

Dell EMC™ Virtual Appliance Manager

Version 9.0

Installation Guide

REV 01

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Preface

As part of an effort to improve its product lines, Dell 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 Dell 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 Dell EMC Online Support (<https://support.emc.com>). Check to ensure that you are using the latest version of this document.

Purpose

This document describes how to install:

- Solutions Enabler virtual appliance
- Unisphere for PowerMax virtual appliance
- VASA Provider virtual appliance

Audience

This document is intended for customer who are installing Virtual Appliance (vApp) Manager.

Related documentation

The following Dell EMC publications provide additional information related to vApp Manager:

- *Dell EMC Solutions Enabler Installation Guide*
- *Dell EMC Unisphere for PowerMax Installation Guide*
- *Dell EMC Unisphere for PowerMax Release Notes*
- *Dell EMC Solutions Enabler Release Notes*
- *Dell EMC VASA Provider Release Notes*

Special notice conventions used in this document

Dell EMC uses the following conventions for special notices:



Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE

Addresses practices not related to personal injury.

Note

Presents information that is important, but not hazard-related.

Typographical conventions

Dell EMC uses the following type style conventions in this document:

Table 1 Typographical conventions used in this content

Bold	Used for names of interface elements, such as names of windows, dialog boxes, buttons, fields, tab names, key names, and menu paths (what the user specifically selects or clicks)
<i>Italic</i>	Used for full titles of publications referenced in text
Monospace	Used for: <ul style="list-style-type: none"> • System code • System output, such as an error message or script • Pathnames, filenames, prompts, and syntax • Commands and options
<i>Monospace italic</i>	Used for variables
Monospace bold	Used for user input
[]	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

Dell EMC support, product, and licensing information can be obtained as follows:

Product information

For documentation, release notes, software updates, or information about Dell EMC products, go to Dell EMC Online Support at <https://support.emc.com>.

Technical support

To open a service request through the Dell EMC Online Support (<https://support.emc.com>) site, you must have a valid support agreement. Contact your Dell EMC sales representative for details about obtaining a valid support agreement or to answer any questions about your account.

eLicensing support

To activate your entitlements and obtain your VMAX license files, visit the Service Center on Dell EMC Online Support (<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 Dell EMC Account Representative or Authorized Reseller.
- For help with any errors applying license files through Solutions Enabler, contact the Dell 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 Dell 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.

Your comments

Your suggestions help us improve the accuracy, organization, and overall quality of the documentation. Send your comments and feedback to:

VMAXContentFeedback@emc.com

Revision history

The following table lists the revision history of this document.

Table 2 Revision history

Revision	Date	Description
01	March 2018	First release of Dell EMC Virtual Appliance Manager Installation Guide, Version 9.0

Revision history

CHAPTER 1

Overview

This chapter provides an overview of the Virtual Appliance Installation Guide. Topics include:

- [Overview](#) 14

Overview

Virtual Appliance (vApp) Manager provides the ability to manage and configure the storage environment. vApp Manager supports:

- Solutions Enabler
- Unisphere for PowerMax
- VASA Provider
- Guest OS
- Embedded Management

This guide provides installation information for Solutions Enabler, Unisphere for PowerMax, and VASA Provider Virtual Appliance instances. The Guest OS and Embedded Management Virtual Appliances are pre-installed at the factory.

CHAPTER 2

Installing the Solutions Enabler Virtual Appliance

This chapter explains how to install the Solutions Enabler Virtual Appliance in a VMware infrastructure environment. Topics include:

- [Introduction](#)..... 16
- [Before you begin](#)..... 17
- [Installing the virtual appliance directly to the ESX Server](#)..... 17
- [Installing the virtual appliance through a vCenter Server](#)..... 21
- [Installing the virtual appliance using OVFTOOL](#)..... 23
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Introduction

The Solutions Enabler Virtual Appliance is a VMware ESX server virtual machine that provides all the components you need to manage the storage environment using the `storsrvd` daemon and Solutions Enabler network client access. Components include:

- Dell EMC Solutions Enabler V9.0 (solely intended as a SYMAPI server for Solutions Enabler client access)
- Linux OS (SUSE 11 SP3 JeOS)
- SMI-S Provider V9.0

In addition, the Solutions Enabler Virtual Appliance includes a browser-based console that is called Dell EMC vApp Manager for Solutions Enabler to configure the storage environment. vApp Manager enables you to perform the following configuration tasks:

- Monitor the application status
- Start and stop selected daemons
- Download persistent data
- Configure the `nethost` file (required for client access)
- Discover storage arrays
- Modify options and daemon options
- Add array-based and host-based license keys
- Run a limited set of Solutions Enabler CLI commands
- Configure ESX host and gatekeeper devices
- Launch Unisphere for PowerMax (available only in Unisphere versions of the appliance console)
- Configure iSCSI initiator and map iSCSI gatekeeper devices
- 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 array-based eLicenses
- Enable SSH
- Configure LDAP
- Manager users
- Reset hostname
- Update `etc/hosts`

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

Root login is not supported on the SUSE 11 virtual machine.

Before you begin

Before you begin to install the Solutions Enabler Virtual Appliance, be sure to complete the tasks that are listed in this section:

Procedure

1. Verify that you are installing the latest version of the appliance by checking the Dell EMC Support website for updates.
2. Verify that the client is running:
 - VMware vSphere Client
 - Any of the following browsers with cookies and JavaScript enabled:
 - Internet Explorer 9.0 through 11.0 (Desktop only)
 - Firefox 30 or later
 - Chrome 21.0.1180 or later

Browsers should have Flash Player 11.2 plug-in installed. If the browser has an older version of Flash Player, you are prompted to download the latest version when you start the web console.
3. Verify that the VMware ESX Server meets the following minimum requirements:
 - Version 4.0 or later
 - Dual disk. 16 GB of disk space and another 5 GB (expandable) disk space
 - 2GB memory
 - One CPU

Installing the virtual appliance directly to the ESX Server

This section describes how to install the Solutions Enabler Virtual Appliance directly to the ESX Server.

Note

When deploying the Virtual Appliance using command line via OVF, or while adding an ESX server in vApp Manager, ensure that the ESX name is specified with the exact case as it is registered in the DNS otherwise, the operation fails.

Step 1: Import the virtual appliance

To import the virtual appliance:

Procedure

1. Download the OVF archive file (*.ova) containing the installation program from Dell EMC Support to a temporary directory.
2. Start the vSphere Client and log in to the ESX Server on which you are installing 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, which is located in the temporary directory you created earlier. Select the OVF archive file with the suffix `*vappxxx_xxx_OVF10.ova`.
6. Click **Next**.
7. On the **Details** page, verify the details about the appliance and click **Next**.
8. On the **End User License Agreement** page, select **Accept all license agreements** and click **Next**.
9. On the **Name and Location** page, specify a name for the appliance and click **Next**.
10. If a resource pool is available, the **Resource Pool** page displays. Select the resource pool of the choice and click **Next**. Otherwise, the **Resource Pool** page is skipped.
11. On the **Datastore** page, select the data store of the choice and click **Next**.
12. On the **Disk Format** page, select the format in which to store the virtual machine's virtual disks and click **Next**.
13. On the **Network Mapping** page, map the source network to the appropriate destination network.
14. On the **Ready to Complete** page, verify the information and click **Finish**.
15. In the Completed Successfully message, click **Close**.
16. Continue with [Step 2: Select gatekeepers](#) on page 19 next.

