Licensed Program
Specifications

IMS Version 7
Program Number 5655-B01

Information Management System (IMS*) Version 7 is a licensed program that operates under Operating System/390 (OS/390*). IMS includes an enterprise database server that provides hierarchical database management services and a strategic enterprise transaction server that provides data communications and transaction management services.

The IMS Version 7 Database Manager (IMS DB) provides database management for transaction managers such as IMS Version 7 Transaction Manager and Customer Information Control System (CICS*). The IMS Version 7 Database Manager processes concurrent database calls for a wide variety of applications. Those applications range from those with moderate volumes and complex data structures to those with high volumes and simpler data structures.

Application programs access databases through IMS DB and its data manipulation language, Data Language /I (DL/I).

The IMS Version 7 Transaction Manager (IMS TM) provides a database-independent transaction processing environment for database managers such as IMS Version 7 Database Manager and DATABASE 2* for OS/390 (DB2* for OS/390, hereafter referred to as DB2). The IMS Version 7 Transaction Manager:

- Manages an IMS TM terminal network
- Stores and shares IMS message queues among multiple IMS TM systems and routes messages between terminals and applications
- Provides connectivity to other IMS TM subsystems and non-IMS TM subsystems
- Schedules application programs to access IMS DB databases or DB2 databases (or both), and non-database files through the Generalized Sequential Access Method (GSAM)
- Provides system control facilities for system definition, restart, recovery, performance, and tuning
- Runs continuously through the year with no required shutdown for Daylight Saving Time
- Can be accessed over the World Wide Web using IMS Internet solutions.

The IMS Family of products includes:
- IMS
- IMS Internet Solutions
  - IMS Connect
  - IMS Connector for Java**
- IMS Database Tools

Together, the IMS Family of products provide client/server and Web solutions for IMS

IMS TM can also be used with the following products to provide client/server solutions:
- MVS OpenEdition*
- Application Server/IMS
- IBM MQSeries*

Highlights of New Function

Compared with previous IMS releases, IMS Version 7 provides enhancements in application development, connectivity, performance, availability, and systems management.

Application Development

IMS Java Application Development: Java application development support enables IMS applications to be written in Java and executed in IMS dependent regions. VisualAge workstation tools as well as host tools can be used for development and testing. IMS Java applications have access to IMS message queues and databases through the use of IMS Java classes. Additionally, the JDBC interface can be used to access both IMS databases and DB2 data. The IMS Java support enhances the ability of customers and business partners to provide integrated e-business application development for IMS.

Extended Markup Language (XML): IMS supports XML through interoperation with the OS/390 XML Parser, Java Edition. The XML parser's application programming interfaces (APIs) can be used with the High Performance Java Compiler -- shipped as part of VisualAge for Java, Enterprise Edition for OS/390 -- to develop a new IMS Java program running in IMS. IMS V7 Java application programmers can thus invoke the APIs (DOM APIs and SAX APIs) of the OS/390 XML Parser, Java Edition, to covert an XML document from its stream form into a "parsed" form for reading, editing, or updating an XML document.

Connectivity

IMS Connect: IMS Connect, a new separately priced facility for IMS, provides enhanced IMS TCP/IP support. Enhancements include SMP installability; dump and trace formatting enhancements for increased serviceability; user exits, command improvement, and asynchronous output support for enhanced usability; and persistent sockets and bottleneck relief for improved performance. IMS Connect requires the IMS TM feature. Much of the function in IMS Connect can be used with IMS V5 or V6 TM. Customers can thus choose IMS Connect ahead of a full migration to IMS V6 or IMS V7. Future enhancements to IMS TCP/IP support with be provided only through IMS Connect for IMS V7.

Open Transaction Manager Access (OTMA) Facility Callable Interface: The function improves IMS connectivity by providing a high-level interface for access to IMS applications from other OS/390 subsystems. It presents an API to application programs to enable access and execution of IMS transactions through IMS OTMA facilities. With this simple and easy-to-use interface, the invoker of the APIs can submit a transaction or command to IMS from within the OS/390 environment without the necessity of understanding the technical protocols of the MVS Cross Coupling Facility (XCF) or IMS OTMA.

Performance

High Availability Large Databases (HALDB): The HALDB function delivers enhancements to capacity, availability, manageability, and usability by enabling partitioning for IMS Full Function databases. HALDB supports as many as 1,001 partitions (each partition having a maximum capacity of 40 gigabytes). This means customers can have over 40 terabytes of OSAM and VSAM datasets. A single HALDB partition has the capacity of an entire IMS Full Function database from some earlier releases of IMS.

HALDB support also allows a partition to be taken offline, have something done to it, and be independently brought back online. This means each partition can be individually unloaded and reloaded, and while offline, have a batch reorganization done to it. Or the entire database can be taken offline and each partition reorganized in parallel, speeding up the offline reorganization process. Thus, HALDB improves database availability because multiple partitions decrease the amount of data unavailable if a partition fails or is taken offline.

HALDB partitions can be processed in parallel, reducing the total time required for batch workload or utility processing. Reorganized HALDBs are immediately usable after image copies can be created because Prefix Resolution or Prefix Update utility processing is no longer required. A series of ISPF panels, with imbedded help screens, provide an interface for creating and migrating databases.

