



## ArcFiniti™ Operations Guide

007-5768-003

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## New Features in this Guide

Changes to this guide include support for the following:

- High availability (HA) ArcFiniti implementation, either preinstalled at the factory or upgraded on-site by SGI personnel. See "HA Management" on page 43.
- LiveArc™ digital asset management features:
  - Replication
  - Data and metadata analyzers
  - Indexes of annotated video and various forms of text
  - Write-once-read-many (WORM) capability to prevent data from being revised

See "LiveArc Digital Asset Management" on page 44

- DMF status and capacity reporting in the ArcFiniti Storage Applications Portal. See "Portal Overview" on page 19.



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## Record of Revision

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001	April 2011 Original publication
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## About This Guide

This guide provides basic information about using the SGI® ArcFiniti™ integrated data archive solution.

### Related Publications

The following SGI publications contain additional information:

- *High Availability Extension and SGI InfiniteStorage*
- *CXFS 6 Administrator Guide for SGI InfiniteStorage*
- *DMF 5 Administrator Guide for SGI InfiniteStorage*
- *DMF 5 Filesystem Audit Guide for SGI InfiniteStorage*
- *InfiniteStorage System Manager Enterprise Edition (ISSM-EE) Administration Guide*
- *InfiniteStorage System Manager Enterprise Edition (ISSM-EE) Software Concepts Guide*
- *SGI COPAN 400 User Guide*
- *SGI C1103-TY12 User's Guide*
- *SGI Management Center for InfiniteStorage Administrator Guide*

For detailed information about managing the SUSE® Linux® Enterprise High Availability Extension (HAE) product, see the *High Availability Guide* provided by the following Novell, Inc., website:

[http://www.novell.com/documentation/sle\\_ha/](http://www.novell.com/documentation/sle_ha/)

For more information about the LiveArc digital asset management features, see the online help and the following Mediaflux™ documentation:

- *Mediaflux Release Notes*
- *Mediaflux Administration Guide*
- *Mediaflux Command User and Developer Guide*

Also see the *Platform Service Manager Online Help* available from the PSM **Help** menu.

## Obtaining Publications

You can obtain SGI documentation as follows:

- See the SGI Technical Publications Library at <http://docs.sgi.com>. Various formats are available. This library contains the most recent and most comprehensive set of online books, release notes, man pages, and other information.
- You can view release notes on your system by accessing the `README.txt` file for the product. This is usually located in the `/usr/share/doc/productname` directory, although file locations may vary.
- You can view man pages by typing `man title` at a command line.

## Conventions

The following conventions are used throughout this document:

<b>Convention</b>	<b>Meaning</b>
<code>command</code>	This fixed-space font denotes literal items such as commands, files, routines, path names, signals, messages, and programming language structures.
<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.
<code>manpage(x)</code>	Man page section identifiers appear in parentheses after man page names.



**GUI**

This font denotes the names of graphical user interface (GUI) elements such as windows, screens, dialog boxes, menus, toolbars, icons, buttons, boxes, fields, and lists.

## Reader Comments

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## Introduction

This chapter discusses the following:

- "What is the ArcFiniti™ Solution?" on page 1
- "Components" on page 2
- "Capacity" on page 8
- "Power Management" on page 9
- "How Does Archiving Work?" on page 10
- "DMF-Managed User Filesystems" on page 12
- "File Exporting" on page 13
- "Using ArcFiniti" on page 14
- "For More Information" on page 17

### What is the ArcFiniti™ Solution?

ArcFiniti is an integrated disk-based data archiving solution that offers performance, accessibility, power efficiency, and long-term data integrity advantages over tape.

Because ArcFiniti is preconfigured at the factory, it is easy to deploy and use. All files are always in an available online state to users. Archived files appear as normal files to users and are easily accessible via high-performance network connections. By transparently managing the placement of file data on the appropriate storage tier, ArcFiniti lets you cost-effectively maintain a seemingly infinite amount of data without sacrificing accessibility.

ArcFiniti also monitors the health of disk drives; if ArcFiniti detects a mechanical problem, it automatically migrates data and alerts the administrator. By operating a subset of the disk drives at any given time, ArcFiniti reduces both the cost of operation and the risk of hardware failure.

## Components

ArcFiniti integrates the following major components:

- ArcFiniti Storage Applications Portal provides access to other tools you will need to manage the ArcFiniti solution
- CXFS™ software allows the sharing of DMF-managed user filesystems among NFS server nodes
- Data Migration Facility (DMF) software manages the archiving of files, making use of the OpenVault™ mounting service
- DMF Manager lets you monitor and manage DMF data migration between storage tiers
- *(Optional)* LiveArc™ digital asset management features:
  - Data and metadata analyzers
  - Indexes of annotated video and various forms of text
  - Replication
  - Write-once-read-many (WORM) capability to prevent data from being revised
- Power Managed RAID® software operates a subset of disk drives at any given time, capping power consumption and turning off drives not in use
- Disk Aerobics® software automatically monitors the health of powered-on disk drives and periodically tests all disk drives in each MAID array
- SGI Management Center for Infinite Storage (SMC IS) lets you monitor local disk metrics and configure Network File System (NFS) exports or Common Internet File System (CIFS) shares from existing filesystems

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**Note:** CIFS shares (via SAMBA) are only supported via the CXFS metadata server. If you want clients to access the same files via CIFS shares and NFS exports, performance will be best if the NFS export is also on the CXFS metadata server.

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- High-performance NFS-serving capability allows any active ArcFiniti node to export data with NFS. See "File Exporting" on page 13.
- SGI InfiniteStorage™ System Manager Enterprise Edition (ISSM-EE) lets you configure and monitor the SGI InfiniteStorage 5000 (IS5000) RAID

- Primary cache of DMF-managed user filesystems for transactional storage on the higher-performance IS5000 RAID
- Archive of migrated file data for persistent storage on cost-effective COPAN™ 400M native massive array of idle disks (MAID), with up to 6 shelves
- SGI® Rackable® C1103-TY12 server nodes that have various functions:

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**Note:** For simplicity, the ArcFiniti nodes are referred to in this guide by their primary function for DMF. The individual DMF processes that archive and recall data are known as *data mover processes*. These mover processes run on the *DMF server* as well as any *parallel data mover nodes*. For brevity, the parallel data mover nodes are referred to in this guide as *mover nodes*.

---

- The DMF server performs the following functions:
  - Coordinates DMF activity as the DMF server
  - Moves data to the assigned MAID shelves in the archive tier
  - Coordinates CXFS activity for the primary filesystem as the CXFS metadata server
  - Mounts CXFS filesystems for access by the DMF server, the mover nodes, and NFS
  - Shares NFS mount points with network-attached NFS clients as an NFS server
- Up to two DMF mover nodes. A mover node performs the following functions:
  - Moves data to assigned MAID shelves in the archive tier
  - Mounts CXFS filesystems for access by the DMF server, the mover nodes, and NFS as a CXFS client-only node
  - Shares NFS mount points with network-attached NFS clients as an NFS server
- Embedded Platform Service Manager (PSM) server and GUI, which lets you control and monitor the ArcFiniti hardware and software components
- Embedded Ethernet switch for intra-cabinet cluster communication

Figure 1-1 shows a conceptual drawing of the ArcFiniti components and their uses, showing the largest model. (The figure does not address HA.)

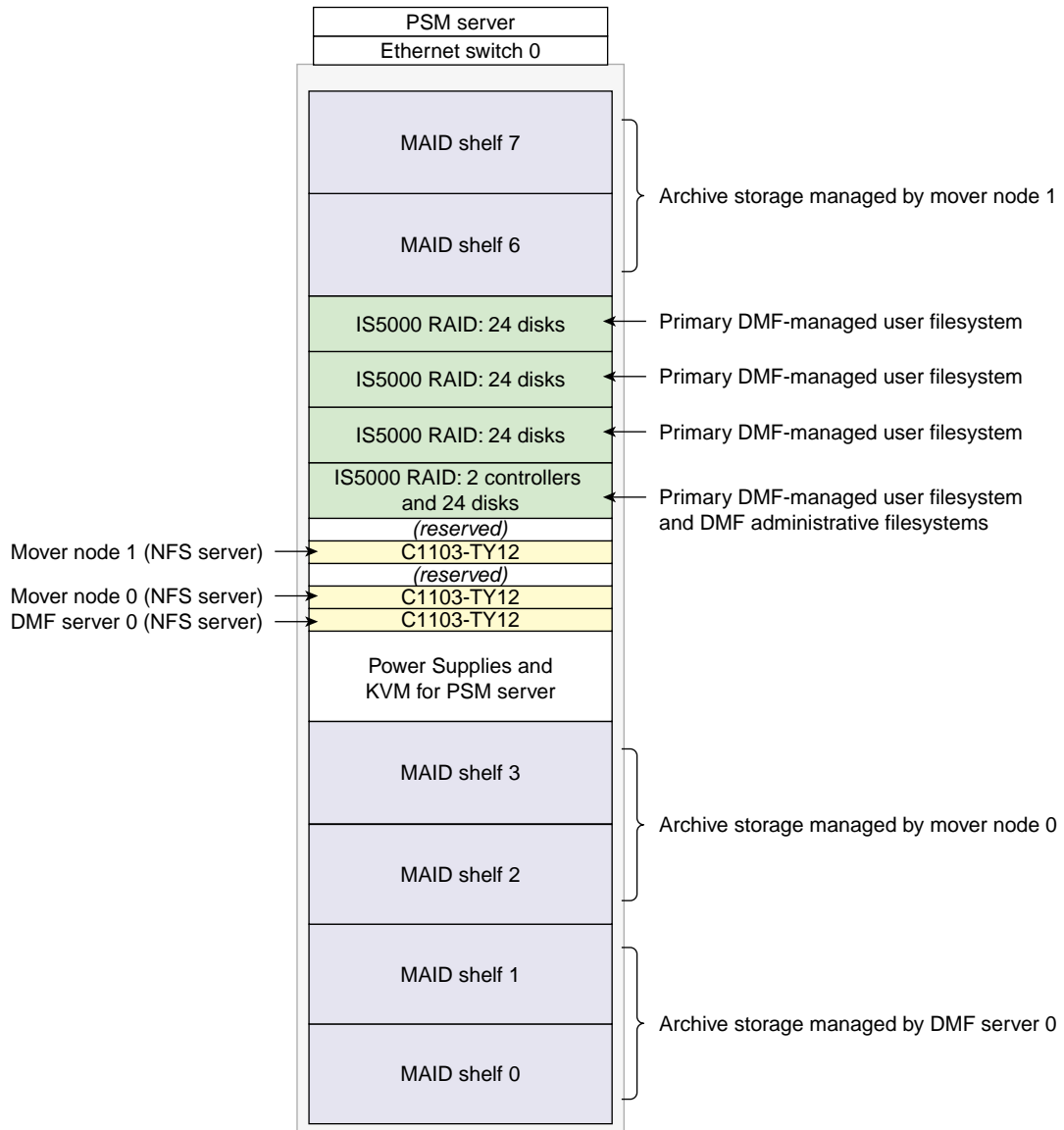
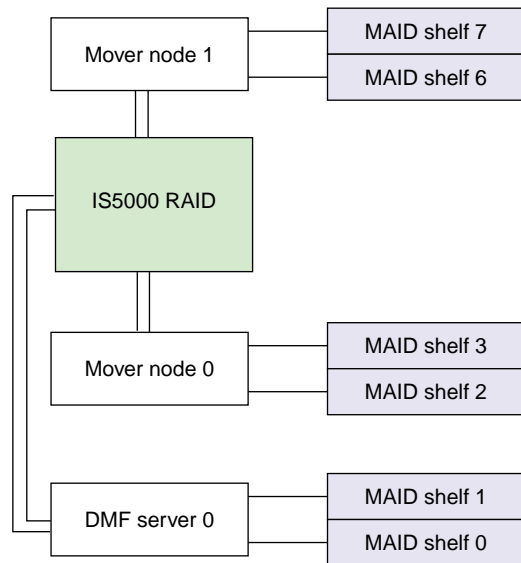


Figure 1-1 ArcFiniti Components

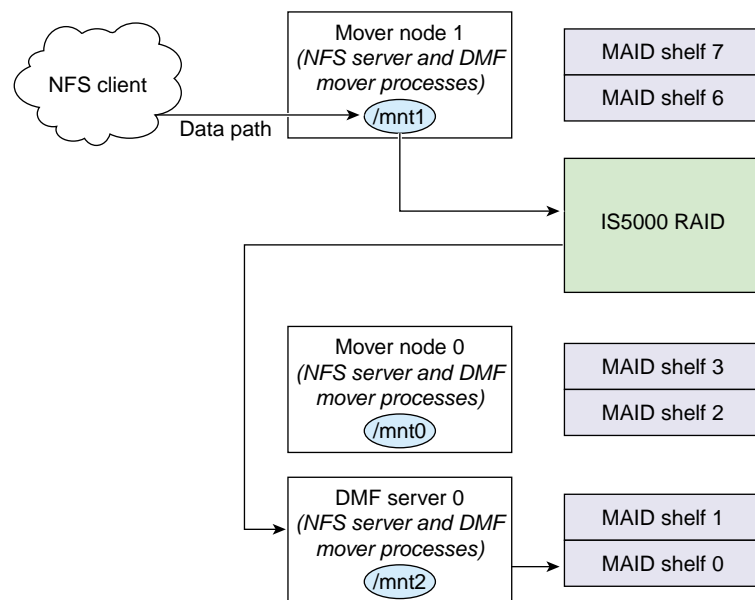
Figure 1-2 is a conceptual drawing of the data-path relationships among the nodes and the storage, showing that all nodes have access via two connections to the primary filesystem on the IS5000 cache, but that each node has access to only two MAID shelves, such as DMF server 0 connects to MAID shelves 0 and 1. (Connections to the client network are not represented in the figure.)



**Figure 1-2** Relationships Among the Nodes, RAID, and MAID Shelves

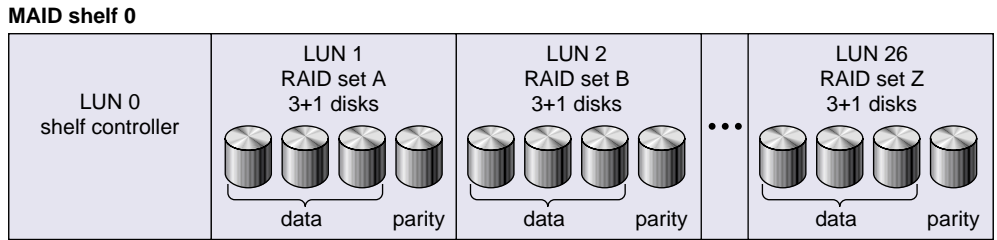


Figure 1-3 shows an example of the path that file data might take from the NFS client to a mount point on a specific ArcFiniti node (in this case, the `/mnt1` mount point on mover node 1) to be stored in the primary filesystem on the IS5000 cache (using a mover process on mover node 1), and then being archived by another node (in this case, a mover process on the DMF server) to the archive tier on one of the MAID shelves available to that node (in this case, the mover process on the DMF server has access to either MAID shelf 1 or MAID shelf 0, and has chosen MAID shelf 0).



