Cisco UCS Performance Manager Getting Started Guide

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Contents

Preface

Cisco UCS Performance Manager Getting Started Guide provides instructions for configuring Cisco UCS Performance Manager Express and Cisco UCS Performance Manager after installation. If you have not yet installed Cisco UCS Performance Manager, follow the instructions in the *Cisco UCS Performance Manager Installation Guide* before using this guide.

- Cisco UCS Performance Manager Express provides monitoring for Cisco UCS Central, Cisco UCS Domains, Linux and Microsoft Windows servers, hypervisor servers, and Control Center.
- Cisco UCS Performance Manager provides monitoring for Cisco UCS Central, Cisco UCS Domains, Linux and Microsoft Windows servers, hypervisor servers, network devices, storage devices, and Control Center.

For convenience, this document uses "Cisco UCS Performance Manager" generically, and notes explicitly any differences between the two licenses.

Related publications

Title	Description
Cisco UCS Performance Manager Installation Guide	Provides detailed information and procedures for installing and upgrading Cisco UCS Performance Manager.
Cisco UCS Performance Manager Migration Guide	Provides detailed information and procedures for migrating data from Cisco UCS Performance Manager version 1.1.x to version 2.0.x.
Cisco UCS Performance Manager Getting Started Guide	Provides instructions for configuring Cisco UCS Performance Manager to monitor your environment, after installation.
Cisco UCS Performance Manager User Guide	Provides specific instructions for using Cisco UCS Performance Manager in the UCS environnment.
Cisco UCS Performance Manager Administration Guide	Provides an overview of Cisco UCS Performance Manager architecture and features, as well as procedures and examples to help use the system.
Cisco UCS Performance Manager Release Notes	Describes known issues, fixed issues, and late-breaking information not already provided in the published documentation set.

Documentation feedback

To provide technical feedback on this document, or to report an error or omission, please send your comments to `ucs-docfeedback@cisco.com`. We appreciate your feedback.

Welcome to Cisco UCS Performance Manager 1

Once Cisco UCS Performance Manager is installed, the Cisco UCS Performance Manager Setup Wizard guides you through the process of accepting the EULA, providing your license key, defining users, setting up UCS Central devices, setting up UCS domains, adding infrastructure devices, and setting up an SMTP host for email generation.

Cisco UCS Performance Manager uses standard management APIs to collect performance data, so no proprietary agents are installed on infrastructure devices. However, Cisco recommends that you review the following sections, and verify that the devices to monitor are ready to respond to requests for data.

Preparing Network Devices

Note If your license is Cisco UCS Performance Manager Express, skip this topic.

Cisco UCS Performance Manager uses SNMP to provide customized or generalized support for many Cisco products.

The following table associates Cisco products with the customized Cisco UCS Performance Manager device types that support them. Device types are listed in the **Network** area of the **Add Infrastructure** wizard, which is both part of the setup wizard and available through the Cisco UCS Performance Manager browser interface.

Note Some of the supported products, such as the Cisco Nexus 7000 and 9000 switches, represent a large number of discrete monitoring endpoints. If you are unsure which Cisco UCS Performance Manager virtual machine size supports the number of high-density devices you wish to monitor, contact your Cisco representative.

Note In order to monitor Cisco Nexus 9000 Series devices, you must first enable NX-API with the **feature** manager CLI command on the device. For detailed instructions on performing this task, see the following Cisco documentation: *http://www.cisco.com/c/en/us/td/docs/switches/datacenter/nexus9000/sw/6-x/programmability/guide/b_Cisco_Nexus_9000_Series_NX-OS_Programmability_Guide/b_Cisco_Nexus_9000_Series_NX-OS_Programmability_Configuration_Guide_chapter_0101.html#concept_BCCB1EFF9C4A4138BECE9ECC0C4E38DF*

Note There is no minimum NX-OS version for Nexus devices.

Cisco product	Device type
Cisco Catalyst 6500 and 3560 Series Switches	Cisco 6500 (SNMP)
Cisco Nexus 5000 Series Switches	Cisco Nexus 5000 (SNMP + Netconf)
Cisco Nexus 2000 Series Fabric Extenders	Cisco Nexus 5000 (SNMP + Netconf)

Cisco product	Device type
Cisco Nexus 7000 Series Switches	Cisco Nexus 7000 (SNMP + Netconf)
Cisco Nexus 1000v and 1010 Series Switches	Cisco Nexus 1000V (SNMP + Netconf)
Cisco Nexus 3000 Series Switches	Cisco Nexus 3000 (SNMP + Netconf)
Cisco Nexus 9000 Series Switches	Cisco Nexus 9000 (NX-API + Netconf)
Cisco Catalyst 6500 Series Virtual Switching Systems	Cisco VSS (SNMP)
Cisco MDS 9000 Series Multilayer Switches	Cisco MDS 9000 (SNMP)

In addition, Cisco UCS Performance Manager provides two generalized device types.

Cisco product	Device type
Cisco CatOS-based switches or routers	Generic Switch/Router (SNMP)
Cisco IOS-based switches or routers	Cisco IOS (SNMP)

To prepare a switch or router device for monitoring, verify that an SNMP agent on the device is running.

Preparing Storage Devices

Note If your license is Cisco UCS Performance Manager Express, skip this topic.

Legacy NetApp Filers

Cisco UCS Performance Manager uses SNMP to monitor legacy NetApp Filers that do not support the Data ONTAP® API (ZAPI).

Note The data gathered are approximate, because the values for many objects (Aggregate, Volume, Plex, and RAID group) are not exposed by the NetApp MIB.

