Veritas™ Dynamic Multi-Pathing Installation Guide

AIX

5.1 Service Pack 1

V Symantec™

Veritas Dynamic Multi-Pathing Installation Guide

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- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
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http://www.symantec.com/business/support/overview.jsp?pid=15107

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http://www.symantec.com/connect/storage-management

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Installation overview and planning

Introducing Veritas Dynamic Multi-Pathing

This chapter includes the following topics:

■ About Veritas Dynamic Multi-Pathing

About Veritas Dynamic Multi-Pathing

Veritas Dynamic Multi-Pathing (DMP) provides multi-pathing functionality for the operating system native devices configured on the system. DMP creates DMP metadevices (also known as DMP nodes) to represent all the device paths to the same physical LUN.

In previous Veritas releases, DMP was only available as a feature of Veritas Volume Manager (VxVM). DMP supported VxVM volumes on DMP metadevices, and Veritas File System (VxFS) file systems on those volumes.

This release extends DMP metadevices to support OS native logical volume managers (LVM). You can create LVM volumes and volume groups on DMP metadevices.

In this release, Veritas Dynamic Multi-Pathing does not support Veritas File System (VxFS) on DMP devices.

Veritas Volume Manager (VxVM) volumes and disk groups can co-exist with LVM volumes and volume groups, but each device can only support one of the types. If a disk has a VxVM label, then the disk is not available to LVM. Similarly, if a disk is in use by LVM, then the disk is not available to VxVM.

Planning to install Veritas Dynamic Multi-Pathing

This chapter includes the following topics:

■ About planning for Dynamic Multi-Pathing installation

■ About installation and configuration methods

About planning for Dynamic Multi-Pathing installation

Before you continue, make sure that you are using the current version of this guide. The latest documentation is available on the Symantec website.

http://www.symantec.com/business/support/overview.jsp?pid=15107

Document version: 5.1SP1.1.

This installation guide is designed for system administrators who already have a knowledge of basic UNIX system and network administration. Basic knowledge includes commands such as `tar`, `mkdir`, and simple shell scripting. Also required is basic familiarity with the specific platform and operating system where Dynamic Multi-Pathing will be installed.

Follow the preinstallation instructions if you are installing one of the Veritas Dynamic Multi-Pathing products by Symantec.

Several component products are bundled with each of these Dynamic Multi-Pathing products.

About installation and configuration methods

You can install and configure Dynamic Multi-Pathing with Veritas installation programs or with native operating system methods.

Use one of the following methods to install and configure Dynamic Multi-Pathing:

■ The Veritas product installer
The installer displays a menu that simplifies the selection of installation options.

■ The product-specific installation scripts
The installation scripts provide a command-line interface to install a specific product. The product-specific scripts enable you to specify some additional command-line options. Otherwise, installing with the installation script is identical to specifying Dynamic Multi-Pathing from the installer menu.

■ The Web-based Veritas installer
The installer provides an interface to manage the installation from a remote site using a standard Web browser.
In this release, there are some limitations in the Web-based installer.
See "About the Web-based installer" on page 35.

■ Silent installation with response files
You can use any of the above options to generate a response file. You can then customize the response file for another system. Run the product installation script with the response file to install silently on one or more other systems.
See "About response files" on page 69.

■ Network Installation Manager (NIM)
You can use the Veritas product installer or the product-specific installation script to generate a NIM configuration file. Use the generated script to install Veritas packages from your NIM server.

System requirements

This chapter includes the following topics:

Release notes

The *Release Notes* for each Veritas product contains last minute news and important details for each product, including updates to system requirements and supported software. Review the Release Notes for the latest information before you start installing the product.

The product documentation is available on the Web at the following location:

http://www.symantec.com/business/support/overview.jsp?pid=15107

Hardware compatibility list (HCL)

The hardware compatibility list contains information about supported hardware and is updated regularly. Before installing or upgrading Storage Foundation and High Availability Solutions products, review the current compatibility list to confirm the compatibility of your hardware and software.

For the latest information on supported hardware, visit the following URL:

http://entsupport.symantec.com/docs/330441

For information on specific HA setup requirements, see the *Veritas Cluster Server Installation Guide.*

Supported AIX operating systems

This section lists the supported operating systems for this release of Veritas products.

Product installation scripts verify the required update levels. The installation process terminates if the target systems do not meet the maintenance level requirements.

The minimum system requirements for this release are as follows:

For Power 6 or earlier processors at one of the following levels:

- AIX 6.1 TL2 or later
- AIX 5.3 at one of the following levels:
  - TL7 with SP6 or later
  - TL8 with SP4 or later

For Power 7 processors at one of the following levels:

- AIX 6.1 TL5 with Service Pack 1 or later
- AIX Version 5.3 executing in POWER6 or POWER6+ compatibility at the following levels:
  - TL11 with Service Pack 2 or later
  - TL10 with Service Pack 4 or later

For important updates regarding this release, review the Late-Breaking News TechNote on the Symantec Technical Support website:

http://entsupport.symantec.com/docs/334998

Disk space requirements

Before installing any of the Veritas Storage Foundation products, confirm that your system has enough free disk space.

Use the "Perform a Preinstallation Check" (P) menu or the -precheck option of the product installer to determine whether there is sufficient space.

```
# ./installer -precheck
```

Licensing Veritas products

This chapter includes the following topics:

- About Veritas product licensing

- Setting or changing the product level for keyless licensing

- Installing Veritas product license keys

About Veritas product licensing

You have the option to install Veritas products without a license key. Installation without a license does not eliminate the need to obtain a license. A software license is a legal instrument governing the usage or redistribution of copyright protected software. The administrator and company representatives must ensure that a server or cluster is entitled to the license level for the products installed. Symantec reserves the right to ensure entitlement and compliance through auditing.

If you encounter problems while licensing this product, visit the Symantec licensing support website.

www.symantec.com/techsupp/

The Veritas product installer prompts you to select one of the following licensing methods:

- Install a license key for the product and features that you want to install.
  When you purchase a Symantec product, you receive a License Key certificate. The certificate specifies the product keys and the number of product licenses purchased.

- Continue to install without a license key.
  The installer prompts for the product modes and options that you want to install, and then sets the required product level.

Within 60 days of choosing this option, you must install a valid license key corresponding to the license level entitled or continue with keyless licensing by managing the server or cluster with a management server. If you do not comply with the above terms, continuing to use the Veritas product is a violation of your end user license agreement, and results in warning messages. For more information about keyless licensing, see the following URL:

http://go.symantec.com/sfhakeyless

If you upgrade to this release from a prior release of the Veritas software, the product installer does not change the license keys that are already installed. The existing license keys may not activate new features in this release.

If you upgrade with the product installer, or if you install or upgrade with a method other than the product installer, you must do one of the following to license the products:

- Run the `vxkeyless` command to set the product level for the products you have purchased. This option also requires that you manage the server or cluster with a management server.
  See "Setting or changing the product level for keyless licensing" on page 20.
  See the `vxkeyless(1m)` manual page.

- Use the `vxlicinst` command to install a valid product license key for the products you have purchased.
  See "Installing Veritas product license keys" on page 22.
  See the `vxlicinst(1m)` manual page.

You can also use the above options to change the product levels to another level that you are authorized to use. For example, you can add the replication option to the installed product. You must ensure that you have the appropriate license for the product level and options in use.

Note: In order to change from one product group to another, you may need to perform additional steps.

Setting or changing the product level for keyless licensing

The keyless licensing method uses product levels to determine the Veritas products and functionality that are licensed. In order to use keyless licensing, you must set up a Management Server to manage your systems.

For more information and to download the management server, see the following URL:

http://go.symantec.com/vom

When you set the product license level for the first time, you enable keyless licensing for that system. If you install with the product installer and select the keyless option, you are prompted to select the product and feature level that you want to license.

After you install, you can change product license levels at any time to reflect the products and functionality that you want to license. When you set a product level, you agree that you have the license for that functionality.

To set or change the product level

1   View the current setting for the product level.

    # **vxkeyless -v display**

2   View the possible settings for the product level.

    # **vxkeyless displayall**

3   Set the desired product level.

    # **vxkeyless -q set *prod_levels***

    where *prod_levels* is a comma-separated list of keywords, as shown in step 2

If you want to remove keyless licensing and enter a key, you must clear the keyless licenses. Use the NONE keyword to clear all keys from the system.

