

DMF Release and Installation Guide for IRIX[®] Systems

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About This Guide

This publication documents features and installation procedures for the Data Migration Facility (DMF), release 2.6.3, on SGI systems running the IRIX operating system releases 6.4.1, 6.5, and later.

Related Publications

The following documents contain additional information that may be helpful:

- *DMF Administrator's Guide for IRIX Systems* describes how to configure and administer DMF.
- *DMF Recovery and Troubleshooting Guide for IRIX Systems* describes how to solve problems with DMF should you encounter them.

To order SGI documentation, go to the SGI Technical Publications Library at <http://techpubs.sgi.com>. Find the title that you want and choose order to get the ordering information page for that document.

Conventions

The following conventions are used throughout this document:

Convention	Meaning
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
manpage (<i>x</i>)	Man page section identifiers appear in parentheses after man page names.
<i>variable</i>	Italic typeface denotes variable entries and words or concepts being defined.
user input	This bold, fixed-space font denotes literal items that the user enters in interactive sessions. Output is shown in nonbold, fixed-space font.

- [] Brackets enclose optional portions of a command or directive line.
- ... Ellipses indicate that a preceding element can be repeated.

Reader Comments

If you have comments about the technical accuracy, content, or organization of this document, please tell us. Be sure to include the title and document number of the manual with your comments. (Online, the document number is located in the front matter of the manual. In printed manuals, the document number can be found on the back cover.)

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We value your comments and will respond to them promptly.

Introduction

This publication documents the Data Migration Facility (DMF), release 2.6.3, for SGI computer systems running the IRIX operating system release 6.4.1, 6.5, or later.

This publication includes the following information:

- Software overview (Chapter 2, "Software Overview", page 3)
- Release package information, including its contents, hardware/software requirements, ordering information, and documentation and training support (Chapter 3, "Release Package", page 11)
- Installation instructions (Chapter 4, "Installation Overview", page 15, through Chapter 8, "Before You Start DMF", page 33)
- Upgrade instructions (Chapter 9, "Upgrading DMF", page 35)

Software Overview

The Data Migration Facility (DMF) is a comprehensive data management tool that can be used to manage free space on your native XFS file system. DMF can also be used to manage reliable, long-term storage of important data.

DMF accomplishes its work by moving user file data between primary storage and secondary storage. This process is called *file migration*. File migration can occur transparently to the end user (*automatic migration*), or it can be invoked manually by command request (*manual migration*). For a complete description of the capabilities of DMF, its commands, and the role of the IRIX system administrator, please refer to the *DMF Administrator's Guide for IRIX Systems*.

This chapter describes changes in the DMF 2.6.3 release as well as changes for the 2.6.2.3 update release.

DMF Features

DMF can be used with any SGI platform that runs IRIX versions 6.4.1, 6.5, or later. Both 32-bit and 64-bit architectures are supported. DMF for IRIX systems can manage only XFS file systems.

The following sections describe data storage and management capabilities provided with DMF, as well as the product's interface with the IRIX kernel.

Data Storage and Management

DMF is delivered with a complete set of utilities that can be used to manage the DMF databases and control automatic space management. The DMF component that manages offline data storage is called a *media-specific process* (or *MSP*). DMF is delivered with the following MSPs:

- A tape MSP that allows the administrator to designate a pool of tapes for use as a repository for stored data
- An FTP MSP that allows the administrator to move migrated data to or from any destination machine accessible via the file transfer protocol (FTP)

- A disk MSP that migrates data into a directory accessed on the current system. It uses POSIX file interfaces to open, read, write, and close files

Refer to the *DMF Administrator's Guide for IRIX Systems* for a detailed description of the MSPs.

Several DMF utilities are designed to ensure the integrity of DMF databases and of the media used by the tape MSP. For example, two utilities provided with the tape MSP can be used to scan tape media looking for hard errors and to recover data from failed media. Additionally, the integrity of DMF databases is examined with the following utilities:

- `dmdbcheck(8)`, which is used to validate the internal structure of any DMF database
- `dmaudit(8)`, which is used to ensure that the DMF database is consistent with the XFS file systems being managed by DMF

You can automate the running of these commands through the DMF configuration file, as described in *DMF Administrator's Guide for IRIX Systems*. Refer to the *DMF Recovery and Troubleshooting Guide for IRIX Systems* for a detailed description of the use of `dmaudit`.

In order for the tape MSP to manage stored data, it must mount and dismount tapes on tape transports connected to the platform on which DMF is running. Most often tape mounting is accomplished by a robotic autoloader. These robotic autoloaders can be managed by OpenVault or by the Tape Management Facility (TMF). DMF supports all the robotic autoloaders the mounting service supports. For a list of supported devices and libraries, refer to the `Readmefile` accessed by the **Dependencies** button on the DMF installation interface (`dmmaint(8)`).

Data Management Application Interface (DMAPI)

DMF interacts with the IRIX kernel in order to migrate user data. This interaction is accomplished through an interface called the *Data Management Application Programming Interface* or *DMAPI*. This interface is recognized by the X/Open Group, where it is called the XDSM standard. DMF is also supported in minor ways by the Network File System (NFS) and Bulk Data Services (BDS). For this reason, you must install several patches on any machine on which you want to run DMF. See the **Dependencies** button on the DMF installation interface (`dmmaint(8)`) for additional information about specific patches.