To prepare a legacy NetApp Filer for monitoring, verify that SNMPv2 is installed, and then start an SNMP agent.

Recent NetApp Filers

Cisco UCS Performance Manager uses HTTP to monitor NetApp Filers that support the Data ONTAP® API (ZAPI).

To prepare a recent NetApp Filers for monitoring, verify the following conditions:

- The Filer is running in 7-Mode or C-Mode.
- ZAPI is installed and enabled. Version 8.0, or a more recent version, is required.

Also, you need the username and password of an account on the Filer that is authorized to use ZAPI.

EMC Storage Arrays

Cisco UCS Performance Manager uses the Web-Based Enterprise Management (WBEM) protocol to send queries to EMC Storage Management Initiative Specification (SMI-S) providers associated with EMC VMAX and VNX storage arrays. Cisco UCS Performance Manager monitors all models of VMAX and VNX storage arrays.

To prepare EMC arrays for monitoring, verify that at least one EMC SMI-S provider is running for each type of array to monitor. (The VMAX and VNX data models are different.) In addition, you need the following information:

- The username and password of a user account that is authorized to collect data on each SMI-S provider.
- The IP address of each SMI-S provider.
- The port number at which each SMI-S provider listens for requests.
- Whether or not to use SSL.

Cisco recommends verifying that an SMI-S provider is responding to requests before adding it to Cisco UCS Performance Manager. SMI-S provider version 4.6 has been certified for this version of Cisco UCS Performance Manager. SMI-S provider version 8.1 is not currently supported.

Note Many of the graphs for components types of EMC arrays display NaN when statistics logging is disabled on the EMC device. The logging feature has a low default timeout value, and must be set to a higher value or turned on again periodically.

Verifying an SMI-S provider

To perform this procedure, you need a Linux host that has a network path to the SMI-S providers of the arrays to monitor.

Note Do not perform this procedure on the Cisco UCS Performance Manager host.

Perform this procedure to verify that the SMI-S providers associated with EMC arrays are configured correctly, and are responding to WBEM queries from command line tools.

1. Log in to a Linux host as `root`, or as a user with superuser privileges.
2. Install a WBEM command-line interface package, such as `wbemcli`.
3. Verify the SMI-S provider. Replace the variables with values that are valid in your environment.

```
wbemcli IP-Address:Port -u admin -p 'Password' -n root/emc --no-ssl
ei('EMC_DiskDrive')
```

The expected result is a list of Disk Drive classes.

Preparing Server Devices

Linux Servers

Cisco UCS Performance Manager uses SNMP or SSH to monitor Linux servers.

To prepare a Linux server for SNMP monitoring, install an SNMP package on the server (for example, *Net-SNMP*) and start the agent.

To prepare a Linux server for SSH monitoring, install an SSH server package (for example, *OpenSSH*) and start the SSH daemon. Also, obtain the username and password of a user account on the server that has standard user privileges (root privileges are not required).

Windows Servers

Cisco UCS Performance Manager uses SNMP or WinRM to monitor the following Microsoft Windows systems:

- Microsoft Windows Server 2012 and 2012 R2

- Microsoft Windows Server 2008 R2

To prepare a Windows system for SNMP monitoring, start the SNMP service.

To prepare a Windows system for WinRM monitoring, refer to the appendix, "Preparing Windows Systems."

Preparing Hypervisor Devices

vSphere EndPoint

Cisco UCS Performance Manager uses SOAP to monitor VMware vSphere servers running vSphere 4.1, 5.0, 5.1, 5.5, or 6.0.

To prepare a VMware vSphere server for monitoring, verify the software version, and obtain the username and password of an account on the server that is authorized to use the vSphere API and determine whether or not to use SSL.

Microsoft Hyper-V

Cisco UCS Performance Manager uses WinRM to monitor the following Microsoft Hyper-V systems:

- Microsoft Hyper-V Server 2012 and 2012 R2
- Microsoft Hyper-V Server 2008 and 2008 R2

To prepare a Hyper-V Server for WinRM monitoring, refer to the appendix, "Preparing Windows Systems."

2 Enabling access to browser interfaces

Control Center and Cisco UCS Performance Manager have independent browser interfaces served by independent web servers. Both web servers are configured to use SSL/TLS communications.

The Control Center web server listens at the hostname of the Control Center master host and port 50443. For a Control Center master host with the fully-qualified domain name (FQDN) `cc-master.example.com`, the hostname URL is `https://cc-master:50443`. As always, you may substitute an IP address for the hostname portion of the URL.

The Cisco UCS Performance Manager web server listens at a *port public endpoint* and a *virtual host public endpoint*.

- The default *port public endpoint* is the hostname of the Control Center master host and port 443. For the FQDN `cc-master.example.com`, the URL of the default port public endpoint is `https://cc-master`. If the Control Center master host has more than one network interface, you can configure additional port public endpoints with different hostnames. Also, you can disable SSL/TLS communications for a port public endpoint, if desired.

  To use a port public endpoint to gain access to the Cisco UCS Performance Manager browser interface, no additional network name resolution entries are required. The default entries for the network interface(s) of the Control Center master host are sufficient.
- The default *virtual host public endpoint* is the text `ucspm` prepended to the hostname of the Control Center master host and port 50443. For the FQDN `cc-master.example.com`, the URL of the default virtual host public endpoint is `https://ucspm.cc-master:50443`. You can change the name of the default virtual host and configure additional virtual host public endpoints, if desired.

  To use a virtual host public endpoint to gain access to the Cisco UCS Performance Manager browser interface, you must add name resolution entries for the virtual host to the DNS servers in your environment or to the hosts files of individual client systems.