Installing the virtual appliance through an ESXi server vSphere web client (6.5 and above)

To install the virtual appliance:

Procedure

1. Start the ESXi web client and log in to the ESX Server on which you are installing the appliance.
2. From the **Navigator** panel, select **Host > Create/Register VM**
The **New virtual machine** window appears.
3. From the **Select creation type** window, select **Deploy a virtual machine from an OVF or OVA file**.
4. Click **Next**.
The **Select OVF and VMDK files** window appears.
5. Type a name for the virtual machine and select the OVF or OVA file to deploy.
6. Click **Next**.
7. The **Select storage** window appears.
Select the data store from the list that is provided and click **Next**.
8. The **License agreement** window appears.
Read and accept the license agreement.
9. Click **Next**.
10. The **Deployment options** window appears.
Select deployment options and click **Next**.

11. The **Additional settings** window appears.
Type the requested **Application** and **Network Properties** information and click **Next**.
12. The **Ready to complete** window appears.
Review the details and click **Finish** to deploy the virtual machine.

Step 2: Select gatekeepers

Present uniquely defined gatekeepers by way of raw device mappings (RDM). For instructions, refer to the appropriate VMware documentation.

Solutions Enabler manages storage arrays through gatekeeper devices that are mapped to the virtual appliance as RDM pass-through devices. The management is done through Dell 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

Gatekeepers can be added using vApp Manager. For ESX V4.0 and earlier, vApp Manager does not allow more than 14 gatekeeper volumes to be added to the virtual appliance. Trying to add more than 14 gatekeepers returns an error message. For detailed information, refer to vApp Manager online help.

Continue with [Step 3: Power on and configure the Virtual Appliance](#) on page 19 .

Step 3: Power on and configure the Virtual Appliance

To power on and configure the Virtual Appliance:

Procedure

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 prompts, type static IP configuration information:

```
Please select your static network configuration.
For IPv4: Enter 1
For IPv6: Enter 2
Enter your choice [1]/2:
```

Please enter static IP configuration:

- IP Address []:
Type the address that is assigned to the appliance, and then type **y** when asked to Confirm [y]/n and continue with the configuration.

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 will be running, and then type **y** when asked to `Confirm [y]/n` and continue with the configuration.

- `Gateway []:`
Type the gateway address to the network on which the appliance will be running, and then type **y** when asked to `Confirm [y]/n` and continue with the configuration.
- `DNS1 []:`
Type the first DNS server address, and then type **y** when asked to `Confirm [y]/n` and continue with the configuration.
- `DNS2 []:`
Type the second DNS server address, and then type **y** when asked to `Confirm [y]/n` and continue with the configuration.
- `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.

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**.

The time zone is now set.

5. At the following prompt, specify whether you want to type 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 Configuration Manager to type the host ESX Server details at a later time. For instructions, refer to the Configuration 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**. When prompted for the root password, type the root password of the ESX Server and confirm it by typing it again.

A Welcome screen displays. You have now finished installing the Solutions Enabler Virtual Appliance.

6. Continue with [Launching vApp Manager](#) on page 25.

Installing the virtual appliance through a vCenter Server

This section describes how to install the Solutions Enabler Virtual Appliance through a vCenter Server 4.0 and later.

Step 1: Import and configure the virtual appliance

To import and configure the virtual appliance:

Procedure

1. Download the OVF archive file (*.ova) containing the installation program from Dell EMC Support to a temporary directory.
2. Start the vSphere Client and log in to the vCenter Infrastructure Server through which you are installing the virtual appliance.
3. Click **Ignore** in the security warning message.
4. From the navigation tree, select the ESX Server on which you are installing the virtual appliance.
5. From the **File** menu, select **Deploy OVF Template**.
6. Browse to the OVF archive file, which is 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 **Details** page, verify the details about the appliance and click **Next**.
9. On the **End User License Agreement** page, select **Accept all license agreements** and click **Next**.
10. On the **Name and Location** page, specify a name for the appliance and click **Next**. It is recommended that you name the appliance with the same fully qualified hostname of the virtual appliance.
11. Select the host/cluster to run the virtual appliance.
12. If a resource pool is available, the **Resource Pool** page displays. Select the resource pool of your choice and click **Next**. Otherwise, the **Resource Pool** page is skipped.
13. On the **Datastore** page, select the data store of your choice and click **Next**.
14. On the **Network Mapping** page, map the source network to the appropriate destination network.
15. 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

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.

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

- Proxy Server: Type the IP address of the proxy server and port. For example:

ProxyServer-IP:Port

- ESX Server Name: Type the fully qualified ESX Server hostname.
- ESX Server Password: Type the ESX Server password in base64 encryption format.

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

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

18. Continue with [Step 2: Select gatekeepers](#) on page 23 next.

Installing the virtual appliance through a vCenter server vSphere web client (6.5 and above)

To install the virtual appliance:

Procedure

1. Start the vSphere web client and log in to the vCenter server on which you are installing the appliance.
2. From the **Navigator** panel, right-click the vCenter name and select **Deploy OVF Template**.

The **Deploy OVF Template** window appears.

3. From the **Select template** window, select **Local file** and click **Browse**.

Browse to the file and click **Next**.

4. The **Select name and location** window appears.

Type a name for the OVF and select a deployment location.

5. Click **Next**.

6. The **Select a resource** window appears.

Select where to run the deployment template from the list that is provided in the **Browse** tab and click **Next**.

7. The **Review details** window appears.

Verify the template details and click **Next**.

8. The **Accept license agreements** window appears.

Read and accept the license agreement.

9. Click **Next**.

10. The **Select storage** window appears.

Populate the **Select virtual disk format** and **VM storage policy** options from the drop-down boxes. In the **Datastores** tab, select the location to store the files from the deployed template and click **Next**.

11. The **Select networks** window appears.
Select a destination network for each source network from the drop-down list. From the **IP Allocation Settings** panel, select the **IP protocol** from the drop-down list and click **Next**.
12. The **Customize template** window appears.
Type the requested information and click **Next**.
13. The **Ready to complete** window appears.
Review the details and click **Finish**.

Step 2: Select gatekeepers

Procedure

1. Select gatekeepers as described in [Step 2: Select gatekeepers](#) on page 19.
You can configure the virtual appliance to add two gatekeeper devices per storage array when it firsts boots up. For instructions, refer to [Step 10](#).
2. Continue with [Step 3: Power on the virtual appliance](#) on page 23 next.

Step 3: Power on the virtual appliance

To power on and configure the Virtual Appliance:

Procedure

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 appears. You have now finished installing the Solutions Enabler Virtual Appliance.
3. Continue with [Launching vApp Manager](#) on page 25.

Installing the virtual appliance using OVFTOOL

Solutions Enabler Virtual Appliance can be installed through command line from any Linux host. This section how to install the virtual appliance using OVFTOOL.

To install Solutions Enabler Virtual Appliance using OVFTOOL, the following are required:

- vCenter Server 4.0 and above.
- ESX Server 4.0 and above managed by vCenter Server 4.x.
- OVFTOOL 1.0 and above.

Note

Please 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 Setup the vCenter Server.

2. Add the ESX Server to the vCenter Server data center.
3. Install VMware OVFTOOL on a Linux host.
4. Move the Solutions Enabler Virtual Appliance kit to the above host.
5. Run the ovftool command with necessary command line switches. For more information about using the command, refer to [Using OVFTOOL](#) on page 24.
6. The Solutions Enabler Virtual Appliance is installed and powered on automatically.
7. Continue with [Launching vApp Manager](#) on page 25.

