MVS/Extended Architecture Data Facility Product: General Information

Program Product

Data Facility Product 5665-284

Release 1.2

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Preface

This manual provides general information about the IBM MVS/Extended Architecture (MVS/XA) Data Facility Product (DFP) to enable managers, system programmers, and others to evaluate MVS/XA DFP for use at their installation. This manual will help you to:

- Understand what the MVS/XA Data Facility Product provides
- Evaluate the usefulness of the MVS/XA Data Facility Product
- Evaluate the compatibility of the MVS/XA Data Facility Product with your current installation

There is no prerequisite reading for this publication, but it is assumed that you have a general knowledge of data management and program management.

Organization

This manual contains the following chapters:

Chapter 1 explains the highlights of the MVS/XA Data Facility Product and the functions available to a user.

Chapter 2 describes the new functions that are included in MVS/XA Data Facility Product Release 1.1.

Chapter 3 describes the new functions that are included in MVS/XA Data Facility Product Release 1.2.

Chapter 4 defines the data management support and capabilities this product offers.

Chapter 5 describes the program management support and system support available with the product.

Chapter 6 identifies the supported utilities.

Chapter 7 identifies the programming and machine requirements for installing and using the product.

Chapter 8 lists the available publications.

Contents

Chapter 1. Introduction

MVS/Extended Architecture Data Facility Product

The MVS/Extended Architecture (MVS/XA) Data Facility Product (DFP) provides support for increased addressable virtual and real storage, maximum channel access, and the capacity to attach additional devices to the processor.

The MVS/XA Data Facility Product provides data management support, device support, program library management support, and utility functions for IBM processors operating in extended architecture mode. When installed with the corequisite products, either MVS/System Product–JES2 Version 2 (5740-XC6) or MVS/System Product–JES3 Version 2 (5665-291), the combination is an operating system environment called MVS/Extended Architecture (MVS/XA).

Release 1.0

The MVS/XA Data Facility Product supports the IBM processors operating in extended architecture mode with:

- 31-bit real and virtual storage addresses that increase the size of addressable real and virtual storage from 16 megabytes to 2 gigabytes
- AMODE/RMODE, which supports the 31-bit addressing capabilities
- An extended architecture that allows all channel paths to be accessed from each IBM processor operating in extended architecture mode
- The new maximum number of unit control blocks, providing for the attachment of up to 4096 devices

As part of this support, MVS/XA Data Facility Product includes selected functions available in OS/VS2 MVS Release 3.8, combined with enhancements previously available in the following IBM program products:

- Data Facility Device Support Release 1.0 through 1.4 (5740-AM7)
- Sequential Access Method-Extended (5740-AM3)
- Data Facility Extended Function (5740-XYQ)
- Access Method Services Cryptographic Option (5740-AM8)
- Offline IBM 3800 Utility (5748-UT2)

(Note: The above five program products will be withdrawn from marketing, effective December 1, 1984.)

MVS/XA Data Facility Product Release 1.0 also includes prerequisite program service and 3800 Enhancements.

Release 1.1

MVS/XA Data Facility Product Release 1.1 added the following enhancements to MVS/XA Data Facility Product:

- Virtual storage constraint relief through:
  - VSAM 31-bit support
  - Virtual I/O 31-bit support
- VSAM global resource serialization
- Programming support for the IBM 3880 Storage Control Model 11 and the IBM 3880 Storage Control Model 13, including new access method services commands previously available in Data Facility Device Support Release 1.5
- SYSGEN support for an increased number of IBM 2840 Display Control Model 2 units

Each of these enhancements is discussed in greater detail in Chapter 2, "Release 1.1 Support" on page 5.

Release 1.2

MVS/XA Data Facility Product Release 1.2 has added the following support to MVS/XA Data Facility Product:

- Magnetic tape label and tape file structure support for ISO/ANSI/FIPS
- Tape OPEN/EOV installation exits
- Data Management Support for Resource Access Control Facility (RACF) Release 5, including always call.
- Catalog constraint relief
- VSAM control block manipulation

Release 1.2 also provides programming device support for the following:

- IBM 3800 Printing Subsystem Model 3 (supported in all-points-addressable mode and 3800 Model 1 compatibility mode)
- IBM 3880 Storage Control Model 13 programming enhancements

This support is discussed in greater detail in Chapter 3, "Release 1.2 Support" on page 7.

MVS/Extended Architecture Data Facility Product Release 1.2 requires MVS/XA Data Facility Product Release 1.1 as an installation base. The corequisite program products, as described above and comprising MVS/XA, must also be installed. Assembler H Version 2 must also be installed for system generation and subsequent maintenance of the MVS/XA operating system. Following the installation of MVS/XA Data Facility Product or MVS/System Product (SP) Version 2, the user may not use the MVS/XA library for building or maintaining a

non-MVS/XA system. Because MVS/XA DFP does not support execution in System/370 mode, there is no change in programming service support of System/370 programs unless otherwise stated herein.

Compatibility has been maintained with previous MVS systems. Generally, nonauthorized problem state programs using published, external interfaces, which currently execute with OS/VS2 MVS, will execute with MVS/XA.

Addressing and Residence Mode (AMODE/RMODE)

The architecture for 31-bit virtual addressing introduces a new control bit in the program status word to define the addressing mode of the executing instruction as 24- or 31-bit mode. When in 31-bit mode, both instruction and data addresses are treated as 31-bit addresses. In 24-bit mode, they are treated as 24-bit addresses, and System/370 addressing architecture is applied. However, the load real address (LRA) instruction returns a 31-bit address regardless of the addressing mode.

MVS/XA provides support for execution in either addressing mode and allows programs to switch from one mode to another during execution. Most existing OS/VS2 MVS programs can execute in 24-bit mode. New or modified programs can be written to take advantage of 31-bit addressing. The default mode of execution is 24 bit.

To manage this dual environment, two new attributes have been defined, addressing mode (AMODE), and residence mode (RMODE). AMODE is the attribute of a CSECT or load module. It states the addressing mode in which the CSECT or load module expects to receive control. RMODE defines whether the program must be resident in storage addressable by 24-bit addressing or 31-bit addressing.

Assembler H Version 2 marks output object modules with AMODE/RMODE attributes that the linkage editor uses to mark load modules in the directory entry. When ATTACH, LINK, or XCTL is used to invoke a load module, the control program ensures that the load module is loaded into the correct addressing range and receives control in the correct addressing mode. The AMODE/RMODE attributes can be overridden at link-edit time with new job control statement parameters or by linkage editor input parameters.

Unless specifically stated otherwise, MVS/XA DFP runs in 24-bit addressing mode. (For further information, see "Programming Considerations," in Chapter 6.)

Large Real Support

The purpose of large real support in MVS/XA DFP is to allow the real addresses of data buffers and selected control blocks to reside above 16 megabytes real. This support reduces the requirements for real storage below 16 megabytes; programs that require such storage will benefit from this change.

Any available real storage in the 31-bit addressing range is used to back virtual storage in either the 24-bit or 31-bit addressing range. When areas of virtual storage in the 24-bit addressing range are page fixed, they are normally page fixed in 24-bit addressable real storage. A new "LOC" parameter of GETMAIN can be used to indicate that an area in 24-bit addressable virtual storage may be backed by 31-bit addressable real storage when page fixed. For example, GETMAIN...LOC=(BELOW,ANY)..., would result in virtual storage being obtained within the 24-bit addressing range. The real storage backing the virtual storage may be anywhere within the 31-bit real addressing range.

The access methods included in MVS/XA DFP use the new parameter (LOC) of GETMAIN.

Unit Control Blocks

MVS/XA allows a maximum of 4096 unit control blocks, an increase from the former limit of 1917 unit control blocks in OS/VS2 MVS. This expansion of as many as 4096 unit control blocks increases the number of devices supported by a given system. Although MVS/XA DFP supports 4096 unit control blocks, the actual number of devices that can be attached depends on the processor and I/O device configuration.

Chapter 2. Release 1.1 Support

MVS/Extended Architecture Data Facility Product Release 1.1 adds additional device support, additional functions, and virtual storage constraint relief for MVS/XA users. This chapter describes the new MVS/XA support.

