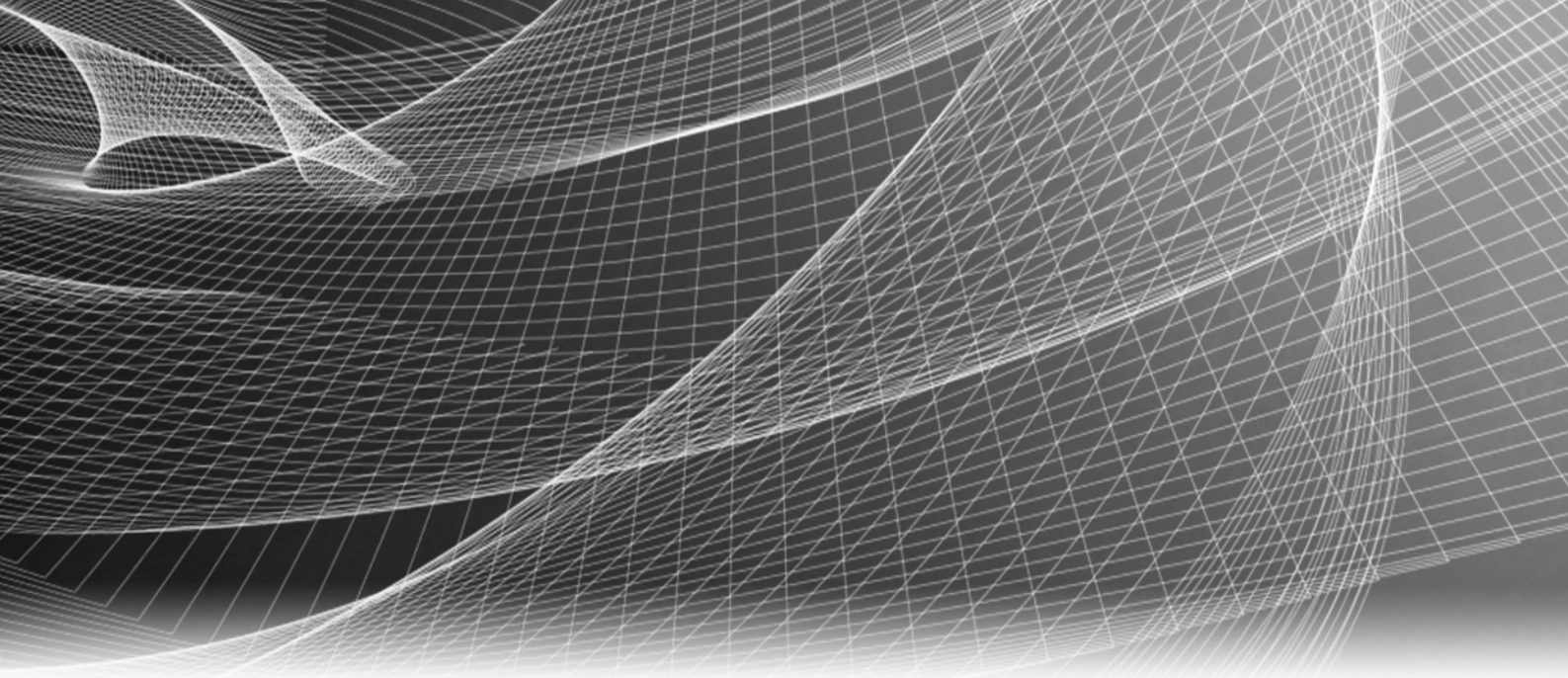




EMC[®] Unisphere[™] for VMAX[™]

Version 1.6

Installation Guide

REV 02

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For the most up-to-date regulatory document for your product line, go to EMC Online Support (<https://support.emc.com>).

CONTENTS

Preface

Chapter 1

Pre-installation considerations

Before you begin	14
Initial Setup User	14
Local and remote installation options	14
Unisphere for VMAX licensing.....	15
Unisphere for VMAX Virtual Appliance	16
Mainframe considerations.....	16
Red Hat 6 64-bit Virtual Machine consideration.....	16
Environment and system requirements	16
Solutions Enabler.....	16
EMC ControlCenter	16
Symmetrix Enginuity.....	16
Concurrent users.....	17
VMware and Hyper-V guests.....	17
Client requirements.....	17
Server requirements.....	18
Other Requirements	19

Chapter 2

Installing Unisphere for VMAX

Installing Unisphere for VMAX	22
Completing the installation	25
Configuring language and regional settings.....	25
Installing a Unisphere license	25
Excluding the data and temp directories from virus scans	25
Starting and stopping the Performance database	26
Starting and stopping the SMAS service.....	26
Launching Unisphere	27
Upgrading to Unisphere for VMAX with Performance.....	28
Upgrading Unisphere for VMAX using the wizard	28
Upgrading Unisphere for VMAX from the command line.....	29
Adding the Performance option (at a later time)	30
Uninstalling Unisphere for VMAX.....	31
Before you begin	31
Uninstalling from Windows	31
Uninstalling from Linux	32

Chapter 3

Installing the Unisphere for VMAX Virtual Appliance

Introduction.....	34
Before you begin.....	35
Installing the virtual appliance directly on the ESX Server.....	36
Installing the virtual appliance through a vCenter Server	39
Installing the virtual appliance using OVFTOOL.....	41
Using OVFTOOL	42
Launching Unisphere or the vApp Manager	43
Launching Unisphere	43

	Launching the vApp Manager	43
	Connecting to the API server.....	44
	Registering the VASA Provider with vSphere	45
	Upgrading the Unisphere for VMAX Virtual Appliance	46
	Upgrading the Unisphere for VMAX Virtual Appliance using an ISO image....	51
	Re-configuring the virtual appliance IP address	52
	Deleting the Unisphere for VMAX Virtual Appliance	54
	Backing up and restoring the Performance database	55
	Backing up Performance database files to another host	55
	Restoring Performance database files from another host	56
	Installing licenses	57
	Installing Symmetrix-based licenses	57
	Installing host-based licenses	57
Appendix A	Security features	
	Authentication	60
	Authorization	60
Appendix B	Replacing the server certificate	
	Replacing the certificate.....	66
Appendix C	Configuring SMAS to work in z/OS	
	Configuring SMAS to work in z/OS.....	70
Appendix D	Third-party copyright notices	
	GNU LESSER GENERAL PUBLIC LICENSE	71
	MySQL	71
	OpenSSL copyright information	71
	Apache Axis 1.2 and Apache Multipart parser	72
	MIT XML Parser	72
	JBoss, Home of Professional Open Source	73
	Parsley 2.4.....	73
	GraniteDS 2.3	73
	PurePDF	74

FIGURES

	Title	Page
1	Local installation: Unisphere for VMAX	14
2	Remote installation: Unisphere for VMAX on server connected to a remote SYMAPI server. 15	

TABLES

	Title	Page
1	Unisphere client requirements	17
2	Server requirements and limitations.....	18
3	Unisphere for VMAX Virtual Appliance VMware ESX Server requirements	35
4	VMAX 1.6 Virtual Appliance update paths	46

PREFACE

As part of an effort to improve its product lines, EMC periodically releases revisions of its software and hardware. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features.

Contact your EMC representative if a product does not function properly or does not function as described in this document.

Note: This document was accurate at publication time. New versions of this document might be released on the EMC online support website. Check the EMC Online Support site <https://support.emc.com> to ensure that you are using the latest version of this document.

Purpose

This document describes how to configure and use EMC Unisphere for VMAX.

Audience

This document is intended for the host system administrator, storage administrator, system programmer, or operator involved in managing Symmetrix systems.

Related documentation

- ◆ *EMC Unisphere for VMAX Release Notes*
- ◆ *EMC Unisphere for VMAX Online Help*
- ◆ *EMC Unisphere for VMAX Performance Viewer Installation Guide*
- ◆ *EMC Unisphere for VMAX - vApp Manager Online Help*
- ◆ *EMC Solutions Enabler Installation Guide*
- ◆ *EMC Symmetrix Performance Analyzer Release Notes*
- ◆ *EMC Symmetrix Performance Analyzer Online Help*
- ◆ *EMC Solutions Enabler Release Notes*
- ◆ *EMC Solutions Enabler Symmetrix Array Controls CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix Array Management CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix Migration CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix SRDF Family CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix SRDF/Star CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix SRM CLI Product Guide*
- ◆ *EMC Solutions Enabler Symmetrix CLI Command Reference*
- ◆ *EMC Solutions Enabler Symmetrix TimeFinder Family CLI Product Guide*
- ◆ *EMC Symmetrix Security Configuration Guide*

Conventions used in this document

EMC uses the following conventions for special notices:



CAUTION, used with the safety alert symbol, indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Note: A note presents information that is important, but not hazard-related.

IMPORTANT

An important notice contains information essential to software or hardware operation.

Typographical conventions

EMC uses the following type style conventions in this document:

Normal	Used in running (nonprocedural) text for: - Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus - Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, functions, and utilities - URLs, pathnames, filenames, directory names, computer names, links, groups, service keys, file systems, and notifications
Bold	Used in running (nonprocedural) text for names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system calls, and man pages Used in procedures for: - Names of interface elements, such as names of windows, dialog boxes, buttons, fields, and menus - What the user specifically selects, clicks, presses, or types
<i>Italic</i>	Used in all text (including procedures) for: - Full titles of publications referenced in text - Emphasis, for example, a new term - Variables
Courier	Used for: - System output, such as an error message or script - URLs, complete paths, filenames, prompts, and syntax when shown outside of running text
Courier bold	Used for specific user input, such as commands
<i>Courier italic</i>	Used in procedures for: - Variables on the command line - User input variables
< >	Angle brackets enclose parameter or variable values supplied by the user
[]	Square brackets enclose optional values
	Vertical bar indicates alternate selections — the bar means “or”
{ }	Braces enclose content that the user must specify, such as x or y or z
...	Ellipses indicate nonessential information omitted from the example

Where to get help

EMC support, product, and licensing information can be obtained on EMC Online Support, as described next.

Note: To open a service request through EMC Online Support, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or to answer any questions about your account.

Product information

For documentation, release notes, software updates, or for information about EMC products, licensing, and service, go to EMC Online Support (registration required) at:

<https://support.EMC.com>

Technical support

EMC offers a variety of support options.

Support by Product — EMC offers consolidated, product-specific information on the Web at:

<https://support.EMC.com/products>

The Support by Product web pages offer quick links to Documentation, White Papers, Advisories (such as frequently used Knowledgebase articles), and Downloads, as well as more dynamic content, such as presentations, discussion, relevant Customer Support Forum entries, and a link to EMC Live Chat.

EMC Live Chat — Open a Chat or instant message session with an EMC Support Engineer.

eLicensing support

To activate your entitlements and obtain your Symmetrix license files, visit the Service Center on <https://support.EMC.com>, as directed on your License Authorization Code (LAC) letter emailed to you.

For help with missing or incorrect entitlements after activation (that is, expected functionality remains unavailable because it is not licensed), contact your EMC Account Representative or Authorized Reseller.

For help with any errors applying license files through Solutions Enabler, contact the EMC Customer Support Center.