**Figure 1-3** Example Data Path from NFS Client to COPAN MAID

Each MAID shelf has a RAID controller and 26 groups of disks; each group is referred to as a *RAID set*. Each RAID set appears to the DMF server and to the mover nodes as a SCSI disk device *logical unit (LUN)*. Each RAID set has three data disks plus one parity disk (known as *RAID 5*) . Figure 1-4 shows a conceptual example of a MAID shelf.



**Figure 1-4** MAID Shelf Contents

Each RAID set A-Z will be formatted with an XFS filesystem. Large files, known as *volumes*, will be preallocated on the filesystem. From the point of view of DMF and OpenVault, these volumes are the logical equivalent of a tape cartridge. (These volumes are sometimes referred to as *tapes* in command output and documentation.)

If you have an HA ArcFiniti system, either preinstalled at the factory or upgraded on-site by SGI personnel, a failure of the DMF server or a mover node will cause its functionality to fail over to the passive DMF server or the alternate mover node.

## Capacity

ArcFiniti has a range of five models, which enables growth in capacity and in network throughput. Table 1-1 describes the disk capacity and port options by model. (Because the primary disk content essentially overlaps with the archive disk content, the archive capacity is the total useful disk space.)

To upgrade your solution, contact SGI Professional Services.

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**Note:** The sizes in the following table are in powers of 1000 (TB), not 1024 (TiB).

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**Table 1-1** ArcFiniti Models

Feature	A156	A234	A468	A936	A1404
Gigabit Ethernet ports	2	2	2	4	6
10-Gigabit Ethernet ports	2	2	2	4	6
Primary filesystem disk capacity on IS5000 RAID	10.8 TB	10.8 TB	10.8 TB	22.8 TB	34.8 TB
Archive tier disk capacity on COPAN MAID for standard ArcFiniti solution	156 TB	234 TB	468 TB	936 TB	1.4 PB
<i>Additional primary filesystem disk capacity available with an optional extra tray of IS5000 disks</i>	<i>12 TB</i>	<i>12 TB</i>	<i>12 TB</i>	<i>12 TB</i>	<i>12 TB</i>

## Power Management

Power Managed RAID software selectively powers-on the group of drives that constitute an individual RAID set in the COPAN MAID, ensuring that a preconfigured maximum threshold of 50% of the drives within the MAID shelves are powered on at any one time. It powers off the drives in the least-recently used RAID set after a period of disuse or when a fixed power budget is exceeded. All drives will eventually power off when not in use by DMF, and power on again as needed. This has the following benefits:

- Reduces heat and vibration, which increases the reliability of drives, and therefore protects the data on those drives and minimizes repair costs
- Reduces power-consumption and therefore operational costs

To maintain the power budget, DMF carefully controls how many RAID sets are accessed at once and groups archival/retrieval requests in order to move data efficiently. If data is required from a disk that is powered down, Power Managed RAID will spin down the drives in another RAID set and then power up the drives in the RAID set that contains the data being requested.

## How Does Archiving Work?

ArcFiniti uses DMF to continuously monitor the managed user filesystem. Only the most timely data resides on the higher performance primary filesystem; less timely data is automatically migrated to the archive tier. However, data always appears to be online to end users and applications, regardless of its actual location.

DMF moves file data to archive storage on the COPAN MAID disk, but it leaves critical metadata (such as index nodes, or *inodes*, and directories) in the primary filesystem on the IS5000 cache. A user retrieves a file from the IS5000 cache simply by accessing it normally through NFS; DMF automatically recalls the file's data from the archive storage, caching it on the primary filesystem. From a user's perspective, all content is visible all of the time.

Figure 1-5 describes the archiving concept, showing that data is removed from the IS5000 cache after migrating (represented by the dashed lines) and moved to the archive on MAID, but the inode remains in place in the primary filesystem. During the period when the data has been copied to the archive storage on MAID but has not yet been deleted from the primary filesystem, the file is considered to be *dual-state*. After the data has been deleted from the primary filesystem, the file is considered to be *offline*.

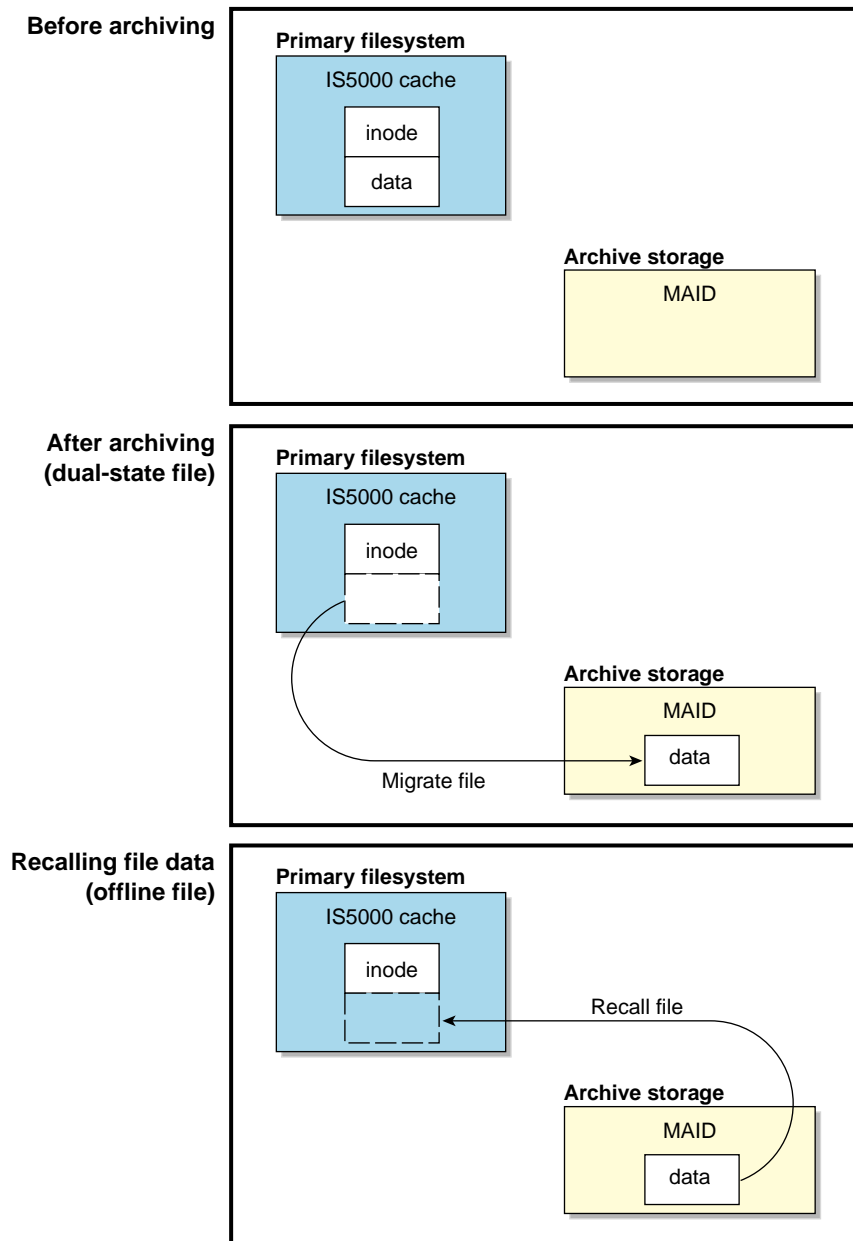


Figure 1-5 Archiving and Recalling File Data

Because the inodes and directories remain online, users and applications never need to know where the data actually resides; archived files remain cataloged in their original directories and are accessed as if they were still online. In fact, when drilling into directories or listing their contents, a user cannot determine whether a file is online or offline; determining the data's actual residence requires special commands or command options. The only difference users might notice is a slight delay in access time.

The DMF server and the mover nodes can each run multiple data mover processes. For the purposes of archiving, all DMF mover processes running on each ArcFiniti node share access to the same underlying CXFS clustered filesystems on the IS5000 cache that the users access via NFS.

The IS5000 cache also contains several filesystems (required for DMF administrative directories) that are shared among all ArcFiniti nodes; these administrative filesystems are not accessible to users.

## DMF-Managed User Filesystems

Your ArcFiniti solution comes preconfigured with up to six user filesystems that will be monitored by DMF. By default, there is one large primary filesystem that incorporates all of the available user space on the IS5000 disks. If there are multiple filesystems, the ArcFiniti solution can be preconfigured to restrict a particular filesystem's data to a subset of the available MAID shelves or the filesystem can be given equal access to all MAID shelves.

When a file is archived, a copy of a file's data is placed onto one of the available MAID shelves by default; a MAID shelf will be chosen so as to balance the amount of data stored on each shelf. ArcFiniti uses RAID 5 for secondary storage and powers off disks for longer life, so it is not absolutely necessary to make a second copy of file data when archiving a file (which is different from the recommendation when using DMF with tapes). However, a second copy is recommended if the ArcFiniti cabinet has at least two MAID shelves. (The ArcFiniti solution makes at most one copy per shelf.) If desired, your system may have been preconfigured to make an additional copy on a different shelf on a per-filesystem basis. To modify the DMF configuration, contact SGI Support.

The preconfigured solution comes with all of the required DMF administrative directories and migration policies appropriate for typical use of the ArcFiniti solution. The default migration policies do the following:

- Copy (migrate) most file data from the primary cache to the archive tier, other than files accessed within the last hour (to allow file content to stabilize). This occurs frequently (such as every night) or when the free-space minimum threshold is exceeded.
- Keep at least 10% of the primary filesystem free for new data. When the filesystem reaches this threshold, DMF will free the already-migrated data from the primary filesystem until 20% of the filesystem is free, selecting the oldest files first. (Optionally, a portion of each file can be left on the primary filesystem for use by file managers, in order to avoid unnecessary recall of a file due to directory browsing.)
- *(Optional)* Compress migrated data, if appropriate for your site. (By default, there is no compression.)

For more information, see *DMF 5 Administrator Guide for SGI InfiniteStorage*.

## File Exporting

When exporting NFS filesystems from multiple ArcFiniti nodes without the high availability (HA) feature installed, file locks taken by NFS clients will not be preserved across NFS server outages.

If your NFS client applications use file locks, you should do one of the following:

- Export a given filesystem from only one ArcFiniti node
- Install the HA feature and export a given filesystem from only one of the HA clusters, either the DMF server HA cluster or the mover node HA cluster

Table 1-2 summarizes where a given filesystem may be exported.

**Table 1-2** Nodes that Can Export a Given Filesystem

CIFS	NFS	NFS with Locks	NFS with Locks and HA
DMF active server only	Both: <ul style="list-style-type: none"><li>• DMF active server</li><li><i>and</i></li><li>• Both mover nodes</li></ul>	Either: <ul style="list-style-type: none"><li>• DMF active server</li><li><i>or else</i></li><li>• One mover node</li></ul>	Either: <ul style="list-style-type: none"><li>• DMF active server</li><li><i>or else</i></li><li>• Both mover nodes</li></ul>

---

**Note:** The passive server can only export files after failover occurs, when it becomes the active server.

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## Using ArcFiniti

This section provides an overview of the following:

- "ArcFiniti Tools" on page 14
- "Monitoring" on page 16
- "Backing Up Data" on page 16
- "Modifying the Configuration" on page 17
- "Fixing Problems" on page 17

## ArcFiniti Tools

The *ArcFiniti Storage Applications Portal* provides access to several system administration tools that you will need to manage the ArcFiniti solution. Most of the tools are also available directly, via the user data networks. Figure 1-6 shows an example of the portal. For details about accessing and using the portal, see "ArcFiniti Storage Applications Portal" on page 19.

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**Note:** The ArcFiniti solution was preconfigured according to the specifications for your site and is optimized for use in archiving persistent data. You should not make changes to the ArcFiniti components unless you fully understand the implications or are advised to do so by SGI Support.

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sg i ArcFiniti Storage Applications Portal Available Capacity 369.87 TiB

Server	Application	State	Actions
tdmf1 (DMF Server)	Baseboard Management Controller (192.168.10.220)	online	<a href="#">open X interface</a>
jdmf1 (DMF Mover)	Connect to server (shellinabox-2.10) System Configuration (yast2-2.17.92) High Availability (pacemaker-mgmt-client-2.0.0) Storage Array Manager (SMEEclient-10.77.G8.14) XVM & CXFS Manager (sgi-sysadm_xvm-client-2.1) DMF Manager (dmf-manager-5.5.0) Storage Monitoring & Configuration (ssmc-1.5) LiveArc Configuration (3.7.001) Archive System Diagnostics	started	<a href="#">open web interface</a> <a href="#">stop service</a>
jdmf2 (DMF Mover)		installed	<a href="#">open X interface</a>
tdmf2 (DMF Server)		installed	<a href="#">open X interface</a>
		installed	<a href="#">open X interface</a>
		installed	<a href="#">open X interface</a>
		started	<a href="#">open web interface</a>
		started	<a href="#">open web interface</a> <a href="#">stop service</a>
		started	<a href="#">open web interface</a>
		ready	<a href="#">download data</a>

[Platform Service Manager](#) for 10.4.2.227

For more information, refer to the ArcFiniti™ [Operations Guide](#).

Documentation for each application is available through its management interface.

**Figure 1-6** ArcFiniti Storage Applications Portal

## Monitoring

You should monitor DMF on a daily basis to ensure that it is operating properly. ArcFiniti is preconfigured with several automated tasks that generate reports about activity, status, and errors. Additionally, some serious error conditions generate messages. It is important that you use DMF Manager (available through the portal) to examine these reports and messages regularly so that you can find any problems in time to retrieve important information that can help diagnose the problem.

As an alternative to monitoring the reports, you can choose to have email notification sent to a site-specific address; see "Using DMF Email Notification" on page 64.

In addition, you can configure PSM to send system event email through the administrative network, and to send regular hardware health checks to the administrator and SGI. You can also configure the IS5000 RAID to send event email through the user data network.

See Chapter 2, "Managing the ArcFiniti Solution" on page 19.

If you have an HA ArcFiniti system, see the chapter about administrative tasks in *High Availability Extension and SGI InfiniteStorage*. If you want to upgrade to an HA system, contact SGI.