The following sections provide additional information about public endpoints, and instructions for creating public endpoints and for configuring virtual host name resolution.

Creating public endpoints

This section decribes how to create a port public endpoint and a virtual host public endpoint. The following table outlines the process for each.

Port public endpoint	Virtual host public endpoint
1 Create the endpoint	**1** Create the endpoint

Port public endpoint	Virtual host public endpoint
2 Configure the Zope service	2 Configure the Zope service 3 Configure virtual host name resolution

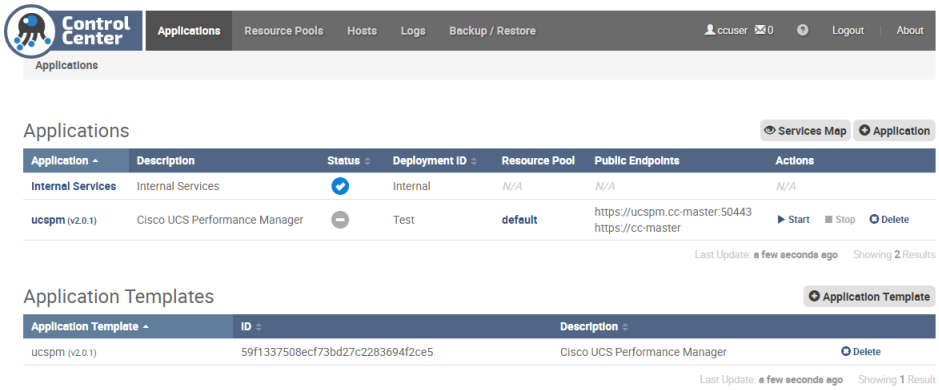
To change an existing public endpoint, create a new endpoint and then delete the existing endpoint.

Note Virtual host public endpoints must use SSL/TLS communications. Port public endpoints can communicate with or without SSL/TLS.

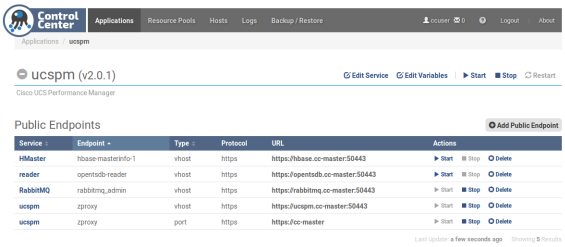
Creating a port public endpoint

Use this procedure to create a new port public endpoint. Port public endpoints can communicate with or without SSL/TLS.

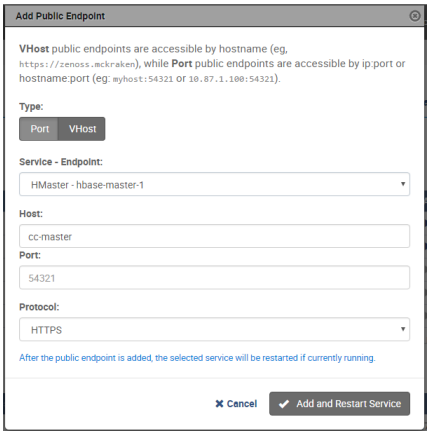
1 Log in to the Control Center browser interface.



2 In the **Application** column of the **Applications** table, click the application name (**ucspm**).



3 Click **+ Add Public Endpoint**, located above the **Public Endpoints** table, on the right side.



The default view of the **Add Public Endpoint** dialog displays the fields for creating a port public endpoint.

4 Define a new port public endpoint.

a In the **Type** area, click **Port**.

b From the **Service - Endpoint** list, select **ucspm - zproxy**.

The selection is the last entry in the list.

c In the **Host** field, enter a hostname or IP address that is assigned to a network interface on the Control Center master host.

The default value is the hostname that was added with the Deployment Wizard when Cisco UCS Performance Manager was initially deployed. If the Control Center master host has more than one network interface, you may add the hostname or IP address assigned to one of the other interfaces.

d In the **Port** field, enter a safe, unused port number greater than or equal to 1024 and less than or equal to 65535.

For a list of ports considered unsafe, see *Unsafe ports on Chrome*. For the list of ports used by the Control Center master host, refer to the *Cisco UCS Performance Manager Installation Guide*.

e In the **Protocol** field, select **HTTPS** or **HTTP**.

You can set up a secure proxy server to handle HTTP requests sent to a port public endpoint, if desired.

f Click **Add and Restart Service**.

Configure the **Zope** service to use the new port public endpoint. Choose one of the configuration options in the following table.

Zope configuration	Procedure
HTTPS and the default secure proxy server	*Configuring Zope for HTTPS and the default secure proxy server* on page 11
HTTP and no proxy server	*Configuring Zope for HTTP and no proxy server* on page 13
HTTP and a secure proxy server other than the default	*Configuring Zope for HTTP and a secure proxy zerver* on page 14

Note When you configure Zope for HTTP protocol and no proxy server, you can only gain access to the Cisco UCS Performance Manager browser interface through port public endpoints configured for HTTP. Virtual host public endpoints must use HTTPS protocol, so any existing virtual host public endpoints stop working.

