

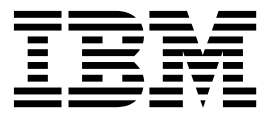
IMS
Version 13

Release Planning
(December 20, 2017 edition)

IBM

IMS
Version 13

Release Planning
(December 20, 2017 edition)



Note

Before you use this information and the product it supports, read the information in “Notices” on page 227.

December 20, 2017 edition.

This edition applies to IMS Version 13 (program number 5635-A04), IMS Database Value Unit Edition, V13.1 (program number 5655-DSM), IMS Transaction Manager Value Unit Edition, V13.1 (program number 5655-TM2), and to all subsequent releases and modifications until otherwise indicated in new editions.

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About this information

These topics provide general information to help you evaluate and plan for IMS™ Version 13. The topics describe the new features and enhancements for IMS Version 13, the hardware and software requirements for these new features and enhancements, considerations for migration and coexistence for IMS Version 13, and an overview of the IMS Tools that are enhanced to work with IMS Version 13.

This information is available in IBM® Knowledge Center.

For information about IMS Version 12, including its enhancements and considerations for migration and coexistence, see *IMS Version 12 Release Planning*, (GC19-3019).

When you install IMS, you will also need information from the following information units:

- *IMS Version 13 Installation*
- *IMS Version 13 System Definition*
- *IMS Version 13: Program Directory for Information Management System Transaction and Database Servers*

How to use the Release Planning information

Use the IMS Version 13 Release Planning information to learn about the new enhancements in IMS Version 13 and to plan your migration.

The Release Planning information is organized into the following parts:

- Part 1, “General planning information for IMS Version 13,” on page 1, which contains general information about the new release, including the following information:
 - A summary list of the enhancements included in IMS Version 13
 - An overview of the hardware and software requirements
 - Migration considerations for IMS Version 13
 - Coexistence considerations between the supported versions of IMS
 - A listing of the changed, new, and deleted messages and abends for IMS Version 13
 - A listing of the new and changed log records for IMS Version 13
- Part 2, “IMS Version 13 enhancements,” on page 101, which describes each new enhancement in IMS Version 13.

In the IBM Knowledge Center, the description of each enhancement includes links to all of the topics that are new or changed for the enhancement. On the web, see [IMS Version 13 enhancements](#).

- Part 3, “IBM IMS Tools support for IMS Version 13,” on page 171, which describes IBM IMS Tools and products that support IMS Version 13.
- Part 4, “Featured integration solutions for IMS Version 13,” on page 211, which contains overviews of some of the new ways that you can further integrate IMS Version 13 and the rest of your IT architecture.

Note: If you are migrating to IMS Version 13 from IMS Version 11 or earlier, you must refer to the *IMS Release Planning Guide* for each IMS release that you are

skipping for complete information about the enhancements, the software and hardware requirements, and the migration and coexistence considerations that are specific to that release.

Prerequisite knowledge

Before using this information, you should have knowledge of either the IMS Database Manager (DB) or the IMS Transaction Manager (TM). You should also understand basic z/OS® and IMS concepts, your installation's IMS system, and have a general knowledge of the tasks involved in project planning.

You can learn more about z/OS by visiting the “z/OS basic skills” topics in IBM Knowledge Center.

You can gain an understanding of basic IMS concepts by reading *An Introduction to IMS*, an IBM Press publication.

IBM offers a wide variety of classroom and self-study courses to help you learn IMS. For a complete list of courses available, go to the IBM Skills Gateway and search for IMS.

IMS function names used in this information

In this information, the term HALDB Online Reorganization refers to the integrated HALDB Online Reorganization function that is part of IMS Version 13, unless otherwise indicated.

How new and changed information is identified

New and changed information in most IMS library PDF publications is denoted by a character (revision marker) in the left margin. The first edition (-00) of *Release Planning*, as well as the *Program Directory* and *Licensed Program Specifications*, do not include revision markers.

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).

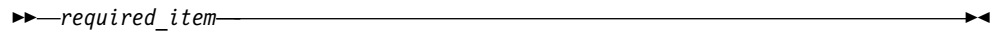
Revision markers do not necessarily indicate all the changes made to the information because deleted text and graphics cannot be marked with revision markers.

How to read syntax diagrams

The following rules apply to the syntax diagrams that are used in this information:

- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
 - The >>--- symbol indicates the beginning of a syntax diagram.

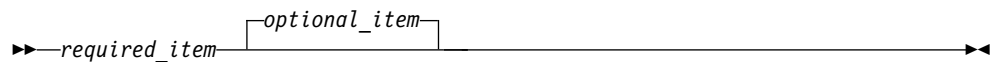
- The ---> symbol indicates that the syntax diagram is continued on the next line.
- The >--- symbol indicates that a syntax diagram is continued from the previous line.
- The --->< symbol indicates the end of a syntax diagram.
- Required items appear on the horizontal line (the main path).



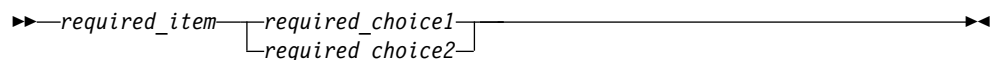
- Optional items appear below the main path.



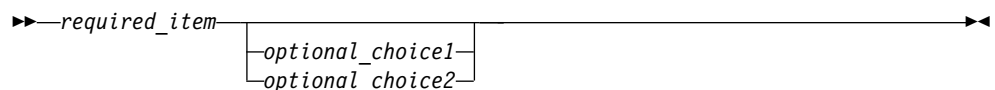
If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.



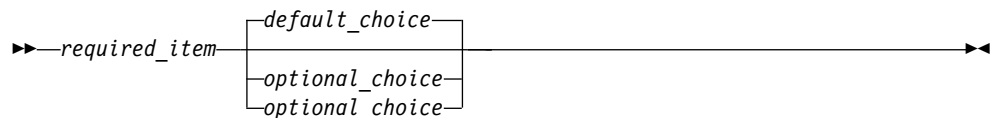
- If you can choose from two or more items, they appear vertically, in a stack. If you *must* choose one of the items, one item of the stack appears on the main path.



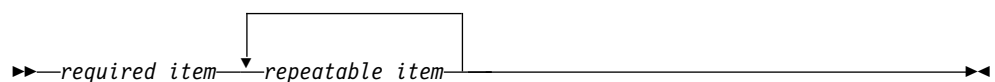
If choosing one of the items is optional, the entire stack appears below the main path.



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



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



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

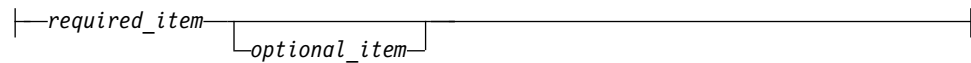


A repeat arrow above a stack indicates that you can repeat the items in the stack.

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



fragment-name:



- In IMS, a b symbol indicates one blank position.
- Keywords, and their minimum abbreviations if applicable, appear in uppercase. They must be spelled exactly as shown. Variables appear in all lowercase italic letters (for example, *column-name*). They represent user-supplied names or values.
- Separate keywords and parameters by at least one space if no intervening punctuation is shown in the diagram.
- Enter punctuation marks, parentheses, arithmetic operators, and other symbols, exactly as shown in the diagram.
- Footnotes are shown by a number in parentheses, for example (1).

Accessibility features for IMS Version 13

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

Accessibility features

The following list includes the major accessibility features in z/OS products, including IMS Version 13. These features support:

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

Keyboard navigation

You can access IMS Version 13 ISPF panel functions by using a keyboard or keyboard shortcut keys.

For information about navigating the IMS Version 13 ISPF panels using TSO/E or ISPF, refer to the *z/OS TSO/E Primer*, the *z/OS TSO/E User's Guide*, and the *z/OS ISPF User's Guide Volume 1*. These guides describe how to navigate each interface, including the use of keyboard shortcuts or function keys (PF keys). Each guide includes the default settings for the PF keys and explains how to modify their functions.

Related accessibility information

Online documentation for IMS Version 13 is available in IBM Knowledge Center.

IBM and accessibility

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

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 information, you can take one of the following actions:

- Click the **Contact Us** tab at the bottom of any IBM Knowledge Center topic.
- Send an email to imspubs@us.ibm.com. Be sure to include the book title and the publication number.

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.

Part 1. General planning information for IMS Version 13

In addition to the new functions and enhancements that are available, IMS Version 13 has new hardware and software requirements, as well as new considerations for migration and coexistence between IMS systems.

These topics describe how the new IMS Version 13 functions might affect your installation, list new, changed, and deleted messages and codes, and describe the IBM IMS Tools that support IMS Version 13.

Chapter 1. Overview of IMS Version 13 enhancements

The enhancements to IMS Version 13 affect all areas of the product: IMS Database Manager, IMS Transaction Manager, and IMS system. In addition, several components support the integration of IMS with other products.

IMS Database Manager enhancements

IMS Version 13 Database Manager includes the following enhancements:

- “Database versioning enhancement” on page 104
- “DBRC enhancements” on page 107
- “DEDB Alter enhancement” on page 108
- “Extended address volume (EAV) enhancement for GSAM” on page 109
- “HALDB alter enhancement” on page 109
- “/START DB command enhancement overview” on page 114
- “IMS catalog access enhancement” on page 114

IMS Transaction Manager enhancements

The IMS Version 13 Transaction Manager includes enhancements to the following functions: callout, Intersystem Communication (ISC), and Open Transaction Manager Access (OTMA).

- “Asynchronous callout enhancements for IBM MQ” on page 115
- “DL/I ICAL call and Java API enhancements for synchronous program switch” on page 116
- “ISC TCP/IP enhancement” on page 120
- “OTMA enhancements” on page 125
 - “OTMA callable interface asynchronous enhancement” on page 125
 - “OTMA client type declaration enhancement” on page 127
 - “OTMA descriptor enhancements” on page 128
 - “OTMA display tpipe hold queue counts enhancement” on page 129
 - “OTMA early termination notification enhancements” on page 131
 - “OTMA enhancement to omit response data from ACKs to synchronous callout response messages” on page 133
 - “OTMA exit routine enhancements” on page 133
 - “OTMA global flood control enhancements” on page 134
 - “Enhancement for WTO important OTMA messages” on page 137

IMS system enhancements

IMS Version 13 includes enhancements to the overall IMS system, including both the IMS Database Manager and the IMS Transaction Manager.

- “Application development enhancements” on page 141
- “Application thread increase enhancement” on page 142
- “Command enhancements” on page 142
- “/DIAGNOSE command enhancements” on page 146
- “DRDA DDM command support for native SQL enhancement” on page 146

- “ESAF support in Java dependent regions enhancement” on page 148
- “IMS Catalog Populate utility (DFS3PU00) serviceability enhancements” on page 148
- “IMS Connect enhancements” on page 149
- “IMS CQS enhancement” on page 150
- “IMS repository enhancements” on page 150
- “IMS security enhancements” on page 155
- “Reduced total cost of ownership enhancements” on page 160
- “SQL support enhancements” on page 162
- “User exit enhancements” on page 164

Chapter 2. Hardware requirements

IMS Version 13 has base hardware requirements. Some individual functions have additional hardware requirements.

Processor requirements

The processor that IMS Version 13 runs on must meet the following requirements:

- An IBM zSeries machine running in z/Architecture[®] mode (ESA mode is not supported by IMS Version 13)
- Capable of running z/OS Version 1 Release 13 or later
- A 64-bit processor, such as those described in the following table
- A processor that supports the Long Displacement Facility of the z/Architecture

Table 1. IBM 64-bit processors

Machine name	Machine type
IBM eServer [™] zSeries 900 (z900) ¹	2064
IBM eServer zSeries 800 (z800)	2066
IBM eServer zSeries 990 (z990)	2084
IBM eServer zSeries 890 (z890)	2086
IBM System z9 [®] Enterprise Class (formerly z9 [®] 109)	2094
IBM System z9 Business Class (z9 BC)	2096
IBM System z10 [®] Enterprise Class (z10 EC)	2097
IBM System z10 Business Class (z10 [™] BC)	2098
IBM zEnterprise [®] 196 (z196)	2817
IBM zEnterprise 114 (z114)	2818
IBM zEnterprise EC12 (zEC12)	2827
IBM zEnterprise BC12 (zBC12)	2828
IBM z13s	2965
IBM z14	3906

1. z900 systems must be at the GA2 level (microcode level 3G or later) to enable the Long Displacement Facility. For all other machine types, the Long Displacement Facility is always present.

For more information about IBM 64-bit processors, see System z[®] Hardware at www.ibm.com/systems/z/hardware/.

System console requirements

The console requirements of z/OS Version 1 Release 13 or later apply.

Tape unit requirements

IMS supports IBM 3590 and later tape units (or equivalent products) for installation and maintenance. IMS supports tape block sizes greater than 32760 bytes for the output of the Database Image Copy utility (DFSUDMP0) and the Online Database Image Copy utility (DFSUICP0).

Coupling facility requirements

IMS Version 13 has the following coupling facility requirements.

Sysplex data sharing (including data caching and VSO data sharing) with Internal Resource Lock Manager (IRLM) V2.3 requires a coupling facility level 9 or later. Shared queues, shared-EMH support, and the OM Audit trail also require a coupling facility level 9 or later. System-Managed Duplexing requires a coupling facility level 12 or later, and bidirectional CF-to-CF links (such as HiperLink, ICB link, or IC link).

For more information about coupling facility levels, see <http://www.ibm.com/systems/z/advantages/pso/cftable.html>.

DASD requirements

IMS Version 13 hardware requirements include several requirements for DASD.

During the binding of the IMS control blocks load modules (specifically during the bind of the IMS VTAM[®] control blocks load monitoring module), both the binder work data set SYSUT1 and IMS data sets IMS.SDFSRESL and IMS.SDFSJLIB must reside on a device that supports a record size of 18 KB or greater. For all other system libraries and working storage space, any device that is supported by the operating system is allowed.

For IMS database storage, any device that is supported by the operating system is allowed within the capabilities and restrictions of Basic Sequential Access Method (BSAM), Queued Sequential Access Method (QSAM), Overflow Sequential Access Method (OSAM), and Virtual Storage Access Method (VSAM).

Data sets that reside in the extended addressing space (EAS) of extended address volumes (EAVs) require IBM System Storage[®] DS8000[®] devices at microcode level R4.0 via bundle 64.0.175.0 or higher.

You must preallocate and format the write-ahead data set (WADS) on a DASD device that supports Extended Count-Key-Data (ECKD[™]) architecture.

The fast replication function of the Database Image Copy 2 utility (DFSUDMT0) requires DASD controllers that support one of the following features:

- The concurrent-copy feature of DFSMS
- The FlashCopy[®] feature of the IBM Enterprise Storage Server[®] (ESS)
- The SnapShot feature of the IBM RAMAC Virtual Array (RVA) storage system

FlashCopy and SnapShot might require microcode from IBM to activate their functionality. Also, the source and target data sets (databases and image copies) must reside on the same ESS or RVA hardware.

The DASD storage requirements for the following items are described in the *Program Directory for Information Management System Transaction and Database Servers V13.0*:

- SMP/E system entries
- SMP/E data sets
- Target libraries
- Distribution libraries
- Install process
- Optional machine-readable material

The following types of data sets can be allocated in the extended addressing space (EAS) of an extended address volume (EAV):

- GSAM database data sets
- BPE external trace data sets
- OSAM database data sets
- VSAM database data sets
- Online log data sets (OLDSs), including large OLDS (for example, greater than 64 KB tracks)
- Write ahead data sets (WADSs)
- Restart data sets (RDSs)
- Message queue blocks data sets
- Long and short message data sets
- Terminal devices with UNITYPE = SPOOL or DISK
- RESLIB data sets (IMS.SDFSRESL)
- MODBLKS data sets for online change (IMS.MODBLKSA and IMS.MODBLKSB)
- Application control block library (ACBLIB) data sets
- DBRC RECON data sets (non-PRA)
- Database Image Copy utility (DFSUDMP0) data sets
- Database Image Copy 2 utility (DFSUDMT0) data sets
- Database Change Accumulation utility (DFSUCUM0) data sets
- Local online change data sets (IMS.MODSTAT)
- Global online change data sets (IMS.OLCSTAT)
- Partitioned data set extended (PDSE) data sets (IMS.SDFSJLIB, PGMLIB, SMPLTS, and External Subsystem Attach Facility (ESAF) load libraries)
- Time-controlled operations (TCO) data sets
- System log data sets (SLDSs)
- Recovery log data sets (RLDSs)
- HALDB Indirect List data sets (ILDs)
- IMS Repository data sets
- MFS map library data sets produced by the MFS Language and Service utilities (IMS.FORMAT)
- IMS Trace facility external trace data sets
- IMS Monitor output data sets

Large sequential data set support hardware requirements

To take advantage of this support, hardware that has more than 65,535 tracks must be used.

Multiple Systems Coupling hardware requirements

When the physical link is channel-to-channel (CTC) and is dedicated to IMS, Multiple Systems Coupling (MSC) requires the System/370 CTC adapter or a logical channel on the IBM 3088, ESCON, or Fiber Channel connection (FICON®). MSC FICON CTC support requires that at least one IMS system be installed on an IBM zSeries machine with the FICON channel and FICON CTC microcode. The other side (IMS) can be any processor with a FICON channel.

Parallel RECON access hardware requirements

The parallel RECON access function requires a Parallel Sysplex® environment and DFSMS Transactional VSAM Services (DFSMSStvs). Therefore, parallel RECON access requires Coupling Facility (CF) hardware in the System z sysplex.

Terminals and equipment supported by IMS Version 13

IMS Version 13 supports SLU, LU, NTO, 3270, and Finance (3600) terminals, as well as other equipment such as printers and DASD devices.

The following tables list the terminals and other equipment supported by IMS Version 13.

In the table, the following abbreviations are used:

DSC	Data Stream Compatibility
ISC	Intersystem Communication
LU	Logical Unit
NTO	Network Terminal Option
PC	Personal Computer
PP	Program Product
SLU	Secondary Logical Unit
TTY	Teletypewriter equipment
VTAM	Virtual Telecommunications Access Method

Table 2. Terminals that are supported by IMS Version 13

Compatible product	SNA	Notes®
SLU 1 (for example, 3230, 3232, 3262, 3287, 3767, 3268, 3770, 3770P, 3790 (type 2 batch and bulk print), 4700, 5280, 5550, S/32, S/34, S/38, 8100)	VTAM	1, 2
SLU 2 (for example, 3179, 3180, 3276, 3278, 3279, 3290, 3790 (3270 DSC feature), 3600 Admin PP, 4700, 5280, 5520, 5550, 8100, 8775, S/34, Display writer)	VTAM	1, 2

Table 2. Terminals that are supported by IMS Version 13 (continued)

Compatible product	SNA	Notes [®]
SLU P (for example, 3600, 3630, 3650, 3680, 3770PC, 3790, 4700, 4730, 4736, 5520, 8100, S/34, Series/1)	VTAM	1, 2, 3, 4
LU 6.1 (ISC)	VTAM	1, 2
LU 6.2 (APPC)	VTAM	2
NTO (for example, 33/35, TTY, 2740, 2741, 3101, 3232, 3767, S/23)	VTAM	1, 2

Notes:

1. The IMS Message Format Service (MFS) is available for this device. MFS editing can be bypassed on a message-by-message basis.
2. IMS Fast Path supports the use of compatible terminals.
3. Although IMS provides sample code for this terminal, additional user coding is required.
4. IMS provides no device-resident code for this device. Additional user coding is required to attach it to IMS.

Table 3. Terminals that are supported by IMS Version 13, but withdrawn from IBM Marketing

IMS-supported product	Compatible product	Switched mode	Polled mode	Local mode	SNA	Notes
3270		VTAM	VTAM	VTAM	VTAM	1, 2
Finance (3600)	4700				VTAM	1, 2, 3

Notes:

1. The IMS Message Format Service (MFS) is available for this device. MFS editing can be bypassed on a message-by-message basis.
2. IMS Fast Path supports the use of compatible terminals.
3. Although IMS provides sample code for this terminal, additional user coding is required.

For the following table, refer to operating system descriptions for specific device types.

Table 4. Other equipment that is supported by IMS Version 13

IMS-supported product	Access
System console	MVS™ write-to-operator/write-to-operator-with-reply (WTO/WTOR)
Spool device	Basic Sequential Access Method (BSAM)
Card reader	BSAM
Printer	BSAM
Magnetic tape	BSAM
DASD devices	BSAM

Restriction: IMS Version 13 does not support BTAM devices (2740-1, 2740-2, 2741, 2780, System/3, and System/7).

Remote Site Recovery hardware requirements

For basic Remote Site Recovery (RSR) functions, you need a Sysplex Timer, a high bandwidth control unit, and at least one tape unit.

RSR requires:

- A Sysplex Timer (if either data sharing or workload is spread across multiple CPCs)
- A high bandwidth control unit (such as a 3172)
- At least one tape unit at the tracking site

Coordinated Disaster Recovery support for IMS and DB2[®] requires that the DB2 logs reside on devices that support Extended Remote Copy (XRC).

zIIP utilization hardware requirements

One or more IBM System z Integrated Information Processors (zIIPs) must be online on the machine at the time an IMS Connect or IMS ODBM address space is started in order to have any threads zIIP eligible and executed on a zIIP for that execution instance.

If no zIIPs are online when the address space is started, no work will be moved to a zIIP.

Chapter 3. Software requirements

IMS Version 13 has base software requirements. Some individual functions have additional software requirements.

Operating software requirements

IMS Version 13 and its various functions have specific operating software requirements.

Before you install IMS Version 13, check with your IBM Support Center or check either Information/Access or Service Link for additional preventive service planning (PSP) information that you need to be aware of. The PSP upgrade name for IMS Version 13 is IMS1300.

The z/OS service levels that are required for installation and execution are described in the *Program Directory for Information Management System Transaction and Database Servers V13.0*.

IMS Version 13 base software requirements

The base IMS Version 13 system runs on z/OS Version 1 Release 13 or later. Certain features and functions have additional software requirements.

IMS Version 13 requires the following minimum version, release, or modification levels (as long as those versions remain available and supported by IBM):

- z/OS Version 1 Release 13 (5694-A01) or later
 - When running IMS Version 13 on z/OS Version 1 Release 13, APARs/PTFs OA36172/UA61786 and OA39392/UA66823 must be installed.
 - IBM High-Level Assembler Toolkit (5696-234) Version 1 Release 5, a separately orderable feature of z/OS.
 - z/OS V1R13.0 Security Server RACF® V1R13.0 or later, or an equivalent product, if security is used. RACF is available with the IBM SecureWay Security Server for z/OS (a separately orderable feature of z/OS).
- IRLM Version 2.3 or later (5635-A04), if data sharing is used. IRLM Version 2.3 is delivered with IMS Version 13.

When using multiple IMS systems:

- On the same z/OS system, you need only one IRLM.
- Of different release levels on the same z/OS system, you can have one IRLM or you can use two or more IRLM address spaces. If two or more IMS systems share data and are running on the same z/OS system, they should use the same IRLM.
- On different z/OS systems for inter-processor block-level data sharing, you must have one IRLM on each z/OS system.

IMS Version 13 also operates in a virtual machine (VM) under control of z/OS. This environment is intended for use in a program development, testing, and non-XRF production environment.

Restrictions: The VM environment has the following restrictions:

- The Log Analysis utilities might yield inaccurate time-stamp results.
- If you operate the IMS Version 13 Transaction Manager under VM for production purposes and have specific throughput or terminal response-time requirements, plan to benchmark under VM to ensure that the proposed configuration meets your performance needs.

System-Managed CF Structure Duplexing is recommended, though not required, for the Resource Manager resource structure.

Coordinated Disaster Recovery support for IMS and DB2 requires the IMS Version 13 Remote Site Recovery (RSR) Recovery Level Tracking (RLT) feature.

Coexistence APARs

Certain functions of IMS Version 13 can coexist with IMS Version 11 and IMS Version 12 with the appropriate coexistence APARs applied.

See “Overview of coexistence APARs” on page 71 for an overview of the APARs that are needed for coexistence purposes.

Database Resource Adapter (DRA) software requirements

The version of the IMS DRA modules that are used by a DRA client must be the same version as the IMS with which the DRA client is communicating.

Recommendations:

- Concatenate the IMS.SDFSRESL library to the DRA client step library so the correct version of the DRA Startup/Router routine (DFSPRRC0) is loaded into the DRA client load library.
- Ensure that the DRA Startup Table (DFSPZPxx) points to the correct version of IMS.SDFSRESL.

Data sharing software requirements

For block-level data sharing, IRLM Version 2.3 or later is required. The IRLM is an independent component that is shipped with IMS Version 13. The IRLM must be defined as a z/OS subsystem. Block-level data sharing of databases is supported between all in-service levels of IMS.

Dynamic resource definition software requirements

Although dynamic resource definition (DRD) has the same hardware and software requirements as IMS Version 13, certain configuration and system definition requirements exist.

The following configuration and system definition requirements apply to DRD:

- IMS must be defined with a Common Service Layer (CSL) in order to enable DRD. The CSL must contain a Structured Call Interface (SCI), an Operations Manager (OM) and, if the IMSRSC repository is used, a Resource Manager (RM).
- You must enable DRD by specifying the appropriate parameters in either of the following IMS PROCLIB members:
 - DFSDFxxx
 - DFSCGxxx (CSL parameters. These can be replaced by the <COMMON_SERVICE_LAYER> section of DFSDFxxx.)

- You must have a set of at least two resource definition data sets (RDDSs) or a set of IMSRSC repository data sets where the resource definitions that support DRD are stored. These RDDSs or IMSRSC repository data sets must exist before you store resource definitions that are created, updated, or deleted with DRD.
- You must have an entry point for DRD commands, such as the TSO SPOC application, the Manage Resources application, or another application that interacts with the OM API.
- The INITMOD procedure requires that either MODBLKSA or MODBLKSB is defined to initialize the MODSTAT data set, even for an IMS that does not define the MODBLKS data set.
- The Global Online Change utility (DFSUOLC0) requires that either MDBS=A or MDBS=B is defined to initialize the OLCSTAT data set, even for an IMS that does not define the MODBLKS data set.

Fast Path software requirements

The Fast Path 64-bit buffer manager requires a minimum of 2.1 gigabytes of 64-bit common storage. Also, if the Fast Path 64-bit buffer manager will be used on systems that are being tracked by a Fast Database Recovery (FDBR) address space, the DFSDF= keyword must be specified on the FDR procedure.

HALDB Index/ILDS Rebuild utility free space function software requirements

The HALDB Index/ILDS Rebuild utility (DFSPREC0) requires four 2 GB data spaces to store and sort the rebuilt indirect list entries (ILEs) before reloading them into the ILDS.

IMS callout function software requirements



To support the IMS callout function, OTMA must be enabled in IMS and IMS Connect configured for callout support.

Also, one of the following components that is external to IMS is required:

- The IMS Enterprise Suite SOAP Gateway
- The IMS TM Resource Adapter
- An IBM WebSphere® DataPower® appliance
- A user-written IMS Connect client (TCP/IP application)

The synchronous program switch functionality, which was added in IMS Version 13, is a variation of the callout function. However, even though IMS processes synchronous program switch requests as OTMA transactions, the synchronous program switch functionality does not require you to enable OTMA, IMS Connect, or any of the external software components in the preceding list.

Related concepts:

-  [IMS Enterprise Suite SOAP Gateway overview](#)
-  [IMS TM Resource Adapter overview](#)

IMS catalog function software requirements

The IMS catalog function has software requirements.

Distributed environments that use the IMS catalog function can use either the IMS Universal drivers or the IBM IMS Data Provider for Microsoft .NET to access the catalog. The IMS catalog function supports the use of the IMS Universal drivers, IMS Data Provider for Microsoft .NET, traditional IMS database query techniques, or batch processing in the z/OS environment.

ISC TCP/IP software requirements

Software requirements for the IMS Version 13 ISC TCP/IP function include requirements for CICS®, ETO, IMS Connect, and a minimal CSL.

The software requirements for the IMS Version 13 ISC TCP/IP function are:

- IBM CICS Transaction Server for z/OS, Version 5.1 (or later) must be used.
- IMS Connect is required to provide TCP/IP socket connection support for IMS.
- The Common Service Layer (CSL) with at least the Structured Call Interface (SCI) and the Operations Manager (OM) is required. SCI is required for communications between IMS and IMS Connect and OM is required for type-2 command support.
- A single point of control (SPOC) program, such as the IMS TSO SPOC, must be used to issue type-2 commands to the OM API or REXX SPOC API.
- For each IMS subsystem that uses dynamically defined terminals with ISC TCP/IP, the IMS Extended Terminal Option (ETO) is required.

IMS Connect software requirements

IMS Connect has software requirements in addition to those of the base IMS product.

The software requirements for IMS Connect include:

- z/OS Communications Server V1R13.0 or later (TCP/IP).
- To implement security, z/OS Security Server RACF or an equivalent product.
- To use the local option for client communications, there are additional software requirements. See IMS Transaction Manager Resource Adapter overview (Application Programming).
- To use Secure Sockets Layer (SSL), z/OS System SSL, a sub-component of z/OS Cryptographic System Services, is required. For information about z/OS encryption support available with the z/OS Cryptographic System Services SSL module, see *z/OS Cryptographic Services System SSL Programming* (SC14-7495).

IMS 14 is the last version of IMS to support the IMS Connect SSL function.

Customers using this function should migrate to using IBM z/OS Communications Server Application Transparent Transport Layer Security (AT-TLS) to set up Secure Socket Layer (SSL) on TCP/IP connections to IMS Connect.

- To support the IMS Universal drivers or a user-written DRDA source server, an IMS Common Service Layer is required, including the Open Database Manager, the Operations Manager, and the Structured Call Interface.
- IMS Connect must have z/OS UNIX System Services superuser privileges, to ensure that IMS Connect can open ports.

IMS Connect XML Adapter support

The IMS Connect XML Adapter support in IMS Version 13, used with the IMS Enterprise Suite SOAP Gateway, requires IBM Developer for System z Version 8 or

later. Certain functions of the IMS Enterprise Suite SOAP Gateway might have additional software requirements.

Java application program support in IMS Version 13

Java™ applications that run in or access IMS Version 13 must meet specific software requirements.

Software requirements for Java applications that access IMS databases

IMS Version 13 requires software to support Java application programs that access IMS databases.

IMS Version 13 requires the following software:

- z/OS UNIX System Services available at run time.
- Hierarchic File System (HFS) or zFS. For information on preparing HFS, see *z/OS UNIX System Services File System Interface Reference*.

IMS provides two generations of Java drivers and resource adapters:

- The IMS Universal drivers, which are the most recent generation (delivered with IMS Version 11 and later)

Note: The IMS Java dependent region (JDR) resource adapter reuses some of the interfaces and classes in the IMS Universal drivers. As a result, it is packaged as part of the IMS Universal drivers starting IMS 13 APAR PI62580 (PTF UI39459) and has the same software requirements as the IMS Universal drivers.

- The drivers and resource adapters provided by the classic Java APIs for IMS.

Recommendation: IMS Version 13 is the last release to support the IMS Classic Java APIs. Customers that are using these APIs should migrate to the IMS Universal drivers.

Software requirements for Java application programs that use the IMS Universal drivers or JDR resource adapter

The IMS Universal drivers that Java application programs can use to access IMS data have software requirements.

The IMS Universal drivers have the following runtime software requirements:

- IBM SDK, Java Technology Edition, Version 6.0.1 or later (31-bit or 64-bit)
- One or more of the following conditional requirements:
 - For CICS applications, IBM CICS Transaction Server for z/OS Version 4.1 (5655-S97) or later
 - For Db2® stored procedures:
 - Db2 11 for z/OS (5615-DB2) or later
 - Db2 10 for z/OS (5605-DB2)
 - Db2 for z/OS Version 9.1 (5635-DB2)
 - For WebSphere applications, WebSphere Application Server for z/OS (5655-N02) or WebSphere Application Server for distributed platforms (5724-J08), Version 7.0.1 or later. You must use the fix pack that contains WebSphere Application Server APAR PK89274 installed in the system.
- RACF or an equivalent product

- The software requirements for the JDR resource adapter are the same as for the IMS Universal drivers.

Java application programs that use the IMS Universal drivers also require a way to generate the IMS database metadata, such as using the IMS Enterprise Suite Explorer for Development.

Note: Use binary-mode FTP to transfer the IMS Universal drivers JAR or RAR files to another system.

JAR and RAR files for type-4 connectivity

The following table describes the JAR and RAR files that provide type-4 connectivity for the IMS Universal drivers:

Table 5. Type-4 connectivity JAR and RAR files for Java applications that use the IMS Universal drivers

Driver	JAR or RAR file
IBM IMS Universal DL/I driver	<i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/imsudb.jar
IBM IMS Universal JDBC driver	<i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/imsudb.jar
IBM IMS Universal Database resource adapter	For use within WebSphere Application Server (both z/OS and distributed platforms): <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbJLocal.rar for JCA/JDBC local transaction processing only <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbXA.rar for JCA/JDBC two-phase (XA) commit processing or local transaction processing <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbLocal.rar for CCI local transaction support <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbXA.rar for CCI two-phase commit (XA) transaction support

JAR and RAR files for type-2 connectivity

The following table describes the JAR and RAR files that provide type-2 connectivity for the IMS Universal drivers:

Table 6. Type-2 connectivity JAR and RAR files for Java applications that use the IMS Universal drivers

Driver	JAR file
IMS Universal DL/I driver	<i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/imsudb.jar
IMS Universal JDBC driver	<i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/imsudb.jar

Table 6. Type-2 connectivity JAR and RAR files for Java applications that use the IMS Universal drivers (continued)

Driver	JAR file
IMS Universal Database resource adapter	For use within WebSphere Application Server (both z/OS and distributed platforms): <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbLocal.rar for CCI programming interface to perform SQL or DL/I data operations <i>pathprefix</i> /usr/lpp/ims/ims13/imsjava/rar/imsudbJLocal.rar for JDBC programming interface to perform SQL data operations

When DriverType=2:

- The transaction scope is local (a unit of work is scoped to a particular connection). Multiple connections can have independent units of work associated with each connection.
- Application programs can issue local commit and rollback calls through either the JDBC Connection interface or the CCI LocalTransaction interface.
- ContainerManaged beans are supported, but require the following properties to be set in the EJB Deployment Descriptor:
 - In the Bean tab, specify the following properties under the LocalTransaction heading:
 - Boundary = BeanMethod
 - Resolver = ContainerAtBoundary
 - Unresolved action = Rollback
 - In the Assembly tab, set the transaction scope to NotSupported.

When DriverType=2_CTX:

- Specifies a global scope transaction model in which a unit of work can span multiple bean methods. RRS-managed transaction applications use this driver type. The container coordinates commit and rollback processing through RRS.
- Application programs can use the UserTransaction interface for explicit commit and rollback calls.

Software requirements for Java applications that use the classic Java APIs for IMS

Java applications that access IMS databases by using the classic Java APIs for IMS have specific software requirements, depending on the environment in which the application runs.

Recommendation: IMS Version 13 is the last release to support the IMS Classic Java APIs. Customers that are using these APIs should migrate to the IMS Universal drivers.

Important: Ensure that the class path in your environment contains only either the .jar files for the IMS Universal drivers or the .jar files for the Classic Java APIs. Mixing the two in the class path could result in a java.lang.NoSuchMethodError exception in the DFSJVM00 module.

JMP and JBP address spaces

Java application programs that run in JMP or JBP regions require the IBM 31-bit SDK for z/OS, Java 2 Technology Edition, Version 6 or later.

Support for interoperation between Java and COBOL or PL/I when running in a JMP or JBP region requires the object-oriented syntax for Java interoperability that is in IBM Enterprise COBOL for z/OS (program number 5655-G53) or later, or Enterprise PL/I for z/OS (program number 5655-H31) or later.

Java application programs that access Db2 for z/OS subsystems from JMP or JBP regions require that APAR/PTF PQ74629/UQ77540 be applied to the Db2 for z/OS subsystem.

The JAR files that are required to support this environment are:

Environment	JAR file
All	imsjavaBase.jar
Java message processing (JMP) region and Java batch processing (JBP) region	imsjavaTM.jar
JDBC only	<ul style="list-style-type: none">imsJDBC.jarimsXQuery.jar (for XQuery support)

WebSphere Application Server environment

Java application programs that provide JDBC access to IMS DB from WebSphere Application Server for z/OS require:

- WebSphere Application Server for z/OS Version 7.0.1 (program number 5655-R36) or later
- z/OS Resource Recovery Services (RRS)
- RACF or an equivalent security product
- The IMS Open Database Access (ODBA) component
- The IMS Database Resource Adapter (DRA) component

The JAR files that are required to support this environment are:

Environment	JAR file
All	imsjavaBase.jar
WebSphere Application Server for z/OS only	<ul style="list-style-type: none">imsDBJCA.jarimsDBJCA.rar
JDBC only	<ul style="list-style-type: none">imsJDBC.jarimsXQuery.jar (for XQuery support)

For information about configuring this environment, see *IMS Version 13 Communications and Connections*.

CICS environment

Java application programs that provide JDBC access to IMS DB from a CICS environment require:

- One of the following versions of CICS Transaction Server for z/OS:

- Version 3.2 (5655-M15) or later and JDK 1.4.2 or later
- Version 3.2 (5655-M15) or later (with APAR PK59577 applied) and JDK 5.0 or later
- The IMS DRA component installed in the CICS environment

The version of the IMS DRA modules that are used by a DRA client must be the same version as the IMS with which the DRA client is communicating. For more information, see “Database Resource Adapter (DRA) software requirements” on page 12.

The JAR files that are required to support this environment are:

Environment	JAR file
All	imsjavaBase.jar
JDBC only	<ul style="list-style-type: none"> • imsJDBC.jar • imsXQuery.jar (for XQuery support)

Db2 for z/OS environment

Java application programs that provide JDBC access from IMS DB for Db2 for z/OS stored procedures require:

- One of the following versions of Db2 for z/OS:
 - Db2 for z/OS Version 10.1 (5605-DB2) or later with the DB2 SQLJ/JDBC driver
 - Db2 for z/OS Version 9.1 (5635-DB2) or later with the DB2 SQLJ/JDBC driver
- The IMS Open Database Access (ODBA) component installed in the Db2 for z/OS environment
- The IMS DRA component installed in the Db2 for z/OS environment

The JAR files that are required to support this environment are:

Environment	JAR file
All	imsjavaBase.jar
JDBC only	<ul style="list-style-type: none"> • imsJDBC.jar • imsXQuery.jar (for XQuery support)

Software requirements for Java applications that access IMS transactions

Java applications that access IMS transactions must meet specific software requirements.

- Java programs that run in Java message processing (JMP) and Java batch processing (JBP) regions require IBM SDK for z/OS, Java Technology Edition, Version 6.0.1 or later.
- For programs that access transactions using the IMS TM Resource Adapter, see supported versions and software configurations.

The JAR file `imsudb.jar` is needed to support JMP and JBP regions.

Note: IMS 13 APAR PI62580 (PTF UI39459) is required. Because IMS Java dependent region (JDR) resource adapter reuses some of the interfaces and classes

in the IMS Universal drivers, the classes and interfaces are packaged together as one .jar file, `imsudb.jar`. Previously, the `imsutm.jar` for the JDR resource adapter was packaged separately.

Important: Ensure that the class path in your environment does not contain the .jar files for the Classic Java APIs. Having the .jar files for both the Classic Java APIs and the IMS Universal drivers in the class path could result in a `java.lang.NoSuchMethodError` exception in the DFSJVM00 module.

Open Database solution software requirements

To use the Open Database solution, IMS must be configured as an IMSplex and IMS Connect is required.

The Open Database solution requires IMS Connect, as well as the following Common Service Layer (CSL) components:

- Operations Manager (OM)
- Structured Call Interface (SCI)
- Open Database Manager (ODBM)

Important: Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the `CSLDCxxx` member of the IMS PROCLIB data set.

Parallel RECON access software requirements

To use the parallel RECON access function of Database Recovery Control (DBRC), you must configure IMS as an IMSplex and install DFSMS Transactional VSAM Services (DFSMSStvs), a separately orderable feature of z/OS.

Shared queues XCF enhancement software requirements

A MINVERS value of 12.1 is required in the RECON data set for a z/OS cross-system coupling facility (XCF) to manage in an IMS shared-queue group either APPC synchronous conversations or, if the appropriate synchronization level is specified, OTMA send-then-commit (CM1) transactions.

SQL support software requirements

For IMS to process SQL calls in the native host environment, COBOL Version 5 with IMS coprocessor support is required. With COBOL Version 5, all load modules must reside within a partitioned data set extended (PDSE). The IMS catalog must be enabled for this SQL support.

Sysplex serialized program management

The sysplex serialized program management function requires that a Resource Manager be active with a resource structure defined. This requirement in turn means that you need a Common Service Layer installed.

The sysplex serialized program management function has the following software requirements:

- The following Common Service Layer components: Operations Manager, Structured Call Interface, and Resource Manager

- A resource structure defined in a coupling facility
- Shared message queues

Sysplex data sharing

IMS sysplex data sharing (including data caching, shared SDEPs, and shared VSO DEDB areas) requires IRLM Version 2.3 or later.

User exit enhancements software requirements

Exits to be queried or refreshed using type-2 commands must first be defined in the <USER_EXITS> section of the DFSDFXxx member of the IMS PROCLIB data set.


Some user exits are passed a standard user exit parameter list (SXPL), mapped by macro DFSSXPL. The SXPL contains a version number that can be used to identify what fields are present in the parameter list. If your user exit accesses a field that was added at a specific version of the parameter list beyond the base level for an IMS release, you should test the SXPL version number to ensure that the parameter list you were passed is at the correct version or higher before using the field.

In IMS Version 13, some older user exits are always passed a version 1 SXPL. All other user exits that are passed an SXPL receive a version 6 or later SXPL.

Related concepts:

 Refreshable exit routine types (Exit Routines)

Related reference:

 IMS standard user exit parameter list (Exit Routines)

IMS Enterprise Suite software requirements

IMS Enterprise Suite provides APIs, tools, and a web service solution for facilitating application development and extending access to IMS transactions and data.

IMS Version 13 can be used with the following versions of IMS Enterprise Suite, although some components or functions might have specific IMS requirements.

- IMS Enterprise Suite V3.2
- IMS Enterprise Suite V3.1

Related information:

IMS Enterprise Suite V3.2 overview

IMS Enterprise Suite V3.1 overview

CICS subsystems supported

IBM CICS Transaction Server for z/OS can connect to IMS if minimum version requirements are met. Certain IMS Version 13 functions might include additional version requirements for CICS.

CICS Transaction Server for z/OS Version 3.2 (5655-M15) or later can connect to either the IMS Version 13 Database Manager (DB) or, using the appropriate TM interface, the IMS Version 13 Transaction Manager.

For the ISC TCP/IP function, IBM CICS Transaction Server for z/OS Version 5.1 or later, the Extended Terminal Option (ETO) feature, and IMS Connect are required.

The IMS Universal drivers require CICS Transaction Server for z/OS Version 4.1 (5655-S97) or later.

IBM CICS Transaction Server for z/OS Version 4.2 is required to support the CICS open transaction environment (threadsafe). CICS Version 4.2 takes advantage of the DRA open thread TCB option that was added by IMS Version 12 APAR/PTF PM31420/UK70991. By specifying the DRA open thread TCB option on an INIT request, a CCTL can avoid the overhead of TCB switching and improve parallel processing. When the DRA open thread TCB option is active, the DRA does not attach dedicated DRA thread task control blocks (TCBs). IMS DL/I calls can run on a CICS thread, eliminating the need for IMS to create additional TCBs for each thread and the need to switch between tasks during call processing.

For more information about the DRA open thread TCB option, see:

- INIT request (System Programming APIs)
- Database resource adapter startup table for CCTL regions (System Definition)

Db2 for z/OS subsystems supported

IMS Version 13 Transaction Manager can connect with Db2 for z/OS.

The IMS Version 13 Transaction Manager can be connected to any of the following Db2 products:

- Db2 11 for z/OS (5615-DB2) or later
- Db2 10 for z/OS (5605-DB2)
- Db2 for z/OS Version 9.1 (5635-Db2)

IMS/Db2 Coordinated Disaster Recovery Support requires the IMS Version 13 Remote Site Recovery (RSR) feature, and requires the databases to be registered with Recovery Level Tracking (RLT).

IBM MQ subsystems supported

IMS Version 13 supports IBM MQ.

IBM WebSphere MQ for z/OS V7.0.1 introduces the MQ message expiry option to interface the IMS transaction expiration function.

Intersystem Communication (ISC) subsystems supported

Using Intersystem Communication (ISC), the IMS Version 13 Transaction Manager can be connected to IMS Version 13 and earlier systems, to IBM CICS Transaction Server for z/OS, and to user-written software.

The IMS Version 13 Transaction Manager can be connected to the following products by using ISC:

- IMS Version 13 (5635-A04)
- IMS Version 12 (5635-A03)
- IMS Version 11 (5635-A02)
- IBM CICS Transaction Server for z/OS Version 3.2 (5655-M15) or later

For the ISC TCP/IP function, IBM CICS Transaction Server for z/OS Version 5.1 or later and IMS Connect are required.

- User-written software

Programming languages used to write IMS Version 13

IMS Version 13 is written in High Level Assembler Release 5, PL/X, C, C++, and JDK Version 6.

Programming languages supported

You can write IMS applications in the supported versions of many programming languages.

You can write IMS applications in the currently supported versions of the following languages:

- Ada
- COBOL for OS/390® & VM
- Enterprise COBOL for z/OS

If you use Enterprise COBOL for z/OS Version 5.1, the data set that holds the output load modules of the compiler must be a PDSE.

For the latest version of COBOL for z/OS that is supported for a particular version of z/OS, see COBOL Migration Concerns going to New Release of the Compiler or z/OS.

- Enterprise PL/I for z/OS
- IBM High Level Assembler for z/OS & z/VM® & z/VSE®
- Java, using the IBM 31-bit SDK for z/OS, Java Technology Edition, V6
- PL/I for z/OS and OS/390
- TSO/E REXX
- VS Pascal
- z/OS C/C++

Application programs supported

IMS Version 13 supports application programs that are supported by IMS Version 11 and IMS Version 12.

All application programs that are supported under IMS Version 11 and IMS Version 12 are still supported under IMS Version 13. In general, you should not have to recompile, reassemble, or rebind an IMS application program to run under IMS Version 13.

Application programs that use the use the AIB INQY ENVIRON call might need to be changed. For more information about this situation, see “INQY call for system services migration considerations” on page 56.

Chapter 4. Packaging for IMS Version 13

The IMS product is packaged under several function modification identifiers (FMIDs). This packaging choice is in response to IMS internal requirements and is subject to change in the future.

The existence of an FMID does not imply that installation of the FMID is optional. Refer to the following table to determine which FMIDs are required, optional, or not applicable. Within the table the following notations are used:

R FMID installation is required.

O FMID installation is optional.

N The FMID is not applicable to this environment.

All FMIDs are installed outside of the Installation Verification Program (IVP). See the *Program Directory for Information Management System Transaction and Database Servers V13.0* for installation instructions.

