IMS
15.5.0

Release Planning
(2024-08-30 edition)

Note

Before you use this information and the product it supports, read the information in “Notices” on page 199.

2024-08-30 edition.

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About this information

These topics provide general information to help you evaluate and plan for IMS 15.5. The following topics describe the new features and enhancements for IMS 15.5, the hardware and software requirements for these new features and enhancements, considerations for migration and coexistence for IMS 15.5, and an overview of the IMS Tools that are enhanced to work with IMS 15.5.

This information is available in IBM® Documentation.

For information about IMS 15.4, including its enhancements and considerations for migration and coexistence, see *IMS 15.4 Release Planning* .

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

- *IMS Version 15.5 Installation*
- *IMS Version 15.5 System Definition*
- *IMS 15.5: Program Directory for Information Management System Transaction and Database Servers*

How to use the Release Planning information

Use the IMS 15.5 Release Planning information to learn about the new enhancements in IMS 15.5 and to plan your migration.

The Release Planning information is organized into the following parts:

- Part 1, “General planning information for IMS 15.5,” on page 1, which contains general information about the new release, including the following information:
  - A summary of the enhancements and changes to IMS 15.5
  - An overview of the hardware and software requirements
  - Migration considerations for IMS 15.5
  - Coexistence considerations between the supported versions of IMS
  - A listing of the changed, new, and deleted messages and abends for IMS 15.5
  - A listing of the new and changed log records for IMS 15.5
- Part 2, “IMS 15.5 enhancements,” on page 77, which describes each new enhancement in IMS 15.5.

  In the IBM Documentation, 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 15.5 enhancements.
- Part 3, “IBM IMS Tools support for IMS 15.5,” on page 151, which describes IBM IMS Tools and products that support IMS 15.5.
- Part 4, “Featured integration solutions for IMS 15.5,” on page 189, which contains overviews of some of the new ways that you can further integrate IMS 15.5 and the rest of your IT architecture.

Note: If you are migrating to IMS 15.5 from IMS 14 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.

To learn about z/OS, see z/OS Basic Skills. For more resources, see IBM Z Education and Training.

To learn about IMS, see the IBM Press publication *An Introduction to IMS*, the resources listed for IBM Information Management System, and the variety of options available in IBM Training.

How new and changed information is identified

For most IMS library PDF publications, information that is added or changed after the PDF publication is first published is denoted by a character (revision marker) in the left margin. The *Program Directory* and *Licensed Program Specifications* do not include revision markers.

Revision markers follow these general conventions:

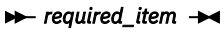
- Only technical changes are marked; style and grammatical changes are not marked.
- If part of an element, such as a paragraph, syntax diagram, list item, task step, or figure is changed, the entire element is marked with revision markers, even though only part of the element might have changed.
- If 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.

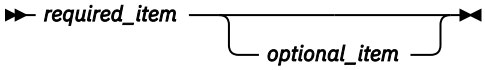
How to read syntax diagrams

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

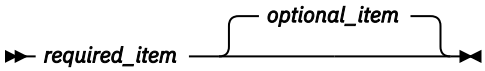
- Read the syntax diagrams from left to right, from top to bottom, following the path of the line. The following conventions are used:
  - The >>--- symbol indicates the beginning of a syntax diagram.
  - The ---> symbol indicates that the syntax diagram is continued on the next line.
  - The >--- symbol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

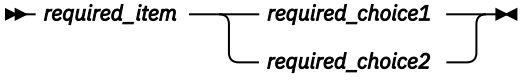
  

  If an optional item appears above the main path, that item has no effect on the execution of the syntax element and is used only for readability.

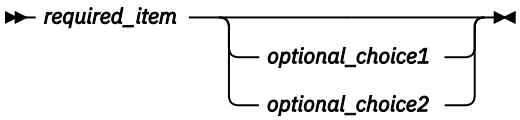
  

- If you can choose from two or more items, they appear vertically, in a stack.

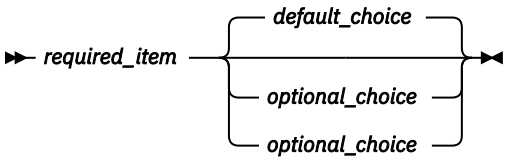
  If you *must* choose one of the items, one item of the stack appears on the main path.

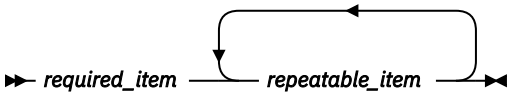
  If choosing one of the items is optional, the entire stack appears below the main path.



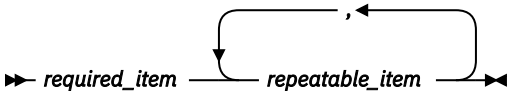
If one of the items is the default, it appears above the main path, and the remaining choices are shown below.



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



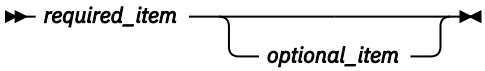
If the repeat arrow contains a comma, you must separate repeated items with a comma.



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 15.5

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 15.5. 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 15.5 ISPF panel functions by using a keyboard or keyboard shortcut keys.

For information about navigating the IMS 15.5 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 15.5 is available in IBM Documentation.

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

About this task

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:

Procedure

- Submit a comment by using the DISQUS commenting feature at the bottom of any IBM Documentation topic.
- Send an email to imspubs@us.ibm.com. Be sure to include the book title.
- Click the **Contact Us** tab at the bottom of any IBM Documentation topic.

What to do next

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 15.5

In addition to the new functions and enhancements that are available, IMS 15.5 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 15.5 functions might affect your installation, list new, changed, and deleted messages and codes, and describe the IBM IMS Tools that support IMS 15.5.

Chapter 1. Hardware requirements

IMS 15.5 has base hardware requirements. Some individual functions have additional hardware requirements.

Processor requirements

IMS 15.5 runs only in z/Architecture® mode on an IBM System z13® processor (machine type 2964) or later.

The following table lists the processors supported by IMS 15.5.

Table 1. Supported IBM processors for IMS 15.5

Machine name	Machine type
IBM z13	2964
IBM z13s®	2965
IBM z14	3906
IBM z14 ZR1	3907
IBM z15®	8561
IBM z15 T02	8562
IBM z16™	3931
IBM z16 A02	3932

System console requirements

The console requirements of z/OS Version 2 Release 4 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 15.5 has the following coupling facility requirements.

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

A coupling facility level of 20 or later is required for the following functions:

- Operations Manager (OM) Audit Trail, if a coupling facility log stream is used
- Parallel RECON access support
- Repository Server Audit Log, if a coupling facility log stream is used
- Resource Manager (RM), if a resource structure is used
- Shared-EMH support
- Shared queues

- Sysplex data sharing (including data caching and VSO data sharing) with Internal Resource Lock Manager (IRLM) V2.3

DASD requirements

IMS 15.5 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).

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 V15.05.00*:

- 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 (ILDSs)
- 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 (DFSMStvs). Therefore, parallel RECON access requires Coupling Facility (CF) hardware in the System z® sysplex.

Terminals and equipment supported by IMS 15.5

IMS 15.5 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 15.5.

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 15.5

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
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 15.5, 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 15.5

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 15.5 does not support BTAM devices (2740-1, 2740-2, 2741, 2780, System/3, and System/7).

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, IMS ODBM, or IMS CQS 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 2. Software requirements

IMS 15.5 has base software requirements. Some individual functions have additional software requirements.

Operating software requirements

IMS 15.5 and its various functions have specific operating software requirements.

Before you install IMS 15.5, check for any preventive service planning (PSP) information that you need to be aware of. IMS 15.5 does not provide PSP buckets, instead, refer to PSP bucket information for IBM Z products for equivalent information.

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 V15.05.00*.

Related concepts

IMS Program Directory ()

IMS 15.5 base software requirements

The base IMS 15.5 system runs on z/OS Version 2 Release 4 or later. Certain features and functions have additional software requirements.

IMS 15.5 requires the following minimum version, release, or modification levels:

- z/OS Version 2 Release 4 (5650-ZOS), or later
  - The following APARs must be installed:
    - If you are using z/OS 2.4, the following z/OS APARs must be installed for data privacy for diagnostics support for IMS 64-bit storage:
      - OA57570
      - OA57633

      for IBM z/OS Workload Interaction Correlator support:
      - OA57165
    - For z/OS data set encryption support, one of the following DFSMS versions:
      - DFSMS 2.4 with APAR OA60688
      - DFSMS 2.5 or above
  - RACF®, or an equivalent product, if security is used. RACF is available with the IBM Security Server for z/OS (a separately orderable feature of z/OS V2R4).
  - IBM High-Level Assembler Toolkit, a separately orderable feature of z/OS V2R4.
- IRLM Version 2.3 (5635-A06) or later, if data sharing is used. IRLM Version 2.3 is delivered with IMS 15.5.

  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 15.5 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 15.5 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.

Coexistence APARs

Certain functions of IMS 15 can coexist with IMS Version 13 and IMS 14 with the appropriate coexistence APARs applied.

See "Overview of coexistence APARs" on page 61 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 (5635-A06) or later is required. The IRLM is an independent component that is shipped with IMS 15. 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.

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.

You also need one of the following external components:

- 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)

Related concepts

IMS Enterprise Suite SOAP Gateway overview

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 V2R4.0 or later (TCP/IP).
- To implement security, z/OS Security Server RACF or an equivalent product.
- 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 15.5, used with the IMS Enterprise Suite SOAP Gateway, requires IBM Developer for System z . Certain functions of the IMS Enterprise Suite SOAP Gateway might have additional software requirements.

Java application program support in IMS 15.5

Java™ applications that run in or access IMS 15.5 must meet specific software requirements.

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.

IMS 15.5 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*.

In IMS 15.5, the IMS Universal drivers provide the IMS Java drivers and database resource adapters.

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 and has the same software requirements as the IMS Universal drivers.

The IMS Universal drivers have the following runtime software requirements:

- IBM SDK, Java Technology Edition, Version 8.0.2.10 or later (31-bit or 64-bit), available from IBM Support Fix Central.
- One or more of the following conditional requirements:
  - For CICS® applications, IBM CICS Transaction Server for z/OS Version 5.5 (5655-Y04), or later, as determined by the JDK version
  - For CICS applications, IBM CICS Transaction Server for z/OS Version 5.4 (5655-Y04), or later, as determined by the JDK version
  - For Db2® stored procedures, Db2 12 for z/OS (5650-DB2®) or later
  - For WebSphere applications, WebSphere Application Server for z/OS (5655-W65) or WebSphere Application Server for distributed platforms (5724-J08), Version 8.5.5 or later, as determined by the supported JDK level.
- 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	*pathprefix*/usr/lpp/ims/ims155/imsjava/imsudb.jar
IBM IMS Universal JDBC driver	*pathprefix*/usr/lpp/ims/ims155/imsjava/imsudb.jar
IBM IMS Universal Database resource adapter	• For use within WebSphere Application Server (both z/OS and distributed platforms): • For JCA/JDBC local transaction processing only: *pathprefix*/usr/lpp/ims/ims155/imsjava/rar/imsudbJLocal.rar • For JCA/JDBC two-phase (XA) commit processing or local transaction processing: *pathprefix*/usr/lpp/ims/ims155/imsjava/rar/imsudbJXA.rar • For CCI local transaction support: *pathprefix*/usr/lpp/ims/ims155/imsjava/rar/imsudbLocal.rar • For CCI two-phase commit (XA) transaction support: *pathprefix*/usr/lpp/ims/ims155/imsjava/rar/imsudbXA.rar

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	*pathprefix*/usr/lpp/ims/ims155/imsjava/imsudb.jar
IMS Universal JDBC driver	*pathprefix*/usr/lpp/ims/ims155/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): • For CCI programming interface to perform SQL or DL/I data operations: *pathprefix*`/usr/lpp/ims/ims155/imsjava/rar/imsudbLocal.rar` • For JDBC programming interface to perform SQL data operations: *pathprefix*`/usr/lpp/ims/ims155/imsjava/rar/imsudbJLocal.rar`

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 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 Java Development Kit (JDK) 8.0.2.10 or later (31-bit or 64-bit), available from IBM Support Fix Central.
- For programs that access transactions using the IMS TM Resource Adapter, see

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

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 CSLDC*xxx* 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 (DFSMStvs), a separately orderable feature of z/OS.

SQL support software requirements

For IMS to process SQL calls in the native host environment, COBOL Version 6.2 (5655-EC6) or later with IMS coprocessor support is required. With COBOL Version 6.2 (5655-EC6) or later, all load modules must reside within a partitioned data set extended (PDSE). The IMS catalog must be enabled for this SQL support.

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 DFSDF*xxx* 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 15.5, 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 15.5 can be used with the following versions of IMS Enterprise Suite, although some components or functions might have specific IMS requirements.

- IMS Enterprise Suite for Distributed Systems V3.3
- IMS Enterprise Suite V3.2

Related information

Release notes for IMS Explorer for Development

Software requirements for IMS Explorer for Development

IMS Enterprise Suite Distributed Systems V3.3 overview

CICS subsystems supported

IBM CICS Transaction Server for z/OS can connect to IMS if minimum version requirements are met. Certain IMS 15.5 functions might include additional version requirements for CICS.

CICS Transaction Server for z/OS Version 5.5 (5655-Y04)z/OS Version 5.4 (5655-Y04) or later can connect to either the IMS 15.5 Database Manager (DB) or, using the appropriate TM interface, the IMS 15.5 Transaction Manager.

Db2 for z/OS subsystems supported

IMS 15.5 Transaction Manager can connect with Db2 for z/OS.

The IMS 15.5 Transaction Manager can be connected to any of the following Db2 products:

- Db2 12 for z/OS (5650-DB2) or later

IBM MQ subsystems supported

IMS 15.5 supports IBM MQ Version 9.2 (5724-H72) or laterIBM MQ Version 9.1 (5724-H72) or later.

Intersystem Communication (ISC) subsystems supported

Using Intersystem Communication (ISC), the IMS 15 Transaction Manager can be connected to IMS 15 and earlier systems, to IBM CICS Transaction Server for z/OS, and to user-written software.

The IMS 15 Transaction Manager can be connected to the following products by using ISC:

- IMS 15 (5635-A06) at any IMS 15 release level
- IMS 14 (5635-A05)
- IMS Version 13 (5635-A04)
- IBM CICS Transaction Server for z/OS Version 5.5 (5655-Y04) or later

  For the ISC TCP/IP function, IMS Connect is required.
- IBM CICS Transaction Server for z/OS Version 5.4 (5655-Y04) or later

  For the ISC TCP/IP function, IMS Connect is required.
- User-written software

Programming languages used to write IMS 15.5

IMS 15.5 is written in High Level Assembler Release 6, PL/X, C, C++, and JDK Version 8.

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 6.2 or later, 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 Product lifecycle details for Enterprise COBOL for z/OS.
- Enterprise PL/I for z/OS

- IBM High Level Assembler for z/OS & z/VM® & z/VSE®
- Java, using the IBM SDK for z/OS, Java Technology Edition, V8.0.2.10 (31-bit or 64-bit), available from IBM Support Fix Central.
- PL/I for z/OS and OS/390
- TSO/E REXX
- VS Pascal
- z/OS C/C++

Application programs supported

IMS 15.5 supports application programs that are supported by IMS Version 13 and IMS 14 and all earlier releases of IMS 15.

All application programs that are supported under IMS Version 13 and IMS 14 and all earlier releases of IMS 15 are still supported under IMS 15.5. In general, you should not have to recompile, reassemble, or rebind an IMS application program to run under IMS 15.5.

Chapter 3. Packaging for IMS 15.5

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 V15.05.00* for installation instructions.

Table 7. FMID requirements in IMS 15.5

FMID	Description	DB batch	DBCTL	DB/DC	DB/DC with XRF ([1])	DCCTL
HIR2230	Internal Resource Lock Manager V2R3	O	O	O	O	N
HMK1500([2])	System Services component IVP component Database Recovery Control Logging component IMS Connect	R	R	R	R	R
JMK1501	Database Manager function	R	R	R	R	N
JMK1502	Transaction Manager function	N	N	R	R	R
JMK1503	Extended Terminal Option feature	N	N	O	O	O
JMK1506	IMS Java On Demand features: IMS Universal drivers for access to IMS DB IMS TM Resource Adapter for access to IMS TM	O	O	O	O	O
JMK151Z	IMS Value Unit Editions:	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 4. Migration to IMS 15.5

The objective of migration support is to enable an orderly migration from your current release of IMS to IMS 15.5.

These topics describe general migration considerations for IMS 15.5 and migration considerations for specific new features and functions of IMS 15.5.

Migrating from an earlier IMS 15 release

Because all releases of IMS within the version IMS 15 use a single set of SMP/E function modification identifiers (FMIDs), you do not need to perform a full installation of IMS to migrate from an earlier release of IMS 15 to IMS 15.5. Instead, you apply APAR/PTFs to migrate to IMS 15.5 if you are already using IMS 15.

About this task

You can migrate to IMS 15.5 from an earlier release of IMS 15 by applying the PTFs for APAR PH59051 to update the IMS installed level that is displayed in select output. After you apply the PTFs for APAR PH59051, the installed level (that is, the version, release, modification level of the IMS system) is updated from the earlier release of IMS 15 to IMS 15.5.

If you have IMS Java on Demand (FMID JMK1506), you should also install the PTF for APAR PH59052 to move to IMS 15.5.

There is one PTF for each IMS FMID between APAR PH59051 and PH59052, as shown in the table below.

Table 8. PTF for each IMS FMID between APAR PH59051 and PH59052

APAR	PTF	FMID	Description
PH59051	UI96269	HMK1500 (Base)	Changes the IMS installed level to 15.5 and requires the IMS 15.4 HMK1500 marker PTF and all HMK1500 maintenance PTFs since IMS 15.4.
	UI96270	JMK1501 (Database Manager)	Requires the IMS 15.4 JMK1501 marker PTF and all JMK1501 maintenance PTFs since IMS 15.4.
	UI96271	JMK1502 (Transaction Manager)	Requires the IMS 15.4 JMK1502 marker PTF and all JMK1502 maintenance PTFs since IMS 15.4.
	UI96272	JMK1503 (ETO)	Requires the IMS 15.4 JMK1503 marker PTF and all JMK1503 maintenance PTFs since IMS 15.4.

Table 8. PTF for each IMS FMID between APAR PH59051 and PH59052 (continued)			
APAR	**PTF**	**FMID**	**Description**
	UI96273	JMK151Z (VUE)	Requires the IMS 15.4 JMK 151Z marker PTF and all JMK151Z maintenance 15.4 and later marker PTFs.
PH59052	UI96295	JMK1506 (Java on Demand)	Requires the IMS 15.4 JMK 1506 marker PTF and all JMK1506 maintenance 15.4 and later marker PTFs.

The PTF for the base FMID HMK1500 is the primary marker PTF. It updates the IMS installed level to 15.5. It also requires the IMS 15.4 HMK1500 maker PTF and all HMK1500 maintenance PTFs that were released since IMS 15.4. When this PTF is applied and no later marker PTF is applied, the IMS system is considered to operate at 15.5.

Depending on each PTF's FMID, other marker PTFs require the corresponding IMS 15.4 marker PTF and the maintenance marker PTFs with the same FMID that were released since IMS 15.4. All of the marker PTFs conditionally require (IF REQ) each other so that they are installed as a single package.

Procedure

The general steps for migrating to IMS 15.5 from an earlier release of IMS 15 are as follows:

1. Shut down the IMS system.
2. Apply the PTFs for for the FMIDs in your IMS installation.
3. Restart the IMS system.

   If you are migrating from an earlier system that was the active system in an XRF complex, you must cold start the system after migration.

   If you are migrating from an earlier system that was not the active IMS system in an XRF complex, you do not need cold start the system after migration. You can warm start the system instead.
4. Perform PTF-level testing.
5. Check the output of the following messages, commands, and log records to confirm that the IMS version number is updated to IMS 15.5:

   - Messages DFS1929I and DFS4878I.
   - The **QUERY IMSFUNC** and **QUERY IMSPLEX** commands.
   - The output page header for DBRC commands.
   - The X'42' and X'4500' log records.

   The IMS installed level is updated to 15.5 in the SCDINLVL control block field and in the &DFSLEVIN macro variable set by IMS macro DFSLEVIN. Output locations, including those in the preceding list, that reference the SCDINLVL control block field are updated to 15.5. However, because the IMS installed level that is specified in the SSCDIMSR control block field and the DFSLEV constant is not changed, the output locations that reference SSCDIMSR or DFSLEV will continue to display 15.1 (the IMS base level) even after you apply .

Related concepts

“Migration considerations for the disablement of Extended Recovery Facility (XRF)” on page 49
As of IMS 15.2, Extended Recovery Facility (XRF) is no longer supported.

Related reference

“IMS 15.5 system continuous delivery functions” on page 84

IMS 15.5 system functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Migrating from IMS 14 and earlier

Migrating from a prior version of IMS involves additional planning and considerations compared with migrating from one IMS release to another within the same version. 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

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.

Considerations when versions are skipped

If you are migrating to IMS 15.5 from IMS 14 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 15.5 from IMS 14, in addition to the requirements and enhancements of IMS 15.5, your migration plan must also account for the requirements and enhancements that are introduced into IMS in all prior releases of IMS 15.

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

General migration recommendations

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 V15.05.00* for the most current hardware requirements, software requirements, prerequisites, and installation information. For general installation information, see *IMS Version 15.5 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 15.5.

  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 54 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 61.
- 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.
- Certain target and distribution library data sets must be either a PDS or a PDSE. The ADFSJLIB, SDFSJLIB, and ADFSLOAD data sets must be PDSE data sets. SDFSRESL data set must be a PDS. All other target (SDFS*xxxx*) and distribution (ADFS*xxxx*) libraries can be either PDS or PDSE.

  Note: Other execution data sets, such as FORMAT, ACBLIB, and MODBLKS data sets, must be a PDS.
- 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 15.5 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 15.5.

- 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 15.5 system, monitor storage usage in both private/eprivate and CSA/ECSA for differences with previous releases. Make adjustments as necessary.

Installation considerations

If you are migrating from an earlier IMS version, complete both the SMP/E install and the entire IVP process before you migrate and prepare your own systems.

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

IMS 15.5 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 15.5 Installation*, before proceeding with the migration and preparation of your own systems.

The following table lists the sample jobs that are shipped with IMS 15.5.

Table 9. Sample installation jobs that are shipped with IMS 15.5

Job name	Job type	Description
DFSALA	SMP/E	Sample job to allocate and initialize a new SMP/E CSI data set (optional)

Table 9. Sample installation jobs that are shipped with IMS 15.5 (continued)

Job name	Job type	Description
DFSALB	SMP/E	Sample job to allocate SMP/E data sets (recommended, but optional)
DFSALOC1	ALLOCATE	Sample job to allocate target and distribution libraries
DFSALOC2	ALLOCATE	Sample job to allocate target and distribution libraries for the On Demand features
DFSJSMKD	MKDIR	Sample job to invoke the supplied DFSJMKDR EXEC to allocate paths for the On Demand Features
DFSDDEF1	DDDEF	Sample job to define SMP/E DDDEFs for IMS
DFSDDEF2	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
DFSPROCB	COPY	Sample job to copy IMS sample JCL procedures to site library

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 15.5.

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.

About this task

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:

Procedure

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:
  - IBM IMS Tools and IMS Version 15.3 Compatibility
  - IBM IMS Tools and IMS Version 15.2 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 IMS1505 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.

Tip: Check the *Installation Information* and *General Information* sections for guidance.

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 “1.c” on page 25.

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:

i) Perform the system definition (SYSGEN) process with "ALL" specified on the IMSCTRL macro.

ii) 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.

iii) 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 54.

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.

i) Compare the CSA storage requirements of the new and current IMS Versions and adjust the IMS region sizes as necessary.

ii) Adjust IMS pool sizes for the new version as necessary.

iii) 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 7, "Message and code changes in IMS 15.5," on page 73.

This step might be performed by an automation or operations group.

i) Determine HIPER and PE exposure.

i) Obtain current enhanced hold data from the Enhanced HOLDDATA for z/OS website.

ii) SMP/E RECEIVE current enhanced hold data

iii) 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.

What to do next

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.

Discontinuance of support

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

Extended Recovery Facility (XRF)

As of IMS 15.2, Extended Recovery Facility (XRF) is no longer supported.

For IMS 15.2 or later, the **HSBID** and **HSBMBR** parameters will not take effect if they are specified as startup parameters in the IMS execution JCL or specified in the DFSPB*xxx* member of the IMS PROCLIB data set. The DFSHSB*xx* member of the IMS PROCLIB data set is not used by IMS 15.2 or later systems.

If you are migrating an IMS 15.1 or earlier system to IMS 15.5 and the system you are migrating was part of an XRF complex, the XRF capability will be deactivated after the system is migrated to 15.5.

The following XRF-related commands are no longer accepted by IMS 15.2 or later systems:

/ERE BACKUP
To manually restart the IMS alternate system in an XRF complex. If you use the **/ERESTART BACKUP** command after migration to restart the IMS system that was the alternate system in the XRF complex, message DFS110I `COMMAND KEYWORD BACKUP INVALID FOR ACTIVE` is issued.

/DISPLAY HSB
To display the system-related information in an Extended Recovery Facility (XRF) environment. If you use the **/DISPLAY HSB** command after migration, message DFS3813 is issued.

/SWITCH
To switch active data sets or to change between the active and alternate systems. If you use the **/SWITCH** command after migration, message DFS3813 or DFS110I, or both, are issued.

/START SURV
To start the operation of the IMS surveillance function in an XRF environment. If you use the **/START SURV** command after migration, message DFS3805 is issued.

/STOP SURV
To stop the operation of the IMS surveillance function in an XRF environment. If you use the **/STOP SURV** command after migration, message DFS3805 is issued.

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.

Remote Site Recovery (RSR)

The RSRMBR= control region startup parameter is no longer valid and is ignored. You can remove it from your IMS JCL, and can also delete any DFSRSRxx members from your IMS PROCLIB data set.

Updates to IMS PDFs in the IBM Publications Center

The IBM Publications Center is discontinued.

IMS Enterprise Suite Version 2.1

IMS Enterprise SuiteVersion 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 SuiteDLIModel 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 IBMData 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.

MFS SOA support

Users should migrate to IBM Rational® Host On Demand.

Specific migration considerations

Specific migration considerations apply when you are migrating from IMS Version 13 or IMS 14 to IMS 15.5.

The information about the IMS features and enhancements that were introduced in the previous versions or releases are not documented in the IMS 15.5 Release Planning information. If you are skipping one or more IMS versions or releases when you migrate to IMS 15.5, review the Release Planning information of each IMS release or version that you are skipping.

For example, if you are migrating to IMS 15.5 from IMS 14, also review the migration considerations in the following information:

- Migration to IMS 15.3
- Migration to IMS 15.2
- Migration to IMS 15
- Migration to IMS 14

The Release Planning information for the IMS releases or versions that are currently supported by IBM is available in the IBM IMS documentation.

Other IMS documentation is available in PDF format. To learn more, see PDF files of IMS documentation ().

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

Migrating to IMS 15.5: DB

Specific migration considerations apply when you are migrating from the IMS Version 13 or IMS 14 Database Manager to the IMS 15.5 Database Manager.

These topics describe the IMS considerations for migrating to the IMS 15.5 Database Manager.

Database recovery utilities migration considerations

The IMS 15.5 Database Recovery (DFSURDB0) and Database Change Accumulation (DFSUCUM0) utilities accept as input log, image copy, and change accumulation data sets created by IMS Version 13 or later.

Database versioning migration considerations

Database versioning introduces some specific considerations for migration.

If you are migrating an IMS system that uses database versioning to IMS 15.5, you must preserve in the catalog the DBD segment instances that define the prior version of any DBD version in use.

CAUTION: If the segment instances for the prior version of a DBD are not preserved, any application programs that use that prior version of the DBD can no longer access the database.

For example, if your IMS system uses version 0 and version 1 of DBD DBD1A in IMS 14, both versions of the DBD1A DBD are stored as separate segment instances in the same DBD1A record in the IMS catalog. Version 1 of DBD1A reflects the actual physical structure of the database. Version 0 of DBD1A is a "virtual" structure that exists only in the IMS catalog.

In this case, when you migrate to IMS 15.5:

- You regenerate version 1 of DBD1A by using the IMS 15.5 generation utilities. When you populate the IMS catalog, version 1 of DBD1A gets inserted as a new set of segments in the same record as all of the segment instances of DBD1A from IMS 14. The IMS 15.5 instance of version 1 now becomes the active version of the DBD and the IMS 14 instance of version 1 is no longer used.
- You do not regenerate version 0 of DBD1A. Instead, you preserve the IMS 14 instance of the DBD1A version 0 in the IMS catalog. Application programs that use version 0 in IMS 15.5 continue to use the segment instances that were generated in IMS 14.

DEDB Alter enhancement migration considerations

The DEDB Alter utility has requirements for migration to IMS 15.5.

If you are invoking the DEDB Alter utility for an IMS 15 function, such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

IMS catalog migration considerations

The IMS catalog is a HALDB PHIDAM database that can require special consideration when migrating to a new version, 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.

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. If you are migrating from IMS Version 13, the ACBs for the catalog must be generated from the DBDs and PSBs that IMS 15.5 supports. If you are migrating from IMS 14, you do not need to re-generate the catalog ACBs. 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.

Before you begin

Ensure that enough storage is allocated to the IMS catalog to accommodate the insertion of a complete IMS 15.5 set of the existing DBD and PSB resources.When migrating from IMS Version 13, the IMS catalog holds a complete set of your existing resources and a complete set of IMS 15.5 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.

About this task

If you are migrating from IMS Version 13, you must generate the catalog ACBs from the DBDs and PSBs that IMS 15.5 supports by using the IMS 15.5 ACB Generation and Catalog Populate utility (DFS3UACB). The DBDs and PSBs for the catalog changed between IMS Version 13 and IMS 15.5. Step 3 is required.

If you are migrating from IMS 14, you do not need to generate new catalog ACBs from the DBDs and PSBs. The DBDs and PSBs for the catalog did not change between IMS 14 and IMS 15.5. Skip step 3.

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.

Procedure

1. If necessary, increase the amount of storage that is allocated to the IMS catalog.
2. Shut down IMS 15.5 if it is running.
3. If you are migrating from IMS Version 13, install the IMS 15.5 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.

   If the IMS catalog is shared by multiple systems and you are migrating from IMS Version 13, you must create a temporary DBDLIB that you will install the IMS 14 DBDs into. This DBDLIB is used to hold the IMS 14 catalog DBDs until migration is complete.

   If you are migrating from IMS Version 13 and you assigned an alias to the IMS Version 13 catalog, run the IMS Catalog Alias Names utility (DFS3ALI0) after you install the IMS 15.5 catalog DBDs from the IMS.SDFSRESL data set to the IMS.DBDLIB. You must run the DFS3ALI0 utility after you install the IMS 15.5 catalog DBDs to the IMS.DBDLIB so that the IMS catalog alias references the IMS 15.5 catalog DBD instead of the IMS Version 13 catalog DBD.
4. Use the IMS 15.5 ACB Generation and Populate utility (DFS3UACB) to generate the ACBs for 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 15.5 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 15.5 system.

What to do next

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)

Migrating an existing IMS catalog in systems that manages ACBs

If you are migrating from IMS 14 with managed ACBs enabled to IMS 15, you can enable IMS 15 to support IMS directory ACBs that are currently being used by an IMS 14 system and load ACBs from the same IMS directory that the IMS 14 system is using. Install APAR PI79314 for IMS 15 to allow an IMS 15 system to support directory ACBs generated from an IMS 14 system. After installing both IMS 14 APAR PI82331 and IMS 15 APAR PI79314, IMS 14 and IMS 15 systems can share the same directory.

Before you begin

Before you begin

ACBSHR=Y must be specified for coexistence between IMS 14 and IMS 15 in a managed ACB environment, even if you are migrating a single IMS 14 system. If the IMS 14 directory was created in an ACBSHR=N environment, you must specify ACBSHR=Y in the IMS 14 system and re-create the IMS directory before the IMS 14 and IMS 15 systems can coexist with managed ACBs enabled.

The migration procedure for the IMS catalog differs depending on whether you are migrating a single IMS system or multiple IMS systems that share a catalog:

- If you are migrating a single IMS system to IMS 15, the installation of the IMS 14 APAR PI82331 in step 4 is not required.
- If you are migrating multiple IMS systems, or if you plan to have IMS 14 and IMS 15 systems coexist in a data sharing environment, the installation of the IMS 14 APAR PI82331 in step 4 is required.

If you require an ACBLIB in your IMS 15 managed ACB environment for the use of tools, utilities, batch jobs, or for any other reason, you must regenerate the ACBs in the ACBLIB by using the IMS 15 Catalog Library Builder utility (DFS3LU00).

About this task

The following steps show how you can migrate an existing IMS catalog in systems that manages ACBs:

Procedure

1. If IMS 15 is running, shut it down.
2. Install the IMS 15 APAR PI79314 on your system to allow to use an IMS directory that contains ACBs generated by an IMS 14 system.
3. Restart the IMS 15 system with the same catalog and ACB management definitions as your IMS 14 system.
4. Install the IMS 14 APAR PI82331 on your IMS 14 system to allow IMS 14 to support directory ACBs generated by an IMS 15 system, and to make changes to the IMS directory from IMS 15.

   Optional: If you do not need to use your IMS 15 system to create or modify any ACBs while the IMS directory is shared with an IMS 14 system, APAR PI82331 is not required.

Related reference

IMS Catalog Library Builder utility (DFS3LU00) (System Utilities)

Migrating to IMS 15.5: TM

IMS considerations for migrating from IMS Version 13 or IMS 14 Transaction Manager to IMS 15.5 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 to the IMS 15.5 Transaction Manager.

APPC/IMS flood control migration considerations

In IMS 14, the new APPC/IMS flood control function is active by default and the IMS system will take action if the default flood thresholds are reached unless you change the default thresholds or disable the function.

The default thresholds were 5,000 and 1,000,000 in IMS 14. In IMS 15.1 and later versions, the default thresholds are changed to 5,000 and 10,000. If the number of active APPC conversations exceeds the default threshold of 5,000, subsequent APPC requests are queued in 64-bit storage until IMS can accept them for processing. If the number of APPC requests that are queued in 64-bit storage exceeds 10,000, IMS stops all APPC input from z/OS. When the number of conversations gets close to the flood thresholds, IMS issues warning messages.

You can modify or disable APPC/IMS flood control by specifying the **APPCMAXC=** parameter in the DFSDCxxx PROCLIB member. To disable the function, specify **APPCMAXC=**0.

The **/DISPLAY ACT** command output is modified to include a **MAXC=** output field that shows the maximum number of APPC conversations that can be active before APPC requests are queued in 64-bit storage.

JVM 64-bit support migration considerations

Specify JVM=64 in the EXEC job control statement to enable the JVM 64-bit support. The JVM= parameter is valid only for Java batch processing (JBP) and Java message processing (JMP) regions.

By default, Java dependent regions load and run with a 31-bit Java virtual machine (JVM). You can modify the JVM addressing mode to 64-bit by specifying the JVM=64 parameter in the DFSJBP and DFSJMP procedure EXEC statement. The new JVM= parameter is valid only for the JBP and JMP regions.