Warning: Clearing the keys disables the Veritas products until you install a new key or set a new product level.

To clear the product license level

1   View the current setting for the product license level.

    # **vxkeyless [-v] display**

2   If there are keyless licenses installed, remove all keyless licenses:

    # **vxkeyless [-q] set NONE**

For more details on using the vxkeyless utility, see the vxkeyless(1m) manual page.

Installing Veritas product license keys

The VRTSvlic fileset enables product licensing. After the VRTSvlic is installed, the following commands and their manual pages are available on the system:

vxlicinst	Installs a license key for a Symantec product
vxlicrep	Displays currently installed licenses
vxlictest	Retrieves features and their descriptions encoded in a license key

Even though other products are included on the enclosed software discs, you can only use the Symantec software products for which you have purchased a license

To install a new license

◆ Run the following commands. In a cluster environment, run the commands on each node in the cluster:

cd /opt/VRTS/bin

./vxlicinst -k xxxx-xxxx-xxxx-xxxx-xxxx-xxx

Section   **2**

Installation of Veritas Dynamic Multi-Pathing

Preparing to install Veritas Dynamic Multi-Pathing

This chapter includes the following topics:

■ Installation preparation overview

■ About configuring ssh or rsh using the Veritas installer

■ Setting environment variables

■ Mounting the product disc

■ Assessing system preparedness

Installation preparation overview

Table 5-1 provides an overview of an installation using the product installer.

Table 5-1   Installation overview

Installation task	Section
Obtain product licenses.	See "About Veritas product licensing" on page 19.
Download the software, or insert the product DVD.	See "Mounting the product disc" on page 27.
Set environment variables.	See "Setting environment variables" on page 26.
Configure the secure shell (ssh) on all nodes.	See "About configuring secure shell or remote shell communication modes before installing products" on page 75.

Table 5-1 Installation overview *(continued)*

Installation task	Section
Verify that hardware, software, and operating system requirements are met.	See "Supported AIX operating systems" on page 18. See "Release notes" on page 17.
Check that sufficient disk space is available.	See "Disk space requirements" on page 18.
Use the installer to install the products.	See "About the Veritas installer" on page 31.

About configuring ssh or rsh using the Veritas installer

The installer can configure passwordless secure shell (ssh) or remote shell (rsh) communications among systems. The installer uses the ssh or rsh daemon that comes bundled with the operating system. During an installation, you choose the communication method that you want to use. You then provide the installer with the superuser passwords for the systems where you plan to install. The ssh or rsh communication among the systems is removed when the installation process completes, unless the installation abruptly terminates. If installation terminated abruptly, use the installation script's -comcleanup option to remove the ssh or rsh configuration from the systems.

In most installation, configuration, upgrade (where necessary), and uninstallation scenarios, the installer can configure ssh or rsh on the target systems. In the following scenarios, you need to set up ssh or rsh manually:

■ When the root broker is outside of the cluster that you plan to configure.

■ When you add new nodes to an existing cluster.

■ When the nodes are in a sub-cluster during a phased upgrade.

■ When you perform installer sessions using a response file.

See "About configuring secure shell or remote shell communication modes before installing products" on page 75.

Setting environment variables

Most of the commands used in the installation are in the /sbin or /usr/sbin directory. Add these directories to your PATH environment variable as necessary.

After installation, Dynamic Multi-Pathing commands are in `/opt/VRTS/bin`. Dynamic Multi-Pathing manual pages are stored in `/opt/VRTS/man`.

Add the following directories to your `PATH` and `MANPATH` environment variable:

■ If you are using Bourne or Korn shell (`sh` or `ksh`), enter the following:

```
$ PATH=$PATH:/usr/sbin:/opt/VRTS/bin
$ MANPATH=/usr/share/man:/opt/VRTS/man:$MANPATH
$ export PATH MANPATH
```

■ If you are using a C shell (`csh` or `tcsh`), enter the following:

```
% set path = ( $path /usr/sbin /opt/VRTS/bin )
% setenv MANPATH /usr/share/man:/opt/VRTS/man:$MANPATH
```

The `nroff` versions of the online manual pages are not readable using the `man` command if the `bos.txt.tfs` fileset is not installed; however, the `VRTSvxvm` and `VRTSvxfs` filesets install ASCII versions in the `/opt/VRTS/man/cat*` and `/opt/VRTS/man/man*` directories that are readable without the `bos.txt.tfs` fileset.

Mounting the product disc

You must have superuser (root) privileges to load the Dynamic Multi-Pathing software.

To mount the product disc

1   Log in as superuser on a system where you want to install Dynamic Multi-Pathing.

    The system from which you install Dynamic Multi-Pathing need not be part of the cluster. The systems must be in the same subnet.

2   Determine the device access name of the disc drive. For example, enter:

```
# lsdev -C -c cdrom
```

The output resembles:

```
cd0 Available 1G-19-00 IDE DVD-ROM Drive
```

In this example, cd0 is the disc's device access name.

3 Make sure the /cdrom file system is created:

```
# cat /etc/filesystems
```

If the /cdrom file system exists, the output contains a listing that resembles:

```
.
.
/cdrom:
dev = /dev/cd0
vfs = cdrfs
mount = false
options = ro
account = false
.
.
```

4 If the /cdrom file system does not exist, create it:

```
# crfs -v cdrfs -p ro -d cd0 -m /cdrom
```

5 Insert the product disc with the Dynamic Multi-Pathing software into a drive that is connected to the system.

6 Mount the disc:

```
# mount /cdrom
# cd /cdrom
```

Assessing system preparedness

Symantec provides the following tools for assessing your system, to ensure that the system meets the requirements for installing Veritas Dynamic Multi-Pathing 5.1SP1.

Symantec Operations Readiness Tools	Symantec Operations Readiness Tools (SORT) is a Web-based application that is designed to support Symantec enterprise products.
	See "Symantec Operations Readiness Tools" on page 29.

Prechecking your systems using the installer

Performs a pre-installation check on the specified systems. The Veritas product installer reports whether the specified systems meet the minimum requirements for installing Veritas Dynamic Multi-Pathing 5.1SP1.

See "Prechecking your systems using the Veritas installer" on page 29.

Symantec Operations Readiness Tools

Symantec™ Operations Readiness Tools (SORT) is a set of Web-based tools that supports Symantec enterprise products. SORT increases operational efficiency and helps improve application availability.

Among its broad set of features, SORT provides patches, patch notifications, and documentation for Symantec enterprise products.

To access SORT, go to:

http://sort.symantec.com

Prechecking your systems using the Veritas installer

The script-based and Web-based installer's precheck option checks for the following:

- Recommended swap space for installation

- Recommended memory sizes on target systems for Veritas programs for best performance

- Required operating system versions

To use the precheck option

1 Start the script-based or Web-based installer.

2 Select the precheck option:

   - From the Web-based installer, select the **Perform a Pre-Installation Check** from the Task pull-down menu.

   - In the script-based installer, from root on the system where you want to perform the check, start the installer.

     ```
     # ./installer
     ```

In the Task Menu, press the p key to start the precheck.

3   Review the output and make the changes that the installer recommends.

Installing Veritas Dynamic Multi-Pathing using the script-based installer

This chapter includes the following topics:

- About the Veritas installer
- Installing Veritas Dynamic Multi-Pathing
- Performing a postcheck on a node

About the Veritas installer

The installer also enables you to configure the product, verify preinstallation requirements, and view the product's description.

If you obtained a standalone Veritas product from an electronic download site, the single-product download files do not contain the general product installer. Use the product installation script to install the product.

At most points during the installation you can type the following characters for different actions:

- Use `b` (back) to return to a previous section of the installation procedure. The back feature of the installation scripts is context-sensitive, so it returns to the beginning of a grouped section of questions.
- Use `Control-c` to stop and exit the program if an installation procedure hangs. After a short delay, the script exits.
- Use `q` to quit the installer.

- Use ? to display help information.

- Use the Enter button to accept a default response.

Additional options are available for the installer.