Table 7. FMID requirements in IMS Version 13

FMID	Description	DB batch	DBCTL	DB/DC	DB/DC with XRF (1)	DCCTL
HIR2230	Internal Resource Lock Manager V2R3	O	O	O	O	N
HMK1300 (2)	System Services component IVP component Database Recovery Control Logging component IMS Connect	R	R	R	R	R
JMK1301	Database Manager function	R	R	R	R	N
JMK1302	Transaction Manager function	N	N	R	R	R
JMK1303	Extended Terminal Option feature	N	N	O	O	O
JMK1304	RSR Recovery-Level Tracking feature	O	O	O	O	O
JMK1305	RSR Database-Level Tracking feature	O	O	O	O	N
JMK1306	IMS Java On Demand features: IMS Universal drivers for access to IMS DB IMS TM Resource Adapter for access to IMS TM Classic Java APIs for IMS	O	O	O	O	O
JMK131Z	IMS Value Unit Editions: IMS Database Value Unit Edition V13.01.00 Program Number 5655-DSM IMS Transaction Manager Value Unit Edition V13.01.00 Program Number 5655-TM2	O	O	O	O	O

Note:

1. Although DCCTL with XRF is a supported combination, it is not included as an IVP option.
2. FMID installation is required even if the primary function provided by this FMID is not used.

Chapter 5. Installation considerations

Before you migrate and prepare your own systems, complete both the SMP/E install and the entire IVP process.

The following sections list the programming considerations for installing IMS and activating its functions.

IMS Version 13 is a complex product to install and prepare for execution. The SMP/E install and the IVP processes are not completed as a single process.

Recommendation: Complete both the SMP/E install and the entire IVP process, documented in *IMS Version 13 Installation*, before proceeding with the migration and preparation of your own systems.

The following table lists the sample jobs that are shipped with IMS Version 13.

Table 8. Sample installation jobs that are shipped with IMS Version 13

Job name	Job type	Description
DFSALA	SMP/E	Sample job to allocate and initialize a new SMP/E CSI data set (optional)
DFSALB	SMP/E	Sample job to allocate SMP/E data sets (recommended, but optional)
DFSALLOC	ALLOCATE	Sample job to allocate target and distribution libraries
DFSJMKD	MKDIR	Sample job to invoke the supplied DFSJMKDR EXEC to allocate paths for the On Demand Features
DFSDDDEF1	DDDEF	Sample job to define SMP/E DDDEFs for IMS
DFSDDDEF2	DDDEF	Sample job to define SMP/E DDDEFs for the IMS Java On Demand Features
DFSAPPLY	APPLY	Sample APPLY job
DFSACCEP	ACCEPT	Sample ACCEPT job

The IVP process:

- Can be used for setting up and demonstrating an IMS system, as well as the testing of selected functions.
- Provides materials that you can use as a guide for working with your own IMS systems.

The IVP process includes:

- Data set allocation
- Post-installation activities on target libraries
- System definition activities
- SVC considerations
- Authorization considerations
- IMS system preparation activities
- IMS application preparation activities
- IMS system and application execution activities

There are no system programming or special programming considerations for IMS Version 13.

Chapter 6. Migration to IMS Version 13

The objective of migration support is to enable an orderly migration from your current release of IMS to IMS Version 13.

These topics describe general migration considerations for IMS Version 13 and migration considerations for specific new features and functions of IMS Version 13.

General migration recommendations

General migration tasks for current IMS installations include researching Preventive Service Planning (PSP), determining hardware and software requirements, backing up your system, and other tasks.

General migration recommendations for current IMS installations are:

- Contact IBM Software Support for current installation, migration, and problem resolution information, and ask for PSP for IMS.
- Read the *Program Directory for Information Management System Transaction and Database Servers V13.0* for the most current hardware requirements, software requirements, prerequisites, and installation information. For general installation information, see *IMS Version 13 Installation*.
- Review the service that has been applied to your current system. Determine if any critical service was released since your copy of the new IMS product was created. If critical service was released, install any that is appropriate for your installation of the new IMS release.
- Review the functions and enhancements for IMS Version 13.

Recommendation: Enable new functions and enhancements in production only after you have the new release up and running in production with your current IMS configuration. After the new IMS release supports your current configuration in production, then take advantage of new functions.

- Review changes to:
 - SMP/E, distribution, and system data sets
 - System definition macros
 - Log records
 - RECON records
 - Exit routines
 - Cataloged procedures
 - Control statement members in the IMS.PROCLIB data set
 - Utilities
 - Operator commands
 - Operating procedures
 - Messages and abend codes
- Determine the availability of updates to IBM IMS Tools, aids, and related products.
- Prepare a migration plan.
- Prepare a fallback plan. See “Fallback considerations” on page 64 for a sample list of items to consider when preparing a fallback plan.

- Apply the appropriate coexistence APARs/PTFs to your existing system. For a list of the coexistence APARs/PTFs, see “Overview of coexistence APARs” on page 71.
- Perform database recovery for any database data sets for which Extended Error Queue Elements (EEQEs) have been recorded in the DBRC Recovery Control (RECON) data set.
- If running the Common Service Layer (CSL) in an IMSplex made up of different versions of IMS, use the latest version of IMS for the CSL address spaces, such as SCI, OM, and so forth.
- Back up your system, including:
 - Databases and areas
 - RECON data sets
 - SMP/E data sets, distribution, and target libraries

Recommendation: Examine Hardware Data Compression (HDC) dictionaries when you migrate to a new release of IMS to determine if they incorporate IMS versions that are now out of service. Although rebinding dictionaries is not required when migrating to a new version of IMS, a gradual refresh of these dictionaries to a current release is a good practice.

- Validate your system definition source. You might want to merge the IVP source with your source.

The IMS IVP is used after the installation of a new IMS system. The IVP is used to verify the installation of IMS and can be used sporadically afterward.

The IVP Variable Export utility mitigates the migration of IVP variables values between releases.
- Install the system prerequisites and your new IMS system (including the pre-generation service).

The complete set of IMS Version 13 modules that are needed for execution are built by a combination of SMP/E processing and running an *ALL* type of system definition process.

If needed, you can use the SMP/E GENERATE command to generate the JCL for jobs that build the modules that are not built during the system definition process.
- Install required service that was not included in the pre-generation service.
- Install any needed updates to IBM IMS tools, aids, and related products.
- Upgrade the RECON data set.
- Build application control blocks (ACBGEN).

Attention: Never use an ACB library built in one version of IMS with an IMS system of another version. You could cause an abend in the IMS control region or you could destroy some or all of your databases. Using an ACB library from one version of IMS with an IMS system of another version is a serious error. Carefully review your fallback plan and JCL. Also, protect your ACB library with RACF (or an equivalent security product), to make the ACB library impossible to use with an incompatible version of IMS.
- Validate cataloged procedures for users.
- Validate user-created members of the IMS.PROCLIB data set.
- Validate, reassemble, and rebind exit routines and user modifications, especially IMS Connect exit routines and code that uses IMS control blocks, such as database randomizers. Check your exit routines before reassembling. Sequence numbers changed in certain modules in IMS Version 13.

- Validate, reassemble, and rebind user programs that process log records. Some log record formats have changed.
- Validate and update operating procedures (for example, recovery, backup, and restart).
- If necessary, set the appropriate values for the AOIP, CMDP, DYNP, EMHB, FPWP, HIOP, LUMC, and LUMP parameters in the DFSPBxxx member of the IMS.PROCLIB data set to specify an upper limit on the amount of storage a pool can acquire. Specifying a limit is not recommended and should be done only after careful consideration. You can also use the IMS Syntax Checker to validate the values for the DFSPBxxx parameters. Consider the various execution parameters described in this information that can affect performance and migration.
- Ensure that appropriate dynamic allocation members are available to the new environment.
- Ensure that any custom routines and exits are available to the new environment (for example, database randomizers, secondary index parsing routines, and others).
- When using MSC to connect IMS systems with different releases, consider all message types (such as ISC, APPC, and OTMA) and the prefix sizes that accompany them.

Recommendation: When message queue data sets are used, make the MSGQ LRECL and block sizes identical across all IMS MSC systems. A problem can occur when an IMS system is migrated to a new release that uses messages with larger prefix sizes and new prefix segment types. When messages that contain these new and larger prefixes are sent to an earlier release of IMS, the new, and larger prefixes might not fit the message queues of the earlier release of IMS. This size mismatch can cause problems when the message is formatted and delivered to its destination, especially with MFS.

- Consider other products that can be affected by migration.

Any product that is dependent on the format and contents of the IMS log or the RECON data set is potentially affected. Examples of affected products or utilities are:

- IMS Statistical Analysis utility
- IMS Fast Path Log Analysis utility
- IMS Log Transaction Analysis utility
- IMS MSC Log Merge utility
- CICS
- IBM Tools
- Non-IBM products, including user modifications

- After you start and test the IMS Version 13 system, monitor storage usage in both private/eprivate and CSA/ECSA for differences with previous releases. Make adjustments as necessary.

Migration steps

General migration tasks for current IMS installations include researching Preventive Service Planning (PSP), determining hardware and software requirements, backing up your system, and other tasks.

Unless otherwise indicated in a particular step, the following steps are typically performed by an IMS system programmer.

The general steps for migrating a current IMS installation to a new version of IMS are:

1. Plan and prepare for the new version of IMS
 - a. Create a migration plan.
 - b. Verify software and hardware requisites that are listed in either the announcement letter or the Program Directory.
 - c. Identify the Migration/Coexistence maintenance that you need to apply by using either the SMP REPORT MISSINGFIX (FIXCAT) command or by checking the PSP Bucket.
 - d. Review the migration and coexistence considerations and the new functions in the IMS Release Planning guide. If you are skipping one or more releases, review the Release Planning Guide for each release you are skipping.
 - e. Determine requirements for your IMS Tools or vendor products.
 - For information about IBM IMS Tools:
 - IMS Information Management Tools and IMS Version 13 Compatibility
 - Contact IBM Software Support for all other IBM Tools related to IMS.
 - Contact vendor support for non-IBM tools and products that are related to IMS.
 - f. Order the product. The product can be ordered from Shopz website.
2. Install the product.
 - a. Review the PSP Buckets by searching for the upgrade name IMS1300 at Preventive Service Planning buckets for mainframe operating environments website and reviewing the upgrade information. If you are skipping a release, also review the upgrade information for the release you are skipping.
 - Pay particular attention to the *Installation Information* and *General Information* sections.
 - b. Perform SMP/E processing (RECEIVE, APPLY, ACCEPT).
 - c. Run the IMS Installation Verification Program (IVP).
 - d. Customize to your environment. Coordinate with your security administrators and database administrators, as appropriate.
 - e. Re-assemble any user code that accesses IMS control blocks or log records.
 - f. Re-work USERMODS as necessary, including the DFSIDEF0 module, if used.
 - g. Ensure that appropriate dynamic allocation members are available to the new environment. This step might be performed by or with a database administrator.
 - h. Ensure that your user exits are available to the new environment.
 - i. Optional: Optionally, compare the members in the current SDFSRESL library to the members in the new SDFSRESL library to make sure that nothing that IMS needs is missing in the new SDFSRESL library.
3. Prepare for implementation
 - a. Implement migration and coexistence maintenance that was identified in step 1c.
 - b. Prepare the z/OS interfaces by, at a minimum, installing the IMS type-2 and type-4 SVCs. Depending on your IMS configuration, you might need to take other steps to prepare the z/OS interface. For more information, see z/OS interface considerations (System Administration).

- c. Verify that the RECONs are ready for upgrade by issuing the DBRC command CHANGE.RECON UPGRADE CHECKUP. This step might be performed by or with a database administrator.
 - d. Upgrade the RECONs by issuing the DBRC command CHANGE.RECON UPGRADE. This step might be performed by or with a database administrator.
 - e. Prepare libraries for the new version by:
 - 1) Perform the system definition (SYSGEN) process with "ALL" specified on the IMSCTRL macro.
 - 2) Create a set of ACB libraries for the IMS version by using the new version of the ACB Maintenance utility. This step is typically performed by a database administrator.
Attention: ACBs must always be generated by using the utilities from the IMS version in which they are used.
 - 3) If necessary, change procedures and jobs, ensuring that the DRA and JCL in DRA client address spaces, such as CICS, Db2 for z/OS stored procedures (SPAS), and so forth, point to the correct SDFSRESL data set.
 - f. Prepare and test a fallback plan. See "Fallback considerations" on page 64. This step is typically performed with database administrators.
 - g. Compare the current amounts of CSA, ECSA, PRIVATE, and EPRIVATE storage that is used to that of the new IMS version.
 - 1) Compare the CSA storage requirements of the new and current IMS Versions and adjust the IMS region sizes as necessary.
 - 2) Adjust IMS pool sizes for the new version as necessary.
 - 3) Take SVC memory dumps of your current IMS address spaces before migration and keep them for comparison purposes.
 - h. Review existing automation and update as appropriate. See Chapter 8, "Message and code changes in IMS Version 13," on page 87. This step might be performed by an automation or operations group.
 - i. Determine HIPER and PE exposure.
 - 1) Obtain current enhanced hold data from the Enhanced HOLDDATA for z/OS website.
 - 2) SMP/E RECEIVE current enhanced hold data
 - 3) Generate and analyze HIPER and PE exposure report by issuing the SMP/E command REPORT ERRSYSMODS pointing to your new TARGET zone. If needed, contact IBM Software Support for help.
 - j. Back up product libraries of old system, for example SDFSRESL, MODBLKS.
 - k. Identify any databases that have extended error queue elements (EEQEs) by issuing the IMS command /DIS DB EEQE and recover the databases as appropriate. This step is typically performed by database administrators.
4. Implement the system
- a. Confirm that no databases have EEQEs by issuing the IMS command /DIS DB EEQE. If any do, resolve them before you proceed. This step is typically performed by database administrators.
 - b. Shut down old system
 - c. Ensure that shutdown completes successfully
 - d. Ensure that the archive of the logs runs successfully (OLDS)
 - e. Incorporate the new product libraries into your environment
 - f. Implement any changes to automation This step might be performed by an automation or operations group.

- g. Cold start the new system by issuing the IMS command /NRE CHKPT 0
FORMAT ALL
- h. Test your application programs This step is typically performed by the
respective lines of business.

After implementation is complete, consider how changes to IMS commands in the new version might impact your installation and operations. This step might be performed by an automation or operations group, or by system programmers.

Important: After implementation of the new version is complete, database administrators and others must use the new versions of the Database Recovery utility (DFSURDB0) and Change Accumulation utility (DFSUCUM0). All other utilities that process logs must be run by using the version of the IMS system that created the log.

Migrating to IMS Version 13 from IMS Version 11 or earlier

If you are migrating to IMS Version 13 from IMS Version 11 or earlier, your migration plan must take into account the requirements and enhancements that are introduced into IMS in the versions that you are skipping.

For example, if you are migrating to IMS Version 13 from IMS Version 11, in addition to the requirements and enhancements of IMS Version 13, your migration plan must also account for the requirements and enhancements that are introduced into IMS in IMS Version 12.

Review the Release Planning information specific to both the IMS version that you are migrating to and the IMS version that you are skipping.

Discontinuance of support

Support is discontinued for various utilities, macros, resource adapters, and functions.

Extended Recovery Facility (XRF) stabilized

Support for the IMS Extended Recovery Facility (XRF) function is stabilized. Enhancements made in IMS no longer include support for XRF.

LGEN system definition

As of July 1, 2017, support for LGEN system definition is discontinued in all versions of IMS. If the LGEN parameter is specified on the SYSTEM= parameter in the IMSCTRL macro, remove the LGEN parameter specification to use the standard IMS system definition.

After IMS Version 13 APAR PI83714 is installed, if the LGEN parameter is specified, IMS issues message G123 and the stage-1 assembly fails with return code 4.

IMS XML DB support

IMS Version 12 is the last release to support IMS XML DB. Support for XML DB in IMS Version 13 ends when IMS Version 12 is out of service.

SECURITY stage-1 system definition macro

Support for the SECURITY macro is discontinued in IMS Version 13. Except for the TRANEXIT and SIGNEXIT keywords, use initialization parameters, such as RCLASS and SECCNT, to specify values that were formerly specified in the SECURITY macro.

In IMS Version 13, you no longer need to specify the TRANEXIT and SIGNEXIT keywords to use the Transaction Authorization exit routine (DFSCTRN0) and the Signon/off Security exit routine (DFSCSNG0). Instead, IMS automatically detects and loads these exit routines and the Security Reverification exit routine (DFSCTSE0) when they are linked in one of the STEPLIB or LINKLIST libraries.

For information about using initialization parameters for security, see Controlling security during system startup for DB/DC and DCCTL (System Administration).

Updates to IMS PDFs in the IBM Publication Center

To enable more frequent updates to the IMS PDFs in support of the continuous delivery and agile methodologies, new or updated PDFs of the IMS documentation will no longer be delivered through the IBM Publications Center.

Instead, all new or updated IMS PDFs will be available for download from PDF files of IMS documentation.

IMS PDFs that are already available in the IBM Publication Center will remain in the IBM Publication Center.

IMS Classic Java APIs

IMS Version 13 is the last release to support the IMS Classic Java APIs. Customers that are using these APIs should migrate to the IMS Universal drivers.

In addition, support for Db2 stored procedures to IMS through Java will no longer be provided in releases after IMS Version 13. You will need the IMS Universal type 2 JDBC driver for direct access to IMS DB from a z/OS Java runtime environment instead of a Db2 stored procedure. Or, you can use Db2 stored procedures in COBOL applications to access IMS through ODBA.

IMS Connect support for SSL

IMS 14 is the last version of IMS to support the IMS Connect SSL function. Installations that use this function should migrate to using IBM z/OS Communications Server Application Transparent Transport Layer Security (AT-TLS) to set up Secure Socket Layer (SSL) on TCP/IP connections to IMS Connect.

IMS Connect support for LOCAL option connections from IMS TM Resource Adapter

In IMS Version 13, LOCAL option for connections between IMS Connect and IMS TM Resource Adapter is supported for 31-bit only. IMS TM Resource Adapter Version 13 customers using 64-bit LOCAL option must migrate to use TCP/IP for communications with WebSphere Application Server for z/OS or the WebSphere Optimized Local Adapter.

IMS 14 is the last version of IMS to support the IMS Connect LOCAL option for connections between IMS Connect and IMS TM Resource Adapter. Reconfigure any connections that currently use the LOCAL option to use either TCP/IP or the WebSphere Optimized Local Adapter.

IMS Control Center

Support for the IMS Control Center is discontinued. To explore, query, start, and stop IMS resources from a browser interface in a distributed environment, use the IBM Management Console for IMS and DB2 for z/OS V1.1 (5655-TAC).

IMS Enterprise Suite Version 2.1

IMS Enterprise Suite Version 2.1 is the last release of IMS Enterprise Suite that includes the DLIModel utility plug-in. Customers using the IMS Enterprise Suite DLIModel utility plug-in should migrate to using the IMS Enterprise Suite Explorer for Development instead. Although IMS Explorer for Development includes enhancements to most IMS Enterprise Suite DLIModel utility plug-in functions, it does not provide support for IMS database web services or IMS XML DB. You can obtain this support through the following options:

- For IMS database web services, you can generate web-enabled IMS database queries by shell sharing IMS Explorer for Development with IBM Data Studio.
- The XML data support in IMS databases is discontinued in IMS 14. For earlier versions of IMS, the support is discontinued when IMS Version 12 is out of service.

XRF support for full-function databases

IMS Version 13 is the last release of IMS in which XRF supports data sharing of full-function databases.

XRF support for the data sharing of full-function databases is discontinued in IMS 14.

MFS SOA support

IMS 14 is the last release to support IMS Message Format Service support for service-oriented architecture (MFS SOA).

Current[®] users should migrate to IBM Rational[®] Host On Demand.

MFS Web Enablement

IMS Version 13 is the last release to support IMS MFS Web Enablement.

Support for MFS Web Enablement in IMS Version 13 extends only to current users of the function.

Current users should migrate to IBM Rational Host Access Transformation Services (HATS), which provides capabilities similar to those provided by MFS Web Enablement.

Specific migration considerations

Specific migration considerations apply when you are migrating from IMS Version 11 or IMS Version 12 to IMS Version 13.

The information about the IMS features and enhancements that were introduced in IMS Version 12 are not documented in the IMS Version 13 Release Planning information. If you are skipping one or more IMS releases when you migrate to IMS Version 13, be sure to review the Release Planning information that is specific to each release of IMS that you are skipping.

For example, if you are migrating to IMS Version 13 from IMS Version 10, also review the migration considerations in the following information:

IMS Version 12: Release Planning, GC19-3019

IMS Version 11: Release Planning, GC19-2442

PDF files of the Release Planning Guides for all IMS releases can be downloaded from the IBM Publications Center.

The Release Planning information for the IMS releases that are currently supported by IBM is available in the IBM Knowledge Center.

If a new function does not have any migration considerations, it is not discussed in the following topics.

Migrating to IMS Version 13: DB

Specific migration considerations apply when you are migrating from the IMS Version 11 or IMS Version 12 Database Manager to the IMS Version 13 Database Manager.

These topics describe the IMS considerations for migrating to the IMS Version 13 Database Manager.

Database recovery utilities migration considerations

With the required service applied, the IMS Version 13 Database Recovery (DFSURDB0) and Database Change Accumulation (DFSUCUM0) utilities accept as input log, image copy, and change accumulation data sets created by IMS Version 11 or later.

However, before an IMS Version 11 system can create a change accumulation data set that can be used as input to the IMS Version 13 Database Change Accumulation utility, APAR/PTF PM37033/UK67281 must be applied to the IMS Version 11 system.

Database versioning migration considerations

Database versioning introduces some specific considerations for migration.

In IMS Version 13 and later, all database definitions (DBDs) that do not specify the DBVER parameter show a version number of 0 as the value of the DBVER parameter, even when database versioning is not enabled.

DEDB Alter enhancement migration considerations

The DEDB Alter utility has requirements for migration to IMS Version 13.

To run the DEDB Alter utility, all IMS data-sharing systems must be at the IMS Version 13 or later level. The MINVERS value in the RECON data set must be 13.1 or later.

If the MINVERS value in the RECON data set is not set to 13.1, the DEDB Alter utility terminates without performing the requested function. The default value for MINVERS in IMS Version 13 is 11.1.

IMS DRA migration considerations

In IMS Version 12, the DRA open thread support changes the way CPU processing time is calculated between IMS and CICS 4.2 and later.

Unless IMS open thread support is disabled, the CICS-DBCTL database adapter transformer, DFHDBAT, always uses CICS-managed L8 open TCBS rather than CICS IMS subtask TCBS. This means that the CICS monitoring facility can measure activity that was previously only reported in the IMS data that was returned whenever a TERM request occurred. The IMS time is included in the CICS SMF type 110 records. For example, CICS can now measure the processor time consumed on the IMS thread. When CICS is using L8 open TCBS, the CPU time reported for these TCBS by the CICS monitoring facility includes the IMS elapsed UOW CPUTIME for the DRA thread.

Therefore, when CICS 4.2 is connected to IMS Version 12 or later, do not add the processor time from the CICS records (SMF type 110 records) and the IMS elapsed UOW CPUTIME when calculating the total processor time for a single transaction, because the IMS processor time would then be included twice. The total processor time for a single transaction is recorded in the USRCPUT field in the CICS records (performance class data field 008 from group DFHTASK). This field includes all processor time used by the transaction when it was executing on any TCB managed by the CICS dispatcher. CICS-managed TCBS include the QR, RO, CO, H8, J8, and L8 mode TCBS.

In the CICS open transaction environment (OTE), the CICS L8 task processor time can also include the cost of creating an IMS DRA thread.

Also take the capture ratio for CICS and IMS into account. Capture ratio is the ratio of reported CPU time to total used CPU time. For more information, see the *z/OS Resource Measurement Facility™ Performance Management Guide*.

If the CICS application is quasi-reentrant, the application runs on a QR TCB and CICS switches to the L8 to call IMS and then back to the QR TCB when returning to the application. The IMS time is included in the L8 CPU time in the CICS SMF type 110 record.

If a CICS application is threadsafe, it can run on an L8 TCB. The IMS calls are done on the L8 TCB and the IMS time is part of the L8 CPU time. Threadsafe applications avoid having to switch back to QR when returning to the application.

You need the IMS log records to get the processor time in the following circumstances:

- You are running on an IMS system that does not support OTE.
- IMS open thread support is disabled in the IMS DFSPZP00 module either by default as **OPENTHRD=** or by specifying **OPENTHRD=DISABLE**. For more information, see Database resource adapter startup table for CCTL regions (System Definition).

| When open thread support is disabled, CICS does not store the CPU time; CICS
| calls IMS on a QR TCB and the IMS DRA switches to an IMS thread TCB and back
| again for each DLI call.

Fast Path migration considerations

Fast Path migration involves possible changes for the Fast Path 64-bit buffer manager.

Fast Path 64-bit buffer manager

| In IMS Version 12, the default values of the FPBP64C and FPBP64E options for the
| Fast Path 64-bit buffer manager changed. The default values for both FPBP64C and
| FPBP64E is N. The change in default values was delivered by IMS Version 12
| APAR/PTF PM84873/UK92995.

If your IMS installation used the Fast Path 64-bit buffer manager on z/OS V1R9, the Fast Path 64-bit buffer manager used 64-bit private storage. When using the Fast Path 64-bit buffer manager on z/OS V1R10 or later, the Fast Path 64-bit buffer manager uses 64-bit common storage.

HALDB alter enhancements migration considerations

| In IMS Version 13, the HALDB alter enhancement introduced some specific
| considerations for migration.

| HALDB alter requires the MINVERS value in the RECON data set to be set to 13.1
| or later. The default value for MINVERS in IMS Version 13 is 11.1.

HALDB support for 8-GB OSAM data sets enhancement migration considerations

The HALDB support for 8-GB OSAM data sets enhancement introduces some specific considerations for migration to IMS Version 13.

Before you can use 8-GB OSAM data sets in a HALDB database, all IMS systems that will access the database must be at IMS Version 13 with APAR PI23918 installed and both MINVERS=13.1 and CDSLID=2 must be specified in the RECON data set.

The default value for MINVERS in IMS 13 is 11.1.

IMS catalog migration considerations

The IMS catalog is a HALDB PHIDAM database that can require special consideration when migrating to a new release, depending on changes to the IMS catalog itself or on changes made to other IMS functions that use the IMS catalog.

Normally, migrating an HALDB database requires that you unload the original database, change its DBD to the new version, reload the database with the new DBD, and then run the new version of the ACB Maintenance utility on the new DBDs and PSBs of the HALDB database.

However, when migrating the IMS catalog, you only need to run the new version of the ACB maintenance utility on the new DBDs and PSBs of the IMS catalog because the catalog DBD structures are identical across versions.

| If you are migrating from IMS Version 11 or earlier, you might need to increase the
| size of your DBDLIB, PSBLIB, and ACBLIB data sets accordingly to accommodate
| new information that is in the DBDs, PSBs, and ACBs.

Migration steps for an existing IMS catalog in systems that use ACB libraries:

Like other IMS databases, the IMS catalog is defined by a DBD and accessed through PSBs. The migration procedure for the IMS catalog differs depending on which version of IMS you migrate from, and if you are migrating multiple IMS systems that share the catalog. When migrating to IMS Version 13, you must re-generate the ACBs from the DBDs and PSBs that IMS Version 13 supports. Additionally, when the ACBs for the other databases and program views in the IMS system are re-generated for the new IMS release, the IMS catalog must be updated with those ACBs to keep the IMS catalog in sync with the active ACBs in use by the IMS system.

Ensure that enough storage is allocated to the IMS catalog to accommodate the insertion of a complete IMS Version 13 set of the existing DBD and PSB resources.

Updating an IMS catalog for a new release can take a long time. Before you populate the IMS catalog, consider tuning your buffer pools based on the number and types of segments in the IMS catalog so that the utility you use for population doesn't do many buffer steals.

The following steps update an existing IMS catalog for a new version of IMS.

Attention: Do not delete and rebuild the IMS catalog if the IMS catalog contains metadata that cannot be restored from the new version of the ACB library. Metadata that cannot be restored from the ACB library includes metadata that is required for database versioning, remarks, or metadata stored by non-IMS products.

1. If necessary, increase the amount of storage that is allocated to the IMS catalog.
2. Shut down IMS Version 13 if it is running.
3. Install the IMS Version 13 DBDs and PSBs for the IMS catalog from the IMS.SDFSRESL data set to the IMS.DBDLIB and IMS.PSBLIB data sets. You do not need to unload and reload the IMS catalog database, even though the IMS catalog DBD might have changed in the new release. The catalog DBDs are called DFSCD000 and DFSCX000. The PSBs are called DFSCPL00, DFSCP000, DFSCP001, DFSCP002, and DFSCP003. These are reserved names and cannot be changed or used for other resources.
4. Use the IMS Version 13 ACB Generation and Populate utility (DFS3UACB) to generate the ACBs for the IMS catalog and all your application PSBs and database DBDs and add them to the IMS catalog. The DFS3UACB utility generates the ACBs and updates the IMS catalog in a single job step, ensuring that the IMS catalog is in sync with the latest ACBs.

As an alternative to using the ACB Generation and Catalog Populate utility (DFS3UACB), you can run both the IMS Version 13 ACB Maintenance utility and the IMS Catalog Populate utility. The ACB Maintenance utility builds the ACBs. The IMS Catalog Populate utility populates the IMS catalog with the new versions of PSBs and DBDs.
5. Activate the ACB library.
6. Restart the IMS Version 13 system.

If you have any application programs that read the IMS catalog, review the structure of the IMS catalog to ensure that the application programs can handle any changes appropriately.

After testing is complete and you are certain that you do not need to fall back to the previous version of IMS, you can remove the DBD and PSB resource instances for the past IMS version from the IMS catalog by using the IMS Catalog Record Purge utility (DFS3PU10).

Related reference:

➤ [IMS Catalog Record Purge utility \(DFS3PU10\) \(System Utilities\)](#)

➤ [ACB Generation and Catalog Populate utility \(DFS3UACB\) \(System Utilities\)](#)

Open Database enhancements migration considerations

You can migrate existing ODBA application servers to use the Open Database Manager (ODBM) and existing IMS DB resource adapter applications to use the IMS Universal Database resource adapter.

You can optionally modify your existing ODBA application servers to use ODBM by adding the IMSPLEX and ODBMNAME parameters to the DFSPRP macro. After you add these parameters, you must recompile and rebind the DFSxxx0 load module (xxxx is the DRA startup table name specified on the APSB call in the AIBRSNM2 field of the AIB).

You can simplify existing ODBA applications by using a single CIMS CONNECT command instead of multiple CIMS INIT commands to connect to more than one IMS DB subsystem.

Recommendation: Because the IMS Universal Database resource adapter is built on industry standards and open specifications, and provides more flexibility and improved support for connectivity, data access methods, and transaction processing options, use the IMS Universal DB resource adapter to develop Java EE applications that access IMS from WebSphere Application Server for z/OS.

WebSphere Application Server for z/OS applications that use the Open Database enhancements must use the IMS Universal Database resource adapter.

For more information about migrating Java applications to use the IMS Universal drivers, see “Java class libraries for IMS migration considerations” on page 58.

Open Database enhancements migration considerations

You can migrate existing ODBA application servers to use the Open Database Manager (ODBM) and existing IMS DB resource adapter applications to use the IMS Universal Database resource adapter.

You can optionally modify your existing ODBA application servers to use ODBM by adding the IMSPLEX and ODBMNAME parameters to the DFSPRP macro. After you add these parameters, you must recompile and rebind the DFSxxx0 load module (xxxx is the DRA startup table name specified on the APSB call in the AIBRSNM2 field of the AIB).

You can simplify existing ODBA applications by using a single CIMS CONNECT command instead of multiple CIMS INIT commands to connect to more than one IMS DB subsystem.

Recommendation: Because the IMS Universal Database resource adapter is built on industry standards and open specifications, and provides more flexibility and improved support for connectivity, data access methods, and transaction processing options, use the IMS Universal DB resource adapter to develop Java EE applications that access IMS from WebSphere Application Server for z/OS.

WebSphere Application Server for z/OS applications that use the Open Database enhancements must use the IMS Universal Database resource adapter.

For more information about migrating Java applications to use the IMS Universal drivers, see “Java class libraries for IMS migration considerations” on page 58.

Migrating to IMS Version 13: TM

IMS considerations for migrating from IMS Version 11 or IMS Version 12 Transaction Manager to IMS Version 13 Transaction Manager include how the enhancements to IMS affect migration, as well as how major IMS functions are affected by migration.

These topics describe the IMS considerations for migrating from IMS Version 11 or IMS Version 12 Transaction Manager to IMS Version 13 Transaction Manager.

OTMA migration considerations

IMS Version 13 includes migration considerations for OTMA.

Migration considerations introduced in IMS Version 13

OTMA global flood control enhancement

The OTMA global flood control enhancement changed existing IMS error messages. The existing DFS4388W and DFS0793I messages have been enhanced to be consistent with the new DFS3428W and DFS3429E messages. Changes in your automation program might be needed if it detects the DFS4388W and DFS0793I messages.

If you use the DFSOTMA client descriptor to specify a global flood limit for all clients, the maximum number of OTMA client descriptors that you can specify in the DFSYDTx member of the PROCLIB data set is reduced from 255 to 254.

In previous releases, the command `/STA TMEMBER ALL INPUT #####` resulted in warning messages. It now turns on global flood control and rejects new input.

Changing the value with `/START TMEMBER ALL INPUT 200` command previously did not trigger the flood status update in the `/DIS OTMA`, and new input continued to be accepted. In IMS Version 13, the flood status takes effect immediately. If there are more messages waiting to be processed than the value:

- Message DFS3429E is displayed, which warns that THE TOTAL OTMA INPUT MESSAGES(TIB) HAVE REACHED THE GLOBAL LIMIT ZZZZ.
- `/DIS OTMA` shows a status of SERVER+FLOOD.
- New input is rejected.

The length of TIB and INPUT columns of IMS `/DISPLAY OTMA` command were increased by one so that these fields can display up to five digits of OTMA message numbers. The T27 DSECT and T28 DSECT of IMS `DISPLAY MACRO` were also updated for these length changes.

In IMS Version 13, the default for global flood controls continues to be a warning message, but the default threshold is now at 10,000 and the relief at 50%. However, if the global flood limits have been activated by either specification of the DFSOTMA client descriptor or the `/STA TMEMBER ALL INPUT` command, reaching the 100% mark results in rejection of new transaction messages until the flood has been relieved at 50%. Additionally, warning messages will be issued at the 80% level.

OTMA Callable Interface enhancements

OTMA C/I no longer receives IMS DFS messages when OTMA NAKs (negative acknowledgement) input for asynchronous messages. They receive a return and reason code indicating the specific error.

Migration considerations introduced in IMS Version 12

Both the OTMA ACEE reduction and the OTMA TPIPE enhancements modified the output of the /DISPLAY OTMA command. The OTMA TPIPE enhancement modified the output of the /DISPLAY TMEMBER command. To recognize the changes, any automated programs that parse the output of this command might need to be modified.

Synchronous program switch migration considerations

In IMS Version 13, the synchronous program switch enhancements introduces migration considerations for the configuration of the MINVERS value in a shared queues environment.

In IMS Version 13, the default value of MINVERS in the RECON data set is 11.1. However, to use the synchronous program switch function in a shared queues environment, all of the participating systems must have a MINVERS value of 13.1.

XRF and Communication Controller for Linux on System z (CCL) migration considerations

IBM is withdrawing from support the Communication Controller for Linux on System z (CCL). The announced date for withdrawal is March 31, 2016.

If your installation uses CCL for IMS XRF tracking of VTAM terminals, consider replacing XRF entirely by setting up an IMSplex with two or more IMS systems and using VTAM Generic Resources (VGR). This option requires a Parallel Sysplex environment.

Migrating to IMS Version 13: System

IMS considerations for migrating from IMS Version 11 or IMS Version 12 systems to IMS Version 13 systems include how the enhancements to IMS affect migration, as well as how major IMS functions such as DBRC and dynamic resource definition (DRD) are affected by migration.

These topics describe the IMS considerations for migrating from IMS Version 11 or IMS Version 12 systems to IMS Version 13 systems.

CQS migration considerations

Migrate CQS and any CQS clients on the z/OS image at the same time. If doing so is not possible, CQS must be migrated before any of the CQS clients are migrated.

See “Common Queue Server coexistence considerations” on page 73 for information about CQS coexistence rules.

DBRC migration considerations

Migrating DBRC to IMS Version 13 includes several tasks, including upgrading the RECON data set.

These topics describe the considerations and tasks for migrating DBRC to IMS Version 13.

Changes to the RECON data set:

Certain records in the RECON data set are new or changed from the records in IMS Version 11 and IMS Version 12.

Changes introduced in IMS Version 13

In IMS Version 13:

- The DSPPTRNC record may be increased in size. The partition record increases in size if, in preparation for HALDB alter, new OSAM block sizes or VSAM CI sizes are defined. 80 bytes are added to the end of the record based on a word boundary.
- The following RECON records have new or changed fields:
 - DSPDBHRC: For a HALDB database, DBALTER# and DBALTCM# fields are added to count the number of partitions to alter and the number of partitions that have completed the HALDB alter process.
For a partition database, new DBALTER and DBALTCMP flags are added to indicate that the alter process has started and completed. For a Fast Path Area, the DBALTER flag indicates that the area is being altered.
For a DEDB database, the new DBALTER# field is used to indicate that DEDB Alter is in progress.

Changes introduced in IMS Version 12

In IMS Version 12:

- The RECON data set listings use full time-stamp precision.
- The LIST.HISTORY TIMELINE Summary output is changed to accommodate the full time-stamp precision.
- Any IMS-related products or user objects that parse the LIST.HISTORY command output or the RECON data set listings might need to change.
- The following RECON records have new or changed fields:
 - DSPRDTRC: New field RDTDBNUM to list the number of registered databases
 - DSPLOGRC: New field LOGBPE replaces the bit in LOGFLAG2
 - DSPSSRC: New SSBPE flag within SSFLAGS2 field to indicate that the IMS subsystem is using a DBRC BPE environment
 - DSPDBHRC: New DBFPFSdflt flag within DBMFlags field to indicate the logging option for Fast Path areas
 - DSPDSHRC: New DSHFULLSEG flag within DSHFLG2 field to indicate the segment logging option for Fast Path areas
 - DSPCAGRC: New CAGRTPRD field to indicate the recovery retention period
 - DSPCHGRC: New CHGOFFU, CHGUSER, CHGLENL, CHGUDATA, CHGUDAT1, and CHGUDAT2 fields containing the offset to the user data and the user data fields themselves
 - DSPRCVRC: A variable-length record with:
 - New RCVEXTCM flag within RCVFLAGS to indicate whether an external command created the recovery record
 - New RCVOFFU, RCVPREORG, RCVNREORG, RCVVARBL, RCVDATA, RCVUSER, RCVLENU, RCVUDATA, RCVUDAT1, and RCVUDAT2 fields containing the offset to the user data and the user data fieldsDSPRCVRC increases in size if user data exists in the record.

- DSPRRGRC: A variable-length record with:
 - New RRGCMD flag within RRGFLAGS to indicate whether an external command created the reorganization record
 - New RRGOFFU, RRGVARBL, RRGDATA, RRGUSER, RRGLENU, RRGUDATA, RRGUDAT1, and RRGUDAT2 fields containing the offset to the user data and the user data fields
 DSPRRGRC increases in size if user data exists in the record.
- The DSPIMGRC record increases in size if user data exists and the image copy is not a user image.

Parallel RECON access migration considerations:

If you are migrating to IMS Version 13 from IMS Version 11 or IMS Version 12, you must apply the DBRC migration/coexistence APARs.

If you are migrating to IMS Version 13 and parallel RECON access (PRA) is in effect, you must ensure that there is no shunted I/O when the upgrade begins.

The upgrade process begins with a quiesce close and a check for shunted I/O. If there is no shunted I/O, the RECON data sets are reopened in LSR (Local Shared Resources) mode. Records are upgraded in COPY1, and COPY1 is copied to COPY2. After upgrade completes, the RECON data sets are reopened in PRA mode, the quiesce for the RECON data sets is released, and other DBRC instances can access the upgraded RECON data sets

Time-stamp precision migration considerations:

In IMS Version 12 and later, with MINVERS set to 10.1 or higher, time-stamp precision is set to the microsecond format. New initialized RECON data sets in IMS Version 10 and later use full time-stamp precision. All instances of IMS or batch jobs accessing IMS Version 12 format RECON data sets must use full time-stamp precision (to the microsecond).

Recommendation: Set the MINVERS value to at least 10.1 before upgrading an IMS Version 10 or IMS Version 11 RECON data set to the IMS Version 12 format.

Certain DBRC commands require the use of the full precision time stamp. For more, see DBRC time stamps (Commands).

Upgrading the RECON data set:

A RECON upgrade batch command is provided to enable you to convert the recovery control (RECON) data set from an IMS Version 11 or IMS Version 12 format to an IMS Version 13 format. You are not required to change the MINVERS value to '13.1' when you migrate to IMS Version 13. Change this value only after you verify that you do not need to coexist with an earlier version of IMS, will not need to fall back, and when you need to use new functions that require the MINVERS value to be set to '13.1'.

Attention: Do not issue the IMS Version 13 CHANGE.RECON UPGRADE command to upgrade the RECON data sets until all IMS Version 11, IMS Version 12, and IMS Version 13 systems that access the RECON data sets have the correct supporting products in place and have been tested for IMS Version 13 support.

To upgrade an IMS Version 11 or IMS Version 12 RECON data set:

1. Apply the IMS Version 13 coexistence Small Programming Enhancements (SPEs) to all IMS Version 11 and IMS Version 12 systems before you upgrade the RECON data set. The coexistence SPEs (APARs/PTFs) are:
 - PM53134/UK80026 for IMS Version 11
 - PM53139/UK80027 for IMS Version 12

Attention: Jobs that access the RECON data set and do not create subsystem records, such as the Database Change Accumulation utility (DFSUCUM0) and the Database Recovery Control utility (DSPURX00), are not protected from having the RECON data set upgraded while they are running on a version of IMS that does not have the appropriate migration/coexistence SPE applied. When these types of jobs access the RECON data set after the upgrade, the results might be unpredictable. Ensure that no such jobs are running when you upgrade the RECON data set.

2. Ensure that you have two active RECON data sets (COPY1 and COPY2) and a spare data set when you upgrade the RECON data sets while other jobs are accessing them.
3. Before issuing the CHANGE.RECON UPGRADE command against the production RECON data sets, upgrade a copy of the production RECON data sets to verify that the upgrade will complete successfully.

When upgrading an IMS Version 11 RECON data set to IMS Version 13:

- Each database record is read to ensure that the internal representation of the DMB number is correct and that the RECON DMB Table record is built or rebuilt if it already exists. The RECON DMB Table record keeps track of all the DMB numbers currently in use. The RECON DMB Table record is updated when a new database is registered in the RECON data set or a database is deleted.
 - If the internal representation of the DMB number in the database record is incorrect, it is corrected during the upgrade unless the database is being updated. In that case, the RECON upgrade fails.
4. Optionally, issue the CHANGE.RECON UPGRADE CHECKUP command. This command checks the status of the RECON data set and records to verify whether the RECON data set is in a state that allows an upgrade. No RECON data set records are changed as a result of issuing the CHANGE.RECON UPGRADE CHECKUP command.
 5. Issue the CHANGE.RECON UPGRADE command by using either the IMS Version 13 DBRC Recovery Control utility (DSPURX00) or the IMS Version 13 DBRC Command API request. This command:
 - Upgrades the RECON data set without shutting down all IMS activity.
 - Uses the DBRC I/O recovery algorithms to recover from any failures during upgrade (so you do not need to back up the RECON data set before you upgrade).

After this command successfully completes, DBRC sets the value for MINVERS (the minimum version of IMS that can sign on to DBRC) to '11.1' if the value was less than '11.1'. You can display the MINVERS value in the output for a LIST.RECON command or a Query request using the DBRC API.

Recommendation: If you use DBRC command authorization, consider setting the RECON qualifier as part of your migration process. You can set the RECON qualifier when you upgrade by adding CMDAUTH parameters to the CHANGE.RECON UPGRADE command, or after the RECON has been upgraded by issuing a CHANGE.RECON CMDAUTH command. If

CMDAUTH parameters are specified on the CHANGE.RECON UPGRADE command, the RECON is upgraded first and then other parameters (such as CMDAUTH) are processed.

For details about the CHANGE.RECON UPGRADE command, see *IMS Version 13 Commands, Volume 3: IMS Component and z/OS Commands*. For details about the Query request, see *IMS Version 13 System Programming APIs*.

6. When you are sure that a fallback to a previous IMS version is unnecessary and all systems that access the RECON data set are at an IMS Version 13 level, you can update the MINVERS value. Before you issue the CHANGE.RECON MINVERS('13.1') command, read "Minimum version value in the RECON data set" on page 65 to understand the ramifications involved in falling back to a previous version.

After you set the MINVERS level for an IMS system, system signon fails for earlier versions of IMS for online environments. All other jobs accessing the RECON data set fail DBRC initialization if the version of IMS used is lower than the MINVERS level.

Dynamic resource definition migration considerations

If you are migrating from IMS Version 11 or IMS Version 12, the process for enabling dynamic resource definition (DRD) for MODBLKS resources in an IMS Version 13 system differs depending on whether your existing IMS system has DRD enabled and, if it does, whether your resource definitions are stored in the IMSRSC repository or in the resource definition data set (RDDS).

Recommendations:

Before enabling dynamic resource definition or shared queues, evaluate any existing DFSINSX0 exit routines. The DFSINSX0 exit might need to be changed so that it checks whether LTERM creation is allowed before it accesses the USEQDATA parameter list that is related to LTERM processing. If LTERM creation is not allowed, the USEQDATA buffer address (INSXAUSQ) is zero.

After you enable DRD, ensure that the resource definitions are no longer loaded from the IMS.MODBLKS data set during IMS cold starts. Otherwise, if you delete runtime resources with a DELETE command and then perform a cold start using the IMS.MODBLKS data set for the resource definitions, those runtime resources will reappear after the next IMS cold start. You can either perform another system definition that omits all those resources, or hereafter start IMS without the IMS.MODBLKS data sets defined and instead, use the resource definitions from the RDDS.

If resources need to be changed during migration, perform a MODBLKS online change operation on the IMS systems that have not migrated to DRD, and issue CREATE, UPDATE, and DELETE commands as necessary on the IMS systems that have migrated to DRD.

Recommendation: When migrating to DRD, use the IMSRSC repository instead of an RDDS, because the repository function is the strategic direction for IMS.

Related tasks:

 Enabling dynamic definition for IMS resource groups (System Definition)

Migrating a non-DRD-enabled IMS system to DRD and the IMSRSC repository:

To enable dynamic resource definition (DRD) with the IMSRSC repository, which is the recommended option for storing dynamically defined resources, you need to enable DRD and the Repository Server (RS) address space. For MODBLKS resources, you also need to import the resource definitions from the MODBLKS data set to the RDDS.

Recommendation: When you migrate to DRD, use the IMSRSC repository instead of an RDDS because the repository function is the strategic direction for IMS.