New Functionality with Release 2.6.3

Note: For the most current and detailed information on changes in DMF functionality, including bugs fixed with specific releases, refer to the files accessed by the **Dependencies** and **News** buttons on the DMF installation interface (`dmmaint(8)`).

The following is a summary of key changes that are included in DMF release 2.6.3:

- The new `dmdbupgrade` support script extends the limit on the number of data records in any DMF database (daemon or MSP) from 16.7 million to over 4 billion. The use of the command is described in the file accessed by the **News** button on the DMF installation interface (`dmmaint(8)`). You must read the procedures carefully and contact your support representative with any questions.
- The MSP write child (`dmatwc`) has been enhanced in release 2.6.3 to use a separate thread for performing tape I/O. This means that `dmatwc` can now overlap all of its tape block processing time with its tape write requests, which results in increased performance.
- With release 2.6.2.3, the tape MSP supports the use of Sony SY-2120 tape drives and Sony PetaSite/DMS-B35 SCSI-attached robotic libraries over OpenVault. The tape MSP also supports AMPEX DST/DIS series tape drive in combination with the Ampex 712 or other SCSI-attached robotic libraries over OpenVault.
- In release 2.6.2.3, the tape MSP was modified to make it more aware of the availability of the mounting service it uses. The MSP checks mounting service availability when it is started and after each occurrence where an MSP write child or read child was unable to reserve its drive. If the mounting service is found to be unavailable, the tape MSP will not start any new child processes until the mounting service is once again available.

If the unavailable mounting service is OpenVault, the MSP will send an email message to the administrator asking that OpenVault be started, and will then periodically poll OpenVault until it becomes available, at which time child processes will again be allowed to run.

In the case of TMF, the tape MSP will not only attempt to initiate the `tmdaemon` if it is not up (based on the exit status of `tmstat`), but it will wait until a TMF device in the `configuration pending` state is configured up before it resumes processing. If TMF cannot be started or if no devices are configured up, the tape MSP will send email to the administrator and poll TMF until a drive becomes available.

- Also in release 2.6.2.3, DMF was enhanced to migrate files and free space in a file system that is 100% full. Previously DMF was unable to migrate files when fewer than (approximately) 50 blocks remained in the filesystem. The new functionality depends upon XFS software introduced as part of IRIX release 6.5.2. Prior releases of IRIX do not support this functionality. DMF dynamically checks the IRIX release level and uses the new feature if it is present.

New and Changed Commands and Scripts

New and changed commands and scripts in DMF release 2.6.2.3 and release 2.6.3 are as follows:

- One new command was added in release 2.6.2.3: The `dmxfsrestore(8)` command lets the DMF administrator invoke the `xfsrestore(1m)` command to restore files dumped to tape volumes that were produced by the DMF administrative scripts `run_full_dump.sh` or `run_partial_dump.sh`. The `dmxfsrestore` command is a wrapper around `xfsrestore(1m)` that performs tape volume mounts for the administrator and then executes and turns control of the restore over to `xfsrestore`.
- The `dmfind(1)` and `dm1s(1)` command source is now based on IRIX the `find(1)` and `ls(1)` commands. The man pages have been revised to reflect these changes.
- The `-p` option was added to the `dmcopy` command. This option lets you have separate invocations of `dmcopy` to copy data to the same destination file. You must use the option on each invocation. Repeating the option will ensure that a single invocation of `dmcopy` without `-p` does not truncate the file at an inopportune time. You should not assume that because you issued one `dmcopy` first that it will automatically reach the daemon's input queue before the others.
- The `dmcdadm(8)`, `dmvoladm(8)`, and `dmcatadm(8)` commands have an additional option, `-j`. This option disables database journaling. Use it when you are loading an empty database from text records, to prevent the creation of a large and operationally useless journal file. It is not recommended that you use the option in any other application, as it could cause existing journals to become corrupt and unable to accurately recreate the database in the case of a catastrophic loss of the database.

Support Changes

Several key aspects of DMF are changing with release 2.6.3, as documented in previous releases. Before upgrading to this release, please read the following information and be sure that your site is able to accommodate the changes. Failure to do so will cause major problems when the DMF is initialized.

Changes to supported operating systems and features are as follows:

- DMF no longer supports the IRIX 6.2 release. It now supports IRIX 6.4.1, 6.5 and later releases. If your site is still running IRIX 6.2, do not upgrade to DMF 2.6.3.
- Support for the tape MSP Autoloader API has been dropped. DMF supports both OpenVault and the Tape Management Facility (TMF). If you have not yet acquired OpenVault or TMF, do not upgrade to DMF 2.6.3.
- TMF is available to all DMF licensed customers for no charge. If you want TMF, order product SC4-TMF-XL. This will grant TMF, free of charge, to any existing DMF-licensed customers.
- DMF is licensed for several different architectures based on the number of CPUs, and DMF does enforce a node locked license. However, it does not enforce licenses based upon the size of the machine.

It is highly likely that a later version of DMF 2.6.3 may start to enforce licenses based upon the number of CPUs in the machine.

Also, the version of FLEXlm being used is likely to change in a future release. This will require SGI to resend all existing DMF customers new license keys.