If you are missing a LAC letter, or require further instructions on activating your licenses through the Online Support site, contact EMC's worldwide Licensing team at licensing@emc.com or call:

- ◆ North America, Latin America, APJK, Australia, New Zealand: SVC4EMC (800-782-4362) and follow the voice prompts.
- ◆ EMEA: +353 (0) 21 4879862 and follow the voice prompts.

CHAPTER 1

Pre-installation considerations

The following sections contain steps and information you need to take and consider before the actual installation happens.

- ◆ [Before you begin](#) 14
- ◆ [Environment and system requirements](#) 16

Before you begin

The following sections contain steps and information you need to take and consider before the actual installation happens.

Initial Setup User

While installing the software, you are prompted to specify an Initial Setup User. You can either specify the user ID you currently use to access the Symmetrix system (if User Authorization is enabled), or you can use the default user ID `smc`. If you plan on using the default ID, there must be no user IDs listed in the User Authorization database. If there are user IDs in the database (regardless of whether user authorization is enabled), then you must use SYMCLI to add the default user ID (`smc`) to the database.

The *Initial Setup User's* role is to install and set up the Unisphere environment (create users and add roles). It is intended to be a temporary role as it allows you only to access and perform administrative tasks on Symmetrix systems that do not have defined user roles (authorization rules). After an Administrator or SecurityAdmin is assigned to a Symmetrix system, the Initial Setup User can no longer access or even see the system from the Unisphere console. Therefore, it is recommended that users not operate in this role for too long.

Note: “[Security features](#)” on page 59 contains more information on users and roles.

Local and remote installation options

Unisphere for VMAX can be installed in local or remote configurations. In a local configuration, install the Unisphere software on a server running Solutions Enabler attached to Symmetrix systems (see the Unisphere server in [Figure 1 on page 14](#)). In a remote configuration, install the Unisphere software on a server connected to the SYMAPI server (see the Unisphere server in [Figure 2 on page 15](#)).

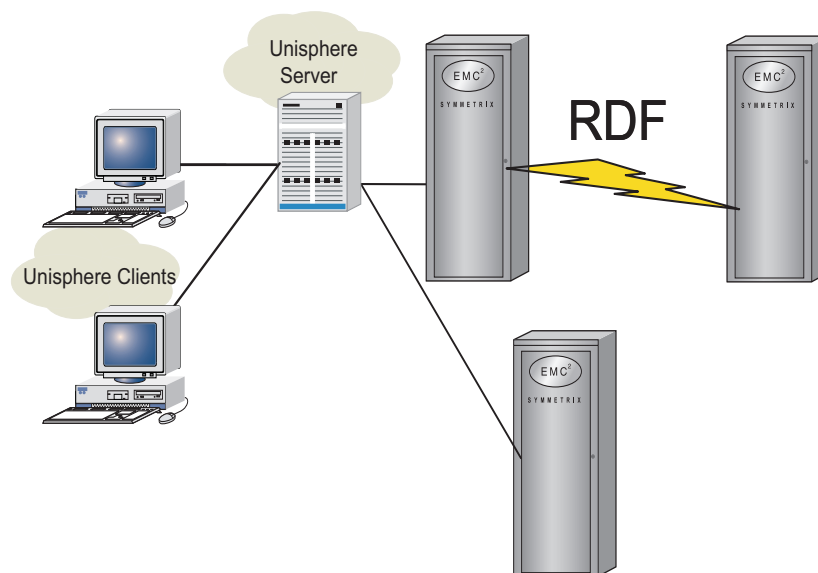


Figure 1 Local installation: Unisphere for VMAX

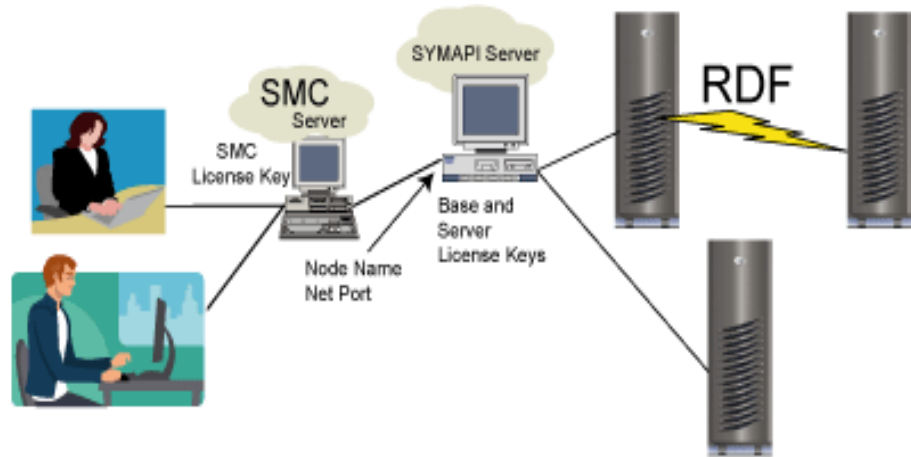


Figure 2 Remote installation: Unisphere for VMAX on server connected to a remote SYMAPI server

Unisphere for VMAX licensing

Unisphere for VMAX uses Symmetrix-based eLicensing.

As a result, you can only manage a Symmetrix VMAX Family system from a Unisphere host, if the Symmetrix system contains a Unisphere for VMAX (SMC) eLicense. However, you can use Unisphere for VMAX to obtain and install the proper eLicense on the Symmetrix system.

Note: Symmetrix systems running Enginuity 5875.198.148 or lower do not require a license key.

After a Symmetrix VMAX Family system that has been managed by SMC is upgraded to Enginuity 5876 or higher, Unisphere will operate with the Symmetrix system even if the proper eLicense is not present. The Unisphere for VMAX (SMC) eLicense is noted as *In Use* in Unisphere's eLicensing report. This designation means that the required eLicense is missing, but access to the system is still allowed to avoid service disruption. To clear this designation, you must obtain and apply the proper eLicense.

Note: With the incorporation of Symmetrix Performance Analyzer into Unisphere for VMAX (as the performance option), the former Symmetrix Performance Analyzer host-based eLicense is no longer required.

Note: For more information on eLicensing, refer to the *EMC Solutions Enabler Installation Guide*.

Unisphere for VMAX Virtual Appliance

There are two versions of Unisphere for VMAX virtual appliances available for ESX V4.0 (and higher) Servers in a VMware environment:

- ◆ Unisphere for VMAX (without the Performance option)
- ◆ Unisphere for VMAX with Performance

For more information and instructions on installing the appliance, refer to [“Installing the Unisphere for VMAX Virtual Appliance” on page 33](#).

Mainframe considerations

For installations where Unisphere for VMAX will be managing mainframe storage, review [Appendix C, “Configuring SMAS to work in z/OS”](#) prior to installing Unisphere for VMAX.

Red Hat 6 64-bit Virtual Machine consideration

Prior to installing Unisphere for VMAX, you should verify that the host is in a properly configured IP network and that it can resolve IP addresses and hostnames.

Environment and system requirements

Unisphere’s web server is supported on the platforms listed in [Table 2 on page 18](#). Unisphere can be used in remote client/server mode to communicate with SYMAPI servers on other systems, including supported versions of AIX, Linux, Solaris, HP-UX, z/OS, and Windows.

Solutions Enabler

Solutions Enabler 64-bit V7.6.0 is the minimum supported version, in local or client/server mode. In client/server mode, the Solutions Enabler version running on the server must be greater than or equal to the version running on the client. In addition, the **storsrvd** daemon must be running on the server.

EMC ControlCenter

If you plan to install Unisphere on the same host as EMC ControlCenter, refer to the *EMC ControlCenter Performance and Scalability Guidelines* for compatibility guidelines.

Symmetrix Enginuity

Unisphere supports the following Symmetrix Enginuity versions:

- ◆ Symmetrix VMAX 10K/20K/VMAX Series systems running Enginuity 5875 or higher
- ◆ Symmetrix VMAX 40K Series systems running Enginuity 5876 or higher
- ◆ Symmetrix DMX systems running Enginuity 5671 or higher

Note: The Performance option requires Enginuity 5773; or 5874 or higher.

Concurrent users

Unisphere for VMAX supports up to five concurrent users, with performance degradation occurring with more than three users.

VMware and Hyper-V guests

Unisphere is supported on a guest operating system on the following platforms, provided the guest is listed in the EMC Support Matrix and in VMware/Hyper-V support documentation, and Unisphere supports the platform. Note that the guest must provide the same CPU, memory, disk, gatekeeper, and other requirements as if it were installed on a physical machine:

- ◆ VMware ESX/ESXi Server versions 4.0, 4.1, 5.0, and 5.1 (and all updates of each version)
- ◆ Windows Server 2008 R2 (Standard and Enterprise)

Virtual machines must not be running on shared memory/resources.

Client requirements

The Unisphere client is browser-based and does not use dynamic ports, so it will function with most VPN solutions.

[Table 1](#) defines the client requirements for Unisphere.

Table 1 Unisphere client requirements

Browser	Version	Memory ^a	Platform
Internet Explorer	7.0 through 10.0 (Desktop only)	600 MB	Windows
Firefox	10.0.7 and 15.0		
Chrome	21.0.1180		

a. Required for the browser as it runs on the machine from which the Console was launched (Flash Player 11.2 or a later release is required).

The minimum client screen resolution is 1024 x 768.

Server requirements

Unisphere must not be installed on the same host as the EMC ControlCenter infrastructure components.

Table 2 defines the server requirements and limitations.

Table 2 Server requirements and limitations

Operating system	Version	Hardware ^a	Available Disk space		Available memory		Volumes ^b
			Unisphere	Unisphere with Performance	Unisphere	Unisphere with Performance	
Windows ^c	Server 2008 SP2 (64-bit)	1.8 GHz	1 GB	100 GB	4 GB	8 GB ^d	80,000
	Server 2008 R2 SP1 (64-bit)						
	Server 2012 (64-bit)						
Linux	Red Hat AS/ES 5.8 through 6.2 (64-bit) ^e						
	SUSE Linux 10 (all SPs) and 11 (SP1 and SP2) (64-bit)						

a. Requires a minimum of one dual-core processor or two CPUs. Consult the EMC E-Lab Interoperability Navigator for supported hardware.

b. Up to 80,000 volumes or up to 10 Symmetrix systems, whichever limit occurs first.

c. Unisphere for VMAX is not supported on Windows Core.

d. This is the minimum amount of memory required to successfully run Unisphere with the performance option on the server; it is not the total amount of memory on the server. If a server has a total of 8 GB of physical memory installed and there is only 6 GB available before installing Unisphere with the performance option, you may experience performance issues with the application. If running on a Virtual Machine, this amount must be dedicated memory, not shared memory.

e. Before attempting to install Unisphere on Red Hat Linux 6.0 or a later release, verify that the following packages are installed. Not all installer packages include these libraries by default, so it is important to verify their presence before running the installation program. Do **NOT** attempt to run the installation process without them. The packages are:

```
libstdc++-devel-4.4.4-13.el6.i686.rpm
libstdc++-4.4.4-13.el6.i686.rpm
libaio-0.3.107-10.el6.i686.rpm
ncurses-libs-5.7-3.20090208.el6.i686.rpm
```

WARNING: Without these items, the product will fail to install.