Virtual Storage Constraint Relief

MVS/XA Data Facility Product Release 1.1 relieves the constraints on virtual storage by providing 31-bit support for VSAM and virtual I/O.

VSAM 31-Bit Support

VSAM 31-bit buffer support allows programs running with AMODE=31 (addressability above 16 megabytes virtual) to create and access buffers above 16 megabytes. User exits are also supported above 16 megabytes.

VSAM record management has been moved to the MVS/XA extended pageable link pack area (EPLPA). To access VSAM record management code from applications below 16 megabytes, an interface module is supplied to allow these applications to continue to function without any change.

VSAM local shared resource (LSR) pool support previously allowed only one local shared resource pool for each address space. Now, up to a total of 16 local shared resource pools may exist for each address space; LSR buffer pools may, optionally, reside above or below 16 megabytes.

Virtual I/O 31-Bit Support

Virtual I/O will support I/O buffers that reside above 16 megabytes virtual storage via 31-bit virtual indirect addressing words (IDAW). Virtual indirect addressing supports all channel command words that virtual I/O supports, except transfer in channel, control number operations, and read and sense with the skip flag on.

This support is equivalent to the support previously provided by the EXCP processor in MVS/SP JES2 Version 2 and MVS/SP JES3 Version 2.

VSAM Global Resource Serialization

VSAM global resource serialization allows a user program to use cross-region sharing of VSAM data sets among a group of interconnected processors.

Programming Support for the IBM 3880 Storage Control Model 11

The IBM 3880 Storage Control Model 11 is a high-performance storage controller that supports paging and swapping functions for MVS/XA. The subsystem includes a two-level storage hierarchy. The first level is a random access electronic storage array referred to as the cache. The second level consists of a number of IBM 3350 Direct Access Storage devices. An access method services command is provided for the 3880 Model 11 to list the subsystem counters and subsystem status.

Programming Support for the IBM 3880 Storage Control Model 13

The IBM 3880 Storage Control Model 13 is a storage controller device that provides a high performance cached DASD subsystem. Three access method services commands are provided for the 3880 Model 13. These commands are used to report subsystem counters and subsystem status, to perform bind and unbind functions, and to set subsystem mode functions.

Sysgen Support

The SYSGEN macro IODEVICE allows you to specify a value of up to 4095 for the PCU operand instead of the value of 255 previously allowed.

Chapter 3. Release 1.2 Support

VSAM Control Block Manipulation Module

The VSAM control block manipulation module (CBMM) runs in the caller's addressing mode, allowing the GENCB, MODCB, SHOWCB, and TESTCB parameter lists, the request parameter list (RPL), and exit list (EXLST) to reside in virtual storage above 16 megabytes for callers in 31-bit addressing mode.

Data Management Support for Resource Access Control Facility (RACF) Release 5

RACF Release 5 provides a new profile checking facility to allow access authorization. The installation creates generic data set profiles that apply to multiple data sets having the same high level qualifier in the data set name. Previously, access authorization was only done for RACF-indicated data sets; that is, data sets protected by a discrete profile. Now, RACF will always be called to verify access via discrete or generic profiles.

Magnetic Tape Label and Tape File Structure Support for ISO/ANSI/FIPS (Version 3)

This support includes the organization, format, and processing of labels designed according to the specifications of the following industry standards as understood and interpreted by IBM as of March 1983:

- International Standards Organization (ISO) 1001-1979, level 4
- American National Standards Institute (ANSI) X3.27-1978, level 4
- Federal Information Processing Standard (FIPS) 79

Extended Access Control: ISO/ANSI/FIPS support provides volume and data set access control for all tape volumes. However, if RACF is available and active for tape, it will override ISO/ANSI/FIPS volume and data set access control. Authorization for ISO/ANSI/FIPS tape accessibility is controlled by either the volume/file installation exits or by RACF installation exits.

Label Validation: ISO/ANSI/FIPS Version 3 tape labels are validated. User-controlled validation may be accomplished by using an installation exit.

Generation Data Groups: A generation file is accommodated on an ISO/ANSI/FIPS Version 3 volume.

Spanned Record Format: Spanned records are supported on an ISO/ANSI/FIPS Version 3 volume.

Extended Logical Record Interface: The logical record interface for spanned records has been extended to accommodate a 16-megabyte logical record for ISO/ANSI/FIPS Version 3 labeled tapes. The actual maximum size depends on available virtual storage.

Processing Differences Between Version 1 and Version 3

The user should be aware that the implementation of the ISO/ANSI/FIPS standard results in some processing differences between Version 1 and Version 3. For example, with Version 3, extending a data set (DISP=MOD) is not allowed, nor can you have duplicate data set names on the same volume. More information about these processing differences is included in *Magnetic Tape Labels and File Structure*.

Catalog Constraint Relief

The allowable number of concurrent catalog users has been increased from 255 to 32767.

Tape OPEN/EOV Installation Exits

When extending to another tape volume, a DCB exit allows a user program to indicate that a specific volume is to be mounted instead of a scratch volume. If a specific volume is to be mounted, the user program returns the volume serial number. A volume security DCB exit allows a user program to indicate acceptance or rejection of the tape. This exit also allows expiration date and password checking to be bypassed when the user is APF authorized and the program properties table indicates security checking is to be bypassed.

Support for the IBM 3800 Printing Subsystem Model 3

The IBM 3800 Printing Subsystem Model 3 is a high-speed electro-photographic printer in the 3800 printer series. It prints text and images with greater density than the Model 1.

The 3800 Model 3 is supported in compatibility mode and all-points-addressable mode (also referred to as page mode).

Compatibility mode

MVS/XA DFP Release 1.2 provides the following support for the IBM 3800 Model 3 running in Model 1 compatibility mode:

- Allows the IBM 3800 Model 3 to function as a line printer and run jobs written for the Model 1
- Supports additional line spacing of 10 lines per inch
- Provides IBM 3800 Model 1 character sets and graphic modification modules for the 3800 Model 3 in 240 x 240 pel density. This includes:
  - 20 library character sets supplied initially with the 3800 Model 1.
  - 16 fonts provided with Document Composition Facility Release 2 (5748-XX9).
- Provides character arrangement tables in IEBIMAGE source format.
- Provides 23 selected IBM 6670 Information Distributor character sets, which were originally designed for printing in 240 x 240 pel density. These character sets have been slightly modified for use with the 3800 Model 3.

- Provides an enhanced IEBIMAGE component to support 240 x 240 pel density and 10 lines per inch.
- Identifies to the host operating system that a 3800 Model 3 is attached through system generation support.
- Provides error recovery procedures for the 3800 Model 3.

IBM 3800 Model 1 to Model 3 Migration

Applications written for the IBM 3800 Model 1 can use an IBM 3800 Model 3 with a minimum of change. Little or no change is required in the JCL.

Printing at 10 lines per inch in compatibility mode requires changes to the forms control buffer (FCB) definition, to the FCB name in the JCL, and possibly some changes to the application program (for example, when line counting is performed by the program).

Either IBM Print Management Facility (5667-307) or the IBM Character Conversion Aid program product (5665-299) may be used to reduce the effort required to convert customer-created characters, designed for the IBM 3800 Model 1, to the new pel density (240 x 240 pels per square inch) required for the IBM 3800 Model 3.

One or more IBM 3800 Models 1 on the same host system with one or more IBM 3800 Models 3 will be supported as Models 1. These Models 1 must be at EC level #454848 or higher.

All-Points-Addressable Mode

MVS/XA DFP Release 1.2, upon availability of and in conjunction with Print Services Facility and its companion and prerequisite program products, supports the 3800 Model 3 in all-points-addressable mode.

There are several IBM licensed programs providing a variety of support for the advanced printing capabilities of the 3800 Model 3. Your installation should determine the applicability of each licensed program to meet your requirements. The licensed programs are listed below:

- Print Services Facility (5665-275) provides all-points-addressable device support.
- Print Management Facility (5665-307) provides several utility functions.
- Overlay Generation Language (5665-308) provides for definition and generation of electronic overlays (forms) for use on the 3800 Model 3.
- A set of three licensed programs provide digitized alphabetic and other character forms for use with the 3800 Model 3.
- Document Composition Facility, Release 3.1 (5748-XX9) now supports the 3800 Model 3, including embedded raster images and selected IBM 4250 Printer functions.