## Backing Up Data

ArcFiniti is configured to copy all data to MAID storage and to back up the following on a daily basis:

- Primary filesystem inodes and directories, which allow the primary filesystem to be restored if the IS5000 disk fails
- DMF database, which maps primary filesystem inodes to file data locations on archive storage

The dumps for each day's backup are kept for 10 days before the space is recycled. One copy of each dump is kept on a non-DMF region of MAID shelf 0 in LUN 26 (RAID set Z). Another copy is kept in `/data2/backups` on the `/data2` system disk in the DMF server.

For more information, see the *DMF 5 Administrator Guide for SGI InfiniteStorage*.

---

**Note:** DMF journals provide incremental records of archival activity between DMF database backups. These journals are kept on the IS5000 cache in a different RAID set from the one used for the DMF database. Like DMF dumps, the DMF journals are stored for a preconfigured amount of time.

---

## Modifying the Configuration

If you did not choose to have your solution preconfigured to make two copies, you can later modify the DMF policies to create another copy. If necessary, you can also modify the DMF space-management and backup tasks by using DMF tools. For more information, contact SGI Support. If changes are made to your system, you should use the **download data** link in the portal to archive the changed system configuration. See "Collecting Data for Problem Analysis" on page 67.

## Fixing Problems

If you run into problems, see Chapter 4, "Troubleshooting the ArcFiniti Solution" on page 67, to determine if the issue is something you can easily solve yourself or if you should contact SGI Support.

## For More Information

For more information about your ArcFiniti solution, see the documentation available online via the portal applications (also listed in the Preface), review the documentation for command-line tools (man pages) by using the `man(1)` command on the servers, and contact SGI Support to learn about technical classes, support services, and professional services. See "Contacting SGI Support" on page 72.

The release notes and manuals for some software components are also provided in the `noarch/sgi-isspdocs` RPM and will be installed on the DMF server into the following locations:

```
/usr/share/doc/packages/sgi-issp-VERSION/TITLE
```

The Mediaflux™ documents that support LiveArc are installed in the following location:

```
/opt/livearc/docs
```

Also see the *Platform Service Manager Online Help* available from the PSM **Help** menu on the GUI.

## Managing the ArcFiniti Solution

This chapter discusses the following:

- "ArcFiniti Storage Applications Portal" on page 19
- "Archive Management" on page 23
- "Clustered Filesystem Management" on page 33
- "NFS and CIFS Management" on page 35
- "COPAN Cabinet Management" on page 38
- "IS5000 RAID Management" on page 41
- "HA Management" on page 43
- "LiveArc Digital Asset Management" on page 44

### ArcFiniti Storage Applications Portal

This section discusses the following:

- "Portal Overview" on page 19
- "Portal Requirements" on page 23
- "Launching the Portal" on page 23

#### Portal Overview

The ArcFiniti Storage Applications Portal provides easy access to system administration tools that you will use to manage the ArcFiniti solution. The portal displays the following:

- DMF server or mover node (the appropriate subset of links will be shown):
  - Baseboard management controller (BMC) for access to server hardware status and to each node's system console, for actions such as displaying the console output, observing server boot progress, and power-cycling the C1103-TY12

- Terminal connection to the C1103-TY12, allowing you to run user and administrator commands
- YaST2 tool for software installation, management, and upgrades
- (*Optional*) Pacemaker GUI for high availability (HA) resource management
- InfiniteStorage System Manager Enterprise Edition (ISSM-EE) for IS5000 storage array management
- CXFS Manager for managing clustered filesystem volumes on the IS5000 RAID
- DMF Manager for monitoring and managing DMF data migration between storage tiers
- SGI Management Center for Infinite Storage (SMC IS) for monitoring local disk metrics and configuring NFS exports and CIFS shares
- (*Optional*) LiveArc Configuration UI for modifying digital asset management features
- Archive System Diagnostics for CXFS and DMF (which will be available for download as a compressed `tar` file)
- COPAN Platform Service Manager (PSM) GUI for monitoring and managing the MAID and other cabinet components

The administrative applications are tunneled through the same interface as the portal for convenience. You can also access DMF Manager and CXFS Manager directly on the DMF server, and YaST2 directly on any of the nodes. For more information, see the documentation for those applications.

The portal provides a high-level DMF status in the **DMF Manager** box when the active DMF server is selected:

- Green indicates that all DMF systems are operational and CXFS is stable, although informational messages may be present (the green color appears when you place the mouse pointer over the DMF Manager application)
- Orange indicates that there are warning messages that require attention, but the ArcFiniti system is functioning
- Red indicates that the ArcFiniti system is down or degraded, which indicates issues such as the following:
  - There is problem with one of the DMF servers or the mover nodes

- The DMF daemon process is not responding
- HA is in maintenance mode
- There are error messages

---

**Note:** In an HA environment, the active DMF server has DMF Manager started.

---

The portal displays the *available capacity*, which is the total writable space remaining on all volumes. If you click on the DMF Manager box, a pop-up window provides more information about the state of CXFS, DMF, and the HA environment, such as shown in Figure 2-1.

## 2: Managing the ArcFiniti Solution

sgl ArcFiniti Storage Applications Portal Available Capacity 369.87 TiB

Server	Application	State	Actions
tdmf1 (DMF Server) jdmf1 (DMF Mover) jdmf2 (DMF Mover) tdmf2 (DMF Server)	Baseboard Management Controller (192.168.10.220)	online	<a href="#">open X interface</a>
	Connect to server (shellinabox-2.10)	started	<a href="#">open web interface</a> <a href="#">stop service</a>
	System Configuration (yast2-2.17.92)	installed	<a href="#">open X interface</a>
	High Availability (pacemaker-mgmt-client-2.0.0)	installed	<a href="#">open X interface</a>
	Storage Array Manager (SMEEclient-10.77.G8.14)	installed	<a href="#">open X interface</a>
	XVM & CXFS Manager (sgi-sysadm_xvm-client-2.1)	installed	<a href="#">open X interface</a>
	DMF Manager (dmf-manager-5.5.0)	started	<a href="#">open web interface</a>
	Storage Monitoring & Control (ssmc-1.5)	2012-03-27 15:29:19 All systems are operational.	<a href="#">web interface</a> <a href="#">service</a>
	LiveArc Configuration (3.7.001)	started	<a href="#">open web interface</a>
	Archive System Diagnostics	ready	<a href="#">download data</a>

[Platform Service Manager](#) for 10.4.2.227

For more information, refer to the ArcFiniti [Operations Guide](#).

Documentation for each application is available through its management interface.

Figure 2-1 Status Shown in the Portal



The tool you will use most often to monitor the ArcFiniti solution is DMF Manager. When you initially open DMF Manager, you will see the **Overview** panel, which displays a high-level graphical view of the ArcFiniti environment and status for each component. At a glance, you can see if everything is operating properly. For more information, see "Monitoring DMF Status" on page 25.



---

**Caution:** You should take care to allow only knowledgeable system administrators access to the administrative tools. Improper use of these tools may result in loss of access to data, loss of data, or reduced system performance. For information about administrative training, contact SGI. See "Contacting SGI Support" on page 72.

---

## Portal Requirements

The portal is supported on Linux® systems and has the following system requirements:

- Firefox™ 3.x or newer with JavaScript™ enabled, displayed through an X11 server
- xterm
- OpenSSH
- Java® Web Start

## Launching the Portal

To access the portal, launch a web browser to the following URL:

`https://YOURSERVER/asap/`

When prompted on how to handle a JNLP file, select `/usr/bin/javaws` as the application.

## Archive Management

This section discusses the following:

- "Accessing DMF Manager" on page 24
- "Monitoring DMF Status" on page 25

- "Viewing Daily Reports" on page 29
- "Monitoring Capacity of the Primary Filesystem" on page 29
- "Monitoring Capacity of the Archive Tier" on page 31
- "Determining the Migration State of a File" on page 31

## Accessing DMF Manager

To access DMF Manager, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the DMF server name to display system administration links for that node.
3. For the **DMF Manager** application, click **open web interface**.
4. If necessary, accept the DMF Manager security certificate.

---

**Note:** DMF Manager generates its own SSL certificates, rather than having the SSL certificates signed by a commercial certificate authority. Therefore, the certificate warning is safe to ignore.

---

If you need help using DMF Manager, select the following from the DMF Manager menu bar:

**Help**  
    > **Getting Started**

## Monitoring DMF Status

When you initially open DMF Manager, you will see the **Overview** panel, which displays a high-level logical view of the ArcFiniti environment, including the relationships and status of components.

With a glance at the DMF Manager **Overview** panel, you can see if the system is operating properly. An icon in the upper-right corner indicates if DMF is up (green) or down (upside down and red). If DMF requires attention, DMF Manager makes actions available to identify and resolve problems. The tool volunteers information and provides context-sensitive online help. DMF Manager also displays performance statistics, allowing you to monitor DMF activity, filesystems, and hardware.

Figure 2-2 is an example of the **Overview** panel. It shows that DMF is up (green icon), but that it has some errors that require action (red indicator icon). It shows that there are two C1103-TY12 server nodes: **TDMF** (the DMF server) and **TDMF2** (a mover node). There is one DMF-managed user filesystem named **/dmfusr1**. The flag indicates that there are messages, likely about the tasks that have yellow warning indicator icons associated with them.

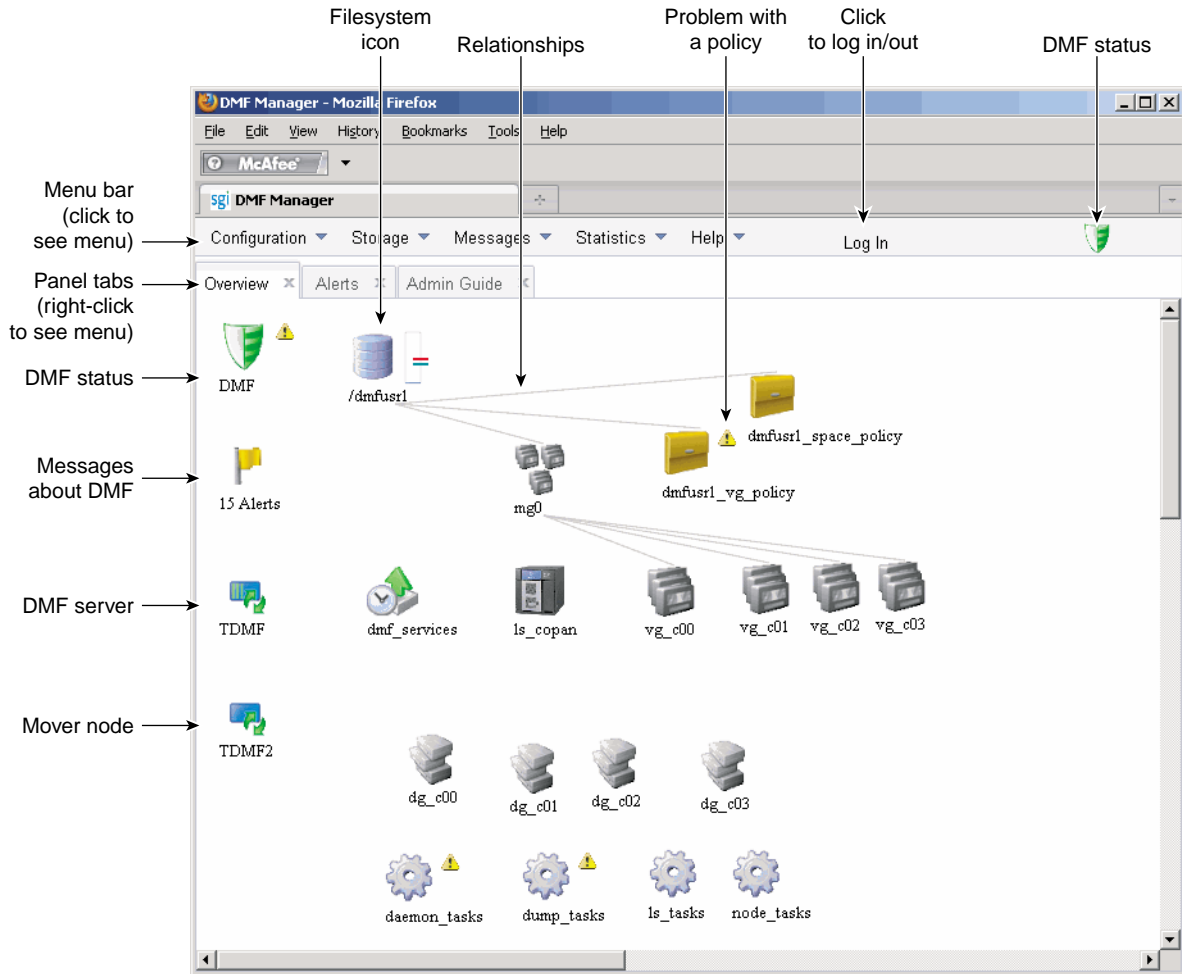


Figure 2-2 DMF Manager

Hover over a node's icon to view its DMF and CXFS states:

- DMF states:

- Active
- Inactive
- Disabled

- CXFS states, such as:

- Stable
- Establishing membership
- Inactive
- Disabled

Right-click the icon and select **Details...** to display a dialog containing more information about DMF and CXFS, including CXFS filesystem mount information. Items in green font indicate that all is well; items in red font indicate a problem. Click **Help** for more information about the fields in the dialog.

Figure 2-3 shows that `TDMF` is the DMF server and CXFS metadata server, and that `TDMF2` is a DMF mover node and CXFS client-only node. Both nodes have normal DMF and CXFS status. To see the CXFS mount information for the filesystems required for DMF administrative directories and for DMF-managed user filesystems, scroll down in the dialog window.