To enable DRD with an IMSRSC repository:

1. Shut down IMS normally.
2. Define the following DRD parameters in the DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set:
 - AUTOIMPORT=AUTO, which specifies that IMS automatically imports resource definitions during a cold start. When AUTOIMPORT=AUTO, IMS checks the RDDS first. If the RDDS is empty, IMS loads the resource definitions from the IMS.MODBLKS data set. If the RDDS contains any resource definitions, IMS ignores any definitions in the IMS.MODBLKS data set.
 - AUTOEXPORT=AUTO, which specifies that IMS automatically exports resource definitions to the RDDS data sets during system checkpoints.
3. Enable DRD by specifying MODBLKS=DYN in either or both of the following locations:
 - The DFSCGxxx member of the IMS.PROCLIB data set
 - The DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set
4. Specify attributes of the repository in the following members of the IMS PROCLIB data set:
 - FRPCFG member
 - BPE configuration parameters member
 - CSLRIxxx member
 - DFSDFxxx member
5. Create the repository catalog pairs of data sets.
6. Create the IMSRSC repository pairs of data sets.
7. Start the Repository Server (RS) address space.
8. Define the IMSRSC repository data sets to RS, which stores information about the IMSRSC repository in the RS catalog repository data sets.
9. Optional: Start the Common Queue Server (CQS) with a resource structure.
10. Enable the IMS Resource Manager (RM) to use the IMSRSC repository dynamically.
 - If the RM address space is running, issue the UPDATE RM command.
 - If RM is not running, restart RM so that it connects to the RS address space.
11. Before you start IMS, specify the EXEC parameters DFSDF=xxx and, if MODBLKS=DYN was specified in the DFSCGxxx member, CSLG=xxx. These parameters identify which DFSDFxxx and DFSCGxxx members in the IMS.PROCLIB data set to use.
12. Cold start IMS.

If the IMSRSC repository is empty, during cold start IMS imports the resource definitions from the IMS.MODBLKS data set to create the runtime resource definitions. The online change process for the IMS.MODBLKS data set is now disabled.

13. After IMS is running, issue the EXPORT DEFN TARGET(REPO) command to export all of the runtime resource definitions to the IMSRSC repository.

You can now use DRD to add (CREATE command), change (UPDATE command), or delete (DELETE command) the runtime resource definitions.

To ensure new and updated runtime resource definitions are recovered across an IMS cold start, issue the EXPORT DEFN TARGET(REPO) to harden the definitions in the IMSRSC repository.

To ensure that deleted runtime resource definitions are not recovered across an IMS cold start, issue the DELETE DEFN command to delete the stored resource definitions from the IMSRSC repository.

Migrating a non-DRD-enabled IMS system to DRD and an RDDS:

To enable dynamic resource definition (DRD) with an resource definition data set (RDDS), you need to enable DRD, specify and allocate the RDDS, and import the resource definitions from the MODBLKS data set to the RDDS.

Recommendation: When migrating to DRD, use the IMSRSC repository instead of an RDDS, because the repository function is the strategic direction for IMS.

If resources need to be changed during migration, perform a MODBLKS online change operation on the IMS systems that have not migrated to DRD, and issue CREATE, UPDATE, and DELETE commands as necessary on the IMS systems that have migrated to DRD.

To enable DRD with an RDDS:

1. Shut down IMS normally.
2. Define the following DRD parameters in the <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set:
 - RDDSDSN=(dsname_1, dsname_n)
These system definition data sets are for the resource definitions.
 - AUTOIMPORT=AUTO, which specifies that IMS automatically imports resource definitions. When AUTOIMPORT=AUTO, IMS checks the RDDS first. If the RDDS is empty, IMS loads the resource definitions from the IMS.MODBLKS data set. If the RDDS contains any resource definitions, IMS ignores any definitions in the IMS.MODBLKS data set.

Note: If AUTOIMPORT=MODBLKS is specified, instead of AUTOIMPORT=AUTO, your runtime definitions are imported from the IMS.MODBLKS data set during IMS cold start. Any changes you make to your online system will not be recovered across the cold start. You can either perform another system definition that includes the changes you made online, or hereafter start IMS with AUTOIMPORT=AUTO specified in the DFSDFxxx PROCLIB member.

- AUTOEXPORT=AUTO, which specifies that IMS automatically exports resource definitions to the RDDS data sets during system checkpoints.

3. Enable DRD by specifying MODBLKS=DYN in either or both of the following locations:
 - The DFSCGxxx member of the IMS.PROCLIB data set
 - The <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set
4. Allocate the system RDDDS data sets that are specified on the RDDSDSN= parameter in the DFSDFxxx member.
5. Specify the IMS EXEC parameters DFSDF=xxx and, if MODBLKS=DYN was specified in the DFSCGxxx member, CSLG=xxx. These parameters identify which DFSDFxxx and DFSCGxxx members to use in the IMS.PROCLIB data set.
6. Cold start IMS. If the RDDDS data sets are empty, during cold start IMS imports the resource definitions in the IMS.MODBLKS data set to create the runtime resource definitions. The online change process for the IMS.MODBLKS data set is now disabled.
7. Start using DRD to add (CREATE command), change (UPDATE command), or delete (DELETE command) the runtime resource definitions.
8. At system checkpoint time, IMS automatically exports the definitions to the RDDDS if any changes have been made. To export any changes immediately after they have been made, either issue a /CHE command, or issue an /EXPORT command.
9. For subsequent cold starts of this IMS, specify AUTOIMPORT=RDDDS in the <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set. When AUTOIMPORT=RDDDS is specified, IMS automatically imports resource and descriptor definitions from the RDDDS during cold start processing.

Migrating a DRD-enabled IMS system that uses an RDDDS to use the IMSRSC repository:

To migrate an IMS system in which dynamic resource definition is enabled from an RDDDS to the IMSRSC repository, you need to enable the Repository Server (RS) address space, and import the resource definitions from the RDDDS to the IMSRSC repository.

To migrate a DRD-enabled IMS system from an RDDDS to the IMSRSC repository:

1. Create a non-system RDDDS that contains definitions for the current runtime and descriptor resources. Use any of the following methods to create this RDDDS:
 - Run the Create RDDDS from the Log Records utility (DFSURCL0)
 - Run the Create RDDDS from the MODBLKS utility (DFSURCM0)
 - Run the DRD IMS SYSGEN stage 1 pre-parser utility (DFSURST0)
 - Run the Copy RDDDS utility (DFSURCP0)
 - Use the EXPORT command, if IMS is running
2. Specify attributes of the repository in the following members of the IMS PROCLIB data set:
 - FRPCFG member
 - BPE configuration parameters member
 - CSLRIxxx member
 - DFSDFxxx member
3. Create the repository catalog pairs of data sets.
4. Create the IMSRSC repository pairs of data sets.

5. Start the Repository Server (RS) address space.
6. Define the IMSRSC repository data sets to RS, which stores information about the IMSRSC repository in the RS catalog repository data sets.
7. Optional: Start the Common Queue Server (CQS) with a resource structure.
8. Enable the IMS Resource Manager (RM) to use the IMSRSC repository dynamically:
 - If the RM address space is running, issue the UPDATE RM command.
 - If RM is not running, restart RM so that it connects to the RS address space.
9. Populate the IMSRSC repository with resource and descriptor definitions by running the batch RDDS to Repository utility (CSLURP10).
10. Cold start IMS with AUTOIMPORT=AUTO specified or use the UPDATE IMS command if IMS is running.

Requirement: If AUTOEXPORT is enabled and RDDSs are defined, IMS continues to export resource definitions to the RDDSs after each system checkpoint, even if IMS is migrated to use the IMSRSC repository. To disable the AUTOEXPORT to RDDS function so that the RDDSs are no longer used:

1. Issue the UPDATE IMS SET(LCLPARM(AUTOEXPORT(N))) command.
2. Modify the DFSDFxxx PROCLIB member to remove the RDDS definitions.

Exit routine migration considerations

There are migration considerations for some exit routines when you migrate to IMS Version 13.

Service and enhancements to IMS can change or add information in the output of certain commands. Any exit routine or automation program that parses the output from these commands might need to be modified. Service changes to the output of a command are documented in ++HOLD statements that describe the changes.

Migration considerations introduced in IMS Version 13

IMS Version 13 introduces enhancements to the following exit routines:

- Signon/off security exit routine (DFSCSGN0)
- Security Reverification exit routine (DFSCCTSE0)
- Transaction Authorization exit routine (DFSCCTR0)

For information about migrating these security exit routines, see “Security enhancements migration considerations” on page 62.

In IMS Version 13, you can dynamically refresh and query more types of exit routines.

To enable dynamic refresh and query support for existing exit routines, specify the exit routines on the EXITDEF parameter in the USER_EXITS section of the DFSDFxxx member. No changes to the exit routine itself are required.

After support for dynamically refreshing and querying an exit routine type is enabled, you can modify, add, or delete the exit routines of that type by issuing the REFRESH USEREXIT TYPE(*type*) command. You can also display information about the exit routines with the QUERY USEREXIT TYPE(*type*) command.

IMS Version 13 enables the following user exit types for the QUERY USEREXIT and REFRESH USEREXIT commands:

User exit type	Exit routine name
BSEX	Build Security Environment User Exit (DFSBSEX0)
LOGEDIT	Log Edit User Exit (DFSFLGE0)
LOGWRT	Logger User Exit (DFSFLGX0)
NDMX	Non-Discardable Messages User Exit (DFSNDMX0)
OTMAIOED	OTMA Input/Output Edit User Exit (DFSYIOE0)
OTMAYPRX	OTMA Destination Resolution User Exit (DFSYPRX0)
OTMARTUX	OTMA Resume TPIPE Security User Exit (DFSRTUX)
RASE	Resource Access Security User Exit (DFSRAS00)

Migration considerations introduced in IMS Version 12

If you are migrating to IMS Version 13 from IMS Version 11, you should be aware of the following migration considerations that are related to exit routine enhancements that are made in IMS Version 12:

- The Log Filter exit routine (DFSFTFX0) might need to be updated if your IMS system is not using the version of the exit routine that is shipped in the IMS Version 13 SDFSRESL library. The exit routine changed in IMS Version 12 to include a new function code that indicates a log buffer send where the data resides above the 2 GB boundary, and three new fields on the exit routine parameter list. If the IMS log buffers reside in 64-bit storage and DFSFTFX0 is part of the IMS system, the exit routine must be able to use the updated parameter list. The sample exit routine shipped with IMS uses the updated parameter list.
- The Logger exit routine (DFSFLGX0) is changed for IMS Version 12 to include version support of the parameter list and new fields that are used when 64-bit addressing is used for buffer storage. If the IMS log buffers reside in 64-bit storage and the DFSFLGX0 exit routine is part of the IMS system, the exit routine must be able to use the updated parameter list.
- The Destination Creation exit routine (DFSINSX0) can create transactions and programs for scheduling. When the DFSINSX0 exit routine creates a transaction or program, it can specify whether the definition of the transaction or program can be exported to the RDDS data set or the IMSRSC repository by setting TRNQ_FC_EXPORT = ON. IMS Version 12, if the created resource can be exported and the IMSRSC repository is enabled in IMS, the next time the EXPORT DEFN TARGET(REPO) command is issued, the resource created by the DFSINSX0 exit routine is exported to the IMSRSC repository.

IMSplex migration considerations

Migrating an IMSplex from one version of IMS to another is a complex process because many factors are involved and many different configurations are possible.

The following considerations apply when planning to migrate an IMSplex:

- Multiple Resource Managers (RMs) and Operations Managers (OMs) can run simultaneously in an IMSplex.
- Only one Structured Call Interface (SCI) can run at any given time in an IMSplex on a single logical partition (LPAR).
- All Common Queue Server (CQS) clients connected to a CQS address space must be stopped before shutting down that CQS.

- CQS clients are limited as to which version of CQS they can connect to. For more information about these rules, see “Common Queue Server coexistence considerations” on page 73.
- Install all appropriate coexistence service onto IMSplexes before attempting to migrate.
- If you are running multiple IMS systems on one logical partition (LPAR), migrate one IMS at a time.
- If you are running multiple LPARs, migrate one LPAR at a time.
- If you activate the automatic RECON loss notification and parallel RECON access functions within the same IMSplex, you must use the CHANGE.RECON IMSPLEX command to ensure that all DBRCs in the IMSplex are using the same IMSplex name that is specified in the RECON data set. If you use the DBRC SCI Registration exit routine (DSPSCIX0) or the IMSPLEX EXEC parameter before issuing the CHANGE.RECON IMSPLEX command, message DSP1136A is issued and subsequent jobs fail due to an unavailable RECON data set.
- Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the CSLDCxxx member of the IMS PROCLIB data set.

Example 1: Migrating IMS systems on a single LPAR

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- All IMS systems in the IMSplex are running on one LPAR (LPAR1).
- One IMS Version 11 (V11) CQS that is using a resource structure.
- One RM and one OM running on the LPAR.
- Two V11 IMS systems (named IMSA and IMSB) that are running on LPAR1 and participating in data sharing and shared queues.

To migrate the IMS systems in this example IMSplex to IMS Version 13 (V13):

1. Prepare the IMSA libraries and data sets for IMS Version 13 (for example, perform a system definition, set up JCL, and so on).
2. Stop the V11 SCI.
3. Start the V13 SCI.
4. Start the V13 OM.

Because there is only one LPAR in this example, and one OM must be running at all times to provide OM services, the higher-level OM is started before shutting down the lower-level OM.

5. Stop the V11 OM.
6. Shut down IMSA.
7. Shut down IMSB.
8. Stop the V11 RM.
9. Stop the V11 CQS.
10. Start the V13 CQS.
11. Start the V13 RM.
12. Cold start IMSA.
13. Restart IMSB.

14. Test IMSA.
15. After IMSA (V13) has tested successfully, proceed to the next step. If IMSA does not pass this testing step, consider whether IMSA needs to fall back to IMS Version 11 and repeat this process after any problems are fixed.
16. Stop the V11 OM.
17. Take IMSB offline and migrate it to IMS Version 13.

Example 2: Migrating IMS systems on multiple LPARs

The operational environment for this example consists of two LPARs and a total of three IMS systems that are participating in shared queues and data sharing.

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- An example IMSplex consisting of:

LPAR1

- One V11 CQS
- One Common Service Layer (CSL), consisting of an OM, RM, and SCI
- One V11 IMS system named IMSC

LPAR2

- One V11 CQS
- One Common Service Layer (CSL), consisting of an OM, RM, and SCI
- Two V11 systems (named IMSD and IMSE)

Recommendation: Migrate less complex LPARs before migrating more complex LPARs.

To migrate the IMS systems in this example IMSplex to IMS Version 13 (V13):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
 - a. Prepare the IMSC libraries and data sets for IMS Version 13 (for example, perform a system definition, set up JCL, and so on).
 - b. Stop the V11 SCI.
 - c. Start the V13 SCI.
 - d. Stop the V11 OM (assuming the same OM name is used before and after the migration).
 - e. Start the V13 OM.
 - f. Shut down IMSC.
 - g. Stop the V11 RM.
 - h. Shut down the V11 CQS.
 - i. Start the V13 CQS.
 - j. Start the V13 RM.
 - k. Coldstart IMSC.
 - l. Test IMSC. If IMSC does not pass this testing step, consider whether IMSC needs to fall back to IMS Version 11 and repeat this process after any problems are fixed.
2. After validating that the migration of IMSC on LPAR1 is successful, start migrating the IMS subsystems on LPAR2 with the following steps:

- a. Prepare the IMSD libraries and data sets for IMS Version 13 (for example, perform a system definition, set up JCL, and so on).
- b. Stop the V11 SCI.
- c. Start the V13 SCI.
- d. Stop the V11 OM.
- e. Start the V13 OM.
- f. Shut down IMSD.
- g. Shut down IMSE.
- h. Stop the V11 RM.
- i. Stop the V11 CQS.
- j. Start the V13 CQS.
- k. Start the V13 RM.
- l. Cold start IMSD.
- m. Restart IMSE.
- n. Test IMSD. If IMSD does not pass this testing step, consider whether IMSD needs to fall back to IMS Version 11 and repeat this process after any problems are fixed.
- o. After IMSD (V13) has tested successfully, proceed to the next step.
- p. Stop the V11 OM.
- q. Take IMSE offline and migrate it to IMS Version 13.

Example 3: Migrating IMS systems on multiple LPARs (with IMS Connect involved)

The operational environment for this example consists of two LPARs and a total of three IMS systems that are participating in shared queues and data sharing.

The following IMSplex migration example assumes:

- Continuous availability is a high priority.
- All coexistence APARs have been installed.
- An example IMSplex consisting of:

LPAR1

- One V11 CQS
- One Common Service Layer (CSL), consisting of an OM, RM, and SCI
- One V11 IMS system named IMSF
- One IMS Connect that is communicating with IMSF, IMSG, and IMSH

LPAR2

- One V11 CQS
- One Common Service Layer (CSL), consisting of an OM, RM, and SCI
- Two V11 IMS systems named IMSG and IMSH

Recommendation: Migrate less complex LPARs before migrating more complex LPARs.

To migrate the IMS systems in this example IMSplex to IMS Version 13 (V13):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
 - a. Prepare the IMSF libraries and data sets for IMS Version 13 (for example, perform a system definition, set up JCL, and so on).

- b. Stop the V11 SCI.
 - c. Start the V13 SCI.
 - d. Stop the V11 OM (assuming the same OM name is used before and after the migration).
 - e. Start the V13 OM.
 - f. Shut down IMS Connect.
 - g. Shut down IMSF.
 - h. Stop the V11 RM.
 - i. Shut down the V11 CQS.
 - j. Start the V13 CQS.
 - k. Start the V13 RM.
 - l. Coldstart IMSF.
 - m. Start IMS Connect. If you start IMS Connect before IMSF, IMS Connect issues a datastore unavailable message.
 - n. Test IMSF. If IMSF does not pass this testing step, consider whether IMSF needs to fall back to IMS Version 11 and repeat this process after any problems are fixed.
2. After validating that the migration of IMSF on LPAR1 is successful, start migrating the IMS subsystems on LPAR2 with the following steps:
- a. Prepare the IMSG libraries and data sets for IMS Version 13 (for example, perform a system definition, set up JCL, and so on).
 - b. Stop the V11 SCI.
 - c. Start the V13 SCI.
 - d. Start the V13 OM.
 - e. Stop the V11 OM.
 - f. Shut down IMSG.
 - g. Shut down IMSH.
 - h. Stop the V11 RM.
 - i. Stop the V11 CQS.
 - j. Start the V13 CQS.
 - k. Start the V13 RM.
 - l. Cold start IMSG.
 - m. Restart IMSH.
 - n. Test IMSG. If IMSG does not pass this testing step, consider whether IMSG needs to fall back to IMS Version 11 and repeat this process after any problems are fixed.
 - o. After IMSG (V13) has tested successfully, proceed to the next step.
 - p. Stop the V11 OM.
 - q. Take IMSH offline and migrate it to IMS Version 13.

INQY call for system services migration considerations

Application programs that use the AIB INQY ENVIRON call might need to be changed.

IMS Version 12 APAR/PTF PM42909/UK78069 increased the length of the data returned by the INQY ENVIRON call from 100 bytes to 108 bytes. As a result, the minimum size of the AIB I/O area required for the INQY ENVIRON call increased from 152 bytes to 160 bytes and the offsets of the optional recovery token and

application parameter fields have changed. If you need to modify the size of your application AIB I/O area, it is highly recommended you set the size to 512 bytes.

Any application programs that referenced the recovery token or application parameter field by its offset prior to IMS Version 12 APAR/PTF PM42909/UK78069 must be modified for continued access to the field, as described in the following recommendations. These fields must not be referenced by offset.

Recommendations: To account for expansion in the length of the reply data, specify an I/O area length of 512 bytes.

To reference the field that contains the recovery token or the application parameter string, code your application programs to locate the field by using the address of the field that is returned in the data output of the INQY ENVIRON call. This is the only valid programming technique to reference the recovery token field and the application parameter string field. No other programming technique should be used to reference these fields.

The recovery token or the application parameter string are optional and therefore are not always returned. If they are not returned, the value in the address field is zero.

If you are migrating to IMS Version 13 from either IMS Version 12 without APAR/PTF PM42909/UK78069 or IMS Version 11 and your applications uses the AIB INQY ENVIRON call, ensure that the application area for the INQY ENVIRON data is a minimum of 108 bytes and corresponding I/O area is a minimum of 160 bytes. It is highly recommended that you set the size of your AIB I/O area to 512 bytes instead of the minimum size just described.

Application programs that issue the INQY ENVIRON call that have an I/O area less than the minimum size receive a status code AG. The I/O area will be filled with partial data, as much as would fit in the I/O area provided. AIBOALEN contains the length of the data returned in the I/O area. AIBOAUUSE contains the output area length that is required to receive all the data for the INQY ENVIRON call.

IVP enhancements migration considerations

Use the IMS installation verification program (IVP) after installing a new IMS system, to verify the installation of that new system, and use it subsequently for other purposes (for example, as an educational tool). The IVP dialogs are replaced when a new release of IMS is installed.

The IVP Variable Export utility mitigates the migration of IVP variables values between releases.

IMS Connect migration considerations

Many migration considerations pertain to migrating IMS Connect from IMS Version 11 or IMS Version 12 to IMS Version 13.

Consider the following items when planning to migrate IMS Connect support to IMS Version 13:

- In IMS Version 13, IMS Connect requires a region size that is at least 170 MB larger than the regions size that was required in IMS Version 12. The increase supports the IMS Connect use of CPOOL instead of STORAGE OBTAIN in the XCF Message exit.

- Automated programs that issue IMS Connect type-2 commands might need to be modified to handle certain type-2 commands that are now processed synchronously in IMS Version 13. IMS Connect type-2 commands that are processed synchronously return the full results of the command in the command response, instead of returning part of the response to the system console. The commands that are processed synchronously also include new completion codes. The following commands are processed synchronously in IMS Version 13:
 - CREATE IMSCON TYPE(DATASTORE) command
 - CREATE IMSCON TYPE(PORT) command
 - UPDATE IMSCON TYPE(DATASTORE) START(COMM) command
 - UPDATE IMSCON TYPE(IMSPLEX) START(COMM) command
 - UPDATE IMSCON TYPE(MSC) START(COMM) command
 - UPDATE IMSCON TYPE(ODBM) START(COMM) command
 - UPDATE IMSCON TYPE(PORT) START(COMM) command
 - UPDATE IMSCON TYPE(RMTIMSCON) START(COMM) command
- In IMS Version 13, the IMS Connect recorder trace records are expanded to capture the entire messages that are sent and received on DRDA sockets, as well as all messages that are sent to and received from OM and ODBM via SCI. Consequently, the amount of trace information produced in IMS Version 13 might be significantly higher than in previous releases. Make sure that BPE external tracing is enabled to account for the increase in information.
- IMS Version 12 introduced new recorder trace records for IMS Connect that make use of BPE's external trace tables.
- In IMS Version 12 and later, IMS ships load modules for the user exit routines HWSUNIT0, HWSJAVA0, HWSSMPL0, HWSSMPL1 in addition to the source. Previously, working samples were provided but always had to be assembled and bound. Even if no changes are made to the provided source samples, IMS Connect always loads HWSUINIT and HWSJAVA0. HWSSMPL0 and HWSSMPL1 must be specified on the EXIT= parameter of the TCPIP configuration statement before they are loaded.
- You can use the default values for the UIDCACHE and UIDAGE statements in the IMS Connect configuration member, but you must update the configuration member if you want to use other values.
- User-written IMS Connect clients that use CM0 Send-Receive interactions can update their applications to specify ACK NoWait and eliminate the receive call for the timeout.
- Automated application programs that interpret the output from the VIEWHWS and QUERY MEMBER commands must be changed to take advantage of:
 - New output fields added in IMS Version 13
 - New output fields added in IMS Version 12

Java class libraries for IMS migration considerations

IMS Version 13 is the last release to support the IMS Classic Java APIs. Customers that are using these APIs should migrate to the IMS Universal drivers.

Migration considerations for log record suffix time-stamp uniqueness

In IMS Version 12 and later, the time-stamp value in the log record suffix is no longer necessarily unique in every log record produced by an IMS system. The time stamp in each log record is always greater than or equal to the time-stamp value in the previous log record. The sequence number remains unique per record and is always greater than the sequence number in the previous log record.

The log record suffix of every log record written by IMS contains:

- An 8-byte time stamp in hardware TOD (STCK) format (log record field LOGRC_STCK)
- An 8-byte log sequence number (log record field LOGRC_SEQUENCE_NUMBER)

Before IMS Version 12, every log record produced by one IMS system had a unique time stamp value and a unique log sequence number. The time stamp in each log record was always greater than the time stamp in the previous record. The log sequence number in each log record was always greater than the log sequence number in the previous record.

Recommendation: Use the concatenation of fields LOGRC_STCK and LOGRC_SEQUENCE_NUMBER to establish a unique, time-ordered key for sorting log records. Do not use only the LOGRC_STCK field because the results might be unpredictable.

Remote Site Recovery migration

To avoid a loss of disaster recovery protection during the migration period, plan for an orderly migration to IMS Version 13 of IMS systems that participate in Remote Site Recovery (RSR). Migrating RSR to IMS Version 13 does not depend on any non-IMS software other than that required for RSR to operate.

Planning and administration tasks

The system programmer, system administrator, and the database administrator must carefully plan the migration to IMS Version 13 of IMS systems that participate in RSR. Also, automation programs and procedures might need to be created or modified based on messages issued during an RSR migration.

To take advantage of added IMS function, RSR users must migrate from IMS Version 11 and IMS Version 12 to IMS Version 13. The migration path must be chosen carefully for the IMS subsystems that are participating in RSR. Migration of any IMS system that participates in RSR includes all the steps that are required to move to the new level.

To migrate from IMS Version 11 or IMS Version 12 to IMS Version 13 in an RSR environment:

1. Migrate the tracking IMS and Transport Manager Subsystem (TMS) to the IMS Version 13 level.
2. Migrate the active site TMS that is running isolated log sender (ILS) to the IMS Version 13 level. You must complete this step before or during migration of the first active IMS. Stop ILS on all the other TMSs so that the tracking IMS does not attempt to establish conversations with an ILS at an earlier level.
3. Migrate the rest of the active IMS subsystems and active site TMS systems to the IMS Version 13 level as necessary.

Pre-Version 13 library retention

Retain all pre-IMS Version 13 libraries that are required for processing the pre-IMS Version 13 tracking log data sets until there is no possibility of needing the pre-IMS Version 13 log data sets. If a tracking log data set must be recovered for any reason, it must be processed by the Log Recovery utility (DFSULTR0) from the same version of IMS. Therefore, even after a remote takeover, you might need to retain pre-IMS Version 13 libraries at the remote site, even if all active IMS

subsystems have been migrated to IMS Version 13.

Takeover considerations

Active IMS systems must restart at the remote site after a remote takeover to access to tracking log data sets (for normal and emergency restart). The new active IMS systems must run at the same IMS version level as the old active IMS systems that created the log records that are used for restart processing.

Handling error situations

If the tracking IMS terminates abnormally while at the pre-IMS Version 13 level, perform an emergency restart at the pre-IMS Version 13 level and successfully shut down before you migrate to IMS Version 13. Doing so allows the tracking IMS to create an RSR position data set that is used during cold start processing of the new IMS Version 13 RSR tracker. The RSR position data set helps the RSR tracker reestablish routing positions on the various PRILOG records.

If a deallocate or close error message for the RSR position data set is issued by the IMS Version 11 or IMS Version 12 tracking IMS during shutdown, resolve the problem that is causing the error before you migrate the tracking IMS system to IMS Version 13. If the problem causes an error during RSR position data set allocation such that the tracking IMS is unable to find or access the position data set, you can continue normal cold-start processing. However, normal cold-start processing will result in the tracking IMS processing only log data from new active IMS systems because the tracking IMS has no indication of where the previous tracking IMS stopped. You can restart the tracking IMS at the pre-IMS Version 13 level if a new RSR position data set needs to be created to alleviate this problem.

The following steps describe what can happen if an active IMS spans the migration of a tracking IMS and an RSR position data set is not available:

1. Log data is received at the tracking site from an active IMS Version 11 or IMS Version 12 system before migrating the tracking IMS to IMS Version 13 (the active PRILOG is not closed).
2. The tracking IMS migrates to an IMS Version 13 level but the active IMS does not shut down (the PRILOG did not close in the active site RECON data sets).
3. After a cold start, the IMS Version 13 tracker is unable to find the RSR position data set.
4. The user elects to continue cold start processing.
5. Log data is received from the active IMS with the same PRILOG start time as was processed by the previous release tracking IMS. This log data is not applied to any remote site database.

RSR migration path to IMS Version 13

The following table describes steps for migrating IMS and TMS from IMS Version 11 or IMS Version 12 to IMS Version 13, and the combinations of IMS systems and resources that are supported. In the table:

- The Steps column shows the order in which you can migrate the components of the RSR complex (where A = Active and R = Remote).
- The bold type in a table cell shows in which IMS version the current changes occur.

Table 9. Supported paths and configurations for migrating RSR to IMS Version 13

Steps		Active site state			Remote site state			Notes
A	R	IMS	TMS/ILS	RECON	IMS	TMS/ILS	RECON	
0	0	pre-V13	pre-V13	pre-V13	pre-V13	pre-V13	pre-V13	1
1	1	pre-V13	pre-V13	V13	pre-V13	pre-V13	V13	2
1	2	pre-V13	pre-V13	V13	V13	V13	V13	3
2	2	pre-V13	V13	V13	V13	V13	V13	4
3	2	V13	V13	V13	V13	V13	V13	5

Note:

- (0,0) - This is the initial state. All subsystems at both the active and remote sites are running at the pre-IMS Version 13 level.
- (1,1) - Both RECON data sets are upgraded by using the CHANGE.RECON UPGRADE command. It does not matter which site (active or remote) is run first. It only matters that both RECON data sets are upgraded before proceeding.
- (1,2) - The tracking IMS and remote site TMS are migrated to IMS Version 13. These IMS systems can be migrated separately, but to ensure integrity, simultaneous migration is preferable.
- (2,2) - The active site TMS is migrated to IMS Version 13. This can be accomplished as part of migrating the active IMS to IMS Version 13. All non-IMS Version 13 isolated log senders (ILSs) must be stopped and ILS started on the IMS Version 13 TMS so that missing log data from the IMS Version 13 IMS can be sent to the tracking IMS.
- (3,2) - The active IMS subsystems are migrated to IMS Version 13. Each IMS subsystem can be migrated independently.

Alternatives to RSR migration and coexistence

The alternatives to RSR migration and coexistence are:

- Require IMS users of the RSR function to migrate all systems that are participating in RSR to IMS Version 13 simultaneously.
- Disable the RSR function while active site systems migrate to IMS Version 13.

Changed interfaces

The interface between the log router and various other components has been changed to support multiple release log record handling. The interfaces of the following components have changed:

- Active site IMS logger
- Active system tracker
- DBRC
- DL/I tracker
- Fast Path tracker
- Isolated log sender

Security enhancements migration considerations

The SECURITY macro is no longer used in IMS Version 13 and later IMS systems. Also, some security exit routines might need to be changed when migrating from IMS Version 12 or earlier.

SECURITY macro migration considerations

IMS Version 12 is the last version to support the SECURITY macro. You can use initialization parameters to specify most of the SECURITY macro keyword values.

If the SECURITY macro is specified in an IMS Version 13 or later IMS system, IMS issues message G115 and continues processing the stage 1 system definition input. For fallback purposes, you can leave the SECURITY macro in the IMS Version 13 stage 1 system definition input, in which case, you can ignore message G115.

To prepare you IMS system for the removal of the SECURITY macro, move your security specifications from the SECURITY macro to initialization parameters, use the following procedure:

1. Before you migrate to IMS Version 13, replace the SECLVL and TYPE security specifications in the SECURITY macro with the corresponding security specifications in the DFSPBxxx PROCLIB member.

The following table shows SECLVL and TYPE specifications in the SECURITY macro parameters and the parameter specifications in the DFSPBxxx PROCLIB member that replace them.

Table 10. EXEC parameters available in IMS Version 12 listed by the SECURITY macro parameters that they replace

SECURITY macro parameter	Corresponding DFSPBxxx parameter
SECLVL=NOSIGN	SGN=N
SECLVL=SIGNON	SGN=Y
SECLVL=FORCSIGN	SGN=F
SECLVL=NOTRAN	TRN=N
SECLVL=TRANAUTH	TRN=Y
SECLVL=FORCTRAN	TRN=F
TYPE=NORACTRM+NORACFCM	RCF=N
TYPE=RACFTERM	RCF=T
TYPE=RACFCOM	<ul style="list-style-type: none">• RCF=C (specifies command authorization for ETO terminals)• RCF=S (specifies command authorization for ETO terminals and statically defined terminals)
TYPE=RACFTERM+RACFCOM	<ul style="list-style-type: none">• RCF=A (specifies command authorization for both ETO and statically defined terminals, sign on security, and transaction authorization)• RCF=Y (specifies command authorization for ETO terminals, sign on security, and transaction authorization)
TYPE=NORAS	ISIS=N
TYPE=RASRACF	ISIS=R

Table 10. EXEC parameters available in IMS Version 12 listed by the SECURITY macro parameters that they replace (continued)

SECURITY macro parameter	Corresponding DFSPBxxx parameter
TYPE=RASEXIT	ISIS=C
TYPE=RAS	ISIS=A
TYPE=SIGNEXIT, TYPE=NOSIGNEX	IMS detects and loads the exit routines that are linked in one of the IMS STEPLIB libraries or in LINKLST. See "Security exit routines migration considerations."
TYPE=TRANEXIT, TYPE=NOTRANEX	IMS detects and loads the exit routines that are linked in one of the IMS STEPLIB libraries or in LINKLST. See "Security exit routines migration considerations."

2. Move SECCNT parameter to the COMM or MSGEN macro.
3. Move the RCLASS and SECCNT parameter specifications from the SECURITY macro to the appropriate PROCLIB member.
 - For DB/DC or DCCTL systems, you can move both the RCLASS and SECCNT parameter specifications to the DFSDCxxx PROCLIB member.
 - For all system types, you can move the RCLASS parameter specification to the DFSPBxxx PROCLIB member.
4. Comment out the SECURITY macro in the stage 1 system definition input. For fallback purposes, do not delete it.

If different versions of IMS use the same PROCLIB members, do not comment out the SECURITY macro. In this case, you can ignore the message and return code issued by the IMS Version 13 system definition and initialization processes. For more coexistence information, see "Security enhancements coexistence considerations" on page 84.
5. Start using IMS Version 13 with the security options specified in initialization parameters.
6. When there is no need to fall back to or coexist with a previous version of IMS, remove the SECURITY macro from the stage 1 system definition input.

For information about using initialization parameters for security, see "Controlling security during system startup for DB/DC and DCCTL" in the *IMS Version 13 System Administration*.

Security exit routines migration considerations

If you use either the Signon/off Security exit routine (DFSCSGN0) or the Transaction Authorization exit routine (DFSCTRN0), you do not need to specify an initialization parameter to load these exit routines. IMS detects and loads the exit routines that are linked in one of the IMS STEPLIB libraries or in LINKLST. A new message, DFS1937I, is issued when they are loaded.

As of IMS Version 13, the following security exit routines are no longer bound to the IMS nucleus:

- Signon/off security exit routine (DFSCSGN0)
- Security Reverification exit routine (DFSCCTSE0)
- Transaction Authorization exit routine (DFSCTRN0)

Before IMS Version 13, if DFSCCTSE0 was used, you included the DSECT in DFSCCTRN0. As of IMS Version 13, all the security exit routines can be linked independently.

Recommendations:

- Split DFSCCTSE0 and DFSCCTRN0 into two separate load modules.
- Link the modules as reentrant (RENT) and AMODE/RMODE 31. If the load modules are not linked as reentrant, IMS loads them multiple times.
- If you change DFSCSGN0, DFSCCTRN0 or DFSCCTSE0, make sure to keep a copy of the old version for fallback purposes.

If the exit routines cannot be linked separately or cannot use a common work area, they must be linked in the following manner:

- If the CSECT of DFSCCTSE0 is part of DFSCCTRN0 source, DFSCCTSE0 must be linked as an ALIAS of DFSCCTRN0.
- If virtual address spaces are used to exchange data between DFSCSGN0, DFSCCTRN0, and DFSCCTSE0, then DFSCCTSE0 and DFSCSGN0 must be linked as ALIASs of DFSCCTRN0.

Syntax Checker enhancements migration considerations

The Syntax Checker assists with IMS release-to-release migrations by providing the ability to convert supported IMS.PROCLIB members from one release to the other.

When you use the Syntax Checker to check parameters for earlier releases of IMS, you must verify that the correct release number is displayed.

WADS migration considerations

The IMS Version 12 and later write-ahead data set (WADS) must be preallocated and formatted on a DASD device that supports Extended Count-Key-Data (ECKD) architecture.

The WADS channel program is rewritten and replaced as of IMS Version 12.

Fallback considerations

Major functions of IMS are generally not compatible with earlier versions.

Consider the following guidelines when preparing your migration fallback plan. This information is a guide to fallback inhibitors, and is not comprehensive:

- If your IMS system uses IMS-managed ACBs...
- The ACB Maintenance utility, ACBGEN, is required.
- For each IMS that you are migrating to a pre-Version 13 level, complete the following steps:
 1. Ensure that the status of all databases and PSBs updated by IMS Version 13 are correct.
 2. Resolve DBRC issues. See “DBRC fallback considerations” on page 65.
 3. Shut down IMS Version 13.
 4. Install the version of IMS that you want.
 5. Cold start the IMS.
- You can use the IBM IMS Queue Control Facility for z/OS (QCF) to requeue IMS Version 13 messages to IMS Version 11 or IMS Version 12 message queues.

If you fall back from IMS Version 13 to IMS Version 12, ensure that the IMS Version 12 DBRC Coexistence APAR PM53139 is applied to the IMS Version 12 system.

If you fall back from IMS Version 13 to IMS Version 11, ensure that the IMS Version 11 DBRC Coexistence APAR PM53134 is applied to the IMS Version 11 system.

DBRC fallback considerations

Certain steps must be taken to revert the level of DBRC from IMS Version 13 to IMS Version 11 or IMS Version 12.

BPE-based DBRC

If you are falling back from a BPE-based IMS Version 13 DBRC to a BPE-based IMS Version 12 DBRC, there are no fallback considerations for the BPE DBRC base.

To revert to using a non-BPE based DBRC:

1. Shut down the IMS control region that is associated with the BPE-based DBRC address space.
2. Modify the DBRC procedure to use JCL appropriate for a non-BPE based DBRC region.
3. Restart IMS with the DBRCNM parameter specifying the non-BPE DBRC region startup JCL.

Database Change Accumulation utility (DFSUCUM0)

If you fall back from IMS Version 13 to IMS Version 11 and you have change accumulation (CA) data sets created at the Version 13 level, the database changes in these CA data sets are not recoverable because the IMS Version 11 utility cannot process them. Invalidate the Version 13 change accumulation data sets by running an image copy of the related databases at the IMS Version 11 level.

Minimum version value in the RECON data set

If the MINVERS value is set to '13.1' and you need to fall back from IMS Version 13 to an earlier version, you must lower the MINVERS value because jobs in an earlier release cannot access the RECON data if the current MINVERS value is set to '13.1' .

To change the MINVERS value to '11.1', complete the following steps:

1. Shut down all IMS Version 13 subsystems.
2. Ensure that all IMS Version 13 subsystem records have been removed from the RECON data set. Issue a LIST.SUBSYS command to see the subsystem records in the RECON data set. Delete all IMS Version 13 subsystem records in the RECON data set using the DELETE.SUBSYS command.
3. Reset the MINVERS value by issuing a CHANGE.RECON MINVERS('11.1') command using IMS Version 13.
4. If you receive message DSP1205E (meaning that the database quiesce flags are active), use the CHANGE.DB or CHANGE.DBDS command to set off the flags. After the flags are off, reissue the CHANGE.RECON MINVERS('11.1') command.

To change the MINVERS value to '12.1', complete the following steps:

1. Shut down all IMS Version 13 subsystems.
2. Ensure that all IMS Version 13 subsystem records have been removed from the RECON data set. Issue a LIST.SUBSYS command to see the subsystem records in the RECON data set. Delete all IMS Version 13 subsystem records in the RECON data set using the DELETE.SUBSYS command.
3. Reset the MINVERS value by issuing a CHANGE.RECON MINVERS('12.1') command using IMS Version 13.
4. If you receive message DSP1205E (meaning that the database quiesce flags are active), use the CHANGE.DB or CHANGE.DBDS command to set off the flags. After the flags are off, reissue the CHANGE.RECON MINVERS('12.1') command.

Dynamic definition for MODBLKS resources fallback considerations

You can fall back from an IMS system that has dynamic definition (DRD) enabled for MODBLKS resources to an earlier version of IMS.

To fall back from an IMS Version 13 system that uses the IMS repository function to an IMS Version 12 or IMS Version 11 system that uses a resource definition data set (RDDS):

1. Ensure that you have a non-system RDDS that contains a complete set of all the resource definitions before shutting down IMS Version 13.
2. Cold start the IMS Version 12 or IMS Version 11 system and import the resource definitions from the RDDS.

To fall back from an IMS system that has DRD enabled and uses an RDDS to an IMS system that does not use DRD:

1. Ensure that the IMS.MODBLKS data set has a complete set of all the resource definitions while you have DRD enabled. This set of resource definitions includes resource definitions that were originally in the IMS.MODBLKS data set at cold start time, and the resource definitions (or removal thereof) for the resources that were added, changed, or deleted dynamically. Having this set enables you to fall back to using online change for the IMS.MODBLKS data set with all the resources that were defined either by system definition originally or dynamically.

Optionally, you can use the Resource Definition Data Set (RDDS) Extraction utility (DFSURDD0) to extract the resource definitions to create Stage-1 macro statements from the stored resource definitions in an RDDS.

2. Shut down IMS normally.
3. Remove or change the MODBLKS keyword to enable online change for the IMS.MODBLKS data set:
 - Remove the MODBLKS keyword from the DFSCGxxx member or the DFSDFxxx member of the IMS.PROCLIB data set (or from both members). If both members are defined, any values specified in the DFSCGxxx member override the values specified in the DFSDFxxx member.
 - Change the value of the MODBLKS keyword from DYN to OLC in the DFSCGxxx member or in the <COMMON_SERVICE_LAYER> section of the DFSDFxxx member of the IMS.PROCLIB data set (or in both members).
4. Ensure that the IMS JCL includes the MODBLKS DD statement.
5. Cold start IMS. An IMS cold start creates runtime resource definitions from the stored resource definitions in the IMS.MODBLKS data set. The online change process for the IMS.MODBLKS data set is now enabled. Variations of the

dynamic resource definition CREATE, DELETE, and UPDATE commands that change definitions are no longer permitted.

6. Reinstitute your in-house procedures that use the online change process for the IMS.MODBLKS data set and disable the procedures that use DRD commands.
7. Perform other pertinent tasks related to falling back to a previous version.

IMS catalog fallback

An IMS system in which the IMS catalog is enabled can fall back to an earlier version of IMS.

If you are falling back to a prior version of IMS in which the IMS catalog was enabled, unless the DBD and PSB instances from the prior version were purged from the IMS catalog, you do not need to change the IMS catalog.

If the DBD and PSB instances from the prior version were not purged, fallback to the IMS catalog of the prior version is achieved by making the ACB library (ACBLIB) of the prior version the active ACBLIB again. The active ACBLIB determines which DBD and PSB instances are active in the IMS catalog.

If the DBD and PSB instances from the prior version were purged from the IMS catalog, you must repopulate the IMS catalog with the DBD and PSB instances from the prior version after you make the ACBLIB from the prior version active.

After fallback is complete, you can leave the IMS Version 13 DBD and PSB instances in the IMS catalog or you can purge them to save storage.

If you are falling back to a version of IMS that does not support the IMS catalog, and the IMS catalog was registered to DBRC in the IMS Version 13 system, remove the database definitions for IMS catalog from DBRC.

IMS Version 11 and earlier systems do not recognize the CATALOG section of the DFSDFxxx PROCLIB member, so the catalog specifications in the DFSDFxxx PROCLIB member do not need to be removed.

The following figure shows the IMS catalog before fallback. The ACBLIB for the new version is active. The new DBDs are used in the DMB pool of the new version of IMS and the new DBD instances in the DBD record in the IMS catalog are used.

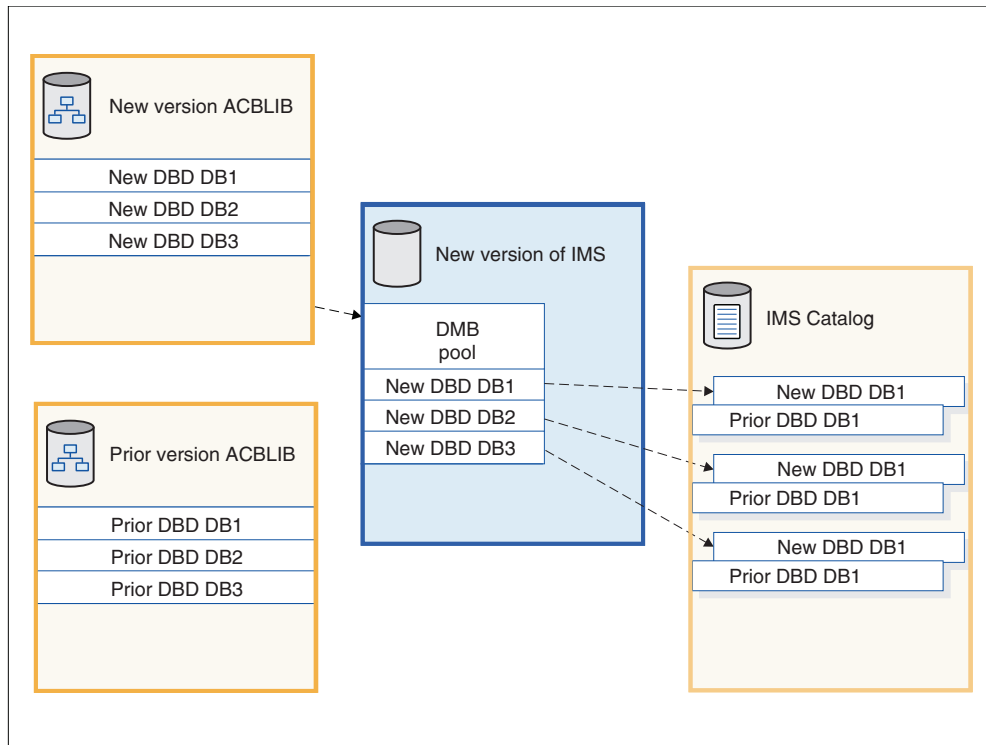


Figure 1. DBDs that IMS uses before fallback

The following figure shows the IMS catalog after fallback. The ACBLIB for the prior version is made active again. The prior version of IMS loads the prior DBDs into the DMB pool and uses the prior DBD instances in the DBD records in the IMS catalog.