Installing Veritas Dynamic Multi-Pathing

Use the installer program to install Veritas Dynamic Multi-Pathing (DMP) on your system.

The following sample procedure installs DMP on a single system.

To install DMP

1   To install on multiple systems, set up the systems so that commands between systems execute without prompting for passwords or confirmations.

    See "About configuring secure shell or remote shell communication modes before installing products" on page 75.

2   Load and mount the software disc.

3   Move to the top-level directory on the disc.

    # **cd /mnt/cdrom**

4   From this directory, type the following command to install on the local system. Also use this command to install on remote systems provided that the secure shell (SSH) or remote shell (rsh) utilities are configured:

    # **./installer**

5   Enter I to install and press the Return key.

6   When the list of available products is displayed, select **Veritas Dynamic Multi-Pathing**, enter the corresponding number, and press the Return key.

7   At the prompt, specify whether you accept the terms of the End User License Agreement (EULA). Press the return key to proceed.

8   Select one of the following installation options:

    - A minimal installation installs filesets for minimal functionality for the selected product.

    - A recommended installation installs the recommended DMP filesets that provide complete functionality of the product.
      Note that this option is the default.

- The display selection displays all filesets and provides information about them. Note that the recommended installation installs the minimum and the recommended filesets.

9   When the installer prompts you, indicate the systems where you want to install DMP. Enter one or more system names, separated by spaces.

10   The installer program verifies the system for installation. If the installer does not verify a system, fix the issue and return to the installer.

     After the system checks complete, the installer displays a list of the filesets to be installed. Press Return to continue with the installation.

11   The installer can configure remote shell or secure shell communications for you among systems, however each system needs to have rsh or SSH servers installed. You also need to provide the superuser passwords for the systems. Note that for security reasons, the installation program neither stores nor caches these passwords.

12   The installer program prompts you to choose a licensing method.

     If you have a valid license key, select 1 and enter the license key at the prompt.

     To install through keyless licensing, select 2.

Note: With the keyless license option, you must manage the systems with a management server.

For more information, go to the following Web site:

http://go.symantec.com/sfhakeyless

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13   The installer installs the product packages. Next, at the prompt, specify whether you want to send your installation information to Symantec.

```
Would you like to send the information about
this installation to Symantec to help improve installation
in the future? [y,n,q,?] (y) y
```

14   The installer program completes the installation and starts the DMP processes.

     If required, check the log files to confirm the installation.

```
Installation log files, summary file, and response file
are saved at:

        /opt/VRTS/install/logs/installer-****
```

Performing a postcheck on a node

The installer's `postcheck` command can help you to determine installation-related problems.

Note: This command option requires downtime for the system.

To run the postcheck command on a node

◆ Run the installer with the `-postcheck` option.

```
# ./installer -postcheck system_name
```

The installer reports some errors or warnings if any processes or drivers do not start.

Installing Veritas Dynamic Multi-Pathing using the web-based installer

This chapter includes the following topics:

- About the Web-based installer
- Features not supported with Web-based installer
- Before using the Veritas Web-based installer
- Starting the Veritas Web-based installer
- Obtaining a security exception on Mozilla Firefox
- Performing a pre-installation check with the Veritas Web-based installer
- Installing Dynamic Multi-Pathing with the Web-based installer

About the Web-based installer

Use the Web-based installer's interface to install Veritas products. The Web-based installer can perform most of the tasks that the script-based installer performs.

You use the `webinstaller` script to start and stop the Veritas XPortal Server `xprtlwid` process. The `webinstaller` script can also be used to check the status of the XPortal Server.

When the `webinstaller` script starts the `xprtlwid` process, the script displays a URL. Use this URL to access the Web-based installer from Internet Explorer or FireFox.

The Web installer creates log files whenever the Web installer is operating. While the installation processes are operating, the log files are located in a session-based directory under the `/var/tmp` directory. After the install process completes, the log files are located in the `/opt/VRTS/install/logs` directory. It is recommended that you keep the files for auditing, debugging, and for future use.

The location of the Veritas XPortal Server configuration file is `/var/opt/webinstaller/xprtlwid.conf`.

See

See

Features not supported with Web-based installer

In this release, the following features that can be performed using the script installer are not available in the Web-based installer:

- Configuring server-based I/O fencing
- Configuring non-SCSI3 I/O fencing in virtual environments where SCSI3 is not supported

Before using the Veritas Web-based installer

The Veritas Web-based installer requires the following configuration.

Table 7-1   Web-based installer requirements

System	Function	Requirements
Target system	The systems where you plan to install the Veritas products.	Must be a supported platform for Veritas Dynamic Multi-Pathing 5.1SP1.
Installation server	The server where you start the installation. The installation media is accessible from the installation server.	Must use the same operating system as the target systems and must be at one of the supported operating system update levels.

Table 7-1   Web-based installer requirements *(continued)*

System	Function	Requirements
Administrative system	The system where you run the Web browser to perform the installation.	Must have a Web browser. Supported browsers: ■ Internet Explorer 6, 7, and 8 ■ Firefox 3.x

Starting the Veritas Web-based installer

This section describes starting the Veritas Web-based installer.

To start the Web-based installer

1   Start the Veritas XPortal Server process `xprtlwid`, on the installation server:

   # **./webinstaller start**

   The webinstaller script displays a URL. Note this URL.

   Note: If you do not see the URL, run the command again.

   ---

2   On the administrative server, start the Web browser.

3   Navigate to the URL that the script displayed.

4   The browser may display the following message:

   `Secure Connection Failed`

   Obtain a security exception for your browser.

5   When prompted, enter `root` and root's password of the installation server.

Obtaining a security exception on Mozilla Firefox

You may need to get a security exception on Mozilla Firefox.

To obtain a security exception

1   Click **Or you can add an exception** link.

2   Click **Add Exception** button.

3 Click **Get Certificate** button.

4 Uncheck **Permanently Store this exception checkbox (recommended)**.

5 Click **Confirm Security Exception** button.

6 Enter root in User Name field and root password of the web server in the Password field.

Performing a pre-installation check with the Veritas Web-based installer

This section describes performing a pre-installation check with the Veritas Web-based installer.

To perform a pre-installation check

1 Start the Web-based installer.

See "Starting the Veritas Web-based installer" on page 37.

2 On the Select a task and a product page, select **Perform a Pre-installation Check** from the **Task** drop-down list.

3 Select the product from the **Product** drop-down list, and click **Next**.

4 Indicate the systems on which to perform the precheck. Enter one or more system names, separated by spaces. Click **Validate**.

5 The installer performs the precheck and displays the results.

6 Click **Finish**. The installer prompts you for another task.

Installing Dynamic Multi-Pathing with the Web-based installer

This section describes installing Dynamic Multi-Pathing with the Veritas Web-based installer.

To install Dynamic Multi-Pathing using the Web-based installer

1 Perform preliminary steps. See "Performing a pre-installation check with the Veritas Web-based installer" on page 38.

2 Start the Web-based installer.

See "Starting the Veritas Web-based installer" on page 37.

3 Select **Install a Product** from the **Task** drop-down list.

4 Select **Veritas Dynamic Multi-Pathing** from the Product drop-down list, and click Next.

5 On the License agreement page, read the End User License Agreement (EULA). To continue, select **Yes, I agree** and click **Next**.

6 Choose minimal or recommended filesets. Click **Next**.

7 Indicate the systems where you want to install. Separate multiple system names with spaces. Click **Validate**.

8 If you have not yet configured a communication mode among systems, you have the option to let the installer configure ssh or rsh. If you choose to allow this configuration, select the communication mode and provide the superuser passwords for the systems.

9 After the validation completes successfully, click **Next** to install Dynamic Multi-Pathing on the selected system.

10 After the installation completes, you must choose your licensing method.

On the license page, select one of the following tabs:

- Keyless licensing

  Note: The keyless license option enables you to install without entering a key. However, in order to ensure compliance you must manage the systems with a management server.

  For more information, go to the following website:

  http://go.symantec.com/sfhakeyless

  Click **Register**.

- Enter license key
  If you have a valid license key, select this tab. Enter the license key for each system. Click **Register**.

