



Program Directory for Directory Maintenance Facility for z/VM

function level 640

Program Number 5741-A07

for Use with
z/VM version 6 release 4

Document Date: November 2016

GI13-3476-00

Note!

Before using this information and the product it supports, be sure to read the general information under “Notices” on page 41.

This program directory, dated November 2016, applies to IBM® Directory Maintenance Facility for z/VM®, function level 640 (DirMaint™), Program Number 5741-A07.

A form for reader's comments appears at the back of this publication. When you send information to IBM®, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

© **Copyright International Business Machines Corporation 1995, 2016. All rights reserved.**

Note to U.S. Government Users — Documentation related to restricted rights — Use, duplication or disclosure is subject to restrictions set forth in GSA ADP Schedule Contract with IBM Corp.

Contents

DirMaint™ Web Information	v
1.0 Introduction	1
1.1 Program Description	1
1.2 Enhancements for Directory Maintenance Facility for z/VM, function level 640	2
2.0 Program Materials	4
2.1 Basic Machine-Readable Material	4
2.2 Optional Machine-Readable Material	4
2.3 Program Publications	4
2.3.1 Basic Program Publications	4
2.3.2 Base Program Publications	5
2.3.3 Softcopy Publications	5
2.4 Program Source Materials	5
2.5 Publications Useful During Installation and Service	5
3.0 Program Support	7
3.1 Preventive Service Planning	7
3.2 Statement of Support Procedures	7
4.0 Program and Service Level Information	8
4.1 Program Level Information	8
4.2 Service Level Information	8
4.3 Cumulative Service	8
5.0 Installation and Migration Requirements and Considerations	9
5.1 Hardware Requirements	9
5.2 Program Considerations	9
5.2.1 Operating System Requirements	9
5.2.2 Other Program Product Requirements	9
5.2.3 Migration Considerations	9
5.2.3.1 Customizable Parts	9
5.2.3.2 z/VM Upgrade Installation Procedure Preparation	9
5.2.3.3 Place into Production EXEC name change	10
5.2.3.4 Minidisks Definitions	10
5.2.3.5 External Security Manager (ESM) Password Authentication	10
5.2.4 Program Installation/Service Considerations	10
5.3 DASD Storage and User ID Requirements	11
5.3.1 Required DASD Storage for DirMaint	11
5.3.2 Required DASD Storage for DirMaint Based on Source Directory Size	15
5.3.3 Optional DASD Storage for DirMaint	17
5.3.4 Optional DASD Storage for DirMaint Based on Source Directory Size	18

5.3.5 User ID Directory Information	19
6.0 Installation Instructions	20
6.1 DirMaint Enablement and Customization Process Overview	20
6.2 Enable DirMaint for Use	21
6.3 Tailor the DirMaint Server Machines	22
6.3.1 Tailor the DirMaint Installation	23
6.4 Place DirMaint Tailored Files Into Production	27
6.4.1 Copy the Server Code to the Server Minidisks	27
6.4.2 Log On (initialize) the DirMaint Server Machines	28
6.4.3 Obtaining DirMaint HELP	29
7.0 Service Instructions	30
7.1 Servicing DirMaint	30
Appendix A. Moving DirMaint to SFS Directories and Creating a PPF Override	31
A.1 Setup SFS File Pool and Directories	32
A.2 Copy Minidisk (or SFS) Files to SFS Directories	34
A.3 Create Product Parameter File (PPF) Override	34
Appendix B. Disabling DirMaint	38
Appendix C. Preparing for the z/VM Upgrade Installation Procedure	39
Notices	41
Privacy Policy Consideration	42
Trademarks	42
Reader's Comments	44

Figures

1. Basic Material: Informal Documentation	4
2. Basic Material: Unlicensed Publications	5
3. Program Publications: New Editions	5
4. Publications Useful During Installation / Service on z/VM version 6 release 4	5
5. PSP Upgrade and Subset ID	7
6. Component IDs	7
7. DASD Storage Requirements for (Required) Target Minidisks	12
8. DASD Storage Requirements for Required Disks Based on Source Directory Size	15
9. DASD Storage Requirements for (Optional) Target Minidisks	17
10. DASD Storage Requirements for Optional DIRMAINT Disks Based on Source Directory Size	18

11. DirMaint FL640 Supplied Sample Files	22
--	----

DirMaint™ Web Information

The DirMaint web page can be visited at URL:

www.vm.ibm.com/related/dirmaint

There you will find:

- Additional useful information, hints, and tips.
- A PDF version of the DirMaint FL640 program directory available for viewing.
- The ability to subscribe to future updates.

1.0 Introduction

This program directory is intended for the system programmer responsible for program installation and maintenance. It contains information concerning the material and procedures associated with the installation of DirMaint. You should read all of this program directory before installing the program and then keep it for future reference.

When you are ready to install DirMaint, read section 3.1, “Preventive Service Planning” on page 7. This section tells you how to find any updates to the information and procedures in this program directory.

The program directory contains the following sections:

- 2.0, “Program Materials” on page 4 identifies the basic and optional program materials and documentation for DirMaint.
- 3.0, “Program Support” on page 7 describes the IBM support available for DirMaint.
- 4.0, “Program and Service Level Information” on page 8 lists the APARs (program level) and PTFs (service level) incorporated into DirMaint.
- 5.0, “Installation and Migration Requirements and Considerations” on page 9 identifies the resources and considerations for installing, migrating and using DirMaint.
- 6.0, “Installation Instructions” on page 20 provides detailed installation and customization instructions for DirMaint.
- 7.0, “Service Instructions” on page 30 provides servicing instructions for DirMaint.
- Appendix A, “Moving DirMaint to SFS Directories and Creating a PPF Override” on page 31 provides detailed information on moving DirMaint into the shared file system (SFS) and overriding the default Product Parameter File (PPF).
- Appendix B, “Disabling DirMaint” on page 38 provides a description of disabling DirMaint FL640, when DirMaint is not licensed.
- Appendix C, “Preparing for the z/VM Upgrade Installation Procedure” on page 39 provides information for configuring DirMaint for use with the z/VM upgrade installation procedure.

1.1 Program Description

Directory Maintenance Facility for z/VM, function level 640 provides:

- Commands to allow general users to control those portions of their directory entry not directly affecting their privileges or resources, relieving the system administrators of this chore;
- Commands to allow system administrators to easily make updates to the directory affecting user privileges and resource allocations, improving productivity;
- Integrity checking and verification services to avoid accidental damage to the directory or overlapping of DASD allocations.

1.2 Enhancements for Directory Maintenance Facility for z/VM, function level 640

- Modifications to the exits maintained by DirMaint. These modifications allow for greater automation of systems management.

The following enhancements were made in DirMaint FL640

- DIRM GLOBALOPTS, MACHINE, and SETMACH commands have been updated to allow the definition of a z/Architecture-only virtual machine.
- New exits and configuration data specifications are added to the interface between DirMaint and RACF/VM for link and NICDEF creation and deletion, allowing for further coordination of CP and RACF privileges, and discrete resource profile creation and deletion.

The following enhancements were made in DirMaint FL630

- Support is added so that in an SSI cluster, the DIRMAINT server maps extents for system attached DASD volumes on all members of the SSI cluster. In previous releases this is only done for the member on which the DIRMAINT server is running. In DirMaint FL640, the DIRMAINT machine additionally issues CP QUERY ALLOC MAP commands via the CP AT command on all systems for which a satellite server is defined in the DIRMSAT CONTROL file.
- Support is added to supply the UPGDVHXT exit to be used by the z/VM upgrade installation procedure.

The following enhancements were made in DirMaint FL620

- Support is added for z/VM Single System Image Clusters. A z/VM single system image (SSI) cluster is a multisystem environment in which the z/VM member systems can be managed as a single resource pool and running virtual servers (guests) can be relocated from one member to another. For more information about the SSI environment and setting up SSI clusters, see *z/VM: CP Planning and Administration*. To support SSI clusters, the following changes have been made in DirMaint:
 - Several DirMaint commands have been updated to support new IDENTITY and SUBCONFIG directory entries and the new BUILD directory statement.
 - DIRM ADD command has been updated for cloning SUBCONFIG entries. In support of this, a new :SSI_VOLUMES. section has been added to the EXTENT CONTROL file.
 - DIRM DIRECTORY command has been updated to add, change or delete the SSI option and additional volume labels.
 - DIRM GLOBALOPTS, OPTION and SETOPTN commands have been updated to add, delete, alter or query the new CHPIDVIRTUALIZATION option.
 - New DIRM SSI command has been added to prepare a source directory for use within an SSI cluster.
 - New DIRM UNDOSSI command has been added to reverse changes made to a source directory by the DIRM SSI command.

- New DIRM VMRELOCATE command has been added to support the new VMRELOCATE directory statement in a user or profile entry.
- New support has been added for the satellite server machines to act as a spool file bridge for commands to and responses from the DIRMAINT machine for users on remote nodes to the DIRMAINT machine in an SSI environment.

Note: To use the functions that define and maintain an SSI cluster, the IBM z/VM Single System Image Feature must be licensed and enabled.

2.0 Program Materials

An IBM program is identified by a program number and a feature code. The program number for DirMaint is 5741-A07.