Other Requirements

- ◆ Unisphere for VMAX can be installed on the same system as the SYMAPI server, or on a system connected to the SYMAPI server. Refer to [Figure 1 on page 14](#) and [Figure 2 on page 15](#), respectively.
- ◆ If you are changing your SYMAPI connection type, such as changing from a local connection to a client/server configuration, you must perform a fresh installation.
- ◆ If upgrading from SPA V2.2.1 or higher to Unisphere V1.6, back up the SPA database using the **SPA DB Backup utility for Unisphere**. This utility is available on the EMC online support website (look for SPADBUpgradeBackupSMASToUniVMAX). For instructions on how to use the utility, refer to the accompanying README file. After the installation of Unisphere, use the **Restore** option. The SPA online help provides instructions on backing up and restoring the SPA database.
- ◆ If upgrading from a version lower than SPA 2.2.1, first upgrade to SPA 2.2.1, then upgrade to Unisphere as outlined in the previous bullets in this section.
- ◆ **Linux installations:** Before starting a new installation of Unisphere with the Performance option on Linux, the `mysql` user and `mysql` group must be present. In addition, the `mysql` user password must be `mysql` and the user must be a member of the `mysql` group. An example of the MySQL instructions follows:

```
shell> groupadd mysql
shell> useradd -m -g mysql -p mysql mysql
```


CHAPTER 2

Installing Unisphere for VMAX

This chapter explains how to install Unisphere for VMAX:

◆ Installing Unisphere for VMAX	22
◆ Completing the installation	25
◆ Launching Unisphere	27
◆ Upgrading to Unisphere for VMAX with Performance	28
◆ Uninstalling Unisphere for VMAX.....	31

Installing Unisphere for VMAX

This section describes how to access and install the Unisphere for VMAX software.

Step 1: Accessing the software

Unisphere for VMAX is distributed as a platform-specific kit that can be downloaded from the EMC Online Support site at:

<https://support.EMC.com>

The following kits are available:

- ◆ For Windows 64-bit: **UNIVMAX_V1.6.0.x_WINDOWS_X86_64.exe**
- ◆ For Linux 64-bit: **UNIVMAX_V1.6.0.x_LINUX_X86_64.bin**

Note: In the file names above, the **x** in 1.6.0.x represents the software build number. That number will vary based on when the software was built.

To access the software from online support:

1. On the EMC Online Support site:
 - a. Click **Support By Product** in the main navigation bar.
 - b. In the **Find a Product** box, type **Unisphere for VMAX** and click the arrow.
 - c. Locate the appropriate kit and download it to a directory on the host's drive.

Step 2: Installing the software

You can install Unisphere using an installation wizard, as described in “[Step 2A: Installing Unisphere for VMAX using the wizard](#)” on page 22, or from the command line, as described in “[Step 2B: Installing Unisphere for VMAX from the command line](#)” on page 23).

Note: To install Unisphere using the wizard in Linux, the display manager must be enabled; otherwise, the installer defaults to console mode.

Step 2A: Installing Unisphere for VMAX using the wizard

To install Unisphere for VMAX using the wizard:

1. Save all files and exit all applications.
2. Change directory to the location of the kit and run the appropriate executable for your operating system.
3. In the **Introduction** page, review the recommendations and click **Next**.
4. In the **Choose Install Folder** page, click **Next** to accept the default directory, or click **Choose** to select another directory.
5. In the **Choose Install Set** page, click **Unisphere for VMAX** to install Unisphere or **Unisphere for VMAX with Performance Analyzer** to install Unisphere with the Performance option, and then click **Next**.
6. In the **SYMAPI Connection Type** page:

- a. Specify an Initial Setup User name (default is `smc`). You can either accept the default or use your Windows username if you have authorization enabled on the Unisphere server host. [“Initial Setup User” on page 14](#) explains the role of the Initial Setup User.
- b. Specify a **Connection Type** for the initial login based on the following:

Local — On a host with Solutions Enabler installed and attached to Symmetrix systems.

Remote — On a remote server connected to a SYMAPI server; you must specify the SYMAPI server **Node Name** and **Net Port**. The default net port for SYMAPI is 2707.

Note: [“Local and remote installation options” on page 14](#) provides more information on each of the connection types.
- c. Click **Next**.
7. In the **Ports Configuration** page, specify the ports to use/enable when connecting to the Unisphere server.

The default ports of the Unisphere server and Performance database (if installing Unisphere with the Performance option) are shown. If you want to use the default ports, verify that they are available, and click **Next** to accept and enable them. Otherwise, you can specify and enable different ports, and click **Next**.
8. In the **Pre-Installation Summary** page, verify the summary information, and click **Install** to continue the installation.
9. In the **Install Complete** page, click **Done**.

Step 2B: Installing Unisphere for VMAX from the command line

To install Unisphere for VMAX from the command line:

1. Save all files and exit all applications.
2. Change directory to the location of the kit.
3. Run the following command if you are installing Unisphere on Windows:

```
KitName -i console
```

Or the following commands if you are installing Unisphere on Linux:

```
chmod +x KitName
./KitName
```

Where *KitName* is one of the following operating system-specific kit names:

- For Windows 64-bit: **UNIVMAX_V1.6.0.x_WINDOWS_X86_64.exe**
- For Linux 64-bit: **UNIVMAX_V1.6.0.x_LINUX_X86_64.bin**

Note: In the file names above, the **x** in 1.6.0.x represents the software build number. That number will vary based on when the software was built.

4. In the **Introduction** pane, review the recommendations and press **Enter**.

5. In the **Choose Install Folder** pane, press **Enter** to accept the default directory, or specify a different directory and press **Enter**.
6. In the **Choose Install Set** pane, press **Enter** to install **Unisphere for VMAX** or type **2** and press **Enter** to install **Unisphere for VMAX with Performance Analyzer**.
7. In the **SYMAPI Connection Type** page:
 - a. Specify an Initial Setup User name (default is `smc`). You can either accept the default or use your Windows username if you have authorization enabled on the Unisphere server host. [“Initial Setup User” on page 14](#) explains the role of the Initial Setup User.
 - b. Specify a **Connection Type** for the initial login based on the following:

Local — On a host with Solutions Enabler installed and attached to Symmetrix systems.

Remote — On a remote server connected to a SYMAPI server; you must specify the SYMAPI server **Node Name** and **Net Port**. The default net port for SYMAPI is 2707.

Note: [“Local and remote installation options” on page 14](#) provides more information on each of the connection types.
8. In the **Ports Configuration** pane, specify the ports to use or enable when connecting to the Unisphere server.

The default ports of the Unisphere web server are shown. If you want to use the default ports, verify that they are available and press **Enter** to accept and enable them. Otherwise, you can specify and enable different ports, and press **Enter**.
9. In the **Pre-Installation Summary** pane, verify the summary information, and then press **Enter** to continue the installation.
10. In the **Install Complete** pane, press **Enter**.
11. Refer to [“Completing the installation” on page 25](#) for instructions on completing the installation.

Completing the installation

This section describes the tasks to perform after the installation has been completed.

Configuring language and regional settings

For *Windows* users outside the United States, you must configure your regional and language settings to **English (United States)** if you plan on using the graph feature of the Quality of Service (QoS) and Replication Monitors. To configure your settings:

1. Stop the EMC SMAS service (if it is running). [“Starting and stopping the SMAS service” on page 26](#) provides instructions.
2. In the Windows **Control** panel, double-click **Regional and Language Options**.
3. On the **Regional Options** tab, set the **Standards and formats** to **English (United States)**.
4. On the **Advanced** tab, set the **Language for non-Unicode programs** to **English (United States)** and select **Apply all setting to the current user account and to the default user profile**.
5. Restart the service.

Installing a Unisphere license

Before you can manage a Symmetrix system running Enginuity 5876 or higher, you must install a Unisphere for VMAX (SMC) eLicense on the Symmetrix system. For instructions on installing licenses, refer to **Installing Licenses** in the Unisphere online help.

Excluding the data and temp directories from virus scans

Note: This section applies only to Unisphere for VMAX with the Performance option.

MySQL advises that you exclude the following directories from any virus scan:

- ◆ The data directory and all its subdirectories
(`<InstallDirectory>\EMC\SMAS\jboss\standalone\data\msq\data`)
- ◆ The temp directory
(`<InstallDirectory>\EMC\SMAS\jboss\standalone\data\msq\temp`)

⚠ CAUTION

Not following this advice may lead to data corruption in the Performance database.

Starting and stopping the Performance database

Note: This section applies only to Unisphere for VMAX with the Performance option.

Linux

To start/stop the Performance database (MySQL) in Linux, change to this directory:

```
<InstallDirectory>/SMAS/jboss/standalone/data/msq
```

and use the following commands:

Action	Command
Start (Always start the Performance DB before starting the SMAS service.)	./smas_mysql_unix_helper.sh -S
Stop (Always stop the SMAS service before stopping the Performance DB.)	./smas_mysql_unix_helper.sh -k

Windows

To start/stop the **EMC_smasdb** service in Windows, use the **Control Panel (Administrative Tools, Services)**.

Alternatively, you can use the following commands to start/stop the Windows services using CLI:

```
net start "EMC Symmetrix Management Application Server"
net stop "EMC Symmetrix Management Application Server"
net start "EMC_smasdb"
net stop "EMC_smasdb"
```

Starting and stopping the SMAS service

Take the necessary precautions before starting/stopping the service.

Linux

To start/stop the SMAS service in Linux, change to this directory:

```
/etc/init.d
```

and use the following commands:

Action	Command
Start server (Always start the Performance DB before starting the SMAS service.)	./smas start
Stop server (Always stop the SMAS service before stopping the Performance DB.)	./smas stop

Windows

To start/stop the EMC Symmetrix Management Application Server in Windows, use the **Services** panel (**Control Panel, Administrative Tools, Services**).

Launching Unisphere

To launch Unisphere:

1. Type the following URL in a browser:

`https://<Host_IP>:8443`

Note: For your browser to access the Unisphere for VMAX console, Flash Player 11.2 or a later release is required. Flash Player is available from the Adobe website.

2. On the login window, type **smc** for both the ID and Password, and then click **Login**.

Upgrading to Unisphere for VMAX with Performance

The following upgrade paths are supported with this release of Unisphere for VMAX:

- ◆ Unisphere for VMAX V1.0 or higher
- ◆ Symmetrix Management Console version 7.3.3 / Symmetrix Performance Analyzer version 2.3.3

Note: Direct upgrade from 32 bit SMC is not supported. To upgrade in this scenario, upgrade to Unisphere for VMAX V1.0 first, and then to Unisphere for VMAX V1.6.

The installation program automatically upgrades your installation according to the settings used in the previous installation, including port, connection type, and whether the Performance option is installed.

The following Unisphere for VMAX settings from your previous installation are maintained through the upgrade process:

- ◆ Users
- ◆ Alert Policies and Threshold Settings
- ◆ Email Settings: Mailing List and SMTP Config
- ◆ Performance dashboard settings
- ◆ Queries

Before upgrading Unisphere for VMAX with the Performance option

As a safeguard, follow these steps:

Note: Refer to the Unisphere for VMAX online help to perform these tasks.

1. Backup the Performance database.
2. Record the Symmetrix system registrations, including the settings for data collection and diagnostic interval.
3. Export the Performance settings (metric and alert definitions and user templates). This operation requires setting a password to use when you import the saved settings to the new system.