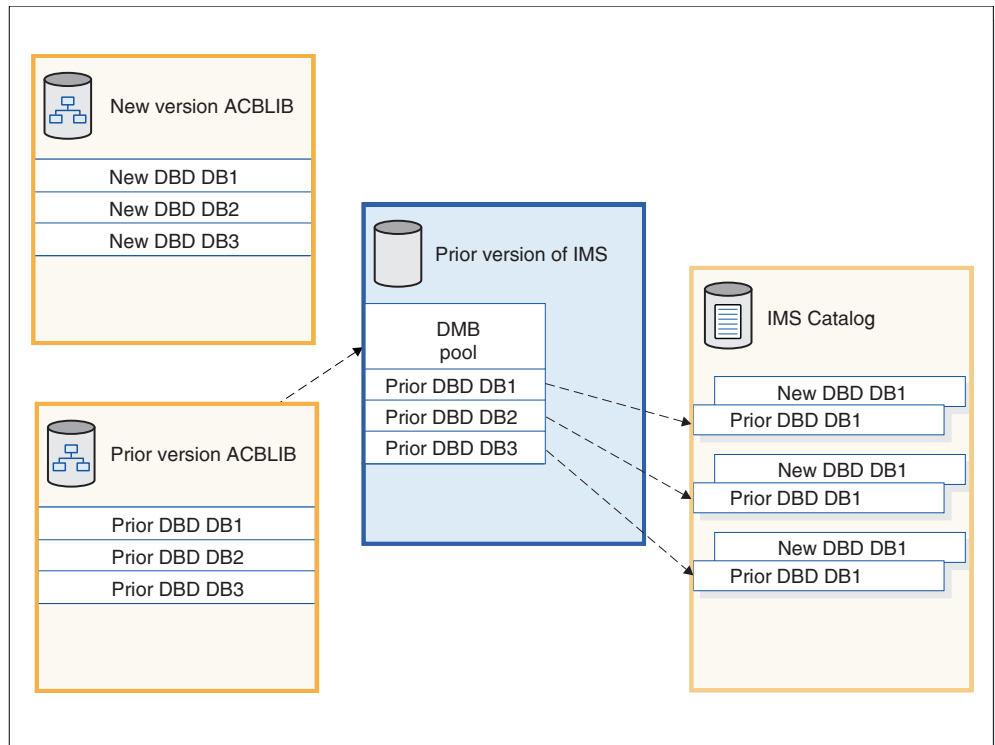


Figure 2. DBDs that IMS uses after fallback

Chapter 7. Coexistence with IMS Version 13

Restrictions and compatibility considerations apply for coexistence of IMS Version 13 with earlier versions of IMS.

If an IMS Version 13 enhancement, or any other IMS function, has no coexistence or compatibility considerations, it is not described in these topics.

Overview of coexistence APARs

IMS Version 11 and IMS Version 12 must have certain APARs installed to coexist with IMS Version 13.

The following table describes the coexistence APARs and PTFs needed for various IMS functions. For detailed information about individual APARs and PTFs, go to the IMS home page at www.ibm.com/ims and click **Support**.

Table 11. APARs and PTFs needed for IMS Version 13 coexistence with IMS Version 11 and IMS Version 12

IMS Version 13 function	IMS Version 11 coexistence APAR/PTF	IMS Version 12 coexistence APAR/PTF	Additional information
Database Change Accumulation utility (DFSUCUM0)	PM37033/UK67281	None	For more information, see "Database utility coexistence considerations" on page 76.
DBRC RECON data sets	PM53134/UK80026	PM53139/UK80027	For more information, see "DBRC coexistence considerations" on page 74.
HALDB online reorganization (OLR)	PM31791/UK67485	None	For more information, see "HALDB OLR coexistence considerations" on page 78.
PSB library	<ul style="list-style-type: none"> • PM23843/UK64013 • PM32390/UK65495 • PM35639/UK66632 	None	For more information, see "PSB library coexistence considerations" on page 81.
IMS repository enhancements	<ul style="list-style-type: none"> • PM19026/UK63964 • PM32766/UK68882 	<ul style="list-style-type: none"> • PM80588/UK92589 	For more information, see "IMS repository function coexistence considerations" on page 79.
Security enhancements	<ul style="list-style-type: none"> • PM48203/UK74050 • PM72199/UK82616 	<ul style="list-style-type: none"> • PM48204/UK74051 • PM73558/UK82617 	IMS Version 13 does not support the SECURITY macro. You can use initialization parameters to specify all of the SECURITY macro keyword values. Initialization parameters for the RCLASS and SECCNT keywords are delivered through the APARs/PTFs listed.

Determining which coexistence service needs to be installed

You can identify the outstanding service that needs to be installed on your IMS Version 11 and IMS Version 12 systems to enable them to coexist with IMS Version 13 by using SMP/E and the IMS Version 13 FIXCAT category.

The FIXCAT category for IMS Version 13 is `IBM.Coexistence.IMS.V13` with the keyword `IMSV13COEX`.

The following is an example of the steps to determine what IMS service needs to be installed on IMS Version 11 or IMS Version 12 to coexist with IMS Version 13:

1. Download the current enhanced HOLDDATA
2. SMP/E RECEIVE the current enhanced HOLDDATA
3. Run the SMP/E REPORT MISSINGFIX command pointing to your IMS Version 11 or IMS Version 12 zone (for example):

```
SET BOUNDARY (GLOBAL) .  
REPORT MISSINGFIX ZONES (targetzone)  
FIXCAT(IBM.Coexistence.IMS.V13)
```

Related information:

Enhanced HOLDDATA for z/OS

IBM Fix Category Values and Descriptions

General coexistence considerations

Although IMS Version 13 can coexist with earlier versions of IMS, general coexistence considerations apply.

IMS Version 13 can coexist with earlier versions, so existing applications and data can be used without change. Migration and coexistence support is provided for IMS Version 11 and IMS Version 12.

The following general coexistence considerations apply:

- You must build new application control blocks (ACBs) for all existing program specification blocks (PSBs) and database definitions (DBDs).
- An all-system generation and a cold start are required for online systems (DBCTL, DB/DC, DCCTL). All data sets must be formatted when IMS is initialized the first time. To ensure that the data sets are formatted, specify the `FORMAT ALL` keywords on the cold start command (`/NRESTART CHECKPOINT 0` or `/ERESTART COLDSYS`).
- If you are installing multiple versions of IMS in the same processor, you can continue to use the prior versions of the IMS SVCs with the prior versions of IMS. However, the IMS Version 13 SVCs are downward compatible with IMS Version 11 and IMS Version 12. Only IMS Version 13 requires the IMS Version 13 SVCs.
- As of IMS Version 11, IMS uses a dynamic abend dump formatting module (DFSAFMX0). If you are running only versions of IMS that are Version 11 or later, you do not need to install the static abend dump formatting module (DFSAFMD0) on the host z/OS system. If you want to have IMS online dump formatting, and your z/OS system is running any jobs (either online or batch) for IMS Version 10 or earlier, the DFSAFMD0 module must be installed on the z/OS system.

- As of IMS Version 13, the old IMS static resource cleanup module, DFSMRCL0, is no longer shipped with IMS. DFSMRCL0 was used in IMS Version 8 and earlier. All currently supported versions of IMS use a dynamic resource cleanup module (DFSMRC20).

Recommendation: If you have not already done so, remove the DFSMRCL0 zap installed in IEAVTRML and the LPA direct pointer to the IMS SDFSRESL data set.

- For DB/DC and DCCTL online systems, the MFS format library is a required data set, regardless of whether MFS is used. DBCTL systems do not require an MFS format library.

- Utilities and logs

You might need to change programs that process the log because some log records that are created by database changes have been modified. For a list of the log records that are new, deleted, or changed for IMS Version 13, see Chapter 9, “Log record changes in IMS Version 13,” on page 99.

- **Extended checkpoint restriction:** You cannot use extended checkpoint to restart applications across different releases of IMS.

Specific coexistence considerations

Functional areas of or enhancements to IMS Version 13 have specific coexistence considerations.

The following topics describe specific coexistence considerations for IMS Version 13.

Common Queue Server coexistence considerations

Restrictions limit how Common Queue Servers (CQSs) from earlier versions of IMS can coexist.

General CQS coexistence rules

The following general coexistence rules apply to CQS in IMS Version 13:

- An IMS Version 11 or an IMS Version 12 can register with an IMS Version 13 CQS.
- An IMS Version 13 cannot register with a pre-IMS Version 13 CQS.
- An IMS Version 12 cannot register with a pre-IMS Version 12 CQS.
- An IMS Version 11 cannot register with a pre-IMS Version 11 CQS.
- User or vendor-written CQS clients that want to register with an IMS Version 13 CQS must be compiled with IMS Version 11 or later CQS macros.
- User or vendor-written CQS clients that are compiled with the IMS Version 13 CQS macros cannot register with a pre-IMS Version 13 CQS.
- User or vendor-written CQS clients that are compiled with the IMS Version 12 CQS macros cannot register with a pre-IMS Version 12 CQS.
- User or vendor-written CQS clients that are compiled with the IMS Version 11 CQS macros cannot register with a pre-IMS Version 11 CQS.
- An IMS Version 11 CQS, an IMS Version 12 CQS, and an IMS Version 13 CQS can connect to the same coupling facility structure.
- Any supported version of CQS can run on the same central processing complex (CPC).

For example:

- An IMS Version 13 CQS supports clients that are assembled with the IMS Version 11, IMS Version 12, or IMS Version 13 CQS macros.
- A client that is assembled with the IMS Version 13 CQS macros can register only with an IMS Version 13 CQS. The IMS Version 13 client cannot register with an IMS Version 11 or an IMS Version 12 CQS. Similarly, a client that is assembled with the IMS Version 12 CQS macros cannot register with an IMS Version 11 CQS.

DBRC coexistence considerations

An IMS Version 13 Database Recovery Control (DBRC) instance can coexist with an IMS Version 11 DBRC or an IMS Version 12 DBRC if you install the DBRC coexistence small programming enhancements (SPEs) to the IMS Version 11 or IMS Version 12 systems, and upgrade your RECON data set to the IMS Version 13 format by issuing a CHANGE.RECON UPGRADE command. Additional coexistence considerations apply to other DBRC functions.

SPEs are available for IMS Version 11 and IMS Version 12 that enable the coexistence of the earlier version DBRC with DBRC for IMS Version 13. With the appropriate SPE installed, IMS Version 13 and earlier version DBRCs can share the upgraded RECON data set. If the RECON data set has not been upgraded to IMS Version 13, the SPE has no effect. After the RECON data set has been upgraded, the SPE enables DBRC to convert records to the appropriate release format, depending on whether the record is being written to or the record is being read from the RECON data set. The SPE does not, however, enable the earlier level DBRC for the new functions delivered with DBRC in IMS Version 13.

The following coexistence SPEs must be installed to the IMS Version 11 or IMS Version 12 DBRC for coexistence purposes:

- IMS Version 11: PM53134/UK80026
- IMS Version 12: PM53139/UK80027

Restriction: After a RECON data set is upgraded to the IMS Version 13 level, it is not accessible to any pre-IMS Version 13 system that does not have the DBRC Coexistence SPE installed.

The MINVERS level must be set to the lowest level of IMS that uses or shares the RECON data sets.

Attention: Set a region size of 0M for all pre-IMS Version 13 Log Archive utility (DFSUARC0) jobs when an upgraded RECON data set is used. Unpredictable results can occur for any DBRC job that reads, writes, or changes any RECON record when inadequate storage is available for the job.

DBRC application coexistence considerations

There are two versions of each DBRC API (DSPAPI) macro: Version 1.0 (delivered with IMS Version 9) and Version 2.0 (delivered with IMS Version 10 and later). DBRC applications compiled with the Version 1.0 DSPAPI macros work without modification or reassembly with Version 2.0 of the DBRC API. However, these applications cannot use any of the newer functions (such as AUTH) or newer options (such as READONLY=YES) that are supported in the Version 2.0 macros.

For IMS Version 9, the default version level of the DSPAPI macros is 1.0. For IMS Version 10 and later, the default version level of the DSPAPI macros is 2.0. If a DBRC application that was originally assembled with the version 1.0 macros is reassembled using an IMS Version 10 or later macro library, and does not specify VERSION=1.0, the application might not work as expected because of the default version change.

Recommendation: If the functionality of an IMS Version 9 DBRC application remains unchanged and is reassembled using an IMS Version 10 or later macro library, specify VERSION=1.0 on the DSPAPI macros.

The enhancements in Version 2.0 of the DBRC API are available only with IMS Version 10 and later. These enhancements can be used only by DBRC applications that are compiled with Version 2.0 or later of the DBRC API.

The output blocks for the IMS Version 13 DBRC API requests contain more information than the output blocks for earlier-version API requests. DBRC applications must use the latest maps to access the additional information.

In a coexistence environment, the RECON data set can be managed (read, updated, and so on) using the functions that each sharing DBRC supports. For example, a shared RECON data set could be:

- Updated by a DBRC instance using the batch DBRC commands that are processed by the Database Recovery Control (DBRC) utility (DSPURX00), and queried by using the Query requests through Version 1.0 of the DBRC API
- Updated or queried by an IMS Version 10 or later DBRC using either the batch DBRC commands or API requests through Version 2.0 of the DBRC API

IMS utilities coexistence considerations

The Batch Backout, Log Recovery, and Log Archive utilities must be run on the IMS release that created the logs. For example, an IMS Version 12 Batch Backout utility cannot back out logs that were created on IMS Version 13.

The Database Recovery and Change Accumulation utilities must be run on the IMS release that is the same as the highest level of the logs that are being used. For example, an IMS Version 12 Database Recover utility can use logs that were created on IMS Version 11 or IMS Version 12, but not on IMS Version 13.

Database versioning coexistence considerations

In IMS Version 13, database versioning introduces some specific considerations for coexistence with other versions of IMS.

Coexistence considerations

Recommendation: Although an IMS Version 13 system in which database versioning is enabled can coexist with an IMS system that does not support database versioning, do not enable database versioning until all of your IMS systems are migrated to IMS Version 13.

If an IMS system that has database versioning enabled must coexist with an IMS system that does not support database versioning, prevent application programs that run on the IMS system that does not support database versioning from accessing any database that has multiple versions.

DBD and PSB source that is coded for database versioning support cannot be processed by the DBD Generation and PSB Generation utilities of IMS Version 12 and earlier systems. The DBVER and DBLEVEL keywords added in IMS Version 13 are not recognized by IMS Version 12 and earlier systems.

DEDB Alter enhancement coexistence considerations

The DEDB Alter utility has requirements for coexistence in IMS Version 13.

To run the DEDB Alter utility, all IMS data-sharing systems must be at the IMS Version 13 or later level. The MINVERS value in the RECON data set must be 13.1 or later.

If the MINVERS value in the RECON data set is not set to 13.1, the DEDB Alter utility terminates without performing the requested function. The default value for MINVERS in IMS Version 13 is 11.1.

DRA coexistence considerations

The version of the IMS DRA modules that are used by a DRA client must be the same version as the IMS with which the DRA client is communicating. A DRA client that communicates with multiple versions of IMS must use the appropriate version of the IMS DRA modules for each version of IMS.

Recommendations:

- Concatenate the IMS.SDFSRESL library to the DRA client step library so the correct version of the DRA Startup/Router routine (DFSPRRC0) is loaded into the DRA client load library.
- Ensure that the DRA Startup Table (DFSPZPxx) points to the correct version of IMS.SDFSRESL.

IMS can allocate the PCB list that the database resource adapter (DRA) passes to applications in 31-bit addressable storage. The DRA startup table option PCBLOC=31 causes the PCB address list and the PCBs to be placed above the 16 MB line. This placement is incompatible with AMODE 24 applications.

When IBM CICS Transaction Server for z/OS connects to DBCTL, IMS returns an indicator if PCBLOC=31 is in effect. If the PSB is AMODE 24 and PCBLOC=31 is in effect, CICS abends the application with a CICS abend code ADCF during the schedule of the PSB.

IBM CICS Transaction Server for z/OS Version 3.1 and IBM CICS Transaction Server for z/OS Version 3.2 require the installation of APAR/PTF PK54100/UK30299/UK30300 to cause the abend.

Database utility coexistence considerations

Coexistence restrictions apply to the use of some database utilities.

JCL from earlier versions of IMS might need to be changed because IMS Version 13 DBRC uses time-stamp precision to the microsecond.

Recommendation: Use DBRC with all IMS Version 13 database change accumulation and database recovery jobs, especially during migration and coexistence.

Attention: Other utility programs (such as Log Merge and Log Analysis) work properly only when they process data that was created by an IMS subsystem or batch application program that is at the same release level as the utility program. Otherwise, the results are unpredictable and the output is unreliable.

Restrictions:

- IMS Version 13 utilities must be used whenever the input data for a DBDS contains log, image copy, or change accumulation records created by the IMS Version 13 system.
- Log records generated by a particular version of IMS must use that same version (or later) of the Database Recovery (DFSURDB0) and Database Change Accumulation (DFSUCUM0) utilities to process those logs. For example, the IMS Version 12 utilities can process either IMS Version 11 or IMS Version 12 log records, but cannot process IMS Version 13 log records.

Dynamic definition for MODBLKS resources coexistence considerations

If you use dynamic resource definition (DRD) for MODBLKS resources there are a few points to consider if different versions of IMS coexist.

When an instance of IMS Version 13 is using an IMSRSC repository and is coexisting with an earlier-version IMS that is using an RDDS, changes to online resources or descriptors made on the IMS Version 13 system are not exported to the earlier-version RDDS unless an EXPORT DEFN TARGET(RDDS) command is issued.

Recommendation: When changes are made to DRD runtime resources or descriptors in a multi-version IMSplex, store the definitions for those resources and descriptors in the IMSRSC repositories and RDDS as appropriate.

Restriction: Only IMS Version 12 or later systems can use the IMS repository function.

With all IMS systems using an RDDS, IMS Version 13 can coexist with IMS Version 12 without the need for any coexistence APARs. For an IMS Version 13 to coexist with an IMS Version 11 system (and both are using RDDSs), coexistence APARs/PTF PM19026/UK63964 and PM32766/UK68882 must be installed on the IMS Version 11 system.

The Destination Creation exit routine (DFSINSX0) supports an IMSplex in which some systems are enabled for DRD and some are not. If the DFSINSX0 exit routine is set up to create runtime resource definitions (and the same exit is used across the IMSplex), the routing behavior differs, depending on whether the master is enabled for DRD or not. If the master has DRD enabled, the created definition is routed to one or all IMS systems in the IMSplex. If the master does not have DRD enabled, you cannot route the created definition to other IMS systems in the IMSplex. The local exit creates the definition for a local DRD-enabled system.

Related concepts:

“IMS repository function coexistence considerations” on page 79

Exit routine coexistence considerations

Exit routines that run in IMS Version 11 or IMS Version 12 will work without modification in IMS Version 13. They will not, however, be able to use the latest functions without being modified.

Exit routines that run in multiple versions of IMS must be sensitive to the version of the Standard User Exit Parm List (SXPL). The version number of the SXPL can change if fields are added to the SXPL in a release of IMS.

For example, an exit routine that runs in a mixed-version IMSplex that needs to access the SXPLASWA field in the SXPL, which was introduced in IMS Version 11, must look for SXPLVER6 or later.

SXPLVER6 is the most recent version of the SXPL.

If security exit routines are to be shared across multiple versions, see “Security enhancements coexistence considerations” on page 84.

Related concepts:

“User exit enhancements” on page 164

“Exit routine migration considerations” on page 51

Fast Database Recovery (FDBR) coexistence considerations

An FDBR region must be at the same release level as the IMS system that it is tracking.

HALDB alter enhancement coexistence considerations

The HALDB alter enhancement introduces some specific considerations for coexistence with IMS Version 13.

HALDB alter requires the MINVERS value in the RECON data set to be set to 13.1. The default value for MINVERS in IMS Version 13 is 11.1.

HALDB OLR coexistence considerations

Coexistence restrictions apply to the use of the High Availability Large Database (HALDB) online reorganization (OLR) process.

If an IMS Version 13 system is coexisting with an IMS Version 11 or earlier system and you want to use the OLR ownership release function, the following service must be installed:

- Version 10 - APAR/PTF PM31789/UK67484
- Version 11 - APAR/PTF PM31791/UK67485

HALDB support for 8-GB OSAM data sets enhancement coexistence considerations

The HALDB support for 8-GB OSAM data sets enhancement introduces some specific considerations for coexistence with IMS 14.

This enhancement supports coexistence with IMS Version 13 systems in data sharing environments only if SPE APAR PI23918 has been applied to all the IMS Version 13 resident libraries (RESLIBS) that access the RECON data set. The maintenance enables HALDB support for 8-GB OSAM data sets for IMS Version 13. The MINVERS value in the RECON data set must be 13.1 with the CDSLID value set to 2.

IMS catalog coexistence considerations

If you use the IMS catalog, certain considerations apply when IMS systems of different release levels coexist.

The IMS catalog is release independent. IMS systems at different release levels can use the same IMS catalog. However, because database definitions (DBDs), program views (PSBs), and application control blocks (ACBs) are release specific, the IMS catalog must contain a complete set of release-specific metadata for each release of IMS that uses the IMS catalog.

Consequently, when IMS systems at different release levels share the IMS catalog, the amount of storage that the IMS catalog requires increases by the amount of storage that is required to store the metadata from the ACB libraries of each release that uses the IMS catalog.

You can determine the amount of additional storage that the IMS catalog requires for a new release by providing the ACB library of the new release as input to the IMS Catalog Populate utility (DFS3PU00) and running the utility in analysis mode.

The DBD and PSB metadata for a given release of IMS must be generated and added to the IMS catalog by the generation and population utilities that are provided with that release.

All systems that use the IMS catalog must be IMS Version 12 or later.

IMS repository function coexistence considerations

The IMS repository function in IMS Version 13 can coexist with lower-level versions of IMS.

With the appropriate coexistence APARs/PTFs installed, an IMS Version 13 that uses DRD with IMSRSC repository can coexist with an IMS Version 11 that has DRD enabled or an IMS Version 12 that has DRD with or without IMSRSC repository enabled.

An IMS change list is created only if the command master IMS is IMS Version 13 or later and the RM that processes change list requests is at V13 (1.6) level or higher.

Two possible scenarios for keeping stored resource definitions synchronized across multi-version IMSplex systems are shown as follows:

Scenario 1: Making attribute changes in a mixed environment of IMS systems that use RDDS and IMSRSC repository

In this scenario:

- IMSA is running IMS Version 11, using DRD with an RDDS.
- IMSB is running IMS Version 12, using DRD with an RDDS.
- IMSC is running IMS Version 13 and using DRD with an IMSRSC repository.
- All three IMS systems are in the same IMSplex and using shared queues.

The following steps illustrate changing an attribute of a transaction and storing its resource definition for scenario 1.

1. Check for work in progress by issuing a QRY TRAN SHOW(WORK) command. Either wait for the work to finish or address the work in progress.
2. When the transaction is not in use, an attribute of a transaction is changed on each IMS system by issuing an UPDATE or CREATE command.

3. IMSA and IMSB store the changed resource definition into their respective RDDSs by issuing the EXPORT DEFN TARGET(RDDS) command. IMSC stores the changed resource definition into its IMSRSC repository by issuing the EXPORT DEFN TARGET(REPO) command.
4. Work for the transaction is restarted.

Scenario 2: Changing a transaction definition on one IMS and propagating the change to the other IMS systems

In this scenario:

- IMSA is running IMS Version 11, using DRD with an RDDS, and using an IMS Version 13 CSL.
- IMSB is running IMS Version 12, using DRD with an RDDS, and using an IMS Version 13 CSL.
- IMSC and IMSD are running IMS Version 13 and are using DRD with a single IMSRSC repository.
- All four IMS systems are participating in shared queues.

The following steps illustrate changing an attribute of a transaction and storing its resource definition for scenario 2.

1. Check for work in progress by issuing a QRY TRAN SHOW(WORK) command. Either wait for the work to finish or address the work in progress.
2. When the transaction is not in use, change an attribute of the transaction on IMSC by issuing an UPDATE command.
3. Store the changed transaction definition in the IMSRSC repository for IMSC and IMSD by issuing either of the following EXPORT command from IMSC.


```
EXPORT DEFN TARGET(REPO) SET(IMSID(IMSC,IMSD))
EXPORT DEFN TARGET(REPO) SET(IMSID(*))
```
4. Update the runtime definition of the transaction on IMSD by importing the stored resource definition from the IMSRSC repository by issuing the IMPORT DEFN SOURCE(REPO) command
5. Export the changed transaction definition from IMSC to a non-system RDDS by issuing the EXPORT DEFN TARGET(RDDS) command.
6. Update the runtime definition of the transaction on IMSA and IMSB by importing the stored resource definition from the non-system RDDS by issuing the IMPORT DEFN SOURCE(RDDS) command.
7. Export the changed transaction definition from IMSA and IMSB to their respective system RDDSs by issuing the EXPORT DEFN TARGET(RDDS) command.
8. Work for the transaction is restarted.

Coexistence with IMS Version 12

The following IMS Version 12 APAR/PTF must be installed in an IMS Version 12 system to enable coexistence between an IMS Version 13 Resource Manager (RM) instance and an IMS Version 12 RM instance:

PM80588/UK92589

Prevents an IMS Version 12 RM address space from processing QUERY, UPDATE, and DELETE commands that are issued against an IMS Version 13 or later IMSRSC repository change list.

Coexistence with IMS Version 11

The following APARs/PTFs must be installed in an IMS Version 11 system for an IMS Version 13 RM to coexist with an IMS Version 11 RM:

- IMS Version 11 APARs PM19026/UK63964 and PM32766/UK68882

IMS Connect coexistence considerations

The IMS Version 13 IMS Connect function supports IMS Version 12 and IMS Version 11, although new functions might not be available when connecting with the older versions.

IMS Connect instances from IMS Version 12 or IMS Version 11 might also be able to connect to an IMS Version 13 system, but coexistence APARs might be required.

- The IMS Connect function in IMS Version 13 and later reports its health to z/OS Workload Manager (WLM), but the IMS Connect functions in IMS Version 12 and earlier do not report their health. This difference can affect how the z/OS Sysplex Distributor routes messages when different versions of IMS Connect coexist, because only the workload of the IMS Connect function in IMS Version 13 and later is accurately reported.
- IMS Version 13 introduces new and changed IMS type-2 commands for IMS Connect. If a type-2 command is broadcast to an IMSplex in which multiple versions of IMS Connect coexist, instances of IMS Connect from earlier versions reject commands that include keywords that they do not support and ignore commands that they do not recognize. If the type-2 command is routed specifically to an IMS Version 11 instance of IMS Connect, the Operations Manager (OM) rejects the command.

MSC coexistence considerations

You can connect an IMS Version 13 Transaction Manager subsystem to other supported versions of IMS by using Multiple Systems Coupling (MSC).

The following IMS versions can coexist with an IMS Version 13 system in an MSC network:

- IMS Version 12 (5635-A03)
- IMS Version 11 (5635-A02)

Open Database coexistence considerations

Coexistence restrictions apply to the use of Open Database.

The IMS Universal drivers that come with IMS Version 13 can be used by Java applications that access IMS Version 12 or IMS Version 11 databases as long as all the IMS systems are part of a mixed-version IMSplex that includes an IMS Version 13 system (along with its ODBM and IMS Connect address spaces).

Open Database Manager (ODBM) can only connect to the IMS systems that are of the same version as ODBM itself. In a mixed-version IMSplex, to limit ODBM connection to the IMS systems of the same version, list the eligible IMS systems as data stores in the CSLDCxxx member of the IMS PROCLIB data set.

PSB library coexistence considerations

The vector tables in the PSB library are larger in IMS Version 12 and later than in previous versions.

The following coexistence APARs/PTFs are provided to enable IMS Version 11 jobs to process an IMS Version 12 or later PSB library: PM23843UK64013, PM32390/UK65495, and PM35639/UK66632

PST coexistence considerations

The number of program specification tables (PSTs) that can be allocated during system initialization in IMS Version 13 can be larger than in previous versions. The larger number of PSTs in IMS Version 13 is not recognized by previous versions of IMS.

In a mixed-version IMSplex, commands that reference the MAXRGN parameter and specify a value greater than 999 pass validation at the Operations Manager (OM) layer because OM uses the highest IMS version grammar. However, if any these commands are routed to an IMS system that is a lower version than IMS Version 13, the command fails on that IMS system. The affected commands are:

- CHANGE TRAN
- CREATE TRAN
- CREATE TRANDESC
- UPDATE TRAN
- UPDATE TRANDESC

Remote Site Recovery (RSR) coexistence considerations

RSR coexistence supports configurations that meet certain version level requirements.

IMS Version 13 RSR coexistence supports configurations in which:

- The tracking site Transport Manager Subsystem (TMS) is at the IMS Version 13 level and the active site is at IMS Version 11 or IMS Version 12 level.
- The active site RECON data sets are at the IMS Version 11 or IMS Version 12 level (with the IMS Version 13 DBRC coexistence SPE applied).
- The active TMS that is running ILS is at the IMS Version 11 or IMS Version 12 level.
- One or more active IMS systems are at the IMS Version 11 or IMS Version 12 level.

The following table describes the supported configurations of a simple set of subsystems in an RSR Global Service Group (GSG). Some unsupported configurations are not included because a prerequisite configuration is also not supported. Some unsupported configurations are included even though a prerequisite configuration is supported so that the reason for non-support can be explained.

The simple set of configurations in the table assumes:

- A single active IMS
- A single TMS that is running the Isolated Log Transport
- A single set of active site RECON data sets
- A single tracking IMS
- A single remote site TMS
- A single set of remote site RECON data sets

The table also describes valid and invalid RSR coexistence configurations. The following notation is used to denote the state of the subsystems and RECON data sets in this table:

- pre-V13: IMS Version 11 or IMS Version 12
- pre-V13 + SPE: IMS Version 11 or IMS Version 12, with the appropriate IMS Version 13 DBRC coexistence SPE applied
- V13: IMS Version 13

Table 12. Valid RSR coexistence subsystem configurations and migration progression

Active site state			Remote site state			Notes
IMS	TMS/ILS	RECON	IMS	TMS	RECON	
pre-V13	pre-V13	pre-V13	pre-V13	pre-V13	pre-V13	Supported.
pre-V13 + SPE	pre-V13	pre-V13	pre-V13	pre-V13	pre-V13	Supported.
pre-V13 + SPE	V13	V13	pre-V13	pre-V13	pre-V13	Supported.
pre-V13	V13	pre-V13	pre-V13	pre-V13	pre-V13	Not supported. The local TMS/ILS cannot be migrated to IMS Version 13 if the RECON data sets have not been upgraded to IMS Version 13.
pre-V13 + SPE	pre-V13 + SPE	pre-V13	pre-V13	pre-V13	pre-V13	Supported.
V13	pre-V13 + SPE	pre-V13	pre-V13	pre-V13	pre-V13	Not supported. The RECON data sets must be upgraded to IMS Version 13 before running any IMS at the IMS Version 13 level. The active IMS cannot be at the IMS Version 13 level if the local site TMS that is running ILS is not at the same version level. The local site IMS cannot be at a later version level than the remote IMS.
pre-V13 + SPE	pre-V113 + SPE	V13	pre-V13	pre-V13	pre-V13	Supported.
pre-V13	V13	V13	pre-V13	pre-V13	pre-V13	Not supported. The local site TMS that is running ILS cannot be at the IMS Version 13 level if the tracking IMS is at the pre-Version 13 level. Also, if the active RECON is at IMS Version 13, the IMS must have the SPE applied.
V13	V13	V13	pre-V13	pre-V13	pre-V13	Not supported. The local site TMS that is running ILS and the active IMS cannot be at the IMS Version 13 level if the tracking IMS is at the pre-Version 13 level. The active IMS also cannot be at the IMS Version 13 level.
pre-V13	pre-V13	pre-V13	pre-V13 + SPE	pre-V13	pre-V13	Supported.
pre-V13 + SPE	pre-V13	pre-V13	pre-V13 + SPE	pre-V13	pre-V13	Supported.
pre-V13 + SPE	pre-V13 + SPE	pre-V13	pre-V13 + SPE	pre-V13	pre-V13	Supported.

Table 12. Valid RSR coexistence subsystem configurations and migration progression (continued)

Active site state			Remote site state			Notes
IMS	TMS/ILS	RECON	IMS	TMS	RECON	
V13	pre-V13 + SPE	V13	pre-V13 + SPE	pre-V13	pre-V13	Not supported. An active IMS cannot be at the IMS Version 13 level if the tracking IMS is not at the IMS Version 13 level. The active site TMS that is running ILS also cannot be at the pre-Version 13 level or at the pre-Version 13 + SPE level. 1
pre-V13	pre-V13 + SPE	pre-V13	pre-V13 + SPE	pre-V13	pre-V13	Supported 1.
pre-V13 + SPE	pre-V13 + SPE	pre-V13	pre-V13 + SPE	pre-V13	pre-V13	Supported 1.
pre-V13 + SPE	pre-V13 + SPE	V13	pre-V13 + SPE	pre-V13	pre-V13	Supported 1.
pre-V13 + SPE	pre-V13 + SPE	V13	V13	pre-V13	pre-V13	Not supported. The tracking IMS cannot be at the IMS Version 13 level if the remote site RECON data sets are not upgraded to IMS Version 13. 1 2
pre-V13 + SPE	pre-V13 + SPE	V13	pre-V13 + SPE	pre-V13 + SPE	V13	Supported.
V13	pre-V13 + SPE	V13	pre-V13 + SPE	pre-V13 + SPE	V13	Not supported. The active IMS cannot be at the IMS Version 13 level if neither the tracking IMS nor the active site TMS that is running ILS is not at the IMS Version 13 level.
pre-V13 + SPE	pre-V13 + SPE	V13	V13	V13	V13	Supported.
V13	pre-V13 + SPE	V13	V13	V13	V13	Not supported. The active IMS cannot be at the IMS Version 13 level if the active site TMS that is running ILS is not at the IMS Version 13 level.
pre-V13 + SPE	V13	V13	V13	V13	V13	Supported.
V13	V13	V13	V13	V13	V13	Supported.

Note:

1. The remote site TMS can also be at the IMS Version 11 or IMS Version 12 level.
2. Regardless of the configuration of the active site subsystems and the RECON data sets, this state is not supported.

Security enhancements coexistence considerations

If an IMS Version 13 subsystem shares the DFSPBxxx or DFSDCxxx PROCLIB members or security exit routines with an IMS Version 12 or earlier subsystem, coexistence considerations apply.

SECURITY macro coexistence considerations

Use the following procedure to enable multiple versions of IMS to share DFSPBxxx or DFSDCxxx PROCLIB members:

1. Install the following security small programming enhancement (SPE) APARs/PTFs:

- IMS Version 11 - PM48203/UK74050
 - IMS Version 12 - PM48204/UK74051
2. Ensure that all of the security options are specified as initialization parameters and not parameters of the SECURITY macro.
For information about using initialization parameters for security, see “Controlling security during system startup for DB/DC and DCCTL” in the *System Administration* information.
 3. Leave the SECURITY macro in the IMS Version 13 stage 1 system definition input because the earlier versions of IMS require the SECURITY macro. Ignore message G115.

Security exit routine coexistence considerations

In IMS Version 11 and IMS Version 12, the following exit routines must be linked into the IMS nucleus.

- Security Reverification exit routine (DFSCTSE0)
- Signon/off security exit routine (DFSCSGN0)
- Transaction Authorization exit routine (DFSCTRN0)

This linking arrangement enables the exit routines to use virtual address spaces to exchange data between them.

Another requirement in earlier versions of IMS was that the CSECT of DFSCTRN0 had to be within DFSCTSE0 if DFSCTSE0 was used.

In IMS Version 13, these exit routines will run without modification. However, they must be linked differently.

- DFSCTSE0 must be linked as an ALIAS of DFSCTRN0.

Recommendation:

- Link DFSCTSE0 and DFSCTRN0 as reentrant and AMODE/RMODE 31. If the load modules are not linked as reentrant, IMS loads them twice.
- If v-type address constants are used by DFSCTSE0, DFSCTRN0, and DFSCSGN0 to exchange data between the exit routines, DFSCTSE0 must be linked as an ALIAS of DFSCSGN0.

Recommendation:

- Link DFSCTSE0 and DFSCTRN0 as reentrant and AMODE/RMODE 31. If the load modules are not linked as reentrant, IMS loads them three times.

Shared message queue coexistence considerations

Instances of IMS Version 11, IMS Version 12, and IMS Version 13 can share an IMS message queue in an IMSplex.

Synchronous program switch coexistence considerations

Coexistence considerations for synchronous program switch include the configuration of the MINVERS value in a shared queues environment

In IMS Version 13, the default value of MINVERS in the RECON data set is 11.1. However, to use the synchronous program switch function in a shared queues environment, all of the participating systems must have a MINVERS value of 13.1.

Sysplex serialized program management coexistence considerations

IMS Version 13 supports sysplex serialized program management.

As of IMS Version 12 APAR/PTF PM31422/UK70974, you can control the sysplex serial program management feature using the GBL_SERIAL_PGM parameter in the DFSCGxxx member of the IMS PROCLIB data set. Sysplex serial program management requires Shared Queues, RM and RM structures be defined in order to be active. The default is Yes.

Syntax Checker coexistence considerations

The IMS Version 13 Syntax Checker supports IMS Version 11, IMS Version 12, and IMS Version 13.

Be sure that the version shown is correct when you use the Syntax Checker to check the parameters of earlier versions.

Restrictions for IMS Version 13 during coexistence

There are no general restrictions for IMS Version 13 in a coexistence environment; however, certain restrictions apply to new functions.

| The HALDB alter and DEDB alter functions do not support coexistence with IMS
| Version 12 or earlier systems in data sharing environments. Both functions require
| a minimum version (MINVERS) of 13.1 in the RECON data set.

| The synchronous program switch function does not support coexistence with IMS
| Version 12 or earlier systems in shared queues environments. The synchronous
| program switch function requires a minimum version (MINVERS) of 13.1 in the
| RECON data set.

Chapter 8. Message and code changes in IMS Version 13

IMS Version 13 includes new and changed messages and codes. Also, many messages were deleted from IMS Version 13.

Messages and codes that were added or changed in earlier versions of IMS are not listed.

For messages and codes that were added or changed through the service process, the APARs or PTFs contain appropriate ++HOLD cards to indicate the updates.

Recommendation: Always check the ++HOLD cards in the service stream for information about new, deleted, or changed messages and abend codes.

New messages and codes for Version 13

IMS Version 13 includes new BPE, CQS, CSL, DFS, DSP, G, HWS, and XDFLD messages, as well as new abend, DL/I, AIB, and SQL codes.

New BPE messages

The following messages are new:

BPE0048E
BPE0049I
BPE0050I
BPE0051E
BPE0052E
BPE0053E
BPE0054I

New CQS messages

The following messages are new:

CQS0012I
CQS0034A
CQS0247W
CQS0248I
CQS0301I
CSL2504I
CSL3070I
CSL4115E

New CSL messages

The following messages are new:

CSL4113E
CSL4114E

New DFS messages

The following messages are new:

DFS0006E
DFS0095I

| DFS0123E
| DFS0904I
| DFS1849E
| DFS1853I
| DFS1937I
| DFS3187I
| DFS3197I
| DFS3198I
| DFS3287E
| DFS3298E
| DFS3417E
| DFS3428W
| DFS3429E
| DFS3436E
| DFS3437E
| DFS3523W
| DFS3527E
| DFS3529
| DFS3531E
| DFS3549E
| DFS3553E
| DFS3555E
| DFS3785E
| DFS3786E
| DFS3787E
| DFS3788I
| DFS3789I
| DFS3948E
| DFS3950A
| DFS4408I
| DFS4409A
| DFS4410I
| DFS4411E
| DFS4412I
| DFS4413E
| DFS4414I
| DFS4432E
| DFS4433E
| DFS4434I
| DFS4435I
| DFS4436I
| DFS4437I
| DFS4438E
| DFS4439E
| DFS4440I
| DFS4441I
| DFS4442I
| DFS4443I
| DFS4500E
| DFS4518I
| DFS4575E
| DFS4576W
| DFS4585W
| DFS4586E
| DFS4600E
| DFS4600I

| DFS4601E
DFS4601I
DFS4602E
DFS4603I
DSF4604I
DFS4605I
DFS4606I
DFS4607I
DFS4608E
DFS4610E
DFS4611E
DFS4612E
DFS4613E
DFS4614E
DFS4616E
DFS4617E
DFS4618E
DFS4619E
DFS4620E
DFS4621E
DFS4622E
DFS4623W
DFS4624I
DFS4625E
DFS4626I
DFS4627E
DFS4628I
DFS4629E
DFS4630E
DFS4634I
DFS4635I
DFS4636I
| DFS4637E
DFS4639E
DFS4640E
DFS4641E
DFS4642E
DFS4643E
DFS4644E
DFS4645W
DFS4646I
| DFS4648E
| DFS4649A
DFS4650I
DFS4651I
| DFS4652E
| DFS4660E
| DFS4661E
| DFS4662E
DFS4663E
DFS4664I
DFS4665I
DFS4666E
| DFS4667I
| DFS4668I
| DFS4669E

| DFS4671I
| DFS4677E
| DFS4678E
| DFS4679E
| DFS4687E
| DFS4704E
| DFS4705E
| DFS4706E
| DFS4707E
| DFS4708E
| DFS4709E
| DFS4710E
| DFS4711E
| DFS4720I
| DFS4721I
| DFS4831E
| DFSIX089

New DSP messages

The following messages are new:

DSP0397E
DSP0398E
DSP0399E
DSP1074E
DSP1075E
DSP1097E
| DSP1206E
DSP1249E
DSP1250E
DSP1251E
| DSP1256E
| DSP1262I
| DSP1267E
| DSP1268E

New G messages

The following messages are new:

G115

New HWS messages

The following messages are new:

HWSG4000I
HWSG4005I
HWSG4010I
HWSG4015E
HWSG4020W
HWSG4025W
HWSG4030W
HWSG4040W
HWSG4045W
HWSG4060I
HWSG4065E
HWSG4080W

|
HWSG4100E
HWSG4230W
HWSG4235W
HWSG4255W
HWSI1610W
HWSS0776W
HWSU3900E
HWSV4400I
HWSV4405I
HWSV4410E
HWSV4415E
HWSV4425I
HWSV4435W
HWSV4440E
HWSV4480W
HWSV4485W
HWSV4500E
HWSV4600E
HWSV4630W
HWSV4800E
HWSV4820E
HWSV4830W
HWSV4840W
HWSV5000E
HWSV5030W
HWSI1610W
HWSU3900E
HWSV4400I
HWSV4405I
HWSV4410E
HWSV4415E
HWSV4420E
HWSV4425I
HWSV4435W
HWSV4440E
HWSV4480W
HWSV4485W
HWSV4500E
HWSV4600E
HWSV4630W
HWSV4800E
HWSV4820E
HWSV4830W
HWSV4840W
HWSV5000E
HWSV5030W

New XDFLD messages

The following messages are new:

| XDFLD600
| XDFLD601
| XDFLD602
| XDFLD603
| XDFLD604

New abend, DL/I, AIB, and utility codes

The following codes are new:

0055
0841
1002
1143
BPE 3404
BPE 3405
AN
BH
SF
0100/0110
OTMA 0036
Fast Path utility status codes

New SQL codes

The following codes are new:

000
+098
+100
-010
-101
-104
-117
-122
-158
-198
-199
-203
-204
-205
-206
-208
-301
-302
-303
-305
-313
-350
-404
-407
-408
-413
-420
-490
-514
-516
-517
-518
-519
-530
-531
-840
-904

| -5001
| -8001
| -8002
| -8003
| -8004
| -8005
| -8006
| -8007
| -8008
| -8009
| -8010
| -8011
| -8013
| -8014
| -8015

Changed messages and codes for Version 13

IMS Version 13 includes changed BPE, CQS, CSL, DBD, DFS, DSP, FLD, G, HWS, and SEG messages, as well as changed abend codes and component codes.

The following messages and codes are changed. An asterisk (*) indicates that the message text is changed.

Changed BPE messages

The following messages are changed:

BPE0001E
BPE0006I
BPE0010I
BPE0014E
BPE0017I
BPE0028I
BPE0029I
BPE0037E

Changed CQS messages

The following messages are changed:

| CQS0034A
| CQS0300I
| CQS0222E
| CQS0350W
| CQS0354E

Changed CSL messages

The following messages are changed:

| CSL0001E
| CSL0012I
| CSL2501I

Changed DBD messages

The following messages are changed:

| DBD760

Changed DFS messages

The following messages are changed:

| DFS047A
| DFS0123E
| DFS0430I
| DFS0488I
| DFS0843I
| DFS0535I
| DFS550I
| DFS554A
| DFS686W
| DFS0730I
| DFS0793I
| DFS0832I
| DFS0842I
| DFS1190I
| DFS1269E
| DFS1913I
| DFS1919I
| DFS1994I
| DFS2166
| DFS2205I
| DFS2291I
| DFS2372I
| DFS2452I
| DFS2473I
| DFS2499W
| DFS2513I
| DFS2662A
| DFS2679A
| DFS2854A
| DFS2857E
| DFS2858E
| DFS0962I
| DFS2859I
| DFS2868W
| DFS2930I
| DFS2991E
| DFS3298E
| DFS3314W
| DFS3347A
| DFS3374W*
| DFS3178E
| DFS3422X
| DFS3549E
| DFS3613I
| DFS3678E
| DFS3688I
| DFS3702I
| DFS3709A
| DFS4342E
| DFS4388W
| DFS4401E*
| DFS4419I*
| DFS4420E

| DFS4421E
| DFS4424E
| DFS4426I
| DFS4429E
| DFS4440I
| DFS4441I
| DFS4477E
| DFS4478E
| DFS4486E
| DFS4494E
| DFS4600I
| DFS4601I
| DFS4637E*
| DFS4637I
| DFS4662E
| DFS4663E
| DFS4810I

Changed DSP messages

The following messages are changed:

| DSP0012I
| DSP0141I
| DSP0222I
| DSP0224I
| DSP1076I
| DSP1095A

Changed FLD messages

The following messages are changed:

| FLD180

Changed G messages

The following messages are changed:

| G430
| G449
| G561

Changed HWS messages

The following messages are changed:

| HWSC0001I
| HWSC0114W
| HWSN1940W
| HWSS0714E
| HWSV4425I
| HWSX0905E
| HWSX0907E

Changed SEGM messages

The following messages are changed:

| SEGM760

Changed abend codes

The following abend codes are changed:

| 0029
| 0071
| 0073
| 0088
| 0107
| 0113
| 0119
| 0370
| 0587
| 0602
| 0630
| 0717
| 0757
| 0780
| 0800
| 0840
| 0979
| 1002
| 1009
| 1011
| 1021
| 1026
| 3055
| 3303
| 3305
| 3422

Changed component codes

The following component codes are changed:

| BPEATTCH codes
| BPELOAD codes
| BPERDPDS codes
| AIB 0108/0308
| BPE 3400
| BPE 3401
| BPE 4095
| ODBM 0010
| Fast Path utility: UR
| AC
| BA
| FM

Deleted messages and codes for Version 13

A number of messages and codes were removed from IMS in Version 13.

Deleted messages

The following messages were removed from IMS Version 13:

| CSL0010E
| DFS3187W

| DFS3253I
| DFS4147E
| DFS4149W

Deleted codes

The following codes were removed from IMS Version 13:
| 0062

Chapter 9. Log record changes in IMS Version 13

The following table lists the log records that are new or changed in IMS Version 13.

Table 13. New or changed log records for IMS Version 13

X'07'	X'0408'	X'5901'
X'16'	X'4021'	X'5903'
X'22'	X'4507'	X'5904'
X'35'	X'450A'	X'5936'
X'36'	X'450F'	X'5937'
X'47'	X'56FA'	X'6740'
X'63'		X'67D0'
X'66'		X'9904'

In IMS Version 13 and later, certain existing statistics fields in the type X'07' and the type X'56FA' records now include I/O counts and times relating to Fast Path DEDB I/O that is issued by an IMS dependent region. Prior to IMS Version 13, Fast Path DEDB I/O statistics were not included in these fields.