The program announcement material describes the features supported by DirMaint. Ask your IBM marketing representative for this information if you have not already received a copy.

The following sections identify:

- The basic and optional program materials available with this program

2.1 Basic Machine-Readable Material

DirMaint is a priced feature of z/VM version 6 release 4 and is distributed pre-installed in a disabled state as part of the z/VM system deliverable. Therefore, there are no basic machine readable materials. **If you want to enable and use DirMaint then you MUST order the Directory Maintenance Facility for z/VM, function level 640 to obtain a license for it.** Refer to the z/VM version 6 release 4 software announcement for information on ordering z/VM version 6 release 4 and its features.

2.2 Optional Machine-Readable Material

There are no optional machine-readable materials for DirMaint.

2.3 Program Publications

The following sections identify the basic and optional publications for DirMaint.

2.3.1 Basic Program Publications

Figure 1 identifies the informal shipped documentation for DirMaint. One copy of this publication is included with your DirMaint order.

Figure 1. Basic Material: Informal Documentation

Publication Title	Form Number
Memo to Users IBM Directory Maintenance Facility for z/VM, function level 640	GI13-3481

The following publication is part of your order for DirMaint but it is only available as softcopy. Refer to 2.3.3, "Softcopy Publications" on page 5 for the World Wide Web URLs that the program directory can be found at.

Figure 2. Basic Material: Unlicensed Publications

Publication Title	Form Number
Program Directory for Directory Maintenance Facility for z/VM	GI13-3476

2.3.2 Base Program Publications

Figure 3 identifies the base program publications associated with DirMaint.

Figure 3. Program Publications: New Editions

Publication Title	Form Number
z/VM: Directory Maintenance Facility Tailoring and Administration Guide	SC24-6190
z/VM: Directory Maintenance Facility Commands Reference	SC24-6188
z/VM: Directory Maintenance Facility Messages	GC24-6189

2.3.3 Softcopy Publications

The DirMaint publications are supplied softcopy as part of the *IBM Online Library: z/VM Collection* in BookManager® and Adobe® Portable Document Format (PDF). DirMaint publications, with the exception of the Program Directory, are also available in the z/VM library in the IBM Knowledge Center web site:

<http://www.ibm.com/support/knowledgecenter/SSB27U>

In addition, the DirMaint publications, including this program directory, are available in Adobe Portable Document Format from the z/VM internet library home page on the World Wide Web; the URL for this home page is:

www.vm.ibm.com/library

2.4 Program Source Materials

No program source materials or viewable program listings are provided for DirMaint.

2.5 Publications Useful During Installation and Service

The publications listed in Figure 4 may be useful during the installation of DirMaint.

Figure 4 (Page 1 of 2). Publications Useful During Installation / Service on z/VM version 6 release 4

Publication Title	Form Number
z/VM: Directory Maintenance Facility Tailoring and Administration Guide	SC24-6190
z/VM: VMSES/E Introduction and Reference	GC24-6243

Figure 4 (Page 2 of 2). Publications Useful During Installation / Service on z/VM version 6 release 4

Publication Title	Form Number
z/VM: Service Guide	GC24-6247
z/VM: Installation Guide	GC24-6246
z/VM: CP Planning and Administration	SC24-6178
z/VM: CP Commands and Utilities Reference	SC24-6175
z/VM: CMS Commands and Utilities Reference	SC24-6166
z/VM: CMS File Pool Planning, Administration, and Operation	SC24-6167
z/VM: CP Messages and Codes	GC24-6177
z/VM: CMS and REXX/VM Messages and Codes	GC24-6161
z/VM: Other Components Messages and Codes	GC24-6207

3.0 Program Support

This section describes the IBM support available for DirMaint.

3.1 Preventive Service Planning

Before installing DirMaint, check with your IBM Support Center or use IBMLink™ (ServiceLink) to see whether there is additional Preventive Service Planning (PSP) information. To obtain this information, specify the following UPGRADE and SUBSET values:

Figure 5. PSP Upgrade and Subset ID

Retain				
COMPID	Release	Upgrade	Subset	Description
5749DVH00	640	DIRM640	DIRM/640	Install information
5749DVH00	640	DIRM640	yynnRSU	RSU service recommendations

Note: RSU-BY-LVL information can be obtained from the vm service rsu web site at url:

www.vm.ibm.com/service/rsu

3.2 Statement of Support Procedures

When you order Directory Maintenance Facility for z/VM, function level 640, you are entitled to support under the basic warranty for z/VM version 6 release 4. You should note that the Software Subscription and Support for Directory Maintenance Facility for z/VM, function level 640 is *automatically* added to your order. This provides zSeries® service to which you are likely accustomed. If you do not want the Software Subscription and Support for DirMaint, then you must take specific action to decline it when ordering DirMaint. Refer to the applicable z/VM version 6 release 4 software announcement for ordering information.

Report any difficulties you have using this program to your IBM Support Center. If an APAR is required, the Support Center will provide the address to which any needed documentation can be sent.

Figure 6 identifies the component IDs (COMPID), Retain Release and Field Engineering Service Numbers (FESN) for DirMaint.

Figure 6. Component IDs

Retain			
COMPID	Release	Component Name	FESN
5749DVH00	640	DirMaint FL640	6415401

4.0 Program and Service Level Information

This section identifies the program and any relevant service levels of DirMaint. The program level refers to the APAR fixes incorporated into the program. The service level refers to the PTFs shipped with this product. Information about cumulative service is also provided.

4.1 Program Level Information

The following APAR fixes against DirMaint FL630 have been incorporated into this release:

VM64759	VM65143	VM65359	VM65444	VM65526	VM65588
VM65090	VM65155	VM65377	VM65458	VM65564	VM65592
VM65092	VM65160	VM65389	VM65494	VM65565	VM65750
VM65119	VM65244	VM65409	VM65496	VM65569	VM65756
VM65125	VM65276	VM65430	VM65497	VM65582	VM65830
VM65138	VM65297	VM65436			

4.2 Service Level Information

Check the DIRM640 PSP bucket upgrade for any additional PTFs that should be installed or any additional install information. This can be accomplished by checking with your IBM Support Center or using IBMLink (ServiceLink). In addition, review the Directory Maintenance Facility for z/VM, function level 640 web page at:

www.vm.ibm.com/related/dirmaint

for any additional service hints, tips, and concerns.

4.3 Cumulative Service

Cumulative service for DirMaint is available through a periodic, preventive service deliverable, the Recommended Service Upgrade (RSU). The RSU is used to provide service updates for multiple z/VM components and features (including DirMaint) and is often referred to as a *stacked* RSU.

See the PSP bucket upgrade DIRM640 and subset yynnRSU (where yynn is the year and the RSU service level) for the latest RSU available. For the list of PTF's included on the RSU, see the RSU service memo on the deliverable or the VM service web site.

The stacked RSU can be obtained by ordering PTF UM97640.

5.0 Installation and Migration Requirements and Considerations

The following sections identify the system requirements for installing and activating DirMaint.

5.1 Hardware Requirements

There are no special hardware requirements for DirMaint.

5.2 Program Considerations

The following sections list the programming considerations for installing and activating DirMaint.

5.2.1 Operating System Requirements

DirMaint FL640 supports the following VM operating systems:

- z/VM version 6 release 4

5.2.2 Other Program Product Requirements

No other products are required for DirMaint.

5.2.3 Migration Considerations

5.2.3.1 Customizable Parts

If you use the migration or upgrade installation procedure documented in the *z/VM: Installation Guide*, to migrate DirMaint from a z/VM V5.4, z/VM V6.2 or z/VM V6.3 system to z/VM V6.4, then the customizable files will be migrated to z/VM V6.4, where possible. If the customizable files have been changed on the new level of DirMaint and you have made changes to them on your previous system you will be told to rework your changes. For the migration procedure (z/VM v5r4 only) the DirMaint directory file disks, (e.g. 1DF) will not be automatically migrated, nor will the customizable files on those disks. You will need to migrate those disks and files yourself.

5.2.3.2 z/VM Upgrade Installation Procedure Preparation

DirMaint provides the UPGDVHXT exit for use with the z/VM upgrade installation procedure. In order for this exit to work successfully, some DirMaint configuration is necessary. If you plan to use the upgrade installation procedure, refer to Appendix C, "Preparing for the z/VM Upgrade Installation Procedure" on page 39 for the associated configuration changes.

5.2.3.3 Place into Production EXEC name change

In z/VM® version 6 release 4 the PUT2PROD command should be used to place serviced parts into production. DIR2PROD and IN2PROD will not work properly and should not be used for service.

5.2.3.4 Minidisks Definitions

The DIRMAINT 1DE must be allocated as stated in the notes in Figure 9 on page 17. It is shipped with the required allocation on the z/VM V5.4 and higher system deliverable. But if you plan on using the DIRMAINT 1DE minidisk from a release prior to z/VM V5.4 then you **MUST** reallocate it. Otherwise, the delta directory support will not function properly.

5.2.3.5 External Security Manager (ESM) Password Authentication

With the ESM_PASSWORD_AUTHENTICATION_EXIT, mixed case passwords and password phrases are supported for authentication by DirMaint when the ESM has been configured for mixed case passwords and password phrase support.