Upgrading Unisphere for VMAX using the wizard

To upgrade to Unisphere, or Unisphere with the Performance option for Windows:

1. Access the software, as described in [“Step 1: Accessing the software” on page 22](#).
2. Navigate to the location of the kit and run the appropriate executable for your operating system.
3. In the instance detected message window, click **Upgrade Installed Features**.
4. In the **Introduction Upgrade Feature** page, click **Next**.
5. In the **Pre-Installation Summary** page, click **Install**.

The upgrade process completes.

Upgrading Unisphere for VMAX from the command line

To upgrade to Unisphere, or Unisphere with the Performance option for Linux:

1. Stop the SMAS service, as explained in [“Starting and stopping the SMAS service” on page 26](#).
2. Access the software, as described in [“Step 1: Accessing the software” on page 22](#).
3. Navigate to the location of the kit and run the appropriate executable for your operating system.
4. The screen message displays:

```
An instance of Unisphere for VMAX with Performance was detected on
this host. Would you like to upgrade the currently installed
Unisphere for VMAX with Performance Analyzer 1.6.0 or exit the
install. Choose 2 (Upgrade Installed Features).
```
5. The installation script displays the current Unisphere version and the version to which you will upgrade. Press **Enter**.
6. The installation script informs you that it is stopping the database. Press **Enter** to continue.

InstallAnywhere will guide you through the upgrade installation of Unisphere for VMAX with the Performance option.

7. Press **Enter** through each option in the installation process.

The upgrade process completes.

After upgrading the Unisphere for VMAX with the Performance option

After completing the upgrade to Unisphere for VMAX, follow these steps:

1. If you were using Link and Launch client registrations to launch Unisphere from ControlCenter, ProSphere, or vSphere VSI clients, you must re-register your host with Unisphere. The *Adding Link & Launch client registrations* section in the Unisphere help provides instructions.
2. If upgrading from SMC V7.3.x to Unisphere for VMAX on a system configured for LDAP, the Initial Setup User must re-enter the bind password in the **Configure Authentication** box; otherwise, LDAP users cannot log in. The *Configuring Authentication* section in the Unisphere help provides instructions.

Verify your Performance data:

3. Verify your Symmetrix system registrations, data collection, and diagnostic intervals. (Compare to the registration settings you recorded prior to the upgrade.)
4. Verify your database. If necessary, restore your database from the Unisphere for VMAX console.
5. Verify the Performance settings (metric and alert definitions and user templates). If you need to import the performance settings, use the password you set when you exported the settings.

Note: Refer to the Unisphere for VMAX online help to perform these tasks.

Adding the Performance option (at a later time)

If you need to add the Performance option to an existing Unisphere for VMAX V1.6 configuration, follow these steps:

Using the Wizard (for Windows)

1. Access the software, as described in [“Step 1: Accessing the software” on page 22](#).
2. Change directory to the location of the kit and run the appropriate executable for your operating system.
3. In the **UNIVMAX Instance detected** box, click **Add New Feature**.
4. In the **Introduction Add Feature** page, click **Next**.
5. In the **Ports Configuration** page, the default port is displayed. You can specify the port to use or enable when connecting to the Performance database.
6. In the **Pre-Installation Summary** page, click **Install**.

Using the command line (for Linux)

1. Stop the SMAS service, as explained in [“Starting and stopping the SMAS service” on page 26](#).
2. Access the software, as described in [“Step 1: Accessing the software” on page 22](#).
3. Change directory to the location of the kit and run the appropriate executable for your operating system.
4. The screen message displays:

```
An instance of Unisphere for VMAX with Performance was detected on
this host. Would you like to upgrade the currently installed
Unisphere for VMAX with Performance Analyzer 1.6.0 or exit the
install. Choose 2 (Upgrade Installed Features).
```
5. In the **Introduction Add Feature** line, press **Enter** to continue.
6. In the Create the 'mysql' group and 'mysql' user before continuing, press **Enter**.
7. In the **Ports Configuration** line, the default port displays. Press **Enter** to accept the default port, or specify the port to use and press **Enter**.
8. In the **Pre-Installation Summary** section, press **Enter** to continue.

Uninstalling Unisphere for VMAX

This section describes how to uninstall Unisphere for VMAX.

Before you begin

Before you begin uninstalling Unisphere for VMAX, review the following:

- ◆ Uninstalling Unisphere with the Performance option removes the Performance database. The Unisphere online help provides instructions on backing up/restoring the Performance database should you want to reuse it at a later time.
- ◆ During an uninstallation, the installation program prompts you to export your customized performance settings (metrics and threshold settings only) to file that can be imported to another Unisphere environment. The Unisphere online help provides instructions on exporting/importing your customized performance settings.

⚠ CAUTION

Uninstalling Unisphere terminates all client sessions to the SMAS server and any SYMAPI operations in progress.

Uninstalling from Windows

You can uninstall Unisphere for VMAX from a Windows host using either the Windows **Add/Remove Programs** box, the command line, or Windows Explorer.

Using Windows Add/Remove Programs

To uninstall Unisphere for VMAX from the Windows **Add/Remove Programs** box:

1. From the Windows **Start** menu, select **Settings, Control Panel, Add/Remove Programs**.
2. In the **Add/Remove Programs** dialog, select **EMC UNIVMAX** and click **Change/Remove**.
3. In the **Uninstall EMC UNIVMAX** wizard, click **Uninstall**.
4. Complete the remaining steps in the wizard.

Using the command line

To uninstall Unisphere for VMAX using the command line:

1. Change directory location to:

```
<InstallDirectory>\EMC\SMAS\_EMC_SMAS_installation
```

2. Type the following to launch the uninstallation wizard:

```
Uninstall_EMC_SMAS_Installation -i console
```

3. Complete the steps in the wizard.

Note: A few files remain after the uninstallation operation. To remove them you can delete the SMAS folder.

Using Windows Explorer

To uninstall Unisphere for VMAX using Windows Explorer:

1. Double-click the following to launch the uninstallation wizard:

```
<InstallDirectory>\EMC\SMAS\_EMC_SMAS_installation\  
Uninstall_EMC_SMAS_Installation.exe
```

2. Complete the steps in the wizard.

Note: A few files remain after the uninstallation operation. To remove them you can delete the SMAS folder.

Uninstalling from Linux

You can uninstall Unisphere for VMAX from a Linux host using the command line:

1. Navigate to the following directory:

```
<InstallDirectory>/EMC/SMAS/_EMC_SMAS_installation
```

2. Type the following to launch the uninstallation wizard:

```
./Uninstall_EMC_SMAS_Installation.exe -i console
```

3. Complete the steps in the wizard.

Note: A few files remain after the uninstallation operation. To remove them you can delete the SMAS directory.

CHAPTER 3

Installing the Unisphere for VMAX Virtual Appliance

This chapter describes how to install the Unisphere for VMAX Virtual Appliance in a VMware infrastructure environment:

◆ Introduction	34
◆ Before you begin	35
◆ Installing the virtual appliance directly on the ESX Server	36
◆ Installing the virtual appliance through a vCenter Server	39
◆ Installing the virtual appliance using OVFTOOL	41
◆ Launching Unisphere or the vApp Manager	43
◆ Registering the VASA Provider with vSphere	45
◆ Upgrading the Unisphere for VMAX Virtual Appliance	46
◆ Upgrading the Unisphere for VMAX Virtual Appliance using an ISO image	51
◆ Re-configuring the virtual appliance IP address	52
◆ Deleting the Unisphere for VMAX Virtual Appliance	54
◆ Backing up and restoring the Performance database	55
◆ Installing licenses	57

Introduction

The Unisphere for VMAX Virtual Appliance and the Unisphere for VMAX with Performance Virtual Appliance are VMware ESX Server virtual machines that provide all of the components you need to manage your Symmetrix environment using the `storsrvd` daemon and Solutions Enabler network client access. These include:

- ◆ EMC Unisphere for VMAX V1.6 (standalone or with the Performance option)
- ◆ EMC Solutions Enabler V7.6.0 (solely intended as a SYMAPI server for Solutions Enabler client access)
- ◆ Linux OS (SUSE 11 64-bit SP2)¹
- ◆ SMI-S Provider V4.6.0

In addition, the appliances include a browser-based console to configure your storage environment. The following consoles enable you to perform configuration tasks not available in the appliances directly:

- ◆ EMC vApp Manager for Unisphere for VMAX - Management
- ◆ EMC vApp Manager for Unisphere for VMAX - Management & Performance

Using these consoles, you can perform the following tasks:

- ◆ Launch Unisphere
- ◆ Monitor the application status
- ◆ Start and stop selected daemons
- ◆ Import and export persistent data
- ◆ Configure the `nethost` file (required for client access)
- ◆ Discover storage systems
- ◆ Modify options and daemon options
- ◆ Add host-based license keys
- ◆ Run a limited set of Solutions Enabler CLI commands
- ◆ Configure ESX host and gatekeeper volumes
- ◆ Load Symmetrix-based eLicenses
- ◆ Configure LDAP
- ◆ Configure iSCSI initiator and map iSCSI gatekeeper volumes
- ◆ Configure additional NIC card (optional)
- ◆ Download SYMAPI debug logs
- ◆ Import CA signed certificate for web browser
- ◆ Import custom certificate for `storsrvd` daemon
- ◆ Check disk usage
- ◆ Restart appliance
- ◆ Configure symavoid entries
- ◆ Load Symmetrix-based eLicenses
- ◆ Enable SSH
- ◆ Manage users
- ◆ Reset hostname
- ◆ Update `etc/hosts`

Note: For information on using the vApp Manager console, refer to its online help.

1. Root login is not supported on SUSE 11 SP2 virtual machine.

Before you begin

Before you begin to install either Unisphere for VMAX Virtual Appliance or Unisphere for VMAX Virtual Appliance with the Performance option, be sure to complete the tasks listed in this section.

- ☐ Verify that you are installing the latest version of the appliance by checking EMC online support for updates.
- ☐ Verify that the client is running:
 - VMware vSphere Client
 - Either of the following browsers with cookies and javascript enabled:
 - Internet Explorer 7.0 through 10.0 (Desktop only)
 - Firefox 10.0.7 and 15.0
 - Chrome 21.0.1180

Browsers should have Flash Player 11.2 or a later release installed. If your browser has an outdated version of Flash Player, you are prompted to download the latest version when you start the web console.

- ☐ Verify that the virtual machine is not running shared memory/resources.
- ☐ Verify that the VMware ESX Server has a dual CPU and meets the minimum requirements listed in [Table 3](#):

Table 3 Unisphere for VMAX Virtual Appliance VMware ESX Server requirements

Requirement	Unisphere for VMAX	Unisphere for VMAX with Performance
ESX Server version	4.0 or higher	4.0 or higher
Disk space	16 GB	91 GB
Memory	2 GB	8 GB

Installing the virtual appliance directly on the ESX Server

This section describes how to install the Unisphere for VMAX Virtual Appliance (with or without Performance Analyzer) directly on the ESX Server.