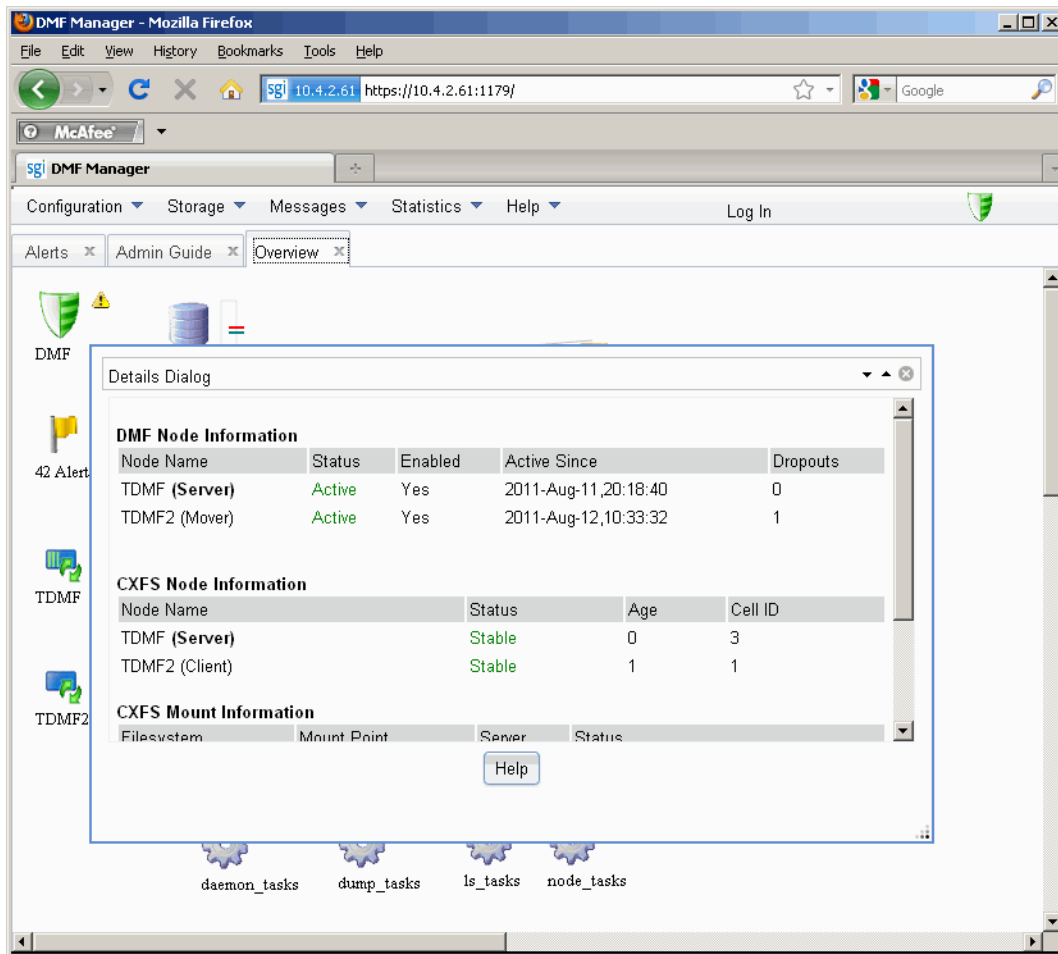


Figure 2-3 DMF Details Dialog

If you suspect a problem with DMF, see "Collecting Data for Problem Analysis" on page 67.

For more information, access the *DMF 5 Administrator Guide for SGI InfiniteStorage* by clicking on the **Help** in the DMF Manager menu bar.

## Viewing Daily Reports

You can use the following DMF Manager panel to view daily activity reports (those containing critical log errors show red warning symbols):

**Messages**  
    > **Reports**

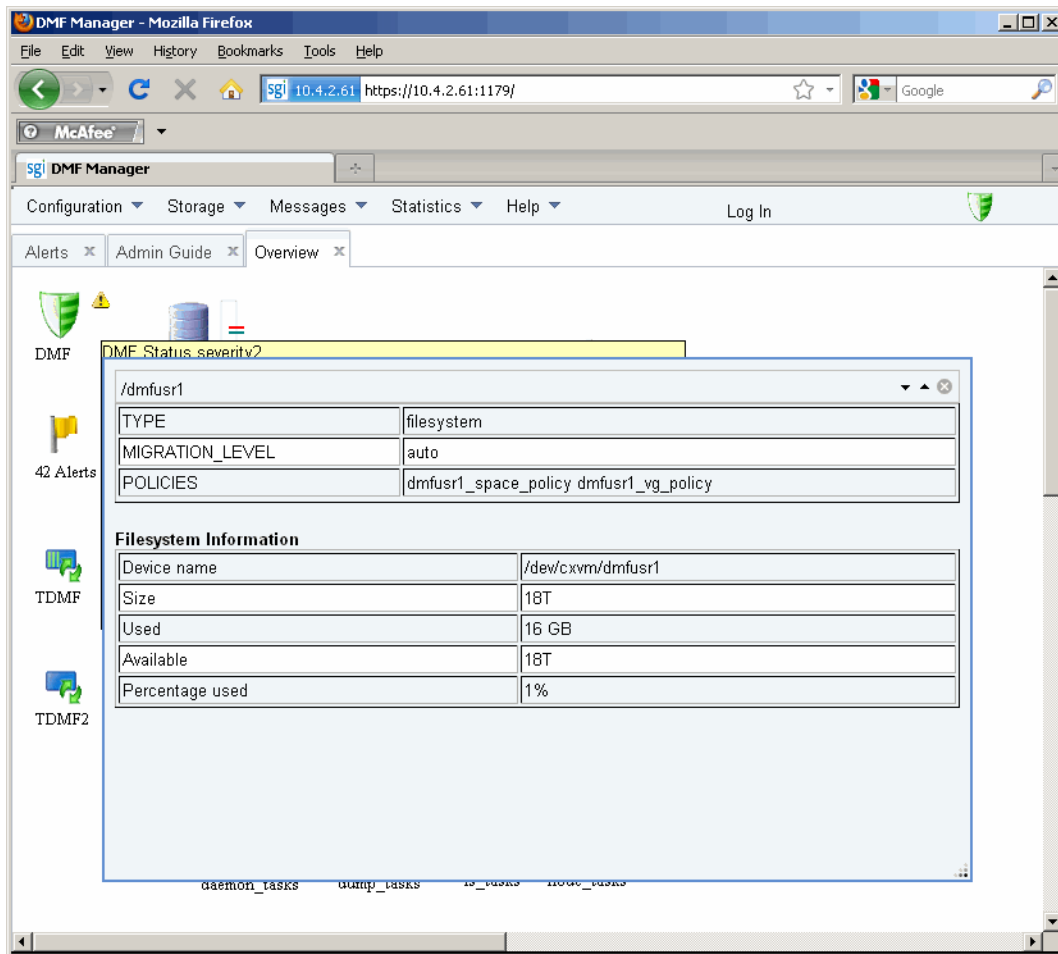
For more information about understanding the reports, see the *DMF 5 Administrator Guide for SGI InfiniteStorage*.

## Monitoring Capacity of the Primary Filesystem

To determine the capacity of the filesystem in the primary filesystem, do the following:

1. Right-click on the filesystem icon.
2. Select **Show Configuration...**
3. Examine the output under **File System Information**:
  - **Size** represents the total capacity of the filesystem
  - **Used** represents the amount of data currently residing in the filesystem
  - **Available** represents the amount of space that is free in the filesystem

Figure 2-4 shows an example for the `/dmfusr1` filesystem.



**Figure 2-4** User Filesystem Capacity in DMF Manager

You can also hover the cursor over the DMF shield icon to display the current fullness of the filesystems required for DMF administrative directories.



## Monitoring Capacity of the Archive Tier

To determine the available space on the COPAN MAID, do the following:

1. Select the following menu:

```
Statistics
  > DMF Resources
```

2. Select **Volume Groups** and the particular volume group that you want to monitor.
3. Examine the display.

---

**Note:** Some DMF configuration parameters use multipliers that are powers of 1000, such as KB, MB, and GB. However, the **DMF Activity**, **DMF Resources**, and **DMF I/O** panels use multipliers that are powers of 1024, such as kiB, MiB, and GiB. For example, this means that 1 MiB/s is  $2^{20} = 1048576$  bytes per second.

---

## Determining the Migration State of a File

To determine the migration state of a given file, do the following:

1. Select **open terminal** for the DMF server from the portal window.
2. In the terminal window, use the `dmls(1)` or `dmfind(1)` commands, which are similar to the Linux `ls(1)` and `find(1)` commands.

For example, the following command displays the files in the `/dmi4/abc` directory:

```
# dmls -l /dmi4/abc
total 68584
-rw-r--r-- 1 abc  sys  16373855 2006-07-22 15:01 (OFL) dmf_tst.00005
-rw-r--r-- 1 abc  sys  26362860 2006-07-22 15:02 (OFL) dmf_tst.00015
-rw-r--r-- 1 abc  sys  36199305 2006-07-22 15:03 (OFL) dmf_tst.00025
-rw-r--r-- 1 abc  sys  39310090 2006-07-22 15:04 (OFL) dmf_tst.00035
-rw-r--r-- 1 abc  sys  51488786 2006-07-22 15:06 (OFL) dmf_tst.00045
-rw-r--r-- 1 abc  sys  16373855 2006-07-22 15:52 (OFL) dmf_tst.00163
-rw-r--r-- 1 abc  sys  36199305 2006-07-22 15:53 (UNM) dmf_tst.00183
-rw-r--r-- 1 abc  sys  39310090 2006-07-22 15:55 (OFL) dmf_tst.00193
-rw-r--r-- 1 abc  sys  17829904 2006-07-22 15:59 (UNM) dmf_tst.00223
-rw-r--r-- 1 abc  sys  14572782 2006-07-22 16:06 (UNM) dmf_tst.00233
-rw-r--r-- 1 abc  sys  16373855 2006-07-22 16:08 (OFL) dmf_tst.00246
```

```
-rw-r--r-- 1 abc sys 27294750 2006-07-22 17:12 (DUL) dmf_tst.00606
-rw-r--r-- 1 abc sys 72121722 2006-07-22 17:17 (OFL) dmf_tst.00616
-rw-r--r-- 1 abc sys 22807602 2006-07-22 17:24 (DUL) dmf_tst.00636
```

DMF regards files as being of one of the following types:

- *Regular files* (REG) are user files residing only on the primary filesystem.
- *Migrating files* (MIG) are files whose copies on the archive tier on MAID are in progress.
- *Migrated files* are files that have one or more complete archive copies and no pending or incomplete archive copies. Migrated files are one of the following types:
  - *Dual-state files* (DUL) are files where the data resides both on primary filesystem and on the archive tier
  - *Offline files* (OFL) are files where the data is no longer on the primary filesystem
  - *Unmigrating files* (UNM) are previously offline files in the process of being recalled to primary filesystem
  - *Partial-state files* (PAR) are files with some combination of dual-state, offline, and/or unmigrating regions

---

**Note:** DMF does not migrate pipes, directories, or special files.

---

Like a regular file, a migrated file has an inode. An offline file or a partial-state file requires the intervention of DMF to recall its offline data; a dual-state file is accessed directly from the primary filesystem.

The operating system informs the DMF daemon when a migrated file is modified. If anything is written to a migrated file, the offline copy is no longer valid, and the file becomes a regular file until it is migrated again.

For more information, see the man pages and the *DMF 5 Administrator Guide for SGI InfiniteStorage*.

## Clustered Filesystem Management

---

**Note:** Filesystems mounted under the `cxfs_private` directory are restricted to LiveArc internal use.

---

To manage volumes via CXFS, depending upon the software installed, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the DMF server name.
3. For the **XVM & CXFS Manager** application, click **open X interface**.
4. Enter the password for the `psm` user.
5. Select the **Local** connection in the CXFS Manager startup dialog.
6. Click **OK**.
7. To monitor the state of a component, click on it in the **View** area.
8. To make changes, select the desired item from the **Tasks** menu.

For example, to mount a filesystem, you would select:

```
Tasks
  > Filesystems
      > Mount CXFS Filesystem
```

Figure 2-5 shows the **CXFS Manager** window displaying information for a specific component in the *details area*.

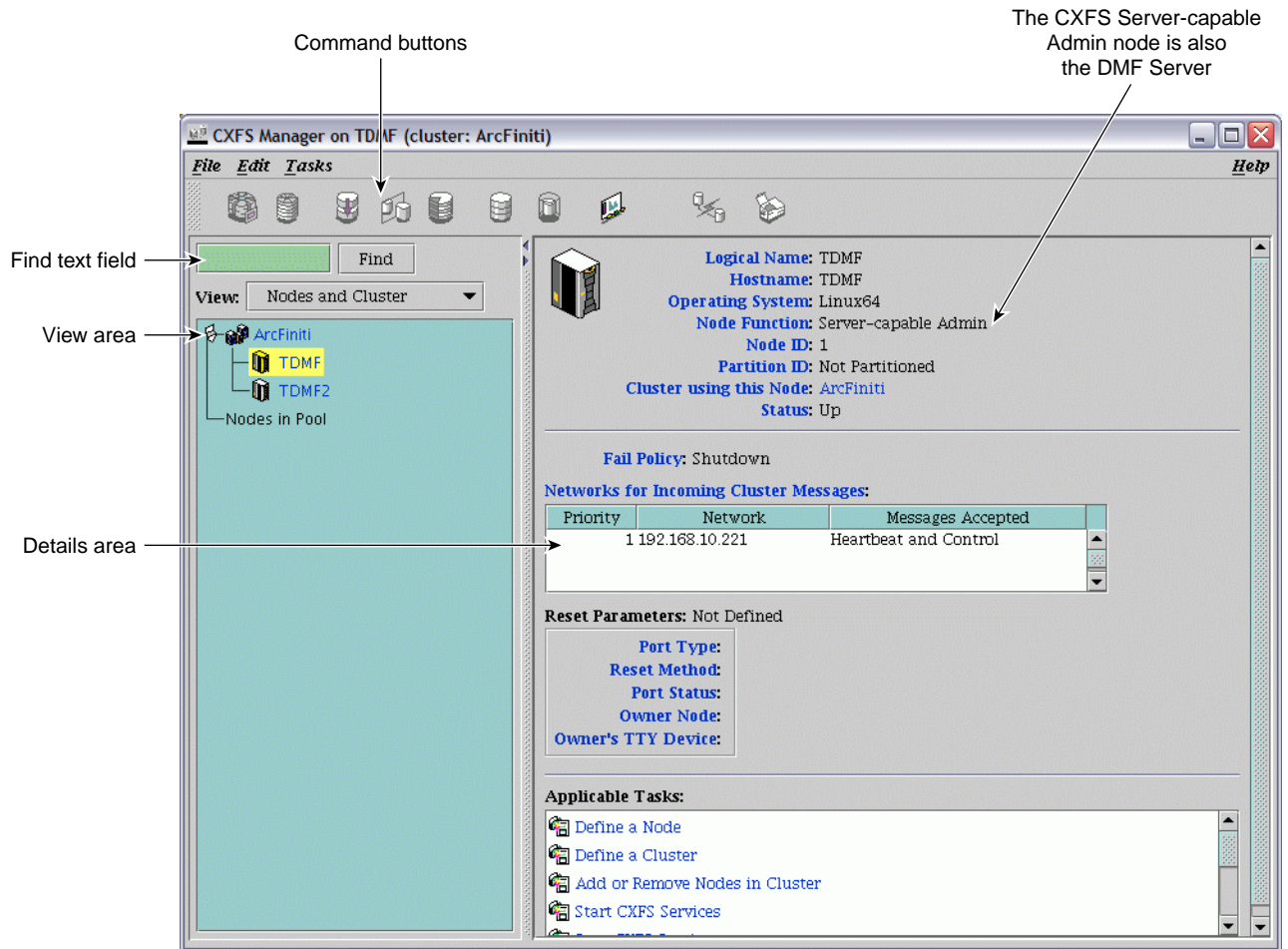


Figure 2-5 CXFS Manager GUI Showing Details for a Node

Click **Help** for more information.