For more information on mixed-case passwords and password phrases, see your ESM documentation.

The default ESM_PASSWORD_AUTHENTICATION_EXIT provided with DirMaint was changed from DVHDA0 MODULE (which uses diagnose x'A0' to authenticate a user ID/password pair with an ESM) to DVHXA EXEC (which uses the new DMSPASS CSL routine to authenticate a user ID/password pair with an ESM) in DirMaint FL530. In order to use the DMSPASS CSL routine, the user directory entry for the DIRMAINT machine must contain OPTION DIAG88. The directory entry for user ID DIRMAINT as shipped with the z/VM V5.3 and higher system deliverable includes this option.

5.2.4 Program Installation/Service Considerations

This section describes items that should be considered before you install or service DirMaint.

- DirMaint is pre-installed on the z/VM version 6 release 4 system deliverable in a disabled state.
- With the packaging changes introduced with to provide support for a z/VM single system image (SSI), note that **all DirMaint service activity now must be performed using the user ID MAINT_{vr}m (e.g. MAINT640).**
- VMSES/E is required to install and service this product.
- If you modify or eliminate any of the IBM-supplied user IDs, minidisk addresses or SFS directory names that are associated with DirMaint, you **must** create an appropriate PPF override for the **SERV2P \$PPF** file.

You also must use the **VMFUPDAT SYSSUF** command to update the VM SYSSUF Software Inventory file, so that your PPF override for SERVP2P PPF is used for automated service processing. For more information about PPF overrides, see the *z/VM: VMSES/E Introduction and Reference*.

- RSUs will be supplied as necessary. Service between RSUs can be obtained via CORrective service. For information on applying the RSU or CORrective service see the z/VM: Service Guide.

- A section of the *Directory Maintenance Facility Tailoring and Administration Guide* entitled "Directory Entries for the DirMaint Machines" provides useful background information on the server directories.
- As a part of DirMaint configuration, you may need to modify a DirMaint part. If you use the automated service procedures, you will need to create a local modification. For information on applying local service and local modifications see the z/VM: Service Guide.

5.3 DASD Storage and User ID Requirements

Sections 5.3.1, "Required DASD Storage for DirMaint" and 5.3.2, "Required DASD Storage for DirMaint Based on Source Directory Size" on page 15 lists the user IDs and minidisks that are required to install and service DirMaint. Sections 5.3.3, "Optional DASD Storage for DirMaint" on page 17 and 5.3.4, "Optional DASD Storage for DirMaint Based on Source Directory Size" on page 18 lists the user IDs and minidisks that are optional for DirMaint.

5.3.1 Required DASD Storage for DirMaint

The table in Figure 7 on page 12 contains the required DASD for the 6VMDIR40, MAINT, and DirMaint server user IDs in order to install and service DirMaint FL640.

Important DASD Notes:

- All of the user IDs and minidisks shown in Figure 7 on page 12 through Figure 10 on page 18 have been defined as part of the installed z/VM version 6 release 4 system deliverable.
- **All** of the DirMaint user IDs are defined by single-configuration virtual machines definitions. See *z/VM: CP Planning and Administration* for information on single-configuration and multiconfiguration virtual machine definitions.
- 6VMDIR40 is a default user ID and can be changed. If you choose to change the name of this user ID you need to create a Product Parameter Override (PPF) to reflect this change. See A.3, "Create Product Parameter File (PPF) Override" on page 34 for an example of creating a PPF override.
- The DIRMSAT user ID and minidisk resources are required if you plan on using a DirMaint Satellite server machine. One or more satellite servers are required to maintain multiple object directories with a single source file in a single system image (SSI) cluster or within a Cross System Extension (CSE) cluster.
- If you need to add or increase a minidisk then it **MUST** be CMS formatted.
- **None of the 6VMDIR40 492, 491, 41F, or 11F minidisks, or any disks owned by DirMaint servers can reside in a shared file system directory.** In the event of shared file system problems, it may be impossible to make any directory changes. And it is possible that one or more directory changes, such as allocating more DASD space, may be necessary to make the shared file system operational again. The DIRMAINT 15D minidisk must not reside in a shared file system directory.

- The DIRMAINT 1AA, and 1FA, the DATAMOVE 1AA, and the DIRMSAT 1AA minidisks are in the required list since they are strongly recommended.
- The 1AA minidisks are used to maintain history files for debugging purposes. The sizes of the 1AA and the 2AA (backup) minidisks are dependent on the number of DirMaint transactions and the length of time the history files are maintained before being overwritten. Large numbers of transactions and/or a long retention period may require these devices to be larger than the defaults defined in the table. If your system has an ESM (external security manager) that allows for authorized virtual machines to write log records into the ESM audit trail, then you may wish to omit the 1AA minidisks in favor of the ESM's audit trail.

Figure 7 (Page 1 of 3). DASD Storage Requirements for (Required) Target Minidisks

Minidisk owner (user ID)	Default Address	Storage in Cylinders		FB-512 Blocks	SFS 4K Blocks	Usage
		DASD	CYLS			Default SFS Directory Name
6VMDIR40	2B2	3390	13	18720	2340	Contains all of the base code shipped with DirMaint VMPSFS:6VMDIR40.DIRM.OBJECT
6VMDIR40	2B1	3390	10	14400	1800	Contains optional source files (3*) VMPSFS:6VMDIR40.DIRM.SOURCE
6VMDIR40	2C2	3390	2	2880	360	Used for DirMaint sample files VMPSFS:6VMDIR40.DIRM.SAMPLE
6VMDIR40	2C4	3390	1	1440	180	Used for user local modifications for DirMaint VMPSFS:6VMDIR40.DIRM.LOCALMOD
6VMDIR40	2D2	3390	50	72000	9000	Contains serviced files VMPSFS:6VMDIR40.DIRM.DELTA

Notes:

1. Cylinder values defined in this table are based on a 4k block size. FB-512 and SFS block values are derived from the 3390 cylinder values in this table.
2. *NONSFS in the SFS 4K block column means that disk cannot be installed to the shared file system and must remain a minidisk.
3. Cylinder values for the 2B1 minidisk are based on the source files in packed format. In order to create updates and assemble the files they will need to be unpacked. Disk sizes unpacked will be approximately double that which is shown in this table.
4. Directory entries for the DATAMOVE 5F0 and 5FF minidisks are required for DASD management processing. These directory entries are used as a place holder and they need to specify 3380 as the DASD. A physical 3380 DASD volume with a label of \$\$\$\$\$\$ is not needed.
5. An asterisk by a cylinder value indicates that this value is additional space that is needed above the default size of that disk.

Figure 7 (Page 2 of 3). DASD Storage Requirements for (Required) Target Minidisks

Minidisk owner (user ID)	Default Address	Storage in Cylinders		FB-512 Blocks	SFS 4K Blocks	Usage
		DASD	CYLS			Default SFS Directory Name
6VMDIR40	2A6	3390	4	5760	720	Contains AUX files and version vector table that represents your test level of DirMaint VMPSFS:6VMDIR40.DIRM.APPLYALT
6VMDIR40	2A2	3390	4	5760	720	Contains AUX files and version vector table that represent your production level of DirMaint VMPSFS:6VMDIR40.DIRM.APPLYPROD
6VMDIR40	29D	3390	9	12960	1620	Contains American English help files for DirMaint VMPSFS:6VMDIR40.DIRM.HELP
6VMDIR40	29E	3390	1	1440	180	Test disk for DirMaint code belonging on MAINT's 19E VMPSFS:6VMDIR40.DIRM.MAINT19E
6VMDIR40	492	3390	15	21600	*NONSFS	Test disk for DirMaint servers, also contains sample directories and other system files and new source files. Also servers 192 disk
6VMDIR40	491	3390	30	43200	*NONSFS	Production disk for DirMaint servers, also servers 191 disk
6VMDIR40	41F	3390	8	11520	*NONSFS	Test disk for DirMaint interface code
6VMDIR40	11F	3390	16	23040	*NONSFS	Production disk for DirMaint interface code also servers 11F disk

Notes:

1. Cylinder values defined in this table are based on a 4k block size. FB-512 and SFS block values are derived from the 3390 cylinder values in this table.
2. *NONSFS in the SFS 4K block column means that disk cannot be installed to the shared file system and must remain a minidisk.
3. Cylinder values for the 2B1 minidisk are based on the source files in packed format. In order to create updates and assemble the files they will need to be unpacked. Disk sizes unpacked will be approximately double that which is shown in this table.
4. Directory entries for the DATAMOVE 5F0 and 5FF minidisks are required for DASD management processing. These directory entries are used as a place holder and they need to specify 3380 as the DASD. A physical 3380 DASD volume with a label of \$\$\$\$\$\$ is not needed.
5. An asterisk by a cylinder value indicates that this value is additional space that is needed above the default size of that disk.