11 After the product is registered, reboot the systems if prompted.

For information about migrating your data volumes to DMP devices, refer to the *Veritas Dynamic Multi-Pathing Administrator's Guide*.

12 Select the checkbox to specify whether you want to send your installation information to Symantec.

```
Would you like to send the information about this installation
to Symantec to help improve installation in the future?
```

Click **Finish**.

Installing Veritas Dynamic Multi-Pathing using other methods

This chapter includes the following topics:

- Installing Dynamic Multi-Pathing using NIM and the installer

Installing Dynamic Multi-Pathing using NIM and the installer

You can use the product installer in concert with NIM to install the Veritas product, or to install the operating system and the Veritas product.

The instructions in this section assume a working knowledge of the Network Installation Management process. See the operating system documentation for detailed information on Network Installation Management.

In the following samples, the LPP resource uses LPP-6100-up2date and its relevant SPOT resource is spot-6100-up2date.

Preparing the bundle and script resources on NIM server

You need to prepare the bundle and script resources on the NIM server before using NIM to install Dynamic Multi-Pathing filesets. The following actions are executed on the NIM server.

Note: Make sure that a NIM LPP_SOURCE is present on the NIM server.

To prepare the bundle and script resources

1 Insert and mount the installation media.

2 Choose an LPP source:

```
# lsnim |grep -i lpp_source
LPP-6100-up2date resources lpp_source
LPP-5300-up2date resources lpp_source
```

3 Navigate to the product directory on the disc and run the installdmp command to prepare the bundle and script resources:

```
# ./installdmp -nim LPP-6100-up2date
```

The installation program copies the necessary filesets and patches to the LPP resource directory.

4 Enter a name for the bundle, for example *DMP51SP1*.

5 Enter **y** to generate the NIM script resource for copying the Veritas installer and libraries after the installation.

```
Do you want to generate the NIM script resource? [y,n,q] (n) y
NIM script resource copy_cpi for copying installer scripts
to disk created successfully
```

The script configure file is created at /opt/VRTS/nim/copy_cpi.

6   Run the `lsnim -l` command to check that the install_bundle resource is created successfully.

```
# lsnim -l DMP51SP1_bundle
DMP51SP1_bundle:
class = resources
type = installp_bundle
Rstate = ready for use
prev_state = unavailable for use
location = /opt/VRTS/nim/DMP51SP1.bnd
alloc_count = 0
server = master
```

7   Verify that the script resource is created successfully:

```
# lsnim -l copy_cpi
copy_cpi:
class = resources
type = script
Rstate = ready for use
prev_state = unavailable for use
location = /opt/VRTS/nim/copy_cpi
alloc_count = 0
server = master
```

Installing Dynamic Multi-Pathing on the NIM client using SMIT

You can install Dynamic Multi-Pathing on the NIM client using the SMIT tool.

Perform these steps on each node to have Dynamic Multi-Pathing installed in a cluster.

To install Dynamic Multi-Pathing

1   On the NIM client, start smitty.

```
# smitty install
```

2   In the menu, select **Network Installation Management**.

3   In the menu, select **Perform NIM Software Installation and Maintenance Tasks**.

4   In the menu, select **Install Software Bundle**.

5   In the menu, select the LPP_SOURCE. In this example, specify **LPP-6100-up2date**.

6 In the menu, select the bundle, for example, **DMP51SP1_bundle**.

7 For the customization script that you want to run after installation, specify **copy_cpi**.

8 For the installp flags, specify that the ACCEPT new license agreements flag has a **yes** value.

9 Press the Enter key to start the installation. Note that it may take some time to finish.

Installing Dynamic Multi-Pathing and the operating system on the NIM client using SMIT

You can install VCS and the operating system on the NIM client using the SMIT tool.

Perform these steps on each node to have Dynamic Multi-Pathing and AIX installed in a cluster.

To install Dynamic Multi-Pathing and the operating system

1 On the NIM server, start smitty for a NIM and operating system installation.

```
# smitty nim_bosinst
```

2 In the menu, select the stand-alone target.

3 In the menu, select **spot - Install a copy of a SPOT resource**.

4 In the menu, select the spot resource **spot-6100-up2date**.

5 In the menu, select the LPP_SOURCE. In this example, select **LPP-6100-up2date**.

6 In the menu, select the following options:

- For the Customization SCRIPT to run after installation option, specify **copy_cpi**.

- For the ACCEPT new license agreements option, specify **yes**.

7 For the installp flags, specify that the ACCEPT new license agreements flag has a **yes** value.

Section **3**

Verification of the installation

- Chapter 9. Verifying the Veritas Dynamic Multi-Pathing installation

Verifying the Veritas Dynamic Multi-Pathing installation

This chapter includes the following topics:

- Verifying that the products were installed
- Installation log files
- Starting and stopping processes for the Veritas products

Verifying that the products were installed

Verify that the Dynamic Multi-Pathing products are installed.

Use the `lslpp` command to check which filesets have been installed:

lslpp -L | grep VRTS

The filesets should be in the COMMITTED state.

See "Veritas Dynamic Multi-Pathing installation filesets" on page 83.

Use the following sections to further verify the product installation.

Installation log files

The Veritas product installer or product installation script installdmp program creates log files for auditing and debugging. After every product installation, configuration, or uninstall, the installer displays the name and location of the

files. The files are located in the `/opt/VRTS/install/logs` directory. Symantec recommends that you keep the files for auditing, debugging, and future use.

The log files include the following types of text files:

Installation log file	The installation log file contains all commands executed during the procedure, their output, and errors generated by the commands. This file is for debugging installation problems and can be used for analysis by Veritas Support.
Response file	The response file contains the configuration information that you entered during the procedure. You can use the response file for future installation procedures by invoking an installation script with the `responsefile` option. The response file passes arguments to the script to automate the installation of that product. You can edit the file to automate installation and configuration of additional systems.
Summary file	The summary file contains the results of the installation by the common product installer or product installation scripts. The summary includes the list of the filesets, and the status (success or failure) of each fileset. The summary also indicates which processes were stopped or restarted during the installation. After installation, refer to the summary file to determine whether any processes need to be started.

Starting and stopping processes for the Veritas products

After the installation and configuration is complete, the Veritas product installer starts the processes that are used by the installed products. You can use the product installer to stop or start the processes, if required.

To stop the processes

◆ Use the -stop option to stop the product installation script.

For example, to stop the product's processes, enter the following command:

./installer -stop

To start the processes

◆ Use the -start option to start the product installation script.

For example, to start the product's processes, enter the following command:

```
# ./installer -start
```

Section 4

Uninstallation of Veritas Dynamic Multi-Pathing

■

Uninstalling Veritas Dynamic Multi-Pathing

This chapter includes the following topics:

- Uninstalling Dynamic Multi-Pathing with the Veritas Web-based installer
- Removing Storage Foundation products using SMIT
- Uninstalling Veritas Dynamic Multi-Pathing

Uninstalling Dynamic Multi-Pathing with the Veritas Web-based installer

This section describes how to uninstall with the Veritas Web-based installer.

To uninstall Dynamic Multi-Pathing

1   Perform the required steps to save any data that you wish to preserve. For example, take back-ups of configuration files.

2   Start the Web-based installer.

See "Starting the Veritas Web-based installer" on page 37.

3   On the Select a task and a product page, select **Uninstall a Product** from the Task drop-down list.

4   Select **Veritas Dynamic Multi-Pathing** from the Product drop-down list, and click **Next**.

5   Indicate the systems on which to uninstall. Enter one or more system names, separated by spaces. Click **Validate**.

6   After the validation completes successfully, click **Next** to uninstall Dynamic Multi-Pathing on the selected system.

7 If there are any processes running on the target system, the installer stops the processes. Click **Next**.

8 After the installer stops the processes, the installer removes the products from the specified system.

Click **Next**.

9 After the uninstall completes, the installer displays the location of the summary, response, and log files. If required, view the files to confirm the status of the removal.

10 Click **Finish**.

The Web-based installer prompts you for another task.

Removing Storage Foundation products using SMIT

Use the following procedure to remove Storage Foundation products using SMIT.

To remove the packages using SMIT

1 Enter this command to invoke SMIT:

```
# smit
```

2 In SMIT, select **Software Installation and Maintenance** > **Software Maintenance and Utilities** > **Remove Installed Software**.