When you specify the JVM= parameter on the EXEC PGM=DFSRRC00 card for the JMP region, you must specify all positional parameters, PRLD=, SSM=, PARDLI=, MINTHRD= and MAXTHRD=, before the JVM= parameter. MAXTHRD= and MINTHRD= are two positional parameters that are hidden when the JVM= parameter is not provided.

By specifying JVM=64, Language Environment®, the infrastructure that supports a 64-bit JVM, is also changed to the 64-bit addressing mode.

You can change to the default 31-bit addressing mode by specifying JVM=31.

To determine which addressing mode a JVM in a Java dependent region is using, you can check the JVM= parameter, the environment file, or the status messages in the job output.

Example

The following sample output shows status messages of a job that uses 31-bit JVM. In the 31-bit addressing mode, the DFSJVM00 module is used, and the LIBPATH points to a 31-bit JVM directory.

```
DFSJVM00: ENVIRON member name is DFSJVMEV
DFSJVM00: LIBPATH=/usr/lpp/java170/J7.0/bin/
DFSJVM00: JVMOPMAS member name is DFSJVMMS
```

In the following sample output of a job that uses 64-bit JVM, the DFSJVM64 module is used, and the LIBPATH points to a 64-bit JVM directory.

```
DFSJVM64: ENVIRON member name is DFSJVMEV
DFSJVM64: LIBPATH=/usr/lpp/java170/J7.0_64/bin/
DFSJVM64: JVMOPMAS member name is DFSJVMMS
```

OTMA migration considerations

IMS 15.5 includes migration considerations for OTMA.

Migration considerations introduced in IMS 15

Network security credential propagation enhancement

If the security-data section of the OTMA message prefix contains network security credentials, the size of the OTMA message can increase by up to 504 bytes. Therefore, consider increasing the size of the SHMSG and LGMSG message queue data sets and the size of the message queue pool.

Migrating to IMS 15.5: System

IMS considerations for migrating from IMS Version 13 or IMS 14 systems to IMS 15.5 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 to the IMS 15.5 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.

Any customer- or vendor-written CQS client that processes CQS return, reason, or completion codes should be evaluated to see if it should be updated for the new codes.

See “Common Queue Server coexistence considerations” on page 62 for information about CQS coexistence rules.

DBRC migration considerations

Migrating DBRC to IMS 15.5 includes several tasks, including upgrading the RECON data set.

These topics describe the considerations and tasks for migrating DBRC to IMS 15.5.

Changes to the RECON data set

Certain records in the RECON data set are new or changed from the records in IMS Version 13 and IMS 14.

Changes introduced in IMS 15

In IMS 15, the following RECON records have changed fields:

- DSPRCNRC:
  - The RCNDATA flag within the RCNFIXED field is changed to indicate the new RECON header name.
  - The RCNMVERS flag within the RCNFIXED field is changed to indicate the current minimum version number during upgrade. The version number cannot be earlier than 13.1 (X'D1').
- DSPRCR1: The RCR1LVL flag within the RCR1VERS field is changed to indicate the RECON header extension record.
- DSPLOGRC: The LOGRELVL flag within the LOGFIXED field is changed to indicate the log release level, which is 15.1 in IMS 15 for all log record types.
- DSPOLDRC: The OLDRELVL flag within the OLDDENT(*) field is changed to indicate the OLDS release level, which is 15.1 in IMS 15 for all OLDS record types.
- DSPSSRC:
  - The SSRELLVL flag within the SSFIXED field is changed to indicate the subsystem release level, which is 15.1 (X'E1') in IMS 15.

– The SSCOEXLV flag within the SSFIXED field is changed to indicate the subsystem coexistence level, which is 15.1 (X'E1') in IMS 15.

REPAIR.RECON migration considerations

The DBRC Command Authorization exit routine (DSPDCAX0) or RACF command authorization definitions might need to be updated to allow users to use the **REPAIR.RECON** command.

If you use security procedures to verify the authority of a user to issue DBRC commands, update the DBRC Command Authorization exit routine (DSPDCAX0) or RACF command authorization definitions to authorize the use of the **REPAIR.RECON** command. As with other DBRC commands, consider restricting access to only those users who must issue the command.

Related concepts

Security for DBRC commands and API requests (System Administration)

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 13 or IMS 14 format to an IMS 15.5 format.

If you are migrating from a release that is within the IMS version that you are already on (for example, if you are migrating from IMS 15.1 to IMS 15.5), you do not need to run the **CHANGE.RECON UPGRADE** command to upgrade the RECON data sets.

You are not required to change the MINVERS value when you migrate to IMS 15. 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 15.1.

Attention:

- Do not issue the IMS 15.5 **CHANGE.RECON UPGRADE** command to upgrade the RECON data sets until all IMS Version 13, IMS 14, and IMS 15.5 systems that access the RECON data sets have the correct supporting products in place and have been tested for IMS 15.5 support.
- Because Remote Site Recovery (RSR) is no longer supported after IMS 14, you must remove all Global Service Group (GSG) information before migrating to IMS 15. Issue the LIST.GSG command to identify any GSG and issue the DELETE.GSG command to remove it before upgrading the RECON data set.

Migration to IMS 15 from IMS Version 13 or earlier versions may be achieved by migrating to the IMS Version 13 or the IMS 14 RECON data set format first and then using IMS 15 to issue the CHANGE.RECON UPGRADE command.

To upgrade an IMS Version 13 or IMS 14 RECON data set:

1. Apply the IMS 15 coexistence Small Programming Enhancements (SPEs) to all earlier versions of IMS systems before you upgrade the RECON data set. For a list of the coexistence SPEs (APARs/PTFs) for DBRC RECON data sets, see “Overview of coexistence APARs” on page 61.

   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.
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 15.5 DBRC Recovery Control utility (DSPURX00) or the IMS 15.5 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 '13.1' if the value was less than '13.1'. 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 15.5 Commands, Volume 3: IMS Component and z/OS Commands*. For details about the Query request, see *IMS Version 15.5 System Programming APIs*.
6. Optionally, after the RECON data set for a system is upgraded, issue the **REPAIR.RECON DMBNUM CHECKUP** command against a copy of the production RECON data set. This command verifies that all of the data management block (DMB) numbers in the different records in the RECON data set are valid. If no problems are found, run the command once a year.

   If problems are found when you verify the validity of the DMB numbers, issue the **REPAIR.RECON DMBNUM UPDATE** command against the production RECON data set when access to the RECON data set would be minimal.

   Like the **CHANGE.RECON UPGRADE**, you can issue the **REPAIR.RECON DMBNUM** command by using either the IMS 15.5 DBRC Recovery Control utility (DSPURX00) or the IMS 15.5 DBRC Command API request.
7. 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 15 level, you can update the MINVERS value. Before you issue the **CHANGE.RECON MINVERS**('15.1') command, read "Minimum version value in the RECON data set" on page 54 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.

Related concepts

"Overview of coexistence APARs" on page 61
IMS Version 13 and IMS 14 must have certain APARs installed to coexist with IMS 15.

Dynamic resource definition migration considerations

If you are migrating from IMS Version 13 or IMS 14, the process for enabling dynamic resource definition (DRD) in an IMS 15.5 system differs depending on whether your existing IMS system has DRD enabled. For MODBLKS resources, the process also depends on 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 and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL 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 and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members for the resource definitions, those runtime resources will reappear after the next IMS cold start. For MODBLKS and MSC resources, you can either perform another system definition that omits all those resources, or hereafter start IMS without the IMS.MODBLKS data sets and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members defined. For MODBLKS resources, you can use the resource definitions from the RDDS instead. MODBLKS resources can be stored in the IMS.MODBLKS data set, RDDS or the IMSRSC repository, while MSC resources can be stored in the DFSCLL3x, DFSCLR0x, and DFSCLC0x members or the IMSRSC repository.

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

Recommendation: When migrating to DRD, for MODBLKS resources, 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.

About this task

Recommendation: When you migrate to DRD for MODBLKS resources, 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:

Procedure

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 searches data sources in the following order:

     a. IMSRSC repository

     b. RDDS

     c. MODBLKS data set and the DFSCLL3x member of the IMS.SDFSRESL data set
   - During migration to IMS 15.5, if the IMSRSC repository is enabled and the DFSDFxxx member has the AUTOEXPORT=AUTO explicitly defined, automatic export of MODBLKS resources to the IMSRSC repository is enabled after IMS 15.5 is cold started. If dynamic definition of MSC resources is also enabled, MSC resources are also automatically exported to the repository after IMS 15.5 is cold started. Any resource definition changes (creates and updates) are automatically exported to the IMSRSC repository at the next checkpoint.

     If you do not want to automatically export MODBLKS resource definitions to the IMSRSC repository, you must remove the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member and either let it default to AUTO or use one of the following values:

- AUTOEXPORT= NO for no autoexport
- AUTOEXPORT = RDDS for autoexport to the RDDS

For MSC resources, automatic export must be enabled to store the MSC resources in the IMSRSC repository.

When you are ready to enable autoexport to the IMSRSC repository you must modify the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member to explicitly specify AUTOEXPORT=AUTO or AUTOEXPORT=REPO.

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

   To enable DRD for MSC resources, you must also specify MSCRSCS=DYN in the MSC section of the DFSDFxxx member.
4. If you are enabling DRD for MSC resources, specify MSCREPO=Y in the MSC section of the DFSDFxxx PROCLIB member to enable the IMSRSC repository for MSC resources.
5. 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
6. Create the repository catalog pairs of data sets.
7. Create the IMSRSC repository pairs of data sets.
8. Start the Repository Server (RS) address space.
9. Define the IMSRSC repository data sets to RS, which stores information about the IMSRSC repository in the RS catalog repository data sets.
10. Optional: Start the Common Queue Server (CQS) with a resource structure.
11. 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.
12. Before you start IMS, specify the EXEC parameters DFSDF=*xxx* and, if MODBLKS=DYN was specified in the DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members in the IMS.PROCLIB data set to use.
13. Cold start IMS.

    If the IMSRSC repository is empty, during cold start IMS imports the resource definitions from the IMS.MODBLKS data set and the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set to create the runtime resource definitions. The online change process for the IMS.MODBLKS data set is now disabled.
14. After IMS is running, issue one of the following commands to export the runtime resource definitions to the IMSRSC repository:
    - For MODBLKS resources, the **EXPORT DEFN TARGET(REPO)** command
    - For all runtime resource definitions, including both MODBLKS and MSC resources, the **/CHECKPOINT** command

Results

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

What to do next

To ensure new and updated runtime resource definitions are recovered across an IMS cold start, issue the **EXPORT DEFN TARGET(REPO)** for MODBLKS resources or the **/CHECKPOINT** command for both MODBLKS and MSC resources 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.

About this task

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:

Procedure

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, the IMSRSC repository, or both, during system checkpoints.
3. Enable DRD by specifying MODBLKS=DYN in either or both of the following locations:
   - The DFSCG*xxx* member of the IMS.PROCLIB data set
   - The <DYNAMIC_RESOURCES> section of the DFSDF*xxx* member of the IMS.PROCLIB data set
4. Allocate the system RDDS 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 DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members to use in the IMS.PROCLIB data set.
6. Cold start IMS. If the RDDS 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 RDDS 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=RDDS in the <DYNAMIC_RESOURCES> section of the DFSDFxxx member of the IMS.PROCLIB data set. When AUTOIMPORT=RDDS is specified, IMS automatically imports resource and descriptor definitions from the RDDS during cold start processing.

Migrating a DRD-enabled IMS system that uses an RDDS to a new release

To migrate a DRD-enabled IMS system using Resource Definition Data Sets (RDDSs) to a new release of IMS, the resource and descriptor definitions for the current IMS must be migrated to a system RDDS used by the new IMS.

About this task

There are multiple ways to migrate resource and descriptor definitions from the current system to a system RDDS used by the new IMS.

Option 1

1. Create a non-system RDDS that contains the resource and descriptor definitions from your current IMS. Use any of the following methods to create this RDDS:
   - Run the Create RDDS from the Log Records utility (DFSURCL0).
   - Run the Create RDDS from the MODBLKS utility (DFSURCM0).
   - Run the DRD IMS SYSGEN stage 1 pre-parser utility (DFSURST0).
   - Run the Copy RDDS utility (DFSURCP0).
   - Use the **EXPORT** command if the current IMS is still up.
2. Allocate empty system RDDS data sets for the new IMS.
3. Cold start the new IMS without importing any resource definitions. This can be done by cold starting IMS with empty system RDDS data sets and no MODBLKS data sets defined. Bring up the new IMS system including the Common Service Layer (CSL) address spaces (SCI, OM, and potentially RM).
4. Once the new IMS is up, use the **IMPORT** command to import the resource and descriptor definitions from the non-system RDDS created in step 1.
5. Export the resource and descriptor definitions to a system RDDS used by the new IMS using either of the following methods:
   - Issue the **EXPORT** command to export the resource and descriptor definitions to a system RDDS.
   - If AUTOEXPORT=AUTO or RDDS is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member, issue the **/CHE** command to export the resource and descriptor definitions to a system RDDS.

Option 2

1. Run the RDDS Extraction utility (DFSURDD0) to convert the stored resource and descriptor definitions in the system RDDS used by the current IMS to IMS type-2 **CREATE** commands.
2. Allocate empty system RDDS data sets for the new IMS.
3. Cold start the new IMS without importing any resource definitions. This can be done by cold starting IMS with empty system RDDS data sets and no MODBLKS data sets defined. Bring up the new IMS system including the Common Service Layer (CSL) address spaces (SCI, OM, and potentially RM).
4. Use the Batch SPOC utility (CSLUSPOC) to submit the **CREATE** commands generated in step 1.

5. Export the resource and descriptor definitions to a system RDDS used by the new IMS using either of the following methods:
   - Issue the **EXPORT** command to export the resource and descriptor definitions to a system RDDS.
   - If AUTOEXPORT=AUTO or RDDS is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member, issue the **/CHE** command to export the resource and descriptor definitions to a system RDDS.

Migrating MSC macro definitions to the IMSRSC repository

You can migrate your MSC macro definitions to the IMSRSC repository to store the definitions in a single, centralized location for all IMS systems in an IMSplex. Migrating MSC definitions to the IMSRSC repository also ensures that the definitions are saved across an IMS cold start.

Procedure

To migrate MSC macro definitions to the IMSRSC repository, complete the following steps:

1. Enable automatic export and automatic import by defining both of the following parameters in the DYNAMIC_RESOURCES section of the DFSDFxxx member of the IMS.PROCLIB data set:
   - AUTOEXPORT=AUTO or AUTOEXPORT=REPO
   - AUTOIMPORT=AUTO
2. Enable dynamic resource definition for MSC resources by specifying MSCRSCS=DYN in the MSC section of the DFSDFxxx member. Also ensure that MODBLKS=DYN is specified in either or both of the following locations:
   - The DFSCGxxx member of the IMS.PROCLIB data set
   - The COMMON_SERVICE_LAYER section of the DFSDFxxx member of the IMS.PROCLIB data set
3. Enable the IMSRSC repository for MSC resources by specifying MSCREPO=Y in the MSC section of the DFSDFxxx member.
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. If you are enabling more than one IMS Resource Manager (RM), start the Common Queue Server (CQS) with a resource structure.
10. Enable 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. Specify the MSC=Y execution parameter in your startup procedure to initialize the MSC function.
12. If one or more logical link paths are not defined in an MSNAME stage-1 system definition macro, specify the SYSID= parameter in the MSC section of the DFSDFxxx member to define one or more local system IDs (SYSIDs) for the IMS system.
13. If you are cold starting IMS with IMSRSC repository support for MSC resources enabled for the first time and you want MSC resources to be automatically exported to the IMSRSC repository at the cold start, ensure that the following data sets contain the current MSC resource definitions:

- The DFSCLL3x member of the IMS.SDFSRESL data set, for both MSC physical and logical link definitions
- The DFSCLC0x member of the IMS.SDFSRESL data set, for MSC logical link path definitions
- The DFSCLR0x member of the IMS.SDFSRESL data set, for remote logical terminal definitions

14. Specify the EXEC parameters DFSDF=*xxx* and, if MODBLKS=DYN was specified in the DFSCG*xxx* member, CSLG=*xxx*. These parameters identify which DFSDF*xxx* and DFSCG*xxx* members in the IMS.PROCLIB data set to use.
15. Cold start IMS.

    If the IMSRSC repository does not contain MSC resources, the MSC resource definitions that were generated during the system generation process are imported into the IMS system to create the runtime resource definitions. The runtime resource definitions are then automatically exported to the IMSRSC repository at the cold start.

    If one of the following conditions are true, ensure that at least one system identifier (SYSID) is specified in the MSC section of the DFSDFxxx PROCLIB member. Otherwise, IMS cold start abends with ABENDU0741 `MODID MS0ABEND`. At least one of the SYSIDs should be the lowest SYSID you plan to define for that IMS system.

    - AUTOIMPORT=AUTO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member with no MSC resources in the IMSRSC repository and no MSC resources are defined in stage-1 system definition macros.
    - AUTOIMPORT=REPO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member with no MSC resources in the IMSRSC repository.
    - AUTOIMPORT=NO is specified in the DYNAMIC_RESOURCES section of the DFSDFxxx member.
16. Optional: Issue the QUERY command for the type of MSC resource that you exported to the IMSRSC repository with the SHOW(DEFN) keyword specified.

    The local definitions in the IMS system and the global definitions in the IMSRSC repository are displayed. All of the MSC resource attributes should be identical between IMS and the IMSRSC repository.

Results

After you migrate MSC macro definitions to the IMSRSC repository, the MSC resource definitions that you create or update since the last automatic export are exported to the IMSRSC repository at the next IMS checkpoint. The IMS checkpoint can be initiated either by issuing the **/CHECKPOINT** command or automatically by the IMS system.

What to do next

If you are using channel-to-channel (CTC) links, consider removing the DD definitions for the CTC links from the IMS JCL before you import the MSC resources from the IMSRSC repository. This allows the CTC addresses that are defined to be used for the CTC links that are imported from the IMSRSC repository.

If you use the IMSRSC repository to store dynamically defined MSC resources, the DFSCLL3x and DFSCLR0x members of the IMS.SDFSRESL data set are no longer required. Because the DFSCLC0x member might contain non-MSC resources, the DFSCLC0x might still be required. After you are satisfied with the setup of your DRD environment for MSC resources, the DRD environment is running successfully, and your MSC resources are exported to the IMSRSC repository, you can remove the DFSCLL3x and DFSCLR0x members. For the DFSCLC0x member, update the member to remove MSC logical link path definitions. If automatic import is enabled, MSC resource definitions are imported during IMS cold start from the repository that contains the most current data. However, you can continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members as the source for your MSC resource definitions, instead of a repository. If you continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members, keep your system definition macros synchronized with the changes you make dynamically using DRD commands.

If you migrate to using the IMSRSC repository for dynamically defined MSC resources but continue to use the DFSCLL3x, DFSCLR0x, and DFSCLC0x members of the IMS.SDFSRESL data set, keep resource definitions that are in the members synchronized with the resource definitions that are in the repository.

This synchronization enables you to maintain viable DFSCLL3x, DFSCLR0x, and DFSCLC0x members if you must disable DRD and fall back to using the system generation process for MSC resources. To keep your DFSCLL3x, DFSCLR0x, and DFSCLC0x members synchronized with your online definitions, update your static macro definitions with the changes that you make dynamically using type-2 commands. When changes are made dynamically, perform a MSC system definition to add, change, or delete resources from the DFSCLL3x, DFSCLR0x, and DFSCLC0x members.

Related concepts

Maintaining your dynamic resource definition environment (System Definition)

Related tasks

Defining the IMSRSC repository (System Definition)

Related reference

UPDATE RM command (Commands)
/CHECKPOINT command (Commands)
QUERY LTERM command (Commands)
QUERY MSLINK command (Commands)
QUERY MSNAME command (Commands)
QUERY MSPLINK command (Commands)
DYNAMIC_RESOURCES section of the DFSDFxxx member (System Definition)
MSC section of the DFSDFxxx member (System Definition)
FRPCFG member of the IMS PROCLIB data set (System Definition)
BPE configuration parameter member of the IMS PROCLIB data set (System Definition)
CSLRIxxx member of the IMS PROCLIB data set (System Definition)

Related information

0741 (Messages and Codes)

Exit routine migration considerations

There are migration considerations for some exit routines when you migrate to IMS 15.5.

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 15

IMS 15.5 and later systems obtain the user exit header block (UEHB) and any additional buffers that are passed to the DFSAOUE0 exit routine from 31-bit private storage.

The following user exit routines are removed from the IMS nucleus and are loaded as stand-alone load modules during IMS initialization:

- DFSCMTU0
- DFSCNTE0
- DFSCSMB0 and user-defined from TRANSACT EDIT=
- DFSCTTO0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSFEBJ0
- DFSME000-DFSME127
- DFSPIXT0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSSIML0

For more information about the migration considerations that are related to the removal of the preceding user exits from the IMS nucleus, see “Migration considerations for removing user exit routine specification from system definition” on page 51.

IMSCTF macro removal migration considerations

In IMS 15.5, the IMSCTF macro is no longer supported and is ignored during system generation. If the IMSCTF macro is specified, IMS System generation stage 1 assembly will issue message G122 in an MNOTE 2, which results in a return code of 2 for the assembly.

If you specified the following parameters in the IMSCTF macro, you must specify the parameter values by using the DFSPB*xxx* member of the IMS PROCLIB data set, JCL, or the DFSIDEF0 module for IMS 15.5.

The CPLOG= parameter

If you specified the **CPLOG=** parameter in the IMSCTF macro, use one of the following methods to define the checkpoint log frequency for IMS 15.5. If you do not use one of the following methods to specify the checkpoint log frequency for IMS 15.5, a default value of 500,000 is used.

- Specify the **CPLOG=** parameter in the DFSPBxxx member of the IMS PROCLIB data set.
- Specify the **CPLOG=** parameter in JCL.
- Issue the **/CHANGE CPLOG** command.

The LOG= parameter

In IMS 15.5, the IEFRDER DD statement for the system log is included in the DBBBATCH, DLIBATCH, IMSCOBGO, and IMSPLIGO procedures. The IEFRDER2 DD statement is included as a comment. To use the IEFRDER2 DD statement, remove the asterisks (*).

The IMSMON DD statement is included as a comment in the DBC, DCC, and IMS procedures for IMS 15.5. To use the IMSMON DD statement, remove the asterisks (*).

The PRDR= parameter

If you specified the **PRDR=** parameter in the IMSCTF macro, use one of the following methods to specify the name for the IMSRDR procedure for IMS 15.5. If you do not specify a name for the IMSRDR procedure for IMS 15.5, IMS uses a default name of IMSRDR as the name of the IMSRDR procedure that is started by the **/START REGION** command.

- Specify the **PRDR=** parameter in the DFSPBxxx member of the IMS PROCLIB data set.
- Specify the **PRDR=** parameter in JCL.

In addition, a sample IMSRDR procedure is supplied in the ADFSPROC and SDFSPROC library data sets. If you specify the **PRDR=** parameter in the DFSPBxxx member or in JCL, the name of the sample IMSRDR procedure does not change.

The RDS= parameter

In IMS 15.5, use one of the following methods to specify the buffer size for the restart data set (IMS.RDS):

- Specify the **RDS=** parameter in the DFSPB*xxx* member.
- Specify the **RDS=** parameter in JCL.

In IMS 15.5, you do not need to specify the device type on which the IMS.RDS data set resides.

The SVCNO= parameter

If you defined a type 2 SVC number by using the **SVCNO=** parameter on the IMSCTF macro, perform the following steps to use the type 2 SVC in IMS 15.5.

Important: If you specify the **SVC2=** parameter in the DFSIDEF0 module, ensure that the DFSIDEF0 module resides in an APF-authorized library that is included in the IMS Control Region JOBLIB or STEPLIB concatenation, or in the z/OS LINKLIST concatenation.

1. Define a type 2 SVC number by specifying the SVC2= keyword in one of the following locations. If you do not use the SVC2= keyword to define a type 2 SVC number, IMS uses a default value of 254.

   Important: If you use the Open Database Access (ODBA) interface or the database resource adapter (DRA) and you do not want to use the default value of 254 for the type 2 SVC number, you can define the number only by using the DFSIDEF macro of the DFSIDEF0 module.

   - In the DFSPBxxx member of the IMS PROCLIB data set. The value that you specify in the DFSPBxxx member overrides the value that is specified on the DFSIDEF macro.
   - In JCL. The value that you specify in JCL overrides the SVC2= keyword value that is specified in the DFSPBxxx member and the value that is specified on the DFSIDEF macro.
   - On the DFSIDEF macro of the DFSIDEF0 module by specifying the following code:

     ```
     DFSIDEF TYPE=PARM,SVC2=
     ```

     The value that is specified on the DFSIDEF macro is overidden by the value that is specified in the DFSPBxxx member or in JCL.
2. If you used the SVC2= parameter on the DFSIDEF macro to define a type 2 SVC number, assemble and link the DFSIDEF0 module into IMS.SDFSRESL.
3. Run JCL to re-link the type 2 SVC routine, DFSVC200, as IGC*xxx*, where *xxx* is the type 2 SVC number. To generate sample JCL for re-linking the routine, specify TYPE=GEN,SVC2=*xxx* on the DFSIDEF macro.

   Important: If you specify TYPE=GEN on the DFSIDEF macro, you cannot use another form of the TYPE= statement on the macro.
4. Bind the type 2 SVC routine into the z/OS nucleus.

If you defined a type 4 SVC number by using the **SVCNO=** parameter on the IMSCTF macro, perform the following steps to use the type 4 SVC in IMS 15.5.

Important: If you specify the **SVC4=** parameter in the DFSIDEF0 module, ensure that the DFSIDEF0 module resides in an APF-authorized library that is included in the IMS Control Region JOBLIB or STEPLIB concatenation, or in the z/OS LINKLIST concatenation.

1. To define a type 4 SVC number, specify the following code on the DFSIDEF macro of the DFSIDEF0 module. If you do not use the SVC4= keyword to specify a type 4 SVC number, IMS uses a default value of 255.

   ```
   DFSIDEF TYPE=PARM,SVC4=
   ```
2. Assemble and link the DFSIDEF0 module into IMS.SDFSRESL.
3. Run JCL to re-link the type 4 SVC routine, DSP00MVS, as IGC00*yyy*, where *yyy* is the EBCDIC representation of the zoned-decimal type 4 value. You can use the sample JCL, which is generated when you specify TYPE=GEN,SVC4=*yyy* on the DFSIDEF macro, to re-link the routine.

   Important: If you specify TYPE=GEN on the DFSIDEF macro, you cannot use another form of the TYPE= statement on the macro.
4. Bind the type 4 SVC routine in an LPA or MLPA library.

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.

Note: The discussions in this topic aim at version-to-version migrations, therefore the considerations and examples are the same for all IMS 15 releases.

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 62.
- 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 CSLDC*xxx* 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 13 (V13) CQS that is using a resource structure.
- One RM and one OM running on the LPAR.
- Two V13 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 15 (V15):

1. Prepare the IMSA libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
2. Stop the V13 SCI.
3. Start the V15 SCI.
4. Start the V15 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 V13 OM.
6. Shut down IMSA.
7. Shut down IMSB.
8. Stop the V13 RM.
9. Stop the V13 CQS.
10. Start the V15 CQS.
11. Start the V15 RM.
12. Cold start IMSA.
13. Restart IMSB.

14. Test IMSA.
15. After IMSA (V15) 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 13 and repeat this process after any problems are fixed.
16. Stop the V13 OM.
17. Take IMSB offline and migrate it to IMS 15.

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 V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - One V13 IMS system named IMSC

  LPAR2

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - Two V13 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 15 (V15):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
   a. Prepare the IMSC libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Stop the V13 OM (assuming the same OM name is used before and after the migration).
   e. Start the V15 OM.
   f. Shut down IMSC.
   g. Stop the V13 RM.
   h. Shut down the V13 CQS.
   i. Start the V15 CQS.
   j. Start the V15 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 13 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 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.

c. Start the V15 SCI.
d. Stop the V13 OM.
e. Start the V15 OM.
f. Shut down IMSD.
g. Shut down IMSE.
h. Stop the V13 RM.
i. Stop the V13 CQS.
j. Start the V15 CQS.
k. Start the V15 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 V13 and repeat this process after any problems are fixed.
o. After IMSD (V15) has tested successfully, proceed to the next step.
p. Stop the V13 OM.
q. Take IMSE offline and migrate it to IMS 15.

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 V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - One V13 IMS system named IMSF
  - One IMS Connect that is communicating with IMSF, IMSG, and IMSH

  LPAR2

  - One V13 CQS
  - One Common Service Layer (CSL), consisting of an OM, RM, and SCI
  - Two V13 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 15 (V15):

1. Migrate the subsystems on LPAR1 first by performing the following actions:
   a. Prepare the IMSF libraries and data sets for IMS 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Stop the V13 OM (assuming the same OM name is used before and after the migration).
   e. Start the V15 OM.
   f. Shut down IMS Connect.

g. Shut down IMSF.
h. Stop the V13 RM.
i. Shut down the V13 CQS.
j. Start the V15 CQS.
k. Start the V15 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 V13 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 15 (for example, perform a system definition, set up JCL, and so on).
   b. Stop the V13 SCI.
   c. Start the V15 SCI.
   d. Start the V15 OM.
   e. Stop the V13 OM.
   f. Shut down IMSG.
   g. Shut down IMSH.
   h. Stop the V13 RM.
   i. Stop the V13 CQS.
   j. Start the V15 CQS.
   k. Start the V15 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 13 and repeat this process after any problems are fixed.
   o. After IMSG (V15) has tested successfully, proceed to the next step.
   p. Stop the V13 OM.
   q. Take IMSH offline and migrate it to IMS 15.

IMS repository function migration considerations

There are several migration considerations related to the IMS repository enhancements.

Automatic export to the IMSRSC repository

If AUTOEXPORT=AUTO is specified in the DFSDFxxx member and IMS is enabled with the IMSRSC repository, autoexport to the IMSRSC repository is enabled at system checkpoints. To disable the autoexport to the IMSRSC repository function during migration to IMS 15.5, modify the DFSDFxxx member in one of the following ways:

- Remove the AUTOEXPORT= specification so that AUTOEXPORT will default to AUTO and not trigger the autoexport to the IMSRSC repository. If IMS also has system RDDS, then autoexport will be done to the RDDS.
- Modify to AUTOEXPORT=NO so that no autoexport is enabled.
- Modify to AUTOEXPORT=RDDS so that autoexport is only to the system RDDS and not the IMSRSC repository.

Remember: Autoexport to the IMSRSC repository is not enabled if AUTOEXPORT=AUTO is defaulted to. You must explicitly specify autoexport in the DFSDFxxx member.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository enabled and no system RDDS defined, IMS Version 13 and earlier will disable autoexport (AUTOEXPORT=N) since no system RDDS data sets are defined. A DFS3374W message is issued to indicate that autoexport is disabled.

If you have AUTOEXPORT=AUTO explicitly specified and not defaulted to with IMSRSC repository enabled and no system RDDS defined, IMS 15.5 will, at the end of the next checkpoint, export the changed definitions automatically since the last export to the IMSRSC repository.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository enabled and system RDDS defined, IMS Version 13 and earlier will export the changed definitions automatically to the system RDDS at the end of the next checkpoint.

If you have AUTOEXPORT=AUTO defined with IMSRSC repository defined and system RDDS defined, IMS 15.5 will, at the end of the next checkpoint, export the changed definitions automatically since the last export to the IMSRSC repository. IMS will also export the changed definitions automatically to the system RDDS. The automatic export to the system RDDS will occur even if the automatic export to the IMSRSC repository did not succeed.

Create RDDS from Log Records utility (DFSURCL0) migration considerations

Run the same version of the DFSURCL0 utility as the version of the IMS that produced the IMS logs being used as input.

For example, use the IMS 15 DFSURCL0 utility with IMS 15 log data sets. If you run with mixed versions, the results can be unpredictable.

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.

Migration considerations for the disablement of Extended Recovery Facility (XRF)

As of IMS 15.2, Extended Recovery Facility (XRF) is no longer supported.

If you are migrating an IMS 15.1 or earlier system to 15.5 and the IMS system you are migrating was part of an XRF complex, the XRF capability will be deactivated after the system is migrated to 15.5.

If you are migrating to IMS 15.5 an IMS 15.1 or earlier system that was the active system in an XRF complex, you must cold start the system after migration. If you warm start instead the IMS system that was the active system in the XRF complex, an abend might be issued due to log reading error.

If, however, you are migrating to IMS 15.5 an IMS system that was not previously the active IMS system in an XRF complex, you do not need cold start the system after migration. You can warm start the system instead.

The following XRF-related commands are no longer accepted by IMS 15.2 or later systems:

/ERE BACKUP
: To manually restart the IMS alternate system in an XRF complex. If you use the **/ERESTART BACKUP** command after migration to restart the IMS system that was the alternate system in the XRF complex, message DFS110I `COMMAND KEYWORD BACKUP INVALID FOR ACTIVE` is issued.

/DISPLAY HSB
: To display the system-related information in an Extended Recovery Facility (XRF) environment. If you use the **/DISPLAY HSB** command after migration, message DFS3813 is issued.

/SWITCH
To switch active data sets or to change between the active and alternate systems. If you use the **/SWITCH** command after migration, message DFS3813 or DFS110I, or both, are issued.

/START SURV
To start the operation of the IMS surveillance function in an XRF environment. If you use the **/START SURV** command after migration, message DFS3805 is issued.

/STOP SURV
To stop the operation of the IMS surveillance function in an XRF environment. If you use the **/STOP SURV** command after migration, message DFS3805 is issued.

In an XRF complex, logs and data for access to application databases are stored in a DASD that is shared between the active and the alternate IMS systems. After an IMS 15.1 or earlier system is migrated to IMS 15.5, each IMS system must have its own log data sets, such as OLDS, WADS, RDS, and so on, for each system to restart. If each IMS system does not have its own log data sets, you can start only one of the IMS systems after migration.

Related information
DFS110I (Messages and Codes)
DFS3805 (Messages and Codes)
DFS3813 (Messages and Codes)

Migration considerations for Fast Path DEDB area data sets (ADS) encryption

Install APAR PI83756 to enable this feature.

Migration considerations introduced in IMS 15

To migrate from non-encrypted Fast Path DEDB ADS to encrypted Fast Path DEDB ADS, perform the following steps:

1. Perform one of the following methods to create encrypted ADS:
   - Define the shadow ADS with the same attributes as the non-encrypted ADS and specify key labels with the shadow ADS. Run DEDB ALTER utility.
   - Define new ADS as SMS-managed extended format DASD and specify key labels with them. Register the new ADS to DBRC by using the following command:

     INIT.ADS DBD(*xxxxxxxx*) AREA(*yyyyyyyy*) ADSN(*AREA data set name*) UNAVAIL

     Run CREATE utility.
2. Stop the non-encrypted ADS if necessary.

To fallback from encrypted Fast Path DEDB ADS to non-encrypted ADS, create new ADS without key label and use the DEDB ALTER and DEDB Area Data Set Create utilities to copy encrypted ADS to new ones.

