

# DMF Release and Installation Guide

007-3683-007

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## New Features

The major new feature of DMF release 2.8 is support for DMF on SGI Altix 3000 platforms.



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## Record of Revision

<b>Version</b>	<b>Description</b>
2.6.1	October 1997 Original printing to support the Data Migration Facility (DMF) release 2.6.1 running under SGI IRIX systems.
2.6.2	July 1998 Reprint with revision to support DMF release 2.6.2 running under SGI IRIX systems.
2.6.2.2	December 1998 Reprint with revision to support DMF update release 2.6.2.2 running under SGI IRIX systems.
004	May 2000 Reprint with revision to support DMF update release 2.6.3 running under SGI IRIX systems.
005	October 2000 Reprint to support the Data Migration Facility (DMF) update release 2.6.3.2 running under SGI IRIX systems.
006	May 2002 Reprint to support the Data Migration Facility (DMF) update release 2.7 running under SGI IRIX systems.
007	June 2003 Reprint to support the Data Migration Facility (DMF) update release 2.8 running under SGI IRIX and Linux systems.



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## About This Guide

This publication documents features and installation procedures for the Data Migration Facility (DMF), release 2.8, on SGI Altix 3000 systems running the Linux operating system and other SGI systems running the IRIX operating system 6.5 and later releases.

## Related Publications

The following documents contain additional information that may be helpful:

- *DMF Administrator's Guide* describes how to configure and administer DMF.
- *DMF Recovery and Troubleshooting Guide* 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 (x)	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.
<b>user input</b>	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.

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## Introduction

This publication documents the Data Migration Facility (DMF) for SGI computer systems running the Linux operating system and the IRIX operating system release 6.5.2 or later. On IRIX systems, both 32-bit and 64-bit architectures are supported. On Linux systems, only 64-bit architectures are supported.

DMF can manage CXFS and XFS file systems on the IRIX operating system, but currently manages only XFS on the Linux operating system.

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 7)
- Installation instructions (Chapter 4, "Installation Overview", page 11, through Chapter 9, "Before You Start DMF", page 27)
- Upgrade instructions (Chapter 10, "Upgrading DMF", page 29)

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**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)`).

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## 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 or CXFS 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 or Linux system administrator, please refer to the *DMF Administrator's Guide*.

The following sections describe data storage and management capabilities provided with DMF, as well as the product's interface with the IRIX or Linux 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 components that manage offline data storage are called *media-specific processes* (or *MSPs*) and *library servers* (or *LSs*).

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**Note:** Linux does not support tape MSPs. Under Linux, the LS is the only choice to manage offline tape data storage.

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The LS is a newer component than the MSP and can be used instead of one or more tape MSPs, providing improved error avoidance/recovery and tape volume scratch pools. The `dmmsptols` script converts an existing tape MSP database to an LS database. It also makes any necessary changes to the daemon database. A number of DMF commands have options to facilitate the handling of library servers.

DMF is delivered with the following MSP/LS functionality:

- A tape MSP or LS 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.

For the tape MSP/LS 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 of the robotic autoloaders the mounting service supports. For a list of supported devices and libraries, refer to the *Readme* file by clicking on the **Dependencies** button on the DMF maintenance interface, (`dmmaint(8)`).

For a detailed description of the MSP and LS components, refer to the *DMF Administrator's Guide*.

Several DMF utilities are designed to ensure the integrity of DMF databases and of the media used by the tape MSP or LS. For example, you can use `dmatsnf` and `dmatread` to scan tape media looking for hard errors and to recover data from failed media. Additionally, you can examine the integrity of DMF databases by using `dmdbcheck(8)` to validate the internal structure of any DMF database and `dmaudit(8)` to ensure that the DMF database is consistent with the XFS/CXFS file systems being managed by DMF. For a detailed description of the use of `dmaudit`, refer to the *DMF Recovery and Troubleshooting Guide*.

You can automate the running of the `dmdbcheck(8)` and `dmaudit(8)` commands through the DMF configuration file, as described in *DMF Administrator's Guide*.