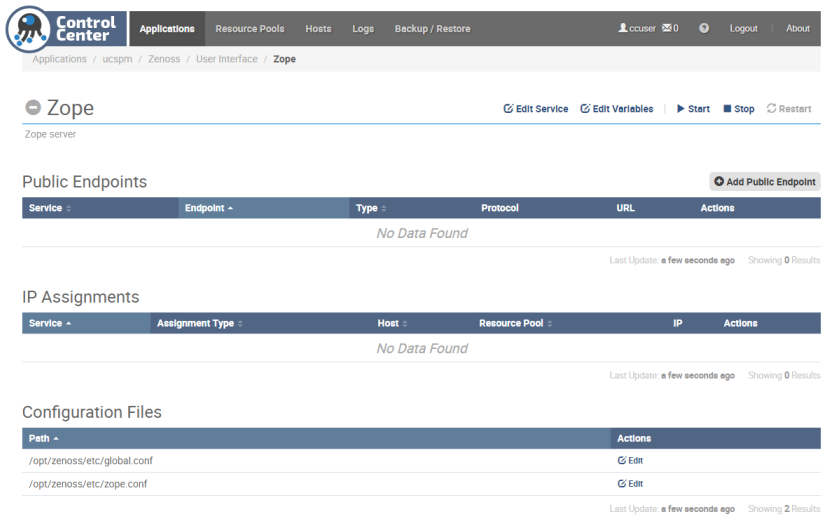
Configuring Zope for HTTPS and the default secure proxy server

Before performing this procedure, create a port public endpoint or a virtual host public endpoint to use the HTTPS protocol.

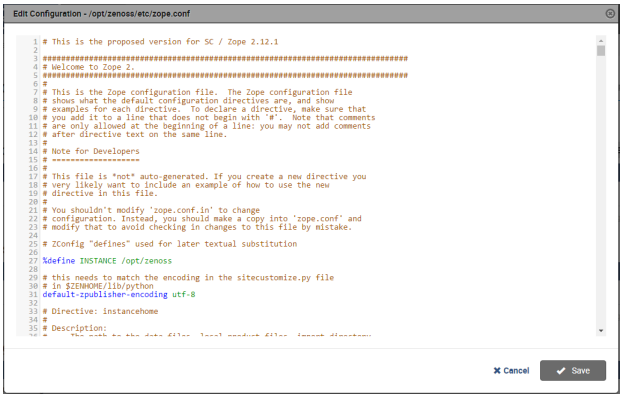
Use this procedure to configure the **Zope** service for SSL/TLS communications and the secure proxy server that is included in Cisco UCS Performance Manager.

1. Log in to the Control Center browser interface.
2. In the **Application** column of the **Applications** table, click the application name (**ucspm**).
3. Scroll down to the bottom of the **Services** table, and then click **Zope**.

   The Control Center browser interface displays the details page of the **Zope** service.
4. Scroll to the top of the **Zope** service details page.



5. In the **Actions** column of the **Configuration Files** table, click the **Edit** control of the **/opt/zenoss/etc/zope.conf** file.



6. Configure Zope for secure communications with the proxy server.
   a. In the **Edit Configuration** dialog, scroll down to the `cgi-envirtonment` directive.

      The directive is about one-third of the way down from the top of the file, on or near line 380.
   b. Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
  HTTPS ON
</cgi-environment>
```

7. Configure the Beaker add-on product to use secure communications.
   a. In the **Edit Configuration** dialog, scroll down to the `product-config` directive.

      The directive is at the bottom the file, on or near line 1122.

b Set the value of the `session.secure` key to `True`.

8 At the bottom of the **Edit Configuration** dialog, click **Save**.

Next steps:

- If you created a port public endpoint before performing this procedure, the endpoint is ready to use.
- If you created a virtual host public endpoint before performing this procedure, proceed to *Configuring name resolution for virtual hosts* on page 18.

Configuring Zope for HTTP and no proxy server

Before performing this procedure, create a port public endpoint to use the HTTP protocol. For more information, see *Creating a port public endpoint* on page 10.

Use this procedure to configure the **Zope** service for insecure communications with Cisco UCS Performance Manager browser interface clients.

Note When you configure Zope for insecure communications, any existing virtual host public endpoints stop working.

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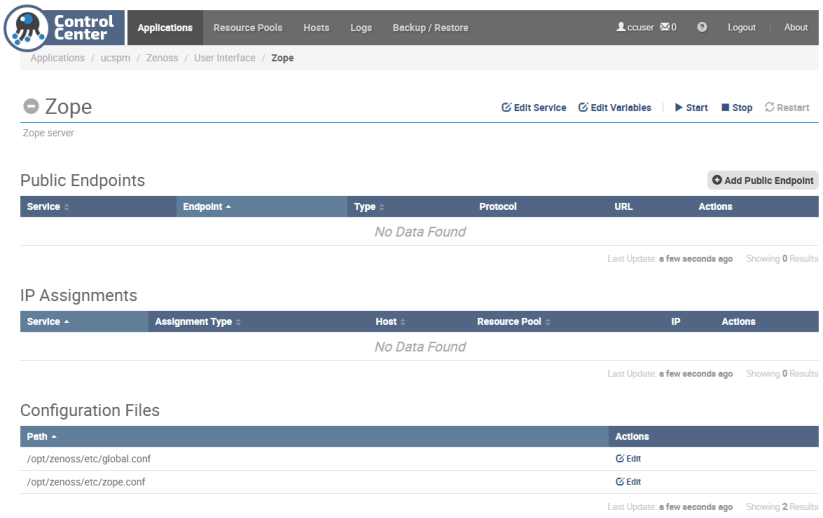
1 Log in to the Control Center browser interface.

2 In the **Application** column of the **Applications** table, click the application name (**ucspm**).

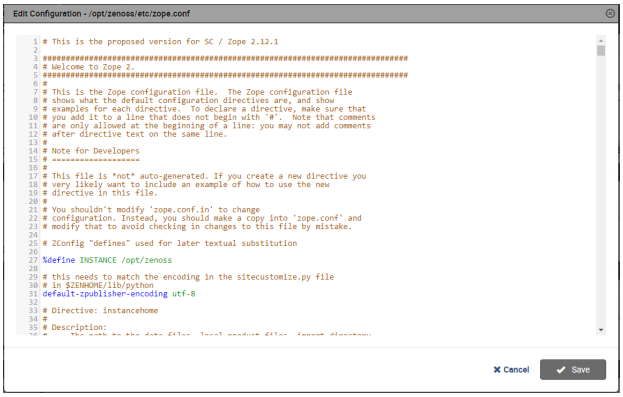
3 Scroll down to the bottom of the **Services** table, and then click **Zope**.

The Control Center browser interface displays the details page of the **Zope** service.

4 Scroll to the top of the **Zope** service details page.



5 In the **Actions** column of the **Configuration Files** table, click the **Edit** control of the **/opt/zenoss/etc/zope.conf** file.



6 Configure Zope for insecure communications with the proxy server.

   a In the **Edit Configuration** dialog, scroll down to the `cgi-envirtonment` directive.

   The directive is about one-third of the way down from the top of the file, on or near line 380.

   b Configure the proxy server for insecure communications:

```
<cgi-environment>
  HTTPS OFF
</cgi-environment>
```

7 Configure the Beaker add-on product to use insecure communications.

   a In the **Edit Configuration** dialog, scroll down to the `product-config` directive.

   The directive is at the bottom the file, on or near line 1122.

   b Set the value of the `session.secure` key to `False`.

8 At the bottom of the **Edit Configuration** dialog, click **Save**.

Configuring Zope for HTTP and a secure proxy zerver

Before performing this procedure, create a port public endpoint to use the HTTP protocol. For more information, see *Creating a port public endpoint* on page 10.

Use this procedure to configure the **Zope** service for SSL/TLS communications and a secure proxy server that is available on your network.

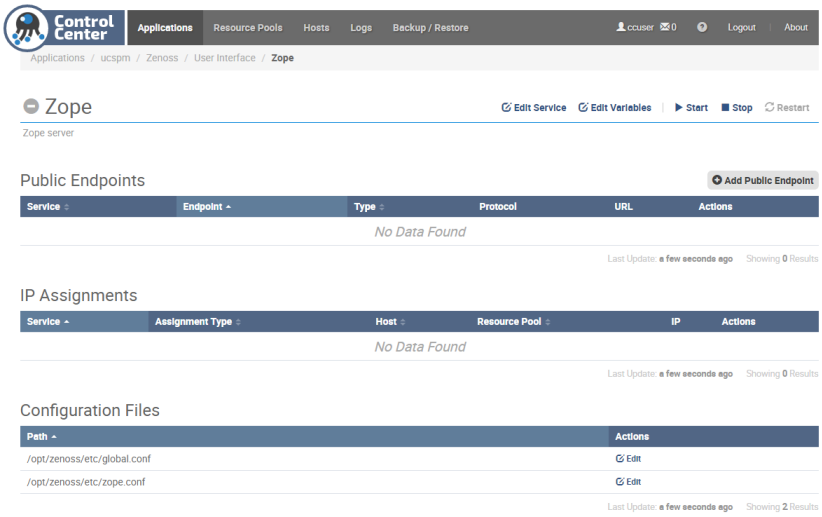
1 Log in to the Control Center browser interface.

2 In the **Application** column of the **Applications** table, click the application name (**ucspm**).

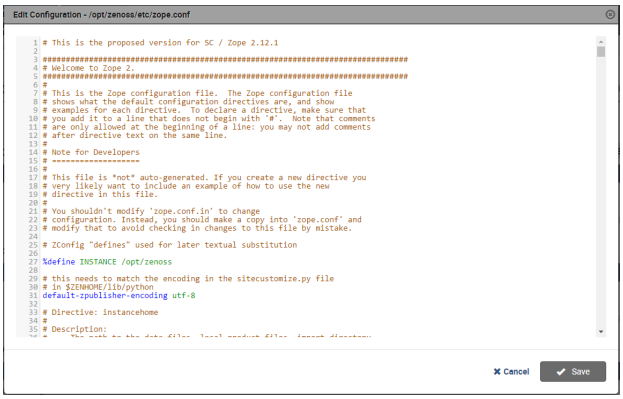
3 Scroll down to the bottom of the **Services** table, and then click **Zope**.

   The Control Center browser interface displays the details page of the **Zope** service.

4 Scroll to the top of the **Zope** service details page.



5 In the **Actions** column of the **Configuration Files** table, click the **Edit** control of the **/opt/zenoss/etc/zope.conf** file.



6 Configure Zope for secure communications with your proxy server.

a In the **Edit Configuration** dialog, scroll down to the `cgi-envirtonment` directive.

The directive is about one-third of the way down from the top of the file, on or near line 380.

b Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
  HTTPS ON
</cgi-environment>
```

7 Configure the Beaker add-on product to use secure communications.

a In the **Edit Configuration** dialog, scroll down to the `product-config` directive.

The directive is at the bottom the file, on or near line 1122.

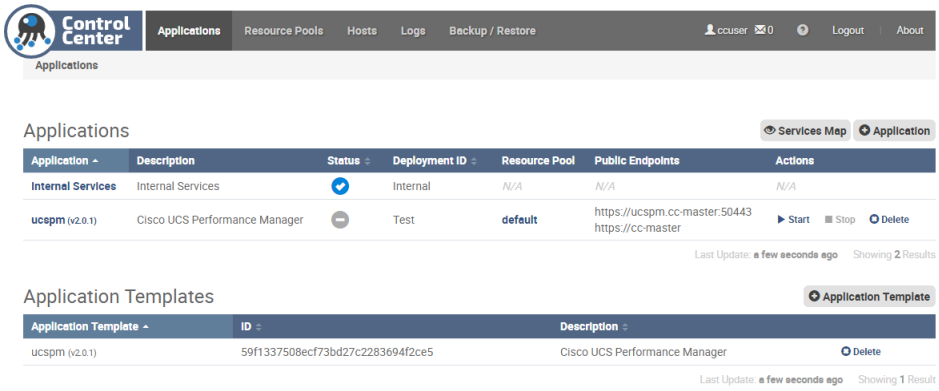
b Set the value of the `session.secure` key to `True`.