- Graphical Data Display Manager, Release 3 (5748-XXH) output files may now be printed through Print Services Facility on the 3800 Model 3 in all-points-addressable mode.

IBM Storage Control Model 13 Programming Enhancements

These enhancements include the capability to ensure that all updates made during write-check will be successfully written to the media and improved reporting on cache usage for attached devices via the access method services cache device command LISTDATA.

Chapter 4. Data Management Support

In addition to the support provided for IBM processors that operate in the extended architecture mode, the MVS/XA Data Facility Product provides data management capabilities to support large real storage.

Most of the functions described in Chapters 4, 5, and 6 are part of the existing IBM OS/VS2 MVS Release 3.8 system. Portions of the OS/VS2 MVS System Control Program and the program products identified in Chapter 1 have been modified and merged into the MVS/XA DFP program product. In the MVS/XA environment, these functions do not exist as separate products.

The Integrated Catalog Facility

MVS/XA DFP includes support for the integrated catalog facility catalog provided to OS/VS2 MVS users by the Data Facility Extended Function (DFEF) (5740-XYQ) program product. Integrated catalog facility consists of a master catalog and an option for support of many user catalogs.

The integrated catalog facility catalog is a functional replacement for VSAM master catalogs, VSAM user catalogs, and OS control volumes (CVOLs). It features improvements in reliability, recovery, performance, usability, and direct access storage device (DASD) space management, while allowing user interfaces to catalog data to remain unchanged.

Integrated Catalog Facility Structure

The integrated catalog facility is composed of one basic catalog structure and at least one VSAM volume data set. A VSAM volume data set exists on each volume on which VSAM data sets reside. The VSAM volume data set contains two types of records—one VSAM volume control record, the first record in the VSAM volume data set, and one or more VSAM volume records. The integrated catalog facility uses the VSAM volume data set to contain the information about the VSAM data sets residing on the volume with the VSAM volume data set. The extent information is contained in the VSAM volume records within the VSAM volume data set.

Basic Catalog Structure

The basic catalog structure is a VSAM key-sequenced data set and contains volume, data set security, ownership, and associated information for VSAM and non-VSAM data sets. The basic catalog structure has no special characteristics or embedded control information, and you may use any utility programs applicable to a key-sequenced data set.

The volume ownership restrictions associated with the VSAM catalog do not apply to the basic catalog structure. VSAM data sets residing on one volume may be cataloged in as many as 36 different basic catalog structures. In addition, one VSAM catalog, as well as data sets cataloged in one VSAM catalog, may coexist with the basic catalog structure on a volume.

A basic catalog structure can also point to a volume on which only non-VSAM data sets or generation data groups reside. Information required by the integrated catalog facility for data set and generation data groups is contained in the basic catalog structure itself; no VSAM volume data set is required on such a volume.

When a basic catalog structure is defined, attributes that could not previously be specified for the existing VSAM catalog may now be specified. These attributes include the control interval size for the data and index component and the amount of free space that is to be left free. Most utility functions and tuning specifications available with VSAM key-sequenced data sets are also available for the basic catalog structure.

VSAM Volume Data Set

The VSAM volume data set is a VSAM entry-sequenced data set and contains characteristics of VSAM data set components residing on the same volume as the VSAM volume data set itself. It also contains names of up to 36 basic catalog structures that have VSAM data set components residing on this volume. Therefore, the VSAM volume data set is shared among any basic catalog structures that have VSAM data sets defined on that volume.

If space allocation quantities other than the standard defaults are needed, you may explicitly define a VSAM volume data set by using the DEFINE CLUSTER command. Otherwise, the VSAM volume data set is implicitly defined when the first VSAM data set or basic catalog structure is defined on that volume. Whenever additional space is needed in the VSAM volume data set itself, it is extended.

The VSAM volume data set consists of two types of records:

- The VSAM volume control record
- The VSAM volume record

The VSAM volume control record contains entries for as many as 36 basic catalog structures, each having basic catalog structure or VSAM data set components defined on that volume.

Each VSAM volume record contains data set characteristics information for a basic catalog structure or a VSAM data set component residing on that volume. The VSAM volume record is updated each time a data set is opened or closed.

The data set characteristics information contained in the VSAM volume record was previously kept in the VSAM catalog. This information is now kept on the volume on which the component resides.

Integrated Catalog Facility Recovery

The integrated catalog facility improves catalog recovery. The dynamic information associated with the VSAM data set (the data set characteristics) resides in the VSAM volume data set on the same volume as the VSAM data set itself.

The VSAM volume data set contains the data set characteristics that must be synchronized with the data set each time it is updated. This allows you to periodically copy the volume for backup and recovery operations and prevent the data set and VSAM volume data set portion of the integrated catalog facility from becoming out of synchronization.

The basic catalog structure maintains a record of the associated data sets; for example, a record of a data set and its related alternate indexes and paths.

When you use access method services commands, all the objects associated with the record are processed before the record is updated. This allows you to restart most processing at the point of interruption, without data loss or special processing.

Integrated Catalog Facility Diagnostic Aids

The access method services command, DIAGNOSE, analyzes the basic catalog structure and/or VSAM volume data set, verifies catalog data integrity, and determines if they contain errors.

In addition to the DIAGNOSE command, you can use all the existing access method services and catalog diagnostic aids for the integrated catalog facility, except those related to the catalog recovery area for a VSAM catalog. The catalog recovery area is not used by the integrated catalog facility.

Access Method Services

The following sections describe how access method services commands may be used in the MVS/XA DFP environment.

- **Creating a Catalog**

  The DEFINE USERCATALOG | MASTERCATALOG command allows you to define an integrated catalog facility catalog by using the ICFCATALOG parameter.

  When you define an integrated catalog facility catalog, you can specify parameters that relate to performance, buffers, catalog sharing, and the request parameter list (RPL) limit. These parameters cannot be specified when defining a VSAM catalog.

- **Converting a Catalog**

  The CNVTCAT command allows you to convert OS CVOLs or VSAM catalog entries to integrated catalog facility entries.

- **Defining Objects in a Catalog**

  You use the DEFINE command to define objects in an integrated catalog facility.

  You can explicitly create a VSAM volume data set with the DEFINE CLUSTER command. If you do not explicitly create the VSAM volume data set, access method services dynamically creates it the first time the VSAM volume data set is required for a specific volume.

  For objects defined in an integrated catalog facility, each VSAM component and key range has its own data set control block and may have up to 123 extents.

- **Altering a Catalog**

  You may alter most of the attributes of VSAM and non-VSAM entries in a basic catalog structure, and the attributes of the basic catalog structure itself, with the ALTER command. However, you cannot alter the VSAM volume data set.

- **Diagnosing Data Structures**

  You may use DIAGNOSE to scan a basic catalog structure or VSAM volume data set to determine the presence of invalid data or relationships in the basic catalog structure and/or VSAM volume data set that may cause problems if they are not corrected. The output from the DIAGNOSE command may warn you against using the invalid data and therefore would minimize the impact that would result from using the data or losing other data.

  There are two kinds of checking you can do with the DIAGNOSE command:

  - Check the entry's format and content
  - Compare an entry with a basic catalog structure, a VSAM volume data set, and/or a volume table of contents (VTOC) for consistency

  The DIAGNOSE command allows you to have both checking and comparing done, or only checking if system time or resources are not available. You can also specify entries to be included or excluded from checking.

- **Deleting a Catalog Entry**

  The DELETE command is used to delete entries or objects from the catalog.