Step 1: Installing the virtual appliance

To install the virtual appliance:

1. On the EMC Online Support site:
 - a. Click **Support By Product** in the main navigation bar.
 - b. In the **Find a Product** box, type **Unisphere for VMAX** and click the arrow.
 - c. Locate the appropriate kit and download the OVF archive file (*.ova) containing the installation program to a temporary directory:
 - Unisphere for VMAX Virtual Appliance file name:
`univmax160_x_suse11_x86_64_vapp_OVF10.ova`
 - Unisphere for VMAX with Performance Virtual Appliance file name:
`univmaxpa160_x_suse11_x86_64_vapp_OVF10.ova`

Note: In the file names above, the **x** in 160_x represents the build number. That number will vary based on when the software was built.

2. Start the vSphere Client and log in to the ESX Server on which you want to install the appliance.
3. Click **Ignore** in the security warning message.
4. From the **File** menu, select **Deploy OVF Template**.
5. Browse to the OVF archive file, located in the temporary directory you created earlier. Select the OVF archive file with the suffix `*vapp_OVF10.ova`.
6. Click **Next**.
7. On the **OVF Template Details** page, verify the details about the appliance and click **Next**.
8. On the **End User License Agreement** page, select **Accept** and click **Next**.
9. On the **Name and Location** page, specify a name for the appliance and click **Next**.
10. On the **Disk Format** page, select the format in which to store the virtual machine's virtual disks and click **Next**.
11. On the **Network Mapping** page, select the network you want the virtual appliance to use and click **Next**.
12. On the **Ready to Complete** page, verify the information and click **Finish**.
13. In the **Completed Successfully** message, click **Close**.

Step 2: Powering on and configuring the virtual appliance

To power on and configure the virtual appliance:

1. On the **Summary** page of the Virtual Infrastructure Client, click **Power On**.

2. Click the **Console** tab and watch as the appliance starts up.
3. At the following prompt, type **y** and press **Enter** to configure static IP address:

Do you want to configure static IP address? [y]/n:

- A **[y]**es response produces the following series of prompts that enable you to configure your network:

– IP Address []:

Type the address assigned to the appliance and press **Enter**.

Note: The virtual appliance uses this IP address to query the DNS Server and get its hostname. Therefore, you must ensure that the IP address has a hostname mapping in the DNS Server.

– Netmask []:

Type the mask of the network on which the appliance is located and press **Enter**.

– Gateway []:

Type the gateway address to the network on which the appliance is located and press **Enter**.

– Is a proxy server necessary to reach the internet? y/n [n]:

A **[y]**es response enables you to specify the IP address of the proxy server and the port.

A **[n]**o response continues the configuration.

The network is configured at this point.

4. At the following prompt, specify whether you want to set the time zone:

Do you want to set the time zone? y/[n] :

- A **[n]**o response continues the configuration. If you select this option, you can use the appliance console to specify the time zone at a later time.
- A **[y]**es response produces the following series of prompts that enable you to set the time zone:

– Please select a continent or ocean

Type the number that corresponds to the time zone location and press **Enter**.

– Please select a country

Type the number that corresponds to the country-specific time zone you want to set and press **Enter**.

– Please select one of the following time zone regions

Type the number that corresponds to regional time zone you want to set and press **Enter**.

– Is the above information OK?

A **[y]**es response accepts your answers.

A **[n]** response enables you to go back and change your responses.

5. At the following prompt, specify whether you want to enter the host ESX Server information:

Do you want to set the host ESX Server y/[n]? :

- A **n** response continues the configuration. If you select this option, you can use the virtual appliance console to enter the host ESX Server details at a later time. For instructions, refer to the vApp Manager's online help.
- A **y** response prompts you for the ESX Server hostname, in which case you should type the fully qualified hostname of the ESX Server and press **Enter**.

A Welcome screen opens. You have now finished installing the Unisphere Virtual Appliance.

6. Continue with [“Step 3: Adding gatekeepers”](#) next.

Step 3: Adding gatekeepers

Solution Enabler manages Symmetrix systems through gatekeeper volumes mapped to the virtual appliance as RDM pass-through volumes. The management is done through EMC proprietary commands using SCSI 3B/3C WRITE/READ commands. For every call, a WRITE command is issued to send the request, and then a READ command to get the results.

Note: For specific recommendations on the number of gatekeepers required for all Symmetrix configurations, refer to EMC Knowledgebase solution emc255976 available on the EMC Online Support site.

1. Use either of the following methods to add gatekeeper volumes:

- Add them through the vApp Manager. For instructions, refer to the vApp Manager online help.

Note: After adding gatekeepers through the vApp Manager, you must also restart the SMC daemon through the vApp Manager.

- Present them as raw device mapping (RDM) volumes through the vSphere client. For instructions, refer to the appropriate VMware documentation.

2. Continue with [“Launching Unisphere or the vApp Manager”](#) on page 43.

Installing the virtual appliance through a vCenter Server

This section describes how to install the virtual appliance through a vCenter Server 4.0 and higher.

Step 1: Configuring the virtual appliance

To configure the virtual appliance:

1. On the EMC Online Support site:
 - a. Click **Support By Product** in the main navigation bar.
 - b. In the **Find a Product** box, type **Unisphere for VMAX** and click the arrow.
 - c. Locate the appropriate kit and download the OVF archive file (*.ova) containing the installation program to a temporary directory:
 - Unisphere for VMAX Virtual Appliance file name:
`univmax160_x_suse11_x86_64_vapp_OVF10.ova`
 - Unisphere for VMAX with Performance file name:
`univmaxpa160_x_suse11_x86_64_vapp_OVF10.ova`

Note: In the file names above, the **x** in 160_x represents the build number. That number will vary based on when the software was built.

2. Start the vSphere Client and log in to the vCenter Infrastructure Server through which you want to install the virtual appliance.
3. Click **Ignore** in the security warning message.
4. From the navigation tree, select the ESX Server on which you want to install the virtual appliance.
5. From the **File** menu, select **Deploy OVF Template**.
6. Browse to the OVF archive file, located in the temporary directory you created earlier. Select the OVF archive file with the suffix `*vapp_OVF10.ova`.
7. Click **Next**.
8. On the **OVF Template Details** page, verify the details about the appliance and click **Next**.
9. On the **End User License Agreement** page, select **Accept** and click **Next**.
10. On the **Name and Location** page, specify a name for the appliance and click **Next**.
11. Select the host/cluster on which to run the virtual appliance.
12. If the resource pool is available, select it; otherwise, continue with this procedure.
13. If more than one datastore is attached to the ESX Server, select the datastore for your appliance; otherwise, continue with this procedure.
14. On the **Network Mapping** page, select the network you want the virtual appliance to use and click **Next**.
15. On the **IP Address Allocation** page, set the IP allocation policy for the virtual appliance to **Static**:

16. Use the drop-down list to choose an IP protocol (IPv4) to use and click **Next**.

17. Customize the software solution for this installation by doing the following:

a. Provide valid values for the following OVF properties:

- IP Address
- Netmask
- Gateway
- DNS Server 1
- DNS Server 2

b. Optionally, provide/select valid values for the following OVF properties:

Note: Ignore the “Network Properties” section that appears in vSphere V5.0 and higher.

- Time zone: Select the appropriate time zone.
- Proxy Server: Enter the IP address of the proxy server and port. For example:
ProxyServer-IP:Port
- ESX Server Name: Enter the fully qualified ESX Server hostname.
- ESX Server Password: Enter the ESX Server password in base64 encryption format.
- Default Gateway
- DNS
- Network 1 IP Address
- Network 1 Netmask
- Network 2 IP Address
- Network 2 Netmask

18. On the **Ready to Complete** page, verify the information and click **Finish**.

19. In the **Completed Successfully** message, click **Close**.

Step 2: Powering on the virtual appliance

To power on the virtual appliance:

1. On the **Summary** page of the Virtual Infrastructure Client, click **Power On**.
2. Click the **Console** tab and watch as the appliance starts up.

A Welcome screen opens. You have now finished installing the Virtual Appliance.

3. Continue with [“Step 3: Selecting gatekeepers,”](#) next.

Step 3: Selecting gatekeepers

Select gatekeepers as described in [“Step 3: Adding gatekeepers”](#) on page 38.

Installing the virtual appliance using OVFTOOL

You can install the virtual appliance through the command line from any Windows or Linux host. This section explains how to install the virtual appliance using OVFTOOL.

To install the virtual appliance using OVFTOOL, the following are required:

- ◆ vCenter Server 4.0 or a later release.
- ◆ ESX Server 4.0 or a later release managed by vCenter Server 4.x.
- ◆ VMware OVFTOOL 1.0 or a later release.

Note: Refer to the appropriate documentation for installing vCenter Server and VMware OVFTOOL.

Here is a brief description of the steps on how to install the virtual appliance using OVFTOOL:

1. Install and set up the vCenter Server.
2. Add the ESX Server to the vCenter Server datacenter.
3. Install VMware OVFTOOL on a Windows or Linux host.
4. Move the Unisphere for VMAX Virtual Appliance kit to the same Linux host.
5. Run the ovftool command with necessary command line switches. For more information on using the command, refer to [“Using OVFTOOL.”](#)

Unisphere for VMAX Virtual Appliance is installed and powered on automatically.

6. Add Gatekeeper(s).
7. Continue with [“Launching Unisphere or the vApp Manager” on page 43.](#)

Using OVFTOOL

OVFTOOL has the following syntax:

```
/usr/bin/ovftool --acceptAllEulas --overwrite --powerOffTarget
--powerOn --prop:ipAddress=<IP-ADDRESS> --prop:netmask=<NETMASK>
--prop:gateway=<GATEWAY> --prop:dns1=<DNS1> --prop:dns2=<DNS2>
--prop:timezone=<TIMEZONE> --prop:esxServer=<ESX-SERVER>
--prop:encr yRootPasswd=<ROOT-PASSWORD> --name=<VM-DISPLAYNAME>
--datastore=<DATASTORE> --net:Network\ 1=<VM Network Port Group>
--net:Network\ 2=<VM Network Port Group> <OVA-FILE>
vi://Administrator:<vCenter-admin-passwd>@<vCenter-Server>/
<DataCenter-Name>/host/<esx-server-name>
```

Parameter	Description
<IP-ADDRESS>	IP Address of the Virtual Appliance.
<NETMASK>	Netmask of the Virtual Appliance.
<GATEWAY>	Gateway
<DNS1>	IP of DNS Server1.
<DNS2>	IP of DNS Server2.
<TIMEZONE>	Time Zone setting. (Optional)
<ESX-SERVER>	Fully qualified hostname of ESX server. (Optional)
<ROOT-PASSWORD>	Root password of ESX Server in base64 encrypted format. (Optional)
<VM-DISPLAYNAME>	VM Displayname. To automatically add gatekeeper volumes during virtual appliance boot, VM Displayname must be the same as the fully qualified hostname of the Virtual Appliance.
<DATASTORE>	Name of the datastore attached to ESX Server. Required only if more than one datastore is attached to ESX Server.
<VM Network Port Group>	VM network port group. If both NIC cards need to be in different networks, the VM Network port group needs to be different.
<OVA-FILE>	Absolute path of ova file.
<vCenter-Server>	Name of the vCenter.
<vCenter-admin-passwd>	vCenter Server's Administrator password.
<esx-server-name>	ESX Server name as displayed in the vCenter Server.