- All existing releases and updates of DMF 2.6.x have been placed on the external public web pages for download. Shortly after release 2.6.3, SGI will remove DMF updates from the public web pages and place the updates in a customer accessible location for DMF licensed customers with DMF support contracts. SGI will leave a recent update on the public page for demonstration and evaluation purposes. SGI plans no change to the frequency of updates, and DMF will be supported in its usual way.

Differences between DMF 2.5 and DMF 2.6

The basic structure of DMF is the same in DMF 2.5 (for UNICOS and UNICOS/mk environments) and DMF 2.6 (for IRIX environments). Changes were made to update the product in areas affected by operating system dependencies. The DMF

administrator interface was improved in the areas of database administration utilities and automatic space management. There have also been changes in basic terminology. The changes are briefly described as follows:

- The `MOUNT_OPTIONS` configuration parameter is no longer used. To specify label type and block size, use the `LABEL_TYPE` and `BLOCK_SIZE` parameters of the device object. The `TMF_TMMNT_OPTIONS` parameter allows you to specify a tape group name (the `-g` option) and to specify how compression is done (the `-i` option).
- DMF 2.6 product installation is very different from the procedures used under DMF 2.5.
- Under the UNICOS operating system, the kernel interface that supports file state transitions is `dmofrq(2)`. Under the IRIX operating system, this interface is `DMAPI 2.3`.
- The syntax of the configuration file was revised and all the file calculation information and MSP selection information is now embedded in this file.
- The use of the `HOME_DIR`, `SPOOL_DIR`, and `JOURNAL_DIR` directories has been restructured.
- Automated space management is now handled entirely by the new program `dmfsmn(8)`; therefore, the `fsmon(8)` and `dmmctl(8)` commands were not ported.
- In DMF 2.6.2, tape mounting can be accomplished by using OpenVault, the Tape Management Facility (TMF), or a set of internal routines extracted from the UNICOS tape subsystem (DMF refers to these routines as the autoloader). The autoloader is available only temporarily.
- Because IRIX does not support the UNICOS user database feature (UDB), the protected files feature of DMF 2.5 is not supported under DMF 2.6.
- The `dmmode(2)` command is not supported under DMF 2.6.
- The client/server configuration option is not supported under DMF 2.6.
- The new `dmscanfs(8)` command provides the report functionality of the `dmhit(blank)` command, which was not ported.
- The commands `dmdalter` and `dmdbase` have been replaced with a single command, `dmdadm(8)`, which has an administrator interface similar to that of `dmcatadm(8)` and `dmvoladm(8)`.

- The `dmmigall` command has been renamed `dmmigrate(8)`.
- The IRIX `ls(1)` and `find(1)` commands were not modified to provide information about DMF managed files. To find this information, use the DMF commands `dmls(1)` and `dmfind(1)`, which are based on the IRIX commands.
- Because IRIX supports sparse files, the file length does not necessarily indicate the actual space occupied by the file on disk. DMF works with the actual space used.
- The tape format was modified to be non-system specific and to handle files with sparse data. Tapes written by DMF at 2.6 on IRIX systems cannot be read by DMF on UNICOS systems.
- The FTP MSP stores file data differently. It now uses the same format as the tape MSP uses. This allows the FTP MSP to efficiently handle sparse files and provides for enhanced recoverability.
- The structure of the directory written by `dmsnap(8)` is different.
- The `dmdump(8)` and `dmsort(8)` commands use `f77` blocking for binary data.
- File handles are now called *bit-file identifiers* (`bfids`) and `dev/inode` is now called *fhandle*.

Release Package

This chapter provides information on the DMF release package and the software and hardware platforms that DMF supports.

Release Package Contents

The DMF 2.6.3 release package includes the following:

- A CD-ROM that contains the installable binary packages for DMF 2.6.3
- *DMF Release and Installation Guide for IRIX Systems* (this publication)
- *DMF Administrator's Guide for IRIX Systems*
- *DMF Recovery and Troubleshooting Guide for IRIX Systems*
- A DMF entitlement number for licensing (see Chapter 7, "FLEXlm License Requirements", page 31)

Hardware and Software Requirements

DMF 2.6.3 runs on SGI computer systems running the IRIX operating system 6.4.1, 6.5, or later.

Licensing Information

DMF is released independently of operating system releases and is distributed by order only to licensed sites. Software keys are used to enforce licensing. DMF licenses apply to a single specific system. DMF license fees vary depending on the type of hardware.

DMF contains an embedded proprietary software package known as the Raima Data Manager (RDM) from Raima Corporation. RDM is not available from SGI; if you want to obtain it, contact Raima Corporation. SGI reserves the right to make changes to the embedded package which will cause it to be different from that which you obtain from Raima Corporation.

Ordering DMF 2.6.3

You can order the DMF 2.6.3 release in the following ways:

- Customers can download the software and a temporary license from the following URL (choose **Download**):

<http://www.sgi.com/software/dmf/>

- Customers can contact the order desk at the SGI Distribution Center in Minnesota by telephone (+1 651 683 5907 or 1 800 284 2729 extension 35907), through electronic mail (orderdsk@sgi.com), or by fax (+1 651 452 0141).
- Customers outside of the United States and Canada can contact their local service or sales organization for ordering information.

Software will be shipped by ground service or 5-day international service unless otherwise requested.

To order any additional publications, contact the order desk at the SGI Distribution Center in Minnesota, or contact your local service or sales organization for ordering information. DMF documentation is also available as part of the DMF Download Evaluation Software in InSight format as described in "Documentation Support".