- **Copying, Merging, or Splitting a Catalog**

  The REPRO command enables you to manipulate entries of an integrated catalog facility in the following ways:

  - Copy the integrated catalog facility catalog entries or data set entries to another integrated catalog facility catalog (on a similar or a different device type)
  - Merge or split selected entries from one integrated catalog facility catalog to another integrated catalog facility catalog and update the VSAM volume data sets involved

- **Backing Up a Catalog**

  In any environment, backup and recovery are prime concerns. The EXPORT command enables you to create a backup copy of a basic catalog structure in the same manner a data set is exported. With the integrated catalog facility:

  - If the basic catalog structure is damaged, you can restore the backup copy.
  - If the basic catalog structure entry is in error, you can re-create the catalog entry (if the VTOC and VSAM volume data set are intact).
  - If the VSAM volume data set is in error, you can import VSAM data sets or do a full volume restore, depending on how much data needs to be recovered. There are no special access method services commands to support VSAM volume data set or VTOC backup.

- **Listing a Catalog**

  You can use the LISTCAT command to list the entries in a basic catalog structure and its related VSAM volume data sets.

Security

An integrated catalog facility catalog and its data sets may be password protected or protected with the IBM Resource Access Control Facility (5740-XXH).

The VSAM volume data set does not contain password information and can be read without special authorization; writing is limited to system key, supervisor state, or authorized program routines.

The access method services REPRO function gives you the ability to encipher and decipher data using a software version of the United States National Bureau of Standards Data Encryption Standard. (This function was previously provided by the Access Method Services Cryptographic Option Program (5740-AM8).)

All data sets supported for copying by REPRO (any VSAM or ISAM data set, or any other data set that can be accessed sequentially, except VSAM catalogs and integrated catalog facility catalogs) are supported as input for enciphering via REPRO ENCIPHER. The user can decipher the sequential cipher text data set using REPRO DECIPHER. This function of the REPRO command uses the services of the IBM Programmed Cryptographic Facility (5740-XY5) or the IBM Cryptographic Unit Support Program (5740-XY6) or a functional equivalent to encipher/decipher the data and provide facilities for controlling the cryptographic key.

RACF Release 5

To lessen the possibility that unauthorized access to protected data components of existing VSAM data sets does not occur when migrating to this release, the installation security administrator should define either discrete or generic profiles to protect the data sets on a cluster basis after RACF Release 5 (or later release or modification level) is installed, but before MVS/XA DFP Release 1.2 is installed. Continued use of prior releases of RACF or the failure to define either discrete or generic profiles constitutes a security exposure to the previously protected resources.

Compatibility

VSAM catalogs and integrated catalog facility catalogs can be used concurrently on the same system. Integrated catalog facility catalogs can be defined on the same volume with VSAM catalogs and other basic catalog structures.

Migration and Conversion Considerations

In an environment in which an integrated catalog facility is shared by multiple host systems, the integrated catalog facility must be installed on all systems that can access the shared catalog.

OS CVOLs or VSAM catalogs (recoverable or nonrecoverable) can be converted to integrated catalog facility catalogs, by using the access method services command CNVTCAT. CNVTCAT will not convert integrated catalog facility entries to OS CVOL or VSAM catalog entries and will not convert VSAM catalog entries to OS CVOL entries.

Migration to the integrated catalog facility can be done either by:

- Data set—until all the data sets from the existing catalog are cataloged on the integrated catalog facility catalog.
- Catalog—the entire existing catalog is converted to the integrated catalog facility at one time.

During the conversion process, you may have a master catalog with both VSAM and integrated catalog facility catalogs defined in it. This allows you to convert the existing OS CVOLs and VSAM catalogs to integrated catalog facility catalogs at your own rate, with a minimum impact to your installation and its processing.

Note: OS/VS2 MVS Data Facility Extended Function (DFEF) users that have previously converted to the integrated catalog facility need not repeat that conversion when MVS/XA DFP is installed.

Alternate Master Catalog

You may specify an alternate master catalog during the initial program load and identify the location of data sets on the system residence volume by a special character string. This character string may then be used in place of the volume serial and unit identifiers of the catalog.

Indirect Volume Serial Identification and Device Type

You may change the system residence volume serial number and/or device type without having to recatalog all the non-VSAM data sets on the new volume.

Certain data sets must be cataloged and reside on the system residence volume. If the system residence volume serial number changes because of a new system release, or for any other reason, these data sets must be recataloged.

Indexed Volume Table of Contents (VTOC)

Support for indexed VTOCs is functionally equivalent to the support introduced to System/370 users with the IBM Data Facility Device Support (DFDS) program product (5740-AM7).

A VTOC is made up of data set control blocks (DSCBs). These DSCBs describe the type and location of data sets on a direct access storage device volume. To locate a data set by data set name, without the indexed VTOC, it is necessary to sequentially scan DSCBs on the device. This requires search commands that occupy a channel and control unit during the entire search. Channel time increases as the number of data sets on a volume increases.

VTOC access is improved by using an index structure for the current VTOC. The index resides in a separate data set on the volume. An entry is made in an index record for each data set on the volume, with a pointer to the data set control block for that data set. This allows direct access to the VTOC by data set name. With an indexed VTOC, the sequential hardware search of the VTOC is eliminated, freeing the channel, control unit, and device (except for access to the index itself).

The VTOC index also includes space management information. The space information is contained in space maps that control free space in the VTOC index itself, free space in the VTOC, and the space on the direct access storage device volume.

The common VTOC access facility (CVAF) is used by the system and may be used by you to access an indexed VTOC or a nonindexed VTOC. The common VTOC access facility may be used to read or write information in the VTOC index, to determine whether the VTOC on a mounted volume is indexed, or to read or write data set control blocks.

Programs that currently access a VTOC through documented DADSM interfaces should continue to operate without change on volumes with a VTOC index. Programs that access the VTOC via EXCP or SAM should continue to operate without change on volumes with a VTOC index, with one exception: Those programs that obtain information from the Format-5 DSCB(s) must be modified to use CVAF to obtain the same information from the VTOC index.

Device Support Facilities, which is a class 2 system control program, may be used:

- To create a VTOC with or without an index when a volume is initialized
- To build an index over an existing volume's VTOC
- To rebuild the index as desired

Device Support Facilities allows an orderly migration from the nonindexed VTOC to the indexed VTOC, one volume at a time. You may select the volumes you want to change, and then change them at your own pace.

You can list an indexed VTOC with the IEHLIST utility in a dump, edited, or abridged format. The IEHLIST utility also retrieves space information from the space maps.

If you wish, you may list index information with other utilities, such as IEBPTPCH, as you would any sequential data set.

The VTOC index may be password protected in the same way as may any other sequential data sets. The VTOC and the VTOC index may also be protected using the Resource Access Control Facility.

Each of the ALLOCATE, EXTEND, SCRATCH, PARTIAL RELEASE, and RENAME functions of DADSM provides a preprocessing and postprocessing exit to allow the installation to get control before and after DADSM processing. One module is shipped for the preprocessing and one for the postprocessing exit. You may replace them with your own installation exit modules.

Coexistence with systems that do not support the VTOC index is a major feature of the VTOC index design.

- Any volume with a nonindexed format that is currently usable on OS/VS2 MVS or OS/VS1 may be moved to an MVS/XA environment and used as is.
- Device Support Facilities may be used to initialize a VTOC index on these volumes whenever desired, except on volumes whose VTOC does not begin on record 1 of a track.
- A volume with a VTOC index can be moved to and from DOS, OS, VS1, SVS, MVS, MVS/370, and MVS/XA. However, if you move the indexed VTOC volume to a system that does not have indexed VTOC programming support,

you should use Device Support Facilities to convert to the nonindexed format. To ensure integrity of the data on the volume, you should re-create the index when returning the volume to a system with indexed VTOC programming support.

- If the indexed VTOC will be shared, the systems that are sharing the indexed VTOC must all have the indexed VTOC programming support.

Access Methods

Virtual Storage Access Method (VSAM)

Virtual storage access method (VSAM) is a direct access storage device access method for direct and sequential processing by means of either an index key or relative byte addressing. VSAM provides support for batch users, online transactions, and data base applications.

VSAM supports three types of data set organizations including:

- A key-sequenced data set that contains a record that is identified for retrieval by its key (a unique value in a predefined field)
- An entry-sequenced data set that contains a record that is identified for retrieval by its displacement from the beginning of a data set
- A relative record data set that contains a record that is identified for retrieval by its relative record number

VSAM 31-bit support consists of the following:

- VSAM data buffers optionally obtained above 16 megabytes
- VSAM record management code in the extended pageable link pack area (EPLPA)
- As many as a total of 16 local shared resource (LSR) pools

The utility program, access method services, provides the required VSAM services to establish and maintain data sets and to copy and print data sets.

