VERITAS Storage Migrator™ 3.4.1

Installation Guide

UNIX

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VERITAS

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Preface

Introduction

This guide describes how to install and configure VERITAS Storage Migrator™. This guide is intended for administrators who have a good working knowledge of the UNIX operating system.

All information in this manual applies to VERITAS Storage Migrator (*VSM*). See the release notes for specific information on the hardware and operating systems to which this software applies.

Note This release of VSM uses two types of graphical user interfaces: Java-based (VSM-Java) and Motif-based (`xhsmadm`). VERITAS recommends using the VSM-Java interface. The Motif-based GUI (`xhsmadm`) will not be supported in future releases of VSM.

Note In this publication, the term *NetBackup Media Manager* refers to the media-management software that is part of NetBackup. The term *volume* refers to removable storage media, either tape or optical disc.

Audience

This guide is intended for system administrators responsible for configuring and maintaining VSM systems using UNIX.

This guide assumes:

- A basic understanding of system administration.
- A good working knowledge of the UNIX operating system.
- A basic understanding of storage management principles.

Scope

The purpose of this guide is to explain how to install and configure VSM.

Organization

This guide is organized as follows:

- Chapter 1, “Things to Know Before You Install VSM” on page 1, contains critical information on installing VSM. Read this chapter before you install VSM.
- Chapter 2, “Installation” on page 11, provides the specific steps necessary to install VSM on a server system. Read this chapter before configuring VSM.
- Chapter 3, “Configuration with VSM-Java” on page 29, provides the specific steps necessary to configure VSM on a server system with the VSM-Java interface.
- Appendix A, “Converting from ufs-type to vxfs-type File Systems” on page 39, provides the specific steps necessary to convert to a vxfs file system.
- Appendix B, “Alternate Configuration Interface” on page 45, provides the specific steps necessary to configure VSM on a server system with the Motif-based interface, `xhsmadm`.
- The glossary, on page 53, offers a list of common VSM terms.

Using This Guide

When reading this document, it is advised to read the chapters in numerical order unless advised to see a specific section.

Related Documents

- The *VERITAS Storage Migrator Release Notes* provides important information such as the platforms and operating systems that are supported, new features, and problems fixed since the last release.
- The *VERITAS Storage Migrator Administrator’s Guide* describes how to plan, set up, and maintain VERITAS Storage Migrator. This documents also contains man page and information on tools used within VSM.
- The *VERITAS NetBackup Release Notes - UNIX* and *VERITAS NetBackup DataCenter Release Notes* provide important information about NetBackup and Media Manager such as supported platforms, operating systems, and peripheral storage equipment.
- The *VERITAS NetBackup Installation Guide - UNIX* and *VERITAS NetBackup DataCenter Installation Guide* describe how to install VERITAS NetBackup.
- The *Media Manager Device Configuration Guide* describes how to configure storage devices controlled by Media Manager.
- The *Media Manager System Administrator’s Guide* describes Media Manager, its components, and how they are used to manage media volumes, drives, and robots.

Conventions

The following explains typographical and other conventions used in this guide.

Type Style

Table 1. Typographic Conventions

Typeface	Usage
`Bold fixed width`	Input. For example, type **`cd`** to change directories.
`Fixed width`	Paths, commands, filenames, or output. For example: The default installation directory is `/opt/VRTSxx`.
Italics	Book titles, new terms, or used for emphasis. For example: *Do not* ignore cautions.
Sans serif (italics)	Placeholder text or variables. For example: Replace *filename* with the name of your file.
Sans serif (no italics)	Graphical user interface (GUI) objects, such as fields, menu choices, etc. For example: Enter your password in the Password field.

Notes and Cautions

Note This is a Note and is used to call attention to information that makes it easier to use the product or helps you to avoid problems.

Caution This is a Caution and is used to warn you about situations that can cause data loss.

Key Combinations

Some keyboard command sequences use two or more keys at the same time. For example, you may have to hold down the Ctrl key before you press another key. When this type of command is referenced, the keys are connected by plus signs. For example:

Press Ctrl+t

Command Usage

The following conventions are frequently used in the synopsis of command usage.

brackets [ ]

The enclosed command line component is optional.

Vertical bar or pipe (|)

Separates optional arguments from which the user can choose. For example, when a command has the following format:

`command` *arg1*|*arg2*

The user can use either the *arg1* or *arg2* variable.

Getting Help

- For updated information about this product, including system requirements, supported platforms, supported peripherals, and a list of current patches available from Technical Support, visit our web site:

  `http://www.veritas.com/products/vhsm/`

- For product assistance, contact VERITAS Customer Support.

  US and Canadian Customers: 1-800-342-0652

  International Customers: +1 (650) 335-8555

- VERITAS Customer Support can also be reached through electronic mail at:

  `support@veritas.com`

Things to Know Before You Install VSM 1

Introduction

This *Installation Guide* helps you install VERITAS Storage Migrator (*VSM*) on a UNIX server system. It also contains some notes and cautions about these products. This document includes both initial installation procedures and upgrade installation procedures (from VSM 3.4. or VSM 3.2.5 to VSM 3.4.1). Refer to the *Release Notes* for this product for a list of supported platforms, operating systems, and file system levels.

This manual assumes that you have system administrator level knowledge in the following areas:

- UNIX operating system
- VERITAS NetBackup and its Media Manager application

Note If you are uncomfortable with any of these qualifications, contact your system administrator.

Installing VSM requires you to load the product binaries (executables) and possibly add VSM kernel modules to the system kernel. After installing VSM, you can also setup the example VSM configuration for verifying correct installation and trial use of VSM.

General Note About Upgrading to VSM 3.4.1

You can upgrade to VSM 3.4.1 from either release 3.2.5 or release 3.4 for VSM.

Before upgrading from VSM release 3.2.5 to VSM 3.4.1, you must do the following:

- You must upgrade to release 3.4 of NetBackup and then install NetBackup patch J0850645 (or higher).
- If NetBackup media Manager is installed, you must upgrade it to release 3.4.
- You must obtain valid capacity license keys for VSM.

Cautions and Other Information

This section explains things you need to know before you install or configure VSM.

Notes and Cautions for All Systems

First Time Users

If you are installing VSM for the first time, we recommend that you set up VSM to manage a small test file system first. This familiarizes you with the concepts and operation of VSM. When you finish testing, you must do additional clean up before you configure your production (real) system. These steps are explained in "Using Your Testing System (Optional)" on page 34.

Storage Migrator Remote Users

With this release, there is no distinction between Storage Migrator and Storage Migrator Remote. If you previously installed, Storage Migrator Remote, you need to only install Storage Migrator 3.4.1.

Software Patches

With this release of VSM, you must install NetBackup 3.4 and NetBackup patch J0850645 (or higher). When installing software patches provided by VERITAS, always install the latest patch. The NetBackup patches are synchronized with VSM patches. When installing these patches for NetBackup and VSM, first install the NetBackup patch and then the VSM patch. Doing this guarantees that VSM is installed correctly.

Note Installing VSM software patches is documented in the *Release Notes* for each specific patch.

For a list of current patches for VSM, visit our support web site at the address below:

```
http://support.veritas.com/menu_ddProduct_VHSM.htm
```

VERITAS Storage Migrator Licensing

For new and existing sites, licensing is enforced when `migcopy` copies data using the following storage methods: optical (`op` and `ow`), tape (`ct`, `dt`, and `mt`), and VERITAS NetBackup (`nb`). Licensing is capacity based and it includes active and obsolete granules, not any granules marked dead. See the `miglicense(1M)` man page for information on displaying both the current license capacity of VSM and the actual capacity currently in use at your site. As your site grows, you will need to address licensing issues in the future. VSM automatically warns you when your site reaches 90% license capacity.

When you upgrade VSM from 3.4 to 3.4.1, you do not need to enter license keys unless your current usage exceeds your current license keys. You can determine your license capacity by using the Storage Migrator Storage Space Test option in the VSM installation process, as described in “Install VSM Executables” on page 16.

When you install this product for the first time, or upgrade from VSM 3.2.5 to 3.4.1, you are prompted for a licensing key. Enter the base capacity license key found in your VSM 3.4.1 box, as well as any additional capacity license keys you purchased.

Caution You must have valid capacity license keys before you install VSM. Do not force the installation without the appropriate license keys.

If you do not have sufficient capacity license keys, discontinue installing VSM. Call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 outside of the US and Canada, to order additional license keys.

Using VSM-Java and Motif-based (`xhsmadm`) Configuration Interfaces

VERITAS recommends using the VSM-Java interface to configure VSM. This interface is explained completely in the *System Administrator’s Guide*. Do not use both VSM-Java and `xhsmadm` interfaces simultaneously on your system; doing so can produce unpredictable results.

VSM and Macintosh File Servers

If your managed file systems are accessed by Macintosh, certain metadata files should not be migrated by VSM. To prevent this, add the following lines to your global `migstop` file (`/usr/var/openv/hsm/database/migstop`):

```
.../.HSResource
.../.HSancillary
.../.HSicon
```

VERITAS NetBackup

Timeout on File Caches

If VSM is used in conjunction with VERITAS NetBackup, a timeout may occur when VERITAS NetBackup tries to restore a file that has been migrated by VSM. The default value of `CLIENT_READ_TIMEOUT` in the VERITAS NetBackup configuration file `/usr/openv/netbackup/bp.conf` is 300 seconds.

To resolve this, reconfigure `CLIENT_READ_TIMEOUT` to be a larger number. A value of 600 seconds should be adequate in most cases.

Migrated Files Cached During Non-Root User Backups

Migrated files are included when NetBackup is used on a VSM-managed file system. When a non-root user initiates a backup, VSM will cache any migrated files, which causes a temporary increase to the size of your file system. To ensure smooth operation of VSM and NetBackup, allow sufficient disk space in your file system.

VERITAS NetBackup Classes

When defining a VERITAS NetBackup class for migrating files with the `nb` method, set the class attribute for Storage Unit to a specific type. Do *not* use the default (any available).

If your site uses the `nb` method to migrate files, set the expiration date for the VERITAS NetBackup class used to *infinite*. When using VERITAS NetBackup do not back up the managed file system to any VERITAS NetBackup class used by VSM for migrating files.

VERITAS NetBackup Restore

VSM may leave a small portion of a migrated file, a *slice*, on the file system. If you use VERITAS NetBackup to restore migrated and purged files, this slice value is changed to 0. This can cause performance delays when such files are used by `file` or `head` commands. If files with 0 slice values are modified, VSM migrates the modified file, thereby correcting the slice value. This is fully explained in the VSM *Administrator's Guide*.

Dual Copies

If you are migrating dual copies, and both are using the `nb` method, define more than one VERITAS NetBackup class and assign a different volume pool to each class. Then, register each VERITAS NetBackup class to a different volume with a unique volume set number. Doing this prevents VSM from possibly migrating both copies of a file to the same physical media.

`mignbscan` Command

One of the configurable attributes for registering a VERITAS NetBackup class as an `nb` volume is Size, defined as the capacity in bytes of the VERITAS NetBackup system available for storing migrated files. A value of 0 is interpreted as unlimited storage capacity.

If the size of an `nb` volume is configured to be very large (or unlimited), running `mignbscan` can be prohibitively time consuming because every image within the VERITAS NetBackup class is scanned. VERITAS recommends that you define multiple VERITAS NetBackup classes and register each as a different volume with a finite size that meets your needs.