3 Under the "SOFTWARE name" menu, press F4 or Esc-4 to list all software installed on the system.

4 Enter "/" for Find, type "VRTS" to find all Veritas packages, and select the packages that you want to remove.

5 Reboot the system after removing all Storage Foundation packages.

6 Depending on the choices that were made when Storage Foundation was originally installed, you may find that not all of the listed Storage Foundation packages are installed on the system. You may also choose to remove the VRTSvlic licensing package unless this is required by other Veritas software.

Uninstalling Veritas Dynamic Multi-Pathing

Use the following procedure to remove Veritas Dynamic Multi-Pathing (DMP).

To uninstall DMP

1 To uninstall from multiple systems, set up the systems so that commands between systems execute without prompting for passwords or confirmations.

   See "About configuring secure shell or remote shell communication modes before installing products" on page 75.

2 On the system where you plan to remove DMP, move to the /opt/VRTS/install directory.

3 Run the uninstalldmp command.

   ```
   # ./uninstalldmp
   ```

4 When the installer prompts you, enter the names of each system where you want to uninstall DMP. Separate system names with spaces.

5 The installer program checks the systems. It then asks you if you want to stop DMP processes.

   ```
   Do you want to stop DMP processes now? [y,n,q,?] (y)
   ```

   If you respond yes, the processes are stopped and the filesets are uninstalled.

6 After the uninstall completes, the installer displays the location of the summary, response, and log files. If required, view the files to confirm the status of the removal.

Section 5

Installation reference

Installation scripts

This appendix includes the following topics:

■ Command options for the installation script

■ Command options for uninstall script

Command options for the installation script

The `installdmp` command usage takes the following form:

```
installdmp [ system1 system2... ]
 [ -configure | -install | -license | -precheck
         | -requirements | -start   | -stop | -uninstall
         | -upgrade | -postcheck ]
 [ -logpath log_path ]
 [ -responsefile response_file ]
 [ -tmppath tmp_path ]
 [ -hostfile hostfile_path ]

 [ -keyfile ssh_key_file ]

 [ -nim LLT_SOURCE ]

[ -patchpath patch_path ]
 [ -pkgpath pkg_path ]

[ -rsh | -redirect | -installminpkgs | -installrecpkgs
         | -installallpkgs   | -minpkgs | -recpkgs | -allpkgs
         | -listpatches | -pkgset |  -copyinstallscripts
         | -pkginfo | -serial | -comcleanup | -makeresponsefile
         | -pkgtable | -ignorepatchreqs | -version | -nolic ]
```

Table A-1 lists the `installdmp program` command options.

Table A-1 installdmp program options

Option and Syntax	Description
`-allpkgs`	View a list of all Dynamic Multi-Pathing filesets and patches. The installdmp program lists the filesets and patches in the correct installation order. You can use the output to create scripts for command-line installation, or for installations over a network. See the -minpkgs and the -recpkgs options.
`-comcleanup`	The `-comcleanup` option removes the ssh or rsh configuration added by installer on the systems. The option is only required when installation routines that performed auto-configuration of ssh or rsh are abruptly terminated.
`-configure`	Configure Dynamic Multi-Pathing after using `-install` option to install Dynamic Multi-Pathing.
`-copyinstallscripts`	Use this option when you manually install products and want to use the intallation scripts that are stored on the system to perform product configuration, uninstallation, and licensing tasks without the product media. Use this option to copy the installation scripts to an alternate rootpath when you use it with the `-rootpath` option. The following examples demonstrate the usage for this option: ■ `./installer -copyinstallscripts` Copies the installation and uninstallation scripts for all products in the release to /opt/VRTS/install. It also copies the installation Perl libraries to /opt/VRTSperl/lib/site_perl/*release_name* . ■ `./install`*product_name* `-copyinstallscripts` Copies the installation and uninstallation scripts for the specified product and any subset products for the product to /opt/VRTS/install. It also copies the installation Perl libraries to /opt/VRTSperl/lib/site_perl/*release_name* . ■ `./installer -rootpath` *alt_root_path* `-copyinstallscripts` The path *alt_root_path* can be a directory like /rdisk2. In that case, this command copies installation and uninstallation scripts for all the products in the release to /rdisk2/opt/VRTS/install. CPI perl libraries are copied at /rdisk2/opt/VRTSperl/lib/site_perl/release_name. For example, for the 5.1 SP1 the *release_name* is UXRT51SP1.

Table A-1 installdmp program options *(continued)*

Option and Syntax	Description
-hostfile	Specifies the location of a file that contains the system names for the installer.
-ignorepatchreqs	The -ignorepatchreqs option is used to allow installation or upgrading even if the prerequisite packages or patches are missed on the system.
-install	Install product filesets on systems without configuring Dynamic Multi-Pathing.
-installallpkgs	Selects all the filesets for installation. See the -allpkgs option.
-installminpkgs	Selects the minimum filesets for installation. See the -minpkgs option.
-installrecpkgs	Selects the recommended filesets for installation. See the -recpkgs option.
-keyfile *ssh_key_file*	Specifies a key file for SSH. The option passes -i *ssh_key_file* with each SSH invocation.
-license	Register or update product licenses on the specified systems. This option is useful to replace a demo license.
-listpatches	The -listpatches option displays product patches in correct installation order.
-logpath *log_path*	Specifies that log_path, not /opt/VRTS/install/logs, is the location where install log files, summary files, and response files are saved.
-makeresponsefile	Create a response file. This option only generates a response file and does not install Dynamic Multi-Pathing.
-minpkgs	View a list of the minimal filesets and the patches that are required for Dynamic Multi-Pathing. The installdmp program lists the filesets and patches in the correct installation order. The list does not include the optional filesets. You can use the output to create scripts for command-line installation, or for installations over a network. See the -allpkgs and the -recpkgs options.

Table A-1   installdmp program options *(continued)*

Option and Syntax	Description
`-nim LLT_SOURCE`	Generates an installp_bundle for the NIM Server to install Dynamic Multi-Pathing. You must specify a valid *LLT_SOURCE* location.
`-nolic`	Allows installation of product packages without entering a license key. Licensed features cannot be configured, started, or used when this option is specified.
`-patchpath patch_path`	Specifies that *patch_path* contains all patches that the installdmp program is about to install on all systems. The *patch_path* is the complete path of a directory. **Note:** You can use this option when you download recent versions of patches.
`-pkginfo`	Displays a list of packages in the order of installation in a user-friendly format. Use this option with one of the following options: ■ -allpkgs If you do not specify an option, -allpkgs is used by default. ■ -minpkgs ■ -recpkgs
`-pkgpath pkg_path`	Specifies that *pkg_path* contains all filesets that the installdmp program is about to install on all systems. The *pkg_path* is the complete path of a directory, usually NFS mounted.
`-pkgset`	Discovers and lists the 5.1SP1 filesets installed on the systems that you specify.
`-pkgtable`	Displays the Dynamic Multi-Pathing 5.1SP1 filesets in the correct installation order.
`-postcheck`	Checks that the processes are running and other post-installation checks.
`-precheck`	Verify that systems meet the installation requirements before proceeding with Dynamic Multi-Pathing installation. Symantec recommends doing a precheck before you install Dynamic Multi-Pathing.

Table A-1   installdmp program options *(continued)*

Option and Syntax	Description
`-recpkgs`	View a list of the recommended filesets and the patches that are required for Dynamic Multi-Pathing. The installdmp program lists the filesets and patches in the correct installation order. The list does not include the optional filesets. You can use the output to create scripts for command-line installation, or for installations over a network. See the -allpkgs and the -minpkgs options.
`-redirect`	Specifies that the installer need not display the progress bar details during the installation.
`-requirements`	View a list of required operating system version, required patches, file system space, and other system requirements to install Dynamic Multi-Pathing.
`-responsefile` *response_file*	Perform automated Dynamic Multi-Pathing installation using the system and the configuration information that is stored in a specified file instead of prompting for information. The *response_file* must be a full path name. You must edit the response file to use it for subsequent installations. Variable field definitions are defined within the file. See "Installing Dynamic Multi-Pathing using response files" on page 69.
`-rsh`	Specifies that *rsh* and `rcp` are to be used for communication between systems instead of ssh and `scp`. This option requires that systems be preconfigured such that *rsh* commands between systems execute without prompting for passwords or confirmations
`-serial`	Performs the installation, uninstallation, start, and stop operations on the systems in a serial fashion. By default, the installer performs these operations simultaneously on all the systems.