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>
    
```

Where:

<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 devices during virtual appliance boot, VM Displayname to be same as fully qualified hostname of Virtual Appliance.
<DATASTORE>	Name of the data store attached to ESX Server. Required only if more than one data store is attached to ESX Server.

<VM Network Port Group>	VM network port group. If both NIC cards must be in different network, then the VM Network port group must 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 vApp Manager

After the vApp is deployed, complete the following the steps to launch vApp Manager:

Procedure

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

```
https://appliance_ip:5480
```

or

```
https://appliance_host_name:5480
```

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

Note

You are required to change the password from vApp Manager on first login. vApp Manager can also be configured to use LDAP for user authentication. For more information about LDAP, refer to the vApp Manager online help.

Updating the Solutions Enabler Virtual Appliance

Periodically, Dell EMC releases security patches and hot-fixes for the Solutions Enabler Virtual Appliance. These patches and fixes are available on the Dell EMC Support website, in ISO images.

Updating from an ISO image

This procedure explains how to upgrade the virtual appliance to V9.0.

The following requirement applies in instances where SRDF Metro vWitness is configured: If you are performing a HYPERMAX OS upgrade that includes an eManagement Solutions Enabler upgrade, ensure that you upgrade the Solutions Enabler vApp before upgrading the eManagement Solutions Enabler version. The Solutions Enabler version of the vApp, which runs the vWitness lock service

(`storvwlscd`), must be the same or higher than the Solutions Enabler version of the eManagement vApp, which runs the vWitness manager service (`storvwmd`).

To update an existing Virtual Appliance from an ISO image:

Procedure

1. Upload the ISO image into the ESX Server using the VI client:
 - a. Login to the ESX Server using the VI client.
 - b. Select the ESX Server on the left panel.
 - c. Select the **Configuration** tab on the right panel.
 - d. Select **Hardware > Storage** to list the datastores that are connected to the ESX Server.
 - e. Right-click the data store and select **Browse Datastore**.
The **Datastore Browser** window displays.
 - f. Upload the appliance update ISO file.
 - g. Exit the dialog box.
2. Mount the ISO image on the virtual appliance CD drive:
 - a. Right-click the virtual appliance and select **Edit Settings**.
 - b. On the **Hardware** tab, select **CD/DVD Drive 1**.
 - c. In the right panel, select **Datastore ISO File**, and click **Browse** to locate the ISO image in the data store.
 - d. Select **Device Status > Connected**.
 - e. Click **OK** to exit the dialog box.
3. Update the appliance:
 - a. On the **Console** tab, go to the virtual appliance console.
 - b. Use the Move Up/Down keys and select **Appliance Update**.
 - c. Press **Enter** to perform the update.

The update will take approximately 10 minutes, after which the screen returns to the main console.

Note

Use the welcome screens of the vApp and the vApp Manager to confirm that your virtual appliance has been updated correctly.

Deleting the Solutions Enabler Virtual Appliance

To delete the Solutions Enabler Virtual Appliance:

Procedure

1. In the vApp Manager interface, backup the persistent data.
2. In the VMware management interface, power off the appliance.
3. Right-click the appliance and select **Delete from Disk**.

4. Click **Yes** in the confirmation message.

CHAPTER 3

Installing the Unisphere for PowerMax Virtual Appliance

This chapter explains how to install the Unisphere for PowerMax Virtual Appliance in a VMware infrastructure environment. Topics include:

- [Introduction](#)..... 30
- [Before you begin](#).....31
- [Installing the virtual appliance directly on the ESX Server](#)..... 31
- [Installing the virtual appliance through a vCenter Server](#) 37
- [Installing the virtual appliance using OVFTOOL](#).....40
- [Launching Unisphere or the vApp Manager](#)44
- [Upgrading the Unisphere Virtual Appliance using an ISO image](#)..... 45
- [Re-configuring the virtual appliance IP address](#).....47
- [Deleting the Unisphere for PowerMax Virtual Appliance](#)..... 49
- [Backing up and restoring the performance database](#).....49
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Introduction

The Unisphere for PowerMax Virtual Appliance is a VMware ESX Server virtual appliance that provides all of the components you need to manage the PowerMax environment using the `storsrvd` daemon and Solutions Enabler network client access. Components include:

- Dell EMC Unisphere for PowerMax V9.0.
- Dell EMC Solutions Enabler V9.0 (solely intended as a SYMAPI server for Solutions Enabler client access).
- Linux OS (SUSE 11 SP3).
Root login is not supported on SUSE 11 SP3 virtual machines.
- SMI-S Provider V9.0, including ECOM.

In addition, the appliances include a browser-based console to configure the storage environment. The Unisphere for PowerMax vApp Manager enables you to perform configuration tasks not available in the appliances directly. Using this console, you can perform the following tasks:

- Launch Unisphere
- Monitor the application status
- Start and stop selected daemons
- Download 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 PowerMax-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
- Clear temporary files
- Restart appliance
- Configure symavoid entries
- Enable SSH
- Manage users
- Reset hostname
- Update `/etc/hosts` file

For information on using the Unisphere for PowerMax vApp Manager, refer to its online help.

Before you begin

Before you begin to install Unisphere for PowerMax Virtual Appliance, carry out the tasks in this section.

- Verify that you are installing the latest version of the appliance by checking the Dell EMC Support website for updates.
- Verify that the client is running:
 - VMware vSphere client
 - One of the following browsers with cookies and Javascript enabled:
 - Internet Explorer 9.0 through 11.0 (Desktop only)
 - Firefox 30 or later
 - Chrome 21.0.1180 or later
- Verify that the virtual machine is not running shared memory/resources.
- Verify that the VMware ESX Server meets the following minimum requirements:

Table 3 Unisphere for PowerMax Virtual Appliance VMware ESX Server requirements

ESX Server component	Requirement
Processor	Dual-core or two CPUs
ESX Server version	4.0 or later
Disk space	120 GB
Memory	16GB for exclusive use by Unisphere for PowerMax

Note

If you are upgrading to V9.0, the available memory is checked as part of the upgrade operation. If the requirement is not met, the upgrade is canceled.

Installing the virtual appliance directly on the ESX Server

This section describes how to install the Unisphere for PowerMax Virtual Appliance directly on the ESX Server.

Step 2 has three configuration options, depending on the virtual appliance network connection:

- IPv4 only — [Step 2A: Powering on and configuring the virtual appliance \(IPv4 only\)](#) on page 33.
Use this option if the DNS server does not support IPv6 hostnames or the DNS/ESX server is configured on an IPv4-only network.
- IPv6 only — [Step 2B: Powering on and configuring the virtual appliance \(IPv6 only\)](#) on page 34.

Use this configuration if the network configuration for the virtual appliance is IPv6 only. The virtual appliance is not able to communicate with an IPv4 host unless IPv6 packets are encapsulated inside IPv6 packets using tunneling.

- Dual stack — [Step 2C: Powering on and configuring the virtual appliance \(Dual stack\)](#) on page 35.

Use this configuration if the system is configured for both IPv4 and IPv6. The system supports both formats but IPv6 addresses are used for configuring the vApp Manager, SMAS and storsrvd. An IPv4 address is used only for reaching IPv4 DNS and ESX servers.

Step 1: Installing the virtual appliance

To install the virtual appliance:

Procedure

1. On the Dell EMC Support website:
 - a. Click **Support By Product** in the main navigation bar.
 - b. In the Find a Product box, type `Unisphere for PowerMax` 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 PowerMax Virtual Appliance` file name: `univmaxpa900_x_suse11_x86_64_vappxxx_xxx_OVF10.ova` Where `x` in `900_x` represents the build number. That number varies depending 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, which is located in the temporary directory you created earlier. Select the OVF archive file with the suffix `*vappxxx_xxx_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 Storage page, configure the storage options available and click **Next**.
11. On the Disk Format page, select the format in which to store the virtual machine's virtual disks and click **Next**.
12. On the Network Mapping page, select the network that you want the virtual appliance to use and click **Next**.
13. On the Ready to Complete page:
 - a. Verify the information.
 - b. (Optional) Select **Power on after deployment**.
 - c. Click **Finish**.
14. In the Completed Successfully message, click **Close**.

Installing the virtual appliance through an ESXi server vSphere web client (6.5 and above)

To install the virtual appliance:

Procedure

1. Start the ESXi web client and log in to the ESX Server on which you are installing the appliance.
2. From the **Navigator** panel, select **Host > Create/Register VM**
The **New virtual machine** window appears.
3. From the **Select creation type** window, select **Deploy a virtual machine from an OVF or OVA file**.
4. Click **Next**.
The **Select OVF and VMDK files** window appears.
5. Type a name for the virtual machine and select the OVF or OVA file to deploy.
6. Click **Next**.
7. The **Select storage** window appears.
Select the data store from the list that is provided and click **Next**.
8. The **License agreement** window appears.
Read and accept the license agreement.
9. Click **Next**.
10. The **Deployment options** window appears.
Select deployment options and click **Next**.
11. The **Additional settings** window appears.
Type the requested **Application** and **Network Properties** information and click **Next**.
12. The **Ready to complete** window appears.
Review the details and click **Finish** to deploy the virtual machine.

Step 2A: Powering on and configuring the virtual appliance (IPv4 only)

When configuring a virtual appliance, for each prompt, type the information that is requested, press **Enter**, and then confirm that the information you entered is correct.

To power on and configure the IPv4-only virtual appliance:

Procedure

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. When prompted to do so, configure an IPv4 IP address:

```
Please select your static network configuration.
For IPv4: Enter 1
For IPv6: Enter 2
Enter your choice [1]/2:
```

Select IPv4. The following information is requested:

- IP Address []:
Type the address that is assigned to the appliance and then type **y** to continue with the configuration.
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 then type **y** to continue with the configuration.
- Gateway []:
Type the gateway address to the network on which the appliance is located and then type **y** to continue with the configuration.
- DNS1 []:
Type the IP address of the first DNS server and then type **y** to continue with the configuration.
- DNS2 []:
Type the IP address of the second DNS server and then type **y** to continue with the configuration.
- Is a proxy server necessary to reach the internet? **y/n** [n]:
Type **y** to configure a proxy server. For each of the following prompts, type the information that is requested, press **Enter**:
 - ProxyServer []:
Type the IP address of the proxy server and press **Enter**.
 - ProxyPort []:
Type the proxy port and press **Enter**.
Type **n** to continue the configuration without configuring a proxy server.
- Do you want to set the timezone? **y/[n]** :
Type **y** to set the time zone. For each of the prompts, type the information that is requested, press **Enter**.
- Do you want to set host esx server? **y/[n]** :
Type **y** to set the ESX Server. For each of the prompts, type the information that is requested, press **Enter**.
You have now finished installing the Unisphere Virtual Appliance.

4. Continue with **Step 3: Adding gatekeepers**.

Step 2B: Powering on and configuring the virtual appliance (IPv6 only)

When configuring a virtual appliance, for each prompt, type the information that is requested, press **Enter**, and then confirm that the information you entered is correct.

In an IPv6-only configuration, any DNS configured has IPv6 addresses. If you want to use one or more DNS servers with IPv4 addresses, see [Step 2C: Powering on and configuring the virtual appliance \(Dual stack\)](#) on page 35.

To power on and configure the IPv6-only virtual appliance:

Procedure

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. When prompted to do so, configure an IPv6 IP address:

```
Please select your static network configuration.
For IPv4: Enter 1
For IPv6: Enter 2
Enter your choice [1]/2:
```

Select IPv6. The following information is requested:

- IP Address []:
Type the IPv6 address that is assigned to the appliance.
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.
- Prefix []:
Type the prefix length of the network on which the appliance is located.
- Gateway []:
Type the gateway address to the network on which the appliance is located.
- DNS1 []:
Type the IPv4/IPv6 address of the first DNS server of the network on which the appliance is located.
- DNS2 []:
Optional: Type the IPv4/IPv6 address of the second DNS server of the network on which the appliance is located.

Note

If neither of the configured DNS values are IPv4, the vApp is configured with a pure IPv6 network configuration. You cannot revert to a dual-stack network configuration at a later time.

You have now finished installing the Unisphere Virtual Appliance.

4. Continue with [Step 3: Adding gatekeepers](#) on page 37.

Step 2C: Powering on and configuring the virtual appliance (Dual stack)

When configuring a virtual appliance, for each prompt, type the information that is requested, press Enter, and then confirm that the information you entered is correct.

In a dual stack configuration, one or more of the DNS servers that are configured has an IPv4 address. If you want to use only DNS servers with IPv6 addresses, see [Step 2B: Powering on and configuring the virtual appliance \(IPv6 only\)](#) on page 34.

To power on and configure the dual stack virtual appliance:

Procedure

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. When prompted to do so, specify whether you want to configure an IPv4 or an IPv6 IP address:

```
Please select your static network configuration.  
For IPv4: Enter 1  
For IPv6: Enter 2  
Enter your choice [1]/2:
```

Select IPv6. The following information is requested:

- **Does your DNS server configured supports IPv6 hostnames? y/ [n] :**
To continue, type **y**. If you type **n**, configuration cancels.
- **IP Address []:**
Type the IPv6 address that is assigned to the appliance.
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.
- **Prefix []:**
Type the prefix length of the network on which the appliance is located.
- **Gateway []:**
Type the gateway address to the network on which the appliance is located.
- **DNS1 []:**
Type the IPv6 address of the first DNS server of the network on which the appliance is located.
- **DNS2 []:**
*Optional:*Type the IPv6 address of the second DNS server of the network on which the appliance is located.
You have now finished installing the Unisphere Virtual Appliance.

4. If you entered an IPv4 IP address for one or more DNS servers, you are prompted to specify additional IPv4 configuration information for those DNS servers:
 - **IPv4 Address []:**
Type the IPv4 address that is assigned to the appliance.
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.
 - **Gateway []:**
Type the gateway address to the network on which the appliance is located.
 - **Is a proxy server necessary to reach the internet? y/n [n] :**
Type **y** to specify the IP address of the proxy server and the port.
Type **n** to continue the configuration without configuring a proxy server.

- *Optional: ESX Server Name []:*
Type the fully qualified ESX Server hostname.
 - *Optional: ESX Server Password []:*
Type the ESX Server password in base64 encryption format.
- You have now finished installing the Unisphere Virtual Appliance.

5. Continue with **Step 3: Adding gatekeepers**.

Step 3: Adding gatekeepers

Solution Enabler manages storage arrays through gatekeeper volumes that are mapped to the virtual appliance as RDM pass-through volumes. The management is done through Dell 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.

Unisphere for PowerMax requires gatekeepers. For specific recommendations on the number of gatekeepers that are required for all array configurations, refer to Dell EMC Knowledgebase Solution emc255976 available on the Dell EMC Support website. To power on and configure the dual stack virtual appliance:

Procedure

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, restart the SMC daemon through the vApp Manager.

Note

For ESX V4.0 and earlier, vApp Manager does not allow more than 14 gatekeeper volumes to be added to the Virtual Appliance. Trying to add more than 14 gatekeepers returns an error message.

- 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 44.

Installing the virtual appliance through a vCenter Server

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

Step 1: Configuring the virtual appliance

To configure the virtual appliance:

Procedure

1. On the Dell EMC Support website:

- a. Click **Support By Product** in the main navigation bar.
- b. In the **Find a Product** field, type **Unisphere for PowerMax** 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 PowerMax Virtual Appliance file name:
univmaxpa900_x_suse11_x86_64_vapp_OVF10.ova

Note

In the file name above, the x in 900_x represents the build number. That number varies 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, which is 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. If the resource pool is available, select it; otherwise, continue with this procedure.
12. If more than one data store is attached to the ESX Server, select the data store for the appliance; otherwise, continue with this procedure.
13. On the Network Mapping page, select the network that you want the virtual appliance to use and click **Next**.
14. On the Storage page, configure the storage options that are presented and click **Next**.
15. On the Disk Format page, configure the disk format options that are presented and click **Next**.
16. On the Properties page, provide valid values for and confirm the following OVF properties:

IP Address

Type the IPv4 or IPv6 address to be assigned to eth0.

Netmask or Prefix

Type the netmask (IPv4 only) or prefix (IPv6 only) of the network on which the virtual appliance is located.

Gateway

Type the gateway address to the network on which the appliance is located.

IPv4 Address for dual stack [Optional]

IPv4 address for dual stack.

IPv4 Netmask for dual stack [Optional]

IPv4 netmask address for dual stack.

IPv4 Gateway for dual stack [Optional]

IPv4 gateway for address for dual stack.

DNS Server 1

Type the DNS address of the network on which the appliance is located.

DNS Server 2

Optional: Type the DNS address of the network on which the appliance is located.

Timezone

Optional: Select the appropriate time zone.

Proxy Server

Optional: Type the IP address of the proxy server and port. For example:

`proxy_server_IP:port_number`

Optional: ESX Server Name

Type the fully qualified ESX Server hostname.

Optional: ESX Server Password

Type the ESX Server password in base64 encryption format.

Ignore the Network Properties section that appears in vSphere V5.0 and later. Click **Next**.

17. On the **Ready to Complete** page, verify the information and click **Finish**.
18. In the **Completed Successfully** dialog box, click **Close**.

Installing the virtual appliance through a vCenter server vSphere web client (6.5 and above)

To install the virtual appliance:

Procedure

1. Start the vSphere web client and log in to the vCenter server on which you are installing the appliance.
2. From the **Navigator** panel, right-click the vCenter name and select **Deploy OVF Template**.

The **Deploy OVF Template** window appears.

3. From the **Select template** window, select **Local file** and click **Browse**.

Browse to the file and click **Next**.

4. The **Select name and location** window appears.

Type a name for the OVF and select a deployment location.

5. Click **Next**.

6. The **Select a resource** window appears.

Select where to run the deployment template from the list that is provided in the **Browse** tab and click **Next**.

7. The **Review details** window appears.
Verify the template details and click **Next**.
8. The **Accept license agreements** window appears.
Read and accept the license agreement.
9. Click **Next**.
10. The **Select storage** window appears.
Populate the **Select virtual disk format** and **VM storage policy** options from the drop-down boxes. In the **Datastores** tab, select the location to store the files from the deployed template and click **Next**.
11. The **Select networks** window appears.
Select a destination network for each source network from the drop-down list. From the **IP Allocation Settings** panel, select the **IP protocol** from the drop-down list and click **Next**.
12. The **Customize template** window appears.
Type the requested information and click **Next**.
13. The **Ready to complete** window appears.
Review the details and click **Finish**.

Step 2: Powering on the virtual appliance

To power on the virtual appliance:

Procedure

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](#) on page 40.

Step 3: Selecting gatekeepers

Select gatekeepers as described in [Step 3: Adding gatekeepers](#) on page 37.

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.

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

To install the virtual appliance using OVFTOOL:

Note

When deploying the virtual appliance using the command line through OVF or while adding an ESX server in vApp Manager, specify the ESX name using the exact letter case used when it was registered in the DNS. Otherwise, the deployment fails.

Procedure

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 PowerMax Virtual Appliance kit to the same Linux host.
5. Run the ovftool command with necessary command line switches.

For more information about using the command, refer to [Using OVFTOOL](#) on page 41. Unisphere for PowerMax Virtual Appliance is installed and powered on automatically.

6. Add gatekeepers.
7. Continue with [Launching Unisphere or the vApp Manager](#) on page 44.

Using OVFTOOL

When deploying an IPv4-only or IPv6-only network configuration, OVFTOOL has the following syntax:

```
ovftool --acceptAllEulas --overwrite --powerOffTarget --powerOn
--prop:ipAddress=<IP-ADDRESS>
--prop:netmask_or_prefix=<NETMASK-OR-PREFIX>
--prop:gateway=<GATEWAY> --prop:dns1=<DNS1> --prop:dns2=<DNS2>
--prop:timezone=<TIMEZONE> --prop:esxServer=<ESX-SERVER-NAME>
--prop:encryRootPasswd=<ROOT-PASSWORD> --name=<VAPP-NAME>
--datastore=<DATASTORE> --net:Network\ 1=VM\ Network
--net:Network\ 2=VM\ Network --network=VM\ Network <OVA-FILE>
vi://<VCENTER ADMIN ACCOUNT>:<VCENTER-ADMIN-PASSWORD>@
<VCENTER-HOST>/host/<ESX-SERVER-NAME>
```

When deploying a dual-stack network configuration, OVFTOOL has the following syntax:

```
ovftool --acceptAllEulas --overwrite --powerOffTarget --powerOn
--prop:ipAddress=<IP-ADDRESS>
--prop:netmask_or_prefix=<NETMASK-OR-PREFIX>
--prop:gateway=<GATEWAY> --prop:ipv4_address=<IPV4-ADDRESS>
--prop:ipv4_gateway=<IPV4-GATEWAY>
--prop:ipv4_netmask=<IPV4-NETMASK> --prop:dns1=<DNS1>
--prop:dns2=<DNS2> --prop:timezone=<TIMEZONE>
--prop:esxServer=<ESX-SERVER-NAME>
--prop:encryRootPasswd=<ROOT-PASSWORD> --name=<VAPP-NAME>
--datastore=<DATASTORE> --net:Network\ 1=VM\ Network
--net:Network\ 2=VM\ Network --network=VM\ Network <OVA-FILE>
vi://<VCENTER ADMIN ACCOUNT>:<VCENTER-ADMIN-PASSWORD>@
<VCENTER-HOST>/host/<ESX-SERVER-NAME>
```

Parameter	Description
IP-ADDRESS	IP address of the virtual appliance.
NETMASK-OR-PREFIX	Netmask or prefix of the virtual appliance.
GATEWAY	Gateway.
IPV4-ADDRESS	IPv4 address (Dual stack only).
IPV4-GATEWAY	IPv4 address of the gateway (Dual stack only).
IPV4-NETMASK	IPv4 netmask (Dual stack only).
DNS1	IP address of DNS server 1.
DNS2	IP address of DNS server 2.
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)
VAPP-NAME	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.
OVA-FILE	Absolute path of ova file.
VCENTER-HOST	Name of the vCenter.
VCENTER-ADMIN-PASSWORD	vCenter Server's Administrator password.
ESX-SERVER-NAME	ESX Server name as displayed in the vCenter Server.

Procedure

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 PowerMax Virtual Appliance kit to the same Linux host.
5. Run the ovftool command with necessary command line switches.
Unisphere for PowerMax Virtual Appliance is installed and powered on automatically.
6. Add gatekeepers.
7. Continue with [Launching Unisphere or the vApp Manager](#) on page 44.

Example 1 Examples

Example 1 Examples (continued)

The following command is an example for an IPv4 configuration:

```
/usr/bin/ovftool --acceptAllEulas --overwrite --powerOffTarget
--powerOn --prop:ipAddress=192.0.2.1
--prop:netmask_or_prefix=255.255.252.0
--prop:gateway=198.51.100.1 --prop:dns1=203.0.113.1
--prop:dns2=203.0.113.2 --prop:timezone=America/New_York
--prop:esxServer=api4194.example.com
--prop:encryRootPasswd=XXXXXXXXXX --name=SE_ipv4_99.example.com
--datastore=api4134_local --net:Network\ 1=VM\ Network
--net:Network\ 2=VM\ Network --network=VM\
Network univmaxpa900_108_suse11_x86_64_vapp_OVF10.ova
vi://XXXX:XXXXXXXXXX @API4195/"vApp Build"/host/api4134.example.com
```

The following command is an example for an IPv6 configuration:

```
/usr/bin/ovftool --acceptAllEulas --overwrite --powerOffTarget
--powerOn --prop:ipAddress=2001:DB8:0:0:0:0:1:1
--prop:netmask_or_prefix=64 --prop:gateway=2001:DB8:1:0:0:0:0:1
--prop:dns1=2001:DB8:1:1:0:0:0:1 --prop:dns2=2001:DB8:1:1:0:0:0:2
--prop:timezone=America/New_York
--prop:esxServer=api4194.example.com
--prop:encryRootPasswd=XXXXXXXXXX --name=SE_ipv6_1001.example.com
--datastore=api4134_local --net:Network\ 1=VM\ Network
--net:Network\ 2=VM\ Network --network=VM\
Network univmaxpa900_108_suse11_x86_64_vapp_OVF10.ova
vi://XXXX:XXXXXXXXXX @API4195/"vApp Build"/host/api4134.example.com
```

The following command is an example for a dual stack configuration:

```
/usr/bin/ovftool --acceptAllEulas --overwrite --powerOffTarget
--powerOn --prop:ipAddress=2001:DB8:0:0:0:0:1:2
--prop:netmask_or_prefix=64 --prop:gateway=2001:DB8:1:0:0:0:0:2
--prop:dns1=2001:DB8:1:1:0:0:0:1 --prop:ipv4_address=192.0.2.2
--prop:ipv4gateway=198.51.100.2 --prop:ipv4_netmask=255.255.252.0
--prop:dns2=2001:DB8:1:1:0:0:0:2 --prop:timezone=America/New_York
--prop:esxServer=api4194.example.com
--prop:encryRootPasswd=XXXXXXXXXX
--name=SE_ipv6_1001.example.com --datastore=api4134_local
--net:Network\ 1=VM\ Network --net:Network\ 2=VM\ Network
--network=VM\ Network
```

Launching Unisphere or the vApp Manager

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

Launching Unisphere

To launch Unisphere:

Procedure

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

`https://appliance_IP:unisphere_port_number`
or

`https://appliance_host_name:unisphere_port_number`

The Unisphere port number is configured during installation. The default HTTPS port number is 8443.

If the host IP address is an IPv6 address, surround the IP address with square brackets, for example:

`https://[2001:db8:ffff:ffff:ffff:ffff:ffff:ffff]:8443`

If the host IP address is an IPv4 address, type the IP address as normal, for example:

`https://198.51.100.255:8443`

2. At the login window, type the Unisphere Initial Setup User username and password, and click **Login**.

The default username for the Unisphere Initial Setup User is `smc` and the default password is `smc`.

Launching the vApp Manager

To launch the vApp Manager:

Procedure

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

- `https://appliance_IP:unisphere_port_number`
- `https://appliance_host_name:unisphere_port_number`

The default Unisphere port number is 5480.

If the host IP address is an IPv6 address, surround the IP address with square brackets, for example:

`https://[2001:db8:ffff:ffff:ffff:ffff:ffff:ffff]:5480`

If the host IP address is an IPv4 address, type the IP address as normal, for example:

`https://198.51.100.255:5480`

For either of the URLs above, the browser is redirected as shown in the following table.

Original URL	Redirected URL
<code>https:// appliance_IP:unisphere_port_ number</code>	<code>https:// appliance_IP:unisphere_port_ number/vappmgr/#/login</code>
<code>https:// appliance_host_name:unisphere_por t_number</code>	<code>https:// appliance_IP:unisphere_port_ number/vappmgr/#/login</code>

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

The first time you login, you must change your password. The vApp Manager can also be configured to use LDAP for user authentication.

Note

When LDAP is already configured from Unisphere for PowerMax, LDAP users need to be added to vApp Manager as an admin. This process requires logging into vApp Manager before disabling the local directory from Unisphere for PowerMax. Unisphere for PowerMax local users will not be visible in vApp Manager. For more information, refer to the vApp Manager online help.

The vApp Manager appears. 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 *Dell EMC Solutions Enabler Installation Guide*.

Setting the storevntd daemon to start automatically

To set the `storevntd` daemon to start automatically:

Procedure

1. On the vApp Manager dashboard, select **Manage > Daemons**.
2. In the **Daemons** column, locate the `storevntd` daemon.
3. Ensure that the button displayed in the **Startup Type** column has the text **Automatic**. That is, the daemon is configured to start automatically.

Upgrading the Unisphere Virtual Appliance using an ISO image

Periodically, Dell EMC releases virtual appliances with security patches and hotfixes for the virtual appliance. These are available on the Dell EMC Support website as ISO files. If you are running Unisphere for VMAX V8.4.0, or later, you can download and use an ISO upgrade file.

From:	To:	Complete:
Unisphere VMAX V8.4.0 or a later release	Unisphere for PowerMax V9.0	<p>Step 1: Downloading the ISO upgrade file.</p> <p>Step 2: Uploading the ISO upgrade file to the datastore.</p> <p>Step 3: Mounting the ISO image.</p> <p>Step 4: Completing the upgrade.</p>

Before you begin

Ensure that the ESX Server minimum hardware requirements for the version to which you are upgrading are met before commencing the upgrade procedure. The available memory is checked as part of the upgrade operation and if the requirements are not met, the upgrade is canceled.

For more information about the ESX Server hardware requirements for Unisphere for PowerMax Virtual Appliance, see [Table 3](#) on page 31.

Step 1: Downloading the ISO upgrade file

Procedure

1. Navigate to the Dell EMC Support website.
2. Locate and download the following file:
UNIVMAX900_x_se900_x_vapp_upgrade_x86_64.iso

In the file name above, x in UNIVMAX900_x and the x in se900_x represent software build numbers. Those numbers vary based on when the software was built.

Step 2: Uploading the ISO upgrade file to the datastore

After the download is completed, upload the ISO file to the ESC server using the VI client.

Procedure

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 displays, click **Upload files**. The **Upload Items** dialog box opens.
7. Navigate to where you saved the ISO upgrade file, select the file, and click **Open**.
8. In the **Upload/Download Operation** dialog box that displays, click **Yes** to accept the warning.

Step 3: Mounting the ISO image

Procedure

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**, that the **Connect at power on** check box is selected and click **OK**.

Step 4: Completing the upgrade**Procedure**

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 displays.

Re-configuring the virtual appliance IP address

You can reconfigure only the network configuration selected when the virtual appliance was first installed.

For example, if you initially set up an IPv6-only configuration, you can reconfigure the IPv6 network parameters but you cannot change it to a dual-stack configuration.

To re-configure a virtual appliance with an IPv4 address configuration:

Procedure

1. Do one of the following:
 - To re-configure a virtual appliance with an IPv4 address configuration:
 - a. Log in to the vSphere client and navigate to the virtual appliance console.
 - b. Use the **Move Up/Move Down** keys to select **Configure IP** and press **Enter**.
 - c. At the following prompt, type `y` and press **Enter** to configure the static IP address:

```
Do you want to configure static IP address?
```

The following series of prompts enable you to reconfigure your network:

- IP Address []:

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

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 on the DNS server.

- Netmask []:

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

- Gateway []:

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

- DNS1 []:
Type the first DNS server address and press the **Enter** key.
 - DNS2 []:
Type the second DNS server address and press the **Enter** key.
 - Is a proxy server necessary to reach the internet? y/
[n]:
Type **y** to specify the IP address of the proxy server and the port.
Type **n** to continue the configuration without specifying a proxy server.
 - Are the above mentioned parameters correct? [y]/n:
Type **y** to re-configure the virtual appliance IP address and return to the console.
Type **n** to go back and change your responses.
- To re-configure a virtual appliance on an IPv6-only address configured vApp:
 - a. Log in to the vSphere client and navigate to the virtual appliance console.
 - b. Use the **Move Up/Move Down** keys to select **Configure IP** and press **Enter**.
 - c. The following series of prompts enable you to reconfigure your network:
 - IP Address [current_ip_address]:
Type a valid IPv6 address and press the **Enter** key.
 - Prefix [current_prefix]:
Type the prefix of the network on which the appliance is located and press the **Enter** key.
 - Gateway [current_gateway]:
Type the gateway address to the network on which the appliance is located and press the **Enter** key.
 - DNS1 [current_dns_1]:
Type the first DNS server address and press the **Enter** key.
 - DNS2 [current_dns_2]:
Type the second DNS server address and press the **Enter** key.
- To re-configure a virtual appliance on a dual-stack configured vApp:
 - a. Log in to the vSphere client and navigate to the virtual appliance console.
 - b. Use the **Move Up/Move Down** keys to select **Configure IP** and press **Enter**.
 - c. The following series of prompts enable you to reconfigure your network:
 - IP Address [current_ip_address]:
Type a valid IPv6 address and press the **Enter** key.
 - Prefix [current_prefix]:
Type the prefix of the network on which the appliance is located and press the **Enter** key.
 - Gateway [current_gateway]:
Type the gateway address to the network on which the appliance is located and press the **Enter** key.
 - DNS1 [current_dns_1]:

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

- `DNS2 [current_dns_2]`:
Type the second DNS server address and press the **Enter** key.
- `IPv4 Address [current_ipv4_address]`:
Type the IPv4 address and press the **Enter** key.
- `Netmask [current_netmask]`:
Type the netmask of to the network on which the appliance is located and press the **Enter** key.
- `Gateway for IPv4 [current_ipv4_gateway]`:
Type the IPv4 gateway address and press the **Enter** key.

Deleting the Unisphere for PowerMax Virtual Appliance

To delete the Unisphere for PowerMax Virtual Appliance:

Procedure

1. (Optional) If you plan to restore Unisphere and Solutions Enabler persistent data, back up the persistent data in the Unisphere for PowerMax Virtual Appliance console.
2. (Optional) If you plan to restore the performance database, backup the database according to [Backing up and restoring the performance database](#) on page 49.
3. In the VMware management interface, power off the appliance.
4. Right-click on the appliance and select **Delete From Disk**.
5. 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:

Procedure

1. Log in to the vApp Manager (`https://host_name:port_number`) 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:

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

4. Move the backup files from the backup location to the staging location:

```
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:

```
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:

Procedure

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: `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: `manage_spa_db_backup.sh -list -staging`

5. Move the backup files from the staging location to the backup location:

```
manage_spa_db_backup.sh -restore
```

6. Log in to Unisphere (`https://host_name:port_number`) and start the database restore process as described in the Unisphere help.

7. After the restoration has been completed and backup files are no longer

needed, clean the backup and staging locations: `manage_spa_db_backup.sh -clean -all`

Installing licenses

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

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

Installing array-based licenses

Array-based licenses are used to license features on arrays running Engenuity 5875 or later. These licenses are stored on the storage array.

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 array-based licenses:

Procedure

1. Open the vApp Manager.
2. Select **Manage > Licenses**.
3. In the **eLicensing** panel, click **Add License File** to open the **Add eLicensing License** wizard.
4. In the **Upload License** page select **Symmetrix Based License** and click **Choose 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. Click **Next**.
7. In the **Add Symmetrix License** panel, select the storage array on which to install the license file, and click **Next**.

Installing host-based licenses

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

To install host-based licenses:

Procedure

1. Open the vApp Manager.
2. Select **Manage > Licenses**.
3. Type the license key (requires four characters per input box) in the **SE Licensing** panel and click **Add**.

CHAPTER 4

Installing the VASA Virtual Appliance

This chapter explains how to install the VASA Virtual Appliance in a VMware infrastructure environment. Topics include:

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Introduction

Virtual Volumes (VVols) are devices used to store application data, virtual machine configuration, swap space, and memory state. VVols provide storage arrays with visibility at a virtual disk level and enables them to fulfill the application's storage requirements. VVols offer more granular control to end users and increased scale beyond the previous limit of 256 logical unit numbers (LUNs) per ESXi host.

VASA (vSphere APIs for Storage Awareness) is the framework responsible for storage orchestration between VMware vSphere™ components and the storage array.

The VASA Provider is delivered as a virtual appliance or vApp which orchestrates the lifecycle of VVols and their derivatives: snapshots, clones, and fast-clones. It also provides storage topology, capabilities and status information to the vCenter™ and the ESXi hosts. Contained within the virtual appliance is a browser-based GUI console called vApp Manager for VASA Provider that can be used to perform VASA Provider-specific management and configuration tasks that are not handled by VMware workflows, Unisphere for PowerMax or Solutions Enabler CLI.

Dell EMC PowerMax VASA Provider version 9.0 supports the VASA 2.0 protocol and PowerMax and VMAX All Flash arrays running the Q1 2018 PowerMaxOS 5978 release or later.

Before you begin

The current version of Dell EMC PowerMax VASA Provider has the following system requirements:

- The VASA Provider virtual appliance requires two virtual disks with a minimum size of 10 GB and 15 GB each.
- Configuration requires 4GB of RAM and two Virtual Central Processing Units (vCPU).
- To host its database, Dell EMC PowerMax VASA Provider needs a Raw Device Mapping (RDM) device (for PowerMax and VMAX arrays only). The recommended size is 4 GB.
- A minimum of VMware vSphere 6.0 or later is required.
- Protocol Endpoints are supported only through ACLX-enabled ports.
- A redundant TCP/IP network is required.
- A minimum of five gatekeepers are required to be mapped to the virtual appliance.

Note

The number of gatekeepers needs to be increased in the case of multiple concurrent operations.

-
- A SnapVX license on the array is needed to support Snapshot operations.

Note

The Solutions Enabler instance embedded inside the VASA Provider vApp virtual machine is solely for Dell EMC PowerMax VASA Provider.

Deploy and configure the virtual appliance

To deploy and configure the virtual appliance:

Procedure

1. Download the OVF archive file (*.ova) containing the installation program from Dell EMC Support to a temporary directory.
2. Start the vSphere Client and log in to the vCenter Infrastructure Server through which you will be installing the virtual appliance.
3. From the navigation tree, select the ESXi Server on which you will be installing the virtual appliance.
4. Right-click the ESXi Server and select **Deploy OVF Template**.
5. Browse to the OVF archive file, located in the temporary directory you created earlier. Select the OVF archive file and click **Next**.
6. On the **Review details** page, verify the details about the appliance and click **Next**.
7. On the **Accept License Agreements** page, select **Accept** and click **Next**.
8. On the **Name and Location** page, specify a name and location for the appliance and click **Next**.
9. On the **Disk Format**, select the format in which to store the virtual machine's virtual disks and click **Next**.
10. On the **Network Mapping** page, select the networks the deployed template should use and click **Next**.
11. On the **Customize template** page, provide valid values for the following OVF properties and then click **Next**:
 - a.
 - IP Address
 - Netmask
 - Gateway
 - DNS Server 1
 - DNS Server 2

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. The VASA Protocol will not work properly without a properly configured DNS service.

- b. Optionally, provide/select valid values for the following OVF properties:
 - Proxy Server: Enter the IP address of the proxy server and port. For example:
ProxyServer-IP:Port
 - ESXi Server Name: Enter the fully qualified ESXi Server hostname.
 - ESXi Server Password: Enter the ESXi Server password in base64 encryption format.

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

Note

The **Target** setting on the **Ready to Complete** page needs to be the same as the **ESXi Server Name**.

13. When the **Completed Successfully** message appears, click **Close**.

Launching vApp Manager

After the vApp is deployed, follow the steps below to launch vApp Manager:

Procedure

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