Documentation Support

DMF documentation is available as part of the SGI technical publications library at the following URL:

<http://techpubs.sgi.com>

If you click **Library Search** and type DMF in the search box, you will find the publications that support DMF.

The release package also contains the documentation in InSight format. All of the DMF publications are included on the DMF media.

The DMF documentation for release 2.6.3 includes the following:

- *DMF Release and Installation Guide for IRIX Systems* (this publication).
- *DMF Administrator's Guide for IRIX Systems*, which contains information about configuring and administering DMF.

- *DMF Recovery and Troubleshooting Guide for IRIX Systems*, which describes how to detect and repair discrepancies between your file system and the DMF daemon database.
- Man pages. Man pages are preformatted files containing information about commands and other aspects of operating systems or compatible products. DMF release 2.6.3 contains the man pages listed in Table 3-1:

Table 3-1 DMF Release 2.6.3 Man Pages

Type	Man pages available
User commands	dmattr(1) dmcoppy(1) dmfind(1) dmget(1) dmls(1) dmput(1)
Administrator commands	dmatread(8) dmatsnf(8) dmatvfy(8) dmaudit(8) dmcatadm(8) dmcheck(8) dmclripc(8) dmconfig(8) dmdadm(8) dmdaemon(8) dmdate(8) dmdbcheck(8) dmdbrecover(8) dmdidle(8) dmdstat(8) dmdstop(8) dmdump(8) dmdumpj(8) dmfill(8) dmfsfree(8) dmfsmon(8) dmhdelete(8) dmlockmgr(8) dmmaint(8) dmmigrate(8) dmmove(8) dmov_keyfile(8) dmov_loadtapes(8) dmov_makecarts(8) dmscanfs(8) dmselect(8) dmsnap(8) dmsort(8) dmversion(8) dmvoladm(8) dmxfrestore(8)
File formats	dmf_config(5) trxj(5)

Training Support

You can obtain information about SGI SGI training services and facilities for DMF at the following URL:

<http://servinfo.csd.sgi.com>

Select **Training Center > Description, Schedules, Registration & Maps**.

Installation Overview

Installation is the second of four steps necessary to the successful implementation of DMF at a site:

- Planning
- Installation
- Configuration
- Initialization

The planning, configuration, and initialization steps, as well as daily operation, are described in the *DMF Administrator's Guide for IRIX Systems*.

The procedures described in this document are used for the installation of major releases, revisions, and product upgrades delivered on the release media.

All installation steps are initiated through the SGI `inst` utility and the `dmmaint` utility.

Preparing for Installation

Before beginning the installation of DMF, ensure that you meet the following requirements:

- You must be `root`
- The Data Management API (DMAPI) is the mechanism within IRIX and the XFS file system for passing file management requests between the kernel and DMF. Ensure that you have installed DMAPI and the appropriate patches as listed in the files displayed by the `Dependencies` and `News` buttons on the `dmmaint(8)` display.



Caution: In order for file systems to be managed by DMF, they must be mounted to enable the DMAPI interface. You can do this by using the `mount -o dmi` command or by declaring parameter 4 in the `fstab` entry to be `dmi`. (refer to the man pages for `mount` or `fstab`). Failure to enable `dmi` for DMF-managed file systems will result in a configuration error.

- DMF uses a set of path names in which it stores databases, log and journal files, and temporary files. These file systems have a set of requirements about which you may want to know before installation:
 - HOME_DIR, the base path name for DMF directories in which databases reside, must be a separate root file system.
 - JOURNAL_DIR, the base path name for DMF directories in which the daemon and tape MSP database journal files reside, must be a separate file system on a different disk from HOME_DIR.
 - SPOOL_DIR, the base path name used to construct the directory names for DMF directories in which DMF log files reside, must be a separate file system.
 - TMP_DIR, the base path name used to construct the directory names for DMF directories in which DMF puts temporary files such as pipes, should exist, but does not necessarily need to be a separate file system.
 - MOVE_FS, the base path name for the scratch file system used to move files between MSPs, has requirements only if you configure more than one MSP. If you have more than one MSP, MOVE_FS must be a separate root file system, and it must be mounted to enable the DMAPI interface.

All of these configuration requirements are checked by the `dmcheck(8)` command.

- DMF state information is kept within a file system structure called an *extended attribute*. Extended attributes can be either inside the inode or in attribute blocks associated with the inode. DMF runs much faster when the extended attribute is inside the inode, because this minimizes the number of disk references that are required to determine DMF information. In certain circumstances, there can be a large performance difference between inode-resident extended attribute and non-resident extended attribute.

You should configure your file systems to ensure that the extended attribute is always inode-resident. This is done with the `mkfs_xfs` command. Declare the inode size to be 512 bytes using the `-i size=512` option. File systems that already exist will have to be dumped, recreated, and restored. This change is not mandatory.