Table 14. Fast Path DEDB statistics recorded in X'07' and X'56FA' log records

X'07' record field	X'56FA' record field	Description
DLRVSAMR	TPVSAMR	VSAM READ I/O count
DLRVSAMW	TPVSAMW	VSAM WRITE I/O count
DLRTOTIO	TPTOTIO	Total DLI I/O count
DLRTMEIO	TPTDBIO	Elapsed DB I/O time

Note: Only Fast Path I/O that is issued while under the dependent region is included in these statistics. Statistics about Fast Path write I/Os that are issued asynchronously by the IMS control region are not included.

For details about the DSECT names that are associated with these log records and descriptions of why the log record was issued, see the topic Log records (Diagnosis) in *IMS Diagnosis* information.

Part 2. IMS Version 13 enhancements

Planning for the IMS Version 13 enhancements includes understanding how the following areas are affected: installation, system definition, administration, troubleshooting, and reference.

The following topics provide planning information for the enhancements to IMS Version 13.

Chapter 10. IMS Database Manager enhancements

The IMS Version 13 Database Manager includes enhancements to DBRC and new support for database versioning and dynamic database restructuring.

Chapter 12, “IMS system enhancements,” on page 141 describes additional enhancements for the IMS Database Manager.

Data capture enhancements

In IMS Version 13, the information that IMS can capture about changes to the data in IMS databases is expanded to include information related to data changes that was not previously captured.

The new options for capturing data in IMS Version 13 require the following APARs that are available through PTF UI20034:

- APAR PI07353
- APAR PI07355
- APAR PI09599

The options include the following new enhancements:

- Subset pointer updates and positioning information can now optionally be captured in the Changed Data log record (X'9904') or the Data Capture exit routine control blocks.

If keyword INPOS is specified in the EXIT parameter of the DBD or SEGM statement, data from the following twin is captured on ISRT calls of non-unique segments with RULE=HERE, if the next twin exists.

If keyword SSPCMD is specified in the EXIT parameter of the DBD or SEGM statements, SSP command codes (M, R, S, W, Z) are captured. This includes:

- SSP command codes specified for segments updated by ISRT, REPL, or DLET calls
- SSP updates made in Get-type calls (for example, GU, GHU)
- SSP updates made for non-updated segments in the specified path of ISRT and REPL calls
- If PATH is specified, R command codes are captured for segments in the path of an ISRT even if no SSP command codes on the SSA.

If specified on the ISRT call, F and L command codes are always captured.

- Information about Fast Path DEDB FLD calls can now be captured in X'9904' records in the data capture log.
- To support the new options for capturing data changes, the EXIT= parameter on the DBD and SEGM macros of the DBD Generation utility accept three new values:

FLD

When specified with the LOG parameter, capture updates made by a DEDB FLD call in X'9904' log records in the data capture log. This is valid only for DEDB databases when the LOG parameter is specified. The information is not passed to the data capture exit routine.

SSPCMD

Capture DEDB subset pointer command codes. This option is only valid for DEDBs.

INPOS

When an ISRT call is done for an unkeyed or non-uniquely-keyed segment and an insert rule of HERE is used, pass twin data. The twin data that IMS is positioned on before the ISRT call is captured.

Log record changes

The following log records are new or changed by this enhancement in IMS Version 13:

- X'9904'

Requirements

This enhancement has the same hardware and software requirements as the base IMS Version 13 product.

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Changes to exit routines

These enhancements add additional options for Data Capture exit routines.

Changes to utilities

The DBD and SEGM macros for the DBD Generation utility have been updated with new values for the EXIT= parameter.

Database versioning enhancement

Database versioning provides the ability to assign user-defined version identifiers to different versions of the structure of a database. These identifiers enable you to make structural changes to a database while providing multiple views of physical data to a variety of applications.

New applications that reference a newer structure of a database can be brought online without affecting applications that use previous database structures. Unchanged applications, which do not have to be sensitive to the new physical structure of the database, can continue to access the database.

Database versioning can be used for the following types of databases:

- DEDB
- HDAM
- HIDAM

- PHDAM
- PHIDAM

Database versioning supports the following changes to a database definition:

- An increase to the length of a segment.
- The addition of new fields to existing undefined space at the end of a segment.

Attention: Before you add new fields to a segment in existing space that is undefined to IMS, you must make sure that your existing application programs do not initialize, modify, or otherwise use the free space.

The following IMS components are updated to support database versioning:

DFSDFxxx PROCLIB member

Two new keywords, `DBVERSION` and `DBLEVEL`, are added to the `DATABASE` section of the `DFSDFxxx PROCLIB` member that specify whether database versioning is enabled and, if so, what default versioning is to be used.

In the `CATALOG` section of the `DFSDFxxx` member, the keyword `VERSIONS` replaces `INSTANCES`. If `INSTANCES` is specified, it is ignored.

DBD and PSB generation statements

The `DBD` and `PCB` statements are enhanced with a new `DBVER` parameter, where you can specify the database version number.

The `PSBGEN` statement is enhanced with a new `DBLEVEL` parameter that can be used to override the `DBLEVEL` specification in the `DFSDFxxx PROCLIB` member.

Requirements:

- The IMS catalog must be enabled.
- The affected database descriptions (DBDs) must be in the IMS catalog.
- After a change is implemented and a version number is assigned to the DBD, if the database is logically related to one or more databases, all logically related databases must be included in the `ACBGEN` process.

After versioning is enabled for a database, you can specify a version number for an application program by using the `DBVER` keyword in the `PCB` statement or the application program can specify a version number at run time by using the `INIT VERSION DL/I` call.

Application programs that use the `INIT VERSION` call must issue it before issuing any `DL/I` calls that access the database. A version specified on the `INIT VERSION` call overrides any version number that is specified on the `PCB` statement, as well as any defaults defined in either the `PSB` statement or at the IMS system level in the `DFSDFxxx PROCLIB` member.

Database versioning can be used in conjunction with the database alter functions to keep track of different versions of the structure of a database.

Migration considerations

All generated database definitions (DBDs) that do not specify the `DBVER` parameter have a version number of 0.

Coexistence considerations

Recommendation: Although an IMS Version 13 system in which database versioning is enabled can coexist with an IMS system that does not support database versioning, do not enable database versioning until all of your IMS systems are migrated to IMS Version 13.

If an IMS system that has database versioning enabled must coexist with an IMS system that does not support database versioning, prevent application programs that run on the IMS system that does not support database versioning from accessing any database that has multiple versions.

DBD and PSB source that is coded for database versioning support cannot be processed by the DBD Generation and PSB Generation utilities of IMS Version 12 and earlier systems. The DBVER and DBLEVEL keywords added in IMS Version 13 are not recognized by IMS Version 12 and earlier systems.

Impact to troubleshooting for IMS

The database versioning enhancement introduces new messages and codes and modifies the documentation of existing messages and codes.

In most cases, changes to the existing messages are limited to the introduction of new values in existing variable fields and documentation changes. However, the text of several messages that are issued by the IMS Catalog Record Purge utility has changed.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

The QUERY DB command can now be used to display the current version of a database.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to utilities

The database versioning enhancement introduces changes to the DBD input statement of the DBD Generation utility.

This enhancement also introduces changes to the PCB and PSBGEN statements of the PSB Generation utility.

The IMS Catalog Record Purge utility is changed significantly to support purging catalog segment records for specific database versions.

DBRC enhancements

The DBRC enhancements for IMS Version 13 include changes to the RECON data set, changes that support the DEDB alter and HALDB alter functions, and changes to the DELETE LOG command. To use the HALDB alter and the DEDB alter functions, the MINVERS value must be set to "13.1".

The RECON data set changes for IMS Version 13 are as follows:

- The header version indicator is set to V13R1.
- The default value for MINVERS is set to "11.1."
- The RECON level is set to "13.1" (X'D1').
- The log release level in the PRILOG, SECLOG, PRISLD, SECSLD, PRIOLD, and SECOLD (and interim) records is set to X'32', but is listed as "13.1".
- The version and coexistence level in the subsystem record is set to "13.1" (X'D1').

To support the DEDB alter function:

- The INIT.ADS command is enhanced with new SHADOW and SHADOW IC keywords. Use these new keywords to register shadow area data sets and shadow image copy data sets to DBRC.
- The DBDS (TYPE=FP) record is enhanced:
 - A new flag is added to indicate that the area is being altered.
 - Two counters are added to show the number of available shadow data sets and the number of shadow data sets that are registered to DBRC.
 - A list of the shadow area data sets is added.
- The DB (TYPE=FP) record is enhanced with a counter field that indicates whether DEDB alter is active.
- The CHANGE.DB command is enhanced with two new keywords (ALTER or NOALTER) that can change the status of a Fast Path DEDB to indicate if it is in the process of being altered.

To support the HALDB alter function:

- The CHANGE.PART command is enhanced with a new keyword, ALTERSZE. This keyword can be used before altering a HALDB to specify new partition block sizes (for OSAM) or CI sizes (for VSAM).
- The CHANGE.DB command is enhanced with two new keywords (ALTER or NOALTER) that can change the status of a HALDB partition to indicate if it is in the process of being altered. This status cannot be changed if one or more of the partitions in the database are authorized.
- The NOTIFY.REORG command is enhanced with a new keyword, ALTER, that indicates that the online reorganization process is altering a HALDB.
- Two counter fields are added to the DB (TYPE=HALDB) record to indicate the number of partitions to be altered and the number of partitions that have been altered.
- The DB (TYPE=PART) record is changed as follows:
 - Two new flags are added. One flag indicates that the partition is being altered and the other flag indicates that the alter process has completed.
 - An array of the new OSAM block sizes or VSAM CI sizes used during the HALDB alter process is added, along with a field to indicate the offset to the new array. When the HALDB alter process completes, the new OSAM block sizes are copied to the current block size array and storage containing the array of new block/CI sizes is deleted from the record.

- The record increases in size by 80 bytes (based on a word boundary) when the HALDB alter process is active and the offset of a new array of OSAM block sizes or VSAM CI sizes is not zero.
- An “ALTER” indicator is added to the reorganization record (REORG).

Certain DBRC API requests are enhanced to show the new information that is in the RECON data sets.

The output block version number of the DBRC API is as follows:

- Increased to 5.0 for IMS Version 13 because new output data has been added to the API.
- 4.0 for the IMS Version 12 API.
- 3.0 for the IMS Version 11 API.

The DELETE.LOG INACTIVE | TOTIME commands (for RLDS and SLDS) now use the stop time of the PRILOG or SECLOG when determining if a closed log is older than the retention period specified in the RECON data set header.

DEDB Alter enhancement

In IMS Version 13, you can alter the physical attributes of a data entry database (DEDB) area or change the DEDB randomizer while the DEDB area remains online.

You can use the new DEDB Alter utility (DBFUDA00) to make the following changes without taking the area offline:

- Alter a DEDB area definition of SIZE, UOW, or ROOT specifications of a DEDB area
- Change the randomizer that is used for the DEDB database

The DEDB Alter function is invoked using the DEDB Alter utility (DBFUDA00). The DEDB Alter utility supports two functions: ALTERAREA and REPLRAND. Only one function can be invoked in a single DEDB Alter utility execution.

Requirements:

- A two-stage randomizer must be used, which enables areas to be processed individually.
- All IMS data sharing systems must be at IMS Version 13 or later. The MINVERS value in the RECON data set must be 13.1 or later.
- The DEDB databases must be registered to DBRC.
- If the active IMS system in an XRF pair participates in the altering of a DEDB database, both the active and tracking IMS systems in the XRF pair must share the same ACB library.
- If an IMS system that is tracked by an FDBR region participates in the altering of a DEDB database, both the tracked IMS system and the FDBR region must share the same ACB library.

Restrictions:

- The DEDB Alter utility can alter only one area at a time. However, one or more DEDB Alter utilities can run concurrently to alter an area or to change a DEDB randomizer of different DEDB databases.
- The DEDB Alter ALTERAREA function does not support altering a DEDB that has sequential dependent (SDEP) segments defined. However, the DEDB Alter

REPLRAND function does support changing a randomizer only for a DEDB database that has SDEP segments defined.

- The DEDB Alter function does not support DEDB databases that are in Virtual Storage Option (VSO) or Shared Virtual Storage Option (SVSO) mode. DEDB databases with the VSO or SVSO option must first be unloaded with the /VUNLOAD command before running the DEDB Alter utility.

Migration considerations

All IMS data-sharing systems must be at IMS Version 13 to invoke the DEDB Alter utility.

If the MINVERS value in the RECON data set is not set to 13.1, the DEDB Alter utility terminates without performing the requested function. The default value for MINVERS in IMS Version 13 is 11.1.

Coexistence considerations

To run the DEDB Alter utility, all IMS data-sharing systems must be at the IMS Version 13 or later level. The MINVERS value in the RECON data set must be 13.1 or later.

If the MINVERS value in the RECON data set is not set to 13.1, the DEDB Alter utility terminates without performing the requested function. The default value for MINVERS in IMS Version 13 is 11.1.

Extended address volume (EAV) enhancement for GSAM

IMS Version 13 extends support for extended address volumes (EAV) to GSAM database data sets.

In IMS Version 13, you can allocate GSAM database data sets in the extended addressing space (EAS) of an EAV.

Requirement: Non-VSAM data sets that reside in the extended addressing space (EAS) of extended address volumes (EAVs) require IBM System Storage DS8000 devices at microcode level R4.0 via bundle 64.0.175.0 or higher.

HALDB alter enhancement

In IMS Version 13, you can use type-2 commands to make structural changes to a HALDB while the HALDB remains online.

The ALTER option is currently supported by the following database access types:

- PHDAM
- PHIDAM

You can use the ALTER option to make only the following changes to a database definition:

- An increase to the length of a segment.
- The addition of new fields to existing, undefined space at the end of a segment.

IMS uses the HALDB online reorganization (OLR) process to make structural changes to an online HALDB database. During OLR processing, IMS performs the

reorganization by copying the data from the input data sets to the output data sets using the new structure definitions by reading from ACB members in the staging ACB library.

To bring the changed ACBLIB member online, use the online change (OLC) process.

After the alter process is complete for the HALDB and the ACB members are activated by the OLC process, application programs can use the new database structure.

The following steps describe the HALDB alter process:

1. Define the structural changes and generate a new database definition (DBD) that goes into the DBD library.
2. Run the ACB Maintenance utility, which creates a new ACB member in the staging ACB library.
3. If necessary, set ALTERSZE values in the RECON data set to increase the block or CI sizes of the database data sets.
4. Issue the type-2 INITIATE OLREORG command, with the new ALTER option, to start the HALDB alter process. IMS reads the staging ACB library and applies the changes to the online database.
5. After the HALDB alter process finishes successfully, issue online change commands to activate the new ACB member.
6. After the new ACB members are active, the new database structure can be used.

Requirements:

- A MINVERS value of “13.1” must be set in the RECON data set.
- The HALDB alter function requires a type-2 command environment: CSL Operations Manager (OM) and the structured call interface (SCI). (The type-1 /INITIATE OLREORG command does not support the HALDB alter function.)
- The HALDB alter function uses dynamic allocation of the staging ACBLIB and requires that the staging ACBLIB be available throughout alter processing until the online change function completes the alter process.

Migration considerations

HALDB alter requires the MINVERS value in the RECON data set to be set to 13.1 or later. The default value for MINVERS in IMS Version 13 is 11.1.

Coexistence considerations

HALDB alter requires the MINVERS value in the RECON data set to be set to 13.1. The default value for MINVERS in IMS Version 13 is 11.1.

Impact to troubleshooting for IMS

The HALDB alter enhancement introduces new messages and codes and modifies the documentation of existing messages and codes.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, andabend codes in IMS Version 13, see Chapter 8, “Message and code changes in IMS Version 13,” on page 87.

Impact to programming for IMS

Batch application programs can access a HALDB database while a HALDB alter operation is in progress without requiring any changes to their existing execution JCL. However, until the online change function completes the alter operation, IMS still requires the original, unaltered database definition for comparison purposes, even if all of the segment data in the database already conforms to the new database definition. Consequently, DLIBATCH application programs must reference the DBD library that contains the original, unaltered DBD on the IMS DD statement in the execution JCL. DBBBATCH application programs must reference the active ACB library that contains the original, unaltered database definition on the IMSACB DD statement. A DD statement for the library that contains the new, altered database definition is not required.

Impact to IMS reference information

Impact to commands

The HALDB alter enhancement introduces changes to both IMS and DBRC commands.

IMS commands related to both the Online Change (OLC) function and the HALDB Online Reorganization (OLR) function have been enhanced to support HALDB alter.

The DBRC commands CHANGE.DB and CHANGE.PART have changed, as well as NOTIFY.REORG. The output of the LIST commands have also changed to reflect new fields and statuses in the HALDB RECON records.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to utilities

With the exception of the HD Reorganization Reload utility (DFSURGL0), batch utilities can access a HALDB database while a HALDB alter operation is in progress without requiring any changes to their existing execution JCL. However, until the online change function completes the alter operation, IMS still requires the original, unaltered database definition for comparison purposes, even if all of the segment data in the database already conforms to the new database definition. Consequently, the IMS DD statement in the execution JCL must reference the DBD library that contains the original, unaltered database definition until online change is performed. A DD statement for the DBD library that contains the new, altered database definition is not required.

Prior to IMS Version 13, when the HD Reorganization Reload utility applied DBD changes to a database during reload, it did not need to reference the DBD library that contains the original, unaltered database definition. However, because IMS needs to compare the altered DBD to the unaltered DBD to properly transform

| segment data, you need to add to the execution JCL of the HD Reorganization
| Reload utility an IMS DD statement that references the DBD library that contains
| the original, unaltered DBD.

HALDB support for 8-GB OSAM data sets enhancement

In IMS Version 13, IMS HALDB databases (partitioned, full-function databases) that are not reorganized by the HALDB Online Reorganization function can support 8-GB OSAM data sets after APAR PI23918 is applied.

Unlike VSAM database data sets, which can have a maximum size of 4 gigabytes, OSAM database data sets can have a maximum size of 8 gigabytes. However, before IMS Version 13, if OSAM was used for HALDB databases, the maximum data set capacity was limited to 4 gigabytes. Database administrators can now increase the maximum size of HALDB OSAM database data sets to 8 gigabytes if DBRC is being used. When an HALDB OSAM database data set is increased to 8 gigabytes, the HALDB Online Reorganization (OLR) function cannot be run against that database. To continue to be able to use OLR for HALDB OSAM databases, the maximum size of the OSAM database data sets must be kept to 4 gigabytes.

Taking advantage of HALDB support for 8-GB OSAM data sets means increased database scalability. Defining larger database data sets increases overall database capacity, reduces the number of database data sets that need to be defined, and reduces the risk of exceeding the maximum number of database data sets that can be open at the same time.

The DBRC commands INIT.DB and CHANGE.DB are enhanced with the OSAM8G and NOOSAM8G keywords. OSAM8G specifies that the maximum data set size of OSAM database data sets in a PHDAM or PHIDAM database is 8 gigabytes. NOOSAM8G specifies that the maximum data set size is 4 gigabytes.

Migration considerations

To use the enhancement, all IMS systems must be at the IMS Version 13 level and the MINVERS value in the RECON data set must be 13.1.

APAR PI23918 must be applied to all the IMS Version 13 resident libraries (RESLIBS) that access the RECON data set.

The MINVERS value in the RECON data set must be 13.1 with the CDSLID value set to 2. The default value for MINVERS in IMS Version 13 is 11.1.

Coexistence considerations

The coexistence considerations for this enhancement are the same as the migration considerations.

Log record changes

This enhancement does not introduce any new or changed log records.

Requirements

This enhancement does not have any specific hardware or software requirements beyond those of the IMS Version 13 product.

Restrictions

The HALDB Online Reorganization function does not support HALDB 8-GB OSAM database data sets. HALDB databases that use 8-GB OSAM data sets can be reorganized by using the offline utilities HD Reorganization Unload utility (DFSURGU0) and HD Reorganization Reload utility (DFSURGL0).

Impact to installing and defining IMS

This enhancement has no impact on installing and defining IMS.

Impact to administering IMS

Database administrators have more flexibility in implementing and managing their HALDB databases. Large HALDB databases are more easily accommodated by using 8-GB OSAM data sets instead of 4-GB data sets. The maximum OSAM data set capacity for new and existing HALDB databases is recorded in the RECON data set.

When the maximum data capacity of OSAM data sets is reduced and any data set in a partition contains more than 4 GB of data, the partition might need to be split.

Programming for IMS

This enhancement has no impact on IMS application programming.

Impact to troubleshooting for IMS

If the INITIATE OLREORG command is issued for a HALDB database that supports 8-GB OSAM data sets to start the HALDB online reorganization process, the command fails with completion code 1EF.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to commands

In addition to changing the DBRC INIT.DB and CHANGE.DB commands, this enhancement changes the LIST output for OSAM HALDBs to indicate the maximum data set capacity. The master database listing includes either DSORG=OSAM to indicate 4-GB data sets or DSORG=OSAM8G to indicate 8-GB data sets. The partition database listing does not include these fields.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to exit routines

This enhancement has no impact on exit routines.

Impact to utilities

This enhancement has no impact on utilities.

IMS Catalog Purge utility (DFS3PU10) enhancement

In IMS Version 13, the IMS Catalog Record Purge utility (DFS3PU10) is enhanced to take a checkpoint after every 200 updates to the IMS catalog.

After making 200 updates to the IMS catalog, the utility issues a CHKP call to commit the updates and writes message DFS4518I in the utility output.

This enhancement requires IMS Version 13 APAR/PTF PI14804/UI18241.

/START DB command enhancement overview

Under certain conditions in IMS Version 13, the results of the /START DB command are changed from what they were in prior releases of IMS.

In releases of IMS earlier than IMS Version 13, a /START DB command fails with message DFS0565I if the command is issued while a non-MPP application is running and it has intent for the database that is specified in the command. In IMS Version 13, the /START DB command is successful if the database previously failed allocation (DDIRNAV1 is on), even if a non-MPP application is running with intent for the database.

No documentation changes are associated with this line item.

IMS catalog access enhancement

In IMS Version 13, you can use the ACCESS parameter to control the access level (READ or UPDATE) of the IMS catalog.

In the CATALOG or CATALOGxxxx section of the DFSDFxxx member, specify one of the following parameters:

- If the data is read-only, specify ACCESS=READ. READ is the default value.
- If the data can be updated, specify ACCESS=UPDATE.

This enhancement requires IMS Version 13 APAR PI38297 (PTF UI28806).

Chapter 11. IMS Transaction Manager enhancements

The IMS Version 13 Transaction Manager includes enhancements to the following functions: callout, Intersystem Communication (ISC), and Open Transaction Manager Access (OTMA).

Chapter 12, “IMS system enhancements,” on page 141 describes additional enhancements for the IMS Transaction Manager.

Asynchronous callout enhancements for IBM MQ

In IMS Version 13, the destination descriptor for IMS asynchronous callout requests is expanded to include a new type: MQSERIES.

IBM MQ supports asynchronous callout requests from the ALT IOPCB interface. In IMS Version 13 and later, OTMA can be configured with destination descriptors for IBM MQ applications.

The MQSERIES destination descriptor uses routing information that is specified in the DFSYDTx member of IMS PROCLIB data set instead of getting this information from a Prerouting exit routine (DFSYPX0) or a Destination Resolution exit routine (DFSYDRU0).

The IBM MQ message descriptor (MQMD) data structure expected by IBM MQ contains fields that control IBM MQ message handling. The OTMA descriptor contains parameters to configure the MQMD structure, which can be set either with the DFSYDTx member of the IMS PROCLIB data set, or with type-2 commands.

A descriptor that matches the destination sets the default routing and message handling parameters. However, the OTMA routing exits can be called to override the descriptor. The exits must be enabled with the EXIT=YES parameter for that destination descriptor.

Impact to installing and defining IMS

The DFSYDTx member of the IMS PROCLIB data set contains new and changed parameters for the MQSERIES destination descriptor.

The TMEMBER, TPIPE, USERID, EXIT parameters are valid for IBM MQ descriptors. The MQRTQ= parameter is required. The MQRTQMGR= parameter is optional.

Impact to troubleshooting for IMS

The following character strings are added to the list of possible *descriptor_errortext* values for message DFS2385E:

- EXIT MUST BE YES OR NO
- DUPLICATE EXIT KEYWORD

| For a complete list of new, changed, and deleted messages, and abend codes for
| IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on
| page 87.

| **Impact to IMS reference information**

| *Impact to commands*

| The following commands are enhanced to support the MQSERIES destination
| descriptor:

- | • CREATE OTMADESC
- | • QUERY OTMADESC
- | • UPDATE OTMADESC

| *Impact to exit routines*

| A new flag, input field, and return code are added to the user exit parameter list
| for the OTMA Destination Resolution exit routine (OTMAYPRX).

| A new flag, a input field, and return code are added to the user exit parameter list
| for the OTMA User Data Formatting exit routine (DFSYDRU0).

DL/I ICAL call and Java API enhancements for synchronous program switch

| In IMS Version 13, the DL/I ICAL call can be used to send a request to another
| IMS application and receive the response in the same unit of work for the original
| application. The Java dependent region resource adapter includes a Java Message
| Service (JMS) interface that can be used by Java applications for the same
| functionality in Java dependent regions.

Synchronous program switch

The IMS application program that initiates a *synchronous program switch* can run in an MPP, BMP, JMP, JBP, or IFP region.

The target application program can be in the same IMS system, a remote IMS system via MSC, or an IMS system that is accessible via shared queues.

IMS schedules the transaction for the ICAL call as an OTMA transaction. You do not need to enable OTMA to make a synchronous program switch request.

To use the synchronous program switch function, you must first configure an OTMA destination descriptor with TYPE=IMSTRAN for the destination application. The destination descriptor can be set in the DFSYDTx member of the IMS.PROCLIB data set, or you can create it with the CREATE OTMADESC command. The TMEMBER, TPIPE, and SMEM parameters behave differently for the IMSTRAN descriptor type than for other descriptor types. These parameters are used to optionally specify a default destination for late response messages from the target application program.

To issue a synchronous callout request from your IMS application, issue the ICAL call and specify the OTMA descriptor name. The ICAL call can also be issued

through a REXXTDLI call, or from a Java application that runs in a JMP or JBP region. Optionally, you can also specify a timeout value (the maximum time to wait for the response to return).

The following figure shows the five-step synchronous program switch processing model.

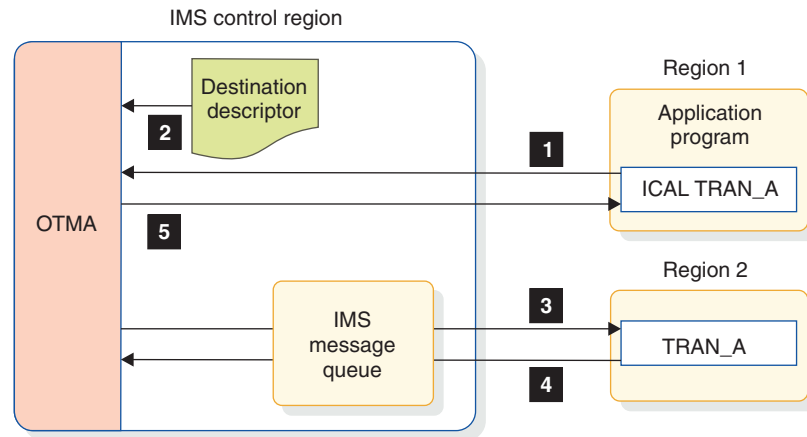


Figure 3. IMS synchronous program switch processing

1. The application program that is running in region 1 issues an ICAL to TRAN_A.
2. The IMS control region reads the destination descriptor.
3. IMS routes the message to the destination application in region 2 using the send-then-commit (CM1) protocol. The OTMA routing function is used even if OTMA is not enabled in the IMS system.
4. After the target application finishes processing, it returns the response message to the IMS control region.
5. The IMS control region responds to the original DL/I ICAL call with the response message. Optionally, if the originating application already timed out, IMS can enqueue the late response message in a pre-specified tpipe for later retrieval.

Synchronous program switch in Java dependent regions

IMS™ provides support for synchronous program switch functionality from Java™ message processing (JMP) or Java batch processing (JBP) applications through an IMS implementation of the Java Message Service (JMS).

DL/I ICAL RECEIVE subfunction

The RECEIVE subfunction of the DL/I ICAL is added to enable applications to efficiently receive large messages that did not fit into the initially specified response area.

When a send/receive (SENDRECV) subfunction call returns too much data to fit in the allocated response area, IMS:

- Truncates the data and returns only the data that fits in the allocated response area

- Puts the actual length of the response message into the AIBOALEN field
- Keeps the entire response message in an internal control region buffer for a certain length of time

The application can take the following actions:

- Ignore the truncated message
- Issue another SENDRECV ICAL call with the larger, correct response area size
- Issue a RECEIVE ICAL call with a correct response area size to get the complete response message from the internal buffer

The complete response data for the original ICAL call is held in the IMS control region buffer until one of the following events occurs:

- The application issues a new ICAL call with the SENDRECV subfunction code is issued
- The IMS application reaches a sync point or terminates
- The IMS application issues a ROLB or CHECKPOINT call

Migration considerations

No impact.

Coexistence considerations

To use the synchronous program switch function in a shared queues environment, all participating systems must be IMS Version 13 or later systems.

Log record changes

The '67D0' log record is changed to include a new error reason code for the synchronous program switch enhancement.

Requirements

The synchronous callout program switch enhancement has the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

- The OTMA Input/Output Edit exit routine (DFSYIOE0) is not called for a synchronous program switch request or response message.
- The TM and MSC Message Routing and Control exit routine (DFSMSCE0) is not called for a synchronous program switch request.
- The target transaction is not part of the RRS commit scope of the initiating application program.
- BMP and JBP applications cannot make synchronous program switch requests in a DBCTL environment.
- The target transaction has read-only access to Fast Path MSDBs.
- The target transaction cannot be an IMS conversational transaction.
- To use synchronous program switch in a shared queues environment, all of the participating IMS systems must be Version 13 or later and have a MINVERS value of 13.1

- IMS schedules synchronous program switch transactions as OTMA transactions, using the OTMA security setting (NONE, CHECK, or FULL). The DFSBSEX0 exit routine is not called for the target transaction.

Impact to installing and defining IMS

OTMA destination descriptor information is enhanced with the new IMSTRAN type of destination for IMS synchronous program switches.

The TMEMBER, TPIPE, SMEM, SYNTIMER, and EXIT parameters are valid for TYPE=IMSTRAN descriptors. The following additional parameters are also valid:

LTERMOVR

Specifies a logical terminal name used to override the name specified in the I/O PCB of the IMS application program. This parameter is optional.

REPLYCHK=YES | NO

Specifies whether originating IMS detects if the target IMS application replies to the IOPCB. When REPLYCHK=YES and the target application does not reply to the IOPCB (or issue an ICAL request for synchronous program switch to a third application), IMS issues return and reason codes to the application instead of a timeout to the ICAL call. This parameter is optional and the default is YES.

When REPLYCHK=NO, IMS does not check to see whether the target application replies to the I/O PCB or if it issues a synchronous program switch to another transaction.

SYNCTP=YES | NO

Specifies whether the destination TPIPE for the late messages needs to be created as a synchronized TPIPE. This parameter is optional and the default is NO.

Impact to administering IMS

New topics are added and existing topics are revised in the communications and connections information about using OTMA destination descriptors for IMS synchronous program switches.

Impact to programming for IMS

Existing application programming topics are enhanced to include updates to the:

- ICAL call information
- Callout approach concepts
- Callout implementation information

Impact to troubleshooting for IMS

The diagnosis information is enhanced with OTMA trace entry information for synchronous program switches.

The following new messages are added:

DFS4687E

An error occurred during synchronous program switch processing for a DL/I ICAL call. The message includes a short summary of the underlying cause of the error.

DFS1190I

A /PSTOP AOITOKEN or /PSTOP REGION SYNC command was issued, but the region was not waiting for the specified AOI token or ICAL response.

Additional reasons for having the A1 status code returned to application programs are added.

For a complete list of the new, changed, and deleted messages and abend codes in IMS Version 13, see Message and code changes in IMS Version 13 (Release Planning).

Impact to IMS reference information*Impact to commands*

Synchronous program switch information is added to the following commands:

- CREATE OTMADESC
- /DISPLAY ACTIVE
- /DISPLAY OTMA
- /PSTOP
- QUERY OTMADESC
- /SECURE
- /STOP OTMA
- /STOP TMEM
- UPDATE OTMADESC

Impact to exit routines

Synchronous program switch information is added to the following exit routines:

- OTMA Destination Resolution exit routine (DFSYPRX0)
- Message Control/Error exit routine (DFSCMUX0)
- OTMA User Data Formatting exit routine (DFSYDRU0)

Impact to utilities

This enhancement does not affect utilities.

ISC TCP/IP enhancement

In IMS Version 13, the Intersystem Communication (ISC) function supports TCP/IP connections between IMS and IBM CICS Transaction Server for z/OS. The TCP/IP support for ISC is provided in IMS by IMS Connect.

ISC support for TCP/IP connections provides an alternative to the connection support provided by the Virtual Telecommunications Access Method (VTAM). Existing statically defined ISC terminals can be enabled for TCP/IP support by coding the ISCTCPIP parameter in the DFSDCxxx PROCLIB member. ETO logon descriptors can be used to define dynamic ISC terminals that support TCP/IP.

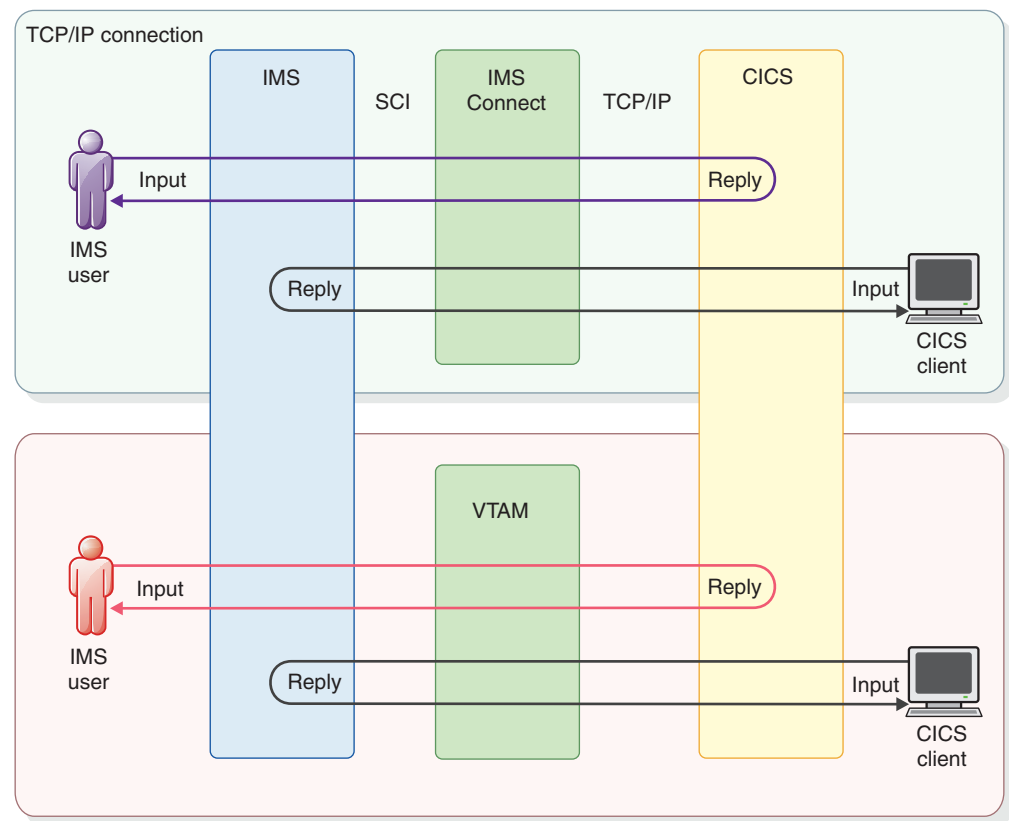
To communicate with CICS over an ISC TCP/IP connection, IMS uses the private CICS IP interconnectivity (IPIC) protocol for session control and data flow. However, applications programs are not sensitive to the use of IPIC or the use of

either ISC TCP/IP or ISC VTAM. Unless your application programs use functions that are not supported by ISC TCP/IP, you can switch from ISC VTAM links to ISC TCP/IP links without changing application programs on either side of the link.

The following figure shows the main components that support ISC TCP/IP communication between IMS and CICS: the Structured Call Interface (SCI) for communication between IMS and IMS Connect, and IMS Connect for communication with CICS over TCP/IP.

The figure compares these components with the main components that support ISC VTAM communication. The primary difference between the two communication types is that for ISC TCP/IP the path between IMS and CICS is provided by SCI, IMS Connect, and TCP/IP. For ISC VTAM, the path between IMS and CICS is provided by VTAM only.

Both communication types support input that originates from either an IMS user or a CICS user. In either case, the input is sent to the partner subsystem, which processes the transaction and returns a reply.



Migration considerations

The steps for migrating ISC terminals to use TCP/IP differ depending on whether the terminals are statically or dynamically defined.

To migrate dynamically defined ISC terminals to TCP/IP:

1. Define ETO logon descriptors that specify `UNITYTYPE=ISCTCPIP` and `LCLICON=ims_connect`. Create a generic descriptor that can be used by several nodes.

2. Make the associated definition changes in CICS.
3. Issue the IMS type-1 command `/OPNDST NODE node1 USER user1 LOGOND logondescriptor`.

To migrate statically defined ISC terminals to TCP/IP:

1. Make sure the IMS definitions are correct.
 - If you are switching an existing terminal from VTAM to TCP/IP, ensure that the terminal is defined with `UNITYTYPE=LUTYPE6` in the TYPE stage-1 system definition macro.
 - If you are defining a new terminal, code the appropriate system definition macros, including the TYPE, TERMINAL, and SUBPOOL macros. The TYPE macro must specify `UNITYTYPE=LUTYPE6`.
2. Specify `ISCTCPIP=(nodename,iconname)` in the `DFSDCxxx` PROCLIB member for each node that is to use the TCP/IP support.

Note: Existing VTAM connection definitions in CICS must be changed to use IPIC if the same names are being used.

3. Cold start IMS.

Coexistence considerations

Although ISC TCP/IP does not impose any coexistence issues with previous versions of IMS, all systems that use this function must be IMS Version 13 or later systems.

Fallback from TCP/IP to VTAM

The steps for falling back from TCP/IP to VTAM support differ for statically and dynamically defined terminals.

To revert dynamically defined terminals to VTAM support:

1. Stop the TCP/IP ISC connections by issuing either IMS type-1 command `/STOP` or `/QUIESCE`.
2. If necessary, put the USER(*subpool*) that is associated with the TCP/IP connection into a cold state by issuing the IMS type-1 command `/ASSIGN USER user1 TO VTAMPOOL`. The command deallocates the USER *user1* from the TCP/IP connection so that it can be used for the logon of ISC VTAM connections.

Note: The USER cannot be signed on or in conversation mode, response mode, or preset mode.

3. Restart the ISC VTAM connection by issuing the IMS type-1 command `/OPNDST NODE node1 USER user1`.

To revert statically defined terminals to VTAM support:

1. Delete the ISCTCPIP parameter that specifies the node name of the terminal from the `DFSDCxxx` PROCLIB member.
2. Cold start IMS. Warm and emergency restarts keep the ISCTCPIP specification active.
3. Review the CICS requirements.

Log record changes

The following log records are changed in IMS Version 13 for the ISC TCP/IP enhancements:

- X'16' signon/signoff record (DFSLOG16)
- X'35' enqueue record (QLOGENQU)
- X'36' dequeue record (QLOGDEQS)
- X'63' logon/logoff record (DFSLOG63)
- X'66' predeq/preenq record (DFSLOG66)
- X'4021' checkpoint record (DFSCHKPT)

Requirements

The ISC TCP/IP function has the following requirements:

- IBM CICS Transaction Server for z/OS, Version 5.1 (or later) must be used.
- IMS Connect is required to provide TCP/IP socket connection support for IMS.
- The Common Service Layer (CSL) with at least the Structured Call Interface (SCI) and the Operations Manager (OM) is required. SCI is required for communications between IMS and IMS Connect and OM is required for type-2 command support.
- A single point of control (SPOC) program, such as the IMS TSO SPOC, must be used to issue type-2 commands to the OM API or REXX SPOC API.
- For each IMS subsystem that uses dynamically defined terminals with ISC TCP/IP, the IMS Extended Terminal Option (ETO) is required.

Restrictions

The following functions are not supported by ISC TCP/IP.

- CICS transactions that use the SEND(INVITE)/RECV protocol for synchronous communication
- CICS transactions that use the SEND(LAST)/RECV protocol
- Extended Recovery Facility (XRF)
- IMS operator commands except for /DISPLAY and /RDISPLAY
- IMS conversational mode transaction
- IMS response mode transactions, including Fast Path
- IMSplex Terminal Management (STM)
- Front-End Switch (FES)
- Message Format Service (MFS)
- VTAM Generic Resources (VGR)

Impact to installing and defining IMS

For dynamically defined ISC terminals, a new LCLICON keyword is added to the ETO logon descriptor to specify IMS Connect instances that support ISC TCP/IP connections. ETO logon descriptors are defined in the DFSDSCTy PROCLIB member and generated by IMS in the DFSDSCMx PROCLIB member.

For statically defined ISC terminals, a new ISCTCPIP keyword is added to the DFSDCxxx PROCLIB member to enable statically defined ISC terminals for ISC TCP/IP.

IMS Connect support for ISC TCP/IP introduces two new configuration statements, ISC and RMTICIS to the IMS Connect configuration PROCLIB member HWSCFGxx. Also, a CICSPORT keyword is added to the TCPIP statement.

For a list of the installation and definition topics that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to administering IMS

New topics are added and existing topics are revised in the communications and connections information about using a TCP/IP link for ISC and about using IMS Connect as the ISC communications vehicle.

New topics are added to the operations and automation information that describe using IMS Connect commands to stop and restart ISC TCP/IP connections from IMS Connect when they do not clean up properly after being stopped in IMS.

For a list of the administration topics that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Programming for IMS

Programming is not directly affected by the ISC TCP/IP function. No information in the programming category is new or changed for the ISC TCP/IP function in IMS Version 13.

Impact to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of new, changed, and deleted messages, and abend codes for IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to exit routines

This enhancement does not affect exit routines.

Impact to utilities

This enhancement does not affect utilities.

MSC link increase enhancement

In IMS Version 13, the maximum numbers of both logical and physical links that you can define is increased.

For logical links, the maximum number of MSLINK macros that you can define is now 999 or, in IMS systems defined as large systems by the LGEN parameter in the IMSCTRL macro, 676.

For physical links, the maximum number of MSPLINK macros that you can define is now 999 or, in IMS systems defined as large systems by the LGEN parameter in the IMSCTRL macro, 676.

Also, the maximum value of the SESSIONS keyword in the MSPLINK macro is increased to 999.

This enhancement requires APAR PM90983 (PTF UK97740).

OTMA enhancements

OTMA enhancements in IMS Version 13 include a new destination descriptor type, the ability to notify OTMA clients earlier about an impending IMS termination, and more control over OTMA exit routines.

OTMA callable interface asynchronous enhancement

In IMS Version 13, the OTMA Callable Interface (OTMA C/I) provides a high level interface for host infrastructure applications to send and retrieve messages with IMS OTMA using XCF services. This enhancement changes OTMA C/I to use the OTMA hold queue.

Prior to this enhancement, OTMA C/I asynchronous messages that are sent using `otma_send_async_API` have the responses sent immediately upon availability back by OTMA since there is no hold queue. OTMA C/I must “store” these messages in XCF until the client issues `otma_receive_async_API`. This has led to many timing issues between OTMA C/I and the client.

In IMS Version 13, OTMA C/I specifies it is hold queue-capable on the client-bid. The `otma_send_async_API` has been changed to use `SendOnly` with `ACK` protocol. The asynchronous output is placed on the hold queue. The `otma_receive_async_API` now uses `Resume TPIPE Single` to retrieve the output.

This enhancement does not change the synchronous send-then-commit (commit mode 1) flows.

Migration considerations

OTMA C/I clients no longer receive IMS DFS messages when OTMA NAKs the input for asynchronous messages but receive a return and reason code indicating the specific error.

Coexistence considerations

The OTMA callable interface asynchronous enhancement does not impact coexistence considerations.

Log record changes

The OTMA callable interface asynchronous enhancement does not impact the log record.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

OTMA C/I internally chooses HOLDQ at client-bid and uses SendOnly with ACK and Resume TPIPE Single. There are no changes required to client OTMA C/I applications for these.

Impact to administering IMS

The OTMA callable interface asynchronous enhancement does not impact IMS administration.

Programming for IMS

The OTMA C/I client using asynchronous messaging will no longer receive IMS DFS messages when the input is NAK'd by OTMA. OTMA C/I will be provided return and reason codes to indicate the specific error.

Rather than receiving DFS064 for an invalid transaction code, the OTMA C/I client now receives

RC=00000014, RSN=0000001A,0000001D,00000000,00000002.

RC=x'14' indicates OTMA NAK codes.

RSN=x'1A' indicates message cancelled.

x'1D' indicates SMB not found (invalid transaction code).

Impact to troubleshooting for IMS

The OTMA callable interface asynchronous enhancement does not impact troubleshooting.

Impact to IMS reference information

Impact to commands

The OTMA callable interface asynchronous enhancement does not impact commands.

Impact to exit routines

DFSYDRU0 – OTMA User Data Formatting exit routine

You can now specify that OTMA C/I uses the hold queue when asynchronous output is created before the OTMA C/I client has established via client-bid. This is optional, as any queued output is moved by OTMA to the hold queue after the OTMA C/I client has connected and specified that it is hold queue-capable.

Impact to utilities

The OTMA callable interface asynchronous enhancement does not impact utilities.

OTMA client type declaration enhancement

In IMS Version 13, OTMA clients, such as IMS Connect, IBM MQ, OTMA C/I, each have unique processing considerations.

- IMS Connect is hold queue-capable and supports the Resume TPIPE protocol.
- IBM MQ supports synchronous TPIPEs for Commit Mode 0 (Commit-then-Send) messages.
- OTMA C/I has been enhanced to be hold queue-capable.

In many cases these differences in client type impact how OTMA processes client requests and messages. The client initialization process (client-bid) has been enhanced to allow clients to declare their “type” to OTMA. Knowing the type allows OTMA to optimize certain functions for greater efficiency.

IMS Connect in IMS Version 13 provides the OTMA client type at client-bid. OTMA C/I is already identified, as is the internal DFSYICAL for Synchronous Program Switch. IBM MQ requires changes to the client-bid to declare the client type.

The client type is also set for OTMA clients created by OTMA destination routing descriptors, such as IMS Connect and IBM MQ.

Migration considerations

The OTMA client type declaration enhancement does not impact migration considerations.

Coexistence considerations

The OTMA client type declaration enhancement does not impact coexistence considerations.

Log record changes

The OTMA client type enhancement does not impact log record changes.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same requirements as the base IMS Version 13 product.

Impact to installing and defining IMS

The OTMA client type declaration enhancement does not impact installation and system definition.