VSAM offers multiple levels of password protection or can utilize Resource Access Control Facility (RACF) protection to improve data set security, and a user exit so that user-written security routines may be included.

Sequential Access Method (SAM)

MVS/XA Data Facility Product uses the buffer scheduling function introduced to OS/VS2 MVS users with SAM-E for queued sequential access method (QSAM) processing. In MVS/XA Data Facility Product, SAM uses the EXCPVR macro instead of the EXCP macro for all basic sequential access method (BSAM), QSAM direct access, and virtual I/O operations. For basic direct access method (BDAM) WRITE/LOAD, the conventional EXCP macro is implemented. These changes may improve data access performance by:

- Reducing channel program interpretation and translation

- Reducing the frequency of fixing and freeing of pages
- Reducing the path length per block for the SAM I/O operations
- Decreasing direct access storage device contention
- Increasing the number of QSAM buffers transferred per I/O operation

Queued Sequential Access Method (QSAM)

In QSAM, logical records are retrieved or stored as requested. This access method anticipates the need for records based on their sequential order. Normally, the desired record is in storage before the request for retrieval. When writing data, a program using QSAM can continue as if a record had been written immediately, although the QSAM routines may have blocked that record with other logical records and deferred writing until multiple buffers have been filled.

Basic Sequential Access Method (BSAM)

In BSAM, data is sequentially organized and stored or retrieved in physical blocks. Macro instructions initiate input and output operations. The completion of these operations is tested by using a macro instruction.

Basic Partitioned Access Method (BPAM)

BPAM, used in conjunction with BSAM, is designed for efficient storage and retrieval of discrete sequences of data (members) belonging to the same partitioned data set on a direct access storage device. The data set includes a directory that relates a member name to its address on the volume. Members can be added to a partitioned data set as long as space is available in the directory and data set. All input/output operations for BPAM, other than directory manipulation, are performed by BSAM.

Basic Direct Access Method (BDAM)

In BDAM, records in a data set are organized on direct access volumes in any manner chosen by the programmer. Records are stored or retrieved by actual or relative addresses within the data set. An address can be the requested record or a starting point within the data set for which a search for the record begins.

Indexed Sequential Access Method (ISAM)

ISAM arranges data records in a logical sequence by key fields. The system maintains a multilevel index structure and retrieves any record by its key.

Virtual I/O (VIO)

Temporary data sets can be handled by a facility called virtual I/O. The temporary data sets reside within the paging data sets and appear to a problem program and to the access method as if they resided in a conventional data set. A temporary data set using virtual I/O is dynamically allocated 4K-byte (page-size) physical blocks in direct access storage device storage. Virtual I/O builds an image of the tracks in virtual storage.

Virtual I/O provides these advantages:

- Elimination of some of the usual I/O device allocation and data management overhead for temporary data sets

- Generally more efficient use of direct access storage space
- Use of the I/O balancing capability of the paging mechanism

Virtual I/O processing is compatible with the BDAM, BPAM, BSAM, QSAM, and XDAP macro interfaces. Recovery processing, currently available for temporary data sets, is also provided for data sets using virtual I/O. However, they are not available for deferred restart.

OPEN, CLOSE, and END-OF-VOLUME

These functions provide the necessary preparatory support for the access methods to carry out the I/O operations requested by the processing program.

OPEN processing mounts and verifies the volume and creates the linkage between the system, the access methods, and the processing program.

CLOSE processing demounts the user volume as required, and, when the processing program is finished with the input/output (I/O) operations, removes the linkage created by OPEN.

End-of-volume processing supports an interface to direct access device storage management (DADSM) to extend data sets when the end of the allocation of a data set is reached. If multiple-volume data sets are specified in the DD statement, automatic volume switching is accomplished by the end-of-volume routine. End-of-volume provides allocation for additional extents, provides final processing on a volume, mounts and verifies additional volumes, and checks or builds data set labels for each volume.

Direct Access Device Storage Management (DADSM)

Except for VSAM catalog managed spaces, direct access device storage management (DADSM) is used to control allocation and deallocation of space on direct access storage devices.

Security

Security is the ability to protect resources from unauthorized access, alteration, or destruction. MVS/XA Data Facility Product supports the protection of data sets using either passwords or Resource Access Control Facility.

The access method services REPRO function provides the facility to protect data while it is stored in external storage. The REPRO command uses the services of the IBM Programmed Cryptographic Facility (5740-XY5) or the IBM Cryptographic Unit Support Program (5740-XY6), or a functional equivalent, to encipher/decipher the data and to provide facilities for controlling the cryptographic key.

Chapter 5. Program Management and System Support

The program management and system support described in this chapter were parts of the existing IBM OS/VS2 MVS Release 3.8 that are modified and merged into the MVS/XA Data Facility Product.

Linkage Editor

The linkage editor combines separately compiled or assembled object modules into a single program ready to be loaded and executed. It combines previously edited load modules with each other or with object modules, and enables changes to be made in a program without recompiling or reassembling the entire program. Only modules that are changed need to be recompiled or reassembled.

Linkage editor modifications for MVS/XA DFP:

- Support the specification of 24- and 31-bit addressing modes (AMODE) and residency modes (RMODE), which may be specified in source programs submitted to Assembler H Version 2, the linkage editor JCL, or the linkage editor control statements.
- Insert relocation dictionary record and relocation dictionary/control record counts into program library members to support program fetch.
- Preserve the high-order bit in 4-byte V-cons.
- Process the RSECT information for each control section.
- Improve performance with the removal of the overlay structure. This enlarges the region size requirement during execution of the linkage editor by 32K bytes.

Object modules acceptable as input to the MVS/XA DFP linkage editor are acceptable to the OS/VS2 MVS linkage editor, but AMODE/RMODE/RSECT information is ignored and not carried forward to the load module. RSECTs are read-only CSECTs in the nucleus and only have meaning in the nucleus. Object modules acceptable as input to the OS/VS2 MVS linkage editor are acceptable to the MVS/XA DFP linkage editor, which assigns default values of 24-bit addressing to AMODE/RMODE.

Load modules built by the OS/VS2 MVS linkage editor are acceptable as input to the MVS/XA DFP linkage editor, which applies default values for the new attributes. Load modules built by the MVS/XA DFP linkage editor are acceptable as input to the OS/VS2 MVS linkage editor: AMODE/RMODE/RSECT is ignored as input, and the OS/VS2 MVS linkage editor does not provide AMODE/RMODE/RSECT information as output.

Program Fetch

Program fetch reads a load module into virtual storage and relocates any address constants in the module.

Program fetch modifications for MVS/XA DFP:

- Evaluate the RMODE program attributes, then read the load module into storage within the 31-bit virtual addressing range or the 24-bit virtual addressing range, as specified
- Utilize the relocation dictionary and relocation dictionary/control record block counts in the PDS directory entry to build channel programs
- Use new channel control word 31-bit virtual addresses to read a module into virtual storage within the 31-bit addressing range
- Run in 31-bit mode

A load module link-edited by the OS/VS2 MVS linkage editor can be loaded and executed in an MVS/XA system. Defaults are taken for the AMODE/RMODE information. A load module link-edited by the MVS/XA DFP linkage editor can be loaded and executed in an MVS/370 system. AMODE/RMODE information is ignored.

IEBCOPY

IEBCOPY is a data set utility used to copy one or more partitioned data sets or to merge partitioned data sets. A partitioned data set that is copied to a sequential data set is said to be "unloaded." The sequential data set created by an unload operation can be copied to any direct access device. A "load" operation consists of using one or more data sets created by an unload operation to re-create a partitioned data set. Specific members of a partitioned or unloaded data set can be selected for, or excluded from, a copy, unload, or load operation.