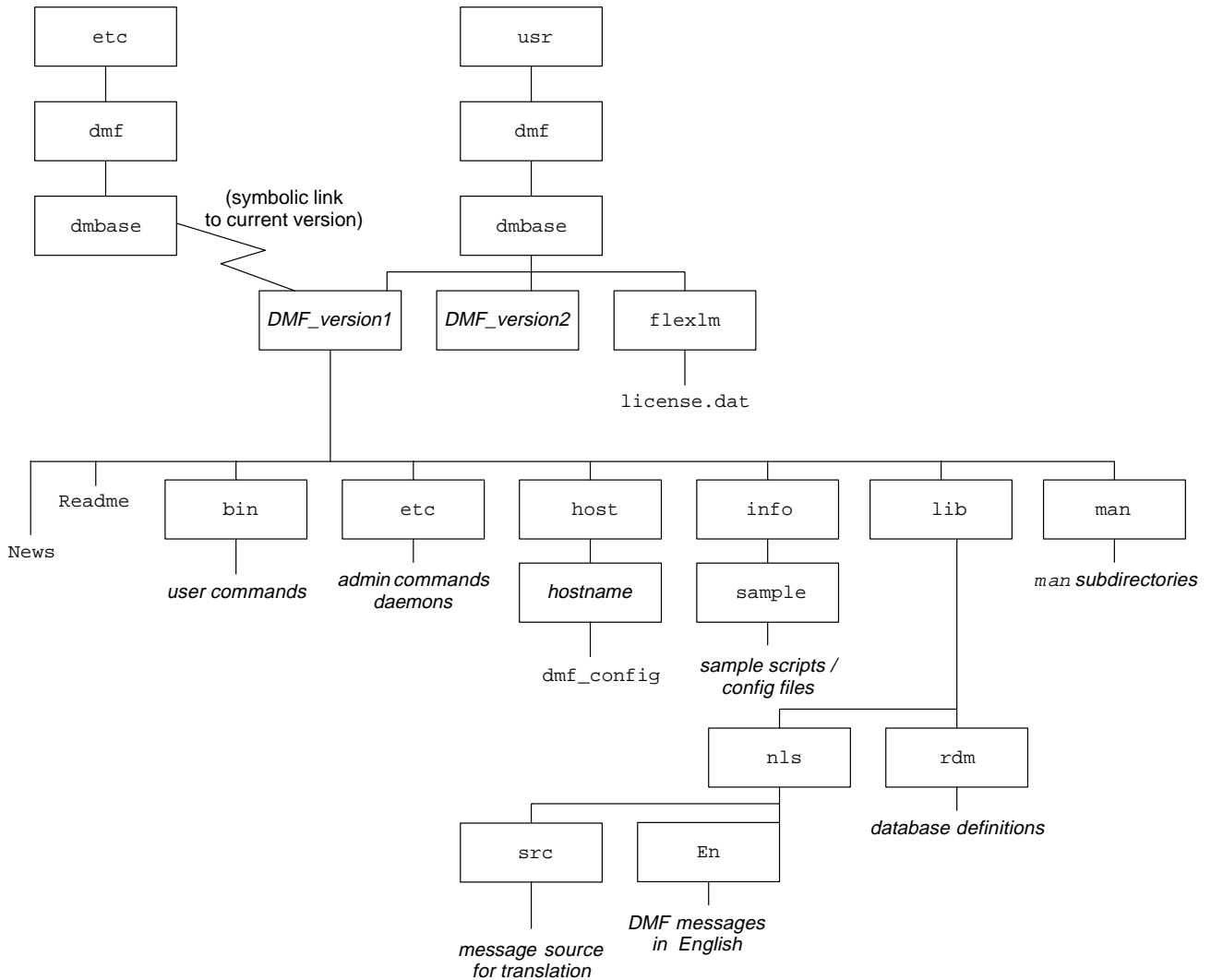
- Ensure that, in the operating system configuration file, the following IPC kernel configuration parameters are set equal to or greater than the default: `MSGMAX`, `MSGMNI`, `MSGSEG`, and `MSGSSZ`. The parameters are described in Appendix A of *IRIX Admin: System Configuration and Operation*, SGI publication 007-2859.

- DMF man pages are installed into `/usr/dmf/dmbase/version/man`. Ensure that you and all DMF users add the correct path to the `MANPATH` environment variable as described in Chapter 8, "Before You Start DMF", page 33.

When you have completed the installation, you must configure DMF prior to using it. See the *DMF Administrator's Guide for IRIX Systems* for information on configuring DMF.

DMF Directory Structure

The following diagram shows the DMF directory structure:



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Figure 4-1 DMF Directory Structure

There is more than one *version* directory if you upgrade DMF from a previous release. When you use the `dmmaint(8)` utility, you will activate the most recent version and configure it.

The `News` and `Readme` files are displayed by the `News` and `Dependencies` buttons on the `dmmain(8)` display.

Using the `inst` Utility

This chapter describes how to use the IRIX `inst(1m)` utility to install DMF 2.6.3.

Note: To install DMF 2.6.3, you are required to have `root` permission.

To install DMF, you have two methods available. If you want to download the DMF software from the World Wide Web, complete the steps in Procedure 5-1. If you have ordered the software on a CD-ROM, complete the steps in Procedure 5-2, page 22.

Procedure 5-1 Downloading the Software from the World Wide Web

Note: All existing releases and updates of DMF 2.6.x have been placed on the external public web pages for download. Shortly after release 2.6.3, SGI will remove DMF updates from the public web pages and place the updates in a customer accessible location for DMF licensed customers with DMF support contracts. SGI will leave a recent update on the public page for demonstration and evaluation purposes. SGI plans no change to the frequency of updates, and DMF will be supported in its usual way.