Queue Space Exit: This performance enhancement informs the Queue Space Notification user exit routine of a stopped conversational transaction destination. By notifying the exit routine that a destination is stopped, stacked messages can be prevented -- system resources are not tied up with undeliverable messages and system availability is enhanced.

Suppress 3270 Negative Response: Performance and system availability are enhanced by the addition of a new execution option for suppressing the SNA exception response that is normally associated with the SNA protocols used with SLU2 input error conditions.

Spool Enhancement: I/O Spool performance is improved and affects all IMS environments that write to the spool datasets. Additionally, a new system parameter is provided that controls the spool print utility jobname. This is of value when using cloned definitions and spool datasets in a Parallel Sysplex environment.

External Storage Subsystem (ESS) support: ESS support provides users of OSAM databases that reside on ESS DASD improved I/O performance.

I/O Performance Enhancements: Fiber Channel Connectivity (FICON) support improves I/O performance.

IMS Enterprise Storage Server Support: This performance enhancement provides users of OSAM databases significantly improved I/O performance.

Application Control Block (ACB) Enhancements: ACB generation is changed to help avoid unnecessary automatic rebuilding of PSBs when DMBs are rebuilt. The maximum number of SENSEGs and PCBs allowed in a PSB is increased.

Common Storage Area (CSA) Contraint Relief: More below-the-line 16M Common Storage Area usage is made available by moving modules and control blocks above the 16M line.

64-bit Real Support: For IMS I/O operations, above-the-bar 64-bit real storage is used for IMS page-fixed storage, freeing up below-the-bar real storage for customer use.

Availability

Online Recovery Service (ORS): ORS, a new separately priced facility for IMS, provides database recovery processing in an online IMS environment. This facility enables a customer to recover multiple database datasets simultaneously. ORS reads image copies, logs, and Change Accumulation datasets in parallel. It reads each input only once, even when it is used in the recovery of multiple datasets. ORS applies the database changes to multiple datasets simulataneously. This speeds recoveries through the reduction of I/Os and the use of parallel processes.

ORS also enables a customer to recover databases to any point in time. This includes times at which the databases were being updated. It is not necessary to have previously created a recovery point by quiescing or deallocating the databases. ORS applies only committed updates as part of this process. This capability means that databases may be more available since they do not have to be deallocated to create recovery points.

Online commands are used to initiate database recoveries. Change Accumulation may be used but is never required before a recovery. This is true even when data sharing is used. ORS may be used to recover full function database data sets or Fast Path DEDB areas.

Extended Terminal Option Enhancements: Extended Terminal Option, a separately priced feature of IMS, provides the ability to dynamically add terminals to the network.

The descriptor limit of 50 records per ETO descriptor is now removed. This allows nearly an unlimited number of remote terminals to be specified for a specific Multiple Systems Coupling (MSC) link.

ETO is also enhanced to improve autologon and printer support, reducing the need for operator intervention and monitoring.

Deferred Access Control Block (ACB) Open: This enhancement provides the option of delaying the queuing of VTAM logon requests until IMS is ready to start accepting logons. Use of this function can reduce or prevent time outs.

Specifying Checkpoint Log (CPLOG) as an IMS Execution Parameter: This function improves system availability by allowing users to change the number of log records produced between system checkpoints without the requirement of a system generation. Users can specify the number of log records between system checkpoints using the CPLOG execution parameter. The CPLOG value can be changed via the /CHANGE command.

Rapid Network Reconnect (RNR): RNR utilizes the facilities of VTAM's Multinode Persistent Session Services to improve system availability by allowing IMS TM to automatically reconnect terminal sessions following any kind of IMS failure and subsequent restart. RNR reduces network reconnect time after an IMS, MVS, or VTAM, or CPC failure in a Sysplex environment.

Secondary Logical Unit Program/Finance Cold Session Termination: This enhancement improves availability by providing a command that allows a SLUP or FINANCE type session status to be reset to a "cold" state.

VTAM Generic Resource (VGR) Enhancement: The installation can choose to have VTAM, instead of IMS, manage the generic resource affinity. This means that when any session outage occurs, whether a CPC, MVS, VTAM, or IMS failure, a new terminal session can be immediately established with any available IMS system.

Database Recovery Control (DBRC) Facility Enhancements: DBRC assists the database administrator and system operator in performing database recovery activities to ensure data integrity. System availability is improved by allowing users to upgrade the Recovery Control (RECON) dataset from IMS V6 to IMS V7 without stopping active subsystems.

System performance is enhanced by providing an enhanced system of RECON record size warning messages. Users can tailor the issuance of the warnings to their operating environment.

Systems management and recovery can be automated with the addition of a new message that detects a RECON dataset loss and lists the names of the subsystems using the failed RECON dataset.

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Improved diagnostic information in ABEND messages, and in trace records, and new diagnostic tools for use by IBM service personnel, enhance DBRC serviceability. The LIST.HISTORY command is enhanced to provide an at-a-glance timeline for each DBDS/Area

Using DBRC, database integrity is protected by requiring an image copy of datasets immediately after the database is loaded. Also, fully recovery using an image copy taken prior to a load is prevented.

System management is improved by no longer allowing DBRC to automatically increase the GENMAX value when a user takes more than the specified number of image copies during a specified recovery period.

