 4 from the IMS HALDB Toolkit Main Menu, and press **Enter**.

The **Convert from Full Function to HALDB** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

Convert Full function to HALDB

1 Select Function                               Current Settings
                                                Environment: your new environment
                                                Project:
                                                IMS Version: 15

1 Add-Delete-Change Project
2 Projects in Progress
3 Select a Project

4. Start or Continue with the Current Project

5. Rebuild old DBD
6. Rebuild old dataset allocation
7. Rebuild old DBRC
8. UNDO conversion

```

Figure 88. **Convert Full function to HALDB** panel

2. Select option 1 (Add-Delete-Change Project), and press **Enter**.

The **Project Maintenance for Environment** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

Project Maintenance for Environment new environment name just created

Select Function
1 Display Project(s)
2 Add a new Project
3 Delete Project(s)
4 Change Project Settings

```

Figure 89. **Project Maintenance for Environment** panel

3. To add a new project, select option 2 and press **Enter**.

The **Define a New Conversion Project** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

Define a New Conversion Project
Current Environment is your new environment just created

Project Name:
Description:

```

Figure 90. **Define a New Conversion Project** panel

4. Specify a useful name and description for the project, and press **Enter**.

The **Project Tracking and Staging KSDS Allocation** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

      Project Tracking and Staging KSDS Allocation

      Specify DSN:

      Specify DATACLAS:
      Specify STORCLAS:
      Specify Space:      2      (in CYL)

      Specify VOLSER

```

Figure 91. **Project Tracking and Staging KSDS Allocation** panel

5. Specify the KSDS allocation rules, and press **Enter**.

An ISPF edit panel is displayed with generated JCL that you can submit to create the required KSDS data set. If necessary, edit the job, then submit it.

6. After the job runs successfully, press the **END** key (PF3).

The next panel indicates that the environment definitions have been copied, and asks you if you want to change any options.

```

----- IMS HALDB Toolkit -----
Command ==>

      The options of the environment have been copied
      Do you want to change the options now?

      N      Y  Change options
           N  Do not change options

```

Figure 92. **Change options** panel

If you are satisfied with the environment options for the environment connected to this project, press **Enter**.

If you want to change any options, you can do by specifying Y and pressing **Enter**. Panels from the environment definition are displayed again.

After the options are changed, a panel is displayed indicating that the project was created and that the environment options have been updated.

Deleting an environment

An IMS environment allows you to keep conversion projects and definitions for different IMS systems in one place. You can also delete existing environments that are no longer needed.

Procedure

1. Select option 1 (Add-Delete-Change Environment) from the IMS HALDB Toolkit Main Menu and press **Enter**.

The **Environment Maintenance** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

                Environment Maintenance

                1 Select Function

                  1 Display Environment(s)
                  2 Add a new Environment
                  3 Delete Environment(s)
                  4 Change Environment Settings

```

Figure 93. **Environment Maintenance** panel

2. Select option 1 to see a list of all environments and press **Enter**.

The **Environment List** panel is displayed. The panel shows an example of a list of environments.

```

----- IMS HALDB Toolkit -----Row 1 of 3
Command ==>

                Environment List

Sel      Environment      Description
-----
          Testit          my test envir
          Online          online IMS
s        PROD            production IMS
*****

```

Figure 94. **Environment List** panel

3. You can select the one to delete by entering an s next to PROD environment. Press **Enter**.

The next panel that is displayed is a verification panel that confirms the deletion.

```

----- IMS HALDB Toolkit -----
Command ==>

Do you want to delete the environment and all its projects?
If you are sure you want to delete it, specify "Y".

      N Delete environment   PROD
      Y  Yes
      N  No

```

Figure 95. **Verification panel for deleting environments**

If Y is specified, a dialog box is displayed which indicates that the environment was deleted. Otherwise, you are returned to the list of environments and no environment is deleted.

Chapter 21. Processing a project

You can process a project to perform maintenance and conversion tasks.

Topics:

- [“Selecting a project” on page 251](#)
- [“Processing a project using the Project Work panel” on page 253](#)
- [“Creating and submitting JCL” on page 255](#)
- [“Using SYNC points to halt or continue to the next phase of a project” on page 256](#)
- [“Processing a project using a partition selection exit” on page 258](#)

Selecting a project

You can use the IMS HALDB Toolkit main menu to select conversion and maintenance options for projects.

You must select an environment before beginning a conversion so that IMS HALDB Toolkit knows which data sets and RECONS to use. If you do not currently have an environment or you want to switch to a different environment, select option 2 (Add-Delete-Change Environment) from the IMS HALDB Toolkit main menu.

To begin a conversion project from an existing environment, select option 4 (Convert from Full Function to HALDB) from the IMS HALDB Toolkit main menu.

To begin an entire DBD library conversion project from an existing environment, select option 5 (Convert entire DBD library to HALDB) from the IMS HALDB Toolkit main menu.

To begin a maintenance project from an existing environment, select option 6 (Split or Consolidate HALDB Partitions) from the IMS HALDB Toolkit main menu.

Alternatively, you can select option 3 (Projects in Progress) to obtain a list of all projects for this environment. From this list, you can select the appropriate project.

Choosing a new or "last active" conversion project

To begin a conversion project from an existing environment, select option 4 (Convert from Full Function to HALDB) from the IMS HALDB Toolkit main menu.

The **Convert Full Function to HALDB** panel is displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                Convert Full Function to HALDB  
  
4  Select Function                Current Settings  
                                   Environment: online  
                                   Project: 0-HD02  
                                   IMS Version: 15  
  
1  Add-Delete-Change Project  
2  Projects in Progress  
3  Select a Project  
  
4  Start or Continue with the Current Project  
  
5  Rebuild old DBD  
6  Rebuild old dataset allocation  
7  Rebuild old DBRC  
8  UNDO conversion
```

Figure 96. **Convert Full Function to HALDB** panel

Selecting option 4 on this panel automatically connects IMS HALDB Toolkit to the last active project.

Note: If no connection can be made, the message `no project selected` is displayed. In that case, select option 3 to select a project.

Choosing a new or "last active" entire DBD library conversion project

To begin an entire DBD library conversion project from an existing environment, select option 5 (Convert entire DBD library to HALDB) from the IMS HALDB Toolkit main menu.

The **Convert DBD library to HALDB** panel is displayed.

```
----- IMS HALDB Toolkit -----
Command ==>

                Convert DBD library to HALDB

Select Function                                Current Settings
                                                Environment: online
                                                Project: 0-HD02
                                                IMS Version: 15

1 Add-Delete-Change Project
2 Projects in Progress
3 Select a Project

4 Start or Continue with the Current Project

5 DBD source generation only
```

Figure 97. **Convert DBD library to HALDB** panel

Selecting option 4 or option 5 on this panel automatically connects IMS HALDB Toolkit to the last active project.

Note: If no connection can be made, the message `no project selected` is displayed. In that case, select option 3 to select a project.

Choosing a new or "last active" maintenance project

To begin a maintenance project from an existing environment, select option 6 (Split or Consolidate HALDB Partitions) from the IMS HALDB Toolkit main menu.

The **Split or Consolidate HALDB Partitions** panel is displayed.

```
----- IMS HALDB Toolkit -----
Command ==>

                Split or Consolidate HALDB Partitions

4 Select Function                                Current Settings
                                                Environment: online
                                                Project: 0-HD02
                                                IMS Version: 15

1 Add-Delete Conversion Project
2 Projects in Progress
3 Select a Project

4 Start or Continue with the Current Project
```

Figure 98. **Split or Consolidate HALDB Partitions** panel

Selecting option 4 on this panel automatically connects IMS HALDB Toolkit to the last active project.

Note: If no connection can be made, the message no project selected is displayed. In that case, select option 3 to select a project.

Selecting a project from the environment

After you choose a new or "last active" project, the Project List for Environment *your environment* panel is displayed, which shows all projects in the specified environment.

In the following example, two types of projects are shown: maintenance (M) and conversion (C).

```
----- IMS HALDB Toolkit -----Row 1 of 3
Command ==>

          Project List for Environment your environment

Sel      Environment      Description
-----
          PHD02           Make it 2 partitions
          Type: M         DSN: your.ihc2.split.phd02
          0-HD02          hd osam with 4 secind
          Type: C         DSN: your.ihc2.project.hd02
*****Bottom of data*****
```

Figure 99. **Project List for Environment** panel

You can now select a conversion or maintenance project.

If the conversion or maintenance project you select has already been selected by a different user ID, you cannot select it.

After you select a project, the **Project Work** panel is displayed.

Processing a project using the Project Work panel

After you select a project to convert, the **Project Work** panel is displayed.

About this task

```
----- IMS HALDB Toolkit -----
Command ==>

          Project Work Panel      Environment:  Online
                                Project:         0-HD02

0  Select Function

0  Setup Parameter
1  Continue with Current Project
2  Show Status of Project
3  Recreate JCL of Current Phase
4  Restart at Current or Prior Level
5  Restart From Beginning

Project Desc: hd osam with 4 secind
Project KSDS: your.ihc2.project.hd02
```

Figure 100. **Project Work** panel

You can select any of the following options in any order that is necessary to help you complete your work.

Procedure

- If you select option 0 (Setup Parameter) from the **Project Work** panel, the **Select Function** panel is displayed. Select the Setup Parameter to specify any setup changes. However, some changes can only be performed at the start of a project.

You can use the **Select Function** panel to change setup parameters that were made during project definition or to include parameters that might have been omitted. Depending on which step the conversion process is performing, some changes might have no effect.

You should ensure that you complete all changes before selecting DBDs to be converted.

```

----- IMS HALDB Toolkit -----
Command ==>

Select Function:
1 IMS Datasets
2 DBD Libraries
3 DBD Conversion Rules
4 Source Statements Save
5 Partition Definition Rules
6 Partition Name Rules
7 PHDAM,PHIDAM Space Allocation Rules
8 PSINDEX Space Allocation Rules
9 ILDS Space Allocation Rules
A JCL Defaults
B Conversion Mode
E Specify UNLOAD utility
F Specify RELOAD utility
G Specify IMAGE COPY utility
H Specify SPACE allocation rules
I Show all settings

```

Figure 101. **Select Function** panel

- Select the Continue with Current Project to continue with a project that was interrupted. If the previous step was completed, conversion begins with the next step.

If this is the first time you are selecting option 1, IMS HALDB Toolkit proceeds to the DBD selection phase.

- If you select option 2 (Show Status of Project) from the **Project Work** panel, the **DBDs in Project HDO2** panel is displayed. Select Show Status of Project to view the step which is currently being processed. Use the Help key for explanations of fields on the panel.

This panel is informational, only, and lists all DBDs that have been specified for conversion.

In the example, suppose you selected HDO2 and HPV20. The secondary indexes (indicated by X) and the primary index (indicated by P) are added, automatically.

If the selected databases had logically related databases, they would also be added automatically, and the process would continue until all related databases were added.

If you had a complex relationship consisting of, for example, five primary DBDs and twenty secondary indexes, all would be included by selecting only one.

```

----- IMS HALDB Toolkit -----Row 1 to 5 of 5
Command ==>

          DBD(s) in Project HDO2

S   DBD      Type   Prim DBD   Log. Current Level   Current Status
-----
   HD02      D           HD02      Collect DBDs         Wait for User
  SI021      X           HD02      Collect DBDs         Wait for User
  SI023      X           HD02      Collect DBDs         Wait for User
  SI022      X           HD02      Collect DBDs         Wait for User
  SI024      X           HD02      Collect DBDs         Wait for User
   HDV1      D           HDV1      Collect DBDs         Wait for User
   HPV20      P           HDV1      Collect DBDs         Wait for User

```

Figure 102. **DBDs in Project HDO2** panel

- Select Recreate JCL of Current Phase to re-create JCL for all processes currently in SUBMITTED status. This might be necessary if, for example, a batch function did not complete and you are no longer in the panel to submit the JCL.

After re-creating the JCL, you might need to resubmit it.

- If you select option 4 (Restart at Current or Prior Level) from the **Project Work** panel, a list of project phases is displayed in chronological order. Select Restart at Current or Prior Level to restart a conversion project from the current or prior level. This would typically be necessary if the JOB did not complete, and the JCL is no longer available.

This panel shows all steps within a current conversion phase that are finished or in progress. You can go back to a previous step if the step has not completed. After you have started the "reload" phase, it might not be possible to go back. You cannot proceed to a future step. When you restart at a prior level, the project restarts at the beginning of that step.

In the following example, the last project syncpoint is displayed at the top of the panel; the current phase is displayed at the bottom.

```
----- IMS HALDB Toolkit -----
Command ==>

      Project Restart
      Current Phase:  Remove Project

      Sel      Project Phase
-----
                        Sync all Reloads
                        Post Processing
                        Remove Project
*****Bottom of data*****
```

Figure 103. **Project phases** panel

- If you select option 5 (Restart from Beginning) from the **Project Work** panel, a delete confirmation panel is displayed. Select Restart from Beginning to restart a conversion project from the beginning. All data currently held in the project file is deleted.

Any changes made during the process up to this point, are not backed out.

```
----- IMS HALDB Toolkit -----
Command ==>

The project is restarted from the beginning. All work so far will
be deleted. If this is what you want, specify "Y".

      N  Clear Project Dataset
      Y  Yes
      N  No
```

Figure 104. **Clear Project Dataset** panel

Ask me later

If, when setting up your parameters, you specified Ask me later, the panels that correspond begin to display.

About this task

At this stage of the conversion process, other special panels might also display.

Creating and submitting JCL

When all questions have been answered regarding how to process a conversion project, IMS HALDB Toolkit creates JCL and presents an ISPF panel for you to submit it.

When the IMS management of ACBs is enabled, //IMS DD is not generated.

About this task

```
=====
File Edit Edit_Settings Menu Utilities Compilers Test Help
-----
VIEW          xxxxx.SPFTEMP1.CNTL                      Columns 00001 00072
Command ==>                                         Scroll ==> PAGE
***** ***** Top of Data *****
000001 //XXJOB JOB 11,xx,CLASS=A,MSGCLASS=X
000002 //*
000003 //*
000004 //*
000005 //DEL EXEC PGM=IDCAMS
000006 //SYSPRINT DD SYSOUT=*
000007 //SYSIN DD *
000008 DELETE IMSDB.UNLOAD.HD02
000009 SET MAXCC=0
000010 /*
000011 //UNLOAD EXEC PGM=IHCHALDB,
000012 // COND=(4,LE),
000013 // REGION=60M
000014 //STEPLIB DD DISP=SHR,DSN=your.SIHCLDDB
000015 // DD DISP=SHR,DSN=your.SDFSRESL
000016 //DFSRESLB DD DISP=SHR,DSN=your.SDFSRESL
000017 //IMS DD DISP=SHR,DSN=your.DBDLIB
000018 //RECON1 DD DISP=SHR,DSN=your.RECON1
000019 //RECON2 DD DISP=SHR,DSN=your.RECON2
000020 //RECON3 DD DISP=SHR,DSN=your.RECON3
000021 //HD0201 DD DISP=SHR,DSN=IMSDB.HD02.HD0201
000022 //SI02101 DD DISP=SHR,DSN=IMSDB.SI021.SI02101
000023 //SI02301 DD DISP=SHR,DSN=IMSDB.SI023.SI02301
000024 //SI02201 DD DISP=SHR,DSN=IMSDB.SI022.SI02201
000025 //SI02401 DD DISP=SHR,DSN=IMSDB.SI024.SI02401
=====
```

Figure 105. ISPF panel for submitting conversion JCL

When the JCL processes successfully, an indicator displays to confirm that the batch job has completed. A phase can have more than one batch job; all the jobs must be completed before the next phase begins.

Using SYNC points to halt or continue to the next phase of a project

After certain phases complete, a sync point is reached. The sync point allows you to interrupt the project at a logical point.

About this task

Sync points specify whether to continue to the next step.

A typical reason to halt a project is when batch processing has not completed and you will be unavailable for a period of time.

Procedure

To halt or continue to the next phase from a project checkpoint:

1. At a project checkpoint, the **Project Checkpoint** panel displays and you can choose to start the next phase or halt the project.

```

----- IMS HALDB Toolkit -----
Command ==>

          Project Checkpoint

Current Environment      Online
Current Project         0-HD02

Phase completed         End Unload
Next Phase              Start Implementation

-- Start next phase?
  "Y" Yes
  "N" No

```

Figure 106. **Project Checkpoint** panel

- Specify Y to begin the next phase of the project.
- Specify N to halt the project.

To halt or resume project conversion:

2. If you halt the project, a **Project Halted** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

          The project has been halted

Current Environment      Online
Current Project         0-HD02
Project Phase           Sync Unload
Project Status          To be done

```

Figure 107. **Project Halted** panel

The status panel automatically causes the **Project Work** panel to display.

- Optional: To quit the project and continue later, by pressing the **End** key.
- Optional: To resume project conversion, select the appropriate option from the **Project Work** panel.

```

----- IMS HALDB Toolkit -----
Command ==>

          Project Work Panel      Environment: Online
                                   Project:         0-HD02

          0 Select Function

          0 Setup Parameter
          1 Continue with Current Project
          2 Show Status of Project
          3 Recreate JCL of Current Phase
          4 Restart at Current or Prior Level
          5 Restart From Beginning

          Project Desc: hd osam with 4 secind
          Project KSDS: your.ihc2.project.hd02

```

Figure 108. **Project Work** panel

- Optional: To resume project conversion, select the appropriate option from the **Project Work** panel.
- Optional: To resume project conversion, select option 1 from the **Project Work** panel. The project continues from where it stopped.

Processing a project using a partition selection exit

You must use a partition selection exit to process the project, if the database records (root segments) are to be distributed by methods other than the root segment key. If the database records are to be distributed by a portion of the root key, which is not the leftmost portion, you must use a selection exit.

Before you begin

For example, if the regional identifier is in a lower portion of the key, and the data should be separated by region identifier.

Restriction on partition selection exits:

- Caution should be used if you want to specify a partition selection exit for the secondary index.
Using the exit can result in index keys that are no longer consecutive from one index partition to the next, thus impacting applications that use PCBs with PROCSEQ.
- IMS HALDB Toolkit does not support a selection exit on PSINDEX.
- If the data is to be distributed using the leftmost portions of the root segment high key, no selection exit is required, and none should be provided.

About this task

Selection exits are called for initialization and sequencing.

Exits provide the following functions:

- IMS knows the number of partitions and provides the partition number as input to the exit.
- The exit has additional parameters including the `keystng` parameter from the partition definition. This parameter can be used to identify and sequence partitions.

Other methods are possible; however, they are prone to errors when the exit identifies a certain number of partitions, but does not receive that input from the DBRC definitions.

Procedure

1. Activate the partition selection exit for use.
2. Define partition boundaries.
3. Select or change the DBD.
4. Optional: Define other conversion options.

Results

If you use the IHCPSEL0 exit, you can activate the exit and define the partition boundaries as part of one task. If you supply your own partition selection exit, you must perform extra steps to make sure that your conversion process runs smoothly.

IHCPSEL0 exit

The IHCPSEL0 exit is provided with IMS HALDB Toolkit and works the same way as the high key works for partitioning without a selection exit.

IHCPSEL0 uses the DBRC `keystng` parameter to identify the key portion and the high subkey for that partition. This enables flexibility for changing the partitioning method. The `keystng` parameter is specified as `ooo;lll;kkkkk` where:

ooo

Is the numeric specifying the offset from the start of the root key. The smallest offset is 001.

lll

Is the numeric specifying the length of the subkey. *lll+ooo* must not be larger than the root segment key.

kkkkk

Is the high-level qualifier key of the subkey for this partition.

IHCPSEL0 performs certain checks during initialization. It verifies that all *ooo* and *lll* are the same for each partition. Then, it checks for duplicate high keys.

Keys can be defined shorter than *lll*. In that case, they are padded with x"FF".

Using a partition selection exit for conversion

After you create a project and before you select a DBD, you can activate a partition selection exit. You can also use this procedure to define the partition boundaries.

About this task

On the next panel (**Specify a Partition Selection Exit**), you are asked to specify the partition selection exit.

Procedure

1. Select option 1 under "Selection Exit" on the **DBD Conversion Rules** panel.

You can also specify a partition selection exit for the secondary index; however, this might cause problems. The index keys will no longer be consecutive from one index partition to the next. This has an impact on applications that use PCBs with PROCSEQ. IMS HALDB Toolkit does not support a selection exit on PSINDEX.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                DBD Conversion Rules  
  
Multi DSG:           1  To single DSG  
                   2  Leave as is  
                   3  Ask during Conversion  
  
Convert VSAM to OSAM:  1  Yes  
                   2  No  
                   3  Ask during Conversion  
  
Change DBD name:     1  Yes  
                   2  No  
  
Selection Exit:      1  1  Yes  
                   2  2  No  
                   3  3  Ask during Conversion  
  
Heal Index Pointer   1  Yes  
                   2  No  
                   3  Ask during Conversion
```

Figure 109. **DBD Conversion Rules** panel

2. On the next panel (**Partition Selection Exit**), specify the partition selection exit.

You can use either IHCPSEL0, which is supplied, or provide your own selection exit.

If you use your own exit, you must provide strings for the partition or define the number of partitions.

```

----- IMS HALDB Toolkit -----
Command ==>

          Partition Selection Exit for  HIDV2

Specify a Partition Selection Module:  IHCPSEL0
Specify a Key Offset from Start of the Key:  2
Specify a String Length:  4
      Root Segment Key Length is:  8
      (Offset length must not exceed root key)

1 Specify Strings
  1 Yes, prompt for strings
  2 No, number of partitions is:  0

Use the HELP key for more information

```

Figure 110. **Partition Selection Exit** panel

3. If you use IHCPSEL0, provide the subset high keys.

IMS HALDB Toolkit provides the **Specify Partition Keystings** panel and the **Partition Keystings (character)** panel for you to enter subset high key information.

```

----- IMS HALDB Toolkit -----
Command ==>

          Specify Partition Keystings

          1 Select
            1 Enter keystings in character format
            2 Enter keystings in hex format
            3 Provide dataset

          Member      (if dataset is partitioned)

```

Figure 111. **Specify Partition Keystings** panel

```

----- IMS HALDB Toolkit -----
Command ==>

          Partition Keystings for HIDV2
          Character Keystings only

          Max key length:  4
          No. of keys   :  0

Specify Key:  499

          Specify 'FF' for high value key

```

Figure 112. **Partition Keystings (character)** panel

4. When you are finished entering keys, press the **End** key.
The Keystings for xxxxxx panel displays all of the keys that you entered.
5. Optional: Use the Keystings for xxxxxx panel to change any of the information that you entered.

```

----- IMS HALDB Toolkit -----Row 1 of 2
Command ==>

                Keystings for   DBD HIDV2

        Selections:  "D" for DELETE           Key Length:  4
                   "C" for CHANGE           Key Offset:  2
                   "I" for INSERT

S           Key value
-----
Char:  499
Hex:   F4F9F9

Char:  .
Hex:   FF

***** Bottom of data *****

```

Figure 113. Verifying partition keystings

IMS HALDB Toolkit performs a final check for the partition selection exit.

- Optional: If you encounter the Partition Selection Exit xxxxxxxx is not currently in your RESLIB panel, copy the exit into your RESLIB. Partition boundary calculations are then performed.

```

----- IMS HALDB Toolkit -----
Command ==>

        Partition Selection Exit
                IHCPSEL0
        is currently not in your RESLIB

        Please copy the exit to your RESLIB
        and hit enter when done.

-----

Char:  499
Hex:   F4F9F9

Char:  .
Hex:   FF

***** Bottom of data *****

```

Figure 114. Confirming existence of partition selection exit

Changing the DBDs

After DBDs and partition boundaries are selected, you can begin conversion by unloading the primary DBDs.

About this task

New DBDs and partitions must be defined, and new data sets must be allocated. Then, reloads can be performed and conversion will be complete.