1. Go to the following URL:

`http://www.sgi.com/software/dmf`

Choose `Download`.

2. If you have a license agreement, skip to step 4. If you do not have a license agreement, click on `temporary license` to obtain an evaluation copy of the software. Read the form and click on `Accept Terms`.
3. Fill in the Registration Form. After you enter `Submit`, a temporary `FLEXIm` license file will be mailed to you, which you will need when configuring DMF. Click on the link to go to the DMF download page.
4. Click on the link for the `README` file (in the first paragraph). It contains information about completing the installation. Use the `Back` button on your browser to return to the software download page.
5. Use your left mouse button to select the release level of the software you want to download, which will start an automatic transfer to your system. Note the

version number that you clicked, because you will use this information later when using the `dmmaint(8)` utility.

After the transfer is complete, you will see the message `Unpacking distribution...please wait.`

Note: If you are running your browser on a machine that is different from the one on which you want to install the software, you can download the tar file by using your right mouse button to select the software and choosing `Save Link As`. You can then download the tar file into any path name you specify.

6. Enter the `root` password if you are prompted for it. (If you began the browser session with `root` permission, you are not prompted.) You will see a message that says `Please wait: Initializing Software Manager`. The Software Manager is launched in a new window.
7. Click on **Customize Installation**. You will receive more information about the size of the DMF software and the directories and files in it. Click on the `Install` button and select the folder icon next to `Product` to view the contents of the software.
8. Click on the **Start** button. The **Status Log** section of the window will display the following message when the DMF installation is complete:

`Installations and removals were successful.`
9. Select **File > Exit**.
10. Use the DMF version maintenance utility (`dmmaint(8)`) to make DMF 2.6.3 the active version. For information about how to use `dmmaint`, see Chapter 6, "DMF Version Maintenance Utility", page 25.

Procedure 5-2 Installing the Software from CD-ROM

1. Place the CD-ROM into the drive.
2. Using the left mouse button, select `System->Software Manager` on the pulldown menu.
3. On the `Available Software` list, select `/CDROM/dist`.
4. Click on **Customize Installation**. You will receive more information about the size of the DMF software and the directories and files in it. Click on the `Install`

button and select the folder icon next to `Product` to view the contents of the software.

5. Click on the `Start` button. The **Status** Log section of the window will display the following message when the DMF installation is complete:

```
Installations and removals were successful.
```

6. Select **File > Exit**.
7. Eject the CD-ROM.
8. Use the DMF version maintenance utility (`dmmaint`) to make DMF 2.6.3 the active version. For information about how to use `dmmaint(blank)`, see Chapter 6, "DMF Version Maintenance Utility", page 25.

DMF Version Maintenance Utility

After you have installed the DMF 2.6.3 release, set this DMF release to be the active version of DMF by using the DMF version maintenance utility (`dmmaint(8)`). This utility handles the setup of all symbolic links that DMF requires to operate normally.

You can use the `dmmaint` utility to view DMF release-specific news and to view information related to dependencies of which you should be aware before you start this version of DMF.

You can use the `dmmaint` utility to switch between versions of DMF and to install your temporary or permanent licenses.



Caution: Ensure that you have installed your FLEXlm license file for this release. The FLEXlm license included with your DMF 2.6.3 release is temporary; when you obtain your permanent DMF license, you must restart DMF 2.6.3.

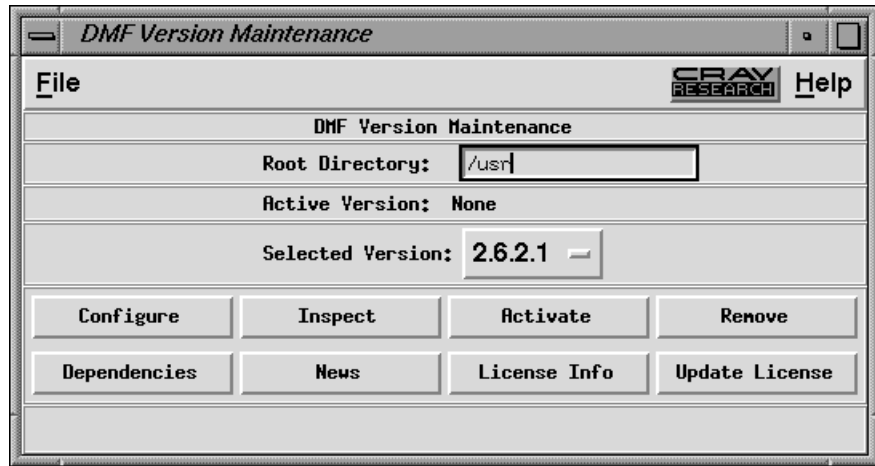
For information about FLEXlm licensing requirements, see Chapter 7, "FLEXlm License Requirements", page 31.

In the directory `/usr/dmf/dmbase/version/etc`, use the `dmmaint` utility to select the active version. (*version* is the version you selected when you downloaded the software). In order to use the `dmmaint` utility, ensure that your `DISPLAY` environment variable is set up, and then enter the following command:

```
dmmaint &
```

If `DISPLAY` is not defined, `dmmaint` reverts to line mode, which has menu selections that are equivalent to the fields and buttons on the graphic user interface. Line mode is provided for remote log in, and is not recommended for general use.