Figure 7 (Page 3 of 3). DASD Storage Requirements for (Required) Target Minidisks

Minidisk owner (user ID)	Default Address	Storage in Cylinders		FB-512 Blocks	SFS 4K Blocks	Usage
		DASD	CYLS			Default SFS Directory Name
6VMDIR40	191	3390	9	12960	1620	6VMDIR40 user ID's 191 minidisk VMPSFS:6VMDIR40.
MAINT	19E	3390	1*	1440	180	Production disk for DirMaint user exec.
DATAMOVE	155	3390	9	12960	*NONSFS	Server's A-disk
DIRMSAT	155	3390	9	12960	*NONSFS	Server's A-disk
DIRMAINT	1AA	3390	20	28800	*NONSFS	Contains CONSOLE and TRANSLOG files
DATAMOVE	1AA	3390	20	28800	*NONSFS	Contains CONSOLE and TRANSLOG files
DIRMSAT	1AA	3390	20	28800	*NONSFS	Contains CONSOLE and TRANSLOG files
DIRMAINT	15D	3390	9	12960	*NONSFS	Intersystem locking disk Required when using Satellite servers
DIRMAINT	1FA	3390	12	17280	*NONSFS	Temporary storage for arriving spool files
DATAMOVE	1FA	3390	9	12960	*NONSFS	Temporary storage for arriving spool files
DATAMOVE	5F0	3380	1	1440	*NONSFS	Place holder for DASD management processing (4*)
DATAMOVE	5FF	3380	1	1440	*NONSFS	Place holder for DASD management processing (4*)

Notes:

1. Cylinder values defined in this table are based on a 4k block size. FB-512 and SFS block values are derived from the 3390 cylinder values in this table.
2. *NONSFS in the SFS 4K block column means that disk cannot be installed to the shared file system and must remain a minidisk.
3. Cylinder values for the 2B1 minidisk are based on the source files in packed format. In order to create updates and assemble the files they will need to be unpacked. Disk sizes unpacked will be approximately double that which is shown in this table.
4. Directory entries for the DATAMOVE 5F0 and 5FF minidisks are required for DASD management processing. These directory entries are used as a place holder and they need to specify 3380 as the DASD. A physical 3380 DASD volume with a label of \$\$\$\$\$\$ is not needed.
5. An asterisk by a cylinder value indicates that this value is additional space that is needed above the default size of that disk.

5.3.2 Required DASD Storage for DirMaint Based on Source Directory Size

The following table contains the required DASD for the DIRMAINT and DIRMSAT servers whose disk size is based on the source directory size.

Figure 8 (Page 1 of 2). DASD Storage Requirements for Required Disks Based on Source Directory Size

Minidisk owner (user ID)	Default Address	Calculation for Storage in Cylinders	Usage
DIRMAINT	155	Two Times the Source Directory Size	DIRMAINT server's A-disk
DIRMAINT	1DF	Two times the Source Directory Size	Contains the primary directory files

Notes:

- It is not recommended** that any disks owned by DirMaint servers reside in a shared file system directory. In the event of shared file system problems, it may be impossible to make any directory changes. And it is possible that one or more directory changes, such as allocating more DASD space, may be necessary to make the shared file system operational again.
- All the disks defined in this table **MUST** be CMS formatted.
- If the number of DASD volumes in your Source Directory is greater than 100, use the following equation to determine extra cylinder sizes for the DIRMAINT 155 and 1DF disks:

$$\text{num_extra_cyls} = (\text{num_dasd_volumes} - 100)/180$$

Add the number of extra cylinders from this calculation to the **Calculation for Storage in Cylinders** in the above table for the DIRMAINT 155 and 1DF disks. This will account for internal DirMaint control files used for DASD management purposes.

This calculation is based on a block size of 4K. If your block size differs, replace 180 in the equation above with the number of blocks per cylinder that will be associated with the DIRMAINT 155 and 1DF disks.
- If you are using DirMaint with the Systems Management Application Programming interface (SMAPI) and the number of directory manager SMAPI requests is greater than 12,000 per day, use the following equations to determine extra cylinder sizes for the DIRMAINT 155 disk:

$$\text{extra_requests} = (\text{daily_requests} - 12,000) \times \text{days_in_log}$$

$$\text{days_in_log} = \text{PREVIOUS_DAYS} + 1$$

where **PREVIOUS_DAYS** is the previous day count configured in the 1SAPI_REQUESTS_BEHAVIOR= configuration statement. The default days_in_log is 3.

$$\text{extra_blocks} = \text{extra_requests}/68$$

$$\text{extra_cyls} = \text{extra_blocks}/180 \times 2$$

Add the number of extra cylinders from these calculations to the **Calculation for Storage in Cylinders** in the above table for the DIRMAINT 155 disk. This will account for the internal 1SAPI REQUESTS file used for processing Query_Asynchronous_Operation_DM API calls.

This calculation is based on a block size of 4K. If your block size differs, replace 180 in the equation above with the number of blocks per cylinder that will be associated with the DIRMAINT 155 disk.

Figure 8 (Page 2 of 2). DASD Storage Requirements for Required Disks Based on Source Directory Size

Minidisk owner (user ID)	Default Address	Calculation for Storage in Cylinders	Usage
DIRMAINT	1DB	Three Times the Source Directory Size	Contains the USER BACKUP file
DIRMSAT	1FA	Two times the Source Directory Size	Temporary storage for arriving spool files

Notes:

1. **It is not recommended** that any disks owned by DirMaint servers reside in a shared file system directory. In the event of shared file system problems, it may be impossible to make any directory changes. And it is possible that one or more directory changes, such as allocating more DASD space, may be necessary to make the shared file system operational again.
2. All the disks defined in this table **MUST** be CMS formatted.
3. If the number of DASD volumes in your Source Directory is greater than 100, use the following equation to determine extra cylinder sizes for the DIRMAINT 155 and 1DF disks:

$$\text{num_extra_cyls} = (\text{num_dasd_volumes} - 100)/180$$

Add the number of extra cylinders from this calculation to the **Calculation for Storage in Cylinders** in the above table for the DIRMAINT 155 and 1DF disks. This will account for internal DirMaint control files used for DASD management purposes.

This calculation is based on a block size of 4K. If your block size differs, replace 180 in the equation above with the number of blocks per cylinder that will be associated with the DIRMAINT 155 and 1DF disks.

4. If you are using DirMaint with the Systems Management Application Programming interface (SMAPI) and the number of directory manager SMAPI requests is greater than 12,000 per day, use the following equations to determine extra cylinder sizes for the DIRMAINT 155 disk:

$$\text{extra_requests} = (\text{daily_requests} - 12,000) \times \text{days_in_log}$$

$$\text{days_in_log} = \text{PREVIOUS_DAYS} + 1$$

where **PREVIOUS_DAYS** is the previous day count configured in the 1SAPI_REQUESTS_BEHAVIOR= configuration statement. The default days_in_log is 3.

$$\text{extra_blocks} = \text{extra_requests}/68$$

$$\text{extra_cyls} = \text{extra_blocks}/180 \times 2$$

Add the number of extra cylinders from these calculations to the **Calculation for Storage in Cylinders** in the above table for the DIRMAINT 155 disk. This will account for the internal 1SAPI REQUESTS file used for processing Query_Aynchronous_Operation_DM API calls.

This calculation is based on a block size of 4K. If your block size differs, replace 180 in the equation above with the number of blocks per cylinder that will be associated with the DIRMAINT 155 disk.

5.3.3 Optional DASD Storage for DirMaint

The following table contains the optional DASD for the MAINT and DirMaint server user IDs in order to install optional source, install and service Uppercase English help files, copy American English help files to MAINT's 19D minidisk, and for DirMaint backup minidisks.

Figure 9. DASD Storage Requirements for (Optional) Target Minidisks

Minidisk owner (user ID)	Default Address	Storage in Cylinders		FB-512 Blocks	SFS 4K Blocks	Usage
		DASD	CYLS			Default SFS Directory Name
MAINT	19D	3390	9*	12960	1620	Production disk containing American English help files for DirMaint
MAINT	402	3390	9*	12960	1620	Production disk containing Upper Case English help files for DirMaint
DIRMAINT	1DE	3390	20	28800	*NONSFS	Delta object directory work edit disk.
DIRMAINT	2AA	3390	20	28800	*NONSFS	Contains a backup of the CONSOLE and TRANSLOG files.
DATAMOVE	2AA	3390	20	28800	*NONSFS	Contains a backup of the CONSOLE and TRANSLOG files.
DIRMSAT	2AA	3390	20	28800	*NONSFS	Contains a backup of the CONSOLE and TRANSLOG files.
DIRSAT	1DE	3390	20	28800	*NONSFS	Delta object directory work edit disk.

Notes:

1. Cylinder values defined in this table are based on a 4k block size. FB-512 and SFS block values are derived from the 3390 cylinder values in this table.
2. *NONSFS in the SFS 4K block column means that disk cannot be installed to the shared file system and must remain a minidisk.
3. All the disks defined in this table (except the DIRMAINT 1DE disk) MUST be CMS formatted.
4. The DIRMAINT 1DE disk must be allocated in the following manner: For CKD devices: cylinder 0 must be allocated as PERM space and cylinder 1 through END must be allocated as DRCT space. For FBA devices: pages 1 through 3 must be allocated as PERM space and pages 4 through END must be allocated as DRCT space.
5. An asterisk by a cylinder value indicates that this value is additional space that is needed above the default size of that disk.