Because the DBDs have changed, an online change must be performed before making the new HALDBs available. The conversion process makes all changes except online changes, although it creates required JCL and control statements.

You submit the JCL as specified in your setup options or during project definition. You can change the options according to the needs of your project.

Creating partition boundaries

After DBDs are selected, you should locate effective partition boundaries. This section describes ways to create partition boundaries.

About this task

You can accomplish this by locating the high-level key of each partition that you want. You must select partition boundaries for all participating databases, including secondary indexes.

The index record size increases significantly because of the increase in the pointer size from 4 to 28 and the addition of the root segment key.

Procedure

- Use a partition selection exit.
- Specify the high key for a partition.
- Set partition boundaries automatically.

Defining the number of partitions by specifying high keys

After DBDs are selected, you can define the number of database partitions you want to have by specifying high keys for the partitions.

About this task

The number of partitions will be the number of high keys you specify. You must select partition boundaries for all participating databases, including secondary indexes. You need not specify the keys in sequence. The highest key defined is replaced as x'FF'.

The index record size increases significantly because of the increase in the pointer size from 4 to 28 and the addition of the root segment key.

Procedure

1. On the **Primary DBD Partitioning Rules** panel, select option 4 Specify High Keys.

```
----- IMS HALDB Toolkit -----
Command ==>

                Primary DBD Partitioning Rules

Partitions:      3      1 Fixed Number of Partitions      1
                  2 Fixed Partition Size (MB)      2048
                  3 Ask during Conversion
                  4 Specify High Keys

PDB Conversion:  3      1 Use existing Keys or Partitions
                  2 Create new Partition boundaries
                  3 Ask during Conversion

Additional Partitioning Layouts to be created?
                  2      1 Yes
                  2      2 No, use the one created during Collect

Combine Database records:
                    5000 (number of database records)
```

Figure 115. **Primary DBD Partitioning Rules** panel

The **Specify Partition Keystings** panel is displayed.

2. To specify keys, select option 1 or 2 depending on whether you want character or hex format.

```

----- IMS HALDB Toolkit -----
Command ==>

          Specify Partition Keystrings

          Select
          1 Enter keystrings in character format
          2 Enter keystrings in hex format
          3 Provide dataset
            Member                (if dataset is partitioned)
-----

```

Figure 116. *Specify Partition Keystrings panel*

- Optional: Select option 1 and the **Specify Partition Keystrings Character Keystrings only** panel is displayed.

Enter one key at a time; or, if you have a file containing the keys, you can use it here.

The file must have as many records as the number of keys you want, the keys must be the first position of the record, and the file must have fixed record length.

```

----- IMS HALDB Toolkit -----
Command ==>

          Specify Partition Keystrings
          Character Keystrings only

          Max key length: 0
          No. of keys   : 0

Key: 0101

          Specify 'FF' for high value key
-----

```

Figure 117. *Specify Partition Keystrings (character) panel*

- When you have entered all keys, press the **End** key. The Keystrings for xxxxx panel displays all keys that were entered.
- To change this list, select option D, C, or I.
- Press the **End** key to begin processing, when the list is final.
- Verify partitioning results. You can view results using the output list from the data collector.

```

----- IMS HALDB Toolkit -----Row 1 of 3
Command ==>

          Keystrings for DBD HD02

          Selections: "D" for DELETE      Key Length: 0
                   "C" for CHANGE      Key Offset: 0
                   "I" for INSERT

1
S          Key value
-----
          Char: 0101
          Hex : F0F1F0F1

          Char: 66
          Hex : F6F6

          Char: .
          Hex : FF
***** Bottom of data *****

```

Figure 118. *Displaying high keys*

Setting partition boundaries automatically

There are two methods to set partition boundaries automatically: specifying the partition size (recommended) and specifying the number of partitions.

Procedure

1. To specify partition size, select option 2 in the "Partitions" section of the **Primary DBD Partitioning Rules** panel.

This method ensures that no partition will be larger than the maximum size allowed.

```
----- IMS HALDB Toolkit -----
Command ==>

                Primary DBD Partitioning Rules

Partitions:      3      1 Fixed Number of Partitions      1
                  2 Fixed Partition Size (MB)      2048
                  3 Ask during Conversion
                  4 Specify High Keys

PDB Conversion:  3      1 Use existing Keys or Partitions
                  2 Create new Partition boundaries
                  3 Ask during Conversion

Additional Partitioning Layouts to be created?
                  2      1 Yes
                  2      2 No, use the one created during Collect

Combine Database records:
                  5000 (number of database records)
```

Figure 119. **Primary DBD Partitioning Rules** panel

2. Optional: To specify the number of partitions, select option 1 in the "Partition" section of the **Primary DBD Partitioning Rules** panel.
If you use this method, a resulting partition might be larger than the 4 GB maximum. In that case, IMS HALDB Toolkit resets the size to 2 GB.
3. Optional: To specify partition boundaries for a secondary index, select option 1 or 2 in the **PSINDEX Definition Rules** panel.

```
----- IMS HALDB Toolkit -----
Command ==>

                PSINDEX Definition Rules

                2      1 Fixed Number of Partitions
                    Partition Number      1

                2 Fixed Partition Size
                    Size (MB)      1024

                * Ask during conversion

                4 Same high keys as the primary DBD
                    (Index is the ROOT key)
                    (Primary DBD must specify keys)
                    (Defaults to "2" if index is not the root key)
```

Figure 120. **PSINDEX Definition Rules** panel

You must consider VSAM freespace.

Typically, option 2 (the default) with a maximum size of 1 GB is the best option.

Specifying additional conversion options

You can specify additional options during the conversion process.

About this task

For example:

- Change the DBD name.

Changing the name impacts post-processing. You must define the new DBDs to your online system, change all PSBs, and ensure that the applications will be changed if they are aware of the DBD name.

- Convert from VSAM to OSAM.

OSAM has advantages not available in VSAM, especially when you use OSAM sequential buffering (OSB).

- Convert to a single data set group.

Some databases contain multiple data set groups to minimize problems with database size.

When you use IMS HALDB Toolkit, this adjustment is unnecessary. You need only one data set group.

Chapter 22. Converting to HALDB

If the database is offline, you can use the ISPF user interface to convert the database to a HALDB.

The following sections explain how to accomplish this task.

Topics:

- [“Considerations for converting to HALDB” on page 267](#)
- [“Converting to HALDB using the ISPF user interface” on page 267](#)

Considerations for converting to HALDB

The following considerations apply when you convert to a HALDB by using the ISPF user interface.

When databases are offline, conversion options are available by using ISPF panels or by using the batch conversion method.

Converting full-function databases requires that IMS HALDB Toolkit evaluate partition sizes and boundaries. Partitioned databases which use the PDB/PDF product are considered full-function databases and can be converted as such.

The conversion process for PDBs/PDFs uses partition high keys (for HIDAM/HISAM to PHIDAM) or the number of partitions (HDAM to PHDAM).

You can also choose to select the partition boundaries again. In this case, the partition definition from the PDB is ignored and the database is treated in the same way as any full-function database.

Considerations for converting to HALDB when the IMS management of ACBs is enabled:

- New database definitions must exist in the IMS catalog staging data sets before running the ISPF user interface.
- The shadow database is unloaded by using the active database definition obtained from the IMS catalog directory data sets, then reloaded by using the pending database definition obtained from the IMS catalog staging data sets.
- JCL for DBDGEN is not generated because the pending database definition obtained from the IMS catalog staging data sets is used.
- JCLs for image copy are not generated because the image copy utility does not support the pending database definition obtained from the IMS catalog staging data sets. You must take an image copy manually after the conversion.

Converting to HALDB using the ISPF user interface

You can use the ISPF user interface to convert your full-function databases to HALDB.

Procedure

1. When the IMS management of ACBs is enabled, create the IMS catalog staging data sets. You can refer to the examples in [“CONVERT example: Preparing a staging data set before converting a database when the IMS management of ACBs is enabled” on page 76](#).
2. To display the **DBD Conversion Selection** panel, select option 1 (Continue with Current Project) from the **Project Work** panel.
If you did not select DBDs, or if you cleared the project data set, this step is necessary.
3. Select one of the provided DBD libraries, or enter a specific DBD library and press **Enter** to see a list of DBDs.

When the IMS management of ACBs is enabled, no DBD library is displayed. Press **Enter** without selecting or specifying a DBD library.

All DBDs and related databases must be converted together. You must select, at minimum, the primary DBD.

All related DBDs and indexes will be automatically included. In addition, you can add DBDs that are not related (from an IMS perspective), and they will be converted at the same time.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
    DBD Conversion selection  
  
    Select one of the provided DBD libraries  
    or specify a DBD library below  
    1      your.DBDLIB  
    2  
    3  
    4  
    5  
    6  
    7  
    8  
    9  
  
    Specify a DBDLIB dataset name:  
    your.DBDLIB  
  
    DBD      *          "*" for list of DBDs
```

Figure 121. **DBD Conversion Selection** panel

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
    DBD Conversion selection  
  
    Select one of the provided DBD libraries  
    or specify a DBD library below  
    1  
    2  
    3  
    4  
    5  
    6  
    7  
    8  
    9  
  
    Specify a DBDLIB dataset name:  
  
    DBD      *          "*" for list of DBDs
```

Figure 122. **DBD Conversion Selection** panel when the IMS management of ACBs is enabled

4. Select the primary DBD to be converted; related DBDs are automatically added to the list.

```

----- IMS HALDB Toolkit -----Row 1 of 115
Command ==>                               Scroll ==> PAGE

          Select  DBD
          -----
          s      DEDB1
                HD01
                HD02
                HD02TT
                HDV1
                HDV2
                HDX2
                HIDAM2
                HID02
                HID03
                HID04
                HIDV2
                HISAM
                HISAM1
                HPI20
                HPI30
                HPI40
                HPV20
                JD02
                JI021
                JI022
                JI023
                JI024
                KEY120
                LDBD1

```

Figure 123. Selection panel for DBDs to be converted

5. Press the **End** key to display the status panel showing all selected DBDs.
6. View your selections, and press the **End** key to display the following DBD Selection for Project xxxxx panel, which allows you to confirm that the DBD list is complete.

```

----- IMS HALDB Toolkit -----
Command ==>

          DBD Selection for Project 0-HD02

          Confirm the end of DBD Selection

          Y      "Y" If no more DBDs are to be added
                "N" If more DBDs are to be added
                "H" Hold project

```

Figure 124. Confirmation panel for DBD selections

7. Continue processing the project as described in [Chapter 21, "Processing a project,"](#) on page 251.
8. When the IMS management of ACBs is enabled, issue the `IMPORT DEFN SOURCE(CATALOG)` command to activate the new database definition.
9. When the IMS management of ACBs is enabled, take an image copy manually.
10. After the conversion process is complete and you are certain that you will not need to revert the database to its non-HALDB state, you can delete any DFSMDA members for the old database.

Chapter 23. Maintaining HALDB

The maintenance function from the ISPF user interface helps you maintain HALDBs after you convert them from full-function. The maintenance function is used to split or consolidate partitions.

You can use ISPF to perform maintenance tasks after databases are converted.

The databases must be offline before beginning any maintenance task. The databases must be taken offline manually.

To maintain a database online, you must use the batch process.

You can perform the following tasks using the ISPF user interface:

- Select DBDs for maintenance
- Select and maintain partitions
- Create and run JCL

The following sections explain how to accomplish these tasks.

Topics:

- [“Splitting or consolidating HALDB partitions” on page 271](#)
- [“Selecting DBDs for maintenance” on page 272](#)
- [“Selecting and maintaining partitions” on page 273](#)

Splitting or consolidating HALDB partitions

You access the maintenance panel by selecting option 6 from the IMS HALDB Toolkit main menu.

About this task

The **Split or Consolidate HALDB Partitions** panel is displayed.

The panel shows the current environment in which you are working and the IMS version for which it is defined. If you are connected to a project which is eligible for maintenance, the project name is also displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                Split or Consolidate HALDB Partitions  
  
Select Function                                Current Settings  
                                                Environment:  
                                                Project:  
                                                IMS Version: 15  
  
1 Add-Delete HALDB Maintenance Project  
2 Projects in Progress  
3 Select a Project  
  
4 Start or Continue with the Current Project
```

Figure 125. **Split or Consolidate HALDB Partitions** panel

The panel offers the following functions:

- Select option 1 to maintain projects that are defined within the specified environment.
- Select option 2 to display all projects that are defined within the environment.
- Select option 3 to select a project. If no project is preselected, you must select a project before proceeding.

A list of projects is displayed; however, only those defined as maintenance projects (Type: M) are eligible for selection.

After you select a project, the name is displayed on the project line.

- Select option 4 to connect to the project that is displayed under Current Settings and to display the **Project Work** panel.

In ISPF mode, Help is available for using the fields on this panel.

```

----- IMS HALDB Toolkit -----
Command ==>

      Project Work Panel      Environment:  New Envir
                             Project:         PHIDV2

0  Select Function

    0  Setup Parameter
    1  Continue with Current Project
    2  Show Status of Project
    3  Recreate JCL of Current Phase
    4  Restart at Current or Prior Level
    5  Restart From Beginning

Project Desc: Consolidate partitions
Project KSDS: your.project.consoli.phidu2

```

Figure 126. **Project Work** panel

Selecting DBDs for maintenance

If you select option 1 on the **Split or Consolidate HALDB Partitions** panel, you are asked to select the DBD.

About this task

DBDs are extracted from the RECON.

The **HALDB DBDs** panel is displayed.

Select the DBD to be processed. Only one DBD can be selected at-a-time.

```

----- IMS HALDB Toolkit -----
Command ==>

      HALDB DBDs

Sel   DBD      Organization
-----
      PHDV1    PHDAM, VSAM
      PHIDV2    PHIDAM, VSAM
      PPAIR2    PHDAM, OSAM
      PSHV21    PSINDEX
      PSHV22    PSINDEX
      QHV21     PSINDEX
      QHV22     PSINDEX
      QIDV2     PHIDAM, VSAM
      YHV21     PSINDEX
      YHV22     PSINDEX
      YIDV2     PHIDAM, VSAM
      ZEY120    PHDAM, OSAM
***** Bottom of data *****

```

Figure 127. **Selecting HALDB DBDs**

The panel is displayed for selecting the DBD library which contains the selected DBD, as shown in the following example.

Select the appropriate DBD library or type the data set name. The DBD library you choose will be associated with the project.

When the IMS management of ACBs is enabled, no DBD library is displayed. Press **Enter** without selecting or specifying a DBD library.

```
----- IMS HALDB Toolkit -----  
Command ===>  
  
    Select one of the provided DBD libraries  
    or specify a DBD library below  
    for HALDB DBD  PHDV1  
  
    1      your.DBDLIB  
    2  
    3  
    4  
    5  
    6  
    7  
    8  
    9  
  
    Specify a DBDLIB dataset name:  
    your.DBDLIB
```

Figure 128. Selecting HALDB DBD library

```
----- IMS HALDB Toolkit -----  
Command ===>  
  
    1  Select one of the provided DBD libraries  
    or specify a DBD library below  
    for HALDB DBD  PHDV1  
  
    1  
    2  
    3  
    4  
    5  
    6  
    7  
    8  
    9  
  
    Specify a DBDLIB dataset name:
```

Figure 129. Selecting HALDB DBD library when the IMS management of ACBs is enabled

The next step is to select a partition.

Selecting and maintaining partitions

You use the **Select Partitions for Maintenance** panel to select and maintain partitions. All partitions are displayed in key sequence.

About this task

The current size of the partition and the space used are displayed to assist you in deciding which partitions to select.

You can select multiple partitions. However, if you select more than one, they must be in key sequence and be selected or cleared one-at-a-time.

IMS HALDB Toolkit considers multiple partitions as one entity and creates new partitions based on the goals that you defined in the project setup.

```

----- IMS HALDB Toolkit -----
Command ==>

      Select Partitions for Maintenance      Master DBD:  PHDV1

              "S" to select a partition
              "D" to deselect a partition

Sel   Partition  Curr   Space (CYL)   High key
      Sel        Sel      Allocated      Used
-----
      PHDV13          2         2         03
      PHDV14          2         2         05
      PHDV12          2         2         06
      PHDV10          2         2         55
      PHDV11          2         2         x'FF'
***** Bottom of data *****

```

Figure 130. Displaying all partitions in key sequence

Restriction on partition selection exits

Only partition selection exit IHCPSEL0 (provided with this product) is supported. DBDs with other partition selection exits are not supported.

Chapter 24. Creating JCL statements for database utilities

IMS HALDB Toolkit can create JCL for database utilities. You can then run reorganization or backup and recovery utilities for HALDBs or selected partitions.

Procedure

1. From the IMS HALDB Toolkit main menu, select option 7 (Database Utilities) and press **Enter**.

The **Database Utilities** panel is displayed.

```
----- IMS HALDB Toolkit -----
Command ==>

                Database Utilities

Select Function                                Current Settings
                                                Environment: ims14

1  Index Pointer Healer
2  Recover Partition
3  Backup Partition
4  Unload Partition
5  Reload Partition
6  Unload entire Database
7  Reload entire Database
8  Reorganize PSINDEX
9  Drop Partition
A  Load Partition
B  Merge HALDBs
```

Figure 131. Database utilities main menu

This panel allows you to select utility functions for performing actions on selected databases or partitions.

Option 1

This function reads the PSINDEX data sets and determines whether the EPS pointers are valid. If necessary, ILDS data sets from the primary database partitions are used to update the index pointer. This function requires the primary database to be offline.

Options 2 - 7

These functions create JCL to perform the action of the selected utility. Either IMS Tools products or standard utilities are used. On the main menu, you can select option 0 (Setup Utilities) to specify which utilities and associated parameters IMS HALDB Toolkit should use.

Option 8

If your CI and CA splits are a high number, this function reorganizes the PSINDEX. This function requires the PSINDEX database to be offline.

Option 9

This function is used to remove a partition. If the database has secondary indexes, the function also removes corresponding index records. This method is faster than rebuilding indexes for remaining partitions.

It is still possible to undo the drop at this time. Because a dropped partition has only been "disabled", it can be reactivated. However, secondary indexes must be rebuilt. If the database has been updated, you must unload and reload to reactivate the dropped partition.

Option A

This function allows you to load a single partition (PCB with PROCOPTL). Using this function can cause performance issues if secondary indexes are inserted. The insertion of secondary indexes is

delayed until the partition has been loaded. The index records are then inserted sequentially. The application does not see status codes related to insertion of the records. However, if index loading fails, the job ends.

Option B

This function enables user-partitioned databases to transform to a single HALDB. The following restrictions apply:

- DBDs must be identical.
- The key range of the partitions must not overlap.

This function imports selected partitions into the target master DBD. Data set names are changed according to the rules in the target database. This function checks the key consistency of neighboring partitions. The merge is performed only if all checks have been satisfied.

2. Select a function from the menu and press **Enter**.

A panel displays that shows all HALDBs that are currently defined.

3. Select a DBD on which to perform a function and, if necessary, its partition. Press **Enter**.

The JCL for that function is generated automatically.

Chapter 25. Other ISPF utilities

You can use Other Utilities functions provided by the ISPF user interface to perform other HALDB tasks.

From the IMS HALDB Toolkit main menu, select option 8 (Other Utilities) and press **Enter**.

The **Utilities** panel is displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                          Utilities  
  
    Select Function          Current Settings  
                            Environment: ims14  
1 Show DBD Source  
2 Reassemble DBD  
  
3 Partition Selection Exit Test Utility  
4 OSAM Multi volume
```

Figure 132. Utilities panel

Option 1 allows you to rebuild the source of your DBD. You are asked to specify the DBDLIB and select a DBD. The DBD source will be displayed.

Option 2 is the same as option 1, but applies JCL to the DBD source to enable you to do a DBDGEN.

Option 3 generates the JCL for testing a partition selection exit.

Option 4 creates the JCL to handle a non-SMS OSAM Multi volume.

Chapter 26. Using ISPF DBRC support functions

You can use DBRC support functions provided by the ISPF user interface to show, clone, copy, and backup HALDB definitions and partitions.

About this task

To use DBRC utilities, select option 9 (DBRC for HALDB) from the IMS HALDB Toolkit main menu and press **Enter**.

The **DBRC Support** panel is displayed to allow you to select a function that is supported by DBRC.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
                                DBRC Support  
  
    Select Function                Current Settings  
                                Environment: ims14  
  
    1 Show Partition Definition  
  
    2 Show Partitions with Authorization Exceptions  
    3 Show all Subsystems  
  
    4 Resolve Authorization Exceptions  
    5 Clone Partition Definition  
    6 Copy Partitions to a different RECON  
  
    7 Backup DBD Definition
```

Figure 133. **DBRC Support** panel

Topics:

- [“Showing partition definitions” on page 279](#)
- [“Cloning DBRC definitions” on page 280](#)
- [“Copying DBRC partitions” on page 282](#)
- [“Backing up DBRC DBD definitions” on page 283](#)

Showing partition definitions

You can use the **DBRC Support** panel to show partition definitions.

Procedure

1. From the IMS HALDB Toolkit main menu, select option 9 (DBRC for HALDB) and press **Enter**.

The **DBRC Support** panel is displayed.

2. From the **DBRC Support** panel, select option 1 (Show Partition Definitions) and press **Enter**.

The **Partition Definition in DBRC** panel is displayed. The panel shows a list of all HALDB master DBDs and their partition definitions.

```

----- IMS HALDB Toolkit -----
Command ==>

                Partition Definition in DBRC

Displayed as currently defined in RECON data sets

Select
1 Show all HALDB DBDs and Partitions
2 Show DBD
3 Show Partition

RECON1: your.RECON1
RECON2: your.RECON2
RECON3: your.RECON3

```

Figure 134. **Partition Definition in DBRC** panel

- To see details about a DBD and its partitions, select a row and press **Enter**.

For following example shows the result for option 1 (Show all HALDB DBDs and Partitions):

```

----- IMS HALDB Toolkit -----Row 1 of 7
Command ==>

                HALDB DBDs and Partitions

Sel DBD      Part      Organization  Sel.Exit
   PHD02A  PHD02A0  PHDAM,OSAM
           PHD02A1
           PHD02A2
           PHD02A3
           PHD02B0
           PHD02B1
*****Bottom of data*****

```

Figure 135. **HALDB DBDs and Partitions** panel

Cloning DBRC definitions

You can use the clone function from the **DBRC Support** panel to replicate HALDB DBRC definitions to other RECONS.

Procedure

- From the IMS HALDB Toolkit main menu, select option 9 (DBRC for HALDB) and press **Enter**.
The **DBRC Support** panel is displayed.
- From the **DBRC Support** panel, select option 5 (Clone Partition Definition) and press **Enter**.
The **HALDB DBDs** panel is displayed showing the list of HALDB DBDs.

```

----- IMS HALDB Toolkit -----Row 1 of 6
Command ==>

                                HALDB DBDs
                                -----
                                Sel   DBD      Organization
                                -----
                                s     PHD02    PHDAM,OSAM
                                PSI021    PSINDEX
                                PSI022    PSINDEX
                                PSI023    PSINDEX
                                PSI024    PSINDEX
                                PUSER     PHDAM,OSAM
***** Bottom of data *****

```

Figure 136. Selecting DBDs to be cloned or copied

3. Enter **s** to make a partition selection, along with any secondary indexes you want to include, and press **Enter**.

The **Enter Target RECON Data Set Names** panel is displayed.