Filename Restrictions

VSM supports filenames with any combination of alphanumeric characters (a-z, 0-9) and most special characters, with the following exceptions:

- | (a pipe)
- (a space)

The `nb` method, in addition to the above characters, does not support the following:

```
* ? [ ] \ { ( )
```

FlashBackup and Snapshot

Do not use the FlashBackup feature of VERITAS NetBackup (if available) or VERITAS VxFS Snapshot method to back up VSM-managed file systems.

NetBackup Patch Requirements

See “Software Patches” on page 2 for details on NetBackup patch requirements.

NetBackup Media Manager

VERITAS Storage Migrator requires NetBackup Media Manager. Before registering tape or optical volumes in the VSM database, you must install, configure, and activate NetBackup Media Manager on the VSM server. For VERITAS Storage Migrator, you must configure one or more VSM volume pools in NetBackup Media Manager. When registering tape and optical disc volumes, the volumes must be assigned to a VSM volume pool. Unless, and until, the media registration process is completed, attempts to migrate files from a VSM-managed file system will fail. Registration of media depends on the type of media used. VSM adds media to its volume database (VOLDB) in the order the media is labeled. For more information see the VSM *System Administrator’s Guide*, chapter 4, “Register Media with VSM.”

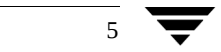
Managing Subdirectories

VERITAS recommends that you only manage an *entire file system*, not subdirectories within the VSM-managed file system. However, should you opt to manage subdirectories within a managed file system, consider the following:

- On Solaris *ufs* implementations, when the VSM daemon (`migd`) is not running, non-super users cannot access their files in the managed file system.

Note Solaris *ufs* will not be supported in future releases of VSM.

- VSM can report errors if migrated files are moved to or restored in the unmanaged part of the file system.



- Creating hard links to directories or files from the managed part of the file system to the unmanaged part can cause unexpected results.
- High- and low-water marks are not based on the managed subdirectory, but on the total disk space for the file system. These parameters may not achieve the desired result.

Locking Delays

When a VSM process copies a file, the FHDB entry for that file is locked. Consequently, other VSM copy operations must wait until the first operation is done before locking the FHDB and continuing. For example, if you attempt to cache a file during a `migmove` operation (when that file is copied from one migration level to another), the FHDB entry for that file is locked. This means that the `migmove` process must finish before `migcopy` can cache the file.

VSM-Java Interface

VSM-Java interface 3.4.1 must be used to manage VSM 3.4.1. Mismatched release versions of VSM-Java and VSM will not work together.

Even if the versions match, you may notice Java problems. These problems are documented in the *VERITAS NetBackup Release Notes* (see the *"Java Problems Seen in NetBackup-Java"* section).

Notes and Cautions for HP-UX Systems

Dynamic Space Allocation

Inode space is allocated dynamically on *vxfs* file systems. After VSM migrates and purges large files, it is possible to create enough other files that the file manager will allocate additional inode space in the file system. In extreme situations, this additional inode space may not leave enough room in your file system for you to cache your migrated file. Removing files from disk releases the space for the files, but not the allocated inode space.

The VSM configuration thresholds include the space used for the dynamically allocated inodes. If, for example, 55% of your file system is used for inode space, VSM will never be able to release any of this space.

Man Pages

On HP-UX, the man pages are in the `/usr/openv/man/share/man` directory. Add this man page path to your MANPATH environment variable to access the VSM man pages.

Startup Script for HP-UX

With this release of VSM, the startup scripts changed. You should copy startup scripts when you install or upgrade VSM to 3.4.1. To copy startup scripts for HP-UX, see "Copy Startup Scripts" on page 20.

Notes and Cautions for IRIX Systems

XFS and DMAPI

VSM supports the SGI XFS file system and uses the DMAPI interface provided by XFS to manage a file system. Before installing VSM, you must install XFS and the software package `eoe.sw.dmi`. After installing the `eoe.sw.dmi` package, the *xfs* file system must be mounted with the `dmi` option. An example entry in the `/etc/fstab` file is as follows:

```
/dev/dsk/xlv/xhsm1 /xhsm1  xfs  dmi,rw,noauto 0 0
```

Known Problems and Limitations

It is possible to remove a migrated file when the daemon is *not* running. This may happen in the following situations:

a. If the system is rebooted, and the managed file system is mounted before the daemon is running, you could remove a migrated file by doing an `rm` *file*.

b. If the managed file system is unmounted, the daemon is stopped, and the file system is remounted without restarting the daemon, you could remove a migrated file by doing an `rm` *file*.

Removing a migrated file when `migd`, the migration daemon, is not running leaves active entries for that file in the FHDB. To correct the FHDB, execute `migdbcheck -F -r` *hsmname* when `migd` is not running. If problems persist, contact Technical Support.

VSM-Java Interface

The VSM-Java interface is not available on native SGI IRIX platforms. You can use a Windows NT workstation to manage an SGI IRIX server. To do this, you must first install VSM-Java on the Windows NT workstation. See "Configuration with VSM-Java" on page 29 for details on VSM-Java. If you do not have a Windows NT workstation, you can use `xhsmadm` to manage the SGI IRIX servers. See"Alternate Configuration Interface" on page 45 for details on `xhsmadm`.

If you are also installing VSM on Solaris or HP-UX systems at your site, you can use either the Solaris or HP-UX system to manage VSM on SGI IRIX and other system types.

Man Pages

On IRIX, the man pages are in the `/usr/openv/man/catman/local` directory. Add this man page path to your MANPATH environment variable to access the VSM man pages.

Startup Script for IRIX

With this release of VSM, the startup scripts changed. You should copy startup scripts when you install or upgrade VSM to 3.4.1. To copy startup scripts for IRIX, see"Copy Startup Scripts" on page 20.

Notes and Cautions for Solaris Implementations (DMAPI Interface)

Dynamic Space Allocation

Inode space is allocated dynamically on *vxfs* file systems. After VSM migrates and purges large files, it is possible to create enough other files that the file manager will allocate additional inode space in the file system. In extreme situations, this additional inode space may not leave enough room in your file system for you to cache your migrated file. Removing files from disk releases the space for the files, but not the allocated inode space.

The VSM configuration thresholds include the space used for the dynamically allocated inodes. If, for example, 55% of your file system is used for inode space, VSM will never be able to release any of this space.

Man Pages

On Solaris, the man pages are in the `/usr/openv/man/share/man` directory. Add this man page path to your MANPATH environment variable to access the VSM man pages.

Startup Script for Solaris (DMAPI)

With this release of VSM, the startup scripts changed. You should copy startup scripts when you install or upgrade VSM to 3.4.1. To copy startup scripts for Solaris implementations with a DMAPI interface, see "Copy Startup Scripts" on page 20.

Notes and Cautions for Solaris Implementations (ufs)

Caution Do not use a VSM-managed file system as a regular (*ufs*) file system on Solaris platforms. Changes will corrupt the file system in that configuration, and it will no longer provide proper access to migrated files. Therefore, a VSM-managed file system must always be mounted and used as a type `HSM` file system, except where otherwise indicated in supporting documentation.

Quota

ufs quotas *cannot* be turned on or off when a file system is mounted as an `HSM` file system type.

Mount Option, noatime

In Solaris 8, the mount option `noatime` prevents `atime` changes on read access to files. This can cause VSM to migrate recently accessed files more aggressively than intended. Do not use this option with VSM.

Man Pages

On Solaris, the man pages are in the `/usr/openv/man/share/man` directory. Add this man page path to your MANPATH environment variable to access the VSM man pages.

Startup Script for Solaris (ufs)

With this release of VSM, the startup scripts changed. You should copy startup scripts when you install or upgrade VSM to 3.4.1. To copy startup scripts for Solaris implementations with a *ufs* interface, see “Copy Startup Scripts” on page 20.

Installation 2

This chapter discusses the steps required to install VSM 3.4.1 at your site. Before you begin installing VSM 3.4.1, review "Things to Know Before You Install VSM" on page 1 to ensure that VSM offers you the best performance at your site. You should also review the VSM *Release Notes* before installing VSM 3.4.1. Additional information on VSM 3.4.1 is available in the VSM *System Administrator's Guide.*

The following is an overview of the general processes you will follow when installing and configuring VSM.

The General Installation Process (an Overview)

The following is a general summary of the processes you must complete to install or upgrade VSM:

- Read the "Cautions and Other Information" section that starts on page 2.
- Meet all requirements listed in "Prerequisites for Installing VSM" on page 12.
- Install VSM at your site:
  - Installing VSM for the first-time (an initial installation): these procedures start on page 13 (in the "Initial Installation, 3.4.1" section). Once you install VSM, configure VSM with the VSM-Java interface, as explained in "Configuration with VSM-Java" on page 29.
  - Upgrading VSM to 3.4.1 (an upgrade installation): these procedures start on page 21 (in the "Upgrade Installation (3.2.5 or 3.4 to 3.4.1)" section).

Note The VSM installation usually takes about 30 minutes. Please note that installing VERITAS NetBackup and NetBackup Media Manager takes additional time.

Prerequisites for Installing VSM

The following prerequisite resources are needed for installing VERITAS Storage Migrator at release level 3.4.1 on a UNIX server system. Refer to the VSM *Release Notes* for a list of supported platforms, operating systems, and file system levels.

Requirements Before You Install VSM 3.4.1

Do the following before installing or upgrading VSM:

1. Verify that you have the VSM installation CD-ROM. This CD-ROM also includes VSM-Java for the Windows NT platform, which allows you to configure VSM from an NT system (required for SGI IRIX).
2. If installing VSM 3.4.1 for the first time, or if upgrading from VSM 3.2.5, verify that you have the VERITAS NetBackup DataCenter 3.4 and NetBackup Media Manager 3.4 installation CD-ROM. Also verify that NetBackup patch J0850645 (or higher) is available.
3. First read "Notes and Cautions for All Systems" on page 2. Then, read the appropriate section for your installation:
   - "Notes and Cautions for HP-UX Systems" on page 6.
   - "Notes and Cautions for IRIX Systems" on page 7.
   - "Notes and Cautions for Solaris Implementations (DMAPI Interface)" on page 8.
   - "Notes and Cautions for Solaris Implementations (ufs)" on page 8.
4. Verify that you have the root password to the server.
5. If installing VSM for the first time, or if upgrading from VSM 3.2.5, verify that you have the base capacity license key and purchased additional capacity license keys. This step is not required if upgrading from VSM 3.4 to 3.4.1, unless your usage exceeds your current capacity license.

Note If you need to purchase additional capacity license keys, call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 outside of the US and Canada.

6. If NetBackup Media Manager is not yet installed yet, but will be used at your site, verify that you have about 140 MB of disk space in `/usr` partition.
7. If NetBackup Media Manager is installed at your site, verify that you have about 100 MB of disk space in `/usr` partition.
8. Verify that you have about 70 KB of space in the root partition for kernel modules.
9. If you want to verify that VSM is successfully installed at your site, ensure that you have a file system available for testing. This process is optional.

10. If necessary, install the correct version of the file system you will manage with VSM:
    a. For DMAPI implementations running on *Solaris*, obtain and install the VERITAS VxFS 3.3.3 or VxFS 3.4 executables separately before installing VSM 3.4.1.
    b. For implementations running *HP-UX 10.20*, obtain and install OnlineJFS 3.1.
    c. For implementations running *HP-UX 11.0*, obtain and install OnlineJFS 3.3.
    d. For implementations running *SGI IRIX*, obtain and install the `eoe.sw.dmi` kernel module from the SGI IRIX installation CD-ROM.

Note `eoe.sw.dmi` is not installed by default when you use the standard IRIX install disk. Before you can use VSM, you must install this with SGI's install procedures and reboot the system.