5.3.4 Optional DASD Storage for DirMaint Based on Source Directory Size

The following table contains the optional DASD for the DIRMAINT server whose disk size is based on the source directory size.

<i>Figure 10. DASD Storage Requirements for Optional DIRMAINT Disks Based on Source Directory Size</i>			
Minidisk owner (user ID)	Default Address	Calculation for Storage in Cylinders	Usage
DIRMAINT	2DF	Two Times the Source Directory Size	Contains a backup of the secondary directory files
DIRMAINT	2DB	Three Times the Source Directory Size	Contains a backup of the USER BACKUP file
<p>Notes:</p> <ol style="list-style-type: none"> It is not recommended that any disks owned by DirMaint servers reside in a shared file system directory. In the event of shared file system problems, it may be impossible to make any directory changes. And it is possible that one or more directory changes, such as allocating more DASD space, may be necessary to make the shared file system operational again. All the disks defined in this table MUST be CMS formatted. 			

5.3.5 User ID Directory Information

User directory statements supplied in the 6VMDIR40 PRODPART file (and pre-defined in the default USER DIRECT file shipped with the z/VM System deliverables) have user IDs that have privilege classes other than G. These privilege classes are required for the following reasons:

- The 6VMDIR40 install ID must have class E privilege to complete the Directory Maintenance Facility for z/VM, function level 640 installation.
- The DIRMAINT virtual machine must have class B privilege for any of the following:
 - Use of MSGNOH
 - Use of DIAGNOSE X'3C'
 - Use of DIAGNOSE X'84'
 - Use of DIAGNOSE X'D4' for SECLABEL use
- The DIRMAINT virtual machine must have class D privilege to issue the CP QUERY ALLOC command for determining system owned space. The DIRMAINT server will map these as used extents.

Note: There are risks associated with granting any user ID class D authority. You may prefer to create a separate class for the CP QUERY command and grant the DIRMAINT user ID authority to that class. See the *z/VM: CP Planning and Administration* for additional information on moving a command to a new class.

- The DATAMOVE virtual machine must have class B privilege for any of the following:
 - Use of MSGNOH
 - Use of DIAGNOSE X'D4' for SECLABEL use
- The DIRMSAT virtual machine must have class B privilege for any of the following:
 - Use of MSGNOH
 - Use of DIAGNOSE X'3C'
 - Use of DIAGNOSE X'84'
 - Use of DIAGNOSE X'D4' for SECLABEL use

Alternate privilege classes may be required if CP's user Class Restructure support has been used to redefine the system privileges. Some of these classes may not be required if RACF/VM, or an equivalent external security manager, is installed and the appropriate permissions have been granted to the service machines to issue the necessary commands and diagnose instructions.

6.0 Installation Instructions

DirMaint is shipped pre-installed in a DISABLED state as part of the z/VM system.

This chapter describes the step-by-step procedures to enable and customize DirMaint. The step-by-step procedures are in two-column format. The steps to be performed are in bold, large numbers. Commands for these steps are on the left-hand side of the page in bold print. Additional information for a command may exist to the right of the command.

Each step of the instructions must be followed. Do not skip any step unless otherwise directed to. Throughout these instructions, the use of IBM-supplied default minidisk addresses and user IDs is assumed. If you use different user IDs, minidisk addresses, or SFS directories to support DirMaint, adapt these instructions as needed for your environment.

Note: DirMaint provides the UPGDVHXT exit for use with the z/VM upgrade installation procedure. In order for this exit to work successfully, some DirMaint configuration is necessary. If you plan to use the upgrade installation procedure, refer to Appendix C, “Preparing for the z/VM Upgrade Installation Procedure” on page 39 for the associated configuration changes.

Deploying Linux™ on z/VM

If you plan to deploy Linux on z/VM go to the *z/VM: Getting Started with Linux on System z®* publication and follow the instructions for enabling, configuring and setting up DirMaint and Linux virtual servers instead of following these instructions.

6.1 DirMaint Enablement and Customization Process Overview

The following is a brief description of the main steps to complete the enablement and customization of DirMaint.

Have you Licensed DirMaint?

DirMaint is pre-installed on z/VM version 6 release 4, using VMSES/E, in a DISABLED state. **If, and only if**, you have a license for DirMaint FL640 proceed with the instructions to enable and customize it for use.

Did you do an upgrade installation?

If you used the upgrade installation procedure documented in the *z/VM: Installation Guide* to upgrade a z/VM version 6 release 2 or 3 system with DirMaint enabled to a z/VM version 6 release 4 system, no further enablement or customization is necessary. Your installation of DirMaint is complete.

- Set DirMaint to the ENABLED state.

This will allow DirMaint to run.

Note: If enabling DirMaint after using the limited access directory manager function installed for use with the System Management Application Programming Interface (SMAPI), DirMaint must be configured as described in the *Directory Maintenance Facility Tailoring and Administration Guide* before DirMaint will continue to function successfully with SMAPI.

- Tailor DirMaint server machines

Information about file tailoring and initial activation of the program is presented in 6.3, “Tailor the DirMaint Server Machines” on page 22.

- Place DirMaint files into Production

Once the product files have been tailored and the operation of DirMaint is satisfactory, the product files are copied from the test BUILD disk(s) to production BUILD disk(s).

6.2 Enable DirMaint for Use

In order to use DirMaint once you have acquired a license for it, you need to follow the instructions in the ***MEMO TO USERS for IBM Directory Maintenance Facility for z/VM, function level 640*** to enable it for use.

What's Next?

Once you have completed the enablement instructions in the *MEMO TO USERS for IBM Directory Maintenance Facility for z/VM* you need to return to this program directory and continue with 6.3, “Tailor the DirMaint Server Machines” on page 22.

6.3 Tailor the DirMaint Server Machines

This section is required.

Note: If you used the IBM upgrade installation procedure documented in the *z/VM: Installation Guide* to upgrade a z/VM V6.3 system with DirMaint enabled to a z/VM V6.4 no additional customization is required. You may skip the rest of this section and continue to 7.0, "Service Instructions" on page 30.

You will initialize the server machines with the DirMaint code. Additionally, you will tailor the server machines for your operating environment. After completion of this section, DirMaint will be installed in test mode. This means the RUNMODE= entry in the CONFIG DATADVH file on the 41F minidisk will be set to *testing*. In this mode the DIRMAINT server will not place the source directory online. Any commands you issue to the DIRMAINT server are for test purposes only. When testing using the instructions found in the Appendix titled 'Test the Installation/Service for DirMaint' in the *Directory Maintenance Facility Tailoring and Administration Guide* (or the DirMaint web site), DirMaint will be in test mode only unless you change the RUNMODE= entry.

The following table describes:

- Sample files provided with DirMaint that have been installed to the 2C2 samples disk.
- The tailorable system file name of the sample file which the DirMaint servers will recognize and use.
- The minidisk where the DirMaint servers will look for the system file.
- The purpose of the system file.

For example, the CONFIG SAMPDVH sample file will be copied as the CONFIG DATADVH system file to the 41F minidisk and is the DirMaint servers configuration file.

Figure 11 (Page 1 of 2). DirMaint FL640 Supplied Sample Files

Sample File Name	Configuration File Name	Disk	File Description
ACCESS SAMPDVH	ACCESS DATADVH	29E	Provides location of user interface disk to the DIRMAINT EXEC.
AUTHDASD SAMPDVH	AUTHDASD DATADVH	1DF	Provides authorization of DASD requests for the DirMaint servers.
CONFIG SAMPDVH	CONFIG DATADVH	41F	Configuration file for the DirMaint servers.
CONFIGRC SAMPDVH	CONFIGRC DATADVH	41F	Configuration file for the DirMaint servers if using RACF. You need to move this file from 2C2 disk to the 41F disk if you are using RACF.
DATAMOVE SAMPDVH	DATAMOVE DATADVH	492	Defines key time events for the DATAMOVE server.
DIRMAINT SAMPDVH	DIRMAINT DATADVH	492	Defines key time events for the DIRMAINT server.
DIRMMAIL SAMPDVH	DIRMAINT NEWMAIL	41F	A file containing mail like information on the DirMaint product.
DIRMSAPI EXEC SAMP	DIRMSAPI EXEC	41F	Sample of how to use the DirMaint application programming interface. Copy this to any disk you wish to run it from.
DIRMSAT SAMPDVH	DIRMSAT DATADVH	492	Defines key time events for the DIRMSAT server.

Figure 11 (Page 2 of 2). DirMaint FL640 Supplied Sample Files

Sample File Name	Configuration File Name	Disk	File Description
DVHNAMES SAMPDVH	DVHNAMES DATADVH	492	Defines key system administration and support players and how to communicate with them.
DVHPROFD SAMPDVH	DVHPROFA DIRMAINT	492	Defines the disks which the DIRMAINT server will access when initialized.
DVHPROFM SAMPDVH	DVHPROFM DATADVH	492	Defines the disks which the DATAMOVE server will access when initialized.
DVHPROFS SAMPDVH	DVHPROFA DIRMSAT	492	Defines the disks which the DIRMSAT server will access when initialized.
150CMDS SAMPDVH	150CMDS DATADVH	41F	List of commands, command part handler routine, whether or not password authentication is required for processing the command, and the command set class for DIRMAINT 150A compatibility mode.
140CMDS SAMPDVH	140CMDS DATADVH	41F	List of commands, command part handler routine, whether or not password authentication is required for processing the command, and the command set class for DIRMAINT 140A compatibility mode.
EXTENT SAMPDVH	EXTENT CONTROL	1DF	Provides device specific information for the DirMaint servers.
PROFILE EXEC SAMP	PROFILE EXEC	492	Sample PROFILE EXEC for the DirMaint servers.