Additional DBRC commands are being provided to aid in database administration with the RECON for High Availability Large Database (HALDB). This is accomplished by creating a master template in a single editable file that can be geographically propagated and tailored to different sites or systems and by creating the definitions that can be executed in batch to create and restore partitions should they be unavailable from the RECON.

Systems Management/Usability

Sysplex Shared Message Queueing Enhancements: The Common Queue Server (CQS), used for Shared Message Queuing with the Sysplex Coupling Facility, is enhanced to allow multiple clients (for example, IMS) to connect to a structure through a single CQS. Additional enhancements allow a client to get more information about the Cold Queue, request information that was previously only available to user exits, and control the time stamp used by CQS to compute message age for a particular object.

This enhancement addresses the delivery of output messages to Associated Printers in a shared queues environment. Now, by enabling autologon to a printer, enqueued messages from a backend application can be delivered to the associated front end printer.

CQS enhancements support multiple IMS systems sharing a CQS address space in a recovery situation thus reducing system resource requirements.

The CQS performance enhancement for IMS TM can provide a performance improvement when used with the OS/390 Logger for CQS restart and recovery.

Asynchronous OTMA/APPC input messages can now run on any IMS system in the shared queues group that is available for processing. Previously these messages were forced to process on the front-end IMS system.

Improved diagnostics are provided for APPC, OTMA, and CQS, making it easier to maintain and debug an IMS TM system.

Resource Access Control Facility (RACF) PassTicket: This enhancement allows the terminal/system entering the /SIGN ON command with a PassTicket (instead of a password) to specify the application name used in the creation of the PassTicket.

USERID Clarification: The USERID clarification enhancement provides a way for application programs and user exits to determine the content of a USERID field. The content could be a RACF USERID, an LTERM name, a PSB name, blanks, binary zeros, or some other value.

Routing Exit Enhancements: For ease of coding and maintenance, three Multiple Systems Coupling (MSC) exits (Input Message Routing, Link Receive, and Program Routing) and the Terminal Routing exit are combined into a single exit routine no longer requiring MSC. This provides a consistent set of routing capabilities across all exit entry points and functions of the new exit module. MSC routing exit serviceability now logs routing errors and footprints in the message to indicate which exits re-routed the message.

IMS External Subsystem Attach Facility (ESAF) Trace Enhancements: ESAF allows other products to attach to IMS. It allows IMS application programs, running in IMS dependent regions, to access resources owned by the attached products, for example, DB2 resources as well as IMS resources.

Displaying the IMS System Parameters: This usability enhancement displays to the system console and to the job log various parameters used in the initialization of an IMS control region.

Installation Verification Program (IVP) Enhancements: The IVP panels are changed to have the same look and feel as panels for other IBM products. A Java sample application is also provided.

IMS External Subsystem Attach Facility (ESAF) Enhancements: ESAF allows other products to attach to IMS. It allows IMS application programs, running in IMS dependent regions, to access resources owned by the attached products, for example, DB2 resources as well as IMS resources.

The Deadlock SNAP Trace Records: This enhancement provides diagnostic information for identifying the source of an external-subsystem-detected deadlock condition.

Enhanced diagnostic information is also provided for IMS ESAF. Trace records are now written after an event occurs, such as signon. To accommodate Sysplex tracing, trace entry sizes are increased to 16 words. New and modified trace records provide additional information to facilitate the diagnosis of ESAF problems.

Support for Data Facility Storage Management Facility (DFSMS) constructs is added to make installation easier for sites that use SMS-managed volumes HALDB sample applications are also provided.

Logger Enhancements: IMS V7 provides a more dynamic capability to change system checkpoint frequency which improves system management and availability by allowing users to change the number of log records produced between system checkpoints without requiring a system generation. Users can specify the number of log records between system checkpoints using the CPLOG execution parameter. The CPLOG value can be changed via the /CHANGE command.

Fast Path Database Enhancements: Fast Path databases offer the highest performance and availability in IMS database access, including:

- DEDB I/O Toleration improves handling of write errors when a Data Entry Database (DEDB) write fails. IMS maintains a copy of the data in memory so the data may continue to be accessed and updated by the system experiencing the write error.

- The IMS Monitor is enhanced to provide monitoring of Fast Path DEDBs, MSDBs, EMH Queues, BALGs, and IFP regions. The monitoring capabilities for Full Function and Fast Path databases are also enhanced to support new constraints so that limitations can be placed on what is monitored.

- Sequential Dependent Segments (SDEPs) Scan expands compressed data. This enhancement extends the current IMS compression capability to the Fast Path Scan utility so that compressed SDEP components can be processed in any environment.

- Timestamp and version information are provided in the Application Control Block for Data Entry Databases (DEDBs), aiding system programmers in analyzing Fast Path database problems.

- DEDB Multiple Area Data Sets (MADS) I/O timing, delivered through the service process, provides relief to the "long busy" state situation associated with internal recovery processing by RAMAC disk drives and slow recovery of non-RAMAC disk drives.

Highlights of Existing Function

The following are the major existing functions of both the IMS Database Manager and the IMS Transaction Manager:

Shared Message Queues and Shared EMH Queues

Using an MVS coupling facility, IMS can store and share IMS message queues among multiple IMS TM systems. Incoming messages from one IMS TM in a Sysplex can be placed on the shared queue by IMS TM's Common Queue Server for processing by any other IMS TM that has access to the shared queue. Using shared queues enables automatic workload balancing across all IMS subsystems in the Sysplex, thus providing increased capacity and availability for the IMS system. Shared queues also provide an alternative to using MSC to transfer messages across a Sysplex.