11. If necessary, see "Converting from ufs-type to vxfs-type File Systems" on page 39.
12. Once the above steps are completed, you are ready to install VSM. See "Initial Installation, 3.4.1" on page 13 or "Upgrade Installation (3.2.5 or 3.4 to 3.4.1)" on page 21, whichever is appropriate for your installation.

Initial Installation, 3.4.1

Follow the instructions in this section *only if you have never installed VSM before on this server.*

Initial Installation Overview for VSM 3.4.1

As a super-user, these are the procedures you will follow to install VSM for the first time on your server system:

Note The following is a summary of specific procedures you must complete to install VSM 3.4.1 for the first time at your site. Each procedure is explained later in this chapter.

- Verify that you have met all VSM installation prerequisites, as explained in "Prerequisites for Installing VSM" on page 12. This process is required.
- Enable Large File Support, as explained in "Enable Large File Support (Optional)" on page 14. This process is optional.
- Install VERITAS NetBackup DataCenter 3.4, as explained in "Install VERITAS NetBackup DataCenter 3.4" on page 14. This process is required.

- Install and configure NetBackup Media Manager, as explained in “Install and Configure NetBackup Media Manager” on page 15. This process is required if using tape (`mt`, `ct`, `dt`) or optical (`op`, `ow`) methods.
- Install NetBackup patch J0850645 (or higher), as explained in “Install NetBackup Patch” on page 16. This process is required.
- Install VSM executables, as explained in “Install VSM Executables” on page 16. This process is required, and may include a re-boot on an HP-UX 11.0 system.
- Enable user permissions, as explained in “Enable User Permissions (Optional)” on page 18. This process is optional.
- Reboot the server, as explained in “Reboot” on page 19. This process is required.
- Copy startup scripts, as explained in “Copy Startup Scripts” on page 19. This process is required.

Enable Large File Support (Optional)

If you have a DMAPI implementation of VSM running on Solaris 2.6, Solaris 7, Solaris 8, or HP-UX, you can optionally configure the file system to support files that are two gigabytes (or larger). This procedure is not applicable for Solaris ufs or IRIX file systems.

Note No such action is required for SGI IRIX systems to enable large file support. SGI IRIX supports large files by default.

Caution Modifying a VxFS file system to support files larger than 2 gigabytes is irreversible.

- On Solaris system with VxFS, use this command for each managed *vxfs-type* file system:

  ```
  /usr/lib/fs/vxfs/fsadm -F vxfs -o largefiles mount_point
  ```

- On HP-UX system with OnLineJFS, use this command:

  ```
  /usr/sbin/fsadm -F vxfs -o largefiles mount_point
  ```

Install VERITAS NetBackup DataCenter 3.4

If you have not installed NetBackup DataCenter 3.4, you must complete the following steps now:

1. For complete details on this installation process, see the NetBackup *DataCenter Installation Guide.*

Note VSM does not support the VERITAS NetBackup BusinesServer.

2. If this VSM server is also a NetBackup server, obtain and install VERITAS NetBackup DataCenter 3.4. If the VSM server is a VERITAS NetBackup client only, then push the appropriate VERITAS NetBackup 3.4.1 client software to this server.
   The supported VERITAS NetBackup client types are as follows:
   a. For Solaris 2.6, the VERITAS NetBackup client type is **`Solaris`** or **`Solaris2.6`**.
   b. For Solaris 2.7, the VERITAS NetBackup client type is **`Solaris`** or **`Solaris7`**.
   c. For Solaris 2.8, the VERITAS NetBackup client type is **`Solaris`** or **`Solaris8`**.
   d. For SGI IRIX 6.5, the VERITAS NetBackup client type is **`IRIX65`**.
   e. For HP-UX 10, the VERITAS NetBackup client type is **`HP-UX10.20`**.
   f. For HP-UX 11, the VERITAS NetBackup client type is **`HP-UX11.00`**.
3. Install NetBackup patch J0850645 (or higher) on the NetBackup server. This is required for VSM 3.4.1.

Install and Configure NetBackup Media Manager

This process is required if using tape (`mt`, `ct`, `dt`) or optical (`op`, `ow`) methods.

To install and configure NetBackup Media Manager, do the following:

- If installing VERITAS Storage Migrator on a Solaris platform, the default installation directory is `/opt`. You are asked to accept this or provide an alternate directory. If you chose an alternate directory, *you must specify a directory pathname that already exists*. By default, `/opt/openv/` is created and soft linked to `/usr/openv/` and `/opt/var/openv/` is created and soft linked to `/usr/var/openv/`. The remaining sections of this document reference the linked directories `/usr/openv/hsm` and `/usr/var/openv/hsm` rather than the installed location.
- If you are using tape and optical disc methods `ct`, `dt`, `mt`, `op`, or `ow`, install and configure the server for NetBackup Media Manager 3.4. If you will use the NetBackup (`nb`) method, you must have NetBackup server software installed, as well as either NetBackup Media Manager a master or slave server software installed. Refer to the *VERITAS NetBackup DataCenter Installation Guide, VERITAS NetBackup Installation Guide- UNIX*, and the *VERITAS NetBackup Media Manager Device Configuration Guide* for complete information.
- *NetBackup Media Manager Configuration:* To make use of unassigned tape and optical volumes in the scratch pool on NetBackup Media Manager, include the following statement in the NetBackup Media Manager configuration file,

`/usr/openv/volmgr/vm.conf`.
SCRATCH_POOL = *scratch_pool_name*
Where *scratch_pool_name* is the pool name for all volumes currently unassigned in the NetBackup Media Manager scratch pool.

- For complete details, refer to the NetBackup documentation (*VERITAS NetBackup DataCenter* 3.4 and the 3.4.1 *VERITAS NetBackup - UNIX* documentation sets) to install, configure, and test NetBackup Media Manager.

Install NetBackup Patch

- Once you verify NetBackup 3.4 is installed, install NetBackup patch J0850645 (or higher). This is required for VSM 3.4.1. To do this, follow the installation instructions provided with the patch.

Install VSM Executables

Before you run the install script, you should do the following:

- Verify that the file systems you will manage with VSM *do exist* and are *mounted*. If these file systems do not exist, create these using the vendor's file system `mkfs` command (or equivalent).
- You must have valid capacity license keys before you install VSM. The base capacity license key is included in the VSM 3.4.1 box. You can determine your license capacity by using the Storage Migrator Storage Space Test option in the VSM installation process. If you need to purchase additional license keys, call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 outside of the US and Canada. Be prepared to enter the license key when prompted during the upgrade.

Caution Do not force the install without license keys.

The VSM license keys look something like this:
`1ABC-DE2F-GHIJ-K3LM-N4PQ`. This is not a real capacity license key.

To run the install script, do the following:

1. Log in as root user on the UNIX server that has the CD-ROM drive.
2. Insert the VERITAS Storage Migrator CD-ROM in the drive.
3. Change your working directory to the CD-ROM directory:
`cd` */cd_rom_directory*

On some platforms, it is necessary to mount the CD-ROM. For example,
`mount /`*`cd_rom_directory`*
`cd /`*`cd_rom_directory`*
Where *cd-rom_directory* is the path to the directory for accessing the CD-ROM.

4. Enter the following command to execute the installation script:

   ```
   ./install
   ```

   If you want to install VSM in a directory other than the default, `./install` will prompt you with directions.

Note In some previous releases of VSM, Solaris users used `pkgadd` to install VSM. You must now use `./install` to install VSM; `./install` automatically invokes the `pkgadd` command at the appropriate point in the install.

5. On Solaris, the install script displays the following options first.

   Choose one of the following based on your configuration:

   ```
   1   Storage Migrator pkgadd SUNWhsmee
   2   Storage Migrator Storage Space Test
   0   To quit from these options
   ```

6. If you chose **2** (Storage Migrator Storage Space Test) in step 5, VSM performs a capacity usage test for your site and terminates the install script. This test determines whether additional capacity license keys are required at your site and terminates the install script.

7. If you chose **1** (Storage Migrator pkgadd SUNWhsmee) in step 5, and your site has sufficient capacity license keys, you will see the following.

   Choose one of the following based on your configuration:

   ```
   1. Storage Migrator for Solaris ufs file system
   2. Storage Migrator for VERITAS VxFS file system
   ```

8. On HP-UX and SGI IRIX, the install script requests the software packages you wish to install. The VSM-Java interface is not installed on SGI IRIX systems.

   Choose one of the following based on your configuration:

   ```
   1. Storage Migrator
   2. Storage Migrator Storage Space Test
   0. To quit from these options
   ```

9. If you chose **1** (Storage Migrator) in step 8, and your site has sufficient capacity license keys, you will see the following.

   Choose one of the following based on your configuration:

   ```
   1. Storage Migrator for Solaris ufs file system
   2. Storage Migrator for VERITAS VxFS file system
   ```


Note On HP-UX and Solaris, the script installs the VSM-Java interface executables. However, the VSM-Java interface is not installed on SGI IRIX systems. See "Installing VSM-Java" on page 30 for further details on how to use the VSM-Java interface to manage an SGI IRIX, Solaris, or HP-UX system.

Note If you need to purchase additional license keys, call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 elsewhere.

10. If prompted, enter a valid capacity license key. The install script determines if you have licensing sufficient for current usage at your site and prompts you for license keys. If you are not prompted to use all of the license keys you purchased, this means your current usage does not require all licensing keys at this time. You can add unused capacity license keys at a future date with the `miglicense` command or VSM-Java interface.

VSM installs its executables in the `/usr/openv/hsm/bin` directory. Example configuration files are installed in the `/usr/var/openv/hsm/database` and `/usr/var/openv/hsm/example/database` directories.

11. If installing VSM on HP-UX, you must reboot. The install script will ask if you want to reboot at this point. VERITAS recommends that you reboot at this point.

Enable User Permissions (Optional)

If preferred, set user permissions by executing the following commands:

- The `migrate` command allows users to force migrate specific files. Enter this command to give non-super users permission to execute `migrate`:

  `chmod 4511 /usr/openv/hsm/bin/cmd/migrate`

- The `migpurge` command allows users to force purge specific files. Enter this command to give non-super users permission to execute `migpurge`:

  `chmod 4511 /usr/openv/hsm/bin/cmd/migpurge`

Note On Solaris platforms, you must also enter the following command to allow non-super users to purge their own files:
`chmod 4511 /usr/openv/hsm/bin/admincmd/migmkspace`

- The `migtie` command allows users to cache groups of related files together. Enter this command to give users permission to execute `migtie`:

  `chmod 4511 /usr/openv/hsm/bin/migtie`

- The `miggroup` command allows users to premigrate files in a grouped directory together. Enter this command to give users permission to execute `miggroup`:

  `chmod 4511 /usr/openv/hsm/bin/miggroup`

Note Pre-migrating files is only supported in DMAPI implementations.

- Set user permissions for `migtarhelp` and `migsetdb` if you want to allow non-root users to restore migrated and purged files using VERITAS NetBackup:

  `chmod 4511 /usr/openv/hsm/bin/admincmd/migtarhelp`
  `chmod 4511 /usr/openv/hsm/bin/migsetdb`

Reboot

- If installing on HP-UX, you must reboot the server. After you reboot the server proceed to "Copy Startup Scripts" on page 19.
- For all other operating systems, a reboot is not required. Proceed directly to "Copy Startup Scripts" (below).

Copy Startup Scripts

If you want to use the VERITAS-supplied startup scripts, copy these to the correct location. This copy process varies by platform, which is explained below:

Note You must copy startup scripts when you install VSM to 3.4.1.