Warning!

Notes:

1. DIR2PROD EXEC, which runs when placing the DirMaint code into production, will copy the system files located on the 41F and 492 test disks to the 11F and 491 production disks. To avoid possibly back leveling these files, you **should only** make changes to these files on the 41F and 492 test disks.
2. You should **never** change the CONFIG DATADVH file. Changes you wish to make to the configuration files should be accomplished using override files as described in the *Directory Maintenance Facility Tailoring and Administration Guide* manual.

6.3.1 Tailor the DirMaint Installation

- 1 Log on to MAINT640.
- 2 Run PUT2PROD to place any outstanding DirMaint service, such as a previously applied RSU, into production.

If you are running in an SSI cluster you need to do the PUT2PROD on every member before continuing with rest of these instructions. You need to do this as this is how DirMaint gets enabled on the other members.

put2prod dirm

- 3 The DIRMAINT, DATAMOVE, and DIRMSAT user ID's were created with a password of AUTOONLY on the z/VM version 6 release 4 system deliverable. Update the appropriate directory statements in the USER DIRECT file on the 2CC minidisk with valid passwords prior to continuing with these instructions.

If you are running in an SSI cluster you must also update the passwords for each DATAMOV n and DIRMSAT n user ID in your SSI cluster. The USER DIRECT file must be put online on every member in the SSI cluster.

Log on to MAINT640 on one member and update the USER DIRECT file and then put it online with the DIRECTXA command. Then log on to MAINT640 on the other members, access the 2CC as file mode C and enter DIRECTXA.

- 4 Log on to 6VMDIR40.
- 5 Access the disk where the DIR2PROD EXEC resides.

access 492 e

- 6 The file DVHPROFA DIRMAINT (located on the 6VMDIR40 492 minidisk) **must** have a filetype matching the user ID running the DIRMAINT server. If your server is not named DIRMAINT, then rename this file to have a filetype matching the DIRMAINT server user ID. The file DVHPROFA DIRMSAT (only necessary if using a satellite server, located on the 6VMDIR40 492 minidisk) **must** have a filetype matching the user ID running the DIRMSAT server. If your satellite server is not named DIRMSAT, then rename this file to have a filetype matching the DIRMSAT server user ID.
- 7 Access certain DirMaint server and 6VMDIR40 test build minidisks which contain your production tailorable system files using the DIR2PROD exec.

dir2prod access_new 6VMDIR40 {DIRM | DIRMSFS}

DIR2PROD will access the DIRMAINT 1DF disk as filemode J, the 6VMDIR40 492 disk as filemode K, and the 6VMDIR40 41F disk as filemode L.

Use **DIRM** if installing to minidisks or **DIRMSFS** if installing to SFS.

- 8 Create the USER INPUT file on the DIRMAINT 1DF disk for DirMaint's use.
Note: The 1DF disk was accessed previously as file mode J. The USER INPUT file must be a RECFM F LRECL 80 file when located on the 1DF disk.

- a. If you are a new user to DirMaint, copy your current monolithic directory (USER DIRECT on MAINT 2CC) to the DIRMAINT 1DF as USER INPUT.

```
link maint 2cc 2cc rr
acc 2cc c
copyfile user direct c user input j (olddate
```

- b. If migrating from DirMaint FL540, FL610, FL620 or FL630 obtain your current user directory in monolithic format from your old system using the DIRMaint USER BACKUP command. This places a USER BACKUP file on the old system DIRMAINT 1DB disk. Combine your appropriate current user IDs in the USER BACKUP file with the new system USER DIRECT file from the MAINT 2CC disk and copy to the new system DIRMAINT 1DF minidisk as USER INPUT.

- 9** If migrating from DirMaint FL540, FL610, FL620 or FL630 copy the following files to your z/VM V6.4 installation--this must be done from a user that has LNKNOPAS privileges (such as the MAINT user ID):

- Any files listed in Figure 11 on page 22 which you have modified.
- All CONFIGnn DATADVH files you created.
- Files for which no sample is supplied, such as:

```
AUTHFOR CONTROL
DVHLINK EXCLUDE
PROFILE XEDIT
PWMON CONTROL
RPWLIST DATA
```

- See the Appendix titled 'DirMaint Tailorable and Non-Tailorable System Files' in the *Directory Maintenance Facility Tailoring and Administration Guide* (or the DirMaint web site) which lists all tailorable system files for DirMaint, what they are used for, and where an administrator can find more information.

- 10** See the "Data Files" section of the "Tailoring the DIRMAINT Service Machine" chapter in the *Directory Maintenance Facility Tailoring and Administration Guide* for further details on configuring and tailoring DirMaint and setting up the DirMaint server machine environments for your testing purposes. Files that need configuring are those such as listed in Figure 11 on page 22 or if migrating, the files you copied, or any other relevant files listed in the above publication.

- 11** Return here when you have completed all tailoring and setup work for the DirMaint servers.

What's Next?

You have now finished tailoring the DirMaint virtual machines. Continue with the instructions found in the Appendix titled 'Test the Installation/Service for DirMaint' in the *Directory Maintenance Facility Tailoring and Administration Guide* (or the DirMaint web site). When complete, return to 6.4, "Place DirMaint Tailored Files Into Production" on page 27 to place the new DirMaint code into production.

6.4 Place DirMaint Tailored Files Into Production

Important note

This procedure should only be done after you have successfully tested your DirMaint installation.

Placing the DirMaint code into production is a two step process:

- First the test code is moved from the test build disks to the server production minidisks.
- Then general user code is placed on the MAINT 19E minidisk, making it available to all users.

6.4.1 Copy the Server Code to the Server Minidisks

This step will be accomplished by using the DIR2PROD EXEC.

Warning!

The DIR2PROD EXEC will copy the system files located on the 41F and 492 test disks to the 11F and 491 production disks. To avoid possibly back leveling these files, you **should only** make changes to these files on the 41F and 492 test disks.

- 1** If any of the DirMaint server machines, DIRMAINT, DATAMOVE, or DIRMSAT, are logged on you need to log them off. Log on to the MAINT640 user ID and use the FORCE command to log off any DirMaint server machines. (You can use the Q NAMES EXT AT ALL command to see what user IDs are logged on. In an SSI cluster this command will also show you what members the DirMaint server machines are running on. You can use the AT command to issue a FORCE command on another member.)
- 2** Log on to **6VMDIR40**.
- 3** Access the disk where the DIR2PROD EXEC resides

access 492 e

- 4** Copy code from the test minidisks to the production minidisks.

If you are running in an SSI cluster you need to log onto each member of the cluster and run this command as it updates the MAINT 19E disk.

```
dir2prod update_files 6VMDIR40 {DIRM | DIRMSFS}  
dir2prod prod 6VMDIR40 {DIRM | DIRMSFS}
```

Use **DIRM** if installing to minidisks or **DIRMSFS** if installing to SFS.

6.4.2 Log On (initialize) the DirMaint Server Machines

This step will have you bring up the DirMaint server machines.

- 1** You need to make sure that RUNMODE= is set to *operational* in your override file (CONFIGnn DATADVH) to the CONFIG DATADVH file. If you ran the test instructions in the DirMaint Tailoring and Administration then your CONFIGnn DATADVH file would reside on DIRMAINT's 155 minidisk; unless you moved it to the 41F minidisk (owned by user ID 6VMDIR40).

If you need to update your override file you can log on to the DIRMAINT user ID. You will need to hit the enter key twice in order to be able to enter the CMS XEDIT command to update your override file. Once you have completed your update you can run DVHBEGIN, then RLDDATA and finally #CP DISC to disconnect from this user ID.

- 2** Issue the following commands to reinitialize each DirMaint server.

Note:

- When you IPL z/VM the DIRMAINT and DIRMSAT server machines are automatically started by AUTOLOG1's PROFILE EXEC if DirMaint is enabled.
- The DATAMOVE service machine will be automatically autologged by the DIRMAINT server machine when needed.

a Log on to the DIRMAINT server.

Make sure DIRMAINT starts to initialize. If DIRMAINT did not start to initialize you need to type in DVHBEGIN to start DIRMAINT.

If you see message 'DVHITI3531W An OFFLINE CONTROL exists...', issue ONLINE if you want to enable object directory updates according to the ONLINE= configuration statement. Otherwise you must later issue DIRM ONLINE from an authorized user before automatic object directory updates will occur.

Wait for the 'DVHWAI2140I Waiting for work' message.

After you see this message then disconnect the server by issuing #CP DISC.

- b** If running in an SSI cluster, log on to MAINT640 to bring up the DIRMSAT server machines.