Table A-1	installdmp program options *(continued)*
Option and Syntax	**Description**
`-start`	Starts the daemons and processes for Dynamic Multi-Pathing.
	If the installdmp program failed to start up all the Dynamic Multi-Pathing processes, you can use the -stop option to stop all the processes and then use the -start option to start the processes.
	See the -stop option.
	See "Starting and stopping processes for the Veritas products " on page 48.
`-stop`	Stops the daemons and processes for Dynamic Multi-Pathing.
	If the installdmp program failed to start up all the Dynamic Multi-Pathing processes, you can use the -stop option to stop all the processes and then use the -start option to start the processes.
	See the -start option.
	See "Starting and stopping processes for the Veritas products " on page 48.
`-tmppath` *tmp_path*	Specifies that *tmp_path* is the working directory for installdmp program. This path is different from the /var/tmp path. This destination is where the installdmp program performs the initial logging and where the installdmp program copies the filesets on remote systems before installation.
`-upgrade`	Upgrades the installed filesets on the systems that you specify.
`-uninstall`	Uninstalls Dynamic Multi-Pathing from the systems that you specify.
`-version`	Checks and reports the installed products and their versions. Identifies the installed and missing filesets and patches where applicable for the product. Provides a summary that includes the count of the installed and any missing filesets and patches where applicable.

Command options for uninstall script

The `uninstalldmp program` command usage takes the following form:

```
uninstalldmp [ <system1> <system2>... ]
        [ -logpath <log_path> ]
        [ -responsefile <response_file> ]
        [ -tmppath <tmp_path> ]
        [ -hostfile <hostfile_path> ]
        [ -keyfile <ssh_key_file> ]

  [ -rsh | -redirect | -copyinstallscripts
          | -serial | -comcleanup
          | -makeresponsefile | -version | -nolic ]
```

Table A-2 lists the `uninstalldmp program` command options.

Table A-2   uninstalldmp program options

Option and Syntax	Description
-comcleanup	The -comcleanup option removes the ssh or rsh configuration added by installer on the systems. The option is only required when installation routines that performed auto-configuration of ssh or rsh are abruptly terminated.

Table A-2   uninstalldmp program options *(continued)*

Option and Syntax	Description
`-copyinstallscripts`	Use this option when you manually install products and want to use the intallation scripts that are stored on the system to perform product configuration, uninstallation, and licensing tasks without the product media.
	Use this option to copy the installation scripts to an alternate rootpath when you use it with the `-rootpath` option.
	The following examples demonstrate the usage for this option:
	■ `./installer -copyinstallscripts` Copies the installation and uninstallation scripts for all products in the release to /opt/VRTS/install. It also copies the installation Perl libraries to /opt/VRTSperl/lib/site_perl/*release_name* .
	■ `./installproduct_name -copyinstallscripts` Copies the installation and uninstallation scripts for the specified product and any subset products for the product to /opt/VRTS/install. It also copies the installation Perl libraries to /opt/VRTSperl/lib/site_perl/*release_name* .
	■ `./installer -rootpath alt_root_path -copyinstallscripts` The path *alt_root_path* can be a directory like /rdisk2. In that case, this command copies installation and uninstallation scripts for all the products in the release to /rdisk2/opt/VRTS/install. CPI perl libraries are copied at /rdisk2/opt/VRTSperl/lib/site_perl/release_name. For example, for the 5.1 SP1 the *release_name* is UXRT51SP1.
`-hostfile`	Specifies the location of a file that contains the system names for the installer.
`-keyfile ssh_key_file`	Specifies a key file for SSH. The option passes `-i ssh_key_file` with each SSH invocation.
`-logpath log_path`	Specifies that log_path, not /opt/VRTS/install/logs, is the location where uninstalldmp program log files, summary file, and response file are saved.
`-makeresponsefile`	Use this option to create a response file or to verify that your system configuration is ready for uninstalling Dynamic Multi-Pathing.

Table A-2 uninstalldmp program options *(continued)*

Option and Syntax	Description
-nolic	Allows installation of product packages without entering a license key. Licensed features cannot be configured, started, or used when this option is specified.
-redirect	Displays progress details without showing progress bar.
-responsefile *response_file*	Perform automated Dynamic Multi-Pathing uninstallation using the system and the configuration information that is stored in a specified file instead of prompting for information.
	The *response_file* must be a full path name. You must edit the response file to use it for subsequent installations. Variable field definitions are defined within the file.
	See "Uninstalling Dynamic Multi-Pathing using response files" on page 70.
-rsh	Specifies that *rsh* and rcp are to be used for communication between systems instead of ssh and scp. This option requires that systems be preconfigured such that *rsh* commands between systems execute without prompting for passwords or confirmations
-serial	Performs the installation, uninstallation, start, and stop operations on the systems in a serial fashion. By default, the installer performs these operations simultaneously on all the systems.
-tmppath *tmp_path*	Specifies that *tmp_path* is the working directory for uninstalldmp program. This path is different from the /var/tmp path. This destination is where the uninstalldmp program performs the initial logging and where the installdmp program copies the filesets on remote systems before installation.
-version	Checks and reports the installed products and their versions. Identifies the installed and missing filesets and patches where applicable for the product. Provides a summary that includes the count of the installed and any missing filesets and patches where applicable.

Response files

This appendix includes the following topics:

- About response files
- Installing Dynamic Multi-Pathing using response files
- Uninstalling Dynamic Multi-Pathing using response files
- Syntax in the response file
- Response file variable definitions

About response files

The installer or product installation script generates a response file during any installation, configuration, upgrade, or uninstall procedure. The response file contains the configuration information that you entered during the procedure. When the procedure completes, the installation script displays the location of the response files.

You can use the response file for future installation procedures by invoking an installation script with the `responsefile` option. The response file passes arguments to the script to automate the installation of that product. You can edit the file to automate installation and configuration of additional systems.

You can generate a response file using the `makeresponsefile` option.

Installing Dynamic Multi-Pathing using response files

Typically, you can use the response file that the installer generates after you perform Dynamic Multi-Pathing installation on one cluster to install Dynamic Multi-Pathing on other clusters. You can also create a response file using the `-makeresponsefile` option of the installer.

To install Dynamic Multi-Pathing using response files

1   Make sure the systems where you want to install Dynamic Multi-Pathing meet the installation requirements.

2   Make sure the preinstallation tasks are completed.

3   Copy the response file to one of the cluster systems where you want to install Dynamic Multi-Pathing.

4   Edit the values of the response file variables as necessary.

5   Mount the product disc and navigate to the directory that contains the installation program.

6   Start the installation from the system to which you copied the response file. For example:

```
# ./installer -responsefile /tmp/response_file
```

```
# ./installdmp -responsefile /tmp/response_file
```

Where /tmp/*response_file* is the response file's full path name.

Uninstalling Dynamic Multi-Pathing using response files

Typically, you can use the response file that the installer generates after you perform Dynamic Multi-Pathing uninstallation on one cluster to uninstall Dynamic Multi-Pathing on other clusters.

To perform an automated uninstallation

1   Make sure that you meet the prerequisites to uninstall Dynamic Multi-Pathing.

2   Copy the response file to one of the cluster systems where you want to uninstall Dynamic Multi-Pathing.

3   Edit the values of the response file variables as necessary.

4   Start the uninstallation from the system to which you copied the response file. For example:

```
# /opt/VRTS/install/uninstalldmp -responsefile /tmp/response_file
```

Where /tmp/*response_file* is the response file's full path name.

Syntax in the response file

The syntax of the Perl statements that are included in the response file variables varies. It can depend on whether the variables require scalar or list values.

