



**EMC® ProSphere™**  
Version 2.0

**Deployment Guide**  
P/N 300-015-288  
REV 08

**EMC Corporation**  
*Corporate Headquarters:*  
Hopkinton, MA 01748-9103  
1-508-435-1000  
[www.EMC.com](http://www.EMC.com)

Copyright © 2011-14 EMC Corporation. All rights reserved.

Published September 2014

EMC believes the information in this publication is accurate as of its publication date. The information is subject to change without notice.

THE INFORMATION IN THIS PUBLICATION IS PROVIDED "AS IS." EMC CORPORATION MAKES NO REPRESENTATIONS OR WARRANTIES OF ANY KIND WITH RESPECT TO THE INFORMATION IN THIS PUBLICATION, AND SPECIFICALLY DISCLAIMS IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Use, copying, and distribution of any EMC software described in this publication requires an applicable software license.

For the most up-to-date regulatory document for your product line, go to the Technical Documentation and Advisories section on the EMC Online Support site.

For the most up-to-date listing of EMC product names, see EMC Corporation Trademarks on EMC.com.

All other trademarks used herein are the property of their respective owners.

<b>Chapter 1</b>	<b>Documentation map</b>	
<b>Chapter 2</b>	<b>Deployment Checklist</b>	
	VMware considerations .....	12
	Network considerations.....	12
	Storage considerations .....	12
	Host considerations .....	12
	Switch considerations .....	13
<b>Chapter 3</b>	<b>Overview</b>	
	ProSphere terminology .....	16
	Deployment task reference table .....	18
<b>Chapter 4</b>	<b>Prepare VMware Infrastructure</b>	
	Base VMware infrastructure requirements checklist.....	22
	VMware user credentials .....	22
	Virtual hardware requirements .....	23
	Provision thick and thin disks .....	24
	VMware Tools on the ProSphere vApp .....	24
	Browser requirements .....	24
	Obtain VMware infrastructure requirements (vSphere Client) .....	25
	Obtain VMware infrastructure requirements (vCloud Director) .....	26
<b>Chapter 5</b>	<b>Configure Hosts</b>	
	Avoid underscores in hostnames.....	30
	Characters not allowed in hostnames.....	30
	DNS registration .....	30
	Validate HBAs .....	30
	EMC ProSphere/SCA Host Configuration Utility .....	32
	Configure Windows hosts and WS-MAN.....	32
	Configure Kerberos authentication.....	34
	Configure Windows hosts and WMI .....	35
	Prerequisites for Windows Server 2003 or 2008, and Windows 2012.....	35
	Disable UAC on Windows 2008 SP2.....	37
	Disable UAC on Windows 2008 R2 .....	37
	Add a user with the necessary remote DCOM permissions .....	37
	Configure UNIX and Linux hosts.....	42

	Discovery requirements .....	43
	Collect performance data .....	46
	Prepare for discovery of VMware guests.....	47
	Prepare for discovery of VMware infrastructure .....	47
	Discovery requirements .....	47
<b>Chapter 6</b>	<b>Configure Storage Systems</b>	
	Configure the EMC SMI-S Provider .....	50
	Requirements for discovery data collection.....	50
	Requirements for performance data collection .....	51
	Configure the provider .....	51
	Replace the EMC SMI-S provider host .....	52
	Configure the EMC Control Station for NAS.....	53
	Verify NAS licenses using Control Station .....	53
<b>Chapter 7</b>	<b>Configure Switches</b>	
	Configure Cisco switches .....	58
	Perform preconfiguration tasks .....	58
	Configure switches for SNMPv1/2.....	60
	Configure switches for SNMPv3 .....	61
	Configure Brocade SMI Agents.....	63
<b>Chapter 8</b>	<b>Deploy ProSphere</b>	
	Deploy ProSphere with the vSphere Client.....	66
	Deployment time.....	66
	Deploy ProSphere .....	66
	Deploy ProSphere with the vCloud Director .....	72
	Deployment time.....	72
	Deployment procedure .....	72
	Modify action and delay settings .....	74
	Next steps .....	74
<b>Chapter 9</b>	<b>Add NICs for Isolated Networks</b>	
	Overview .....	76
	Supported multiple NIC configurations.....	76
	Configuration 1: NICs on a DE .....	76
	Configuration 2: NICs on a PA .....	77
	Configuration 3: NICs on a PA and a Secondary PA .....	78
	Configuration 4: NICs on a DE and a Collector .....	79
	Configuration 5: NICs on a PA and a DE.....	80
	Configuration 6: NICs on a PA, a Secondary PA and a DE.....	81
	Configure an additional NIC on a ProSphere virtual machine .....	82
	Modify the /etc/hosts file .....	83
<b>Chapter 10</b>	<b>Deploy Collectors</b>	
	Collector.....	85
	Obtain deployment files.....	85
	Determine the Collectors required for data center .....	85
	Collect information .....	86
	Deploy Collectors with the vSphere Client .....	86
	Deploy Collectors with the vCloud Director .....	89

Upload the new deployment file to the catalog .....	89
Deploy the Collector vApp from the vApp template .....	89
Modify action and delay settings .....	90
Register a Collector with the ProSphere Application.....	90
Load balance Collectors.....	91

## **Chapter 11 Deploy Secondary ProSphere Application**

Secondary ProSphere Application .....	94
Limitation .....	94
Obtain deployment files .....	94
Collect information.....	95
Deploy a Secondary ProSphere Application with the vSphere Client.....	96
Deploy a Secondary ProSphere Application with the vCloud Director .....	98
Upload the new deployment file to the catalog .....	98
Deploy the Secondary ProSphere Application from the vApp template.....	98
Modify action and delay settings .....	99
Register a Secondary ProSphere Application .....	99

## **Chapter 12 Post-Deployment Tasks**

Synchronize time zones and system times.....	102
Log into ProSphere .....	102
Customize the security compliance message .....	104
Create or edit the message .....	105
Integrate ProSphere with Unisphere for VMAX.....	105
Configure CMCNE/BNA .....	109
CMCNE.....	109
Configure CMCNE/BNA for launch in context .....	110
Prepare for alert integration .....	113
Synchronize ProSphere deployments .....	114
Integrate ProSphere with Watch4net .....	114
Deploy trusted certificates.....	115
Additional information.....	115

## **Appendix A Updates and Backups**

Overview.....	118
ProSphere update methods .....	119
Download an ISO file to a virtual CD-ROM.....	119
Install updates on ProSphere .....	120
Create snapshots before updating software .....	120
Select the EMC Update Repository as a source for updates .....	121
Select a virtual CDROM or web server for updates .....	121
Receive updates reminder at login and apply updates .....	122
Manually check for and apply updates.....	123
Update ProSphere, including the Greenplum database .....	124
Impact of upgrades .....	130
Create and restore snapshots or backups.....	130
Shut down or start up ProSphere or its virtual machines .....	131
Create ProSphere snapshots in vSphere Client.....	131
Roll back to a snapshot in vSphere Client.....	132
Create ProSphere snapshots in vCloud Director .....	132
Roll back to a snapshot in vCloud Director .....	133
Back up and restore ProSphere with VMware Data Recovery .....	133



*As part of an effort to improve and enhance the performance and capabilities of its product lines, EMC periodically releases revisions of its hardware and software. Therefore, some functions described in this document may not be supported by all versions of the software or hardware currently in use. For the most up-to-date information about product features, refer to your product release notes.*

*If a product does not function properly or does not function as described in this document, contact your EMC representative.*

## Revision history

The following table presents the revision history of this document:

Revision	Date	Description
01	April 2013	Initial version for 2.0 release.
02	April 2013	Corrections to vCloud information.
03	June 2013	Initial version for 2.0.1.0 release. Added <a href="#">"Update ProSphere, including the Greenplum database"</a> on page 124. Clarified <a href="#">"Configure Windows hosts and WS-MAN"</a> on page 32.
04	June 2013	Corrections to <a href="#">Chapter 6, "Configure Switches"</a> .
05	September 2013	Initial version for 2.0.1.2 release. Added Kerberos configuration steps in <a href="#">"Configure Kerberos authentication"</a> on page 34. Clarified procedure for Unisphere for VMAX integration in <a href="#">"Integrate ProSphere with Unisphere for VMAX"</a> on page 105.
06	December 2013	Initial version for 2.0.1.3 release. Corrected specification of .ovf file in <a href="#">"Deploy ProSphere"</a> on page 66. Added information about vCenter security to <a href="#">"Requirements for performance data collection"</a> on page 51.
07	July 2014	Enhancements to vApp installation.
08	September 2014	Made syntax correction in the Updates chapter.

## Audience

This document is part of the EMC ProSphere documentation set, and is intended for use by system administrators and integrators responsible for deploying ProSphere.

## Conventions used in this document

EMC uses the following conventions for special notices.

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

## Typographical conventions

EMC uses the following type style conventions in this document:

<b>Normal</b>	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> <li>Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus)</li> <li>Names of resources, attributes, pools, Boolean expressions, buttons, DQL statements, keywords, clauses, environment variables, functions, utilities</li> <li>URLs, pathnames, filenames, directory names, computer names, filenames, links, groups, service keys, file systems, notifications</li> </ul>
<b>Bold</b>	Used in running (nonprocedural) text for: <ul style="list-style-type: none"> <li>Names of commands, daemons, options, programs, processes, services, applications, utilities, kernels, notifications, system calls, man pages</li> </ul> Used in procedures for: <ul style="list-style-type: none"> <li>Names of interface elements (such as names of windows, dialog boxes, buttons, fields, and menus)</li> <li>What user specifically selects, clicks, presses, or types</li> </ul>
<i>Italic</i>	Used in all text (including procedures) for: <ul style="list-style-type: none"> <li>Full titles of publications referenced in text</li> <li>Emphasis (for example a new term)</li> <li>Variables</li> </ul>
<code>Courier</code>	Used for: <ul style="list-style-type: none"> <li>System output, such as an error message or script</li> <li>URLs, complete paths, filenames, prompts, and syntax when shown outside of running text</li> </ul>
<b><code>Courier bold</code></b>	Used for: <ul style="list-style-type: none"> <li>Specific user input (such as commands)</li> </ul>
<i><code>Courier italic</code></i>	Used in procedures for: <ul style="list-style-type: none"> <li>Variables on command line</li> <li>User input variables</li> </ul>

## Contacting Customer Support

### Where to get help

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

### Product information

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

<http://support.emc.com>

### Technical support

For technical support, go to the EMC Online Support site and choose Support by Product. Enter **ProSphere**. On the Support page, you will see several options, including one for making a service request. Note that to open a service request, you must have a valid support agreement. Contact your EMC sales representative for details about obtaining a valid support agreement or with questions about your account.

### Your comments

Your suggestions will help us continue to improve the accuracy, organization, and overall quality of the user publications. Send your general opinions of EMC documentation to:

[techpubcomments@emc.com](mailto:techpubcomments@emc.com)

Send your opinions of EMC ProSphere documentation to:  
[ProSphere\\_doc\\_comments@emc.com](mailto:ProSphere_doc_comments@emc.com)





# ProSphere Documentation Library

*Numbers indicate  
suggested flow of reading*

## Deployment

### Release notes

Information about this release you should know before proceeding

### Support matrix

Software and hardware supported for deployment and discovery

### Performance & scalability

Optimize performance and scalability

Determine how many Collectors you will need

### Deployment guide

Configure hosts, switches, arrays, and the VMware infrastructure

Deploy ProSphere and the Collectors

Perform updates and backups

## Administration

### Admin guide

Manage licenses, users, and roles  
Perform discovery  
Manage alerts  
Collect log files  
Configure multiple sites  
Troubleshooting

### Security guide

Configure software and physical settings for a deployed ProSphere vApp

### Ports usage

Configure firewalls and ports used by ProSphere

## Reference

### Scenarios guide

Use cases describing discovery, displaying capacity and performance data

Using alerts to analyze problems

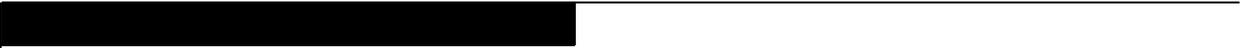
### Console help

View dedicated topics for each view and dialog

View detailed descriptions of capacity and performance metrics.

Describes all of the basic operations

Includes a topic for each error code



This checklist summarizes the requirements that need to be in place before ProSphere™ is deployed. Keep this chapter and the following documents close at hand; they will guide you with detailed procedures for deploying ProSphere and setting up the network environment for ProSphere.

- ◆ *EMC ProSphere Support Matrix*
- ◆ *EMC ProSphere Security Configuration Guide*

**Note:** If your corporation requires additional ProSphere security hardening to comply with the U.S. Federal or Department of Defense mandates, the ProSphere Federal Security Hardening Guide is available to all US Federal customers. Contact your EMC® representative to obtain a copy. These procedures must be performed immediately after you deploy ProSphere.

The chapter includes the following sections:

- ◆ [VMware considerations](#) ..... 12
- ◆ [Network considerations](#) ..... 12
- ◆ [Storage considerations](#) ..... 12
- ◆ [Host considerations](#) ..... 12
- ◆ [Switch considerations](#) ..... 13

**Note:** ProSphere 2.0 runs on SuSE Linux Enterprise Server 11 SP2 (64 bit) which is installed as part of the Deploy OVF Template process and is included with the ProSphere 2.0 software.

**Note:** ProSphere does not support the installation of any third-party software, including security packages.

---

## VMware considerations

- Ensure that you have at least one VMware ESX or ESXi server that is managed by a vCenter server.
- Identify a VMware ESXi, vCenter server, or vCloud Director server for the vApp installation. Consult your VMware administrator to ensure that all the required VMware infrastructure is in place.
- Allocate the required RAM each for the Discovery Engine, ProSphere Application, and Historical Database

---

## Network considerations

- Collect the following network data for each of the three virtual machines and one for each Collector:
  - A valid static IP address for the virtual machine.
  - A fully qualified domain name for the virtual machine.
  - A network mask for the IP address.
  - A network gateway for the IP address.
  - Primary and optional secondary DNS server IP addresses.
- Register all IP addresses used by ProSphere in DNS, and ensure that the reverse lookup through PTR records is supported.
- Check for firewall restrictions that may interfere with normal ProSphere operation in your VMware environment, broader network, and storage resource discovery.
- Ensure that you have a license to deploy the ProSphere vApp in a DRS cluster. This requires at least an enterprise license with ESX.
- Clusters where ProSphere will be deployed must have at least two hosts and must be in DRS mode.

---

## Storage considerations

- Download and install the EMC SMI-S Provider, used to discover EMC arrays.
- Check that Unisphere for VMAX is installed on Storage Area Network (SAN) attached hosts that have dedicated gatekeepers to Symmetrix arrays. VNX/CLARiiON arrays are discovered over TCP/IP.
- On Network Attached Storage (NAS), verify that licenses are enabled.
- To consolidate and view Unisphere for VMAX alerts in ProSphere, install Unisphere for VMAX.
- To consolidate and view VNX alerts in ProSphere, install Unisphere Remote.

---

## Host considerations

- WMI — required to discover physical Windows hosts and collect performance data using WMI access credentials.

- ❑ WS-MAN — required to discover Windows hosts using WS-MAN access credentials.
- ❑ SSH - root and sudo — required to discover physical UNIX hosts. For the non-root user, install sudo on the host and configure the sudoer file.
- ❑ VMware Infrastructure — required to discover VMware environments. ESX server or vCenter credentials with Browse–Datastore and Storage Views–View permissions are required.
- ❑ WinRM service — required to discover Windows hosts using WS-MAN access credentials (optional).
- ❑ EMC— supported HBA drivers and firmware and HBA vendor-specific SNIA libraries (required for all operating systems)
- ❑ iostat — required for performance data collection on Linux (RedHat and SuSE) and Solaris hosts.
- ❑ sar — required for performance data collection on AIX and HP-UX hosts.

---

## Switch considerations

- ❑ Install Connectrix Manager Converged Network Edition (MCNE) or Connectrix Manager Data Center Edition (DCE) on a separate host.
- ❑ If you are discovering Brocade switches, install the Brocade SMI Agent. CMCNE contains the Brocade SMI Agent (Headless), which is required for data integration. The Brocade SMI Agent is available with all versions of CMCNE. The website [support.emc.com](http://support.emc.com) provides CMCNE software and documentation.
- ❑ HTTP or HTTPS access credentials for the Brocade SMI Agent to discover Brocade switches.
- ❑ Discover fabrics to be managed in the EMC SMI-S Provider before discovering it from ProSphere. For installation instructions, go to [support.emc.com](http://support.emc.com).
- ❑ SNMP v1, v2, and v3 access credentials to discover Cisco switches.
- ❑ Zoning requirements and conventions for passive discovery of hosts.
- ❑ To consolidate and view Cisco alerts in ProSphere, install Cisco Prime Data Center Network Manager (DCNM).



---

This chapter provides an overview of environment configuration and deployment.

The chapter includes the following sections:

- ◆ [ProSphere terminology](#)..... 16
- ◆ [Deployment task reference table](#)..... 18

**Note:** If you are applying ProSphere updates, such as installing ProSphere 2.0, go directly to [Appendix A, “Updates and Backups”](#).

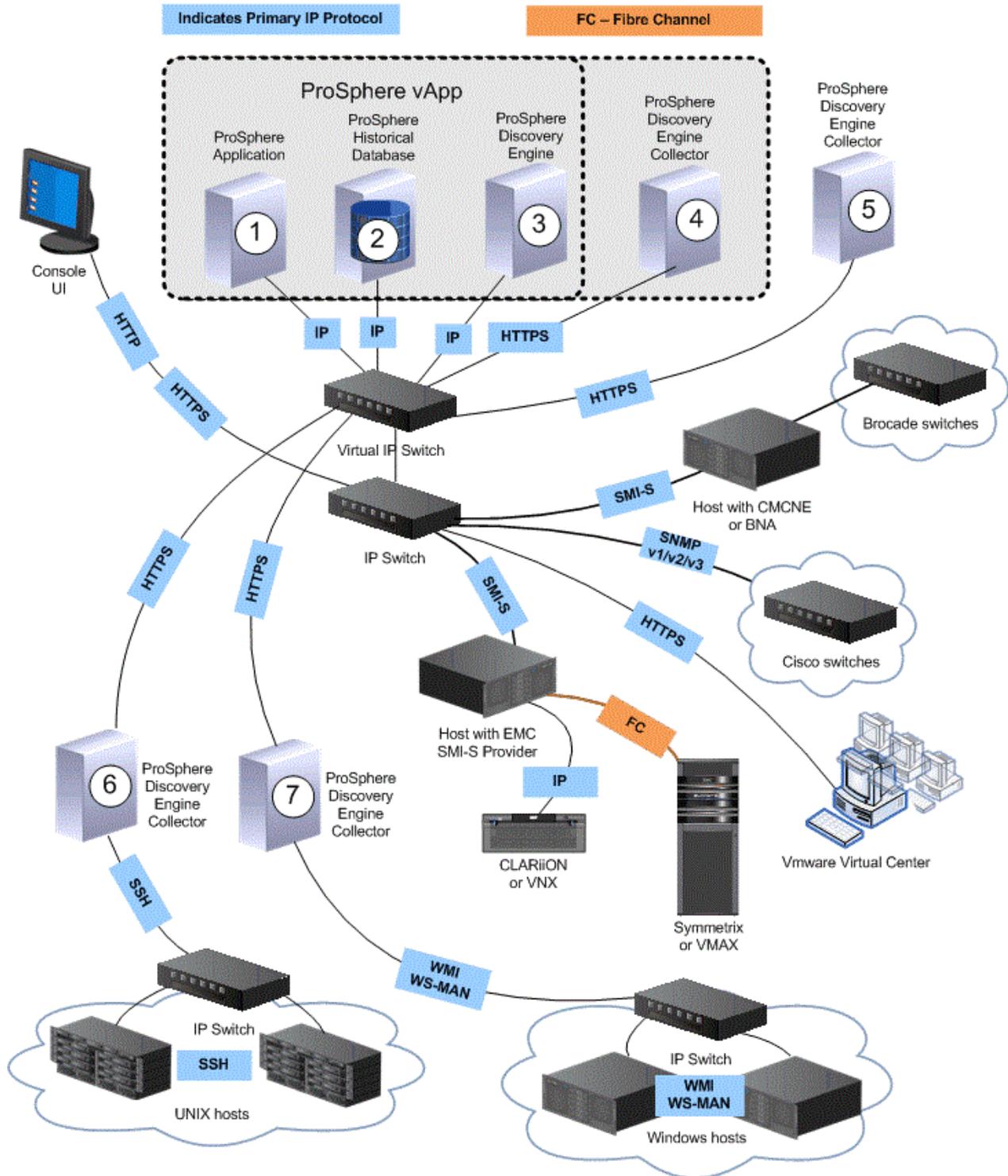
## ProSphere terminology

The following terms related to ProSphere are used in this document:

- ◆ A “virtual machine” is a software computer that runs an operating system and applications. Multiple virtual machines can run concurrently on the same host. The virtual machines that form the core of ProSphere are: the **ProSphere Application**, the **Discovery Engine**, and the **Historical Database**. Some deployments include one or more instances of an additional virtual machine: the **Discovery Engine Collector** (Collector). [Figure 1 on page 17](#) illustrates these virtual machines.
- ◆ A “vApp”, shown in [Figure 1 on page 17](#) is a software solution optimized for the cloud, consisting of multiple virtual machines, packaged and maintained as a single entity in OVF format. ProSphere is deployed as a VMware vApp, configured as a collection of interdependent virtual machines.

Figure 1 ProSphere Architecture

Overview of the Communication Protocol and Technology



- ◆ A “virtual appliance” is a software solution composed of one or more virtual solutions. A virtual appliance is packaged as a unit by an appliance vendor and is deployed, managed, and maintained as a unit. ProSphere is also a virtual appliance.

- ◆ A “ProSphere Application” (1 in the figure) manages ProSphere components, controlling activity with the Historical Database, the Discovery Engines, and user Consoles.
- ◆ A “Historical Database” (2) stores attribute and performance data for all discovered objects. It receives data from the Discovery Engines and is managed by the ProSphere Application.
- ◆ A “Discovery Engine” (3) discovers logical and physical resources in the network and supplies attributes and performance data to the Historical Database. It controls any of the optional Discovery Engine Collectors, and is managed by the ProSphere Application.
- ◆ A “Discovery Engine Collector” (4, 5, 6, and 7) discovers logical and physical resources in the network and supplies attributes and performance data to the Discovery Engine. Collectors appear in scale-out deployments. While there is only one Discovery Engine, there may be many Collectors. In the figure, Collector 4 is inside the firewall the Collectors 5 through 7 are outside the firewall.

## Deployment task reference table

[Table 1 on page 18](#) is a guide to documentation on deployment-related tasks.

Table 1

### Documentation references

To...	Refer to...
<b>Get started...</b>	
Learn about ProSphere architecture	Architecture chapter in the <i>EMC ProSphere Administrator Guide</i>
Decide whether and how to scale out a ProSphere deployment	<i>EMC ProSphere Performance and Scalability Guidelines</i>
Prepare the network and its components (hosts, arrays, and switches)	<ul style="list-style-type: none"> <li>• See “<a href="#">Deployment Checklist</a>” on page 11 for a list of requirements before deployment</li> <li>• Configuration chapters in this manual for software configuration procedures</li> <li>• <i>EMC ProSphere Support Matrix</i> for supported versions of hardware and software</li> <li>• <i>EMC ProSphere Release Notes</i> for supplemental information about a specific release</li> </ul>
Change system passwords	<i>EMC ProSphere Security Configuration Guide</i>
Broad overview of configuration, deployment, and product use	<i>EMC ProSphere User Guide</i>
<hr/> <p><b>Note:</b> Subsequent references are to chapters in this manual.</p> <hr/>	
<b>Verify that the VMware infrastructure meets the base infrastructure requirements</b>	
Verify that your VMware infrastructure meets the base infrastructure requirement	<a href="#">Chapter 3, “Prepare VMware Infrastructure”</a>
Verify that you have the VMware credentials required for deployment	

Table 1 Documentation references

To...	Refer to...
Verify that you meet the virtual hardware requirements	
Obtain VMware information needed in the deployment process	
<b>Configure the ProSphere environment to allow successful discoveries</b>	
Configure third-party software used to discover hosts and related performance data	<a href="#">Chapter 4, "Configure Hosts"</a>
Configure array data providers (software that exposes array management information)	<a href="#">Chapter 5, "Configure Storage Systems"</a> , <a href="#">Chapter 6, "Configure Switches"</a>
Configure Cisco and Brocade switches and fabrics	<a href="#">Chapter 6, "Configure Switches"</a>
<b>Deploy ProSphere from vSphere Client</b>	
Download the deployment files (.ovf file and .vmdk files) to a location accessible to the vSphere Client.	<a href="#">Chapter 7, "Deploy ProSphere"</a>
Open the vSphere Client and connect to the vCenter server managing the VMware environment.	
Enter information at the Deploy OVF Template dialog box. This includes information about the resource pool for the ProSphere vApp, the datastore, and the ProSphere virtual machines.	
Use a vSphere Client to download the files and transmit them to an ESX or ESXi server.	
<b>OR</b>	
<b>Deploy ProSphere from vCloud Director</b>	
Create a vCloud catalog.	<a href="#">Chapter 7, "Deploy ProSphere"</a>
Upload deployment files into a vApp template in the catalog.	
Deploy ProSphere from the vApp template.	
<b>Add NICs for isolated networks</b>	<a href="#">Chapter 8, "Add NICs for Isolated Networks"</a>
<b>Deploy Collectors, if needed to scale out the deployment.</b>	<a href="#">Chapter 9, "Deploy Collectors"</a>
<b>Deploy a Secondary ProSphere Application, if needed to enhance performance</b>	<a href="#">Chapter 10, "Deploy Secondary ProSphere Application"</a>

Table 1

**Documentation references**

To...	Refer to...
<b>Perform post-deployment tasks</b>	
Synchronize ProSphere deployments, if you have more than one deployment	<a href="#">Chapter 11, "Post-Deployment Tasks"</a>
Deploy organization-trusted certificates through the ProSphere Console	
<b>Apply updates</b>	<a href="#">Appendix A, "Updates and Backups"</a>
<b>Back up ProSphere</b>	<a href="#">Appendix A, "Updates and Backups"</a>

---

This chapter provides information about infrastructure requirements and how to prepare your VMware environment for ProSphere deployment. The following sections detail infrastructure requirements:

- ◆ Base VMware infrastructure requirements checklist ..... 22
- ◆ VMware user credentials ..... 22
- ◆ Virtual hardware requirements ..... 23
- ◆ Provision thick and thin disks ..... 24
- ◆ VMware Tools on the ProSphere vApp ..... 24
- ◆ Browser requirements ..... 24
- ◆ Obtain VMware infrastructure requirements (vSphere Client) ..... 25
- ◆ Obtain VMware infrastructure requirements (vCloud Director) ..... 26

## Base VMware infrastructure requirements checklist



### IMPORTANT

**Consult with your VMware administrator to ensure that all the required VMware infrastructure is available before you start ProSphere deployment.**

The base VMware infrastructure requirements include:

- A VMware vSphere virtualized computing environment.



### IMPORTANT

**ProSphere does not validate hostnames. You must independently register with DNS (1) hostnames you specify for virtual machines (2) hostnames for hosts that ProSphere will discover (3) hostnames for hosts about which information will be collected in reports. Failing to register hostnames with the corresponding DNS may prevent normal operation of ProSphere.**

- An installed vCenter server.
- An installed VMware ESX or ESXi server running in the vSphere environment.
- A data store with a minimum 600 GB of free space for the unzipped appliances and for the downloaded zipped appliance image files. This data store will hold the appliance images needed to run ProSphere.
- If you are deploying ProSphere in a VMware cluster setup, ESX or ESXi servers should be time-synchronized to an external Network Time Protocol (NTP) server. However, the product can be deployed on a single ESX server, if the server meets hardware requirements mentioned in [“Virtual hardware requirements” on page 23](#). If you deploy on a single ESX server, in the data center section of vCenter set the environment for a single ESX server and not a cluster.
- The clock settings of all the ESX or ESXi servers present within the cluster are synchronized. Unsynchronized ESX or ESXi servers might lead to ProSphere discovery issues.

**Note:** To take advantage of vSphere features that enhance availability and flexibility of a virtual infrastructure, EMC recommends that you deploy ProSphere on an ESX or ESXi server cluster.

**Note:** If using vCloud for deployment of ProSphere, the vCloud administrator should ensure that the virtual datacenter created has sufficient hardware resources as per the specifications in [EMC ProSphere Performance and Scalability Guidelines](#).

## VMware user credentials

ProSphere deployment is performed by a user logged into the VMware infrastructure. [Table 2 on page 23](#) specifies the user credentials required by VMware for an installer.

Table 2 VMware credentials required for ProSphere deployment

VMware infrastructure resource	Required user credentials
Data store	<ul style="list-style-type: none"> <li>• Allocate space</li> <li>• Browse data store</li> <li>• Low-level file operations</li> </ul>
Host Local Operators	<ul style="list-style-type: none"> <li>• Create Virtual Appliance</li> <li>• Delete Virtual Appliance</li> <li>• Reconfigure Virtual Appliance</li> </ul>
Host Profile	View
Network	Assign Network
Resource	<ul style="list-style-type: none"> <li>• Assign vApp to Resource Pool</li> <li>• Assign VM to resource pool</li> <li>• Migrate</li> <li>• Query VMotion</li> </ul>
vApp	Full permissions
Virtual machine	Full permissions

## Virtual hardware requirements

ProSphere administrators can use this information to make their deployment decisions based on current and expected hardware resource utilization.