```

----- IMS HALDB Toolkit -----
Command ==>

Enter target RECON Dataset names

RECON1  your.other.recon1
RECON2  your.other.recon2
RECON3  your.other.recon3

```

Figure 137. Selecting the target RECON data sets

4. Specify the RECON data sets to which you plan to clone the HALDB DBRC definitions and press **Enter**.

The **Options for DBRC Cloning of DBD** panel is displayed:

```

----- IMS HALDB Toolkit -----
Command ==>

Options for DBRC cloning of DBD  PHD02

Enter new dataset name prefix
your.new.hlq

Add DBD name to dataset name prefix
Y  Y Yes
   N No

Include secondary indexes
Y  Y Yes
   N No

```

Figure 138. Specifying cloning parameters

5. Specify the following parameters:

- Specify a new data set name prefix.
- If you include the secondary index databases, use the DBD name as an additional data set qualifier

IMS HALDB Toolkit creates the JCL to transport partition definitions of the selected DBD and any secondary indexes.

Submit the JCL to create the partition definition in your alternate RECONS.

Note: You should not use this function to transport image copies to partitions that have just been defined. Use the Copy function, instead. However, you can use any Load process to transport data to replicated partitions.

Copying DBRC partitions

You can use the copy function from the **DBRC Support** panel to replicate HALDB DBRC definitions to other RECONS.

About this task

Use this function to copy DBRC definitions and partition data sets to a different RECON.

The data transport process can unload or reload. However, this function is designed to allow transport with image copies.

Procedure

1. From the IMS HALDB Toolkit main menu, select option 9 (DBRC for HALDB) and press **Enter**.
The **DBRC Support** panel is displayed.
2. From the **DBRC Support** panel, select option 6 (Copy Partitions to a Different RECON) and press **Enter**.
The **Enter Target RECON Dataset Names** panel is displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
Enter target RECON Dataset names  
  
RECON1  your.new.recon1  
RECON2  your.new.recon2  
RECON3  your.new.recon3
```

Figure 139. Selecting the target RECON data sets

3. Specify the RECON data sets to which you plan to copy the HALDB DBRC definitions and press **Enter**.
The **Copy Database to Different RECON** panel is displayed.

```
----- IMS HALDB Toolkit -----  
Command ==>  
  
Copy database to different RECON. DBD is PHD02  
  
Include secondary indexes  
Y   Y Yes  
    N No  
  
Enter new dataset name prefix  
your.new.hlg  
Add DBD name to dataset name prefix  
Y   Y Yes  
    N No  
  
Create IDCAMS for new datasets  
Y   Y Yes  
    N No  
Specify DATACLAS for new datasets  
  
Specify VOLSER for new datasets
```

Figure 140. Specifying copy parameters

4. Specify the following parameters:
 - Specify a new data set name prefix.
 - If you include the secondary index databases, use the DBD name as an additional data set qualifier.IMS HALDB Toolkit can create the IDCAMS statements for the new files.

IMS HALDB Toolkit creates the JCL.

The first step creates a file containing DBRC statements and (optionally) a file containing IDCAMS statements.

The DBRC statements create the HALDB DBD and its partitions. The partition number is maintained so that image copies can be used.

Additionally, all complete image copy entries are transported to the new RECONS.

VOLSER information is not copied.

You must have CATDS in your DBRC definition.

An optional third step uses the IDCAMS statements to allocate new files. File sizes are copied from the original files.

You can now load your database into the new files by using the Recovery function and accessing the new RECON.

Backing up DBRC DBD definitions

You can use the **DBRC Support** panel to back up DBRC DBD definitions.

Procedure

1. From the IMS HALDB Toolkit main menu, select option 9 (DBRC for HALDB) and press **Enter**.

The **DBRC Support** panel is displayed.

2. Select option 7 from the DBRC Support menu.

A list of HALDB master DBDs displays.

3. Select the DBD.

A **View** panel displays the database and partition definition for the selected master DBD.

4. Select all rows.

5. Issue a **CREATE** command on the command line, and specify the file to which the definitions are to be backed up.

Part 9. Reference

The topics in this section provide you with technical references to help you interpret IMS HALDB Toolkit reports and understand the contents of the sample library file.

Topics:

- [Chapter 27, “Sample reports,” on page 287](#)
- [Chapter 28, “Contents of the sample library file \(SIHCSAMP\),” on page 299](#)
- [Chapter 29, “Performance tips and considerations,” on page 303](#)

Chapter 27. Sample reports

This topic contains samples of reports that you might encounter as you use IMS HALDB Toolkit.

This topic contains only those reports created by IMS HALDB Toolkit. The reports created by the IMS and IMS Tools products are described in the manuals for those utilities.

Topics:

- “MSGPRINT data set” on page 287
- “IHCLIST data set” on page 287

MSGPRINT data set

The MSGPRINT data contains progress messages issued during the IMS HALDB Toolkit job.

Runtime Messages report

The following figure shows an example of the Runtime Messages report.

```
                Runtime Messages
22:04:07,9 IHC01002I Utility driver started
22:04:07,9 IHC01000I IMS version is 15
22:04:08,0 IHC01001I Control cards used in this run
22:04:08,0 IHC01000I   ANALYZEPART DBD(PHIDB1) -
22:04:08,0 IHC01000I   PARTLIST(PHIDB11,PHIDB12) -
22:04:08,0 IHC01000I   PARTNUM(3)
22:04:08,5 IHC01000I Verification started
22:04:08,5 IHC01000I IMS HALDB Toolkit level 1.1 09/15/21 03.36 26
22:04:08,7 IHC01000I List of partitions
22:04:08,7 IHC01000I   PHIDB11
22:04:08,7 IHC01000I   PHIDB12
22:04:09,3 IHC01000I Verification ended, return code is 0
22:04:09,3 IHC01000I Analyze started
22:04:09,3 IHC01000I Input: PHIDB11L DBSMS.DB.PHIDB1.L00001
22:04:09,4 IHC01000I Input: PHIDB11X DBSMS.DB.PHIDB1.X00001
22:04:09,4 IHC01000I Input: PHIDB11A DBSMS.DB.PHIDB1.A00001
22:04:09,4 IHC01000I Input: PHIDB12L DBSMS.DB.PHIDB1.L00002
22:04:09,4 IHC01000I Input: PHIDB12X DBSMS.DB.PHIDB1.X00002
22:04:09,4 IHC01000I Input: PHIDB12A DBSMS.DB.PHIDB1.A00002
22:04:09,7 IHC01079I HSSR region controller started
22:04:11,0 IHC01089I Analyzing DBD PHIDB1
22:04:11,2 IHC01084I 64 database records read **FINAL**
22:04:11,3 IHC01079I HSSR region controller ended
22:04:11,3 IHC01000I Analyze ended, return code is 0
22:04:11,3 IHC01002I Utility driver ended
22:04:11,3 IHC01003I Highest return code is 0000
End of messages
```

Figure 141. Runtime Messages report

IHCLIST data set

The IHCLIST data set contains several reports. The reports generated differ by which function was performed.

Function	Reports
ANALYZEPART	<ul style="list-style-type: none">• Collect DBDs report• Runtime Options In Effect report• Unload report (not printed when the input data is unloaded data sets)

Function	Reports
CONVERT	<ul style="list-style-type: none"> Collect DBDs report Runtime Options In Effect report Unload report
MAINTAIN	<ul style="list-style-type: none"> Collect DBDs report Runtime Options In Effect report Unload report
CHECK (HALDB Analyzer utility)	HADB Analyzer report
PSEXIT (Test Partition Selection Exit utility)	Partition Selection Exit report

Collect DBDs report

The Collect DBDs report shows the result of your partition settings. The report displays the number of partitions including their respective high keys. The total line is included at the top for reference.

Partitioning for DBD GRE										
Part	Roots	%	All Segments	%	Prefix Bytes	%	Data Bytes	%	Total Bytes	%
Total	7,648,481	100.00	135,324,722	100.00	2,596,445,972	100.00	12,563,776,313	100.00	15,160,222,285	100.00
1	1,230,845 Key: 0993049356 F0F9F9F3F0F4F9F3F5F6	16.09	16,886,545	12.47	301,372,370	11.60	1,933,145,962	15.38	2,234,518,332	14.73
2	1,120,757 Key: 1643153240 F1F6F4F3F1F5F3F2F4F0	14.65	20,321,387	15.01	398,392,968	15.34	1,813,704,646	14.43	2,212,097,614	14.59
3	1,055,010 Key: 2133450824 F2F1F3F3F4F5F0F8F2F4	13.79	20,430,027	15.09	397,198,092	15.29	1,824,718,562	14.52	2,221,916,654	14.65
4	1,102,409 Key: 2720091872 F2F7F2F0F0F9F1F8F7F2	14.41	19,838,361	14.65	380,466,050	14.65	1,840,985,951	14.65	2,221,452,001	14.65
5	1,029,017 Key: 3673346745 F3F6F7F3F3F4F6F7F4F5	13.45	20,921,079	15.45	401,675,768	15.47	1,857,788,517	14.78	2,259,464,285	14.90
6	915,871 Key: 4333266611 F4F3F3F3F2F6F6F6F1F1	11.97	20,180,337	14.91	393,720,982	15.16	1,794,588,257	14.28	2,188,309,239	14.43
7	1,194,572 Key: 9733926648 F9F7F3F3F9F2F6F6F4F8	15.61	16,746,986	12.37	323,619,742	12.46	1,498,844,418	11.92	1,822,464,160	12.02
Partitioning for DBD GRX01										
Part	Roots	%	All Segments	%	Prefix Bytes	%	Data Bytes	%	Total Bytes	%
Total	7,648,408	100.00	7,648,408	100.00	152,968,160	100.00	145,319,752	100.00	298,287,912	100.00
1	7,648,408 Key: FFFFFFFFFFFFFFFFFFFF	100.00	7,648,408	100.00	152,968,160	100.00	145,319,752	100.00	298,287,912	100.00
Partitioning for DBD GRX02										
Part	Roots	%	All Segments	%	Prefix Bytes	%	Data Bytes	%	Total Bytes	%
Total	6,911	100.00	6,911	100.00	138,220	100.00	3,476,233	100.00	3,614,453	100.00
1	6,911 Key: FFFFFFFFFFFFFFFFFFFF	100.00	6,911	100.00	138,220	100.00	3,476,233	100.00	3,614,453	100.00

Figure 142. Collect DBDs report (Part 1 of 2)

Partitioning for DBD GRX03										
Part	Roots	%	All Segments	%	Prefix Bytes	%	Data Bytes	%	Total Bytes	%
Total	7,648,408	100.00	7,648,408	100.00	152,968,160	100.00	168,264,976	100.00	321,233,136	100.00
1	7,648,408	100.00	7,648,408	100.00	152,968,160	100.00	168,264,976	100.00	321,233,136	100.00
	Key:									
	FFFFFFFFFFFFFFFFFFFFFFFF									
Partitioning for DBD GRX04										
Part	Roots	%	All Segments	%	Prefix Bytes	%	Data Bytes	%	Total Bytes	%
Total	3,182,169	100.00	3,182,169	100.00	63,643,380	100.00	89,100,732	100.00	152,744,112	100.00
1	3,182,169	100.00	3,182,169	100.00	63,643,380	100.00	89,100,732	100.00	152,744,112	100.00
	Key:									
	FFFFFFFFFFFFFFFFFFFFFFFF									

Figure 143. Collect DBDs report (Part 2 of 2)

The following descriptions apply to the fields in this report:

Part

Displays the partition number. The partition number is assigned based on the order of high keys. Partition numbers in this report do not indicate partition IDs.

Roots

Displays the number of root segments and its percentage of all root segments. This shows how many database records will be assigned to that partition.

All Segments

Displays the number of segments in each partition and its percentage of all segments.

Prefix Bytes

Displays the number of bytes (and its percentage of all bytes) that are required to store the prefix. This has particular significance for index databases. For example, the report in [Figure 142 on page 288](#) shows that the GRX01 database has 153 MB for the prefix and 145 MB for data.

Data Bytes

Displays the number of bytes (and its percentage of all bytes) required to store the data portion. This is the actual amount of data that will be stored on disk.

Total Bytes

Displays the sum of prefix bytes and data bytes.

Total

Displays the total number of bytes and segments in the database.

Runtime Options In Effect report

The Runtime Options In Effect report summarizes the runtime options that were applied to the job.

```

HALDB Conversion Analyzer

Runtime Options in effect

Primary DBD.....: PHIDB1
Source for Analyzer.....: Database
Method of Operation.....: Analyze and Unload
Database Type.....: HALDB
  Partition.....: PHIDB11
  Partition.....: PHIDB12
Partitioning for primary DBD.....: Partition Number
Number of Partitions.....: 3
Partitioning for secondary Indexes.....: Partition Size
Size of a Partition.....: 1024

```

Figure 144. Runtime Options In Effect report

The following descriptions apply to the fields in this report:

Primary DBD

The name of the primary DBD.

Source for Analyzer

The input provided to the Analyzer. This field shows either Database or Unload file.

Method of Operation

Whether an unload was performed. This field shows either Analyze only or Analyze and Unload.

Database Type

The type of the database. This field shows either HALDB or Not HALDB.

Partition

The name of the partition that was processed.

Partitioning for primary DBD

The method used for partitioning the primary DBD. This field shows one of the following methods:

- Partition Number
- Partition Size
- High Keys
- Add empty partition

Partitioning for secondary Indexes

The method used for partitioning the secondary indexes. This field shows one of the following methods:

- Partition Number
- Partition Size
- High Keys
- Along with primary DBD

Unload report

The Unload report shows the number of segments and the segment size. The segment size is the true size as it is stored in the database.

It can be useful to know the average database record length when tuning your database. In this case, it is helpful for specifying the byte limit parameter of your PHDAM database.

A sample report is shown in the following example:

Unload for DBD GRE			
Segment	Segment Count	Segment Data	Prefix and Data
GRA	7,648,481	1,541,514,136	1,373,247,554
GRA5	3,182,169	57,466,524	76,559,538
GRB	29,744,738	1,633,250,273	2,007,332,787
GRC	25,221,133	805,503,608	654,176,810
GRE	24,133,135	965,325,400	1,110,124,210
GRH	4,860,332	231,274,879	260,436,871
G	16,617,211	1,893,610,390	1,993,313,656
RL	1,998,779	95,669,886	107,662,560
GRO	18,415,591	1,214,534,914	1,325,028,460
GRQ	3,503,153	229,727,199	250,746,117
Total	135,324,722	8,268,809,017	13,974,016,149
	Avg. database record length:		1,827.03

Figure 145. Unload for DBD GRE report

The following descriptions apply to the fields in this report:

Segment

Displays the segment name

Segment Count

Displays the number of segments of this type in the database

Segment Data

Displays the total amount of data bytes for this segment type in the database

Prefix and Data

Displays the total bytes of this segment type in the database

Total

Displays the sum of the segment types

Avg. database record length

Displays the result of dividing the total prefix and data bytes by the number of root segments

HALDB Analyzer report

This report shows analysis information gathered by the HALDB Analyzer utility.

```

Report for database PHD02

Exceptions and errors
=====
No errors or exceptions detected

Threshold detail
=====
Item          Low    High    Curr    Warn Crit    Detail    Total
-----
RAPUSE        60     80      9
ROOTOVFL      1      30      3
ROOTHOME      2      20     23
SYNONYM       n/a    n/a     10
SPLIT         5      10      0
PTRHEAL       20     80      0
AVGFSE        1      30     0.9
              393    421

Database datasets
=====
DDNAME      Extents  BLKSIZE      Records    Allo (KB)    Used (KB)    Overhead    Segments
-----
PHD020L     1        4,096         0           720          720           0           0
PHD020A     1        4,096        329         1,440        1,316         5,792        1,325
PHD021L     1        4,096         0           720          720           0           0
PHD021A     1        4,096         46          1,440         184          4,660         171
PHD022L     1        4,096         0           720          720           0           0
PHD022A     1        4,096         46          1,440         184          4,660         171
-----
Total                               6,480        3,844

Database segments
=====
Segment Name      Segment Count  avg.  Total bytes  Data bytes  Prefix bytes
                Total      in RAA  length
-----
ROOT              30           29         82           2,460         1,920         540
DEP01             235          31       1,022         240,170       235,000         5,170
DEP02             1,402        165       1,018         1,427,236     1,402,000       25,236
-----
Total             1,667        225         55,662       1,669,866     1,638,920       30,946
Avg. database record length
1=====

```

Figure 146. HALDB Analyzer report (Part 1 of 6)

Report for partition PHD020

Exception details

```

=====
Roots in partition.....:          24
Partition selection errors...:      0
Randomizer errors.....:            0
ILKs in partition.....:          1,325
Erroneous ILKs.....:              0
Number of missing ILEs.....:      0
  
```

Threshold detail

```

=====
Item      Low    High    Curr    Warn Crit    Detail    Total
-----
RAPUSE    60     80     21
ROOTOVFL  1      30     0
ROOTHOME  2      20     20
SYNONYM   n/a    n/a    12
SPLIT     5      10     0
AVGFSE    1      30     0.9
SPACE     300    2500   1    *    1,327,134  1,327,134
  
```

Partition datasets

```

=====
DDNAME    Extents  BLKSIZE    Records    Allo (KB)    Used (KB)    Overhead    Segments
-----
PHD020L   1        4,096      0           720          720          0           0
PHD020A   1        4,096     329         1,440        1,316        5,792       1,325
-----
Total                                2,160        2,036
  
```

Partition segments

```

=====
Segment   Segment Count      avg.
Name      Total      in RAA    length    Total bytes    Data bytes    Prefix bytes
-----
ROOT      24          24        82        1,968          1,536          432
DEP01    187         11        1,022     191,114        187,000          4,114
DEP02    1,114       54        1,018     1,134,052      1,114,000       20,052
-----
Total    1,325       89        55,297     1,327,134      1,302,536       24,598
Avg. database record length
  
```

Partition pointer

```

=====
Segment   Type  Target      Total    Nonzero  Pcnt    Other block  Pcnt    Other in RAA  Pcnt
-----
n/a      RAP   ROOT        100      21      21.00     5      23.80     5      23.80
ROOT     TF    ROOT        24       3      12.50     0      0.00     0      0.00
        PCF   DEP01       24      24     100.00    22     91.66     0      0.00
        Split data
        0      0      0.00     0      0.00
DEP01    TF    DEP01       187     163     87.16    163    100.00     9      5.52
        PCF   DEP02       187     187     100.00    44     23.52     0      0.00
DEP02    TF    DEP02     1,114     927     83.21    229    24.70     8      0.86
-----
Total                                1,636    1,325    80.99     463    34.94     22     1.66
  
```

1=====

Figure 147. HALDB Analyzer report (Part 2 of 6)

Report for partition PHD021

Exception details

```

=====
Roots in partition.....:          3
Partition selection errors...:    0
Randomizer errors.....:          0
ILKs in partition.....:         171
Erroneous ILKs.....:            0
Number of missing ILEs.....:     0
    
```

Threshold detail

```

=====
Item      Low   High  Curr  Warn Crit      Detail      Total
-----
RAPUSE    60    80    3
ROOTOVFL  1     30    0
ROOTHOME  2     20   33
SYNONYM   n/a   n/a    0
SPLIT     5     10    0
AVGFSE    1     30   0.7
SPACE    300   2500  0   *
          171,366  171,366
    
```

Partition datasets

```

=====
DDNAME    Extents  BLKSIZE    Records    Allo (KB)    Used (KB)    Overhead    Segments
-----
PHD021L   1        4,096         0         720         720          0           0
PHD021A   1        4,096        46        1,440        184         4,660       171
-----
Total                                2,160        904
    
```

Partition segments

```

=====
Segment   Segment Count      avg.
Name      Total      in RAA  length      Total bytes      Data bytes      Prefix bytes
-----
ROOT              3          3      82          246          192          54
DEP01            24         10   1,022      24,528      24,000          528
DEP02           144         56   1,018     146,592     144,000      2,592
-----
Total            171         69      57,122     171,366     168,192      3,174
Avg. database record length
    
```

Partition pointer

```

=====
Segment  Type  Target      Total      Nonzero  Pcnt  Other block  Pcnt  Other in RAA  Pcnt
-----
n/a      RAP  ROOT        100         3    3.00         1  33.33         1  33.33
ROOT     TF   ROOT         3           0    0.00         0  0.00         0  0.00
         PCF  DEP01        3           3  100.00        2  66.66         1  33.33
         Split data
         0           0    0.00         0  0.00         0  0.00
DEP01    TF   DEP01       24          21   87.50        21 100.00         8  38.09
         PCF  DEP02       24          24  100.00         4  16.66         0  0.00
DEP02    TF   DEP02      144         120   83.33        27  22.50         9   7.50
-----
Total                                298         171  57.38         55  32.16         19  11.11
    
```

1=====

Figure 148. HALDB Analyzer report (Part 3 of 6)

Report for partition PHD022

Exception details

```

=====
Roots in partition.....:          3
Partition selection errors...:    0
Randomizer errors.....:          0
ILKs in partition.....:         171
Erroneous ILKs.....:            0
Number of missing ILEs.....:     0
  
```

Threshold detail

```

=====
Item      Low    High    Curr    Warn Crit    Detail    Total
-----
RAPUSE    60     80     3
ROOTOVFL  1      30     33
ROOTHOME  2      20     33
SYNONYM   n/a    n/a     0
SPLIT     5      10     0
AVGFSE    1      30     0.8
SPACE     300    2500   0    *
          171,366  171,366
  
```

Partition datasets

```

=====
DDNAME    Extents  BLKSIZE    Records    Allo (KB)    Used (KB)    Overhead    Segments
-----
PHD022L   1        4,096      0           720          720          0           0
PHD022A   1        4,096      46          1,440        184          4,660      171
-----
Total                                2,160        904
  
```

Partition segments

```

=====
Segment   Segment Count      avg.
Name      Total      in RAA    length    Total bytes    Data bytes    Prefix bytes
-----
ROOT      3          2         82         246           192           54
DEP01    24         10      1,022      24,528        24,000         528
DEP02   144         55      1,018     146,592       144,000        2,592
-----
Total    171         67         57,122     171,366       168,192        3,174
Avg. database record length
  
```

Partition pointer

```

=====
Segment  Type  Target      Total    Nonzero  Pcnt    Other block  Pcnt    Other in RAA  Pcnt
-----
n/a     RAP  ROOT        100      3      3.00      1  33.33      0  0.00
ROOT    TF   ROOT         3        0      0.00      0  0.00      0  0.00
        PCF  DEP01        3        3  100.00      2  66.66      1  33.33
        Split data
        0        0  0.00      0  0.00
DEP01   TF   DEP01        24       21  87.50     21 100.00      8  38.09
        PCF  DEP02        24       24 100.00      3  12.50      0  0.00
DEP02   TF   DEP02       144      120  83.33     34  28.33     15  12.50
-----
Total                                298      171  57.38     61  35.67     24  14.03
  
```

1=====

Figure 149. HALDB Analyzer report (Part 4 of 6)

Report for index PSI021

Report for partition PSI0210

Exception details

```
=====
Total index records.....:      23
Deleted index records.....:       0
Pointer healing needed.....:       0
CI splits.....:                 0
CA splits.....:                 0
CA size (CIs).....:            180
Freespace CI (%).....:          0
Freespace CA (%).....:          0
```

Partition datasets

```
=====
DDNAME   Extents  BLKSIZE      Records      Allo (KB)      Used (KB)      Overhead      Segments
-----
PSI0210A    1      4,096         23          1,440          720              0             23
-----
Total                                1,440          720
```

Report for partition PSI0211

Exception details

```
=====
Total index records.....:      7
Deleted index records.....:       0
Pointer healing needed.....:       0
CI splits.....:                 0
CA splits.....:                 0
CA size (CIs).....:            180
Freespace CI (%).....:          0
Freespace CA (%).....:          0
```

Partition datasets

```
=====
DDNAME   Extents  BLKSIZE      Records      Allo (KB)      Used (KB)      Overhead      Segments
-----
PSI0211A    1      4,096         7           1,440          720              0             7
-----
Total                                1,440          720
```

1=====

Figure 150. HALDB Analyzer report (Part 5 of 6)

Report for index PSI022

Report for partition PSI0220

Exception details

=====

Total index records.....: 96
Deleted index records.....: 0
Pointer healing needed.....: 0
CI splits.....: 1
CA splits.....: 0
CA size (CIs).....: 180
Freespace CI (%).....: 0
Freespace CA (%).....: 0

Partition datasets

=====

DDNAME	Extents	BLKSIZE	Records	Allo (KB)	Used (KB)	Overhead	Segments
PSI0220A	1	4,096	96	1,440	720	0	96
Total				1,440	720		

Report for partition PSI0221

Exception details

=====

Total index records.....: 139
Deleted index records.....: 0
Pointer healing needed.....: 0
CI splits.....: 1
CA splits.....: 0
CA size (CIs).....: 180
Freespace CI (%).....: 0
Freespace CA (%).....: 0

Partition datasets

=====

DDNAME	Extents	BLKSIZE	Records	Allo (KB)	Used (KB)	Overhead	Segments
PSI0221A	1	4,096	139	1,440	720	0	139
Total				1,440	720		

Figure 151. HALDB Analyzer report (Part 6 of 6)

Partition Selection Exit report

This report shows information gathered by the partition selection test tool.