## Data Management Application Interface (DMAPI)

DMF interacts with the IRIX or Linux kernel 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, which calls it the XDSM standard. DMF is also supported in minor ways by the Network File System (NFS) and Bulk Data Services (BDS). You must install the DMAPI software component on any machine that will be a DMF server. It also might be necessary to install specific patches. To obtain information about specific patches, use the **Dependencies** button on the DMF installation interface, (`dmmain(8)`).

## Distributed Commands

The distributed command (DC) feature is an installation subset of the full DMF product that you can install on hosts that have DMF-managed filesystems exported to them, but never execute as the DMF server host. The DC feature allows DMF user commands (`dmput`, `dmget`, `dmfind`, `dmls`, `dmcopu`, and `dmattr`) to be executed on the client host.

The DMF User Library, `libdmfusr.so`, allows users to write their own custom DMF user commands that use the same DC Application Program Interface (API) as the DMF user commands listed previously.

Licensing is installed and enforced on the DMF server machine only. No licensing is required on the client host.

## Differences from UNICOS/UNICOS/mk DMF

If you are upgrading from a UNICOS or UNICOS/mk operating system to an IRIX or Linux operating system, you will need to be aware of the differences between IRIX/Linux DMF functionality and UNICOS/UNICOS/mk DMF functionality. The basic structure of DMF is the same for IRIX or Linux environments as for UNICOS and UNICOS/mk environments. However, the differences occur in areas affected by operating system dependencies. The DMF administrator interface differs in the areas of product installation, database administration utilities, and automatic space management. There are also differences in basic terminology. Table 2-1, page 5 provides a summary of key differences between the two operating systems as they relate to DMF.

**Table 2-1** IRIX/Linux and UNICOS/UNICOS/mk DMF Differences

Functionality	UNICOS/UNICOS/mk	IRIX/Linux
Kernel interface that supports file state transitions	<code>dmofrq(2)</code> command.	DMAPI 2.3 (see "Data Management Application Interface (DMAPI)", page 4).
Use of <code>HOME_DIR</code> , <code>SPOOL_DIR</code> , <code>JOURNAL_DIR</code> directories	No separate daemon subdirectory (daemon files in root of <code>HOME</code> , <code>SPOOL</code> , or <code>JOURNAL</code> directory).	Separate daemon subdirectory

Functionality	UNICOS/UNICOS/mk	IRIX/Linux
Protected files feature	Supported as a part of the user database feature (UDB).	Not supported.
<code>dmmode(2)</code> command	Supported.	Not supported. Offline files are always processed when accessed.
Client/server configuration option	Supported.	Not supported.
Reporting	<code>dmhit(blank)</code> command.	<code>dmscanfs(8)</code> command.
DMF database administration	<code>dmdalter</code> and <code>dndbase</code> commands.	<code>dmdadm(8)</code> command, which has an administrator interface similar to that of the <code>dmcatadm(8)</code> and <code>dmvoladm(8)</code> commands.
File migration and conversion to dual state	<code>dmmigall(8)</code> command.	<code>dmmigrate(8)</code> command.
Information reporting on DMF managed files	<code>ls(1)</code> and <code>find(1)</code> commands	<code>dmls(1)</code> and <code>dmfind(1)</code> commands (based on the IRIX commands, <code>ls</code> and <code>find</code> ).
Structure of directory written by the <code>dmsnap(8)</code> command	Daemon database in <code>snap</code> directory, MSP databases in <code>snap</code> directory subdirectories named for <i>mspname</i>	Separate daemon and MSP/LS subdirectories in <code>snap</code> directory
File handle terminology	File handle.	Bit-file identifier ( <code>bfid</code> ).
File handle terminology.	<code>dev/inode</code> .	<code>fhandle</code> .

## 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 release package includes the following:

- A CD-ROM that contains the installable binary packages for the current DMF release
- *DMF Release and Installation Guide* (this publication)
- *DMF Administrator's Guide*
- *DMF Recovery and Troubleshooting Guide*
- A DMF entitlement number for licensing (see Chapter 8, "FLEXlm License Requirements", page 25)

### Hardware and Software Requirements

DMF runs on SGI Altix 3000 systems running the Linux operating system or other SGI systems running the IRIX operating system 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 RDM Embedded from Birdstep Technology, Inc. RDM Embedded is not available from SGI; if you want to obtain it, contact Birdstep Technology, Inc. SGI reserves the right to make

changes to the embedded package, which will cause it to be different from that which you obtain from Birdstop Technology, Inc.