- *To copy startup scripts for HP-UX*
  For HP-UX systems, startup scripts can be used to start VSM:

`cp /usr/openv/hsm/bin/goodies/hpuxrc.sh /sbin/init.d/hsm`

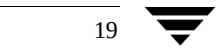
`ln -s /sbin/init.d/hsm /sbin/rc2.d/S680hsm`

`ln -s /sbin/init.d/hsm /sbin/rc1.d/K360hsm`

  These scripts are described in `/usr/openv/hsm/bin/goodies/README`. When you copy these startup scripts, you should reboot this system. After that, you are ready to configure VSM, which is described in "Configuration with VSM-Java" on page 29.

Note If the sequence numbers, which are part of the symbolic links, are already used, you may use other numbers.

Note `hpuxrc.sh` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and/or optical methods for VSM.



- *To copy the startup scripts for SGI IRIX*
  For SGI IRIX systems, the following startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/irixrc.sh /etc/init.d/hsm
ln -s /etc/init.d/hsm /etc/rc2.d/S78hsm
ln -s /etc/init.d/hsm /etc/rc0.d/K12hsm
```

  These scripts are described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup scripts, you are now ready to configure VSM, which is described in "Configuration with VSM-Java" on page 29.

Note If the sequence numbers, which are part of the symbolic links, are already used, you may use other numbers.

- *To copy the startup scripts for Solaris (DMAPI)*
  For Solaris systems with DMAPI, startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/S78hsmveritas /etc/rc2.d/S78hsmveritas
```

  This script is described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup script, you are now ready to configure VSM, which is described in "Configuration with VSM-Java" on page 29.

Note If the sequence number 78, which is part of the name of this startup script, is already used, you may use another number as necessary.

Note `S78hsmveritas` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and/or optical methods for VSM.

12. *To copy the startup scripts for Solaris (UFS)*
For Solaris UFS systems, startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/S73HSM.mount /etc/rc2.d/S73HSM.mount
```

This script is described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup script, you are now ready to configure VSM, which is described in "Configuration with VSM-Java" on page 29.

Note If the sequence number 73, which is part of the name of this startup script, is already used, you may use another number as necessary.

Note `S73HSM.mount` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and or optical methods for VSM.

Upgrade Installation (3.2.5 or 3.4 to 3.4.1)

Follow the instructions in this section if you already have VSM 3.4 or VSM 3.2.5 installed on this server and you want to upgrade to 3.4.1.

Upgrade Installation Overview for VSM 3.4.1

As a super-user, these are the procedures you will follow to upgrade VSM on the server system:

Note The following is a summary of specific procedures you must complete to install an upgraded version of VSM at your site. Each procedure is explained fully later in this chapter.

- Verify that you have met all VSM installation prerequisites, as explained in "Prerequisites for Installing VSM" on page 12.
- Prepare to Upgrade, as explained in "Prepare to Upgrade" on page 22. This process is required.
- If desired, upgrade Solaris Operating System, as explained in "Upgrade Solaris Operating System" on page 22. This process is required if you upgrade from VSM 3.2.5 with Solaris 2.5.1. For all other upgrades, this process is optional.

Note Solaris 2.5.1 is no longer supported in 3.4.1, therefore you must convert to a later Solaris release.

- If desired, change file systems from ufs-type to vxfs-type, as explained in "Converting from ufs-type to vxfs-type File Systems" on page 39. This process is optional.
- Verify that you have NetBackup DataCenter 3.4 installed, as explained in "Upgrade to NetBackup Media Manager 3.4 and DataCenter 3.4" on page 23. This process is required.
- If you are using NetBackup Media Manager, verify that version 3.4 is installed, as explained in "Upgrade to NetBackup Media Manager 3.4 and DataCenter 3.4" on page 23. This process is required.
- Install NetBackup patch J0850645 (or higher), as explained in "Install NetBackup Patch" on page 23. This process is required.
- Install VSM executables, as explained in "Install VSM Executables" on page 23. This process is required.
- Enable user permissions, as explained in "Enable User Permissions (optional)" on page 26. This process is optional.
- Reboot the system if installing on HP-UX, as explained in "Reboot" on page 19. This process is required.

- Copy startup scripts, as explained in "Copy Startup Scripts" on page 27. This process is required due to changes in this release of VSM.

Prepare to Upgrade

1. Prevent users from forcing new migrations by renaming the `migrate` command:

   ```
   mv /usr/openv/hsm/bin/migrate /usr/openv/hsm/bin/migrate.old
   ```

2. Prevent `cron` jobs from running any VSM commands automatically.

Note You can convert your file system from ufs-type to vxfs-type. If you convert your file system from ufs-type to vxfs-type, you must do so *before* you install any new VSM software. See "Converting from ufs-type to vxfs-type File Systems" on page 39 for further information.

---

3. Run `migdbcheck` to make sure the FHDB is correct.
   Repeat this step for each VSM-managed file system.
4. Verify that all your migrated files are copied if you will backup the file system (see step 5). Doing this minimizes the amount of time required to do the backup. Use `migdbcheck` to determine if you must make any copies. If necessary, run `migrc -R` to make copies of the migrated files.
5. If desired, back up the managed file system using VERITAS NetBackup. This is a precautionary step. Repeat this step for each VSM-managed file system.
6. Stop the `migrd` daemon with the UNIX `kill` command. This process is optional.
7. Back up all VSM databases and the global database `/usr/var/openv/hsm`. This is a precautionary step, and it is optional.
8. Stop the `migd` and `migvold` daemon with the `stopmigd` command.
9. Terminate the configuration interface.

Upgrade Solaris Operating System

- If you are upgrading from VSM 3.2.5 on a Solaris 2.5.1 system, you must upgrade Solaris 2.5.1 to Solaris 2.6, Solaris 7, or Solaris 8. To upgrade, follow the operating system instructions provided by Sun Microsystems.
- If upgrading to VSM 3.4.1 from any other system, upgrading from Solaris 7 to Solaris 8 is optional. To upgrade, follow the operating system instructions provided by Sun Microsystems.

Upgrade to NetBackup Media Manager 3.4 and DataCenter 3.4

This section only applies if you are upgrading from VSM 3.2.5. If you are upgrading from 3.4, go directly to "Install NetBackup Patch" (below).

To upgrade NetBackup Media Manager and DataCenter, do the following:

1. Verify that NetBackup DataCenter 3.4 is installed; upgrade if necessary. Refer to the *VERITAS NetBackup DataCenter Installation Guide* for complete information.
2. If you are using tape and optical disc methods `ct`, `dt`, `mt`, `op`, or `ow`, verify that NetBackup Media Manager 3.4 is installed; upgrade if necessary. Refer to the *VERITAS NetBackup Media Manager Device Configuration Guide* for complete information.
3. *For Solaris only:* The default installation directory is `/opt`. You are asked to accept this or provide an alternate directory. If you chose an alternate directory, you must specify a directory *pathname that already exists*. By default, `/opt/openv/` is created and soft linked to `/usr/openv/` and `/opt/var/openv/` is created and soft linked to `/usr/var/openv/`. The remaining sections of this document reference the linked directories `/usr/openv/hsm` and `/usr/var/openv/hsm`, rather than the installed location.
4. If you use the NetBackup (`nb`) method, you must upgrade the software on the NetBackup server.
5. When done, continue with the "Install NetBackup Patch" process (below).

Install NetBackup Patch

Once you verify NetBackup 3.4 is installed, install NetBackup patch J0850645 (or higher). This is required for VSM 3.4.1. To do this, follow the installation instructions provided with the patch.

Install VSM Executables

Before you run the install script, you should know the following:

- When upgrading from 3.2.5, you must know your capacity license keys. You must enter the base capacity license key and any other required capacity license keys you purchased. The VSM license keys look something like this:
  `1ABC-DE2F-GHIJ-K3LM-N4PQ`
  This is not a real capacity license key.

Note If you need to purchase additional license keys, call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 outside of the US and Canada.

To run the install script, do the following:

1. Log in as root user on the UNIX server that has the CD-ROM drive.
2. Insert the VERITAS Storage Migrator CD-ROM in the drive.
3. Change your working directory to the CD-ROM directory:

   `cd` */cd_rom_directory*

   On some platforms, it is necessary to mount the CD-ROM. For example,

   `mount` /*cd_rom_directory*
   `cd` */cd_rom_directory*

   Where *cd-rom_directory* is the path to the directory for accessing the CD-ROM.
4. Enter the following command to execute the installation script:

   `./install`

   If you want to install VSM in a directory other than the default, `./install` will prompt you with directions.

Note In some previous releases of VSM, Solaris users used `pkgadd` to install VSM. You must now use `./install` to install VSM; `./install` automatically invokes with the `pkgadd` command at the appropriate point in the install.

5. On Solaris, the install script displays the following options first. Choose one of the following based on your configuration:

   ```
   1 Storage Migrator pkgadd SUNWhsmee
   2 Storage Migrator Storage Space Test
   0 To quit from these options
   ```
6. If you chose **2** (Storage Migrator Storage Space Test) in step 5, VSM performs a capacity usage test for your site and terminates the install script. This test determines whether additional capacity license keys are required at your site and terminates the install script.
7. If you chose **1** (Storage Migrator pkgadd SUNWhsmee) in step 5, and your site has sufficient capacity license keys, you will see the following. Chose one of the following based on your configuration:

   ```
   1. Storage Migrator for Solaris ufs file system
   2. Storage Migrator for VERITAS VxFS file system
   ```

8. On HP-UX and SGI IRIX, the install script requests the software packages you wish to install. Choose one of the following based on your configuration:

```
1. Storage Migrator
2. Storage Migrator Storage Space Test
0 To quit from these options
```

9. If you chose **2** (Storage Migrator Storage Space Test) in step 8, VSM performs a capacity usage test for your site and terminates the install script. This test determines whether additional capacity license keys are required at your site and terminates the install script. If you need to purchase additional license keys, call 1-800-342-0652 from the US and Canada, or +1 (650) 335-8555 outside of the US and Canada.

Note On HP-UX and Solaris, the script installs the VSM-Java interface executables. However, the VSM-Java interface is not installed on SGI IRIX systems. See "Installing VSM-Java" on page 30 for further details on how to use the VSM-Java interface to manage an SGI IRIX, Solaris, or HP-UX system.

10. If prompted, enter the valid capacity usage license key for your site.

Caution When upgrading from VSM 3.2.5, you must have valid capacity license keys before you install VSM. Do not force the installation without the appropriate license keys.

`./install` determines if you have licensing sufficient for current usage at your site. If you are not prompted to use all of the license keys you purchased, this means your current usage does not require all licensing keys at this time. You can add unused capacity license keys at a future date with the `miglicense` command or VSM-Java interface.

VSM installs the executables in the `/usr/openv/hsm/bin` directory. Example configuration files are installed in the `/usr/var/openv/hsm/database` and `/usr/var/openv/hsm/example/database` directories.

Enable User Permissions (optional)

If preferred, set user permissions by executing the following commands:

- The `migrate` command allows users to force migrate specific files. Enter this command to give non-super users permission to execute `migrate`:

  `chmod 4511 /usr/openv/hsm/bin/cmd/migrate`

- The `migpurge` command allows users to force purge specific files. Enter this command to give non-super users permission to execute `migpurge`:

  `chmod 4511 /usr/openv/hsm/bin/cmd/migpurge`

Note On Solaris platforms, you must also enter the following command to allow non-super users to purge their own files:
`chmod 4511 /usr/openv/hsm/bin/admincmd/migmkspace`

- The `migtie` command allows users to cache groups of related files together. Enter this command to give users permission to execute `migtie`:

  `chmod 4511 /usr/openv/hsm/bin/migtie`

- The `miggroup` command allows users to premigrate files in a grouped directory together. Enter this command to give users permission to execute `miggroup`:

  `chmod 4511 /usr/openv/hsm/bin/miggroup`

Note Pre-migrating files is only supported in DMAPI implementations.

- Set user permissions for `migtarhelp` and `migsetdb` if you want to allow non-root users to restore migrated and purged files using VERITAS NetBackup:

  `chmod 4511 /usr/openv/hsm/bin/admincmd/migtarhelp`
  `chmod 4511 /usr/openv/hsm/bin/migsetdb`

Reboot

- If installing on HP-UX, you must reboot the server. After you reboot the server proceed to “Copy Startup Scripts” on page 27.
- For all other operating systems, a reboot is not required. Proceed directly to “Copy Startup Scripts” on page 27.

Copy Startup Scripts

The VERITAS-supplied startup scripts are enhanced in VSM 3.4.1. The startup scripts start the daemons and run `migVSMstartup` for each VSM-managed file system when your server boots. When the server is shutdown the scripts perform an orderly shutdown of all VSM activities and stop the daemons. If you do not use the VERITAS-supplied startup scripts, you *must* manually perform these actions.

If you want to use these scripts, you should copy the files and create the indicated links as needed for your server platform.

Once you copy the startup scripts (detailed below), the upgrade is complete. After the next server reboot, VSM will be ready for use, or you may elect to run the `startmigd` command and `migVSMstartup` for each managed file system.

Note The startup scripts from VSM 3.4 and earlier do not contain the latest changes. If you currently use a VSM supplied startup script, then you should copy the new startup script after upgrading VSM to 3.4.1.

- *To copy startup scripts for HP-UX*
  For HP-UX systems, startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/hpuxrc.sh /sbin/init.d/hsm
ln -s /sbin/init.d/hsm /sbin/rc2.d/S680hsm
ln -s /sbin/init.d/hsm /sbin/rc1.d/K360hsm
```

  These scripts are described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup scripts, you are now ready to reboot this system and use VSM.

Note If the sequence numbers, which are part of the symbolic links, are already used, you may use other numbers.

Note `hpuxrc.sh` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and or optical methods for VSM.

- *To copy the startup scripts for SGI IRIX*
  For SGI IRIX systems, the following startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/irixrc.sh /etc/init.d/hsm
ln -s /etc/init.d/hsm /etc/rc2.d/S78hsm
ln -s /etc/init.d/hsm /etc/rc0.d/K12hsm
```

  These scripts are described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup scripts, you are now ready to use VSM.

Note If the sequence numbers, which are part of the symbolic links, are already used, you may use other numbers.

- *To copy the startup scripts for Solaris (DMAPI)*
  For Solaris systems with DMAPI, startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/S78hsmveritas /etc/rc2.d/S78hsmveritas
```

  This script is described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup script, you are now ready to use VSM.

Note If the sequence number 78, which is part of the name of this startup script, is already used, you may use another number.

Note `S78hsmveritas` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and or optical methods for VSM.

- *To copy the startup scripts for Solaris (UFS)*
  For Solaris UFS systems, startup scripts can be used to start VSM:

```
cp /usr/openv/hsm/bin/goodies/S73HSM.mount /etc/rc2.d/S73HSM.mount
```

  This script is described in `/usr/openv/hsm/bin/goodies/README`. When you copy the startup scripts, you are now ready to use VSM.

Note If the sequence number 73, which is part of the name of this startup script, is already used, you may use another number.

Note `S73HSM.mount` starts the NetBackup Media Manager daemon, `ltid`, if it is installed on the system and you are using tape and or optical methods for VSM.

Configuration with VSM-Java 3

This chapter discusses the steps required to configure VSM 3.4.1 at your site with the VSM-Java interface, the recommended configuration interface. Before you start this chapter you must have VSM 3.4.1 installed on your server, and you must have started `migrd`. Note that configuring VSM 3.4.1 is only required if you just installed VSM 3.4.1 for the first time on this server, or if you are managing a new server with VSM. Otherwise, you do not need to configure this server.

Additional information on VSM 3.4.1 is available in the VSM *Release Notes* and VSM *System Administrator's Guide*.

Caution VERITAS strongly recommends that you do not use both VSM-Java or `xhsmadm` simultaneously on your system; doing so can produce unpredictable results.

The following is an overview of the general processes you will follow when installing and configuring VSM.

Initial Configuration with VSM-Java Interface, 3.4.1

As a super-user, follow these steps to configure VSM, for both test (optional) and production systems:

- Verify you have VSM 3.4.1 installed before you attempt to configure VSM on this server system. This is described in "Installation" on page 11. This process is required.
- Start `migrd` on the system server that you want to configure:
  `/usr/openv/hsm/bin/admincmd/migrd`
  This process is required.
- Launch the VSM-Java interface, as explained in "Launching VSM-Java" on page 31. This process is required.
- Set up your trial system configuration, as explained in "Testing System Configuration (Optional)" on page 31. This process may be optional for your site.
- Test your trial VSM installation, as explained in "Using Your Testing System (Optional)" on page 34. This process may be optional for your site.

- Set up your production (real) system configuration, as explained in "Configuring Your Production System with VSM-Java" on page 36. This process is required.

About VSM-Java

This section explains how to install and launch VSM-Java. You will need to use VSM-Java for both your test and production configurations. For complete details on using VSM-Java, refer to the VSM *System Administrator's Guide*.

You can run VSM-Java on the VSM server or an NT workstation for HP-UX and Solaris. However, on SGI IRIX you can only run VSM-Java on an NT workstation. This is because VSM-Java is not available on native SGI IRIX platforms.

Installing VSM-Java

To use the VSM-Java interface, install it on a Java-capable machine. If you installed VSM on a Solaris or HP-UX server, VSM-Java is installed on that machine. VSM-Java is available for use with the local (or remote) display console. A Windows NT workstation can also be used as a remote display console for Solaris or HP-UX or IRIX servers. Note that IRIX servers do not install their own copy of VSM-Java, thus an NT workstation, acting as a remote display console, is the only way to use VSM-Java to manage IRIX servers.

If you use a Windows NT workstation as a remote display console, you must first install VSM-Java for Windows NT on that workstation. VSM-Java for Windows NT is available on the VSM 3.4.1 installation CD-ROM.

To install VSM-Java for Windows NT, do the following:

1. Insert the installation CD-ROM in the Windows NT workstation CD drive.
2. Click Install.
3. Follow the screen prompts.

Note For more information on how to configure VSM with VSM-Java interface, refer to the VSM *System Administrator's Guide*.

Launching VSM-Java

You must start `migrd` on all VSM systems you will manage with VSM-Java.

To start `migrd` on the VSM server, do the following:

- Enter the `/usr/openv/hsm/bin/admincmd/migrd` command.

Note VSM-Java will run on HP-UX when the server is rebooted.

Note For further details on VSM-Java, see "Testing System Configuration (Optional)", below, or "Configuring Your Production System with VSM-Java" on page 36.

To launch VSM-Java for Windows NT, do the following:

1. Select Unix Administration from the VERITAS Storage Migrator menu.
2. Then select, Start > Programs > VERITAS Storage Migrator > Unix Administration.

To launch VSM-Java on Solaris or HP-UX, do the following:

1. If using UNIX, make sure your *DISPLAY* variable is correctly set.
2. Use the `/usr/openv/java/migsa &` command to launch VSM-Java.

Testing System Configuration (Optional)

Before starting VSM, you can set up trial (test) VSM configuration files for testing. This process is optional.

A Caution about Testing Systems

Testing requires that you create a trial configuration. However, in most cases, the trial configuration must be deleted before you configure your production (real) system. Failure to complete the steps below will result in unpredictable results. It is critical that you complete the steps in "Remove Your Testing System" on page 35 when you are ready to setup your production system.

For trial configuration with VSM-Java, complete the following steps:

1. Make sure the file system that you want to manage with VSM is mounted correctly for your operating system (as described below). The examples below require correct `fstab` entries.

Note After you mount the file system, you must click the Refresh button.

2. If you are running *kernel-based Solaris (ufs)*, the managed file systems must be mounted as a *ufs* file systems. An example `mount` command is as follows:

```
mount -F ufs /dev/rdsk/c0t0d0s6 /test1
```

Note The configuration process will unmount the `ufs` file system and re-mount it as an `hsm` file system.

   a. If you are running *DMAPI (nonkernel-based) Solaris (vxfs)*, the managed file systems must be mounted as *vxfs* file systems. An example `mount` command is as follows:

```
mount -F vxfs -o largefiles /dev/rdsk/c0t0d0s6 /test1
```

   b. If you are running *HP-UX with OnLineJFS*, the managed file systems must be mounted as `vxfs` file systems. An example `mount` command is as follows:

```
mount -F vxfs -o largefiles /dev/vg00/lvol9 /hsm9
```

   c. If you are running *SGI IRIX*, the managed file systems must be mounted as `xfs` file systems, with the `dmi` option enabled. Examples of the `/etc/fstab` entry and `mount` command are below:

```
/dev/dsk/dks0dis2 /test xfs rw,dmi 0 0
mount -F xfs -o dmi /dev/dsk/dks3d3s4 /hsm3
```

Note During configuration on implementations for Solaris *ufs* file systems, VSM will unmount and re-mount the managed file system. Selected file systems, therefore, must be mounted, but not in use at this time. For this reason, you cannot manage `/`(the root file system), `/usr`, `/swap`, and other file systems that are required at all times.

3. Verify that the path `/usr/openv/hsm/bin` is included in your search path. You can change the root user's login script to include the path to VSM and NetBackup Media Manager executables. The NetBackup Media Manager executables are in `/usr/openv/volmgr/bin` directory.

4. You must register at least one volume for the migration method you chose for trial. If you are using VERITAS Storage Migrator with methods `ct`, `dt`, `mt`, `op`, or `ow`, make sure at least one volume is registered to `HSM` or in a volume pool that VSM is using.

5. Verify that the NetBackup Media Manager daemons are active at this time. To do this see the *VERITAS NetBackup DataCenter System Administator's Guide*, the *VERITAS NetBackup System Administator's Guide - UNIX*, or the *VERITAS NetBackup System Administator's Guide - Windows NT/2000*, which ever is appropriate for your installation.

6. If you are migrating to tape or optical media, start the NetBackup Media Manager daemon, `ltid`.
7. Start the VSM daemon, `migrd`, and launch VSM-Java, as explained in "Launching VSM-Java" on page 31.
8. Start the VSM daemon, `migd`. The system is now ready for migration.
9. Login to the server that you will configure for a trial VSM configuration.
10. Select a server from the left-hand pane of the Storage Migrator main dialog.
11. Start the VSM daemons with VSM-Java by selecting the following: Actions > Server > Start Daemons.
12. Configure a test system to be managed by VSM by selecting the following: Configure > Basic Configuration Wizard...
13. Select a file system to manage. Click Next.
14. Select the storage method you wish to use. Click Next.
15. De-select Migrate files daily at. At this point, the choices you have to make depend on the storage method you selected in step 14 (above). These choices are explained in step 16 through step 18.
16. If you selected tapes or local devices in step 14, do the following:
    a. Change Number of Copies to **1**.