- 1 Issue the following command to start the appropriate DIRMSAT user ID on the appropriate member based on the information in the next paragraph. You **should not** start any DIRMSAT user ID on the member where the DIRMAINT server is running.

A satellite server named DIRMSAT is defined for the member system in slot 1 in the SSI cluster, as identified by the CP QUERY SSI command. Satellite servers named DIRMSAT2, DIRMSAT3, and DIRMSAT4 are defined for the member systems in slots 2, 3, and 4, respectively.

at *membername* cmd xautolog {dirmsat | dirmsat*n*} Where *membername* is the member name associated with the slot from the QUERY SSI command where you need to start a satellite server.

6.4.3 Obtaining DirMaint HELP

In order to obtain DirMaint American English help, either of the following must be issued:

- DIRM HELP
- HELP DVHAMENG

In order to obtain DirMaint Uppercase English help, either of the following must be issued:

- DIRM HELP
- HELP DVHUCENG

The Directory Maintenance Facility for z/VM, function level 640 product is now installed and built on your system.

7.0 Service Instructions

Note - z/VM Automated Service Procedure

The z/VM automated service procedure (use of the **SERVICE** and **PUT2PROD** commands) is **required** for applying service to DirMaint.

7.1 Servicing DirMaint

Use the service instructions documented in the *z/VM: Service Guide* to receive, apply, build and place DirMaint service into production.

If you want to test the applied service before placing it into production, then after the **SERVICE** command has been run see the Appendix titled 'Test the Installation/Service for DirMaint' in the *Directory Maintenance Facility Tailoring and Administration Guide* (or the DirMaint web site), for the minimum steps necessary for ensuring that your new code is functional. When your testing is complete, return back to the *z/VM: Service Guide* to finish the service application (e.g. run **PUT2PROD** command).

PUT2PROD should have reinitialized the **DIRMAINT** server machine. You need to make sure that you have reinitialized any **DIRMSAT** or **DATAMOVE** server machines. Refer to 6.4.2, "Log On (initialize) the DirMaint Server Machines" on page 28 for information on initializing the DirMaint server virtual machines.

Appendix A. Moving DirMaint to SFS Directories and Creating a PPF Override

By default, Directory Maintenance Facility for z/VM, function level 640 is installed to minidisks as part of the z/VM version 6 release 4 system deliverable unless you choose to install DirMaint to SFS during the initial z/VM version 6 release 4 installation. If you did not install DirMaint into SFS directories and want to move it now, you can. Refer to Figure 7 on page 12 to see which minidisks can reside in SFS. IBM recommends that you use the default file pool, VMPSFS, but you can use a file pool of your choosing. If you are running in an SSI cluster then this new file pool needs to be accessible to all members. This can be accomplished by specifying the SSI startup parameter in the file pool server DMSPARMS file.

A summary of the steps that are needed to place DirMaint into SFS are:

- Allocate space in the user-defined or default file pool
- Provide the user IDs 6VMDIR40 and MAINT640 with access to the file pool
- Create the necessary DirMaint subdirectories
- Copy files from the minidisks to the new SFS subdirectories
- Create a PPF override, if not using the default file pool or subdirectory names.

Where to next

You need to do one of the following:

- If you want to place DirMaint into SFS directories **using the defaults defined in the 6VMDIR40 PPF file** and you are running in a non-SSI or a single member SSI environment, you can use the **MOVE2SFS** command, as documented in the *z/VM: CP Commands and Utilities Reference* manual.
- If you want to place DirMaint into your **own user-defined file pool or SFS directories** or want to use the default SFS directories and you are running in a multiple member SSI environment, continue with the instructions in A.1, “Setup SFS File Pool and Directories” on page 32.
- If you **only need to create a PPF override**, continue with the instructions in A.3, “Create Product Parameter File (PPF) Override” on page 34.

If you were pointed to this appendix from another section and you have completed the steps required (whether provided in this appendix or in the *Z/VM: CP Commands and Utilities Reference*) you should now return to your original section to continue.

A.1 Setup SFS File Pool and Directories

Notes:

1. The steps that follow help you determine the DirMaint file pool space requirements, file pool enrollment, and SFS directory definitions. If not all of these steps are required - for example, if you are changing only SFS directory or subdirectory names - adapt these instructions as needed for your environment.
2. The steps that follow assume that a user-defined SFS file pool name is being used. If you will be using the VM default file pool name, VMPSFS, substitute it in any place you see the text 'user-defined file pool' or variable *userfilepool*.
3. For more information about planning for, generating and managing a file pool and server, see *z/VM: CMS File Pool Planning, Administration and Operation*.

- 1** Determine the number of 4k blocks that are required for the SFS directories, for each user ID, by adding up the 4K blocks required for each SFS directory you plan to use.

If you intend to use all of the default DirMaint SFS directories, the 4K block requirements for each directory are summarized in Figure 7 on page 12.

This information will be used when the 6VMDIR40 user ID is enrolled in the user-defined file pool.

- 2** Enroll user 6VMDIR40 in the user-defined file pool using the ENROLL USER command:

```
ENROLL USER 6VMDIR40 userfilepool: (BLOCKS blocks)
```

where *blocks* is the number of 4k blocks that you calculated in the previous step.

Note: This must be done from a user ID that is an administrator for the user-defined file pool.

- 3** Make the system service maintenance user ID, MAINT640, a file pool administrator for the user-defined file pool so that it can update files on the DirMaint service directories by adding the MAINT640 user ID to the ADMIN startup parameter in the user-defined file pool DMSPARMS file.

- 4** Determine if there are enough blocks available in the file pool to install DirMaint. This information can be obtained from the QUERY FILEPOOL STORGRP command. The output from this command is a list of storage groups and the number of 4K blocks free. If the number of blocks free is smaller than the total 4K blocks needed (refer to Figure 7 on page 12 to obtain total blocks needed) to install DirMaint you need to add space to the

file pool. See *z/VM: CMS File Pool Planning, Administration, and Operation* manual for information on adding space to a file pool.

- 5 Create the necessary subdirectories using the CREATE DIRECTORY command.

Note: All of the DirMaint subdirectories are shown in the create directory commands. If you are not planning to create all of them, then just enter the commands for the ones you are planning to create.

A complete list of default DirMaint SFS directories is provided in Figure 7 on page 12.

If you have changed any of the default SFS directory names then use your new name in place of the old name in the create directory command.

```
set filepool userfilepool:  
create directory userfilepool:6VMDIR40.DIRM  
create directory userfilepool:6VMDIR40.DIRM.object  
create directory userfilepool:6VMDIR40.DIRM.source  
create directory userfilepool:6VMDIR40.DIRM.localsam  
create directory userfilepool:6VMDIR40.DIRM.sample  
create directory userfilepool:6VMDIR40.DIRM.delta  
create directory userfilepool:6VMDIR40.DIRM.applyalt  
create directory userfilepool:6VMDIR40.DIRM.applyprod  
create directory userfilepool:6VMDIR40.DIRM.help  
create directory userfilepool:6VMDIR40.DIRM.maint19e
```

If necessary, see the *z/VM: CMS Commands and Utilities Reference* manual for more information about the CREATE DIRECTORY command.

- 6 If you intend to use an SFS directory as the work space for the 6VMDIR40 user ID, update the IPL control statement in the 6VMDIR40 CP user directory entry to look like:

```
IPL CMS PARM FILEPOOL userfilepool
```

This will cause CMS to automatically access 6VMDIR40 top directory as file mode A. Refer to the *z/VM:CP Planning and Administration* for information on updating the CP user directory.

A.2 Copy Minidisk (or SFS) Files to SFS Directories

- 1 Copy the files from the DirMaint minidisks (or from the VMPSFS file pool if DirMaint is already installed there) to your new user-defined SFS file pool and directories using the VMFCOPY command.

Note: Repeat the ACCESS and VMFCOPY commands, that follow, for each disk or SFS directory you need to copy. Refer to Figure 7 on page 12 for the default minidisk and SFS directory names for DirMaint.

access *vdev* **e**

access *dirid* **f**

vmfcopy * * **e = f** (**prodid** 6VMDIR40%DIRM **olddate**

Where

- *vdev* is the minidisk you are copying files from. If you are copying from SFS then substitute the default SFS directory name in place of *vdev*.
- *dirid* is the name of the (target) SFS directory that you are copying files to.
- 6VMDIR40%DIRM is the PRODID defined within the 6VMDIR40 PPF file for the minidisk and SFS DirMaint components.

The VMFCOPY command will update the VMSES PARTCAT file on the target directory.

A.3 Create Product Parameter File (PPF) Override

This section provides information to help you create a product parameter file (PPF) override. The example used in this section is how to change the shared file system (SFS) file pool where DirMaint files reside. Refer to the *z/VM: VMSES/E Introduction and Reference* for more information on PPF overrides.

Note: Do **not** modify the product supplied 6VMDIR40 \$PPF, 6VMDIR40 PPF, SERVP2P \$PPF or SERVP2P PPF files to change the VMPSFS file pool name or any other installation parameters. If the 6VMDIR40 \$PPF file is serviced, the existing \$PPF file will be replaced, and any changes to that file will be lost. By creating your own \$PPF override, your updates will be preserved.