MVS/XA Data Facility Product provides modification to IEBCOPY to:

- Determine the number of relocation dictionary (RLD) and/or control records following any given block of text in a load module. The count is then inserted into the control record preceding the block of text and is also inserted, in the case of the first text block of a load module, into the partitioned data set (PDS) directory entry for that module. The same functions are performed by the linkage editor.
- Reblock text for improved direct access storage space utilization during a copy of a load module from one module library to another. New parameters allow you to specify a minimum and maximum block size.
- Improve performance with the removal of the overlay structure. This enlarges the region size requirement during execution of IEBCOPY by approximately 28K bytes.

In addition, IEBCOPY automatically lists the number of unused directory blocks and the number of unused tracks available for member records in the output partitioned data set. If LIST=NO is coded, the names of copied, unloaded, or loaded members listed by the input data set are suppressed.

Loader

The loader combines the basic editing function of the linkage editor and the loading function of program fetch into one job step. It loads object modules produced by language translators, and load modules produced by the linkage editor, for execution. It is designed for loading modules that do not require the specific facilities of the linkage editor and program fetch. The loader does not produce load modules for program libraries. MVS/XA DFP support allows the loader to load programs and relocate address constants in virtual storage within both the 31-bit addressing range and the 24-bit addressing range.

For execution, the loader loads object modules produced by language translators and load modules produced by the linkage editor. The loader does not produce load modules for program libraries. The MVS/XA DFP loader loads programs and relocates address constants in virtual storage within the complete 31-bit addressing range.

AMBLIST

AMBLIST is a service aid program that produces formatted listings for system serviceability and diagnostic purposes and supports virtual addresses for the nucleus. AMBLIST lists MLPA (modified link pack area), FLPA (fixed link pack area), and PLPA (pageable link pack area) separately or together. This includes extended and nonextended sections of addressable space.

RSECTs are read-only CSECTs in the nucleus and only have meaning in the nucleus. The RSECT, RMODE, and AMODE information for the object module is included in the external symbol dictionary as one hexadecimal byte of data under the heading R/R/A. AMODE and RMODE information for the load module is read from the partitioned data set by AMBLIST and printed with the load module summary. The AMODE for the main entry point, the AMODE for each alias entry point, and the RMODE for the load module are provided. The RSECT information appears as data in the scatter table when a nucleus load module is listed.

MVS/XA DFP AMBLIST handles all old and new modules. With the nucleus pack mounted on an IBM processor operating in extended architecture mode, AMBLIST can also map the nucleus of an OS/VS2 MVS system.

Checkpoint/Restart

The checkpoint/restart facilities gather and record information about the status of a job and its related control blocks to allow a restart, should one be necessary. Execution resumes at the beginning of a job step (step restart) or from a place within a job step (checkpoint restart). Automatic restart can be authorized by the operator at the console. Deferred restarts take place when a job is resubmitted.

MVS/XA DFP checkpoint/restart supports the new MVS/XA environment, including new and modified control blocks and the extended storage map.

User application programs that successfully take checkpoints on OS/VS2 MVS may do so on MVS/XA. User application programs assembled on MVS/XA that are executed on a System/370 must correctly utilize the SPLEVEL macro to provide the desired portability. For a description of the SPLEVEL macro, see *MVS/Extended Architecture General Information*, GC28-1118.

TSO LINK/LOADGO

The LINK/LOADGO prompter supports AMODE/RMODE attributes. AMODE is the attribute of the entry point into a load module that specifies the addressing mode in effect and defines the addressing mode into the entry point for the load module.

RMODE is the attribute of a load module that specifies the residence mode of a load module loaded into virtual storage for execution. The RMODE option on the LOADGO or LINK command is used to assign the residence mode for the load module.

LINK and LOADGO commands from MVS/XA, using AMODE and/or RMODE options, will be rejected by OS/VS2 MVS because of an invalid keyword. LINK and LOADGO commands acceptable to OS/VS2 MVS are acceptable to MVS/XA.

Chapter 6. Utility Functions Support

The following utility programs are included as part of the MVS/XA Data Facility Product.

Data Set Utilities

The data set utility programs reorganize, modify, or compare data at the data set and/or record level and are required for proper generation and maintenance of MVS/XA. The general function performed by each utility follows:

- IEBCOPY copies, compresses, merges, loads, and unloads partitioned data sets (PDSs). It also reblocks load modules and inserts the count of relocation dictionary (RLD) records and/or control records following the next text record into the control records. It inserts the count of RLD records for the first text block of a load module into the partitioned data set (PDS) directory entry.
- IEBGENER copies a sequential data set or members of a partitioned data set, or converts a data set from sequential to partitioned organization.
- IEBPTPCH prints or punches records residing in a sequential or a partitioned data set.
- IEBCOMPR compares two identically organized sequential or partitioned data sets at the logical record level.
- IEBISAM copies, prints, reorganizes, loads, and unloads indexed sequential data sets.
- IEBUPDTE updates a symbolic library.
- IEBEDIT produces an edited input job stream data set from a master job stream data set.
- IEBDG (data generator) creates output data sets with either internally generated test data or externally supplied input.
- IEBIMAGE provides means for the user to create, modify, and print modules for use with the IBM 3800 Printing Subsystem Models 1 and 3.

System Utilities

System utility programs are used to maintain collections of data and system control information. These programs are invoked through the use of job control statements and utility control statements. The following are the system utility programs:

- IEHINITT writes volume label sets in EBCDIC, BCD, or ASCII code on magnetic tapes. The IEHINITT utility included in MVS/XA DFP can initialize volume labels for ISO/ANSI/FIPS support.
- IEHATLAS locates and assigns an alternate track to replace a defective track and copies usable records from the defective track to the alternate track. It can also be used to rebuild defective records.

- IFHSTATR selects, formats, and writes information from type 21 error statistics by volume records, from backed-up SMF data sets.
- IEHLIST lists entries in the directory of one or more partitioned data sets, including AMODE/RMODE characteristics, or entries in a volume table of contents.
- IEHMOVE moves or copies logical collections of data.
- IEHPROGM modifies system control data and maintains data sets at an installation level.
- Offline IBM 3800 support provides the same functional capability as the online IBM 3800 Model 1. The program executes in an MVS/XA environment to create control information and place it on magnetic tape. This information can then be used to set up the IBM 3800 Printing Subsystem Model 1 for the offline printing of data.

Independent Utility

Independent utility ICAPRTBL only operates in a System/370 environment; it does not run under MVS/XA (or any other operating system). However, it provides stand-alone buffer loading for the IBM 3211 Printer and the IBM 3203 Printer Model 5 in preparation for using these printers under MVS/XA.

Utility Modifications

The utilities IEHLIST, IEHMOVE, and IEHPROGM are modified to operate under MVS/XA. These utilities now support 3-byte unit control block addresses and no longer use the device allocation tables. The maximum number of unit control blocks allowed under MVS/XA is increased to 4096.

The utility IEBCOPY is modified for MVS/XA to reblock load modules and insert the count of relocation dictionary records following the next text record into the control records. It also inserts the count of the relocation dictionary records for the first text block of a load module into the partitioned data set directory entry.

Load modules processed on an OS/VS2 MVS system may be used on an MVS/XA system.

Utilities Not Supported

For further information about utilities that are no longer supported in the MVS/XA environment, see "MVS Functions Available in Other Programs" in Chapter 7.

Chapter 7. Operating Environment

Machine Requirements

The MVS/XA Data Facility Product is designed to operate on IBM processors executing in System/370 extended architecture mode.

To operate the Tape-To-Printing Subsystem feature (#7810) of the IBM 3800 Printing Subsystem Model 1, the offline 3800 utility output is written to:

- 9-track tape with a density of 800, 1600, or 6250 bpi or
- 7-track tape with a density of 556 or 800 bpi, odd parity, and the data converter feature

Programming Requirements

MVS/XA DFP Release 1.2 requires MVS/XA DFP Release 1.1 and its prerequisites as an installation base; the functions provided by either MVS/System Product–JES2 Version 2 Release 1.2 (5740-XC6) (with PTF #UZ90212 or, for users of RACF Release 6, PTF #UZ90285 applied) or MVS/System Product–JES3 Version 2 Release 1.2 (5665-291) (with PTF #UZ90212 or, for users of RACF Release 6, PTF #UZ90285 applied) and their prerequisites for execution; and their program distribution libraries for system generation. Later releases and modifications may be used unless otherwise announced by IBM.