8 At the bottom of the **Edit Configuration** dialog, click **Save**.

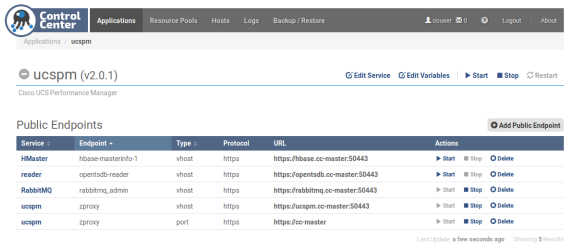
Creating a virtual host public endpoint

Use this procedure to create a new virtual host public endpoint. Virtual host public endpoints must use SSL/TLS communications.

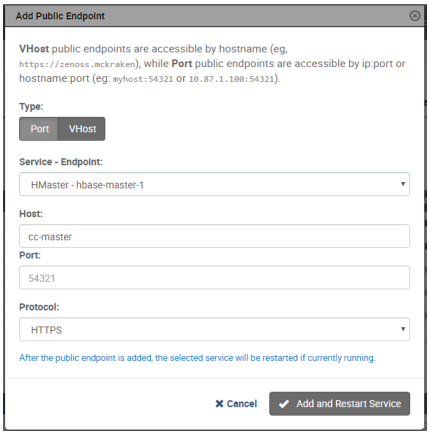
1 Log in to the Control Center browser interface.



2 In the **Application** column of the **Applications** table, click the application name (**ucspm**).



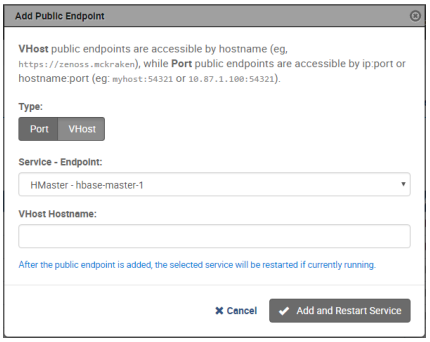
3 Click **+ Add Public Endpoint**, located above the **Public Endpoints** table, on the right side.



The default view of the **Add Public Endpoint** dialog displays the fields for creating a port public endpoint.

4 Define a new virtual host public endpoint.

a In the **Type** area, click **VHost**.



b From the **Service - Endpoint** list, select **ucspm - zproxy**.

The selection is the last entry in the list.

c In the **VHost Hostname** field, enter a virtual hostname.

The following strings of text are valid in this field:

- A fully-qualified domain name (FQDN). Any string of text that includes one or more full stop characters (`.`) is treated as an FQDN.
- A string of text that contains only letters and one or more hypen characters (`-`). The string is prepended to the hostname of the Control Center master host, with a full stop character (`.`) separating the string and the hostname.

d Click **Add and Restart Service**.

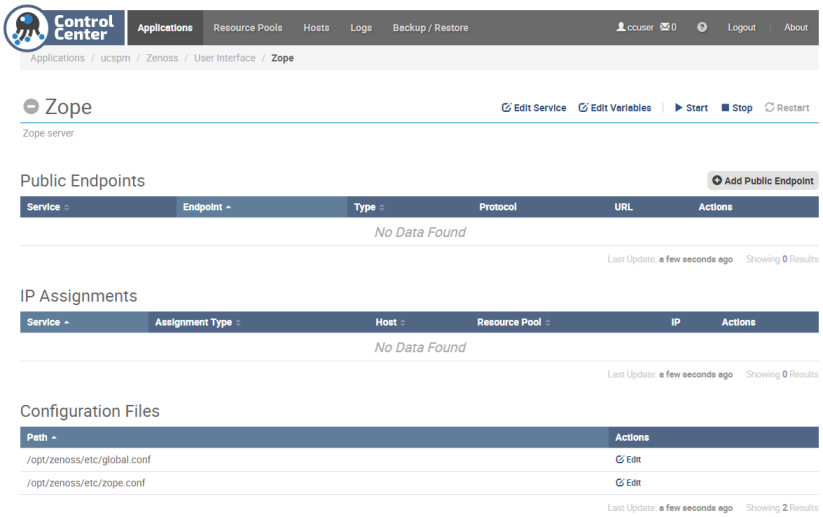
Configuring Zope for HTTPS and the default secure proxy server

Before performing this procedure, create a port public endpoint or a virtual host public endpoint to use the HTTPS protocol.

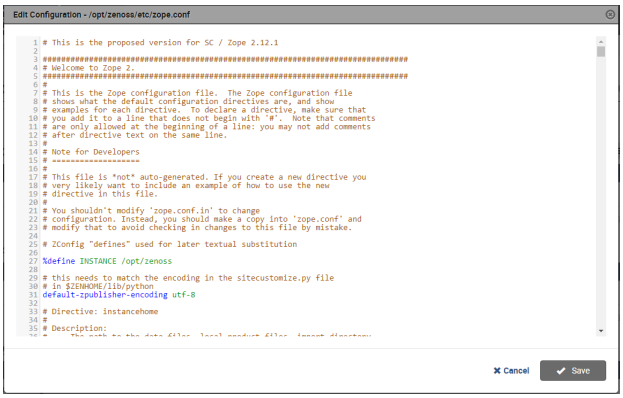
Use this procedure to configure the **Zope** service for SSL/TLS communications and the secure proxy server that is included in Cisco UCS Performance Manager.