Note Always make two copies in *production* (non-test) configurations.

    b. If more than one storage device is available on your server, select the one you want to use for First copy.
    c. Click Next.
17. If you selected alternate disk in step 14, do the following:

Note Whenever you specify a directory, it must already exist.

    a. Specify a directory to be used for the disk copies.
    b. Click Next.

18. If you selected Remote Server ftp in step 14 on page 33, do the following:

Note Whenever you specify a directory, it must already exist.

a. Specify a directory to be used for the disk copies.

b. Specify a server, directory, user name, and password to be used for making the ftp copies.

c. Click Next.

19. At this point, for all storage methods, you will be presented with a review of the configuration. You can go Back if you wish to make any changes, otherwise click Finish. When you complete this step, you are done configuring your test system and should proceed to "Using Your Testing System (Optional)" (below).

Note Once you go Back to a previous screen, any changes you made to the current screen will be lost. You must re-enter these changes when your return to this screen.

Using Your Testing System (Optional)

Once you complete your trial configuration ("Testing System Configuration (Optional)" on page 31), your trial system is ready for testing. This section allows you to test that your system is installed correctly, and to get familiar with VSM operation.

To Test Your Trial System by caching and migrating a file, do the following:

```
cd managed-fs                    /*Change to the managed file system*/
mkdir test                       /*Create a temporary test directory*/
cd test
cp /usr/var/openv/hsm/example/database/migconf testfile
                                 /*Create a test file in test directory*/
```

Note Make sure that `testfile` is larger than the configured slice when you complete the above command.

```
migrate testfile                 /*Premigrate the file*/
migrc -R hsm1                    /* Push the file to secondary storage */
```

where: **hsm1** = The *hsmname* used in the trial configuration file.

Note Do not continue until you see the `migrecover.sh[pid]: Finished` message in the VSM log.

```
migloc testfile                  /* See Migrated status, dk & secondary storage
                                 method used (ct, dt, mt, op, ad, etc.)*/
```

```
migpurge testfile          /* Purge the premigrated file */
migloc testfile            /* See Migrated status & no dk method*/
tail testfile              /* Cache the file back to disk */
migloc testfile            /*See cached status */
```

Note If you get any error messages following this procedure, examine the VSM error log files to determine the exact cause.

Remove Your Testing System

Caution You must clean up your trial configuration before you create your production system. We strongly recommend that you do this after testing and *before* you create a production (real) configuration.

VERITAS strongly recommends that you do the following after testing and before you create a production (real) configuration:

1. Remove all test files and directories from the VSM managed file system.
2. Recycle test volumes using the `migrecycle` command:
   a. Use `migdbrpt -a` *hsmname* to determine all `tape`, `optical`, `ad`, and/or `ftp` volumes used for testing.
   b. For each such volume, but not including the `dk` volume, run `migrecycle -a` 0 *hsmname label method*
3. Remove VSM management from the file system with VSM-Java:
   a. Select the managed filesystem in the left-hand pane of the Storage Migrator main dialog.
   b. Select Edit > Delete HSM Management...
4. Re-initialize the file system with `newfs`.

Configuring Your Production System with VSM-Java

Before starting VSM, you must set up the VSM configuration files. If you used your production configuration as your trial configuration, you can skip the following procedure.

Note You should follow the steps below *only* if you are configuring VSM for the first time on this server.

Note You must register at least one volume for the migration method you chose for production. If you are using VERITAS Storage Migrator with methods `ct`, `dt`, `mt`, `op`, or `ow`, make sure at least one volume is registered to VSM or in a volume pool VSM is using. Also make sure that the NetBackup Media Manager daemons are active.

For production (real) configuration of VSM with VSM-Java, complete the following steps:

1. Make sure the file system is mounted correctly for your operating system (as described below). The `setuphsm` command will leave the file system correctly mounted if it encountered no errors:

   a. If you are running *kernel-based Solaris (ufs)*, the managed file systems must be mounted as ufs file systems. An example `mount` command is as follows:
   `mount -F ufs /dev/dsk/c0t0d0s6 /test1`.

Note The configuration process will unmount the *ufs* file system and re-mount it as an *hsm* file system.

   b. If you are running *DMAPI (nonkernel-based) Solaris (vxfs)*, the managed file systems must be mounted as vxfs file systems. An example `mount` command is as follows:
   `mount -F vxfs -o largefiles /dev/dsk/c0t0d0s6 /test1`

   c. If you are running *HP-UX*, the managed file systems must be mounted as vxfs file systems. An example `mount` command is as follows:
   `mount -F vxfs -o largefiles /dev/vg00/lvol9 /hsm9`

d. If you are running *SGI IRIX*, the managed file systems must be mounted as `xfs` file systems, with the `dmi` option enabled. Examples of the `/etc/fstab` entry and `mount` command are below:

```
/dev/dsk/dks0dis2 /test xfs rw,dmi 0 0
mount -F xfs -o dmi /dev/dsk/dks3d3s4 /hsm3
```

Note While configuring Solaris *ufs* file systems, VSM will unmount and re-mount the managed file system. Selected file systems, therefore, must be mounted, but not in use at this time. For this reason, you cannot manage / (the root file system), `/usr`, `/swap`, and other file systems that are required at all times.

2. Verify that the path `/usr/openv/hsm/bin` is included in your search path. You can change the root user's login script to include the path to VSM and NetBackup Media Manager executables. The NetBackup Media Manager executables are in `/usr/openv/volmgr/bin` directory.

3. If you are using VERITAS Storage Migrator with methods `ct`, `dt`, `mt`, `op`, or `ow`, make sure at least one volume is registered to VSM or in a volume pool VSM is using.

4. Verify that the NetBackup Media Manager daemons are active at this time. To do this see the *NetBackup DataCenter System Administator's Guide*.

5. Start the NetBackup Media Manager daemon, `ltid`, if you are migrating to tape or optical media. The system is now ready for migration.

6. Start the VSM daemon, `migd`.

7. Start the VSM daemon, `migrd`, and launch VSM-Java, as explained in "Launching VSM-Java" on page 31. The system is now ready for migration.

8. Login to the server that you will configure for a trial VSM configuration.

9. Select a server from the left-hand pane of the Storage Migrator main dialog.

10. Start the VSM daemons with VSM-Java by selecting the following:
Actions > Server > Start Daemons.

11. Configure a test system to be managed by hsm by selecting the following:
Configure > Basic Configuration Wizard...

12. Select a file system to manage. Click Next.

13. Select the storage method you wish to use. Click Next.

14. De-select Migrate files daily at. At this point, the choices you have to make depend on the storage method you selected in step 13 (above). These choices are explained in step 15 through step 17.

15. If you selected tapes or local devices in step 13 on page 37, do the following:

a. Change Number of Copies to 1.

Note Always make two copies in *production* (non-test) configurations.

b. If more than one storage device is available on your server, select the one you want to use for First copy.

c. Click Next.

16. If you selected alternate disk in step 13 on page 37, do the following:

Note Whenever you specify a directory, it must already exist.

a. Specify a directory to be used for the disk copies.

b. Click Next.

17. If you selected Remote Server ftp in step 13 on page 37, do the following:

Note Whenever you specify a directory, it must already exist.

a. Specify a directory to be used for the disk copies.

b. Specify a server, directory, user name, and password to be used for making the ftp copies.

c. Click Next.

18. At this point, for all storage methods, you will be presented with a review of the configuration. You can go Back if you wish to make any changes, otherwise click Finish. When you complete this step, you are done configuring your test system and should proceed to "Using Your Testing System (Optional)" on page 34.

Note Once you go Back to a previous screen, any changes you made to the current screen will be lost. You must re-enter these changes when your return to this screen.

Upgrade Configuration with VSM-Java Interface, 3.4.1

If you upgraded from version 3.2.5 or 3.4 to 3.4.1, you do not need to reconfigure your system once VSM is installed.

Converting from ufs-type to vxfs-type File Systems A

This appendix describes how to convert from an existing ufs-type VSM-managed file system to a vxfs-type VSM-managed file system. Do this *before* installing any new VSM software.

Follow this procedure when you are changing from a kernel-based implementation of VSM to a non-kernel-based implementation of VSM.

The steps in this chapter use the VSM-Java interface. You can use the Motif-based interface, `xhsmadm`, to perform most of the same functions.

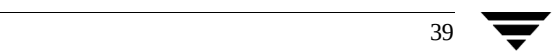
Caution VERITAS strongly recommends that you do not use both VSM-Java and `xhsmadm` simultaneously on your system; doing so can produce unpredictable results.

Note Before starting the conversion, ensure that VxFS 3.3.3 or 3.4 is installed on your machine. Then, create and mount a vxfs file system for each VSM-managed ufs file system that you will be converting.

Things to Know Before Converting File System Type

Changing file system types is a significant change. You should consider a few facts before you convert to a vxfs-type file system:

- If the mount path has changed, and you later scan volumes to reconstruct the FHDB, the paths in the reconstructed FHDB will be wrong. Further details are explained in “Mount Paths and Reconstructing Your FHDB” on page 44.
- Slice values do not carry forward through the conversion process. Further details are explained in “Slice Values Are Set to 0” on page 43.
- It is important to run `convert_to_cached.sh` as described in “Converting from ufs-type to vxfs-type File Systems” on page 40 (step 29). Further details are explained in “Verifying the Entries within the FHDB” on page 43.



Converting from ufs-type to vxfs-type File Systems

To convert to a vxfs-type file system, do the following:

1. Verify that VxFS 3.3.3 or 3.4 is installed on your machine.
2. Make sure all copies of migrated files have been made. Run `migrc -RM` *hsmname* to finish making copies for each VSM-managed file system.
3. Purge all files in premigration by running `mignospace -i` *hsmname* for each VSM-managed file system.
4. For each VSM-managed file system, run `migdbcheck -F` *hsmname* to ensure that the FHDB is correct, and make any necessary corrections.
5. Backup each VSM-managed file system using VERITAS NetBackup. You must use VERITAS NetBackup to prevent the caching of migrated files. You should exclude the *.PAIN* file from the backups.
6. Stop all VSM activity by setting the state attribute of each VSM to `0` (Inactive) and stopping the migration daemons:
   a. If you are currently using VSM 3.4, select a managed file system in the left-hand pane of the Storage Migrator main dialog. Then, select the following: Actions > File system > Deactivate.
   b. If you are currently using VSM 3.4.1, select a managed file system in the left-hand pane of the Storage Migrator main dialog. Then, select the following: Idle > Deactivate.
   c. After all file systems have been set to inactive, stop the migration daemons by selecting the server in the left-hand pane and selecting the following: Actions > Server > Stop Daemons
7. Exit from the VSM-Java interface and stop the `migrd` daemon with `stopmigrd`.

Note As an alternative to step 7: exit from `xhsmadm` and stop the `migrd` daemon with the UNIX `kill` command. Proceed to step 8 when done.

8. As a precaution, back up all VSM database directories with `tar` or VERITAS NetBackup (optional):

   `/bin/tar -cvpf` *archive_file dwpath*
9. Also as a precaution, make a backup copy of the global configuration file `/usr/var/openv/hsm/database/migconfg`.
10. Unmount all VSM-managed file systems.
11. Run `install.hsm -d` to de-install the current VSM kernel modules.
12. If you are using an `rc2.d` script, such as `S73HSM.mount`, remove it now.

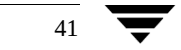
13. Remove the old VSM executables: `rm -rf /usr/openv/hsm/bin`.

Caution You must NOT remove any of the VSM databases.

14. If you are upgrading from VSM 3.2.5, you must now upgrade NetBackup Media Manager and VSM. Install NetBackup Media Manager first, followed by VSM.
15. If VSM 3.4.1 is not yet installed, install VSM now.