MVS/XA DFP Release 1.2 users of Resource Access Control Facility (5740-XXH) are required to be at least at the RACF Release 5 level.

Assembler H Version 2 licensed program (5668-962) performs the assemblies required for system generation and subsequent maintenance of the MVS/XA DFP.

Users of the all-points-addressable mode for the IBM 3800 Printing Subsystem Model 3 will require the functions provided by the Print Services Facility program product (5665-275).

Users of access method services REPRO encryption/decryption require functions provided by:

- Programmed Cryptographic Facility (5740-XY5), or
- Cryptographic Unit Support (5740-XY6) and its prerequisites.

Later releases and modifications of the licensed programs listed above may be used unless otherwise announced by IBM.

Installation Considerations

MVS/XA Data Facility Product Release 1.0 supports a packaging plan that replaces part of an installation's distribution libraries and combines service and program products into one package. This simplifies the installation process by minimizing the requirement for any prerequisite maintenance or program products except those listed under "Customer Responsibilities." This plan also compacts the installation's system modification program control data sets.

MVS/XA Data Facility Product is installed via System Modification Program Extended (SMP/E) program product (5668-949) or SMP Release 4 (with PTF UR03129). Installation via SMP/E requires a stage 1 system generation, whereas SMP Release 4 (with PTF UR03129) will require a full system generation.

MVS/XA DFP Release 1.1 is an update to MVS/XA DFP Release 1.0, and MVS/XA DFP Release 1.2 is an update to MVS/XA DFP Release 1.1 and Release 1.0.

An IOGEN or SYSGEN may be required for the installation of new devices.

Installation procedures are described in the program directory.

Customer Responsibilities

The user needs to order and install Device Support Facilities (5655-257) Release 6 (or later release or modification) for MVS/XA. Also required is the stand-alone version of Device Support Facilities (5747-DS1). See "MVS Functions Available in Other Programs" on page 30 for more information.

Current users of either OS/VS2 MVS IEHDASDR or the Direct Access Storage Dump Restore program product need to order and install Data Facility Data Set Services (DFDSS) (5740-UT3), as described in "MVS Functions Available in Other Programs" on page 30, or its functional equivalent. This should be done early in the migration cycle in order to back up disk files to tape using the format acceptable to DFDSS for restoration.

Users that have DFDSS installed at the time of MVS/XA DFP installation must reinstall DFDSS Release 1.2 (or later release or modification) prior to executing in Extended Architecture mode.

Additionally, current S/370 users and new installations must order and install MVS/XA Data Facility Product and one of the corequisites: MVS/System Product–JES2 Version 2 (5740-XC6) or MVS/System Product–JES3 Version 2 (5665-291). The linkage editor available in DFP must be used during system generation and subsequent maintenance. Assembler H Version 2 (5668-962) must be used to perform the assemblies required for system generation and subsequent maintenance.

Installations planning to use the access method services REPRO encipher/decipher function must order and install one of the following or its functional equivalent:

- Programmed Cryptographic Facility licensed program (5740-XY5)
- Cryptographic Unit Support licensed program (5740-XY6) and its prerequisites.

Installations planning to use the IBM 3880 Storage Control Model 11 must allocate some or all of the paging data sets on 3350s attached to the IBM 3880 Storage Control Model 11.

Installations planning to use the IBM 3800 Printing Subsystem Model 3 in all-points-addressable mode must select and order those licensed programs that provide the functions best fitting their requirements. For more information about the licensed programs that support the advanced printing capabilities of the IBM 3800 Printing Subsystem Model 3, see "All-Points-Addressable Mode" on page 9.

MVS/XA DFP Release 1.2 users of Resource Access Control Facility (5740-XXH) are required to be at the RACF Release 5 level or higher.

To lessen the possibility that unauthorized access to protected data components of existing VSAM data sets do not occur when migrating to this release, the installation security administrator should define either discrete or generic profiles to protect the data sets on a cluster basis after RACF Release 5 (or later release or modification level) is installed, but before MVS/XA DFP Release 1.2 is installed. Continued use of prior releases of RACF or the failure to define either discrete or generic profiles constitutes a security exposure to the previously protected resources.

Programming Considerations

MVS/XA DFP non-VSAM functions generally run in 24-bit virtual addressing mode. The 31-bit callers need to be aware of the following situations:

- Only 24-bit virtual addresses must be passed to most MVS/XA DFP functions. Addresses passed to supervisor call macros, control blocks, non-VSAM buffers, and user exit routines must reside within the 24-bit addressing range. Storage for these may be obtained by issuing GETMAIN and specifying a new parameter when you request that storage be allocated in the 24-bit or the 31-bit addressing range.

- If you run in 24-bit mode, non-VSAM access methods may be called directly, using the OS/VS2 MVS macro interfaces. Users running in 31-bit mode must branch to a user-written routine that is resident in a 24-bit addressing space, change into 24-bit addressing mode, and interface with the access method from this routine.

- If calls are made through a supervisor call interface, the system resolves the mode change so that the calling program may issue the call in either mode. Most MVS/XA DFP supervisor calls run in 24-bit addressing mode. The requirement of only passing 24-bit addresses to MVS/XA DFP also applies to the supervisor call interface.

Thirty-one-bit VSAM buffer support in Release 1.1 requires the following considerations:

- If you request data buffers above 16 megabytes, you must run in 31-bit addressing mode. A caller in 24-bit addressing mode cannot use 31-bit VSAM buffers.

- The ACB macro and the OPEN and CLOSE parameter lists for the ACB must reside below 16 megabytes. BLDVRP and DLVRP macro parameter lists must also reside below 16 megabytes.

- To use the new 31-bit VSAM buffer and local shared resource support, you must recompile that part of your program that contains ACB, BLDVRP, and DLVRP macro specifications. The 31-bit parameter must also be coded on the ACB, BLDVRP, and DLVRP macros. If the GENCB, MODCB, SHOWCB, or TESTCB macros are used, the ACBs they reference must reside below 16 megabytes; the EXLST RPLs they reference may reside above 16 megabytes.

Because VSAM record management executes in 31-bit mode, addresses in those control blocks that interface with VSAM are treated as 31-bit addresses. The use of previously reserved or unused bytes in address fields (for example, the use of byte 0 for flags) is invalid.

MVS Functions Available in Other Programs

The following functions of OS/VS2 MVS are not included in the MVS/XA Data Facility Product. These functions are available in the current releases of the class 2 system control programs or program products listed:

- Device Support Facilities (5655-257) is a class 2 system control program operating in various System/370 environments. Release 6 (or later release or modification) of Device Support Facilities recognizes and operates in the MVS/XA environment. This program must be ordered separately and replaces the disk initialization functions contained in IBCDASDI and IEHDASDR, because these two functions do not exist in MVS/XA DFP.

- Data Facility Data Set Services (DFDSS) (5740-UT3) performs dump/restore functions. This program must be ordered separately and is the only program offered by IBM for extended architecture mode dump/restore.

Direct Access Storage Device Migration Aid (5668-002) provides assistance in moving data from other supported direct access devices to the IBM 3375 or IBM 3380 Direct Access Storage devices.

Compatibility

From MVS/XA Data Facility Product Release 1.0: User programs that use published external interfaces, that do not run authorized, and that execute with OS/VS2 MVS Release 3.8 or MVS/XA Release 1.0 or Release 1.1, will perform the same function in the Release 1.2 environment.

From MVS/Extended Architecture Release 1.0 or OS/VS2 MVS Release 3.8: VSAM record management resides in the extended pageable link pack area (EPLPA). User programs that access VSAM data sets will continue to run unaltered.

OS/VS2 MVS Programs not Available with MVS/XA Data Facility Product: Four OS/VS2 MVS Release 3.8 programs will not be available on installation of MVS/XA Data Facility Product. The programs and suggested alternatives for specified functions are listed below:

IBCDASDI Disk initialization functions are currently available in Device Support Facilities.