## Ordering a DMF Release Package

You can order a DMF release in the following ways:

- 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](mailto: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.

DMF documentation includes the following:

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



- *DMF Recovery and Troubleshooting Guide*, 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. Man pages are listed in Table 3-1:

**Table 3-1** DMF Man Pages

Type	Man pages available
User commands	dmattr(1) dmcoppy(1) dmfind(1) dmget(1) dm1s(1) dmput(1)
Administrator commands	dmatread(8) dmatsnf(8) dmatvfy(8) dmaudit(8) dmcatadm(8) dmcheck(8) dmclripc(8) dmconfig(8) dmdadm(8) dmfdemon(8) dmdate(8) dmdbcheck(8) dmdbrecover(8) dmddidle(8) dmddstat(8) dmddstop(8) dmddump(8) dmddumpj(8) dmfill(8) dmfsfree(8) dmfsmon(8) dmhdelete(8) dmlockmgr(8) dmmaint(8) dmmigrate(8) dmmove(8) dmmsptols(8) dmov_keyfile(8) dmov_loadtapes(8) dmov_makecarts(8) dmscanfs(8) dmselect(8) dmnap(8) dmselect(8) dmversion(8) dmvoladm(8) dmxfstore(8)
File formats	dmf.conf(5) trxj(5)

## Training Support

You can obtain information about 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*.

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(8)` utility on IRIX systems and the `rpm(8)` utility on Linux systems and the `dmmaint(8)` utility.

## Preparing for Installation

Beginning with DMF release 2.7, the installable DMF package includes a server software subsystem and a client software subsystem. The server software subsystem provides the full set of DMF functionality, including the DMF daemon, MSPs, LSs, DMF user and administrator commands, DMF online manuals, and all DMF man pages. The client software subsystem provides the executable files, libraries, and the subset of man pages that allow a machine to be a DMF client. This subsystem allows users on the client to use the DMF distributed commands. Only one of these subsystems can be installed on a machine.

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 or Linux and the XFS/CXFS file system for passing file management requests between the kernel and DMF. Ensure that you have installed DMAPAPI and the appropriate

patches on the DMF server, as listed in the files displayed by the **Dependencies** and **News** buttons on the `dmmaint(8)` display.

---



**Caution:** For file systems to be managed by DMF, they must be mounted on the DMF server to enable the DMAPi interface. On IRIX systems, you can do this by using the `mount -o dmi` command or by declaring parameter 4 in the `fstab` entry to be `dmi`. On Linux systems, you can do this by using the `mount -o dmap_i -o mtpt = mountpoint` command or by adding `dmap_i, mtpt = mountpoint` to the fourth field in the `fstab` entry. For more information on the `mount` or `fstab` commands, see the man pages. Failure to enable DMAPi for DMF-managed file systems will result in a configuration error.

---

- 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 on IRIX systems and the `mkfs.xfs` command on Linux systems. 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*.

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

## DMF Directory Structure

Beginning with DMF 2.8, DMF no longer supports multiple installed versions of DMF that can be made active via the `dmmaint(8)` program. While it is not necessary to

delete any existing pre-2.8 versions of DMF, they will not be accessible by the DMF 2.8 software and they can be removed at the convenience of the administrator.

The reason for this change is that the pre-2.8 DMF directory hierarchy of `/usr/dmf/dmbase` is no longer the target installation directory of DMF. Rather, DMF 2.8 and later binaries, libraries, header files, and man pages are installed directly into the proper system locations and they are accessed directly from those locations without the use of symbolic file links.

When DMF 2.8 or later is installed, if the symbolic file link `/etc/dmf/dmbase` exists, it will be deleted. This link was used in pre-2.8 versions of DMF to access the “active” version of DMF, and as such, it was part of the administrators’ initialization procedure to add this link to their `PATH` environment variable. Since it is no longer used in DMF 2.8 and later versions, it could cause an incorrect copy of a DMF command to be executed if an administrator’s path included the link to be searched before the normal system binary locations. This way, even if the administrator neglects to remove the link from the path, it should not make any difference.