Migration considerations for moving logger parameters to DFSDF*xxx*

IMS 15 includes migration considerations related to the consolidation of the IMS logger parameters into the mandatory LOGGER section of the DFSDF*xxx* member of the IMS PROCLIB data set.

The IMS logger parameters that were previously specified in the DFSVSM*xx* PROCLIB member are moved to the new LOGGER section of the DFSDF*xxx* PROBLIB member. Any logger parameters that are still specified in the DFSVSM*xx* member are ignored by the IMS system and not reported in the error log.

The **ARC=** and **WADS=** parameters, which were previously specified in the DFSPB*xxx* PROCLIB member or on the EXEC parameters of the control region JCL, are also moved to the DFSDF*xxx* PROCLIB member. If you specify **ARC=** or **WADS=** in DFSPB*xxx* or in the control region JCL, the specifications are ignored by the IMS system.

Migration considerations for network security credential propagation enhancement

There are several migration considerations related to the network security credential propagation enhancement.

- If the security-data section of the OTMA message prefix contains network security credentials, the size of the OTMA message can increase by up to 504 bytes. Therefore, consider increasing the size of the SHMSG and LGMSG message queue data sets and the size of the message queue pool.
- If both of the following situations occur, you might need to modify code that includes the HWSOMPFX macro:
  - The Network Session ID (NETSID) section or the Network User ID (NETUID) section, or both, is included in the security section of the OTMA message header.
  - Either the **DSECT=**ALL or the **DSECT=**N0 option is specified with the HWSOMPFX macro.

  The size of the NETUID and NETSID sections can vary, causing the locations of the fields that are below the security section to change. However, if the **DSECT=**ALL or the **DSECT=**N0 option is specified, a contiguous DSECT, the HWSOMPFX DSECT, is generated that does not account for sections that vary in size. Therefore, the fields in the OTMA message header that are below the security section might become inaccessible.

  For the fields of the OTMA message header that are below the security section to be accessed, you need to map the HWSOMUSR, HWSOMAPP, or HWSOMAPX DSECTS of the HWSOMPFX macro to the changed locations of the fields.

  For more information about the fields of the OTMA message header, see OTMA header fields used by IMS Connect (Communications and Connections).
- In IMS 15, processing by the HWSJAVA0 user message exit routine of the user data section that is in the OTMA message header is updated. If the OTMA message header contains network security information and the HWSOMPFX macro is used, the HWSJAVA0 exit routine specifies both the **DSECT=** and the **NETSEC_OPT=**YES options for the HWSOMPFX macro. The **DSECT=** and the **NETSEC_OPT=**YES options cause the following behaviors:
  - An individual DSECT is generated for each section of the OTMA message header.
  - The HWSECDNDS DSECT, or the HWSECARDS DSECT, or both, is generated to map network security information.
  - The HWSOMPFX DSECT is not generated.

Migration considerations for removing user exit routine specification from system definition

IMS 15.5 includes migration considerations for removing user exit routine specification from system definition.

Migration considerations introduced in IMS 15

The following user exit routines are removed from the IMS nucleus and are loaded as stand-alone load modules during IMS initialization:

- DFSCMTU0
- DFSCNTE0
- DFSCSMB0 and user-defined from TRANSACT EDIT=
- DFSCTTO0 and user-defined from TYPE EDIT= or LINEGRP EDIT=
- DFSFEBJ0
- DFSME000-DFSME127
- DFSPIXT0 and user-defined from TYPE EDIT= or LINEGRP EDIT=

- DFSSIML0

In order for the IMS system to properly load the user exits during IMS initialization, either move the user exit routines to an authorized library in the JOBLIB, STEPLIB, or LINKLIST library concatenated in front of the IMS.SDFSRESL, or ensure that the library that is currently specified by the USERLIB= keyword of the IMSGEN macro is added to the JOBLIB, STEPLIB, or LINKLIST concatenation.

The USERLIB= parameter on the IMSGEN macro is no longer used because no user exits are linked during Sysgen. G121 MNOTE0 is issued if USERLIB= is specified.

With the removal of user exit routines from the nucleus, some user-defined options in the system definition COMM macro are no longer valid and are replaced by IMS startup keyword parameter definitions in the DFSPBxxx proclib member or in the JCL override. The following table lists the COMM keywords affected, their replacement keywords in the DFSPBxxx, and the user exit routines that are affected by this change. If the COMM macro keywords are specified, the stage 1 system generation assembly issues an MNOTE 2.

Table 10. COMM macro changes

COMM keyword	DFSPBxxx keyword	User exit	Notes
FESEXIT = (NO|YES, timeout)	FESEXIT = N|Y FESTIM = timeout	DFSFEBJ0	Front End Switch routine. G118 MNOTE 2 is issued if FESEXIT=YES is specified in the COMM macro. The FESTIM= keyword in DFSPBxxx already exists before IMS 15.
MFSEXIT=(field, segment)	MFSEXITF=field MFSEXITS=segment	DFSME000-DFSME127	MFS input message field and segment edit routines. G119 MNOTE 2 is issued if MFSEXIT is specified in the COMM macro. Field specifies the range of field edit routines (000-field). Segment specifies the range of segment edit routines (segment-127).
OPTIONS=USERMSGS	USERMSGS=N|Y	DFSCMTU0	User message table. G120 MNOTE 2 is issued if OPTIONS=USERMSGS is specified in COMM macro.
SIMEXIT=NO|YES	SIMEXIT=N|Y	DFSSIML0	Shared printer message router routine. G117 MNOTE 2 is issued if SIMEXIT=YES is specified in the COMM macro.

Important: Prior to IMS 15, these user exits were linked into the IMS nucleus, which automatically made them non-reentrant (because the nucleus is non-reentrant). They are now loaded as stand-alone modules during IMS initialization. Thus, if you use IMS 15 and you link one of these user exit routines as reentrant, you must ensure that it is not dependent on any information from a previous iteration and that it does not store into itself. To learn more, see Routine binding restrictions (Exit Routines).

If the user exit routines that are removed from the nucleus use callable services, the customer must link DFSCSI00 with each user exit.

Existing user exit routines must be examined to determine if any external references (VCONs) to the nucleus exist. Any such external references must be removed or link edit processing will fail due to unresolved external references.

The actual interfaces to the exits are not being changed. Unless the exits have VCONs to the nucleus, users don't need to update the code in the exits.

Migration considerations for sample procedures removal enhancement

IMS includes migration considerations for the SDFSPROC data set for sample procedures removal enhancement.

Migration considerations introduced in IMS 15

In IMS 14 and earlier, the **PROCLIB=** parameter of the IMSGEN macro determines whether SYSGEN generates the IMS sample procedures in the IMS.PROCLIB dataset.

In IMS 15, the **PROCLIB=** parameter of the IMSGEN macro is obsolete. Only **PROCLIB=NO** is allowed. The default value for the parameter is changed to **PROCLIB=NO**. If **PROCLIB=YES** or **PROCLIB=IMS** is specified, the IMS system generates an MNOTE return code 2 with message G918 issued.

Delete the **PROCLIB=** keyword, or change **PROCLIB=YES** or **PROCLIB=IMS** to **PROCLIB=NO** to avoid a return code of 2 during stage 1 system definition.

If sample procedures are used, copy them from IMS.SDFSPROC to IMS.PROCLIB data set. Rename the data sets if necessary to match the original data sets generated by SYSGEN.

For sample procedures that are not delivered during the SMP/E processing in the IMS SDFSPROC library, use the DFSPROCB JCL to create the sample procedures and rename the sample procedures whose names do not match what they would have been if they are generated by system definition.

For more information about using the DFSPROCB JCL to create and rename certain sample procedures, see Running the DFSPROCB job to complete sample procedures (System Definition).

In IMS 14 or earlier, most sample procedures generated by SYSGEN includes variable data that the IMS system sets based on various specifications in the stage 1 system definition macros. In IMS 15, because sample procedures are now provided as copy source during SMP processing, you can update these sample procedures so that the variable data matches what they would have been if generated by SYSGEN when it is necessary.

In IMS 14 or earlier, some sample procedures omit entire sections of the sample procedure, or have different versions of the sample procedure, depending on the type of system or other specifications in stage 1 system definition macros.

In IMS 15, the new sample procedures, in general, assume a 'standard' DB/DC system, because the actual system environment is not known. For each procedure that has conditionally-generated statements for 'non-standard' environments, the prolog in the sample procedure includes detailed instructions on how the sample procedure should be modified.

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

IMS 15 introduced new changes to the write-ahead data set (WADS).

The WADS must be defined as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and with the SHAREOPTIONS(3 3) parameter. The access method services (AMS) utility IDCAMS can be used to define the data set.

If the WADS for different IMS systems on different logical partitions (LPARs) share the same data set name, you must specify SHAREOPTIONS(3 3) for the WADS, even though the physical data sets are not shared between the systems.

Recommendation: Use different data set name for the IMS 15.5 WADS than the name used for the WADS in current IMS version. This allows you to predefine the IMS 15.5 WADS before shutting down the current IMS system. Otherwise, the WADS must be deleted and redefined after the current IMS system goes down and before the system is started as an IMS 15.5 system.

You can use the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDF*xxx* PROCLIB member to enable or disable the use of zHyperWrite to write to the WADS.

Example

The following JCL is an example of allocating the WADS:

```
//AMS EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *

DEFINE CLUSTER -
```

```
     (NAME(IMSA.WADS.VSAM) -
     VOLUME(VOL001) -
     CONTROLINTERVALSIZE(4096) -
     SHAREOPTIONS(3 3) -
     CYLINDERS (20 0) -
     LINEAR)
/*
```

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 ACB libraries, the ACB Maintenance utility (ACBGEN) is required.
- For each IMS that you are migrating to a pre-15.5 level, complete the following steps:
  1. Ensure that the status of all databases and PSBs updated by IMS 15.5 are correct.
  2. Resolve DBRC issues. See “DBRC fallback considerations” on page 54.
  3. Shut down IMS 15.5.
  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 re-queue IMS 15 messages to IMS Version 13 or IMS 14 message queues.

If you are falling back from an IMS 15.5 system to a prior release in IMS 15, you do not need cold start the system. You can shut down and warm start the system instead.

For DBRC migration and coexistence:

- If you are falling back from IMS 15.5 to a prior release in IMS 15, no DBRC coexistence APAR is needed.
- If you are falling back from IMS 15.5 to IMS 14, ensure that the IMS 14 DBRC coexistence APAR PI62558 and PI49208 are applied.
- If you are falling back from IMS 15.5 to IMS Version 13, ensure that the IMS Version 13 DBRC coexistence APAR PI62555, PI27285, and PI49334 are applied.

DBRC fallback considerations

Certain steps must be taken to revert the level of DBRC from IMS 15 to IMS Version 13 or IMS 14.

Minimum version value in the RECON data set

If the MINVERS value is set to '15.1' and you need to fall back from IMS 15 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 '15.1'.

To change the MINVERS value to '13.1', complete the following steps:

1. Shut down all IMS 15 subsystems.
2. Ensure that all IMS 15 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 15 subsystem records in the RECON data set using the **DELETE.SUBSYS** command.
3. If the cross-DBRC service level ID (CDSLID) is not set to 2 and any HALDB databases are defined to support 8-GB OSAM data sets, the **CHANGE.RECON MINVERS('13.1')** command will fail, and message DSP1256E will be issued. To prevent the command from failing, take one of the following actions:
   - Complete the appropriate steps to change the maximum OSAM data set size for each HALDB from 8 GB to 4 GB.

- If the appropriate maintenance for HALDB support of 8-GB OSAM data sets has been applied to all of the IMS Version 13 resident libraries (RESLIBs) that access the RECON data set, include the CDSLID(2) parameter in the **CHANGE.RECON MINVERS('13.1')** command in the next step.

4. Reset the MINVERS value by issuing a **CHANGE.RECON MINVERS('13.1')** command using IMS 15.

To change the MINVERS value to '14.1', complete the following steps:

1. Shut down all IMS 15 subsystems.
2. Ensure that all IMS 15 subsystem records are removed from the RECON data set.
   - To view the subsystem records in the RECON data set, issue the **LIST.SUBSYS** command.
   - If IMS 15 subsystem records exist, issue the **DELETE.SUBSYS** command to delete them.
3. Issue the **CHANGE.RECON MINVERS('14.1')** command to reset the MINVERS value to fall back to IMS 14 from IMS 15.

Related tasks

Changing the maximum OSAM data set size for a HALDB from 8 GB to 4 GB (Database Administration)

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 15 system that uses the IMS repository function to an IMS 14 or IMS Version 13 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 15.
2. Cold start the IMS 14 or IMS Version 13 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.

Dynamic definition of MSC resources fallback considerations

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

Complete the following procedure to fall back from an IMS system that has dynamic definition enabled for MSC resources to an IMS system that does not have dynamic definition enabled for MSC resources:

1. Keep your stage 1 system definition synchronized with dynamic definition of MSC resources.
2. Run system generation for stage 1 system definition that includes MSC resources, which are the following:
   a. MSPLINK, MSLINK, MSNAME, and NAME macros
   b. IMSCTRL macro with MSVID and SYSTEM=(MSVERIFY) parameters specified
   c. APPLCTN and TRANSACT macros with the SYSID parameter specified
3. Restore old copies of MSC user exits.
4. Restore old copies of automation programs that issue QUERY LTERM, QUERY MSLINK, QUERY MSNAME, and QUERY MSPLINK commands and parse the output.
5. Remove new MSC parameters from the DFSDFxxx member of the IMS PROCLIB data set.
6. Cold start IMS at a previous IMS release level.
7. Complete other pertinent tasks related to falling back to a previous version of IMS.
8. Disable Common Service Layer (CSL) with the Structured Call Interface (SCI) and the Operations Manager (OM) if these are not needed for any other IMS function.
9. Confirm that dynamic definition is disabled for MSC resources by issuing the QUERY MEMBER TYPE(IMS) command, and ensuring that the command output does not include DYNMSC in the local attributes.

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 15.5 DBD and PSB instances in the IMS catalog or you can purge them to save storage.

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.

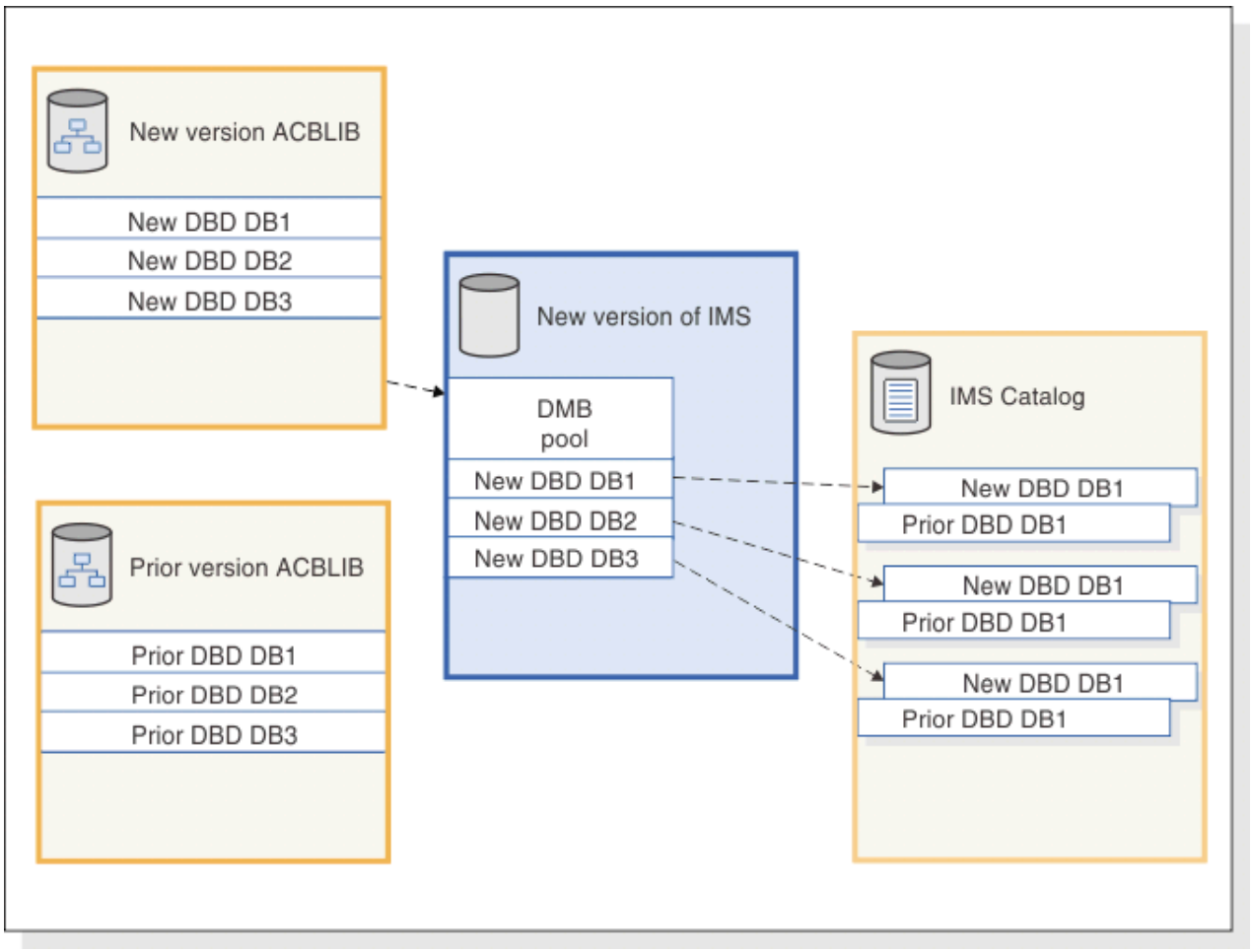


Figure 1. DBDs that IMS uses before fallback

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.

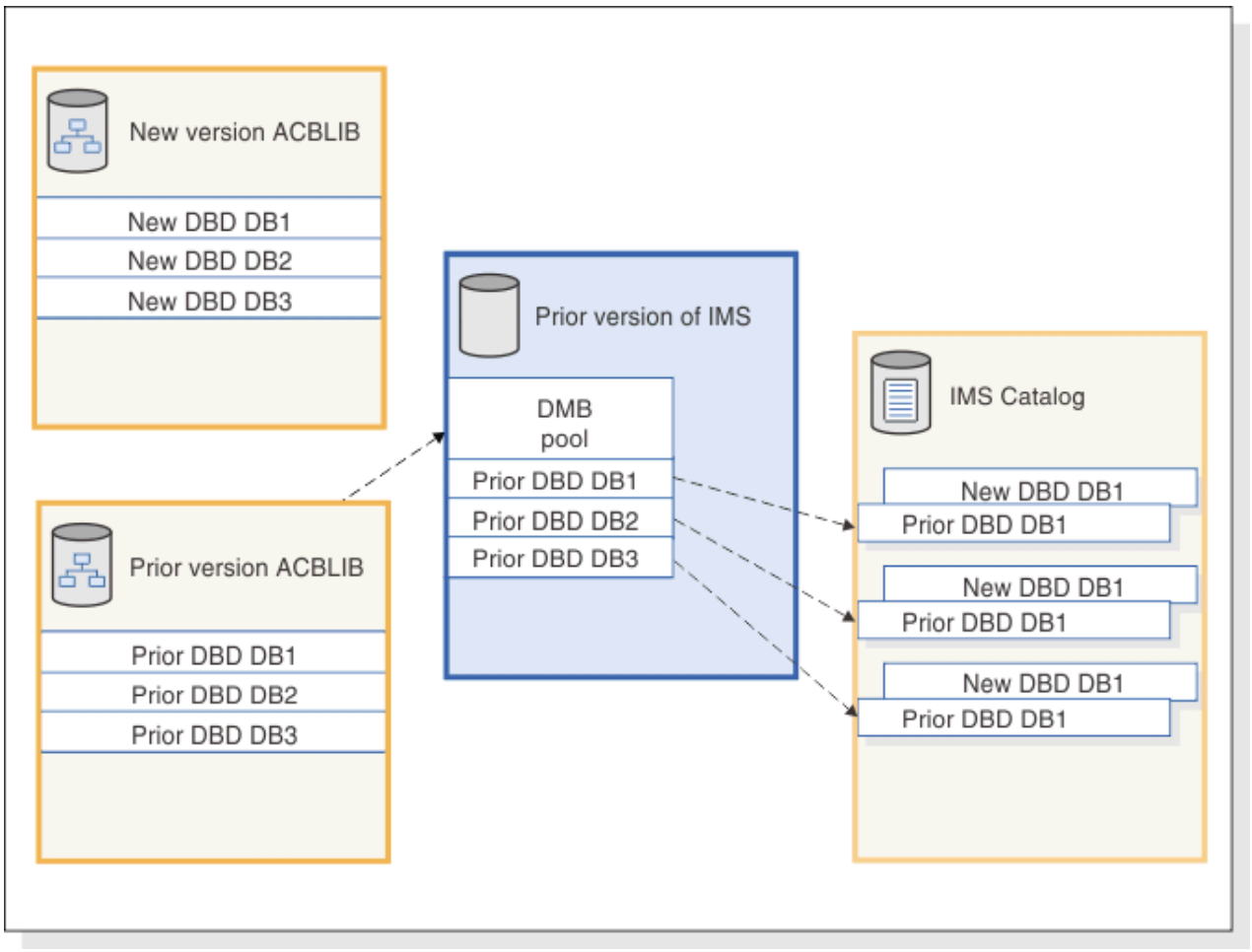


Figure 2. DBDs that IMS uses after fallback

Fallback from IMS-managed ACBs to ACBLIBs

The procedure for falling back from the IMS management of ACBs to the installation-managed ACB libraries (ACBLIBs) is different depending on whether your installation has activated any new or modified databases or program views since the IMS management of ACBs was enabled.

Falling back from IMS-managed ACBs before resource updates are activated

If your installation has not activated any new or modified databases or program views since enabling the IMS management of ACBs and your ACB, DBD, and PSB libraries are unchanged, the procedure for falling back from the IMS management of ACBs to the installation-managed ACB libraries (ACBLIBs) involves updating the DFSDFxxx member, changing various references to the IMS catalog back to references to the ACB, DBD, and PSB libraries, and restarting IMS.

About this task

The following procedure does not include steps for falling back from an IMS catalog. Disabling the IMS catalog is not required when falling back to installation-managed ACBLIBs.

The following procedure is generally applicable to both falling back within a release and falling back to a prior release of IMS.

Procedure

1. In the <CATALOG> section of the DFSDFxxx PROCLIB member, specify ACBMGMT=ACBLIB.

2. If you use the IMS Catalog Definition exit routine (DFS3CDX0), modify it to indicate that the IMS management of ACBs is not enabled.
3. If necessary, update any JCL to reference the ACBLIB, DBDLIB, and PSBLIB.
4. If DBRC was configured to refer to the IMS catalog for database definitions, reconfigure DBRC to refer to the DBDLIB instead by issuing the **CHANGE.RECON** command with NOCATALG specified.
5. Restart IMS.

What to do next

Before running the IMS Catalog Populate utility (DFS3PU00) again on a system that uses ACB libraries, remove the MANAGEDACBS control statement from the JCL.

If necessary, revert any tools or products that were updated to run in the IMS-managed ACBs environment so that they use the ACB, DBD, and PSB libraries again.

Falling back from IMS-managed ACBs to installation-managed ACBLIBs

If your installation has activated new or modified databases or program views after enabling the IMS management of ACBs, the procedure for falling back to installation-managed ACB libraries (ACBLIBs) includes recreating the DBD, PSB, and ACB libraries from the active resources in the IMS catalog.

About this task

The following procedure does not include steps for falling back from an IMS catalog. Disabling the IMS catalog is not required when falling back to installation-managed ACBLIBs.

The following procedure is generally applicable to both falling back within a release and falling back to a prior release of IMS.

Procedure

1. Build the input statements for DBD Generation and PSB Generation utilities from the IMS catalog by using the DFS3LU00 utility.
2. Build the DBD and PSB libraries by running the DBD and PSB Generation utilities.

   If you are falling back to a prior release of IMS, be sure to use the utilities for that release of IMS.
3. Build the ACB library by providing the DBD and PSB libraries as input to the ACB Maintenance utility.

   If you are falling back to a prior release of IMS, be sure to use the utilities for that release of IMS.
4. In the <CATALOG> section of the DFSDFxxx PROCLIB member, specify ACBMGMT=ACBLIB.
5. If you use the IMS Catalog Definition exit routine (DFS3CDX0), modify it to indicate that the IMS management of ACBs is not enabled.
6. If necessary, update any JCL to reference the ACBLIB, DBDLIB, and PSBLIB.
7. If DBRC was configured to refer to the IMS catalog for database definitions, reconfigure DBRC to refer to the DBDLIB instead by issuing the **CHANGE.RECON** command with NOCATALG specified.
8. Restart the IMS system.

What to do next

Remove the MANAGEDACBS control statement from the JCL for the IMS Catalog Populate utility (DFS3PU00) before running the utility again on a system that uses ACB libraries.

If necessary, revert any tools or products that were updated to run in the IMS-managed ACBs environment so that they use the ACB, DBD, and PSB libraries again.

Falling back from IMSRSC repository support for dynamically defined MSC resources

You can fall back from an IMS system that has IMSRSC repository support for dynamically defined MSC resources to an earlier version of IMS.

Procedure

1. Keep your stage 1 system definition synchronized with dynamic definition of MSC resources.
2. Issue the **DELETE DEFN** command for all of the MSC resource types that have resource definitions in the IMSRSC repository for the IMS that is falling back. Issue the **DELETE DEFN** command with keywords FOR(IMSID(IMS1)) and NAME(*) for each MSC resource type.

   For example, if IMS1 is falling back, to delete all MSC resources, issue the following commands in the following order:

   ```
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(TRAN)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(LTERM)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSNAME)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSLINK)FOR(IMSID(IMS1))
   DELETE DEFN TARGET(REPO) NAME(*) TYPE(MSPLINK)FOR(IMSID(IMS1))
   ```
3. Run system generation for stage 1 system definition that includes MSC resources, which are the following:
   - MSPLINK, MSLINK, MSNAME, and NAME macros
   - IMSCTRL macro with MSVID and SYSTEM=(MSVERIFY) parameters specified
   - APPLCTN and TRANSACT macros with the SYSID parameter specified
4. Restore old copies of MSC user exits.
5. Restore old copies of automation programs that issue QUERY LTERM, QUERY MSLINK, QUERY MSNAME, and QUERY MSPLINK commands and parse the output.
6. Remove new MSC parameters from the DFSDFxxx member of the IMS PROCLIB data set.
7. Cold start IMS at a previous IMS release level.
8. Complete other pertinent tasks related to falling back to a previous version of IMS.
9. Confirm that dynamic definition is disabled for MSC resources by issuing the QUERY MEMBER TYPE(IMS) command, and ensuring that the command output does not include DYNMSC in the local attributes.

WADS fallback considerations

When you fall back from IMS 15.5 to a previous version of IMS, ensure that the WADS is allocated consistently with the prior version.

You must use a non-VSAM WADS data set in an IMS system of previous version.

If you defined WADS data set names for IMS 15.5 during migration that were different from the names used by the previous IMS version, use the previous names for fallback. The fallback process replaces the reference to the WADS data sets systematically. Otherwise, the WADS must be deleted and redefined after the IMS 15.5 system is shut down, and before the system is started at the previous IMS version.

At the end of fallback, cold start IMS with the **FORMAT ALL** or **FORMAT WA** keyword.

Chapter 5. Coexistence with IMS 15.5

Restrictions and compatibility considerations apply for coexistence of IMS 15.5 with earlier versions of IMS.

If an IMS 15.5 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 13 and IMS 14 must have certain APARs installed to coexist with IMS 15.

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 and click **Support**.

Table 11. APARs and PTFs needed for IMS 15 coexistence with IMS Version 13 and IMS 14

IMS 15.5 function	IMS Version 13 coexistence APAR/PTF	IMS 14 coexistence APAR/PTF	Additional information
DBRC RECON data sets	PI62555/UI44432	PI62558/UI44433	For more information, see "DBRC coexistence considerations" on page 63.
IMSRSC support for MSC	PI49334/UI32565	PI49208/UI32429	
IMS repository enhancements - Automatic export	PI27285/UI23504	No APAR needed	
OTMA TPIPE Parallelism Coexistence	PM93878/UK98632	No APAR needed	
IMS Managed ACB Coexistence	None	• PI79314/UI51473/UI51474 • PI82331/UI51271/UI51272	

Determining which coexistence service needs to be installed

You can identify the outstanding service that needs to be installed on your IMS Version 13 and IMS 14 systems to enable them to coexist with IMS 15 by using SMP/E and the IMS 15 FIXCAT category.

About this task

The FIXCAT category for IMS 15 is `IBM.Coexistence.IMS.V15` with the keyword `IMSV15COEX/K`.

The following is an example of the steps to determine what IMS service needs to be installed on IMS Version 13 or IMS 14 to coexist with IMS 15:

Procedure

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 13 or IMS 14 zone (for example):

```
SET BOUNDARY (GLOBAL) .
    REPORT MISSINGFIX ZONES (targetzone)
```

Related information

Enhanced HOLDDATA for z/OS

IBM Fix Category Values and Descriptions

General coexistence considerations

Although IMS 15 can coexist with earlier versions of IMS, general coexistence considerations apply.

IMS 15 can coexist with earlier versions, so existing applications and data can be used without change. Migration and coexistence support is provided for IMS Version 13 and IMS 14.

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 15 SVCs are downward compatible with IMS Version 13 and IMS 14. Only IMS 15 requires the IMS 15 SVCs.
- 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 15.5, see Chapter 8, “Log record changes in IMS 15.5,” on page 75.
- **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 15.5 have specific coexistence considerations.

The following topics describe specific coexistence considerations for IMS 15.5.

Common Queue Server coexistence considerations

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

IMS 15 introduces the CQS automatic structure checkpoint function. An IMS 15 or later CQS that uses automatic structure checkpoint can coexist with IMS Version 13 and IMS 14 CQSs that are connected to the same shared queue structure. However, you can specify **STRCHKPT=** in the CQSSLxxx member of the IMS PROCLIB data set only in IMS 15 CQSs. Only IMS 15 or later CQSs can trigger automatic structure checkpoints, but all versions of CQS participate in the checkpoints.

General CQS coexistence rules

An IMS 15 CQS is downward compatible with IMS Version 13 and IMS 14. However, a CQS of an earlier IMS version is not upward compatible with a CQS of a later IMS version. The following general coexistence rules apply to CQS in IMS 15 at all IMS 15 release levels:

- An IMS Version 13 or an IMS 14 can register with an IMS 15 CQS.
- An IMS 15 cannot register with a pre-IMS 15 CQS.

- An IMS 14 cannot register with a pre-IMS 14 CQS.
- An IMS Version 13 cannot register with a pre-IMS Version 13 CQS.
- User or vendor-written CQS clients that want to register with an IMS 15 CQS must be compiled with IMS Version 13 or later CQS macros.
- User or vendor-written CQS clients that are compiled with the IMS 15 CQS macros cannot register with a pre-IMS 15 CQS.
- User or vendor-written CQS clients that are compiled with the IMS 14 CQS macros cannot register with a pre-IMS 14 CQS.
- 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.
- An IMS Version 13 CQS, an IMS 14 CQS, and an IMS 15 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 15 CQS supports clients that are assembled with the IMS Version 13, IMS 14, or IMS 15 CQS macros.
- A client that is assembled with the IMS 15 CQS macros can register only with an IMS 15 CQS. The IMS 15 client cannot register with an IMS Version 13 or an IMS 14 CQS. Similarly, a client that is assembled with the IMS 14 CQS macros cannot register with an IMS Version 13 CQS.

DBRC coexistence considerations

An IMS 15 Database Recovery Control (DBRC) instance can coexist with an IMS Version 13 DBRC or an IMS 14 DBRC if you install the DBRC coexistence small programming enhancements (SPEs) to the IMS Version 13 or IMS 14 systems, and upgrade your RECON data set to the IMS 15 format by issuing a **CHANGE.RECON UPGRADE** command. Additional coexistence considerations apply to other DBRC functions.

SPEs are available for IMS Version 13 and IMS 14 that enable the coexistence of the earlier version DBRC with DBRC for IMS 15. With the appropriate SPE installed, IMS 15 and earlier version DBRCs can share the upgraded RECON data set. If the RECON data set has not been upgraded to IMS 15, 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 15.

The following coexistence SPEs must be installed to the IMS Version 13 or IMS 14 DBRC for coexistence purposes:

- IMS Version 13: PI62555
- IMS Version 14: PI62558

Restriction: After a RECON data set is upgraded to the IMS 15 level, it is not accessible to any pre-IMS 15 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 15 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 15.5 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 version that created the logs. For example, an IMS 14 Batch Backout utility cannot back out logs that were created on IMS 15.

The Database Recovery and Change Accumulation utilities must be run on the IMS version that is the same as the highest level of the logs that are being used. For example, an IMS 14 Database Recover utility can use logs that were created on IMS Version 13 or IMS 14, but not on IMS 15.

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.

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 15 DBRC uses time-stamp precision to the microsecond.

Recommendation: Use DBRC with all IMS 15 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 version level as the utility program. Otherwise, the results are unpredictable and the output is unreliable.

Restrictions:

- IMS 15 utilities must be used whenever the input data for a DBDS contains log, image copy, or change accumulation records created by the IMS 15 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 14 utilities can process either IMS Version 13 or IMS 14 log records, but cannot process IMS 15 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 15 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 15 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.

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 66
The IMS repository function in IMS 15 can coexist with lower-level versions of IMS.

Exit routine coexistence considerations

Exit routines that run in IMS Version 13 or IMS 14 will work without modification in IMS 15. 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.

Related concepts

“Exit routine migration considerations” on page 42
There are migration considerations for some exit routines when you migrate to IMS 15.5.

Fast Database Recovery (FDBR) coexistence considerations

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

Coexistence considerations for DEDBs with more than 2048 areas

IMS 15 Fast Path DEDBs with more than 2048 areas are supported only in IMS 15.1 and later. You must install APAR PH12671 and enable the enhancement on all the IMSs that share a DEDB with more than

2048 areas. If an IMS does not have this APAR installed and attempts to open a DEDB with more than 2048 areas, opening the database will fail.

For IMS 15.1 and later, the maximum number of areas for a DEDB is 9999.

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 added to the IMS catalog either by DDL or by using the generation and population utilities that are provided with that release.

Earlier versions of IMS cannot process any segments or fields that are added to the IMS catalog DBD by a new release of IMS.

IMS ACB management coexistence considerations

Before you enable the IMS management of ACBs for the first time in a data sharing environment, migrate all IMS Version 13 and earlier systems in the data sharing group to the new IMS release.

After all IMS systems that share an IMS catalog are migrated to the new release, IMS systems that use DBD, PSB, and ACB libraries can coexist in the data sharing group with IMS systems that use IMS-managed ACBs. However, the ACB, DBD, and PSB libraries must be kept in sync with the IMS catalog. Changes made to databases and program views in an IMS catalog that is enabled for ACB management are not automatically propagated to IMS systems that still use ACB, DBD, and PSB libraries.