IBCDMPRS The stand-alone disk *restore* functions are currently available in the Data Facility Data Set Services (DFDSS) program product. The stand-alone disk *dump* functions are no longer available or supported.

IEHDASDR

- Disk initialization functions are currently available in Device Support Facilities.
- Dump/restore functions are currently available in DFDSS.

  However, DFDSS does not support the dump format produced by IEHDASDR. Users may order and install DFDSS to create backup tapes in an acceptable format.

Analysis Program-1 (AP-1) The functions to aid in the analysis of DASD error situations are available in Device Support Facilities.

DASDR The Direct Access Storage Dump Restore (5740-UT1) program product creates tape in two formats, neither of which is accepted by DFDSS. Any tape created by this IBM program and that is used to restore data, must be restored by the original DASDR, not DFDSS.

Chapter 8. Publications Support

The publications library supporting MVS/XA DFP Release 1.0 and Release 1.1 has been changed considerably for Release 1.2. The contents of several books have changed and, in addition, many books now have different titles. The table below shows the publications that support Release 1.2, including the old (Release 1.0/Release 1.1) titles:

System Reference Manuals

Release 1.2 Title	Release 1.0/1.1 Title	Short Title
MVS/Extended Architecture Integrated Catalog Administration: Access Method Services Reference, GC26-4019	*MVS/Extended Architecture Access Method Services Reference for the Integrated Catalog Facility*, GC26-4019	*Access Method Services Reference*
MVS/Extended Architecture VSAM Catalog Administration: Access Method Services Reference, GC26-4075	*MVS/Extended Architecture Access Method Services Reference for VSAM Catalogs*, GC26-4075	*Access Method Services Reference*
MVS/Extended Architecture Integrated Catalog Administration: Access Method Services Reference Summary, GX26-3739	*MVS/Extended Architecture Access Method Services Reference Summary for Integrated Catalog Facility*, GX26-3739	*Access Method Services Reference Summary*
MVS/Extended Architecture Cache Device Administration, GC26-4017	—	*Cache Device Administration*
MVS/Extended Architecture Catalog Administration Guide, GC26-4041	*MVS/Extended Architecture Catalog Users Guide*, GC26-4041	*Catalog Administration Guide*
MVS/Extended Architecture Checkpoint/Restart User's Guide, GC26-4012	*MVS/Extended Architecture Checkpoint/Restart*, GC26-4012	*Checkpoint/Restart*
MVS/Extended Architecture Data Facility Product: Planning Guide, GC26-4040	*MVS/Extended Architecture Data Facilities Planning Guide*, GC26-4040	*Data Facility Product: Planning Guide*
MVS/Extended Architecture Data Facility Product: General Information, GC26-4007	Same	*Data Facility Product: General Information*
MVS/Extended Architecture Data Facility Product: Licensed Program Specifications, GC26-4008	Same	*Data Facility Product: Licensed Program Specifications*
MVS/Extended Architecture Data Facility Product: Master Index, GC26-4069	Same	*Data Facility Product: Master Index*

Release 1.2 Title	Release 1.0/1.1 Title	Short Title
MVS/Extended Architecture Data Administration: Macro Instruction Reference, GC26-4014	*MVS/Extended Architecture Data Management Macro Instruction*, GC26-4014	*Data Administration: Macro Instruction Reference*
MVS/Extended Architecture Data Administration Guide, GC26-4013	*MVS/Extended Architecture Data Management Services*, GC26-4013	*Data Administration Guide*
MVS/Extended Architecture Linkage Editor and Loader User's Guide, GC26-4011	*MVS/Extended Architecture Linkage Editor and Loader*, GC26-4011	*Linkage Editor and Loader*
MVS/Extended Architecture Message Library: System Messages, Volumes 1 and 2, GC28-1376 and GC28-1377	Information was in: (1) *MVS/Extended Architecture Linkage Editor and Loader Messages*, GC26-4020 and (2) *MVS/Extended Architecture Utilities Messages*, GC26-4021	*System Messages*
MVS/Extended Architecture Installation: System Generation, GC26-4009	*MVS/Extended Architecture System Generation Reference*, GC26-4009	*System Generation Reference*
MVS/Extended Architecture System-Data Administration, GC26-4010	*MVS/Extended Architecture System Programming Library: Data Management*, GC26-4010	*System-Data Administration*
MVS/Extended Architecture Magnetic Tape Labels and File Structure Administration, GC26-4003	*MVS/Extended Architecture Tape Labels*, GC26-4003	*Magnetic Tape Labels and File Structure*
MVS/Extended Architecture Data Administration: Utilities, GC26-4018	*MVS/Extended Architecture Utilities*, GC26-4018	*Utilities*
MVS/Extended Architecture VSAM Administration: Macro Instruction Reference, GC26-4016	*MVS/Extended Architecture VSAM Reference*, GC26-4016	*VSAM Administration: Macro Instruction Reference*
MVS/Extended Architecture VSAM Administration Guide, GC26-4015	*MVS/Extended Architecture VSAM Users Guide*, GC26-4015	*VSAM Administration Guide*
Offline IBM 3800 Utility, SH20-9138	Same	—
OS Programming Support for the IBM 3505 Card Reader and IBM 3525 Card Punch, GC21-5097	Same	—

Diagnostic and Logic Manuals

Note: All the logic manuals listed below (identified by (*)) are Licensed Material—Property of IBM, obtainable only upon signing a licensing agreement.

Release 1.2 Title	Release 1.0/1.1 Title	Short Title
MVS/Extended Architecture Access Method Services Logic, LY26-3889 (*)	Same	*Access Method Services Logic*
MVS/Extended Architecture BDAM Logic, LY26-3893 (*)	Same	*BDAM Logic*
MVS/Extended Architecture Catalog Diagnosis Guide, SY26-3899	Same	*Catalog Diagnosis Guide*
MVS/Extended Architecture Catalog Diagnosis Reference, SY26-3897	Same	*Catalog Diagnosis Reference*
MVS/Extended Architecture Checkpoint/Restart Supervisor Call Logic, LY26-3890 (*)	Same	*Checkpoint/Restart Supervisor Call Logic*
MVS/Extended Architecture Common VTOC Access Facility Diagnosis Reference, SY26-3929	Same	*CVAF Diagnosis Reference*
MVS/Extended Architecture CVOL Processor Logic, LY26-3895 (*)	Same	*CVOL Processor Logic*
MVS/Extended Architecture DADSM and Common VTOC Access Facility Diagnosis Guide, SY26-3896	Same	*DADSM and CVAF Diagnosis Guide*
MVS/Extended Architecture DADSM Diagnosis Reference, SY26-3904	Same	*DADSM Diagnosis Reference*
MVS/Extended Architecture ISAM Logic, LY26-3894 (*)	Same	*ISAM Logic*
MVS/Extended Architecture Linkage Editor Logic, LY26-3902 (*)	Same	*Linkage Editor Logic*
MVS/Extended Architecture Loader Logic, LY26-3901 (*)	Same	*Loader Logic*
MVS/Extended Architecture Media Manager Diagnosis Guide and Reference, SY26-3898	Same	*Media Manager Diagnosis Guide and Reference*
MVS/Extended Architecture Open/Close/EOV Logic, LY26-3892 (*)	Same	*Open/Close/EOV Logic*

Release 1.2 Title	Release 1.0/1.1 Title	Short Title
MVS/Extended Architecture SAM Logic, LY26-3891 (*)	Same	*SAM Logic*
MVS/Extended Architecture Utilities Logic, LY26-3903 (*)	Same	*Utilities Logic*
MVS/Extended Architecture VIO Logic, LY26-3900 (*)	Same	*VIO Logic*
MVS/Extended Architecture VSAM Logic, LY26-3907 (*)	Same	*VSAM Logic*
Offline IBM 3800 Utility Logic, LY20-8058 (*)	Same	—

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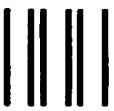

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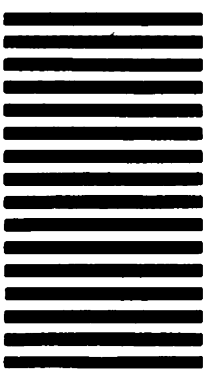

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