Common Queue Server (CQS)

Common Queue Server (CQS) manages shared queues in a Sysplex for multiple IMS TM subsystems. CQS receives, maintains, and distributes data objects from a shared queue on behalf of these TMs (called clients).

Distributed Sync Point

Distributed Sync-Point support allows APPC and DCE/RPC application programs and DCE/RPC remote application programs to participate with IMS in protected conversations with coordinated resource updates. OS/390's Resource Recovery Services/MVS (RRS/MVS) manages the sync-point process on behalf of the conversation participants: the application program and IMS (acting as resource manager). Application programs can access and update resources of multiple participating resource managers with integrity.

Fast Path High Availability Databases

IMS Fath Path Data Entry Databases (DEDBs) are designed to provide continuous availability with high performance for large databases. IMS utilities can reorganize or image copy a DEDB without disrupting its availability to the end user.

You can add, change, and delete Fast Path DEDBs at the database or area level without shutting down and restarting IMS. The IFP or MPP regions that access the DEDBs need not be

stopped during online-change processing. DEDB online change can be used in XRF, RSR, and Sysplex environments.

Using the Fast DB Recovery, you can also restore database resources from a failed subsystem in a Sysplex data-sharing environment more quickly. This function monitors another IMS DBCTL or IMS TM/DB subsystem in the Sysplex and in the event of a problem, restores the databases, by the failed system. Other IMS subsystems releases the locks held by the failed system, and allows processing to continue, thus increasing availability.

Fast Path Data Entry Databases

The IMS Fast Path Virtual Storage Option (VSO) allows portions of data entry databases (DEDBs) to be stored in an MVS data space. Thus, DEDBs can have performance similar to IMS Main Storage Databases (MSDBs).

DEDBs support segment-level locking and database field calls. MSDB applications can use DEDBs (especially VSO DEDBs) instead of MSDBs.

IMS provides a utility to migrate non-terminal-related MSDBs to DEDBs, regardless of whether you use VSO.
Migrating MSDBs to VSO DEDBs improves data availability for MSDB applications.

MVS Resource Management

IMS supports MVS Workload Management by allowing it to monitor IMS transactions or batch jobs while they are executing. Workload Management determines if the executing IMS transactions or batch jobs are meeting the response-time and performance goals, and can adjust MVS resources assigned to help IMS achieve its goals. By using MVS Workload Management, operations and systems management personnel can make more informed decisions in controlling the workload mix and prioritization to meet business objectives, such as system performance goals.

IMS enables workload balancing for transaction processing work in a Parallel Sysplex* with enhancements to certain Multiple Systems Coupling (MSC) exit routines. You can define all transactions as local for each system and use the exit routines to control routing between systems.

MVS Automatic Restart Manager

In a Parallel Sysplex environment, IMS supports the MVS Automatic Restart Manager. This support improves the availability of IMS systems.

Although part of IMS Version 5, IMS enablement for the MVS Automatic Restart Manager will be delivered through the IMS service process.

MVS OpenEdition Enablement

IMS supports MVS OpenEdition and the support services it provides. These services, when used with other selected products, conform to approved standards or provide an implementation for appropriate draft standards. Using such services as the portable operating system interface for computer environments (POSIX) standards and the distributed computing environment (DCE) remote procedure call (RPC) enables application portability for MVS and IMS.

New IMS applications can use POSIX threads support on MVS. Using threads support makes it easier to write multitasking applications, such as a server application. Application programmers and system programmers can use callable services to use many of the POSIX-related services. These services make it easier to code certain tasks in assembler language.

POSIX.1 support provides a standard interface that is available on a wide range of IBM and non-IBM operating systems. Programs that conform to the POSIX.1 standard can be more easily ported to and from MVS. Programmers with UNIX** and C language skills can develop programs for MVS and IMS TM using their current skills.

POSIX.2 shell and utilities provide a user interface that is familiar to UNIX programmers, thus improving their productivity when using MVS.

With a growing number of transmission control protocol/Internet protocol (TCP/IP), RPC, and POSIX-conforming applications available commercially, your application needs can often be met more quickly with off-the-shelf software that conforms to POSIX, thus reducing the cycle time from identification of a need to delivery of a solution. These solutions can complement and use existing IMS applications and data.

For Open Access to IBM and non-IBM Net-works:

Using MVS OpenEdition facilities, current data and logic can be made available to heterogeneous clients by using a single set of standardized interfaces. For example, you can use an RPC from a local area network (LAN) or workstation to access IMS TM applications. OpenEdition DCE and the OpenEdition DCE Application Server/IMS provide application access to IMS TM host applications from workstations and LANs. The Application Server is a bridge between the new, heterogeneous world of DCE to the more traditional world of MVS. It allows a new class of

workstation products to access IMS using a standard method of heterogeneous interoperability.

Open Transaction Manager Access

IMS Open Transaction Manager Access (OTMA) is a client/server protocol for IMS transactions. In a client/server environment, the IMS Transaction Manager is the high-performance server, and with the OTMA feature you can attach many different MVS client subsystems.