1. Log in to the Control Center browser interface.
2. In the **Application** column of the **Applications** table, click the application name (**ucspm**).
3. Scroll down to the bottom of the **Services** table, and then click **Zope**.

   The Control Center browser interface displays the details page of the **Zope** service.
4. Scroll to the top of the **Zope** service details page.



5 In the **Actions** column of the **Configuration Files** table, click the **Edit** control of the **/opt/zenoss/etc/zope.conf** file.



6 Configure Zope for secure communications with the proxy server.

a In the **Edit Configuration** dialog, scroll down to the `cgi-envirtonment` directive.

The directive is about one-third of the way down from the top of the file, on or near line 380.

b Configure the proxy server for SSL/TLS communications:

```
<cgi-environment>
  HTTPS ON
</cgi-environment>
```

7 Configure the Beaker add-on product to use secure communications.

a In the **Edit Configuration** dialog, scroll down to the `product-config` directive.

The directive is at the bottom the file, on or near line 1122.

b Set the value of the `session.secure` key to `True`.

8 At the bottom of the **Edit Configuration** dialog, click **Save**.

Next steps:

- If you created a port public endpoint before performing this procedure, the endpoint is ready to use.
- If you created a virtual host public endpoint before performing this procedure, proceed to *Configuring name resolution for virtual hosts* on page 18.

Configuring name resolution for virtual hosts

To enable access to browser interfaces by virtual hosts, add name resolution entries to the DNS servers in your environment or to the hosts files of individual client systems.

- On Windows client systems, the hosts file is `C:\Windows\System32\drivers\etc\hosts`.
- Linux and OS/X client systems, the hosts file is `/etc/hosts`.

Name resolution syntax

The following line shows the syntax of the entry to add to a name resolution file:

```
IP-Address FQDN Hostname ucspm.Hostname
```

For example, the following entry identifies a Control Center master host at IP address `192.0.2.12`, hostname `cc-master`, in the `example.com` domain.

```
192.0.2.12  cc-master.example.com  cc-master  ucspm.cc-master
```

Configuring name resolution on a Windows 7 system

To perform this procedure, you need Windows Administrator privileges.

1. Log in to the Windows 7 system as a user with Administrator privileges.
2. From the **Start** menu, highlight **All Programs > Accessories > Notepad**.
3. Right click, and then select **Run as administrator**.
4. From the Notepad **File** menu, select **Open**.
5. In the **File name** field of the **Open** window, enter `C:\Windows\System32\drivers\etc\hosts`.
6. Add a name resolution entry to the end of the file.

   For more information, see *Name resolution syntax* on page 18.
7. Save the file, and then exit Notepad.

Configuring name resolution on a Linux or OS/X system

To perform this procedure, you need superuser privileges on the client system.

1. Log in to the client system as `root` or as a user with `sudo` privileges.
2. Open the `/etc/hosts` file in a text editor.
3. Add a name resolution entry to the end of the file.

   For more information, see *Name resolution syntax* on page 18.
4. Save the file, and then close the editor.

Setting up Cisco UCS Performance Manager 3

This chapter describes how to use the Cisco UCS Performance Manager Setup Wizard to accept the end-user license agreement, to provide your license key, define users and passwords, to set up UCS Central and UCS Domains, to add additional infrastructure, and to set up SMTP.

The Setup Wizard runs the first time you log in to the Cisco UCS Performance Manager browser interface. (For more information about supported browsers and client operating systems, see *Preface* on page 4.)

To open the Cisco UCS Performance Manager browser interface, navigate to the port public endpoint or virtual host public endpoint that was defined previously. For more information, see *Enabling access to browser interfaces* on page 9.

Note The Setup Wizard times out after 20 minutes if you have not completed it. To start it again, close its browser window or tab, and then log in again.

To complete the Setup Wizard, you need the following items:

- Authorization to accept the Cisco UCS Performance Manager end-user license agreement on behalf of your organization.
- A password for the default administrative account (`admin`).
- A username and password for one additional administrative account.
- The license key for your product (Cisco UCS Performance Manager Express or Cisco UCS Performance Manager). To obtain a license key, contact your Cisco representative.
- The hostnames or IP addresses of UCS Central and UCS Domains in your environment. In addition, you need the username and password of an account on each server that is authorized for read access to the resources you plan to monitor.

The Setup Wizard includes the **Add Infrastructure** page as the final step. The step is optional, and the **Add Infrastructure** page is a standard part of the Cisco UCS Performance Manager interface, so you can use it at any time.

Accepting the License Agreement

Perform this procedure after installing Cisco UCS Performance Manager on a virtual machine, and starting it in Control Center.

1 In a web browser, navigate to the login page of the Cisco UCS Performance Manager interface.

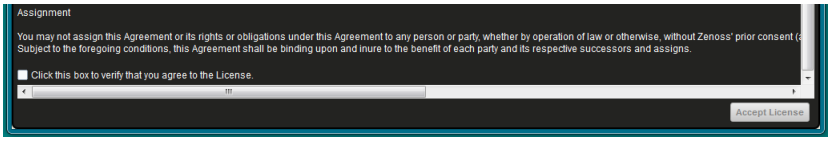
Cisco UCS Performance Manager redirects the first login attempt to the **Setup** page, which includes the **End User License Agreement** (EULA) dialog.