The screen shown in Figure 6-1 is then displayed:



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Figure 6-1 DMF Version Maintenance Display

The fields and buttons of the DMF Version Maintenance display are described as follows:

Field/Button	Description
Root Directory	Lets you set the root directory to be scanned for installed versions of DMF. The default value is /usr. Do not change this directory on IRIX systems.
Active Version	Displays the current active installed version of DMF. If there is no active DMF configured, None is displayed.
Selected Version	Lets you select a specifically installed version of DMF with which to work. You must select a version of DMF to work with before using the Configure , Inspect , Activate , Remove , Dependencies , News , License Info , or Update License buttons. Simply release your mouse button over the version you want to make active.
Configure	Lets you customize the DMF configuration file for the selected version of DMF. If this is the first time you have configured this version of DMF, a window appears telling you that there is no

configuration file. You are asked which file you would like to use as a basis for the new configuration. You may choose an existing configuration file or one of several sample files that are pre-configured for different types of media-specific processes (MSPs).

If you are modifying an existing configuration, a window appears that asks if you would like to modify the existing configuration file or use an alternate file. If you choose an alternate file, you see the same window that you would see if this were a new configuration.

After you choose a file to use as a basis, an editing session is started (in a new window) that displays a copy of that configuration file. You can make changes as desired.

After exiting from the editor, you are prompted for confirmation before the original configuration file is replaced with the edited copy.

For more information on the possible parameters you can use in your DMF configuration file, see the `dmf_config(5)` man page (available from the **Help** button).

Inspect

Runs the `dmcheck(8)` program to report errors.

After you have created a configuration file for the selected version of DMF, you can click the **Inspect** button, which runs `dmcheck` to report any errors in that configuration. If there are errors, you can click the **Configure** button, make changes, and continue to alternate between **Configure** and **Inspect** until you are satisfied that the configuration is correct.

Activate

Lets you make the selected version of DMF the active version. When you click this button, `dmmain` runs `dmcheck`. If the selected version's DMF configuration file contains errors, click **Examine errors** to determine what is wrong with the configuration. If another version of DMF is already running, you are prompted for confirmation to continue.

When it makes the selected version active, `dmmaint` first stops DMF if it is already running. A symbolic link is created in `/etc/dmf/dmbase` that points to the selected version's base directory. Also created are the symbolic links `/etc/init.d/dmf`, `/etc/rc0.d/K79dmf`, and `/etc/rc2.d/S25dmf`, which point to the selected version's DMF startup script. `chkconfig` is used to create a DMF configuration variable and set its value to `on`. Finally, you are asked if the newly activated version of DMF should be started.

Remove

Lets you remove the selected version of DMF. Positive confirmation is requested. If you click `OK`, all DMF files and directories for the selected version are removed. If the selected version was also the active version, DMF is stopped, the symbolic links are removed, and the active version becomes `None`.

Dependencies

Lets you view the dependencies file (`/usr/dmf/dmbase/version/Readme`) for the selected version. This file contains information on any dependencies that exist for a specific version of DMF, such as operating system levels supported, patch requirements, and so on.

News

Lets you view the news file (`/usr/dmf/dmbase/version/News`) for the selected version. This file contains information such as new DMF features, changes in the products, descriptions of fixed bugs, and future product plans.

License Info

Lets you view all FLEXlm license information for the selected version of DMF. The display shows the host name and FLEXlm host ID, which you need when you apply for a DMF permanent license. The name of the license file is also displayed, as is a short description of the state of any DMF license within the file.

Update License

Lets you make changes to the FLEXlm license file. An editing session is started in a new window displaying a copy of the contents of the license file. You can add or delete licenses as desired. After you exit the editor,

positive confirmation is requested before the original license file is replaced by the modified copy.

Help

Lets you view the `dmmaint(8)` or `dmf_config(5)` man page.

Procedure 6-1 Running `dmmaint`

The following procedure uses `dmmaint` to complete the initial configuration of DMF:

1. Select **Dependencies** to read about all the hardware and software requirements that must be fulfilled before running DMF.
2. Select **News** to read about what is new with this revision of DMF.
3. If you have not yet installed a FLEXlm license for DMF, select the **Update License** button and use your mouse to copy and paste your license into the file. Close the window. Select **License Info** and examine the output to verify that the license is installed correctly.
4. Select **Configure** to begin configuration of the current revision of DMF. The first time that you select this button, `dmmaint` will prompt you for the file you want to use as a basis for the configuration. Choose to use your existing configuration file or one of the sample files provided. If you choose to use your existing configuration, you will need to add new parameters to implement new features. `dmmaint` then opens an editing window containing the `dmf_config` file, allowing you to modify the configuration to suit your needs. When you exit the window, `dmmaint` will ask if you want to make your changes permanent. If so, click OK.
5. You may make additional editing changes to your configuration by reselecting **Configure**. If you are modifying an existing configuration, a window appears that asks if you would like to modify the existing configuration file or use an alternate file. If you choose an alternate file, you see the same window that you would see if this were a new configuration.
6. Click the **Inspect** button, which runs `dmcheck` to report any errors in that configuration. If there are errors, you can click the **Configure** button, make changes, and continue to alternate between **Configure** and **Inspect** until you are satisfied that the configuration is correct.
7. When you are satisfied that your configuration is correct, select **Activate** to make this version of DMF the active one. `dmmaint` will run `dmcheck` to check for configuration errors. If any are found, you will be notified and will be allowed to examine those errors. You will then be asked whether you wish to continue to

make DMF active in spite of any errors. If so, `dmmaint` will establish all the necessary symbolic links to make DMF active. It also establishes links to the DMF startup script in `/etc/init.d`, `/etc/rc2.d`, and `/etc/rc0.d`. These links ensure that that DMF will be automatically started whenever your machine is booted and will be automatically stopped during a machine shutdown. If you do not want DMF to be automatically started and stopped, enter the following command after activating DMF (you must be running as `root`):

```
chkconfig dmf off
```

For information about how to start and stop DMF, see the `dmdaemon(8)` and `dmstop(8)` man pages.