All partitions						
Segment Name	Pref-length		Segment Count	Prefix Bytes	Data Bytes	Total Bytes
	before	after				
ROOT	18	18	30	540	1920	2460
DEP01	22	22	235	5170	235000	240170
DEP02	18	18	1402	25236	1402000	1427236
Total			1667	30946	1638920	1669866
ILE records			265			
Partition 1						
Segment Name	Pref-length		Segment Count	Prefix Bytes	Data Bytes	Total Bytes
	before	after				
ROOT	18	18	7	126	448	574
DEP01	22	22	51	1122	51000	52122
DEP02	18	18	298	5364	298000	303364
Total			356	6612	349448	356060
ILE records			58			
Partition 2						
Segment Name	Pref-length		Segment Count	Prefix Bytes	Data Bytes	Total Bytes
	before	after				
ROOT	18	18	23	414	1472	1886
DEP01	22	22	184	4048	184000	188048
DEP02	18	18	1104	19872	1104000	1123872
Total			1311	24334	1289472	1313806
ILE records			207			
Database record distribution						
Part	Roots	%	Data	%		
1	7	23.33	356060	21.32		
2	23	76.66	1313806	78.67		

Figure 152. Partition selection test tool report

Chapter 28. Contents of the sample library file (SIHCSAMP)

This reference topic provides descriptions for the contents of the IMS HALDB Toolkit sample library file (SIHCSAMP).

The following members are included in sample library SIHCSAMP:

IHCCHAL

This member provides the sample skeleton CLIST for ISPF invocation.

Requirement: The ISPF data set names must match the target library names.

IHCCHALC

This member provides the sample skeleton CLIST for ISPF invocation.

When the IMS management of ACBs is enabled, you must use this CLIST to start the ISPF user interface, and specify ACBMGMT=CATALOG in the IMS Catalog Definition exit routine (DFS3CDX0).

When the IMS management of ACBs is not enabled, ISPF is generally invoked using IHCCHAL. However, when you specify ACBMGMT=ACBLIB in the IMS Catalog Definition exit routine (DFS3CDX0), you can also use the CLIST provided by IHCCHALC to start the ISPF user interface.

Requirement: The ISPF data set names must match the target library names.

IHCCHAL1

This member provides the skeleton CLIST for invocation from control suite.

IHCCKSDS

This member provides the sample JCL for ISPF installation.

IHCASET

This member provides the sample JCL for installation setup parameters that are used on a routine basis.

IHCEACBL

This member provides the sample JCL to create a list of PSBs that contain a specified DBD.

IHCEANA

This member provides the sample JCL to run the HALDB analyzer.

IHCECLON

This member provides the sample JCL to clone DBRC for test environments.

IHCECOPY

This member provides the sample JCL to copy a database to a different IMS (and RECON).

IHCECVTN

This member provides the sample JCL to convert to HALDB offline.

IHCECVTY

This member provides the sample JCL to convert to HALDB online.

Note: This member is not supported by IMS Database Utility Solution.

IHCECVT1

This member provides the sample JCL to convert to HALDB by specifying the number of partitions.

IHCECVT2

This member provides the sample JCL to convert to HALDB by specifying the partition size.

IHCECVT3

This member provides the sample JCL to convert to HALDB by specifying the high keys of the partition.

IHCEDBBK

This member provides the sample JCL to back up DBRC definitions for a specified DBD.

IHCEDBD

This member provides the sample JCL to re-create DBD source from DBDLIB.

IHCEDBRC

This member provides the sample JCL to relink the DBRC module DSPCRTR0.

IHCEDBRI

This member provides the sample JCL to set up HALDB data set name substitution outside of DBRC.

IHCEDFDS

This member provides the sample JCL to copy a database to a different IMS using DFSMSdss.

IHCEDFSH

This member provides the sample JCL to create DFSHALDB statement using keys.

IHCEDROP

This member provides the sample JCL to drop a single partition.

IHCEILK

This member provides the sample JCL to reset ILK.

IHCEIXHL

This member provides the sample JCL for the Index Pointer Healer.

IHCELOAD

This member provides the sample JCL to load a single partition.

IHCMAI1**IHCMAI2****IHCMAI3**

These members provide the sample JCL to run the analysis portion of the CONVERT and MAINTAIN commands.

IHCEMERG

This member provides the sample JCL to merge two HALDBs into one.

IHCMTNN

This member provides the sample JCL to maintain HALDB partitions offline.

IHCMTNY

This member provides the sample JCL to maintain HALDB partitions online.

Note: This member is not supported by IMS Database Utility Solution.

IHCMTN1

This member provides the sample JCL to split two partitions into four partitions.

IHCMTN2

This member provides the sample JCL to rearrange partitions using the partition size.

IHCMTN3

This member provides the sample JCL to rearrange partitions using high keys.

IHCEOSAM

This member provides the sample JCL for OSAM multivolume allocation (non-SMS).

IHCPESEL

This member provides the sample JCL for the partition selection test tool.

IHCERE01

This member provides the sample JCL to reorganize a PSINDEX.

IHCESAM1**IHCESAM2****IHCESAM3****IHCESAM4****IHCESAM5****IHCESAM6**

These members provide the sample JCL to create rules for substituting HALDB data set names outside of DBRC.

IHCESPLT

This member provides the sample JCL to split an unload file on a partition boundary.

IHCEUNIT

This member provides the sample JCL to show all DASD unit names and mark VIO.

Chapter 29. Performance tips and considerations

Use this information to learn the techniques for improving the performance of ANALYZEPART, CONVERT, and MAINTAIN function jobs.

Generally, the performance of an IMS HALDB Toolkit job is not affected by IHCSYSIN command parameters. However, you can improve the IMS HALDB Toolkit job performance by tuning the processes of other IMS Tools products that IMS HALDB Toolkit calls. Such IMS Tools products include IMS High Performance Unload, IMS High Performance Load, and IMS High Performance Image Copy.

The following table summarizes the IMS Tools products that IMS HALDB Toolkit functions call.

Table 40. IMS Tools products that IMS HALDB Toolkit functions call

IMS Tools product	ANALYZEPART	CONVERT	MAINTAIN
IMS HP Unload	X	X	X
IMS HP Load	-	X	X
IMS HP Image Copy	-	X	X

Improving the performance of the unload process (IMS HP Unload)

If IMS High Performance Unload is used for unloading data, you can tune and improve the performance of the unload process. To do so, create an IMS High Performance Unload default option table (FABHOPT) with HSSROPT control statements that improve the performance of the HSSR Engine and concatenate the FABHOPT to the STEPLIB DD of the IMS HALDB Toolkit JCL job.

For more information about creating an IMS High Performance Unload default option table, see the topic "Site default options" in the *IMS High Performance Unload User's Guide*.

Improving the performance of the load process (IMS HP Load)

If IMS High Performance Load is used for loading data, you can tune and improve the performance of the load process. To do so, provide IMS High Performance Load control statements with the following methods:

- Specify RELOAD.xxxx parameters in the IHCSYSIN DD. RELOAD.xxxx parameters are applied to the load process as FRRIN control statement keywords to control the behavior of the load processing.
- Create an IMS High Performance Load default option table (HPSROPT) with FRRIN control statements that improve the performance of the load processing and concatenate the HPSROPT to the STEPLIB DD of the IMS HALDB Toolkit JCL job.

HPSROPT, if concatenated to the STEPLIB DD, is always referred to. All RELOAD.xxxx parameters in IHCSYSIN DD and applicable FRRIN control statement keywords in HPSROPT are applied to the load process. If the same parameter is present in both IHCSYSIN DD and HPSROPT, for example, RELOAD.HPIO(YES) in IHCSYSIN DD and HPIO=N in HPSROPT, the parameter in IHCSYSIN is applied.

For more information about creating an IMS High Performance Load default option table, see the topic "Setting installation default options" in the *IMS High Performance Load User's Guide*.

Improving the performance of the image copy process (IMS HP Image Copy)

If IMS High Performance Image Copy is used for creating image copies, you can tune and improve the performance of the image copy process. To do so, provide IMS High Performance Image Copy control statements with the following methods:

- Specify IC.xxxx parameters in the IHCSYSIN DD. IC.xxxx parameters are applied to the image copy process as ICEIN control statement keywords to control the behavior of the image copy processing.
- Create an IMS High Performance Image Copy default option table (FABJGLIO) with ICEIN control statements that improve the performance of the image copy processing and concatenate the FABJGLIO to the STEPLIB DD of the IMS HALDB Toolkit JCL job.

FABJGLIO, if concatenated to the STEPLIB DD, is always referred to. All IC.xxxx parameters in IHCSYSIN DD and applicable ICEIN control statement keywords in FABJGLIO are applied to the load process. If the same parameter is present in both IHCSYSIN DD and FABJGLIO, for example, IC.VIC(Y) in IHCSYSIN DD and VIC=N in FABJGLIO, the parameter in IHCSYSIN is applied.

For more information about creating an IMS High Performance Image Copy default option table, see the topic "Setting default values for the FABJMAIN program" in the *IMS High Performance Image Copy User's Guide*.

Part 10. Troubleshooting

The topics in this section provide you with technical references to help you troubleshoot and diagnose IMS HALDB Toolkit problems.

Topics:

- [Chapter 30, “Messages and codes,” on page 307](#)
- [Chapter 31, “Gathering diagnostic information,” on page 359](#)

Chapter 30. Messages and codes

This section provides detailed information about IMS HALDB Toolkit messages and codes.

Topics:

- [“Return and abend codes” on page 307](#)
- [“Trace file or trace panel” on page 307](#)
- [“ISPF messages” on page 308](#)
- [“Batch messages” on page 308](#)

Return and abend codes

This reference section provides detailed information about IMS HALDB Toolkit return and abend codes.

You might encounter the following return or abend codes during processing.

A return or abend code other than 0 is an unusual condition.

An abend code of U 999 is issued after a subtask ends abnormally. The subtask abend code is also shown in the messages.

Either of the following return codes is issued:

0

Function completed successfully.

4

One or more of the following is true:

- Not all functions completed.
- You may need to perform an IMS online change to complete the requested function.
- TAKEOVER(DELAY) was specified.

Trace file or trace panel

In a normal situation, a trace file is automatically attached to batch processing.

In the event of an error situation, you should attach the trace file to your error documentation to assist IBM Software Support in resolving the problem.

A trace panel is a screen containing trace information which depicts an error situation. When you submit error documentation, print the screen and attach it to the documentation to assist IBM Software Support.

For more information about the diagnostic information that you should attach when contacting IBM Software Support, see [Chapter 31, “Gathering diagnostic information,” on page 359](#).

ISPF messages

For explanations of ISPF messages, see the appropriate ISPF publication.

Batch messages

This reference section provides detailed information about IMS HALDB Toolkit batch messages.

Message format

IMS HALDB Toolkit messages adhere to the following format:

```
IHC0nnnnx
```

Where:

IHC0

Indicates that the message was issued by IMS HALDB Toolkit

nnnn

Indicates the message identification number

x

Indicates the severity of the message:

A

Indicates that operator intervention is required before processing can continue.

E

Indicates that an error occurred, which might or might not require operator intervention.

I

Indicates that the message is informational only.

W

Indicates that the message is a warning to alert you to a possible error condition.

Each message also includes the following information:

Explanation:

The Explanation section explains what the message text means, why it occurred, and what its variables represent.

System action:

The System action section explains what the system will do in response to the event that triggered this message.

User response:

The User response section describes whether a response is necessary, what the appropriate response is, and how the response will affect the system or program.

IHC01000E*text*

Explanation

The *text* of this message provides information about the error.

System action

None.

User response

None.

IHC01000I*text*

Explanation

The *text* of this message provides information about the error.

System action

None.

User response

None. This message is informational.

IHC01001I Control cards used in this run**Explanation**

Displays the control statements that you supplied.

System action

None.

User response

None. This message is informational.

IHC01002I Utility driver [started | ended | terminated] with error.**Explanation**

This message indicates the start or termination of a batch run. Previous messages indicate a possible error reason.

System action

None.

User response

None. This message is informational.

IHC01003I Highest return code is *nnnn***Explanation**

The highest return code of the utilities and functions is *nnnn*.

System action

None.

User response

None. This message is informational.

IHC01004E Error return code is *nnnn*, reason code *rrrr***Explanation**

A utility function ended with an error. The return code is indicated by *nnnn*, and the reason code is indicated by *rrrr*.

System action

The utility has been terminated.

User response

Evaluate the preceding error messages to determine the cause of the problem and resolve the error condition.

IHC01005E Expected continuation not received.**Explanation**

The control statements are in error. A continuation was indicated, but no additional control statement was found.

System action

Processing terminates.

User response

Correct the control statement error and resubmit the job.

IHC01006E No commands found.**Explanation**

The IHCSYSIN file was specified, but no control statements were specified.

System action

Processing terminates.

User response

Provide the necessary control statements.

IHC01007E Invalid command *cmd* found in line *nnn*.**Explanation**

The command *cmd* is invalid. The control statement line is indicated by *nnn*.

System action

Processing terminates.

User response

Correct the control statement and resubmit the job.

IHC01008E Invalid keyword *key* found in line *nnn*.

Explanation

The keyword *key* is not valid for the specified command.

System action

Processing terminates.

User response

Correct the control statement and resubmit the job.

IHC01009E Invalid syntax for keyword *key* in line *nnn*.

Explanation

The keyword requires syntax rules. Syntax rules are: *numeric*, *ddname*, *dsname*, or simply *yes*, or *no*. Message IHC01014I is issued to show the reason for the error.

System action

Processing terminates.

User response

Correct the control statement and resubmit the job.

IHC01010E Duplicate keyword *key* in line *nnn*.

Explanation

The keyword *key* is being used more than once in the same command.

System action

Processing terminates.

User response

Remove the duplicate keyword and resubmit the job.

IHC01011E No command found in line *nnn*.

Explanation

A command must start within the first 20 bytes of a control statement. No command was found.

System action

Processing terminates.

User response

Correct the control statement and resubmit the job.

IHC01012E Command *cmd* requires keyword *key*.

Explanation

The indicated keyword *key* is required for this command *cmd*.

System action

Processing terminates.

User response

Add the keyword and resubmit the job.

IHC01013E Keyword *key* and *key* are mutually exclusive.

Explanation

Mutually exclusive keywords have been specified.

System action

Processing terminates.

User response

Correct the control statement and resubmit the job.

IHC01014I Reason is *rsn*

Explanation

This message explains control statement errors. The variable *rsn* provides information about the control statement errors.

System action

None.

User response

None. This message is informational.

IHC01015E Keyword *key* requires keyword *key*

Explanation

Both of the specified keywords are required and must be specified.

System action

Processing terminates.

User response

Add the missing keyword and resubmit the job.

IHC01016I **Command ccccc started/ended/
terminated**

Explanation

Command *cccc* has either started or ended.

System action

None.

User response

None. This message is informational.

IHC01017E **Nothing to schedule**

Explanation

After all control cards have been checked, there was no command to be processed.

System action

Processing stops.

User response

Keep the output listing and contact IBM Software Support.

IHC01018E **No control cards specified.**

Explanation

The file IHCSYSIN is empty.

System action

Processing terminates.

User response

Provide control statements.

IHC01019I **IMS batch driver started/ended**

Explanation

The IMS batch driver component is used to run IMS applications in a shell. This is done to support additional functionality.

System action

None.

User response

None. This message is informational.

IHC01020E **DBD nnnnn is in error, reason: rrr**

Explanation

The DBD decoder found errors for DBD *nnnnn*. These errors are probably due to one of the following reasons *rrr*:

- DBD has logical relation.
- The DBD version is not supported.
- The DBD type is not supported.
- DBD *nnnnn* is not a valid DBD.
- The DBD name is different from the member name. The member name in the DBD library and the name inside the DBD are different. The name inside the DBD is the valid name.
- DOS does not support this DBD.
- The index DBD has no primary DBD.
- The index DBD has more than one target DBD. IMS HALDB Toolkit does not support multiple target DBDs.
- The target DBD is an IMS HALDB Toolkit DBD, but the index DBD is not.
- The index DBD is an IMS HALDB Toolkit DBD, but the target DBD is not.

System action

Processing stops.

User response

Correct the invalid DBDs and restart the process.

IHC01021E **IMS or DBDLIB DD-statement
missing**

Explanation

The JCL is missing one or both of these statements.

System action

Processing stops.

User response

Add the IMS DD statement describing the appropriate DBDLIBs.

IHC01022E **RESLIB not in STEPLIB
concatenation**

Explanation

The IMS SDFSRESL is not available to this job step.

System action

Processing stops.

User response

Add the IMS SDFSRESL to the STEPLIB.

IHC01023E Unsupported level of IMS is being used

Explanation

IMS HALDB Toolkit is run under an unsupported version of IMS.

System action

Processing stops.

User response

Run IMS HALDB Toolkit with a supported version of IMS.

IHC01024E DBD is not a PSINDEX DBD

Explanation

A HALDB function was requested, but the selected DBD is not a PSINDEX DBD.

System action

The function (step) ends.

User response

Select a PSINDEX DBD. This is a secondary index DBD which has been converted to HALDB.

IHC01025E DBD *nnnn* not found

Explanation

DBD *nnnn* was requested, but is not in the DBD library.

System action

The job step ends.

User response

Ensure that you are using the correct DBD library; the IMS DD statement is pointing to those files.

IHC01026E KEYLEN + KEYOFF exceeds root key length of *nnn*

Explanation

The PSEXIT command is used to show the results of the partition selection exit IHCPSELO.

System action

The job step ends.

User response

Correct the KEYLEN, KEYOFF, or both specifications, and restart the process.

IHC01027E DBD *xxxxx* is already HALDB

Explanation

The PSEXIT command is used with full function databases to test the functionality and distribution of a partition selection exit. The specified DBD is already HALDB.

System action

The job step ends.

User response

None.

IHC01028E No keys specified

Explanation

The partition selection exit, IHCPSELO, requires that key strings be specified. No keys were found.

System action

The job step ends.

User response

Provide keys in the //KEYS DD statement.

IHC01029E Error during initialization of *nnnn*

Explanation

The partition selection exit, *nnnn*, returned an error during its initialization phase.

System action

The job step ends.

User response

If the exit is IHCPSEL0, the reason is located in the messages job log. Otherwise, check with the author of the identified exit to determine the reason for the error.

IHC01030E DBRC not operational

Explanation

DBRC was requested; however, DBRC initialization failed.

System action

Processing stops.

User response

Keep the output listing and contact IBM Software Support.

IHC01031I DBRC subsystem *nnnnn* signon/signoff successful/failed

Explanation

This message is displayed at the start or the end of the DBRC connection. *nnnnn* indicates the specified subsystem name.

System action

None.

User response

If no request to DBRC is required, this message might be appropriate. However, if subsequent errors are displayed, the reason might be an error in DBRC connection.

IHC01032E HALDB master DBD *nnnnn* is not in the RECON

Explanation

The master DBD definition of a HALDB is kept in the RECON. A HALDB DBD named *nnnnn* was requested. The RECON does not have a record for this DBD.

System action

Processing stops.

User response

Correct the DBD name if this is the error. Otherwise, you might be using the wrong RECON.

IHC01033E DBD *nnnnn* is not HALDB

Explanation

The DBD *nnnnn* is expected to be a HALDB DBD. However, this is not the case.

System action

Processing stops.

User response

You might be using the wrong DBDLIB. If not, you must convert the specified DBD to HALDB.

IHC01034E Partition *nnnnn* is not in master DBD *dddd*

Explanation

Partition *nnnnn* was requested. However, *nnnnn* is not defined within its master DBD *dddd*.

System action

Processing stops.

User response

Either the partition name or the DBD name is wrong. You might also be using the wrong RECON.

IHC01035I Partition *pppp* authorized *nnnn*

Explanation

Partition *pppp* has been authorized with DBRC. *nnnn* is the authorization scope. It may be read, read exclusive, update, or exclusive.

System action

The DBRC authorization for the indicated partition has been performed.

User response

None. This message is informational.

IHC01036E Partition *pppp* not authorized, reason is *nn*

Explanation

Partition *pppp* could not be authorized with DBRC. The reason code *nn* can be found in message DFS047I.

System action

Processing stops.

User response

Make the database available by issuing the appropriate IMS commands.

IHC01037I **Partition *pppp* authorization released**

Explanation

Partition *pppp* is no longer authorized for the current function.

System action

None.

User response

None. This message is informational.

IHC01038E **Error during START of ISPF, reason code is *xx***

Explanation

The ISPF application failed during startup. The code can be 20 to 24.

System action

The application terminated.

User response

Apply the appropriate action based on the reason code:

- Reason code 20: A previous error occurred.
Save the trace screen and contact IBM Software Support.
- Reason code 21: A trace screen was displayed.
Save the trace screen and contact IBM Software Support.
- Reason code 22 to 24: An internal error occurred.
Contact IBM Software Support.

IHC01039E **orphaned split data is *nnn***

Explanation

When IMS Online Reorganization Facility scanned the primary database to build a shadow copy of the primary index, it detected that there were data

portions of split root segments that did not have the corresponding segment portions.

System action

The IMS Online Reorganization Facility job continues.

User response

The number of orphaned split data segments should be small. If you receive this message and the number that is displayed as *nnn* is 10 or more, it indicates that the primary database might have a problem. Check the primary database.

IHC01040I **Data set *dsname* not found**

Explanation

Dynamic allocation returned an error when allocating the data set named *dsname*. The data set was not found.

System action

If the data set is essential, the process terminates with error.

User response

The data set name comes from the MDALIB or from the RECON. Correct the data set name in those places and resubmit the job.

IHC01041I **Data set *dsname* in use**

Explanation

Dynamic allocation returned an error when allocating the data set. The data set is allocated in an exclusive state by a different job.

System action

The process terminates.

User response

Wait until the other job releases the data set and resubmit your job.

IHC01042E **Subtask *task id* has terminated abnormally.**

Explanation

The functions of IMS HALDB Toolkit run as subtasks. Some of them might be in parallel. The subtask did not complete normally.

System action

The process is terminated. The final abend code will be U999.

User response

Collect the job output, including the dump, and contact IBM Software Support.

IHC01043E **Abend code is *code***

Explanation

This message follows IHC01042E to display the abend code.

System action

The process terminates.

User response

Collect the job output, including the dump, and contact IBM Software Support.

IHC01044E **Unexpected end of service task *task***

Explanation

The service task *task* terminated unexpectedly.

System action

The process terminates.

User response

Collect the job output, including the dump, and contact IBM Software Support.

IHC01045I **Return code is *nnnn***

Explanation

The command ended with return code *nnnn*.

System action

None.

User response

None. This message is informational.

IHC01046E **Data set *nnnn* is migrated**

Explanation

The data set named *nnnnn* could not be accessed.

System action

Processing stops.

User response

Recall the prior data set and rerun it.

IHC01047E **Partition selection module *nnnnn* not found**

Explanation

The PSEXIT command could not find the specified partition selection exit.

System action

Processing stops.

User response

Provide the library containing the exit in the STEPLIB.

IHC01048I **Partition selection size set to 2048MB**

Explanation

Simulation, conversion, or maintenance of a HALDB was requested, specifying a fixed number of target partitions. However, one of the following conditions occurred:

ANALYZEPART

The size of the partitions would exceed 8 GB.