Impact to administering IMS

The OTMA client type declaration enhancement adds new fields to the DFSYMSG and HWSOMPFX macros to accommodate declaring the client type on the client-bid.

DFSYMSG MACRO			
TMAMHFLG	DS	X	Flags for Client Bid
TMAMHQUE	EQU	X'80'	Special message hold queue needed
TMAMCIQU	EQU	X'40'	Client Type OTMA C/I
TMAMCICN	EQU	X'20'	Client Type IMS Connect
TMAMCWMQ	EQU	X'10'	Client Type IBM MQ
TMAMCSPS	EQU	X'08'	Client Type Sync Pgm Swi
HWSOMPFX MACRO			
OMHDRQUE	DS	XL1	Flags for client bid
OMHDRCMQ	EQU	X'80'	CREATE HOLD MESSAGE QUEUE
*	EQU	X'40'	Reserved Client Type
OMHDRICN	EQU	X'20'	IMS Connect Client Type
*	EQU	X'10'	Reserved Client Type
*	EQU	X'08'	Reserved Client Type

Programming for IMS

The OTMA client type declaration enhancement does not impact IMS programming.

Impact to troubleshooting for IMS

The OTMA client type declaration enhancement does not impact IMS troubleshooting.

Impact to IMS reference information

Impact to commands

The OTMA client type declaration enhancement does not impact commands.

Impact to exit routines

The OTMA client type declaration enhancement does not impact exit routines.

Impact to utilities

The OTMA client type declaration enhancement does not impact utilities.

OTMA descriptor enhancements

In IMS Version 13, both the OTMA destination descriptor and the OTMA client descriptors have changed to support OTMA functionality.

The OTMA destination descriptor is enhanced to support both the synchronous program switch enhancement and the asynchronous callout function enhancements for IBM MQ.

The OTMA client descriptor is enhanced to support OTMA global flood control.

Destination descriptor enhancements for asynchronous callout to IBM MQ

To support asynchronous callout requests to IBM MQ, OTMA destination descriptors that are defined in the DFSYDTx member of the IMS.PROCLIB data set now support a new type, MQSERIES, and several new parameters.

The MQSERIES-type destination descriptor uses routing information that is specified in the DFSYDTx member of IMS PROCLIB data set. A Prerouting exit routine (DFSYPX0) or a Destination Resolution exit routine (DFSYDRU0) is no longer required for these messages.

The attributes that are set by the OTMA destination descriptor for IBM MQ can also be set, viewed, modified, or deleted by the IMS type-2 commands CREATE, UPDATE, DELETE, and QUERY.

For more information about the IMS callout enhancements, see “Asynchronous callout enhancements for IBM MQ” on page 115.

Destination descriptor enhancements for synchronous program switches

To support synchronous program switches between IMS application programs, OTMA destination descriptors now support a new type, IMSTRANS and several new parameters.

The attributes that are set by the OTMA destination descriptor for a synchronous program switch can also be set, viewed, modified, or deleted by the IMS type-2 commands CREATE, UPDATE, DELETE, and QUERY.

For more information about the IMS callout enhancements, see “DL/I ICAL call and Java API enhancements for synchronous program switch” on page 116.

Client descriptor enhancements for OTMA global flood control

To support the implementation of a global flood warning, IMS Version 13 introduces a new system OTMA client descriptor, DFSOTMA. The INPT parameter in the DFSOTMA client descriptor sets a global flood threshold that applies to all OTMA clients.

For more information about the global flood control enhancements, see “OTMA global flood control enhancements” on page 134.

OTMA display tpipe hold queue counts enhancement

In IMS Version 13, OTMA provides two queues for asynchronous output destinations that support tpipe hold queue-capable clients (such as IMS Connect).

Send/Receive responses for Commit Mode 1 (Commit-then-Send) transactions are queued to the primary tpipe queue. Asynchronous messages from SendOnly transactions or Alternate IOPCB inserts are queued to the tpipe hold queue and are retrieved using Resume TPIPE protocol. Prior to IMS Version 13, the existing /DISPLAY command output reports the total messages queued to both queues.

There is no external method to determine whether the messages are on the primary tpipe queue or tpipe hold queue or both.

IMS Version 13 adds an OUTPUT parameter to the /DISPLAY TMEMBER TPIPE command to report the primary tpipe queue and tpipe hold queue counts separately. Note that this enhancement is valid only for tpipe hold queue-capable OTMA clients and does not apply to non-tpipe hold queue clients such as IBM MQ. This option is also only available for non-shared-queues IMS systems and is ignored when IMS has shared queues enabled. The OUTPUT parameter is mutually exclusive with the SYNC and QCNT parameters.

The /DISPLAY TMEMBER TPIPE command can be used to determine if output is queued for given OTMA TMEMBER/TPIPEs. When IMS OTMA clients are tpipe hold queue-capable (such as IMS Connect), the OUTPUT parameter can be used to determine if the messages are on the primary tpipe queue or tpipe hold queue. Tpipe hold queue output is retrieved using the Resume TPIPE protocol.

Migration considerations

The OTMA display tpipe hold queue counts enhancement does not impact migration considerations.

Coexistence considerations

The OTMA display tpipe hold queue counts enhancement does not impact coexistence considerations.

Log record changes

The OTMA display tpipe hold queue counts enhancement does not impact log record changes.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

The OTMA display tpipe hold queue counts enhancement does not impact installation or system definition.

Impact to administering IMS

The OTMA display tpipe hold queue counts enhancement does not impact IMS administration.

Programming for IMS

The OTMA display tpipe hold queue counts enhancement does not impact IMS application programming.

Impact to troubleshooting for IMS

The OTMA display tpipe hold queue counts enhancement does not impact IMS troubleshooting.

Impact to IMS reference information

Impact to commands

Two new status terms can appear in the command output when the OUTPUT keyword is specified:

PMRY

represent the "primary tpipe queue."

HLDQ

represents "tpipe hold queue."

The /DISPLAY TMEMBER TPIPE OUTPUT command can be used to display the output counts for both primary tpipe queue and tpipe hold queue when the OTMA client is tpipe hold queue-capable, such as IMS Connect. This parameter is ignored for clients that are not tpipe hold queue-capable, such as IBM MQ, and when IMS has shared queues enabled. The OUTPUT parameter is mutually exclusive with the SYNC and QCNT parameters.

Important: Specifying the OUTPUT parameter can double the number of lines for the display. Take care when using the ALL or masked TPIPE names.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to exit routines

The OTMA display tpipe hold queue counts enhancement does not impact exit routines.

Impact to utilities

The OTMA display tpipe hold queue counts enhancement does not impact utilities.

OTMA early termination notification enhancements

IMS Version 13 introduces an enhancement that allows OTMA clients (such as IMS Connect, IBM MQ, and OTMA C/I) to be notified of IMS termination earlier in the termination process. This is done for both scheduled and unscheduled terminations. The IMS OTMA clients can then route new requests to other IMS systems to be processed. This enhancement addresses environments that process high rates of transactions via IMS OTMA and experience some transactions being accepted but not processed by IMS during either scheduled or unscheduled IMS terminations.

If an IMS Version 13 subsystem is terminating and can no longer process OTMA messages, OTMA clients need to route work to other IMS subsystems. In IMS Version 13, OTMA notifies the clients earlier in the termination process than in earlier versions of IMS.

For OTMA clients that interpret when IMS leaves the z/OS cross-system coupling facility (XCF) group as the signal that IMS is no longer available, OTMA now leaves the XCF group earlier in the IMS termination process.

These enhancements apply to both scheduled shutdowns and abends.

When IMS has a planned shutdown (/CHE {FREEZE | DUMPQ | PURGE}), OTMA adds notification to OTMA clients during Phase 1 of shutdown. OTMA sends a TMAMMNTR (x'3C') resource monitor protocol message with TMAMRSIM_S1SHTDN that indicates IMS shutdown, and with TMAMRSIM_STATUS set to '1' to indicate that IMS cannot process new requests. OTMA also sends a TMAMCSPA (x'14') protocol message to inform clients to suspend processing for all TPIPEs. These protocol messages, sent at the start of shutdown, inform OTMA clients that IMS is no longer available and they should route new requests to another system.

When IMS has an unplanned shutdown (abend), OTMA issues IXCLEAVE to leave the XCF group immediately after the log buffers are purged. This informs the OTMA clients, by using their XCF group exits, that IMS OTMA is no longer active in the XCF group. The OMTA clients can then route new requests to another system.

Migration considerations

The OTMA early termination notification enhancement does not impact migration considerations.

Coexistence considerations

The OTMA early termination notification enhancement does not impact coexistence considerations.

Log record changes

The OTMA early termination notification enhancement does not impact log record changes.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

The OTMA early termination notification enhancement does not impact installation and system definition.

Impact to administering IMS

The OTMA early termination notification enhancement does not impact IMS administration.

Programming for IMS

The OTMA early termination notification enhancement does not impact programming for IMS.

Impact to troubleshooting for IMS

The OTMA early termination notification enhancement does not impact IMS troubleshooting.

Impact to IMS reference information

Impact to commands

The OTMA early termination notification enhancement does not impact commands.

Impact to exit routines

The OTMA early termination notification enhancement does not impact exit routines.

OTMA enhancement to omit response data from ACKs to synchronous callout response messages

In IMS Version 13, when the send-only with ACK protocol is used to return responses to synchronous callout requests, you reduce the size of the ACK messages that OTMA sends by omitting the copy of the response data from the ACK messages.

By default, OTMA echoes back to the callout service provider the data that is contained in the response messages to synchronous callout requests. The data is echoed back as a part of the positive acknowledgement (ACK) that OTMA issues when the synchronous callout response is successfully received.

Typically, the callout service provide does not need the response data echoed back with ACK messages. Doing so incurs overhead, especially when the responses are very large.

You can instruct OTMA to omit the copy of the response data from ACK messages by specifying X'10' in the Synchronization or Callout Flags field at byte 3 of the state data section of the OTMA message prefix.

This enhancement is added to IMS Version 13 by APAR PM90943 and PTF UI16239.

OTMA exit routine enhancements

In IMS Version 13, you can pass information from an OTMA destination descriptor to the OTMA routing exit routines. When the exit routines receive control, they can override the information from the destination descriptor.

A new optional parameter, EXIT= NO | YES, is added in all of the Open Transaction Manager Access (OTMA) destination descriptor types. The EXIT= parameter specifies whether an exit routine is called after the information in the OTMA destination descriptor is applied to a message.

- For synchronous program switches, you can use the Message Control/Error exit routine (DFSCMUX0) to override the routing information in the descriptor.
- For OTMA ALTPCB output messages, you can use the OTMA Destination Resolution exit routine (OTMAYPRX) or the OTMA User Data Formatting exit routine (DFSYDRU0) to override the routing information in the descriptor.

If EXIT=NO is specified in the OTMA destination descriptor for ALTPCB output messages, IMS uses the routing information in the destination descriptor only, if a destination descriptor matches the destination. If a descriptor does not match the destination for OTMA ALTPCB output messages, IMS uses the exit routines (OTMAYPRX or DFSYDRU0), if available.

After APAR/PTF PI16243/UI20171 is applied, when EXIT=YES is specified in an OTMA destination descriptor for OTMA ALTPCB output messages and the OTMAYPRX user exit routine either sets RC=100 or does not exist, the TPIPE name and TMEMBER name from the OTMA destination descriptor can be passed to the DFSYDRU0 exit routine as the destination name and destination client name.

Also, the DFSYDRU0 user exit can set a new return code of 101 to inform IMS to use the matching destination descriptor to set the message destination with the OTMA user data prefix that is prepared by the exit routine.

The input parameter list of DFSYDRU0 user exit is expanded to include the original CHNG call value so that you can use it to determine the message destination.

OTMA global flood control enhancements

IMS Version 13 OTMA provides a new option to enforce the global flood limit to reject new requests and protect IMS from storage exhaustion. Previous releases protected flood conditions for individual OTMA clients (TMEMBERS) but only provided warning messages when the global flood limit was reached.

In previous releases, OTMA's Message Flood Detection and Control capability provided a mechanism to automatically monitor the growth of active OTMA input messages and the control blocks associated with these input requests. Specifically, when an OTMA client sends a transaction to IMS, OTMA internally creates a control block called the TIB (Transaction Instance Block) to track each active input message. If several thousand OTMA input transactions are received from an OTMA client and waiting to be processed, thousands of control blocks representing the requests would require much IMS storage space, which could affect the overall IMS operations in the system.

To prevent this type of OTMA message flood condition from an OTMA client, OTMA stops receiving the input transactions from this member based on a maximum value for the number of TIBs allowed for the OTMA client in the system. However, suppressing the input OTMA transactions only targets individual OTMA clients that have the maximum value or threshold of TIBs defined.

This type of OTMA flood control does not protect the IMS system when it has multiple OTMA clients. In this case, each one of them may not reach the flood limit for the member. However, the total TIBs from all the OTMA clients could exceed the global flood limit of the IMS system. When this happens, the IMS system (pre-IMS13) issues a warning signal with the Global Flood Control capability introduced in IMS IMS Version 11 to the system console, the MTO and all the OTMA clients without suppressing the input OTMA transactions. New

transactions, however, can still come into IMS and flood the system. This could cause the IMS system to fail with a S878 abend.

Migration considerations

Older releases of IMS provided the following messages for the input message flood condition:

- DFS1988W
- DFS1989E
- DFS0767I

IMS Version 11 introduced four new messages:

- DFS4380W
- DFS4381I
- DFS4388W
- DFS0793I

In IMS Version 13, the existing DFS4388W (when limit is reached and the new global support is not active) and DFS0793I (when flood is relieved) messages have been enhanced to make them clearer and to be consistent with the new messages:

DFS3428W

THE TOTAL OTMA INPUT MESSAGES(TIB) HAVE REACHED XX% OF
THE GLOBAL LIMIT ZZZZ

DFS3429E

THE TOTAL OTMA INPUT MESSAGES(TIB) HAVE REACHED THE
GLOBAL LIMIT ZZZZ

Prior to IMS Version 13, issuing the /STA TMEMBER ALL INPUT command turned on global flood notification. The same command in IMS Version 13 enforces the global limit and causes any new input to be rejected. If DFSOTMA is used, IMS considers it to be one entry toward the 255 max member entries. This means the total entries allowed for the OTMA clients or members becomes 254.

Coexistence considerations

The OTMA global flood control enhancement does not impact coexistence considerations.

Log record changes

The header of OTMA 4033 log record includes the OTMA TSCD restart information. This header was expanded by 4 bytes at the end to include the OTMA global flood control limit. The original 2-byte field for the global flood limit in the beginning of the header becomes unused and reserved for future usage.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

A system client name, DFSOTMA, has been introduced for the OTMA client descriptor defined in DFSYDTx PROCLIB member to specify a global flood limit for all the OTMA clients and to activate the global flood control in order to suppress new OTMA transactions.

Impact to administering IMS

You can activate global flood control to suppress new OTMA input transactions by specifying the global flood limit value INPT for the DFSOTMA member in the OTMA client descriptor for all the OTMA clients, or by issuing the IMS command /START TMEMBER ALL INPUT #####.

Programming for IMS

A new extended reason code was added to the X'0100' return code description to indicate that a request was rejected due to OTMA global message flood condition.

For the OTMA 0030 sense code, two reason codes were added: X'01' and X'02'.

Impact to troubleshooting for IMS

The default OTMA global flood limit of the system has been changed from 8,000 to 10,000 along with a default relief level change from 6400 to 5000. New DFS3428W warning message has been introduced when 80% of the global flood limit has been reached. This message is issued at every 5% increment thereafter until the global flood limit is reached.

When the global flood limit is reached, the enhanced warning message DFS4388W and new DFS3429E error message are sent to the system console and MTO, along with OTMA protocol messages, to reflect a warning status to all the OTMA clients when the global flood control has not been activated.

This global flood status can be relieved when the input messages in the system have been processed and the number of TIBS has been reduced to 50% or less of the global limit. The enhanced relief message, DFS0793I, is then sent to the IMS MTO and system console, along with OTMA protocol messages, to reflect a good status to all the OTMA clients.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

In IMS Version 13, the meaning and actions associated with the /STA TMEMBER ALL INPUT ##### command have changed.

In IMS Version 11, when this command was issued, OTMA used the specified limit instead of the system default of 8000 to monitor the total active input message count for send-then-commit (CM1) transactions from all of the OTMA clients. If the total number reached this specified limit, OTMA issued a DFS4388W to the IMS MTO and system console along with OTMA protocol messages with the warning status to all of the OTMA clients.

In IMS Version 13, the limit is used for more than a warning and allows OTMA to prevent any new message from being accepted until the flood situation is relieved. The /DISPLAY OTMA command of a degraded system shows “SERVER+FLOOD” in the user status of the OTMA server member when the global flood control has been activated and the global flood limit is reached.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to exit routines

A new flag, input field, and return code have been added to the user exit parameter list in the DFSYPRX0 exit routine. The address at +88 points to a location that stores the routing information that is defined in the descriptor for IBM MQ and IMS Connect. If the destination name matches a non-OTMA destination in the descriptor, or if it does not match any entry in the OTMA destination descriptor, this new field is zero. For the destination as IMS Connect, see the TMAMICON_DESCRIPTOR DSECT mapping for the detailed routing information. For the destination as IBM MQ, see the TMAMMQS_DESCRIPTOR DSECT mapping for the detailed routing information.

Similarly, DFSYDRU0 has added a new flag, input field, and return code to the user exit parameter list. The address at +100 points to a location that stores the routing information that is defined in the descriptor for IBM MQ and IMS Connect. If the destination name matches a non-OTMA destination in the descriptor, or if it does not match any entry in the OTMA destination descriptor, this new field is zero.

Enhancement for WTO important OTMA messages

In IMS Version 13, the enhancement for WTO important OTMA messages provides OTMA messages to the Write To Operator (WTO) console that were previously sent only to the Master Terminal Operator (MTO) LTERM.

If you use automation for console Write To Operator (WTO) messages, you will benefit from OTMA messages, which are now being sent to both the MTO and WTO consoles. There are no changes to the message content.

Migration considerations

The enhancement for WTO important OTMA messages does not impact migration considerations.

Coexistence considerations

The enhancement for WTO important OTMA messages does not impact coexistence considerations.

Log record changes

The enhancement for WTO important OTMA messages does not impact log records.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

The enhancement for WTO important OTMA messages does not impact installation and system definition.

Impact to administering IMS

The enhancement for WTO important OTMA messages does not impact IMS administration.

Programming for IMS

The enhancement for WTO important OTMA messages does not impact programming.

Impact to troubleshooting for IMS

The following IMS OTMA messages, when they are generated, are now sent to both the MTO and WTO console:

- DFS0062W (Messages and Codes)
- DFS1281E (Messages and Codes)
- DFS1283E (Messages and Codes)
- DFS1284E (Messages and Codes)
- DFS1297E (Messages and Codes)
- DFS1964E (Messages and Codes)
- DFS2374W (Messages and Codes)
- DFS2375W (Messages and Codes)
- DFS2376W (Messages and Codes)
- DFS2386I (Messages and Codes)
- DFS2391I (Messages and Codes)
- DFS2393I (Messages and Codes)
- DFS2396I (Messages and Codes)

| For a complete list of all of the new, changed, and deleted messages, and abend
| codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version
| 13," on page 87.

| **Impact to IMS reference information**

| *Impact to commands*

| The enhancement for WTO important OTMA messages does not impact
| commands.

| *Impact to exit routines*

| The enhancement for WTO important OTMA messages does not impact exit
| routines.

| *Impact to utilities*

| The enhancement for WTO important OTMA messages does not impact utilities.

Chapter 12. IMS system enhancements

IMS Version 13 includes enhancements to the overall IMS system, including both the IMS Database Manager and the IMS Transaction Manager.

Application development enhancements

IMS Version 13 provides several enhancements for application programs.

IMS application programs can advantage of the following enhancements:

Callout enhancements

The IMS ICAL call of the DL/I API is enhanced to support synchronous program switches, in which an IMS application program sends a request to another IMS application program and waits for the response. This enhancement also supports synchronous program switches from Java dependent regions through the JMS API.

For the calling application program, the call is sent and the response is received in a single unit of work.

The ICAL call is also enhanced to enable the calling application programs to more efficiently receive large response messages.

For more information about ICAL call enhancements, see DL/I ICAL call and Java API enhancements for synchronous program switch (Release Planning).

The asynchronous callout function is enhanced to facilitate sending asynchronous messages to IBM MQ.

For more information about this enhancement, see “Asynchronous callout enhancements for IBM MQ” on page 115.

Database versioning

IMS Version 13 includes the ability to assign user-defined version identifiers to different versions of the structure of a database. These identifiers enable you to make structural changes to a database while providing multiple views of physical data to a variety of applications. New applications that reference a newer structure of a database can be brought online without affecting applications that use previous database structures. Unchanged applications, which do not have to be sensitive to the new physical structure of the database, can continue to access the database.

For more information about this enhancement, see Database versioning enhancement (Release Planning).

ESAF support in Java dependent regions

Application programs that run in IMS Java dependent regions (JDRs) can now use either the DB2 Recoverable Resource Manager Services Attach Facility (RRSAF) or the ESAF (external subsystem attach facility) to access external subsystems.

For more information about this enhancement, see ESAF support in Java dependent regions enhancement (Release Planning).

SQL support

Before IMS Version 13, only Java application programs and DB2 stored procedures could issue SQL database calls to IMS. IMS Version 13 expands SQL support to COBOL application programs that run in the IMS

environment. This new support enables SQL programmers to access IMS databases in a similar manner as they use for relational databases.

For more information about this enhancement, see SQL support enhancements (Release Planning).

Application thread increase enhancement

The maximum number of concurrent application threads is increased from 999 to 4095.

In IMS Version 13, you can specify up to 4095 partition specification tables (PSTs) on the MAXPST control region parameter in DBC, DCC, or IMS procedures. The total number of PSTs is the sum of the number of dependent regions, CICS/DBCTL threads, and Open Database Access threads.

You can also specify up to 4095 concurrent active threads on the MAXTHRDS parameter of the CSLDCxxx PROCLIB member. The Syntax Checker and the DFSPRP macro for DBCTL are enhanced to support the increased value for the MAXTHRDS parameter.

The following additional enhancements to IMS support the increase of concurrent application threads:

- The value specified on the PST parameter in the procedures can now be between 0 and the number specified on the MAXPST parameter.
- The maximum region count (MAXRGN) value that can be specified is increased for the following commands:
 - CREATE TRAN
 - CREATE TRANDESC
 - UPDATE TRAN
 - UPDATE TRANDESC
- The BAL() status indicator in the output from a /DISPLAY TRAN command is changed to support a 4-digit decimal number.

Command enhancements

IMS Version 13 includes enhancements to existing commands, and several new commands. Most of the enhancements are to type-2 commands, to support the IMS strategy of enhancing the capability of single point of control (SPOC) applications that issue type-2 commands through the Operations Manager (OM) API or the REXX SPOC API.

Database versioning command enhancements

The following IMS commands are enhanced for IMS Version 13 to support the database versioning enhancement:

- QUERY DB command (Commands)

DBRC command enhancements

The following DBRC commands are enhanced for IMS Version 13 to support the DBRC enhancements:

- CHANGE.RECON command (Commands)
- DELETE.LOG command (for RLDS and SLDS) (Commands)

- INIT.ADS command (Commands)
- INIT.RECON command (Commands)

The following DBRC commands are enhanced for the HALDB support for 8-GB OSAM data sets enhancement:

- CHANGE.DB command (Commands)
- INIT.DB command (Commands)
- LIST.DB command (Commands) (For HALDB master records, the command output shows the maximum data capacity of OSAM data sets. See DB (HALDB) record fields (Commands)).

DEDB Alter command enhancements

The following DBRC commands are enhanced for IMS Version 13 to support the DEDB Alter function:

- INIT.ADS command (Commands)
- LIST.DBDS command (Commands)
- LIST.DB command (Commands)
- LIST.RECON command (Commands)
- NOTIFY.RECOV command (Commands)

/DIAGNOSE command enhancements

The /DIAGNOSE command is enhanced to improve the reliability of diagnostic information and to streamline the problem determination process.

The following IMS command is enhanced to support the /DIAGNOSE command enhancements:

- /DIAGNOSE command, which is described in the following topics:
 - /DIAGNOSE commands (Commands)
 - /DIAGNOSE SET command (Commands)
 - /DIAGNOSE SNAP command (Commands)

/DISPLAY POOL QBUF command enhancements

The /DISPLAY POOL command is enhanced to return addition information when QBUF is specified in a shared queues environment.

The command output now displays:

- The number of buffers that are currently in use, as well as highest.
- The highest number of buffers that have been in use at one time.

For more information, see /DISPLAY POOL command (Commands).

HALDB command enhancements

The following IMS commands are enhanced to support the HALDB alter function:

- /DISPLAY MODIFY command (Commands)
- INITIATE OLC command (Commands)
- INITIATE OLREORG command (Commands)
- QUERY DB command (Commands)
- QUERY OLREORG command (Commands)

- TERMINATE OLREORG command (Commands)
- UPDATE OLREORG command (Commands)

The following DBRC commands and command output are enhanced to support the HALDB alter function:

- CHANGE.DB command (Commands)
- CHANGE.PART command (Commands)
- NOTIFY.REORG command (Commands)
- Sample listing of a RECON data set at the active site (Commands)
- Sample listing of a RECON data set at the tracking site (Commands)
- DB (HALDB) record fields (Commands)
- DB (PART) record fields (Commands)

IMS Connect command enhancements

IMS Version 13 introduces a number of new and change commands for IMS Connect.

The following type-2 commands are new for IMS Connect in IMS Version 13:

- CREATE IMSCON TYPE(DATASTORE) command (Commands)
- CREATE IMSCON TYPE(PORT) command (Commands)
- QUERY IMSCON TYPE(CONVERTER) command (Commands)

The ISC over TCP/IP enhancement introduces additional new commands for IMS Connect:

The following commands are changed for IMS Connect in IMS Version 13:

- IMS Connect QUERY MEMBER command (Commands)
- IMS Connect QUERY PORT command (Commands)
- VIEWHWS command (Commands)
- VIEWPORT command (Commands)

IMS repository enhancements

The IMS Version 13 IMS repository enhancements introduce a variety of changed IMS commands:

The following IMS type-1 and type-2 commands are changed in IMS Version 13:

- CREATE DB command (Commands)
- CREATE DBDESC command (Commands)
- CREATE PGM command (Commands)
- CREATE PGMDESC command (Commands)
- CREATE RTC command (Commands)
- CREATE RTCDESC command (Commands)
- CREATE TRAN command (Commands)
- CREATE TRANDESC command (Commands)
- /DBDUMP command (Commands)
- /DBRECOVERY command (Commands)
- DELETE DB command (Commands)

- DELETE DBDESC command (Commands)
- DELETE DEFN command (Commands)
- DELETE PGM command (Commands)
- DELETE PGMDESC command (Commands)
- DELETE RTC command (Commands)
- DELETE RTCDESC command (Commands)
- DELETE TRAN command (Commands)
- DELETE TRANDESC command (Commands)
- /ERESTART command (Commands)
- EXPORT command (Commands)
- IMPORT DEFN SOURCE(REPO | RDDS) command (Commands)
- /PSTOP command (Commands)
- /PURGE command (Commands)
- QUERY DB command (Commands)
- QUERY PGM command (Commands)
- QUERY RTC command (Commands)
- QUERY TRAN command (Commands)
- /START DB command (Commands)
- /START PGM command (Commands)
- /START RTC command (Commands)
- /START TRAN command (Commands)
- /STOP DB command (Commands)
- /STOP PGM command (Commands)
- /STOP RTC command (Commands)
- /STOP TRAN command (Commands)
- UPDATE DB command (Commands)
- UPDATE DBDESC command (Commands)
- UPDATE PGM command (Commands)
- UPDATE PGMDESC command (Commands)
- UPDATE RTC command (Commands)
- UPDATE RTCDESC command (Commands)
- UPDATE TRAN command (Commands)
- UPDATE TRANDESC command (Commands)

ISC over TCP/IP command enhancements

The IMS Version 13 ISC over TCP/IP enhancement introduces a variety of new and changed IMS and IMS Connect commands:

The following IMS type-2 commands are new in IMS Version 13:

- QUERY IMSCON TYPE(ISC) command (Commands)
- QUERY IMSCON TYPE(ISCUSER) command (Commands)
- QUERY IMSCON TYPE(RMTCICS) command (Commands)
- UPDATE IMSCON TYPE(ISC) command (Commands)
- UPDATE IMSCON TYPE(ISCUSER) command (Commands)
- UPDATE IMSCON TYPE(RMTCICS) command (Commands)

The following IMS commands are changed in IMS Version 13:

- /CLSDST command (Commands)
- /DISPLAY ASMT command (Commands)
- /DISPLAY NODE command (Commands)
- /DISPLAY TIMEOVER command (Commands)
- /DISPLAY TRACE command (Commands)
- /OPNDST command (Commands)
- QUERY NODE command (Commands)
- QUERY IMSCON TYPE(CLIENT) command (Commands)
- QUERY IMSCON TYPE(PORT) command (Commands)
- QUERY IMSCON TYPE(SENDCLNT) command (Commands)
- /TRACE NODE command (Commands)
- UPDATE IMSCON TYPE(CLIENT) command (Commands)
- UPDATE IMSCON TYPE(PORT) command (Commands)
- UPDATE IMSCON TYPE(SENDCLNT) command (Commands)

The following IMS Connect commands are changed in IMS Version 13:

- IMS Connect QUERY MEMBER command (Commands)
- IMS Connect QUERY PORT command (Commands)
- VIEWHWS command (Commands)
- VIEWPORT command (Commands)

/DIAGNOSE command enhancements

The IMS /DIAGNOSE command is enhanced with new output options, and to include information about more resource types.

As of IMS Version 12, the default output destination for the /DIAGNOSE command is DISPLAY. This option routes captured resource information back to the issuing LTERM.

The IMS Version 13 /DIAGNOSE command has:

- A new output option: SYSOUT
- A new SNAP resource type: MSNAME
- Extended functionality for the following resource types: DB, AREA, MODULE, and BLOCK
- Support for output filtering for the following resource types: LTERM, NODE, and USER

DRDA DDM command support for native SQL enhancement

In IMS Version 13, the Distributed Relational Database Architecture™ (DRDA) distributed data management (DDM) command support for native SQL is an enhancement to the IMS DRDA interface that enables clients to use DDM commands to make SQL calls to IMS databases.

The DDM command support for SQL requires the Open Database Manager (ODBM) component of the IMS Common Service Layer (CSL). The ODBM

translates the DDM commands into SQL and then routes the SQL calls to an appropriate IMS system. The receiving IMS system's native SQL engine translates the SQL into DL/I.

Among the clients that can use the DDM command support are Type 2 and Type 4. This enables SQL processing to be handled directly by IMS instead of on the client side, which results in increased performance for the IMS Open Database solution.

Migration considerations

The DRDA DDM command support for native SQL enhancement does not impact migration.

Coexistence considerations

With the native SQL support, you can flow both native SQL statements and DLI within the same connection. You achieve this by using the PSB object and casting to a ConnectionImpl to return a PCB that can then be used to access the DL/I driver interface.

Fallback considerations

A fallback mechanism to bypassing all the new native SQL code points can be achieved by setting the native SQL connection property to "false." By default, native SQL connection property is set to "true," and native SQL is supported as long as the target server supports native SQL for IMS. If you set the native SQL connection property to false, the connection only supports the DL/I Agent, DRDA code points, and result sets.

Log record changes

The DRDA DDM command support for native SQL enhancement does not impact log records.

Requirements

The Open Database Manager (ODBM) component and the Structure Call Interface (SCI) component of the IMS Common Service Layer (CSL) are required to use the DRDA DDM command support for native SQL enhancement.

Restrictions

This enhancement has the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

The DRDA DDM command support for native SQL enhancement does not impact installation and system definition.

Impact to administering IMS

The DRDA DDM command support for native SQL enhancement does not impact system administration.

Programming for IMS

Several new DRDA DDM commands are provided as part of the DRDA DDM command enhancement for native SQL.

Impact to troubleshooting for IMS

The DRDA DDM command support for native SQL enhancement does not impact troubleshooting.

Impact to IMS reference information

Impact to commands

The DRDA DDM command support for native SQL enhancement does not impact other IMS or IMS component commands.

Impact to exit routines

The DRDA DDM command support for native SQL enhancement does not impact exit routines.

Impact to utilities

The DRDA DDM command support for native SQL enhancement does not impact utilities.

ESAF support in Java dependent regions enhancement

IMS Version 13 applications that run in IMS Java dependent regions (JDRs) can use either the DB2 Recoverable Resource Manager Services Attach Facility (RRSAF) or the ESAF (external subsystem attach facility) to access external subsystems. RRSAF is the default attach facility.

JDR applications that use the ESAF can access subsystems such as Db2 for z/OS or IBM MQ. The advantages of using the ESAF include: consistency for Db2 for z/OS connections across all regions types, and less complex external subsystem definitions.

To use the ESAF, specify an SSM parameter in the DFSJMP or DFSJBP procedure. The SSM value can be the same value as the value that is specified on the SSM parameter for the control region procedure.

IMS Catalog Populate utility (DFS3PU00) serviceability enhancements

For diagnostic and auditing purposes, IMS Version 13 enhances the IMS Catalog Populate utility (DFS3PU00) with an option to generate reports of the DBD and PSB instances that are added to the IMS catalog or that are duplicates of instances that already exist in the IMS catalog.

To generate the reports, provide a SYSINP DD statement to specify new input control parameters for the DFS3PU00 utility. You can also specify the maximum number of error messages that are allowed before the DFS3PU00 utility terminates.

These enhancements also apply to the ACB Generation and Catalog Populate utility (DFS3UACB), which calls the DFS3PU00 utility during the populate phase of execution.

These enhancements are delivered by APAR PI05829 and PTF UI13348.

Changes to troubleshooting for IMS

The serviceability improvements introduce several new and changed DFS messages.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Changes to utilities

In IMS Version 13, you can specify the new input control parameters for the DFS3PU00 utility or the DFS3UAC0 utility in a SYSINP DD statement, as described in the following list:

SYSINP DD

An optional control statement sequential data set with 80-character fixed-length records. Only characters in positions 1 - 72 are read.

The control statement parameters, which are separated by blanks or commas, can be specified on one or more records.

IMS Connect enhancements

In IMS Version 13, IMS Connect includes enhancements to functionality, resiliency, and simplification, as well as new type-2 commands.

IMS Connect in IMS Version 13 can:

- Connect IMS and CICS subsystems using the Intersystem Communication (ISC) protocol.
- Auto-restart the Language Environment® for z/OS.
- Expand recorder trace records.
- Use RACF Event Notification Facility (ENF) support for cached RACF user IDs.
- Configure the TCP/IP backlog (queue) size.
- Report overall health to Workload Manager (WLM).
- Support the Transport Layer Security (TLS) Version 1.1 and Version 1.2 protocols for the SSL port. This support is delivered by APAR/PTF PM96825/UK98317.
- Support the following special characters in RACF passwords if support for special characters is enabled in RACF:
. < + | & ! * - % _ > ? : =
This support is delivered by APAR/PTF PI54038/UI36524.

To improve performance, IMS Connect now uses CPOOL instead of STORAGE OBTAIN in the XCF Message Exit. As a consequence of this change, the required IMS Connect region size is 170 MB larger than in IMS Version 12.

New type-2 commands enable the following tasks:

- Dynamically create data store definitions with the CREATE IMSCON TYPE(DATASTORE).
- Dynamically create port definitions with the CREATE IMSCON TYPE(PORT).
- Start and stop the ISC links, ISC parallel sessions, and TCP/IP connections with CICS that are managed by IMS Connect with the following commands:
 - UPDATE IMSCON TYPE(ISC)
 - UPDATE IMSCON TYPE(ISCUSER)
 - UPDATE IMSCON TYPE(RMTCICS)
- Query the ISC links, ISC parallel sessions, and TCP/IP connections with CICS that are managed by IMS Connect with the following commands:
 - QUERY IMSCON TYPE(ISC)
 - QUERY IMSCON TYPE(ISCUSER)
 - QUERY IMSCON TYPE(RMTCICS)
-)
- Query the XML converters that are loaded in IMS Connect (QUERY IMSCON TYPE(CONVERTER))

IMS Connect resources that are modified by using the CREATE IMSCON and UPDATE IMSCON commands are not saved across restarts of IMS Connect.

IMS CQS enhancement

When IMS Common Queue Server (CQS) rejects a z/OS STOP *cqsjobname* command because CQS clients are still connected, CQS issues a new message.

CQS issues a CQS0301I message for each connected client. This information enables the operator to shut down or quiesce the connected CQS clients so that the CQS address space can be stopped.

IMS repository enhancements

In IMS Version 13, the IMS repository function supports the IMS change list. IMS uses the change list to preserve and restore the changes that are made to the IMSRSC repository while the IMS was down.

The IMS repository enhancements consist of the following enhancement:

- IMS change list support

IMS change list support

When the IMPORT DEFN SOURCE(REPO) SCOPE(ALL) command is issued, if there is an IMS system that is not active but has the resource and descriptor names specified on the IMPORT command in its IMS resource list, Resource Manager (RM) creates an *IMS change list* in the IMSRSC repository with a list of the resource and descriptor names being imported. The creation of the change list in the repository is initiated by the command master IMS.

IMS reads the change list and applies the resource definition changes when it restarts at normal or emergency restart. The change list is not read or reprocessed when IMS is cold started because all the resource definitions are read from the

repository at cold start. IMS deletes the change list after successfully processing the change list during restart, or at the end of cold start.

You can also use the DELETE DEFN TYPE(CHGLIST) command to delete any residual IMS change list that could not be deleted by IMS during IMS change list processing.

Migration considerations

No impact.

Coexistence considerations

An IMS change list is created only if the command master IMS is IMS Version 13 or later and the RM that processes change list requests is at V13 (1.6) level or higher.

The following IMS Version 12 APAR/PTF must be installed in an IMS Version 12 system to enable coexistence between an IMS Version 13 Resource Manager (RM) instance and an IMS Version 12 RM instance:

PM80588/UK92589

Prevents an IMS Version 12 RM address space from processing QUERY, UPDATE, and DELETE commands that are issued against an IMS Version 13 or later IMSRSC repository change list.

Log record changes

The X'22' IMPORT log records are created when the IMS change list is processed during IMS internal import. The X'22' log records are modified to have a new bit that indicates that the resources are imported from the IMS change list.

Requirements

The IMS repository enhancements have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

No impact.

Impact to installing and defining IMS

IMS warm or emergency restart processes the IMS log to build runtime resource definitions. After the log is processed, if IMS is enabled to use the IMSRSC repository, IMS calls Resource Manager (RM) to read and process the change list, if one exists, for the IMS.

When you issue the IMPORT DEFN SOURCE(REPO) command, you can specify whether the import is applicable to:

- All IMS systems in which the resource is defined (even if some of the IMS systems are not active), or
- All active IMS systems in the IMSplex

The keywords SCOPE(ALL) and SCOPE(ACTIVE) for the IMPORT DEFN command identify whether the command applies to all IMS systems in which the resource is defined or only to the active systems.

If stored resource definitions are imported by an IMPORT DEFN SCOPE(ALL) command and an IMS system for which the resource definitions are defined is not active, a change list is created by the RM for that IMS in the repository. A change list consists of resource and descriptor names and types that are to be imported when the IMS system restarts.

If IMS is enabled to use the repository, IMS calls Resource Manager (RM) during warm start or emergency start to read any change list for the IMS. If a change list exists for the IMS that is being restarted, the database, program, transaction, and routing code resources and descriptors in the IMS change list and that apply to the IMS environment are quiesced and are not available for use until the stored resource definitions are imported from the repository. After the IMS log is processed, IMS imports the stored resource definitions from the repository for the database, program, transaction, and routing code resources and descriptors in the IMS change list. It then applies the changes to the runtime resource and descriptor definitions in the IMS. For the resources or descriptors that are in the IMS change list and that do not exist in IMS, the runtime resource definitions are created from the stored resource definitions in the repository. For the resource or descriptors that exist in IMS, the runtime resource definitions are updated with the stored resource definitions from the repository. The change list for the IMS system is deleted at the end of the cold, warm, or emergency restart.

Impact to administering IMS

If IMS is using the IMSRSC repository, databases can be created or updated from the change list in the repository at the end of IMS warm or emergency restart.

If IMS is enabled to use the repository, resource definitions in the change list are read at the end of warm or emergency restart. IMS calls the Resource Manager (RM) to read any change list for the IMS. The change list is maintained by RM in the repository. If a change list exists, IMS imports the stored resource definitions from the repository for all the resources and descriptors in the change list. The resources and descriptors in the change list are quiesced and are not available for use until the stored resource definitions are imported from the repository. The change list for the IMS system is deleted at the end of warm or emergency restart or at the end of IMS cold start.

Programming for IMS

No impact.

Impact to troubleshooting for IMS

Several DFS messages have been added or changed for the IMS repository enhancements.

For a list of the messages and codes that are new or changed for these enhancements, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

New return and reason codes are added to the following commands:

- CREATE DB
- CREATE DBDESC
- CREATE PGM
- CREATE PGMDESC
- CREATE RTC
- CREATE RTCDESC
- CREATE TRAN
- CREATE TRANDESC

The DELETE DEFN command is enhanced to support the TYPE(CHGLIST) keyword. The DELETE DEFN TYPE(CHGLIST) command specifies that any residual IMS change list that failed to be deleted by IMS during IMS change list processing is to be deleted.

The following commands are enhanced to support new completion codes:

- DELETE DB
- DELETE DBDESC
- DELETE DEFN
- DELETE PGM
- DELETE PGMDESC
- DELETE RTC
- DELETE RTCDESC
- DELETE TRAN
- DELETE TRANDESC
- EXPORT
- UPDATE DB
- UPDATE DBDESC
- UPDATE PGM
- UPDATE PGMDESC
- UPDATE RTC
- UPDATE RTCDESC
- UPDATE TRAN
- UPDATE TRANDESC

The IMPORT command is enhanced to support additional functionality for the SCOPE(ALL) keyword.

If SCOPE(ALL) is specified and an IMS system to which the resources and descriptors are defined is not active, the command master IMS calls RM to create or update an IMS change list in the repository with a list of the resource and descriptor names being imported. The resource definitions of all the resource names in the IMS change list are imported at warm or emergency restart so that the IMS is synchronized with all other IMS systems in the IMSplex. If a change list is created in the repository, a response line is returned on the IMPORT command for each resource name in the change list with the IMSID of the IMS for which the change list is created, along with the import type (IMPTYPE) of the change list.

The following commands are enhanced to support new status REPOCHGLIST for NOTINIT-xx-reason status:

- QUERY DB
- QUERY PGM
- QUERY RTC
- QUERY TRAN

Impact to exit routines

The Destination Creation exit routine (DFSINSX0) exit might fail with a completion code of 1D7 and the DFS3824 message if the default descriptor is being imported from the IMS change list in the IMSRSC repository or was not successfully imported from the change list. This error can occur if the default descriptor is not the IMS system-defined default descriptor.

Impact to utilities

No impact.

Castout thresholds for CIs in VSO areas

In IMS Version 13, the castout thresholds for CIs in VSO areas are provided. The thresholds are timers. When the timer expires, a CI is cast out of the VSO area.

The castout threshold for CIs in VSO areas is a timer after which a CI is castout of VSO areas. You can configure the thresholds for VSO areas with different number of CIs by specifying the following parameters in the DFSDFxxx member of the IMS PROCLIB data set under the <SECTION=FASTPATH> section:

VSO1THLD=

Specifies the castout threshold time in seconds for a VSO area with less than or equal to 800 control intervals (CIs). The valid range is 1 - 300. The default value is 300.

VSO2THLD=

Specifies the castout threshold time in seconds for a VSO area with 801 - 3500 CIs. The valid range is 1 - 300. The default value is 240.

VSO3THLD=

Specifies the castout threshold time in seconds for a VSO area with greater than 3500 CIs. The valid range is 1 - 300. The default value is 180.

Changes to administering IMS

The VSO1THLD, VSO2THLD, and VSO3THLD parameters are added to the DFSDFxxx member of the IMS PROCLIB data set. For more information, see Castout thresholds for CIs in VSO areas (Database Administration).

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

IMS security enhancements

Enhancements to security in IMS Version 13 include the removal of the SECURITY macro, the addition of initialization parameters to PROCLIB members, improvements to security exit routines, and, after the appropriate APAR/PTF is applied, support for RACF password phrases.

Removal of the IMS SECURITY macro

Enhancements to security in IMS Version 13 include the removal of the SECURITY macro and the addition of initialization parameters to PROCLIB members.

To reduce the dependency on system generation, IMS Version 13 removes the support for the SECURITY stage-1 system definition macro.

Most security options that were previously specified by using the SECURITY macro are now specified by using the following initialization parameters ISIS, RCLASS, RCF, SECCNT, SGN, and TRN.

With the removal of the SECURITY macro in IMS Version 13, you no longer need to specify the use of the Signon/off Security exit routine (DFSCSGN0) and the Transaction Authorization exit routine (DFSCTRN0) during system definition or system startup. Instead, if the exit routines are linked in one of the STEPLIB or LINKLIST libraries, IMS loads the exit routine. There are no startup parameters to specify to load the routines. For more information about the changes to the security exit routines, see DFSCSGN0, DFSCTRN0, and DFSCCTSE0 security exit routine enhancements (Release Planning).

If the SECURITY macro is specified in the IMS Version 13 system definition stage 1 input stream, message G115 is issued and the macro statement checking ends with a return code of 2.

The RCLASS parameter is added to the DFSPBxxx PROCLIB member. The SECCNT parameter is added to the DFSDCxxx PROCLIB member.

The Syntax Checker is enhanced in IMS Version 13 to support the RCLASS and SECCNT initialization parameters.

Migration considerations

IMS Version 12 was the last version of IMS to support the SECURITY macro. You can use initialization parameters to specify most options that were previously specified on the SECURITY macro keyword values.

If you have not already done so in your IMS Version 11 or IMS Version 12 system, you must move your RCLASS, SECCNT, SGN, and TRN parameter specifications from the SECURITY macro to the DFSDCxxx or DFSPBxxx PROCLIB members.

SIGNEXIT and TRANEXIT parameter specifications are no longer used. To use the Signon/off Security exit routine (DFSCSGN0) and Transaction Authorization exit routine (DFSCTRN0), link them in one of the IMS STEPLIB libraries or in LINKLST. IMS automatically loads and uses the exit routines that are linked in one of the IMS STEPLIB libraries or in LINKLST. A new message, DFS1937I, is issued for every security exit routine that is loaded.

In IMS versions earlier than IMS Version 13, if DFSCCTSE0 was used, you included the CSECT in DFSCSTRN0. Now, all the security exit routines can be linked independently.

For more important information about migrating the security exit routines, see DFSCSGN0, DFSCSTRN0, and DFSCCTSE0 security exit routine enhancements (Release Planning).

For more migration information, see "Security enhancements migration considerations" on page 62.

Coexistence considerations

Use the following procedure to enable multiple versions of IMS to share the DFSPBxxx or DFSDCxxx PROCLIB members:

1. Install the following security small programming enhancement (SPE) APARs/PTFs:
 - IMS Version 11 - PM48203/UK74050
 - IMS Version 12 - PM48204/UK74051
2. Ensure that all of the security options are specified as initialization parameters and not as parameters of the SECURITY macro.
For information about using initialization parameters for security, see Controlling security during system startup for DB/DC and DCCTL (System Administration).
3. Leave the SECURITY macro in the IMS Version 13 stage 1 system definition input because the lower-level versions of IMS require the SECURITY macro. Ignore message G115.