Note You should mount each vxfs VSM-managed file system at the same mount point as the corresponding ufs VSM-managed file system. If you need them to be different, several configuration changes are required, some of which must be done manually. *VERITAS does not recommend manual configuration changes.*

16. Create and mount a vxfs file system for each VSM-managed ufs file system that you will be converting.
17. Update `/etc/vfstab` by removing both entries for each VSM-managed file system.
18. Adding a vxfs entry for each file system to be managed by VSM.
19. If your vxfs managed file systems are mounted at the same mount points that were used for the ufs managed file systems, skip ahead to step 21.
20. If you have mounted the vxfs file system at a different mount point than the ufs file system, do the following:
    a. Change the file system mount point in both the global and VSM configuration files.
    b. Using your editor of choice, edit the global configuration file `/usr/var/openv/hsm/database/migconfg`. Then, modify each *fspath=mount_point* as necessary.
    c. You will also have to edit each VSM configuration file *dwpath*`/database/migconf` to change the *name=managed_directory* portion of the `FILESYS` entry.
21. Ensure that the vxfs file systems are mounted at the configured paths.
22. Start `/usr/openv/hsm/bin/admincmd/migrd`. Then launch the VSM-Java interface:
    a. Select a managed file system in the left-hand pane of the main window.
    b. Then, select Actions > Filesystem > Set State > Activate. This sets the state of the VSM to Active.
    c. Repeat this process for each managed file system.



23. For each VSM-managed file system run the following:

```
/usr/openv/hsm/bin/migalter -I mount_point
/usr/openv/hsm/bin/migrc -L hsmname
/usr/openv/hsm/bin/ihprint -v hsmname
```

24. If your vxfs managed file systems are mounted at the same mount points that were used for the ufs managed file systems, skip ahead to step 26.

25. If you have mounted the vxfs file system at a different mount point than the ufs file system:

a. Run the following to connect the paths to the FHDB:

```
/usr/openv/hsm/bin/admincmd/change_path.sh \
-s path_current_fhdb -o old_mount_point -n new_mount_point \
-d path_new_fhdb
```

b. Copy the new FHDB created by `change_path.sh` over the old FHDB.

c. Repeat this process (all of step 25) for each VSM-managed file system as needed.

26. Run `startmigd -m`. This will result in a WARNING message for each VSM-managed file system that is mounted.

27. Restore each of the backed up VSM files systems using VERITAS NetBackup.

Note If you have mounted the vxfs file system at a different mount point than the ufs file system, you must specify an alternate path restore.

---

28. Run `stopmigd -m`.

29. Run `migdbcheck` to make sure the FHDB is correct and correct if necessary:

Caution Completing step 29 is *critical* to the accuracy of your FHDB.

---

a. If the file `/tmp/migdbcheck-orphan.`*hsmname.pid* was created by `migdbcheck`, files that were cached unmodified in the ufs file system were restored as regular files. These files can be converted back to cached unmodified files by running the following:

```
/usr/openv/hsm/bin/admincmd/convert_to_cached.sh \ -f
/tmp/migdbcheck-orphan.hsmname.pid hsmname
```

b. Repeat this process (all of step 29) for each VSM-managed file system.

Note If you do not do this conversion (all of step 29), new copies of these files will be made the next time they are migrated.

---

30. Run `startmigd -m`. This will result in a WARNING message for each VSM-managed file system that is mounted.

Note It is normal to see a warning message when VSM mounts a managed file system.

31. If desired, copy the supplied startup script:

```
cp /usr/openv/hsm/bin/goodies/S78hsmveritas /etc/rc2.d/S78hsmveritas
```

Note The above script is described in `/usr/openv/hsm/bin/goodies/README`.

Note If the sequence number 78, which is part of the name of this startup script, is already used, you can use another number as necessary.

After you complete step 31, the non-kernel-based implementation of VSM is running.

Troubleshooting Your Newly Converted vxfs File System

Verifying the Entries within the FHDB

When you converted to a vxfs-type file system, you should have run `convert_to_cached.sh`. If not, your FHDB could contain inaccurate file handle references. If there is any question about the accuracy of your FHDB, complete the following procedure.

- *To verify that your FHDB is correct, do the following:*

1. Run `migdbcheck -f` *hsmname* to check for FHDB inaccuracies.
If problems are found, VSM displays this message:

```
- - ERROR: 1 FHDB entires with no file with a matching handle were found.
```

If you see the message above, you must correct your FHDB.

2. To correct the FHDB, run `migbdcheck -F -r` *hsmname.* When you are prompted, mark the entries as inactive. When you have completed this step, your FHDB is again accurate.

Slice Values Are Set to 0

When you convert to a vxfs-type file system, the slice values for all migrated files are set to 0. This means if someone attempts to access any part of the migrated file that was in the now-missing slice, VSM must restore the entire file.

Mount Paths and Reconstructing Your FHDB

VERITAS recommends that you do not change mount paths on a VSM-managed file system. If you change your mount paths, `migreconstruct` cannot rebuild lost files in the VSM-managed file system. For more information, see step 25 of “Converting from ufs-type to vxfs-type File Systems”on page 42.

Alternate Configuration Interface B

Configuration with the Motif-based interface, `xhsmadm`, 3.4.1

This section describes how to configure VSM with the Motif-based interface, `xhsmadm`. You must have VSM 3.4.1 installed before you complete the steps in this chapter.

`xhsmadm` is an older interface with *limited features* when compared to the VSM-Java. `xhsmadm` will be discontinued in the future. Therefore, VERITAS recommends that you use VSM-Java (Java-based interface) instead of `xhsmadm`. See "Configuration with VSM-Java" on page 29 for complete details on the Java interface. VSM-Java also has s fully documented online help system to help you.

Note Complete all installation steps, which start on page 11, before you configure VSM.

Caution VERITAS strongly recommends that you use only VSM-Java or `xhsmadm` to change the configuration of your system. Do not use both interfaces simultaneously on your system; doing so can produce unpredictable results.

Configuration Prerequisites

Complete the following steps if you want to prepare the system for VSM configuration with `xhsmadm`:

1. Make sure the file system is mounted correctly for your operating system (as described below). The `setuphsm` command will leave the file system correctly mounted if it encountered no errors. The examples below require correct `fstab` entries:

   a. If you are running *kernel-based Solaris (ufs)*, the managed file systems must be mounted as ufs file systems. An example `mount` command is as follows:

   ```
   mount -F ufs /dev/rdsk/c0t0d0s6 /test1
   ```

Note The configuration process will unmount the ufs file system and re-mount it as an *hsm* file system.

b. If you are running *DMAPI (nonkernel-based) Solaris (vxfs)*, the managed file systems must be mounted as vxfs file systems. An example mount command is as follows:

```
mount -F vxfs -o largefiles /dev/rdsk/c0t0d0s6 /test1
```

c. If you are running *HP-UX*, the managed file systems must be mounted as vxfs file systems. An example mount command is as follows:

```
mount -F vxfs -o largefiles /dev/vg00/lvol9 /hsm9
```

d. If you are running *SGI IRIX*, the managed file systems must be mounted as xfs file systems, with the dmi option enabled. Examples of the /etc/fstab entry and mount command are below:

```
/dev/dsk/dks0d1s2 /test xfs rw,dmi 0 0
mount -F xfs -o dmi /dev/dsk/dks3d3s4 /hsm3
```

Note When configuring Solaris *ufs* file systems, VSM will unmount and mount the managed file system. Selected file systems, therefore, must be mounted, but not in use at this time. For this reason, you cannot manage /(the root file system), /usr, /swap, and other file systems that are required at all times.

2. Verify that the path /usr/openv/hsm/bin is included in your search path before using any VSM commands. You can change the root user's login script to include the path to VSM and NetBackup Media Manager executables. The NetBackup Media Manager executables are in /usr/openv/volmgr/bin directory.

3. Register at least one volume for the migration method you chose for trial. If you are using VERITAS Storage Migrator with methods ct, dt, mt, op, or ow, make sure at least one volume is registered to HSM or in a volume pool VSM is using.

4. Verify that the NetBackup Media Manager daemons are active at this time. To do this see the *NetBackup DataCenter System Administator's Guide*.

5. Start xhsmadm, which is located in the goodies directory:

/usr/openv/hsm/bin/goodies/xhsmadm

Note On SGI IRIX platforms, start xhsmadm from **/usr/openv/hsm/bin/xhsmadm**.

6. Start the VSM daemons (migd, migvold, and migrd), if these daemons are not already running, with startmigd or xhsmadm by selecting the following:
File > Start Daemons > Start both daemons.

7. Start the NetBackup Media Manager daemon, `ltid`, if you are migrating to tape or optical media. The system is now ready for migration.

Note Whichever interface you use to configure your *test* system, must be used to configure your *production* system. Do not use both VSM-Java and `xhsmadm` interfaces simultaneously on your system; doing so can produce unpredictable results.

Using `xhsmadm` to Configure Your System

This section describes how to configure VSM with the Motif-based interface, `xhsmadm`. Note that the VSM-Java interface has more features and is recommended for configuring VSM (see "Initial Configuration with VSM-Java Interface, 3.4.1" on page 29).

All installation steps should be completed before configuring VSM. If you have not yet installed VSM, see "Installation" on page 11 for complete information.

Complete the followings steps to configure each VSM-managed file system with `xhsmadm`:

1. Make sure that you have met all installation prerequisites (see "Prerequisites for Installing VSM" on page 12). This includes any required patches.
2. Before starting VSM, and after installing VSM, you must setup the VSM configuration files. Use the `xhsmadm` interface as explained below. Selected file systems should be mounted. Follow the steps listed in this chapter *only* if configuring VSM for the first time on this server. If you are changing the configuration of a server that was upgraded to 3.4.1, follow the procedure found in chapter 3 of the VSM *System Administrator's Guide*.
3. Before using VSM commands make sure the path `/usr/openv/hsm/bin` is included in your search path. You can change the root user's login script to include the path to VSM and NetBackup Media Manager executables. The NetBackup Media Manager executables are in `/usr/openv/volmgr/bin` directory.
4. If you are using VERITAS Storage Migrator with methods `ct`, `dt`, `mt`, `op`, or `ow`, make sure at least one volume is registered to VSM or in a volume pool VSM is using. Also make sure that the NetBackup Media Manager daemons are active at this time.
5. Define the *DISPLAY* variable.

6. Start xhsmadm:

```
/usr/openv/hsm/bin/goodies/xhsmadm &
```

Note On SGI IRIX platforms, start xhsmadm from **/usr/openv/hsm/bin/xhsmadm**.

7. Create an HSMDEV entry for each file system directory you are going to manage. Selecting each configuration file entry automatically displays the attributes assigned to that entry. You can add entries and edit attributes easily through the xhsmadm interface.

8. Attributes that you include in each configuration file entry are as follows:

Name

Name (*hsmname*) that you assign to this HSMDEV entry. This name must be a unique alphanumeric value, such as vsm1

You can use only letters or a combination of letters and numbers with no trailing whitespace. Avoid using only numbers because this can cause some utilities to work incorrectly. Maximum name length is 32 characters. The default is hsm. You can configure up to 64 *hsmnames*.

Mount Point

Path name (*fspath*) of the file system for this HSMDEV entry. It is the mount point for the file system. This parameter is required. The full path's *path/filename* (including directories) must be 1023 characters or less for VSM to migrate files.

Caution Always create the database directory in a local file system that VSM does not manage. This prevents deadlocks when migrating files from the database or workdir directories.