FLEXIm License Requirements

The software licensing used by DMF is based on the FLEXIm product from GLOBEtrotter Software, Inc. A FLEXIm license is required to use DMF.

For more information on FLEXIm, you may order the *Flexible License Manager End User Manual* from GLOBEtrotter Software, Inc., or from the SGI Distribution Center in Minnesota.

The DMF license is issued to a specific host ID. You will be asked to provide the license manager host ID when you obtain your permanent license. To obtain the number, launch the `dmmaint` utility and select the **License Info** button. A window displays the host name and the FLEXIm host ID. When you are asked for the license manager host ID, provide this FLEXIm host ID.

You must have a separate license for each host machine on which DMF is installed.

When you download or order DMF, you will receive a temporary license and an entitlement number from the SGI Distribution Center in Minnesota; you must get a permanent DMF license and restart DMF once you have that license.

Install the DMF software. Steps to take for the temporary license are described in Procedure 6-1, page 29.

Along with your entitlement number, you will receive a URL to a key generation page. To obtain your permanent license, follow the instructions on the key generation page. After you have provided the required information, a key will be sent to you through electronic mail.

If for some reason you cannot use the World Wide Web key generation page, you can telephone or email the SGI Distribution Center in Minnesota and a key will be sent to you.

Customers can contact the order desk at the SGI Distribution Center in Minnesota by telephone (+1 651 683 5907 or 1 800 284 2729 extension 35907), through electronic mail (orderdsk@sgi.com), or by fax (+1 651 452 0141).



Warning: You **must** use `dmmaint` to install your permanent license. DMF keys cannot be installed with the SGI license manager.

Before You Start DMF

To use DMF commands and DMF man pages, set your `PATH` and `MANPATH` environment variables. The DMF administrator commands and executables are installed in `/etc/dmf/dmbase/etc`; the user commands are installed in `/etc/dmf/dmbase/bin`. Man pages are installed in `/etc/dmf/dmbase/man`.

Note: If you are not familiar with setting the `MANPATH` environment variable, you should know that some paths are checked even though they are not listed by default. In other words, even though the command `echo $MANPATH` in `ksh` returns no message or in `csh` returns the message `MANPATH - Undefined variable`, certain paths are still searched for man pages. Setting the `MANPATH` environment variable as described in the following examples will overwrite these paths.

If `MANPATH` has not been set, you should read the `man(1)` man page to determine the paths that are checked and then include those paths in the commands below.

The following example uses `sh` syntax to set and display the DMF `PATH` environment variables:

```
# PATH=$PATH:/etc/dmf/dmbase/etc:/etc/dmf/dmbase/bin; export PATH
# MANPATH=$MANPATH:/etc/dmf/dmbase/man; export MANPATH
# env | grep PATH
MANPATH=/usr/man:/usr/share/catman:/usr/catman:/usr/local/man:/etc/dmf/dmbase/man
PATH=/usr/sbin:/usr/bsd:/sbin:/usr/bin:/bin:/etc:/usr/etc:/usr/bin/X11:/etc/dmf/dmbase/etc:/etc/dmf/dmbase/bin
```

The following example uses `csh` syntax to set and display the DMF `PATH` environment variables:

```
% setenv PATH ${PATH}:/etc/dmf/dmbase/etc:/etc/dmf/dmbase/bin
% setenv MANPATH ${MANPATH}:/etc/dmf/dmbase/man
% env | grep PATH
MANPATH=/usr/man:/usr/share/catman:/usr/catman:/usr/local/man:/etc/dmf/dmbase/man
PATH=/usr/sbin:/usr/bsd:/sbin:/usr/bin:/bin:/etc:/usr/etc:/usr/bin/X11:/etc/dmf/dmbase/etc:/etc/dmf/dmbase/bin
```

You can set the user command and man path names in the file `/etc/profile` for all `ksh` users and `/etc/cshrc` for all `csh` users, or provide a module for users.

Upgrading DMF

Upgrading the DMF software is essentially the same procedure as the one described in Procedure 5-1, page 21.

You need to be aware of the following differences from an initial installation:

- When you start to edit the configuration file for the new version of DMF, you are prompted as to whether you want to use the existing configuration file or one of several sample files.
- When you select **Activate** to make the new revision of DMF active, you may receive a warning that the current version of DMF is running and will have to be stopped. You must click **OK** if you want the activation to continue.
- After installing and testing a new revision of DMF, you most likely will want to remove the previous revision of DMF. Select the previous revision using the **Selected Version:** list box, then select **Remove**. You will be prompted for confirmation before the revision is actually removed. If the revision being removed is the active revision, then DMF will be stopped and all symbolic links will be removed.

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