To ensure that the ACB, DBD, and PSB libraries are consistent with the resources in an IMS catalog that is enabled for IMS ACB management, use one of the following methods:

- Use the IMS Catalog Library Builder utility (DFS3LU00) to create the ACB, DBD, and PSB libraries for the IMS systems that still require them from the active databases and program views in the IMS catalog. This method establishes the IMS catalog as the definitive source of active database and program views for all IMS systems. This is the recommended method.
- Use the generation utilities to create the ACB, DBD, and PSB libraries for all IMS systems. Distribute them among the IMS systems that still require them and use them to populate the IMS catalog.

Related reference

IMS Catalog Library Builder utility (DFS3LU00) (System Utilities)

IMS repository function coexistence considerations

The IMS repository function in IMS 15 can coexist with lower-level versions of IMS.

When you specify the EXPORTNEEDED control statement on the Create RDDS from Log Records utility (DFSURCL0), it is recommended that you run the same version of the DFSURCL0 utility as the version of the IMS that produced the IMS logs being used as input. For example, use the IMS 14 DFSURCL0 utility with IMS 14 log data sets. Otherwise, the results can be unpredictable.

Automatic export to the IMSRSC repository is supported only by an IMS 14 Resource Manager (RM) or later. Any lower-level RM systems that receive a request to update the repository for an automatic export

will fail. IMS Version 12 APAR PI27283 and IMS Version 13 APAR PI27285 are open for the coexistence to not support RM to handle the AUTOEXPORT parameter. It is recommended that you enable automatic export to the IMSRSC repository only after all RM systems have been migrated to IMS 14.

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 13, using DRD with an RDDS.
- IMSB is running IMS 14, using DRD with an RDDS.
- IMSC is running IMS 15 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.

   If AUTOEXPORT=AUTO is enabled, the changes are written to the system RDDS at IMSA and IMSB at the next checkpoint and to the IMSRSC repository for IMSC at the next checkpoint.
4. Work for the transaction is restarted.

Important: During migration to IMS 15, IMSRSC repository is enabled if the DFSDFxxx member has AUTOEXPORT=AUTO explicitly defined and autoexport export to the IMSRSC repository is enabled after IMS 15 is cold started. Any resource definition changes (creates and updates) will be automatically exported to the IMSRSC repository at the next checkpoint.

If you do not want to enable the autoexport to the IMSRSC repository, you must remove the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member and let it default to AUTO or you must modify the member to either of these values:

AUTOEXPORT= NO for no autoexport
AUTOEXPORT = RDDS for autoexport to the RDDS

To enable autoexport to the IMSRSC repository, you must modify the AUTOEXPORT= parameter in the DYNAMIC RESOURCES section of the DFSDFxxx member to specify AUTOEXPORT=AUTO or AUTOEXPORT=REPO. In Scenario 1, if IMSC has AUTOEXPORT=AUTO explicitly specified, autoexport to the IMSRSC repository is enabled. To disable autoexport, modify the DFSDFxxx member for IMSC to specify AUTOEXPORT= NO.

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 13, using DRD with an RDDS, and using an IMS 15 CSL.
- IMSB is running IMS 14, using DRD with an RDDS, and using an IMS 15 CSL.
- IMSC and IMSD are running IMS 15 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 TAEGET(RDDS)** command.
8. Work for the transaction is restarted.

Coexistence with IMS Version 13

The following IMS Version 13 APAR/PTF must be installed in an IMS Version 13 system to enable coexistence between an IMS 15 Resource Manager (RM) instance and an IMS Version 13 RM instance:

PI27285/UI23504
Prevents an IMS Version 13 RM address space from processing requests for automatic export to the IMSRSC repository from an IMS 15 system.

IMS Connect coexistence considerations

The IMS 15 IMS Connect function supports IMS 14 and IMS Version 13, although new functions might not be available when connecting with the older versions.

IMS Connect instances from IMS 14 or IMS Version 13 might also be able to connect to an IMS 15 system, but coexistence APARs might be required.

- Support for cascading global transactions from the IMS TM resource adapter to an IMS TM system on a different LPAR is supported only after both IMS Connect and the IMS control region are migrated to IMS 14.

  If IMS Connect receives a global transaction from IMS TM resource adapter when IMS Connect and IMS are not on the same LPAR and either IMS Connect, IMS, or both, are not at IMS 14, the transaction is rejected with a NAK message that includes a sense code of X'2F'.
- IMS Version 12 and IMS Version 13 instances of IMS Connect can connect to OTMA tpipes that support parallel processing of RESUME TPIPE requests after the appropriate coexistence APARs are applied. The APARs are required only for IMS Version 12 and IMS Version 13 instances of IMS Connect that connect to tpipes in which tpipe parallelism is enabled.

  Previous versions of IMS Connect require these compatibility fixes:

  – IMS Connect Version 13 APAR/PTF PM93878/UK98632
  – IMS Connect Version 12 APAR/PTF PM93880/UK98633
- IMS 15 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.

MSC coexistence considerations

You can connect an IMS 15 Transaction Manager subsystem to other supported versions of IMS by using Multiple Systems Coupling (MSC).

The following IMS versions can coexist with an IMS 15 system in an MSC network:

- IMS 14 (5635-A05)
- IMS Version 13 (5635-A04)

For an IMS that was generated with MSC resources to coexist with IMS 15, any MSC user exits that access MSC LLB control blocks (logical links) or MSC LCB control blocks (physical links) must be changed to access those blocks using callable services or DSCBTS services. This change is required regardless of whether dynamic MSC is enabled.

You might need to update an MSC resource definition in an IMSplex in which an IMS 15 system that uses an IMSRSC repository coexists with an IMS Version 13 or earlier IMS system. In this scenario, the MSC resource updates that are made on the IMS 15 system by using the **UPDATE** commands must be made on the IMS Version 13 or earlier IMS systems by coding stage-1 system definition macros.

If the IMSRSC repository support for dynamically defined MSC resources is enabled for IMS 15, apply the following coexistence APARs to the RM systems in the IMSplex:

- IMS 14: APAR/PTF PI49208/UI32429
- IMS Version 13: APAR/PTF PI49334/UI32565

Use one of the following methods to install the coexistence APARs that are listed in the preceding list:

- First, install IMS Version 13 APAR/PTF PI49334/UI32565, and the IMS 14 preconditioning APAR/PTF PI49208/UI32429 on all RM systems in the IMSplex. Then, install the IMS 14 preconditioning APAR/PTF PI45186.
- Install all of the following APARs on all RM systems in the IMSplex at the same time:
  - IMS Version 13 APAR/PTF PI49334/UI32565
  - IMS 14 preconditioning APAR/PTF PI49208/UI32429
  - IMS 14 preconditioning APAR/PTF PI45186

Network security credential propagation enhancement coexistence considerations

The network security credential propagation enhancement introduces some specific considerations for coexistence with IMS 15.5.

If network security credentials are sent from a client application of IMS TM resource adapter, the credentials can be passed to IMS and audited in IMS log records only if IMS, IMS Connect, and IMS TM resource adapter are all Version 15 or later. If network security credentials are included in messages from IMS TM resource adapter Version 15 and IMS Connect is Version 14 or earlier, the messages are sent to IMS Connect without the network security credentials, even if the IMS system is Version 15 or later. If network security credentials are sent from IMS TM resource adapter Version 15 and the IMS system is V14 or earlier system, you must modify the HWSJAVA0 user message exit to remove the network security credentials from the security-data section of the OTMA message prefix.

If network security credentials are sent from a user-written client application that uses the HWSSMPL0 or the HWSSMPL1 user message exit, the credentials can be passed to IMS and audited in IMS log records only if IMS and IMS Connect are both Version 15 or later. If network security credentials are sent from an application that uses HWSSMPL0 or the HWSSMPL1 and IMS Connect is Version 14 or earlier, the IRM extensions that contain the network security credentials are ignored, even if the IMS system is Version 15 or later. If network security credentials are sent from an application that uses HWSSMPL0 or the

HWSSMPL1 and the IMS system is Version 14 or earlier, the user message exit removes the security credentials from the OTMA message prefix.

If network security credentials are included in IMS callout messages to IMS TM resource adapter Version 14 or earlier, the credentials are removed from the callout messages.

Open Database coexistence considerations

Coexistence restrictions apply to the use of Open Database.

The IMS Universal drivers that come with IMS 15 can be used by Java applications that access IMS 14 databases as long as all the IMS systems are part of a mixed-version IMSplex that includes an IMS 15 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 CSLDC*xxx* member of the IMS PROCLIB data set.

Shared message queue coexistence considerations

Instances of IMS Version 13, IMS 14, and IMS 15 can share an IMS message queue in an IMSplex.

Syntax Checker coexistence considerations

The IMS 15 Syntax Checker supports IMS Version 13, IMS 14, and IMS 15.

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

Restrictions for IMS 15.5 during coexistence

There are no general restrictions for IMS 15.5 in a coexistence environment; however, certain restrictions apply to new functions.

Chapter 6. Command changes in IMS 15.5

In IMS 15.5, a number of commands have been enhanced to support new functionality and some commands have been removed.

Disablement of Extended Recovery Facility (XRF)

As of IMS 15.2, Extended Recovery Facility (XRF) is no longer supported.

For IMS 15.2 or later, the following XRF-related commands are no longer accepted:

/ERESTART BACKUP
To manually restart the IMS alternate system in an XRF complex.

/DISPLAY HSB
To display the system-related information in an Extended Recovery Facility (XRF) environment.

/SWITCH
To switch active data sets or to change between the active and alternate systems.

/START SURV
To start the operation of the IMS surveillance function in an XRF environment.

/STOP SURV
To stop the operation of the IMS surveillance function in an XRF environment.

INIT OLC command enhancement

The **INIT OLC TYPE(ACBMBR)** command has new option called BLDPSBNO with APAR PH16612.

The BLDPSBNO option enables you to change DBDs that do not have structural updates.

CREATE IMCON command enhancement

The IMS compliance control block support introduces the following updates:

- A new return code X'0C000014' with the reason code X’00005000’ in **CREATE IMSCON TYPE(DATASTORE)** command
- A new completion code 53 in **CREATE IMSCON TYPE(IMSPLEX)** command

IMS ALTPCB enhancement for IMS Connect

The SENDALTP keyword is introduced in the following commands:

- **CREATE OTMADESC** command
- **UPDATE OTMADESC** command
- **VIEWHWS** command
- **VIEWDS** command
- **CREATE IMSCON TYPE(DATASTORE)** command
- **UPDATE IMSCON TYPE(CONFIG)** command
- **UPDATE IMSCON TYPE(DATASTORE)** command
- **QUERY IMSCON TYPE(CONFIG)** command
- **QUERY IMSCON TYPE(DATASTORE)** command

Chapter 7. Message and code changes in IMS 15.5

IMS 15.5 includes new and changed messages and codes. Also, many messages were deleted from IMS 15.5.

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 IMS 15.5

When new messages and codes are introduced to IMS 15.5, they will be included in this topic.

New DFS messages

The following messages are new:

DFS9003E
DFS9004E
DFS9005E
DFS9006E
DFS9007E
DFS9035E
DFS9036E
DFS9037E
DFS9038E
DFS9039E
DFS9040E
DFS9041E
DFS9042E
DFS9043E
DFS9044E
DFS9045E
DFS9046E
DFS9047E
DFS9048E
DFS9049E
DFS9050I
DFS9051I
DFS9052E
DFS9053I
DFS9054I
DFS9055E
DFS9056E
DFS9057E
DFS9058E
DFS9128I

New HWS messages

The following messages are new:

HWSJ2720W
HWSJ2725W

Changed messages and codes for IMS 15.5

When messages and codes are changed in IMS 15.5, they will be included in this topic.

Changed BPE messages

The following messages are changed:

BPE0045E

Changed DFS messages

The following messages are changed:

DFS2342E

Changed component codes

The following component codes are changed:

BPE abend code 3400

Deleted messages and codes for IMS 15.5

When messages and codes are deleted from IMS 15.5, they will be included in this topic.

Chapter 8. Log record changes in IMS 15.5

The following table lists the log records that are new or changed in IMS 15.5.

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 15.5 enhancements

The enhancements to introduced in IMS 15.5 span the following areas of IMS: system definition, administration, troubleshooting, and reference.

The following topics provide planning information for the enhancements to IMS 15.5.

Chapter 9. IMS enhancement PTFs

Until a new version of IMS is released, IBM continues to enhance the most recently released version of IMS. The enhancements, which can include one or more new IMS functions or support for new technologies or products, are released as PTFs.

The following topics provide an overview of the IMS continuous delivery model and a list of the newest IMS functions.

The IMS continuous enhancement process

IMS uses a continuous delivery model to enhance the most recent in-service version of IMS. In the continuous delivery model, as soon as new IMS function or support for new technology is developed and tested, it is immediately released in a PTF.

Continuous delivery enhancements are applied only to the most recent in-service version of IMS. As soon as a new version of IMS is released, continuous delivery enhancements are applied only to the new version of IMS, and the previous version is designated as a long term support release and is no longer enhanced.

The continuous release of enhancements delivers the IMS functionality and IMS support for new technology that your business needs when your business needs it, without having to wait for a new version of IMS.

The continuous release of enhancements also delivers even higher quality code, because enhancements are delivered when they are ready, without the pressure to match the development and test schedule of a particular enhancement to the schedule of a major release that was set before development on the enhancement even began.

Enhancements that are delivered in function-level releases do not require you to reinstall IMS to adopt new functions or enable new support. Most new functionality or support for new technology that would require you to reinstall IMS or that would be particularly disruptive to your IMS installation is held for delivery on a release boundary.

Some new IMS functions affect IMS Tools. To keep your IMS Tools working as expected, you must apply the APARs/PTFs specified in the 'IMS Tools' column. For a list of functions delivered as part of the continuous delivery process for the IMS Tools family of products, see IMS Tools: New Functions Available via Continuous Delivery.

Some new functionality remains disabled by default after you install the PTF, so that you can enable it when you're ready. You can dynamically enable some of the disabled enhancements by using the **UPDATE IMSFUNC** command. Or, you can enable the function statically at IMS cold start by defining the parameter for the function in the applicable member of the IMS PROCLIB data set. Other new functionality, due to either technical or strategic requirements or because it has no impact until you choose to use it, is enabled by default after you install the PTF.

IMS 15.5 Database Manager continuous delivery functions

IMS 15.5 Database Manager functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 12. IMS Database Manager continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
IMS Data Definition utility (DFS3ID00) DLIBATCH enhancement The IMS Data Definition utility (DFS3ID00) DL/I batch enhancement improves the DFS3ID00 utility, allowing it to be run in a DL/I batch region.	PH51761/ UI91330 June 2023	15.4 and later	No	Not impacted
"IMS Catalog Maintenance utility (DFS3CM00) enhancement" on page 99 The IMS Catalog Maintenance utility (DFS3CM00) fixes incorrect entities in the catalog such as header timestamps and PARTYPE values. It can be run in either a DL/I region or a BMP region.	PH47533/UI91647 May 2023	15.1 and later	Yes	Not impacted
"Bypass extent check for DEDB data sets" on page 99 This enhancement is added to the available Fast Path options. When enabled, it specifies that normal extent checking may be suspended while data is being written.	PH26898/UI91084 March 2023	15.1 and later	No	Not impacted
IMS Data Definition utility (DFS3ID00) enhancement The IMS Data Definition utility (DFS3ID00) submits Data Definition Language (DDL) SQL statements natively without the need of IMS Connect and ODBM address spaces.	PH43314/PTF UI79944 July 2022	15.3 and later	No	Not impacted
"IMS catalog API enhancement" on page 101 The GET functions of the IMS catalog API are enhanced so that you do not need to return the extended attribute table in a DBD. This parameter is valid only for the **FORMAT=DBDLIB** parameter.	PH39492/UI80985 June 2022	15.1 and later	Yes	Not impacted
"IMS Catalog Library Builder utility (DFS3LU00) enhancement" on page 102 The IMS Catalog Library Builder utility (DFS3LU00) is enhanced to build GSAM resources.	PH30248/UI79185 February 2022	15.1 and later	Yes	Not impacted
"IMS restricted updates" on page 102 This enhancement ensures that the consistency of data is maintained between active and standby sites in an IMS replication environment by allowing only the replication program, database utilities, and authorized users to make updates to the databases at the standby site.	PH26604/UI79023 January 2022	15.1 and later	No	Not impacted

Table 12. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"Increased number of areas for Fast Path DEDBs" on page 105 This enhancement allows up to 9999 areas per database.	PH12671/UI78774, UI78775 January 2022	15.1 and later	Yes	IMS Fast Path Solution Pack: PH35790/ UI78785 IMS Recovery Solution Pack: PH43903/UI79415 IMS Tools Base: PH37927/UI77431, PH36800/ UI75486 Others: Not impacted
"IMS catalog API enhancement" on page 101 The IMS catalog API can support up to 36 concurrent FUNCTION=OPEN requests. Up to 36 OPEN requests can be active at one time if the system-generated DDname is available and there are no environment limits.	PH25400/UI71469 September 2020	15.1 and later	Yes	Not impacted
"Catalog Populate utility batch logging enhancement for GSAM resources" on page 105 The IMS Catalog Populate utility (DFS3PU00) is enhanced with a new parameter **GSAMPCB** to indicate GSAM resources in MANAGEDACBS= STAGE or UPDATE mode running in DLI using PSB DFSCP001.	PH10634/UI69598 May 2020	15.1 and later	Yes	Not impacted
"DBRC managed ACB staging directory command support" on page 105 If the IMS management of ACBs is enabled, you now can get database definition information from the staging directory or the active directory.	PH17441/UI69829 June 2020	15.1 and later	No	Not impacted
"GSAM DBD enhancement" on page 106 To eliminate the need for an ACBGEN of a PSB that references a GSAM DBD, you can now use a new GSAM parameter, **gsamdbd**, with the STAGE and UPDATE parameters when you use the IMS Catalog Populate utility.	PI96542/UI67109 December 2019	15.1 and later	No	Not impacted
"IMPORT DEFN SOURCE(CATALOG) command enhancements" on page 106 Use the **IMPORT DEFN SOURCE(CATALOG)** command to activate application and database resource definitions (PSBs and DBDs) in an online IMS system by importing them from the staging data set of the IMS catalog.	PI83433/UI65332 September 2019	15.1 and later	No	Not impacted

Table 12. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"IMPORT DEFN SOURCE(CATALOG) command enhancements" on page 106(NOCHECK option) If **OPTION(NOCHECK)** is specified, the **IMPORT DEFN** command imports database changes that are created without their associated PSBs that are included in the staging directory by using the DFS3UACB utility with **BLDPSB=NO** parameter or DDL ALTER.	PH09142/UI64750 August 2019	15.1 and later	No	Not impacted
"GSAM processing data set pre-allocation for the IMS Catalog Populate (DFS3PU00) utility" on page 106 Use the IMSDG001 DD statement to define an empty work data set to be temporarily used as an IMS.ACBLIB data set for the IMS Catalog Populate utility (DFS3PU00) when the IMS management of ACBs is enabled. Use this DD statement to define a work data set manually instead of the DFS3PU00 utility dynamically creating and deleting a work data set.	PI96063/UI55336 April 2018	15.1 and later	No	Not impacted
"Fast Path DEDB area data sets (ADS) encryption" on page 107 You can encrypt Fast Path DEDB area data sets (ADS) by specifying a key label with it.	PI83756/UI53418 April 2018	15.1 and later	No	IMS Fast Path Solution Pack: IMS Tools and data set encryption support Others: Not impacted
"IMS catalog API enhancement" on page 101(CATALOG API ENHANCEMENTS TO OPEN, LIST, GET AND CLOSE FOR BOTH) Allows both the staging and the directory data sets of the IMS catalog to be accessed by using a single OPEN, GET, and LIST request.	PI84981/ UI53467PI84986/ UI54029 February 2018	15.1 and later	Yes	Not impacted
"IMS catalog API enhancement" on page 101 (CATALOG API DFS3CATQ - AUTO DETECT OF THE BSDS HLQ) The HLQ request allows the boot strap data set (BSDS) name to be discovered automatically for the IMS catalog API OPEN request.	PI90082/UI55179 April 2018	15.1 and later	Yes	Not impacted
"ODBM Security Options Enhancement" on page 108 Use the **ODBMSECURE** parameter to specify whether IMS performs security checking on a PSB resource for an ODBM thread at the time of the allocate PSB (APSB) request.	PI94682/UI56399 June 2018	15.1 and later	No	Not impacted

Table 12. IMS Database Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"Preallocation of ADS for DEDB created by DDL with SDEP defined" on page 108 Use the **PREALLOC=** parameter in the DFSDFxxx member to preallocate area data sets (ADS) for data entry database (DEDB) with segment dependent (SDEP) segments defined.	PI79109/UI53032 January 2018	15.1 and later	No	Not impacted
"Fast Path secondary index database maintenance enhancement" on page 108 You can use the **FPSISETI=** parameter to allow or prevent Fast Path secondary index database maintenance.	PI96872/UI57675 August 2018	15.1 and later	No	Not impacted
"DFS982I message text enhancement" on page 109 The batch and online message DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue in the message text.	PI95617/UI56768 June 2018	15.1 and later	Yes	Not impacted
"DFS1769W error code enhancement" on page 109 This enhancment adds error code 06 to the message text, which indicates that a **/DBD** or **/DBR** command is in progress against the IMS catalog database.	PH02205/UI58583 September 2018	15.1 and later	Yes	Not impacted
"Data capture suppression enhancement" on page 110 The enhancement allows you to prevent the Data Capture exit routine from being called for updates from a CCTL or ODBM address space.	PH00728/UI59377, UI59378 November 2018	15.1 and later	No	Not impacted
"DCCTL enhancement to support IMS management of ACBs" on page 110 IMS management of ACBs was not supported in a DCCTL environment. This enhancement adds support for IMS management of ACBs in a DCCTL environment.	PI89178/UI59937 November 2018	15.1 and later	No	Not impacted

IMS 15.5 system continuous delivery functions

IMS 15.5 system functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 13. IMS system continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS 15.5 release overview" on page 134 IMS uses a continuous delivery model to enhance the most recent in-service version of IMS. Instead of performing a full installation of IMS, you can migrate to IMS 15.5 from prior IMS 15.x releases by applying APAR PH59051. After the migration, output locations, including the output of the messages, commands, and log records that reflect IMS versions, are updated to 15.5.	PH59051/UI96269, UI96270, UI96271, UI96272, UI96273 June 2024	15.5	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"RACF PassTicket support for commands from IMS Connect to IMS OM" on page 132 This enhanced support enables IMS Connect users to authenticate user IDs for IMS Connect connections to IMS Operations Manager by using RACF PassTickets. The IMS Connect API (ICON API) for Java is also enhanced to accommodate this enhancement.	PH51844/UI92221 July 2023	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	• IMS Administration Foundation (IMS Tools Base 1.7: PH55878/ UI93094) • Others: Not impacted
"INQY ENVIRON2 enhancement" on page 135 The new INQY call ENVIRON2 subfunction returns more information about an IMS execution environment than the ENVIRON subfunction. ENVIRON2 returns fields such as primary and active JVM addressing modes, Managed ACB activation, IMS installed version, and IMS function level.	PH45098/UI90543 February 2023	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	• IMS Batch Terminal Simulator 4.1: PH57710/ UI94994 • Others: Not impacted
"Non-stop PSB after an application abends in a non-message-driven BMP region" on page 136 With this enhancement, you can program the Non-Discardable Messages exit (DFSNDMX0) to control programs after an application abends in a non-message-driven BMP region. To do so, this enhancement provides new keywords that you can use with the optional **NDMX_CALLED_FOR()** parameter.	PH41104/UI90217 January 2023	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: Yes	IMS Extended Terminal Option Support 3.2: PH49840/UI82787 Others: Not impacted
"IMS JDBC Map Case enhancement" on page 136 If you use a SQL SELECT * statement and a WHERE clause with the IMS Universal JDBC driver to retrieve map case fields from a segment, the returned results include all fields by default. You can simplify your results by using the **removeInvalidCaseFields** property to remove case fields from the result set that do not satisfy the DEPENDINGON field condition in the WHERE clause.	PH48054/UI82397 September 2022	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS Connect send-only with error protocol enhancement" on page 136 IMS Connect clients can use the new send-only with error protocol to send transactions and receive errors that occur in IMS Connect. By using the send-only with error protocol, clients could receive responses for errors that occur in IMS Connect while maintaining the high throughput of the send only protocol.	PH41890/UI81659 July 2022	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: Not applicable	Not impacted
"IMS compliance control blocks support" on page 137 Operation Manager and IMS address spaces copy and consolidate internal compliance audit settings into new compliance data control blocks that are source-shipped. These address spaces then provide the address of the control blocks by using a z/OS® name and token pair with the name BPECOMPLIANCEDAT.	PH42600/UI80770 May 2022	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Not applicable	• IBM Security zSecure Suite 2.5.0: OA63173/ UJ08291 • IBM Z® Security and Compliance Center (IBM zSCC)
"IMS Fast Monitor (FASTMON) user exit enhancement" on page 138 The IMS Fast Monitor user exit (FASTMON) provides a programming interface to capture the same data that is available to the IMS Monitor. The IMS Fast Monitor (FASTMON) user exit, like the IMS Monitor (IMSMON) user exit, provides access to the IMS Monitor data without the need to modify IMS code.	PH24963/UI76510 July 2021	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Not applicable	Not impacted
"ACEE creation and management enhancement for ESAF Db2 interface" on page 139 The **ESAF_SIGNON_ACEE=YES | NO** option is added to the DFSJVMEV member of the IMS PROCLIB data set. You can use this parameter to enable the IMS system to create and manage the ACEE in a persistent JVM dependent region for ESAF threads.	PH33024/UI76067 June 2021	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"HEX and binary literal support in JDBC SQL queries" on page 140 IMS Universal JDBC Drivers support the usage of HEX and binary literals in SQL syntax. The supported SQL statements for literals include SELECT, INSERT, UPDATE, DELETE, and fields in the WHERE clause.	PH 25586/UI71410 September 2020	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS support for IBM z/OS Workload Interaction Correlator" on page 140 IBM z/OS Workload Interaction Correlator gathers statistical data from participating applications, and generates synchronized, standardized, summarized data across z/OS and middleware stack.	PH15062/UI70312 July 2020	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"IMS installed level enhancement in the IMS Monitor log record" on page 131 The IMS installed level is added to the IMS Monitor's start record, the X'4E90' record.	PH17307/UI68217 March 2020	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	IMS Performance Analyzer 4.4: PH22481/UI68673 IMS Problem Investigator 2.4: PH23704/UI69102 IMS Problem Investigator 2.5: PH23716/UI69234
"INIT OLC TYPE(ACBMBR) command enhancement" on page 141 The INIT OLC TYPE(ACBMBR) command has a new option called **BLDPSBNO**. The BLDPSBNO option enables you to change DBDs that do not have structural updates.	PH16612/UI67189, UI67190 December 2019	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted
"Overflow sequential access method (OSAM) data set encryption" on page 141 You can enable OSAM data set z/OS encryption, which allows you to enhance security without changes to applications and to reduce outages.	PI85987/UI66794, UI66795 December 2019	15.2 and later	• DBCTL: Yes • DCCTL: No • Batch: Not applicable	See IMS Tools and data set encryption support
"REXXIMS MAPDEF packed decimal function enhancement" on page 142 The IMS adapter REXXIMS is enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned (Z) data types.	PH16409/UI66831 December 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"Data privacy for diagnostics support for IMS 64-bit storage" on page 143 To protect sensitive diagnostic data that is sent to IBM or other third-party vendors, you can use a sample job that runs against an IMS dump to redact 64-bit storage objects that have been tagged as sensitive by IMS. Requests for certain 64-bit storage objects in IMS are made by specifying the **IARV64 SENSITIVE=** parameter to tag the storage as possibly containing or not containing customer-sensitive data.	PH14059/UI65556 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted
"Password phrase enhancement for IMS Connect" on page 127 IMS Connect is enhanced to support password phrases with 9 - 100 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines.	PH14651/UI65540 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"IMS installed level API (DFSGVRM) enhancement" on page 131 Use the DFSGVRM API to get the version, release, and modification level of an IMS system.	PH14457/UI65422, UI65423, UI65424, UI65425, UI65426 September 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	IMS Recovery Expert: PH19397/UI66692 IMS Cloning Tool 1.2: PH18926/UI66638 Others: Not impacted
"ByteBuffers in the IMS Universal JDBC and DL/I Interfaces" on page 143 All users of IMS Universal Driver running IMS 15 or later can use byte buffers as an I/O area to INSERT, SELECT, and UPDATE full segment areas from an SQL query. A new interface for issuing ICAL and enhanced support for Dynamic Arrays and ArrayResultSets have also been added.	PH14157/UI64958 August 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"ODBM RAS U210 prevention enhancement" on page 127 IMS Connect has been enhanced to prevent U210 abend in IMS when UDB applications terminate with work in progress.	PH07679/UI62878 July 2019	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"Dynamic enablement of zHyperWrite enhancement" on page 123 Dynamic enablement of zHyperWrite enhancement provides a new parameter, **ZHYPERWRITE**, to the **UPDATE IMS SET(LCLPARM)** command to allow you to dynamically enable or disable IBM zHyperWrite for the online log data sets (OLDS) and write-ahead log data set (WADS).	PH02149/UI61325 February 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"Database segment mapping enhancement" on page 143 The database segment mapping enhancement allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment without knowledge of the database schema.	PH05433/UI61285 February 2019 APAR PH03426 for IMS Universal Drivers October 2018 PI97302/ UI59327 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: No	Not impacted
"STOP REGION command enhancement" on page 144 The **/STOP REGION** command has a new **ABDUMP FORCE** keyword to terminate regions with a TERM PENDING or WAIT-INIT-INPROG status when a CREATE THREAD is not performed on IMS.	PH05432/UI60488 January 2019	15.1 and later	• DBCTL: Not applicable • DCCTL: Yes • Batch: Not applicable	Not impacted
"Starting Common Service Layer components enhancement " on page 145 This enhancement enables IMS to automatically start in an Resource Manager environment, the Operations Manager, Structured Call Interface (SCI), and RM address spaces of the CSL.	PH04044/UI60475 January 2019	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"IMS restart message enhancement" on page 145 Message DFS5055I is added to enable you to determine whether an IMS restart is in progress, completed, or hung.	PH01551/UI59302 27 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"Open Database Manager (ODBM) and JDBC driver support for INIT STATUS Group call" on page 146 ODBM allows an INIT STATUS GROUPx call from an application by using IMS Universal Drivers (UDB). Issuing the INIT STATUS GROUPA call avoids ABEND U3303 and issuing the INIT STATUS GROUPB call avoids ABEND U0777.	PH02698/ UI58748PH00366/ UI58745 October 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"RACF PassTicket support for DRDA clients enhancement" on page 128 RACF® PassTickets is used to authenticate users who access an IMS database from IMS Connect clients that use the Distributed Relational Database Architecture™™ (DRDA) protocol.	PI99040/UI58288 PH02135/UI58345 September 2018	15.1 and later	• DBCTL: Yes • DCCTL: No • Batch: Yes	IMS Connect Extensions 3.1: PH16143/UI65791 Others: Not impacted
"UPDATE TRAN command enhancement " on page 146 You can run the **UPDATE TRAN** command with the **PLCTTIME** attribute to specify whether or not dynamic resource definition (DRD) is enabled.	PH00581/UI58235 September 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Log record PARDLI flag enhancement" on page 147 The X'08' log record has been enhanced to include a flag that indicates the use of the parallel DL/I mode (PARDLI) of the IMS application region that an application has been scheduled into.	PI99293/UI58053 28 August 2018	15.1 and later	• DBCTL: No • DCCTL: No • Batch: No	Not impacted
"Displaying RACF sign-on messages" on page 132 You can configure IMS to pass RACF sign-on messages to the Greeting Message exit routine (DFSGMSG0) when sign-on is successful. You can code the DFSGMSG0 user exit routine to display or process the RACF messages to improve security and password management.	PI85328/UI57462, UI57463 July 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	IMS Extended Terminal Option Support 3.2: PH04092/UI60354 Others: Not impacted
"IMS Universal Database resource adapter connectivity enhancement for WebSphere Application Server Liberty" on page 147 The IMS Universal Database resource adapter is enhanced to provide type-2 and type-4 connectivity support for WebSphere Application Server Liberty.	PI95663/UI57273 July 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"IVP support for 8-character TSO/E user IDs on z/OS 2.3" on page 147 The IVP supports the use of 8-character TSO/E user IDs. This requires that IMS run on z/OS® 2.3 or later.	PI94550/UI56602 June 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted

Table 13. IMS system continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable environments	IMS Tools
"IMS Connect message HWSC0010I enhancement" on page 130 IMS Connect message HWSC0010I is enhanced to be issued after IMS Connect initialization is complete. With this enhancement, system administrators can start automated operations after message HWSC0010I is issued to ensure that their automated operations and requests are processed by IMS Connect.	PI91859/UI55921 May 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Generic return code enhancement for RACF verifications" on page 133(IMS CONNECT - RACFGENRC OPTION) The **RACFGENRC=** parameter is added to the HWS statement of the HWSCFGxx member of the IMS PROCLIB data set to allow you to specify whether a generic return code or message is returned by IMS Connect. The generic return code or message is issued if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.	PI94909/UI55527 April 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Generic return code enhancement for RACF verifications" on page 133 (IMS - SGNGENRC OPTION) The **SGNGENRC=** parameter for procedures is added to allow you to specify whether a generic return code is issued by IMS if RACF is used to verify sign-ons to IMS and the user ID or password provided is invalid.	PI95173/UI55198, UI55199 April 2018	15.1 and later	• DBCTL: No • DCCTL: Yes • Batch: No	Not impacted
"Data set support for zHyperWrite" on page 123 Specify whether to use zHyperWrite for writing data to the write-ahead log data sets (WADS) and online log data sets (OLDS). The command output of **/DISPLAY OLDS** shows whether zHyperWrite is used when data is written to the OLDS or WADS.	PI75575/UI54239 March 2018 PI82325/UI54815 April 2018	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: No	Not impacted
"Function level activation control enhancement" on page 147 Dynamically enable or disable new IMS functions that are delivered as PTFs under the IMS continuous delivery model without causing an IMS system outage. After you install a new IMS function, you control when to enable and disable the function by using the **UPDATE IMSFUNC** command.	PI83839/UI52153 December 2017	15.1 and later	• DBCTL: Yes • DCCTL: Yes • Batch: Yes	Not impacted

IMS 15.5 Transaction Manager continuous delivery functions

IMS 15.5 Transaction Manager functions are delivered using PTFs as part of the IMS continuous delivery enhancement process and allow you to use new enhancements faster and more frequently.