An OTMA client acts as a gateway between IMS TM and a heterogeneous network. TCP/IP, RPC, MQSeries, and IMS ATM systems can be used across their appropriate platforms in conjunction with each other, thus taking advantage of existing applications, data, and programmer skills.

Although part of IMS Version 5, OTMA enablement will be delivered through the IMS service process.

Full-Function Database

IMS full-function databases support complex data structures such as logical relationships and secondary indexes.

Database Control (DBCTL)

DBCTL is an IMS DB operating environment that consists of the IMS DB product connected to a transaction management subsystem other than the IMS Version 7 Transaction Manager. With DBCTL, transaction management subsystems (such as CICS/ESA Version 4) can have online access to full-function databases and Fast Path DEDBs.

Data Sharing

IMS DB can concurrently access and share databases with other IMS DB subsystems in database/data communications (DB/DC), DBCTL, or batch environments.

IMS data sharing is improved by using S/390 parallel processing technology. In a Sysplex that includes a coupling facility and the IBM Internal Resource Lock Manager (IRLM) Version 2, IMS can share data at the block level among as many as 32 systems. In a Sysplex, IMS is no longer limited by IRLM to two central processor complexes (CPCs) in its data sharing.

IMS Version 5 multisystem data sharing provides improved capacity and performance, and enables incremental horizontal growth. Performance is improved by using the coupling facility for database (both virtual storage access method (VSAM) and overflow sequential access method (OSAM) buffer invalidation notifications and for the IRLM lock tables.

Lock management and serialization for multi-system data sharing is handled by IRLM Version 2 using a coupling facility.

IMS multisystem data sharing can be used whether you have IMS TM or CICS/ESA as your transaction manager.

Database Recovery Control (DBRC)

DBRC helps automate the recovery of databases by keeping track of database image copies and logs needed for recovery. DBRC also helps ensure database integrity in a data-sharing or Remote Site Recovery environment.

Remote Site Recovery

The Remote Site Recovery (RSR) feature lets you recover quickly from an interruption of computer services at an active site. The RSR feature allows you to maintain a geographically remote secondary IMS site that tracks the activity of the primary site and that can take over the active workload in the event of an outage. Because RSR maintains copies of your active resources at the remote site, including shadow databases and remote logs, you significantly enhance your ability to protect your investment in applications and data.

Extended Terminal Option (ETO)

ETO, a separately priced feature of IMS TM, is designed to provide a significant continuous availability enhancement by allowing changes to the IMS VTAM terminal network to be made online, without the need for a planned outage for IMS system generation. ETO is designed to provide improved network and system security by controlling system access and message delivery for each user ID rather than for each terminal (which can be shared by more than one user).

Advanced Program-to-Program Communications for IMS (APPC/IMS)

APPC/IMS provides the capability to develop distributed and cooperative (client/server) IMS TM applications to communicate with programmable workstations and other systems using APPC/MVS and the LU 6.2 protocol. IMS TM allows you to use the Common Programming Interface for Communications (CPI-C) or the IMS DL/I programming interface to communicate with LU 6.2 systems.

IMS TM supports network-qualified names for APPC/IMS environments. IMS MSC supports transactions from APPC/IMS

subsystems. You can include IMS MFS message formats with APPC/IMC transacations.

Data Communications Control (DCCTL)

DCCTL is an IMS TM operating environment that consists of the IMS TM product connected to a database management subsystem (other than the IMS Version 7 Database Manager). With DCCTL, database management subsystems (such as Version 3 or Version 4 of DB2 for MVS/ESA) can have access to IMS transaction management (without a prerequisite for the IMS DB). Thus, DCCTL can provide a high-performance, database-independent, transaction processing environment for DB2.

Multiple Systems Coupling (MSC)

MSC permits message and transaction routing between two or more IMS TM subsystems in one or more MVS systems or processors. Whether a transaction is processed on a local IMS TM subsystem or a remote one is transparent to an end user entering the transaction. Thus, MSC provides a single-system image to the end user. MSC supports transactions (messages), responses, program-to-program switches, and fixed-length conversational scratch pad areas on two or more IMS systems.

Intersystem Communication (ISC)

Intersystem Communication allows communication between IMS TM and another subsystem (such as CICS), a user-written subsystem, or another IMS TM subsystem using the LU 6.1 protocol.

Front-End Switching

IMS TM can be a front-end network manager connected to a back-end application processing subsystem, which can be another IMS TM subsystem or a non-IMS TM subsystem. ISC (LU 6.1), LU 0, and LU 2 communications protocols are supported between the front- and back-end subsystems.

Extended Recovery Facility (XRF)

XRF provides a local alternate IMS subsystem that monitors the status of an active IMS subsystem so that the alternate subsystem can take over the active subsystem's workload in the event of an outage. XRF can be used to minimize the impact to end-users of planned and unplanned IMS subsystem or MVS system outages.

Online Change

Online change capability improves the availability of an online IMS subsystem by allowing non-disruptive changes to the IMS subsystem. Resources such as database definitions, transaction definitions, application definitions, MFS formats, and security definitions can be added, deleted, or changed without bringing down the IMS subsystem.

Subsystem Logging

In an online environment, log records are stored on DASD, instead of being written to tape. Logging to DASD simplifies recovery of the IMS subsystem, reduces operator involvement, and improves system availability.