Table 3 Virtual hardware requirements

Virtual Machine	Virtual Processor	RAM / Memory	Storage
<b>Requirements for an unscaled deployment</b>			
ProSphere Application	Four 64-bit CPUs	8 GB	230 GB
		<p><b>Note:</b> Before discovering ProSphere capacity data using the Solution Pack for ProSphere-SCA, contact Customer Support to increase the memory of the ProSphere Application to 12 GB, and increase the memory of the Topology Service from 1 GB to 2 GB.</p>	
Discovery Engine	Four 64-bit CPUs	8 GB	40 GB
Historical Database	Four 64-bit CPUs	6 GB	230 GB

Table 3 Virtual hardware requirements

Virtual Machine	Virtual Processor	RAM / Memory	Storage
<b>Requirements, for a scaled deployment with an additional Discovery Engine Collector (Collector)</b>			
Additional Collector	Two 64-bit CPUs	6 GB	30 GB (For Thick Disk) 2.2 GB (For Thin Disk)
<b>Requirements for a deployment with an additional (Secondary) ProSphere Application</b>			
Secondary ProSphere Application	Two 64-bit CPUs	4 GB	230 GB

**Note:** No special VMware configuration procedures are required before deploying ProSphere.

## Provision thick and thin disks

When making a decision to use thick or thin provisioning, consider the future storage capacity requirements of all the virtual machines on the same datastore, and the disk space usage of ProSphere Application and Historical Database. *EMC ProSphere Performance and Scalability Guidelines* details the storage considerations for ProSphere deployments.

## VMware Tools on the ProSphere vApp

Because ProSphere installation performs the updates to VMware Tools on ProSphere virtual machines, VMware Tools are listed as “unmanaged” when viewed in the vSphere client software. This means they are not managed by the vCenter server.

## Browser requirements

ProSphere requires Adobe Flash Player version 10.2.153.1 or later, which is available for most popular browsers including Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome. If your Flash player is older than this version, upgrade to the latest available Flash player.

ProSphere is best displayed on a monitor set to a resolution of 1024x768 or higher.

Transport Layer Security (TLS) 1.0 is required as the security setting for the web browser.

Ensure that your browser accepts cookies and that pop-up blockers are disabled. For browsers in which the launching window does not automatically close (for example, Microsoft Internet Explorer), it is necessary to use a new browser instance for each ProSphere login. The browser retains cookies directing it to the previous ProSphere Application, even after you enter the URL for a new ProSphere website.

**Note:** A browser instance can be reused if the cookies for the appropriate ProSphere website are deleted.

## Obtain VMware infrastructure requirements (vSphere Client)

This section is for users who deploy ProSphere from vSphere Client.

Obtain the following information that you are required to specify during deployment. Space is provided below to write down these values.



### **IMPORTANT**

**Use only a vCenter to connect the vSphere Client to an ESX server. Attempts to deploy directly to an ESX server will fail.**

- ◆ The IP address or hostname for the vCenter server managing the VMWare environment. The username and password to connect the vSphere Client to the server.

VMware server IP address or hostname: \_\_\_\_\_

Username: \_\_\_\_\_

Password: \_\_\_\_\_

- ◆ Verify that you have privileges needed to deploy a vApp.
- ◆ The name for this deployment of ProSphere (for example, *Local ProSphere deployment*).

Name for the ProSphere vApp: \_\_\_\_\_

- ◆ The following infrastructure location for the ProSphere vApp:

Inventory Location: \_\_\_\_\_

Host/Cluster: \_\_\_\_\_

Disk format (Thick/Thin): \_\_\_\_\_

Resource Pool: \_\_\_\_\_

- ◆ The name of a data store in the local vSphere environment to hold the ProSphere virtual machine images.

Data store: \_\_\_\_\_

- ◆ The names of the vSphere network(s) in which to deploy each of the three virtual machines for the ProSphere vApp. The virtual machines may be deployed in separate subnets.

ProSphere network: \_\_\_\_\_

Discovery Engine network: \_\_\_\_\_

Historical Database network: \_\_\_\_\_

Collector network: \_\_\_\_\_

Collector network: \_\_\_\_\_

Collector network: \_\_\_\_\_

Collector network: \_\_\_\_\_

- ◆ The desired secure access and network properties for the Historical Database virtual machine, including:

DNS servers (separated by commas):

\_\_\_\_\_

Search domain strings (separated by spaces):

\_\_\_\_\_

Hostname: \_\_\_\_\_

IP address: \_\_\_\_\_

Netmask: \_\_\_\_\_

Subnet gateway: \_\_\_\_\_

- ◆ The desired secure access and network properties for the Discovery Engine virtual machine, including:

DNS servers (separated by commas):

\_\_\_\_\_

Search domain strings (separated by spaces):

\_\_\_\_\_

Hostname: \_\_\_\_\_

IP address: \_\_\_\_\_

Netmask: \_\_\_\_\_

Subnet gateway: \_\_\_\_\_

- ◆ The desired secure access and network properties for the ProSphere Application virtual machine, including:

DNS servers (separated by commas):

\_\_\_\_\_

Search domain strings (separated by spaces):

\_\_\_\_\_

Hostname: \_\_\_\_\_

IP address: \_\_\_\_\_

Netmask: \_\_\_\_\_

Subnet gateway: \_\_\_\_\_

## Obtain VMware infrastructure requirements (vCloud Director)

This section is for users who deploy ProSphere from vCloud Director.

Obtain the following information that you are required to specify during deployment. Space is provided below to write down these values.

- ◆ The IP address or hostname for the vCloud Director server.
- ◆ The username and password to log in to the vCloud Director server.

VMware Director server IP address or hostname:

\_\_\_\_\_

Username: \_\_\_\_\_

Password: \_\_\_\_\_

- ◆ Verify that you have privileges in vCloud Director that allow you to create a catalog, upload a vApp template to the catalog, and deploy a vApp template. For information on Predefined Roles and Their Rights, go to <http://pubs.vmware.com>

- ◆ The name for this deployment of ProSphere (for example, *Local ProSphere deployment*).  
Name for the ProSphere vApp: \_\_\_\_\_
- ◆ The following details for ProSphere vApp deployment:  
Virtual datacenter name \_\_\_\_\_  
IP allocation (should be Static-Manual): \_\_\_\_\_  
Storage profile: \_\_\_\_\_  
Lease information: \_\_\_\_\_
- ◆ The names of the network(s) in the virtual datacenter inventory where you wish to deploy the virtual machines for the ProSphere vApp. The virtual machines may be deployed in separate subnets.  
ProSphere network: \_\_\_\_\_  
Discovery Engine network: \_\_\_\_\_  
Historical Database network: \_\_\_\_\_  
Collector network: \_\_\_\_\_  
Collector network: \_\_\_\_\_  
Collector network: \_\_\_\_\_  
Collector network: \_\_\_\_\_  
Secondary ProSphere network: \_\_\_\_\_
- ◆ The desired secure access and network properties for the Historical Database virtual machine, including:  
DNS servers (separated by commas):  
\_\_\_\_\_  
Search domain strings (separated by spaces):  
\_\_\_\_\_  
Hostname: \_\_\_\_\_  
IP address: \_\_\_\_\_  
Netmask: \_\_\_\_\_  
Subnet gateway: \_\_\_\_\_
- ◆ The desired secure access and network properties for the Discovery Engine virtual machine, including:  
DNS servers (separated by commas):  
\_\_\_\_\_  
Search domain strings (separated by spaces):  
\_\_\_\_\_  
Hostname: \_\_\_\_\_  
IP address: \_\_\_\_\_  
Netmask: \_\_\_\_\_  
Subnet gateway: \_\_\_\_\_
- ◆ The desired secure access and network properties for the ProSphere Application virtual machine, including:

DNS servers (separated by commas):

\_\_\_\_\_

Search domain strings (separated by spaces):

\_\_\_\_\_

Hostname: \_\_\_\_\_

IP address: \_\_\_\_\_

Netmask: \_\_\_\_\_

Subnet gateway: \_\_\_\_\_

This chapter provides instructions for the installation and configuration of third-party software used to discover hosts and related performance data.

The chapter includes the following sections:

- ◆ [Avoid underscores in hostnames](#) ..... 30
- ◆ [DNS registration](#)..... 30
- ◆ [Validate HBAs](#)..... 30
- ◆ [EMC ProSphere/SCA Host Configuration Utility](#) ..... 32
- ◆ [Configure Windows hosts and WS-MAN](#) ..... 32
- ◆ [Configure Windows hosts and WMI](#)..... 35
- ◆ [Configure UNIX and Linux hosts](#)..... 42
- ◆ [Prepare for discovery of VMware guests](#) ..... 47
- ◆ [Prepare for discovery of VMware infrastructure](#) ..... 47

---

## Avoid underscores in hostnames

Hostname labels can contain only the lowercase ASCII letters “a” through “z”, the digits “0” through “9”, and the hyphen (“-”). No other symbols, punctuation characters, or white spaces are permitted.

If ProSphere encounters a host name with an underscore, users can be prevented from logging in.

You can confirm the situation by searching the log files for the following string:

```
IllegalArgumentException: Host cannot be null
```

---

## Characters not allowed in hostnames

Do not include the following characters in hostnames:

- ◆ comma (,)
- ◆ tilde (~)
- ◆ colon (:)
- ◆ exclamation point (!)
- ◆ at sign (@)
- ◆ number sign (#)
- ◆ dollar sign (\$)
- ◆ percent (%)
- ◆ caret (^)
- ◆ ampersand (&)
- ◆ apostrophe (')
- ◆ period (.)
- ◆ parentheses (())
- ◆ braces ({})
- ◆ underscore (\_)
- ◆ white space (blank)

---

## DNS registration

Make sure the hostnames are in DNS format with FQDN, and IP addresses must be registered with the appropriate domain name servers and resolve for a reverse DNS lookup. In hostnames, do not include underscores or characters listed in [“Characters not allowed in hostnames” on page 30](#).

---

## Validate HBAs

All host platforms require the following to discover SNIA-qualified HBA-related information:

- ◆ EMC-supported host bus adapter (HBA) drivers and firmware. The HBA driver installed must be SNIA HBA API 2.0 compliant. The *EMC ProSphere Support Matrix* provides specific details.

- ◆ The vendor-specific SNIA libraries must be installed on the target host.

---

**Note:**

The HBA model number and part number should be verified before updating the hosts with SNIA libraries for HBA.

You can install the SNIA library in one of the following ways:

- As part of HBA driver installation package.
- Install latest version of HBAnywhere (for Emulex installations) or SAN Surfer (for Qlogic installation).

To discover an HP-UX host with a multi-port Fibre Channel card, the package CommonIO bundle 0812(Dec 2008) or later should be present on the host to obtain the updated FC-SNIA file set.

---

To validate that the appropriate SNIA libraries are installed, download and run the inq application from the EMC Online Support Site using the following procedure:

1. From the EMC Online Support Site, click **Search**.
2. In the **Search** field type inq utility.
3. Select the latest version of inq.
4. Select the operating system for your host.
5. Download inq and follow the provided installation instructions.
6. Run the following command on the host after installation:

**Inq -hba**

If the command lists the HBAs, then the SNIA libraries are properly installed, which means that ProSphere can discover the HBAs.

## EMC ProSphere/SCA Host Configuration Utility

The EMC Host Configuration Utility helps customers verify the settings discussed in this chapter, which enable a Windows host to be successfully discovered in ProSphere or in SCA. Optionally, the utility automatically configures the settings. The utility is available on the EMC Online Support Site ([support.emc.com](http://support.emc.com)).

## Configure Windows hosts and WS-MAN

This section describes how to configure WS-MAN to work with ProSphere. WS-MAN is the preferred discovery mechanism for Windows 2008 and later.

**Note:** On Windows 2012, before performing steps in this section, change network connectivity from public to private. Go to **Control Panel**. Select **Network and Internet**. Under **Network and Sharing Center**, click **Connect to a network**. On the right-hand screen, right-click **Network-> Turn Sharing on or off**. Click **Yes, Turn on sharing and connect to devices**. After performing the steps in this section, set network connectivity as preferred.

**Note:** ProSphere will not copy the INQ binary executable on Windows hosts when discovery is scheduled using the WS-MAN access profile.

Note the following:

- ◆ Discovery must be done under the access profile of a user that is an Administrator or a member of the Administrators group. These credentials are entered as WS-MAN credentials in ProSphere. The *EMC ProSphere Administrator Guide* explains how to create access credentials.
- ◆ The user account used for discovery must be permitted access to the host to be discovered.

Windows Remote Management (WinRM) is the Microsoft implementation of the WS-MAN protocol. Manually perform the following steps to prepare to discover configuration items (CIs) with WinRM. All of the following commands should be run from a Windows Powershell prompt.

To Configure WinRM for use with ProSphere, follow these steps on the host you wish to discover.

1. Run **winrm quickconfig** to enable a firewall exception for WS-MAN. Enter **y** when prompted.

In case the command fails, ensure the Windows Remote Management service is running and the Startup Type is set to Automatic. Then run the following commands individually from a Windows Powershell prompt:

- a. `Get-WmiObject -computer $server Win32_Service -Filter "Name='WinRM'" | Start-Service`

In this command, \$server refers to the target Windows hostname.

- b. `winrm create winrm/config/listener?Address=*&Transport=HTTP`
- c. `netsh advfirewall firewall add rule name="Windows Remote Management(Http-In)" dir=in action=allow program="System" protocol=TCP localport="5985" profile="Domain,Public,Private" enable=yes`

---

**Note:** If you wish to configure WinRM to use HTTPS transport instead, refer to <http://support.microsoft.com>.

---

For Windows Server 2003 hosts such as R2 hosts, for which WinRM is not installed by default, WinRM is available as the Hardware Management feature through the Add/Remove System Components feature in the Control Panel under Management and Monitoring Tools. Complete installation and information about configuring WinRM using the Winrm command-line tool is available online in the "Hardware Management Introduction" at <http://technet.microsoft.com>, which describes the WinRM and the IPMI features in Windows Server 2003 R2. If you use Windows 2003 and need to install WinRM on a large number of servers, ask your Windows Administrator for assistance and direct him or her to the "Hardware Management Introduction".

2. Enable authentication on the WinRM service. The authentication scheme can be Basic or Kerberos.
  - a. Check the current authentication settings with the command:

```
winrm get winrm/config/service/auth
```

- b. Enable the authentication scheme on the WinRM service with the command:

```
winrm set winrm/config/service/auth @{<authentication  
scheme>="true"}
```

For example :

To enable the Basic authentication scheme, execute the command:

```
winrm set winrm/config/service/auth @{Basic="true"}
```

To enable the Kerberos authentication scheme, execute the command:

```
winrm set winrm/config/service/auth @{Kerberos="true"}
```

---

**Note:** The WinRM service supports Basic authentication only for local accounts and the Kerberos authentication for domain users in addition to users in admin groups.

---

3. To allow the transfer of unencrypted data on the WinRM service, run the following command:
- ```
winrm set winrm/config/service @{AllowUnencrypted="true"}
```
4. To set the MaxEnvelopeSizekb, so that the WinRM client and server components interact with the WS-Management protocol, run the following command:

```
winrm set winrm/config @{MaxEnvelopeSizekb="1039440"}
```

---

**Note:** On some machines single vertical quotes (ASCII character 39) are required for these commands as shown in the following:

```
winrm set winrm/config/service/auth '@{Basic="true"}'  
winrm set winrm/config/service/auth '@{Kerberos="true"}'  
winrm set winrm/config/service '@{AllowUnencrypted="true"}'  
winrm set winrm/config '@{MaxEnvelopeSizekb="1039440"}'
```

To insert the single quote character, you may need to copy and paste it from another source such as Notepad.

---

5. For Windows 2003, to gather details on HBA configuration, install the fcinfo file, which can be downloaded from the Microsoft website:

<http://www.microsoft.com>

---

**Note:** You can also automatically and remotely configure the WinRM service required for WS-MAN data collection using Group Policies.

For complete details on configuring WinRM, refer to “Installation and Configuration for Windows Remote Management” at <http://msdn.microsoft.com>.

---

## Configure Kerberos authentication

For successful Kerberos authentication across domains, follow the steps in this section in addition to the steps in the preceding section.

For procedural examples, please refer to EMC Community Network article “Setting up WS-MAN with Kerberos Authentication, on Windows Server 2008 R2.”

- ◆ Ensure that a trust relationship exists across domains for cross-domain Kerberos discovery to be successful.
- ◆ Associate access credentials with a domain user account
- ◆ Add the domain user account (not a local account) to the local Administrators group on the server being discovered

---

**Note:** You can meet the two requirements above by adding the domain user to the Domain Admins group. The Domain Admins group is automatically added to all Windows domain servers as part of the local Administrators group.

- ◆ Configure the Key Distribution Center (KDC) name to discover hosts using Kerberos authentication

## Configure KDC name while deploying ProSphere

Add the Domain Name Server (DNS) value for KDC to the DNS Server field and the domain name of KDC to the search domain field in the vApp configuration step for the ProSphere Application, Discovery Engine, Historical Database, and all the Collectors.

## Configure KDC name after deploying ProSphere

---

**Note:** In vCenter if the Edit Settings option is used to put more than two IP addresses in the DNS field, or if during the deployment of the ProSphere appliance more than two IP addresses are provided, then when the appliance is rebooted, vCenter does not update DNS settings on the appliance. Only two DNS servers can be used for ProSphere vApp deployment.

If the DNS value for KDC is not configured while deploying ProSphere, perform the following:

1. Power-down the vApp.
2. Right click on individual VMs and select **Edit Settings**.
3. In **Options > Properties**, add **DNS for KDC** to the **DNS Server** field and the domain name of KDC to the search domain field for Kerberos authentication.
4. Power on the vApp.

These changes must be performed on all the ProSphere VMs and Collectors.

---

**Note:** Ensure that you can correctly resolve the hostname associated with the IP address from ProSphere.

---

## Configure Windows hosts and WMI

ProSphere supports discovery of Windows hosts through Windows Management Instrumentation (WMI).

**Note:** WS-MAN is the preferred discovery mechanism for Windows 2008 and later.

ProSphere will copy the INQ binary executable on Windows hosts when discovery is scheduled using the WMI access profile.

The following sections describe how to configure WMI to work with ProSphere.

---

### Prerequisites for Windows Server 2003 or 2008, and Windows 2012

**Note:** On Windows 2012, before performing steps in this section, change network connectivity from public to private. Go to **Control Panel**. Select **Network and Internet**. Under **Network and Sharing Center**, click **Connect to a network**. On the right-hand screen, right-click **Network-> Turn Sharing on or off**. Click **Yes, Turn on sharing and connect to devices**. After performing the steps in this section, set network connectivity as preferred.

The following are prerequisites for Windows host discovery by ProSphere:

- ◆ Discovery must be done under the access profile of a user that is an Administrator or a member of the Administrators group. These credentials are entered as WMI credentials in ProSphere. The *EMC ProSphere Administrator Guide* explains how to create access credentials.
- ◆ The user account used for discovery must be permitted access to the host to be discovered.
- ◆ The user has WMI privileges.
- ◆ The user has write privileges to the default Temp directory.

On Windows 2003, the path for the default Temp directory is:

```
C:\Document and Settings\\local settings\Temp
```

ProSphere tries to write data to the default Temp directory.

If this directory does not have write privileges, ProSphere tries to write data to C:\Windows\Temp.

If the C:\Windows\Temp directory does not have write privileges, ProSphere tries to write data to the user-configured %Temp% directory.

If the user-configured %Temp% directory does not have write privileges, the operation fails.

On Windows 2008, the path for the default Temp directory is:

```
C:\Users\\AppData\Local\Temp
```

ProSphere tries to write data to the default Temp directory.

If this directory does not have write privileges, ProSphere tries to write data to C:\Windows\Temp.

If the C:\Windows\Temp directory does not have write privileges, ProSphere tries to write data to the user-configured %Temp% directory.

If the user-configured %Temp% directory does not have write privileges, the operation fails.

---

**Note:** To find the exact location of the %Temp% directory:

Select **Start->Run**

Type **%Temp%**

This opens the directory.

---

- ◆ Ensure that the Visual C++ 2005 SP1 Redistributable Package is installed on the host.

---

**Note:** In case the windows update option is enabled and you do not find this package on your system, you can download the package from <http://www.microsoft.com/>

---

- ◆ Ensure that the WMI and Remote Registry services are running.

---

**Note:** To ensure that the services are started:

Select **Start->Run**

Type **services.msc..**

Ensure the **Windows Management Instrumentation** and **Remote Registry** services are started. If they are not, right click on the services and select **Start**.

---

- ◆ Make appropriate registry changes on a Windows Server 2008 R2 host. The section "[Make registry changes on a Windows Server 2008 R2 host](#)" on page 42 provides information on the required registry changes.
- ◆ For WMI, to allow access to the Root/CIMV2 namespace and all subnamespaces the following permissions must be set:
  - Execute Methods
  - Full Write
  - Partial Write
  - Enable Account
  - Remote Enable
  - Read Security

The section "[Add a user with the necessary WMI permissions](#)" on page 38 provides information on how to set the necessary permissions.

- ◆ Microsoft Distributed Object Component Model (DCOM) communication is enabled on the server to be discovered.

The section "[Enable DCOM](#)" on page 38 provides information on how to configure DCOM on port 135.

- ◆ The host firewall is properly configured to permit DCOM on port 135.

The section "[Add a firewall exception to open Dynamic RPC ports](#)" on page 39 provides information on how to configure DCOM on port 135.

- ◆ ProSphere must be using Windows credentials with remote DCOM permissions and WMI permissions.

---

### Disable UAC on Windows 2008 SP2

1. Open a command prompt and type **msconfig**.
2. Select the tools tab, scroll down select **Disable UAC**, and select **Launch**.
3. Make the desired changes in the dialog box to disable UAC.
4. Confirm the success message.
5. Reboot the host.

---

### Disable UAC on Windows 2008 R2

1. Open a command prompt and type **msconfig**.
2. Select the tools tab, then select **Change UAC Settings**.
3. Select **Launch**.
4. Make the desired changes in the dialog box to disable UAC.
5. Reboot the host.

---

### Add a user with the necessary remote DCOM permissions

To configure a DCOM-enabled user account on a Windows server host:

1. Log on to the server as a local or domain user who has full read/write permissions to the %Temp% directory.
2. Click the Windows **Start** button and then select **Run**.
3. Type **dcomcnfg**.
4. Expand **Component Services** in the **Console Root** tree view, and then expand **Computers**.
5. Right-click **My Computer** from the expanded **Computers** tree view, and then select **Properties**.
6. Click **Default Properties**.
7. Select **Enable Distributed COM on this computer**.
8. Click **COM Security**.
9. Click **Edit Limits** in the **Launch and Activation Permissions** area.
10. Ensure the Administrators group or the username you require is in the list of **Group and user names**.

In case the Administrators group or the username is not present in the list:

- a. Click **Add**.
  - b. Type the Administrator group or username in the **Enter the object names to select** field. The username you add must have full permissions to the %Temp% directory.
  - c. Click **OK**.
11. In the **Permissions for Administrators** area, select the **Remote Launch** and **Remote Activation** boxes to provide the user with these permissions and then click **OK**.

- Click **OK** to close the **My Computer Properties** and **Component Services** dialog boxes.

### Enable DCOM

On the host to be discovered, verify that the following registry key value is set to Y:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Ole ->EnableDCOM
```

### Add a user with the necessary WMI permissions

To set WMI privileges for a Windows user account:

- Log on to the server as a local or domain user.
- Click the Windows **Start** button and then select **Run**.
- Type **WMIMGMT.MSC**.
- Right-click on **WMI Control (Local)** and then select **Properties**.
- Click the **Security** tab.
- Select the **Root > CIMV2** namespace and then click **Security**.
- Select the user account or group that has the DCOM permission setting required for discovery, as selected in [“Add a user with the necessary remote DCOM permissions” on page 37](#)

In case the user account or group name is not listed, [step 10 on page 37](#) provides instructions to add the required user account or group.

- Ensure that all the permissions are enabled in the Permissions for Administrators area.
- Click **Apply** and then **OK**.
- Click **OK**.
- Close the **Windows Management Infrastructure (WMI)** dialog box.

### Configure dynamic RPC ports

**Note:** This procedure is applicable to both Windows Server 2003 and Windows Server 2008 and is required only when the firewall is enabled and all the dynamic RPC ports traffic is blocked in the customer environment.

To configure dynamic RPC ports:

- Log on to the server as a local or domain user.
- Click the Windows **Start** button, then select **Run**.
- Type **regedt32.exe**.
- Expand the following registry key path:

```
HKEY_LOCAL_MACHINE\Software\Microsoft\Rpc
```

- Create subkeys under **Rpc** by right-clicking on **Rpc** and then selecting **New > Key**.
- Set the new key name to **Internet**.
- Right-click the **Internet** key and select **New > Multi-String Value**. Set the new value to **Ports**.
- Right-click on the **Ports** key and select **Modify**.
- Type in the dynamic RPC ports as 5000-5100.

10. Right-click the **Internet** key, select **New > String Value**, and assign the name **PortsInternetAvailable**.
11. Right-click **PortsInternetAvailable** and select **Modify**.
12. Type the letter **Y** in the **Value Data** field.
13. Right-click the **Internet** key, select **New > String Value**, and assign the name **UseInternetPorts**.
14. Right-click **UseInternetPorts** and select **Modify**.
15. Type the letter **Y** in the **Value Data** field.
16. Exit the Registry Editor.
17. Restart the host to activate these dynamic port changes.

---

**Note:** In ProSphere, if you configure a single port (for example: port 135) and try to discover hosts, multiple threads from topology and performance data collection collide on that host resulting in discovery errors. Therefore, a range of ports is required for discovery to be successful. It is recommended that you have 100 open ports to support the metrics claimed in *EMC ProSphere Performance and Scalability Guidelines*. If you have more than the typical number of applications on a host, you may need to open more ports.

---

### Add a firewall exception to open Dynamic RPC ports

If a firewall is enabled, you need to add firewall exceptions that opens port 135 and the dynamic RPC ports.

The *EMC ProSphere Security Configuration Guide* lists ports that ProSphere requires to be open and listening, and lists port assignments.

On Windows Server 2008, if you have the default Windows 2008 firewall software then add the following exception rules to allow the WMI traffic.

#### Inbound firewall exception rule for dynamic RPC ports

To create an inbound firewall exception rule ProSphere-Dynamic-RPC-ports:

1. Click **Start > Administrative tools > Windows firewall with Advanced Security**.
2. Select **Inbound Rules** in the left hand navigation tree.
3. Right-click **Inbound Rules** and click on **New Rule**.
4. Select **Rule Type** as **Custom** and click **Next**.
5. Select **This program path** in the Program section, and type **%SystemRoot%\System32\dllhost.exe** as a path for dllhost.exe
6. Ensure **Services** is set as **default (all programs and services only)** in the Program section, and click **Next**.
7. Select **TCP** for **Protocol Type**, **Dynamic RPC** for **Local Port**, **All Ports** for **Remote Port** in the **Protocol and Ports** section, and click **Next**.
8. Ensure the **Scope and Action** properties section is set as **default** and click **Next**.
9. Enable **Domain**, **Private**, and **Public** in **Profile** section, and click **Next**.
10. Set **Name** as **ProSphere-Dynamic-RPC-ports** and click **Finish**.

---

**Note:** You can also type the following command at a command prompt to create the above rule:

```
netsh advfirewall firewall add rule name="ProSphere-Dynamic-RPC-ports"
dir=in action=allow program="%SystemRoot%\System32\dlhhost.exe"
protocol=TCP localport=RPC profile=public,private,domain
```

---

### Inbound firewall exception rule for port 135

To create an inbound exception rule for the port 135 ProSphere-WMI-DCOM-in:

1. Click **Start > Administrative tools (Control Panel) > Windows firewall with Advanced Security**.
2. Select **Inbound Rules** in the left hand navigation tree.
3. Right-click **Inbound Rules** and click on **New Rule**.
4. Select **Rule Type** as **Custom** and click **Next**.
5. Select **This program path** in the **Program** section, and type **%SystemRoot%\System32\svchost.exe** as a path for svchost.exe
6. Select **Services** by clicking on **Customize** button in the **Program** section.
7. Highlight **Apply to this Service**, select **Remote Procedure Call(RPC)** as the service, click **OK** and click **Next**.
8. Select **TCP** for **Protocol Type**, **RPC Endpoint Mapper** for **Local Port**, **All Ports** for **Remote Port** in the **Protocol and Ports** section, and click **Next**.
9. Ensure the **Scope** and **Action** properties section is set as **default** and click **Next**.
10. Enable **Domain**, **Private**, and **Public** in **Profile** section, and click **Next**.
11. Set **Name** as **ProSphere-WMI-DCOM-in** and click **Finish**.

---

**Note:** You can also type the following command at a command prompt to create the above rule:

```
netsh advfirewall firewall add rule name="ProSphere-WMI-DCOM-in"
dir=in action=allow program="%SystemRoot%\System32\svchost.exe"
service=RpcSs protocol=TCP localport=RPC-EPMap
profile=public,private,domain
```

---

### Inbound firewall exception rule to allow asynchronous WMI traffic

To create an inbound firewall exception rule ProSphere-WMI-Async-in:

1. Click **Start > Administrative Tools > Windows Firewall with Advanced Security**.
2. Select **Inbound Rules** in the left hand navigation tree.
3. Right-click **Inbound Rules** and click on **New Rule**.
4. Select **Rule Type** as **Custom** and click **Next**.
5. Select **This program path** in the **Program** section, and type **%SystemRoot%\System32\wbem\unsecapp.exe** as a path for unsecapp.exe
6. Ensure **Services** is set as **default (all programs and services only)** in the **Program** section, and click **Next**.
7. Select **TCP** for **Protocol Type**, **Dynamic RPC** for **Local Port**, **All Ports** for **Remote Port** in the **Protocol and Ports** section, and click **Next**.
8. Ensure the **Scope** and **Action** properties section is set as **default** and click **Next**.

9. Select **Profile** as appropriate for the network, in the **Profile** section, and click **Next**.
10. Set **Name** as **ProSphere-WMI-Async-in** and click **Finish**.

**Note:** You can also type the following command at a command prompt to create the above rule:  
 netsh advfirewall firewall add rule name="Prosphere-WMI-Async-in" dir=in action=allow  
 program="%SystemRoot%\System32\wbem\unsecapp.exe" protocol=TCP localport=RPC  
 profile=public,private,domain

### **Inbound firewall exception rule called Prosphere-WMI-in**

To create an inbound firewall exception rule ProSphere-WMI-in:

1. Click **Start > Administrative Tools > Windows Firewall with Advanced Security**.
2. Select **Inbound Rules** in the left hand navigation tree.
3. Right-click **Inbound Rules** and click on **New Rule**.
4. Select **Rule Type** as **Custom** and click **Next**.
5. Select **This program path** in the Program section, and type **%SystemRoot%\System32\svchost.exe** as a path for svchost.exe
6. Select **Services** by clicking on **Customize** button in the **Program** section.
7. Highlight **Apply** to this service, select **Windows Management Instrumentation** as the service, click **OK** and click **Next**.
8. Select **TCP** for **Protocol Type**, **Dynamic RPC** for **Local Port**, and **All Ports** for **Remote Port** in the **Protocol and Ports** section, and click **Next**.
9. Ensure the **Scope** and **Action** properties section is set as **default** and click **Next**.
10. Select **Profile** as appropriate for the network, in the **Profile** section, and click **Next**.
11. Set **Name** as **ProSphere-WMI-in** and click **Finish**.

**Note:** You can also type the following command at a command prompt to create the above rule:  
 netsh advfirewall firewall add rule name=" Prosphere-WMI-in" dir=in action=allow  
 program="%SystemRoot%\System32\svchost.exe" service=Winmgmt protocol=TCP  
 localport=RPC profile=public,private,domain

For Windows 2003, if you are using a third-party firewall software or windows firewall software, then you need to configure the firewall exceptions to allow the traffic for port 135 and the dynamic RPC ports.

The port 135 must be open to accept the incoming remote connection to the Service Control Manager (SCM), which provides RPC-based services for DCOM. The port allows the client to locate a DCOM service.

**Note:** This procedure is required only if the port 135 is locked in the customer environment.

To open the DCOM port:

1. Click **Start**, and then click **Control Panel**.
2. Double-click **Windows Firewall**, and then click the **Exceptions** tab.
3. Click **Add Port**.

4. Type **DCOM\_TCP135** in the Name field, and **135** in the Port number field.
5. Click **TCP**, and then click **OK**.
6. Click **OK** and close the **Control Panel** window.

---

**Note:** You can also type the following command at a command prompt to open a port:  
netsh firewall add portopening protocol=tcp port=135 name=DCOM\_TCP135  
mode=ENABLE

---

#### Firewall exception rule for dllhost.exe

To create a firewall exception for dllhost.exe:

1. Click **Start > Control Panel > Windows firewall**.
2. Select **Exceptions** tab and click **Add Program**.
3. Click **Browse** and select **dllhost.exe** from the path  
%SystemRoot%\System32\dllhost.exe.

---

**Note:** You can also type the following command at a command prompt to create the above rule:  
netsh firewall add allowedprogram program="%systemRoot%\system32\dllhost.exe"  
name="dllhost.exe" mode=ENABLE

---

#### Make registry changes on a Windows Server 2008 R2 host

The following DCOM-related host registry changes are required to discover a Windows Server 2008 R2 host.

1. Run the **regedit** command to open the **Registry Editor** and navigate to the key **HKEY\_CLASSES\_ROOT\CLSID\76a64158-cb41-11d1-8b02-00600806d9b6**, which is for the WBEM Scripting Locator.
2. Right-click and select **Permissions**.
3. Choose the **Administrators** group and assign **Full Control**.
4. Click **Advanced**.
5. Click **Owner**, and change the owner to **Administrators** group.
6. Click **Apply** and **OK**.
7. Click **OK** and then exit the **Registry Editor**.

---

## Configure UNIX and Linux hosts

The following sections describe how to configure Linux and UNIX hosts for ProSphere discovery and performance data collection.

---

**Note:** ProSphere will copy the INQ binary executable on Unix and Linux hosts when discovery is scheduled using the SSH access profile.

---

## Discovery requirements

For discovery, ProSphere requires user credentials for Secure Shell (SSH) access to UNIX and Linux hosts. The user account used for discovery must be permitted access to the host to be discovered. These credentials are entered as SSH credentials in ProSphere. The *EMC ProSphere Administrator Guide* explains how to create access credentials.

## Run with root privileges

One important requirement for Linux/UNIX host discovery is the ability for some discovery commands to run as root user. This can be achieved through tools or commands, such as sudo.

### Use sudo for host discovery

Linux and UNIX host discovery requires use of the sudo command to elevate the discovery mechanism to root privilege for select commands. The sudo command enables you to:

- ◆ Temporarily elevate user credentials to root for specific commands that are configured in the sudoers file.
- ◆ Log on to a Linux or UNIX machine as a non-root user.
- ◆ Run SCSI commands to discover storage-related information for the host.

The following configuration must be set on the host when using sudo user for host discovery.

- ◆ The path of sudo command must be included in environment variable `$PATH` for the sudo user. The variable `$PATH` can be set either in `/etc/environment` or `/etc/default/login` or any other OS specific file.
- ◆ The paths of OS commands must be included in environment variable `$PATH` for sudo user. These paths are different for different operating systems.

Usually, most of the command files are located at the following locations by default:

```
/usr/local/sbin:/usr/local/bin:/sbin:/bin:/usr/sbin:/usr/bin
```

These paths should be included in `$PATH` variable.

- ◆ To test whether the path is correctly set, log in as sudo user, and run **which sudo** or **sudo**.
- ◆ The sudoers file must be available. By default, it is available in `/etc` or `/opt/sfw/etc/` or `/usr/local/etc/sudoers`.
- ◆ The sudo user should have root privilege to run the following commands on a given host for resource discovery:
  - `/tmp/nl_dwd/inq`
  - `<path of fcinfo command>/fcinfo`
  - `<path of powermt command>/powermt`
  - `<path of dmidecode command>/dmidecode`
  - `<path of sar command>/sar` (for collection of path performance data on AIX and HP-UX hosts)

**Note:** To allow a non-privileged ProSphere user to use the sar utility as root user, include the following line in the sudoers file:

```
srn ALL=(ALL) nopasswd: <path of sar command>/sar
```

For example:

```
srn ALL=(ALL) nopasswd: /usr/local/sbin/sar
```

**Note:** [Figure 2 on page 44](#) provides an example of additional, required sudoers file content. It is recommended that you do not edit the sudoers file with any editor other than visudo. The permissions for a valid sudoers file must be set to 440.

```
login as: cmguser
Password:*****
#sudo
usage: sudo -h | -K | -k | -L | -V
...
#which sudo
/usr/local/bin/sudo
#ls -l /etc/sudoers
-r--r----- 1 root      root          923 Dec 13 05:36 /etc/sudoers

login as: root
Password:*****
#visudo sudoers

# sudoers file.
#
# This file MUST be edited with the 'visudo' command as root.
#
# See the sudoers man page for the details on how to write a sudoers file.
#
# Host alias specification
# User alias specification
  User_Alias CMGU=cmguser
# Cmnd_alias specification
  Cmnd_Alias CMGEMC=/tmp/nl_dwd/inq,<path of powermt command>/powermt,<path
of dmidecode command>/dmidecode,<path of fcinfo command>/fcinfo, <path of
sar command>/sar
# Defaults specification
# User privilege specification
  root ALL=(ALL) ALL
  CMGU ALL=NOPASSWD:CMGEMC
# Uncomment to allow people in group wheel to run all commands
# %wheel ALL=(ALL) ALL
# Same thing without a password
# %wheel ALL=(ALL) NOPASSWD: ALL
# Samples
# %users ALL=/sbin/mount /cdrom,/sbin/umount /cdrom
# %users localhost=/sbin/shutdown -h now
#cmguser ALL=(ALL) NOPASSWD: ALL

login as: cmguser
Password:*****
#sudo fcinfo hba-port
HBA Port WWN: 10000000c9702593
...
#ls /tmp/nl_dwd/inq
/tmp/nl_dwd/inq
#sudo /tmp/nl_dwd/inq -mapinfo
```

**Figure 2** Sample sudoers file content for Linux/UNIX host discovery

## SSH key based authentication

ProSphere uses SSH private/public key based authentication that enables you to discover UNIX hosts with a private key. A public key needs to be present on all the UNIX hosts that are to be discovered using the private key.

You can choose any key generation tool to generate a valid public/private key pair.

These steps describe the procedure to generate a public and private key pair for UNIX hosts using the `ssh-keygen` tool.

1. For UNIX hosts outside of ProSphere, generate a public and private key pair using the command:

```
ssh-keygen -t rsa -f <location_of_the_private_key/name_of_private_key_file> -N "passphrase"
```

**Note:** Leave the passphrase blank if you do not choose to encrypt.

For example: `ssh-keygen -t rsa -f /root/.ssh/id_rsa -N""`

2. Ensure that the public and private key pair that is generated has the following permissions:

```
chmod 600 /root/.ssh/id_rsa  
chmod 644 /root/.ssh/id_rsa.pub
```

**Note:** The private key file is `id_rsa`, the public key file is `id_rsa.pub`.

3. To make the key pair functional, append the public key to `/root/.ssh/authorized_keys` in the target UNIX host using the following command:

```
cat <location_of_the_private_key/name_of_private_key_file> >>  
/root/.ssh/authorized_keys
```

For example:

```
cat /root/.ssh/id_rsa.pub >> /root/.ssh/authorized_keys
```

4. Copy the private key (that is, `/root/.ssh/id_rsa`) to the ProSphere Discovery Engine:
  - a. Copy the private key to any location on the machine from which ProSphere is accessed.

- b. Use the **Import Private key** button on the **Create Access Credentials** dialog box to get the key from the machine where ProSphere is accessed and copy the key to the ProSphere Application. The following graphic illustrates the **Import Private key** button.

The screenshot shows a dialog box titled "Create Access Credentials - SSH". It is divided into two main sections: "Access Credentials" and "SSH Attributes".

**Access Credentials:**

- Type: SSH (dropdown menu)
- Name: (empty text field)
- Description: Applicable to discover all UNIX hosts (text area)
- Make this a global access credential: (unchecked checkbox)

**SSH Attributes:**

- Applicable to discover all UNIX hosts: (checked checkbox)
- Port: 22 (text field)
- User Name: (empty text field)
- Password: (empty password field)
- Confirm Password: (empty password field)
- Sudo (Non-root Privileges): (checked checkbox)
- Use Private Key: (checked checkbox)
- Private Key: (empty text field) with an "Import Private key" button next to it, which is circled in red.
- Passphrase: (empty text field)

## Collect performance data

For collection of path performance data, specific software (depending on host Operating System) must be running on the host.

- ◆ Solaris — iostat
- ◆ Linux (RedHat and SuSE) — The iostat package version 5.0.5 must be installed on the Linux host for successful path performance collection. If the package is not installed, path performance collection fails with the error "Failed to discover performance metrics."
- ◆ AIX — sar
- ◆ HP-UX — sar
- ◆ Windows 2000 and later — The Windows Management Instrumentation (WMI) service must be enabled and running.

Consult the relevant manpages and user documentation for installation and configuration instructions for these tools.

Contact your UNIX vendor for information about downloading and installing their iostat (or sar) package.

---

## Prepare for discovery of VMware guests

A VMware guest is the operating system on a virtual machine.

For ProSphere to discover a host where a VMware guest resides (that is, discover a virtual machine rather than a physical host), VMware tools is required. Work with your VMware admin to have VMware tools installed on VMware guests.

If VMware Tools are not installed on a VMware guest, ProSphere cannot discover the virtual machine where the VMWare guest resides.

---

## Prepare for discovery of VMware infrastructure

The virtual infrastructure of VMware environments is discovered by ProSphere from vSphere vCenter using the Virtual Infrastructure (VI) API. This Web Services API is hosted on vCenter servers and can be accessed by ProSphere for resource discovery. For more information about this service interface, refer to the VMware vSphere Web Services Documentation at:

<http://www.vmware.com>

---

## Discovery requirements

For virtual infrastructure discovery, ProSphere requires:

- ◆ Assignment of individual ESX credentials or assignment of VirtualCenter credentials. In either case, Read-only permissions must be included, with the addition of Browse Datastore and StorageViews—View permissions. These credentials are entered as VMware Infrastructure credentials in ProSphere. The *EMC ProSphere Administrator Guide* provides instructions for creating discovery access credentials.
- ◆ Unblocked access to the IP address of the Web Services interface on all VMware ESX and VirtualCenter servers to discover.



---

This chapter provides configuration instructions for array data providers used by EMC ProSphere, such as SMI-S providers, to support resource discovery and data collection.

This chapter includes the following sections:

- ◆ [Configure the EMC SMI-S Provider .....](#) 50
- ◆ [Configure the EMC Control Station for NAS.....](#) 53

---

## Configure the EMC SMI-S Provider

The EMC SMI-S Provider provides partners and other product groups with an industry-standard SNIA interface to EMC arrays, which produces faster solution development. Ultimately, it ensures interoperability and simplified management of customers' network environments. EMC SMI-S Provider supports the SNIA Storage Management Initiative (SMI), an ANSI standard for storage management.

The SMI strives to ensure consistent data by providing a unified interface to the many storage objects that must be managed in a storage environment. This enables application developers to focus on a single standard interface for the development of management tools.

The EMC SMI-S Provider has been paired with the EMC Common Object Manager (ECOM) to provide an SMI-compliant interface for EMC Symmetrix® and VNX™/CLARiiON® arrays. ProSphere collects resource and performance data for EMC Symmetrix, VNX and CLARiiON storage arrays using the EMC SMI-S Provider..

---

### Requirements for discovery data collection

To discover supported Symmetrix, VNX, and CLARiiON storage devices and collect resource data from them in ProSphere, the following requirements must be met:

- ◆ A host that manages and monitors a Symmetrix array needs six dedicated gatekeepers from each Symmetrix array.
- ◆ A supported version of the EMC SMI-S Provider for the array must be installed on a host that has FC connectivity to Symmetrix arrays and IP connectivity to the CLARiiON/VNX arrays

---

**Note:** To be discovered, a Symmetrix array must have connectivity to the host where the SMI-S Provider is installed. Only FC connected arrays in a remote replication configuration are discovered in ProSphere, so multiple SMI-S Providers are needed to discover all the arrays. Refer to the SMI-S release notes to determine scalability limitations. Therefore, you should install SMI-S Providers on hosts in such a way that each array has connectivity from at least one SMI-S Provider host.

---

The EMC SMI-S Provider is available for download from the EMC Online Support site ([support.emc.com](http://support.emc.com)) and may optionally be provided by EMC on CD-ROM. Installation instructions can be downloaded with the software in the *EMC SMI-S Provider Release Notes*.

---

**Note:** When installing the EMC SMI-S Provider, EMC Solutions Enabler is also installed. Any previous version of EMC Solutions Enabler will be uninstalled, and the new version of EMC Solutions Enabler will be installed. You may need to install the additional EMC Solutions Enabler daemons that are not included in the basic SMI-S Provider /EMC Solutions Enabler installation.

---

**Note:** Only one version of EMC SMI-S Provider and EMC Solutions Enabler can be installed on the same host.

- 
- ◆ The EMC SMI-S Provider host must be accessible by ProSphere in the TCP/IP network. The host IP address, access port, username, password, and namespace for the provider must be known to enter these as access credentials in ProSphere.

These credentials are entered as SMI-S credentials. The EMC ProSphere Administrator Guide provides instructions for creating discovery access credentials.

- ◆ VNX/CLARiiON SPA IP address or FQDN, VNX/CLARiiON SPB IP address or FQDN, and VNX/CLARiiON username and password must be known.

---

## Requirements for performance data collection

EMC Unisphere for VMAX must be installed in order to display performance data for the “Array FE Directors - % busy” metric as well as handle Symmetrix Performance Analyzer alerts in ProSphere.

“[Integrate ProSphere with Unisphere for VMAX](#)” on page 105 provides configuration details.

In vCenter, the security level must be set to 2 or 3 to collect performance data.

---

## Configure the provider

The EMC SMI Provider must be configured to access the arrays before ProSphere can discover the arrays. The EMC SMI-S Provider release notes contain instructions for setting up the Provider.

### Verify the setup of the EMC SMI-S Provider

- ◆ To verify that the EMC SMI-S Provider is correctly set up, use the TestSmiProvider tool that is installed with the Provider on the provider host.
- ◆ ProSphere array discovery requires the IP address of the EMC SMI Provider host, SMI Access Credentials that include the EMC SMI Provider user/password (default credentials are user = “admin”, password = “#1Password”), SMI provider port #, and SSL Enabled setting.

**Note:** The EMC SMI Provider user/password is not the same as the array credentials previously mentioned for VNX/CLARiiON.

The connection to the EMC SMI-S Provider can be validated using the Discovery Job status information. Essentially, if arrays are detected then the SMI Access Credentials are correct. If arrays are not detected, then check the Discovery Job status information for errors (usually the provider is either down, the provider user/password is incorrect, the incorrect port was specified, or the SSL enabled setting is incorrect). To sanity check these settings, go to the EMC SMI Provider host, verify that the provider is running, and use the TestSmiProvider application to establish a connection to the Provider using the same information supplied in the access credentials.

- ◆ For VMAX/Symmetrix arrays, it is important to keep in mind that ProSphere only supports VMAX/Symmetrix arrays that are fibre-attached to the EMC SMI-S Provider host. This is known as a “local” connection to the provider. VMAX/Symmetrix arrays that are “remote” attached to the EMC SMI-S Provider through other intermediate arrays using RDF connections are excluded from discovery by ProSphere. The TestSmiProvider Display Version (“dv”) command will show which Symmetrix and Clariion arrays are connected to the provider and whether they are local or remote.

For VNX/CLARiiON, this means that the IP addresses for Service Processor A

and Service Processor B, as well as a “username and password of the CLARiiON or VNX array that is of administrator-level privilege with global scope” (quoted from the *EMC SMI-S Provider Release Notes*), must be specified.

- For VNX/CLARiiON that is fibre-connected to the EMC SMI-S Provider host (“local” to provider): the customer must configure the provider for in-band discovery of the VNX/CLARiiON as detailed in the *EMC SMI-S Provider Release Notes*.
- For VNX/CLARiiON that is TCP/IP connected to the EMC SMI-S Provider host (“remote” to provider): the customer must configure the provider for out-of-band discovery of the VNX/CLARiiON as detailed in the *EMC SMI-S Provider Release Notes*.

---

## Replace the EMC SMI-S provider host

Typical reasons for replacing an EMC SMI-S provider host are:

- ◆ You have decided to decommission the current host.
- ◆ The current host does not have enough memory or cpu to manage storage arrays.

Use this procedure:

1. Decommission the current SMI-S provider host.
2. If you will continue to use the host for a different purpose, uninstall the EMC SMI-S provider from the host.
3. Install the EMC SMI-S provider on the new host and add arrays.
4. Rerun the initiation discovery job using the provider IP of the new EMC SMI-S Provider host.

ProSphere starts using the new provider on the new host. Performance data collection for arrays is through the new provider as well.

## Configure the EMC Control Station for NAS

ProSphere NAS discovery requires access to Control Station with the NAS license enabled either for CIFS, NFS or both. Optionally, the “snapsure” license can be enabled. The user can check and enable the required license through the NAS CLI or the Unisphere UI for Control Station. For the most recent details, refer to the NAS Control Station documentation.



### **IMPORTANT**

**Ports 7 and 443 must be open to permit a successful VNX file or Celerra discovery in ProSphere 2.0.**

### Verify NAS licenses using Control Station

The following sections explain how to verify NAS licenses with Control Station for different NAS models.

#### Verify NAS licenses for all NAS models

For all NAS models, you can verify the NAS license using the Control Station CLI.

1. Login to the NAS CLI using the username and password for the NAS administrator.
2. Type the command `nas_license -list` to display existing licenses:

```
[nasadmin@lglad245 ~]$ nas_license -list
key          status      value
site_key     online     50 17 df d9
filelevelretention online
replicatorV2 online
cifs         online
nfs          online
```

#### Enable a NAS license

To enable the license use this command:

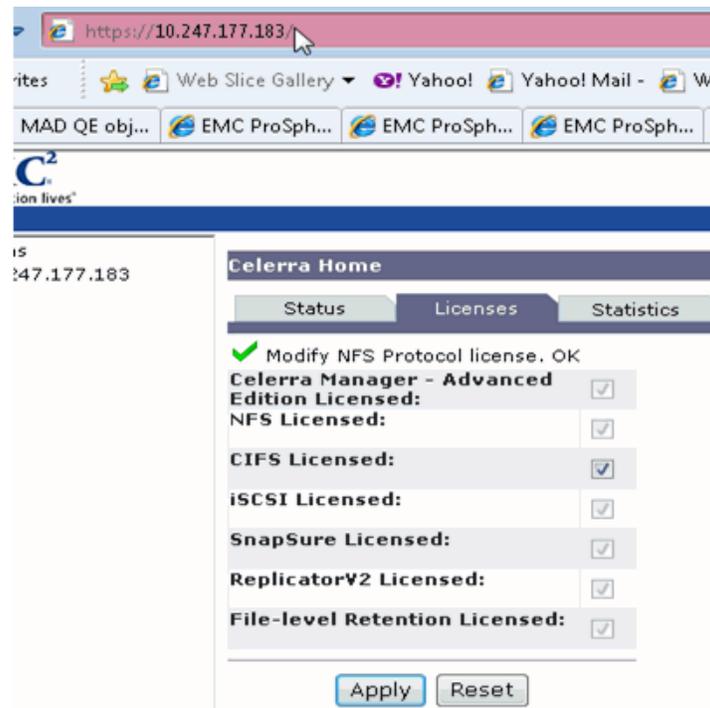
```
nas_license -create nfs (or cifs, or snapsure)
```

#### Verify licenses for older NAS models

To verify licenses for older NAS models, such as Celerra Integrated:

1. Open a browser (`https://<control-station-ip>`) to NAS Control Station.

2. Click the **Licenses** tab.



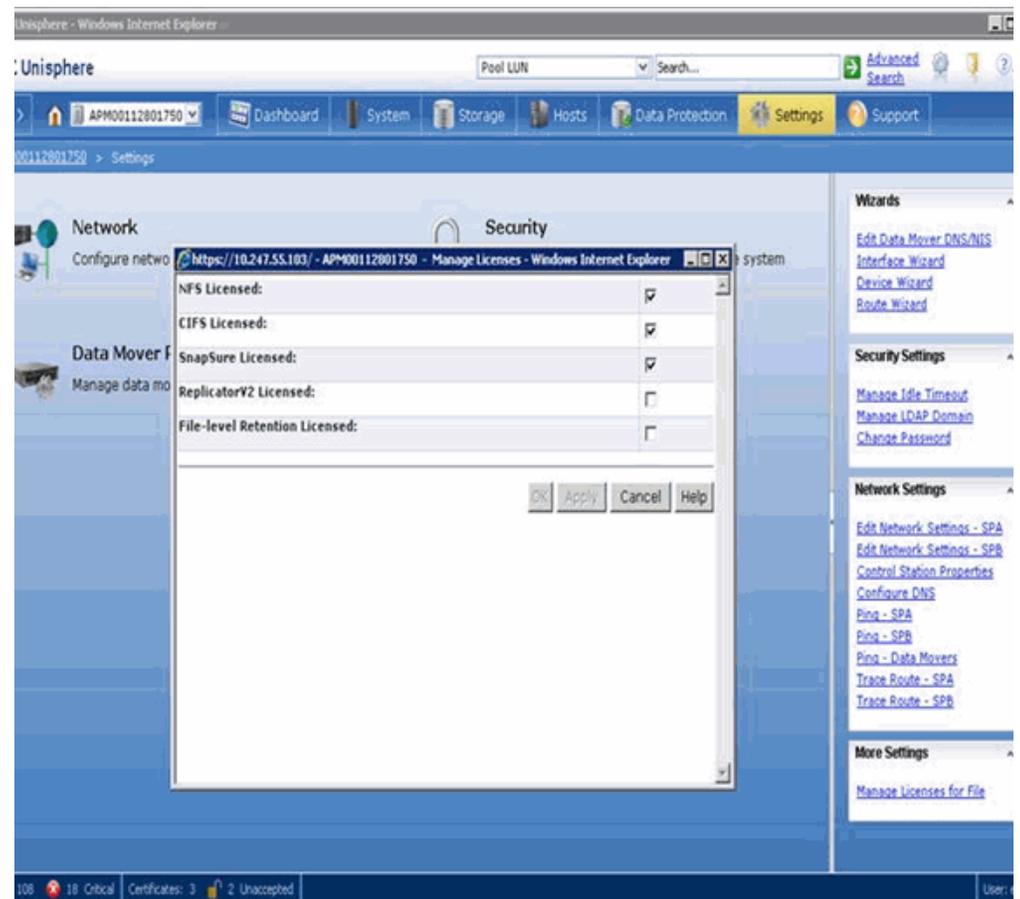
3. View or edit settings.

### Verify licenses for newer NAS models

To verify licenses for newer NAS models, such as VNX Unified:

1. Open a browser (<https://<control-station-ip>>) to NAS Control Station to view and edit license settings.
2. Select **Settings**.
3. Select **More Settings**.

#### 4. Select Manage Licenses for file.



#### 5. View or edit settings.



---

This chapter provides configuration instructions for switches to support resource discovery and data collection in EMC ProSphere.

The chapter includes the following sections:

- ◆ [Configure Cisco switches](#) ..... 58
- ◆ [Configure Brocade SMI Agents](#) ..... 63

## Configure Cisco switches

This section applies to homogeneous fabrics that contain one or more Cisco switches.

ProSphere supports two modes of SNMP communications for Cisco switches: the less secure SNMPv1/v2 mode and more secure SNMPv3 mode.

### Perform preconfiguration tasks

Before you discover a Cisco switch or a homogeneous Cisco fabric in ProSphere:

1. Ensure all hardware (including switch model) and software is listed as supported in the *EMC ProSphere Support Matrix*.
2. Verify the TCP/IP connectivity to the switches to be discovered. Test by issuing a **ping** command to these switches.

Determine if SNMP traps are enabled. Log in to the switch and run the **show snmp trap** command, as in the following example:

---

```
SWDevCisco8-9216i# show snmp trap
```

| <u>Trap type</u> |                               | <u>Enabled</u> |
|------------------|-------------------------------|----------------|
| entity           | : entity_mib_change           | Yes            |
| entity           | : entity_module_status_change | Yes            |
| entity           | : entity_power_status_change  | Yes            |
| entity           | : entity_module_inserted      | Yes            |
| entity           | : entity_module_removed       | Yes            |
| entity           | : entity_unrecognised_module  | Yes            |
| entity           | : entity_fan_status_change    | Yes            |
| entity           | : entity_power_out_change     | Yes            |
| link             | : linkDown                    | Yes            |
| link             | : linkUp                      | Yes            |
| link             | : extended-linkDown           | Yes            |
| link             | : extended-linkUp             | Yes            |
| link             | : cieLinkDown                 | Yes            |
| link             | : cieLinkUp                   | Yes            |
| link             | : connUnitPortStatusChange    | Yes            |
| link             | : fcTrunkIfUpNotify           | Yes            |
| link             | : fcTrunkIfDownNotify         | Yes            |
| link             | : delayed-link-state-change   | Yes            |
| link             | : fcot-inserted               | Yes            |
| link             | : fcot-removed                | Yes            |
| callhome         | : event-notify                | No             |

---

|          |                                 |     |
|----------|---------------------------------|-----|
| callhome | : smtp-send-fail                | No  |
| cfs      | : state-change-notif            | No  |
| cfs      | : merge-failure                 | No  |
| fcdomain | : dmNewPrincipalSwitchNotify    | No  |
| fcdomain | : dmDomainIdNotAssignedNotify   | No  |
| fcdomain | : dmFabricChangeNotify          | No  |
| rf       | : redundancy_framework          | Yes |
| aaa      | : server-state-change           | No  |
| license  | : notify-license-expiry         | Yes |
| license  | : notify-no-license-for-feature | Yes |
| license  | : notify-licensefile-missing    | Yes |
| license  | : notify-license-expiry-warning | Yes |
| scsi     | : scsi-disc-complete            | No  |
| fcns     | : reject-reg-req                | No  |
| fcns     | : local-entry-change            | No  |
| fcns     | : db-full                       | No  |
| fcns     | : remote-entry-change           | No  |
| rscn     | : rscnElsRejectReqNotify        | No  |
| rscn     | : rscnIlsRejectReqNotify        | No  |
| rscn     | : rscnElsRxRejectReqNotify      | No  |
| rscn     | : rscnIlsRxRejectReqNotify      | No  |
| fcs      | : request-reject                | No  |
| fcs      | : discovery-complete            | No  |
| fctrace  | : route                         | No  |
| zone     | : request-reject1               | No  |
| zone     | : merge-success                 | No  |
| zone     | : merge-failure                 | No  |
| zone     | : default-zone-behavior-change  | No  |
| zone     | : unsupp-mem                    | No  |
| vni      | : virtual-interface-created     | No  |
| vni      | : virtual-interface-removed     | No  |
| vsan     | : vsanStatusChange              | No  |
| vsan     | : vsanPortMembershipChange      | No  |
| fspf     | : fspfNbrStateChangeNotify      | No  |
| upgrade  | : UpgradeOpNotifyOnCompletion   | Yes |

|                 |                              |     |
|-----------------|------------------------------|-----|
| upgrade         | : UpgradeJobStatusNotify     | Yes |
| feature-control | : FeatureOpStatusChange      | No  |
| vrrp            | : cVrrpNotificationNewMaster | No  |
| fdmi            | : cfdmiRejectRegNotify       | No  |
| snmp            | : authentication             | No  |

In this example, many of the traps are not enabled. EMC recommends enabling all traps, unless there is a compelling reason not to do so.

3. Enable SNMP traps. Run the **snmp-server enable traps** command, as in the following example:

```
SWDevCisco8-9216i# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
SWDevCisco8-9216i (config)# snmp-server enable traps
```

4. Display the traps that are enabled. Run the **show snmp trap** command. The values in the **Enabled** column should be **Yes**.

EMC recommends that all switches in the Cisco fabric have the same SNMP credentials for use with ProSphere. For example, if the SNMPv1/v2 community setting private is used, all Cisco switches in the fabric should have the SNMPv1/v2 private community name set with a role of network-admin. For an SNMPv3 user, the same SNMPv3 credentials with the role of network-admin should be set on every switch in the fabric.

**Note:** ProSphere displays the Cisco VSAN fabric as partially discovered if no community string was provided during its configuration.

Cisco switch discovery is initiated by pointing ProSphere discovery dialog to a seed switch. ProSphere discovers all switches in the fabric by obtaining the fabric members from the seed switch. Therefore, all Cisco switches need to have either SNMPv1/2 or SNMPv3 configuration set.

ProSphere discovers all the connected switches in a physical fabric.

ProSphere does not support discovery of Cisco switches over FCIP connections. To discover a Cisco fabric that contains FCIP connections, discover a Cisco switch on either side of the FCIP connection.

ProSphere does not support Cisco device aliases or Cisco enhanced device aliases.

## Configure switches for SNMPv1/2

The SNMPv1/2 information you enter when performing discovery is necessary for ProSphere to contact the switch to obtain information. ProSphere collects data from the switch using the same SNMP community name. It uses SNMP port for communication. This is normally hard set to port 161.

1. Refer to the Cisco documentation for detailed information on configuring Cisco switches for SNMPv1/v2 management.
2. The Cisco switches must have an SNMPv1 community name that has read only privileges set on every switch in the fabric. The SNMP community selected must have a network-operator role.

- Log in to the switch and log in as an administrator.
- Use the **snmp-server community** command to configure read-only privileges as shown in the next example:

```
Cisco8-9216i# config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Cisco8-9216i (config)# snmp-server community eccuser ro
```

- To determine if an SNMPv1 community user exists, log in to the switch and run the command as shown in following example:

```
Cisco8-9216i# show snmp community
```

| <u>Community</u> | <u>Group / Access</u> |
|------------------|-----------------------|
| eccuser          | network-admin         |

- Set the ProSphere Discovery Engine as the SNMPv1/2 trap destination.

---

### Configure switches for SNMPv3

This section contains guidelines on creating SNMPv3 users for discovery of and management of Cisco switches in ProSphere.

The SNMPv3 information you enter when performing discovery is necessary for ProSphere to contact the switch to obtain information. ProSphere collects data from the switch using SNMPv3 secure credentials. ProSphere uses the SNMP port for communication. ProSphere supports SNMPv3 with all the combinations of Auth (MD5, SHA) and Priv (AES, DES, NONE).

---

**Note:**

EMC recommends creating the same SNMP v3 users with the same authentication and privacy passwords on all physical switches in the fabric.

The Cisco documentation provides information on creating SNMP v3 users on Cisco MDS switches.

---

For example, to create an SNMPv3 user called ECCuser with a network-operator role, SHA authorization, and AES128 authentication, do the following:

- Run the **snmp-server user** command as shown in following example:

```
Cisco8-9216i# config terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
Cisco8-9216i (config)#snmp-server user ECCuser network-operator  
auth sha <SHA-password> priv aes-128 <AES-password>
```

2. Confirm the new user creation by running the **show snmp user** command as shown in the following example:

```
SWDevCisco8-9216i# show snmp user
```

---

| SNMP USERS  |             |                      |                  |
|-------------|-------------|----------------------|------------------|
| <u>User</u> | <u>Auth</u> | <u>Priv(enforce)</u> | <u>Groups</u>    |
| admin       | md5         | no                   | network-admin    |
| ECCuser     | sha         | aes-128 (no)         | network-operator |

---

```
NOTIFICATION TARGET USERS (configured for sending V3 Inform)
```

---

| <u>User</u> | <u>Auth</u> | <u>Priv</u> |
|-------------|-------------|-------------|
|-------------|-------------|-------------|

---