Table 14. IMS Transaction Manager continuous delivery enhancements

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"OTMA fast transaction pipe checkpoint cleanup (FASTTPCU) enhancement" on page 113 The OTMA fast transaction pipe checkpoint cleanup (FASTTPCU) enhancement increases the regularity of cleaning up idle stateless OTMA transaction pipe (tpipe) from three consecutive checkpoints to two consecutive checkpoints. As a result, IMS storage has more space cleared up for other uses.	PH52141/UI93586 November 2023	15.3 and later	No	Not impacted
"OTMA checkpoint statistics enhancement" on page 113 Two new x'45' statistic record subtypes are added, one for Global OTMA information (x'451A') and one for OTMA Member information (x'451B'). This provides an easier way to track OTMA statistics to aid in fine-tuning the system.	PH45589/UI93202 October 2023	15.1 and later	No	• IMS Problem Investigator with APAR PH55496/PTF UI92916 • IMS Performance Analyzer
"IMS ALTPCB enhancement for IMS Connect" on page 114 IMS introduces a new function, SENDALTP, for IMS Connect customers to obtain an ALTPCB output without issuing Resume TPIPE calls. When IMS receives a commit-then-send send-receive call from IMS Connect, an ALTPCB output triggered by the input transaction can be sent back to the initiating IMS Connect client by using the input TPIPE name.	PH39434/UI83360, PH39438/UI83364 November 2022	15.1 and later	No	Not impacted
31-bit COBOL and 64-bit Java interoperability (Application Programming) You can enable interoperability between 31-bit COBOL code and 64-bit Java™ code by adding value JVM=3164 to an IMS dependent region's parameter list, installing required software, and configuring the dependent region. Supported dependent region types include MPR, BMP, IFP, JBP, and JMP.	PH37140/UI78199 November 2021	15.1 and later	No	Not impacted

Table 14. IMS Transaction Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"Static VTAM transaction output security enhancement" on page 115 Static VTAM® terminals are enhanced with the ability to apply transaction output security checks to prevent unauthorized accesses from different users to transaction outputs. With this enhancement, you can enable output security for static VTAM terminals by specifying an optional parameter **STATICOUTSEC** in the DFSDCxxx member of the IMS PROCLIB data set.	PH24997/UI70314, UI70315 July 2020	15.1 and later	No	Not impacted
"OTMA lightweight transaction pipe enhancement" on page 116 The OTMA lightweight transaction pipe enhancement improves the flood control of OTMA transaction pipes (tpipes). By using the OTMA lightweight tpipe function, IMS reduces the storage for each tpipe by dynamically allocating the associated ITASKs and other tpipe related storage only when they are needed.	PH17832/UI68699, UI68700 April 2020	15.1 and later	No	Not impacted
"Enhancement for the processing of OTMA commit-then-send messages in shared-queues environments" on page 117 A new OTMA ITASK DFSYDAD0 is created through OID TCB to separately process OTMA commit-then-send back-end messages in a shared queues environment. As a result, the main OTMA ITASK DFSYMOM0 can focus on other important jobs.	PH02371/UI65336 September 2019	15.1 and later	No	Not impacted
"MFS sign-on format support for RACF password phrases" on page 118 You can use MFS for RACF password phrases that are up to 100 characters long and that are submitted from 3270 and SLU 2 devices through DFS3649A or DFS3656A.	PH09313/UI64359, UI64360 July 2019	15.1 and later	No	IMS Extended Terminal Option Support 3.2: PH14600/UI64580 Others: Not impacted
"OTMA ACEE flood control enhancement" on page 119 With this enhancement, you can enable OTMA ACEE flood control in the DFSOTMA descriptor of the DFSYDTx member of the IMS PROCLIB data set. When enabled, you limit the number of RACF user IDs, which in turn limits the number of ACEEs that are cached by OTMA and prevents virtual storage in the IMS control region from running out.	PI81171/UI62316, UI62317 April 2019	15.1 and later	No	Not impacted

Table 14. IMS Transaction Manager continuous delivery enhancements (continued)

Function description	APAR, PTF, and release date	IMS version	Applicable for batch environments?	IMS Tools
"Reduce LUMP storage for OTMA commit-then-send messages enhancement" on page 120 OTMA is enhanced to reduce the amount of storage that is allocated in LU 6.2 device manager private buffer pools and OTMA for commit-then-send (CM0) I/O PCB output messages.	PH00002/UI62030 March 2019	15.1 and later	No	Not impacted
"OTMA conversational transaction timeout enhancement" on page 120 You can configure IMS Open Transaction Manager Access (OTMA) to end conversational transactions and remove from storage the control blocks associated with those transactions if the transaction is inactive for a specified period of time.	PI94954/UI61211 February 2019	15.1 and later	No	Not impacted
Tpipe processing You can split OTMA client's ACK/NAK messages to a new IMS ITASK to avoid delay for tpipe processing.	PI96089/UI57596 August 2018	15.1 and later	No	Not impacted
"OTMA transaction pipe cleanup enhancement" on page 121 An OTMA tpipe is deleted after it has been idle across three consecutive system checkpoints, even if other tpipes associated with the same tmember are being used. Consequently, idle OTMA tpipes are made available more quickly to process subsequent transactions on the IMS message queue, and IMS storage space is less likely to become flooded.	PI88409/UI54735, UI54736 April 2018	15.1 and later	No	Not impacted
IMS ICAL processing IMS ICAL processing for synchronous program switch needs to support the DFSMSCE0 exit for workload router processing.	PI82826/UI52624 January 2018	15.1 and later	No	Not impacted

Chapter 10. IMS Database Manager enhancements

The IMS 15.5 enhancements to IMS Database Manager (IMS DB) include enhancements that enable dynamic database definition, enhancements to the Open Database Manager (ODBM), and other enhancements that improve usability and performance for users of IMS DB.

The Chapter 12, “IMS system enhancements,” on page 123 in IMS 15.5 might also impact IMS DB.

IMS Data Definition utility (DFS3ID00) DL/I batch enhancement

In IMS 15.4, the IMS Data Definition utility (DFS3ID00) has been enhanced to allow it to be run in a DL/I batch region.

Data Definition Language (DDL) SQL statements can be submitted with IMS Connect and ODBM address spaces. The DFS3ID00 utility performs this same task natively and writes the metadata for your application programs (PSBs) and databases definitions to the IMS catalog records and the runtime blocks to the staging directory data set.

In addition to allowing the utility to run in DL/I batch regions, this enhancement adds new ACTIVATE control options used to activate target runtime blocks while IMS is down.

This enhancement is delivered with APAR PH51761/PTF UI91330 and enabled by IMS 15.4.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

IMS Catalog Maintenance utility (DFS3CM00) enhancement

The IMS Catalog Maintenance utility (DFS3CM00) is added to fix incorrect entities in the catalog such as header timestamps and PARTYPE values.

The DFS3CM00 utility can be run in either a DL/I region or a BMP region.

This enhancement is delivered with APAR PH47533/PTF UI91647 and enabled by IMS 15.1.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Bypass extent check for DEDB data sets

In IMS 15.5, a bypass extent check enhancement for DEDB data sets is added to the available Fast Path options. When enabled, this enhancement specifies that normal extent checking may be suspended while data is being written.

Enabling this option could result in improved performance in certain cases when multiple applications are simultaneously reading or writing the same disk extent ranges. For example, users of HSSP or HSRE with a Metro Mirror configuration may benefit from use of this feature.

Normally, when your program writes on DASD, the DASD subsystem performs extent serialization that prevents all access to that extent from all other programs on all systems while data is being written.

This prevents other programs from reading and writing within the extent and from seeing certain types of incomplete updates. But if bypass extent check is enabled by coding BYPASS_EXTENT=Y in the FASTPATH section of the DFSDFxxx member, the DASD subsystem will serialize access to only one track at a time, not to the whole extent.

If you know that other programs might be reading the data set at the same time that your program is writing and that a mechanism exists within those other programs to avoid or tolerate potentially incomplete updates within an extent, then enabling bypass extent check could provide improved performance due to normal extent serialization being suspended.

This enhancement is delivered with APAR PH26898 (PTF UI91084).

Restrictions

When enabled, bypass extent check will function for all supported DEDB CI sizes except for:

- **3380 DASD:** 12 KB, 16 KB, 24 KB, and 28 KB
- **3390 DASD:** 20 KB and 28 KB

Coexistence considerations

It is acceptable to have bypass extent check enabled on one IMS and disabled on the other(s), but the bypass extent check option will not become active until it is enabled on all systems.

Log records

The following log records have been changed by this enhancement in IMS 15:

- **Checkpoint record 4080:** CHKRBEC flag is added to the CHKRSTF byte to indicate bypass extent check mode.

Changes to installing and defining IMS

After applying PTF UI91084 for APAR PH26898, you can enable the bypass extent check option by specifying BYPASS_EXTENT=Y in the FASTPATH section in the DFSDFxxx member. (The default is BYPASS_EXTENT=N).

Changes to troubleshooting for IMS

For a list of the messages and codes that are new or changed for this enhancement, see the IMS messages and codes row in the table in “Documentation changes” on page 100.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Documentation changes

The following table lists the publications that contain new or changed topics for the bypass extent check enhancement for DEDB data sets. Publications that are not impacted by this enhancement are not included in the table.

Table 15. Links to topics that have new or changed content for this enhancement		
Publication	**Links to topics**	
Release planning	• General planning information for IMS 15 – – – • IMS Version 15 enhancements – "IMS 15.5 Database Manager continuous delivery functions" on page 79 – "Bypass extent check for DEDB data sets" on page 99 (new) (this topic)	
System definition	• FASTPATH section of the DFSDFxxx member (System Definition)	
IMS messages and codes	**DFS messages**	DFS1919I

IMS Data Definition utility (DFS3ID00) enhancement

In IMS 15.3, the IMS Data Definition utility (DFS3ID00) is added to submit Data Definition Language (DDL) SQL statements.

Data Definition Language (DDL) SQL statements can be submitted with IMS Connect and ODBM address spaces. The DFS3ID00 utility performs this same task natively and writes the metadata for your application programs (PSBs) and databases definitions to the IMS catalog records and the runtime blocks to the staging directory data set.

This enhancement is delivered with APAR PH43314/PTF UI79944 and enabled by IMS 15.3.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, "Message and code changes in IMS 15.5," on page 73.

IMS catalog API enhancement

In IMS 15.5, the IMS catalog API function enhancements allow both the staging and the directory data sets of the IMS catalog to be accessed using a single OPEN, GET, and LIST requests. The HLQ request allows the boot strap data set (BSDS) name to be discovered automatically for the IMS catalog API OPEN request. The IMS catalog API can support up to 36 concurrent FUNCTION=OPEN requests. These enhancements can be used by IMS vendor-supplied tools.

The IMS catalog API function enhancement to OPEN, GET, and LIST requests is delivered by APARs/PTFs PI84981/UI53467 and PI84986/UI54029. The IMS catalog API HLQ function is delivered by APARs/PTFs PI90082/UI55179.

The OPEN function enhancement allows you to allocate and open the staging and the directory data sets of the IMS catalog by providing the new keyword BOTH for the DEFINITION parameter of the OPEN request. Previously, each OPEN request could allocate and open only either the staging data set or the directory data set, but could not open both.

The HLQ function enhancement allows IMS vendor-provided tools to acquire the high-level qualifier of the boot strap data set (BSDS) during an OPEN request without manually specifying the BSDS name in the request JCL.

The LIST and GET functions of the IMS catalog API are also enhanced, allowing you to define whether the functions retrieve information from the staging or the directory data set.

With APAR/PTF PH39492/UI80985, the GET functions of the IMS catalog API are enhanced so that you do not need to return the extended attribute table in a DBD. This parameter is valid only for the **FORMAT=DBDLIB** parameter.

The CLOSE function has also been updated to close both the staging and the directory data sets of the IMS catalog if they are both open.

Changes to programming for IMS

IMS Catalog Library Builder utility (DFS3LU00) enhancement

In IMS 15, the IMS Catalog Library Builder utility (DFS3LU00) is enhanced to build GSAM resources.

Previously, you could not build GSAM resources with the IMS Catalog Library Builder utility (DFS3LU00). This restriction is removed.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

IMS restricted updates

Install PH26604 to ensure that the consistency of data is maintained between active and standby sites in an IMS replication environment by allowing only the replication program, database utilities, and authorized users to make updates to the databases at the standby site.

Prerequisites

You must have the following prerequisites to enable the restricted update feature:

- IMS 15.1 or IMS 15.2 with PH26604
- z/OS 2.4
- RREPL parameter in the database section of the DFSDFxxx member must be set to ABEND, STATUS, or NONE
- Facility class DFS.DB.RREPL.* defined with update access permit for selective users

Setting Restricted Update mode by using type-2 commands

You can use a new attribute RREPL (Read-or-Replication only) for the database to determine whether a user can make updates. You can use the type-2 commands **UPDATE DB** and **UPDATE AREA** with the RREPL parameter to enable or disable the Restricted Update mode on full-function databases, including partitions, and Fast Path areas:

```
UPDATE DB NAME(DB List) SET(RREPL(ABEND | STATUS | NONE))
UPDATE AREA NAME(Area List) SET(RREPL(ABEND | STATUS | NONE))
```

RREPL
Specifies whether the database (or area) is in Read-or-Replication-only mode where reads are allowed for any program, but updates are allowed only for replication programs and authorized users, and the action to take when this mode is enabled.

STATUS
If an update is attempted by a nonreplication and unauthorized program, the status code RR is returned on any DL/I call that would have resulted in an update.

ABEND
If an update is attempted by a nonreplication and unauthorized program, the program is terminated with the user abend U3303.

NONE
The database (or area) is not in a Read-or-Replication-only mode.

The following guidelines and restrictions apply to the RREPL parameter:

- The RREPL parameter cannot be combined with any other **UPDATE DB** or **UPDATE AREA** command options.
- The RREPL parameter cannot be set on a catalog database. The command will fail and indicate that it is an IMS defined resource and the action cannot be completed. RC=0 is issued when the **UPDATE DB** command is used with wildcard (*), but the catalog is not impacted.
- The RREPL parameter cannot be set on an MSDB. The command will fail and indicate that the RREPL parameter is not valid for an MSDB.
- GSAM databases are not supported. If the **UPDATE DB** command is used to enable Restricted Update mode on a GSAM database, RC=0 is issued, and no action will be taken.
- If the RREPL parameter set on a Fast Path or HALDB database, its value is propagated to Fast Path areas or to HALDB partitions.
- The RREPL parameter that is specified on a database is retained across WARM, ERE, and ERE COLDCOMM restarts.
- During COLD, ERE COLDBASE, and ERE COLDSYS restarts, the RREPL parameter will be set on all databases, areas, and partitions based on the value that is specified in the database section of the DFSDFxxx member.
- Updates are allowed from Fast Path utilities (Create, Compare, Scan, Delete, and Reorg) and full-function utilities (OLR and OIC) regardless of the RREPL value on the database.

Setting the default Restricted Update mode by using the DFSDFxxx member

A default RREPL value for all the databases and areas can be set by using the RREPL keyword in the database section of the DFSDFxxx member during a cold restart:

```
RREPL = ABEND | STATUS | NONE | NA
```

RREPL =

Specifies whether to enable the Restricted Update mode on all the databases where reads are allowed for any program, but updates are allowed only for replication programs and authorized users.

Note that the **CREATE DB** command does not set the RREPL value for the new database. You must use the **UPDATE DB** command to set it.

ABEND
Restricted Update mode is enabled, and a U3303 abend occurs when unauthorized users try to make updates.

STATUS
Restricted Update mode is enabled, and an RR status code occurs when unauthorized users try to make updates.

NONE
Restricted Update mode is not enabled, and any user can make updates. However, you can use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode.

NA
This is the default value and means that Restricted Update mode is disabled. You cannot use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode. If you use the **UPDATE DB** and **UPDATE AREA** commands to enable the RREPL mode, those commands will fail with reason code 2074 and the error text "RREPL is not active".

During cold restarts, the RREPL value in the database section of the DFSDFxxx member is used to set the RREPL value on all databases, partitions, and areas.

During warm, ERE, and ERE Coldcomm restarts, the RREPL value in the FSDFxxx member is used to enable or disable the Restricted Update mode. The RREPL value that is set to any value other than NA enables the Restricted Update mode. Note that the RREPL value in the DFSDFxxx member does not impact the RREPL setting on any database, partition, or area unless the value is set to NA.

Checking the Restricted Update mode by using type-2 commands

You can find the RREPL value associated with a database or area by using the type-2 QUERY DB and QUERY AREA commands, for example:

```
QUERY DB NAME(DB List) STATUS(RREPL)
QUERY DB NAME(DB List) SHOW(STATUS)

QUERY AREA NAME(Area List) STATUS(RREPL)
QUERY AREA NAME(Area List) SHOW(STATUS)
```

RREPL
Sets the STATUS() filter to return information about databases that have the Restricted Update RREPL value set to ABEND or STATUS.

Security for restricted database updates

You can restrict specific users to make DLET, ISRT, and REPL calls to databases that have Restricted Update mode enabled by setting the RREPL parameter to ABEND or STATUS.

Also, you must define the facility class DFS.DB.RREPL.*, and users must be authorized with UPDATE authority.

If an unauthorized user makes an update call to a database that uses Restricted Update mode, it will result in the 3303 abend or the RR status code depending on the RREPL parameter value.

Note that the RREPL value at the area and partition level will take precedence over the value on the database level. Also, updates are allowed from Fast Path utilities (Create, Compare, Scan, Delete, and Reorg) and full-function utilities (OLR and OIC) regardless of the RREPL value that is set on the database.

The following sample RACF command defines the facility class and grants USRT002 and USRT005 permission to update the database:

```
RDEF FACILITY DFS.DB.RREPL.* UACC(NONE)
PERMIT DFS.DB.RREPL.* CLASS(FACILITY) ID(USRT002, USRT005) ACCESS(UPDATE)
```

Log record changes

The following log record changes were made for this feature:

- Log record 22: The RREPLAF byte is added to indicate Restricted Update mode on an area.
- Checkpoint record 4006: RREPL flags are added to the CHKDDFG2 byte to indicate Restricted Update mode on an area.
- Checkpoint record 4084: The area level RREPL flag byte DMACRRAF is stored in 4084.

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 IBM Docs.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Increased number of areas for Fast Path DEDBs

Before this enhancement, Fast Path Data Entry Databases (DEDBs) allowed up to 2048 areas per database. However, you can have up to 9999 areas if you apply APAR PH12671 on IMS 15.1.

The maximum size of a DEDB area is 4 GB. The maximum number of areas per database is increased from 2048 to 9999, making the maximum size of a DEDB database 39996 GB (40 TB).

You can manage larger workloads by creating DEDBs that are 5 times larger than in previous versions of IMS.

After you apply PTFs UI78774 and UI78775 for APAR PH12671 on IMS 15.1, you can enable this enhancement by using either of the following methods:

- Specify DEDBGT2K=Y in the FASTPATH section in the DFSDFxxx member. (The default is DEDBGT2K=N.)
- Issue the following **UPDATE IMSFUNC** type-2 command:

```
UPDATE IMSFUNC NAME(DEDBGT2K) SET(ENABLED(Y))
```

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Catalog Populate utility batch logging enhancement for GSAM resources

In IMS 15.5, the IMS Catalog Populate utility (DFS3PU00) is enhanced with a new parameter GSAMPCB to indicate GSAM resources in MANAGEDACBS= STAGE or UPDATE mode running in DLI using PSB DFSCP001.

The GSAMPCB parameter indicates that the IEFRDER batch log data set is used by the catalog update task for catalog database changes and not shared with other tasks in the utility.

The function is enabled when new GSAMPCB parameter is specified on MANAGEDACBS=(STAGE|UPDATE,LATEST|UNCOND,GSAMPCB)= control statement in Catalog Populate utility using PSB DFSCP001 in DLI mode.

Changes to utilities

A new parameter GSAMPCB is added to the IMS Catalog Populate utility (DFS3PU00).

DBRC managed ACB staging directory command support

If the IMS management of ACBs is enabled, you now can get database definition information from the staging directory or the active directory.

You can specify two new mutually exclusive optional keywords, STAGING or ACTIVE, in the following DBRC commands:

- CHANGE.DBDS
- CHANGE.PART
- INIT.DB
- INIT.DBDS
- INIT.PART

- NOTIFY.REORG

If neither keyword is specified, the active directory is read by default.

These optional keywords are not allowed if DBDLIB is being used.

GSAM DBD enhancement

To eliminate the need for an ACBGEN of a PSB that references a GSAM DBD, you can now use a new GSAM parameter, *gsamdbd*, with the STAGE and UPDATE parameters when you use the IMS Catalog Populate utility.

For example, you can specify:

- MANAGEDACBS=(STAGE,GSAM=*gsamdbd*)
- MANAGEDACBS=(UPDATE,GSAM=*gsamdbd*)

gsamdbd is the name of changed GSAM database. This database's record will be inserted into the IMS catalog, and the application control block will be written to the staging or active directory based on the MANAGEDACBS control statement parameters that you specify.

IMPORT DEFN SOURCE(CATALOG) command enhancements

The IMPORT DEFN SOURCE(CATALOG) command has new options: NAME and NOCHECK.

NAME option

The **IMPORT DEFN SOURCE(CATALOG)** command is enhanced to support the NAME() keyword to allow you to specify one or more DBDs or PSBs or both to be imported by name instead of importing all of the DBD and PSB ACBs from the staging directory.

The function is enabled when the new OPTION(NAME) is specified in the **IMPORT DEFN SOURCE(CATALOG)** command.

All the resources associated with the database DBD or program PSB resources (or both) that are specified on the NAME() keyword are also imported, except for GSAM. For GSAM DBDs and PSBs, only the named GSAM DBDs and PSBs are imported.

NOCHECK option

The **IMPORT DEFN** command can be used to import changed DBD members with no associated PSB members that are rebuilt by using the DFS3UACB utility with BLDPSB=NO or by using DDL ALTER. The **IMPORT DEFN** command with the NOCHECK option improves performance to import database changes for the BUILD DBD especially for a catalog directory with large number of members.

The function is enabled when the new OPTION(NOCHECK) is specified in the **IMPORT DEFN SOURCE(CATALOG)** command.

GSAM processing data set pre-allocation for the IMS Catalog Populate (DFS3PU00) utility

In IMS 15.5, you can use the IMSDG001 DD statement to define an empty work data set to be temporarily used as an IMS.ACBLIB data set for the IMS Catalog Populate utility (DFS3PU00) when the IMS management of ACBs is enabled. Use this DD statement to define a work data set manually instead of the DFS3PU00 utility dynamically creating and deleting a work data set.

IMSDG001 is an optional control statement. The empty work data set that you define by using this statement temporarily holds the IMS.ACBLIB data set members that reference a generalized sequential access method (GSAM) database. The DFS3PU00 utility then moves the ACBLIB members into the IMS directory data set after it copies the ACB library members from the libraries that are specified on the IMSACBnn DD statement.

Changes to utilities

A new control statement, IMSDG001, is added to the IMS Catalog Populate utility (DFS3PU00).

Fast Path DEDB area data sets (ADS) encryption

In IMS 15.5, you can encrypt Fast Path DEDB AREA data sets (ADS) by specifying a key label with it. Install APAR PI83756 to enable this feature. Fast Path DEDB area data sets (ADS) uses z/OS data set encryption, which is available in z/OS 2.2 with APAR OA50569 and dependent APARs installed, or in z/OS 2.3 or later.

Restriction

DEDB ADS encryption requires Fast Path 64-bit buffers. This is specified by FPBP64=Y in the FASTPATH section of the DFSDFxxx member in the IMS PROCLIB data set. DEDB ADS encryption is not supported when you are using 31-bit Fast Path buffers.

You must define all data sets that are encrypted by using z/OS data set encryption, including Fast Path DEDB ADS, as SMS-managed extended format data sets. Do not define Fast Path DEDB ADS with the extended addressability attribute. Ensure that the DATACLAS parameter that you use to allocate your ADS does not include the extended addressability attribute.

Migration considerations

To migrate from non-encrypted Fast Path DEDB ADS to encrypted Fast Path DEDB ADS, perform the following steps:

1. Perform one of the following methods to create encrypted ADS:
   - Define the shadow ADS with the same attributes as the non-encrypted ADS and specify key labels with the shadow ADS. Run DEDB ALTER utility.
   - Define new ADS as SMS-managed extended format DASD and specify key labels with them. Register the new ADS to DBRC by using the following command:

     INIT.ADS DBD(*xxxxxxxx*) AREA(*yyyyyyyy*) ADSN(*AREA data set name*) UNAVAIL

     Run CREATE utility.
2. Stop the non-encrypted ADS if necessary.

To fallback from encrypted Fast Path DEDB ADS to non-encrypted ADS, create new ADS without key label and use the DEDB ALTER and DEDB Area Data Set Create utilities to copy encrypted ADS to new ones.

Remember: If you use non-IMS tools or products to process the Fast Path ADS, confirm with the tool or product provider that the tool or product supports encrypted DEDBs before enabling encryption.

Coexistence considerations

Make sure all the IMS systems that share encrypted Fast Path ADS meet the following requirements:

- All the IMS systems are IMS 15 with APAR PI83756 installed.
- All the IMS systems are using Fast Path 64-bit buffers.
- All the z/OS systems are z/OS 2.2 with OA50569 installed, or z/OS 2.3 and later.

If an encrypted Fast Path ADS is shared by an IMS system that is IMS 14or earlier versions, or IMS 15 without APAR PI83756, this IMS system will not be able to open or access the ADS. Message IEC161I with return code 122 will be displayed.

Performance considerations

Additional Fast Path buffers are used when writing to an encrypted area data set. A temporary buffer is obtained at write I/O time to encrypt the data to be written. This buffer is released after the data has

been written to the ADS. Each Fast Path buffer includes the buffer itself (64-bit storage) and a 31-bit ECSA control block called a DMHR, which is used to track the buffer. Therefore, encrypting ADS may increase Fast Path 64-bit buffer and ECSA usage. Use the **FPBP64M=** parameter in the FASTPATH section of the DFSDFxxx member to increase the limit for the amount of 64-bit Fast Path buffers to avoid buffer shortages if necessary. Monitor the 64-bit buffer usage statistics in the IMS 4516 statistics log records when migrating to encrypted ADS.

ODBM Security Options Enhancement

In IMS 15.5, the ODBM security options enhancement added a parameter, **ODBMSECURE**, to the IMS control region.

You can use the **ODBMSECURE** parameter to specify whether IMS performs security checking on a PSB resource for an ODBM thread at the time of the allocate PSB (APSB) request.

The **ODBMSECURE** parameter can be specified in either the DFSCGxxx member, or the DFSDFxxx member section <SECTION=COMMON_SERVICE_LAYER>. If you specify ODBMSECURE in both the DFSCGxxx member and the CSL section of the DFSDFxxx member, the values specified in the DFSCGxxx member override the values specified in the DFSDFxxx member.

Preallocation of ADS for DEDB created by DDL with SDEP defined

In IMS 15.5, use the **PREALLOC=** parameter in the DFSDFxxx member to preallocate area data sets (ADS) for data entry database (DEDB) with segment dependent (SDEP) segments defined.

If a DEDB does not have an SDEP, IMS calculates the space of an ADS cluster by using the **UOW**, **ROOT**, and **SIZE** parameters in an AREA statement.

For DEDB that has SDEP segments defined, the **PREALLOC=** parameter is added to the DDL section of the DFSDFxxx member so that you can choose one of the following ways to define area data sets:

- If **PREALLOC=YES** is defined, pre-allocated area data sets are used.
- If **PREALLOC=NO** is defined, parameters such as **CYLINDERS**, **TRACKS**, and **VOLUME** are used to allocate area data sets.

PREALLOC=NO is the default.

Changes to installing and defining IMS

The **PREALLOC=** parameter is added to the DDL section of the DFSDFxxx member of the IMSPROCLIB data set.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Fast Path secondary index database maintenance enhancement

In IMS 15.5, install APAR/PTF so that you can use the **FPSISETI=** parameter to allow or prevent Fast Path secondary index database maintenance.

The Set Index Maintenance Off (SETI) statement suppresses index maintenance for any data entry database (DEDB). If a process that updates DEDB records does not access the DEDB through the secondary index database, updating the DEDB records simultaneously with the secondary index database is less efficient. It is more efficient to disable the secondary index maintenance, update the DEDB records separately, and then update the secondary index database. In this case, you might prefer using SETI statements to suppress index maintenance and later using vendor product tools or in-house applications

to resynchronize the DEDB with its index database. If the SETI statement is used but you do not use resynchronizing tools, secondary index databases might become out of sync with its primary DEDB databases. With this enhancement, you can use **FPSISETI=N** in the Fast Path section of the DFSDFxxx member to disable the SETI control statement and to ensure that primary DEDB databases and its secondary indexes are synchronized.

Changes to installing and defining IMS

The new parameter, **FPSISETI=**, is added to FASTPATH section of the DFSDFxxx member.

Changes to troubleshooting for IMS

A new message DFS4723A is created to inform users of **FPSISETI=N**. Abend code 1060 is changed to be related to DFS4723A.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

DFS982I message text enhancement

In IMS 15.5, the batch and online message DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue in the message text.

The addition of log information to the message text facilitates the diagnosis of database backout problems.

Changes to troubleshooting for IMS

The message text of DFS982I is enhanced to include the log block sequence and log return code for I/O error reading backout queue.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

DFS1769W error code enhancement

In IMS 15.5, the DFS1769W error code enhancement adds error code 06 to the message text.

When a **/DBD** or **/DBR** command is in progress for the IMS catalog database, IMS cannot dynamically attach the catalog PSB DFSCP000 because the IMS catalog database is not available. Previously, IMS issues message DFS1796W with the error code 03. This error code is misleading because it indicates a PSB or PSBW pool space shortage. This enhancement adds error code 06 to message DFS1796W, which indicates that a **/DBD** or **/DBR** command is in progress against the IMS catalog database.

Changes to troubleshooting for IMS

New error code is added to message DFS1796W.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Data capture suppression enhancement

In IMS 15.5, you can use the Data capture suppression enhancement to prevent the Data Capture exit routine from being called unnecessarily. This enhancement allows you to prevent the Data Capture exit routine from being called for updates from a CCTL or ODBM address space.

Previously, the Data Capture exit routine was always called for application program activity on an IMS database if the exit routine was specified in the database definition (DBD). The exit routine would be called regardless of which program specification block (PSB) was active. Therefore, Data Capture exit routines were global and might have had a performance impact across the entire database system.

With this enhancement, the **SUPPDCAPNAME=** parameter is introduced to the DFSDF*xxx* member of the IMS PROCLIB data set. If you specify the job name of a CCTL or ODBM address space on the **SUPPDCAPNAME=** parameter, database updates invoked by the job are not captured by the Data Capture exit routine, even if the exit routine is specified on the **EXIT=** parameter of the DBD. Database or database segment updates that are invoked by jobs other than the one that is specified on the **SUPPDCAPNAME=** parameter continue to be captured by the Data Capture exit routine.

By using this enhancement to suppress database or database segment updates when those updates are made from a CCTL or ODBM address space, you can reduce CPU usage and improve the efficiency with which data is processed in your IMS environment.

Do not enable this support in a replication environment if the updates made by the replication are replicated, also known as cascaded, to another system.

Log records

No log record changes were made for this enhancement, and products that use X'99' log data do not need to change if this enhancement is enabled.

Changes to defining IMS

The **SUPPDCAPNAME=** parameter is introduced to the DATABASE section of the DFSDF*xxx* member of the IMS PROCLIB data set.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

DCCTL enhancement to support IMS management of ACBs

In IMS 15.5, the DCCTL environment supports IMS management of ACBs. Install APAR PI89178 to enable this enhancement.

IMS management of ACBs was not supported in a DCCTL environment. This enhancement adds support for IMS management of ACBs in a DCCTL environment. Since a DCCTL does not own any database nor service DL/I database calls, the IMS directory that it uses must be maintained by another IMS that supports the TM/DB environment. When the IMS Catalog and directory data set has been created by that other IMS, the DCCTL system can be configured to use the directory data set. The DCCTL system cannot create or maintain any IMS directory data set or the IMS catalog.

Changes to installing and defining IMS

A DCCTL system can participate in a sysplex environment where one ore more IMS have enabled IMS management of ACBs and use the directory data sets that are created and maintained by the non-DCCTL IMS systems. The DCCTL system itself cannot create or maintain any IMS Catalog or directory data set. If

ACBMGMT=CATALOG is specified in the DFSDF*xxx* member of the DCCTL system, the system will enable IMS management of ACBs.

For a DCCTL system, CATALOG=NO must be specified in the CATALOG and CATALOG*xxx* section of the DFSDF*xxx* member because a DCCTL system cannot create or maintain the IMS catalog.

Changes to troubleshooting for IMS

The following messages are either changed, created, or deleted so that if CATALOG=Y is specified for a DCCTL system or such a system tries to access the IMS Catalog, relevant error messages or abend code will occur:

- DFS3505E (changed)
- DFS3551E (changed)
- DFS4427E (changed)
- DFS4892E (new)
- 1002 (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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

DEDB Alter utility enhancements

In IMS 15.5, the DEDB Alter utility is enhanced to enable you to add a new field to existing free space in a segment while the DEDB area remains online.

This enhancement increases the availability of your DEDB database. Previously, a DEDB database had to be taken offline to add a new field to a segment.

Requirements:

- A two-stage randomizer must be used, which enables areas to be processed individually.
- All IMS data sharing systems must be at IMS 15 or later.
- The DEDB databases must be registered to DBRC.
- If you are using the DEDB Alter utility to add a Segment Edit/Compression exit routine, the Segment Edit/Compression exit routine must be able to handle mixed compressed and non-compressed data in a DEDB database. If data is non-compressed, on read access, it does not expand the non-compressed data, and on write access, it compresses the data and writes out as compressed data. If data is compressed, on read access, it expands the compressed data, and on write access, it compresses the data and writes out as compressed data.
- if you expand just the SDEP portion of an area by increasing the shadow’s data set size, you will still need to do an ACBGEN.

Restrictions:

- You can alter only one area in a DEDB database at a time with the DEDB Alter utility. You can have multiple instances of the DEDB Alter utility running concurrently, but each instance must be running against a different DEDB database.
- 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.
- Because the IMS management of ACBs does not support XRF environments, the DEDB Alter utility does not support XRF when IMS manages ACBs.

Migration considerations

If you are invoking the DEDB Alter utility for an IMS 15 function, such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

Coexistence considerations

You can run the DEDB Alter utility in a coexistence environment; however, if you are invoking the DEDB Alter utility for an IMS 15 function such as ALTERDB, the DEDB Alter utility detects the version of the IMS system and terminates if the IMS version does not support the particular change.

Changes to administering IMS

For a list of topics for administering IMS that are changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to utilities

For a list of the utilities that are changed for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

IMS Database Manager enhancements

The IMS 15.5 enhancements to IMS Database Manager (IMS DB) include enhancements that enable dynamic database definition, enhancements to the Open Database Manager (ODBM), and other enhancements that improve usability and performance for users of IMS DB.

The Chapter 12, “IMS system enhancements,” on page 123 in IMS 15.5 might also impact IMS DB.

Chapter 11. IMS Transaction Manager enhancements

The enhancements to IMS Transaction Manager (IMS TM) in IMS 15.5 include enhancements to Multiple Systems Coupling (MSC), Open Transaction Manager Access (OTMA), IMS Connect, synchronous callout, and more.

The Chapter 12, “IMS system enhancements,” on page 123 in IMS 15.5 might also impact IMS TM.