CONVERT

The size of the partitions would exceed 4 GB.

MAINTAIN

- For a VSAM or OSAM HALDB whose maximum data capacity is 4 GB, the size of the partitions would exceed 4 GB.
- For an OSAM HALDB whose maximum data capacity is 8 GB, the size of the partitions would exceed 8 GB.

System action

The selection of a fixed number of partitions is ignored. Processing continues with partition size set to 2 GB. This increases the number of partitions beyond the requested number.

User response

None. The simulation, conversion, or maintenance is valid. It is not necessary to restart with a different parameter.

IHC01049E **Pointer error detected. Index must be rebuilt.**

Explanation

The index pointer healer detected that an index EPS pointer requires healing. The corresponding ILE (the record in the target partition ILDS) was not found.

System action

Index pointer healer stops.

User response

Rebuild the invalid index or ILDS. If the index is invalid, rebuild it using either recovery or a PSINDEX rebuild tool. If the ILDS is invalid, rebuild it using the ILDS tool.

IHC01050E **DD statement *ddname* not found in JCL**

Explanation

The DD statement named *ddname* is required. It is not present in the JCL.

System action

Processing terminates.

User response

Provide the specified DD statement and resubmit the job.

IHC01051E **HD unload file is from HALDB database**

Explanation

The PSEXIT command is using an unload file which is already from a HALDB.

System action

Processing stops.

User response

Provide an unload file from a full-function database.

IHC01052E **Error from Sort**

Explanation

Standard sort is used. The sort returned with an error.

System action

Processing terminates.

User response

Collect the sort job output, including the dump, and contact IBM Software Support.

IHC01053E **VSAM *func* error DD=*ddname*, RC=*rc*, RPL feedback=*fdbk*.**

Explanation

The indicated VSAM function experienced an error.

System action

Processing terminates.

User response

Collect the VSAM job output, including the dump, and contact IBM Software Support.

IHC01054E **Key table *xxxxx* not in project KSDS**

Explanation

This is a should-not-occur situation.

System action

Processing stops.

User response

Keep the output listing and contact IBM Software Support.

IHC01055E **Errors in control cards.**

Explanation

This message is preceded by other messages that identify errors in control statements.

System action

Processing terminates.

User response

Correct control statement errors and resubmit the job.

IHC01056E Project KSDS is invalid**Explanation**

The project KSDS has been provided through the IHC PROJ DD statement. This data set does not contain the required project information.

System action

Processing stops.

User response

Keep the output listing, and contact IBM Software Support. This JCL has been created by a conversion or maintenance project.

IHC01057E Data set *dsname* ignored**Explanation**

The IDCAMS rebuild process is attempting to retrieve the data set attributes from existing data sets. The specified data set name *dsname* could not be found.

System action

No IDCAMS statements are created for the target file.

User response

You must manually allocate the file that is to be copied.

IHC01058I No pointer to heal in file *ddname***Explanation**

The pointer healer function was requested. The file indicated that its DD name did not have a pointer to heal.

System action

None.

User response

None. This message is informational.

**IHC01059I File *ddname* has *nnn1* pointer.
nnn2 needed healing.****Explanation**

The pointer healer function was requested. The index file *ddname* has *nn1* pointer. However, only *nn2* pointer needed healing.

System action

None.

User response

None. This message is informational.

**IHC01060I Total records in index *xxxxx* are
*nnnn*****Explanation**

The message displays the number of records in index *xxxxx*.

System action

None.

User response

None. This message is informational.

IHC01061I Initial load for DBD *dbd***Explanation**

The specified DBD is loading the database using a PROC OPT=L PSB.

System action

None.

User response

None. This message is informational.

IHC01062I Loading index DBD *dbd***Explanation**

While the primary database is loaded (see 01061I), the secondary index *dbd* is also loaded.

System action

None.

User response

None. This message is informational.

IHC01063I Loading index file *ddname***Explanation**

The PSINDEX file *ddname* is loaded as part of loading the secondary index.

System action

None.

User response

None. This message is informational.

IHC01064I **Number of records in file *ddname* is *nnn***

Explanation

The PSINDEX file *ddname* has been loaded. The number of records in this file is *nnn*.

System action

None.

User response

None. This message is informational.

IHC01065I **Application program *pgm* started/ended**

Explanation

The application program *pgm* is participating in the PROCOPT=L support function. The message shows the start and the end of the program.

System action

None.

User response

None. This message is informational.

IHC01066I **PSB is *psb***

Explanation

The message shows the PSB used by this application.

System action

None.

User response

None. This message is informational.

IHC01067I **Application program return code is *nnnn***

Explanation

The application ended with the specified return code.

System action

None.

User response

None. This message is informational.

IHC01068I **IMS version is *vers***

Explanation

The message shows the IMS version that is currently being used.

System action

None.

User response

None. This message is informational.

IHC01069I **DDname *ddn* is not part of the DBD *dbd***

Explanation

The DD name *ddn* was found in the MDA member, but does not belong to the given DBD.

System action

None required; however, you might want to check the DBD to ensure that all other members belong there.

User response

None. This message is informational.

IHC01070E **DBD *dbd* is OSAM, but file allocated is VSAM**

Explanation

During data set verification, a mismatch was found between the DBD type and the file type.

System action

Processing stops.

User response

Verify that both your MDA library and your DBD library are correct.

IHC01071E **DBD *dbd* is VSAM, but file allocated as OSAM**

Explanation

During data set verification, a mismatch was found between the DBD type and the file type.

System action

Processing stops.

User response

Verify that both your MDA library and your DBD library are correct.

IHC01072E **File *ddn* is OSAM/KSDS/ESDS but should be OSAM/KSDS/ESDS**

Explanation

The DD name *ddn* has an invalid file type.

System action

Processing stops.

User response

Assign the correct data set to the file indicated by *ddn*.

IHC01073I **IMS region controller started or ended**

Explanation

This message is issued to indicate the start or the end of an IMS Batch region.

System action

None.

User response

None. This message is informational.

IHC01074I **Sorting index file *ddn***

Explanation

This part of the initial load support function. The PSINDEX file *ddn* is now being sorted and created.

System action

None.

User response

None. This message is informational.

IHC01075E **Database record key out of range**

Explanation

The current function unloads a DBD participating in a user-partitioning conversion, when multiple identical DBDs are converted to one HALDB. The high-level qualifier key of each DBD has been specified. The unload function of this DBD now detects that a key is not within its boundaries.

System action

Processing stops.

User response

Begin the boundary selection process again. The initial boundary selection might be incorrect.

IHC01076I **Key: *kkkkkkkkkkkkkkkkkk***

Explanation

This message is related to IHC01075E. It shows the key in process.

System action

Processing stops.

User response

Begin the boundary selection process again. The initial boundary selection might be incorrect.

IHC01077I **Low key: *kkkkkkkkkkkkkkkkkk***

Explanation

This message is related to IHC01075E. It shows the lowest key that this DBD is allowed to accept.

System action

Processing stops.

User response

Begin the boundary selection process again. The initial boundary selection might be incorrect.

IHC01078I **High key: *kkkkkkkkkkkkkkkkkk***

Explanation

This message is related to IHC01075E. It shows the highest key that this DBD is allowed to accept.

System action

Processing stops.

User response

Begin the boundary selection process again. The initial boundary selection might be incorrect.

IHC01079I **HSSR region controller started or ended.**

Explanation

This message is issued during the unload phase. HSSR is used to assist the unload function.

System action

None.

User response

None. This message is informational.

IHC01080I **Start of *ddname* listing.**

Explanation

The specified file is being listed. The possible DD names are DFSVSAMP and DFSHALDB.

System action

None.

User response

None. This message is informational.

IHC01081I **End of *ddname* listing**

Explanation

This message indicates that the listing of the specified file has ended.

System action

None.

User response

None. This message is informational.

IHC01082I **Unloading DBD *dbd***

Explanation

The database *dbd* is currently being unloaded.

System action

None.

User response

None. This message is informational.

IHC01083I **Loading DBD *dbd***

Explanation

The database *dbd* is currently being loaded.

System action

None.

User response

None. This message is informational.

IHC01084I ***nnnn* database records read
[FINAL]**

Explanation

This is a progress message that is issued every 250,000 database records (root segments). The indication of FINAL shows the total amount of database records.

System action

None.

User response

None. This message is informational.

IHC01085E **Error in partition part *part*, data
set *ddn***

Explanation

This message is accompanied by 01086E or 01087E.

System action

Processing stops.

User response

Keep the output listing, and contact IBM Software Support.

IHC01086E **Expected partition *part*, found *part***

Explanation

The partitioning scheme is out-of-order.

System action

Processing stops.

User response

Keep the output listing, and contact IBM Software Support.

IHC01087E **Status code *cc* received**

Explanation

The status code *cc* was received as a response from an IMS call.

System action

Processing stops.

User response

The status code may indicate an unavailable database. If this is the case, make the database available and rerun. In all other cases, keep the output listing and contact IBM Software Support.

IHC01088E **Utility terminates with error**

Explanation

An error condition has occurred. Previous messages have been issued to explain the error.

System action

Processing stops.

User response

Proceed as instructed in previous messages that were issued to explain the error.

IHC01089I **Analyzing DBD *dbdname***

Explanation

The specified DBD is analyzed.

System action

None.

User response

None. This message is informational.

IHC01090E **Last partition is already empty**

Explanation

The last partition does not contain any data.

System action

The request to add an empty partition is discarded.

User response

None.

IHC01091E **MDA *dbdname* DDname *ddname*
not found**

Explanation

The MDA member *dbdname* does not have the specified DD defined.

System action

The process terminates.

User response

Correct the specified MDA member and resubmit the job.

IHC01092I **DBDGEN complete for DBD
*dbdname***

Explanation

The specified DBD has been compiled and linked.

System action

None.

User response

None. This message is informational.

IHC01093E **DDname *ddname* not found**

Explanation

The specified DD statement was not found in the JCL.

System action

The process terminates.

User response

Add the specified DD statement and resubmit the job.

IHC01094E **DBD *dbdname* has external logical relationship.**

Explanation

The specified DBD has a logical relationship to a different DBD. This type of relationship is not supported by IMS Online Reorganization Facility therefore, the specified DBD cannot be reorganized with IMS Online Reorganization Facility.

System action

Processing terminates.

User response

None.

IHC01095E **DBD *dbdname* has HALDB OLR active.**

Explanation

IMS OLR is currently reorganizing this partition. IMS Online Reorganization Facility cannot run with OLR active. This situation can also occur when OLR is paused. The indication is that both the A-J and M-V data sets are active.

System action

Processing terminates.

User response

Reorganize a different partition or wait until OLR completes to resubmit your job.

IHC01096E **DBD *dbdname* is HALDB with logical relationship**

Explanation

The specified DBD is a HALDB and also has a logical relationship. IMS Online Reorganization Facility can process a HALDB with a logical relationship only if all partitions are processed in the IMS Online Reorganization Facility job.

System action

Processing terminates.

User response

To process all partitions in one IMS Online Reorganization Facility job, specify the PARTITION(*) keyword and resubmit the job.

IHC01097E **DBD *dbdname* is not registered.**

Explanation

The specified DBD is not in DBRC. IMS Online Reorganization Facility requires that the DBDs must be registered. This requirement also applies to the index DBDs.

System action

Processing terminates.

User response

Register this DBD and all its index DBDs and resubmit the job.

IHC01098E **DBD *dbdname* has conflicting DBRC definitions.**

Explanation

The specified DBD does not match its DBRC definition.

System action

Processing terminates.

User response

Compare your DBD to a LIST.RECON of that DBD. Correct the errors and resubmit the job.

IHC01099E **DBD *dbdname* has *dbrc status*.**

Explanation

The specified DBD has a DBRC status that does not allow the processing of this DBD.

System action

Processing terminates.

User response

Correct the DBRC exception and resubmit the job.

IHC01100I *process started in sub address space*

Explanation

The specified process started in a dependent address space.

System action

None.

User response

None. This message is informational.

IHC01101I *process ended in sub address space, return code code*

Explanation

The specified process ended in a dependent address space.

System action

None.

User response

None. This message is informational.

IHC01102E *Sub address space terminated abnormally*

Explanation

The dependent address space did not end normally.

System action

The primary address space terminates. The messages will be displayed in the message file.

User response

This message is accompanied by another message that indicates the cause of the error. If you cannot resolve the problem, contact IBM Software Support.

IHC01103E *DBD dbdname does not have DBDS ddname in DBRC*

Explanation

The specified DBD does not have the DBDS record defined in DBRC. The DBD definition in DBRC is incomplete.

System action

The process terminates.

User response

Add the specified DBDS to the RECON. Use the INIT.DBDS function of the DBRC utility.

IHC01104E *Dynamic allocation failed, DSN dsname*

Explanation

The data set that is indicated by dsname is probably a database data set. The data set name was obtained from the RECON. Additional messages explain the reason for the allocation failure.

System action

Processing terminates.

User response

Correct the reason for the allocation failure and resubmit the job.

IHC01105E *DSN dsname is too long.*

Explanation

The length of the specified database data set name exceeds the maximum allowable length. Database data set names are appended with ".S", which means that database data set names can be a maximum of 42 characters.

System action

Processing terminates.

User response

The data set names must be shortened. If they cannot be shortened, the specified DBD cannot be processed by IMS Online Reorganization Facility.

IHC01106I *Allocating the shadow files.*

Explanation

The shadow files are being defined and allocated. This message precedes the IDCAMS list from the allocation.

System action

None.

User response

None. This message is informational.

IHC01107E **Online subsystem *imsid* not available.**

Explanation

The RECON subsystem records show this subsystem as an online IMS subsystem. However, IMS Online Reorganization Facility is not active in this subsystem.

System action

Processing terminates.

User response

Add the IMS Online Reorganization Facility load library to the online system STEPLIB. Verify that IMS Online Reorganization Facility has been properly set up.

IHC01108I **AOI interface connected to *imsid*.**

Explanation

The IMS Online Reorganization Facility job established operator command capability with the IMS subsystem that is named in the message.

System action

None.

User response

None. This message is informational.

IHC01109I **No online subsystem active.**

Explanation

No online IMS subsystem was active at this time.

System action

The process continues.

User response

None. This message is informational.

IHC01110E **HIDAM root segment has compressed key.**

Explanation

The root segment of a HIDAM or PHIDAM database is compressed. The compression is not only DATA, but

also KEY. IMS Online Reorganization Facility does not allow compressed root keys for HIDAM databases.

System action

Processing terminates.

User response

The database must not have key compression. Remove the key compression by using the offline utilities and perform a DBD change between unload and reload.

IHC01111E **Software for *product* not available.**

Explanation

The named product is required for IMS Online Reorganization Facility to do the reorganization.

System action

Processing terminates.

User response

Add the program library for the specified product to the STEPLIB. Make sure that the library is APF authorized.

IHC01112I **Reloading DD *ddname* DSN *dsname***

Explanation

The target data sets that are identified in this message will be used to load the database.

System action

None.

User response

None. This message is informational.

IHC01113E **OPEN failed for DDname *ddname*.**

Explanation

The OPEN operation failed for the DD name indicated by *ddname*.

System action

Processing terminates.

User response

Collect the output and contact IBM Software Support.

IHC01114I **Secondary index build started or ended.**

Explanation

This message indicates that a secondary index build process has either started or has ended.

System action

None.

User response

None. This message is informational.

IHC01115I **DDname *ddname* found in JCL. It is deallocated.**

Explanation

The specified DD statement is allocated internally.

System action

None.

User response

Remove the DD statement from the JCL and resubmit the job.

IHC01116I **Shared index written with index DBD *dbdname*.**

Explanation

The shared secondary index will be assigned to the first DBD.

System action

None.

User response

None. This message is informational.

IHC01117I **Pre Reorganization Utility started or ended**

Explanation

This message indicates that the prereorganization utility has either started or has ended.

System action

None.

User response

None. This message is informational.

IHC01118I **Prefix Resolution started or ended.**

Explanation

This message indicates that the prefix resolution has either started or has ended.

System action

None.

User response

None. This message is informational.

IHC01119I **Prefix Update started or ended.**

Explanation

This message indicates that the prefix update has either started or has ended.

System action

None.

User response

None. This message is informational.

IHC01120E **Primary DBD *dbdname* is NONRECOV.**

Explanation

The primary DBD is defined as NONRECOV in DBRC. This is not permitted.

System action

Processing terminates.

User response

Change the DBD to RECOV in DBRC and resubmit the job.

IHC01121E **DBD *dbdname* is not supported for this function.**

Explanation

The specified DBD has an unsupported DBD type. HSAM, DEDB, or Index DBDs are not supported.

System action

Processing terminates.

User response

The specified DBD cannot be reorganized with this tool

IHC01122I **IC *ddname* specified but ignored. DBD is NONRECOV.**

Explanation

The specified database DDNAME was specified to be image copied. However, the DBD is defined as NONRECOV. Therefore, an image copy is unnecessary.

System action

None.

User response

If you need an image copy, run the offline utility.

IHC01123E **IC *ddname* is not a valid DDname.**

Explanation

The ICDDN keyword specifies a database DD statement. Neither the Primary DBD nor its index DBDs contain this DD.

System action

Processing terminates.

User response

Correct the ICDDN keyword and resubmit the job.

IHC01124E **IC *ddname* DDname *icddn* specified, but not in JCL.**

Explanation

The ICDDN keyword specifies an image copy DD *icddn* for the database DD *ddname*. The *icddn* was not found in the JCL.

System action

Processing terminates.

User response

Provide a DD statement for the image copy and resubmit the job.

IHC01125E **Duplicate DDname *ddname* in ICDDN keyword.**

Explanation

The ICDDN keyword is used to describe the image copies. The specified DDNAME is used more than once.

System action

Processing terminates.

User response

Provide a unique DD statement for each image copy and resubmit the job.

IHC01126E **Inconsistent shared index *dbdname* DBD. Reason *rsn*.**

Explanation

Shared secondary indexes are being used. They must point to the same primary DBD to be supported by IMS Online Reorganization Facility. Additionally, all shared secondary indexes must have the same DBDS in DBRC.

System action

Processing terminates.

User response

IMS Online Reorganization Facility does not support shared secondary indexes that point to different primary DBDs.

IHC01127E **No IC1 found for *ddname*.**

Explanation

The ICDDN keyword for the database DD *ddname* does not have a primary image copy specified.

System action

Processing terminates.

User response

You cannot specify a secondary IC without a primary IC. Change the ICDDN keyword and resubmit the job.

IHC01128E **IC *ddname* DSN for *icddn* too long.**

Explanation

Dynamic allocation for image copy data sets is being used. The generated *ddname* is too long.

System action

Processing terminates.

User response

Create a shorter IC data set name and resubmit the job.

IHC01129E IC DDname *ddname* is for database.

Explanation

The ICDDN keyword specified a database as target for image copy.

System action

Processing terminates.

User response

Provide a unique file for the image copy and resubmit the job.

IHC01130E DSname for *ddname* is the same as for *ddname*

Explanation

The image copy data sets that are identified by the ICDDN keyword have different DD statements, but have the same data set name.

System action

Processing terminates.

User response

Provide different data sets for the image copies and resubmit the job.

IHC01131E dsname for *icddn* is the same as for database *ddname*.

Explanation

The data set name that was used for an image copy is a database data set name.

System action

Processing terminates.

User response

Provide a different data set name for the image copy and resubmit the job.

IHC01132E GDG *gdgbase* not defined.

Explanation

GDG was specified as a data set name for image copy. However, the GDG base does not exist.

System action

Processing terminates.

User response

Create the GDG base and resubmit the job.

IHC01133E Index DBD *dbdname* for primary DBD *dbdname* in error.

Explanation

The index DBD that is indicated by *dbdname* for the primary DBD that is indicated by *dbdname* is in error.

System action

Processing terminates.

User response

Collect the output, the specified DBD source, and contact IBM Software Support.

IHC01134E NEWDBD DD not in JCL.

Explanation

The NEWDBD keyword was specified in the control statements. The specified DD statement has not been provided.

System action

Processing terminates.

User response

Provide the DD statement that specifies the library that contains the changed DBDs and resubmit the job.

IHC01135E No DBD specified.

Explanation

No DBD keyword was specified in the control statements.

System action

Processing terminates.

User response

Provide a DBD and resubmit the job.

IHC01136E Multiple REORG commands specified

Explanation

More than one REORG command was found in IHCSYSIN.

System action

Processing terminates.

User response

Run each REORG as separate job step.

**IHC01137E DBD *dbdname* compare error.
Reason is: *rsn***

Explanation

The NEWDBD keyword was specified in the control statement. The old and new DBD are compared. The new DBD contains changes that are not supported. The reason text provides an explanation.

System action

Processing terminates.

User response

The changes that can be made to the DBD are restricted when IMS Online Reorganization Facility is used. Use offline utilities for this reorganization.

IHC01138E Primary DBD *dbdname* is not in NEWDBD.

Explanation

The NEWDBD keyword was specified in the control statements. However, the library does not have the primary DBD in it.

System action

Processing terminates.

User response

If you intended to make a DBD change, move your changed DBD to the file that is identified by the NEWDBD keyword.

IHC01139E Post reorganization processing failed in *phase*:

Explanation

The takeover process failed.

System action

Processing terminates.

User response

Use the RESTART parameter to restart the takeover process. The database is still in prohibit authorization status. Do not change the prohibit authorization status. The takeover phase must complete. The takeover process will restart where the last operation stopped.

IHC01140I Attempting to restart in phase *phase*

Explanation

This informational message is issued at the point that the RESTART function continues the takeover process.

System action

None.

User response

None. This message is informational.

IHC01141I Last phase completed was *phase*.

Explanation

This message is issued during restart. The last phase completed is indicated by *phase*.

System action

None.

User response

None. This message is informational.

IHC01142E Neither data set *dsname* or *dsname* was found.

Explanation

During the takeover phase, the data sets are to be renamed. In this case, none of the data sets were found.

System action

The process terminates.

User response

This error typically occurs during a RESTART process. Because a database data set has been deleted, the database must be recovered.

IHC01143E **Index *dbdname* not in NEWDBD library**

Explanation

A secondary index has been changed, but the new DBD has not been provided.

System action

The process terminates.

User response

Correct the changed DBD and resubmit the job.

IHC01144E **New primary DBD has external logical relationships.**

Explanation

The NEWDBD keyword has been specified. The new DBD added external logical relationships which are not supported.

System action

Processing terminates.

User response

Use offline utilities for this process.

IHC01145I **NEWDBD library now in effect.**

Explanation

This message is issued after unload has completed.

System action

None.

User response

None. This message is informational.

IHC01146I **Prior job *jobname* at time for DBD *dbdname* in phase *phase***

Explanation

This message indicates a pending restart. A previous job ran at the specified time for the specified DBD and stopped at the specified phase.

System action

None.

User response

None. This message is informational.

IHC01147I **(*param*) specified for this execution.**

Explanation

The RESTART function is used.

System action

None.

User response

None. This message is informational.

IHC01148I **DBD *dbdname* has non-unique segments**

Explanation

The DBD has segment types that do not have a sequence field or that have a non-unique sequence field.

System action

None.

User response

None. This message is informational.

IHC01149E **IMSACB DD required with NEWDBD and ONLINECHANGE(Y).**

Explanation

The new DBD will be propagated to the online system, which requires the staging library ACBLIB.

System action

Processing terminates.

User response

Add the ACBLIB DD to the JCL and resubmit the job.

IHC01150E Invalid *attrib* for ddname DD

Explanation

The attributes for a KSDS are invalid.

System action

The process terminates.

User response

Correct the attributes for the shadow data sets and resubmit the job.

IHC01151I Temporary RECON created or deleted.

Explanation

A HALDB partition was specified. A temporary RECON was created to define the partitions and the shadow data set names. This RECON is used for the reorganization process.

System action

None.

User response

None. This message is informational.