For example, in the case of a string value:

```
$CFG{Scalar_variable}="value";
```

or, in the case of an integer value:

```
$CFG{Scalar_variable}=123;
```

or, in the case of a list:

```
$CFG{List_variable}=["value", "value", "value"];
```

Response file variable definitions

Table B-1 lists the variables that are used in the response file and their definitions.

Table B-1   Response file variables

Variable	Description
CFG{opt}{install}	Installs Dynamic Multi-Pathing filesets. Configuration can be performed at a later time using the `-configure` option.
	List or scalar: scalar
	Optional or required: optional
CFG{accepteula}	Specifies whether you agree with the EULA.pdf file on the media.
	List or scalar: scalar
	Optional or required: required
$CFG{opt}{vxkeyless}	Installs the product with keyless license.
	List of scalar: scalar
	Optional or required: optional
CFG{systems}	List of systems on which the product is to be installed, uninstalled, or configured.
	List or scalar: list
	Optional or required: required

Table B-1   Response file variables *(continued)*

Variable	Description
CFG{prod}	Defines the product to be installed, uninstalled, or configured. List or scalar: scalar Optional or required: required
CFG{opt}{keyfile}	Defines the location of an ssh keyfile that is used to communicate with all remote systems. List or scalar: scalar Optional or required: optional
CFG{opt}{patchpath}	Defines a location, typically an NFS mount, from which all remote systems can install product patches. The location must be accessible from all target systems. List or scalar: scalar Optional or required: optional
CFG{opt}{pkgpath}	Defines a location, typically an NFS mount, from which all remote systems can install product filesets. The location must be accessible from all target systems. List or scalar: scalar Optional or required: optional
CFG{opt}{tmppath}	Defines the location where a working directory is created to store temporary files and the filesets that are needed during the install. The default location is /var/tmp. List or scalar: scalar Optional or required: optional
CFG{opt}{rsh}	Defines that *rsh* must be used instead of ssh as the communication method between systems. List or scalar: scalar Optional or required: optional
CFG{donotinstall} {fileset}	Instructs the installation to not install the optional filesets in the list. List or scalar: list Optional or required: optional

Table B-1   Response file variables *(continued)*

Variable	Description
CFG{donotremove} {fileset}	Instructs the uninstallation to not remove the optional filesets in the list.
	List or scalar: list
	Optional or required: optional
CFG{opt}{logpath}	Mentions the location where the log files are to be copied. The default location is /opt/VRTS/install/logs.
	List or scalar: scalar
	Optional or required: optional
CFG{opt}{configure}	Performs the configuration after the filesets are installed using the -install option.
	List or scalar: scalar
	Optional or required: optional
CFG{opt}{upgrade}	Upgrades all filesets installed, without configuration.
	List or scalar: list
	Optional or required: optional
CFG{opt}{uninstall}	Uninstalls Dynamic Multi-Pathing filesets.
	List or scalar: scalar
	Optional or required: optional

Configuring the secure shell or the remote shell for communications

This appendix includes the following topics:

- About configuring secure shell or remote shell communication modes before installing products

- Configuring and enabling ssh

- Restarting the ssh session

- Enabling rsh for AIX

About configuring secure shell or remote shell communication modes before installing products

Establishing communication between nodes is required to install Veritas software from a remote system, or to install and configure a cluster. The node from which the installer is run must have permissions to run `rsh` (remote shell) or `ssh` (secure shell) utilities. You need to run the installer with superuser privileges on the systems where you plan to install Veritas software.

You can install products to remote systems using either secure shell (ssh) or remote shell (rsh). Symantec recommends that you use ssh as it is more secure than rsh.

This section contains an example of how to set up ssh password free communication. The example sets up ssh between a source system (system1) that

contains the installation directories, and a target system (system2). This procedure also applies to multiple target systems.

Configuring and enabling ssh

The ssh program enables you to log into and execute commands on a remote system. ssh enables encrypted communications and an authentication process between two untrusted hosts over an insecure network.

In this procedure, you first create a DSA key pair. From the key pair, you append the public key from the source system to the authorized_keys file on the target systems.

Figure C-1 illustrates this procedure.

Figure C-1   Creating the DSA key pair and appending it to target systems
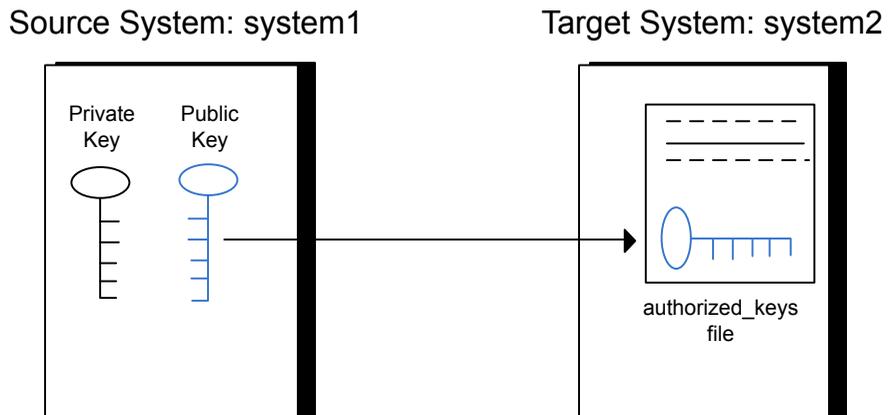
Read the ssh documentation and online manual pages before enabling ssh. Contact your operating system support provider for issues regarding ssh configuration.

Visit the OpenSSH website that is located at: http://openssh.org to access online manuals and other resources.

To create the DSA key pair

1 On the source system (system1), log in as root, and navigate to the root directory.

```
system1 # cd /
```

2 To generate a DSA key pair on the source system, type the following command:

```
system1 # ssh-keygen -t dsa
```

System output similar to the following is displayed:

```
Generating public/private dsa key pair.
Enter file in which to save the key (//.ssh/id_dsa):
```

3 Press Enter to accept the default location of /.ssh/id_dsa.

4 When the program asks you to enter the passphrase, press the Enter key twice.

```
Enter passphrase (empty for no passphrase):
```

Do not enter a passphrase. Press Enter.

```
Enter same passphrase again:
```

Press Enter again.

5 Make sure the /.ssh directory is on all the target installation systems (system2 in this example). If that directory is not present, create it on all the target systems and set the write permission to root only:

```
system2 # mkdir /.ssh
```

Change the permissions of this directory, to secure it.

```
system2 # chmod go-w /.ssh
```

To append the public key from the source system to the authorized_keys file on the target system, using secure file transfer

1   From the source system (system1), move the public key to a temporary file on the target system (system2).

Use the secure file transfer program.

In this example, the file name `id_dsa.pub` in the root directory is the name for the temporary file for the public key.

Use the following command for secure file transfer:

```
system1 # sftp system2
```

If the secure file transfer is set up for the first time on this system, output similar to the following lines is displayed:

```
Connecting to system2 ...
The authenticity of host 'system2 (10.182.00.00)'
can't be established. DSA key fingerprint is
fb:6f:9f:61:91:9d:44:6b:87:86:ef:68:a6:fd:88:7d.
Are you sure you want to continue connecting (yes/no)?
```

2   Enter `yes`.

Output similar to the following is displayed:

```
Warning: Permanently added 'system2,10.182.00.00'
(DSA) to the list of known hosts.
root@system2 password:
```

3   Enter the root password of system2.

4   At the `sftp` prompt, type the following command:

```
sftp> put /.ssh/id_dsa.pub
```

The following output is displayed:

```
Uploading /.ssh/id_dsa.pub to /id_dsa.pub
```

5   To quit the SFTP session, type the following command:

```
sftp> quit
```

6 To begin the `ssh` session on the target system (system2 in this example), type the following command on system1:

```
system1 # ssh system2
```

Enter the root password of system2 at the prompt:

```
password:
```

7 After you log in to system2, enter the following command to append the `id_dsa.pub` file to the `authorized_keys` file:

```
system2 # cat /id_dsa.pub >> /.ssh/authorized_keys
```

8 After the `id_dsa.pub` public key file is copied to the target system (system2), and added to the authorized keys file, delete it. To delete the `id_dsa.pub` public key file, enter the following command on system2:

```
system2 # rm /id_dsa.pub
```

9 To log out of the `ssh` session, enter the following command:

```
system2 # exit
```

10 When you install from a source system that is also an installation target, also add the local system `id_dsa.pub` key to the local `authorized_keys` file. The installation can fail if the installation source system is not authenticated.