Database Pathname

Path (*dwpath*) to the database directory and to the workdir directory that will contain information about the files migrated from this HSMDEV entry's file system. One of the files in *dwpath*/database is called migconf, and it contains the migration parameters for the file system.

The full paths *dwpath*/database/*filename* and *dwpath*/workdir/*filename* must be 1023 characters or less. The maximum *filename* recognized in these paths is 64 characters. The default *dwpath* is as follows: /usr/var/openv/hsm.*hsmname*.

Logfile Pathname

Path (*lgpath*) to the file that will contain log messages for operations pertaining to the file system and databases. The full path *lgpath* must be less than or equal to 1023 characters. The default is /tmp/hsm.*hsmname*.log. Always change the log path to something other than /tmp, since files in /tmp can disappear after a reboot or system crash.

State

Specifies whether automatic disk-space management and access to migrated files is Active (1) or Inactive (0) for this file system. The default is Active (1).

9. On the main xhsmadm screen, select Configure > Add, then from the File > Save Global Configuration File.

10. Make database directories, workdir, and database files for each HSMDEV entry you have created:

Note Before running setuphsm, make sure that the managed file system is mounted as the correct type: v*xfs* for HP-UX, *xfs* for SGI IRIX, or *ufs* or *VxFS* for Solaris. Also make sure the system is not in use. Check file system activity with the UNIX fuser command. If the file system is not mounted or is busy, setuphsm will terminate with unexpected results.

---

a. On the main xhsmadm screen, select an entry in the Configuration File Entries field. Then, select the Configure > Execute setuphsm command.

The setuphsm command gives you the option to specify the name of a subdirectory. A dialog box will appear for you to specify this.

If you want to manage a subdirectory rather than the entire file system, *although VERITAS does not recommend this practice*, use this option. setuphsm copies the initial database files into the database directory. The database pathname (*dwpath*) specified in the global configuration file (step 6 on page 46) defines where the database and workdir will reside.

b. Repeat all of step 10 for each *hsmname* in your global configuration.

11. Customize the migconf file (configuration file) for every VSM-managed file system:

a. On the main xhsmadm screen, double-click on each entry in the Configuration File Entries field. Then, select the Configure > Edit Configuration File. This opens the xhsmadm edit screen for the database used by the selected file system.

b. If you are configuring an experimental (test) system, only the file system *FS* and the methods need to be defined at this time.

c. To demonstrate VSM and verify correct operation, set the following:
METHOD1="ad.1.library.HSM"

d. Otherwise, modify the configuration file according to the configuration planning outlined in chapter 4 of the VSM *System Administrator's Guide*.

12. Register Volumes for VSM use:

a. From the main xhsmadm screen, select the desired entry in the Configuration File Entries field. Then, select the Volumes menu and select the Volume Registration and Reports menu item.

b. Repeat step 12 for all volumes that VSM will use.

Glossary

ad method

Designates the method name for migrating to alternate magnetic disk.

alternate level

Pertains to the second copy migrated. See *primary level.*

API

Application Programming Interface.

archive

The process of backing up files and directories to a storage unit and then deleting the original files and directories.

backup

The process of copying and saving files and directories to storage media.

badness

The calculated value for a file that determines whether or not it is selected to be migrated.

badness, move

The calculated value for a file that determines whether or not it is selected to be moved from one migration level to another.

badness, purge

The calculated value for a file that determines whether or not it is selected to be purged from premigration.

cache

The process of copying migrated files back to the managed file system for access.

caching delay

The time an application is blocked after accessing migrated data and before the data is cached.

class, NetBackup

Defines the backup policy for a group of one or more clients that have similar backup requirements.

concurrent recording

The process of copying data to more than one storage device at the same time.

configuration file (migconf)

A file that contains the migration parameters for a single managed file system or managed directory.

configuration file, global (migconfg)

A file that defines a collection of managed file systems (mount points) along with their attributes, specifying them as separate HSMDEV entries.

consolidation, volume

The process of moving active and obsolete files from volumes to be recycled to other volumes, and updating the FHDB and VOLDB.

ct method

Designates a method name for migrating to tape, defaulted as 8mm double density technology.

daemon

A program that runs in the background and performs some task (for example, starting other programs when they are needed).

daemon, migd

The migration daemon.

daemon, migrd

The VSM-Java daemon.

daemon, migvold

The volume daemon.

defragment, directory

The process of caching previously migrated data in a directory before grouping that directory and migrating the files together to a minimal number of tapes, which reduces the mount and search time whenever the grouped directory is cached.

demand delay parameter

The time in seconds a mount request waits before VSM unmounts a similar unused volume.

device manager

The part of media manager that allocates or deallocates drives based on availability.

directory group

A directory that has been grouped so its files and those in its subdirectories will be premigrated (and cached) as a group.

dk method

Designates the method name for migrating to disk file (used only for premigration).

DMAPI

Data Management Application Programming Interface.

dt method

Designates a method name for migrating to tape, defaulted as DLT 2000 native technology.

empty volume

A volume that contains no active or obsolete files. See *recycling*.

ENOSPC

No space left on device.

export

The process of removing migrated files from one VSM-managed file system that will be imported to another VSM-managed file system. See *import*.

file handle

A unique sequence number that VSM uses to identify migrated files and unmodified cached files. File handles are stored in the file-handle database (FHDB) for the file system.

FHDB

The file-handle database. Each file system can use a separate file-handle database or several file systems can share a database.

free space

The space in the managed file system that is unused.

freespace parameter

Sometimes referred to as *high-water mark.*

ft method

Designates the method name for migrating to a remote volume using FTP.

FTP

File Transfer Protocol.

global configuration file

See *configuration file, global (migconfg).*

global-stop file

See *stop file, global.*

granule

A portion of a larger file that VSM copies to secondary media. The size of the granule is configurable.

grouped directory

See *directory group.*

GUI

Graphical User Interface. This release of VSM uses two types of graphical user interfaces: Java-based and Motif-based. The Motif-based GUI (`xhsmadm`) will not be supported in future releases of VSM.

handle

See *file handle.*

hierarchical storage management

The process of automatically migrating selected files from a managed file system to specified migration levels on secondary storage while maintaining transparent user access to those files.

hierarchy

A collection of managed file systems (mount points) along with their attributes. See *HSMDEV entry* and *configuration file, global (`migconfg`)*.

high-water mark

Disk utilization where VSM begins migration operations: when the percentage of free space falls below the high-water mark.

hint parameter

The volume set availability: library, operator, or vault. See *storage method*.

HSM

In previous versions of documentation for this product, *HSM* represented Veritas Storage Migrator. All such references are now *VSM*. This can also be an abbreviation for *Hierarchical Storage Management*.

HSMDEV entry

An entry in the global configuration file specifying the attributes of a managed file system or managed directory.

hsmname parameter

The name assigned to an HSMDEV entry.

.IHAND file

The inode to handle file, containing inode and handle information about migrated files. (nonkernel-based implementations only)

I/O

Input/Output.

import

The process of adding migrated files to one VSM-managed file system that had been exported from another VSM-managed file system. See *export*.

inode

A data structure that defines the existence of a single file.

kernel

The nucleus of an operating system.

level, migration

The numbered level associated with each storage method. Multi-level migration with VERITAS Storage Migrator has up to eight migration levels.

low-water mark

Disk utilization where VSM stops selecting files for migration: when the percentage of free space reaches the low-water mark.

managed directory

A directory managed by VSM.

managed file system

A file system managed by VSM.

managed server

The server upon which the managed file systems reside, and where VSM software executes.

media

The physical magnetic tapes, optical discs, or magnetic disks upon which data is stored.

Media Manager

Software that provides device management and removable media management of tapes and optical discs.

method name

The name assigned to a set of parameters referring to storage device and media. See *storage method*.

migrate

The process of copying files to secondary storage while retaining the file names in the managed file system.

migrate file, global

A list of files or directories of files that the administrator eants VSM to select for automatic migration.

migrate file, local

A list of files or directories of files that a user wants VSM to select for automatic migration.

mount point

The point where a file system on a disk logically connects to a system's directory structure so the file system is available to users and applications.

mt method

Designates a method name for migrating to tape, defaulted as 4mm DAT DDS-1 technology.

multilevel migration

The process of moving migrated files to and from up to eight migration levels with VERITAS Storage Migrator.

MUM

Minimized UnMounting of storage media following read operations.

name parameter

See *hsmname parameter.*

nb method

Designates the method name for using NetBackup to make copies of files for migration.

NFS

Network File System.

offline storage

Storage media not physically loaded in a storage unit.

op method

Designates a method name for migrating to optical disc as tape with random seek, defaulted as rewritable optical disc.

ow method

Designates a method name for migrating to optical disc as tape with random seek, defaulted as WORM optical disc.

.PAIN file

The PArallel INode file, entries of which are indexed by inode number and show the migration status of each file migrated from the file system. This applies to kernel-based implementations only.

partial file caching

A process which allows `read` access to a migrated file without caching the entire file.

premigration

The first step in the migration process where selected files are moved to the premigration directory within the file system.

primary level

Pertains to the first copy migrated. See *alternate level*.

pseudodevice

A UNIX device with a `/dev` entry and a device driver, but requiring no real device for I/O.

purge

The process of deleting files from the premigration directory after all migrated copies have been made.

purge mark

Disk utilization where VSM stops purging files from the premigration directory: when the percentage of free space reaches the purge mark.

quota parameter

The maximum number of bytes that each user can restrict from migration.

recycling

The process of recovering wasted space on storage media by reregistering empty volumes.

remote volume server

The server upon which the remote volume resides.

remote storage

Storage of migrated files on a remote volume server. See *ft method* and *ad method*.

restore

The process of recovering selected files and directories from a previous backup and returning them to their original directory locations (or to an alternate directory).

secondary storage

Storage of migrated files on storage units connected locally to the managed server.

slice, configured

A portion of the front of a file retained on disk even when the file is completely migrated.

slice, effective

That variable portion of a migrated file which is partially cached to disk.

stop file, global

A list of files or directories of files that the administrator does not want to migrate.

stop file, local

A list of files or directories of files that a user does not want to migrate.

storage method

The manner in which migrated files are copied to different migration levels in secondary storage. A storage method consists of one or more stripes.

storage unit

Refers to the type of storage device on which VSM or NetBackup stores files. It may be a robotic device or a single tape drive.

stripe

The set of parameters used to define a storage method: method name, volume set number, volume set availability (hint), and pool name. A storage method consists of one or more stripes.

thresholds

The parameters used in the VSM-Java interface for selecting files to be migrated, moved, or purged. See *badness*, *badness (move)*, and *badness (purge)*.

threshold parameter

Disk utilization in kernel-based implementations where automatic migration operations begin for the kernel: when the percentage of free space falls below the threshold. See *high-water mark*

unmount delay parameter

The time in seconds a volume that is mounted in read mode remains mounted pending another read request.

VOLDB

The VSM volume database, which contains attributes of each volume registered with VSM.

volume

A tape, optical disc surface, or magnetic disk partition that has been registered and labeled.

volume manager

See *Media Manager.*

volume pool

A group of volumes to be used by a single application and protected from access by other applications and users.

volume set

One or more volumes sharing the same method name and volume set number, e.g. op.1.

volume set number

The number assigned to a volume when media is registered (labeled). See *storage method.*

VSM

An abbreviation that represents VERITAS Storage Migrator; previously known as *HSM*. See also *Hierarchical Storage Management.*

WORM

Write Once, Read Many. This applies to optical discs.

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