```
SWDevCisco8-9216i#
```

3. Set the ProSphere Discovery Engine as the SNMPv3 trap destination.

## Configure Brocade SMI Agents

ProSphere discovers and manages Brocade FC switches through the Brocade SMI Agent; therefore, the Brocade SMI Agent must be installed and configured as a prerequisite to discovery of Brocade switches by ProSphere.

Brocade has incorporated their SMI Agent into the following products:

- ◆ Connectrix Manager Converged Network Edition (CMCNE) and Brocade Network Advisor (BNA)
- ◆ Connectrix Manager Data Center Edition (CMDCE) and Data Center Fabric Manager (DCFM)

Refer to the *EMC ProSphere Support Matrix* to determine the versions of these Brocade products supported by ProSphere. Refer to the CMCNE or CMDCE and/or Brocade SMI Agent documentation for installation and configuration instructions.

“CMCNE” on page 109 explains how to integrate CMCNE with ProSphere.

In order to integrate ProSphere functions with Brocade products, you require licensed versions of one of the following: (1) BNA (2) CMCNE (Professional Plus or Enterprise Edition). The trial versions of BNA or CMCNE (Professional Plus or Enterprise Edition) can be used only for 75 days. The release notes for BNA, and the release notes for CMCNE provide detailed information on the product licensing.

You can install CMCNE with an option of either an integrated Brocade SMI Agent (SAN with Brocade SMI Agent) or just the Brocade SMI Agent only (headless installation).

Table 4 on page 63 lists the features of ProSphere supported by various versions of CMCNE or BNA.

**Table 4** ProSphere features supported by CMCNE/BNA

| CMCNE/BNA License type                         | Topology discoveries | Performance Data Collection | Alert Collection | Launch-in-Context |
|------------------------------------------------|----------------------|-----------------------------|------------------|-------------------|
| Headless Installation (Brocade SMI Agent only) | Yes                  | Yes                         | Yes              | No                |
| Valid Trial License                            | Yes                  | Yes                         | Yes              | Yes               |
| Fully Licensed                                 | Yes                  | Yes                         | Yes              | Yes               |



This chapter provides instructions for the deployment of EMC ProSphere. The following sections detail ProSphere deployment:

- ◆ [Deploy ProSphere with the vSphere Client.....](#) 66
- ◆ [Deploy ProSphere with the vCloud Director .....](#) 72
- ◆ [Next steps .....](#) 74

You can use the vSphere Client or vCloud Director to deploy ProSphere.



#### **IMPORTANT**

**EMC recommends that after the ProSphere vApp has been deployed, but before you power it on for the first time, you take a snapshot of the virtual machine under the vApp folder. Make sure the option to power on the virtual machine after installation is unchecked. Then power on ProSphere from the vApp folder. If ProSphere does not start and run correctly, you can revert back to the snapshot and edit the vApp properties to correct any mistyped information, then power on the vApp from the vApp folder. After ProSphere is running correctly, the snapshot should be deleted. After the vApp is powered on, changes to vApp properties are not supported.**

---

## Deploy ProSphere with the vSphere Client

The deployment files for ProSphere include an .ovf file (small) and its related and co-located .vmdk files (large). Download these files from the EMC Online Support Site (support.emc.com) or another location specified by EMC. Place these files into a single folder in a local file share or URL location that is accessible to the vSphere Client. The vSphere Client downloads these files and transmits them to the ESX or ESXi server.

---

**Note:** A checksum error is displayed during deployment, even if one file is missing. The current and complete names of the .ovf and .vmdk files with the build numbers can be obtained from the *EMC ProSphere Release Notes*.

---

---

### Deployment time

The overall deployment time can be significantly affected by:

- ◆ vSphere Client location in the network
- ◆ File transfer speeds
- ◆ Network performance in the environment

Therefore, EMC recommends that you deploy ProSphere and Collector from within a LAN shared by the VMware environment to save time. A vSphere Client running on a laptop with a small bandwidth virtual private network (VPN), may take several hours to deploy. However, a vSphere Client running in the same, fast local area network (LAN) as the VMware servers may take only a few minutes to deploy.

---

### Deploy ProSphere

---

**Note:** Repeat this procedure for each ProSphere instance that you want to deploy.

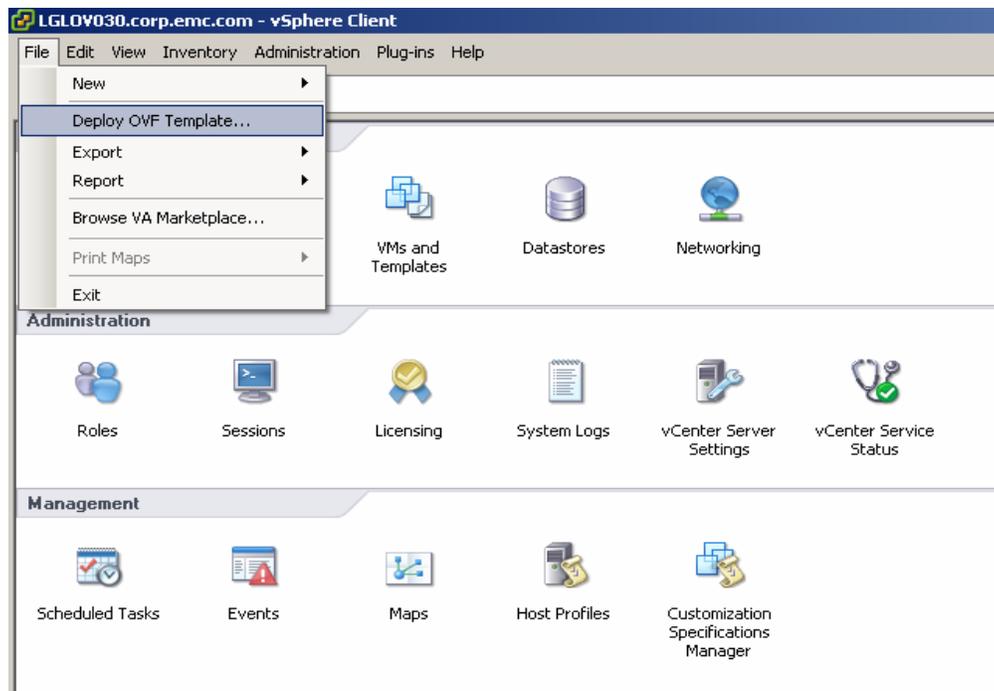
---

1. Open the vSphere Client and connect to the vCenter server managing the VMware environment.
2. Select **File > Deploy OVF Template**, as shown in the figure.

---

**Note:** Online help is available at each step of the **Deploy OVF Template** dialog box in the vSphere Client. But this help is not specific to ProSphere. Consult your VMware administrator if you are uncertain about any of these steps. For example, you may be uncertain about inventory location to select and so on.

---



3. In the **Source** step, browse to a file path or type an URL for the ProSphere-2.0.x.x.xxx.ovf file. Click **Next**.
4. In the **OVF Template Details** step, review the details of the loaded .ovf file. Click **Next**.
5. In the **End User License Agreement** step, review the product license agreement, then click **Accept** followed by **Next**.
6. In the **Name and Location** step, type a unique **Name** (for example, Local ProSphere deployment) and specify an **Inventory Location** in the VMware environment for the ProSphere vApp and its virtual machines. Click **Next**.
7. In the **Host/Cluster** step, select a choice (cluster, host, or both) on which the ProSphere vApp will run. Click **Next**.
8. In the **Resource Pool** step, select a resource pool (associated with the previously selected cluster or host) in which the ProSphere vApp will run. This step is required only if a resource pool has been predefined. Click **Next**.
9. In the **data store** step, select a data store to hold the virtual machine images for ProSphere. If the Thick disk format is selected, the data store should have a minimum 600 GB of space available. Click **Next**.
10. In the **Disk Format** step, for some data stores you are required to select the storage space provisioning method for the virtual machine.
 

*Example options include:*

**Thin provisioned format** (expansion of available storage for the virtual machine on demand) for newer data store file systems.

**Thick provisioned format** (virtual machine storage is allocated and reserved as a block).

Click **Next**.
11. In the **Network Mapping** step, select a destination network for each of the virtual machines in ProSphere.

The vSphere Client may display the warning “Multiple source networks are mapped to the host network” if multiple virtual machines are mapped to the same destination network. Ignore this message.

---

**Note:** In the VMware environment, each selected destination network must have an IP Pool associated with it.

---

Click **Next**.

12. In the **Properties** step, specify the required configuration fields. The description of property appears in red if the required value is missing or incorrect from the dialog box. The properties to set are the following.

---

**Note:** Ensure you specify only the relevant DNS and search domains.

---

### ProSphere Setting

|                  |                                                                                     |
|------------------|-------------------------------------------------------------------------------------|
| Timezone setting | Server timezone to set on the Linux virtual machines deployed as part of ProSphere. |
|------------------|-------------------------------------------------------------------------------------|

### ProSphere Application Settings

|                                |                                                                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| ProSphere Application Hostname | Hostname (FQDN) to assign to the ProSphere Application virtual machine (for example, <b>ProSphere.abc.mycompany.com</b> ) |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|

|                                  |                                                                                                                                                                                      |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ProSphere Application IP Address | IP address to assign to the ProSphere Application virtual machine. This IP address must be registered with the appropriate domain name servers and resolve for a reverse DNS lookup. |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                               |                                          |
|-------------------------------|------------------------------------------|
| ProSphere Application Gateway | Subnet gateway for hosts in the network. |
|-------------------------------|------------------------------------------|

|                                   |                                                                                                                                                      |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| ProSphere Application DNS Servers | Comma-separated list of domain name servers (DNS) available in the network selected for the ProSphere Application and Key Distribution Center (KDC). |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|

|                               |                                                                                                                                                                                                                                                                                                                                |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ProSphere Application Netmask | Enter at most two IP addresses. In vCenter if the Edit Settings option is used to put more than two IP addresses in the DNS field, or if during the deployment of the ProSphere appliance more than two IP addresses are provided, then when the appliance is rebooted, vCenter does not update DNS settings on the appliance. |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                        |                                                                                           |
|----------------------------------------|-------------------------------------------------------------------------------------------|
| ProSphere Application Search Domain(s) | Space-delimited list of domains used in the network selected and the domain name for KDC. |
|----------------------------------------|-------------------------------------------------------------------------------------------|

### Discovery Engine Settings

|                           |                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------|
| Discovery Engine Hostname | Hostname to assign to the Discovery Engine (for example, <b>ProSphere-discovery050</b> ). |
|---------------------------|-------------------------------------------------------------------------------------------|

---

|                                      |                                                                                                                                                                                                                                                                                              |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IP Address                           | IP address to assign to the Discovery Engine if a fixed IP address scheme is in use. This IP address must be registered with the appropriate domain name servers and resolve for a reverse DNS lookup.                                                                                       |
| Discovery Engine Netmask             | Netmask applied to IP addresses in the network.                                                                                                                                                                                                                                              |
| Discovery Engine Gateway             | Subnet gateway for hosts in the network.                                                                                                                                                                                                                                                     |
| Discovery Engine DNS Servers         | Comma-separated list of domain name servers (DNS) available in the network selected and the DNS for KDC.<br><br>Enter at most two IP addresses.                                                                                                                                              |
| Discovery Engine Search Domain(s)    | Space-delimited list of domains used in the network selected and the domain name for KDC.<br><br><b>Note:</b> Be sure to enter a value. Otherwise, when collecting host data DNS resolution fails and hosts discovered on the affected element managers will not appear in the Objects List. |
| <b>Historical Database Settings</b>  |                                                                                                                                                                                                                                                                                              |
| Historical Database Hostname         | Desired network name for the virtual host on which the database will be deployed.                                                                                                                                                                                                            |
| Historical Database IP Address       | IP address to be used for access to the database virtual host if a fixed IP address scheme is in use. This IP address must be registered with the appropriate domain name servers and resolve for a reverse DNS lookup.                                                                      |
| Historical Database Netmask          | Netmask applied to IP addresses in the network.                                                                                                                                                                                                                                              |
| Historical Database Gateway          | Subnet gateway for hosts in the network.                                                                                                                                                                                                                                                     |
| Historical Database DNS Servers      | Comma-separated list of domain name servers (DNS) available in the network selected and the DNS for KDC.<br><br>Enter at most two IP addresses.                                                                                                                                              |
| Historical Database Search Domain(s) | Space-delimited list of domains used in the network selected and the domain name for KDC.                                                                                                                                                                                                    |

Click **Next**.

- In the **Ready to Complete** step, review the list of properties that you specified for ProSphere deployment. If you need to change a value, click **Back** to return to change the previous steps. Click **Finish** to start the deployment. A status bar is displayed in the vSphere Client, showing the deployment progress.

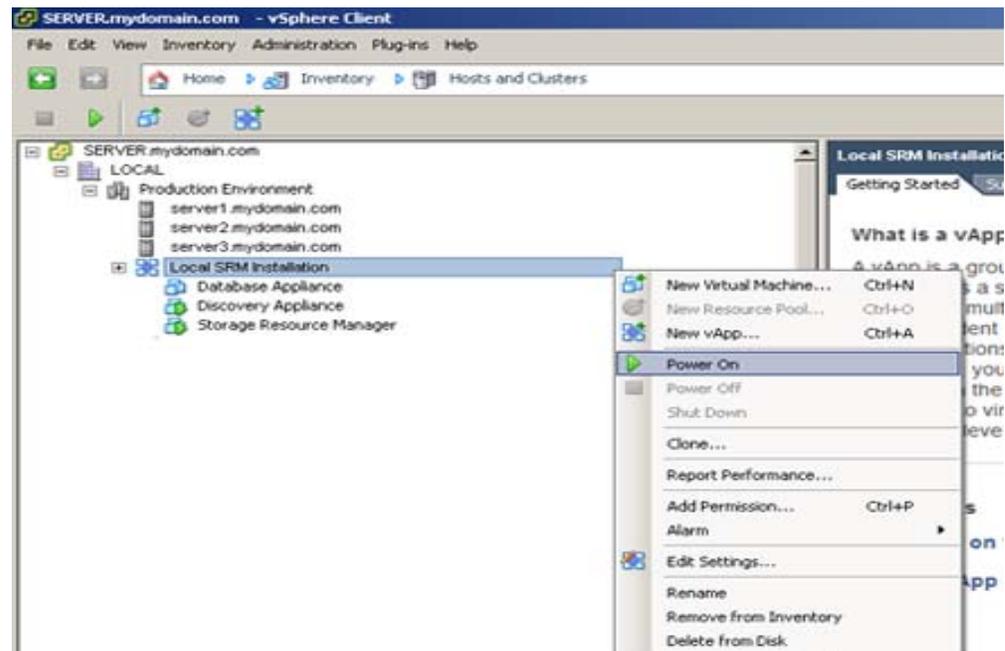
Wait for the **Deployment Completed Successfully** dialog box to appear.

- Click **Close** to close the dialog box.

15. In the vSphere Client, navigate to the **Hosts & Clusters** view.
  - a. Expand the tree in the left panel of this view.
  - b. Locate the cluster and host that you selected for ProSphere during deployment. You will see three new virtual machines:
    - Historical Database
    - Discovery Engine
    - ProSphere Application under the name of the vApp (for example, **Local ProSphere deployment**).
16. Start ProSphere manually after deployment. To start ProSphere in the vSphere Client:
  - a. Right-click the vApp name you assigned during deployment (for example, **Local ProSphere deployment**).
  - b. Select **Power On**, as shown in the figure. vSphere Client will display the power on status in the **Recent Tasks** bar at the bottom of the client.

Wait until all virtual machines have started and the **Status** of the **Start vApp** task for the vApp name (for example, **Local ProSphere deployment**) under the **Recent Tasks** view is listed as **Completed** before proceeding.

**Note:** The first time the database appliance is started, it might take a while to build the required tables and perform other initialization steps.



You are now ready to start using ProSphere through its Web-based Console.

**Note:** If it is necessary to remove the ProSphere vApp and its dependent virtual machine from your VMware environment, follow the procedures recommended by your organization.

---

## Deploy ProSphere with the vCloud Director

The deployment files for ProSphere include an .ovf file (small) and its related and co-located .vmdk files (large). Download these files from the EMC Online Support Site (support.emc.com) or another location specified by EMC. Place these files into a single folder in a local file share or URL location that is accessible to the vCloud Director.

---

**Note:** A checksum error is displayed during deployment, even if one file is missing. The current and complete names of the .ovf and .vmdk files with the build numbers can be obtained from the EMC ProSphere Release Notes.

---

**Note:** ProSphere only supports vCloud Director 5.1 or later.

---

### Deployment time

The overall deployment time can be significantly affected by:

- ◆ The latency between the vCloud Director server and the share location in the network
- ◆ File transfer speeds
- ◆ Network performance in the environment

Therefore, to save time EMC recommends that you deploy ProSphere, and any Collectors or Secondary ProSphere Application, from within a LAN shared by the VMware environment. If you connect to vCloud Director from a browser session on a laptop across a small bandwidth virtual private network (VPN), it may take several hours to upload the vApp template. However, a vCloud Director server session launched from a browser running in the same, fast local area network (LAN) as the vCloud Director may take only a few minutes to upload.

---

### Deployment procedure

Deploying ProSphere using the vCloud Director includes the following procedures:

- ◆ [“Create a vCloud catalog” on page 72](#)
- ◆ [“Upload deployment files to the catalog” on page 72](#)
- ◆ [“Deploy the ProSphere vApp from the vApp template” on page 73](#)

#### Create a vCloud catalog

1. Go to the Catalogs tab.
2. Click the plus (+) button
3. Type a name for the catalog.
4. If you want to share the catalog with others in your organization, click **Next**. Otherwise, click **Finish**.

#### Upload deployment files to the catalog

1. In the **Catalogs** tab, select the catalog you created.
2. Select the **Media** tab.

3. Click on the wheel icon to bring up an option menu then select **Upload**. This displays the **Upload Media** dialog box.
4. Click **Browse** and select the ProSphere.ovf file. After uploading, the files will be stored as a vApp Template.
5. Enter a name for the vApp Template in the **Name** field.
6. Enter a description for the vApp Template (such as ProSphere vApp).
7. Click **Upload**. A progress screen displays the progress of the upload operation.

---

**Note:** The progress screen does not appear if popup blockers is enabled in your web browser.

---

8. When the upload operation is completed, click **Clear**.

### Deploy the ProSphere vApp from the vApp template

1. Click the **My Cloud** tab.
2. Left-click the plus (+) button to display the **Add vApp from Catalog** dialog box.
3. Select the template and click **Next**.
4. Read and accept EULA and click **Next**.
5. Type a name for the vApp.
6. Type a description for the vApp, and click **Next**.
7. Select the virtual datacenter from the dropdown list.
8. Select **Static-Manual** as the IP assignment, and click **Next**.
9. Enter network parameters for each virtual machine. The following list contains sample data:
  - a. IP Range: xx.xxx.xx. 01-03
  - b. Hostname Range: xxxxx01-03
  - c. Netmask: xxx.xxx.xxx.0
  - d. Gateway: xx.xxx.xx.x
  - e. DNS: xx.xxx.xx.xx, yy.yyy.yy.yy

---

**Note:** Enter at most two IP addresses in the DNS field.

---

- f. DNS Search Path domain: com test.test;com test.corp.com,test.com

---

**Note:** Be sure to enter a value. Otherwise, when collecting host data DNS resolution fails and hosts discovered on the affected element managers will not appear in the Objects List.

---

10. Enter the following information for each virtual machine displayed:
  - a. ProSphere Application IP address
  - b. ProSphere Application search domain
  - c. ProSphere Application hostname
  - d. ProSphere Application DNS servers

---

**Note:** Enter at most two IP addresses for DNS servers.

---

- e. ProSphere Application gateway
- f. ProSphere Application netmask
11. Select a time zone. Click **Next**.  
The **Ready to Complete** dialog appears. Check that the information is correct.
12. Click **Finish**. The vApp is listed in the **My Cloud** window.
13. When deployment has completed successfully:
  - a. In the **My Cloud** window, select the vApp.
  - b. Click **Start**.
14. If you need to modify the default lease settings of seven days, follow these steps:
  - a. Right-click the vApp and navigate to **Properties > General > Lease**.
  - b. Select the lease settings recommended by your vCloud administrator.
  - c. Follow the wizard instructions and click **Finish**.

---

### Modify action and delay settings

1. In the **My Cloud** window, click the **vApp** tab, right-click the ProSphere vApp and select **Properties**.
2. Click the **Starting and Stopping VMs** tab.
3. Change the **Boot Delay (seconds)** value to 120.
4. Change the **Stop Delay (seconds)** value to 600.
5. Change the **Stop Action** to **Shutdown**.

---

### Next steps

Congratulations! You now have deployed ProSphere vApp. You can proceed to these next steps:

1. [“Deploy Collectors” on page 85.](#)
2. [“Deploy Secondary ProSphere Application” on page 93](#)
3. [“Synchronize time zones and system times” on page 102](#) to verify the deployment works.
4. [“Log into ProSphere” on page 102.](#)
5. [“Customize the security compliance message” on page 104.](#)



---

This chapter explains how to add ethernet adapters (NICs) to ProSphere virtual machines in order to facilitate working with isolated networks:

- ◆ [Overview .....](#) 76
- ◆ [Supported multiple NIC configurations.....](#) 76
- ◆ [Configure an additional NIC on a ProSphere virtual machine .....](#) 82
- ◆ [Modify the /etc/hosts file .....](#) 83

**Note:** NICs can be added only after the deployment is completed successfully. The network parameters for the newly added NIC can be configured when the VM is up and running.

On the EMC Online Support site, the white paper "ProSphere Multi-NIC Support" provides more details about installing NICs for isolated networks.

## Overview

In real-time data center environments, objects are usually distributed across different networks. Based on the security and firewall settings, access to isolated/non-routed/protected networks is usually restricted. From an administrator's perspective, it is difficult to monitor objects in isolated networks. Multiple ProSphere instances must be deployed and configured, which requires additional resources. Reporting and analysis become tedious because data must be consolidated from different sources into a centralized database, often resulting in inconsistent real-time data. Correcting such problems is time-consuming and impractical.

ProSphere attempts to overcome such challenges by allowing the user to add and configure additional NIC adapters. These adapters allow ProSphere to easily connect to isolated networks, allowing discovery and monitoring of their objects

## Supported multiple NIC configurations

The following sections list the different multiple NIC configurations supported by ProSphere.

Configurations 1 through 3 are used in normal deployments. Configurations 4 through 6 are used in scale-out deployments.

### Configuration 1: NICs on a DE

The objective of the configuration in [“NICs on a Discovery Engine”](#) on page 77 is to monitor CIs connected to a data center LAN and CIs connected to an isolated LAN in a normal deployment.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, and the Historical Database
- ◆ Communications to local CIs

The isolated network is not reachable from the ProSphere network. This network may be connected to multiple customer networks that are protected or isolated from the data center LAN.

An example use for this configuration is a service provider environment where the customer manages multiple other client or customer CIs. The client or customer networks are not routed to the customer's corporate network.

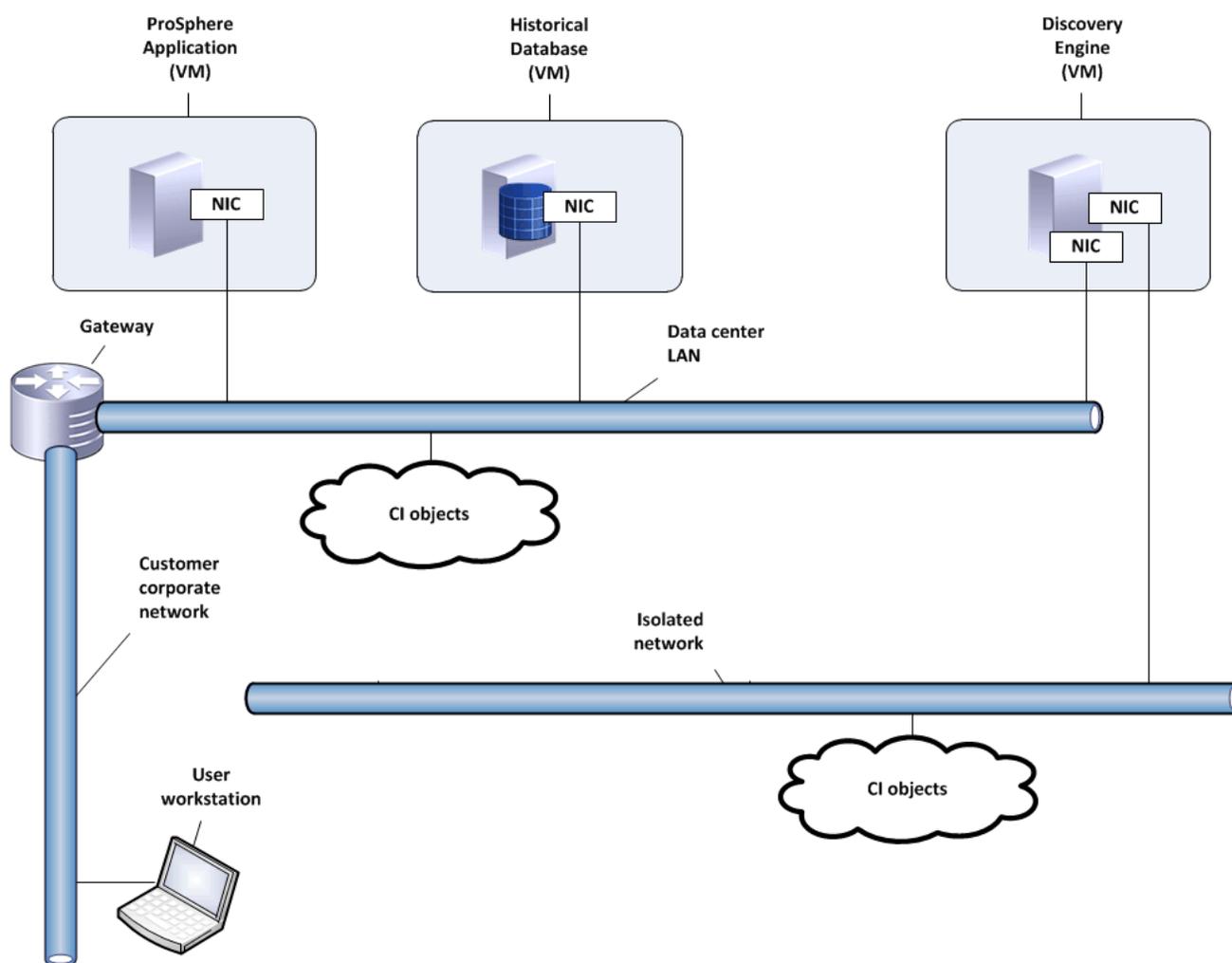


Figure 3 NICs on a Discovery Engine

### Configuration 2: NICs on a PA

The objective of the configuration in [“NICs on a ProSphere Application”](#) on page 78 is to federate a ProSphere instance connected to a data center LAN with another instance deployed in an isolated LAN.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, and the Historical Database
- ◆ Communications to local CIs

The isolated network is associated with the other ProSphere deployment, which is reachable only through the isolated network.

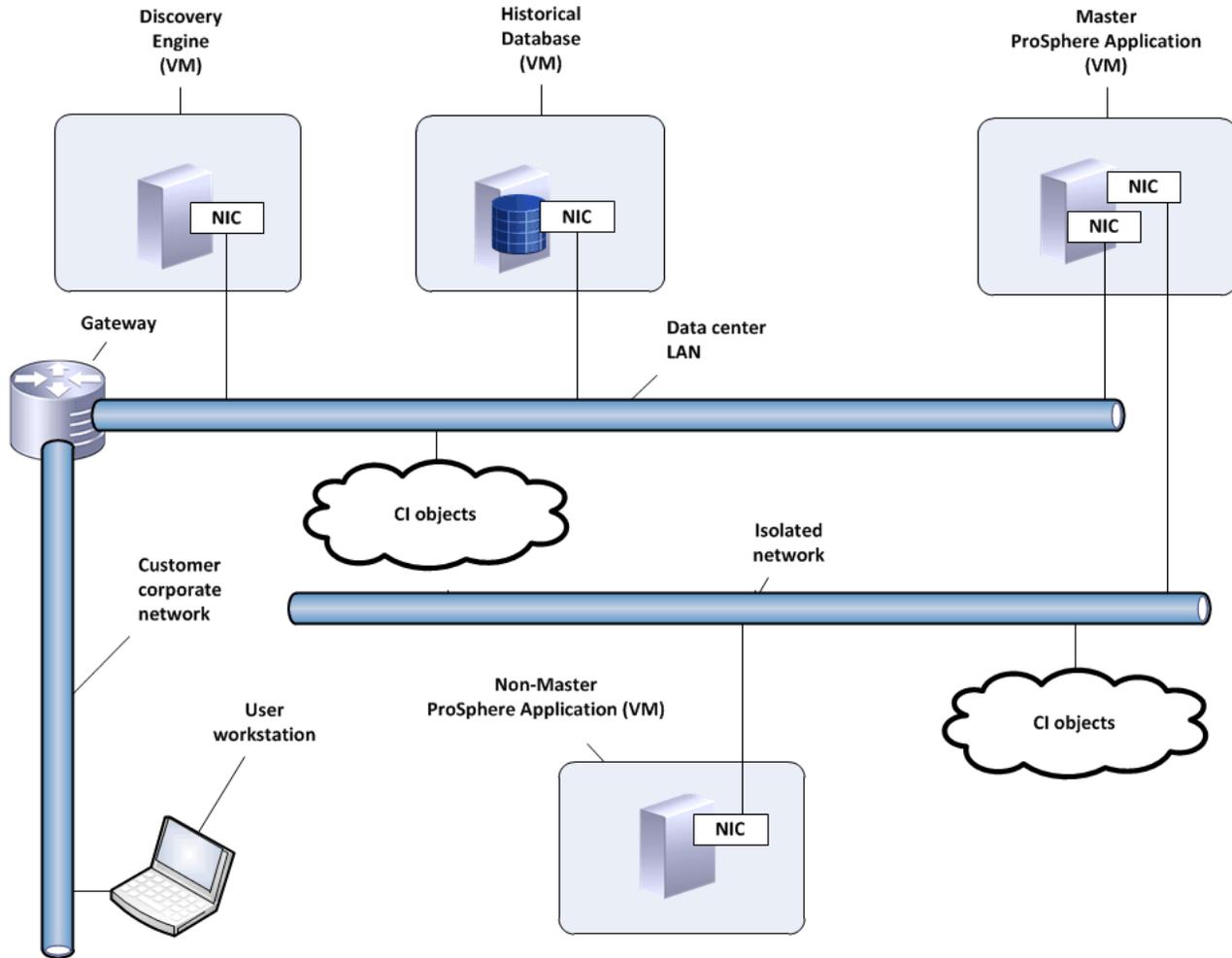


Figure 4 NICs on a ProSphere Application

### Configuration 3: NICs on a PA and a Secondary PA

In the configuration shown in “NICs on a ProSphere Application and Secondary ProSphere Application” on page 79, a Secondary ProSphere Application is configured and connected to a data center LAN. The objective is to federate a ProSphere instance with another instance deployed in an isolated LAN.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, and the Historical Database
- ◆ Communications to local CIs

More than one deployment of ProSphere exists. The deployments are synchronized, and the deployment associated with the data center LAN contains the Master Capacity Application.

The isolated network is associated with the other ProSphere deployment, which is reachable only through the isolated network.

A user of the non-master ProSphere Application may request performance data for local CIs discovered by the Master Capacity Application. In this configuration, a Secondary ProSphere Application with a second NIC exists on the site of the Master Capacity Application. The second NIC provides access to the performance data of these CIs.

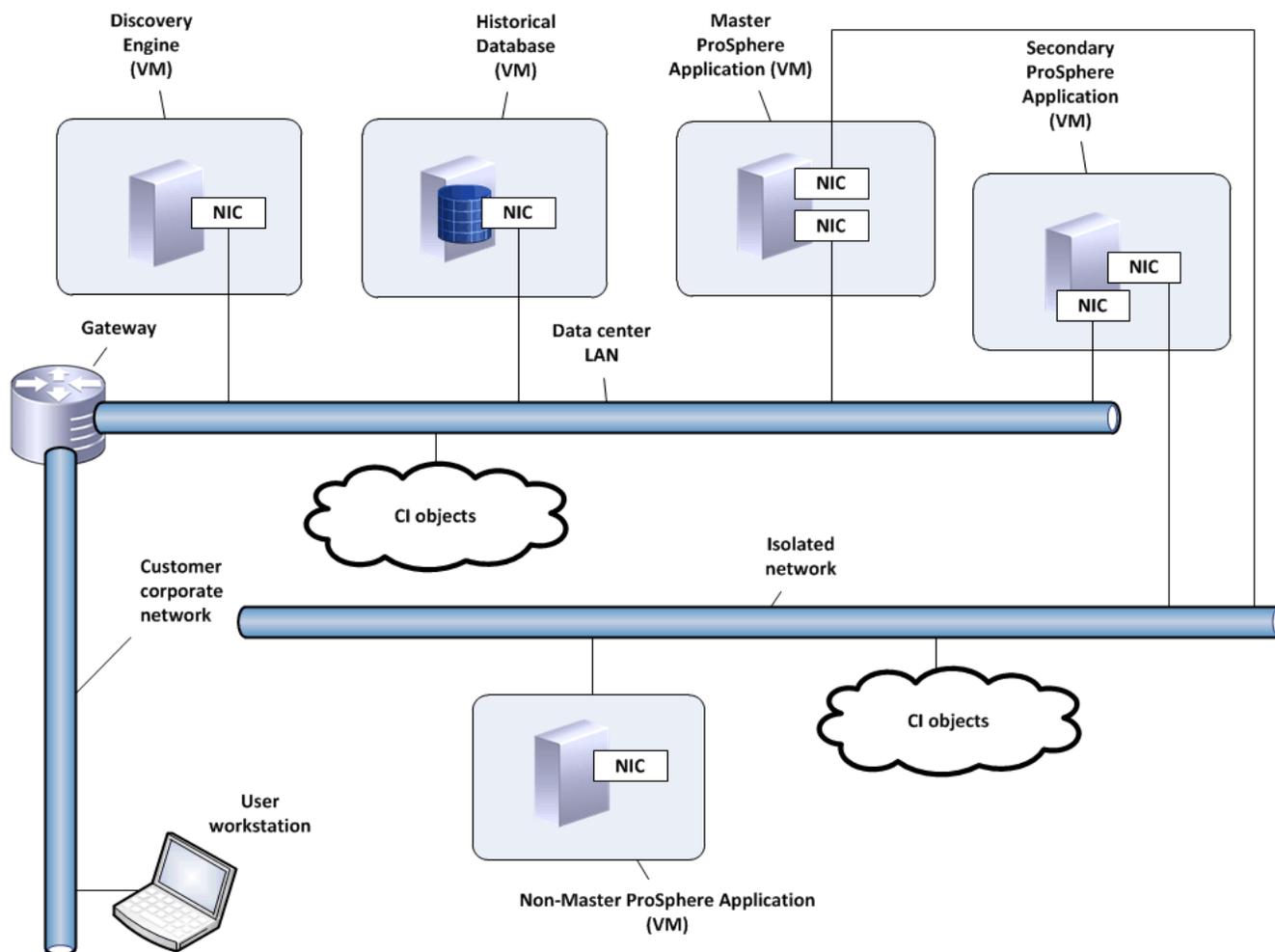


Figure 5 NICs on a ProSphere Application and Secondary ProSphere Application

#### Configuration 4: NICs on a DE and a Collector

The objective of the configuration in “NICs on a Discovery Engine and Collector” on page 80 is to monitor CIs that are connected to a data center LAN, and CIs connected to an isolated/non-routed LAN.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, the Historical Database, and Collectors

- ◆ Communications to local CIs

The additional NIC facilitates communication with CIs from isolated network which are otherwise inaccessible through the data center LAN.

The isolated network may be connected to multiple customer networks that are protected or isolated from the data center LAN.

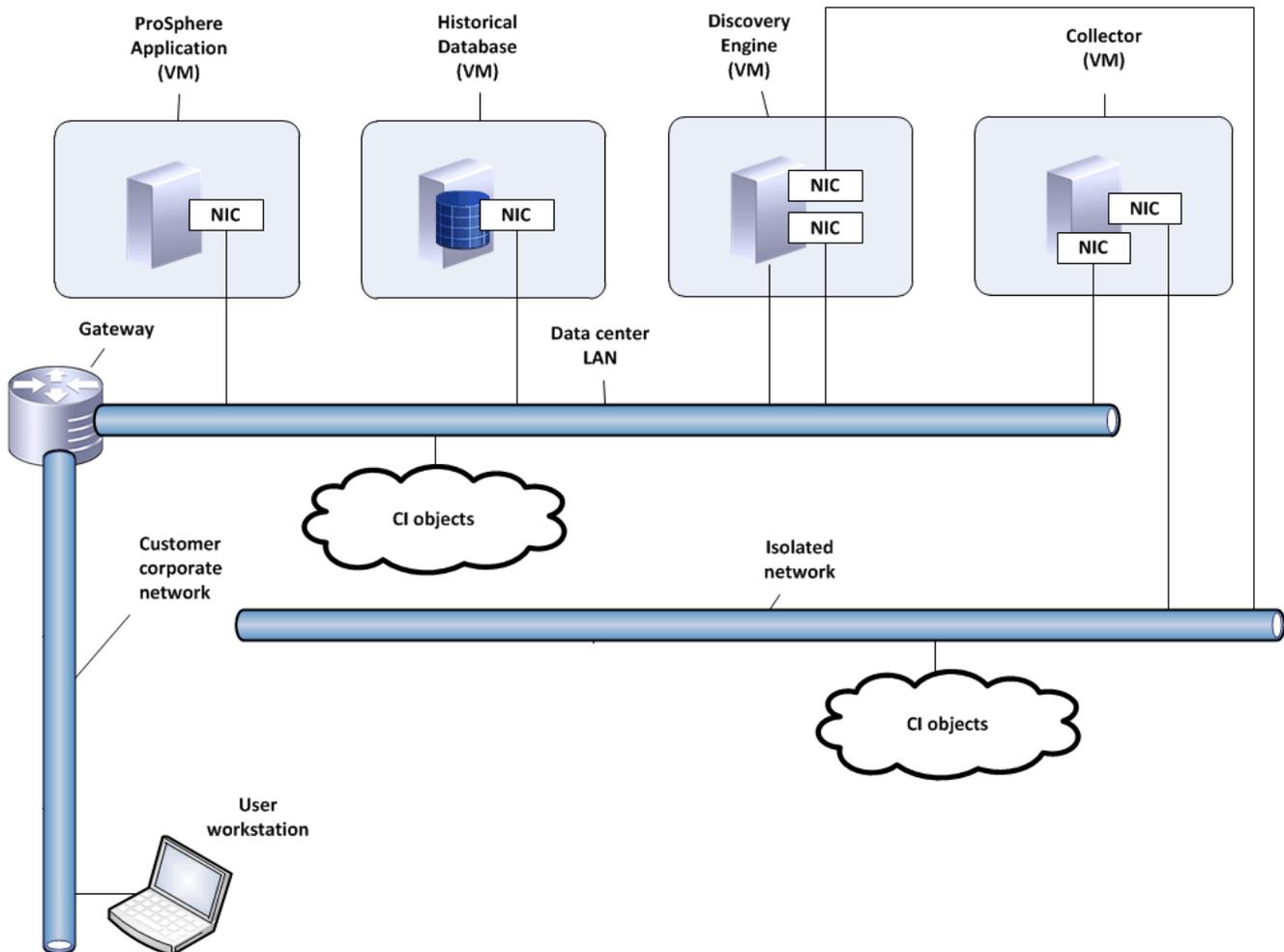


Figure 6 NICs on a Discovery Engine and Collector

### Configuration 5: NICs on a PA and a DE

The objective of the configuration in [“NICs on ProSphere Application and Discovery Engine” on page 81](#) is to monitor CIs that are connected to a usual data center and CI objects connected to an isolated LAN. The isolated LAN could also have a Collector deployed to provide a consolidated proxy for ProSphere traffic.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, the Historical Database, and Collectors
- ◆ Communications to local CIs

The additional NIC on Discovery Engine facilitates communication with CIs from the isolated network that are otherwise inaccessible through the data center LAN. The isolated network may be connected to multiple customer networks that are protected or isolated from the data center LAN. The second NIC on the ProSphere Application grants access to the isolated network Collector to register with the Discovery Engine through the registration interface provided by ProSphere Application.

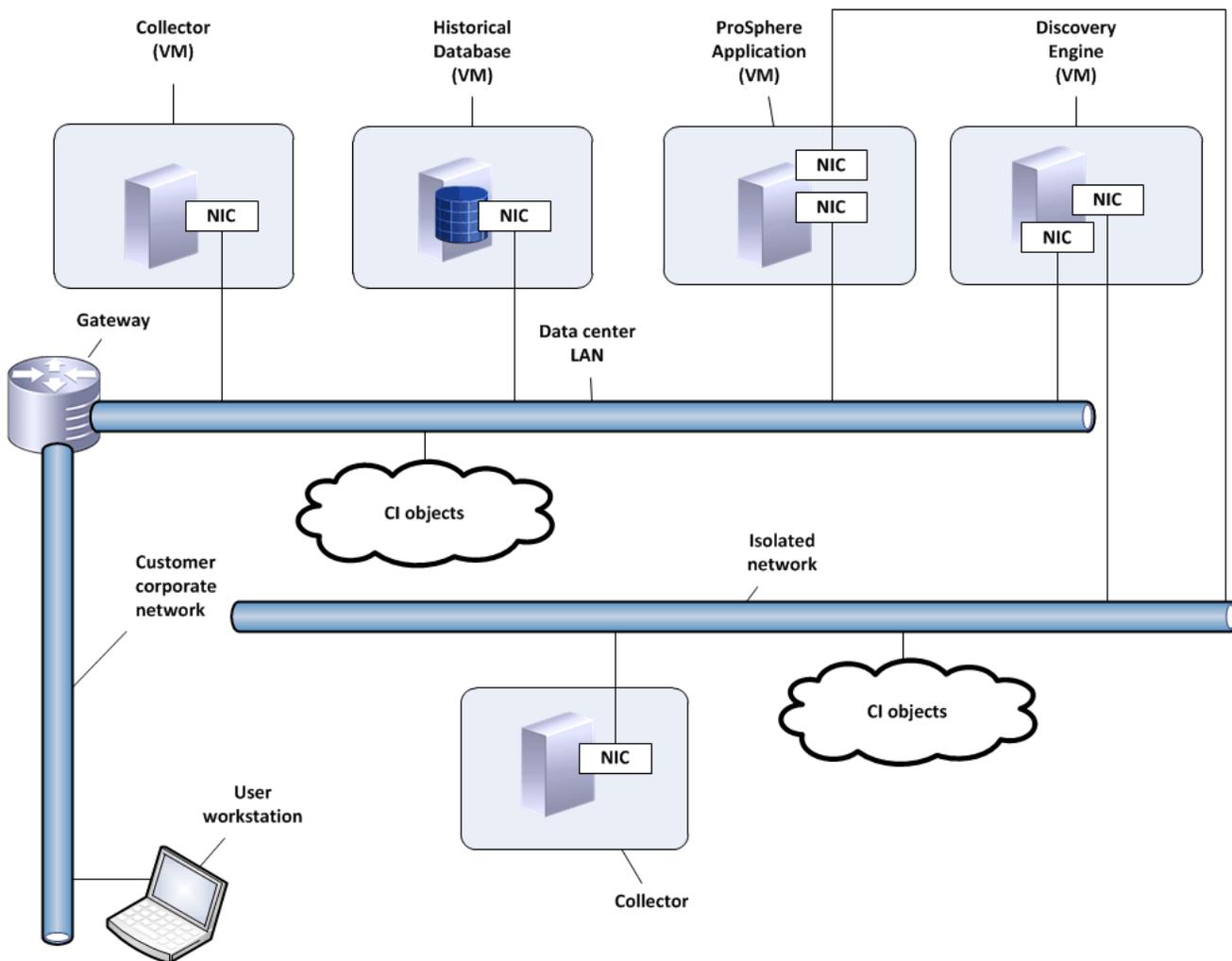


Figure 7 NICs on ProSphere Application and Discovery Engine

### Configuration 6: NICs on a PA, a Secondary PA and a DE

The objective of the configuration in “NICs on ProSphere Applications and Discovery Engine” on page 82 is to monitor CI objects at scale that are connected to a data center LAN, and CI objects connected to an isolated network. Isolated customer networks could also have a Collector installed to provide a consolidated proxy for ProSphere traffic. An additional NIC can also be configured on a Secondary ProSphere Application to gather the performance data supplied by the isolated network Collector for the CIs that are reachable only through isolated networks.

The data center LAN handles typical ProSphere communications traffic such as:

- ◆ Web Console connections
- ◆ Communications between the ProSphere Application, the Discovery Engine, the Historical Database, and Collectors
- ◆ Communications to local CIs

The isolated network communicates to CIs on a network that is not reachable from the data center LAN. The isolated network may be connected to multiple customer networks that are protected or isolated from the data center LAN. The second NIC on the ProSphere Application grants the access to a Collector to register with the Discovery Engine through the registration interface provided by the ProSphere Application. The second NIC on the Secondary ProSphere Application allows a Collector to push the performance data to the Secondary ProSphere Application.

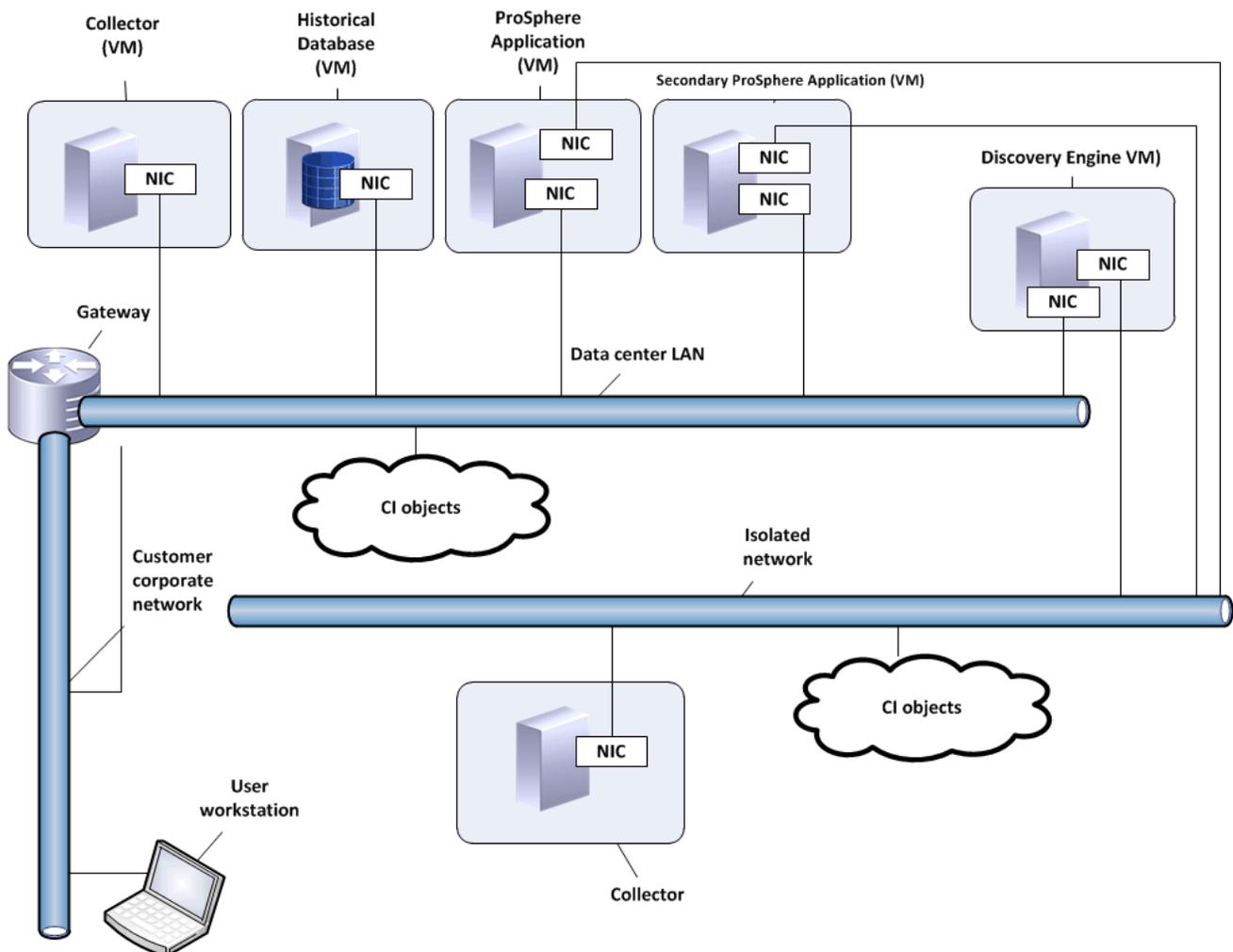


Figure 8 NICs on ProSphere Applications and Discovery Engine

## Configure an additional NIC on a ProSphere virtual machine

The following procedure adds a NIC to a running system for use by the ProSphere Application, Discovery Engine, Collector, or Secondary ProSphere Application:

1. Add a new NIC to the virtual machine from the vSphere Console.

2. Select **Edit Settings** on the virtual machine.
3. Click **Add**.
4. Select **Ethernet Adapter**, then click **Next**.
5. Select the adapter type **VMXNET3** from the dropdown list, choose the network connection label that connects the new NIC to the isolated LAN, then click **Next**.
6. Review the options, and then click **Finish**.

Following is the procedure to configure the IP address and netmask details for the newly added NIC:

1. Log in to the virtual machine with SSH or through the vSphere console.
2. Assign the IP address and other network parameters to ETH1 (the NIC associated with the isolated network) using the following script:

```
/opt/vmware/share/vami/vami_set_network vami_set_network
<interface> (STATICV4) <ipv4_addr> <netmask> <gatewayv4>
```

Example:

```
/opt/vmware/share/vami/vami_set_network eth1 STATICV4
172.16.60.239 255.255.0.0 1.31.148.1
```

**Note:** The <gatewayv4> address should be the default gateway address (the one that was entered when deploying ProSphere).

3. Run the `ifconfig` command and verify that all entries are correct.

## Modify the `/etc/hosts` file

After the IP address is assigned to the ETH1, ensure that the ProSphere virtual machine is able to communicate and resolve the host names of CI objects from the isolated LAN, or the host names of another ProSphere virtual machine connected to Isolated LAN, in case you need to synchronize deployments.

If the host names are not included in the local DNS server, you must append the hostnames in the `/etc/hosts` file on the appropriate ProSphere virtual machine. The specific entries you must add would depend on which multi-NIC configuration you are setting up.

In addition to adding hostnames manually in the `/etc/hosts` file, the user must add the entries in the subsequent boot script on the same virtual machine. This is required because the `/etc/hosts` file is overwritten on every reboot by the subsequent boot script, with default values that are pulled up from the `ovfEnv.xml` file. Thus, any manual changes to the `/etc/hosts` file must be specified explicitly in the subsequent boot script.

For example, if the user wants to add the following line into the `/etc/hosts` file:

```
172.16.60.239 ijk.lmn.com ijk
```

then the subsequent boot script `/opt/vmware/etc/isv/` must be modified as follows:

```
echo "127.0.0.1 localhost.localdom localhost" > /etc/hosts
echo "$HOSTADDR $FQDNADDR $SHORTNAME" >> /etc/hosts
echo "172.16.60.239 ijk.lmn.com ijk" >> /etc/hosts
```

When using configuration 1 or 4, modify the `/etc/hosts` file on the Discovery Engine as follows: to allow host resolution, append the host name entries of the CI objects that belong to the isolated network the user intends to discover.

When using configuration 2 or 3, modify the `/etc/hosts` on the master and non-master ProSphere Applications as follows:

- ◆ On the master ProSphere Application, append the host name of the non-master ProSphere Application.
- ◆ On the non-master ProSphere Application, append the host name of the master ProSphere Application.

[Table 5 on page 84](#) provides an example.

**Table 5 Example: Modify the `/etc/hosts` file for configuration 2 or 3**

| VM         | FQDN         | Data center LAN | Isolated network | <code>/etc/hosts</code> file entry |
|------------|--------------|-----------------|------------------|------------------------------------|
| Master     | abc1.xyz.com | 1.31.91.62      | 172.16.60.239    | 172.16.60.251 ijk.lmn.com ijk      |
| Non-master | ijk.lmn.com  | 1.31.91.61      | 172.16.60.251    | 172.16.60.239 abc1.xyz.com abc1    |

When using configuration 5 or 6, modify the `/etc/hosts` file on the Discovery Engine as follows: to allow host resolution, append the host name entries of the CI objects that belong to the isolated network the user intends to discover.

Also, when attempting to register the Collector located in the isolated network with the Discovery Engine, the user must append the `/etc/hosts` file entries of ProSphere Application, Discovery Engine, and the Collector (on the isolated network) to a configuration similar to one shown in [Table 6 on page 84](#):

**Table 6 Example: Modify the `/etc/hosts` file for configuration 5 or 6**

| VM                            | FQDN         | Data center LAN | Isolated network | <code>/etc/hosts</code> file entry                                 |
|-------------------------------|--------------|-----------------|------------------|--------------------------------------------------------------------|
| ProSphere Application         | abc1.xyz.com | 1.31.91.62      | 172.16.60.239    | 172.16.60.240 qrs.tuv.com qrs                                      |
| Discovery Engine              | abc2.xyz.com | 1.31.91.61      | 172.16.60.238    | 172.16.60.240 qrs.tuv.com qrs                                      |
| Collector on isolated network | qrs.tuv.com  | -               | 172.16.60.240    | 172.16.60.239 abc1.xyz.com abc1<br>172.16.60.238 abc2.xyz.com abc2 |

This chapter provides instructions for deploying the ProSphere Discovery Engine Collector (Collector) to scale resource discovery to meet the needs of large data centers. Collectors are VMware virtual machines that must be deployed after initial ProSphere deployment because they coordinate their activities with an existing Discovery Engine.

The following sections provide details:

|                                                             |    |
|-------------------------------------------------------------|----|
| ◆ Collector.....                                            | 85 |
| ◆ Deploy Collectors with the vSphere Client.....            | 86 |
| ◆ Deploy Collectors with the vCloud Director .....          | 89 |
| ◆ Register a Collector with the ProSphere Application ..... | 90 |

## Collector

The Collector allows you to scale ProSphere resource discovery and data collection to the size of your organization's IT environment. Consult the *EMC ProSphere Performance and Scalability Guidelines* to determine the number of Collectors to deploy.

### Obtain deployment files

Ensure you downloaded files for the Collector from the EMC Online Support Site or another location specified by EMC mentioned in [Table 7 on page 86](#). Place these files in a location accessible to the vSphere Client, such as a local file share or a URL location.

### Determine the Collectors required for data center

Determine the number of Collector virtual machines required to scale ProSphere to your data center size.

## Collect information

Before deploying the Collector, contact your VMware Administrator to obtain the information needed for deployment, as presented in [Table 7 on page 86](#).

**Table 7**      **Deployment Fact Sheet**

| Type                                                                                                                                          | Specifics                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| IP address or hostname for the vCenter or vCloud server managing the VMWare environment                                                       | vCenter or vCloud server IP address or hostname                                                |
| Username and password to connect the vSphere Client to the vCenter Server, or to log in to vCloud                                             | Username                                                                                       |
|                                                                                                                                               | Password                                                                                       |
| If using vCloud, User should have required permissions in vCloud                                                                              | Permissions required for creating a catalog, uploading the vApp template, and deploying a vApp |
| Name for this deployment of the Collector (for example, "ProSphere Collector 1")                                                              | Name for the Collector                                                                         |
| Infrastructure location for the ProSphere Application. This may include a combination of Inventory Location, Host, Cluster, and Resource Pool | Inventory Location                                                                             |
|                                                                                                                                               | Host/Cluster                                                                                   |
|                                                                                                                                               | Disk format (Thick/Thin)                                                                       |
|                                                                                                                                               | Resource Pool                                                                                  |
| Name of a data store in the vSphere environment to hold the Collector images                                                                  | Data store                                                                                     |
| Names of the vSphere networks to deploy the Collector                                                                                         | Collector network                                                                              |
| Location of downloaded deployment files                                                                                                       | Location of OVF file                                                                           |

## Deploy Collectors with the vSphere Client

**Note:** Repeat this procedure for each Collector that you want to deploy.

1. Open the vSphere Client and connect to the vCenter Server managing the VMware environment.
2. Select **File > Deploy OVF Template**.

**Note:** Online help is available at each step of the **Deploy OVF Template** dialog box in the vSphere Client. But this help is not specific to ProSphere. Consult your VMware administrator if you are uncertain about any of these steps. For example, you may be uncertain about inventory location to select and so on.

3. In the **Source** step, browse to a file path or type a URL for the .ovf file. Click **Next**.
4. In the **OVF Template Details** step, review the details of the loaded .ovf file. Click **Next**.
5. In the **End User License Agreement** step, review the product license agreement and then click **Accept** and followed by **Next**.
6. In the **Name and Location** step, type a unique **Name** (for example, ProSphere Collector 1) and specify an **Inventory Location** in the VMware environment for the Collector. Click **Next**.
7. In the **Host/Cluster** step, select a choice — cluster, host, or both — on which the ProSphere vApp will run. Click **Next**.
8. In the **Resource Pool** step, select a resource pool (associated with the previously selected cluster/host) in which the Collector will run. This step is required only if a resource pool has been predefined. If you select the same **Inventory Location** and **Host/Cluster** as the ProSphere vApp, then select the vApp as the **Resource Pool** for the Collector as well.

You can manage the Collector as part of the broader ProSphere vApp. To do this, move the Collectors inside the vApp container into Group1, along with other ProSphere machines. By default, the **Shutdown Operation** will be set to **Power Off**. This value does not permit a graceful shutdown of the Collector.

Perform the following steps to allow the Collector to gracefully shut down:

- a. Select **Edit Settings**.
  - b. Select the **Start Order** tab.
  - c. Under **Shutdown Action**, set the **Operation** to **Guest Shutdown**.
  - d. Set **Shutdown sequence proceeds when** to **600**.
  - e. Click **OK**.
9. Click **Next**.
  10. In the **data store** step, select a data store to hold the virtual machine image for the Collector. The data store should have a minimum 30 GB of space available for a Thick disk format and 2.2 GB for a Thin disk format. Click **Next**.
  11. In the **Disk Format** step, for some data stores you are required to select the storage space provisioning method for the virtual machine.
    - ◆ **Thin provisioned format** (on demand expansion of available storage for the virtual machine) for newer data store file systems
    - ◆ **Thick provisioned format** (virtual machine storage is allocated and reserved as a block)
 Click **Next**.
  12. In the **Network Mapping** step, select a destination network for the Collector. Click **Next**.

*Example options include:*

**Note:** In the VMware environment, each selected destination network must have an IP Pool associated with it.

13. In the **Properties** step, specify the required configuration fields. The description of a property appears in red if the required value is missing or incorrect from the dialog box.

**Note:** Ensure you specify only the relevant DNS and search domains.

The properties to set are:

| Property Group        | Purpose                  | Property                          | Description                                                                                                                                                                                                                                                                                  |
|-----------------------|--------------------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Collector Information | Configures the vApp      | Collector Appliance Hostname      | Hostname to assign to the Collector (for example, ProSphere Collector 1)                                                                                                                                                                                                                     |
|                       |                          | Collector Appliance IP Address    | IP address to assign to the Collector if a fixed IP address scheme is in use                                                                                                                                                                                                                 |
|                       |                          | Collector Appliance Gateway       | Subnet gateway for hosts in the network                                                                                                                                                                                                                                                      |
|                       |                          | Collector Appliance Netmask       | Netmask applied to IP addresses in the network                                                                                                                                                                                                                                               |
|                       |                          | Collector Appliance DNS Server(s) | Comma-separated list of DNS available in the network selected for the ProSphere Application and the DNS for KDC.                                                                                                                                                                             |
|                       |                          | Collector Search Domain(s)        | Comma-separated list of domains used in the network selected and the domain name for KDC.<br><br><b>Note:</b> Be sure to enter a value. Otherwise, when collecting host data DNS resolution fails and hosts discovered on the affected element managers will not appear in the Objects List. |
| Uncategorized         | Configures the Collector | Timezone setting                  | Server time zone to set on the virtual machines deployed as part of ProSphere                                                                                                                                                                                                                |

Click **Next**.

14. In the **Ready to Complete** step, review the list of properties that you specified for deployment. If you need to change a value, click **Back** to return to the previous steps and change a listed value. Click **Finish** to start the deployment. A status bar is displayed in the vSphere Client, showing the deployment progress.

Wait for the **Deployment Completed Successfully** dialog box to appear.

15. Click **Close** to close the dialog box.
16. In the vSphere Client, navigate to the **Hosts & Clusters** view.
  - a. Expand the tree in the left panel of this view.
  - b. Locate the cluster and host that you selected for Collector during deployment.

---

## Deploy Collectors with the vCloud Director

This section includes the following procedures:

- ◆ “Upload the new deployment file to the catalog” on page 89
- ◆ “Deploy the Collector vApp from the vApp template” on page 89
- ◆ “Modify action and delay settings” on page 90

---

### Upload the new deployment file to the catalog

1. In the **Catalogs** tab, select the catalog you created.
2. Select the **Media** tab.
3. Click the wheel icon to bring up an option menu then select **Upload**. This displays the **Upload Media** dialog box.
4. Click **Browse** and select the .ovf file. After uploading, the file will be stored with the other files in the vApp Template.
5. Enter a name for the vApp Template in the **Name** field.
6. Enter a description for the vApp Template (such as the Collector vApp).
7. Click **Upload**. A progress screen displays the progress of the upload operation.

**Note:** The progress screen does not appear if popup blockers is enabled in your web browser.

8. When the upload operation is completed, click **Clear**.

---

### Deploy the Collector vApp from the vApp template

1. Click the **My Cloud** tab.
2. Left-click the plus (+) button to display the **Add vApp from Catalog** dialog box.
3. Select the template and click **Next**.
4. Read and accept EULA and click **Next**.
5. Type a name for the vApp.
6. Type a description for the vApp, and click **Next**.
7. Select the virtual datacenter from the dropdown list.
8. Select a storage profile from the dropdown list and click **Next**.
9. Select Static-Manual as the IP allocation and click **Next**.
10. Enter the IP address and enter network parameters for each the Collector. The following list contains sample data:
  - a. IP Range: xx.xxx.xx. 01-03
  - b. Hostname Range: xxxxx01-03
  - c. Netmask: xxx.xxx.xxx.0
  - d. Gateway: xx.xxx.xx.x
  - e. DNS: xx.xxx.xx.xx, yy.yyy.yy.yy

---

**Note:** Enter at most two IP addresses in the DNS field.

---

- f. DNS Search Path domain: com test.test;com test.corp.com,test.com

---

**Note:** Be sure to enter a DNA Search Path domain value. Otherwise, when collecting host data DNS resolution fails and hosts discovered on the affected element managers will not appear in the Objects List.

---

11. Select a time zone. Click **Next**. The **Ready to Complete** dialog appears.
12. Check that the information is correct.
13. Click **Finish**. The vApp is listed in the **My Cloud** window.
14. When deployment has completed successfully, in the **My Cloud** window select the vApp for the Collector and select **Start**.
15. If you need to modify the default lease settings of seven days, follow these steps:
  - a. Right-click the vApp and navigate to **Properties > General > Lease**.
  - b. Select the lease settings recommended by your vCloud administrator.
  - c. Follow the wizard instructions and click **Finish**.

---

### Modify action and delay settings

1. In the **My Cloud** window, click the **vApp** tab, right-click **Collector** and select **Properties**.
2. Click the **Starting and Stopping VMs** tab.
3. Change the **Boot Delay (seconds)** value to 120.
4. Change the **Stop Delay (seconds)** value to 600.
5. Change the **Stop Action** to **Shutdown**.

---

## Register a Collector with the ProSphere Application

You can deploy additional Collectors as required. After deploying a Collector, register it with the ProSphere Application that manages it.

To register a Collector with the ProSphere Application:

1. Type the Collector URI **https://<collector\_name>/appliance\_registration.html** in the web browser window.
2. Type the ProSphere Application hostname.
3. Type the Security Administrator credentials.
4. Click **Submit**.

After a successful registration of the Collector with the ProSphere Application, a confirmation dialog appears.

---

**Note:** “[Deploy Collectors with the vSphere Client](#)” on page 86 provides information on deploying additional Collectors.

---

---

## Load balance Collectors

The primary Discovery Engine automatically load balances the discovery requests across all available Collectors. You do not have to specify which Collector to use for each discovery job.



This chapter provides instructions for deploying a Secondary ProSphere Application. In rare cases ProSphere collects an extremely large amount of performance data, which might degrade the overall ProSphere performance. To meet such needs, you can add a Secondary ProSphere Application at any time after deploying ProSphere.

**Note:** The *EMC ProSphere Performance and Scalability Guidelines* provides information about when to use a Secondary ProSphere Application.

The following sections provide details:

- ◆ [Secondary ProSphere Application](#) ..... 94
- ◆ [Deploy a Secondary ProSphere Application with the vSphere Client](#) ..... 96
- ◆ [Deploy a Secondary ProSphere Application with the vCloud Director](#) ..... 98
- ◆ [Register a Secondary ProSphere Application](#) ..... 99

---

## Secondary ProSphere Application

A Secondary ProSphere Application receives a share of data routed to the ProSphere Application. This results in an increased CPU availability and enhances ProSphere performance.

---

**Note:** A Secondary ProSphere Application does not have a functional user interface.

---

---

### Limitation

During the deployment of a Secondary ProSphere Application, when performance data collection is shifted from the ProSphere Application to the Secondary ProSphere Application, most likely a data point will be dropped for any metric that is calculated using a counter/delta. This includes most metrics.

The reason is that for metrics calculated with a counter/delta, the calculation cannot occur without two collected data points. The intermediate JSON/XML data files collected on the ProSphere Application are not migrated to the Secondary ProSphere Application, so the Secondary ProSphere Application does not have the previous data locally available for calculation. By design, the Secondary ProSphere Application will not produce a data point for the interval directly after the migration. This omission is observable in the pdc-server log file. Subsequent data collection, calculation, and display should be normal, because it occurs after a second interval has passed and another set of metrics is collected for calculation against a previous set.

This observed behavior (missing data point) should not apply to metrics like Unix Host CPU %Busy that are reported directly without doing counter/delta calculations. For these metrics, the previous data is not used for calculations, and the next data point should appear as scheduled.

---

### Obtain deployment files

Ensure you downloaded files for the Secondary ProSphere Application from the EMC Online Support Site or another location specified by EMC mentioned in [Table 8 on page 95](#). Place these files in a location accessible to the vSphere Client, such as a local file share or a URL location.

## Collect information

Before deploying a Secondary ProSphere Application, contact your VMware Administrator to obtain the information needed for deployment, as presented in [Table 8 on page 95](#).

**Table 8**      **Deployment Fact Sheet**

| Type                                                                                                                                          | Specifics                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| IP address or hostname for the vCenter or vCloud server managing the VMWare environment                                                       | vCenter or vCloud server IP address or hostname                                                |
| Username and password to connect the vSphere Client to the vCenter Server, or to log in to vCloud                                             | Username                                                                                       |
|                                                                                                                                               | Password                                                                                       |
| If using vCloud, User should have required permissions in vCloud                                                                              | Permissions required for creating a catalog, uploading the vApp template, and deploying a vApp |
| Name for this deployment of the ProSphere Application (for example, "ProSphere Application 2")                                                | Name for the ProSphere Application                                                             |
| Infrastructure location for the ProSphere Application. This may include a combination of Inventory Location, Host, Cluster, and Resource Pool | Inventory Location                                                                             |
|                                                                                                                                               | Host/Cluster                                                                                   |
|                                                                                                                                               | Disk format (Thick/Thin)                                                                       |
|                                                                                                                                               | Resource Pool                                                                                  |
| Name of a data store in the vSphere environment to hold the Secondary ProSphere Application images                                            | Data store                                                                                     |
| Names of the vSphere networks to deploy the Secondary ProSphere Application                                                                   | Secondary ProSphere Application network                                                        |
| Desired secure access and network properties for the Secondary ProSphere Application virtual machine                                          | DNS servers (separated by commas)                                                              |
|                                                                                                                                               | Search domain strings (separated by spaces)                                                    |
|                                                                                                                                               | Hostname                                                                                       |
|                                                                                                                                               | IP address                                                                                     |

Table 8 Deployment Fact Sheet

| Type                                    | Specifics            |
|-----------------------------------------|----------------------|
|                                         | Netmask              |
|                                         | Subnet gateway       |
| Location of downloaded deployment files | Location of OVF file |

## Deploy a Secondary ProSphere Application with the vSphere Client

1. Open the vSphere Client and connect to the vCenter Server managing the VMware environment.
2. Select **File > Deploy OVF Template**.

**Note:** Online help is available at each step of the **Deploy OVF Template** dialog box in the vSphere Client. But this help is not specific to ProSphere. Consult your VMware administrator if you are uncertain about any of these steps. For example, you may be uncertain about inventory location to select and so on.

3. In the **Source** step, browse to a file path or type a URL for the .ovf file. Click **Next**.
4. In the **OVF Template Details** step, review the details of the loaded .ovf file. Click **Next**.
5. In the **End User License Agreement** step, review the product license agreement and then click **Accept** and followed by **Next**.
6. In the **Name and Location** step, type a unique **Name** (for example, ProSphere Application 1) and specify an **Inventory Location** in the VMware environment for the Secondary ProSphere Application. Click **Next**.
7. In the **Host/Cluster** step, select a choice — cluster, host, or both — on which the ProSphere vApp will run. Click **Next**.
8. In the Resource Pool step, select a resource pool (associated with the previously selected cluster/host) in which the Secondary ProSphere Application will run. This step is required only if a resource pool has been predefined. Click **Next**.

**Note:** The Secondary ProSphere Application is deployed external to the ProSphere vApp (not in the same vApp as the ProSphere Application) . You cannot manage the Secondary ProSphere Application as part of the ProSphere vApp.

9. In the **data store** step, select a data store to hold the virtual machine image for the Secondary ProSphere Application. The data store should have a minimum of 230 GB space available. Click **Next**.
10. In the **Disk Format** step, for some data stores you are required to select the storage space provisioning method for the virtual machine.

*Example options include:*

- ◆ **Thin provisioned format** (on demand expansion of available storage for the virtual machine) for newer data store file systems
  - ◆ **Thick provisioned format** (virtual machine storage is allocated and reserved as a block)
- Click **Next**.

11. In the **Network Mapping** step, select a destination network for the Secondary ProSphere Application. Click **Next**.

**Note:** In the VMware environment, each selected destination network must have an IP Pool associated with it.

12. In the **Properties** step, specify the required configuration fields. The description of a property appears in red if the required value is missing or incorrect from the dialog box.

**Note:** Ensure you specify only the relevant DNS and search domains.

The properties to set are:

| Property Group                              | Purpose                                        | Property                                         | Description                                                                                                                |
|---------------------------------------------|------------------------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Secondary ProSphere Application Information | Configures the vApp                            | Secondary ProSphere Application Hostname         | Hostname to assign to the Secondary ProSphere Application (for example, ProSphere Application 1)                           |
|                                             |                                                | Secondary ProSphere Application IP Address       | IP address to assign to the Secondary ProSphere Application if a fixed IP address scheme is in use                         |
|                                             |                                                | Secondary ProSphere Application Gateway          | Subnet gateway for hosts in the network                                                                                    |
|                                             |                                                | Secondary ProSphere Application Netmask          | Netmask applied to IP addresses in the network                                                                             |
|                                             |                                                | Secondary ProSphere Application DNS Server(s)    | Comma-separated list of DNS available in the network selected for the Secondary ProSphere Application and the DNS for KDC. |
|                                             |                                                | Secondary ProSphere Application Search Domain(s) | Comma-separated list of domains used in the network selected and the domain name for KDC.                                  |
| Uncategorized                               | Configures the Secondary ProSphere Application | Timezone setting                                 | Server time zone to set on the virtual machines deployed as part of ProSphere                                              |

Click **Next**.

13. In the **Ready to Complete** step, review the list of properties that you specified for deployment. If you need to change a value, click **Back** to return to the previous steps and change a listed value. Click **Finish** to start the deployment. A status bar is displayed in the vSphere Client, showing the deployment progress.

Wait for the **Deployment Completed Successfully** dialog box to appear.

14. Click **Close** to close the dialog box.
15. In the vSphere Client, navigate to the **Hosts & Clusters** view.
- Expand the tree in the left panel of this view.

- b. Locate the cluster and host that you selected for the Secondary ProSphere Application during deployment.

## Deploy a Secondary ProSphere Application with the vCloud Director

This section includes the following procedures:

- ◆ [“Upload the new deployment file to the catalog” on page 98](#)
- ◆ [“Deploy the Secondary ProSphere Application from the vApp template” on page 98](#)
- ◆ [“Modify action and delay settings” on page 99](#)

### Upload the new deployment file to the catalog

1. In the **Catalogs** tab, select the catalog you created.
2. Select the **Media** tab.
3. Click the wheel icon to bring up an option menu then select **Upload**. This displays the **Upload Media** dialog box.
4. Click **Browse** and select the .ovf file. After uploading, the files will be stored as a vApp Template.
5. Enter a name for the vApp Template in the **Name** field.
6. Enter a description for the Secondary ProSphere Application vApp Template (such as ProSphere vApp).
7. Click **Upload**. A progress screen displays the progress of the upload operation.
8. When the upload operation is completed, click **Clear**.

**Note:** In the My Cloud area on the vApps screen, if all three virtual machines are listed under the vApp template with Powered Off status, this indicates that the upload of the OVF and VMDK files was successful.

### Deploy the Secondary ProSphere Application from the vApp template

1. Click the **My Cloud** tab.
2. Left-click the plus (+) button to display the **Add vApp from Catalog** dialog box.
3. Select the template and click **Next**.
4. Read and accept EULA and click **Next**.
5. Type a name for the vApp.
6. Type a description for the vApp, and click **Next**.
7. Select the virtual datacenter from the dropdown list.
8. Select a storage profile from the dropdown list and click **Next**.
9. Select **Static-Manual** as the IP allocation and click **Next**.
10. Enter the IP address and enter network parameters for the Secondary ProSphere Application. The following list contains sample data:
  - a. IP Range: xx.xxx.xx. 01-03

- b. Hostname Range: xxxxx01-03
- c. Netmask: xxx.xxx.xxx.0
- d. Gateway: xx.xxx.xx.x
- e. DNS: xx.xxx.xx.xx, yy.yyy.yy.yy

---

**Note:** Enter at most two IP addresses in the DNS field.

---

- f. DNS Search Path domain: com test.test;com test.corp.com,test.com
11. Select a time zone. Click **Next**. The **Ready to Complete** dialog appears.
  12. Check that the information is correct.
  13. Click **Finish**. The vApp is listed in the **My Cloud** window.
  14. When deployment has completed successfully, in the **My Cloud** window select the vApp for the Secondary ProSphere Application and select **Start**.
  15. If you need to modify the default lease settings of seven days, follow these steps:
    - a. Right-click the vApp and navigate to **Properties > General > Lease**.
    - b. Select the lease settings recommended by your vCloud administrator.
    - c. Follow the wizard instructions and click **Finish**.

---

### Modify action and delay settings

1. In the **My Cloud** window, click the **vApp** tab, right-click the Secondary ProSphere Application and select **Properties**.
2. Click the **Starting and Stopping VMs** tab.
3. Change the **Boot Delay (seconds)** value to 120.
4. Change the **Stop Delay (seconds)** value to 600.
5. Change the **Stop Action** to **Shutdown**.

---

## Register a Secondary ProSphere Application

After deploying a Secondary ProSphere Application, register it with the ProSphere Application that manages it.

To register a Secondary ProSphere Application:

1. Type the Secondary ProSphere Application URI `https://<secondary_prosphere_application_name>/appliance_registration.html` in the web browser window.
2. Type the hostname of the managing ProSphere Application.
3. Type the Security Administrator credentials.
4. Click **Submit**.

After a successful registration of the Secondary ProSphere Application with the ProSphere Application, a confirmation dialog appears.



This chapter provides instructions to follow after the deployment of ProSphere. The following sections detail ProSphere post-deployment steps:

|                                                     |     |
|-----------------------------------------------------|-----|
| ◆ Synchronize time zones and system times .....     | 102 |
| ◆ Log into ProSphere.....                           | 102 |
| ◆ Customize the security compliance message.....    | 104 |
| ◆ Integrate ProSphere with Unisphere for VMAX ..... | 105 |
| ◆ Configure CMCNE/BNA .....                         | 109 |
| ◆ Prepare for alert integration .....               | 113 |
| ◆ Synchronize ProSphere deployments .....           | 114 |
| ◆ Integrate ProSphere with Watch4net.....           | 114 |
| ◆ Deploy trusted certificates .....                 | 115 |
| ◆ Additional information .....                      | 115 |

## Synchronize time zones and system times

After deploying ProSphere, so that SPA and Brocade path performance data collection and alert consolidation will occur as expected, ensure the following:

- ◆ Time zone and system times of ProSphere and the host running BNA or CMCNE are synchronized
- ◆ System times of ProSphere and the hosts running SPA are synchronized

## Log into ProSphere

1. Open a Web browser and browse to the ProSphere Application by specifying the URL address (using the IP address or hostname) of the virtual machine where the ProSphere Application was deployed.

---

**Note:** Ensure you enable Transport Layer Security (TLS) 1.0 in Web browser security settings.

---

2. Accept any security-related dialog box that may appear in the browser asking you to accept a security certificate from EMC (or allow a security exception for ProSphere) and continue.

---

**Note:** The procedure to accept the certificate varies between browsers and even between different versions of the same browsers. To prevent the dialog box from appearing at login, import the certificate from the host you have established.

---

3. Type the default username and password for ProSphere at the login screen (shown in the figure):

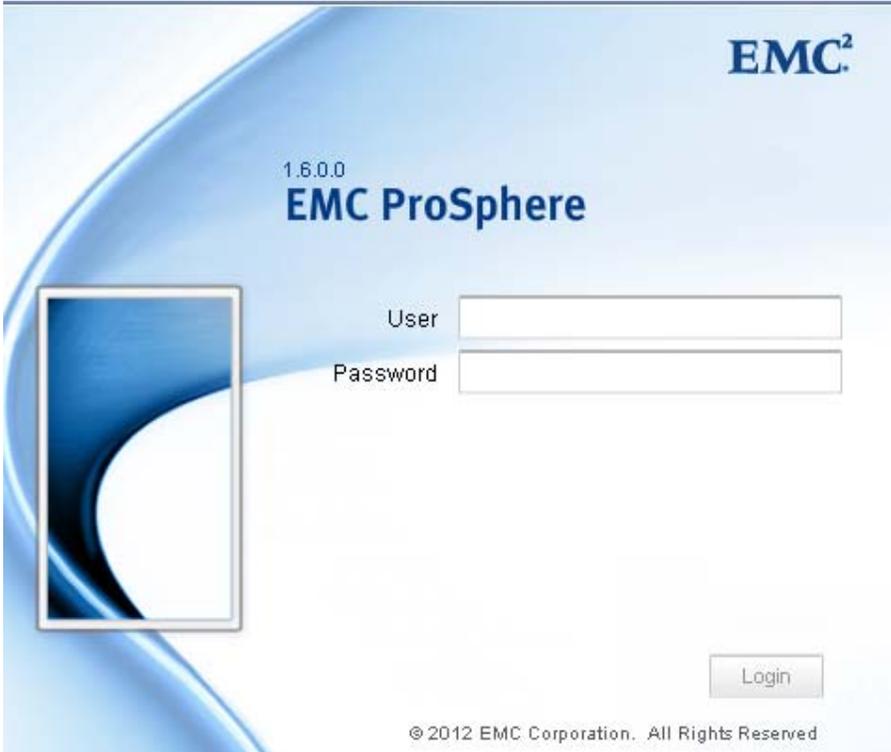
**appadmin** in the **User** field

**Changeme1!** in the **Password** field

---

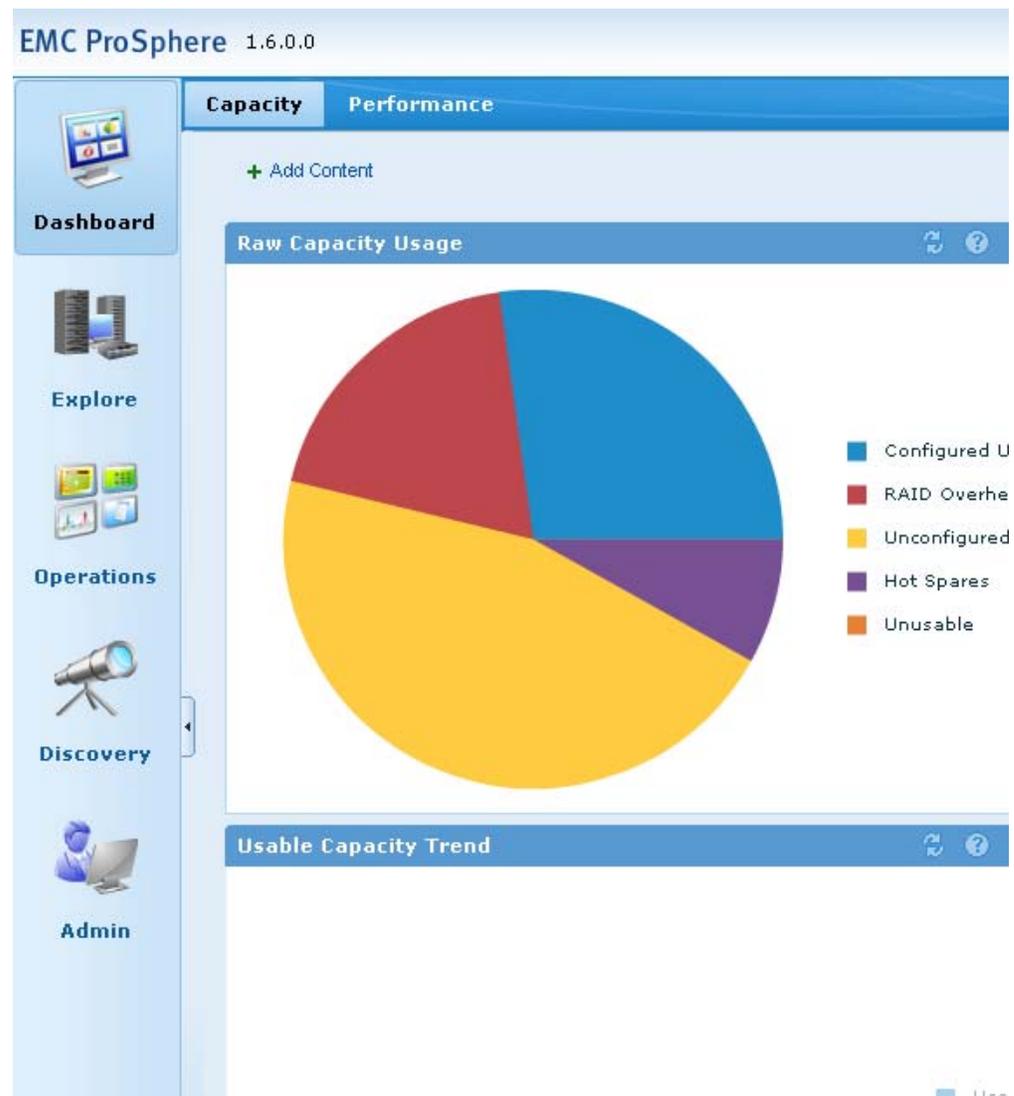
**Note:** The username, **appadmin**, and the password, **Changeme1!**, are predefined and assigned the roles Security Administrator, System Administrator, and User. You should change the password for this account immediately after the first login.

---



The image shows the login interface for EMC ProSphere 1.6.0.0. The background is a light blue gradient with a large, stylized blue wave graphic on the left side. In the top right corner, the EMC logo is displayed. Below the logo, the version number "1.6.0.0" and the product name "EMC ProSphere" are shown. The login form consists of two input fields: "User" and "Password", each with a corresponding text label to its left. A "Login" button is positioned below the "Password" field. At the bottom of the page, there is a copyright notice: "© 2012 EMC Corporation. All Rights Reserved".

4. Click **Login**. The ProSphere Console is loaded and appears in the browser as shown in the figure.



**Note:** Be aware that after the credentials are accepted and before the ProSphere Console is visible, a quick health check is done and the user is warned about problems that might interfere with normal operation. This includes but is not limited to problems such as the ProSphere Application being unable to locate a Discovery Engine over the network.

## Customize the security compliance message

Security Administrators can specify security compliance requirements in a message users must acknowledge before accessing ProSphere.

If such a message is added, it will be shown to the users in the login banner.

## Create or edit the message

**Note:** Ensure that the message is clear to the users and that its security claims are correct.

1. Click **Admin** on the ProSphere Console.
2. Click the **Users and Security** tab.
3. Click **Customize Login Banner**. The **Customize Login Banner** dialog box appears.
4. Type the message.

OR

Edit the existing message.

5. Click **Save**.

## Integrate ProSphere with Unisphere for VMAX

**Note:** The *EMC ProSphere Support Matrix* provides the minimum version requirements for Unisphere for VMAX.

The following are prerequisites for successful Unisphere for VMAX launch-in-context integration.

- ◆ Preferably, only one Unisphere for VMAX instance manages each Symmetrix array. If more than one Unisphere for VMAX instance manages a Symmetrix array, all instances must meet the minimum version requirements and must be the same version.
- ◆ You must have existing, supported versions of Unisphere for VMAX in the data center on a host that can be accessed through HTTP(S) by the ProSphere virtual machines. Ensure that no firewalls block their direct communication. The *Unisphere for VMAX Installation Guide* provides installation instructions. Installation of Unisphere for VMAX is independent of ProSphere installation.
- ◆ On arrays used to launch Unisphere for VMAX, associate ProSphere user accounts with the Admin or Monitor role:
  - In ProSphere, create user accounts to authorize ProSphere users who will launch Unisphere for VMAX in context.
  - In Unisphere for VMAX, on each array where a specific ProSphere user account will be used to launch Unisphere for VMAX, assign the Admin or Monitor role to the account.
- ◆ In Unisphere for VMAX, register Unisphere for VMAX arrays to collect performance data.
- ◆ Associate a ProSphere SMC-SPA access credential with a Unisphere for VMAX launch client.
  - In ProSphere, create an SMC-SPA access credential.
  - In Unisphere for VMAX, register a launch client. Assign the username and password used to create the Unisphere for VMAX-SPA access credential in ProSphere.
- ◆ In ProSphere, rerun the discovery jobs that discovered the Symmetrix arrays.

Perform the following configuration steps:

1. In ProSphere, ensure that user accounts exist for users who will launch Unisphere for VMAX in context. To authorize a ProSphere user, navigate to **Admin > Users and Security** and click **Create user**.
2. In Unisphere for VMAX, authorize each ProSphere user who will launch Unisphere for VMAX. When you authorize a user, assign the role **Admin** or **Monitor** (which has fewer permissions) on each array where the user will launch Unisphere for VMAX. This authorizes the user to launch Unisphere for VMAX on the specified array. For example, suppose John Doe is an authorized ProSphere user who will launch Unisphere for VMAX from ProSphere. In Unisphere for VMAX, on each array where John Doe will launch Unisphere for VMAX, assign the **Admin** role to John Doe at the **Create Authorization Rules** dialog box.

**Create Authorization Rules**

\* Name: john doe

Authority: [Dropdown]

\* Type: User [Dropdown]

Domain: [Text Box]

\* Specify Roles

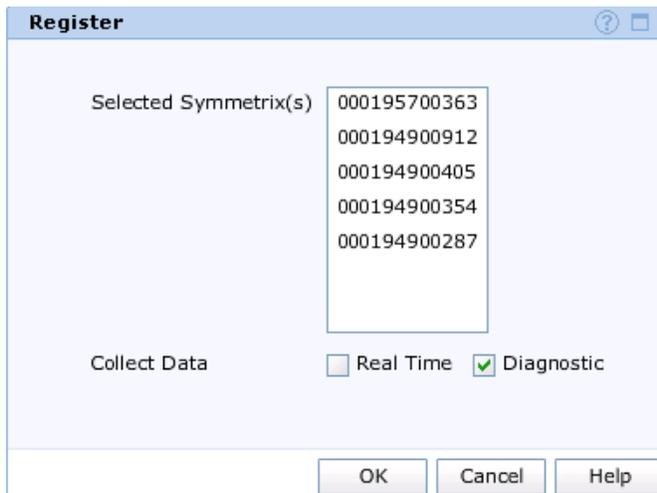
| Symmetrix    | Role             |
|--------------|------------------|
| 000198700411 | Admin [Dropdown] |
|              |                  |
|              |                  |
|              |                  |

OK Cancel Help

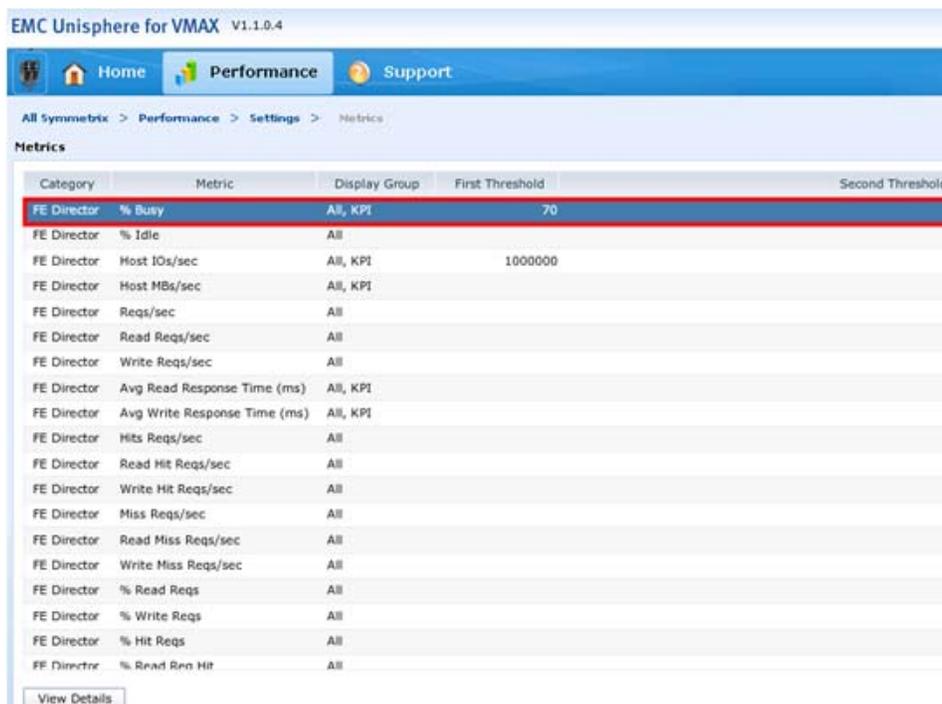
**Note:** The appadmin account exists by default in ProSphere. You can create an appadmin user in Unisphere for VMAX in order to use the ProSphere appadmin account to launch Unisphere for VMAX in context from ProSphere.

3. To collect **Array FE Directors - % Busy** data for a Symmetrix array, register the array for Performance data (assuming that Unisphere for VMAX was installed with the Performance Analytics option).
  - a. Navigate to **Performance > Settings > System Registrations**.
  - b. Select one or more Symmetrix arrays and click **Register**.

- c. Select the **Diagnostic** collection. The **Register** screen displays the array with a green indicator icon in the **Diagnostic** checkbox.



- d. In addition, for the **Array FE Directors - % Busy** metric chart, ensure the metric **FE Director - % Busy** is enabled (it should be by default). To verify, navigate to **Performance > Settings > Metrics**. Click the filter button and select **FE Director**.



- 4. In ProSphere, create an access credential with the type **SMC-SPA**. Navigate to **Discovery > Access Credentials > Create Access Credential**.

**Note:** Only one access credential with the type SMC-SPA can exist in a single deployment of ProSphere. If Unisphere for VMAX is installed on more than one array in a deployment, use the same SMC-SPA access credential (with the same client id) for all instances of Unisphere for VMAX in the deployment. If you have more than one ProSphere deployment, assign a unique client id to the SMC-SPA access credential in each deployment.

**Create Access Credentials - SMC-SPA**

Access Credentials

Type \* SMC-SPA

Name \* SMC-SPA Access Credential

Description Credential to use for integration with SMAS and/or Unisphere for VMAX

Make this a global access credential

SMC-SPA Attributes

Applicable to launch SMC and SPA

Client ID \* testclient

Password \* \*\*\*\*\*

Confirm Password \* \*\*\*\*\*

OK Cancel Help

**Note:** After you create an SMC-SPA access credential in a ProSphere deployment, the option of creating another will not be available in the drop-down list of the **Create Access Credentials** dialog box in that deployment.

5. Register a launch client in all Unisphere for VMAX instances in the deployment.
  - a. Navigate to **Administration > Link and Launch**.
  - b. Click **Create**.

- c. Enter the alphanumeric client ID and a password. All information in the SMC-SPA access credential created in ProSphere (username and password) must match the client information entered in Unisphere for VMAX.

The screenshot shows a dialog box titled "Register Launch Client". It contains three input fields, each preceded by a red asterisk: "Client ID" (containing "testclient"), "Password" (containing asterisks), and "Confirm Password" (containing asterisks). At the bottom of the dialog are three buttons: "OK", "Cancel", and "Help".

- d. Restart Unisphere for VMAX.

**Note:** Whenever you add a client in Unisphere for VMAX, you must restart it. If you do not, authentication fails.

6. From the **Discovery** view of ProSphere, rerun the discovery jobs that discovered the Symmetrix arrays. This validates the SMC-SPA access credentials for all Unisphere for VMAX URLs discovered for the arrays. Both **Performance Data Collection** and **Alerts Collection Status** log message windows display appropriate error messages.

**Note:** When you rerun the discovery jobs, you do not need to change any information including access credential. The discovery job uses the SMC-SPA access credential that is available in the system for performance detection.

## Configure CMCNE/BNA

This section applies to homogenous and mixed fabrics that contain one or more Brocade FC managed by the Connectrix Manager Converged Network Edition (CMCNE)/Brocade Network Advisor (BNA).

The [support.emc.com](http://support.emc.com) website provides CMCNE software and documentation.

### CMCNE

CMCNE is a unified network management solution for data, storage, application delivery, wireless, and converged networks. It provides a single interface for Brocade Fibre Channel SANs, IP networks, wireless networks, and Multiprotocol Label Switching (MPLS) networks — providing end-to-end visibility across different network types through a seamless and unified user experience.

**Note:** CMCNE will discover and report back on Brocade EOS switches.

## Configure CMCNE/BNA for launch in context

Perform the following steps before attempting to launch in context from ProSphere to Brocade:

1. Download the ProSphere Server certificate (apache certificate) from ProSphere Console > **Admin** > **Users and Security** > **Export Certificate**.

**Note:** The *EMC ProSphere Security and Configuration Guide* provides a detailed procedure to import the ProSphere Server certificate.

2. Import it to the CMCNE/BNA Server using either option a or b:
  - a. Use the `keytoolutil.bat` file located in the following location to import the certificate: `<CMCNE/BNA installation-folder>\bin`

The alias name used can be the server shortname.

- b. Use the `keytool.exe` available by default in the following location on CMCNE/BNA hosts: `<CMCNE/BNA installation-folder>\jre\bin`

When you execute the `keytool.exe` file, use the default admin password for BNA, or CMCNE, as appropriate. The following example shows how to execute the `keytool.exe` file on BNA:

```
CMCNE/BNA installation-folder>\jre\bin>keytool
-importcert -v -
file d:\serverCertificate.crt -alias prosphere
Enter keystore password: <default admin password>
Re-enter new password:<default admin password>
Owner: CN=aownlmsspro01.ecc.mssmgt.com
Issuer: CN=aownlmsspro01.ecc.mssmgt.com
Serial number: afddf19db0f238bb
Valid from: Thu Jun 21 13:35:51 CEST 2012 until: Tue Jun
20
13:35:51 CEST 2017
Certificate fingerprints:
    MD5: 28:EB:09:3E:DE:2C:E7:68:A4:0B:F3:56:78:80:DB:33
    SHA1: F1:57:FF:
71:77:F3:16:72:97:BA:B0:A4:DF:FD:D5:17:3B:A3:10:8A
    Signature algorithm name: SHA1withRSA
    Version: 3
Extensions:
#1: ObjectId: 2.5.29.14 Criticality=false
SubjectKeyIdentifier [
KeyIdentifier [
0000: 98 79 6C 28 4B 2E 64 11 C3 A5 30 CA 91 6F 4E
FB .yl(K.d...0..oN.
0010: 85 EF 02 89
]
]
#2: ObjectId: 2.5.29.19 Criticality=false
BasicConstraints:[
```

```
CA:true
PathLen:2147483647
]
#3: ObjectId: 2.5.29.35 Criticality=false
AuthorityKeyIdentifier [
KeyIdentifier [
0000: 98 79 6C 28 4B 2E 64 11 C3 A5 30 CA 91 6F 4E
FB .y1(K.d...0..oN.
0010: 85 EF 02 89 ....
]
[CN=aownlmsspro01.ecc.mssmgt.com]
SerialNumber: [ afddf19d b0f238bb]
]
Trust this certificate? [no]: yes
Certificate was added to keystore
[Storing C:\Users\nl06328\.keystore]
```

3. Restart the CMCNE/BNA service after importing the server certificate.
4. Create a CMCNE/BNA user whose username matches the ProSphere user credentials. From the CMCNE/BNA user management user interface, create a local user whose name matches the ProSphere user id (for example, appadmin).
5. Add any fabrics that are discovered in ProSphere to an Area of Responsibility in CMCNE/BNA, and assign them to the user account you will use to launch CMCNE/BNA, as shown in the following screen.

**Note:** If you need to launch CMCNE/BNA from any discovered fabric, assign the user account to the following Responsibility: All Fabrics. If you do not want to assign permissions that allow the account to launch from any discovered fabric, create an **Area of Responsibility** that is a subset of the discovered fabrics and assign it to the user account.

Users | Policy | LDAP Authorization

Authentication-Primary Local Database Secondary None Authorization Local Database

| User ID ▲     | Full Name | Roles           | Area Of Responsibility | E-mail Notification | Account Enabled | Policy Violations | Account Sta |
|---------------|-----------|-----------------|------------------------|---------------------|-----------------|-------------------|-------------|
| Administrator |           | SAN System A... | All Fabrics            | No                  | Yes             | No                | Active      |
| appadmin      | appadmin  | SAN System A... | Prosphere Fabrics      | No                  | Yes             | No                | Active      |

Add Edit Duplicate Delete Enable Disable Unlock

| Roles                    |                               |
|--------------------------|-------------------------------|
| Name ▲                   | Description                   |
| Host Administrator       | Host Administrator Role       |
| Network Administrator    | Network Administrator Role    |
| Operator                 | Operator Role                 |
| SAN System Administrator | SAN System Administrator Role |
| Security Administrator   | Security Administrator Role   |
| Security Officer         | Security Officer Role         |
| Zone Administrator       | Zone Administrator Role       |

| AOR               |                             |
|-------------------|-----------------------------|
| Name ▲            | Description                 |
| All Fabrics       | All Fabrics from My SAN     |
| Prosphere Fabrics | Fabrics managed by Prospher |

6. ProSphere should be able to do a DNS lookup of the CMCNE/BNA host to determine the FQDN of CMCNE/BNA host. If there are firewalls between the ProSphere host and CMCNE/BNA, configure the firewalls to enable the DNS lookup to work correctly.
7. The computer name of the Windows host where CMCNE is running should be set to the FQDN of the host. For example, if the FQDN is `cmcne-host.lss.emc.com`, and if the Computer Name is set to `cmcne-host`, Launch In-Context will not work. The Computer Name should be set to `cmcne-host.lss.emc.com`.

**Note:** The *EMC ProSphere Support Matrix* lists the CMCNE version supported by ProSphere.

### Authorize ProSphere users with the SMIA Configuration Tool

**Note:** There will be port contention if CMCNE and another SMI Cimom are installed on the same host and they both use the default ports 5988 and 5989.

On the Brocade CMCNE host do the following:

1. **Start > All Programs > CMCNE > Server Management Console.**
2. If you are not logged in as administrator, right-click on the Server Management Console and select **Run as administrator**.
3. In the CMCNE Server Console, click the **Services** tab.
4. Click **Restart**. The message “Stopping Services will cause CMCNE Clients .... “ appears.
5. Click **Yes**.
6. When the restart has completed and the **Status** column displays **Started**, click **Configure SMI Agent**.
7. In the SMIA Configuration Tool Log in window, enter user ID and password.
  - Default User name: **Administrator**
  - Default Password: **password**
8. Click **Login**.
9. In the SMIA Configuration Tool under the **Home** tab, click the **Users** option.
10. In the **Users** window under the **Users** tab, click **Add**.
11. In the **Add User** window, perform the following steps for each ProSphere user:
  - a. Enter the ProSphere user name.
  - b. Enter the ProSphere password.
  - c. Move all fabrics from **Available Roles / AOR TO Selected Roles /AOR**.
  - d. Move **SAN System Administrator** from **Available Roles / AOR** to **Selected Roles /AOR**.
  - e. Once all have been moved click **OK**.
12. In the **Users** window under the **Users** tab you should see the ProSphere users in the list under **Users**.

---

**Note:** ProSphere should be able to do a DNS lookup of the CMCNE host. Verify that all ports are open between ProSphere and the CMCNE server if firewalls exist between the applications. Bear in mind that host-based software firewalls can block communications and must be configured as well.

---

## Update Licenses

On the Brocade CMCNE host perform the following steps to update licenses:

1. Launch CMCNE by selecting the **Start > All Programs > CMCNE > CMCNE** or by double-clicking the CMCNE icon on the desktop, and log in.
2. From the main (**View All**) window, select **Help > License**.
3. In the **License** window, enter the license key or use browse to locate the license key file, and click **OK**.

---

## Prepare for alert integration

Ensure that you record the following details in order to create access credentials for Unisphere Remote for VNX and DCNM alert sources in the ProSphere UI.

Obtain the following Unisphere Remote for VNX details. These details are required in order to create an access credential for the Unisphere Remote instance as an alert source:

- ◆ Port where the Unisphere Remote instance is installed:  
\_\_\_\_\_
- ◆ Username used during installation or configured after installation:  
\_\_\_\_\_
- ◆ Password used during installation or configured after installation:  
\_\_\_\_\_

Obtain the following DCNM details:

- ◆ SAN Web Service Port where the DCNM instance is installed:  
\_\_\_\_\_
- ◆ Username used during installation or configured after installation:  
\_\_\_\_\_
- ◆ Password used during installation or configured after installation:  
\_\_\_\_\_

## Synchronize ProSphere deployments

The procedure for deploying multiple ProSphere or Collector deployments is the same as for a single deployment. However, make sure you create a common Administrator credential for all the deployments and use only this credential to log into ProSphere when you intend to synchronize multiple ProSphere deployments.

The *EMC ProSphere Administrator Guide* and online help contains information about synchronizing multiple ProSphere Applications. Go to **Home > Administering ProSphere > System > Synchronize ProSphere Applications > Synchronize Multiple ProSphere Applications dialog**.

## Integrate ProSphere with Watch4net

You can integrate ProSphere with Watch4net and enable report generation in Watch4net related to the ProSphere performance.

You can disable the SRM Suite integration whenever necessary—for example, when the Watch4net instance is going to be down.

Whenever the IP address or port of the Watch4net is changed, you should change the SRM Suite integration settings.

In a federated ProSphere setup, integrate the SRM suite at each instance of ProSphere.

1. Click **Admin** on the ProSphere Console.
2. Click **Configure SRM Suite Integration** on the **System** tab. The **Configure SRM Suite Integration** dialog box appears.
3. Select **Enable integration**.
  - a. Type the FQDN or IP address of the host in the **Host** field. This field supports a maximum of 63 alphanumeric characters including underscores ( \_ ), periods ( . ), dashes ( - ), and forward slashes ( / ).

- b. Type the port number in the **Port** field. This field supports a maximum of 5 digits in the range of 1 to 65535.
  - c. Keep the default value in the **Group** field.
4. Click **OK**.

**Note:** To disable integration, you would select **Disable integration** at the **Configure SRM Suite Integration** dialog box.

## Deploy trusted certificates

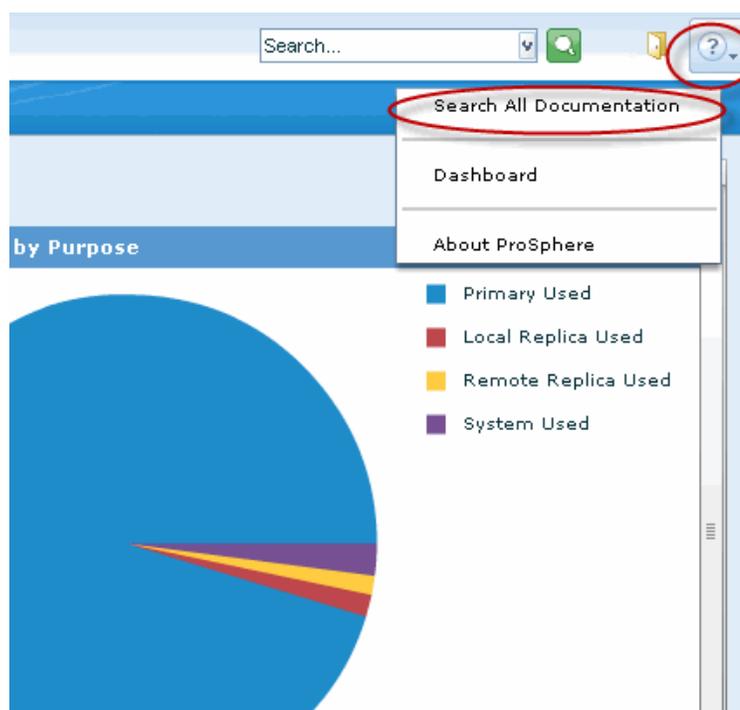
Deploy organization-specific, trusted certificates through the ProSphere Console. ProSphere is deployed with unsigned certificates. ProSphere supports only X.509 certificates. For added security, EMC recommends obtaining and deploying signed certificates specific to your organization. Certificate deployment can be performed in the ProSphere Console. The *EMC ProSphere Security and Configuration Guide* contains more information about importing and exporting certificates.

## Additional information

The *EMC ProSphere Documentation Library*, which is accessible from the ProSphere Console, contains additional information and assistance.

To display the library, right click the **Help** button (?), then select **Search All Documentation**.

Figure 9 Display the EMC ProSphere documentation library





---

Updates to EMC ProSphere are made separately to each virtual machine, from a Web browser.

This chapter explains how to deploy updates to ProSphere and includes the following sections:

- ◆ [Overview .....](#) 118
- ◆ [ProSphere update methods.....](#) 119
- ◆ [Install updates on ProSphere.....](#) 120
- ◆ [Create and restore snapshots or backups .....](#) 130
- ◆ [Back up and restore ProSphere with VMware Data Recovery .....](#) 133

## Overview

EMC may periodically provide you with updates to ProSphere. Updates can represent fixes, improvements, and additions to ProSphere documentation and functionality. Not all updates may affect all virtual machines in ProSphere. Consult your update documentation for specific details and instructions.



### IMPORTANT

**ProSphere 2.0.1.5 has a modified update process and data loss can occur if it is not followed properly. It is imperative that a VM snapshot be taken prior to the entire update process which will allow you to recover from any potential data loss**



### IMPORTANT

**Before updating ProSphere, EMC recommends that you power off the ProSphere vApp and additional ProSphere virtual machines (Collectors and any Secondary ProSphere Application virtual machine). Take a snapshot and power on the vApp and virtual machines, then apply the update.**



### IMPORTANT

**In a federated site, use the following sequence when applying updates to ensure that federated groups, tags, and rediscovery of configuration items work as expected.**

1. Update the master and non-master sites in parallel.
2. When the update completes, reboot the master site before rebooting the non-master sites.

*Wait for reboot and data migration to complete on the master site before logging in to the non-master sites to ensure that all features affected by federation work as expected.*

3. Manually resynchronize all ProSphere Applications from Admin > System > Synchronize ProSphere Application.



### IMPORTANT

**After you upgrade from ProSphere 1.7, if the UI displayed is the 1.7 ProSphere UI, clear the browser cache and launch a fresh browser session.**

## ProSphere update methods

The virtual machines in ProSphere include the following:

- ◆ ProSphere Application
- ◆ Discovery Engine and any Collectors
- ◆ Historical Database

[Table 9 on page 119](#) details the ways perform updates on ProSphere virtual machines.

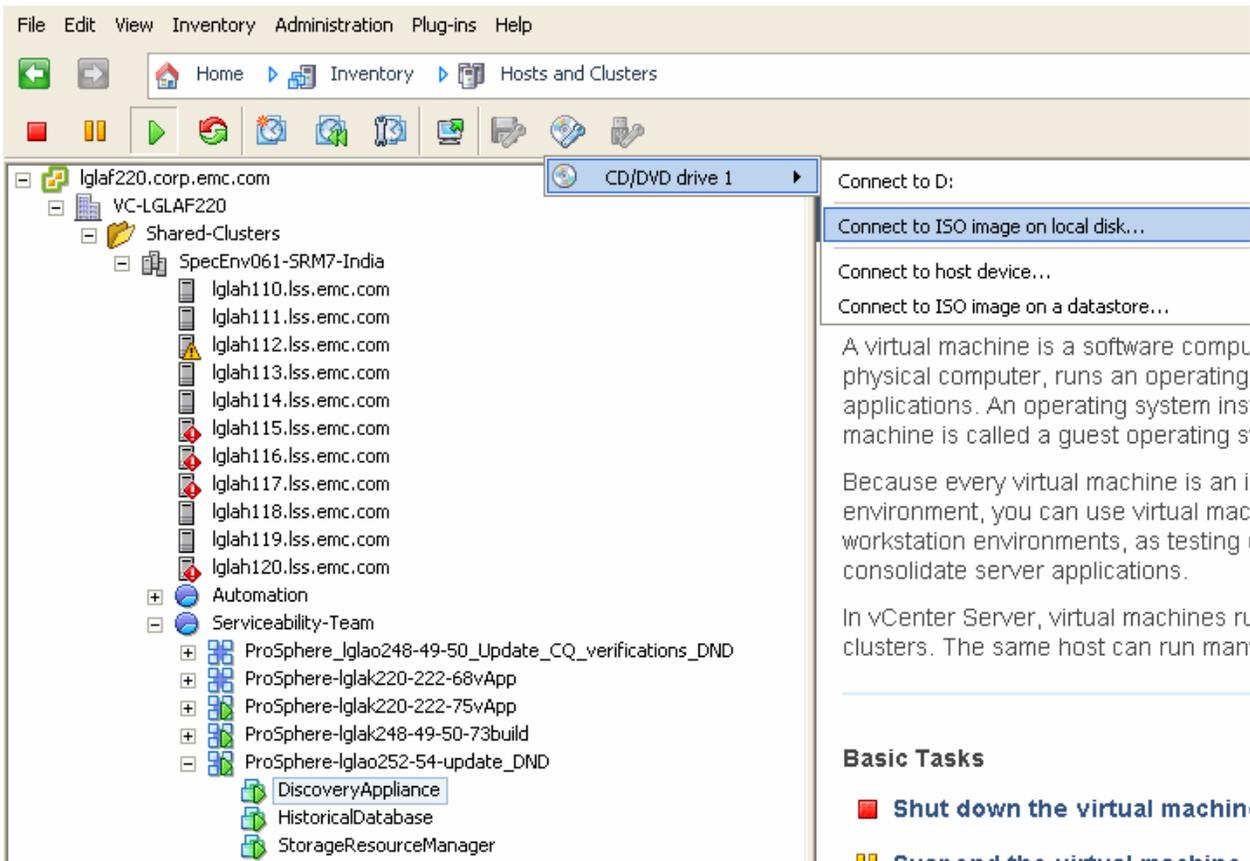
**Table 9** Update Details

| Source                        | Extension | Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Method                 |
|-------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| EMC Update Repository         | n/a       | <p>“<a href="#">Select a virtual CDROM or web server for updates</a>” on page 121 explains how to configure the ProSphere update interface to use one of the URLs of the EMC Update Repository to obtain updates from the web. A different URL has the updates for each ProSphere virtual machine. Apply updates.</p>                                                                                                                                                                                                                                                                                                                                                                                           | Specified Repository   |
| Customer-installed web server | zip       | <p>Create a web server for updates and configure a location where the web server will access the zip files. Go to EMC Online Support site URL provided by EMC. Download and unzip the zip files to the configured location. “<a href="#">Select a virtual CDROM or web server for updates</a>” on page 121 explains how to configure the ProSphere update interface to use the URL of the web server to obtain updates. Apply updates.</p> <p>There is a separate zip file for each ProSphere virtual machine.</p> <p>Each zip file contains two folders, Manifest and Packages. The Manifest folder contains xml metadata files, and the Package folder contains the rpm packages that need to be updated.</p> | Specified Repository   |
| CD-ROM                        | iso       | <p>Go to an EMC Online Support site URL. Download an ISO file to a virtual CD-ROM as explained in “<a href="#">Download an ISO file to a virtual CD-ROM</a>” on page 119.</p> <p>“<a href="#">Select a virtual CDROM or web server for updates</a>” on page 121 explains how to configure the ProSphere update interface to obtain updates from a virtual CD-ROM. Apply updates.</p>                                                                                                                                                                                                                                                                                                                            | Virtual CD-ROM Updates |

### Download an ISO file to a virtual CD-ROM

1. In vSphere, display the vSphere client.
2. Select each of the three ProSphere virtual machines and connect the ISO file to the virtual machine with the **Connect to ISO image on local disk option**, as shown in the following figure. The three virtual machines are:
  - DiscoveryAppliance
  - HistoricalDatabase

- StorageResourceManager.



After the ISO file is attached, the identification of updates can take a few minutes, unless the update check is forced.

## Install updates on ProSphere

The following sections explain how to update ProSphere.

**Note:** After applying updates, some features of ProSphere may not work correctly until after arrays are rediscovered.

### Create snapshots before updating software

Before applying an update, you should create a snapshot or backup of each of the ProSphere virtual machines. [“Create and restore snapshots or backups” on page 130](#) provides more information about creating virtual machine snapshots and backups for ProSphere.

After applying updates to a ProSphere virtual machine, shutdown and restart the vApp. Follow the instructions in [“Shut down or start up ProSphere or its virtual machines” on page 131](#).

**Note:** ProSphere does not create rollback or backup points before applying updates.

Consult your VMware documentation for more information about creating backups and snapshots than what is presented here. VMware also provides documentation at <http://www.vmware.com>.

## Select the EMC Update Repository as a source for updates

This section explains how to configure the source of manual updates as the EMC Update Repository on the web.

After logging in to ProSphere, perform the following:

1. Click **Admin** on the ProSphere Console.
2. Click the **System** tab.
3. Click **Manage Application Software**.
4. Select a system component.
5. Click **Specify Repository** to open the **Specify Repository** dialog box.
6. Select **Use EMC repository**.
7. Type the URL from [Table 10 on page 121](#).
8. Enter username and password.

**Note:** A valid EMC Online Support username and password is required to access the EMC Update Repository.

**Table 10** Update URL for ProSphere virtual machines

| Virtual machine       | Update URL                                                                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------------|
| ProSphere Application | <a href="https://vupdate.emc.com/StorageResourceManager">https://vupdate.emc.com/StorageResourceManager</a> |
| Discovery Engine      | <a href="https://vupdate.emc.com/DiscoveryAppliance">https://vupdate.emc.com/DiscoveryAppliance</a>         |
| Historical Database   | <a href="https://vupdate.emc.com/HistoricalDatabase">https://vupdate.emc.com/HistoricalDatabase</a>         |
| Collector             | <a href="https://vupdate.emc.com/CollectorAppliance">https://vupdate.emc.com/CollectorAppliance</a>         |

## Select a virtual CDROM or web server for updates

This section explains how to configure the source of manual updates as one of the following values:

- ◆ Use CD-ROM updates (if applying updates from an iso file)
- ◆ Use specified repository (if using a zip file)

After logging in to ProSphere, perform the following:

1. Click **Admin** on the ProSphere Console.
2. Click the **System** tab.
3. Click **Manage Application Software**.
4. Select a system component.
5. Click **Specify Repository** to open the **Specify Repository** dialog box.
  - a. If you select **Use CDROM updates**, you will download the ISO file to a virtual CD-ROM as explained in [Table 9 on page 119](#).

- b. If you select **Use specified repository**, type the URL of the customer-installed web server where your virtual machine will look for updates. If the URL requires authentication, provide a valid username and password.

## Receive updates reminder at login and apply updates

The system periodically checks for updates.

If updates are available when you log in to ProSphere, the **Software Updates Available** dialog box is displayed to remind you.

[Table 11 on page 122](#) describes the buttons available on the dialog box.

**Table 11** Software Updates Available dialog box: buttons

| Button          | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Update Software | <p>Displays the <b>Update Software</b> dialog box.</p> <p>To apply updates, click the checkbox next to each update to apply, then click <b>Install Updates</b>.</p> <p>After installing updates, if you have the Discovery Engine Collector deployed, click the Help button for the mandatory procedure. Otherwise, in the vSphere client, power off and reboot the ProSphere vApp. Follow the instructions in <a href="#">“Create and restore snapshots or backups” on page 130</a>.</p> <p><b>Note:</b> Updates to ProSphere are available only in a new browser session. Therefore, after updates are applied, a message appears and prompts you to close the browser and reopen it.</p> <p>During the restart, a data migration operation is in progress, which will take from a few minutes to an hour depending on the amount of data involved. Periodically, you can log in to the ProSphere Console to check progress. If no message is displayed, assume the data migration operation was successful. If a failure message is displayed, contact Customer Support.</p> <p>Before data migration is complete, you see a message like the following:<br/>Migration of data for &lt;...&gt; is still in progress. We suggest logging out and returning once migration is complete. If you continue, some functionality may not be available.</p> |
| Remind Me Later | Postpones the reminder.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| No Reminder     | Prevents the reminder from reappearing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Help            | Displays online help.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

You can disable the updates reminder with the following procedure:

1. Click **Admin** on the ProSphere Console.
2. Click the **System** tab.
3. Click **Manage Application Software**.
4. At the **Manage Application Software** dialog box, click **Updates Reminder**.
5. Select **Only show updates in Manage Application Software dialogs**.

**Note:** This option disables the automatic check for updates at login.

- Click **OK**, or click **Close** to close the dialog box without making changes.

## Manually check for and apply updates

To manually check for updates:

- Click **Admin** on the ProSphere Console.
- Click the **System** tab.
- Click **Manage Application Software**.

If updates are available, the **Health Details** area on the **Manage Application Software** dialog box displays a message indicating that updates are available. If the attempt to check for updates did not succeed, details of the failed operation appear.

[“Manage Application Software dialog box: buttons” on page 123](#) discusses the buttons available on the **Manage Application Software** dialog box.

**Table 12** Manage Application Software dialog box: buttons

| Button             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Update Software    | <p>Displays the <b>Update Software</b> dialog box.</p> <p>To ensure that the most recent available updates are listed, click <b>Check for New Updates</b>.</p> <p>To apply updates, click the checkbox next to each update to apply, then click <b>Install Updates</b>.</p> <p>After installing updates, if you have the Discovery Engine Collector deployed, click the Help button for the mandatory procedure. Otherwise, in the vSphere client, power off and reboot the ProSphere vApp. Follow the instructions in <a href="#">“Create and restore snapshots or backups” on page 130</a>.</p> <p><b>Note:</b> Updates to ProSphere are available only in a new browser session. Therefore, after updates are applied, a message appears and prompts you to close the browser and reopen it.</p> <p>During the restart, a data migration operation is in progress, which will take from a few minutes to an hour depending on the amount of data involved. Periodically, you can log in to the ProSphere Console to check progress. If no message is displayed, assume the data migration operation was successful. If a failure message is displayed, contact Customer Support.</p> <p>Before data migration is complete, you see a message like the following:<br/>Migration of data for &lt;...&gt; is still in progress. We suggest logging out and returning once migration is complete. If you continue, some functionality may not be available.</p> |
| Specify Repository | <p>Selects a source for updates. <a href="#">“Select the EMC Update Repository as a source for updates” on page 121</a> describes this button.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Update Reminder    | <p><a href="#">“Receive updates reminder at login and apply updates” on page 122</a> describes this button.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Close              | <p>Closes the <b>Manage Application Software</b> dialog box without applying updates.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Help               | <p>Displays online help.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Update ProSphere, including the Greenplum database

How you monitor the progress of updates depends on the current stage of the update operation.

### Export Greenplum database prior to ProSphere update

1. Take a VM snapshot of your existing ProSphere vApp.
2. Stop the srm-capacity-input service on the ProSphere SIP appliance:
  - a. Log onto the ProSphere SIP appliance
  - b. Run: `# service srm-capacity-input stop`
  - c. Verify that the service has been stopped:
 