To add the local system `id_dsa.pub` key to the local `authorized_keys` file, enter the following command:

```
system1 # cat /.ssh/id_dsa.pub >> /.ssh/authorized_keys
```

11 Run the following commands on the source installation system. If your ssh session has expired or terminated, you can also run these commands to renew the session. These commands bring the private key into the shell environment and make the key globally available to the user `root`:

```
system1 # exec /usr/bin/ssh-agent $SHELL
system1 # ssh-add

  Identity added: //.ssh/id_dsa
```

This shell-specific step is valid only while the shell is active. You must execute the procedure again if you close the shell during the session.

To verify that you can connect to a target system

1 On the source system (system1), enter the following command:

```
system1 # ssh -l root system2 uname -a
```

where system2 is the name of the target system.

2 The command should execute from the source system (system1) to the target system (system2) without the system requesting a passphrase or password.

3 Repeat this procedure for each target system.

Restarting the ssh session

After you complete this procedure, ssh can be restarted in any of the following scenarios:

■ After a terminal session is closed

■ After a new terminal session is opened

■ After a system is restarted

■ After too much time has elapsed, to refresh ssh

To restart ssh

1 On the source installation system (system1), bring the private key into the shell environment.

```
system1 # exec /usr/bin/ssh-agent $SHELL
```

2 Make the key globally available for the user root

```
system1 # ssh-add
```

Enabling rsh for AIX

To enable rsh, create a /.rhosts file on each target system. Then add a line to the file specifying the full domain name of the source system. For example, add the line:

```
sysname.domainname.com root
```

Change permissions on the /.rhosts file to 600 by typing the following command:

```
# chmod 600 /.rhosts
```

After you complete an installation procedure, delete the `.rhosts` file from each
target system to ensure security:

```
# rm -f /.rhosts
```

Veritas Dynamic Multi-Pathing components

This appendix includes the following topics:

■ Veritas Dynamic Multi-Pathing installation filesets

Veritas Dynamic Multi-Pathing installation filesets

Table D-1 shows the fileset name and contents for each English language fileset for Veritas Dynamic Multi-Pathing. The table also gives you guidelines for which filesets to install based whether you want the minimum, recommended, or advanced configuration.

Table D-1 Veritas Dynamic Multi-Pathing filesets

filesets	Contents	Configuration
VRTSaslapm	Veritas Array Support Library (ASL) and Array Policy Module(APM) binaries Required for the support and compatibility of various storage arrays.	Minimum
VRTSperl	Perl 5.10.0 for Veritas	Minimum
VRTSveki	Veritas Kernel Interface Contains a common set of modules that other Veritas drivers use.	Minimum

Table D-1   Veritas Dynamic Multi-Pathing filesets *(continued)*

filesets	Contents	Configuration
VRTSvlic	Veritas License Utilities Installs the license key layout files required to decode the Storage Foundation license keys. Provides the standard license key utilities vxlicrep, vxlicinst, and vxlictest.	Minimum
VRTSvxvm	Veritas Volume Manager binaries	Minimum
VRTSsfmh	Veritas Storage Foundation Managed Host Discovers configuration information on a Storage Foundation managed host. This information is stored on a central database, which is not part of this release. You must download the database separately at: http://www.symantec.com/business/storage-foundation-manager	Recommended
VRTSspt	Veritas Software Support Tools	Recommended

Troubleshooting installation issues

This appendix includes the following topics:

- Restarting the installer after a failed connection
- What to do if you see a licensing reminder
- Troubleshooting an installation on AIX
- Incorrect permissions for root on remote system
- Resource temporarily unavailable
- Inaccessible system

Restarting the installer after a failed connection

If an installation is killed because of a failed connection, you can restart the installer to resume the installation. The installer detects the existing installation. The installer prompts you whether you want to resume the installation. If you resume the installation, the installation proceeds from the point where the installation failed.

What to do if you see a licensing reminder

In this release, you can install without a license key. In order to comply with the End User License Agreement, you must either install a license key or make the host managed by a Management Server. If you do not comply with these terms within 60 days, the following warning messages result:

```
WARNING V-365-1-1 This host is not entitled to run Veritas Storage
Foundation/Veritas Cluster Server.As set forth in the End User
License Agreement (EULA) you must complete one of the two options
set forth below. To comply with this condition of the EULA and
stop logging of this message, you have <nn> days to either:
- make this host managed by a Management Server (see
  http://go.symantec.com/sfhakeyless for details and free download),
  or
- add a valid license key matching the functionality in use on this host
  using the command 'vxlicinst'
```

To comply with the terms of the EULA, and remove these messages, you must do one of the following within 60 days:

- Install a valid license key corresponding to the functionality in use on the host. After you install the license key, you must validate the license key using the following command:

  ```
  # vxkeyless display
  ```

- Continue with keyless licensing by managing the server or cluster with a management server.
  For more information about keyless licensing, see the following URL:
  http://go.symantec.com/sfhakeyless

Troubleshooting an installation on AIX

Save a copy of `/var/adm/ras/errtmplt` and `/etc/trcfmt` files before you install the product. If the filesets fail to install due to the `template file is corrupted` error message, replace `/var/adm/ras/errtmplt` file and `/etc/trcfmt` file with the ones that you had saved, uninstall all the filesets installed.

Then reinstall.

Incorrect permissions for root on remote system

The permissions are inappropriate. Make sure you have remote root access permission on each system to which you are installing.

```
Failed to setup rsh communication on 10.198.89.241:
'rsh 10.198.89.241 <command>' failed
Trying to setup ssh communication on 10.198.89.241.
```

```
Failed to setup ssh communication on 10.198.89.241:
Login denied

Failed to login to remote system(s) 10.198.89.241.
Please make sure the password(s) are correct and superuser(root)
can login to the remote system(s) with the password(s).
If you want to setup rsh on remote system(s), please make sure
rsh with command argument ('rsh <host> <command>') is not
denied by remote system(s).

Either ssh or rsh is needed to be setup between the local node
and 10.198.89.241 for communication

Would you like the installer to setup ssh/rsh communication
automatically between the nodes?
Superuser passwords for the systems will be asked. [y,n,q] (y) n

System verification did not complete successfully

The following errors were discovered on the systems:

The ssh permission denied on 10.198.89.241
rsh exited 1 on 10.198.89.241
either ssh or rsh is needed to be setup between the local node
and 10.198.89.241 for communication
```

Suggested solution: You need to set up the systems to allow remote access using
ssh or rsh.

See "About configuring secure shell or remote shell communication modes before
installing products" on page 75.

Note: Remove remote shell permissions after completing the Dynamic
Multi-Pathing installation and configuration.

Resource temporarily unavailable

If the installation fails with the following error message on the console:

```
fork() failed: Resource temporarily unavailable
```

The value of maximum number of processes allowed per user may not be large enough. This kernel attribute is a tunable and can be changed on any node of the cluster.

To determine the current value of "Maximum number of PROCESSES allowed per user", enter:

```
# lsattr -H -E -l sys0 -a maxuproc
```

To see the default value of this tunable and its valid range of values, enter:

```
# odmget -q "attribute=maxuproc" PdAt
```

If necessary, you can change the value of the tunable using the smitty interface:

```
# smitty chgsys
```

You can also directly change the CuAt class using the following command:

```
# chdev -l sys0 -a maxuproc=600
```

Increasing the value of the parameter takes effect immediately; otherwise the change takes effect after a reboot.

See the `smitty` and `chdev` manual pages.

Inaccessible system

The system you specified is not accessible. This could be for a variety of reasons such as, the system name was entered incorrectly or the system is not available over the network.

```
 Verifying systems: 12% ...................................
 Estimated time remaining: 0:10 1 of 8
 Checking system communication ............................. Done
System verification did not complete successfully
The following errors were discovered on the systems:
cannot resolve hostname host1
Enter the  system names separated by spaces: q,? (host1)
```

Suggested solution: Verify that you entered the system name correctly; use the `ping`(1M) command to verify the accessibility of the host.

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