IHC01152E NEWDBD specified with HALDB database.

Explanation

IMS Online Reorganization Facility does not support DBD changes for HALDB databases.

System action

Processing terminates.

User response

Use an offline utility and reorganize all partitions.

IHC01153E *ddname* DD cannot be a temporary data set.

Explanation

A temporary data set was specified for the indicated DD.

System action

Processing terminates.

User response

Specify a permanent data set and resubmit the job.

IHC01154E Unable to load module *modname*.

Explanation

The specified module *modname* was not found.

System action

Processing terminates.

User response

Make the user exit available in the JCL and resubmit the job.

IHC01155I Rebuilding primary index.

Explanation

A HIDAM or PHIDAM database is being used. The primary index is created in the shadow data set.

System action

None.

User response

None. This message is informational.

IHC01156E Error creating interim LOG

Explanation

IMS Online Reorganization Facility was unable to allocate a data set for use as a batch log during the apply process. The allocation parameters of this interim data set are based on the IEFORDER DD statement in the JCL.

System action

The IMS Online Reorganization Facility job terminates.

User response

Review the preceding messages to determine why the allocation failed. Resolve the allocation problems and resubmit job.

IHC01157E **Shadow data set for *ddname* too small**

Explanation

The space allocation for the specified predefined shadow data set was insufficient.

System action

The process terminates.

User response

Increase the size of the specified data set and resubmit the job.

IHC01158E **Partition keyword required for HALDB**

Explanation

A HALDB was specified; however, no partition was specified. You must specify the partition that you want reorganized.

System action

The process terminates.

User response

Specify a partition with the PARTITION IHCSYSIN DD statement keyword and resubmit the job.

IHC01159E **Invalid component DSN *dsname***

Explanation

The specified *dsname* is a component name of a VSAM cluster. The *dsname* is too long to use to create shadow data sets.

System action

The process terminates.

User response

Shorten the data set name and resubmit the job.

IHC01160E **Primary DSN *dsname* and shadow have different attributes**

Explanation

Preallocated shadow data sets were used. The data set attributes of the shadow data sets must match the original data sets. The specified data set attributes and the attributes of the shadow data sets do not match.

System action

The process terminates.

User response

Provide the correct attributes. If this data set is an index data set, you probably specified the wrong keylen, key offset, or record length and resubmit the job.

IHC01161E **HALDB partition *name* is on M-V data sets**

Explanation

The partition that is identified by *name* is currently on the M-V data sets. IMS Online Reorganization Facility was unable to create a copy of the data sets on the shadow file.

System action

IMS Online Reorganization Facility processing terminates.

User response

Use an offline reorganization or another IMS Online Reorganization to switch the active data sets, to make them the A-J data sets, and resubmit the job.

IHC01162E **Invalid subparameter for PTRCHECK keyword**

Explanation

The PTRCHECK keyword has a Y or N in the first position and up to four additional parameters. The specified parameters are invalid.

System action

The process terminates.

User response

Provide valid parameters for the PTRCHECK keyword and resubmit the job.

IHC01163E **DD *ddname* block size is not size defined in RECON**

Explanation

The actual block size of the indicated OSAM data set is not the same as the block size that is defined in the RECON data sets.

System action

Processing terminates.

User response

Correct the block size in the RECON data sets and rerun the job.

IHC01164E **Dynamic allocation failed, DD *ddname***

Explanation

IMS Online Reorganization Facility was unable to dynamically allocate a required DD. Messages that are issued prior to this one explain the reason for the allocation failure.

System action

Processing terminates.

User response

Correct the reason for the allocation failure and resubmit the IMS Online Reorganization Facility job.

IHC01165E **Invalid PARTITION specified**

Explanation

A name was entered in the PARTITION keyword, but the partition name is not part of the master DBD.

System action

Processing terminates.

User response

Correct the partition name and resubmit the IMS Online Reorganization Facility job.

IHC01166I **DBD *dbdname* has internal logical relationship**

Explanation

This is an informational message that informs you that the *dbdname* that you specified contains at least one internal logical relationship.

System action

Processing continues. IMS Online Reorganization Facility performs any prefix resolution and update processing that is required for the process that is being performed.

User response

None. This message is informational.

IHC01169E **More than 255 RAPS**

Explanation

More than 255 RAPS have been specified for a partition, which exceeds the limit in IMS.

System action

The process terminates.

User response

Specify a smaller amount of RAPS.

IHC01170E **Byte limit too large**

Explanation

The byte limit exceeded the maximum size, which is 16 MB.

System action

The process terminates.

User response

Specify a smaller byte limit.

IHC01171E **DBD *dbdname* has logical relationship**

Explanation

The purpose of the current function is to convert an entire DBDLIB. However, this function does not allow for logically related DBDs.

System action

The DBD is excluded from this process.

User response

Use a different method to process this DBD.

IHC01172I **DBD *dbdname* was excluded, reason is: *reason***

Explanation

The current function is to convert an entire DBDLIB. The specified DBD will be excluded from this function due to one or more of the following reasons:

- DBD construct error
- DBD is not supported
- DBD is HALDB
- DBD has logical relation
- Primary index is missing
- Secondary index is missing
- Primary database is missing
- MDA library member missing
- MDA DDname not in member
- Data set not cataloged
- Index DBD in error

System action

The DBD is excluded from the conversion.

User response

Make the changes that are indicated by the reason and resubmit the job. Alternately, you can run the conversion as is, and work on those DBDs that failed at a later time.

IHC01173I **DBD *dbdname* is an index**

Explanation

The specified DBD is a PSINDEX or a secondary index. The selected function does not allow for an index DBD.

System action

The process terminates.

User response

Specify a primary DBD.

IHC01174E **Orphaned split segment found**

Explanation

When scanning the primary database to build a shadow copy of the primary index, IMS Online Reorganization Facility detected that there was a root that had been split, and the pointer to the data portion was invalid.

System action

Processing terminates.

User response

When this message is issued, it likely indicates that there is a pointer error in the original database data set. Run IMS High Performance Pointer Checker or an equivalent tool against the original database to determine the pointer errors. Resolve the pointer errors and resubmit the IMS Online Reorganization Facility job.

IHC01175E **All partitions required for
NONRECOV DBD**

Explanation

A nonrecoverable HALDB was specified in the DBD keyword. The command that was specified requires that IMS Online Reorganization Facility change the database to be recoverable during the IMS Online Reorganization Facility processing. IMS Online Reorganization Facility can be run only at the master DBD level for a HALDB, so all partitions must be included in the IMS Online Reorganization Facility processing.

System action

Processing terminates.

User response

Either remove the PARTITION keyword from the command so that all partitions are processed, or manually change the DBD to recoverable and resubmit the IMS Online Reorganization Facility job.

IHC01176E **Data set found empty**

Explanation

This message is preceded by IHC01085, which identifies the primary database DDname and DSname. One record containing the partition ID and the reorg number should be found.

System action

The process terminates.

User response

Verify the load process of that partition. Run the partition initialization, and reload for that partition.

IHC01177E **Shadow data set *dsname* defined as NOREUSE but data set is not empty**

Explanation

The specified data set must be empty.

System action

The process terminates.

User response

Either specify the data set as REUSE or DELETE/DEFINE it prior to this process.

IHC01178E **Dynamic allocation limit reached. Specify larger DYNAMNBR.**

Explanation

The maximum dynamic allocation limit has been reached.

System action

The process terminates.

User response

Specify the DYNAMNBR parameter on your EXEC statement. A value of DYNAMNBR=999 typically resolves this problem.

IHC01179E **VIO has been allocated to *ddname***

Explanation

The current process does not support VIO data sets.

System action

The process terminates.

User response

Specify a unit name that is not VIO. Use the IHCEUNIT member in SIHCSAMP file to locate other unit names that are non-VIO.

IHC01180E **Sort work *ddname* has not enough disk space**

Explanation

ddname cannot allocate enough sort work space. The system might be low on work space.

System action

The job fails.

User response

Override the DD with sufficient disk space so that the system can allocate enough sort work space for the DD.

IHC01181W **ORF must take IC for ONLINE(Y) work. ICOFF(N) set.**

Explanation

ICOFF(N) must be set to process an online database. IMS HALDB Toolkit changed the ICOFF keyword to ICOFF(N).

System action

ICOFF(N) is set and processing continues.

User response

None.

IHC01183E **All partitions required for NOOSAM8G(Y)**

Explanation

IMS HALDB Toolkit found the NOOSAM8G(Y) parameter on the **MAINTAIN** command but no PARTITION(*) parameter. You must specify PARTITION(*) when you specify the NOOSAM8G(Y) parameter.

System action

The process terminates.

User response

Either remove the NOOSAM8G(Y) parameter from the command or specify PARTITION(*).

IHC01184E **NOOSAM8G(Y) cannot be specified for a database registered as NOOSAM8G in RECON**

Explanation

The NOOSAM8G(Y) parameter cannot be specified for a database that is registered as NOOSAM8G in the RECON data sets.

System action

The process terminates.

User response

Remove the NOOSAM8G(Y) parameter from the command.

IHC01185E **PARTSIZE must be less than 4096 for a database registered as NOOSAM8G in RECON**

Explanation

The PARTSIZE value must be less than 4096 for a database that is registered as NOOSAM8G in the RECON data sets.

System action

The process terminates.

User response

Specify a value that is less than 4096 for PARTSIZE.

IHC01186E **PARTSIZE must be less than 4096 when you specify NOOSAM8G(Y)**

Explanation

The PARTSIZE value must be less than 4096 when you specify NOOSAM8G(Y).

System action

The process terminates.

User response

Either remove the NOOSAM8G(Y) parameter or specify a value that is less than 4096 for PARTSIZE.

IHC01188E **DBRCOUT for a non-HALDB requires DSNPREF**

Explanation

The database that is identified from the DBD parameter is a non-HALDB. When a non-HALDB is provided as the input for ANALYZEPART and the DBRCOUT parameter is specified, the DSNPREF parameter must also be specified.

System action

The process terminates.

User response

Specify the DSNPREF parameter and resubmit the job.

IHC01189E **ddname is not APF authorized**

Explanation

One or more libraries in the *ddname* concatenation are not APF authorized.

System action

The process terminates.

User response

APF authorize all the libraries that are concatenated to the *ddname* and rerun the job.

IHC01190I **DSN: dsname has Extended Addressability attribute**

Explanation

The database data sets of the primary database, from which the ILDS data sets are created, have the Extended Addressability attribute.

System action

Processing continues.

User response

None. This message is informational.

IHC01191I **DATACLSL parameter specification is used for ILDS DATACLAS**

Explanation

The DATACLSL parameter specification is used for the data class of the ILDS data sets.

System action

Processing continues.

User response

None. This message is informational.

IHC01192E **Specify DATACLSL parameter for ILDS DATACLAS**

Explanation

The database data sets of the primary database, from which the ILDS data sets are created, have the Extended Addressability attribute, but the DATACLSL parameter is not specified. You must specify a data class without the Extended Addressability attribute for the ILDS data sets.

System action

Processing stops.

User response

Specify the DATACLSL parameter and rerun the job.

IHC01193E Both OSAM sequential data sets and OSAM LDSs are used as input DBDS

Explanation

The MAINTAIN function does not support the mixed use of OSAM sequential data sets and VSAM linear data sets (OSAM LDSs) as input DBDS.

System action

Processing stops.

User response

Even when both OSAM physical sequential data sets and VSAM linear data sets (OSAM LDSs) are used in HALDB, you can run the MAINTAIN function if the PARTITION or PARTLIST parameter of the MAINTAIN function specifies either OSAM physical sequential data sets or VSAM linear data sets (OSAM LDSs), not both, as DBDS of the target partition. Rerun the job as necessary.

IHC01200E FROMDBD *ddname1* TODBD *dbdname2* compare failed: *reason*

Explanation

The merge process detected one or more errors. Potential reasons include:

- DBD names are identical
- Segment structure is different
- Segment definition is different
- DBD type is different
- DBD has secondary index
- DBD has logical relation
- DBD has different partition selection exits
- IHCPSEL0 is defined different

System action

The process terminates.

User response

None. Merging these two HALDBs is not possible.

IHC01201E DBD *ddname* is PSINDEX

Explanation

The specified DBD is an index DBD.

System action

The process terminates.

User response

A PSINDEX DBD cannot be specified for merging.

IHC01202E PGM *name* not found

Explanation

The specified program was not found.

System action

The process terminates.

User response

Correct the program name and resubmit the job.

IHC01203E PSB *name* not found

Explanation

The specified PSB was not found.

System action

The process terminates.

User response

Correct the PSB name and resubmit the job.

IHC01204E PSB not found or valid

Explanation

The specified PCB is not in the PSB or does not have PROCOPT=L.

System action

The process terminates.

User response

Correct the PSB/PCB parameter and resubmit the job.

IHC01205E DFSRESLB DD is required to MAINTAIN PSINDEX.

Explanation

When the MAINTAIN function processes PSINDEXes, the function uses DFSURGL0 (HD Reorganization Reload utility) in the DFSRESLB DD to reload databases. Because the DFSRESLB DD statement is not coded in the JCL, IMS HALDB Toolkit attempted to dynamically allocate the DFSRESLB DD statement using the IMS RESLIB library. However, the IMS RESLIB library containing IMS SVC modules was not found in the STEPLIB concatenation so IMS HALDB Toolkit did not allocate the DFSRESLB DD statement.

System action

Processing terminates.

User response

Specify the IMS RESLIB library containing IMS SVC modules to the STEPLIB DD statement or the DFSRESLB DD statement and rerun the job.

IHC01206I **A GDG base entry is being created.**
NAME: *GDG_base*, LIMIT: *nnn*

Explanation

The IDCAMS utility is creating a GDG base entry. *GDG_base* shows the name of the GDG base entry data set, and *nnn* shows the maximum number of data sets that can be associated with the GDG.

System action

None.

User response

None. This message is informational.

IHC01207I **DBD is a HALDB. DBDSRONLY(Y)**
is ignored.

Explanation

DBDSRONLY(Y) is specified. However, IMS HALDB Toolkit ignored this parameter because the DBD is for a HALDB.

System action

None.

User response

None. This message is informational.

IHC01208I **DBDSRONLY(Y) is specified.**

Explanation

DBDSRONLY(Y) is specified. Because the DBD is for a non-HALDB, the parameter is effective and IMS HALDB Toolkit generates DBD source without simulating HALDB conversion.

System action

None.

User response

None. This message is informational.

IHC01209I **Parameters not related to DBD**
source generation are ignored.

Explanation

Because DBDSRONLY(Y) and DBDSOURCE parameters are specified, IMS HALDB Toolkit generates DBD source without simulating HALDB conversion. IMS HALDB Toolkit ignores all the parameters that are not related to DBD source generation. This message is issued even when such parameters are not specified.

System action

None.

User response

None. This message is informational.

IHC01210E **DBDSOURCE is not specified.**

Explanation

DBDSRONLY(Y) parameter is specified without the DBDSOURCE parameter. DBDSRONLY parameter must be used with the DBDSOURCE parameter.

System action

Processing stops.

User response

Specify the DBDSOURCE parameter and rerun the job.

IHC01211I **DBD is a HALDB. DBDSOURCE is**
ignored.

Explanation

DBDSOURCE parameter is specified. However, IMS HALDB Toolkit ignored this parameter because the DBD is for a HALDB.

System action

None.

User response

None. This message is informational.

IHC01212I **Any DFSMDA members can be deleted for the old database**

Explanation

The conversion process is complete. If you are certain that you will not need to revert the database to its non-HALDB state, you can delete any DFSMDA members for the old database. This message is also issued when the *original_dbds* DD is specified in CONVERT function JCL.

System action

None.

User response

None. This message is informational.

IHC01213E **A PDS or PDSE data set without a member name is specified in the *dbrcout* DD statement.**

Explanation

A PDS or PDSE data set without a member name is specified in the *dbrcout* DD statement.

You can specify SYSOUT=*, a sequential file, or a partitioned data set (PDS) or a partitioned data set extended (PDSE) with a member name in the *dbrcout* DD.

System action

Processing terminates.

User response

Correct the error and rerun the job.

IHC01301W **Dynamic allocation failed, SVC 99 reason code 'xxxx'**

Explanation

IMS Online Reorganization Facility was unable to dynamically allocate a data set. You can find information about the SVC 99 reason codes in the *z/OS MVS Authorized Assembler Services Guide*.

System action

If the data set is a required data set, then processing terminates. Otherwise, processing continues.

User response

Correct the reason for the allocation failure and resubmit the IMS Online Reorganization Facility job.

IHC01311I **Dataset information for dynalloc - UNIT NAME: xxxxxxxx CYL: yyyy**

Explanation

Dynamic allocation failed. xxxxxxxx is the unit name and yyyy is the number of cylinders specified in the SVC 99 parameter list.

System action

None.

User response

When the reason code 0238 is indicated in message IHC01301W immediately before this message, specify a value larger than yyyy to the UNLSPAC parameter and rerun the job. If not, no action is required.

IHC01500W **Online Reorg Facility [initialization for *imsid* | logger exit initialization] failed, RC=xxxx**

Explanation

During IMS control region startup, IMS Online Reorganization Facility was not initialized in the IMS subsystem, *imsid*.

System action

IMS startup continues but IMS Online Reorganization Facility will be active for the IMS subsystem, *imsid*, only when it is restarted.

User response

Review the previous error messages and try to correct the problem. If you are unable to correct the problem, contact IBM Software Support.

The following table lists the IHC01500W return codes and their meanings.

Table 41. Message IHC01500W return codes and their meanings

Return code	Meaning
2	Unable to locate SCD. Contact IBM Software Support.

Table 41. Message IHC01500W return codes and their meanings (continued)

Return code	Meaning
3	Unable to locate IMS Online Reorganization Facility anchor. Logger exit initialization failed.
4	IEANTRT call failed. The error was returned from IEANTRT.
5	BLDL failed for the required module. Unable to load IMS Online Reorganization Facility module into ECSA. Verify that the complete IMS Online Reorganization Facility library is in the STEPLIB.
6	LOAD failed for required module. Verify that the complete IMS Online Reorganization Facility library is in the STEPLIB.
7	Unable to obtain ECSA.
8	Unsupported IMS release.
9	Logger exit initialization failed.
17	Unable to load the HRFYOFxx module or the HRFYOFxx module is not reentrant. Ensure that the IMS Online Reorganization Facility library is in the STEPLIB.

IHC01500I Online Reorg Facility initialization completed for *imsid*

Explanation

During IMS control region startup, IMS Online Reorganization Facility was initialized successfully in the IMS subsystem, *imsid*.

System action

IMS startup continues.

User response

None. This message is informational.

IHC01501W DEBUG setup failed: *reason*, RC=xxxx

Explanation

IMS Online Reorganization Facility was unable to start up additional debugging options. The *reason* specified explains why setup failed.

System action

Processing continues with DEBUG off.

User response

Report the reason and RC to IBM Software Support.

IHC01502I Online Reorg Facility DEBUG status

Explanation

This informational message indicates that the DEBUG services have been activated or stopped.

System action

None.

User response

None. This message is informational.

IHC01503I *action* XCF group *groupname* as member *membername*

Explanation

This informational message indicates that the job has either joined or left an XCF group.

System action

None.

User response

Verify that *groupname* is the same group name as other address spaces to be able to communicate with them.

IHC01504E Target IMS system *imsid* is not active on this host

Explanation

An IMS Online Reorganization Facility maintenance utility was run on an MVS™ system and the target IMS subsystem, *imsid*, is not active on that MVS system.

System action

The IMS Online Reorganization Facility job terminates.

User response

Resubmit the job on the same MVS system where the target IMS subsystem is active.

IHC01505E Online Reorg Facility is not active in target IMS system

Explanation

An IMS Online Reorganization Facility maintenance utility was run but IMS Online Reorganization Facility is not active in the target IMS subsystem.

System action

The IMS Online Reorganization Facility job terminates.

User response

Verify that the target IMS subsystem is correct. IMS Online Reorganization Facility must initially be activated in an IMS subsystem with a restart of the IMS control region. Verify that this was done and that the IHC01500I message was issued to indicate that the IMS Online Reorganization Facility was initialized successfully.

IHC01506W **DEBUG status for IMS *imsid* already state**

Explanation

An IMS Online Reorganization Facility utility was run to set the DEBUG state. The DEBUG state for the IMS subsystem was already in the requested state.

System action

None. DEBUG status is left in previous state.

User response

Verify that the DEBUG status is in the appropriate state.

IHC01507I **DEBUG action request for IMS *imsid* completed**

Explanation

An IMS Online Reorganization Facility utility was run and has successfully changed the DEBUG state for an IMS subsystem.

System action

The requested DEBUG state is now in effect for the target IMS subsystem.

User response

None. This message is informational.

IHC01508W **Unable to install new maintenance: *reason***

Explanation

The IMS Online Reorganization Facility maintenance utility was unable to install new maintenance into an IMS online subsystem.

System action

The previous maintenance level is still in effect for the IMS subsystem.

User response

Correct the *reason* that new maintenance was unable to be installed and resubmit the job.

IHC01509W **IMS using ORF library *datasetname*, new maintenance being loaded from *datasetname***

Explanation

IMS Online Reorganization Facility maintenance utility is being executed with a different library than the IMS control region was initially started with.

System action

New maintenance is installed into the IMS control region from the different library.

User response

The next time the IMS subsystem is restarted it will activate IMS Online Reorganization Facility from the library in the control region STEPLIB. If you want the installation of the new maintenance level to be permanently installed into the IMS subsystem, the new maintenance level must either be copied into the STEPLIB data set for the IMS control region, or the library with the new maintenance level must be added to the STEPLIB of the IMS control region.

IHC01510I **Online Reorg Facility *Vv.r* maintenance successfully installed in *imsid***

Explanation

This informational message indicates that a new maintenance level has successfully been installed into the *imsid* online IMS subsystem.

System action

The new maintenance level is now in effect in the target IMS subsystem.

User response

None. This message is informational.

IHC01511E **Target member *membername*
action reason**

Explanation

An attempt to connect to the IMS Online Reorganization Facility or IMS Tools Online System Interface component in an IMS control region address space failed for the specified reason.

System action

The IMS Online Reorganization Facility job terminates.

User response

If the IMS subsystem is down, it must either be restarted or the SUBSYS record must be removed from DBRC. If the IMS subsystem is active, verify that either the IMS Online Reorganization Facility or IMS Tools Online System Interface component was successfully initialized in that subsystem and that the component joined the same XCF group.

IHC01512I **Connected with target member
*membername***

Explanation

This informational message indicates that the job has successfully connected to the corresponding member.

System action

Processing continues.

User response

None. This message is informational.

IHC01513E **ORF subtask failed RC=xxxx**

Explanation

The IMS Online Reorganization Facility subtask in the IMS control region terminated unexpectedly.

System action

IMS Online Reorganization Facility processing in the IMS control region is no longer available.

User response

Contact IBM Software Support. The IMS subsystem must be restarted to reactivate IMS Online Reorganization Facility in that IMS subsystem.

IHC01514I ***capturetype* capture for
DBD(*dbdname*) action**

Explanation

This informational message indicates that capturing log or change records for the DBD has either been started or has just ended.

System action

If capture has been activated, the captured records will begin being sent to the remote IMS Online Reorganization Facility utility. If capture has been stopped, no more change records for the DBD will be sent to the IMS Online Reorganization Facility utility.

User response

None. This message is informational.

IHC01515W ***message_type* from member
*membername***

Explanation

An unexpected XCF message was received from the corresponding member. *message_type* shows one of the following values:

NEWMBR

The member that newly joined the XCF group. This type of message is typically received when an IMS subsystem is started during the reorganization.

LOSTCONN

The connection to the member was lost. This type of message is typically received when an IMS subsystem terminates during the reorganization or the reorganization job abnormally terminates.

System action

If the IMS Online Reorganization Facility job receives the message, that job terminates. If the message is received in the IMS control region, capturing changes for the remote IMS Online Reorganization Facility utility ends.