OTMA fast transaction pipe checkpoint cleanup (FASTTPCU) enhancement

In IMS 15.5, the OTMA fast transaction pipe (tpipe) checkpoint cleanup enhancement allows an IMS system to delete an idle OTMA tpipe more frequently.

This enhancement is added to IMS 15.5 by APAR PH52141/PTF UI93586.

By default, in IMS 15, an OTMA transaction pipe (tpipe) is deleted after it keeps being idle across three consecutive system checkpoints, even if other tpipes that are associated with the same transaction member are being used. The idle OTMA tpipe occupies unnecessary IMS storage space and cannot be reused for subsequent transaction requests. As a result, storage exhaustion or tpipe flooding could happen in the IMS system.

With the OTMA FASTTPCU enhancement, IMS introduces a new parameter: FASTTPCU, in the DFSOTMA descriptor. When the FASTTPCU function is activated, an idle OTMA tpipe will be cleaned up after two consecutive checkpoints.

When the FASTTPCU function is not activated, by default, an OTMA tpipe is still cleaned up after it is idle across three consecutive system checkpoints. This is a global OTMA attribute.

This new function can be activated by specifying FASTTPCU parameter in DFSOTMA descriptor in DFSYDTx PROCLIB member.

Changes to installing and defining IMS

The **FASTTPCU** parameter is added to the DFSOTMA descriptor in the DFSYDTx member of the IMS PROCLIB data set.

Changes to troubleshooting for IMS

Error texts for the FASTTPCU function are added to message DFS2385E.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

OTMA checkpoint statistics enhancement

In IMS 15.5, OTMA statistics will be collected during checkpoint.

With this enhancement, two new x'45' statistic record subtypes are added, one for Global OTMA information (x'451A') and one for OTMA Member information (x'451B’). A single x'451A' record is created for the Global information and a single x'451B' record is created for each Member. These are written with the already-existing x'45' records during checkpoint.

This enhancement provides more diagnostic information and an easier way to track OTMA statistics (such as the number of TPIPEs) to aid in fine-tuning the system (such as flood control limits).

This enhancement is added to IMS 15.5 by APAR PH45589.

Log record changes

The following log records are new or changed by this enhancement in IMS 15.5:

- X'451A'
- X'451B'

IMS ALTPCB enhancement for IMS Connect

In IMS 15.5, with APAR PH39434 and PH39438, an IMS ALTPCB output triggered by an IMS Connect commit-then-send send-receive call can be sent back to the initiating IMS Connect client.

By default, when IMS Connect is identified as the destination of an IMS ALTPCB output message, IMS queues the output to a TPIPE hold queue. An IMS Connect client is able to retrieve this ALTPCB output with a Resume TPIPE call. However, it might be difficult for an IMS Connect client application to know whether IMS would generate an I/O PCB output or an ALTPCB output. In addition, an ALTPCB output message generated by an IMS shared-queues back-end system has an affinity of the back-end system.

This message affinity prevents the Resume TPIPE call that is sent to the front-end system from retrieving the IMS ALTPCB output message unless IMS Connect activates the super member function. This default behavior of handling the IMS ALTPCB output for IMS Connect complicates the TCP/IP application development for getting an ALTPCB output message.

With APAR PH39434 and PH39438, IMS introduces a new function, SENDALTP, for IMS Connect customers to obtain an ALTPCB output without issuing Resume TPIPE calls. When the SENDALTP function is activated, if IMS receives a commit-then-send send-receive call from IMS Connect, an ALTPCB output triggered by the input transaction can be sent back to the initiating IMS Connect client by using the input TPIPE name.

The supported ALTPCB output message flow is: TCP/IP APP → IMS CONNECT X → IMS → IMS CONNECT X → TCP/IP APP. This SENDALTP function won't work if the ALTPCB output is routed to a different IMS Connect client or to a non-IMS Connect destination using OTMA destination descriptor or OTMA DFSYDRU0 user exit.

You can activate the SENDALTP function with two methods: data store level activation and message level activation.

With data store level activation, the SENDALTP function can be activated for all the commit-then-send send-receive calls from this IMS Connect data store. You can enable the data store level activation with the following methods:

- Using the CREATE IMSCON command or the UPDATE IMSCON command
- Specifying SENDALTP in IMS Connect HWSCFGxx member
- Specifying SENDALTP parameter in OTMA client descriptor in DFSYDTx PROCLIB member

The message level activation can be set for a specific IMS Connect commit-then-send send-receive request through a user-written IMS Connect client, IMS OTMA destination descriptor, or IMS DFSYDRU0 exit.

Changes to defining IMS

The following descriptors are enhanced with the **SENDALTP=** keyword:

- The OTMA client descriptor in the DFSYDTx member of the IMS PROCLIB data set
- The OTMA destination descriptor in the DFSYDTx member of the IMS PROCLIB data set
- The DATASTORE statement in the HWSCFGxx member of the IMS PROCLIB data set
- The HWS statement in the HWSCFGxx member of the IMS PROCLIB data set

The **TPIPE=**, **SMEM=** and **EXIT=** keywords in the OTMA destination descriptor in the DFSYDTx member of the IMS PROCLIB data set are enhanced with descriptions for the **SENDALTP=** keyword.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The following commands are enhanced to have the **SENDALTP** keyword and its description added:

- **CREATE OTMADESC** command
- **UPDATE OTMADESC** command
- **VIEWHWS** command
- **VIEWDS** command
- **CREATE IMSCON TYPE(DATASTORE)** command
- **UPDATE IMSCON TYPE(CONFIG)** command
- **UPDATE IMSCON TYPE(DATASTORE)** command
- **QUERY IMSCON TYPE(CONFIG)** command
- **QUERY IMSCON TYPE(DATASTORE)** command

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 Documentation.

Language Environment enhancement for 31-bit COBOL and 64-bit Java interoperability

In IMS 15, you can enable interoperability between 31-bit COBOL code and 64-bit Java code by adding value **JVM=3164** to an IMS dependent region's parameter list, installing required software, and configuring the dependent region. Supported dependent region types include MPR, BMP, IFP, JBP, and JMP.

Previously, valid values for the JVM= parameter were 31 and 64. This enhancement adds new valid parameter value **JVM=3164**. Applying parameter JVM=3164 indicates to an IMS dependent region that separate Language Environment instances are to be established for each addressing mode: a primary 31-bit Language Environment, and a secondary 64-bit Language Environment that hosts the Java virtual machine (JVM). When JVM=3164, IMS uses new module DFSJVM36.

This enhancement is delivered with APAR PH37140.

Requirements

Enabling interoperability provided by this enhancement requires proper dependent region setup and specific functions from the COBOL compiler, the Language Environment, and the 64-bit IBM Java Software Development Kit (SDK). To learn more about requirements and important considerations regarding Java, COBOL (including Object-Oriented COBOL), and IMS, see 31-bit COBOL and 64-bit Java interoperability (Application Programming).

Static VTAM transaction output security enhancement

In IMS 15.5, static VTAM terminals are enhanced with the ability to apply transaction output security checks to prevent unauthorized accesses from different users to transaction outputs.

Previously, there was no output security for static VTAM terminals. Any user with a valid authorized access to a terminal could access queued outputs in that terminal, even if the user didn't initiate the output transaction. The typical solution was to create a user exit, which was difficult to configure.

Instead of using a new user exit, with this enhancement, you can enable output security for static VTAM terminals by specifying an optional parameter **STATICOUTSEC** in the DFSDC*xxx* member of the IMS PROCLIB data set. When you specify the **STATICOUTSEC** parameter, you decide whether IMS compares the current user with the user who initiated the transaction, if the current user is not the user who initiated the transaction, IMS discards the transaction output. This prevents other users from accessing the transaction that were not initiated by them.

This enhancement is delivered with APAR/PTFs PH24997/UI70315/UI70314.

Changes to defining IMS

The DFSDCxxx member of the IMS PROCLIB data set is enhanced with the following parameters:

STATICOUTSEC=ALL | NO | SREQ
Specifies whether IMS discards transaction reply messages for static terminals when the current user does not match the user associated with the output message. In addition, this parameter tells IMS whether to exit any active or held conversations when a user signs off from the static terminal.

RCVYCONV=
If **STATICOUTSEC=**ALL or **STATICOUTSEC=**SREQ is specified, **RCVYCONV=**NO will be forced for those static terminals affected by the **STATICOUTSEC** keyword.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

OTMA lightweight transaction pipe enhancement

In IMS 15.5, the OTMA lightweight transaction pipe enhancement improves the flood control of OTMA transaction pipes (tpipes).

This enhancement is added to IMS 15.5 by APAR PH17832 (PTFs UI68699 and UI68700).

Previously, when a back-end IMS system processed OTMA input transactions from front-end IMS systems in a shared queues environment, each transaction might trigger the creation of a new tpipe. However, if a tpipe is built for input messages, the output ITASK for the tpipe is not used. If a tpipe is built for output processing, the input ITASK is not needed. Such insufficient use of resources associated with a tpipe makes the back-end IMS system easily reach the limit of tpipe flood.

By using the OTMA lightweight tpipe function, IMS reduces the storage for each tpipe by dynamically allocating the associated ITASKs and other tpipe related storage only when they are needed. By doing so, the back-end IMS system in a shared queues environment can support more tpipes and avoid reaching the tpipe flood limit quickly.

Changes to system definition for IMS

A new parameter **LITETP=** is added to the DFSOTMA descriptor in the DFSYDTx member of the IMS.PROCLIB data set to specify whether the OTMA lightweight tpipe function is enabled. You can enable the OTMA lightweight tpipe function by specifying **LITETP=**YES. The default is NO, which is also the default for an IMS cold start.

Specifying **LITETP=**YES enables IMS to support more tpipe because a lightweight tpipe requires less storage than a regular tpipe. A weighting factor is used on lightweight tpipes when calculating the tpipe count for tpipe flood control. The weighting factor is the percentage of the lightweight tpipe storage size relative to the regular tpipe storage size, which is usually 28%.

The adjusted tpipe count is calculated as follows:

A: the number of front-end tpipes (total tpipes - back-end tpipes)

B: the number of back-end tpipes
W: the weighting factor
adjusted tpipe count=A+(B*W)

When the DFSOTMA **MAXTP=** parameter is specified, if the **LITETP=** parameter is enabled, IMS monitors if the number of tpipes reaches the maximum allowable number by using the adjusted tpipe count instead of the total tpipe count. If the **LITETP=** parameter is disabled, IMS keeps using the total tpipe count for flood control.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The **/DISPLAY** command is enhanced to display two new output fields **BETP** (back-end tpipe) and **WGF** (weighting factor).

BETP
If **LITETP=**YES is specified in the DFSOTMA descriptor, this field shows the number of back-end tpipes for the OTMA member. Otherwise, it is zero.

WGF
The tpipe weighting factor for calculating the adjusted total tpipe count for detecting flood condition. A value of 0 indicates that the OTMA lightweight tpipe function is disabled.

The **TOACEE** output field is changed to **TOA**.

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 Documentation.

Enhancement for the processing of OTMA commit-then-send messages in shared-queues environments

In IMS 15.5, the processing of OTMA commit-then-send (CM0) messages that are sent by a back-end IMS system in shared-queues environments is enhanced to be handled by a new ITASK .

Previously, when a back-end IMS system sent commit-then-send shared queues messages to a front-end IMS system, it first sent notification messages to the front-end IMS system to notify the presence of the outputs. The OTMA ITASK DFSYMOM0 in the front-end IMS system is used to manage these notification messages. However, when the ITASK was busy with processing shared queues notification messages from a back-end system, other jobs that are processed by the ITASK, such as the creation of transaction pipes (tpipes), could be delayed. This impacted the performance of IMS.

With this enhancement, a new OTMA ITASK DFSYDAD0 is created through OID TCB to separately process OTMA commit-then-send back-end messages in a shared queues environment. As a result, the main OTMA ITASK DFSYMOM0 can focus on other important jobs. This enhancement reduces delays and improves performance.

This enhancement also enhances tpipe flood control. The valid value of the **MAXTPRL** parameter in OTMA client descriptors and DFSOTMA client descriptors that defines the relief level of the **MAXTP** value was enhanced to 50 - 95, instead of 50 - 70. A new parameter **MAXTPWN** is added to OTMA client descriptors and DFSOTMA client descriptors. You can use the **MAXTPWN** parameter to define a warning threshold as a percentage of the **MAXTP** value. Before the **MAXTP** threshold is reached, a warning message DFS4515W is issued. You can specify a value in the range 50 - 95 for the **MAXTPWN** parameter. That is, the message DFS4515W can be issued before 50% - 95% of the **MAXTP** value is reached. After you see the warning message DFS4515W, you can remove idle tpipes to prevent tpipes from overflowing so that the IMS

system can continue creating new tpipes. If the **MAXTPWN** value is not specified, the default tpipe flood warning level is 80% of the **MAXTP** threshold value.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The **/DISPLAY TMEMBER** command is enhanced to have **SYW** status and its description removed.

MFS sign-on format support for RACF password phrases

In IMS 15.5, default Message Format Service (MFS) formats can be generated that support RACF password phrases entered from 3270 and SLU 2 devices through message DFS3649A or DFS3656A.

This enhancement is delivered ins IMS 15.1 with APAR PH09313 (PTFs UI64360/UI64359).

Previously, the default MFS formats (DFSIGNP, DFSIGNPB, DFSVERO) that were generated for sign-on from 3270 and SLU2 devices supported only passwords that were 8-characters or less. With this enhancement, you can use MFS for RACF password phrases that are up to 100 characters long and that are submitted from 3270 and SLU 2 devices through DFS3649A or DFS3656A.

The following default MFS formats can be generated with this enhancement to support password phrases:

DFSIGNPC
DFS3649A for dynamic terminals

DFSIGNPD
DFS3649A for static terminals

DFSVEROA
DFS3646A

The formats result in the **/SIGN PASSPHRASE** command to be submitted to the IMS system as input. Also, the formats support both passwords that are 8-characters or less and RACF password phrases that are up to 100 characters long. Therefore, you do not need to switch between MFS formats to support both passwords and RACF password phrases entered from 3270 and SLU 2 devices through message DFS3649A or DFS3656A.

You might need to modify the default DFSIGNPC, DFSIGNPD, and DFSVEROA MFS formats to enable them to support password phrases up to 100 characters long. Due to screen size limitations, the default formats limit the length of PASSWORD and NEW PASSWORD fields so that they fit on a single line. These limits are:

- Maximum 50 characters for screen sizes greater than 66 columns (which include 3270 model 2)
- Maximum 24 characters for screen sizes fewer than 66 columns (which include 3270 model 1)

The length limitations for the PASSWORD and NEW PASSWORD fields apply only with the default formats that are delivered with this enhancement. RACF password phrases that are up to 100 characters long are supported for customer-modified formats.

You can enable the MFS formats that support password phrases to be generated by using one of the following options:

- Code the Greetings Message (DFSGMSG0) user exit to override the default MOD name that is specified by IMS.
- Specify **MFSPPDEF=Y** in the DFSDC*xxx* member of the IMS PROCLIB data set. The **MFSPPDEF** parameter is added with this enhancement.

Changes to defining IMS

The **MFSPPDEF=** parameter is added to the DFSDC*xxx* member of the IMS PROCLIB data set with this enhancement. You can use this parameter to specify whether the default IMS sign-on formats that support password phrases up to 100 characters are used.

If the Greeting Messages exit routine (DFSGMSG0) is coded to change the MFS Message Output Description (MOD) name for messages that are issued during the signon process, the MOD name that is specified in the exit routine is used regardless of the value that is specified for the **MFSPPDEF=** parameter.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to exit routines

The following changes are made with this enhancement to the sample Signon exit routine (DFSSGNX0):

- The DFSIGNPC, DFSIGNPD, and DFSVEROA MFS formats result in the **/SIGN PASSPHRASE** command to be submitted to IMS as input and include the **GROUP** and **NEWPW** keywords of the command. When no data is entered for the **GROUP** or **NEWPW** keyword, the updated sample DFSSGNX0 exit routine deletes the **GROUP** and **NEWPW** keywords and their values.
- The updated sample DFSSGNX0 exit routine uses the new MFSPVAR DSECT to determine the position of the GROUP and NEWPW keywords. The MFSPVAR DSECT assumes a password length of 100.

If you use a customized DFSSGNX0 exit routine, update your customized exit routine to delete empty **GROUP** and **NEWPW** keywords and their parameters from the **/SIGN PASSPHRASE** command string.

OTMA ACEE flood control enhancement

In IMS 15.5, OTMA is enhanced with the accessor environment element (ACEE) flood control function to prevent an excessive number of RACF ACEEs from being stored in cache.

Previously, the number of ACEEs that were stored in cache could not be limited. An unlimited number of ACEEs stored in cache by OTMA and a high aging value for the ACEEs caused virtual storage in the IMS control region to run out.

With this enhancement, you can enable OTMA ACEE flood control in the DFSOTMA descriptor of the DFSYDTx member of the IMS PROCLIB data set. When you enable OTMA ACEE flood control, you limit the number of RACF user IDs, which in turn limits the number of ACEEs that are cached by OTMA. This in turn prevents virtual storage in the IMS control region from running out.

With OTMA ACEE flood control enabled, OTMA checks the expiration values of the least recently used ACEEs first to speed up the ACEE cleanup process.

With this enhancement, you can also specify the **ACEEAGE** parameter on the **/SECURE OTMA** command to define an OTMA ACEE aging value that overrides the aging value passed by OTMA clients. You can use the **ACEEAGE** parameter to define an aging value that is lower than the value passed by OTMA clients, thereby expediting the cleanup of OTMA ACEEs that are stored in cache.

Changes defining IMS

The DFSOTMA descriptor of the DFSYDTx member is enhanced with the following parameters:

TOACEE=NO|YES
Enables or disables the OTMA ACEE flood control function.

ACEEUSR=
When OTMA ACEE flood control is enabled, allows you to define the number of RACF user profiles that are stored in ACEEs.

Changes to commands

The following commands are enhanced:

- The **/DISPLAY OTMA** command is enhanced with the following output fields:

  ACEECT
  Displays the total number of cached OTMA ACEEs for the OTMA server.

  TOACEE
  Displays whether OTMA ACEE flood control is enabled.

- The **/SECURE OTMA** command is enhanced with the **ACEEAGE** parameter to allow you to define an ACEE aging value for OTMA clients.

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 Documentation.

Reduce LUMP storage for OTMA commit-then-send messages enhancement

In IMS 15.5, OTMA is enhanced to reduce the amount of storage that is allocated in LU 6.2 device manager private buffer pools and OTMA for commit-then-send (CM0) I/O PCB output messages.

The storage in LU 6.2 device manager private buffer pools and OTMA is also called LUMP storage.

Previously, 38 KB of LUMP storage was allocated for every CM0 I/O PCB output message, even if the actual size of the message was much smaller. As a result, the amount of LUMP storage that was allocated for the messages was often greater than the amount of storage that was required. With this enhancement, the amount of LUMP storage that is allocated for each output message varies depending on the actual size of the message. Therefore, the amount of unused LUMP storage that is allocated for CM0 I/O PCB output messages is reduced, and more LUMP storage is available for other processes.

OTMA conversational transaction timeout enhancement

In IMS 15.5, you can configure IMS Open Transaction Manager Access (OTMA) to end conversational transactions and remove from storage the control blocks associated with those transactions if the transaction is inactive for a specified period of time.

You specify the time period on the **ENDCONV=** parameter of the DFSOTMA descriptor, which is in the DFSYDT*x* member of the IMS PROCLIB data set. If the conversational transaction is idle for the specified period after the prior iteration of the conversational transaction completes, OTMA ends the transaction.

With this enhancement, you have greater control in preventing IMS storage space from becoming flooded with process management resources, such as transaction instance blocks (TIBs), for transactional conversations that are no longer needed, and in ensuring that your business transactions can continue to be processed by IMS.

Changes to installing and defining IMS

The DFSOTMA descriptor in the DFSYDT*x* member of the IMS PROCLIB data set is enhanced with the **ENDCONV=** parameter. When a conversational transaction has been inactive for the amount of time that you specify, the idle transaction is ended and the resources, such as the TIB, associated with the transaction is removed from IMS storage.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

OTMA transaction pipe cleanup enhancement

In IMS 15.5, the OTMA transaction pipe (tpipe) cleanup enhancement improves the ability of an IMS system to delete idle OTMA tpipes.

This enhancement is added to IMS 15.5 by APAR PI88409 (PTFs UI54736 and UI54735).

In previous releases, an OTMA tpipe was deleted after it had been idle across three consecutive system checkpoints only if all other tpipes associated with the same OTMA target member (tmember) were idle. Therefore, IMS storage space was being used unnecessarily for OTMA tpipes that had been idle for a long time, leading to storage exhaustion. Also, the OTMA tpipes that had already been idle for three consecutive system checkpoints could not be reused for subsequent transaction requests.

With the OTMA tpipe cleanup enhancement, an OTMA tpipe is deleted after it has been idle across three consecutive system checkpoints, even if other tpipes associated with the same tmember are being used. Consequently, idle OTMA tpipes are made available more quickly to process subsequent transactions on the IMS message queue, and IMS storage space is less likely to become flooded.

Changes to administering IMS

IMS automated operator interface (AOI) exits can use message DFS5386I, which is new with this enhancement, to identify whether an OTMA tmember has disconnected from OTMA.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The **/DISPLAY TMEMBER** command is enhanced to add the following status terms. One of the status terms can be displayed if the TPIPE keyword is specified on the command:

MCP
In a shared-queues environment, the tpipe has output messages on the global queue.

SYW
The tpipe is being scanned by IMS.

If a tpipe is in either of the preceding states, the tpipe cannot be deleted.

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 Documentation.

Chapter 12. IMS system enhancements

The enhancements to the IMS 15.5 system are not specific to either the IMS Database Manager or the IMS Transaction Manager and might impact both.

Data set support for zHyperWrite

In IMS 15.5, you can specify whether to use zHyperWrite for writing data to the write-ahead log data sets (WADS) and online log data sets (OLDS). The command output of **/DISPLAY OLDS** shows whether zHyperWrite is used when data is written to the OLDS or WADS.

Dynamic enablement of zHyperWrite enhancement

In IMS 15.5, dynamic enablement of zHyperWrite enhancement provides a new parameter, **ZHYPERWRITE**, to the **UPDATE IMS SET(LCLPARM)** command to allow users to dynamically enable or disable IBM zHyperWrite for the online log data sets (OLDS) and write-ahead log data set (WADS). Install APAR PH02149 (PTF UI61325) to enable this enhancement.

Previously, you could only use the **ZHYPERWRITE** parameter in the LOGGER section of the DFSDFxxx member to enable or disable the use of zHyperWrite. Furthermore, you had to restart IMS for the **ZHYPERWRITE** parameter to take effect. This enhancement provides a new optional keyword, **ZHYPERWRITE**, in the **UPDATE IMS SET(LCLPARM)** command. You can use the **ZHYPERWRITE** keyword of the **UPDATE IMS SET(LCLPARM)** command to dynamically enable or disable zHyperWrite for OLDS or WADS without restarting the IMS system.

Unlike using **ZHYPERWRITE** in the LOGGER section of the DFSDFxxx member, any change specified by using the ZHYPERWRITE parameter in the **UPDATE IMS SET(LCLPARM)** command is not saved if you restart IMS.

If you want the zHyperWrite changes to persist across a restart, update the **ZHYPERWRITE** parameter in the LOGGER section of DFSDFxxx and then issue the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command. In this way, if IMS is restarted, the updated zHyperWrite value is saved and effective.

Coexistence considerations

If the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE))** command is routed to an IMS that does not support the command, the ZHYPERWRITE parameter is ignored.

Changes to commands

A new keyword, ZHYPERWRITE, is added to the **UPDATE IMS SET(LCLPARM)** command.

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 Documentation.

Requirements

The primary and secondary data set volumes must be in a Metro Mirror relationship managed by HyperSwap®. To enable zHyperWrite for the OLDS, DFSMS APAR OA51385 must be installed and the OLDS must be defined as extended format data sets.

The UPDATE IMS command requires the Common Service Layer (CSL) with the Structured Call Interface (SCI) and the Operations Manager (OM) available. This command must be issued through the OM API because it is a type-2 command. The command response is returned through the OM API and is embedded in XML tags. You can issue this command in the following environments:

- DB/DC
- DBCTL

- DCCTL

Restrictions

If you issue the UPDATE IMS SET(LCLPARM(ZHYPERWRITE())) command to enable or disable zHyperWrite for the OLDS, zHyperWrite is enabled or disabled for subsequent OLDS that IMS opens, but not for the OLDS that are currently open. To start or stop using zHyperWrite immediately, issue the /SWITCH OLDS command twice.

If you issue the UPDATE IMS SET(LCLPARM(ZHYPERWRITE())) command to enable or disable zHyperWrite for the WADS, zHyperWrite is enabled or disabled the next time IMS writes to the current WADS.

WADS support for zHyperWrite

In IMS 15.5, the IMS Logger uses the DFSMS Media Manager to write data to the write-ahead log data set (WADS). As a result, the WADS must be defined as a VSAM linear data set.

The DFSMS Media Manager enables the usage of the hardware features like High Performance FICON® for z Systems™ (zHPF), which increases I/O throughput, and zHyperWrite, which reduces latency time for synchronous replication products. For reading from the WADS, regular VSAM is used.

To enable or disable zHyperWrite for the WADS, you have the following options:

- Use the WADS= keyword in the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDFxxx PROCLIB member. For more information, see LOGGER section of the DFSDFxxx member (System Definition).
- With APAR PH02149 (PTF UI61325) installed, you can use the **WADS(Y)** parameter in the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command to dynamically enable zHyperWrite without a restart. For more information, see UPDATE IMS command (Commands).

Migration considerations

The WADS must be defined as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and with the SHAREOPTIONS(3 3) parameter. The access method services (AMS) utility IDCAMS can be used to define the data set.

Recommendation: Use different data set name for the IMS 15.5 WADS than the name used for the WADS in current IMS version. This allows you to predefine the IMS 15.5 WADS before shutting down the current IMS system. Otherwise, the WADS must be deleted and redefined after the current IMS system goes down and before the system is started as an IMS 15.5 system.

Coexistence considerations

For XRF systems, both of the coexisting systems must be of the same IMS version.

Fallback

When you fall back from IMS 15.5 system to a previous version of IMS, ensure that you use a non-VSAM data set for WADS.

If you defined WADS data set names for IMS 15.5 during migration that were different from the names used by the previous IMS version, use the previous names for fallback. The fallback process replaces the reference to the WADS data sets systematically. Otherwise, the WADS must be deleted and redefined after the IMS 15.5 system is shut down, and before the system is started at the previous IMS version.

At the end of fallback, cold start IMS with the **FORMAT ALL** or **FORMAT WA** keyword.

Log record changes

The following log records are new or changed by this enhancement in IMS 15.5:

- X'4507' - The following fields are added:
  - ST4507_WADSCIS, which specifies the number of control intervals in the WADS.
  - ST4507_FLG2 (X'40': ST4507_F2_ZHYPWADS)
- X'4507' - The following fields are removed:
  - ST4507_WADSTRACKS, which specifies the number of physical tracks in the WADS data set.
  - ST4507_WADSBLKSTRK, which specifies the number of physical blocks per track in the WADS data set.

Trace record changes

The following trace subcodes are added to the IMS logger's trace. They are defined in the ILOG macro.

Table 16. New trace subcodes introduced to the IMS Logger's trace

Trace subcode	Description
x'31'	Completed a CONNECT request.
x'32'	Completed a DISCONNECT request.
x'33'	Completed a format request.
x'34'	Completed writing instance ID request.
x'38'	The Media Manager termination exit was driven.
x'39'	The Media Manager error exit was driven.

Requirements

The support of zHyperWrite requires that both the primary and secondary data set volumes be in a Metro Mirror relationship managed by HyperSwap.

Changes to installing and defining IMS

You must define the WADS as a VSAM linear data set with a control interval (CI) size of 4 KB (4096-bytes), secondary space allocation of 0, and the SHAREOPITON (3 3) parameter.

The following JCL example demonstrates how to define the WADS:

```
//AMS EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*
//SYSIN DD *

DEFINE CLUSTER -
     (NAME(IMSA.WADS.VSAM) -
     VOLUME(VOL001) -
     CONTROLINTERVALSIZE(4096) -
     SHAREOPTIONS(3 3) -
     CYLINDERS (20 0) -
     LINEAR)
/*
```

The installation verification program (IVP) is changed to define the WADS as linear VSAM data sets.

Changes to administering IMS

The IMS System Administrator defines all WADS to be used as VSAM linear data sets before starting the IMS 15.5 system for the first time.

Changes to troubleshooting for IMS

This enhancement introduces new and changed IMS messages related to Logger Media Manager.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to utilities

When IMS reads the write-ahead data sets (WADS), the Log Recovery utility might issue the DFS3253W warning message to explain the MVS messages that VSAM issues in the job log.

Changes to commands

The command output of /DISPLAY OLDS shows whether zHyperWrite is used when data is written to the WADS. If zHyperWrite is enabled, WADS=YES is displayed. If zHyperWrite is not enabled, WADS=NO is displayed.

A new keyword, ZHYPERWRITE, is added to the **UPDATE IMS SET(LCLPARM)** command.

OLDS support for zHyperWrite

In IMS 15.5, users can choose whether or not the IMS Logger uses zHyperWrite to write data to the online log data sets (OLDS).

Using zHyperWrite for the OLDS decreases replication latency and makes writes to the OLDS complete quicker in a synchronous replication environment.

Note: This optional enhancement requires that DFSMS APAR OA51385 be applied to your environment and the OLDS be defined as extended format data sets.

Log record changes

No changes to log records. However, as part of the IMS 15 base, the value of the OLDS sub-parameter of the **ZHYPERWRITE** parameter is included in the x’4507’ record as flag ST4507_F2_ZHYPOLDS.

Changes to installing and defining IMS

zHyperWrite can be used for writing to the OLDS to decrease replication latency. To enable or disable zHyperWrite for the OLDS, you have the following options:

- Use the OLDS= keyword in the **ZHYPERWRITE=** parameter in the LOGGER section of the DFSDFxxx PROCLIB member. For more information, see LOGGER section of the DFSDFxxx member (System Definition).
- With APAR PH02149 (PTF UI61325) installed, you can use the **OLDS(Y)** parameter in the **UPDATE IMS SET(LCLPARM(ZHYPERWRITE())** command to dynamically enable zHyperWrite without restarting the IMS system. For more information, see UPDATE IMS command (Commands).

You must ensure that all the OLDS that will be used by the IMS system are defined as extended format data sets.

To disable this enhancement, remove the **OLDS=YES** parameter or change it to **OLDS=NO**.

Changes to commands

The command output of /DISPLAY OLDS shows whether zHyperWrite is used when data is written to the OLDS. If zHyperWrite is enabled, OLDS=YES is displayed. If zHyperWrite is not enabled, OLDS=NO is displayed.

IMS Connect enhancements

In IMS 15.5, IMS Connect is enhanced in multiple ways to improve reliability, availability, serviceability, and security.

Password phrase enhancement for IMS Connect

In IMS 15.5, IMS Connect is enhanced to support password phrases with 9 - 100 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines.

This enhancement is delivered with APAR PH14651 (PTF UI65540).

Previously, IMS Connect rejected any passwords with a length greater than 8 characters for IMS database clients using Open Database function and for IMS transaction manager user-provided clients using HWSSMPL0, HWSSMPL1, or equivalent user-defined exit routines. With this enhancement, password phrases with lengths that are greater than 8 characters and up to 100 characters are supported by IMS Connect. This enhancement enables you to create stronger passwords with higher complexity and security.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to exit routines

The following changes are made with this enhancement to the **HWSAUTH0** user exit routine parameter list:

- In the field **AUTPM_Flag1**, a new flag byte X'20' is added.
- The **AUTPM_APssword** field is used as the address of passwords or password phrases.
- A new field **AUTPM_APsswordL** is added to represent the address of a fullword that contains the length (1 - 100) of the password or the password phrase.

ODBM RAS U210 prevention enhancement

In IMS 15.5, ICON has been enhanced to prevent a U210 abend in IMS when UDB applications terminate with work in progress.

This enhancement is added to IMS 15 by APAR PH07679/UI62878.

When UDB applications terminate and close their socket connections with work in progress due to ICON timeouts, ODBM Timeouts, or a connection error, IMS issues a U210 abend. With this enhancement, ICON issues an internal DPSB call that rolls back uncommitted work and prevents the U210 abend.

To support this enhancement, new CSL4200W, CSL4201W, CSL4202W, and CSL4203W messages are added for the ODBM address space to return information about the internal DPSB request.

Important:

This enhancement must be applied to all IMS, ODBM, and IMS Connect address spaces to ensure that U210 abends in IMS for an internal DPSB requests from IMS Connect are prevented.

If the ODBM CSLDCxxx member is being shared among all ODBM address spaces and you would like to override the DIAGDPSBMSG= parm in this member, then the value must be set after the enhancement changes are applied to all ODBM address spaces. If the CSLDCxxx member is modified before the APAR is applied then the ODBM initialization will fail in error parsing the parameter.

Any SLIP Traps for msgid=DFS554A monitoring for abendU0210 must be modified to SLIP on CSL4202W or CSL4203W messages. Additionally, if DIAGDPSBMSG=NONE is specified in the CSLDCxxx member, then it must be modified to SHORT or LONG or left unspecified so that it defaults to SHORT.

Changes to installing and defining IMS

With this enhancement, new parameter `DIAGDPSBMSG=SHORT | LONG | NONE` is added to the CSLDCxxx member of the IMS PROCLIB data set.

Changes to troubleshooting for IMS

New CSL4200W, CSL4201W, CSL4202W, and CSL4203W messages are added for the ODBM address space to return information about the internal DPSB request. Also, IMS Connect Recorder trace and the BPE RCTR trace in IMS Connect is modified to trace the IMS Connect Socket logon token.

Log record changes

The DFSLOG07 macro of the X'07' log record now indicates whether changes in IMS have been rolled back to prevent a u210 abend.

The DFSLOG07 macro is enhanced to include a new X'08' flag bit (DLRIRLBK) in DLRFLAG4 at offset X'15E'. The DLRIRLBK flag bit operates as an indicator to state whether IMS changes were rolled back before the DPSB request from ODBM was processed to prevent a U210 abend. This DPSB from ODBM is due to the internal DPSB request from IMS Connect. Refer to the CSL4200W and CSL4201W and additional CSL4202W or CSL4203W messages in ODBM for more details.

Changes to troubleshooting for IMS

Trace records are written to the BPE Error trace table in the ODBM address space.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see IMS 15.5 Message and code changes.

Changes to commands

The QUERY ODBM command is updated to return the DIAGDPSBMSG value.

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 Documentation.

RACF PassTicket support for DRDA clients enhancement

RACF PassTickets are one-time-only passwords and are an alternative to RACF passwords and password phrases. RACF PassTickets are also more secure than RACF passwords and password phrases because PassTickets remove the need to send passwords and password phrases across the network in clear text. Because this enhancement adds support for PassTickets for IMS Connect clients that connect to IMS DB by using DRDA, you can use this enhancement to improve the security of the DRDA client connections. Previously, when IMS Connect was configured to call RACF, access from IMS Connect clients to IMS DB could be authenticated by using only RACF passwords or password phrases.