```
https://appliance_ip:5480
```

or

```
https://appliance_host_name:5480
```

2. On the log in panel, type `vpconfig` for both the **User Name** and **Password**, and then click **Login**.

Note

You are required to change your password from vApp Manager on first login. vApp Manager can also be configured to use LDAP for user authentication. For more information on that, refer to the vApp Manager online help.

Adding an ESXi server

Fibre Channel gatekeeper mapping features are unavailable until an ESXi server is attached to the appliance. The ESXi host on which the virtual machine is deployed is detected initially. To attach to a different ESXi server, the current ESXi host must be removed (see "Removing an ESXi server" section) and the new ESXi host added manually. Then select new gatekeeper devices to map (see the "Mapping Fibre Channel gatekeeper devices" section).

Procedure

1. Log into the vApp Manager and select **Manage > Gatekeepers**.

This view shows the unmapped and mapped Fibre Channel gatekeeper devices. If there is no ESXi server attached to the appliance, no devices display. All gatekeeper configuration features are unavailable until an ESXi server is added.

2. Click **Add ESX**, and type the following:
 - Server name (fully qualified server name)
 - ESXi server user name
 - ESXi server password

- Re-enter ESXi server password
3. Click **Add**.

Results

The ESXi server name displays next to the text **Host ESX Attached:**.

Adding an array

You can add an array that the vApp Manager will be managing to the ESXi server to create devices available for mapping.

Procedure

1. Log into the vApp Manager and select **Manage > Gatekeepers**.
2. Next to the Host ESXi name, click **Add Array**.
3. The **Select Array** dialog opens. Select the radio button next to the desired array ID and then click **Add Array**.

The **Devices attached to the Host ESXi** list shows the devices that are available for mapping to the Virtual Appliance machine.

Mapping Fibre Channel gatekeeper devices

Before you begin

If no ESXi server is attached to the appliance, then mapping features are unavailable. See [Adding an ESXi server](#).

Fibre Channel gatekeeper devices are mapped to the appliance through the ESXi server attached to the appliance. If no ESXi server is attached to the appliance, this tab allows for adding a server.

Procedure

1. Log into the vApp Manager and select **Manage > Gatekeepers**.
This view shows the unmapped and mapped Fibre Channel gatekeeper devices.
2. In the **Gatekeeper devices attached to the Host ESX** list, click the checkbox next to the device(s) you want to map and then click **Map Gatekeepers**.

Mounting the database LUN

Dell EMC PowerMax VASA Provider requires that a separate TDEV device is mapped to host the database. The recommended size is 4 GB.

Procedure

1. Log into the vApp Manager and select **Manage > Gatekeepers**.
2. In the **Gatekeeper devices attached to the Host ESX** list, select the device and click **Map Gatekeepers**.

The device is moved from the **Devices attached to the Host ESX** list to the **Devices attached to Virtual Appliance Host** list.

3. In the **Devices attached to Virtual Appliance Host** list, select the device and click **MountDB**.

An information dialog confirms that the device has been successfully mounted.

Viewing Dell EMC PowerMax VASA Provider configuration

Procedure

1. Log into vApp Manager and select **Configure > VP Configuration**.

The following settings are displayed:

VP log file size (MB)

Default value is 64.

VP log level

Default value is `DEBUG`.

Number of log files to be retained

Default value is 10.

Max concurrent connections per session

Default value is 4.

Retain VP certificate

Default value is `False`.

Note

For self-signed certificates on multiple vCenters this setting needs to be set to `True`.

SYMAPI debug log

Default value is `Disabled`.

2. To update a configuration value, select a new value and click **Set**.
After updating a configuration value, you must restart ECOM.

Registering Dell EMC PowerMax VASA Provider with the vSphere Web Client

The default Dell EMC PowerMax VASA Provider credentials for registration are `admin` for user name and `#1Password` for password. In the interests of security Dell EMC recommends changing the default values. The default registration credentials can be changed by going to `https://appliance_IP:5989/ecomconfig` and selecting **Change Password**.

Note

Dell EMC recommends that users don't change other options within the ECOMConfig portal.

Procedure

1. From the **Navigator** panel of the VMware vSphere Web Client for vCenter, select the vCenter in the **Hosts and Clusters** view.
2. In the **Manage** tab, select **Storage Providers** and click on the **+** symbol.
The **New Storage Provider** dialog opens.
3. Fill out the name, user name, password and URL and click **OK**.

Note

The VASA Provider URL is `https://vApp_host_name:5989/vasa-providers.xml`

4. Click **Yes** in the **Security Alert** dialog box that asks if you want to trust the host.
5. To verify the registration, refresh the view in the vSphere Web Client. The Dell EMC PowerMax VASA Provider and its details should be listed.

Note

Users need to rescan from vCenter to discover the newly created storage containers.

Accessing Dell EMC PowerMax VASA Provider using SSH

Before you begin

The default user name and password for logging into Dell EMC PowerMax VASA Provider through SSH is `cseadmin`.

Procedure

1. Log into the vApp Manager and select **Configure > Host**.
2. If the link displays as **Disable SSH**, then the SSH port is already in the enabled state, otherwise, click **Enable SSH** to enable the SSH port.

Upgrading Dell EMC PowerMax VASA Provider

Note

This procedure applies when upgrading the Dell EMC PowerMax VASA Provider from the previous release to the current release.

Procedure

1. Take a snapshot of the vApp before beginning the upgrade. This can be used to restore the vApp if the upgrade procedure fails.
2. Upload the ISO image into the ESXi Server Datastore on which Dell EMC PowerMax VASA Provider is deployed.
3. Start the vSphere Client and log into the vCenter Infrastructure Server through which you will be upgrading the virtual appliance.
4. On the lefthand menu click on **Data Store** and select the ESXi Datastore.
5. Click on **Manage** from the top menu and navigate to the files.
6. Click on the upload icon on the right-hand side to upload the ISO update file.
7. To mount the ISO image on the virtual appliance's CD drive, right-click the virtual appliance and select **Edit Settings**.
8. On the **Virtual Hardware** tab, select CD/DVD Drive 1.
9. From the drop-down menu, select **Datastore ISO File** and click **Browse** to locate the ISO image in the data store.
10. Click **OK** to exit the dialog box.
11. Go to the **Console** tab of the virtual appliance and using the Move Up/Down keys select **Appliance Update**.
12. Press Enter to perform the update.

The update will take a few minutes, after which the virtual appliance will reboot and the screen will show the main console of the latest version.

Note

You can use the welcome screens of the virtual appliance and vApp Manager to confirm that Dell EMC PowerMax VASA Provider has been updated correctly.

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