For some tasks, you may wish to use the `cxfs_admin(8)` command. To access this command, select the **open terminal** link for the server in the portal.

If desired, you can also access CXFS Manager directly from the DMF server. For details, see *CXFS 6 Administrator Guide for SGI InfiniteStorage*.

## NFS and CIFS Management

---

**Note:** Filesystems mounted under the `cxfs_private` directory are restricted to LiveArc internal use.

---

This section discusses the following:

- "Overview of NFS and CIFS Management" on page 35
- "Accessing SMC IS" on page 37
- "Samba Differences" on page 37

### Overview of NFS and CIFS Management

To manage NFS or CIFS on ArcFiniti, you will use SGI Management Center for Infinite Storage (SMC IS). You can use SMC IS to do the following:

- Monitor the state and performance of the storage server, including the following:
  - CPU utilization
  - Local disk throughput and IOPS
  - Network throughput
- Review historical data describing the state and individual performance of the node on which SMC IS is running
- View connected clients and determine how each of these contribute to the current NFS or CIFS workload
- Configure NFS exports or CIFS shares from existing filesystems

---

**Note:** Reverse lookup for NFS clients must be properly configured in the DNS server because the NFS server will always try to do a reverse lookup on client IP addresses (improper configuration will cause delays).

---

Figure 2-6 shows an example of the **Summary** screen.

## 2: Managing the ArcFiniti Solution

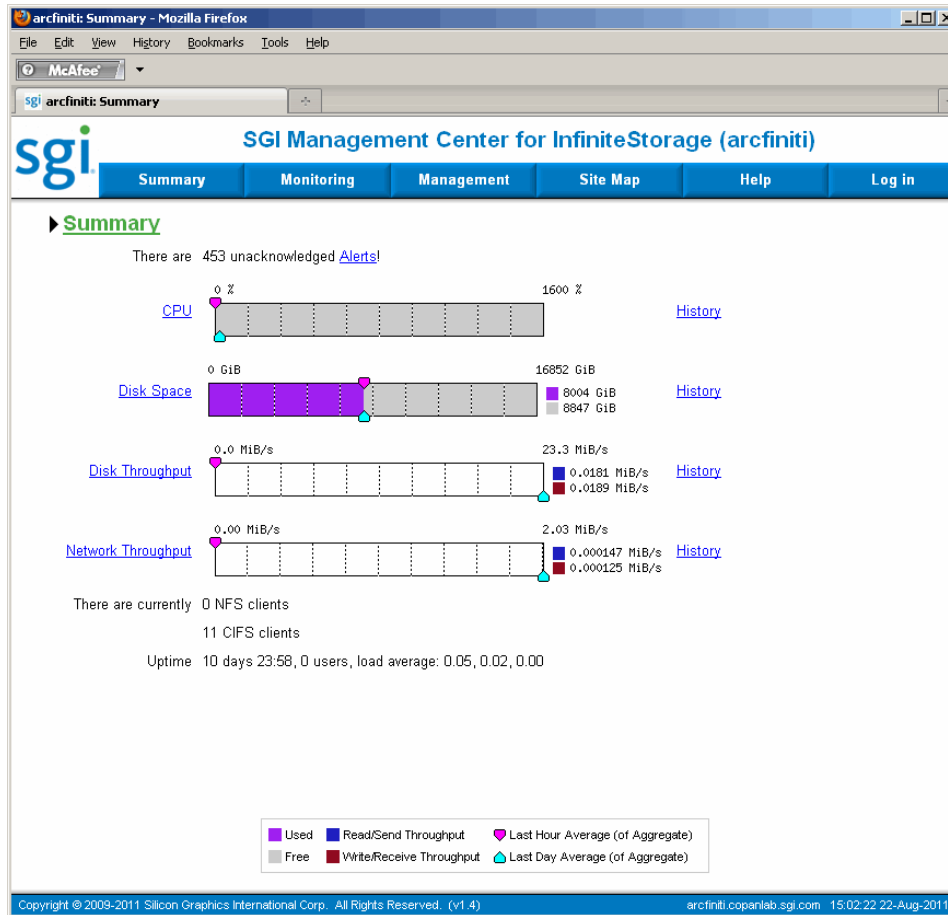


Figure 2-6 SGI Management Center for Infinite Storage (SMC IS)

## Accessing SMC IS

To access SMC IS, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the appropriate node name.
3. For **Storage Monitoring & Configuration** application, click **open web interface**.
4. If necessary, accept the security certificate.

---

**Note:** SMC IS generates its own SSL certificates, rather than having the SSL certificates signed by a commercial certificate authority. Therefore, the certificate warning is safe to ignore.

---

The first time you access SMC IS, you must set the administrator password. You must be logged in to configure NFS exports or CIFS shares.

For more information, click **Help** to access the *SGI Management Center for InfiniteStorage Administrator Guide*.

## Samba Differences

A CXFS filesystem may be shared via Samba from a CXFS node to other types of machines that are not running CXFS software, such as a Windows machine. The Samba server should run on the active metadata server for optimal performance. There can be one Samba server per CXFS filesystem. You must not serve the same CXFS filesystem from multiple nodes in a cluster.

The architecture of Samba assumes that each share is exported by a single server. Because all Samba client accesses to files and directories in that share are directed through a single Samba server, the Samba server is able to maintain private metadata state to implement the required concurrent access controls (in particular, share modes, write caching, and oplock states). This metadata is not necessarily promulgated to the filesystem and there is no protocol for multiple Samba servers exporting the same share to communicate this information between them.

Running multiple Samba servers on one or more CXFS clients exporting a single share that maps to a common underlying filesystem has the following risks:

- File data corruption from writer-writer concurrency
- Application failure due to inconsistent file data from writer-reader concurrency

These problems do not occur when a single Samba server is deployed, because that server maintains a consistent view of the metadata used to control concurrent access across all Samba clients.



---

**Caution:** SGI recommends that you do not use multiple Samba servers.

---

## COPAN Cabinet Management

This section discusses the following:

- "Accessing PSM" on page 38
- "Monitoring the Hardware Components" on page 39
- "Automatically Monitoring MAID Disks" on page 41

### Accessing PSM

To access the Platform Service Manager (PSM) GUI, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Click **Platform Service Manager**.
3. Enter the following:
  - PSM GUI user name: `admin`
  - Default PSM GUI password: `CPN200tx`

---

**Note:** You should change the password and only provide it to those persons who you want to access the PSM GUI.

---



## Monitoring the Hardware Components

The PSM GUI **System View** page displays recent high-priority alerts and overall MAID shelf hardware performance. Basic C1103-TY12 server hardware status is available by clicking on the picture of the server in the cabinet image.

Figure 2-7 shows an example of the PSM GUI.

## 2: Managing the ArcFiniti Solution



Figure 2-7 PSM GUI

You can configure PSM GUI email alerts; see "Using PSM Email Notification" on page 64.

For more information, see the *Platform Service Manager Online Help* available from the PSM GUIHelp menu and *SGI C1103-TY12 User's Guide*.

## Automatically Monitoring MAID Disks

The Disk Aerobics software continuously verifies data on a drive-by-drive basis. It periodically exercises all disks and detects potential drive failures before they occur. Disk Aerobics does the following on each drive:

1. Powers on and spins up the disk drive.
2. Ensures that the drive functions within parameters.
3. Inspects the health of drive segments, tracks, and sectors.
4. Reads the data to ensure its integrity.
5. Spins down and powers off the drive.
6. Records details of the operation.

If Disk Aerobics detects a potential problem in a disk, it will automatically migrate the data to a spare disk within the same MAID shelf and contact the administrator. If so notified, you should contact SGI Support for help in replacing failed hardware.

---

**Note:** PSM does not monitor the IS5000 disks. See "IS5000 RAID Management" on page 41.

---

## IS5000 RAID Management

You can use the InfiniteStorage System Manager Enterprise Edition (ISSM-EE) for monitoring the IS5000 RAID.

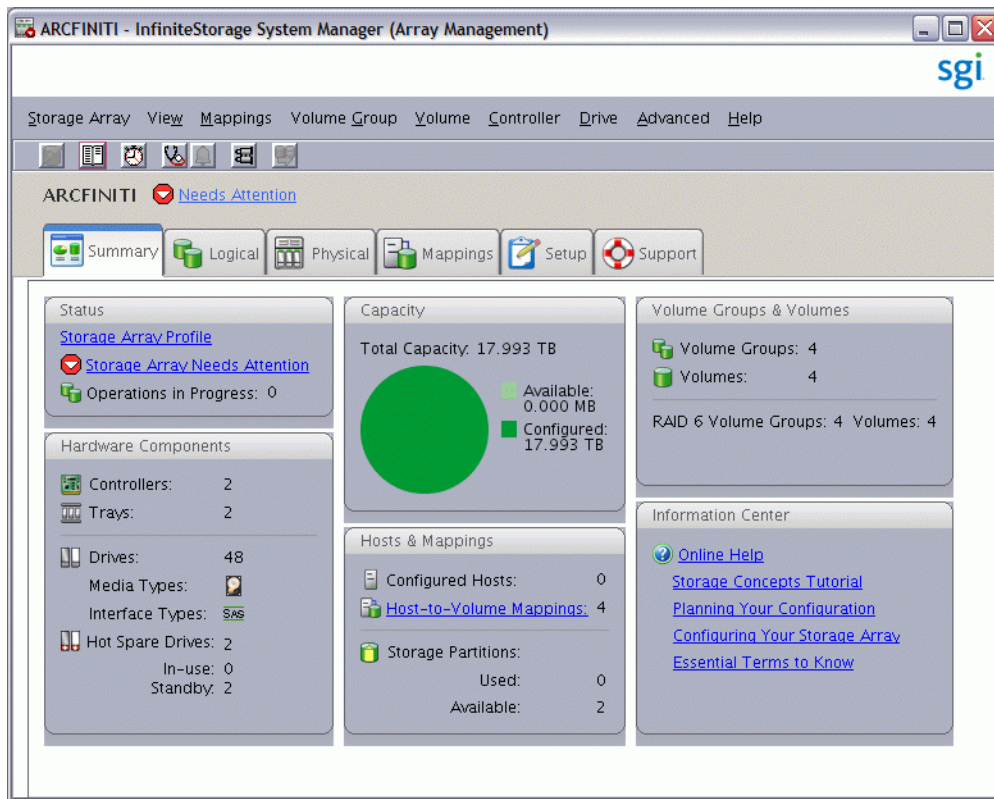
To access ISSM-EE:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the appropriate node name.
3. For the **Storage Array Manager** application, click **open X interface**.

4. Enter the password for the `psm` user.

You should configure email alerts for ISSM-EE.

Figure 2-8 shows an example of the **Summary** window.



**Figure 2-8** ISSM-EE Summary Window

For more information, see:

- *InfiniteStorage System Manager Enterprise Edition (ISSM-EE) Administration Guide*
- *InfiniteStorage System Manager Enterprise Edition (ISSM-EE) Software Concepts Guide*

## HA Management

If your ArcFiniti solution has implemented HA, there are two HA clusters:

- DMF server HA cluster (active/passive)
- OpenVault client service on the mover nodes and optionally the CXFS NFS edge-server HA cluster (active/active)

To access the HA GUI, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the server name:
  - For the DMF server HA cluster, you can access the HA GUI from either the active DMF server or the passive DMF server
  - For the OpenVault client and optionally the CXFS NFS edge-server HA cluster, you can access the HA GUI from either mover node
3. For the **High Availability Pacemaker GUI**, click **open X interface**.
4. Enter the password for the `psm` user.
5. In the **Pacemaker GUI** dialog, select:

**Connection**  
> **Login**

6. Enter the password:
  - HA user ID: `hacluster`
  - Default password: `sgisgi`

For information about using the HA GUI, click the **Help** button the GUI and see the *High Availability Guide* provided by the following Novell website:

[http://www.novell.com/documentation/sle\\_ha/](http://www.novell.com/documentation/sle_ha/)

You can also use commands such as `crm(8)` that you can enter after using the **open terminal** link on the portal to connect to the server.

For more information about tasks specific to SGI products, see *High Availability Extension and SGI InfiniteStorage*.

---

**Note:** Implementing an upgrade to HA or performing a full cluster outage will be handled by SGI personnel. For more information, contact SGI.

---

## LiveArc Digital Asset Management

---

**Note:** Filesystems mounted under the `cxfs_private` directory are restricted to LiveArc internal use.

---

This section discusses the following:

- "Accessing the LiveArc Tools" on page 44
- "Changing the LiveArc Password" on page 51
- "Searching Assets" on page 52
- "Replicating Data" on page 54
- "Analyzing Data" on page 59
- "Indexing Data" on page 60
- "Using WORM" on page 61

### Accessing the LiveArc Tools

To manage the LiveArc digital asset management capabilities, you will use the following tools:

- "Arcitecta™ Desktop" on page 45
- "LiveArc Configuration UI" on page 46
- "Command-Line Services in the Mediaflux Terminal" on page 48
- "Remote Access to Command-Line Services" on page 51

## Arcitecta™ Desktop

---

**Note:** The Arcitecta Desktop requires Java 1.6 and the latest version of Firefox or Internet Explorer® 9.

---

The Arcitecta Desktop lets you manage LiveArc. To access the Arcitecta Desktop, do the following:

1. Access the Arcitecta Desktop by pointing your browser to the following URL:

`http://DMF_server_IPaddress/desktop`

2. Enter the LiveArc password at the prompt:

**Domain:** `system`

**User:** `manager`

**Password:** `change_me` (default)

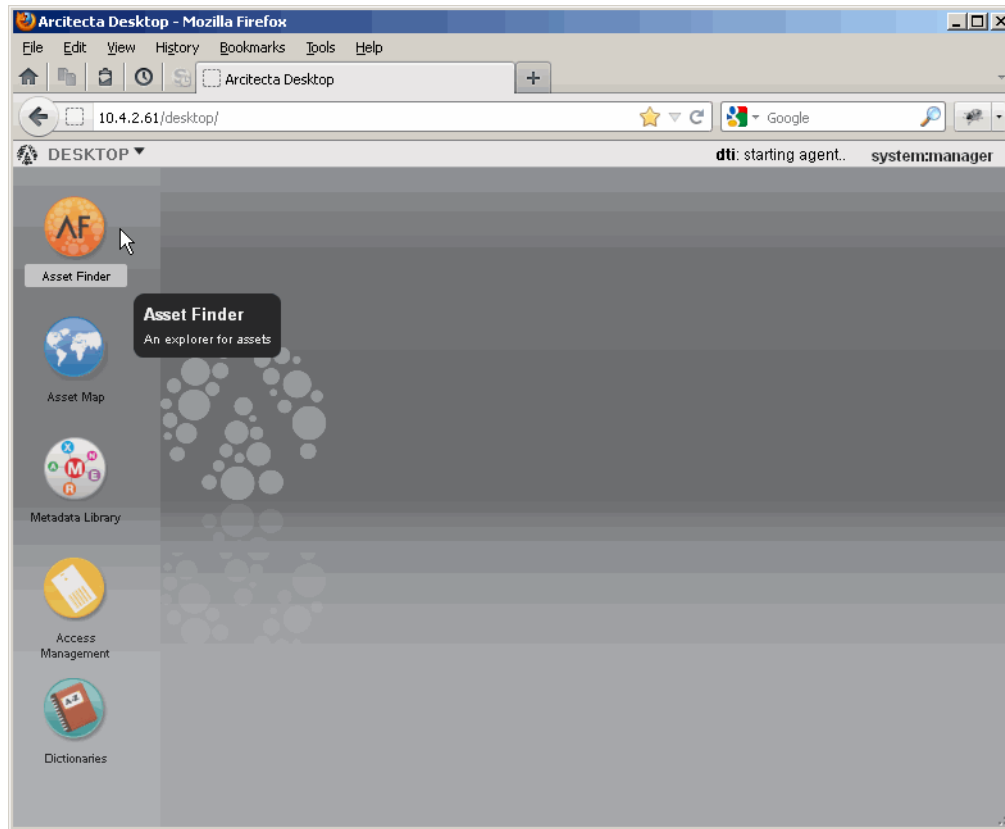
---

**Note:** You should change the password and only provide it to those persons who you want to access the LiveArc configuration. See "Changing the LiveArc Password" on page 51.