Impact to installing and defining IMS

The following parameters are added to members of the IMS PROCLIB data set:

SECCNT

The SECCNT parameter is added to the DFSDCxxx PROCLIB member. This parameter specifies:

- The maximum number of terminal and password security violations to be accepted per physical terminal
- The number of transaction command violations per transaction prior to master terminal notification of such violations

RCLASS

The RCLASS parameter is added to the DFSPBxxx PROCLIB member. This parameter specifies a 1- to 7- alphanumeric character identifier that is used by RACF for transaction authorization and user ID verification.

Impact to administering IMS

The communications and connections and system administration information is updated to reflect the removal of the SECURITY macro.

Impact to troubleshooting for IMS

The following new messages are added:

G115 Indicates that the SECURITY macro is no longer supported.

For a complete list of new, changed, and deleted messages, and abend codes for IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to commands

The /ERESTART and /NRESTART commands are updated to reflect the removal of the SECURITY macro.

DFSCSGN0, DFSCTRN0, and DFSCCTSE0 security exit routine enhancements

Enhancements to security in IMS Version 13 include improvements to the DFSCSGN0, DFSCTRN0, and DFSCCTSE0 security exit routines.

With the removal of the SECURITY macro in IMS Version 13, you no longer need to specify the use of the Signon/off Security exit routine (DFSCSGN0) and the Transaction Authorization exit routine (DFSCTRN0) during system definition or system startup. Instead, if the exit routines are linked in one of the STEPLIB or LINKLIST libraries, IMS loads the exit routine. There are no startup parameters to specify to load the routines. Message DFS1937I is issued when an exit routine is loaded.

Furthermore, in IMS Version 13, the following security exit routines no longer need to be bound to the IMS nucleus, can run in 31-bit storage, and can share a work storage area using a standard technique:

- Signon/off Security exit routine (DFSCSGN0)

The DFSCSGN0 exit routine is called during IMS initialization to give the exit routine the chance to acquire a work storage area. The exit routine passes the address back to IMS. Then, IMS passes the address to the other security exit routines every time they are called.

The DFSCSGN0 exit routine is called after the Initialization exit routine (DFSINTX0) is called.

- Security Reverification exit routine (DFSCCTSE0)
- Transaction Authorization exit routine (DFSCTRN0)

Migration considerations

SIGNEXIT and TRANEXIT startup parameter specifications are no longer used. To use the Signon/off Security exit routine (DFSCSGN0) and Transaction Authorization exit routine (DFSCTRN0), link them in one of the IMS STEPLIB libraries or in LINKLST. IMS automatically loads and uses the exit routines that are linked in one of the IMS STEPLIB libraries or in LINKLST. A new message, DFS1937I, is issued for every security exit routine that is loaded.

In IMS versions earlier than IMS Version 13, if DFSCCTSE0 was used, you included the CSECT in DFSCTRN0. Now, all the security exit routines can be linked independently.

The exit routines are loaded dynamically in IMS Version 13, so the use of VCONs to reference other modules or control blocks does not work.

Recommendations:

- Split DFSCCTSE0 and DFSCTRN0 into two separate load modules.

- If you change DFSCSGN0, DFSCTRN0 or DFSCCTSE0, keep a copy of the old version for fallback purposes.
- A new initialization call (R0=4) is added for the DFSCSGN0 exit routine. Verify that your DFSCSGN0 exit routine functions correctly with this new entry vector

If the exit routines cannot be linked separately or cannot use a common work area, they must be linked in the following manner:

- If the CSECT of DFSCCTSE0 is part of DFSCCTRN0 source, DFSCCTSE0 must be linked as an ALIAS of DFSCCTRN0.
- If virtual address spaces are used to exchange data between DFSCSGN0, DFSCCTRN0, and DFSCCTSE0, both DFSCCTSE0 and DFSCSGN0 must be linked as an ALIAS of DFSCCTRN0.

If you can, link the modules as reentrant (RENT) or reusable (REUS) to avoid IMS loading them multiple times. If the exit routines need to update tables, link them as reusable. When the user exits are linked reentrant, they are loaded into read only storage and are not able to update tables.

For more migration information, see "Security enhancements migration considerations" on page 62.

Coexistence considerations

The security exit routines can be shared between IMS Version 13 and earlier versions without modifying the routines, but they must be linked differently in IMS Version 13.

- DFSCCTSE0 must be linked as an ALIAS of DFSCCTRN0.

Recommendation:

- Link DFSCCTSE0 and DFSCCTRN0 as reentrant and AMODE/RMODE 31. If the load modules are not linked as reentrant, IMS loads them twice.
- If v-type address constants are used by DFSCCTSE0, DFSCCTRN0, and DFSCSGN0 to exchange data, DFSCCTSE0 must be linked as an ALIAS of DFSCSGN0.

Recommendation:

- Link DFSCCTSE0 and DFSCCTRN0 as reentrant and AMODE/RMODE 31. If the load modules are not linked as reentrant, IMS loads them three times.

Impact to installing and defining IMS

The sample security exit routines (DFSCSGN0, DFSCCTRN0, and DFSCCTSE0) used by the IMS installation verification program (IVP) are enhanced to demonstrate the new IMS Version 13 functionality.

Impact to troubleshooting for IMS

The following new messages are added:

DFS1937I

Indicates that the security exit routine identified in the message is loaded.

For a complete list of new, changed, and deleted messages, and abend codes for IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to exit routines

The following exit routines are affected by the security enhancements:

- Signon/off security exit routine (DFSCSGN0)
- Security Reverification exit routine (DFSCTSE0)
- Transaction Authorization exit routine (DFSCTRN0)

/SIGN command enhancement for password phrases

After the IMS Version 13 APAR PM85849 and PTFs UI13516 and UI13517 are applied, the /SIGN command supports submitting password phrases to RACF for authentication.

Password phrases have security advantages over passwords in that they are long enough to withstand most hacking attempts yet are unlikely to be written down because they are so easy to remember.

As defined by RACF, a password phrase is a character string consisting of mixed-case letters, numbers, and special characters including blanks. Password phrases can be up from 9 to 100 bytes in length. If a password phrase is less than 9 bytes, IMS passes it to RACF as a password instead of as a password phrase.

IMS also supports passwords phrases that are passed by VTAM logon data; however, password phrases cannot be changed by using VTAM logon data.

The /OPNDST command does not support password phrases. The default MFS panels do not support password phrases either.

For more information about RACF support for password phrases, see *z/OS Security Server RACF Security Administrator's Guide*.

Changes to commands

The /SIGN command is enhanced with new keywords and valid values to support setting, changing, and entering password phrases for RACF authentication.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Special characters in RACF passwords

In IMS Version 13, when support for special characters is enabled in RACF, IMS also supports special characters in the passwords that IMS passes to RACF.

With this enhancement, IMS supports the following special characters in RACF passwords:

@ # \$. < + | & ! * - % _ > ? : =

Requirements

Before IMS can support RACF passwords that contain the special characters, ensure that APAR OA43999 is installed.

For IMS to support the special characters in RACF passwords when special characters is also enabled in RACF, install APAR/PTFs PI54037/UI36544/UI36545.

Also, ensure that all IMS systems that require support for RACF special characters are migrated to Version 13.

Impact to commands

A period is a valid character in RACF passwords. If support for special characters is enabled in RACF, IMS commands that have passwords are impacted in the following ways:

- A period is normally used as the delimiter at the end of IMS commands. Therefore, when a password is specified at the end of the command, you must insert a space before the period that you are using as the end-of-command delimiter. If a space is not added before the period that you are using as the end-of-command delimiter and support for special characters is enabled in RACF, the period is treated as part of the password and not as a delimiter.
- A period that is specified in the password brackets of an IMS command is not treated as a delimiter.

For a list of the IMS commands that are impacted by this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

TCO auto-signon enhancement

After APAR PI45427 (PTF number is pending APAR closure) is installed, the DFSDCxxx PROCLIB member supports new TCOUSID and SIGNTCO parameters that allow you to specify a user ID for the TCO terminal. IMS can use the specified user ID during restart to create a RACF ACEE for the TCO terminal.

The TCO script can still use the /SIGN command.

Installation Verification Program enhancements overview

In IMS Version 13 the Installation Verification Program (IVP) is enhanced to support the ISC over TCP/IP function.

Specifically, the IVP is enhanced to support the new IMS Connect RMTICIS, ISC, and TCPIP configuration statements in the IMS Connect HWSCFGxx PROCLIB member for ISC links between IMS Connect and CICS.

Reduced total cost of ownership enhancements

Internal changes in IMS Version 13 improve efficiency and reduce MIPS usage. These changes include exploitation of pageable 1 MB pages, support for memory-based data set ENQ management for dynamically allocated data sets, and System z Integrated Information Processor (zIIP) utilization.

IMS Version 13 includes the following internal enhancements:

- BPE dispatcher hot cache line prefetch
- Eliminate local lock obtain around buffer page fix for OSAM buffers
- DFSCP00 improved SVC directory entry search algorithm and removal of IVSK instructions
- IMS logger LOG latch contention reduction
- IMS dispatcher optimization
- IMS page load service algorithm optimization

- Reduce unintentional cache sharing for common storage PSTs
- Shared queues local first optimization for program-to-program switch messages
- Type-2 processing for the IBM IMS Universal Drivers
- OTMA and IMS Connect performance improvements:
 - OTMA YTIB chain converted to a hash table
 - OTMA STORAGE calls converted to CPOOL
 - Unnecessary clearing of OTMA buffers removed
- General instruction optimization (using newer instructions, converting modules to branch relative addressing)
- Reduce contention for the database block serialization latch

Exploitation of pageable 1 MB pages enhancement

IMS Version 13 uses pageable 1 MB pages for certain storage pools and control blocks when this function is available. Pageable 1 MB pages are supported in z/OS V1.13 (web delivery and PTFs required) and higher z/OS releases when running on a IBM zEnterprise EC12 processor with Flash Express. Pageable 1 MB pages can improve performance by reducing the number of steps in dynamic address translation, and by improving translation lookaside buffer (TLB) coverage.

IMS Version 13 requests the following areas to be backed by pageable 1 MB pages, when available:

- CQS interface buffers
- DPSB pool (DLI/SAS PSB pool)
- DLDP pool (DMB pool)
- DBWP pool (DMB work pool)

Important: If you page-fix the DPSB, DLDP, or DBWP pools, they will not be backed by 1 MB pages.

Support for memory-based data set ENQ management for dynamically allocated data sets (MEMDSENQMGMT)

IMS Version 13 takes advantage of the MEMDSENQMGMT function of z/OS. The MEMDSENQMGMT function provides the following benefits:

- Enables jobs and subsystems to use memory-based data set ENQ management for dynamically allocated data sets, instead of scheduler work area-based (SWA-based) data set ENQ management.
- Is faster than SWA-based data set ENQ management, and is intended for jobs that allocate a large number of data sets, such as IMS.

If the MEMDSENQMGMT function is enabled on your z/OS system, data set ENQs for dynamically allocated data sets are managed in memory.

zIIP utilization enhancement

Note: This information provides only general descriptions of the types and portions of workloads that are eligible for execution on Specialty Engines (for example, zIIPs, System z Application Assist Processors (zAAPs), and Integrated Facility for Linux (IFL) (“SEs”). IBM authorizes customers to use IBM SEs only to execute the processing of Eligible Workloads of specific Programs expressly authorized by IBM as specified in the “Authorized Use Table for IBM Machines”

provided at www.ibm.com/systems/support/machine_warranties/machine_code/aut.html ("AUT"). No other workload processing is authorized for execution on an SE. IBM offers SEs at a lower price than General Processors/Central Processors because customers are authorized to use SEs only to process certain types and/or amounts of workloads as specified by IBM in the AUT.

In IMS Version 13 ("V13"), certain processing in the IMS Connect address space and in the IMS Open Database Manager ("ODBM") address space as specified below may, when enclave SRB execution is enabled by a user, be executed under enclave service request blocks ("SRBs"). Enclave SRB execution may be enabled as unconditional;¹ or it may be enabled as conditional, based on the presence of at least one online zIIP during address space initialization. When enclave SRB execution is enabled, V13 will direct z/OS to authorize such work to be processed on an available zIIP.

Except as otherwise described below, the following IMS Connect and ODBM processing can execute under an enclave SRB in V13:

- Processing of IMS Connect address space SOAP message threads for SOAP messages arriving via TCP/IP
- Processing of IMS Connect and ODBM address space Distributed Relational Database Architecture ("DRDA") threads for DRDA requests arriving via TCP/IP
- Processing of IMS Connect address space Multiple System Coupling ("MSC") threads for MSC messages arriving via TCP/IP
- Processing of IMS Connect address space Intersystem Communication ("ISC") threads for ISC messages arriving via TCP/IP
- Processing of ODBM address space threads for requests arriving through the CSLDMI API.

Note that any user exits called by the above processing will not execute under an enclave SRB. User exits are always given control in task control block (TCB) mode, and such exit instructions are not authorized to be processed on a zIIP. Also note that certain processing cannot, due to technical restrictions, execute under enclave SRBs. Such processing includes calling z/OS Resource Recovery Services ("RRS"), IMS DL/I call processing, and z/OS supervisor calls ("SVCs"). IMS switches from SRB mode into TCB mode to perform such processing, and thus such processing will not execute on a zIIP.

SQL support enhancements

Before IMS Version 13, only Java application programs and DB2 stored procedures could issue SQL database calls to IMS. IMS Version 13 expands SQL support to COBOL application programs.

In addition to the existing SQL-to-DL/I call conversion support for Java application programs and DB2 stored procedures, the IMS Database Manager can now process SQL calls in the native host environment. This new support enables SQL programmers to access IMS databases in a similar manner as they use for COBOL applications in relational databases.

1. In an unconditional status, the user may enable such processing to be executed in enclave SRB mode when no zIIP is online or part of the user's System z environment. But, of course, no zIIP utilization could result. A user might request enclave SRB execution even in the absence of zIIPs, to allow the system to project how much work is eligible to run on zIIP and probably would if there were zIIP capacity available. See the PROJECTCPU parameter of the IEAOPTxx SYS1.PARMLIB member in z/OS *MVS Initialization and Tuning Reference* (SA22-7592) for further information.

The new SQL support also provides support for the IBM IMS Data Provider for Microsoft .NET.

Migration considerations

No impact.

Coexistence considerations

No impact.

Log record changes

No impact.

Requirements

This enhancement requires COBOL Version 5.1 with IMS coprocessor support. With COBOL Version 5.1, all load modules must reside within a partitioned data set extended (PDSE).

Restrictions

The following restrictions are in place for this function.

- Only a subset of SQL 2008 is supported.
- The SQL syntax is limited to what IMS DBMS can process natively.
- Only SELECT, INSERT, UPDATE, DELETE, predicate, and ordering support is provided.
- XML DB, aggregation, and grouping support is not provided.
- Static SQL is not currently supported.

Impact to installing and defining IMS

No impact.

Impact to administering IMS

No impact.

Programming for IMS

New programming information is added on COBOL support for SQL and the existing SQL information regarding the IMS Universal JDBC driver has been moved to form a new section of information about application programming for SQL.

Impact to troubleshooting for IMS

SQL completion codes have been added for SQL support.

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, andabend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

No impact.

Impact to exit routines

No impact.

Impact to utilities

No impact.

User exit enhancements

In IMS Version 13, the user exit enhancement provides the means to reduce the number of times IMS must be restarted to update a user exit by extending the existing refresh support to additional user exits.

To reduce the number of times IMS must be restarted to update a user exit, the existing refresh support was expanded to include additional existing user exits. These user exits are now referenced by their user exit type instead of the old default user exit routine. References to the user exit routine for all supported user exit types were changed to use the user exit type.

To provide additional options and flexibility for customization, the existing support for calling multiple user exit routines from a single exit point in IMS was included with the new user exit types.

Migration considerations

You can migrate your exits to use the new user exit services by defining your current exit routines in the EXITDEF parameter of the USER_EXITS section of the DFSDFxxx member. The current exit routine can then be used along with information on the exit being returned by the QRY USEREXIT command. The exit is also refreshable by using the REFRESH USEREXIT command.

Coexistence considerations

There are no special coexistence considerations for this enhancement.

If a shared load library is used for your exit routines, the library can continue to be shared with all IMS systems that use the exits. The exit routines are handled in each IMS as directed. The REFRESH USEREXIT command is rejected by any pre-version 12 IMS that is running in the IMSplex.

Unsupported user exit types are rejected in any pre-version 13 IMS system that is running in the IMSplex for both the QUERY USEREXIT command and the REFRESH USEREXIT command. Neither of these has any effect on that or other IMS system to which the command is directed.

Fallback considerations

There are no special fallback considerations for this enhancement.

If your current exits are defined using the EXITDEF parameter of the USER_EXITS section of the DFSDFxxx member and there is a need to fallback to the previous version of IMS, the exits will be picked up as they have been before. If the exit names were changed for some reason, the names must be changed back to the name that is required for the specific exit.

Log record changes

The user exit enhancement does not impact log records.

Requirements

This enhancement is expected to have the same hardware and software requirements as the base IMS Version 13 product.

Restrictions

This enhancement is expected to have the same restrictions as the base IMS Version 13 product.

Impact to installing and defining IMS

References to the following exit routine names were changed to the user exit type names:

User exit routine name	User exit type name
Log Edit exit routine (DFSFLGE0)	Log Edit user exit (LOGEDIT)
Input/Output Edit exit routine (DFSYIOE0)	Input/Output Edit user exit (OTMAIOED)
Resource Access Security exit routine (DFSRAS00)	Resource Access Security user exit (RASE)
Destination Resolution exit routine (DFSYPRX0)	Destination Resolution user exit (OTMAYPRX)
Resume TPIPE Security exit routine (DFSYRTUX)	Resume TPIPE Security user exit (OTMARTUX)

Impact to administering IMS

References to the following exit routine names were changed to the user exit type names:

User exit routine name	User exit type name
Input/Output Edit exit routine (DFSYIOE0)	Input/Output Edit user exit (OTMAIOED)
Resource Access Security exit routine (DFSRAS00)	Resource Access Security user exit (RASE)
Destination Resolution exit routine (DFSYPRX0)	Destination Resolution user exit (OTMAYPRX)
Resume TPIPE Security exit routine (DFSYRTUX)	Resume TPIPE Security user exit (OTMARTUX)

Programming for IMS

References to the exit routine name Input/Output Edit exit routine (DFSYIOE0) were changed to the user exit type name Input/Output Edit user exit (OTMAIOED).

Impact to troubleshooting for IMS

Four new messages were added which describe the effect on the user exit by the REFRESH USEREXIT command:

- DFS4575E
- DFS4576W
- DFS4585W
- DFS4586E

For a list of the messages and codes that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS Version 13, see Chapter 8, "Message and code changes in IMS Version 13," on page 87.

Impact to IMS reference information

Impact to commands

Support for the following user exit types was added to the QUERY USEREXIT and REFRESH USEREXIT commands:

- Build Security Environment User Exit (BSEX)
- Log Edit User Exit (LOGEDIT)
- Logger User Exit (LOGWRT)
- Non-Discardable Messages User Exit (NDMX)
- OTMA Input/Output Edit User Exit (OTMAIOED)
- OTMA Destination Resolution User Exit (OTMAYPRX)
- OTMA Resume TPIPE Security User Exit (OTMARTUX)
- Resource Access Security User Exit (RASE)

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Impact to exit routines

The following user exits were added to the list of those that use the version 6 standard exit parameter list:

- Build Security Environment User Exit (BSEX)
- Log Edit User Exit (LOGEDIT)
- Logger User Exit (LOGWRT)
- Non-Discardable Messages User Exit (NDMX)
- OTMA Input/Output Edit User Exit (OTMAIOED)

- OTMA Destination Resolution User Exit (OTMAYPRX)
- OTMA Resume TPIPE Security User Exit (OTMARTUX)
- Resource Access Security User Exit (RASE)

z/OSMF workflows for provisioning IMS resources

In IMS Version 13, you can use IBM z/OS Management Facility (z/OSMF) workflows to quickly provision IMS DB/TM systems or Fast Path DEDB databases in z/OS.

IMS provides workflows for IMS resources via GitHub. After you download the workflows and make them available to z/OSMF in your z/OS environment, you can easily provision IMS resources.

If the Cloud Provisioning feature of z/OSMF is enabled, you can create templates from the workflows that can be used to provision IMS resources in zCloud environments.

The .zip file for each resource type includes the readme file, and the XML and properties files that make up a workflow.

You can download the .zip file for each available resource workflow from GitHub at IMS-zOSMF-Workflows.

You can find the documentation for z/OSMF z/OSMF and the Cloud Provisioning feature at z/OS: IBM z/OS Management Facility.

Normal buffer allocation enhancement

In IMS Version 13, CNBA=0 is allowed to be specified for coordinator controller (CCTL) connectors. If CNBA=0, the formula $\text{MAXTHRD} \times \text{FPBUF} + \text{FPBOF} = \text{CNBA}$ is used for the CCTL normal buffer allocation (NBA).

The **CNBA** parameter in the CSLDCxxx member of the IMS PROCLIB data set and DRA startup table specifies the total number of Fast Path NBA buffers for ODBM use. The default value for **CNBA** is 0. You can determine a starting value for CNBA by using the following formula: $\text{MAXTHRD} * \text{FPBUF} + \text{FPBOF} = \text{CNBA}$. If needed, adjust the value of CNBA to meet the performance and storage requirements of your installation. If $\text{FPBUF} > 0$ or $\text{FPBOF} > 0$, and $\text{CNBA} = 0$, the CNBA size during connection request processing is calculated by using the formula.

Changes to installing and defining IMS

The value ranges for **CNBA**, **FPBUF**, and **FPBOF** in the CSLDCxxx member of the IMS PROCLIB data set and database resource adapter startup table for CCTL regions are modified to be 0 to 9999 and 1K to 32K, 0 to 9999, and 0 to 9999 respectively.

Changes to commands

The value ranges for **CNBA**, **FPBUF**, and **FPBOF** in the QUERY ODBM TYPE(CONFIG) and QUERY ODBM TYPE(DATASTORE) commands are revised.

For a list of the commands that are new or changed for this enhancement, see the online version of this information under Release Planning in the IBM Knowledge Center.

Data set encryption support for IMS

z/OS data set encryption support, which includes reading and writing to encrypted data sets, but not creating them, is available on z/OS 2.1 with APAR OA50569 and dependent APARs installed.

You can encrypt data sets that are accessed by DFSMS access methods by using z/OS data set encryption. Define the data set as SMS-managed extended format data sets with a key label associated with it.

The following table lists the data sets that support z/OS data set encryption and the IMS address spaces whose user IDs need access to the key labels associated with the data sets.

Note: In the following table, the column "IMS address spaces whose user IDs need access to the key labels" is not exhaustive. Any program or utility that opens one of the data sets in the following table needs access to the key label that is associated with the data set.

Table 15. IMS data sets that support z/OS data set encryption

Data set types	IMS address spaces whose user IDs need access to the key labels
VSAM (HALDB, non-HALDB)	CTL, DLI, batch jobs, and utilities that access VSAM DBs
GSAM	IMS BMP and Batch jobs
Online log data sets (DFSOLPnn, DFSOLSnn)	CTL (including XRF alternate, FDBR regions), log archive utility, other utilities that access OLDS, and RSR transport manager
Batch log data sets	IMS batch jobs, utilities that access batch logs, and RSR transport manager
SLDS	CTL, log archive utility, Change Accumulation utility, DB recovery utilities, and other utilities that access SLDS and RSR transport manager
RLDS	Log archive utility, change accumulation utility, and DB recovery utilities
Change Accum data sets	Change accumulation utility and DB recovery utilities
Image copy data sets	Image copy utilities and DB recovery utilities
CQS SRDS	CQS
IMS Connect Recorder Trace	IMS Connect and utilities that process IMS recorder trace
BPE Trace data sets	Address spaces that use BPE, utilities that process BPE trace data (including IPCS TSO users)
Fast Path trace	Dependent region
IMS external trace data sets	CTL and utilities that process IMS external trace
z/OS log stream offload and staging data sets	z/OS logger address space

Table 15. IMS data sets that support z/OS data set encryption (continued)

Data set types	IMS address spaces whose user IDs need access to the key labels
IMS repository data sets	Repository server
RRDS	CTL and utilities that access the RRDS
RECON data sets	DBRC, IMS batch jobs that use DBRC, and utilities and tools that access the RECON data sets
Monitor data sets	CTL, utilities that process monitor data output
CQS system checkpoint data sets	CQS

The following data sets cannot be encrypted, either because they are accessed by using non-standard access methods or because DFSMS does not support encryption for them.

- DEDB
- OSAM
- MSDB data sets, including dump, init, and checkpoint
- Queue manager data sets, including LGMSG, SHMSG, and QBLKS
- Restart data sets (RDS)
- All PDS/PDSE type data sets, including PSBLIB, DBDLIB, ACBLIB, MODBLKS, FMTLIB, IMSTFMTx, IMSDALIB, program libraries, PROCLIB or configuration data sets, catalog directory data sets, staging data sets, and BSDS
- WADS (DFSWADSn)
- Spool data sets

Part 3. IBM IMS Tools support for IMS Version 13

The IBM IMS Tools products are designed to enhance the performance and operation of IMS, and are upgraded and enhanced to work with IMS Version 13.

The IMS Tools products are categorized by function. The information describes the minimum version and release levels of the IBM IMS Tools products that support IMS Version 13.

For more information about these tools, go to www.ibm.com/software/data/db2imstools.

For a list of current PTFs for these tools, go to IBM Db2 and IMS Tools PTF Listing.

Chapter 13. IBM IMS Tools Solution Packs for z/OS

The IMS Tools Solution Packs consolidate and integrate related tools, utilities, and functions into single, lower-cost offerings to provide complete solutions that improve systems and data management, enhance performance, and support increased availability of IMS DB and TM systems.

IBM IMS Database Solution Pack for z/OS, V2.1

The IBM IMS Database Solution Pack for z/OS is a utilities management tool that combines the entire set of IBM IMS Tools database products that are needed to manage IMS Full Function and HALDB databases into a single, consolidated solution.

IMS Database Solution Pack for z/OS provides helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a comprehensive set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Solution Pack for z/OS includes the following tools:

- “IBM IMS Database Reorganization Expert for z/OS, V4.1” on page 202
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS High Performance Load for z/OS, V2.1” on page 202
- “IBM IMS High Performance Pointer Checker for z/OS, V3.1” on page 203
- “IBM IMS High Performance Prefix Resolution for z/OS, V3.1” on page 203
- “IBM IMS High Performance Unload for z/OS, V1.2” on page 203
- “IBM IMS Index Builder for z/OS, V3.1” on page 181
- “IBM IMS Library Integrity Utilities for z/OS, V2.2” on page 204

The elements of both IBM IMS Online Reorganization Facility for z/OS and IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Solution Pack for z/OS , V2.1 and are new components of the Solution Pack.

Program number: 5655-DSP

IBM IMS Fast Path Solution Pack for z/OS, V1.3

The IBM IMS Fast Path Solution Pack for z/OS delivers extensive utilities that include functions a database administrator can use to analyze, maintain, and tune IMS Fast Path databases. Included are features that can help boost system availability by enabling the operations of a variety of key functions without taking the IMS database offline.

The IBM IMS Fast Path Solution Pack for z/OS includes:

- IMS Database Repair Facility
- IMS Fast Path Advanced Tool
- IMS Fast Path Basic Tools

- IMS Fast Path Online Tools
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS Library Integrity Utilities for z/OS, V2.2” on page 204

Program number: 5655-W14

IBM IMS Performance Solution Pack for z/OS, V1.3

The IBM IMS Performance Solution Pack for z/OS delivers a more affordable, comprehensive portfolio of IBM database management tools. The product combines the features and functions several separate tools. The products are tightly integrated, making the end-to-end analysis of IMS transactions faster and easier than ever, supporting improved productivity for problem analysts, improved IMS application performance, more efficient IMS resource utilization, and higher system availability.

The IBM IMS Performance Solution Pack for z/OS includes the following tools:

- “IBM IMS Connect Extensions for z/OS, V2.4” on page 189
- “IBM IMS Performance Analyzer for z/OS, V4.4” on page 190
- “IMS Problem Investigator for z/OS, V2.4” on page 190

Program number: 5655-S42

IBM IMS Recovery Solution Pack for z/OS, V2.1

IMS Recovery Solution Pack for z/OS, V2.1 combines all the features, functions, and processes to support efforts to implement best practices backup and recovery scenarios. It also allows for the simultaneous backup and recovery of multiple data sets and Fast Path areas. This solution can help reduce the operational complexity and the impact of database backup and recovery on system resources.

The IBM IMS Recovery Solution Pack for z/OS includes the following tools:

- IMS Database Recovery Facility
- IMS Database Recovery Facility: Extended Functions
- IMS High Performance Change Accumulation Utility
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS Index Builder for z/OS, V3.1” on page 181

Program number: 5655-ISR

IBM Tools Base for z/OS, V1.5

IBM Tools Base for z/OS consists of various components that support key strategic architectures, technologies, and services that are utilized by IMS tools and Db2 for z/OS. In V1.5, the Administration Console component and the embedded IMS Explorer for Administration function that are in V1.4 are moved to IBM Management Console for IMS and Db2 for z/OS.

IBM Tools Base provides common functions that are required in all IMS Tools solution pack environments. Tools Base must either already be installed or installed at the same time as a Solution Pack.

Tools Base is a no-charge PID that you must order from ShopZ when you order other IMS Tools solution packs. Tools Base requires a license and must be installed before installing the first IMS Tools solution pack.

For a list of current PTFs for IBM Tools Base, go to IBM Db2 and IMS Tools PTF Listing.

Tools Base components provide the infrastructure that supports key solution strategies for IMS Tools.

The Tools Base V1.5 includes the following categories and components:

Autonomics

The Autonomics component tools simplify common database maintenance tasks by collecting database state information, analyzing this data, and providing passive or active responses to conditions that exceed specified threshold values. The tools that come in the Autonomics component are:

- IBM Tools Base Autonomics Director for z/OS

Autonomics Director is a core solution for scheduling and automating common database maintenance tasks. Sensor-enabled IMS Tools products capture the state of specific database conditions and store this data in a centralized repository. Autonomics Director uses Policy Services to evaluate this data and then makes recommendations, such as indicating a need to reorganize a database.

- IBM Tools Base Policy Services for z/OS

Policy Services use policies and rules to evaluate the sensor data that is collected by IMS Tools products, and then provides a response to any condition that exceeds the specified threshold values.

- IBM Tools Base IMS Tools Knowledge Base for z/OS

IMS Tools Knowledge Base manages centralized repositories that are created to store and view a variety of data including reports, policies, rules, notification lists, database state (sensor) data, exceptions, recommendations, and evaluation schedules.

Common Services

The Common Services provide functions that facilitate the interactions among tools, and between tools and IMS. The tools that come in the Common Services component are:

- IBM Tools Base Distributed Access Infrastructure for z/OS

Distributed Access Infrastructure enables distributed clients to access IMS Tools through TCP/IP socket communication.

- IBM Tools Base IMS Tools Common Services for z/OS

IMS Tools Common Services includes the Generic Exits for calling multiple exit routines from a single exit point, and the Tools Online System Interface that provides a command interface between IMS and IMS Tools.

- IBM Tools Base Connection Server for z/OS

Connection Server extends ISPF functions for specific IMS Tools to Eclipse-based applications and the IMS Records User Data Utility for scanning and removing from IMS log records any sensitive or confidential user data, such as customer business information. .

Supplementary tools

The Tools Base includes the following Supplementary tools:

- IBM Tools Base IMS Hardware Data Compression Extended for z/OS
IMS Hardware Data Compression Extended provides functions for compressing IMS data by using the z/OS hardware data compression (HDC) that is available on IBM processors.
- IBM Tools Base IMS Batch Terminal Simulator GUI plug-in
The BTS GUI plug-in provides a graphical user interface that allows distributed Eclipse-based clients to access IMS Batch Terminal Simulator in an Eclipse-integrated development environment.
- IBM Tools Base IMS Batch Terminal Simulator Resource Adapter
The BTS Resource Adapter allows you to use IMS Batch Terminal Simulator to test J2C applications that drive IMS Transactions from the WebSphere Application Server environment. Customers use the BTS Resource Adapter to allow their J2C applications to be tested as an inexpensive alternative to testing on a real IMS system.

Program number: 5655-V93

Related concepts:

Chapter 14, "IBM Management Console for IMS and Db2 for z/OS, V1.1," on page 177

Chapter 14. IBM Management Console for IMS and Db2 for z/OS, V1.1

IBM Management Console for IMS and Db2 for z/OS (Management Console) is a lightweight web server that consolidates and simplifies information from IMS and Db2 for z/OS into a single, holistic, web-based interface that is accessible from a standard web browser.

The Administration Console component and its embedded IMS Explorer for Administration extension in IMS Tools Base for z/OS, V1.4 are no longer delivered as part of Tools Base for z/OS, V1.5. They are integrated into Management Console with additional functions.

Management Console, a replacement for IMS Control Center, connects to the IMS Operations Manager through IMS Connect. If you are using the IMS Control Center function, use Management Console instead.

Use of Management Console can help simplify and consolidate presentation of complex information that is gathered across all of the IMS and Db2 for z/OS systems.

- With a single installation of Management Console, you can get an enterprise-wide presentation of system health data, including autonomic symptoms, exceptions, and recommended actions through a standard web browser.
- You can progressively drill down from the enterprise or system level down to individual objects.
- The enterprise-wide view displays the resources with the highest severity symptoms and exceptions and provides the ability to navigate directly to those resources with recommended actions.
- Embedded help provides details and concepts to reduce the learning curve and build the essential foundation for new IMS and Db2 for z/OS system programmers and database administrators.
- You can also view, filter, and search IMS Tools reports that are stored within IMS Tools Knowledge Base repositories.
- You can define and optionally schedule active autonomic maintenance windows to automatically perform recommended actions through the graphical calendaring support.


For IMS, with a defined IMS Connect connection and a specified IMSplex name, related resources are discovered.

- Individual resource dashboards are provided for viewing and accessing each IMSplex, IMS subsystem, IMS Connect, IMS database (full function or Fast Path), IMS transaction, IMS program, or IMS routing code.
- You can search for IMS resources, or query, start, and stop IMS resources, individually or in groups.
- You can update transactions, databases, Fast Path routing codes, and application programs.
- You can issue IMS commands from the embedded IMS command console. The command result is displayed in text, and results from type-2 commands can also be viewed in grid mode (table format). Results in both modes can be printed.

| Program number: 5655-TAC

| **Related information:**

|  [Configuring Management Console for IMSplex management](#)

|  [Configuring Management Console for autonomic maintenance of IMS databases](#)

Chapter 15. IMS Application Management tools

IBM tools provide the reliability and affordability you need to maximize the value of your IMS application management.

IMS Batch Backout Manager for z/OS, V1.1

The IBM IMS Batch Backout Manager for z/OS tool:

- Uses global or inclusion controls.
- Automates batch backout process:
 - Helps automate the normally manual task of backing out database updates after an IMS batch application failure.
 - Reduces the downtime associated with an application failure and improves database availability.
 - Provides automation of the batch backout process after specific application abends.
 - Dynamically handles log close and allocation.
- Performs automatic logging:
 - Forces allocation of batch SLDSs for jobs with no logs allocated (either by specific or by generic job name).
 - Forces DBRC=Y or DBRC=N by specific or generic jobname.
 - Enforces log standards and override JCL logs.
- Bypasses logging:
 - In a DBRC=FORCE environment, avoids the overhead of logging.

Program number: 5697-H75

IBM IMS Batch Terminal Simulator for z/OS, V4.1

The IBM IMS Batch Terminal Simulator for z/OS tool:

- Provides a comprehensive way to test and check IMS application program logic, IMS application interfaces, teleprocessing activity, 3270 format control blocks, and database activity.
- Simulates the operation of IMS applications in TSO and batch environments.
- Operates transparently to the applications, requiring no changes to IMS code, control blocks, libraries, or application load modules.
- Provides a trace of all DL/I calls, SQL calls and IBM MQ calls with related details.
- Provides a stable online system in test and production environments to execute applications properly before they are put online.
- Provides Java language application support under JBP regions.
- Provides a Playback function which creates a file of screen images that correspond to the transaction activities captured in an IMS OLDS or SLDS.
- Can include or exclude by LTERM, transaction, and MODname.
- Include by user ID and time range.

- Output listings include a list of the transaction codes that have been executed, user IDs, transaction code/user ID mapping, listing of the MFS MODnames used, and the transaction screen images.

Program number: 5655-BT4

IBM IMS Program Restart Facility for z/OS, V2.2

The IBM IMS Program Restart Facility for z/OS helps to automate the backout and restart of abended IMS Batch Message Processing (BMP) regions and Data Language/I (DL/I) batch jobs.

The IMS Program Restart Facility for z/OS assists with the following actions:

- A batch job that requires a restart is restarted in accordance with proper restart procedures.
- Identifies and uses the correct log data set and the correct checkpoint ID.
- Automates the backout of abended DL/I batch jobs without the need to manually code and execute multiple IMS utility jobs.
- Automates IMS DL/I batch backout processing at the time an abend occurs (or when the job is restarted if backout cannot be done at abend time). The backout process releases database locks and makes database segments available to other tasks.

In a data sharing IMSplex environment, IMS Program Restart Facility for z/OS provides the additional feature of allowing a BMP to be restarted using a different IMS system. Taking advantage of this feature helps to provide improved restart times in the event of a system outage.

In addition, IMS Program Restart Facility for z/OS provides the ability to restart an IMS job on a different version of IMS than was in use when the job abended. This allows the implementation of an IMS version upgrade by simply abending running IMS jobs before the upgrade, and restarting the jobs after the upgrade is completed.

IMS Program Restart Facility for z/OS is easily implemented and typically requires no application changes. While an IMS batch job is running, IMS Program Restart Facility for z/OS intercepts and writes checkpoint records to two data sets. These data sets are deleted when the batch job completes successfully. In the event of an abend, however, the data sets remain in place and are used to restart the job.

Version 2.2 of IMS Program Restart Facility for z/OS offers:

- New ISPF interface.
- Significant reduction of contention when options are updated.
- Support for restarting jobs across different versions of IMS.
- Capability to specify options that are based on job name, step name, and IMSID instead of only by job name.

All functions of IBM IMS Batch Backout Manager for z/OS (5697-H75) are now incorporated into IMS Program Restart Facility for z/OS , V2.2.

Program number: 5655-E14

Chapter 16. IMS Backup and Recovery Management tools

The following sections describe the IBM IMS backup and recovery management tools.

IBM IMS DEDB Fast Recovery for z/OS, V2.2

The IBM IMS DEDB Fast Recovery for z/OS tool:

- Assists in the operation and maintenance of data integrity of IMS databases.
- Is designed as a fast alternative to emergency restart (ERE) failure recovery.
- Corrects online log data sets (OLDSs) by invalidating logging for transactions that did not reach the synch point.
- Significantly reduces the amount of time needed to recover DEDBs after an IMS failure.
- Generates the JCL for the MSDB Dump Recovery utility to be processed before an IMS cold start for MSDB (main storage database) recovery.
- Shortens the recovery time of an unscheduled IMS cold start while maintaining the integrity of the IMS databases.
- Supports multiple IMS releases from a single Load Library.

Program number: 5655-E32

IBM IMS High Performance Image Copy for z/OS, V4.2

The IBM IMS High Performance Image Copy for z/OS tool functions are:

- Running an image copy function with the hash checking of IMS HP Pointer Checker V2.
- Performing accuracy checking of an image copy.
- Allocating all input and output data sets dynamically.
- Optionally compressing output image copies.
- Creating image copies.
- Providing advanced copy services; concurrent copy, FlashCopy and SnapShot copies.
- Reducing image copy and recovery time. Reduces elapsed time and CPU utilization.
- Providing automatic checkpoint and restart.
- Stopping and starting databases automatically.
- Integrating with other IMS Tools utilities.

Program number: 5655-N45

IBM IMS Index Builder for z/OS, V3.1

The IBM IMS Index Builder for z/OS:

- Offers several features that improve overall performance and enhance ease of use.
- Builds or rebuilds primary and secondary indexes quickly.

- Allows the user to specify an optional output file where records that are needed for prefix resolution can be split off and written as they are read in.
- Eliminates the need to image copy indexes.
- Recognizes index records that have duplicate keys and writes the duplicate keys to a SYSOUT data set.
- Supports building IMS HALDB primary indexes.
- Integrates with the Database Recovery Facility, which enables the building of primary and secondary indexes during a database recovery.

Program number: 5655-R01

IBM IMS Recovery Expert for z/OS, V2.2

The IBM IMS Recovery Expert for z/OS is a storage-aware backup and recovery solution that integrates storage processor fast-replication facilities with IMS backup and recovery operations to allow instantaneous backups with no application downtime and to help reduce recovery time, and simplify disaster recovery procedures while using fewer processor I/O and storage resources. The IMS Recovery Expert V2.2 product belongs to the family of IMS Tools that provides backup and recovery solutions.

Program number: 5655-S98

IBM IMS Recovery Solution Pack for z/OS, V1.1

IMS Recovery Solution Pack for z/OS, V1.1 combines all the features, functions, and processes to support efforts to implement best practices backup and recovery scenarios. It also allows for the simultaneous backup and recovery of multiple data sets and Fast Path areas. This solution can help reduce the operational complexity and the impact of database backup and recovery on system resources.

The IBM IMS Recovery Solution Pack for z/OS includes the following tools:

- IMS Database Recovery Facility
- IMS Database Recovery Facility: Extended Functions
- IMS High Performance Change Accumulation Utility
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS Index Builder for z/OS, V3.1” on page 181

Program number: 5655-V86

Chapter 17. IMS Database Administration tools

The following sections describe the IBM IMS database administration tools.

IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS, V3.2

The IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS provides:

- Application support
 - Dynamic DFSHALDB statement build
 - Partition selection API
- HALDB maintenance:
 - Consolidate or split partitions
 - Heal index pointer
 - Load a single partition
 - Delete a single partition
 - Merge HALDBs
 - Add empty partition to end of HALDB
- DBRC handling:
 - Cloning DBRC Definitions
 - Copy HALDB definitions to different RECONS
 - Backup DBRC definitions
- HALDB analyzer:
 - Analyze HALDB Constructs
 - Extract Root Keys
- System utilities:
 - Split Unload File
 - ILK Rebuild
 - ACBLIB report
 - Create DBD source
- Conversion to HALDBs:
 - ISPF interface
 - Single step batch
 - Integration with the IBM IMS Online Reorganization for z/OS tool allows for near online conversion
 - Testing of partition selection exits

Program number: 5655-N46

IBM IMS Sequential Randomizer Generator for OS/390, V1.1

The IBM IMS Sequential Randomizer Generator for OS/390 tool:

- Creates a randomizer that enables the user to access HDAM and DEDB database segments either directly or sequentially.

- Allows access to HDAM and DEDB databases in logical key sequence without sacrificing their efficient direct access capabilities.
- Optimizes the distribution of database records by adjusting the randomizing module if the number of synonyms or the control interval (CI) or block utilization exceeds the user-specified value.

Program number: 5655-E11

IBM IMS Database Solution Pack for z/OS, V2.1

The IBM IMS Database Solution Pack for z/OS is a utilities management tool that combines the entire set of IBM IMS Tools database products that are needed to manage IMS Full Function and HALDB databases into a single, consolidated solution.

IMS Database Solution Pack for z/OS provides helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a comprehensive set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Solution Pack for z/OS includes the following tools:

- “IBM IMS Database Reorganization Expert for z/OS, V4.1” on page 202
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS High Performance Load for z/OS, V2.1” on page 202
- “IBM IMS High Performance Pointer Checker for z/OS, V3.1” on page 203
- “IBM IMS High Performance Prefix Resolution for z/OS, V3.1” on page 203
- “IBM IMS High Performance Unload for z/OS, V1.2” on page 203
- “IBM IMS Index Builder for z/OS, V3.1” on page 181
- “IBM IMS Library Integrity Utilities for z/OS, V2.2” on page 204

The elements of both IBM IMS Online Reorganization Facility for z/OS and IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Solution Pack for z/OS , V2.1 and are new components of the Solution Pack.

Program number: 5655-DSP

Chapter 18. IMS Data Replication tools

The following sections describe the IBM IMS data replication tools.

IMS Cloning Tool for z/OS, V1.2

The IMS Cloning Tool for z/OS provides a faster, simpler cloning solution that can help improve productivity and supports efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, helping to boost efficiency and to free up DBA time.

Program number: 5655-U91

InfoSphere IMS Replication for z/OS, V10.1

IBM InfoSphere® IMS Replication for z/OS helps increase the availability of IMS data whether it is for a continuous availability strategy or ensuring the timely distribution of critical enterprise information.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-W28

Chapter 19. InfoSphere IMS tools

The following sections describe the IBM InfoSphere IMS tools.

IBM InfoSphere Classic Change Data Capture for z/OS, V11.3

IBM InfoSphere Classic Change Data Capture for z/OS (InfoSphere Classic CDC for z/OS) is a replication solution that captures changes to non-relational mainframe data and delivers them to relational databases, producing an accurate relational replica of your mainframe data on supported target databases in near-real time.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-W29

IBM InfoSphere Classic Federation Server for z/OS, V11.3

The IBM InfoSphere Classic Federation Server for z/OS tool provides the following functions:

- Provides SQL access to mainframe databases and files with transactional speed and enterprise scale without mainframe programming.
- Allows applications and tools to issue SQL SELECT, INSERT, UPDATE, and DELETE commands using ODBC, JDBC, or a CLI (Command Level Interface) to access System z data.
- Stores System z accessed data in VSAM, IAM, and sequential files, as well as Db2 for z/OS, IMS, Software AG Adabas, and CA-Datacom and CA-IDMS databases all without mainframe programming.

Program number 5655-W33

IBM InfoSphere Optim Test Data Management Solution for z/OS, 11.3

The IBM InfoSphere Optim™ Test Data Management Solution for z/OS tool:

- Creates test databases that are relationally intact subsets of an existing production database.
- Migrates subsets of data that require data transformations as part of the migration. This feature is especially useful for masking data used in testing applications or to introduce altered data to the production database.
- Provides for aging all types of date columns, regardless of initial format, and adjusting the resulting dates to suit site-specific business rules. An extensive set

of sample definitions to handle these business rules is distributed with Move. Definitions can be customized to accommodate organization-specific business rules.

Program number: 5655-O21

InfoSphere IMS Replication for z/OS, V10.1

IBM InfoSphere IMS Replication for z/OS helps increase the availability of IMS data whether it is for a continuous availability strategy or ensuring the timely distribution of critical enterprise information.

This tool:

- Helps eliminate geographic limitations
- Helps achieve minimal recovery time objectives (RTOs)
- Provides support for mixed IMS workloads
- Provides flexible, unified monitoring
- Can import or export metadata
- Provides high scalability and performance
- Supports the IBM Change Data Capture Solutions

Program number: 5655-W28

Chapter 20. IMS Performance Management tools

The following sections describe the IBM IMS performance management tools.