Launching Unisphere or the vApp Manager

After you have finished installing the appliance, you can either launch Unisphere or the vApp Manager, and/or connect to the API server through the Solutions Enabler client.

Launching Unisphere

To launch Unisphere:

1. Type one of the following URLs in a browser:

`https://<appliance_IP>:8443`

or

`https://<appliance_host_name>:8443`

Note: For your browser to access the Unisphere for VMAX console, Flash Player 11.2 or a later release is required. Flash Player is available from the Adobe website.

2. On the login window, type **smc** for both the ID and Password, and then click **Login**.

Launching the vApp Manager

To launch the vApp Manager:

1. Type one of the following URLs in a browser:

`https://<appliance_IP>:5480`

or

`https://<appliance_host_name>:5480`

Note: For either of the URLs above, the browser is redirected as shown in the next table.

Original URL	Redirected URL
<code>https://<appliance_IP>:5480</code>	<code>https://<appliance_IP>:8443/SE</code>
<code>https://<appliance_host_name>:5480</code>	<code>https://<appliance_IP>:8443/SE</code>

2. On the log in pane, type **seconfig** for both the User and Password, and then click **Login**.

Note: It is recommended that you change the password from the vApp Manager on first login. The vApp Manager can also be configured to use LDAP for user authentication. For more information, refer to the vApp Manager online help.

The vApp Manager displays. For information on using the vApp Manager, refer to its online help.

Connecting to the API server

For instructions on connecting to the API server, refer to the *EMC Solutions Enabler Installation Guide*.

Registering the VASA Provider with vSphere

VMware VASA (VMware APIs for Storage Awareness) Provider improves VMware vSphere's ability to monitor and automate storage-related operations. VASA Provider reports information about storage topology, capabilities, and status, as well as storage events and alerts to VMware. It is a standard vSphere management plug-in that is installed on each vCenter server, and it interacts with VMware APIs for Storage Awareness.

To register the VASA Provider with vSphere:

1. Connect to the VMware vCenter Server 5.0 or a later release using vSphere Client.
2. In the Virtual Data Center, navigate to **Home > Administration > Storage Providers**, and click **Storage Providers** in the navigator bar.
3. In the **Vendor Providers** pane, select **Add**.
4. Add the vendor provider properties (name, url, and login information).

For ECOM login credentials, refer to SMI-S provider documentation.

For the url, use `https://<vapp-ip>:5989/vasa/services/vasaService`

When the VASA Provider is connected, the VI Client displays the SSL certificate.

5. Click **Yes** to complete the registration.
6. Verify registration with vSphere:
 - a. Navigate to **Home > Administration > Storage Providers > Vendor Providers**.
 - b. Verify that the VASA Provider is listed and displays the list of managed storage systems.

Upgrading the Unisphere for VMAX Virtual Appliance

Periodically, EMC releases virtual appliances with security patches and hotfixes for the virtual appliance. These are available on the EMC online support website as *.ova files.

The steps to update your virtual appliance depend on your update path:

Table 4 VMAX 1.6 Virtual Appliance update paths

From:	To:	Complete:
Unisphere V1.0 or a later release with the Performance option	Unisphere V1.6 with the Performance option	1. “Step 1: Backing up persistent data” on page 47. 2. “Step 2B: Updating Unisphere for VMAX with the Performance option from V1.0 to V1.6” on page 49 3. “Step 3: Restoring persistent data” on page 50. 4. “Step 4: Completing the upgrade” on page 50.
Unisphere V1.0 or a later release without the Performance option	Unisphere V1.6	1. “Step 1: Backing up persistent data” on page 47. 2. “Installing the virtual appliance directly on the ESX Server” on page 36 or “Installing the virtual appliance through a vCenter Server” on page 39, depending on your environment. 3. “Step 3: Restoring persistent data” on page 50. 4. “Step 4: Completing the upgrade” on page 50.
Symmetrix Management Console V7.3.3 with Symmetrix Performance Analyzer	Unisphere V1.6 with the Performance option	1. “Step 1: Backing up persistent data” on page 47. 2. “Step 2A: Updating the SPA Virtual Appliance V7.3.3.x to Unisphere for VMAX with the Performance option” on page 47. 3. “Step 3: Restoring persistent data” on page 50.
Symmetrix Management Console V7.3.3 without Symmetrix Performance Analyzer	Unisphere V1.6	1. “Step 1: Backing up persistent data” on page 47. 2. “Installing the virtual appliance directly on the ESX Server” on page 36 or “Installing the virtual appliance through a vCenter Server” on page 39, depending on your environment. 3. “Step 3: Restoring persistent data” on page 50.

Step 1: Backing up persistent data

Before backing up your persistent data, note the following:

- ◆ Local directory authentication must be enabled through the Unisphere for VMAX GUI. For instructions, refer to *Configuring Authentication Authorities* in the Unisphere online help.
- ◆ The IP address and hostname must be the same.

Do the following to back up the persistent data:

1. Log in to the web console of the existing appliance.
2. Click **Export Persistent Data** to download a zip file containing Solutions Enabler persistent data to your desktop.
3. Extract the zip file to your machine. Note the location of the file **encrypt_se_export_persistent_data_time-stamp.zip.gpg**. You will need this file later to complete this procedure.
4. Power off the old appliance.
5. Continue with [“Step 2: Updating the software”](#) in the next section.

Note: This process may take a few minutes to complete. During this time, the Solutions Enabler daemons are shut down in the background.

Step 2: Updating the software

Step 2A: Updating the SPA Virtual Appliance V7.3.3.x to Unisphere for VMAX with the Performance option

1. Back up the SPA database to another host:
 - a. Enter the appliance console through the vSphere client.
 - b. Simultaneously press the **Alt** and **F2** keys to display the system login prompt.
 - c. Log into the system using the `vappadmin` user account.
 - d. If you are logging in for the first time, use the default password `vappadmin`.
 - e. After you have logged in, change the password by running the `passwd` command.
 - f. Use the following command to back up the SPA database:


```
# manage_spa_db_backup.sh -dbbackup
```
 - g. Use the following command to view the backup files in the staging location:


```
# manage_spa_db_backup.sh -list -staging
```
 - h. Transfer the backup file copies out of the appliance to the backup host. Use the following `sftp` command to access the backup host and then transfer any files ending in `.dat`.


```
# sftp <user-name>@<fully-qualified-host-name>
```

2. Import and install the new appliance in your ESX server. For instructions, refer to [“Installing the virtual appliance directly on the ESX Server” on page 36](#) or [“Installing the virtual appliance through a vCenter Server” on page 39](#), depending on your environment.
3. From the system console, do the following to restore the backed up SPA database files:
 - a. Enter the appliance console through the vSphere client.
 - b. Simultaneously press the **Alt** and **F2** keys to display the system login prompt.
 - c. Log in to the system using the `vappadmin` user account.
 - d. If you are logging in for the first time, use the default password `vappadmin`. After you have logged in, change the password by running the `passwd` command.
 - e. Check for available disk space using the following command:


```
# df -h
```
 - f. Transfer the SPA database from the backup host to the appliance. Use the following `sftp` command to access the appliance and then transfer any files ending in `.dat`.


```
# sftp <user-name>@<fully-qualified-host-name>
```
 - g. Use the following command to view the backup files in the staging location:


```
# manage_spa_db_backup.sh -list -staging
```
 - h. Move the backup files from the staging location to the backup location:


```
# manage_spa_db_backup.sh -restore
```
 - i. Log in to Unisphere (<https://<host-name>:8443/>) and start the database restoration process as described in the Unisphere for VMAX online help.
 - j. After the restoration has been completed and backup files are no longer needed, run the following command to clean the backup and staging locations:


```
# manage_spa_db_backup.sh -clean -all
```
4. Continue with [“Step 3: Restoring persistent data” on page 50](#).

Step 2B: Updating Unisphere for VMAX with the Performance option from V1.0 to V1.6

1. From the system console, do the following to backup the SPA database to another host:
 - a. Log in to Unisphere (<https://<HostName>:8443/>) and start the database backup process, as described in the online help.
 - b. Enter the appliance console through the vSphere client.
 - c. Simultaneously press the **Alt** and **F2** keys to display the system login prompt.
 - d. Log in to the system using the `vappadmin` user account.
If you are logging in for the first time, use the default password `vappadmin`.
 - e. After you have logged in, change the password by running the `passwd` command.
 - f. View the backup files in the backup location by entering the following command:

```
# manage_spa_db_backup.sh -list -backup
```
 - g. Move the backup files from the backup location to the staging location by entering the following command:

```
# manage_spa_db_backup.sh -stage
```


This operation moves the files from the backup area to the staging area (the home directory of the `vappadmin` user account).
 - h. Use the following command to view the backup files in the staging location:

```
# manage_spa_db_backup.sh -list -staging
```
 - i. Transfer the backup file copies out of the appliance to the backup host. Use the following `sftp` command to access the backup host and then transfer any files ending in `.dat`.

```
# sftp <user-name>@<fully-qualified-host-name>
```
2. Import and install the new appliance in your ESX server. For instructions, refer to [“Installing the virtual appliance directly on the ESX Server” on page 36](#) or [“Installing the virtual appliance through a vCenter Server” on page 39](#), depending on your environment.

Note: If you are upgrading from Unisphere for VMAX V1.1.0, be sure to install the appliance using the same IP address and the same gatekeeper(s).

3. From the system console, do the following to restore the backed up SPA database files:
 - a. Enter the appliance console through the vSphere client.
 - b. Simultaneously press the **Alt** and **F2** keys to display the system login prompt.
 - c. Log in to the system using the `vappadmin` user account.
If you are logging in for the first time, use the default password `vappadmin`. After you have logged in, change the password by running the `passwd` command.

- d. Check for available disk space using the following command:

```
# df -h
```

- e. Transfer the SPA database from the backup host to the appliance. Use the following sftp command to access the appliance and then transfer any files ending in .dat.

```
# sftp <user-name>@<fully-qualified-host-name>
```

- f. Use the following command to view the backup files in the staging location:

```
# manage_spa_db_backup.sh -list -staging
```

- g. Move the backup files from the staging location to the backup location:

```
# manage_spa_db_backup.sh -restore
```

- h. Log in to the vApp Manager (<https://<host-name>:8443/>) and start the database restore process as described in the Unisphere for VMAX online help.

- i. After the restoration has been completed and backup files are no longer needed, run the following command to clean the backup and staging locations:

```
# manage_spa_db_backup.sh -clean -all
```

4. Continue with [“Step 3: Restoring persistent data”](#) in the next section.

Step 3: Restoring persistent data

Do the following to restore the exported persistent data:

1. Log in to the new appliance’s vApp Manager.
2. Click **Import Persistent Data** and browse to the location of the `gpg` file you extracted earlier in this procedure.
3. Click **Import**.

When the message `Persistent data stored` appears, close the dialog. The update has been completed.

4. Restart the virtual appliance.
5. Continue with [“Step 4: Completing the upgrade”](#) in the next section.

Note: After completing the import process, custom login passwords are reset to the default username/password (`seconfig/seconfig`). You can reset them the next time you log in.