Fast Path Expedited Message Handler

Fast Path Expedited Message Handler capability supports applications requiring fast response times.

IMS Message Format Service (MFS)

MFS allows application programs to handle logical messages, so they do not need to handle device-specific characteristics of input or output messages.

MFS distributed presentation management (DPM) supports ISC and secondary logical units type P (SLU P) for a user-written program in a SLU P controller or in another subsystem connected with ISC. MFS DPM allows a device-independent data stream to be transmitted between IMS and a remote program, and to allow the application program to use a single data structure, regardless of the data source or destination.

Data Compression

IMS DB supports Enterprise System/9000* data compression hardware. This support provides storage (DASD) savings and improved transaction response time because hardware data compression uses fewer processor resources than software data compression and because I/O operations are reduced for compressed data.

Database Surveyor Utility Feature

This utility surveys an IMS database (HDAM and HIDAM only) and provides a description of the physical organization and free space utilization in the database.

This description helps the database administrator determine the need for a reorganization of the database. This utility complements and is used with the IMS Partial Database Reorganization utility.

Application Programming Interface

Application programmers can write IMS application programs in COBOL, PL/I, the C language, Pascal, Ada, RPG, REXX, or IBM High Level Assembler language. IMS also provides an interface to the IBM Language Environment* for MVS and VM.

The IMS application programming interface (xxxTDLI) has no direct dependency on language compiler release levels. Older IMS application programs that have not been modified (for example, by linking them with Language Environment routines) will continue to run as expected, regardless of current language compiler support.

Discontinuance of Support for CICS Local DL/I

IMS Version 7 does not support the CICS local DL/I environment. You must convert your existing local DL/I applications to use IMS DBCTL.

IMS/ESA Version 4 was the last IMS release to support local DL/I.

Discontinuance of Support for the IMS LU 6.1 Adapter

IMS Version 7 does not support the IMS LU 6.1 adapter for LU 6.2 applications. You must convert existing applications to use APPC/IMS.

IMS/ESA Version 4 was the last IMS release to support the adapter.

Discontinuance of Support for IMS Client Server Object Manager

IMS Version 7 does not support IMS Client Server Object Manager (CSobject). You must migrate to IMS Connect.

IMS/ESA Version 5 is the last IMS release to support CSobject

Other Support Discontinuances

IMS Version 7 does not support the following:

- Assembler H

  You should migrate to the High Level Assembler product.

- The following basic telecommunications access method (BTAM) devices:

  MSPLINK TYPE=BSC

  TYPE UNITYPE=SLUTYPE4

- The ***RECOVCTL*** parameter for the IMS Database Recovery Control (DBRC) ***CHANGE.RECON*** and ***INIT.RECON*** commands.

IMS Version 7 requires VTAM for service changes. IMS Version 5 is the last release for which VTAM is optional for IMS TM.

Specified Operating Environment

Machine Requirements

IMS Version 7 is designed to operate on all processors capable of running OS/390 Version 2 Release 6 or later.

System Console: The console requirements of OS/390 Version 2 Release 6, or later, apply.

Tape Units: At least one IBM 3420, 3480, or 3490 tape unit is required for installation and maintenance.

Direct Access Devices: Both the Binder work data set SYSUT1(during the bind of the IMS VTAM control blocks load monitoring module) and the SDFSRESL 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 supported by the

Non-Sysplex Data Sharing Requirements: For interprocessor block-level data sharing between IMS Version 4 (with IRLM Version 1), IMS Version 5 (with IRLM Version 1), and IMS Version 6 (with IRLM Version 1), one of the following is required:

- An IBM communication controller supported by Advanced Communications Facility / Network Control Progam (ACF/NCP) Version 4 Release 1 (program number 5668-854), or later

- An IBM 3088 multisystem channel communication unit

- A channel-to-channel adapter (CTCA) link

Sysplex Data Sharing Requirements: For data sharing in a Sysplex environment (using IRLM Version 2), the following is required:

- A coupling facility with coupling facility control code level 2 or 3

- One of the following, with its related hardware
  - A 9037 Sysplex timer
  - IBM S/390 9674
  - IBM S/390 9672 Transaction Server
  - IBM ES/9000* 9021 711 model processor

Shared Message Queues and Shared EMH Queues: For sharing message queues and sharing EMH queues in a Sysplex environment, one of the following is required with related hardware:

- An IBM S/390 9674 with coupling facility control code level 3 (level 5 is strongly recommended)
- IBM S/390 9672 Transaction Server
- IBM ES/9000 9021 711-base model processor
- IBM ES/9000 511-base model processor

DFSMS Concurrent Copy Support: Databases and area datasets that are to be copied using the new Database image Copy 2 utility must reside on DASD hardware that supports the DFSMS concurrent copy feature (such as a 3990 Storage Control Model 3 or Model 9 extended function with licensed internal code, or an equivalent device).

MADS I/O Timing requires a Coupling Facility.

Rapid Network Reconnect with Multinode Persistent Sessions requires a Coupling Facility.

IMS Enterprise Storage Server (ESS) support requires an Enterprise Storage Server 2105.

RSR Features: For these features, the following is needed:
- A 9037 Sysplex timer (for data sharing)
- A 3172 highband control unit
- At least one tape unit (3420, 3480, 3490) at the tracking site

Multiple Systems Coupling Requirements:

When the physical link is channel-to-channel and is dedicated to IMS, the System/370* channel-to-channel adapter or a logical channel on the IBM 3088 or ESCON* is required.