---

3. Select **Run** to run the application.
4. Double-click the icon for the tool that you want to use.

Figure 2-9 shows the introductory screen of the Arcitecta Desktop, highlighting the **Asset Finder**. Figure 2-9



**Figure 2-9** Arcitecta Desktop

### LiveArc Configuration UI

To access the LiveArc Configuration UI, do the following:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the appropriate node name.
3. For the **LiveArc Configuration** application, click **open web interface**.
4. Enter the LiveArc system password, which by default is `change_me`.



---

**Note:** You should change the password and only provide it to those persons who you want to access the LiveArc configuration. See "Changing the LiveArc Password" on page 51.

When you enter the password in the LiveArc Configuration UI, you have 10 minutes to make changes. Operations submitted after the 10-minute permission period has elapsed will result in a `UUID expired` message.

If another user logs in during your 10-minute period, any further operations you make will result in an `Invalid UUID` message.

---

5. Click the LiveArc feature you want to configure and provide the required information:
  - **Analyzers**, see "Analyzing Data" on page 59
  - **Indexes**, see "Indexing Data" on page 60
  - **Replication**, see "Submitting a Replication Job" on page 57
  - **WORM** (write-once, read-many), see "Using WORM" on page 61

For more information about LiveArc, click **Documentation** to see the following:

*Mediaflux Release Notes*

*Mediaflux Administration Guide*

*Mediaflux Command User and Developer Guide*

### Command-Line Services in the Mediaflux Terminal

To access the services available from the LiveArc command line, do the following:

1. Do one of the following to open the Mediaflux terminal:
  - Access an `xterm` on the DMF server and run the following command through X11 forwarding:

```
# java -jar /opt/livearc/bin/aterm.ajar &
```

- Place the `/opt/livearc/bin/aterm.ajar` file on an external desktop with Java 1.6 installed and execute the file on that desktop
2. Enter the following information in the **Login** window:

**Server:** *ArcFinitiNode\_IPaddress*

**Transport:** HTTP

**Port:** 80 (default, or number selected in `network.tcl`)

**Domain:** system

**User:** manager

**Password:** `change_me` (default)

Click **Login**.

---

**Note:** If the Mediaflux terminal is idle for more than a minute, you will be logged out.

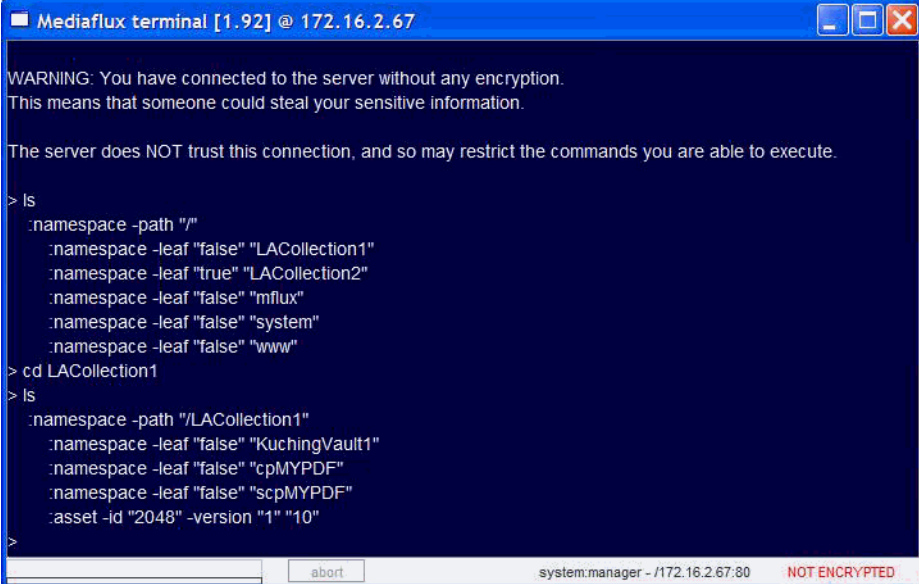
---

LiveArc provides a large number of command-line services, some of which are similar to Linux commands. For example:

- "List Collection Contents"
- "Viewing the LiveArc Version and Installed Packages"
- "Changing the Mediaflux Display Characteristics"
- "Getting Help with Command-Line Services"

#### List Collection Contents

To list the contents of a collection and navigate through the collections, use the `ls` and `cd` commands, as shown in Figure 2-10.



```
Mediaflux terminal [1.92] @ 172.16.2.67

WARNING: You have connected to the server without any encryption.
This means that someone could steal your sensitive information.

The server does NOT trust this connection, and so may restrict the commands you are able to execute.

> ls
:namespace -path "/"
:namespace -leaf "false" "LACollection1"
:namespace -leaf "true" "LACollection2"
:namespace -leaf "false" "mflux"
:namespace -leaf "false" "system"
:namespace -leaf "false" "www"
> cd LACollection1
> ls
:namespace -path "/LACollection1"
:namespace -leaf "false" "KuchingVault1"
:namespace -leaf "false" "cpMYPDF"
:namespace -leaf "false" "scpMYPDF"
:asset -id "2048" -version "1" "10"
>
```

**Figure 2-10** Listing Directory Contents and Navigating Directories

### Viewing the LiveArc Version and Installed Packages

To see the version of LiveArc and the packages that are installed, use the `server.version` and `package.list` commands, as shown in Figure 2-11.

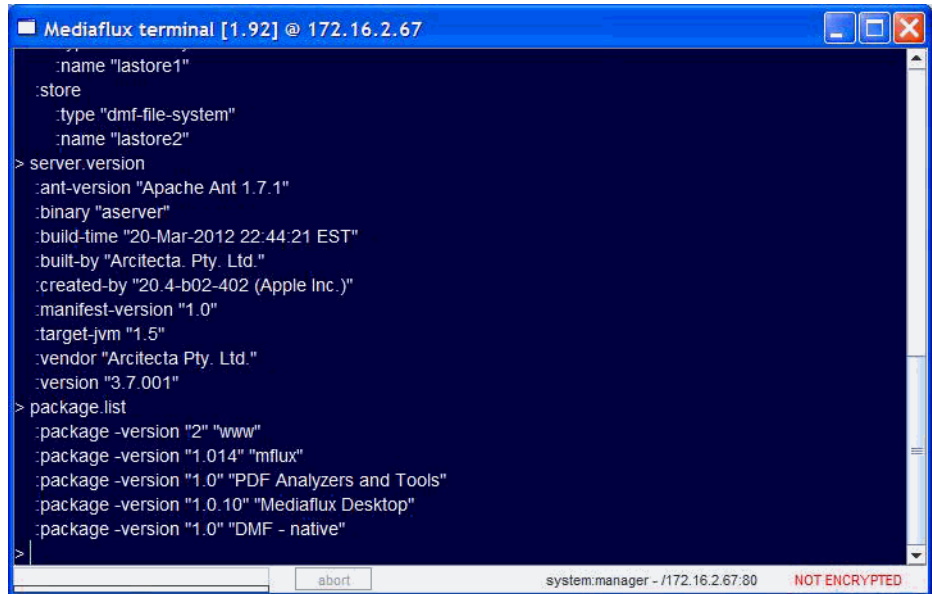


Figure 2-11 Listing LiveArc Installation Information

### Changing the Mediaflux Display Characteristics

To change display characteristics for the current login session (changes are not persistent), use the `display` command.

### Getting Help with Command-Line Services

For more information about command-line services, you can do the following:

- For a list of all available services, enter the following:

```
> help
```

- To get help about a specific command:

```
> help commandname
```

For example, for more information about the `display` command:

```
> help display
```

- Press the `tab` key after entering a command name for brief help about command format.

Also see *Mediaflux Command User and Developer Guide*.

## Remote Access to Command-Line Services

If you are logged on remotely to the DMF server and do not have X11 capabilities, you can use the `mflogon` and `mfcommand` commands to access the Mediaflux command-line services:

```
server# mflogon LiveArc_password
server# mfcommand service_name
```

For example, to view the list of installed packages:

```
server# mfcommand package.list
:package -version "2" "www"
:package -version "1.014" "mflux"
:package -version "1.0" "PDF Analyzers and Tools"
:package -version "1.0.10" "Mediaflux Desktop"
:package -version "1.0" "DMF - native"
```

To get a list of all available services, redirect the output of the `help` command to a text file. For example, to send the `help` text to a file named `service.txt`:

```
server# mfcommand help > service.txt
```

## Changing the LiveArc Password

To change the LiveArc password, do the following:

1. Access the Mediaflux command-line terminal as described in "Command-Line Services in the Mediaflux Terminal" on page 48.
2. Enter the following in the Mediaflux terminal:

```
> authentication.user.password.set: domain system :password newpassword :user manager
```

For more information, see "Command-Line Services in the Mediaflux Terminal" on page 48.

3. Change the password in the following file on every node in the ArcFiniti system:

```
/etc/.mediaflux
```

## Searching Assets

An instance of LiveArc resides on each potential DMF server. As data is ingested, LiveArc will analyze and index the content and metadata.

To search using LiveArc, do the following:

1. Open the Arcitecta Desktop as directed in "Arcitecta™ Desktop" on page 45.
2. Double-click the orange **AF** icon to open the **Asset Finder** window.
3. Select the type of data you want to search and drill down as needed. For a directory, you can toggle between a deep or shallow search by clicking the spyglass icon:
  - **Deep Search** searches all directories within the selected collection from this point down
  - **Shallow Search** searches only the specified directory

As you type in the search field, the tool will suggest terms that match. You can type a single letter to view a pop-up window of suggestions; you can highlight one to make it appear in the search window, then press `Enter` to make it appear in the middle panel.

For example, Figure 2-12 shows that LiveArc will search for entered terms in only the `MyHTML` directory, which is part of the `LACollection1` on the `lastore1` data store.

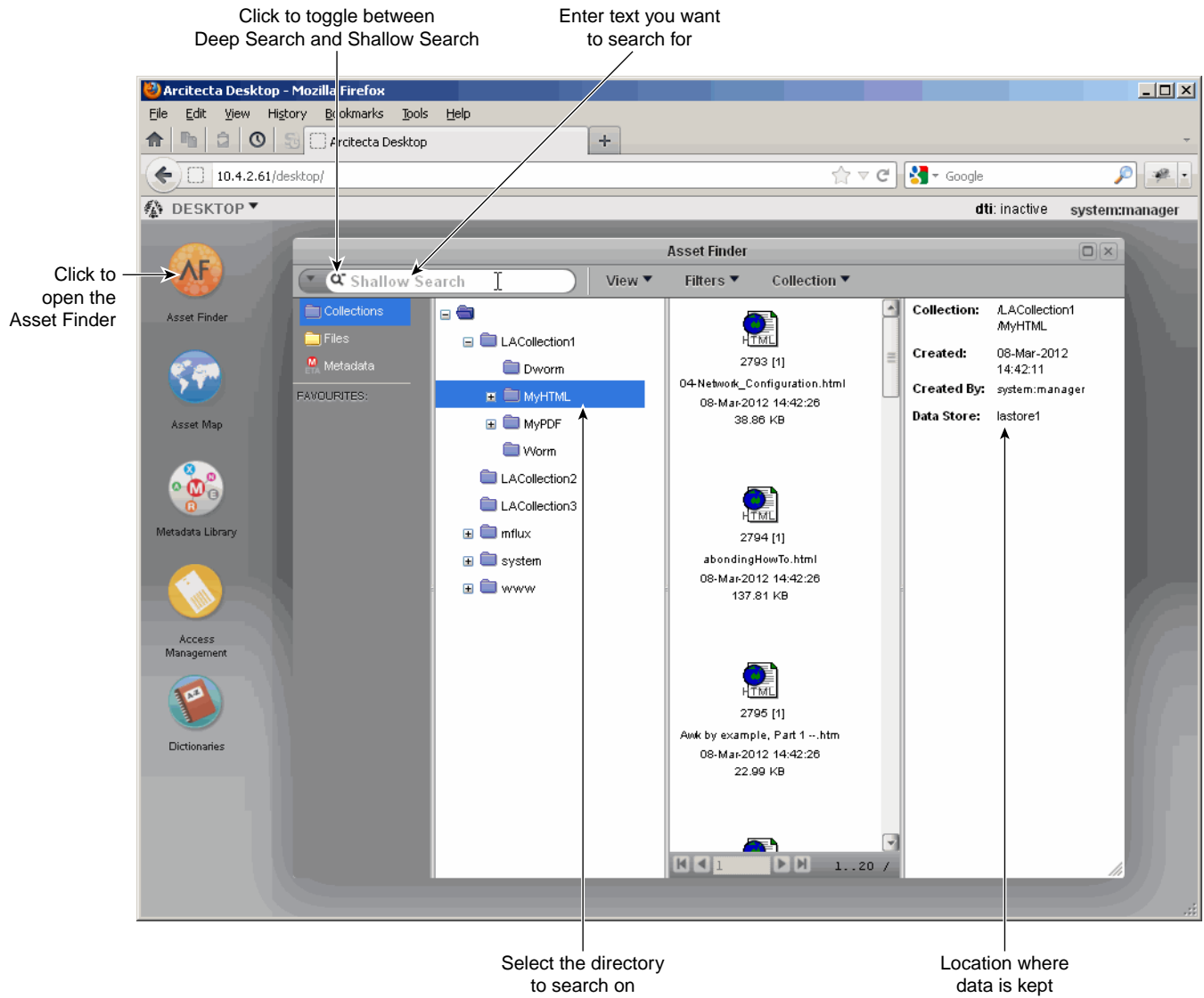


Figure 2-12 Searching for Text in the Asset Finder

To change the way LiveArc parses data, see:

- "Analyzing Data" on page 59
- "Indexing Data" on page 60

## Replicating Data

The LiveArc replication feature creates a copy of a namespace on a LiveArc system that is outside of this ArcFiniti configuration, using the location created in "Creating a Replication Vault" on page 54. You can use replication to do the following:

- Synchronize data sets between mobile or regional repositories and central enterprise repositories
- Manually initiate replication or you can configure it to occur automatically

Replicating data has two parts:

- "Creating a Replication Vault" on page 54
- "Submitting a Replication Job" on page 57

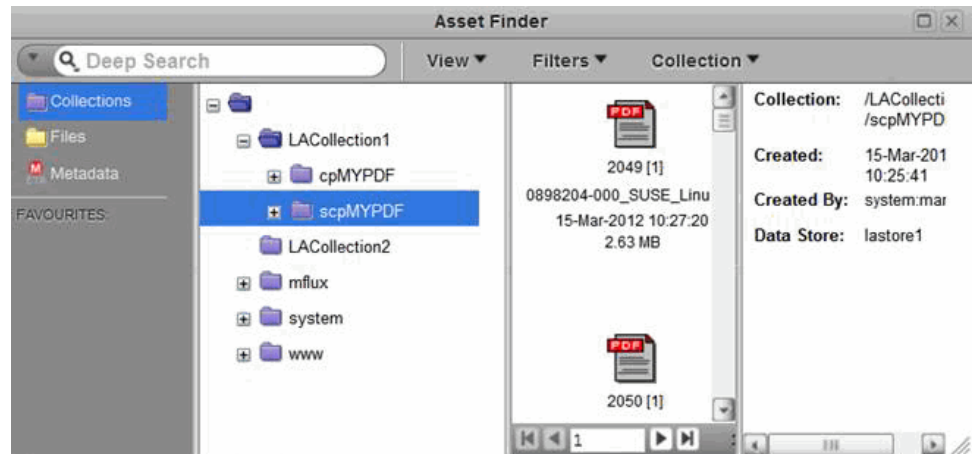
### Creating a Replication Vault

To create a replication vault, do the following:

1. Find the name of the collection on the source node that holds the namespace you want to replicate:
  - a. Open the Arcitector Desktop, as directed in "Arcitector™ Desktop" on page 45, on the source node, such as `server1`.
  - b. Double-click the orange **AF** icon to open the **Asset Finder** window.
2. Browse through the tree, expanding as necessary by clicking on the + symbol next to a collection name.
3. Find the namespace that you want to replicate.

For example, Figure 2-13 shows that the namespace `scpMyPDF` is in the `LACollection1` collection.





**Figure 2-13** Selecting a Namespace to Replicate

You will use this information when entering the source**Namespace** field in the LiveArc UI **Replication** panel. See "Submitting a Replication Job" on page 57.

4. Open the Arcitecta Desktop on the destination node, such as `server2`:
  - a. Highlight the namespace of the collection that corresponds to the collection where you want the new vault to reside.
  - b. Confirm that the **Data Store** field displayed in the right-most panel is on an appropriate data RAID set, such as `lastore0` shown in Figure 2-14.




---

**Caution:** Never select a namespace that has a **Data Store** field of `db`, which is only for use by LiveArc software.

---

- c. Right-click and select **Create Sub-Collection**, as shown in Figure 2-14.

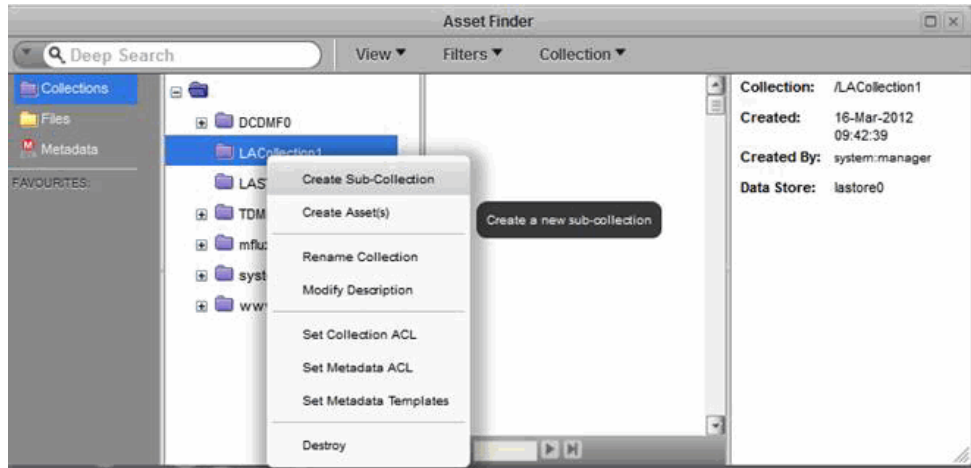


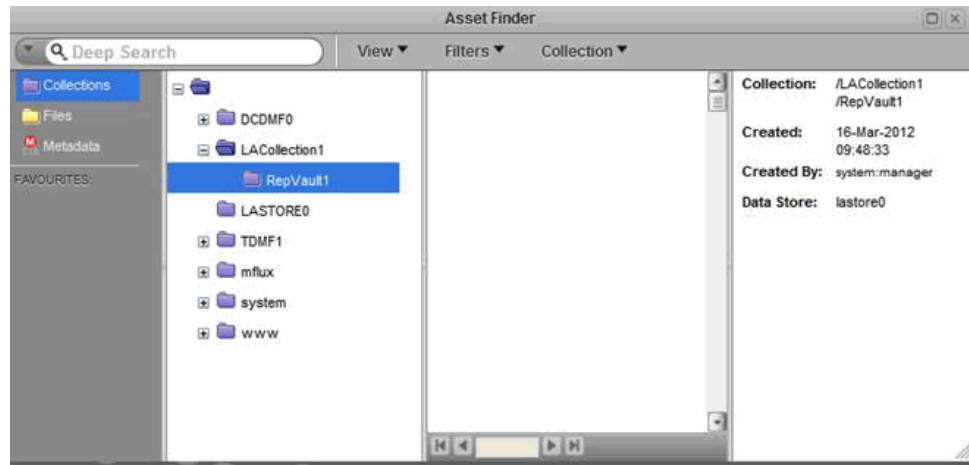
Figure 2-14 Creating a Sub-Collection for a Replication Vault

- d. Enter the name of the replication vault. For ease of association, you might want to use a name that corresponds to the collection name, such as RepVault1 for the LACollection1 collection, as shown in Figure 2-15. You can optionally enter notes in the **Description** field and then click **Create Sub-Collection**.



Figure 2-15 Naming a Replication Vault

The result will be a replication vault named RepVault1 in the LACollection1 collection on server2, as shown in Figure 2-16.



**Figure 2-16** Completed Replication Vault

5. Use the **Replication** tab in the LiveArc UI to create a replication job. See "Submitting a Replication Job" on page 57.

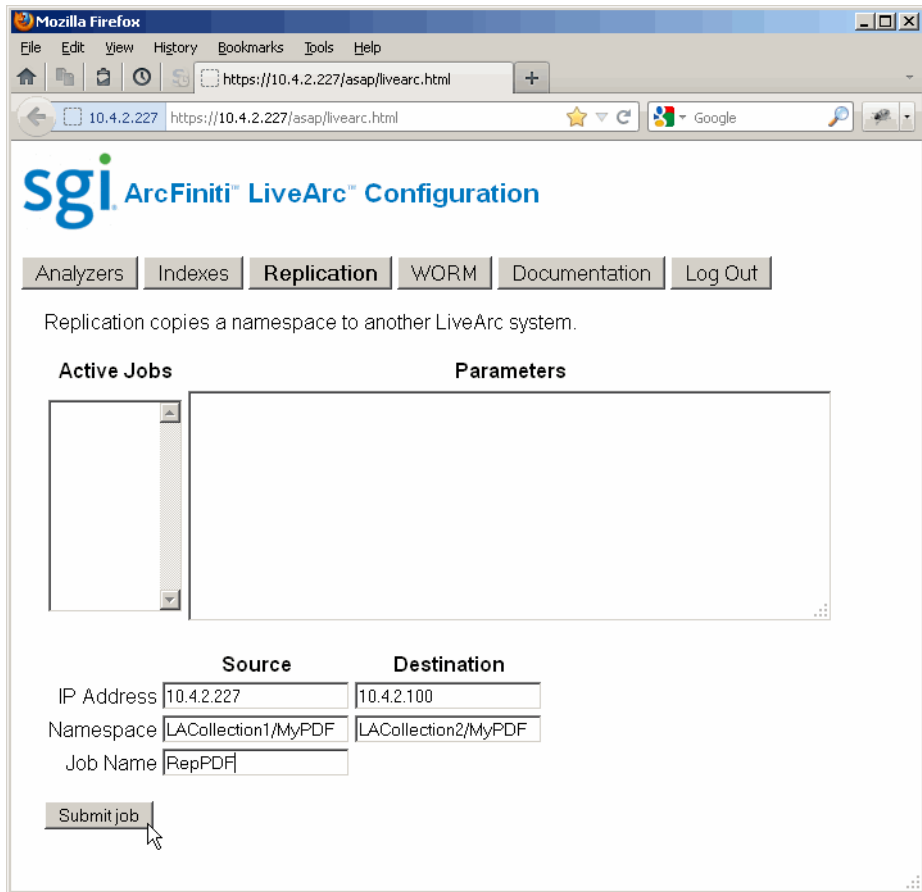
### Submitting a Replication Job

The **Replication** panel displays active jobs. To submit a new job, enter the following:

- IP addresses of the source and the destination
- Namespace at the source (see step 1 of "Creating a Replication Vault" on page 54)
- Namespace at the destination
- Name of the job

You can select and copy text from the **Parameters** field and paste it into the input fields. Click **Submit** to submit the new replication job.

For example, Figure 2-17 shows a new job named RepPDF that will replicate information from LACollection1 to LACollection2 on the node with an IP address of 10.4.2.100.



**Figure 2-17** Creating a New Replication Job

---

**Note:** Clicking **Submit** executes a script that sets up a passwordless `ssh(1)` session, which will exist for the duration of the replication process. When the script exits normally, it destroys the required permission keys. If the script is interrupted, however, the keys may not be destroyed; in this case, you should manually removed the keys from the remote and local server.

---

## Analyzing Data

The **Analyzers** feature extracts metadata and content from assets.

---

**Note:** The analyzers are application-aware and as such they do not log formatting and control-like characters.

---

You can specify which type of analyzer that you want to use:

- Formatted text
- Plain text, which analyzes all of the following:

```
:mime-type "text/plain"  
:extension "txt"  
:extension "bas"  
:extension "vb"  
:extension "c"  
:extension "cc"  
:extension "gcc"  
:extension "h"
```

- Image metadata
- PDF metadata, which analyzes all of the following:

```
:mime-type "application/pdf"  
:extension "pdf"
```

- PDF text, which analyzes all of the following:

```
:mime-type "application/pdf"  
:extension "pdf"
```

By default, LiveArc searches all of the above. (Icon search is reserved for later use.)

You can also add other extensions (for example, `.bash` for plain text) by using the LiveArc services. If you need to use the LiveArc command-line interface, take note of the class and type information so that you can select the appropriate data. See "Command-Line Services in the Mediaflux Terminal" on page 48. For more information, see the Mediaflux documentation.

## Indexing Data

The **Indexes** feature creates a database of the first two ASCII characters in data strings of the enabled type. The database allows the Arcitecta Desktop **Asset Finder** to provide suggestions that match text you enter in the search window.



---

**Caution:** Depending upon the data indexed, the Index database can become almost as large as the data.

---

You can specify that an index is created for any combination of the following types of text:

Type	Description
atext	Annotated video
ctext	Content text
dtext	Description text
mtext	Metadata text
ntext	Names text

Click on a check box to select or deselect it, then click **Apply changes**.

By default, LiveArc searches for all but content text.

## Using WORM

The **WORM** (write-once, read-many) feature allows namespaces to set a policy that forces assets into a read-only state. You can select either of the following WORM modes for a given namespace:

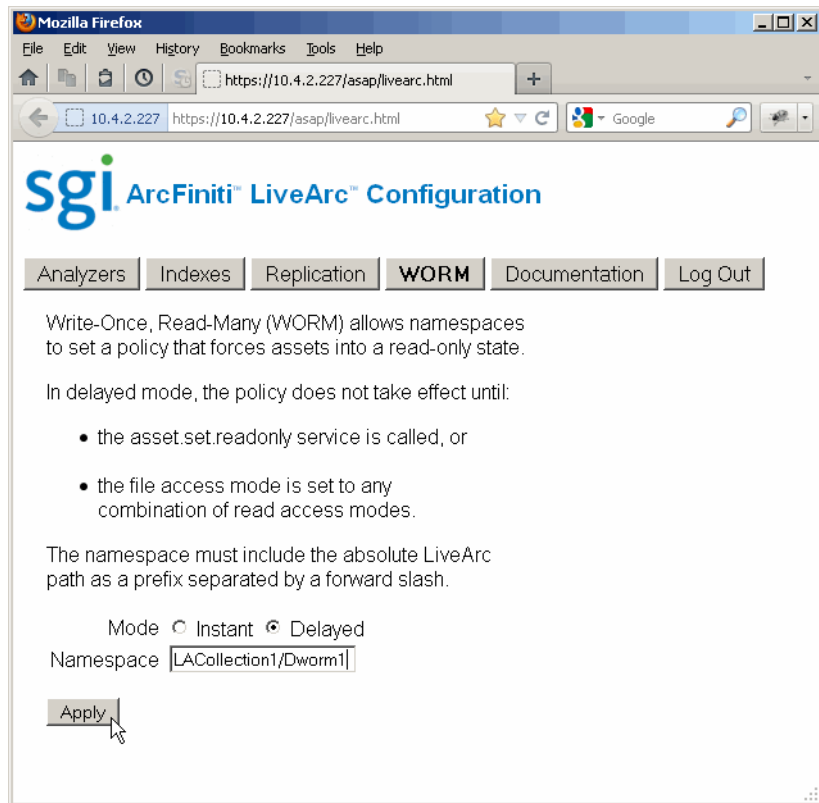
- **Instant** places all files in the namespace into a read-only state
- **Delayed** places a file in the namespace into read-only state only after a user or application does one of the following:
  - Calls the LiveArc service `asset.set.readonly`
  - Sets the access mode to any combination of read-only access modes

You must enter the namespace, which must include the absolute LiveArc path as a prefix separated by a forward slash. If you intend to use both forms of WORM, SGI recommends that you use namespace names that clearly identify the form. For example, you could use `LACollection1/Worm1` for an instant WORM and `LACollection1/Dworm1` for a delayed WORM. Figure 2-18 shows an example.