Step 4: Completing the upgrade

Do the following to complete the upgrade:

1. If upgrading from Unisphere for VMAX V1.1.0 and using LDAP authentication, you must complete the following so that LDAP users can log in to both the vApp Manager and the Unisphere for VMAX GUI:
 - a. In the vApp Manager, add the LDAP users. For instructions, see *Adding and removing users* in the vApp Manager help.

- b. In the Unisphere for VMAX GUI, disable local directory authentication. For instructions, see *Configuring authentication authorities* in the online help.
2. In the vApp Manager, restart the SMC daemon. This enables the vApp Manager to see the attached Symmetrix volumes. For instructions, see *Starting or stopping a daemon* in the online help.

Upgrading the Unisphere for VMAX Virtual Appliance using an ISO image

Periodically, EMC releases virtual appliances with security patches and hotfixes for the virtual appliance. These are available on the EMC online support website as *.iso files. If you are running Unisphere for VMAX 1.5.x, you can download and use an ISO upgrade file.

From:	To:	Complete:
Unisphere V1.5.0 or V1.5.1 with the Performance option	Unisphere V1.6 with the Performance option	1. “Backing up Performance database files to another host” on page 55. 2. “Step 1: Downloading the ISO upgrade file” on page 51. 3. “Step 2: Uploading the ISO upgrade file to the datastore” on page 51 4. “Step 3: Mounting the ISO image” on page 52. 5. “Step 4: Completing the upgrade” on page 52. 6. “Restoring Performance database files from another host” on page 56

Step 1: Downloading the ISO upgrade file

1. In a browser, navigate to the EMC Online Support site at:

<https://support.EMC.com>

2. Locate and download the following file:

UNIVMAX160_x_se760_x_vapp_upgrade_x86_64.iso

Note: In the file name above, the **x** in **160_x** and the **x** in **760_x** represent software build numbers. Those numbers will vary based on when the software was built.

Step 2: Uploading the ISO upgrade file to the datastore

After the download has been completed, upload the ISO file to the ESX server using the VI client.

1. Using the VI client, log in to the ESX server.
2. In the left pane, select the ESX server.
3. In the right pane, select the **Configuration** tab.

4. To list the datastores connected to the ESX server, select **Hardware, Storage**.
5. Right-click the datastore and select **Browse Datastore**.
6. In the Datastore Browser window that appears, click **Upload files to this datastore** and select **Upload File**. The **Upload Items** box opens.
7. Navigate to where you saved the ISO upgrade file, select the file, and click **Open**.
8. In the Upload/Download Operation box that appears, click **Yes** to accept the warning.

Step 3: Mounting the ISO image

1. Right-click the virtual appliance and select **Edit Settings**.
2. On the Hardware tab, select **CD/DVD Drive 1**.
3. In the right pane, select **Datastore ISO File** and click **Browse**.
4. Browse to the location of the ISO file on the datastore and select the file.
5. Verify that under **Device Status**, the **Connect at power on** box is selected and click **OK**.

Step 4: Completing the upgrade

1. Restart the Guest by selecting **Power On Guest**.
2. On the **Console** tab, go to the virtual appliance console.
3. In the lower section of the screen, select **Appliance Update** from the list of options.
4. Press the **Enter** key to start the upgrade. After the upgrade has been completed, the console screen reappears.

Re-configuring the virtual appliance IP address

This procedure explains how to re-configure the virtual appliance IP address.

1. Log in to the vSphere client and go to the virtual appliance console.
2. Use the **Move Up/Move Down** key to select **Configure IP** and press **Enter**.
3. At the following prompt, type **y** and press **Enter** to configure the static IP address:

```
Do you want to configure static IP address? [y]/n:
```

A **[y]** response produces the following series of prompts that enable you to reconfigure your network:

- IP Address []:

Type a valid IP address and press **Enter**.

The virtual appliance uses this IP address to query the DNS Server and get its hostname. Therefore, you must ensure that the IP address has hostname mapping in the DNS Server.

- Netmask []:

Type the mask of the network on which the appliance is located and press **Enter**.

- Gateway []:

Type the gateway address to the network on which the appliance is located and press **Enter**.

- DNS1 []:

Type the first DNS server address and press **Enter**.

- DNS2 []:

Type the second DNS server address and press **Enter**.

- Is a proxy server necessary to reach the internet? y/[n]:

A **[y]** response enables you to specify the IP address of the proxy server and the port.

- Are the above mentioned parameters correct? [y]/n:

A **[y]** response re-configures the virtual appliance IP address and returns to the console.

A **[n]** response enables you to go back and change your responses.

Deleting the Unisphere for VMAX Virtual Appliance

To delete the Unisphere for VMAX Virtual Appliance:

1. *Optional:* If you plan to restore Unisphere and Solutions Enabler persistent data, you should back up the persistent data in the Unisphere for VMAX Virtual Appliance console.

Optional: If you plan to restore the Performance database, you should backup the database according to [“Backing up and restoring the Performance database” on page 55](#)

2. In the VMware management interface, power down the appliance.
3. Right-click on the appliance and select **Delete From Disk**.
4. Click **Yes** in the confirmation message.

Backing up and restoring the Performance database

You can transfer Performance database files between the appliance and another host for file backup and restoration. There is no facility in the appliance user interface to perform this process. However, when you are logged in to the system with the `vappadmin` user account, you can transfer these files.

The `vappadmin` user account is limited to performing the following commands for transferring database files:

- # `passwd` - Changes the login password.
- # `sftp` - Transfers database backup files into the appliance from another host, or out of the appliance to another host.
- # `df` - Checks disk usage.
- # `manage_spa_db_backup.sh` - Moves files between the backup location and staging location, and lists and cleans backup and staging locations.

Backing up Performance database files to another host

From the system console, perform the following steps:

1. Log in to the vApp Manager (<https://<host-name>:8443/>) and start the database backup process as described in the Unisphere help.
2. Log in to the system using the `vappadmin` user account. The first time that you log in, use the default password `vappadmin`. After you are logged in, change the password by running the `passwd` command, which prompts for the old and new passwords.
3. View the backup files in the backup location by entering the following command:

```
# manage_spa_db_backup.sh -list -backup
```

4. Move the backup files from the backup location to the staging location by entering the following command:

```
# manage_spa_db_backup.sh -stage
```

This operation moves the files from the backup area to the staging area (the home directory for the `vappadmin` user account).

5. View the backup files in the staging location by entering the following command:

```
# manage_spa_db_backup.sh -list -staging
```

6. Transfer the backup file copies out of the appliance to the backup host. Use the following `sftp` command to access the backup host and then transfer any files ending in `.dat`.

```
# sftp <user-name>@<fully-qualified-host-name>
```

Restoring Performance database files from another host

From the system console perform the following steps:

1. Log in to the system using the `vappadmin` user account. The first time that you log in, use the default password `vappadmin`. After you have logged in, change the password by running the `passwd` command which prompts for the old and new passwords.

2. Check for available disk space by entering the following command:

```
# df -h
```

3. Transfer the backup file copies from the backup host to the appliance. Use the following `sftp` command to access the backup host and then transfer any files ending in `.dat`.

```
# sftp <user-name>@<fully-qualified-host-name>
```

4. View the backup files in the staging location by entering the following command:

```
# manage_spa_db_backup.sh -list -staging
```

5. Move the backup files from the staging location to the backup location by entering the following command:

```
# manage_spa_db_backup.sh -restore
```

6. Log in to Unisphere (<https://<host-name>:8443/>) and start the database restore process as described in Unisphere help.

7. After the restoration has been completed and backup files are no longer needed, run the following command to clean the backup and staging locations:

```
# manage_spa_db_backup.sh -clean -all
```

Installing licenses

This section describes how to install Symmetrix-based and host-based licenses, using the virtual appliance.

Note: For more information on licensing, refer to the *EMC Solutions Enabler Installation Guide*.

Installing Symmetrix-based licenses

Symmetrix-based licenses are used to license features on Symmetrix systems running Enginuity 5875 or higher. These licenses are stored on the Symmetrix system.

Note: Before starting this procedure, verify that the gatekeepers have been added and that the `symcfg discover` command has been run from the **Command Execution** tab.

To install Symmetrix-based licenses:

1. Open the vApp Manager.
2. Select **License Validation**.
3. In the **eLicensing** pane, click **Add License File** to open the **Add eLicensing License** box.
4. In the **Upload License** pane, click **Upload License File**.
5. In the file browser screen, navigate to the license file and click **Open**.

A copy of the license file is transferred to the appliance.

6. In the **Add Symmetrix License** pane, select the Symmetrix system on which to install the license file, and click **Install License**.

Installing host-based licenses

Host-based licenses are used mainly to license features on Symmetrix systems running Enginuity versions lower than 5875. The one exception is the TimeFinder license, which is a host-based license, regardless of Enginuity level.

To install host-based licenses:

1. Open the vApp Manager.
2. Select **License Validation**.
3. Type the license key (requires four characters per input box) and click **Validate**.

APPENDIX A

Security features

This appendix provides a brief overview of the security features used to secure access to Unisphere for VMAX and Symmetrix systems. The Unisphere help system contains specific configuration procedures required to enable these features. References to those procedures are provided where appropriate.

- ◆ [Authentication](#) 60
- ◆ [Authorization](#) 60

Authentication

Unisphere for VMAX supports the following types of authentication:

- ◆ **Windows** (local and domain-based): Users log in by specifying the Windows domain, username and password (if they have a Windows account on the SMAS server).
- ◆ **LDAP**: Users login with their LDAP-SSL username and password (if they have a user account stored on a LDAP-SSL server).

To use this method, an Unisphere Administrator or SecurityAdmin must set up LDAP-SSL authentication in Unisphere. *Configuring authentication* in the Unisphere online help contains instructions.

- ◆ **Local Unisphere users**: Users login with their Unisphere username and password (if they have a local Unisphere user account).

To use this method, an Unisphere Initial Setup User, Administrator, or SecurityAdmin must create a local Unisphere user account for the user. Local user accounts are stored locally on the SMAS server host and work in much the same way as the other methods to validate user credentials. *Creating local directory users* in the Unisphere online help contains instructions.

Authorization

User authorization is a tool for restricting the management operations that users can perform on a Symmetrix system. By default, authorization rules on a Symmetrix system are enabled for Unisphere users, regardless of whether authorization has been enabled on the Symmetrix system.

When configuring user authorization, an **Administrator** or **SecurityAdmin** maps individual users or groups of users to specific roles, which determine the operations the users can perform.

The state of authorizations on a Symmetrix system determines the privileges an Initial Setup User will have on the system. The following details the relationship between the Initial Setup User and Symmetrix authorizations:

- ◆ If Symmetrix authorization is enabled, authorization rules are always enforced (meaning, the Initial Setup User could theoretically be locked out if no authorization rule exists for the user).
- ◆ If Symmetrix authorization is disabled and there are no authorization rules on the Symmetrix system, the Initial Setup User is granted Admin privileges.
- ◆ If Symmetrix authorization is disabled and there are no Admin or Security authorization rules on the Symmetrix system, the Initial Setup User is granted Admin privileges – other rules are enforced as defined.
- ◆ If Symmetrix authorization is disabled and Admin or Security Admin authorization rules are defined on the Symmetrix system, if the Initial Setup User does NOT have an authorization rule explicitly defined, the Initial Setup User will have NO permissions – all other rules are enforced as defined.