## Installing DMF on IRIX Systems

This chapter describes how to use the IRIX `inst(1m)` utility to install DMF. To install DMF on Linux systems, see Chapter 6, "Installing DMF on Linux Systems", page 17.

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

---

To install DMF, complete the steps in Procedure 5-1, page 15.

**Procedure 5-1** Installing the Software from CD-ROM

1. You must stop DMF before installing an upgrade version. Use the following command:

```
/etc/init.d/dmf stop
```

2. Place the CD-ROM into the drive.
3. Using the left mouse button, select `System->Software Manager` on the pulldown menu.
4. On the `Available Software` list, select `/CDROM/dist`.
5. TO INSTALL THE DMF SERVER: 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.

TO INSTALL THE DMF CLIENT: Click on **Customize Installation**. Select the DMF client software subsystem and the DMF client man pages. Deselect the DMF server subsystem.

6. 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.
```

7. Select **File > Exit**.
8. Eject the CD-ROM.





## Installing DMF on Linux Systems

This chapter provides steps for installing DMF on Linux systems. To install DMF on IRIX systems, see Chapter 5, "Installing DMF on IRIX Systems", page 15.

Before installing DMF 2.8, the site must decide whether the platform onto which DMF server software is being installed will ever export its DMF managed filesystems to another platform that has the DMF client installed, or whether the platform onto which DMF client software is being installed will ever export its imported DMF managed filesystems to another platform that also has the DMF client installed.

The importance of this possible configuration is that the DMF client commands rely on the `xinetd(8)` daemon to communicate with the DMF server machine. That communication is based on the TCPMUX functionality in the `xinetd` command, which is not present in versions of `xinetd` prior to `xinetd-2.3.11`. The DMF installation CD-ROM includes an RPM package of `xinetd-2.3.11` that can be installed before the DMF installation. The administrator can install `xinetd-2.3.11` if it might ever be required by DMF, or to simply upgrade the `xinetd` capability to a later, more robust version.

To determine the current level of `xinetd`, enter the following command:

```
rpm -q xinetd
```

The output of the `rpm` command indicates the current level of `xinetd` that is installed. Use the following procedure to install software from the CD-ROM.

### **Procedure 6-1** Installing the Software from the CD-ROM

1. Place the CD-ROM into the drive.
2. Change directories to the DMF Linux installation directory, as follows:

```
cd /CDROM/rpms
```

3. If you wish to upgrade your current version of `xinetd`, enter the following command:

```
rpm -Uvh xinetd-2.3.11-1.ia64.rpm
```

---

**Note:** This command will fail if the currently installed version of `xinetd` is a later version.

---

---

**Note:** There are a number of `xinetd` configuration files in the `/etc/xinetd.d` directory that the `rpm` command shown above will not overwrite. Rather, it renames the newly installed versions with the suffix `.rpmnew` and logs a message to that effect. This command functions this way to prevent the overwriting of a site-modified configuration file with a default version, thus losing the site modification in the process. The administrator should inspect all `xinetd` configuration files for accuracy and reconcile any differences that are discovered in the new default configuration files (`*.rpmnew`) with the existing files.

---

4. To install the DMF server, enter the following command:

```
rpm -Uvh dmf-2.8.0.0-0.ia64.rpm
```

5. To install the DMF client, enter the following command:

```
rpm -Uvh dmf-client-2.8.0.0-0.ia64.rpm
```

6. Eject the CD-ROM.

## DMF Maintenance Utility

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**Note:** The information in this chapter is for DMF server installation only.

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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 the current version of DMF.

You can use the `dmmaint` utility 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 release is temporary; when you obtain your permanent DMF license, you must restart DMF.

For information about FLEXlm licensing requirements, see Chapter 8, "FLEXlm License Requirements", page 25.

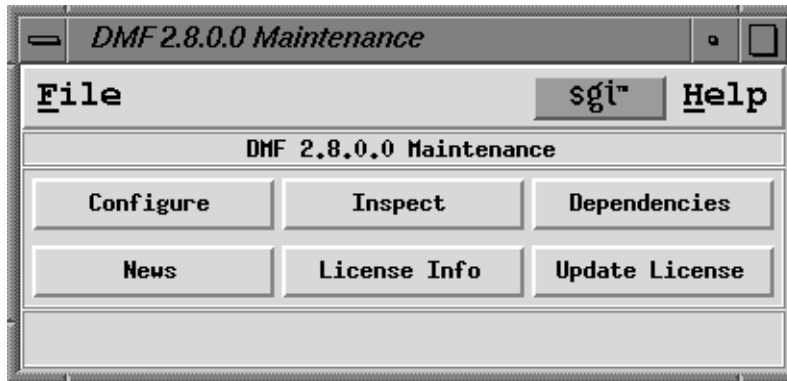
---

To use the `dmmaint` utility, ensure that your `DISPLAY` environment variable is set up, and then enter the following command:

```
/usr/sbin/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 7-1, page 20 is then displayed:



**Figure 7-1** DMF Version Maintenance Display

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

Field/Button	Description
Active Version	Displays the current, installed version of DMF.
Configure	<p>Lets you customize the DMF configuration file for the selected version of DMF.</p> <p>If this is the first time you have configured 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 (MSP)/library servers (LS).</p> <p>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.</p> <p>After you choose a file to use as a basis, an editing session is started (in a new window) that displays a</p>

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 parameters you can use in your DMF configuration file, see the `dmf.conf(5)` man page (available from the **Help** button). The *DMF Administrator's Guide* also provides information on DMF configuration.

**Inspect**

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

After you have created a configuration file for DMF, you can click the **Inspect** button, which runs `dmcheck` to report any errors in the 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.

**Dependencies**

Lets you view the dependencies file (`/usr/relnotes/dmf/ch1.z` on IRIX; `/usr/share/doc/dmf-version_number/readme` on Linux). This file contains information on any dependencies that exist for this version of DMF, such as operating system levels supported, patch requirements, and so on.

**News**

Lets you view the news file (`/usr/relnotes/dmf/ch2.z` on IRIX; `/usr/share/doc/dmf-version_number/news` on Linux). 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.
<b>Update License</b>	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.
<b>Help</b>	Lets you view the <code>dmmaint(8)</code> or <code>dmf.conf(5)</code> man page.

## Completing Initial Configuration

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

### Procedure 7-1 Running `dmmaint`

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 configuration 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. If you do not want DMF to be automatically started and stopped, enter the following command (you must be running as `root`):

```
chkconfig dmf off
```

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





## FLEXIm License Requirements

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**Note:** The information in this chapter is for the DMF server only.

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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 `dmmain` 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 7-1, page 22.

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 ([orderdesk@sgi.com](mailto:orderdesk@sgi.com)), or by fax (+1 651 452 0141).



## Before You Start DMF

To use DMF commands and DMF man pages, set your `PATH` and `MANPATH` environment variables. The DMF administrator commands and executable files are installed in `/usr/sbin`. The user commands are installed in `/usr/bin`. The IRIX man pages are installed in `/usr/share/catman/u_man/cat[1,5,8]`. The Linux man pages are installed in `/usr/share/man/man[1,5,8]`.

---

**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.

---

Since DMF 2.8 and later versions install binaries and man pages in standard system locations, simply ensure that your `PATH` and `MANPATH` environment variables contain the appropriate paths listed above. In most cases, no additional path settings should be required.



## Upgrading DMF

Upgrading the DMF software is essentially the same procedure as the one described in Chapter 5, "Installing DMF on IRIX Systems", page 15 for IRIX systems or in Chapter 6, "Installing DMF on Linux Systems", page 17 for Linux systems.

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

- Before installing a DMF upgrade, you must stop DMF. To do so, enter the following command:  

```
/etc/init.d/dmf stop
```
- When you start to edit the configuration file for the upgrade version of DMF, you are prompted as to whether you want to use the existing configuration file or one of several sample files.

## Support Issues

Before upgrading to a new release, please read the following information and be sure that your site is able to accommodate the process. Failure to do so can cause major problems when the DMF is initialized.

DMF supports both OpenVault and the Tape Management Facility (TMF). You must acquire these facilities before you can upgrade. Support for the tape MSP Autoloader API has been dropped.

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.



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