User response

None.

IHC01516E **XCF buffer limit exceeded**

Explanation

The maximum amount of storage for incoming XCF messages has been exceeded; no further incoming XCF messages can be received.

System action

The IMS Online Reorganization Facility job terminates.

User response

The maximum amount of storage that is used for incoming XCF messages is controlled by the XCFMAX parameter in the HRFSETOP member.

This situation is usually the result of the IMS Online Reorganization Facility utility's inability to process the number of captured change records from the IMS control regions. It might be the result of an extreme amount of online activity and of the IMS Online Reorganization Facility utility running at a priority at which it cannot obtain any CPU cycles to receive pending XCF messages.

Resubmit the IMS Online Reorganization Facility job at a higher priority and at a less active time, or set the XCFMAX value slightly higher. This situation might also occur if the IMS Online Reorganization Facility utility does not receive the pending messages when it should. This situation would likely be an outstanding WTOR or CPU loop.

IHC01517E	Error encountered during capturetype capture for DBD dbdname: FUNC=function RC=xxxx RSN=xxxx
------------------	---

Explanation

The IMS Online Reorganization Facility was unable to capture a change record for a DBD.

System action

Record capture is terminated for the DBD. The IMS Online Reorganization Facility job is notified of the records that were being captured. The IMS Online Reorganization Facility job ends abnormally.

User response

Contact IBM Software Support.

IHC01518E	command call failed: RC=xxxx RSN=xxxx
------------------	--

Explanation

The IMS Online Reorganization Facility utility encountered an error when issuing the IMS command, *command*.

System action

The IMS Online Reorganization Facility utility ends abnormally.

User response

Review the return and reason codes that are described in *IMS Application Programming EXEC DLI Commands for CICS® and IMS*.

IHC01519I	Number of records captured was xxxx
------------------	--

Explanation

Number of records captured was xxxx.

System action

None.

User response

None. This message is informational.

IHC01520E	calltype call ended with "statuscode status code
------------------	---

Explanation

When applying captured changes to the reorganized shadow data sets, the IMS Online Reorganization Facility utility encountered an unexpected status code.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Contact IBM Software Support.

IHC01521W	Error from modulename: FUNC=function RC=xxxx RSN=xxxx
------------------	--

Explanation

An error was encountered while capturing records in the IMS control region.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Contact IBM Software Support.

IHC01522E **DBRC request *request* for DBD *dbdname* DDN *ddname* failed, RC=*xxxx***

Explanation

A DBRC request failed.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Review the return and reason code listed in the *IMS Messages and Codes, Volume 4: IMS Component Codes* to see whether it can be corrected. The IMS Online Reorganization Facility job can be restarted and as part of that restart. The DBRC request is also reattempted. If the error cannot be corrected, contact IBM Software Support.

IHC01523E **DBRC request *request* for LOGDSN *datasetname* failed, RC=*xxxx***

Explanation

A DBRC request for a log data set failed.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Review the return and reason code listed in the *IMS Messages and Codes, Volume 4: IMS Component Codes* to see whether it can be corrected. The IMS Online Reorganization Facility job can be restarted and the DBRC request will be retried. If the error cannot be corrected, contact IBM Software Support.

IHC01524I **The following jobs currently have DBD *dbdname* allocated:**

Explanation

This message is issued with messages IHC01525I and IHC01526I.

System action

None.

User response

None. This message is informational.

IHC01525I **Jobname *jobname* IMSID *imsid* Reg# *regionnumber***

Explanation

This message is issued with messages IHC01524I and IHC01526I.

System action

None.

User response

None. This message is informational.

IHC01526I **The jobs must be stopped before *jobname* can continue**

Explanation

This message is issued in conjunction with messages IHC01524I and IHC01525I when an IMS Online Reorganization Facility job needs to run the */STOP* or */DBRECOVERY* command on a DBD and it is unable to do so until the jobs that are listed relinquish control of the DBD. Message IHC01526A follows this message.

System action

None.

User response

None. This message is informational.

IHC01526A **(*jobname*): Waiting for BMPs
(*imsid*): Reply 'RETRY' or 'CANCEL'**

Explanation

This WTOR message is issued after messages IHC01524I, IHC01525I, and IHC01526I. This message indicates that IMS Online Reorganization Facility is trying to issue the */STOP* or */DBRECOVERY* command on a DBD but the attempt to do so is failing because active BMP jobs exist.

System action

The IMS Online Reorganization Facility job waits for the operator reply. During the wait, the IMS Online Reorganization Facility job makes retry attempts in the background and deletes the WTOR message after a successful retry attempt.

User response

Take one of the following actions:

- Type RETRY to make IMS Online Reorganization Facility immediately retry the attempt.
- Type CANCEL to cancel the reorganization job.
- Type nothing and wait for the listed BMP jobs to end or to be paused, or manually end the BMP jobs so that the control of the DBD is released.

IHC01527W *reply is an invalid reply*

Explanation

An invalid response to the previous WTOR was entered.

System action

The previous WTOR is reissued.

User response

Enter a valid reply.

IHC01528I *The reply was reply*

Explanation

This informational message indicates the operator response for the previous outstanding WTOR.

System action

Processing continues according to reply.

User response

None. This message is informational.

IHC01529W *Takeover processing delayed due to TAKEOVER(DELAY)*

Explanation

TAKEOVER(DELAY) was specified in the control statements. The IMS Online Reorganization Facility job ends without doing takeover processing.

System action

Restart information is saved and the IMS Online Reorganization Facility job ends with RC=4. The original database is left in a DB recovery needed state with PROHIBIT AUTH status set in DBRC.

User response

Determine the reason for delaying the takeover processing. When takeover processing is required, resubmit the IMS Online Reorganization Facility job with TAKEOVER(YES) specified.

IHC01530I *datasetname allocated to DD dname*

Explanation

During restart, IMS Online Reorganization Facility allocates certain DD statements to the data sets that were in effect at the time the previous job terminated. If the dname is in the JCL that is used to restart the job, it will be deallocated first.

System action

Processing continues.

User response

None. This message is informational.

IHC01531I *TOIrequest request for DBD dbdname action*

Explanation

This informational message indicates that IMS Tools System Interface requests have been made and have completed to an IMS control region.

System action

Processing continues.

User response

None. This message is informational.

IHC01532I *Restart information save*

Explanation

This informational message is issued before takeover processing to indicate that restart information has been successfully saved in the IMS Online Reorganization Facility restart data set.

System action

Takeover processing begins unless TAKEOVER(DELAY) was specified.

User response

None. This message is informational.

IHC01533W *TOIrequest request for DBD
dbdname action RC=xxxx
RSN=xxxx*

Explanation

An IMS Tools Online System Interface request to the target IMS subsystem failed.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Review the IMS Tools Online System Interface return and reason codes. There might also be additional messages in the IMS control region that describe why the request failed. The most likely cause is the status of a DBD in the IMS control region. If the problem can be corrected, resubmit the IMS Online Reorganization Facility job. If you are unable to correct the problem, contact IBM Software Support.

IHC01534E *Unknown segment segmentname
in change record*

Explanation

When applying captured change records to the shadow data sets, IMS Online Reorganization Facility encountered a change record that involved a segment that is not in the DBD for which the IMS Online Reorganization Facility job is running.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Verify that the DMB used in the online IMS subsystems corresponds to the DBD for which the IMS Online Reorganization Facility job is running.

IHC01535E *DBRC command request for
Partition partitionname failed,
RC=xxxx*

Explanation

A DBRC request failed.

System action

The IMS Online Reorganization Facility job ends abnormally.

User response

Review the return and reason code listed in the *IMS Messages and Codes, Volume 4: IMS Component Codes* to determine whether it can be corrected. You can restart the IMS Online Reorganization Facility job and the DBRC request will be reattempted. If the error cannot be corrected, contact IBM Software Support.

IHC01536I *Online Reorg Facility Vv.r
maintdate mainttime*

Explanation

This informational message indicates the version, release, maintenance date, and maintenance time of IMS Online Reorganization Facility for the job or IMS control region.

System action

Processing continues.

User response

None. This message is informational.

IHC01537E *Change capture already active for
DBD dbdname on insid*

Explanation

An IMS Online Reorganization Facility job for a DBD was started and there is already an IMS Online Reorganization Facility job for the same DBD active in the IMS subsystem. Only one IMS Online Reorganization Facility job can be executing for a DBD or HALDB partition.

System action

The duplicate IMS Online Reorganization Facility job ends abnormally.

User response

Wait for the current IMS Online Reorganization Facility job for the DBD to end before resubmitting a subsequent IMS Online Reorganization Facility job if it is still needed.

IHC01538E **AOI command request to *imsid* failed, RC=return code RSN=reason**

Explanation

An IMS Online Reorganization Facility request that was issued to the IMS Tools Online System Interface failed.

System action

The IMS Online Reorganization Facility job terminates.

User response

Review the return codes for IMS Tools Online System Interface. If the return and reason codes indicate a problem that you can fix in the IMS subsystem, correct the problem and resubmit the job. If you cannot fix the problem, contact IBM Software Support.

IHC01539I **Caught up with applying changes, waiting for TAKEOVER Window**

Explanation

IMS Online Reorganization Facility has reached the point in the job where it can begin the takeover process. A TAKEOVER window was specified and the begin takeover time has not been reached.

System action

IMS Online Reorganization Facility begins idling until the begin takeover time that was specified is reached. During this idling time, any changes being applied to the original database are still captured and applied to the shadow database.

User response

If no action is taken, IMS Online Reorganization Facility begins the takeover process at the specified time. If you want the takeover performed sooner, you can enter a TAKEOVER command with an MVS MODIFY command. This will cause the takeover process to begin.

IHC01540I **command command was entered**

Explanation

An MVS MODIFY or STOP command was entered by an operator for the IMS Online Reorganization Facility job.

System action

If the command is valid, IMS Online Reorganization Facility processes the command.

User response

None. This message is informational.

IHC01541I **Current phase is: *phase* started at *hh:mm:ss***

Explanation

This message indicates the current status of the IMS Online Reorganization Facility job. The message is the result of the MONITOR keyword being specified or a MONITOR request on the MODIFY command by an operator.

System action

Processing continues.

User response

None. This message is informational.

IHC01542I ***nnnnn* type records captured,
nnnnn type records applied –
nnn%**

Explanation

This message is the second part of monitor information. It indicates the number of log records or change records that were captured by the online systems, and how many and what percentage of those records have been applied to the shadow data sets being reorganized. The message is the result of the MONITOR keyword being specified or a MONITOR request on a MODIFY command by an operator.

System action

Processing continues.

User response

None. This message is informational.

IHC01543W **Takeover window has expired**

Explanation

The end time that was specified by the TAKEOVER.WINDOW parameter has been reached and IMS Online Reorganization Facility is not yet ready to perform takeover processing for the job.

System action

IMS Online Reorganization Facility will take the action specified by the endaction operand of the TAKEOVER.WINDOW parameter.

User response

If WTOR was specified as the action to take when the takeover window expired, determine the action that you want to take and reply to message IHC01544I accordingly.

IHC01544I	Specify action to take: N - keep idling until next window, T - do TAKEOVER when ready, C - continue until TAKEOVER then ask again, A -abend job
------------------	--

Explanation

The specified TAKEOVER window has expired and WTOR was specified as the action to take.

System action

The IMS Online Reorganization Facility job continues processing and waits for an operator response.

User response

Determine the action that you want to take at this time and enter a response through the operator console. The options are:

- N** Indicates that the IMS Online Reorganization Facility job continues processing and tries to perform takeover during the same window on the following day.
- T** Indicates that you want to finish reorganizing the shadow data sets and perform takeover when the job reaches that point.
- C** Indicates that you want to finish reorganizing the shadow data sets and then ask the operator what to do when the takeover point is reached.
- A** Indicates that you want to abend the job.

IHC01545I	Ready for Takeover
------------------	---------------------------

Explanation

The IMS Online Reorganization Facility job is ready for takeover.

System action

The IMS Online Reorganization Facility job issues IHC01544I and waits for an operator response.

User response

See message IHC01544I.

IHC01546W	Unable to complete ONLINECHANGE – reason
------------------	---

Explanation

The Online Reorganization Facility job detected DBD changes. ONLINCHANGE(Y) was in effect, but IMS Online Reorganization Facility was unable to locate any IMSACBA or IMSACBB data sets to copy new ACBs into.

System action

The IMS Online Reorganization Facility job continues takeover processing but ends with RC=4. The databases are left in PROHIBIT AUTH state.

User response

The new ACBs have been generated into the IMSACB data set. You must manually copy these ACBs into the appropriate IMSACBA and IMSACBB data sets. After copying the ACBs, reset the PROHIBIT AUTH flag in DBRC. In future runs of IMS Online Reorganization Facility, if all online IMS subsystems are down, you can supply the appropriate IMSACBA and IMSACBB DD statements in the IMS Online Reorganization Facility job to identify the appropriate data sets.

IHC01547E	Backout failed for DBD <i>dbdname</i> on <i>imsid</i> – original database is in inconsistent state
------------------	---

Explanation

When IMS Online Reorganization Facility was replicating changes that were made to the original database in the online IMS subsystems to the shadow database, the online IMS subsystem encountered an error when it attempted to backout some of the changes that were made to the original database.

System action

IMS stops the original database and leaves it with some changes that have not been backed out. The IMS Online Reorganization Facility job cannot determine which changes should or should not be applied to the shadow database, so the job terminates.

User response

Correct the problem with the original database and resubmit the IMS Online Reorganization Facility job.

IHC01548E **Change capture terminated with inflight changes**

Explanation

IMS Online Reorganization Facility is terminating the apply phase; however, it cannot determine if some of the captured changes should be committed or if they should be backed out.

System action

The IMS Online Reorganization Facility job terminates abnormally.

User response

This is likely a logic error in IMS Online Reorganization Facility. Contact IBM Software Support.

IHC01549E **Unexpected return code (*return code*) from USEREXIT**

Explanation

During the apply phase, IMS Online Reorganization Facility received the return code from the USEREXIT that was specified in the RELOAD.USEREXIT keyword. The return code is an invalid return code from the USEREXIT.

System action

The IMS Online Reorganization Facility job terminates abnormally.

User response

Correct the problem with the USEREXIT that caused it to return the invalid return code, and resubmit the IMS Online Reorganization Facility job.

IHC01550E **USEREXIT requested source segment (*segment name*) in HALDB database be deleted**

Explanation

During the apply phase, the USEREXIT returned a return code that requested a source segment to be deleted. For HALDBs, IMS Online Reorganization Facility does not support deletion of index source segments.

System action

The IMS Online Reorganization Facility job terminates abnormally.

User response

Either resubmit the job without the USEREXIT, or change the USEREXIT so that it does not delete any index source segments.

IHC01551E **Another ORF job already running for DBD *dbdname***

Explanation

IMS Online Reorganization Facility is already running for this DBD.

System action

The process terminates.

User response

None.

IHC01552E **Error saving information in restart data set**

Explanation

The restart data could not be saved.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01553E ***nn* status code from *nnnn* call to HSSR for segment *segname***

Explanation

An unexpected status code was received.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01554E ***dsname* not found in catalog**

Explanation

A database data set that should have been in the catalog was not found.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01555E Information in catalog for *dsname* is different

Explanation

This message is followed by messages IHC01556E and IHC01557E. The allocated and cataloged data sets have discrepancies.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01556E *type in catalog is/are: text*

Explanation

See message IHC01555E.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01557E *type in this job is/are: text*

Explanation

See message IHC01555E.

System action

The process terminates.

User response

Contact IBM Software Support.

IHC01558W DBs are left in prohibit auth state

Explanation

The takeover process did not finish completely. The databases are left in a prohibit authorization (PROHIBIT AUTH = ON) state.

System action

The process ended.

User response

Complete one of the following tasks depending on the situation:

- If the takeover was delayed because you specified TAKEOVER(Delay), specify the RESTART(AUTO) keyword and resubmit the job. The process restarts from the Takeover phase to finish the job.
- If the takeover is incomplete because you specified ONLINECHANGE(N), see the preceding IHC01578W message.
- If the takeover is incomplete because of an error, correct the error. Then specify the RESTART(AUTO) keyword and resubmit the job or manually complete the remaining tasks.

IHC01559E DBD *dbdname* is not in prohibit auth state

Explanation

The specified DBD should still be in prohibit authorization state. However, it is not in that state anymore. The previous IMS Online Reorganization Facility operation did not finish normally.

This problem is probably detected during an IMS Online Reorganization Facility restart operation during which the database was activated by an operator command. The database might have been updated in between two IMS Online Reorganization Facility runs. The current status of the database is not known.

System action

The process terminates.

User response

Collect all output, including output from the previous runs, and check the IMS messages from the CTL and DLISAS region for information that might be related to this database. A time stamp recovery also might be necessary. Contact IBM Software Support.

IHC01560E SORT|IDCAMS failed, Return code is *retcode*

Explanation

The call to the specified utility failed. Additional error messages are issued.

System action

The process terminates.

User response

Refer to the additional messages for information about how to resolve this error.

**IHC01561E RESTART data set can only be
single volume**

Explanation

The file allocation of the restart data set is invalid.

System action

The process terminates.

User response

Resubmit the IMS Online Reorganization Facility restart data set definition.

IHC01562E Unable to locate RECON data sets

Explanation

The RECON data sets were not allocated.

System action

The process terminates.

User response

Provide RECON data sets by:

- Specifying RECONx DDs, or
- Specifying IMSDALIB that has the RECON MDAs

**IHC01563E Captured change records out of
sequence**

Explanation

A sequence error was detected when the captured change records were applied.

System action

The process terminates.

User response

Resubmit the job and contact IBM Software Support to inform them about this error.

**IHC01564W Unable to *imscmd* DBD *dbdname*
on IMS *imsid***

Explanation

The specified IMS command failed on the indicated IMS system for this DBD. This message is followed by message IHC01565A and a WTOR to ask for an action.

System action

Respond to the reply message.

User response

Act on the WTOR.

IHC01565A *text*

Explanation

This message follows message IHC01564W and is self-explanatory.

System action

None.

User response

None.

**IHC01566E DBD *dbdname* has been allocated
by unknown subsystem since
IMS Online Reorganization facility
stopped capturing changes**

Explanation

The database has been allocated since the changes have been applied, but before the takeover process has been started.

System action

The function ends abnormally.

User response

The original database might have been updated. These updates will be lost if a takeover is performed; therefore, restart the process from the beginning.

IHC01567E Not all DBDs defined to *imsid*

Explanation

The database definition in the online system is inconsistent. The primary DBD or some index DBDs might be missing.

System action

The process terminates.

User response

Correct the IMS GEN.

IHC01568I **DBDs not defined to *imsid***

Explanation

The requested DBDs are not defined in the specified IMS system.

System action

The XCF connection to this IMS system is terminated.

User response

None. This message is informational.

IHC01569I **DLI batch job: *jobname* active**

Explanation

IMS Online Reorganization Facility detected that the database to reorganize is being accessed by a DLI batch job. This message is followed by message IHC01569A or IHC01571E.

System action

None.

User response

See the subsequent message IHC01569A or IHC01571E.

IHC01569A **(*jobname*): Waiting for DLI batch jobs to finish. Reply 'C' to cancel**

Explanation

This WTOR message is issued after message IHC01569I. This message indicates that the IMS Online Reorganization Facility job is waiting for the DLI batch jobs to stop.

System action

Processing waits for the DLI batch jobs to stop. During the wait, the IMS Online Reorganization Facility job makes retry attempts in the background and deletes the WTOR message after all the DLI batch jobs stop.

User response

Take one of the following actions:

- Type 'C' to cancel the reorganization job.
- Type nothing and wait for the listed DLI batch jobs to end, or manually end the DLI batch jobs so the reorganization job can proceed.

IHC01570E **Waiting for BMPs has expired**

Explanation

The number of retry attempts to stop BMP jobs reached the maximum number set by the BMPRETRY parameter in the base configuration module.

System action

The process terminates.

User response

Wait for the BMP jobs that are shown in the WTOR message to end, and resubmit the job. You can increase the maximum number of retry attempts by specifying the BMPRETRY parameter in the base configuration module. If the database is used by long-running BMP jobs, consider enabling BMP job pause handling. For more information, see the topic "BMP pause feature" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

IHC01571E **Waiting for DLI batch jobs has expired**

Explanation

The number of retry attempts to wait for DLI batch jobs reached the maximum number set by the DLIRETRY parameter in the base configuration module.

System action

The process terminates.

User response

Wait for the DL/I batch jobs that are shown in the preceding message IHC01569I to end, and resubmit the IMS Online Reorganization Facility job. You can

increase the maximum number of retry attempts by specifying the DLIRETRY parameter in the base configuration module.

IHC01572E **Waiting for database pause has expired**

Explanation

An attempt to pause the database has timed out.

System action

The process terminates.

User response

Resubmit the job. If the error persists, contact IBM Software Support.

IHC01573E **Logical DBD *dbdname* is not specified by the LOGICALDBD keyword.**

Explanation

The database was updated by using a PCB that references the indicated logical DBD, but the LOGICALDBD keyword does not specify the logical DBD. Any logical DBD that applications use for update during the reorganization must be specified with the LOGICALDBD keyword.

System action

Processing terminates.

User response

Use the LOGICALDBD keyword to specify the logical DBD.

IHC01574E **DBD *dbdname* has insert, delete, or replace rules that are not supported.**

Explanation

Unsupported path type is specified in the insert, delete, or replace rules of the indicated DBD. For HALDB databases that have internal logical relationships, the following restrictions apply to the insert, delete, and replace rules. The rules are specified by using the RULES= keyword of a SEGM statement in the physical DBD.

- Insert rules L and V are not supported for logical parents. Only the P insert rule is supported.

- Delete rules L and V are not supported for logical parents. Only the P deletion rule is supported.
- Replace rule V is not supported for logical parents.

No restrictions apply to the insert, delete, and replace rules of full-function databases.

System action

Processing terminates.

User response

None. You cannot use IMS Online Reorganization Facility to process a HALDB DBD with these rules.

IHC01575E **Internal message buffer allocation failed**

Explanation

IMS Online Reorganization Facility cannot allocate the internal message buffers for receiving XCF messages.

System action

Processing terminates.

User response

Adjust the size of the internal message buffers by specifying the XCFMAX parameter in the base configuration module. For more information, see the topic "Base configuration parameters" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

IHC01576E **Internal message buffers are exhausted**

Explanation

The internal message buffers that receive XCF messages are full.

System action

Processing terminates.

User response

Increase the size of the internal message buffers by specifying the XCFMAX parameter in the base configuration module. For more information, see the topic "Base configuration parameters" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

**IHC01577E ONLINECHANGE(N) required
because PSBs must be rebuilt****Explanation**

The specified DBD change involves changes to PSBs, which requires the ONLINECHANGE(N) keyword.

System action

Processing terminates.

User response

Specify ONLINECHANGE(N) and resubmit the job. After the job ends, perform any required post-processing tasks.

IHC01578W IMS online change is required**Explanation**

IMS Online Reorganization Facility updated the staging ACB library with the new database definition, but the ACBs in online IMS subsystems are not updated.

System action

Processing continues.

User response

Use the Online Change Copy utility to copy the ACBs from the staging ACB library to the inactive ACB library. Then perform a standard IMS online change.

**IHC01579W Unable to change DEBUG status:
reason****Explanation**

IMS Online Reorganization Facility could not change the DEBUG state for the target IMS subsystem.

System action

The previous DEBUG state is still in effect for the target IMS subsystem.

User response

Correct the condition reported in the message and resubmit the job.

**IHC01580W Database *database* was not
allocated on STA request****Explanation**

Database was started on online IMS subsystems, but the database was not allocated due to a dynamic allocation failure. The database will be allocated when it is scheduled.

This message might be issued when a job step that follows the IMS Online Reorganization Facility job step attempts to statically allocate the database data sets. After the database data sets are reorganized, the job will have exclusive use of the database data sets until the job completes. Therefore, even if DISP=SHR is specified in the allocation job step, the online IMS subsystem fails to allocate the database data sets.