The following process describes changing the default file pool name, "VMPSFS" to "MYPOOL1":

- 1 Create a new \$PPF override file or edit an existing override file for the SERVP2P \$PPF file.

xedit *overname* \$PPF *fm*2

overname is the PPF override file name (such as "mySRVP2P") that you want to use.

fm is an appropriate file mode. If you create this file yourself, specify a file mode of A.

If you modify an existing override file, specify a file mode of A or D, based on where the file currently resides (A being the file mode of a R/W 191 minidisk, or equivalent; D, that of the MAINT 51D minidisk).

- 2** Create (or modify as required) the Variable Declarations (:DCL.) section for the DIRMSFS and DIRMSFSP2P override areas so that it resembles the :DCL. sections as shown below.

Note: The PPF file used by SERVICE, PUT2PROD and LOCALMOD, is SERVP2P PPF therefore this example shows an override to the SERVP2P \$PPF file.

```
:OVERLST. DIRMSFS DIRMSFSP2P
*
* ===== *
* Override Section for Initial Installation (Using SFS Directories) *
* ===== *
:DIRMSFS. DIRMSFS SERVP2P
:DCL. UPDATE
&INST191 DIR MYPOOL1:6VMDIR40
&BASEZ DIR MYPOOL1:6VMDIR40.DIRM.OBJECT
&BAS1Z DIR MYPOOL1:6VMDIR40.DIRM.SOURCE
&LMODZ DIR MYPOOL1:6VMDIR40.DIRM.LOCALMOD
&SAMPZ DIR MYPOOL1:6VMDIR40.DIRM.SAMPLE
&DELTZ DIR MYPOOL1:6VMDIR40.DIRM.DELTA
&APPLX DIR MYPOOL1:6VMDIR40.DIRM.APPLYALT
&APPLY DIR MYPOOL1:6VMDIR40.DIRM.APPLYPROD
&BLD0Z DIR MYPOOL1:6VMDIR40.DIRM.MAINT19E
&BLD6Z DIR MYPOOL1:6VMDIR40.DIRM.HELP
:EDCL.
:END.
:DIRMSFSP2P. DIRMSFSP2P SERVP2P
:DCL. UPDATE
&INST191 DIR MYPOOL1:6VMDIR40
&BASEZ DIR MYPOOL1:6VMDIR40.DIRM.OBJECT
&BAS1Z DIR MYPOOL1:6VMDIR40.DIRM.SOURCE
&LMODZ DIR MYPOOL1:6VMDIR40.DIRM.LOCALMOD
&SAMPZ DIR MYPOOL1:6VMDIR40.DIRM.SAMPLE
&DELTZ DIR MYPOOL1:6VMDIR40.DIRM.DELTA
&APPLX DIR MYPOOL1:6VMDIR40.DIRM.APPLYALT
&APPLY DIR MYPOOL1:6VMDIR40.DIRM.APPLYPROD
&BLD0Z DIR MYPOOL1:6VMDIR40.DIRM.MAINT19E
&BLD6Z DIR MYPOOL1:6VMDIR40.DIRM.HELP
:EDCL.
:END.
```

This override will replace the :DCL. section of the DIRMSFS and DIRMSFSP2P override areas of the SERVP2P \$PPF file.

- 3** If your \$PPF override file was created as file mode A, copy it to the Software Inventory minidisk (MAINT640 51D). The default file mode is D.

file

copyfile overname \$PPF fm = = d (olddate)

4 Compile your changes to create the usable *overname* PPF file.

vmfppf *overname* *

where *overname* is the file name of your \$PPF override file.

5 Update the VM SYSSUF Software Inventory table. Since you created a PPF override to the SERVP2P \$PPF file you need to make sure that the override name you created is reflected in the PPF tags for DirMaint in the VM SYSSUF table. Type in the command VMFUPDAT SYSSUF. This will bring up a panel so that you can change the PPF names stored in the VM SYSSUF file. Locate 6VMDIR40 under the 'Prodid' column. Replace the PPF name for INSTPPF, BLDPPF and P2PPPF for 6VMDIR40 with your new PPF override file name. Use PF5 to process your changes.

Now that the *overname* PPF file has been created, you should specify *overname* instead of SERVP2P or 6VMDIR40 as the PPF name to be used for any VMSES/E commands that require a PPF name for DirMaint.

Appendix B. Disabling DirMaint

If you had licensed and enabled DirMaint FL640 for use, and no longer are licensed for DirMaint, you need to explicitly disable it by following the instructions in the *MEMO TO USERS for Directory Maintenance Facility for z/VM* section 'Directory Maintenance Facility for z/VM Disablement'.

Appendix C. Preparing for the z/VM Upgrade Installation Procedure

DirMaint provides the UPGDVHXT exit for use with the upgrade installation procedure documented in the *z/VM: Installation Guide*. The following preparations are necessary in order for the procedure to work properly with DirMaint:

- The UPGDVHXT exit program is shipped with the z/VM product. No installation of the exit program is needed.
- The DIRMAINT, DATAMOV* and DIRMSAT* servers must be configured and working properly before starting the upgrade procedure. A DATAMOV* server must be configured for each member of an SSI cluster. A DIRMSAT* server must be configured and running on each member of an SSI cluster that is not running the DIRMAINT server. A DIRMSAT* server is not necessary if you are not operating in an SSI environment.
- MIGMAINT must be authorized for all privilege classes in the AUTHFOR CONTROL file:
ALL MIGMAINT * 140A ADGHMOPS
ALL MIGMAINT * 150A ADGHMOPS
- MIGMAINT must be able to issue commands on behalf of any user without supplying a password. The following statement must be provided in an override CONFIG* DATADVH file on the DIRMAINT 11F disk:
ALLOW_ASUSER_NOPASS_FROM= MIGMAINT *
- Directory updates must be put online immediately. One of your CONFIG* DATADVH files must include the following statement:
ONLINE= IMMED
- Entries must be included in the :EXCLUDE. section of the EXTENT CONTROL file so that the full pack minidisks owned by MAINT, MAINT620, MAINT630, MAINT640, PMAINT, and SYSDUMP1 will be excluded from extent checking. Your :EXCLUDE. section should look something like this. You may have additional entries.

```
:EXCLUDE.  
* USERID ADDRESS  
MAINT* 012*  
MAINT* 013*  
PMAINT 013*  
PMAINT 014*  
SYSDUMP1 012*  
SYSDMP* 012*  
:END.
```
- All DASD volumes that you are using to install your work system must be defined in the :REGIONS. section of the EXTENT CONTROL file.
- If you are using RACF and want DirMaint to update RACF based on the directory changes made during the upgrade process, you must configure DirMaint for use with RACF before running the upgrade procedure. For information on configuring the DirMaint RACF connector, see *z/VM: Directory Maintenance Facility Tailoring and Administration Guide*.

- DirMaint APAR required for an Upgrade Installation: If you are running DirMaint, before using the Upgrade Installation process to upgrade a 620 system, the DirMaint APAR VM65297 must be applied to the 620 system being upgraded.

Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied

warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes to the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licenses of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
DirMaint Development
Dept G37G
1701 North Street
Endicott, NY 13760

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been

made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities on non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information may contain examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information may contain sample application programs in source language, which illustrates programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to IBM application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Privacy Policy Consideration

IBM Software products, including software as a service solutions, ("Software Offerings ") may use cookies or other technologies to collect product usage information, to help improve the end user experience, to tailor interactions with the end user or for other purposes. In many cases no personally identifiable information is collected by the Software Offerings. Some of our Software Offerings can help enable you to collect personally identifiable information. If the Software Offering uses cookies to collect personally identifiable information, specific information about this offering's use of cookies is set forth below.

This Software Offering does not use cookies or other technologies to collect personally identifiable information.

If the configurations deployed for this Software Offering provide you as customer the ability to collect personally identifiable information from end users via cookies and other technologies, you should seek your own legal advice about any laws applicable to such data collection, including any requirements for notice and consent.

For more information about the use of various technologies, including cookies, for these purposes, see the IBM Online Privacy Policy at <http://www.ibm.com/privacy> and the IBM Online Privacy Statement at <http://www.ibm.com/privacy/details>, in particular the section entitled "Cookies, Web Beacons and Other Technologies ", and the IBM Software Products and Software-as-a-Service Privacy Statement at <http://www.ibm.com/software/info/product-privacy>.

Trademarks

IBM, the IBM logo, and [ibm.com](http://www.ibm.com) are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the web at [IBM copyright and trademark information - United States at](http://www.ibm.com/legal/copytrade.shtml)

www.ibm.com/legal/copytrade.shtml

Adobe, the Adobe logo, PostScript and the PostScript logo are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States, and/or other countries.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Reader's Comments

Program Directory for Directory Maintenance Facility for z/VM, function level 640

You may use the VM Feedback page (Contact z/VM) on the z/VM Web site at:

www.vm.ibm.com/forms/

to comment about this document, its organization, or subject matter.

Please understand that your feedback is of importance to IBM, but IBM makes no promise to always provide a response to your feedback. When you send comments to IBM, you grant IBM a nonexclusive right to use or distribute your comments in any way it believes appropriate without incurring any obligation to you.



Program Number: 5741-A07

Printed in USA

G113-3476-00