The following procedure is a high-level description of the end-to-end process, introduced with this enhancement, by which a RACF PassTicket is used to authenticate a user who accesses IMS DB from a DRDA client:

1. When the client connection is first established, the RACF PassTicket that is used to authenticate the connection to IMS DB is generated either by the SQL Batch utility or, for other DRDA clients, by a service that uses the RACF PassTicket generator algorithm.

2. The client application sends to IMS Connect the generated PassTicket and the ID of the user requiring access in the **SECCHK** command (X'106E'). The PassTicket is specified in the code point, X'11A1', for the **PASSWORD** parameter of the **SECCHK** command. The user ID is specified in the code point, X'11A0', for the **USRID** parameter of the **SECCHK** command.
3. IMS Connect issues the RACROUTE REQUEST=VERIFY call to RACF to authenticate the client connection. On the RACF RACROUTE REQUEST=VERIFY call, IMS Connect includes the following information:
   - The RACF PassTicket and the user ID sent from the client application in the **SECCHK** command (X'106E').
   - The application name as specified on the **APPL=** parameter of the ODACCESS statement, which is in the HWSCFG*xx* member of the IMS PROCLIB data set. If an application name is not specified on the **APPL=** parameter of the ODACCESS statement, IMS Connect uses instead the value that is specified on the **ID=** parameter of the HWS statement, which is also in the HWSCFG*xx* member.

Changes to installing and defining IMS

The **APPL=** parameter is added to the ODACCESS statement in the HWSCFG*xx* member of the IMS PROCLIB data set. To authenticate DRDA client connections to IMS DB by using PassTickets, you must specify on the **APPL=** parameter the application name that is defined to RACF in the PTKTDATA class. The value that is specified on this parameter is used, in addition to the user ID and the RACF PassTicket, by IMS Connect in the RACF call RACROUTE REQUEST=VERIFY to authenticate the IMS Connect client to IMS DB.

If a RACF PassTicket is passed from a DRDA client to IMS Connect but this parameter is not specified, the HWS ID from the **ID=** parameter of the HWS statement is used instead by IMS Connect in the RACF call RACROUTE REQUEST=VERIFY.

The **APPL=** parameter is used only if **RACF=Y** is specified in the HWS statement of the HWSCFG*xx* member.

Changes to programming for IMS

To enable you to use the SQL Batch utility to generate RACF PassTickets to authenticate user access to IMS DB from a JDBC application, the **applName** URL property is added to the `DriverManager.getConnection` method of the IMS Universal JDBC driver. On the **applName** parameter, you can specify the 1- to 8-character application name that is defined to RACF in the PTKTDATA class for DRDA clients that access IMS DB. The value that is specified on this parameter is used by the SQL Batch utility to generate the RACF PassTicket.

When a JDBC application connects to IMS DB by using the JDBC `DriverManager` interface, the connection can be authenticated by a PassTicket only when the SQL Batch utility is run.

If you do not use the SQL Batch utility to generate PassTickets, see Generating and evaluating a PassTicket for information on other methods that you can use to enable your DRDA client to generate and evaluate PassTickets.

The **SECCHK** command (X'106E') is also enhanced to allow the PassTicket to be passed to IMS Connect, regardless of whether the PassTicket is generated by the SQL Batch utility or by another service. To pass the generated PassTicket to IMS Connect to authenticate a user to access IMS DB from a DRDA client, include the PassTicket in the code point, X'11A1', for the **PASSWORD** parameter of the command. The user ID must also be specified in the code point, X'11A0', for the **USRID** parameter of the command. IMS Connect uses, in addition to value of the **APPL=** parameter of the ODACCESS statement, the user ID and the PassTicket that are received on the **SECCHK** command to call RACF for user authentication.

Changes to commands

The following commands are enhanced:

QUERY IMSCON TYPE(CONFIG)

The **ODBMAPPL** filter is added to this command to display the value that is specified on the **APPL=** parameter of the ODACCESS statement:

```
QUERY IMSCON TYPE(CONFIG) SHOW(ODBMAPPL)
```

UPDATE IMSCON TYPE(CONFIG)

The **ODBMAPPL** keyword option is added to this command. You can use this keyword option to set the application name that is used by IMS Connect on the RACROUTE REQUEST=VERIFY RACF call to verify DRDA client connections to IMS DB:

```
UPDATE IMSCON TYPE(CONFIG) SET(ODBMAPPL(applname))
```

Changes to exit routines

The IMS Connect DB security user exit routine (HWSAUTH0) is enhanced with the **AUTPM_AAppl** field in the HWSAUTPM parameter list. This field includes the application name that is specified on the **APPL=** parameter of the ODACCESS statement.

Changes to utilities

The SQL Batch utility is enhanced to generate RACF PassTickets to authenticate users of JDBC applications to access IMS DB. To enable the utility to generate RACF PassTickets, you must specify the name of the application that the user requires access to on the **applName** URL property of the `DriverManager.getConnection` method.

To use the SQL Batch utility to generate RACF PassTickets, in addition to specifying the application name in the **applName** property of the `DriverManager.getConnection` method, you must also ensure that the following conditions are met:

- Both the `IRRRacf.jar` and `ibmjzos.jar` files are in the job's class path.
- The following values are the same as each other:
  - The value of the **applName** URL property of the `DriverManager.getConnection` method.
  - The value of the **APPL=** parameter of the ODACCESS statement, which is in the HWSCFG*xx* member of the IMS PROCLIB data set.
- On the JOB statement of the JCL for the SQL Batch utility, the z/OS user ID that is associated with the job is specified.

Coexistence considerations

To use the updates to the **QUERY IMSCON TYPE(CONFIG)** and **UPDATE IMSCON TYPE(CONFIG)** commands that are delivered with this enhancement in a mixed-version IMSplex that includes both IMS 14 and IMS 15, apply the IMS 15 APAR/PTF for this enhancement before you apply the IMS 14 APAR/PTF. That is, apply IMS 15 APAR PI99040 (PTF UI58288) on IMS 15 systems before you apply IMS 14 APAR PI99038 (PTF UI58287) on IMS 14 systems.

IMS Connect message HWSC0010I enhancement

In IMS 15.5, IMS Connect message HWSC0010I is enhanced to be issued after IMS Connect initialization is complete. With this enhancement, system administrators can start automated operations after message HWSC0010I is issued to ensure that their automated operations and requests are processed by IMS Connect.

Previously, message HWSC0010I was issued after IMS Connect started, but IMS Connect might not have completed initialization. Consequently, requests that were sent to IMS Connect after message HWSC0010I was issued might not have been processed and might have failed.

With this enhancement, message HWSC0010I is issued after all the internal components of IMS Connect are initialized.

Restriction: If Open Database Manager (ODBM) is started and **RRS=Y** is specified, but z/OS Resource Recovery Services (RRS) is not started, IMS Connect does not issue message HWSC0010I. Instead, ODBM issues message CSL4001A. In this situation, message HWSC0010I is issued only after the system operator submits RETRY, CONTINUE, or CANCEL in response to message CSL4001A.

Changes to administering IMS

Message HWSC0010I is changed to be issued after instead of before IMS Connect is initialized. System administrators can change automated operations to start after message HWSC0010I is issued to ensure that the operations are processed by IMS Connect. If message HWSC0010I is already being used to start automated operations, you do not need to change your automation.

Changes to troubleshooting for IMS

Message HWSC0010I is changed to be issued after instead of before IMS Connect is initialized. Message HWSC0010I is also enhanced to specify the ID of the IMS Connect instance. The IMS Connect ID that is specified in message HWSC0010I is defined in the **ID=** parameter of the HWS statement in the HWSCFG*xx* member of the IMS PROCLIB data set.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

IMS installed level enhancements

In IMS 15.5, IMS installed level enhancements enable you to get information about the installed IMS release, version, and modification level.

IMS installed level enhancement in the IMS Monitor log record

In IMS 15.5, the IMS installed level is added to the IMS Monitor's start record, the X'4E90' record.

This enhancement is delivered with APAR/PTF PH17307/UI68217.

Log record changes

The following log records are new or changed by this enhancement in IMS 15.5:

- X'4E90'

IMS installed level API (DFSGVRM) enhancement

In IMS 15.5, you can use the DFSGVRM API to get the version, release, and modification level of an IMS system.

Changes to programming for IMS

For a list of topics about programming IMS that are changed by this enhancement, see the System Programming APIs row in the table in “IMS installed level API (DFSGVRM) enhancement” on page 131.

IMS security enhancements

IMS 15.5 introduces security enhancements.

RACF PassTicket support for commands from IMS Connect to IMS OM

In IMS 15.5, IMS Connect (ICON) clients can use RACF PassTicket authentication to issue commands to IMS Operations Manager (OM) for more secured connections.

RACF PassTickets are one-time-only passwords and are an alternative to RACF passwords and password phrases. RACF PassTickets are also more secure than RACF passwords and password phrases because PassTickets remove the need to send passwords and password phrases across the network in clear text.

Previously, when users sent commands from IMS Connect to IMS OM, the application name field could not be used. This prevented ICON users from using PassTickets for authentication.

With this enhanced support for RACF PassTicket authentication, you can use RACF PassTickets as an alternative to passwords to authenticate user IDs for ICON client connections to IMS OM. The IMS Connect API (ICON API) for Java is also enhanced to accommodate this enhancement.

This enhancement is delivered with APAR PH51844 and PH54017.

Changes to programming for IMS

For PassTicket support, you are responsible for all definitions to RACF. You need to establish the RACF PassTicket generation routine and to supply the routine to the distributed platform. To use RACF PassTickets, specify the PassTicket in the IRM in place of the password and also specify the application name.

For IMS Connect API for Java clients, the ICON API does not generate RACF PassTickets. Clients are responsible for generating the PassTickets and setting it in the command request message by issuing the `TmInteraction.setRacfPassword()` method. Clients must also specify the application name by issuing `TmInteraction.setRacfApplName()`.

For more information, see RACF PassTicket for IMS Connect Client connections to IMS OM (Communications and Connections).

Displaying RACF sign-on messages

In IMS 15.5, after APAR PI85328 (PTFs UI57463 and UI57462) is installed, you can configure IMS to pass RACF sign-on messages to the Greeting Message exit routine (DFSGMSG0) when sign-on is successful. You can code the DFSGMSG0 user exit routine to display or process the RACF messages to improve security and password management.

To configure IMS to pass RACF sign-on messages, such as ICH70001 and ICH70002, to the DFSGMSG0 exit routine when sign-on is successful, specify **RACFMSG=Y** in the DFSDC*xxx* PROCLIB member. When a user successfully signs on, IMS passes the storage address of the messages in the parameter list of the exit routine.

The messages are returned by IMS in the WTO format.

For more information about these RACF messages, see z/OS: RACF miscellaneous messages.

Requirements

Changes to installing and defining IMS

During IMS system definition, you can now specify **RACFMSG=Y** in the DFSDC*xxx* PROCLIB member to direct IMS to pass the RACF sign-on messages to the DFSGMSG0 user exit routine.

Changes to exit routines

The parameter list for the Greeting Message exit routine (DFSGMSG0) is updated to include the storage address of the RACF sign-on messages, if any. You can then add code to your DFSGMSG0 exit routine to process the messages as appropriate.

The following example code is from the sample DFSGMSG0 user exit routine. The code, which is shipped disabled, checks for RACF messages and sends them to the system console as WTO messages.

```
CHKTYPE  DS    0H
         J     RACFDONE
         ICM   3,15,GMSGRMSG       IS THERE A RACF MSG
         BZ    SKIPMSGS            NO, SKIP MESSAGES
         AHI   3,8                 SKIP LENGTH AND PTR TO NEXT
         WTO   MF=(E,(3))          SEND MSG
         J     RACFDONE
SKIPMSGS DS    0H
         WTO   'DFSGMSG0 NO RACF MSGS'
RACFDONE DS    0H
```

Generic return code enhancement for RACF verifications

In IMS 15.5, if RACF is used to provide sign-on verification for VTAM terminals or IMS Connect clients and the user ID or password provided at sign-on is invalid, you can enable a generic return code or message to be returned instead of the actual RACF or IMS return code.

With this enhancement, you can inhibit access to information about RACF-verified sign-ons until valid user IDs and passwords are provided.

The option to enable the RACF generic return code to be returned when attempts to sign on to IMS fail is delivered by the following APARs/PTFs:

Changes to installing and defining IMS

The **SGNGENRC=** parameter for procedures is added to allow you to specify whether a generic return code is issued by IMS if RACF is used to verify sign-ons to IMS and the user ID or password provided is invalid.

The **RACFGENRC=** parameter is added to the HWS statement of the HWSCFG*xx* member of the IMS PROCLIB data set to allow you to specify whether a generic return code or message is returned by IMS Connect. The generic return code or message is issued if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The **UPDATE IMSCON TYPE(CONFIG)** command is enhanced to add the **RACFGENRC** attribute to the **SET** keyword. You can use the **RACFGENRC** attribute to define whether a generic return code or message is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

The **QUERY IMSCON TYPE(CONFIG)** command is enhanced to add the **RACFGENRC** filter to the **SHOW** keyword. You can use the **RACFGENRC** filter to query whether a generic return code or message is returned if RACF is used to verify sign-ons from IMS Connect clients and the user ID or password provided is invalid.

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 Documentation.

Changes to exit routines

The Security Information Block (SAFIB) of the IMS Connect Event Recorder exit routine (HWSTECL0) is enhanced to indicate that a RACF request type is R_PASSWORD.

IMS 15.5 release overview

Find out the changes in IMS 15.5 on this page.

Requirements

IMS 15.5 requires a minimum processor type of z13 (2964). For a list of processors supported by IMS 15.5, see “Processor requirements” on page 3.

The base IMS 15.5 system runs on z/OS Version 2 Release 4 or later. For a list of base software requirements for IMS 15.5, see “IMS 15.5 base software requirements” on page 9.

Migration considerations

The IMS team uses a continuous delivery model to enhance the most recent in-service version of IMS. Depending on the current IMS version that you run, you might need to consider different migration approaches.

Migrating from prior IMS 15 releases

Instead of performing a full installation of IMS, you can migrate to IMS 15.5 from prior IMS 15 releases by applying APAR PH59051 (PTF UI96269/UI96270/UI96271/UI96272/UI96273). After the migration, output locations, including the output of the messages, commands, and log records that reflect IMS versions, are updated to 15.5.

Before you apply APAR PH59051 (PTF UI96269/UI96270/UI96271/UI96272/UI96273), ensure that all prior IMS 15 APAR/PTFs are applied. If a required prior PTF is a PTF-in-error (PE) PTF and the fixing PTF is delivered after the release of IMS 15.5, you must apply the fixing PTF when it becomes available.

Migrating from IMS 14 or earlier versions

If you are migrating to IMS 15.5 from IMS 14 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 more instructions on migrating to IMS 15.5, see the following links:

- “Migrating from an earlier IMS 15 release” on page 19
- “Migrating from IMS 14 and earlier” on page 21

The IMS installed level is updated to 15.5 in the SCDINLVL control block field and in the &DFSLEVIN macro variable set by IMS macro DFSLEVIN. Output locations, including those in the preceding list, that reference the SCDINLVL control block field are updated to 15.5. However, because the IMS installed level that is specified in the SSCDIMSR control block field and the DFSLEV constant is not changed, the output locations that reference SSCDIMSR or DFSLEV will continue to display 15.1 (the IMS base level) even after you apply APAR PH59051 (PTF UI96269/UI96270/UI96271/UI96272/UI96273).

After you migrate to IMS 15.5, you can use the DFSGVRM API to get the version, release, and modification level of an IMS system.

Coexistence considerations

For a list of coexistence considerations for IMS 15.5, see Chapter 5, “Coexistence with IMS 15.5,” on page 61

Log record changes

The following log records are changed by this enhancement in IMS 15.5:

X'42'
Field ATLEVEL, which was introduced by PH14457, is changed to reflect the updated IMS installed level of 15.5, where it was previously 15.4.

X'4500'
Field ST4500_IN_LVL, which was introduced by PH14457, is changed to reflect the updated IMS installed level of 15.5, where it was previously 15.4.

Changes to troubleshooting for IMS

The output of the following messages is changed to show the version upgrade:

- The version shown in message **DFS1929I** is changed from 15.4 to 15.5.
- The "current IMS version" field displayed in message **DFS4878I** is changed from 15.4.0 to 15.5.0.
- The version shown in message **DFS2342E** is changed from 15.4 to 15.5.

The documentation of the following messages is changed:

- Message **DFS2342E** and **BPE0045E** are changed to specify the facility requirement on using a System z13 processor or higher.
- BPE abend code **3400** is changed to specify the facility requirement on using a System z13 processor or higher processor in the explanation of sub code X'0E'.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The output of the following commands are changed to show **15.5** in the **Version** column for the IMS installed level:

- **QUERY IMSPLEX**
- **QUERY IMSFUNC**

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 Documentation.

INQY ENVIRON2 enhancement

The new INQY call ENVIRON2 subfunction returns more information about an IMS execution environment than the ENVIRON subfunction. ENVIRON2 returns output such as primary and active JVM addressing modes, Managed ACB activation, IMS installed version, and IMS function level. To use this enhancement, install APAR/PTF PH45098/UI90543.

The ENVIRON subfunction remains unchanged to preserve compatibility with existing application programs. The new IMS DL/I INQY call ENVIRON2 subfunction includes all the values that are returned by ENVIRON, and adds the following information:

- An integer value that represents the address mode of the Java virtual machine (JVM) requested for an IMS dependent region.
- A field to indicate whether the program is running in a Managed ACB environment.
- IMS installed release level, IMS function level, and IMS functions enabled bitmap.
- A version number for the INQY ENVIRON2 output.

Recommendation: The INQY ENVIRON2 DL/I call expands the returned output length from x’7E’ (decimal 126) bytes to x’B2’ (decimal 178) bytes. If the buffer provided for the output area is too short, the call completes with status code AG, and the output is truncated. To ensure that the output area is

large enough, specify a length of 512 bytes, which provides sufficient length and accommodates future expansion of INQY ENVIRON2.

Non-stop PSB after an application abends in a non-message-driven BMP region

You can program the Non-Discardable Messages exit (DFSNDMX0) to control programs after an application abends in a non-message-driven BMP region. To do so, this enhancement provides new keywords that you can use with the optional **NDMX_CALLED_FOR()** parameter.

The DFSNDMX0 exit has been enhanced to support non-message-driven BMP region operations. You can now program the exit to specify the following transaction status:

- **1**: Do not (U)STOP the abended transaction (TRAN) and do not STOP the abended program (PSB).
- **3**: Do not (U)STOP the abended transaction (TRAN), do not STOP the abended program (PSB), and do not send the DFS555I message.

For non-message-driven BMP regions, the DFSNDMX0 exit supports **return code 0** (CONTINUE NORMAL PROCESSING).

You can use the new keywords to specify whether the NDMX exits specified on the EXITDEF=(TYPE=NDMX) statement are called for both, either, or neither message-driven and non-message-driven BMP regions. For the full list of keywords and several examples, see USER_EXITS section of the DFSDFxxx member (System Definition).

Changes to exit routines

The DFSNDMX0 exit routine has been enhanced to support non-message-driven BMP region operations. To learn more, see USER_EXITS section of the DFSDFxxx member (System Definition).

IMS JDBC Map Case enhancement

The JDBC Map Case enhancement provides an optional **removeInvalidCaseFields** connection property to return only valid map case columns and fields in a SQL result set.

If you use a SQL SELECT * statement and a WHERE clause with the IMS Universal JDBC driver to retrieve map case fields from a segment, the returned results include all fields by default. You can simplify your results by using the **removeInvalidCaseFields** property to remove case fields from the result set that do not satisfy the DEPENDINGON field condition in the WHERE clause. To learn more, see Using the removeInvalidCaseFields property (Application Programming).

IMS Connect send-only with error protocol enhancement

In IMS 15.5, IMS Connect clients can use the new send-only with error protocol to send transactions and receive errors that occur in IMS Connect.

When users use the existing send-only protocol, IMS Connect does not return any error response to the client. By using the send-only with error protocol, clients could receive responses for errors that occur in IMS Connect while maintaining the high throughput of the send-only protocol.

Note that IMS Connect does not return error messages from the IMS system. The IMS Connect send-only with error protocol returns only error messages from IMS Connect client back to the client.

This enhancement is delivered with APAR PH41890/PTF UI81659.

IMS compliance control blocks support

In IMS 15.5, the IMS compliance control blocks support provides access to compliance-related data in the Operation Manager and IMS Connect that can be collected for compliance audit purposes.

With the release of IBM z16, a new product, IBM Z Security and Compliance Center (zSCC) is launched to help take the complexity out of the compliance workflow and the ambiguity out of audits. It provides a dashboard that presents security compliance audit data obtained through automated fact collection about an IBM Z system.

In IMS, the Operation Manager (OM) and IMS Connect address spaces have configuration parameter settings that can be used for compliance audits. These settings are typically held in non-source-shipped control blocks whose format and location are not available to non-IMS programs.

However, with the enhancement delivered by APAR PH42600 in IMS 15, OM and IMS address spaces copy and consolidate internal compliance audit settings into new compliance data control blocks that are source-shipped. These address spaces then provide the address of the control blocks by using a z/OS® name and token pair with the name BPECOMPLIANCEDAT.

Any product that performs security audit compliance checks can use these new control blocks to access compliance audit data that is previously inaccessible from OM and IMS Connect. One such product is IBM Security zSecure Suite 2.5.0 with APAR OA63173 (PTF UJ08291), which captures the compliance data and makes it available for compliance tests and displays it in ISPF or in batch reports. IBM Z Security and Compliance Center then externalizes the compliance data to SMF 1154 subtype 85, 86, and 87 records and uses the SMF 1154 records to evaluate an installation's compliance state, which can be displayed on the zSCC dashboard.

For information about the new OM and IMS Connect compliance data control blocks, see IMS compliance control blocks in the System Programming APIs publication.

For more information about IBM Security zSecure Suite 2.5.0, see IBM Security zSecure Suite 2.5.0 Documentation.

For more information about IBM Z Security and Compliance Center, see IBM Z Security and Compliance Center.

Requirements

IBM Z Security and Compliance Center requires IBM z16.

Changes to troubleshooting for IMS

This enhancement introduces changes to the following message and abend code:

- HWSX0909E
- BPE ABEND 3400

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

New codes are added to the following commands in **CREATE IMSCON** command:

- **CREATE IMSCON TYPE(DATASTORE)** command
- **CREATE IMSCON TYPE(IMSPLEX)** command

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 Documentation.

Related reference

IBM Security zSecure Suite 2.5.0

Related information

IBM Z Security and Compliance Center

IMS Fast Monitor (FASTMON) user exit enhancement

IMS 15.5 introduces a new exit, the IMS Fast Monitor user exit (FASTMON), which provides a programming interface for you to capture the same data that is available to the IMS Monitor.

The new IMS Fast Monitor (FASTMON) user exit, like the IMS Monitor (IMSMON) user exit, provides access to the IMS Monitor data without the need to modify IMS code. However, the FASTMON exit is optimized to minimize performance overhead, in exchange for certain functional restrictions.

Compared to the IMSMON user exit, the FASTMON user exit:

- Not refreshable;
- Cannot use user exit callable services;
- Has a simpler register interface.

The FASTMON user exit is called during IMS initialization, IMS termination, and at IMS monitor call points for registered SLOG codes, regardless of whether the IMS Monitor is on or off.

Restrictions

An exit must not modify any other places in the array except for moving a 'Y' in the slot that represents the SLOG codes that the exit is interested in. Because all exit routines for the IMSMON and FASTMON exit types are passed in the same array, making other changes to the slot might unregister another exit's interest in that SLOG code if that exit also puts a 'Y' there.

Changes to installing and defining IMS

The FASTMON user exit can be specified in the EXITDEF parameter in the USER_EXITS section of the DFSDFxxx member.

Changes to administering IMS

The FASTMON user exit provides a similar exit point as the IMSMON user exit does. When FASTMON and IMSMON user exits are both defined, all the FASTMON exits are called first in the order that is listed on the EXITDEF parameter before all the IMSMON exits being called.

Changes to troubleshooting for IMS

This enhancement introduces the following new or changed IMS messages:

- DFS4570E
- DFS4573E
- DFS4588E (new)

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

Support for the FASTMON exit type is added to the **QUERY USEREXIT** and **REFRESH USEREXIT** 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 Documentation.

Changes to exit routines

A new IMS Fast Monitor (FASTMON) user exit is introduced.

Support for the FASTMON exit type is added to the IMS Monitor (IMSMON) user exit because the FASTMON exit might affect some of the IMSMON exit's behaviors.

ACEE creation and management enhancement for ESAF Db2 interface

In IMS 15.5, a new optional keyword **RLA= Y|N** is added to the SSM member of the IMS PROCLIB data set for the Db2 subsystem to reduce the overheads of ACEE creation and management. This is delivered through APAR PH33024.

The ACEE (accessor environment element) is needed for external subsystem (ESS) thread processing to avoid using Db2 internal security. Previously, an ESS created and managed the ACEE for every ESAF call whenever the ACEE was needed with the exception of using ESAF_SIGNON_ACEE for a JVM dependent region. As a result, much workload was caused in the ACEE creation and deletion for every ESAF call. To improve the ESS performance in ACEE creation and management, a **Region Level ACEE (RLA)** parameter is added to the SSM member of the IMS PROCLIB data set for the Db2 subsystem. **RLA=** is a keyword-only parameter that cannot be specified as a positional parameter.

With APAR PH33024, IMS can optionally pass the dependent region address space level ACEE to the Db2 at external subsystem (ESS) Signon. When **RLA=Y** is specified for an Db2 entry in **SSM= proclibmember**, the region level ACEE is passed to Db2 at ESS Signon if there is no ESAF_SIGNON_ACEE present and no TCB level ACEE is present.

This enhancement reduces the overhead of ACEE creation and management because the ACEE is created only once when IMS dependent region address space is initialized and the ACEE is available for future use.

Security considerations

This enhancement would allow Db2 to use external security processing rather than use the internal processing by default. Because there is a one-to-one relationship between IMS transaction code, IMS PSB name, and Db2 package names, and IMS checks the transaction code versus the actual end user ID at the transaction point of entry, it is often acceptable to use the dependent region address space user ID and not the actual end user ID to perform Db2 external security processing. The address space user ID can be controlled by customer to match the IMS/Db2 workloads running in the dependent region. Different dependent regions can have different user IDs.

Changes to troubleshooting for IMS

A new message **DFS7432I** will be issued with the subsystem name and the job name information when a dependent region is up with the parameter **RLA=Y** is specified.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The /DISPLAY SUBSYS command has been enhanced to include the parameter **RLA=** to display on the second line of the **/DIS SUBSYS** command output to show the RLA value for the IMS control region. This

could be **Y**, **N**, or blank. When blank is displayed, it means the **RLA=** is not specified in the control region SSM proclibmember.

For more information about the command for this enhancement, see the online version of this information under Release Planning in the IBM Documentation.

HEX and binary literal support in JDBC SQL queries

In IMS 15.5, IMS Universal JDBC Drivers support the usage of HEX and binary literals in the SQL syntax. This enhancement is delivered with APAR PH25586/ UI 71410 for IMS15 and PH 25585/ UI71424 for IMS14.

IMS Universal JDBC drivers support the usage of HEX and binary literals in the SQL syntax. The supported SQL statements for literals include SELECT, INSERT, UPDATE, DELETE, and fields within the WHERE clause. This enhancement would enable an application developer to specify a standard way to specify the HEX or binary literals values in an SQL (INSERT, UPDATE, DELETE or SELECT) call. This enhancement is delivered with APAR PH25586/ UI 71410 for IMS15 and PH 25585/ UI71424 for IMS14.

Requirements

To enable the use of HEX or binary literals in JDBC SQL queries, **`UserTypeConverters`** must be updated to support `setBytes()` and `getBytes()`.

IMS support for IBM z/OS Workload Interaction Correlator

With the introduction of IMS support for IBM z/OS Workload Interaction Correlator in IMS 15.5, you can gain a unified view of workload performance data for an IMS system and other participating z/OS components and middleware.

Previously, diagnosing IMS performance issues could be challenging because analysis of IMS and other z/OS components and middleware was performed in silo. . In addition, analysis of the correlation between IMS and other participating z/OS components required specialized skills and manual work.

To address the issues, IMS support for IBM z/OS Workload Interaction Correlator is introduced. IBM z/OS Workload Interaction Correlator gathers statistical data from participating applications, and generates synchronized, standardized, summarized data across z/OS and middleware stack. IMS data is collected as part of the unified workload insights, which enable system administrators to reduce downtime without additional subject matter experts or specialized mainframe skills. For each workload, the performance data is captured at 5-second intervals, and exceptional jobs and activities are recorded so that you can identify abnormal jobs.

This enhancement is delivered with APAR/PTF PH15062/UI. With PH15062, IMS becomes a participating application.

IMS registers with IBM z/OS Workload Interaction Correlator during initialization and delivers statistical data to it through a z/OS System Management Facility (SMF) exit. For every normally complete transaction, Message Processing Program (MPP) regions and Java message processing (JMP) regions record both elapsed time and CPU time in a standard form and in an IBM System z Integrated Information Processor (zIIP) form.

IBM z/OS Workload Interaction Correlator generates SMF type 98 records with subtype 1025 to record these statistics. A new macro DFSSR98A maps the SMF type 98 subtype 1025 records.

DFSSR98A is also used by the z/OS Workload Interaction Navigator in the generation of graphical reports.

Hardware requirements

For the IMS support of IBM z/OS Workload Interaction Correlator added by APAR PH15062 to be effective, IMS must be running on a z14 (machine type 3906) processor, or a higher z/OS processor. IMS with APAR PH15062 may still run on a lower version processor. However, message DFS7431I will be issued and no statistics will be saved.

Software requirements

IMS must be running on a z/OS 2.3 or above operating system that has z/OS APAR OA57165 installed. IMS with PH15062 might still run on an earlier release of z/OS or on a z/OS system that does not have APAR OA57165 installed. However, DFS7431I will be issued and no statistics will be saved.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

INIT OLC TYPE(ACBMBR) command enhancement

The INIT OLC TYPE(ACBMBR) command has new a option called BLDPSBNO.

The BLDPSBNO option enables you to change DBDs that do not have structural updates.

Overflow sequential access method (OSAM) data set encryption

Install PH16682/UI67505 to enable OSAM data set z/OS encryption, which allows you to enhance security without changes to applications and to reduce outages.

IMS OSAM database data sets can be defined as physical sequential data sets that are accessed by the IMS custom I/O driver code or as VSAM linear data sets (OSAM LDSs) that are accessed through IBM Media Manager services.

The database processing for an OSAM database is the same regardless of which physical format is used. This means that an OSAM database that uses a VSAM LDS as its physical data set is still an OSAM database, not a VSAM database. When using OSAM to access VSAM Linear data sets (LDS), the data is stored in the OSAM buffer pool. Check your OSAM buffer pool definitions (IOBF) to ensure there are enough buffers to hold these data sets.

OSAM physical sequential data sets cannot be encrypted by using z/OS data set encryption. However, OSAM LDS data sets can be encrypted using z/OS data set encryption if you specify a key label when the data set is defined.

With this APAR, you can also exploit other enhancements that are made available through Media Manager. This enhancement offers additional security benefits. For example, support personnel can have the authority to back up OSAM data sets without being given the ability to decrypt the data. This can be done without changes to applications, and in some cases, without database outages.

Prerequisites

You must have the following prerequisites before you start the process:

- IMS 15.2 with PH16682/UI67505.
- z/OS 2.2 with APAR OA50569 and dependent APARs installed, or z/OS 2.3 and later.
- z196 and Crypto Express 3 or later.
- All OSAM LDS-related APARs are flagged with the IMSOSAMLDS/K fixcat keyword. IBM recommends that you install any APARs with this keyword before using OSAM linear data sets.

Encrypting an OSAM data set

To encrypt OSAM database data sets, define them as VSAM extended format linear data sets (LDSs) and specify a key label. Other IMS OSAM data sets, such as Queue Manager (QMGR) or recovery data sets (RDS), cannot be encrypted by using z/OS data set encryption.

To encrypt an OSAM data set, follow these general steps:

1. Change the definition of the OSAM data set into a VSAM LDS.
2. When you create an OSAM data set, assign a key label to it by using one of the following methods:
   - RACF data set profile
   - JCL, dynamic allocation, TSO ALLOCATE, IDCAMS DEFINE
   - SMS data class
3. Use HALDB online reorganization (or offline unload and reload) to convert to the encrypted data sets.

No application changes are required. Any program that accesses an OSAM data set continues to work with the encrypted OSAM data sets that are defined as VSAM LDS. Data stored in encrypted OSAM data sets are processed the same way as non-VSAM OSAM data sets.

Restrictions

VSAM linear data sets require a CI size that is a multiple of 4096 and from a minimum of 4096 to a maximum of 32786 bytes.

Any OSAM physical sequential data sets that use a block size smaller than 4096 bytes must be changed to a CI size of at least 4096 bytes when converted to OSAM LDS. This can affect current buffer pool definitions and randomization parameters for HDAM databases. Check that the **rbn** parameter times the new CI size does not exceed the OSAM data set maximum of 8 GB, (or 4 GB for OLR-capable PHDAM HALDBs).

IMS OSAM data sets that are not defined as VSAM LDSs, such as OSAM databases using sequential data sets, Queue Manager (QMGR) data sets, and recovery data sets (RDS), cannot be encrypted by using z/OS data set encryption.

Log record changes

In the x'62' log record, the 1-byte field LIOESTYP is updated to indicate that the log record is for an OSAM I/O error reported by Media Manager.

Trace record changes

In the DL/I trace record, new trace entries were created to follow OSAM I/O activity when using Media Manager:

- X'63': OSAM MEDIA MANAGER I/O START
- X'64': OSAM MEDIA MANAGER I/O POST
- X'65': OSAM MEDIA MANAGER OPEN/CLOSE/EOV.

REXXIMS MAPDEF packed decimal function enhancement

In IMS 15.5, the IMS adapter REXXIMS is enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned (Z) data types. This enhancement is delivered with APAR/PTF PH16409/UI66831.

IMS adapter REXXIMS has been enhanced to increase the max MAPDEF length value to 16 bytes for packed (P) and 32 bytes for zoned(Z) data types. In addition to the MAPDEF length values, the scale (.digit) specification has also been increased to allow 0 to 31 digits for both P and Z specifications. The scale indicates the number of digits to the right of a decimal point when converting the number. This enhancement enables REXX programs to map an entire packed decimal field or more than 12 zoned decimal digits and allows application developers to use MAPDEF instead of coding their own routines.

The MAPGET and MAPPUT commands have also been updated to support the longer P and Z length values, as well as the increased scale of a decimal number.

Changes to programming for IMS

This enhancement has updated the valid lengths of the following data types in the MAPDEF, MAPGET and MAPPUT REXXIMS extended commands:

- Zoned decimal **(Z)**: 1-32 bytes
- Packed decimal **(P)** : 1-16 bytes

Data privacy for diagnostics support for IMS 64-bit storage

To protect sensitive diagnostic data that is sent to IBM or other third-party vendors, you can use a sample job run against an IMS dump to redact 64-bit storage objects that have been tagged as SENSITIVE by IMS.