Supported Terminals: See IMS Release Planning Guide (GC26-9437) for a list of the communications devices supported by IMS Version 7.

Programming Requirements

Operating Systems: IMS Version 7 operates in an OS/390 configuration (OS/390 Version 2 Release 6 or subsequent releases or modification levels). The minimum OS/390 configuration comprises the following:

- OS/390 Version 2 Release 6 (5647-AQ1)

- IBM High Level Assembler Toolkit (5696-234), a separately orderable feature of OS/390

- RACF Version 1 Release 9 (5740-XXH), separately orderable as a security server feature of OS/390 V2R6; or equivalent if security is used.

- 64-bit real support requires OS/390 V2R10

IMS can also operate in a Virtual Machine (VM*) environment under the control of OS/390 Version 2 Release 6, and is intended for use in a customer progam development, testing and non-XRF production environment, with some restrictions.

See IMS Release Planning Guide (GC26-9437) for information On other required products.

Access Methods: The IMS Version 7 Database Manager can be connected via subsystem routing communications to:

- DB2 V4 (5695-DB2); and/or

- DB2 V5 (5655-DB2); and/or

- DB2 V6 (5645-DB2); and/or

- DB2 V7 (5675-DB2)

IMS Version 7 uses VSAM shared resources support, which reduces virtual storage requirements by sharing buffers and control blocks across VSAM datasets.
If you use DEDBs, they must be cataloged in an integrated catalog facility (ICF) catalog.
The IMS Version 7 Transaction Manager can be connected via Intersystem Communication (ISC) to the following:

- IMS V7 (5655-B01); and/or

- IMS V6 (5655-158); and/or

- IMS V5 (5695-176); and/or

- ✍ CICS/ESA V4 (5655-018); and/or
- ✍ User-written software

Data Sharing: For block-level data sharing, the IMS Internal Resource Lock Manager (IRLM) is required. The IRLM is an independent component shipped with IMS Version 7. The IRLM must be defined as an MVS subsystem.

Block-level data sharing of full-function databases is supported between all in-service levels of IMS.

Sysplex Data Sharing: IMS Sysplex data sharing (including data caching, shared SDEPs, and shared VSO DEDB areas) requires at least MVS/ESA SP (JES2) Version 5 Release 1 (5655-068) or MVS/ESA SP (JES3) Versoin 5 Release 1 (5655-069), related software, and IRLM Version 2.

For use with VSAM coupling facility structures, DFSMS/MVS Version 1 Release 2 (5695-DF1) is required.

Shared Message Queues and Shared EMH Queues: Support for shared message queues and shared EMH queues requires at least MVS/ESA SP Version 5 Release 2 (5655-068 or 5655-069), or later, and related software and hardware.

Generic Resources: Generic Resource Support requires:

- ✍ OS/390 Release 3 (5655-001) or later
- ✍ The shared-message queues function to be active. OS/390 Version 3 adds generic resource support for APPC/MVS.
- ✍ ACF/VTAM Version 4 Release 2 and MVS Version 5 Release 1 to be installed for non-APPC generic resources.
- ✍ The IMS systems that belong to the generic resource group to be identified (specifies the same IMS generic resource name in the GRSNAME execution parameter for each IMS system
- ✍ LU 6.2 communications to be enabled by defining an APPC generic resource name in the MVS APPCPMxx procedure. LUADD statement for IMS.

Distributed Sync Point: Distributed sync point requires OS/390 Release 3 (5655-001) and VTAM Version 4.4.

APSB SAF Security: To gain the benefits of using APSB SAF security with RACF, Version 1.9.2 of RACF is required.

- ✍ CICS Transaction Server for OS/390 V1 (5655-147); and/or

DFSMS Concurrent Copy: DFSMS Concurrent Copy support requires DFSMS/MVS Version 1 Release 3 (5695-DF1) and DASD that supports concurrent copy.

Support for UCB VSCR: This enhancement requires**:**

- ✍ DFSMS/MVS Version 1 Release 3 (5695-DF1)
- ✍ MVS/ESA SP Version 5 Release 2 (5655-068) and related software
- ✍ Hardware Configuration Definition (HCD)* Version 5 Release 2

Fast Database Recovery: Fast database recovery support requires:

- ✍ IRLM Version 2
- ✍ Sysplex environment with cross-system coupling facility (XCF)
- ✍ MVS Availability Manager (AVM)
- ✍ IMS DB/DC or DBCTL subsystem
- ✍ A shared-database resource (full-function database or DEDB)

OSAM Database Coupling Facility Caching: The OSAM Database Coupling Facility Caching enhancement requires:

- ✍ The same hardware and software requirements as for Sysplex data sharing.
- ✍ That all participating IMS systems in the Sysplex be at Version 6 level.