IBM IMS Buffer Pool Analyzer for z/OS, V1.4

The IBM IMS Buffer Pool Analyzer for z/OS tool:

- Provides modeling facilities to assist with making informed decisions about the addition of buffers to an existing pool, or sizing requirements for a new buffer pool.
- Helps you determine the impact of buffer pool changes before they are made to take the guess work out of the process.
- Analyzes IMS database buffer pools (OSAM and VSAM) to provide statistical analysis of the impact of changes that affect the buffer pools.
- Provides I/O rates and buffering requirements for a specific database.
- Allows for better allocation of real memory resources.
- Identifies databases that most heavily use each database subpool.
- Performs “what if” scenario analysis, such as identifying the impact of splitting a specific database into a new buffer pool.
- Determines the performance effects for a given buffer pool when you add or reduce the number of buffer pools.

Program number: 5697-H77

IBM IMS Connect Extensions for z/OS, V2.4

IBM IMS Connect Extensions for z/OS tool:

- Improves the availability, reliability, and performance of TCP/IP access to IMS through IMS Connect.
- Dynamically manages workload through rules-based routing of TCP/IP OTMA transactions or TCP/IP DRDA requests.
- Records and reports IMS Connect events, activities, and utilization in real time.
- Provides a single point of control for multiple IMS Connect systems.
- Includes an REXX interface for automated operations.
- Dynamically responds to changes in data store availability and flood conditions.
- Improves system security with flexible access control.
- Complements IBM IMS Performance Analyzer for z/OS and IMS Problem Investigator for z/OS tools to aid reporting and accelerate problem determination.

Program number: 5655-S56

IBM IMS Network Compression Facility for z/OS, V1.2

The IBM IMS Network Compression Facility for z/OS:

- Provides several new options for compression of 3270 data streams:
 - Compresses all repeated characters, not just spaces, nulls, asterisks, and dashes

- Allows 3270 Field Merge, blank elimination, and elimination of non-display fields
- Eliminates redundant 3270 Set Buffer Address (SBA) commands
- Makes installation easier by eliminating the need for the XCM address space and subsystem, and for SYS1.PARMLIB updates, except APF authorization of one data set.
- Includes a utility to convert current options to the new PROCLIB member format.
- Improves flexibility by allowing cross-MVS system inquiries and updates to Network Compression Facility information and options.

Program number: 5655-E41

IBM IMS Performance Analyzer for z/OS, V4.4

IBM IMS Performance Analyzer for z/OS tool:

- Delivers end-to-end transit analysis for all types of transaction workloads, including shared queues, across the IMS enterprise.
- Provides comprehensive reporting for IMS Log and IMS Monitor, IMS Connect Extensions for z/OS, and OMEGAMON[®] ATF records.
- Provides a wide variety of reports at various levels of detail, from high-level management summaries and graphical reports to detailed traces for in-depth analysis. These reports can help analyze transaction response time and measure the usage and availability of important resources.
- Provides a complete end-to-end picture of the transaction lifecycle by combining reports from IMS logs and IMS Connect Extensions journals.
- Allows you to design your own form-based transit reports and export these reports to Db2 or in CSV format for input to a business analytics tool such as IBM Cognos[®] Insight.
- Automatically selects log file using Database Recovery Control (DBRC) for quick and easy report requests.
- Includes comprehensive specialized reporting of Database Control (DBCTL) and Fast Path.

Program number: 5655-R03

IMS Problem Investigator for z/OS, V2.4

IBM IMS Problem Investigator for z/OS tool:

- Enhances problem-determination and diagnostic capabilities for IMS TM and IMS DB systems.
- Use the information about IMS and the following related subsystems:
 - IMS Log and IMS Monitor data sets
 - Common Queue Server (CQS) log stream and extracts
 - OMEGAMON[®] ATF
 - Db2 and IBM MQ
 - IMS and IMS Connect transaction indexes that IMS Performance Analyzer creates
 - IMS Connect event data from IMS Connect Extensions journals
- Determines transaction times and event latencies to help identify bottlenecks.

- Provides an end-to-end replay of an IMS transaction on a single screen, including Db2 and MQ events.
- Connects records that are associated with the same transaction across all logs, allowing tracking of all records associated with the transaction while hiding unrelated records.
- Drills down to field level to help analyze the causes of problems that are highlighted in the high-level transaction response time and resource utilization. These problems are reported by IMS Performance Analyzer.
- Provides a REXX command interface for you to customize log record analysis and extracts.

Program number: 5655-R02

IBM Transaction Analysis Workbench, V1.3

The IBM Transaction Analysis Workbench helps you analyze problems with the performance or behavior of transactions on z/OS and includes the following features:

Coverage across z/OS subsystems

Uses the logs and other historical data generated by each subsystem during normal transaction processing and system operations. No special agents are required.

Supported data sources include CICS, Db2, IMS, IBM MQ, WebSphere Application Server for z/OS, various SMF records, and OPERLOG.

Consolidation of different subsystem logs in a single interface

Tracks individual transactions across multiple subsystems and analyzes different logs in the same consistent user interface.

Collaboration between users

Saves information about a problem, such as locations of log files and log records of interest, and then shares that information with other users, enabling collaborative analysis without rework.

Log forwarding

Converts log data to CSV or JSON format and forwards the data to analytics platforms such as Splunk, Elastic, or Hadoop.

Mobile Workload Pricing for z/OS (MWP)

Creates the CSV and SMF files that are required by the Mobile Workload Reporting Tool (MWRT).

Program number: 5697-P37

IBM IMS Performance Solution Pack for z/OS, V1.3

The IBM IMS Performance Solution Pack for z/OS delivers a more affordable, comprehensive portfolio of IBM database management tools. The product combines the features and functions several separate tools. The products are tightly integrated, making the end-to-end analysis of IMS transactions faster and easier than ever, supporting improved productivity for problem analysts, improved IMS application performance, more efficient IMS resource utilization, and higher system availability.

The IBM IMS Performance Solution Pack for z/OS includes the following tools:

- “IBM IMS Connect Extensions for z/OS, V2.4” on page 189
- “IBM IMS Performance Analyzer for z/OS, V4.4” on page 190
- “IMS Problem Investigator for z/OS, V2.4” on page 190

Program number: 5655-S42

Chapter 21. IMS Regulatory Compliance tools

The following sections describe the IBM IMS regulatory compliance tools.

IBM InfoSphere Guardium Data Encryption for Db2 and IMS Databases, V1.2

Formerly known as IBM Data Encryption for IMS and Db2 Databases, InfoSphere Guardium® Data Encryption leverages the System z Crypto Hardware to efficiently secure sensitive and private data at the Db2 row level and the IMS segment level.

The IBM InfoSphere Guardium Data Encryption for Db2 and IMS Databases tool:

- Provides Db2 Edit routines and IMS Exit routines that invoke the z/OS Integrated Cryptographic Service Facility (ICSF) which exploits the Crypto Hardware for data encryption and decryption.
- Contains sample implementation jobs.
- Includes an ISPF front end to build implementation jobs.
- Provides the capability to specify unique encryption keys.

Program number: 5655-P03

IBM InfoSphere Guardium S-TAP for IMS

The IBM InfoSphere Guardium S-TAP® for IMS tool (formally known as IMS Audit Management Expert for z/OS) includes support for:

- Capture of database and segment reads and changes (insert, update, delete)
- Capture of segment concatenated key and segment data on request to provide before and after images of updated segments
- Capture of access to IMS data sets outside the control of IMS services (database data sets, image copy data sets, IMS log data sets, RECON data sets)
- Direct streaming of audit data from z/OS process to a networked Guardium appliance to support near real-time reporting
- System STOP and START activity as recorded in the IMS log

Program number: 5655-STM

Chapter 22. IMS System management tools

The following sections describe the IBM IMS System management tools.

IBM IMS Command Control Facility for z/OS, V2.2

The IBM IMS Command Control Facility for z/OS:

- Issues commands for DBCTL, DCCTL, or DB/DC regions.
- Issues IMS commands from a batch utility or from a TSO session via an ISPF Interface, or from a Callable Application Program Interface (API).
- Ensures successful processing of database START, STOP, DBR, and DBD commands.
- Synchronizes online change and database commands across all regions in a sysplex using the batch interface or callable API.
- Keeps members of an IMSplex synchronized by storing commands that failed due to an IMS being unavailable, and issuing the stored commands at IMS startup.
- Enhanced CCF Message Log improved problem determination and system operation whether running a single IMS or multi-IMSplex.
- Contains added IMS Operations Manager command support that provides more flexibility by enabling users that do not want to use APPC to be able to use the tool.
- Contains message disposition determination which enables users to improve or eliminate user written code.

Program number: 5655-R58

IBM IMS Extended Terminal Option Support for z/OS, V3.2

The IBM IMS Extended Terminal Option Support for z/OS tool:

- Provides a front-end to the IMS Extended Terminal Option (ETO) feature.
- Offers capabilities to help manage, implement, customize, and exploit the benefits of ETO in your systems environment to manage resources effectively.
- Supports tailoring of all parts of ETO, including sign-on processing.
- Lets you set global options for the entire user community and override options for specific terminals or user IDs.
- Allows LTERM names that start with a numeric value.
- Extends shared queues support to issue SYSTEMS level ENQ for all LTERM names that are associated with a user at sign-on.
- Offers SLU type P support and SLU 1 console support that allow you to supply a variety of options on an LU-by-LU basis (for example, Logmode, Logon Description, ASOT, ALOT).

Program number: 5655-L61

IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS, V2.3

The IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS:

- Offers an integrated solution that helps reduce the requirement for IMS SYSGENs.
- Provides DBAs and System Programmers with a reliable, easy-to-use IMS management tools to make application resource changes faster using fewer resources.
- Includes IMSplex support which provides the capability to simultaneously update multiple IMS control regions when executing a resource update list.
- Provides additional options for reverse sysgen, including the capability to select either in-core control blocks or MODBLKS data set resource definitions.
- Contains IMS storage display and zap which provides the capability to display and alter IMS control blocks and storage. A storage map provides z/OS virtual storage boundaries and percent utilization for common storage areas.
- Reloads ACBLIB definitions for database descriptions (DBDs) and program specifications blocks (PSBs) without using online change for ACBLIB.
- Generates a resource update list that will make IMS control blocks match IMS sysgen source macros.
- Manages your IMS SYSGEN definitions using ISPF panels (database, program, transaction, and route code definitions).
- Enables changes, additions, or deletions of resource definitions.
- Updates IMS security definitions, reload ACBs, and issue IMS commands.
- Dynamically makes changes to definitions.
- One user can define what changes are required, and have another user implement the change at a later time, via ISPF or batch.
- Back out changes installed by HP Sysgen Tools.

Program number: 5655-P43

IBM IMS Workload Router for z/OS, V2.7

The IBM IMS Workload Router for z/OS tool:

- Works with IMS TM to provide transparent routing or balancing of a transaction workload among two or more IBM systems.
- Uses IMS Multiple Systems Coupling (MSC).
- Is adaptable to a variety of system configurations.

Program number: 5697-B87

Chapter 23. Tivoli IMS tools

The following sections describe the IBM Tivoli® IMS tools.

Tivoli Decision Support for z/OS V1.8

IBM Tivoli Decision Support for z/OS is designed to help you understand your performance challenges by collecting raw systems metrics data, consolidating them in a repository, providing tools to help you improve operational planning, cost management, responsiveness, and decision making.

Program number: 5698-B06

Tivoli Monitoring, V6.3.0

IBM Tivoli Monitoring can monitor and manage system and network applications on a variety of operating systems, track the availability and performance of your enterprise system, and get reports to track trends and troubleshoot problems.

Program number: 5724-C04

Tivoli AF/OPERATOR on z/OS V3.4.1

IBM Tivoli AF/OPERATOR on z/OS is a robust console automation solution for z/OS environments. Use it to streamline common tasks, optimize system performance and reduce avoidable errors, so that your staff only focuses on events or tasks that require human intervention.

Program number: 5608-C03

Tivoli AF/Integrated Resource Manager, V5.0.0

IBM Tivoli AF/Integrated Resource Manager (AF/IRM) simplifies system automation and resource management through an intuitive console-driven interface that provides comprehensive subsystem management without additional coding.

AF/IRM represents a streamlined paradigm in automation implementation and management that leverages packaged automation objects based on IBM Tivoli best practices. AF/IRM eases automation implementation and maintenance for z/OS and Parallel Sysplex environments, applications and network resources.

Program number: 5608-AFI

Tivoli OMEGACENTER Gateway on z/OS V3.4.1

IBM Tivoli OMEGACENTER Gateway on z/OS

IBM Tivoli OMEGACENTER Gateway on z/OS is a system automation tool for z/OS environments. It integrates your console automation solutions, availability monitors and Tivoli OMEGAMON solutions to provide automated responses to system events.

Program number: 5608-C04

Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS, V5.2 or later

IBM Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS combines the sophisticated reporting, monitoring and buffer pool analysis features of the IBM Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS and IBM Db2 Buffer Pool Analyzer products.

Tivoli OMEGAMON XE for Db2 Performance Expert on z/OS also adds expert database analysis functions to help you maximize performance and enhance productivity.

Program number: 5655-W37

Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS, V5.2 or later

Tivoli OMEGAMON XE for Db2 Performance Monitor on z/OS enables you to monitor, analyze and optimize the performance of Db2 for z/OS and Db2 applications online in real time and in batch reports.

Program number: 5655-W38

Tivoli OMEGAMON XE for IMS on z/OS, V5.3

IBM Tivoli OMEGAMON XE for IMS on z/OS monitors and manages the availability, performance, and resource utilization of your IMS systems, either at a system level or within an IMSplex.

Program number: 5698-T02

Tivoli System Automation for z/OS, V3.5

IBM Tivoli System Automation for z/OS is an IBM Tivoli NetView® for z/OS base software product that provides a single point of control for a various range of systems management functionality.

Tivoli System Automation for z/OS is a policy-based, self-healing, high-availability solution to maximize efficiency and availability of critical systems and applications. IBM Tivoli System Automation for z/OS plays a key role in supplying high end-to-end automation solutions.

Program number: 5698-SA3

Chapter 24. IMS TM management tools

The following sections describe the IBM IMS TM management tools.

IBM IMS Configuration Manager for z/OS, V2.2

You can use IBM® IMS™ Configuration Manager for z/OS® to analyze, modify, and deploy IMS resources and parameters.

IMS Configuration Manager helps you to achieve the following benefits:


- Automated mapping of your entire IMS environment, including resources and parameter configurations.
- Create a common, consistent configuration across your enterprise by identifying inconsistencies.
- Simpler transition to DRD. Integrate DRD with your current change control practices.
- Optimized online installation of resources.
- A unified, structured, and secure change management system and associated processes.
- A faster time-to-production for new IMS applications.
- A better understanding of your parameter configurations across all the IMS systems in your enterprise.

Program number: 5655-WR2

Related concepts:

 [IMS Configuration Manager for z/OS V2.2](#)

Related information:

 http://www.ibm.com/support/knowledgecenter/SSF2ZH_2.2.0/gplu-overview.html

IBM IMS Queue Control Facility for z/OS, V3.2

The IBM IMS Queue Control Facility (QCF) for z/OS tool:

- Manages IMS message queues in both shared and non-shared queue environments.
- Defines up to ten areas of the total queue space to monitor for small or large messages, using the new Queue Space Utilization Notification mechanism.
- Detects (automatically) an IMS cold start and initiates the requeue of messages that were in the queue before the cold start.
- Detects (automatically) an IMS warm start and initiates the requeue of messages (or offloads the messages) that were in the dead letter queue before warm start.
- Offloads (automatically) any messages that were on the queue during message overflow.
- Select messages based on a data string for faster problem determination.
- Contains a new filter for the dead letter queue.
- Contains multiple new console commands to display the top number of destinations that are using the message queues. These commands can display

the destinations using the message queues over last number minutes and initiate the requeue or offload of the messages that were in the queue.

Program number: 5697-N50

IBM IMS Sysplex Manager for z/OS, V1.3

The IBM IMS Sysplex Manager for z/OS tool provides:

- Real-time management of the IMS sysplex Environment.
- Single point of control.
- Single system image through local and aggregate view of data.
- Simplified user interface (TSO/ISPF).
- Structured displays of IMS resources and CF structures.
- Global support of type-1 commands, OM type-2 commands and the IMS TSO SPOC.
- Basic z/OS performance information and SVC dump capture.
- Statistics for CSL (OM, RM and SCI), IRLM, and CQS.
- Dashboard with key system indicators and threshold monitoring.
- Management functions.
- Intercept of system exceptions and generates console alerts.
- Real-time IRLM Long Lock Report.
- Automatic real-time recognition when IRLM detects long locks.
- Consolidated and analyzed information for the top blocker, which is recorded in an exceptions file and sent to the z/OS console for automated operations.
- Browse, delete, and recover capability for messages on shared queues.
- Delete capability for RM resource structure entries.
- Assign affinity capability for transactions in shared-queues environment.
- Support for IMS DB/TM, DBCTL, and DCCTL for IMS Version 8 and later.

Program number: 5655-P01

Chapter 25. IMS Utilities Management tools

The following sections describe the IBM IMS utilities management tools.

IMS Cloning Tool for z/OS, V1.2

The IMS Cloning Tool for z/OS provides a faster, simpler cloning solution that can help improve productivity and supports efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, helping to boost efficiency and to free up DBA time.

Program number: 5655-U91

IBM IMS Database Control Suite for z/OS, V3.2

The IBM IMS Database Control Suite for z/OS:

- Provides a day-to-day IMS database environment management tool for DBAs, system programmers, and application support specialists.
- Enables you to collect and build on the data that is required to generate job control language (JCL) for database backup/recovery/reorganization management using IMS Base Utilities and IBM High Performance Tools.
- Significant improvements to DBDSGRPs that include:
 - Loading pre-existing DBDSGRPs into IMS DBCS from the RECON.
 - Using your naming conventions rather than generated names.
 - Creating DBDSGRPs with a mix of HALDB and full-function databases.
- Has a powerful batch collection function that enables you to enter a database description library (DBDLIB), which then triggers the tool to build the jobs for all logically related members in just one pass, saving time and steps and avoiding data redundancy errors.
- Integrates IBM IMS tools and utilities that automate database backup, recovery, reorganization and monitoring.
- Facilitates database maintenance efficiency with single-step job control language (JCL) conversion.
- Improves DBA productivity with an intuitive interface and ease-of-use enhancements.
- Provides an ISPF interface for the IMS Library Integrity Utilities.
- Includes a simplified user interface; reduction and consolidation of the number of data sets, ISPF panels, and process steps; and more flexibility for local standards.
- Automates tedious manual IMS maintenance functions to make database management easier.
- Is a functional replacement for the IMS DBICF (Database Integrity Control Facility) tool.
- Provides improved usability and productivity because the build process, during which JCL skeletons for utilities are built, is no longer required.
- Provides improved product panels and panel navigation; field level help for all help panels; and fuller integration with DBRC terminology.

Program number: 5655-L08

IBM IMS Database Reorganization Expert for z/OS, V4.1

The IBM IMS Database Reorganization Expert for z/OS tool:

- Supports the creation, customization, and centralized storage of policies on database exception detection and conditional reorganization.
- Provides a Smart Reorganization utility with the capabilities of the exception notification and conditional reorganization based on policies stored in a centralized policy repository.
- Collects statistical data about databases and determines the reorganization needs of the databases based on the reorganization policy selected for the database.
- Detects database exceptions and notifies the TSO users or z/OS operators that are specified in the relevant policy of the exceptional state.

This tool is included in the “IBM Tools Base for z/OS, V1.5” on page 174 (5655-V93).

Program number: 5655-S35

IBM IMS High Performance Image Copy for z/OS, V4.2

The IBM IMS High Performance Image Copy for z/OS tool functions are:

- Running an image copy function with the hash checking of IMS HP Pointer Checker V2.
- Performing accuracy checking of an image copy.
- Allocating all input and output data sets dynamically.
- Optionally compressing output image copies.
- Creating image copies.
- Providing advanced copy services; concurrent copy, FlashCopy and SnapShot copies.
- Reducing image copy and recovery time. Reduces elapsed time and CPU utilization.
- Providing automatic checkpoint and restart.
- Stopping and starting databases automatically.
- Integrating with other IMS Tools utilities.

Program number: 5655-N45

IBM IMS High Performance Load for z/OS, V2.1

The IBM IMS High Performance Load for z/OS tool:

- Provides a high performance database reloading capability for IMS full-function databases.
- Initializes empty HDAM and HIDAM databases.
- Supports IMS Parallel Reorganization for z/OS V3 capabilities, such as image copy creation during database reorganization.
- Supports reorganization reload of HALDB partitions, including online-reorganization-capable HALDB partitions of IMS Version 9 and later.
- Automatically initializes HALDB partition data set before reload.
- Provides a performance replacement for IMS Partition Initialization utility.
- Creates ILDSs.

- Supports various formats of the unloaded data sets.
- Includes the Physical Sequence Sort for Reload (PSSR) utility.
- Includes the Bitmap Resetter utility.
- Gives you the option to load compressed data that was previously unloaded by IBM IMS High Performance Unload for OS/390 in a compressed format.

Program number: 5655-M26

IBM IMS High Performance Unload for z/OS, V1.2

The IBM IMS High Performance Unload for z/OS tool:

- Unloads HALDB, HDAM, HIDAM, HISAM, and SHISAM databases.
- Allows you to unload broken data sets.
- Gives you the option to unload compressed data without decompression overhead.
- Provides multiple standard formats for unload data sets.
- Includes a variety of statistical reports for improved tuning.
- Provides an API that enables application programs to leverage the tool's high performance retrieval techniques efficiently.
- Provides a user exit facility for additional processing of each segment.
- Provides a Sequential Subset Randomizer utility,

Program number: 5655-E06

IBM IMS High Performance Prefix Resolution for z/OS, V3.1

The IBM IMS High Performance Prefix Resolution for z/OS tool:

- Enables you to resolve and update prefixes of IMS databases involved in logical relationships as a single job step.
- Eliminates the intermediate Work File 2 (WF2) and Work File 3 (WF3) data sets.
- Helps you avoid much of the I/O, tape handling, and DASD requirements that are often associated with prefix resolution and prefix update.
- Executes the prefix resolution and prefix update functions as replacements for the IMS Prefix Resolution and IMS Prefix Update utilities.
- Supports IMS Parallel Reorganization for z/OS, V3 single job step execution of database reorganization, prefix resolution, and prefix update tasks.

Program number: 5655-M27

IBM IMS High Performance Pointer Checker for z/OS, V3.1

The IBM IMS High Performance Pointer Checker for z/OS:

- Enables you to analyze corrupt databases quickly and reduce the amount of time spent to diagnose and repair them.
- Generates reports that facilitate system tuning, report space utilization, and detect and report problems in primary and secondary indexes.
- Provides the ability to set several new thresholds, including available extents, CA and CI splits, and database and data set last extents.
- Has significant improvements in performance to Full Checking capabilities: improved usability with simplified setup and operation; parallel processing of databases; and improved reporting.

- Provide ease of use and fast, easy detection of database status.
- Interactively and in batch mode repairs VSAM- and OSAM-organized IMS databases that contain pointer or data errors.
- Performs repairs quickly, thereby reducing the amount of time that the affected database is taken offline.
- Features VSAM and OSAM pointer repair, pointer navigation, a backout safety feature, and an ISPF front end.
- Runs in interactive mode, in which you can view entire blocks of data or individual IMS segments and you can navigate to other segments. Any changes made are tracked and can be undone.
- Runs in batch mode, in which you can dump blocks from the data set or submit changes to the block data.
- Integrates with IMS Parallel Reorg and HP Image Copy.

Program number: 5655-U09

IBM IMS Index Builder for z/OS, V3.1

The IBM IMS Index Builder for z/OS:

- Offers several features that improve overall performance and enhance ease of use.
- Builds or rebuilds primary and secondary indexes quickly.
- Allows the user to specify an optional output file where records that are needed for prefix resolution can be split off and written as they are read in.
- Eliminates the need to image copy indexes.
- Recognizes index records that have duplicate keys and writes the duplicate keys to a SYSOUT data set.
- Supports building IMS HALDB primary indexes.
- Integrates with the Database Recovery Facility, which enables the building of primary and secondary indexes during a database recovery.

Program number: 5655-R01

IBM IMS Library Integrity Utilities for z/OS, V2.2

The IBM IMS Library Integrity Utilities for z/OS:

- Manages IMS ACB, PSB, and DBD libraries:
 - DBD/PSB/ACB Compare, DBD/PSB/ACB Reversal, and DBD/PSB/ACB Mapper
 - Reporting information in a tabular form
 - Checking results from your desktop and ensuring that all PSBs and DBDs were processed as expected
 - Advanced ACBGen
 - Providing a high-speed generation process that greatly reduces the time needed to process large volumes of IMS ACBs
- Includes an Integrity Checker to help prevent system outages caused by databases corrupted by using the wrong DBD.
- Includes a Consistency Checker function to ensure that all the necessary definitions have been created for a database.
- Includes the MFS Reversal and MFS Compare utilities.

- Converts Message Format Services MID, MOD, DIF, and DOF control blocks back into Message Format Services utility control statements.
- Helps you recover the source and compare deltas if you lose your MFS source library or suspect a difference between the generated control blocks and the source.
- Provides useful summary reports of the IMS FORMAT library that show the relationships among the members.
- Cross tool integration provides LIU reporting in IMS Tools utilities and a LIU ISPF available in DB Control Suite.

Program number: 5655-U08

IBM IMS Online Reorganization Facility for z/OS, V1.3

The IBM IMS Online Reorganization Facility for z/OS tool:

- Enables reorganization of IMS full-function and HALDB databases with a short outage in seconds rather than minutes or hours (a short period of time called *takeover time*).
- Reorganizes databases to shadow data sets, captures the changes during this period, and applies them to the reorganized shadow data sets.
- Requires databases and their data sets to be registered with DBRC.
- Reorganizes HISAM, HIDAM, HDAM, and SHISAM databases, and recreates their associated index data sets.
- Supports internal logical relationships.
- Reorganizes PHIDAM and PHDAM databases as single partitions while making selected DBD changes during the process.
- Supports the reorganization of all HALDB partitions in a single job step.
- Supports batch message processing programs (BMPs) that allow you to pause BMPs during /DBRECOVERY commands.
- Allows predefining the online reorganization “window” to schedule when you want your online databases reorganized.
- Supports CICS and OTMA applications that quiesce database access during /DBRECOVERY commands.
- Allows DBD changes to be implemented without manual intervention after reorganization.
- Additional functions include:
 - Reorganizing only an index.
 - Near-online unload.
 - Integration with HALDB Conversion and Maintenance Aid to provide online conversion to HALDB.

Program number: 5655-H97

IBM IMS Database Solution Pack for z/OS, V2.1

The IBM IMS Database Solution Pack for z/OS is a utilities management tool that combines the entire set of IBM IMS Tools database products that are needed to manage IMS Full Function and HALDB databases into a single, consolidated solution.

IMS Database Solution Pack for z/OS provides helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a comprehensive set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Solution Pack for z/OS includes the following tools:

- “IBM IMS Database Reorganization Expert for z/OS, V4.1” on page 202
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS High Performance Load for z/OS, V2.1” on page 202
- “IBM IMS High Performance Pointer Checker for z/OS, V3.1” on page 203
- “IBM IMS High Performance Prefix Resolution for z/OS, V3.1” on page 203
- “IBM IMS High Performance Unload for z/OS, V1.2” on page 203
- “IBM IMS Index Builder for z/OS, V3.1” on page 181
- “IBM IMS Library Integrity Utilities for z/OS, V2.2” on page 204

The elements of both IBM IMS Online Reorganization Facility for z/OS and IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Solution Pack for z/OS , V2.1 and are new components of the Solution Pack.

Program number: 5655-DSP

IBM IMS Fast Path Solution Pack for z/OS, V1.3

The IBM IMS Fast Path Solution Pack for z/OS delivers extensive utilities that include functions a database administrator can use to analyze, maintain, and tune IMS Fast Path databases. Included are features that can help boost system availability by enabling the operations of a variety of key functions without taking the IMS database offline.

The IBM IMS Fast Path Solution Pack for z/OS includes:

- IMS Database Repair Facility
- IMS Fast Path Advanced Tool
- IMS Fast Path Basic Tools
- IMS Fast Path Online Tools
- “IBM IMS High Performance Image Copy for z/OS, V4.2” on page 181
- “IBM IMS Library Integrity Utilities for z/OS, V2.2” on page 204

Program number: 5655-W14

Chapter 26. Miscellaneous IBM tools that support IMS

The following IMS tools also support IMS Version 13.

IMS Application Development Facility (ADF), V2.2

IMS Application Development Facility is an architectural framework within which IMS application development and processing is accomplished.

IBM Application Performance Analyzer for z/OS, V11.1

The IBM Application Performance Analyzer for z/OS measures and reports how your applications use resources. The tool:

- Helps your business maximize the performance of your existing applications and improve the response time of your online transactions and batch turnaround times.
- Gives you the information you need to isolate performance problems in applications and test the effect of increased workloads on your systems.
- Monitors, analyzes and reports the performance of CICS, Assembler, COBOL, PL/I, C/C++, Db2, IMS and IBM MQ applications.
- Collects samples from the monitored address space and analyzes the system or resource application usage of CPU, DASD, I/O or the total address space.
- Features online analysis and reports that can be created as PDF or XML files, so that you can view them on workstations or transfer easily to other applications.
- Integrates with Fault Analyzer for z/OS and Debug Tool for z/OS.

Program number: 5697-Q03

IBM Application Recovery Tool for IMS and Db2 Databases

The IBM Application Recovery Tool for IMS and Db2 Databases minimizes recovery time, cost, and errors by creating a common point-in-time for data recovery and by synchronizing IMS and Db2 logs. The tool:

- Enables a range of database recovery functions in e-business transaction environments.
- Simplifies and coordinates batch application recovery of IBM IMS and IBM Db2 data to a common point, reducing the time and cost of data recovery.
- Recovers IMS and Db2 applications individually.
- Eases log, utility and process management for database recovery.
- Supports IMS High Availability Large Databases (HALDBs) and IMS SYSPLEX data sharing.
- Supports the latest versions of IMS and Db2.

Program number: 5697-F56

IBM DataRefresher™, Version 1.1

IBM DataRefresher provides you with facilities for copying, refining, and manipulating data from a source database or file on one system, and formatting it for a target database or file on the same, or another, system.

Program number: 5696-703

IBM IMS DataPropagator for z/OS, V3.1

The IBM IMS DataPropagator for z/OS® tool:

- Supports IBM MQ-based, asynchronous near real-time propagation that allows:
 - The Capture Component to capture IMS database changes performed by IMS Batch, IMS BMP, and IMS TM application programs
 - The Apply Component to transform the IMS database changes into relational format and apply them to Db2 tables on the same or on different systems from the IMS databases
 - IMS-to-IMS propagation
 - The transmission of the database changes from the Capture to the Target Component through the recoverable, buffered, and queued asynchronous messaging services of IBM MQ
- Reduces elapsed time between the IMS database updates and the Db2 for z/OS table updates to as little as a few seconds.
- Supports point-in-time propagation, allowing the content of the Db2 for z/OS target tables to reflect clearly identified logical points in time of the IMS source databases, for example, the logical end of a business day.
- Exploits the well established, high-performance, reliable queued messaging services of IBM MQ and allows enterprises to leverage their IBM MQ administration and operations skills.
- Improves performance by transmitting multiple IMS database changes within the same IBM MQ message, by compressing IBM MQ message data, and by exploiting the caching services of the Virtual Lookaside Facility (VLF) of z/OS.

Program number: 5655-E52

IBM Debug Tool for z/OS, V12.1 or V13.1

IBM Debug Tool for z/OS is an interactive source-level debugging tool for compiled applications in a variety of environments. The tool can:

- Debug an application interactively as it runs
- Perform seamless debugging of mixed-language applications
- Adjust an application while debugging
- Display, monitor, and alter program variables

IBM Fault Analyzer for z/OS, 12.1 or 13.1

The IBM Fault Analyzer for z/OS assists developers in analyzing and fixing application and system failures. It offers developers information to help determine the cause of failure and assist in resolving the problem.

Program number: 5655-W69, 5655-Q11

IBM File Manager for z/OS for IMS Data, V12.1 or V13.1

The IMS component of File Manager (FM/IMS) is an ISPF application with which you can display, edit, update, create, copy, compare, print and erase your data files. This tool is a member of the IBM Problem Determination Tools suite.

Program Number: 5655-W68, 5655-Q12

IBM Hourglass, V7.1

HourGlass is a z/OS system application, allowing sites to alter the Date/Time returned to a z/OS application when a time request is made (SVC 11 or PC Time Requests). The tool:

- Patterns or specific applications, transactions, users, and address space names can be specified to limit the scope at which HourGlass will alter returned date/time information.

- Accurately simulates date and time processing for thorough application testing.
- Coordinates reporting and data transfers across time zones.
- Identifies applications that request the system date and time, and resolve potential problems before they occur.

Program Number: 5655-U59

IMS Checkpoint Wrapper, V1.1

The IMS Checkpoint Wrapper is a tool for converting IMS application programs that run in batch regions to programs that run in BMP dependent regions; the conversion is done with very little change to the application.

Program Number: 5799-GLT

IBM MQ for z/OS V8.0.0 and V9.0.0

IBM MQ for z/OS V8.0.0 and V9.0.0 offers a messaging powerhouse for the IBM System z platform as part of the universal messaging backbone. It delivers robust connectivity for flexible, reliable messaging for applications including Web services and Web 2.0. It includes market-leading JMS and now also offers publish and subscribe messaging.

Program Number 5655-W97, 5655-MQ9

WebSphere MQ for z/OS, V7.1.0

WebSphere MQ for z/OS V7.1.0 offers a messaging powerhouse for the IBM System z platform as part of the universal messaging backbone. It delivers robust connectivity for flexible, reliable messaging for applications including Web services and Web 2.0. It includes market-leading JMS and now also offers publish and subscribe messaging.

Program Number 5655-R36

Part 4. Featured integration solutions for IMS Version 13

IMS provides a wide variety of options for other software, middleware, and hardware products to connect to and integrate with both IMS transactions and data. Many of these products provide integrated connectivity features specific to IMS. A select few of the integration solutions provided by these products in coordination with IMS are featured here.

Chapter 27. IBM IMS Enterprise Suite for z/OS

The IMS Enterprise Suite for z/OS features independent components that facilitate application development and extends access to IMS transactions and data through use of industry standard tools, programming interfaces, and data protocols.

The components of the IMS Enterprise Suite enhance connectivity, expand application development, and extend standards and tools to facilitate integration with existing assets or other IBM solutions. The latest version is V3.2.

IMS Explorer for Development (IMS Explorer)

IMS Explorer is an Eclipse-based graphical tool that simplifies IMS application development tasks by displaying and enabling editing of IMS databases, segments, fields, and more, from an industry-standard IDE. IMS Explorer also provides the support for creating REST services from IMS transactions to run on IBM z[®]/OS Connect Enterprise Edition. You can also deploy and test the REST services directly from IMS Explorer.

IMS Explorer enables IMS application developers and database architects and developers to:

- Perform common and essential tasks in an end-to-end application development lifecycle
- Simplify the development and visualization of database description (DBD) and program specification block (PSB) resource definitions
- Import COBOL and PL/I data structures to an IMS database by using the importers of, and shell-sharing with, IBM Developer for System z, to generate PSB source, and to import and export DBD and PSB source from or to a z/OS remote system
- Leverage the IMS Universal drivers, thus offering a relational view of IMS data and offering new function, such as graphical assistance to build SQL statements
- Populate the IMS catalog
- Model, create, test, and publish mobile services to access IMS transactions

IMS Explorer for Development provides enhancements to most functions provided by the IMS Enterprise Suite DLIModel utility plug-in, which is no longer supported.

If you use the IMS Enterprise Suite DLIModel utility plug-in, migrate to the IMS Enterprise Suite Explorer for Development instead.

Although IMS Explorer for Development includes enhancements to most IMS Enterprise Suite DLIModel utility plug-in functions, it does not provide support for IMS database web services or IMS XML DB.

- For IMS database web services, you can generate web-enabled IMS database queries by shell-sharing IMS Explorer for Development with IBM Data Studio.
- The XML data support in IMS databases is discontinued when IMS Version 12 goes out of service.

IMS Connect API for Java

IMS Connect API for Java provides programming control of connections to IMS Connect, of interactions with IMS, and of the data that is sent to IMS

for those interactions in the Java programming language. The API provides a simple way to describe TCP/IP socket connections, interaction protocols, message headers, and data through the concepts of reusable profiles. More granular, lower-level calls are provided for more granular controls. The APIs can be used to develop custom IMS Connect TCP/IP client applications in Windows and z/OS environments.

V3.1 is the last version to support the C API.

IMS Data Provider for Microsoft .NET

The IMS Data Provider for Microsoft .NET provides the solution for Microsoft .NET-based applications to access and manipulate IMS data. .NET application developers can use their preferred development environment, such as Microsoft Visual Studio, to call the provided APIs.

The IMS Data Provider for Microsoft .NET requires IMS 13 or later.

IMS SOAP Gateway

IMS SOAP Gateway enables IMS applications to interoperate outside of the IMS environment through the SOAP protocol to provide and request services that are independent of platform, environment, application language, or programming model. IMS applications can become web services or send callout requests to external web services.

V3.2 adds the support of IBM z/OS Communications Server AT-TLS feature for the callout scenario.

IMS Mobile Feature Pack

IMS Mobile Feature Pack provides a solution to create, test, publish, and manage RESTful mobile services to access IMS transactions through the *IMS Mobile feature*, a feature that is installed into either IBM z/OS Connect EE V2.0 (imsmobile-2.0 feature), or WebSphere Application Server Liberty Profile z/OS Connect (imsmobile-1.0 feature).

Important:

- The latest IMS Mobile feature for z/OS Connect EE (imsmobile-2.0 feature) is now made available as the *IMS service provider* that is included directly in z/OS Connect EE V2.0.5 (APAR PI70432) or later. This change significantly improves the installation experience by reducing the steps required to obtain and install the code and to start using the IMS mobile feature. The IMS Mobile Feature Pack component for z/OS Connect EE in IMS Enterprise Suite is removed by APAR PI70548.
- The IMS Mobile feature for WebSphere Liberty Profile z/OS Connect (imsmobile-1.0 feature) is deprecated. IMS Enterprise Suite V3.2 is the last release to include this component. Customers should use the IMS service provider that is bundled with z/OS Connect EE V2.0.5 or later.

For the latest information about the IMS Mobile feature in z/OS Connect EE, see Using the IMS service provider in the IBM Knowledge Center.

Java Message Service (JMS) API

The JMS API enables IMS applications that run in Java message processing (JMP) or Java batch processing (JBP) regions to issue synchronous callout requests to external services. To use the JMP and JBP support for synchronous callout, the JMS version 1.1 interface classes are required.

Some of the IMS Enterprise Suite components include the requisite open source code.

| All of the IMS Enterprise Suite components support standard installation
| processes. The components that run on z/OS support SMP/E and the components
| that run on distributed platforms support or use the IBM Installation Manager.

| For more information about the versions of IMS Enterprise Suite that works with
| IMS V13, see the IMS Enterprise Suite software requirement topic.

| **Related reference:**

| “IMS Enterprise Suite software requirements” on page 21
|

Chapter 28. Mobile and REST API solution with IBM z/OS Connect Enterprise Edition

You can build REST services and APIs to access your IMS assets by using the IMS service provider in IBM z/OS Connect Enterprise Edition (z/OS Connect EE). Your IMS™ applications can also make REST API calls through z/OS® Connect EE.

z/OS Connect EE provides a framework that enables z/OS-based programs and data to participate fully in the new API economy for mobile and cloud applications.

z/OS Connect EE is designed to provide a fast, secure, and reliable connector that accepts standard protocols and can interact with multiple z/OS backend programs and systems. z/OS Connect EE provides a standard interface for these assets to be identified and reached by using the Representational State Transfer (REST) technology, and services are represented in the JavaScript Object Notation (JSON) format. This interface also handles data conversion as needed and provides authorization services to allow or deny users that are based on roles. In other words, z/OS Connect EE is the API gateway into z/OS, with a single, configurable, high throughput REST/JSON interface into CICS, IMS, Db2, and WebSphere Application Server.

In the latest release, z/OS Connect EE V3, tooling support for creating IMS services and developing, deploying, and testing REST APIs to access the services is provided through z/OS Connect EE V3 API toolkit, an Eclipse-based workstation tool that is installed into IBM Explorer for z/OS. After an API is tested and deployed, it can be published to a developer portal. API subscription and management can be handled products such as IBM API Connect™.

z/OS Connect EE V3.0.1 adds the support for z/OS applications to act as an API consumer, issuing RESTful API calls to utilize the underlying services and data from external request endpoints.

IMS as an API provider

IMS service provider that is included in z/OS Connect EE is known as the *IMS Mobile feature* for building mobile services to access your IMS assets. The IMS service provider handles the communications with IMS and data transformation between JSON and byte arrays.

For more information about z/OS Connect EE and the IMS service provider, see *Using the IMS service provider* (in z/OS Connect EE documentation in IBM Knowledge Center).

IMS as an API consumer

z/OS Connect EE provides a Build toolkit that generates, from the API documentation (Swagger document), a set of files to enable an IMS application to call a REST API through z/OS Connect EE. These files include what the z/OS Connect EE server needs to handle data mapping and data transformation, and what the IMS application needs to send the API request and process the response.

| For more information, see z/OS applications to call REST APIs (in z/OS Connect EE
| documentation in IBM Knowledge Center).

| For more information about API economy and IMS, see the API economy solution
| adoption kit.

| IBM z/OS Connect Enterprise Edition V3.0 Program number: 5655-CE3

Chapter 29. IBM Cognos Business Intelligence solution


You can connect an IBM Cognos® Business Intelligence server directly to IMS operational data to create drill-to-detail reports with online access to your critical business data.

An IMS database typically contains operational data for high-volume transactional workloads. These workloads include finance, insurance, and retail applications that contain a wealth of valuable data about customers, interactions, and business trends. In a typical business intelligence scenario, the operational data must be warehoused and pre-processed before it is accessible to the IBM Cognos Business Intelligence (BI) report author. However, relying only on warehoused data adds constraints to the flexibility of a business reporting application. Because the report author has access only to the warehoused data and not the online transactional system, the most up-to-date detail information is not available. IBM Cognos BI 10.2 offers a data connection type for direct connections to IMS databases.

This solution requires the following IMS components:

- IMS Catalog
- IMS Common Service Layer (CSL)
- IMS Open Database Manager (ODBM)
- IMS Connect

Related information:

 [IBM Business Analytics Proven Practices: Best Practices for Using IMS Data in IBM Cognos BI Reports](#)

Chapter 30. Data discovery with IBM Watson Explorer

You can connect IBM Watson™ Explorer directly to IMS operational data to explore your critical business data.

An IMS database typically contains operational data for high-volume transactional workloads. These workloads include finance, insurance, and retail applications that contain a wealth of valuable data about customers, interactions, and business trends. IBM Watson Explorer provides users with a 360 degree view of their enterprise data.

This solution requires the following IMS components:

- IMS Catalog
- IMS Common Service Layer (CSL)
- IMS Open Database Manager (ODBM)
- IMS Connect

Program number: 5725-I17

Related information:

 [IBM Watson Explorer V11](#)

Chapter 31. Integrated access with IBM DataPower Gateway

The IBM DataPower Gateway provides integrated support for IMS Version 13. The DataPower Gateway supports both access to IMS databases and transactions from web-based clients, and synchronous callout requests to web services from IMS application programs.



The DataPower Gateway provides a single point of control to simplify, govern, and optimize the delivery of services and applications and enhance the security of XML and IT services. They extend and strengthen the capabilities of an infrastructure by providing a multitude of functions that can be managed through a web browser interface.

The DataPower Gateway provides three types of support for IMS: Access to databases in IMS DB.

- Access to IMS DB allows an external application to issue SQL calls against IMS databases by using the integrated IMS Universal JDBC driver that is delivered with DataPower Gateway.
- Access to IMS transactions that are running in IMS TM. Access to IMS TM through DataPower allows an external application to initiate a transaction request to an application program that is running in an IMS dependent region and fetch data back.
- Support for synchronous callout requests from application programs that are running in IMS to data or service providers that are running on the DataPower backend.

DataPower Gateway provides plug-in usability with little to no changes to an existing network or application software. No proprietary schemas, coding, or APIs are required to install or manage the device. DataPower Gateway supports XML integrated development environments to help reduce the number of hours that are spent in developing and debugging XML applications.

Related concepts:

-  [DataPower for IMS Implementation Guide](#)
-  [IBM DataPower Gateway Version 7.5](#)

Part 5. Appendixes

Notices

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Title	Acronym	Order number
<i>IMS Version 13 Application Programming</i>	APG	SC19-3646
<i>IMS Version 13 Application Programming APIs</i>	APR	SC19-3647
<i>IMS Version 13 Commands, Volume 1: IMS Commands A-M</i>	CR1	SC19-3648
<i>IMS Version 13 Commands, Volume 2: IMS Commands N-V</i>	CR2	SC19-3649
<i>IMS Version 13 Commands, Volume 3: IMS Component and z/OS Commands</i>	CR3	SC19-3650
<i>IMS Version 13 Communications and Connections</i>	CCG	SC19-3651
<i>IMS Version 13 Database Administration</i>	DAG	SC19-3652
<i>IMS Version 13 Database Utilities</i>	DUR	SC19-3653
<i>IMS Version 13 Diagnosis</i>	DGR	GC19-3654
<i>IMS Version 13 Exit Routines</i>	ERR	SC19-3655
<i>IMS Version 13 Installation</i>	INS	GC19-3656
<i>IMS Version 13 Licensed Program Specifications</i>	LPS	GC19-3663
<i>IMS Version 13 Messages and Codes, Volume 1: DFS Messages</i>	MC1	GC19-4240
<i>IMS Version 13 Messages and Codes, Volume 2: Non-DFS Messages</i>	MC2	GC19-4241
<i>IMS Version 13 Messages and Codes, Volume 3: IMS Abend Codes</i>	MC3	GC19-4242
<i>IMS Version 13 Messages and Codes, Volume 4: IMS Component Codes</i>	MC4	GC19-4243
<i>IMS Version 13 Operations and Automation</i>	OAG	SC19-3657
<i>IMS Version 13 Release Planning</i>	RPG	GC19-3658
<i>IMS Version 13 System Administration</i>	SAG	SC19-3659
<i>IMS Version 13 System Definition</i>	SDG	GC19-3660
<i>IMS Version 13 System Programming APIs</i>	SPR	SC19-3661
<i>IMS Version 13 System Utilities</i>	SUR	SC19-3662

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<i>Program Directory for Information Management System Transaction and Database Servers V13.0 Database Value Unit Edition V13R1</i>	GI10-8966
<i>Program Directory for Information Management System Transaction and Database Servers V13.0 Transaction Manager Value Unit Edition V13R1</i>	GI10-9001
<i>IRLM Messages and Codes</i>	GC19-2666

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Title	Order number
<i>z/OS TSO/E Primer</i>	SA22-7787
<i>z/OS TSO/E User's Guide</i>	SA22-7794
<i>z/OS ISPF User's Guide Volume 1</i>	SC34-4822

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Product Number: 5635-A04
5655-DSM
5655-TM2

Printed in USA

GC19-3658-05



Spine information:

IMS Version 13

Release Planning