In IMS 15, after APAR PH14059, requests for certain 64-bit storage objects within IMS are made specifying the IARV64 SENSITIVE= parameter to tag the storage as possibly containing or not containing customer sensitive data. Certain areas that can contain sensitive data (for example: Fast Path 64-bit buffers and logger 64-bit buffers) are tagged as sensitive. Other areas that contain only IMS internal control type data (for example: storage tracking elements, internal performance statistics, and resource data) are tagged as not sensitive.

When IMS is run on an IBM z15 processor or later, and on z/OS 2.3 or later with z/OS APARs OA57570 and OA57633, the sensitive or not-sensitive storage tags are included as metadata in SVC dumps and stand-alone dumps (SADUMPs) of IMS storage. You can use the z/OS-provided JCL BLSJDPFD in SYS1.SAMPLIB to create a redacted copy of a dump. Storage marked as sensitive is excluded from this copy. Storage marked as not sensitive is included in this copy. See http://publibz.boulder.ibm.com/zoslib/pdf/OA57570.pdf for additional details.

Note: If you use the z/OS-provided JCL BLSJDPFD to generate a redacted SVC dump or stand-alone dump to send to IBM or another software vendor, ensure that you keep the original complete dump until your case has been resolved. Data removed by the tool may be necessary for solving a problem. IBM may request you provide specific information from the original dump, even if you do not send the complete dump to IBM for data privacy reasons.

Requirements

Hardware requirements: For the Data Privacy for Diagnostics support added by PH14059 to be effective, IMS must run on a z15 (machine type 8561) or later processor. IMS with PH14059 can still execute on a lower supported processor than z15; however, the 64-bit storage tagging will be ignored.

Software requirements: For the Data Privacy for Diagnostics support added by PH14059 to be effective, IMS must be running on a z/OS 2.3 or later operating system that has z/OS APARs OA57570 and OA57633 installed. IMS with PH14059 can still execute on a lower supported operating system, or on an operating system without the indicated z/OS APARs; however, the 64-bit storage tagging will be ignored.

ByteBuffers in the IMS Universal JDBC and DL/I Interfaces

In IMS 15.5, ByteBuffers have been enabled in the IMS Universal JDBC and DL/I interfaces. A new interface for issuing ICAL and enhanced support for Dynamic Arrays and `ArrayResultSets` have also been added. This feature is delivered by the APAR PH14157/UI64958.

All users of IMS Universal Driver running IMS 15 or higher can now use Byte Buffers as an I/O area to INSERT, SELECT, and UPDATE full segment areas from an SQL query.

Database segment mapping enhancement

In IMS 15.5, the database segment mapping enhancement allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment

without knowledge of the database schema. This enhancement is delivered with APAR/PI94643/UI59325 (for IMS14) and PI97302/UI59327 (for IMS15).

Starting with IMS V14, this enhancement to database segment mapping allows application developers to access an IMS database segment whose schema is determined by the key feedback data from a parent segment without knowledge of the database schema. It gives database administrators the ability to use the IMS Catalog to maintain field mappings that are dependent on the key feedback data of a segment, in the hierarchical path of the current segment, and make that mapping automatically available to consumers such as application developers and tooling. This enhancement is made available by the following APARs:/PTFs:

- IMS V14 PI96463/UI59325 and PH05093/UI61283
- IMS V15 PI97302/UI59327 and PH05433/UI61285
- V14 APAR PH03415 and V15 APAR PH03426 for IMS Universal Drivers (UDB)

The DSFMAP statement is being enhanced to support a new optional parameter called control segment name, CTLSEGNM. The control segment name parameter specifies the name of a segment in the same hierarchical path of the current segment. When CTLSEGNM is specified, the value on the DEPENDINGON parameter must be a field within the key range of the segment specified on CTLSEGNM. The control segment name will be saved in the IMS Catalog's MAP segment and can be retrieved by the IMS Universal Drivers via a GUR call. The Universal Drivers can then use the control segment value to apply the appropriate mapping to the result set that will be returned to the application.

This APAR modifies the following items:

- The DFSMAP macro in DBDGEN allows specifying the optional parameter CTRLSEGNM.
- ACBGEN can process the optional parameter CTLSEGNM that can be specified on the DFSMAP macro.
- The IMS Catalog populate utility stores the CTLSEGNM value in the MAP segment of the IMS Catalog.
- The GUR DL/I returns the CTLSEGNM value in the MAP segment of the IMS Catalog.
- The DBD XML schema for the GUR DL/I call includes the CTLSEGNM value.

Requirements

To include the new mapping information in the DBD, use the optional control segment name parameter, CTLSEGNM= in the DFSMAP macro in conjunction with the DEPENDINGON= parameter. Ensure that the control segment is in the same hierarchical path as the segment you are trying to map and the field you specify on the DEPENDINGON= parameter must be part of the key of the control segment. After the CTLSEGNM is added to the DFSMAP statement you must perform DBDGEN and ACBGEN for the affected resources as well as run the Catalog Populate Utility for IMS to write the CTLSEGNM to the IMS Catalog in the MAP segment.

Changes to utilities

IMS Catalog Populate Utility has been updated to store the CTLSEGNM value in the MAP segment of the IMS Catalog.

STOP REGION command enhancement

The /STOP REGION command has a new ABDUMP FORCE keyword to terminate regions with a TERM PENDING or WAIT-INIT-INPROG status when a CREATE THREAD is not performed on IMS.

The STOP REGION command is enhanced with APAR/ PTF PI97394/UI60483 for IMS 14 and PH05432/UI60488 for IMS 15 to include a new ABDUMP FORCE keyword. This option terminates a range of messages processing the regions with WAIT-INIT-INPROG or TERM PENDING status when a CREATE THREAD is not performed on IMS. This enhancement is applicable to MPP and JMP regions.

Changes to commands

With this enhancement:

- You must issue a /STO REGION ABDUMP FORCE to stop a region with WAIT-INIT-INPROG when SIGN-ON and IDENTIFY are completed for the region, but a CREATE THREAD is not yet performed on IMS.
- You must issue a /STO REGION ABDUMP FORCE to stop a region with a TERM PENDING status when SIGN-ON and IDENTIFY are completed for the region, but a CREATE THREAD is not yet performed on IMS and /STOP REG could not stop the region.

Starting Common Service Layer components enhancement

In IMS 15.5 with APAR/PTF PH04044/UI60475, IMS is enhanced to automatically start, by using a procedure in an IMS control region, the Common Service Layer (CSL) address spaces in a Resource Manager (RM) environment. More specifically, this enhancement enables IMS to automatically start in an RM environment the Operations Manager (OM), Structured Call Interface (SCI), and RM address spaces of the CSL.

Previously in an RM environment, IMS did not automatically start the OM and SCI address spaces at IMS startup. This was true even if a procedure for the OM or SCI was defined in the IMS PROCLIB data set. In an RM environment, you had to start OM and SCI before you started IMS, manually or through automation, by using the z/OS **START** command or JCL. Also previously, you could not start RM by defining a procedure for the RM in the IMS PROCLIB data set. And, IMS did not start RM automatically at IMS startup. Instead, you could start RM only by using the z/OS **START** command from a z/OS system console or by using JCL.

With this enhancement, IMS automatically starts the OM, RM, or SCI address spaces at IMS start up if a procedure is defined in the IMS PROCLIB data set for the address space, even in an RM environment.

Changes to defining IMS

The **RMPROC=** parameter is added to the following members of the IMS PROCLIB data set. You can use the **RMPROC=** parameter to specify the member of the IMS PROCLIB data set that contains the procedure for the RM address space.

- COMMON_SERVICE_LAYER section of the DFSDF*xxx* member
- DFSCG*xxx* member

IMS restart message enhancement

In IMS 15.5, message DFS5055I is added to enable you to determine whether IMS restart is in progress, completed, or hung.

This enhancement is delivered with APAR/PTF PH01551/UI59302.

With this enhancement, at IMS normal or emergency restart, the first DFS5055I message is issued when the IMS system starts reading the log records. If IMS restart takes longer than 30 seconds, message DFS5055I is reissued every 30 seconds after the first DFS5055I message is issued. Message DFS5055I is issued a final time when the log read process is complete. If message DFS5055I is neither issued to indicate that the log read is completed nor is it issued at regular 30-second intervals, IMS restart is not making progress and might be hung.

Here is an example of the DFS5055I message text:

```
DFS5055I RESTART LOG READ PASS n IS IN PROGRESS; LSN=lsn
DFS5055I RESTART LOG READ PASS n HAS COMPLETED: LSN=lsn
```

In the message text, *n* is the restart log read pass number, which is 1 for normal restart, or 1 or 2 for emergency restart, and *lsn* is the log sequence number.

Previously, because a message was not issued to indicate log read progress, it was difficult to determine whether IMS restart was in progress or hung when restart was taking a long time.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Open Database Manager (ODBM) and JDBC driver support for INIT STATUS Group call

In IMS 15.5, support for ODBM to allow INIT STATUS GROUPx call from an application using IMS Universal Drivers (UDB) is added. This feature is delivered through the APARs PH0366 and PH02698 (for IMS Universal Drivers).

To prevent an IMS Java application from terminating abnormally with ABEND U3303 or ABEND U0777 due to an unavailable database or due to a deadlock, respectively, IMS allows the application to issue an INIT STATUS call before the database can be accessed. With APAR PH02698, IMS Universal Drivers can allow an application to issue an INIT STATUS call, in conjunction with APAR PH00366 that modifies ODBM to enable the support. Issuing the INIT STATUS GROUPA call avoids the ABEND U3303 and issuing the INIT STATUS GROUPB call avoids the ABEND U0777.

Note: This enhancement requires that the APARs PH00366 and PH02698 are applied together.

Changes to programming for IMS

The new methods initStatusGroupA(), initStatusGroupB(), and setInitStatusGroup(String) are added to the Java API specifications for IMS Universal Drivers and IMS JDR resource adapter packages to reflect the support extended for INIT STATUS GROUPx calls. To avoid ABEND U3303, use either **`initStatusGroupA()`** or **`setInitStatusGroup("A")`**. To avoid ABEND U0777 due to a deadlock condition (Abendu777) use INIT STATUS GROUPB. A new optional connection property `initStatusGroup` is also added to the JDBC DriverManager interface to connect to the IMS database. For detailed information the INIT STATUS Group calls, see Javadoc listed in the Documentation Changes table.

UPDATE TRAN command enhancement

In IMS 15.5, the **UPDATE TRAN** command is enhanced with APAR/PTF PH00581/UI58235. The enhancement enables you to run the **UPDATE TRAN** command with the **PLCTTIME** attribute specified whether or not dynamic resource definition (DRD) is enabled.

Previously, the **UPDATE TRAN** command with the **PLCTTIME** attribute specified was processed only if DRD was enabled.

Changes to commands

With this enhancement, return code X'00000010' and reason code X'00004300' are no longer returned when both of the following conditions are true:

- The **UPDATE TRAN** is issued with the **PLCTTIME** attribute specified.
- DRD is disabled.

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 Documentation.

Log record PARDLI flag enhancement

In IMS 15.5, the X'08' Log record has been enhanced to include a flag that indicates the use of the Parallel DL/I mode (PARDLI) of the IMS application region that application has been scheduled into. Install APAR/PTF PI99293/UI58053 to enable this enhancement.

Impact to troubleshooting for IMS

The IMS Logs are enhanced to include a new 1-bit flag to indicate the parallel DL/I mode (PARDLI) option(LINTPDLI), which helps to identify if application ISWITCH to DLI for processing, as parallel DL/I mode (PARDLI) is specified.

For a complete list of Log record changes in IMS 15.5, see Chapter 8, "Log record changes in IMS 15.5," on page 75.

IMS Universal Database resource adapter connectivity enhancement for WebSphere Application Server Liberty

In IMS 15.5, the IMS Universal Database resource adapter is enhanced to provide type-2 and type-4 connectivity support for WebSphere Application Server Liberty.

Type-2 and type-4 connectivity support for WebSphere Application Server Liberty is added to all four types of IMS Universal Database resource adapters:

- `imsudbJLocal.rar`
- `imsudbJXA.rar`
- `imsudbLocal.rar`
- `imsudbXA.rar`

The IMS Universal drivers are also enhanced to work in the CICS OSGi environment.

IVP support for 8-character TSO/E user IDs on z/OS 2.3

In IMS 15.5, the IVP supports the use of 8-character TSO/E user IDs. This requires that IMS run on z/OS 2.3 or later.

Table 17. Links to topics that have new or changed content for this enhancement

Publication	Links to topics
Release planning	• IMS Version 15 enhancements – "IMS 15.5 system continuous delivery functions" on page 84 – "IVP support for 8-character TSO/E user IDs on z/OS 2.3" on page 147 (new) (this topic)

Function level activation control enhancement

In IMS 15.5 with APAR/PTF PI83839/UI52153, you can dynamically enable or disable new IMS functions that are delivered as PTFs under the IMS continuous delivery model without causing an IMS system outage. After you install a new IMS function, you control when to enable and disable the function by using the **UPDATE IMSFUNC** command.

You can continue to enable or disable IMS functions statically by using IMS PROCLIB data set members as with earlier versions of IMS.

This enhancement also provides the following features to support the continuous delivery of IMS functions:

Function level
A number that identifies a PTF containing one or more IMS functions regardless of whether the function is enabled or not in the IMS system.

Function table
Contains information about significant new or changed IMS functions delivered by IMS henceforth, including the current IMS function level and an entry for each function to provide more information about the function.

IMS functions enabled bitmap
For IMS functions that are delivered disabled, a bit for every IMS function that becomes enabled. The functions enabled bitmap also contains the current IMS function level.

QUERY IMSFUNC command
Displays one or more or all of the IMS functions that are defined in the IMS function table and information about the functions. You can also use the **QUERY IMSFUNC** command to see the current IMS function level.

This enhancement, delivered with APAR/PTF PI83839/UI52153, is the first IMS function, and has a function name of FUNCTIONLEVEL and a function level of `00000001`.

Some IMS functions, due to either technical or strategic requirements or because it has no impact until you choose to use it, are enabled by default after you install the PTF. For functions that are enabled by default, you do not need to issue the **UPDATE IMSFUNC** command to start using the enhancement. This function, delivered with APAR/PTF PI83839/UI52153, is enabled by default.

Log record changes

The following log records are new or changed by this enhancement:

X'42'
Enhanced to include the IMS function level at offset X'104'.

X'4500'
Enhanced to include the IMS function level at offset X'C0'.

X'4050'
Newly added to log the following information:

- The IMS functions that are enabled so that the function enablement value can be retrieved at IMS restart.
- The current IMS function level.

X'45FF'
Enhanced to include the following information:

- At offset X'50', the current IMS function level.
- At offset X'54', the offset to the IMS functions enabled bitmap from the start of the X'45FF' log record.
- At offset X'30', some reserved space.

Changes to defining and administering IMS

With this enhancement, after you install a PTF that contains a new continuous delivery IMS function, you decide when to enable and disable IMS functions that are not enabled by default. You can change the function enablement value dynamically by using the **UPDATE IMSFUNC** command. Alternatively, you can enable the new function statically by defining the parameter for the function in the DFSDF*xxx* member of the IMS PROCLIB data set and cold starting IMS.

Tip: If you enable or disable an IMS function by using the **UPDATE IMSFUNC** command, specify the same enablement value in the parameter that defines the function in the IMS PROCLIB data set member. This ensures that the enablement value for the function is retrieved at IMS cold start.

If you change a function enablement value by using the **UPDATE IMSFUNC** command and IMS is cold started, one of the following situations occurs:

- For local functions, the enablement value is retrieved from the DFSDF*xxx* PROCLIB member during cold start. In this case, the **UPDATE IMSFUNC** command might need to be issued following the cold start to return the enablement value to a previous state.
- For global functions, if you use RM, CQS, and a resource structure, the enablement value is retrieved from the resource structure during cold start.
- For catalog functions, the enablement value is retrieved from the catalog during cold start.

Changes that you make by using the **UPDATE IMSFUNC** command are logged in the x'22' map byte x'31' log record and are recoverable across an IMS restart. For example, if a function is enabled in the DFSDF*xxx* member and later disabled by using the **UPDATE IMSFUNC**, the disabled value is recovered if IMS restarts.

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 Documentation.

For a complete list of all of the new, changed, and deleted messages, and abend codes in IMS 15.5, see Chapter 7, “Message and code changes in IMS 15.5,” on page 73.

Changes to commands

The **UPDATE IMSFUNC** command is added to allow you to dynamically enable or disable an IMS function, if the function is not enabled by default, whilst IMS remains online.

The **QUERY IMSFUNC** command is added to allow you to display one or more or all of the IMS functions that are defined in the IMS function table and information about the functions. You can also use the **QUERY IMSFUNC** command to see the current IMS function level.

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 Documentation.

Changes to exit routines

The sample IMS initialization and termination user exit DFSITRX0 is enhanced to show how to access the current IMS function level from the system contents directory (SCD) field SCDFNCE.

IMS system enhancements

The enhancements to the IMS 15.5 system are not specific to either the IMS Database Manager or the IMS Transaction Manager and might impact both.

Part 3. IBM IMS Tools support for IMS 15.5

The IBM IMS Tools products are designed to enhance the performance and operation of IMS, and are upgraded and enhanced to work with IMS 15.5.

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 15.5.

For more information about these tools, go to IMS tools.

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, 2.2

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 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:

- Chapter 14, “IBM IMS Administration Tool for z/OS 1.1,” on page 157
- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 166
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 163
- “IBM IMS High Performance Load for z/OS, 2.1” on page 166
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 167
- “IBM IMS High Performance Prefix Resolution for z/OS, 3.1” on page 167
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 167
- “IBM IMS Index Builder for z/OS, 3.1” on page 163
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 168

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, 2.2.

Program number: 5655-DSP

IBM IMS Database Utility Solution for z/OS, 2.1

IBM IMS Database Utility Solution for z/OS is a utilities management tool that combines IBM IMS Tools database products that are needed to manage IMS full-function and HALDB databases into a single, consolidated solution.

IMS Database Utility Solution for z/OS helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Utility Solution for z/OS includes the following tools:

- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 166
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 163
- “IBM IMS High Performance Load for z/OS, 2.1” on page 166
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 167
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 167
- “IBM IMS Index Builder for z/OS, 3.1” on page 163

- "IBM IMS Library Integrity Utilities for z/OS, 2.2" on page 168

The elements of IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Utility Solution for z/OS, 2.1.

Program number: 5698-DUL

IBM IMS Fast Path Solution Pack for z/OS, 2.1

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 High Performance Fast Path Utilities
- "IBM IMS High Performance Image Copy for z/OS, 4.2" on page 163
- "IBM IMS Library Integrity Utilities for z/OS, 2.2" on page 168

Program number: 5698-FPP

IBM IMS Performance Solution Pack for z/OS, 2.3

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 of 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, 3.1" on page 175
- "IBM IMS Performance Analyzer for z/OS, 4.5" on page 176
- "IMS Problem Investigator for z/OS, 2.5" on page 176

Program number: 5698-P21

IBM IMS Recovery Solution Pack for z/OS, 2.1

IBM IMS Recovery Solution Pack for z/OS 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
- IMS Recovery Expert
- "IBM IMS High Performance Image Copy for z/OS, 4.2" on page 163
- "IBM IMS Index Builder for z/OS, 3.1" on page 163

Program number: 5655-ISR

IBM IMS Transaction Manager Solution Pack for z/OS, 1.1

IBM IMS Transaction Manager Solution Pack for z/OS includes a suite of products you can use to monitor your IMS environments.

The IBM IMS Transaction Manager Solution Pack for z/OS includes the following products:

- "IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS, 2.4" on page 181
- "IBM IMS Configuration Manager for z/OS, 2.3" on page 185
- "IBM IMS Connect Extensions for z/OS, 3.1" on page 175
- "IBM IMS Extended Terminal Option Support for z/OS, 3.2" on page 181
- "IBM IMS Queue Control Facility for z/OS, 3.2" on page 185
- "IBM IMS Sysplex Manager for z/OS, 1.3" on page 186

Program number: 5698-D30

IBM IMS Tools Base for z/OS, 1.7

IBM IMS Tools Base for z/OS consists of various components that support key strategic architectures, technologies, and services that are utilized by IMS tools.

IBM IMS Tools Base provides common functions that are required in all IMS Tools solution pack environments. IMS Tools Base must either already be installed or installed at the same time as a Solution Pack.

IMS Tools Base is a no-charge PID that you must order from ShopZ when you order other IMS Tools solution packs. IMS 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 IMS Tools Base, go to IBM Db2 and IMS Tools PTF Listing.

IMS Tools Base components provide the infrastructure that supports key solution strategies for IMS Tools.

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. Common services components provide functions that facilitate the interactions among tools, and between tools and IMS. IMS Tools Base also provides supplementary tools.

IMS Tools Base 1.7 includes the following components:

Autonomics Director
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.

Policy Services
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.

IMS Tools Knowledge Base
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.

Distributed Access Infrastructure
Distributed Access Infrastructure enables distributed clients to access IMS Tools through TCP/IP socket communication.

IMS Tools Common Services
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.

IMS Hardware Data Compression Extended

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.

IMS Administration Foundation

IMS Administration Foundation provides the foundation for managing IMS. It provides several basic features and functions for IMS system administrators and IMS database administrators, such as the capability of viewing IMS system and resource status. You can use its features after installing IMS Tools Base and activating the IMS Administration Foundation features on IBM Unified Management Server for z/OS.

Program number: 5655-V93

Related concepts

“IBM IMS Administration Foundation for z/OS” on page 159
The IBM IMS Administration Foundation for z/OS provides the foundation for managing IMS.

Chapter 14. IBM IMS Administration Tool for z/OS 1.1

IBM IMS Administration Tool for z/OS centralizes the control of key functions for IMS database administrators, giving you the tools you need to manage IMS DBD and PSB resources.

IMS Administration Tool includes reports on IMS catalog space usage that help you compare catalog contents to your current ACB libraries. You can also issue IMS commands, generate simple, task-based JCL for IMS maintenance, and run SQL statements to access your IMS data. All of this is available in one tool through a graphical web user interface or a traditional ISPF interface.

Related information

IBM IMS Administration Tool for z/OS

Chapter 15. IBM IMS Administration Foundation for z/OS

The IBM IMS Administration Foundation for z/OS provides the foundation for managing IMS.

It provides capability of viewing IMS system and resource status. You can use its features after installing IMS Tools Base and activating the IMS Administration Foundation features on IBM Unified Management Server for z/OS.

With IMS Administration Foundation, you can perform the following tasks:

- Simplifying your administrative tasks by using an IMS command processor and a SQL processor.
- Drilling down IMSplex components and IMS online resources to see their status and finding their relations, or issuing IMS commands.
- Searching the entire sysplex to retrieve information on IMS DBD, PSB, DBRC-defined groups, and IMS online resources and their relationships.

If you also installed some of IMS Tools products, extended features become available, such as the following features:

- Viewing IMS Tools utility reports for databases, HALDB partitions, and DEDB areas.
- Visualizing the database segment structure and segment relationships defined in DBDs and PSBs.
- Detecting threshold exceptions for some selected database space statistics and reviewing those exceptions, history, and the trend of statistics associated with the exceptions.
- Detecting if a database reorganization or an image copy is needed based on the pre-defined criteria.

Related information

IBM IMS Administration Foundation for z/OS

Chapter 16. IMS application management tools

IBM tools provide the reliability and affordability you need to maximize the value of your IMS application management.

IBM IMS Batch Terminal Simulator for z/OS, 4.1

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, 2.2

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.

IBM 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, 2.2.

Program number: 5655-E14

Chapter 17. 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, 2.2

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, 4.2

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.
- 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, 3.1

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 IMS Database Recovery Facility, which enables the building of primary and secondary indexes during a database recovery.

Program number: 5655-R01

IBM IMS Recovery Solution Pack for z/OS, 2.1

IBM IMS Recovery Solution Pack for z/OS 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
- IMS Recovery Expert
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 163
- “IBM IMS Index Builder for z/OS, 3.1” on page 163

Program number: 5655-ISR

Chapter 18. IMS database management tools

The following sections describe the IBM IMS database management tools.

IBM IMS Database Solution Pack for z/OS, 2.2

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 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:

- Chapter 14, “IBM IMS Administration Tool for z/OS 1.1,” on page 157
- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 166
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 163
- “IBM IMS High Performance Load for z/OS, 2.1” on page 166
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 167
- “IBM IMS High Performance Prefix Resolution for z/OS, 3.1” on page 167
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 167
- “IBM IMS Index Builder for z/OS, 3.1” on page 163
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 168

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, 2.2.

Program number: 5655-DSP

IBM IMS Database Utility Solution for z/OS, 2.1

IBM IMS Database Utility Solution for z/OS is a utilities management tool that combines IBM IMS Tools database products that are needed to manage IMS full-function and HALDB databases into a single, consolidated solution.

IMS Database Utility Solution for z/OS helps keep databases operational and tuned. It helps reduce the operational complexity and the impact of database reorganization on system resources.

It provides a set of high-performance utilities to unload, load, index build, reorganize, backup, verify, and report on full-function databases.

The IMS Database Utility Solution for z/OS includes the following tools:

- “IBM IMS Database Reorganization Expert for z/OS, 4.1” on page 166
- “IBM IMS High Performance Image Copy for z/OS, 4.2” on page 163
- “IBM IMS High Performance Load for z/OS, 2.1” on page 166
- “IBM IMS High Performance Pointer Checker for z/OS, 3.1” on page 167
- “IBM IMS High Performance Unload for z/OS, 1.2” on page 167
- “IBM IMS Index Builder for z/OS, 3.1” on page 163
- “IBM IMS Library Integrity Utilities for z/OS, 2.2” on page 168

The elements of IBM IMS High Availability Large Database (HALDB) Toolkit for z/OS are also assimilated into IMS Database Utility Solution for z/OS, 2.1.

Program number: 5698-DUL

IBM IMS Fast Path Solution Pack for z/OS, 2.1

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 High Performance Fast Path Utilities
- "IBM IMS High Performance Image Copy for z/OS, 4.2" on page 163
- "IBM IMS Library Integrity Utilities for z/OS, 2.2" on page 168

Program number: 5698-FPP

IBM IMS Database Reorganization Expert for z/OS, 4.1

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.

Program number: 5655-S35

IBM IMS High Performance Image Copy for z/OS, 4.2

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.
- 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, 2.1

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 Database Reorganization Expert capabilities, such as image copy creation during database reorganization.
- Supports reorganization reload of HALDB partitions, including online-reorganization-capable HALDB partitions.
- 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 z/OS in a compressed format.

Program number: 5655-M26

IBM IMS High Performance Unload for z/OS, 1.2

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, 3.1

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 Database Reorganization Expert for z/OS 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, 3.1

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.
- Provides 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 Database Reorganization Expert and IMS High Performance Image Copy.

Program number: 5655-U09

IBM IMS Index Builder for z/OS, 3.1

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 IMS 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, 2.2

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 Catalog Manager utility, which provides the capabilities to ensure that the IMS catalog and the IMS directory are maintained correctly.
- 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 IMS Library Integrity Utilities reporting in IMS Tools utilities.

Program number: 5655-U08

IBM IMS Cloning Tool for z/OS, 1.2

The IBM IMS Cloning Tool for z/OS provides a faster and simpler cloning solution that can help improve productivity and support efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, which helps boost efficiency and free up DBA time.

Program number: 5655-U91

IBM IMS Sequential Randomizer Generator for OS/390, 1.1

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

Chapter 19. IMS data replication tools

The following sections describe the IBM IMS data replication tools.

IBM IMS Cloning Tool for z/OS, 1.2

The IBM IMS Cloning Tool for z/OS provides a faster and simpler cloning solution that can help improve productivity and support efforts to reduce total cost. It automates the cloning process to provide usable IMS clones within minutes, which helps boost efficiency and free up DBA time.

Program number: 5655-U91

InfoSphere Data Replication for IMS for z/OS, 11.3

IBM InfoSphere® Data Replication for IMS for z/OS helps increases 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-IM1

Chapter 20. InfoSphere IMS tools

The following sections describe the IBM InfoSphere IMS tools.

IBM InfoSphere Classic Change Data Capture for z/OS, 11.3

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-IM5

IBM InfoSphere Classic Federation Server for z/OS, 11.3

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-IM4

IBM InfoSphere Optim Test Data Management Solution for z/OS, 11.7

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 Data Replication for IMS for z/OS, 11.3

IBM InfoSphere Data Replication for IMS for z/OS helps increases 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-IM1

Chapter 21. IMS performance management tools

The following sections describe the IBM IMS performance management tools.

IBM IMS Buffer Pool Analyzer for z/OS, 1.4

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, 3.1

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: 5698-CEX

IBM IMS Network Compression Facility for z/OS, 1.2

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 IMS Network Compression Facility information and options.

Program number: 5655-E41

IBM IMS Performance Analyzer for z/OS, 4.5

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, 2.5

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, 1.3

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, 2.3

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 of 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, 3.1” on page 175
- “IBM IMS Performance Analyzer for z/OS, 4.5” on page 176
- “IMS Problem Investigator for z/OS, 2.5” on page 176

Program number: 5698-P21

Chapter 22. IMS regulatory compliance tools

The following sections describe the IBM IMS regulatory compliance tools.

IBM InfoSphere Guardium Data Encryption for Db2 and IMS Databases, 1.2

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 Security Guardium S-TAP for IMS

The IBM Security Guardium S-TAP® for IMS tool (formally known as IBM InfoSphere Guardium S-TAP for IMS) includes support for:

- Capture of database and segment reads and changes (insert, update, and delete)
- Capture of segment concatenated keys 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, and 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-ST9

Chapter 23. IMS system management tools

The following sections describe the IBM IMS system management tools.

IBM IMS Command Control Facility for z/OS, 2.2

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 multiple IMS systems within a sysplex.
- 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, 3.2

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, 2.4

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.
- Backs out changes installed by IMS HP Sysgen Tools.

Program number: 5655-P43

IBM IMS Workload Router for z/OS, 2.7

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 24. Tivoli IMS tools

The following sections describe the IBM Tivoli® IMS tools.

Tivoli Decision Support for z/OS V1.8 or later

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, 3.4.1

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, 5.0.0

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, 3.4.1

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

IBM OMEGAMON for Db2 for Performance Expert on z/OS, 5.5

IBM OMEGAMON for Db2 for 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.

IBM OMEGAMON for Db2 for Performance Expert on z/OS also adds expert database analysis functions to help you maximize performance and enhance productivity.

Program number: 5655-W37

IBM OMEGAMON for IMS on z/OS, 5.5

IBM OMEGAMON 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

IBM Z System Automation, 4.3

IBM Z System Automation is an IBM Z NetView® base software product that provides a single point of control for a various range of systems management functionality.

It plays a key role in providing end-to-end automation solutions. It is a policy-based, self-healing, high-availability solution to maximize efficiency and availability of critical system elements, applications and hardware & software resources.

Program number: 5698-SA4

Related concepts

IBM Z System Automation

Chapter 25. IMS Transaction Manager management tools

The following sections describe the IBM IMS Transaction Manager (IMS TM) management tools.

IBM IMS Transaction Manager Solution Pack for z/OS, 1.1

IBM IMS Transaction Manager Solution Pack for z/OS includes a suite of products you can use to monitor your IMS environments.

The IBM IMS Transaction Manager Solution Pack for z/OS includes the following products:

- “IBM IMS High Performance System Generation (SYSGEN) Tools for z/OS, 2.4” on page 181
- “IBM IMS Configuration Manager for z/OS, 2.3” on page 185
- “IBM IMS Connect Extensions for z/OS, 3.1” on page 175
- “IBM IMS Extended Terminal Option Support for z/OS, 3.2” on page 181
- “IBM IMS Queue Control Facility for z/OS, 3.2” on page 185
- “IBM IMS Sysplex Manager for z/OS, 1.3” on page 186

Program number: 5698-D30

IBM IMS Configuration Manager for z/OS, 2.3

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 information

IMS Configuration Manager overview

IBM IMS Queue Control Facility for z/OS, 3.2

The IBM IMS Queue Control Facility 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, 1.3

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.

Program number: 5655-P01

Chapter 26. Miscellaneous IBM tools that support IMS

The following IMS tools also support IMS 15.5.

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, V14.1
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-Q09

IBM Debug for z/OS, 15.0 and 16.0
IBM Debug for z/OS is an interactive source-level debugging tool for compiled applications in a variety of environments.

With this tool, you can complete the following tasks:

- 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.
- Use code coverage to optimize testing resources.

The debug functions are also provided in other products with more IDE choices and capabilities, see Products that include IBM z/OS Debugger on IBM Support.

Program number: 5755-Q50, 5755-A06

IBM Fault Analyzer for z/OS, 14.1 or 15.1
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-Q41, 5755-A02

IBM File Manager for z/OS for IMS Data, 14.1 or 15.1
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-Q42, 5755-A03

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

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 15.5

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. 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.

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.

IBM z/OS Connect Enterprise Edition V3.0 Program number: 5655-CE3

Chapter 28. Application development with IMS Explorer for Development

IMS Explorer for Development (IMS Explorer) is a component in IMS Enterprise Suite that facilitates application development and extends access to IMS transactions and data through an Eclipse-based user interface.

Version 3.3 of IMS Enterprise Suite is made available for the distributed platform only to provide a new release of IMS Explorer that is based on Eclipse Neon V4.6. For shell-sharing with Eclipse Luna V4.4-based IBM products, use the IMS Explorer in IMS Enterprise Suite Version 3.2 instead.

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

Version 3.3 adds the support for IMS V15.

Related reference

"IMS Enterprise Suite software requirements" on page 14
IMS Enterprise Suite provides APIs, tools, and a web service solution for facilitating application development and extending access to IMS transactions and data.

IMS Explorer for Development overview

Chapter 29. 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 30. Integrated access with IBM DataPower Gateway

The IBM DataPower Gateway provides integrated support for IMS 15.5. 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

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This bibliography lists all of the publications in the IMS 15.5 library.

Title	Acronym
IMS Version 15.5 Application Programming	APG
IMS Version 15.5 Application Programming APIs	APR
IMS Version 15.5 Commands, Volume 1: IMS Commands A-M	CR1
IMS Version 15.5 Commands, Volume 2: IMS Commands N-V	CR2
IMS Version 15.5 Commands, Volume 3: IMS Component and z/OS Commands	CR3
IMS Version 15.5 Communications and Connections	CCG
IMS Version 15.5 Database Administration	DAG
IMS Version 15.5 Database Utilities	DUR
IMS Version 15.5 Diagnosis	DGR
IMS Version 15.5 Exit Routines	ERR
IMS Version 15.5 Installation	INS
IMS Version 15.5 Licensed Program Specifications	LPS
IMS Version 15.5 Messages and Codes, Volume 1: DFSMessages	MC1
IMS Version 15.5 Messages and Codes, Volume 2: Non-DFS Messages	MC2
IMS Version 15.5 Messages and Codes, Volume 3: IMSAbend Codes	MC3
IMS Version 15.5 Messages and Codes, Volume 4: IMSComponent Codes	MC4
IMS Version 15.5 Operations and Automation	OAG
IMS Version 15.5 Release Planning	RPG
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