User roles

The following introduces the available roles. *Roles and their associated permissions* in the Unisphere online help provides more details on the permissions associated with each role.

- ◆ **None** — Provides no permissions.
- ◆ **Monitor** — Performs read-only (passive) operations on a Symmetrix system excluding the ability to read the audit log or Access Control definitions.
- ◆ **StorageAdmin** — Performs all management (active or control) operations on a Symmetrix system in addition to all Monitor operations. This role does not allow users to perform security operations.
- ◆ **Administrator** — Performs all operations on a Symmetrix system, including security operations in addition to all StorageAdmin and Monitor operations.
- ◆ **SecurityAdmin** — Performs security operations on a Symmetrix system in addition to all Monitor operations.
- ◆ **Auditor** — Grants the ability to view, but not modify, security settings for a Symmetrix system (including reading the audit log, symacl list, and symauth) in addition to all Monitor operations. This is the minimum role required to view the Symmetrix audit log.
- ◆ **Perf Monitor** — Performs the same operations as a monitor, with the addition of being able to set performance alerts and thresholds.

In addition to the above user roles, Unisphere includes an administrative role:

- ◆ **Unisphere Initial Setup User** — Defined during installation, this temporary role provides administrator-like permissions for the purpose of adding local users and roles to Unisphere. For more information on the Initial Setup User, see [“Initial Setup User” on page 14](#) or the online help.

Individual and group roles

Users gain access to a Symmetrix system or component either directly through a role assignment and/or indirectly through membership in a user group that has a role assignment.

User groups enable administrators to assign roles to multiple users simultaneously. User groups are created on the SMAS server according to its operating system and assigned roles with Unisphere.

If a user has two different role assignments (one as an individual and one as a member of a group), the permissions assigned to the user are combined. For example, if a user is assigned a **Monitor** role and a **StorageAdmin** role through a group, the user is granted **Monitor** and **StorageAdmin** rights.

User IDs

The following information details the SYMAPI format for user/role creation. This format appears in the footer bar of the Unisphere GUI, but not in the User/Role list view or creation wizard.

Users and user groups are mapped to their respective roles by IDs. These IDs consist of a three-part string in the form:

Type:Domain\Name

Where:

Type

Specifies the type of security authority used to authenticate the user or group. Possible types are:

- L Indicates a user or group authenticated by LDAP. In this case, *Domain* specifies the fully qualified name of the domain controller on the LDAP server. For example:

`L:danube.com\Finance`

Indicates that user group **Finance** logs in through domain controller **danube.com**.

After they have been configured, individual LDAP users and groups can log in to Unisphere using a simple username, or simple group name, respectively. An example is Finance.

- C Indicates a user or group is authenticated by the SMAS server. For example:

`C:Boston\Legal`

Indicates that user group **Legal** logs in through Unisphere sever **Boston**.

- H Indicates a user or group is authenticated by logging in to a local account on a Windows host. In this case, *Domain* specifies the hostname. For example, the following indicates that user **mason** logs in on host **jupiter**.

`H:jupiter\mason`

- D Indicates a user or group authenticated by a Windows domain. In this case, *Domain* specifies either the simple domain name (for individual users) or the fully qualified domain name (for groups). For example, the following indicates user **putman** logs in through Windows domain **sales**.

`D:sales\putman`

After they have been configured, individual Windows domain users can log in to Unisphere using a simple username. An example is putman. Group Windows domain users can log in to Unisphere using either a simple domain name and group name or a fully qualified domain name and group name.

V Indicates a user or group authenticated by a virtualization domain. In this case, *Domain* specifies the virtualization domain name.

Name Specifies the username relative to that authority. It cannot be longer than 32 characters and spaces are allowed if the username is delimited with quotes. Usernames can be for individual users or user groups.

Within role definitions, IDs can be either fully qualified (as above), partially qualified, or unqualified. When the *Domain* portion of the ID string is an asterisk (*), the asterisk is treated as a wildcard, meaning any host or domain.

Note: When configuring group access, the *Domain* portion of the ID must be fully qualified.

Examples:

D:ENG\jones	Fully qualified path with a domain and username (for individual domain users).
D:ENG.xyz.com\ ExampleGroup	Fully qualified domain name and group name (for domain groups).
D:*jones	Partially qualified that matches username jones with any domain.
H:HOST\jones	Fully qualified path with a hostname and username.
H:*jones	Partially qualified that matches username jones within any host.
jones	Unqualified username that matches any jones in any domain on any host.

If a user is matched by more than one mapping, the user authorization mechanism uses the more specific mapping:

- ◆ If an exact match (for example, D:sales\putman) is found, that is used.
- ◆ If a partial match (for example, D:*putman) is found, that is used.
- ◆ If an unqualified match (for example, putman) is found, that is used.
- ◆ Otherwise, the user is assigned a role of None.

APPENDIX B

Replacing the server certificate

This appendix explains how to replace the Unisphere self-signed certificate with a Certificate Authority signed (CA-signed) certificate.

- ◆ [Replacing the certificate.....](#) 66

Replacing the certificate

This procedure explains how to replace the Unisphere self-signed certificate with a CA-signed certificate in Windows and Linux environments.

Before you begin

Before starting this procedure, verify that you have the keystore password. The Unisphere installation program generates the password during the installation process in the following file:

Windows:

```
<InstallDirectory>\SMAS\jboss\standalone\configuration\standalone-f
ull.xml
```

Linux:

```
<InstallDirectory>/SMAS/jboss/standalone/configuration/standalone-f
ull.xml
```

Within the file, the password has the `KeystorePass` property, is not commented out, and has the following entry:

Windows: `keystoreFile="{jboss.server.home.dir}\conf\keystore`

Linux: `keystoreFile="{jboss.server.home.dir}/conf/keystore`

Step 1: Generating a certificate request

To generate a certificate request:

1. For **Windows**, enter the following:

```
cd <InstallDirectory>\jboss\standalone\configuration
<InstallDirectory>\jre\bin\keytool -certreq -alias tomcat -file tomcatcert.csr -keystore
Keystore
```

For Linux:

```
cd <InstallDirectory>/jboss/standalone/configuration
<InstallDirectory>/jre/bin/keytool -certreq -alias tomcat -file tomcatcert.csr -keystore
Keystore
```

2. When prompted, enter the keystore password.
3. Send the generated certificate request file, **tomcatcert.csr**, to your CA for validation. After the request file has been validated, you should receive a signed certificate back from CA.

Step 2: Importing a trusted certificate into the keystore (optional)

The keystore comes with a default set of trusted CAs. If your CA is not in the keystore's default trust chain, you must import a trusted certificate into the keystore to serve as the root for the trust chain.

To import a trusted certificate in **Windows**, enter the following command:

```
cd <InstallDirectory>\jboss\standalone\configuration
<InstallDirectory>\jre\bin\keytool -import -alias root -file Trusted_CA_cert_file -keystore
keystore -trustcacerts
```

For Linux:

```
cd <InstallDirectory>\jboss\standalone\configuration
<InstallDirectory>\jre\bin\keytool -import -alias root -file Trusted_CA_cert_file -keystore
keystore -trustcacerts
```

Note: If your CA is not in the keystore's default trust chain, and you complete [“Step 3: Importing the CA-signed certificate into the keystore” on page 67](#) without performing this optional step, the following error message appears:

“Failed to establish chain from reply”
YOU SHOULD BE VERY CAREFUL BEFORE IMPORTING A NEW TRUSTED CERTIFICATE.

If you see this error message, complete this step and repeat step 3.

Step 3: Importing the CA-signed certificate into the keystore

To import the CA-signed certificate into the keystore:

1. Stop the SMAS server. For instructions, refer to [“Starting and stopping the SMAS service” on page 26](#).
2. For **Windows**, enter the following command:

```
cd <InstallDirectory>\jboss\standalone\configuration
<InstallDirectory>\jre\bin\keytool -import -alias tomcat -file signed_certificate_file
-keystore keystore -trustcacerts
```

For Linux:

```
cd <InstallDirectory>/jboss/standalone/configuration
<InstallDirectory>/jre/bin/keytool -import -alias tomcat -file signed_certificate_file
-keystore keystore -trustcacerts
```

3. When prompted, enter the keystore password.
4. Start the SMAS server.

APPENDIX C

Configuring SMAS to work in z/OS

This appendix describes how to configure the Symmetrix Management Application Server to work in a z/OS environment.

- ◆ [Configuring SMAS to work in z/OS.....](#) 70

Configuring SMAS to work in z/OS

These instructions apply to VMAX 20K or VMAX 40K Family systems running Enginuity 5876 or higher. Unisphere must be running on a qualified open system server that points to an API server that is running on a mainframe logical partition (LPAR).

To configure SMAS to work in a z/OS environment:

1. Shut down the services as described in [“Starting and stopping the SMAS service” on page 26](#).
2. Do the following on the mainframe side:
 - a. Install Solutions Enabler 7.5 or a later release on your LPAR. Refer to the *EMC Solutions Enabler Installation Guide* for instructions.
 - b. Start the API server on the LPAR.
3. Do the following on the qualified open system server:
 - a. Make the following changes in the file called `daemon_option`, which is located under `/var/symapi/config` on Linux or `UNIVMAX_HOME\EMC\symapi\config` on Windows:
 - Enable the `DMN_REMOTE_MODE` parameter.
 - Set the `DMN_REMOTE_ADDRESS` parameter to the mainframe IP address.
 - b. Start the STP daemon (`storstd`).
 - c. Modify the `ejb-jar.xml` file by removing the comments for the section. The `ejb-jar.xml` file is found in these locations:

- For Linux:

```
/opt/emc/SMAS/jboss/standalone/deployments/spa.ear/spa-ejb.jar/META-INF/
```

- For Windows:

```
C:\Program Files\EMC\SMAS\jboss\standalone\deployments\spa.ear\spa-ejb.jar\META-INF
```

```
<service>
  <ejb-name>SpaStpdConfig</ejb-name>
  <ejb-class>com.emc.em.spa.service.SpaStpdConfig</ejb-class>
  <env-entry>
    <env-entry-name>Stpd_ConnectionType</env-entry-name>
    <env-entry-type>java.lang.String</env-entry-type>
    <env-entry-value>SYMAPI_CONN_TYPE_LOCAL</env-entry-value>
  </env-entry>
  <env-entry>
    <env-entry-name>Stpd_NodeName</env-entry-name>
    <env-entry-type>java.lang.String</env-entry-type>
    <env-entry-value>localhost</env-entry-value>
  </env-entry>
</service>
```

1. Restart the services as described in [“Starting and stopping the SMAS service” on page 26](#).
2. Launch the Unisphere for VMAX console using a secure port. For example:

```
https://xxx:8443/
```

where `xxx` is the IP address or name of the qualified host.

APPENDIX D

Third-party copyright notices

This appendix contains third-party copyright notices.

◆ GNU LESSER GENERAL PUBLIC LICENSE	71
◆ MySQL	71
◆ OpenSSL copyright information	71
◆ Apache Axis 1.2 and Apache Multipart parser	72
◆ MIT XML Parser	72
◆ JBoss, Home of Professional Open Source	73
◆ Parsley 2.4	73
◆ GraniteDS 2.3	73
◆ PurePDF	74

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