DB2 Subsystems Supported: IMS TM Version 7 can be connected via the External Subsystem Attach Facility (ESAF) to any of the following DB2 products:

- ✍ DB2 Version 4 Release 1 (5695-DB2)
- ✍ DB2 Version 3 Release 1 (5685-DB2)
- ✍ DB2 Version 2 Release 3 (5665-DB2)

CICS Subsystems Supported: IMS DB Version 7 can be connected through DBCTL to the following:

- ✍
- ✍ CICS Transaction Server for OS/390 Version 1 (5655-147)
- ✍ CICS/ESA Version 4 (5655-018)
- ✍ CICS/ESA Version 3 (5685-083)

Intersystem Communications Subsystems Supported: IMS TM Version 7 can be connected by ISC to:

- ✍ IMS Version 7 (5655-B01)
- ✍ IMS Version 6 (5655-158)
- ✍ IMS Version 5 (5695-176)
- ✍ IMS Verson 4 (5665-013)
- ✍ CICS Transaction Server for OS/390 Version 1 (5655-147)
- ✍ CICS/ESA Version 4 (5655-018)
- ✍ CICS/ESA Version 3 (5685-083)
- ✍ CICS/VSE Version 2(5686-026)
- ✍ User-written subsystem

Multiple Systems Coupling: IMS Version 7 Transaction Manager can be connected by MSC to any of the following IMS products:

- ✍ IMS Version 7 (5655-B01)
- ✍ IMS Version 6 (5655-158)
- ✍ IMS Version 5 (5695-176)
- ✍ IMS Version 4 (5665-013)

MVS Version 5 Release 1 and OpenEdition: See MVS/ESA SP Version 5 Release 1 and OpenEdition Enhancements announcement for their specific requirements.

Remote Site Recovery Features: The IMS Remote Site Recovery features, recovery-level tracking (RLT) and database-level tracking (DLT), require one of the following:

- ✍ IMS Version 7 Database Manager
- ✍ IMV Version 7 Database/Transaction Manager
- ✍ IMS/ESA Version 6 Database Manager
- ✍ IMS/ESA Version 6 Databse/Transacation Manager

Extended Terminal Option (ETO) Feature: The ETO feature requires one of the following:

- ✍ IMS Version 7 Transaction Manager
- ✍ IMS Verson 7 Database/Transaction Manager
- ✍ IMS/ESA Version 6 Transaction Manager
- ✍ IMS/ESA Version 6 Database/Transacation Manager
- ✍ IMS Version 7 Database Manager
- ✍ IMS Version 7 Database/Transaction Manager
- ✍ IMS/ESA Version 6 Database Manager
- ✍ IMS/ESA Version 6 Database/Transaction Manager

Programmng Languages Supported: Application programmers can write IMS application programs in the following languages:

- ✍ ADA
- ✍ COBOL for MVS and VM
- ✍ VS Pascal
- ✍ PL/I for MVS and VM
- ✍ C and C++ for MVS and VM
- ✍ TSO/E REXX
- ✍ High-Level Assembler

Recommendation: The following languages require the IBM Language Environment for MVS and VM:

- ✍ COBOL for MVS and VM
- ✍ C and C++ for MVS and VM
- ✍ PL/I for MVS and VM

Softcopy Publications: IBM supplies the Library Reader* products on the CD-ROM with the softcopy publications; these products allow you to view IBM softcopy publications from your workstation. To view the IMS publications on other platforms, at least one of the following is required:

BookManager READ/MVS Release 2
5695-046

BookManager READ/VM Release 2
5684-062

SAA* BookManager READ/2 Version 1 Release 2 5601-454

BookManager READ/DOS Verson 1 Release 2
5601-453

BookManager READ for Windows Version 2
5871-AAA

IBM AIX BookManager READ/6000 Version 1
Release 2
5765-086

One of the IBM Library Reader products

Database Surveyor Utility Feature: The IMS Database Surveyor feature requires one of the following:

One of the IBM BookServer products

Compatibility

IMS V7 is upwardly compatible from previous versions/releases, allowing existing applications and data to be used without change.

Migration/Coexistence support is provided for IMS V5 and V6 with V7.

IMS V7 introduces a new combined MSC exit (DFSMSCE0). V7 is the last release to support the old MSC exits: Terminal Routing (DFSCMTR0), Input Message Routing (DFSNPRT0), Link Receive Routing (DFSCMLR0/DFSCMLR1), or Program Routing (DFSCMPR0).

OSAM buffer caching in the Coupling Facility requires that all IMS systems in the Sysplex be on IMS V6 or IMS V7.

IMS Web was provided as an early tool for internet use by customers preparing for and providing access to IMS applications across the internet. IMS Web is no longer available with service being discontinued December 1, 2000. IBM now provides a common connector strategy for consistent easier access to existing applications and data. Replacement solutions for accessing IMS from the Web are provided through the new IMS Connect feature (formerly through the IMS TCP/IP OTMA Connection) and through the IMS Connector for Java function of VisualAge Java, Enterprise Edition. Alternatives still unavailable are through MQSeries, Host on Demand, Net.Data, and the OS/390 Templates.

Service for the IMS TCP/IP OTMA Connection (IMS TOC), which provided early IMS TCP/IP access, is being discontinued March 1, 2001. IMS Connect provides enhanced IMS TCP/IP support and requires the IMS TM feature. Much of the function in IMS Connect can be used with IMS V5 or V6 TM. Customers can thus choose IMS Connect ahead of a full migration to IMS V6 or IMS V7.

Future enhancements to IMS TCP/IP support will be provided only through IMS Connect for IMS V7. Customers currently using IMS TOC should migrate to IMS Connect.

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Usage Restriction

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