```
# service --status-all | grep srm-capacity-input
Checking for service: srm-capacity-input.. unused
```
3. Perform a pre-update Greenplum DB export
  - a. Log into the ProSphere Database appliance.
  - b. Locate a directory that has sufficient filesystem space to hold the DB export.

**Note:** Do not use a directory off of /data, as contents in this area are removed during the upgrade.

4. Perform the following commands:

```
su - gpadmin
pg_dump -a --format=custom --compress=9 historicalDB >
/[directory from step 3b]/ historicalDB_cmp.bkp
```

### Initiate the ProSphere Update

5. Initiate the update process from **ProSphere Console > Admin > System > Manage Application Software**.
6. Wait for the following message to appear:



7. Monitor the update progress for each ProSphere virtual machine:
  - a. Log into each virtual machine with a tool that uses SSH protocol, such as PuTTY.
  - b. Run the following command:

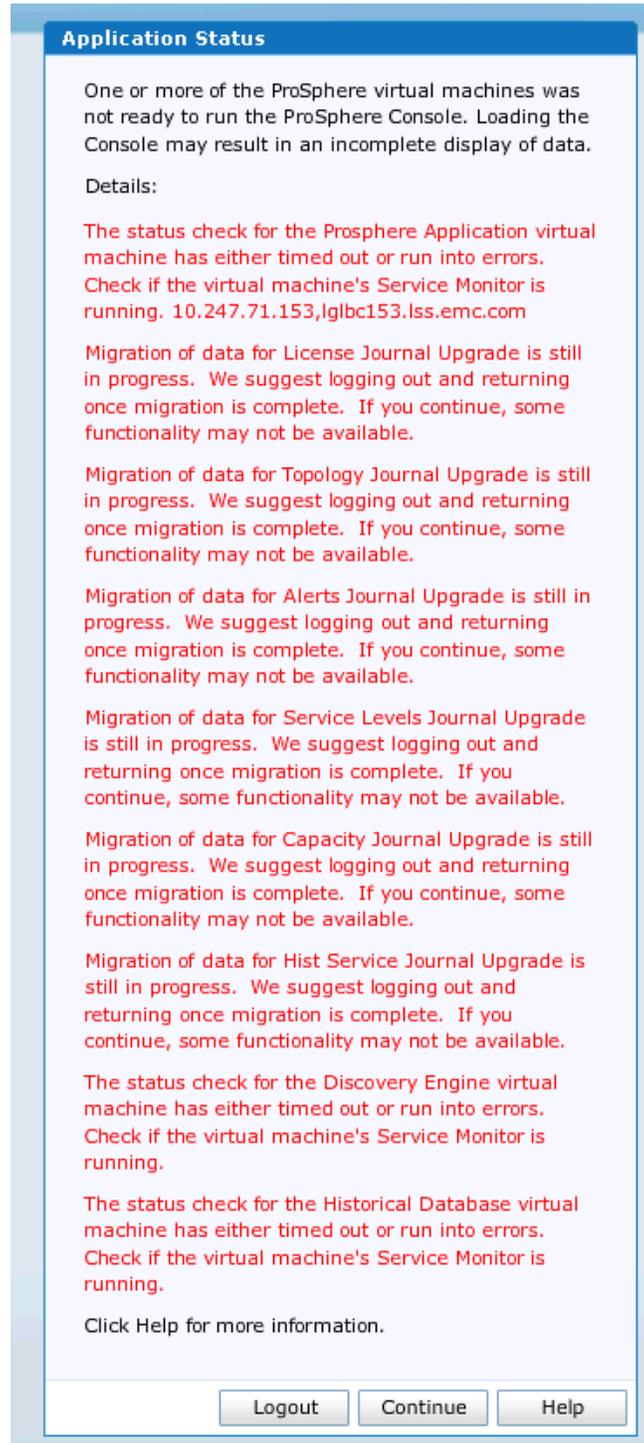
```
tail /opt/vmware/var/log/vami/updatecli.log
```

- c. Confirm that updates on all the virtual machines are complete with these lines.

```
[INFO] Update status: Done finalizing installation  
[INFO] Update status: Update completed successfully  
[INFO] Install Finished
```

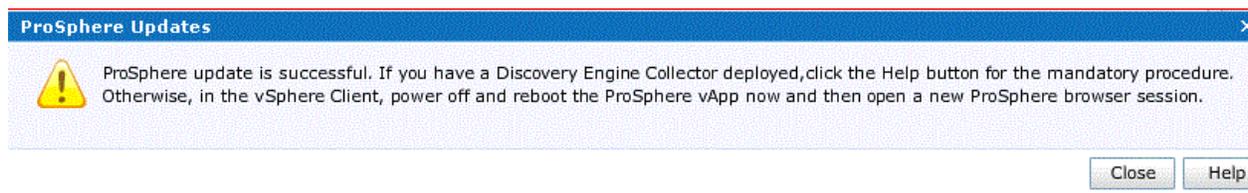
**Note:** If the ProSphere Console has not timed out before update has completed on all the virtual machines, skip to step 6..

8. If the ProSphere Console has timed out during the update, and you log into it before rebooting the ProSphere vApp, the following dialog box appears.



9. Click Logout and skip to step 7.

- Check for this message in the ProSphere Console, indicating that all virtual machines have been updated successfully:



- Power off the ProSphere vApp.

### Import Greenplum database

- Power on the ProSphere DB vApp only.
- Run a Greenplum import of the pre-update export from step #4.
- Perform the following commands:
  - `su - gpadmin`
  - `pg_restore -a -d historicalDB /[directory from step 3b]/historicalDB_cmp.bkp > restore_cmp.txt 2>&1`
- Check the `restore_cmp.txt` file for any errors during the import. If there are errors contact EMC Customer Support.

### Complete the ProSphere Update

- Perform a “Guest shutdown” of the DB appliance.
- Power on the entire ProSphere vApp.
- This triggers the next stage of the update process — data migration.
- Reboot any Discovery Engine Collector and Secondary ProSphere Application deployed.

### Monitor the progress of data migration

During data migration, you can only log into the VMware Console to check the progress of data migration for each ProSphere virtual machine. You cannot log into the ProSphere Console.



#### **CAUTION**

**Do not reboot a ProSphere virtual machine until data migration is complete, or the entire update operation fails.**



#### **IMPORTANT**

**Wait for reboot and data migration to complete on the master site before logging in to the non-master sites to ensure that all features affected by federation work as expected.**

To monitor data migration:

- Open the VMware Console from either vCenter or vCloud Director.

- For each ProSphere virtual machine, wait for all four steps of data migration (as illustrated in the example below) to complete. This may take an extended period of time depending on the size of the journal files being migrated.

```

Driver for the VMXNET 3 virtual network card:           done
VM communication interface:                             failed
VM communication interface socket family:              failed
Guest operating system daemon:                         done
Virtual Printing daemon:                               done
Loading CPUFreq modules (CPUFreq not supported)
Starting HAL daemon                                    done
Setting up (localfs) network interfaces:
  lo
  lo      IP address: 127.0.0.1/8
          IP address: 127.0.0.2/8                       done
  eth0    device: VMware VMXNET3 Ethernet Controller
  eth0    IP address: 10.247.71.153/24                  waiting
Waiting for mandatory devices: eth0
29 28
  eth0    device: VMware VMXNET3 Ethernet Controller
  eth0    IP address: 10.247.71.153/24
  eth0    is up   done
Setting up service (localfs) network . . . . . done
upgrade script for /var/lib/srm-bigdata-upgrade/alerts running ...
May 13 14:12:29 UPGRADE PROGRESS: 2144 alerts found...
May 13 14:12:29 UPGRADE PROGRESS: Alerts older than 90 days will not be migrated
May 13 14:12:29 UPGRADE PROGRESS: Step 1 of 4 being performed... Modifying alert
resources

```

- Ensure that the login prompt appears for each virtual machine, as given in the example below.

The login prompt in the VMware Console indicates that data migration is complete, and you can log into the ProSphere Console again.

```

Prosphere data upgrade is in progress,this could take up to 30 minutes...

Logfile: /var/log/bootflag_removedefaultspaprofile-update.log           done
Flag    : /var/lib/sda-update-flags/remove-default-spaprofile         done

Logfile: /var/log/bootflag_updatewsmanaccesprofile-update.log         done
Flag    : /var/lib/sda-update-flags/updatewsmanaccesprofile         done

Initializing SMTP port (sendmail)                                     done
Starting: srm-threadmanager   done
Apache is already running (/var/run/httpd2.pid)                     done
Starting CRON daemon   done
Starting: logmgmt-server   done
Starting Firewall Initialization (phase 2 of 2)                     done
Starting: srm-msa-config-proxy                                     done
Master Resource Control: runlevel 3 has been reached
Skipped services in runlevel 3:                                     nfs splash

Welcome to SUSE Linux Enterprise Server 11 SP2 (x86_64) - Kernel 3.0.51-0.7.9-d
efault (tty1).

lg1bc154 login: _

```

### Verify completion of the update process

1. Log into the ProSphere Console. The following message appears:



2. In **Admin > System > Manage Application Software**, check the update status for the ProSphere virtual machines.

The value in the Last Updated column should indicate that the virtual machines are updated as shown in this example:

| Manage Application Software |                      |             |                         |
|-----------------------------|----------------------|-------------|-------------------------|
| System Component            | Host Name            | Version     | Last Updated (UTC -0... |
| ProSphere Application       | lg1bc153.lss.emc.com | 2.0.0.0.271 | 2013-05-13 06:02:08     |
| Historical Database         | lg1bc155.lss.emc.com | 2.0.0.0.254 | 2013-05-13 06:02:08     |
| Discovery Engine            | lg1bc154.lss.emc.com | 3.1.0.0.265 | 2013-05-13 06:02:06     |
| ProSphere Application       | lg1bc156.lss.emc.com | 2.0.0.0.271 | 2013-05-13 06:02:08     |

3. Rerun all initial discovery jobs manually.

---

## Impact of upgrades

The upgrade impacts the currently running performance data collection and alert collection jobs, causing them to fail.

To avoid discovery failure, create an SMC-SPA access credential in ProSphere to represent all SMC/SPA instances in the network. An SMC-SPA access credential allows ProSphere to be represented as a launch client in SMC. The launch client needs to be registered in all SMC/SPA instances.

### Upgrading ProSphere from 1.5 to 1.6 or later can have the following results:

- ◆ Performance data collection may fail
- ◆ Alert collection jobs may fail
- ◆ Discovery jobs configured with default credentials are dissociated.

If array detection fails, the status of the array is displayed on the Performance Detection Failures link in Discovery Job Execution Results.

The reasons for failure can be:

- ◆ The SMC-SPA access credential was not created.
- ◆ The SMC-SPA access credential attributes do not match the information in the corresponding launch client in an SMC/SPA instance.

Follow the steps in [“Integrate ProSphere with Unisphere for VMAX”](#) on page 105.

---

## Create and restore snapshots or backups

Snapshots or backups of the ProSphere virtual machines ensure that you can return to the complete, previous working state of ProSphere in the event of a failed update.

Instead of using snapshots, your data center may use VMware Data Recovery as a backup solution for your virtual environment. [“Back up and restore ProSphere with VMware Data Recovery”](#) on page 133 explains how to create backups with VMware Data Recovery.



### IMPORTANT

**If more than one deployment is synchronized, we recommend that you schedule backups of synchronized sites so they start at the same time. This minimizes errors that result from sites being “out-of-sync.”**

---

**Note:** Your VMware environment may have predefined policies related to the creation of snapshots and backups. Consult your VMware administrator before creating snapshots or backups of ProSphere virtual machines. The procedures presented here are only examples.

## Shut down or start up ProSphere or its virtual machines



### **IMPORTANT**

If a ProSphere vApp or virtual machine is improperly shut down, network configuration data may be lost, and the ProSphere virtual machine will be isolated from the network after powering on. This is a known problem with VMware.

[Table 13 on page 131](#) explains how to perform shutdowns and startups with right-click options from the vSphere Console.

**Table 13 Shutdown and startup procedures from vSphere Console**

| Item                      | To shut down use... | To start up use... |
|---------------------------|---------------------|--------------------|
| ProSphere virtual machine | ShutDown Guest      | Power On           |
| ProSphere vApp            | Power Off           | Power On           |

[Table 13 on page 131](#) explains how to perform shutdowns and startups with right-click options from the vSphere Console. Select a virtual machine or vApp, then use the specified command.

**Table 14 Shutdown and startup procedures from vCloud Console**

| Item                      | To shut down use... | To start up use... |
|---------------------------|---------------------|--------------------|
| ProSphere virtual machine | Stop                | Stop               |
| ProSphere vApp            | Start               | Start              |



### **IMPORTANT**

Do not execute reboot from the command line or use Restart Guest from VMware tools. This may render the appliance unusable and result in an empty ovfEnv.xml which corrupts the /etc/hosts file with incorrect entries.



### **IMPORTANT**

If a Collector is powered off directly without first properly shutting down the system, the ProSphere Console can hang. The recommended practice is to use the Shutdown Guest command in vCenter before powering off.

## Create ProSphere snapshots in vSphere Client

To create a snapshot of each of the ProSphere virtual machines in the VMware vSphere Client:

1. Open the vSphere Client and connect to the vCenter Server managing the VMware environment in which ProSphere is running.
2. Navigate to the ProSphere vApp. You can find the vApp by entering a name in the **Search Inventory** search field. You can also navigate to the vApp in the **Inventory Panel**.

---

**Note:** In a scale-out deployment, additional virtual machines of the Collector type exist, as described in the architecture chapter of the *EMC ProSphere Administrator Guide*. Shut down Collectors, then shut down the vApp. Shut down Collectors by first right-clicking each in the vSphere Console and then selecting **Shutdown Guest**.

---

3. Shut down the vApp by right-clicking it and then selecting **Power Off**.



### **IMPORTANT**

**Snapshots should not be taken if ProSphere is running.**

4. Right-click the first virtual machine and select **Snapshot > Take snapshot**.
5. In the **Take Virtual Machine Snapshot** dialog box, enter a **Name** and **Description** for the snapshot.
6. Click **OK** to create the snapshot. The snapshot creation status is displayed in the **Recent Tasks** status bar.
7. Repeat steps 4 through 6 for each virtual machine in the ProSphere vApp.
8. When each snapshot displays a status of **Completed**, power on the ProSphere vApp. Right-click the ProSphere vApp and select **Power On**.
9. Restart any Collectors. Restart each Collector by right-clicking it in the vSphere Console and selecting **Power On**.

---

## **Roll back to a snapshot in vSphere Client**

To roll back to a snapshot of a ProSphere virtual machine in the VMware vSphere Client:

1. Open the vSphere Client and connect to the vCenter Server managing the VMware environment in which ProSphere is running.
2. Navigate to the ProSphere vApp and select one of its virtual machines. You can find the vApp by entering a name in the **Search Inventory** search field. You can also navigate to the vApp in the **Inventory Panel**.
3. Right-click the virtual machine and select **Snapshot, Snapshot Manager**.
4. In the **Snapshot Manager** dialog box, select the name of the snapshot to roll back to and then click **Go to**.
5. Click **Yes** in the **Confirm** dialog box to proceed with the rollback.

---

**Note:** If rolling back a ProSphere virtual machine due to a failed update, EMC recommends rolling back each of the ProSphere virtual machines to a corresponding snapshot.

---



---

**Note:** If multiple instances of ProSphere are synchronized and one is rolled back to a snapshot, attempts to access details of objects discovered after the rollback occurred will return errors. The synchronization chapter of the *EMC ProSphere Administrator Guide* discusses this situation in detail.

---



---

## **Create ProSphere snapshots in vCloud Director**

Use the following procedure to snapshot the ProSphere vApp.

1. If you have any collectors or a Secondary ProSphere Application configured in the environment, power them off before powering off the vApp.
2. Power off the ProSphere vApp.
3. Click the **My Cloud** tab and choose the ProSphere vApp to snapshot.
4. Right click the vApp and select **Create Snapshot**.
5. If you have a Collector or a Secondary ProSphere Application deployed, repeat step 4.

---

**Note:** vCloud director currently supports only one snapshot. The previous snapshot will be overwritten if you take another snapshot.

---

---

### Roll back to a snapshot in vCloud Director

1. Click the **My Cloud** tab and select the ProSphere vApp to revert.
2. Right-click the vApp and select **Revert to snapshot**.
3. If you have a Collector or a Secondary ProSphere Application deployed, repeat step 2.

---

## Back up and restore ProSphere with VMware Data Recovery

The *VMWare Data Recovery Administration Guide* explains how to back up and restore virtual machines.

If VMware Data Recovery is used for backups, each virtual machine must have a name that differentiates it from all virtual machines in all deployments by a customer in a vCenter.

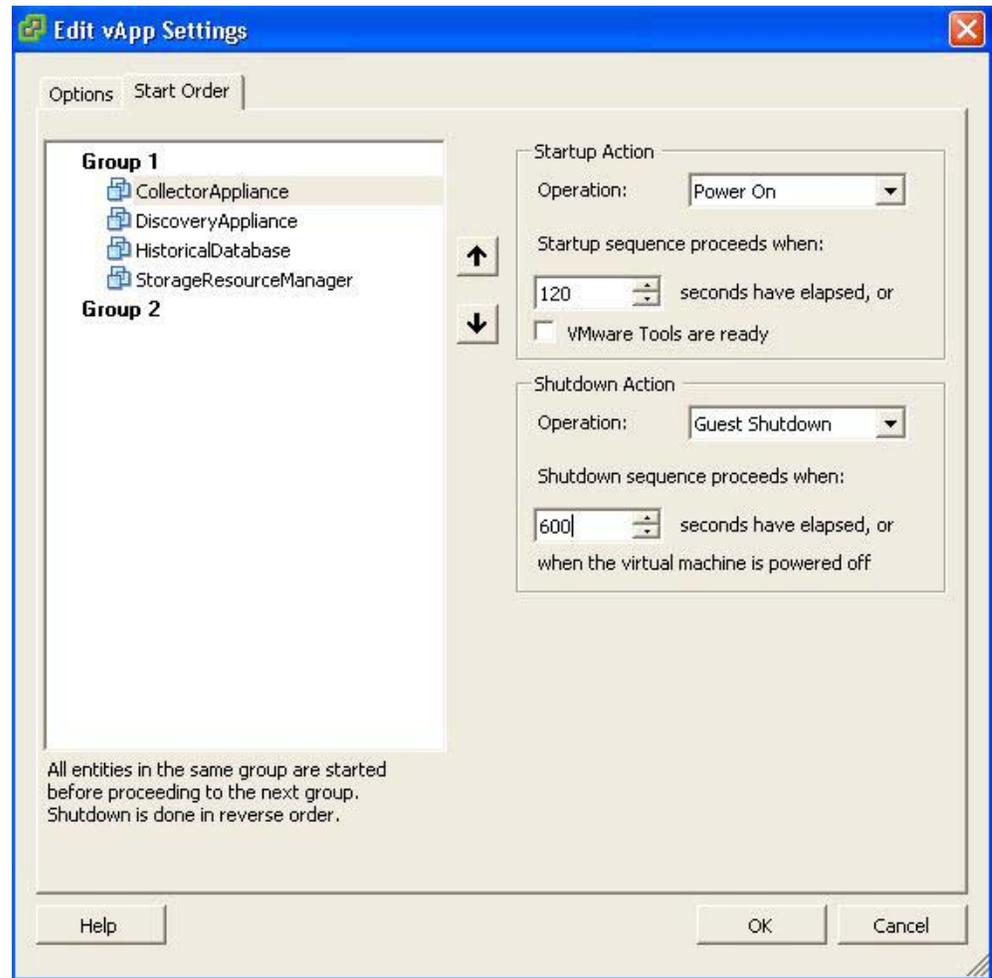
In a scale-out deployment, additional virtual machines of the Collector type exist, as described in the architecture chapter of the *EMC ProSphere Administrator Guide*. Schedule separate backup jobs for the vApp and for the Collector. Schedule these backups to occur at the same time. When restoring the virtual machines from backups, disable automatic power on the Collector so you can manually power it on after you power on and restore the Discovery Engine.

When backing up with VDR, move the Collectors inside the vApp container into Group1, along with other ProSphere machines. When you do this, by default the Shutdown Operation will be set to Power Off. This value does not permit a graceful shutdown of the Collector.

Perform the following step to allow the Collector to gracefully shut down:

1. Select **Edit Settings**.
2. Select the **Start Order** tab.
3. Under **Shutdown Action**, set the **Operation** to **Guest Shutdown**.

4. Set Shutdown sequence proceeds when to 600.



5. Click **OK**.