**Caution:** Never use the `mflux`, `system`, or `www` collections, which contain the LiveArc software and are stored in the `db` data store. You must never use this data store for your site's data.

---



**Figure 2-18** Adding a Delayed WORM Namespace



## Modifying the ArcFiniti Configuration

This chapter discusses the following:

- "Changing the Network Addresses" on page 63
- "Using DMF Email Notification" on page 64
- "Using PSM Email Notification" on page 64
- "Modifying DMF Space-Management Policies" on page 65

Implementing an upgrade to HA will be performed by SGI personnel.

If you require other modifications, call SGI Professional Services.

### Changing the Network Addresses

---



**Warning:** Do not change the network addresses assigned to the built-in Gigabit Ethernet interfaces `eth0` and `eth1`. These interfaces are used internally for administration of the ArcFiniti product.

---

To modify the network, use YaST2. To access YaST2:

1. Open the ArcFiniti Storage Applications Portal (see "Launching the Portal" on page 23).
2. Select the appropriate node name.
3. For the **System Configuration** application, click the **open user interface** link.
4. In YaST2, select:
  - Network Devices**
  - > **Network Settings**
5. Select the desired device and click **Edit**.

## Using DMF Email Notification

Notification messages sent by DMF are available via DMF Manager. However, you can request email notification about these messages by modifying the `ADMIN_EMAIL` parameter in the DMF configuration file. Do the following in DMF Manager (see "Accessing DMF Manager" on page 24):

1. Right-click on the DMF shield icon and select:

**Configure ...**  
    > **Modify Base ...**

2. Enter the email address that you want to receive DMF notifications in the value for the `ADMIN_EMAIL` parameter.

---

**Note:** Click **Help** in the dialog for more information, or right-click on a parameter name for details about that parameter.

---

3. Select **Continue**.
4. Validate the changes by selecting:

**Overview**  
    > **Configure ...**  
        > **Validate Configuration**

5. Save your changes permanently by selecting:

**Overview**  
    > **Configure ...**  
        > **Apply Configuration**

## Using PSM Email Notification

To configure PSM email alerts, doing the following in the PSM GUI (see "Accessing PSM" on page 38):

1. Click **Setup** on the top menu bar.
2. Click **Email Setup**.
3. Enter the required information.

4. Click the **Email Alerts Setup** tab.
5. Click **Create New Email Alert**.
6. Enter the required information.

For more information, see the *Platform Service Manager Online Help* available from the **PSM Help** menu and *SGI C1103-TY12 User's Guide*.

## Modifying DMF Space-Management Policies

To modify the amount of free space that is maintained in the primary filesystem or the amount that is freed when this minimum is reached, you must modify a number of parameters in the DMF configuration file, such as:

```
FREE_SPACE_MINIMUM  
FREE_SPACE_TARGET
```

To modify the amount of data that is left on the primary filesystem for a file that is fully migrated (by default, 32 KiB), you must modify the `AGE_WEIGHT` configuration parameter and the associated `range` clause.

You can make these modifications by doing the following:

1. Open DMF Manager. See "Accessing DMF Manager" on page 24.
2. Click the **Log In** button in the upper-right corner of the window. The default password is `INSECURE`.
3. In the **Overview** panel, right-click on the space-management policy for the filesystem (such as `dmfusr1_space_policy`).
4. Enter in the desired values for the parameters. Click **Help** in the dialog for more information, or right-click on a parameter name for details about that parameter.
5. Click **Continue**. The temporarily changed configuration is indicated by the gray background color of the **Overview** display.

6. Validate the changes by selecting:

**Overview**

- > **Configure ...**
- > **Validate Configuration**

7. Save your changes by selecting:

**Overview**

- > **Configure ...**
- > **Apply Configuration**

For details, see the information about DMF Manager, DMF configuration, automated space management, and partial-state files in the *DMF 5 Administrator Guide for SGI InfiniteStorage* or contact SGI Support.

## Troubleshooting the ArcFiniti Solution

This chapter discusses the following:

- "Collecting Data for Problem Analysis" on page 67
- "Learning More about DMF Problems" on page 68
- "Restoring DMF Filesystems and Databases" on page 71
- "Firefox is Already Running" on page 71
- "Unable to Recall Data" on page 71
- "YaST2 Disk Space Warning" on page 71
- "Power-On: Requires SGI Support" on page 72
- "HA Troubleshooting" on page 72
- "Contacting SGI Support" on page 72

### Collecting Data for Problem Analysis

As soon as you suspect a problem with DMF or CXFS, click the **download data** link for the Archive System Diagnostics application. This will run a script to gather the relevant DMF and CXFS information that will help SGI Support analyze the problem. Click this link for the DMF server and for each mover node. The script will then send a compressed file to the PSM.

---

**Note:** If the file cannot be uploaded to the PSM, you can access it on the DMF server:

```
/var/log/scoop/scoop-DATE+TIME.tar.gz
```

---

You should also use the PSM GUI's collection utility to gather information about the MAID hardware and general cabinet components.

After you have collected the data, contact SGI Support.

## Learning More about DMF Problems

DMF Manager denotes areas with problems by adding a yellow or red icon next to the component that is experiencing problems, depending upon severity. For example, Figure 4-1 shows that although DMF is still running, there are warnings that may require action (yellow icon). To investigate, hover the mouse over the shield icon to display pop-up help that describes the warning.

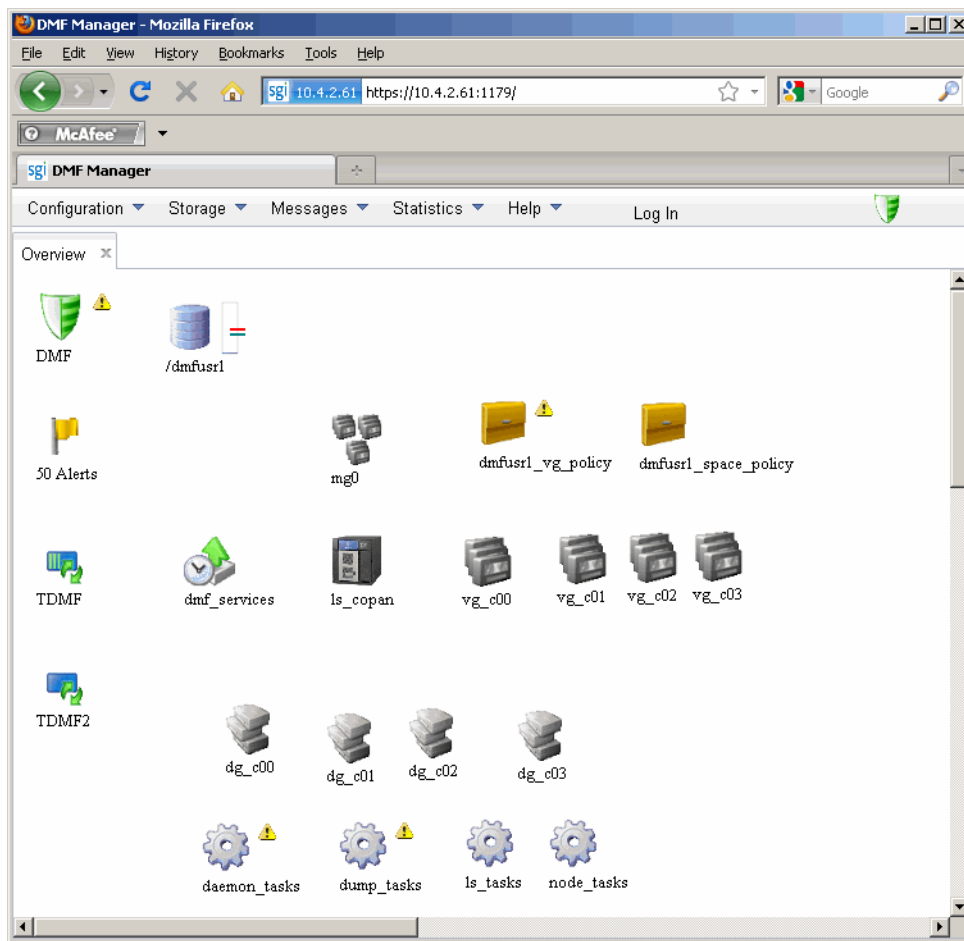


Figure 4-1 DMF Manager Showing Problems

For details, click the **Alerts** icon flag and select **Show Alerts...** or choose the following from the menu bar:

**Messages**  
> **Alerts**

Either action will open the **Alerts** panel, which displays the unacknowledged messages, as shown in Figure 4-2. For more information about an alert, select it and choose **Help on this alert**.

You can also use the following panel to view daily activity reports (those containing critical log errors show red warning symbols):

**Messages**  
> **Reports**

If the **Overview** panel indicates that there are problems, consult the *DMF 5 Administrator Guide for SGI InfiniteStorage* or call SGI Support.

#### 4: Troubleshooting the ArcFiniti Solution

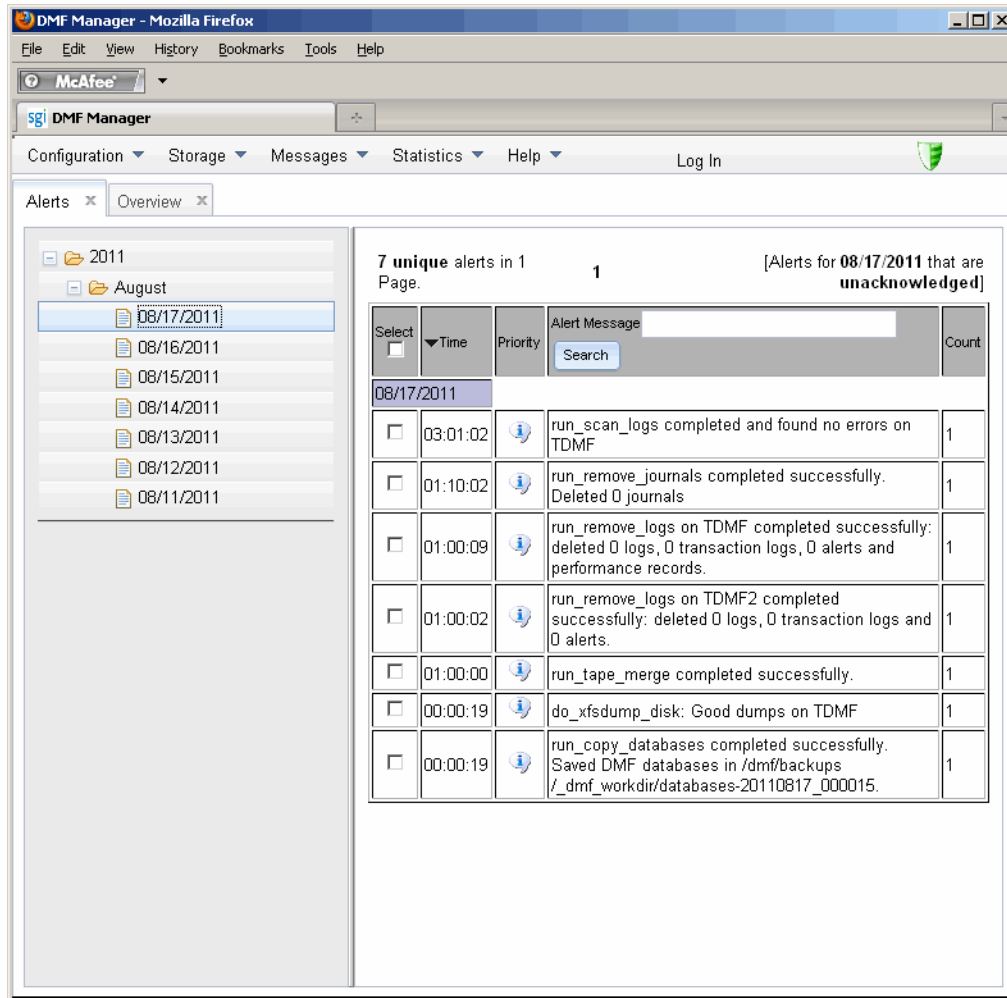


Figure 4-2 DMF Manager Alerts Panel



## Restoring DMF Filesystems and Databases

To restore DMF filesystems and databases, you can use the `dmxfsrestore(8)` command via the **open terminal** action for the DMF server on the ArcFiniti Storage Applications Portal.

For details, see the information about backups and DMF in *DMF 5 Administrator Guide for SGI InfiniteStorage* or contact SGI Support.

## Firefox is Already Running

If you are unable to use the ArcFiniti Storage Applications Portal, verify that you have all of the software requirements in place. See "Portal Requirements" on page 23.

If you are unable to access an application such as DMF Manager, you might have to exit the existing Firefox process. For details, see:

[http://kb.mozillazine.org/Profile\\_in\\_use](http://kb.mozillazine.org/Profile_in_use)

## Unable to Recall Data

Each node connects to only two MAID shelves, such as DMF server 0 connects to MAID shelves 0 and 1. Under circumstances such as the following, the migrated data on the MAID shelves controlled by a given node will be unavailable:

- The node is down
- The shelf is down
- The LUN is down
- There are problems with the filesystem on the LUN

If the DMF server is down, access to all data on the MAID shelves is unavailable.

## YaST2 Disk Space Warning

If you try to use YaST2 while RAID sets in the COPAN MAID are mounted by OpenVault, `yast2` displays a graphic that contains the following warning:

```
Warning: Disk space is running out!
```

However, the red disk usage shown for filesystems such as `/var/opt/openvault/clients/mounts/copan_J00d02` is expected; it indicates that the RAID sets are mounted by OpenVault. You can safely click the **OK** button at the bottom of the window.

## Power-On: Requires SGI Support

Powering on an ArcFiniti system requires a specific sequence of steps. You must call SGI Support for assistance.

## HA Troubleshooting

For basic HA troubleshooting topics, see *High Availability Extension and SGI InfiniteStorage*. For more assistance, contact SGI Support.

## Contacting SGI Support

If the other topics in this chapter do not solve the problem, contact your local SGI Customer Support Center:

<http://www.sgi.com/support>

You can also contact your authorized service provider.

If you are in North America, you can call the Technical Assistance Center at: 1 (800) 800 4SGI

If you are outside North America, see the following website for the appropriate Customer Service phone number:

<http://www.sgi.com/support/supportcenters.html>

---

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