System action

Processing continues.

User response

If static allocation of database data set is requested in a subsequent job step, remove that job step and included it in another job.

**IHC01581E Number of online IMS subsystems
has changed****Explanation**

The IMS Online Reorganization Facility job detected a change in the number of online IMS subsystems during reorganization. See the preceding IHC01515W message to determine whether IMS subsystem was started or terminated.

System action

Processing terminates.

User response

If you do not plan to start or shutdown any online IMS subsystems, resubmit the IMS Online Reorganization Facility job. If you received this message as a result of an error or a sudden termination of the IMS control region, correct the problem in the IMS control region and resubmit the IMS Online Reorganization Facility job.

**IHC01582W One of dual image copy data sets
was not created****Explanation**

Dual image copy was requested but either the primary or the secondary image copy data set was not created due to an error in the image copy process.

System action

Processing continues.

User response

To create another copy, use the Create Image Copy (CRC) function of IMS High Performance Image Copy. For more information, see the *IMS High Performance Image Copy User's Guide*.

IHC01583E Unexpected return code from partition selection exit, FUNC=*function*, RC=*rc*

Explanation

The partition selection exit returned an unexpected return code. *function* is the function code, and *rc* is the return code from the exit.

System action

Processing stops.

User response

Correct the error in the partition selection exit, and resubmit the IMS Online Reorganization Facility job.

IHC01584E Unexpected return code from TOSI client, MOD=*module*, FUNC=*function*, RC=*rc*, RSN=*rsn*

Explanation

The IBM IMS Tools Base IMS Tools Online System Interface (TOSI) client returned an unexpected return code. *module* is the module name, *function* is the function code, and *rc* is the return code.

System action

Processing terminates.

User response

Contact IBM Software Support.

IHC01585E TOSI command security check failed for *imsid*, CLASS=*class*, COMMAND=*command*

Explanation

The IMS HALDB Toolkit job is not authorized to execute the indicated command on the IMS subsystem *imsid*. *class* is the security class that is used on the IMS subsystem.

System action

Processing terminates.

User response

Make sure that your user ID has the required authority to issue the command.

IHC01601I Notification for *dbname* [*partname*] has been sent to AD server

Explanation

A system notification was sent to the Autonomics Director server.

System action

Processing continues.

User response

None. This message is informational.

IHC01602W Notification failed, FUNC=*function*, RC=*rc*, RSN=*rsn*

Explanation

IMS Online Reorganization Facility failed to send the system notification to the Autonomics Director server.

System action

Processing continues.

User response

Ensure that the Autonomics Director server, which the ADXCFGRP keyword specifies, is started correctly.

IHC01603W Notification to AD was canceled: *reason*

Explanation

IMS Online Reorganization Facility did not send a system notification to the Autonomics Director server.

System action

Processing continues. But the system notification to the Autonomics Director server is not sent.

User response

Complete one of the following tasks depending on the reason indicated in the message:

IAVNTFY0 LOAD FAILURE

Ensure that the SHKTLOAD library of IBM IMS Tools Base is specified in the STEPLIB concatenations correctly.

INITIALIZATION FAILURE

Ensure that the XCF group name specified with the ADXCFGRP keyword is correct and the specified Autonomics Director server is correctly configured.

UNSUPPORTED FUNCTION

Ensure that all the conditions for using the ADXCFGRP keyword are met. For the conditions, see the topic "ADXCFGRP keyword" in the *IMS Database Solution Pack IMS Online Reorganization Facility User's Guide*.

INTERNAL ERROR

Contact IBM Software Support.

IHC01604I Utility history data for *dbname* [*partname*] stored

Explanation

IMS Online Reorganization Facility stored the utility history data for the indicated resource in the IMS Tools KB Sensor Data repository. If the database is a full-function database, *dbname* is the name of the database. If the database is a HALDB, *dbname* is the master DBD name, and *partname* is the name of the HALDB partition.

System action

Processing continues.

User response

None. This message is informational.

IHC01605W An error occurred in HKTEXST call, FUNC=*function*, RC=*rc*, RSN=*rsn*

Explanation

An error occurred during the IMS Tools KB job statistics API (HKTEXST) call. *function* is the function code, and *rc* and *rsn* are the return code and the reason code from the API.

System action

Processing continues, but the utility history data is not stored in the IMS Tools KB Sensor Data repository.

User response

Contact IBM Software Support.

IHC01606W Utility history data process was canceled. REASON: *reason*

Explanation

An error occurred and the utility history data process was canceled. *reason* is one of the following texts:

- INITIALIZATION FAILURE
- INTERNAL ERROR

System action

Processing continues, but the utility history data is not stored in the IMS Tools KB Sensor Data repository.

User response

Complete one of the following tasks depending on the reason:

INITIALIZATION FAILURE

Ensure that the SHKTLOAD library of IBM IMS Tools Base is included in the STEPLIB concatenation and that the IMS Tools KB server is configured correctly.

INTERNAL ERROR

Contact IBM Software Support.

IHC01611I Reorganization starts for [database *dbname* | partition *partname*]

Explanation

The Conditional Reorganization Support Service (CRSS) determined that the database or the partition requires a reorganization. IMS Online Reorganization Facility is starting the reorganization process for the indicated database or partition.

System action

Processing continues.

User response

None. This message is informational.

IHC01612I Reorganization is not needed for [database *dbname* | partition *partname*]

Explanation

The Conditional Reorganization Support Service (CRSS) determined that the indicated database or partition does not need to be reorganized.

System action

The IMS Online Reorganization Facility process ends without reorganizing the database or the partition.

User response

None. This message is informational.

IHC01613I **One or more exceptions are detected in [database *dbname* | partition *partname*]**

Explanation

The Conditional Reorganization Support Service (CRSS) evaluated the indicated database or partition and detected one or more database exceptions.

System action

Processing continues.

User response

Complete the following steps:

1. Check the output from the job.

If the reorganization policy was customized to send exception notification messages by using the z/OS WTO service, the TSO/E SEND command, or through email or texting, check those messages that are issued by the job. Those messages include a job summary message (policy evaluation summary message) that summarizes the result of policy evaluation performed by Policy Services during the job.

For more information, see the topic "Checking the policy evaluation summary message" in the *IMS Database Reorganization Expert User's Guide*. For information about finding the Diagnosis report that was created by this job and that is stored in the Output repository of IMS Tools Knowledge Base, see the topic "Finding Diagnosis reports by using report completion codes" in the *IMS Database Reorganization Expert User's Guide*.

2. Check the exceptions in the Diagnosis report and identify the cause of the database exceptions.

For more information, see the topic "Identifying the cause of database exceptions" in the *IMS Database Reorganization Expert User's Guide*.

IHC01614I **No exception is detected in [database *dbname* | partition *partname*]**

Explanation

The Conditional Reorganization Support Service (CRSS) evaluated the indicated database or partition and detected no database exceptions.

System action

Processing continues.

User response

None. This message is informational.

IHC01615I **[Database *dbname* | Partition *partname*] is reorganized because REORGDIAG is specified**

Explanation

The indicated database or partition is reorganized regardless of its status because the job runs in Reorganization Diagnosis mode.

System action

Processing continues.

User response

None. This message is informational.

IHC01616W **An error occurred in BBECRAPI call, FUNC=*function*, RC=*rc*, RSN=*rsn***

Explanation

An error occurred during the Conditional Reorganization Support Service (CRSS) API call. *function* is the function code, and *rc* and *rsn* are the return code and the reason code from the API.

System action

Processing continues.

User response

The detail of the error or the warning is recorded in the journal messages that are issued by the CRSS. Correct the error and rerun the job.

IHC01617W **Conditional Reorg service is deactivated. REASON: *reason***

Explanation

The Conditional Reorganization Support Service (CRSS) cannot continue the job because of the reason displayed.

System action

The processing continues without the CRSS. If the job runs in either Conditional Reorganization mode or Reorganization Diagnosis mode, IMS Online Reorganization Facility reorganizes the database regardless of database status, but the CRSS does not generate a Diagnosis report.

User response

Complete one of the following tasks depending on the reason:

BBECRI00 LOAD FAILURE

Ensure that the IMS Database Reorganization Expert load library is included in the STEPLIB concatenation.

INITIALIZATION FAILURE

Ensure that Policy Services is configured correctly.

ITKB INIT FAILURE

Ensure that the SHKTLOAD library of IBM IMS Tools Base is included in the STEPLIB concatenation and that the Tools KB Server is configured correctly.

ITKB SERVER NOT SPECIFIED

Ensure that the ITKB SERVER keyword is specified in the HRFSYSIN DD statement.

UNSUPPORTED FUNCTION

Ensure that all of the following conditions for the CRSS are met:

- The primary database to reorganize is a full-function database or a single partition of a HALDB.
- The primary database to reorganize is not an index database.
- TAKEOVER(N) is not specified in the REORG HRFSYSIN DD statement.
- DBD change is not requested.

INTERNAL ERROR

Contact IBM Software Support.

IHC01701E **HPSCCATI API failed, RC=*rc*,
RSN=*rsn***

Explanation

Received an error from the HPSCCATI API. *rc* and *rsn* are the return code and the reason code in decimals.

System action

Processing terminates.

User response

Contact IBM Software Support.

IHC01702I **IMS management of ACBs is
enabled**

Explanation

The IMS management of ACBs is enabled.

System action

Processing continues.

User response

None. This message is informational.

IHC01703E **GEX\$CATQ API failed, RC=*rc*,
RSN=*rsn*, DBD=*dbd***

Explanation

Received an error from the GEX\$CATQ API. The return code from the macro call was *rc* and the reason code was *rsn*. For the reason of the error, see the preceding messages with the GEX prefix that were issued by GEX\$CAQ API.

System action

Processing terminates.

User response

Locate preceding error messages and identify the cause of the error.

IHC01704E **The specified DBD is for an
IMS catalog database. IMS DD
statement is required.**

Explanation

The database specified on the DBD parameter is the IMS catalog database, and the IMS management of ACBs is enabled.

System action

Processing terminates.

User response

If you want to process the IMS catalog database, disable the IMS management of ACBs, specify the IMS DD statement and rerun the job.

IHC01705E **Failed to process IMS-managed ACBs. REASON: *reason***

Explanation

IMS HALDB Toolkit failed to process IMS managed ACBs because of the reason displayed.

System action

Processing terminates.

User response

Perform the action that corresponds to the reason shown in the message and rerun the job.

CATALOG OPEN FAILURE

Ensure that the IMS Tools Generic Exits load library is included in the STEPLIB concatenation.

If the reason is not in this list, contact IBM Software Support.

IHC01707I **NEWDBD will be obtained from catalog staging data set**

Explanation

The new DBD will be obtained from the IMS catalog staging data set.

System action

None.

User response

None. This message is informational.

IHC01708W **IMPORT DEFN SOURCE(CATALOG) is required**

Explanation

IMS HALDB Toolkit converted the database using the new database definition obtained from the IMS catalog staging data set, but the staging data sets are not activated in online IMS subsystems.

System action

Processing continues.

User response

Perform these steps to complete the DBD change:

1. Issue the IMPORT DEFN SOURCE(CATALOG) command to activate the new database definition in online IMS subsystems.
2. If the Integrity Checker utility of IMS Library Integrity Utilities is active in your environment, use the LICON utility and re-create the RDE.
3. Turn off the prohibit authorization flag and bring the database back online.

Chapter 31. Gathering diagnostic information

Before you report a problem with IMS HALDB Toolkit to IBM Software Support, you need to gather the appropriate diagnostic information.

Procedure

Provide the following information for all IMS HALDB Toolkit problems:

- A clear description of the problem and the steps that are required to re-create the problem
- All messages that were issued as a result of the problem
- The trace file or trace panel. For more information, see [“Trace file or trace panel”](#) on page 307.
- Product release number and the number of the last program temporary fix (PTF) that was installed
- The version of IMS that you are using and the type and version of the operating system that you are using

Notices

This information was developed for products and services offered in the U.S.A.

This material may be available from IBM in other languages. However, you may be required to own a copy of the product or product version in that language in order to access it.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Director of Licensing
IBM Corporation
North Castle Drive

Armonk, NY 10504-1785
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Trademarks

IBM, the IBM logo, and [ibm.com](http://www.ibm.com)[®] are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at "Copyright and trademark information" at <http://www.ibm.com/legal/copytrade.shtml>.

Other company, product, and service names may be trademarks or service marks of others.

Terms and conditions for product documentation

Permissions for the use of these publications are granted subject to the following terms and conditions:

Applicability: These terms and conditions are in addition to any terms of use for the IBM website.

Personal use: You may reproduce these publications for your personal, noncommercial use provided that all proprietary notices are preserved. You may not distribute, display or make derivative work of these publications, or any portion thereof, without the express consent of IBM.

Commercial use: You may reproduce, distribute and display these publications solely within your enterprise provided that all proprietary notices are preserved. You may not make derivative works of these publications, or reproduce, distribute or display these publications or any portion thereof outside your enterprise, without the express consent of IBM.

Rights: Except as expressly granted in this permission, no other permissions, licenses or rights are granted, either express or implied, to the publications or any information, data, software or other intellectual property contained therein.

IBM reserves the right to withdraw the permissions granted herein whenever, in its discretion, the use of the publications is detrimental to its interest or, as determined by IBM, the above instructions are not being properly followed.

You may not download, export or re-export this information except in full compliance with all applicable laws and regulations, including all United States export laws and regulations.

IBM MAKES NO GUARANTEE ABOUT THE CONTENT OF THESE PUBLICATIONS. THE PUBLICATIONS ARE PROVIDED "AS-IS" AND WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE.

Privacy policy considerations

IBM Software products, including software as a service solutions, ("Software Offerings") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If this Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see IBM's Privacy Policy at <http://www.ibm.com/privacy> and the section titled "Cookies, Web Beacons, and Other Technologies" in IBM's Online Privacy Statement at <http://www.ibm.com/privacy/details>. Also, see the "IBM Software Products and Software-as-a-Service Privacy Statement" at <http://www.ibm.com/software/info/product-privacy>.

Index

A

abend codes [307](#)
accessibility [12](#)
ANALYZEPART
 command parameters [22](#)
 data flow [15](#)
 DBD source [40](#)
 DBRC commands [36](#)
 DD statements [19](#), [47](#)
 examples [34](#)
 simulating conversion [16](#)
 simulating repartitioning [17](#)
 simulating repartitioning with unloaded data sets [18](#)
 unloaded data sets [38](#)
ANALYZEPART command parameters [22](#)
API, partition selection [207](#)
application support
 creating a DFSHALDB statement [217](#)
 deleting a single partition [225](#)
 loading a single partition [221](#)
 loading logical children (PROCOPT=L) [215](#)
 merging two DBDs into one DBD [229](#)
 partition selection API [207](#)
 testing partition selection exits [209](#)

B

BACKUPDBRC
 command parameters [124](#)
 DD statements [122](#)
batch messages [308](#)
batch update
 creating rules for substituting HALDB data set names [196](#)
 maintaining HALDB without DBRC [196](#)
 substituting HALDB data set names [196](#)

C

CHECK
 command parameters [144](#)
 DD statements [141](#)
codes [307](#)
configuration
 sample library file contents (SIHCSAMP) [299](#)
 usage and restrictions [8](#)
CONVERT
 command parameters [51](#)
 converting databases offline [46](#)
 data flow [45](#)
 DBRC commands [78](#)
 examples [72](#)
CONVERT command parameters [51](#)
converting databases offline [46](#)
converting to HALDB
 ISPF user interface [267](#)

converting to HALDB (*continued*)
 offline [267](#)
 selecting DBDs [267](#)
cookie policy [361](#), [363](#)
COPYDBRC
 command parameters [130](#)
 DD statements [128](#)
creating a DFSHALDB statement [217](#)

D

data flow
 ANALYZEPART [15](#)
 CONVERT [45](#)
 MAINTAIN [81](#)
data set names
 creating rules for substituting [187](#)
 creating unregistered [187](#)
 substituting [187](#)
data sets
 converting non-HALDB to HALDB [203](#)
database utilities, ISPF user interface
 database utility functions summary [275](#)
DBDs
 converting non-HALDB to HALDB [202](#)
DBRC enhancement utilities
 cloning DBRC definitions for test environments [125](#)
 copying HALDBs to a different RECON [134](#)
DBRC request
 specifying [185](#)
DBRC support functions, ISPF user interface
 backing up DBRC DBD definitions [283](#)
 cloning DBRC definitions [280](#)
 copying DBRC definitions [282](#)
 showing partition definitions [279](#)
deleting a single partition [225](#)
DFSHALDB statement, creating [217](#)
diagnostic information
 gathering [359](#)
documentation
 accessing [11](#)
 sending feedback [11](#)
documentation changes [3](#)

E

environment, IMS [238](#)
error messages [307](#)

G

global tables [187](#)

H

HALDB Analyzer [139](#)

- HALDB utilities
 - creating unregistered data sets [185](#)
 - DBRC enhancement utilities [121](#)
 - HALDB Analyzer [139](#)
 - healing index pointers [171](#)
 - recovery [167](#)
 - reorganizing a PSINDEX [157](#)
 - simulating HALDB without DBRC [185](#)
 - splitting an unload file into single partition files [161](#)
 - system utilities [175](#)
- HALDB without DBRC
 - installing [185](#)
- HALDBCOPY
 - command parameters [232](#)
 - DD statements [230](#)
- HALDBLOAD
 - command parameters [223](#)
 - DD statements [221](#)
- HALDBs
 - copying to different IMS [136](#)
- healing index pointers [171](#)

I

- IHCECLON [125](#)
- IHCECOPY [134](#)
- IHCEDFDS [136](#)
- IHCESAM1
 - SYSTEM table [197](#)
- IHCESAM2
 - USER table of SYSTEM IVP1 [198](#)
- IHCESAM3
 - IMSID table of SYSTEM IVP1 [199](#)
- IHCESAM4
 - DBD table [200](#)
- IHCESAM5
 - DBDLIB table of SYSTEM IVP1 [200](#)
- IHCESAM6
 - IMSLIB table of SYSTEM IVP1 [201](#)
- IHCUDBD
 - command parameters [178](#)
 - DD statements [176](#)
- IHCUDFSH
 - command parameters [220](#)
 - DD statements [218](#)
- IHCUSPLT
 - command parameters [164](#)
 - DD statements [162](#)
- IHCWPSBL
 - DD statements [179](#)
- IMS management of ACBs [9](#), [77](#), [116](#)
- IMSID table
 - maintaining [192](#)
- ISPF messages [308](#)
- ISPF user interface
 - converting to HALDB [267](#)
 - creating rules for substituting HALDB data set names [188](#)
 - database utilities [275](#)
 - DBRC support functions [279](#)
 - maintaining HALDB [271](#)
 - maintaining HALDB without DBRC [188](#)
 - other utilities [277](#)
 - processing a project [251](#)

- ISPF user interface (*continued*)
 - setting up [237](#)
 - setting up the environment [237](#)
 - starting [237](#)
 - substituting HALDB data set names [188](#)
- ISPF user interface configuration
 - creating a new IMS environment [238](#)
 - creating projects [247](#)
 - deleting an environment [249](#)

L

- legal notices
 - cookie policy [361](#), [363](#)
 - notices [361](#)
 - programming interface information [361](#)
 - trademarks [361](#), [362](#)
- loading a single partition [221](#)
- loading logical children (PROCOPT=L) [215](#)

M

- MAINTAIN
 - command parameters [86](#)
 - data flow [81](#)
 - DBRC commands [116](#)
 - DD statements [83](#)
 - examples [112](#)
 - how it processes partitions [105](#)
 - maintaining databases offline [82](#)
- MAINTAIN command parameters [86](#)
- maintaining databases offline [82](#)
- maintaining HALDB using MAINTAIN [81](#)
- maintaining HALDB, ISPF user interface
 - selecting and maintaining partitions [273](#)
 - selecting DBDs for maintenance [272](#)
 - splitting or consolidating HALDB partitions [271](#)
- merging two DBDs into one DBD [229](#)
- messages [307](#)

N

- notices [361](#)

O

- overview
 - accessibility [12](#)
 - application support [6](#)
 - benefits [6](#)
 - converting to HALDB [6](#)
 - DBRC handling [6](#)
 - HALDB Analyzer [6](#)
 - maintaining HALDBs [6](#)
 - simulating HALDBs [6](#)
 - system utilities [6](#)
 - what does the product do [3](#)

P

- partition boundaries
 - creating partitions automatically [264](#)
 - specifying high keys [262](#)

- partition boundaries (*continued*)
 - using a partition selection exit for conversion [259](#)
- partition selection API [207](#)
- partition selection exit
 - changing the DBDs [261](#)
 - creating partition boundaries [262](#)
 - functions provided by an exit [258](#)
 - IHCPSEL0 exit [258](#)
 - locating partition boundaries [262](#)
 - specifying additional conversion options [265](#)
- performance tips and considerations [303](#)
- problems
 - diagnostic information about [359](#)
- programming interface information [361](#)
- project processing
 - creating and submitting JCL [255](#)
 - project work panel [253](#)
 - selecting a project [251](#)
 - SYNC points [256](#)
 - using a partition selection exit [258](#)
- project work panel
 - ask me later [255](#)
 - restarting at the current or prior level [253](#)
 - restarting from the beginning [253](#)
 - selecting setup parameters [253](#)
 - showing project status [253](#)
- projects [247](#)
- PSEXIT
 - command parameters [212](#)
 - DD statements [209](#)
- PTRHEAL
 - command parameters [174](#)
 - DD statements [172](#)

R

- reader comment form [11](#)
- RECON table
 - maintaining [191](#)
- recovery [167](#)
- reference
 - sample reports [287](#)
- reorganizing a PSINDEX [157](#)
- REORGIND
 - command parameters [160](#), [228](#)
 - DD statements [157](#), [225](#)
- reports
 - Collect DBDs report [288](#)
 - HALDB Analyzer report [291](#)
 - Partition Selection Exit report [297](#)
 - Runtime Messages report [287](#)
 - Runtime Options In Effect report [289](#)
 - Unload report [290](#)
- RESETILK
 - command parameters [170](#)
 - DD statements [168](#)
- return codes [307](#)

S

- sample library file contents (SIHCSAMP) [299](#)
- service information [11](#)
- SIHCSAMP sample library [299](#)

- simulating conversion [16](#)
- simulating databases [17](#)
- simulating HALDB using ANALYZEPART
 - ANALYZEPART command parameters [22](#)
 - data flow [15](#)
 - DD statements [19](#), [47](#)
 - examples [34](#)
 - repartitioning using unloaded data sets [18](#)
 - simulating conversion [16](#)
 - simulating databases [17](#)
- splitting an unload file into single partition files [161](#)
- summary of changes [3](#)
- support
 - required information [359](#)
- support information [11](#)
- system definition
 - modifying [188](#)
- system selection method
 - modifying [190](#)
- system utilities
 - creating a PSB list for selected DBDs [178](#)
 - creating OSAM multi-volume data sets [180](#)
 - listing VIO and unit names [181](#)
 - rebuilding DBD source from DBDLIB [175](#)
- SYSTEMs
 - maintaining [193](#), [194](#)

T

- tables
 - preinstalled [187](#)
- technotes [11](#)
- testing partition selection exits [209](#)
- trace file or trace panel [307](#)
- trademarks [361](#), [362](#)
- troubleshooting
 - batch messages [308](#)
 - ISPF messages [308](#)
 - return and abend codes [307](#)
 - trace file or trace panel [307](#)

U

- unregistered data sets
 - global tables [187](#)
 - installing HALDB without DBRC [185](#)
 - naming conventions [187](#)
- usage and restrictions
 - database limitations [8](#)
 - logical relationships and secondary indexes [8](#)
 - restrictions for OSAM LDSs [8](#)
- USERS
 - maintaining [195](#)

W

- what's new [3](#)



Product Number: 5698-DUL

SC27-8779-03