Note If you are not able to resolve the host name, check your DNS server or add an entry to the `hosts` file on the client machine. For more information, see *Enabling access to browser interfaces* on page 9.

2 Read through the agreement.

3 At the bottom of the EULA dialog, check the check box on the left side, and then click the **Accept License** button on the right side.

Figure 1: Bottom of EULA dialog

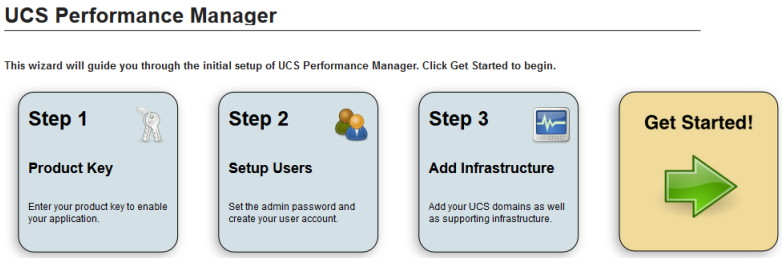


Providing a license key

To perform this procedure, you need a license key file for Cisco UCS Performance Manager Express or Cisco UCS Performance Manager, and the file must be located on the workstation from which you gain access to the Cisco UCS Performance Manager browser interface. For more information about obtaining a license key file, contact your Cisco representative.

Perform this procedure after accepting the EULA.

1 On the **Cisco UCS Performance Manager Setup** page, click **Get Started!**.



2 On the **Add Licenses** page, click the **Add License File** button.

Note If you don't have your license file yet, you can use the trial version for up to 30 days. You can enter your license file at a later date through the user interface. See the "Product Licensing" section of the *Cisco UCS Performance Manager Administration Guide*

3 In the **Open** dialog, select your license file, and then click **Open**.

4 Proceed to the next task or repeat the preceding step.

- If the product name and number of servers in the **Current Status** field matches the product you purchased, click **Next**.
- If the product name and number of servers does not match the product you purchased, click the **Remove** button, and then contact your Cisco representative.

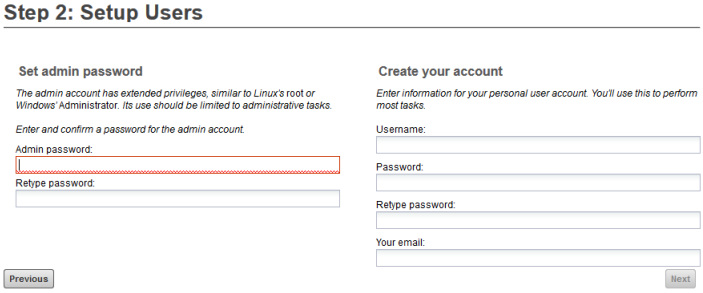
Note The Cisco UCS Performance Manager browser interface includes an option for changing your license key.

Click **Next** to continue to the **Setup Users** step.

Setting up Users

1 In the **Set admin password** area, enter and confirm a password for the `admin` user account.

Passwords must contain a minimum of 8 characters, including one capital letter and one digit.



2 In the **Create your account** area, create one additional administrative user account name and password.

Note You cannot create a user account named `user`. This username is reserved by Cisco UCS Performance Manager.

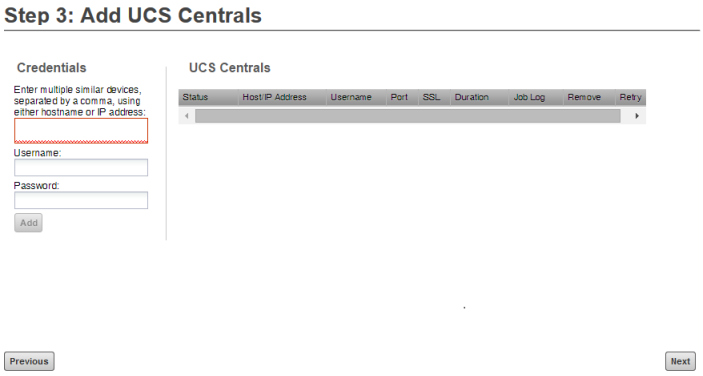
3 Click **Next**.

Click **Next** to continue to the **Add UCS Centrals** step.

Adding UCS Centrals

This procedure is optional. If you are not monitoring a UCS Central, click **Next** to skip to the next step. Otherwise, follow this procedure to add your UCS Central(s).

1 On the **Add UCS Centrals** page, provide connection credentials for one or more UCS Centrals.



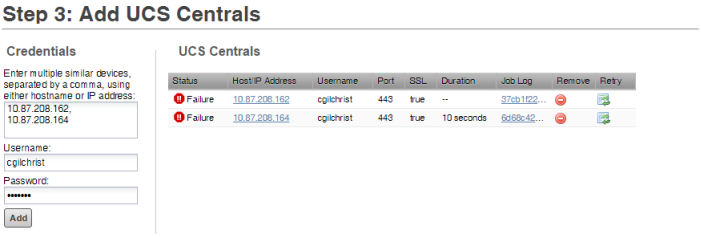
a In the **Enter multiple similar devices, separated by a comma, using either hostname or IP address** field, enter the fully-qualified domain name or IP address of your UCS Central hosts.

b In the **Username** field, enter the name of a user account in UCS Central that is authorized for read access to the resources you plan to monitor.

c In the **Password** field, enter the password of the user account specified in the preceding step.

d Click **Add**.

2 Review the information in the **Status** column of the **UCS Centrals** table, and then remove a UCS Central, add a UCS Central, or continue.



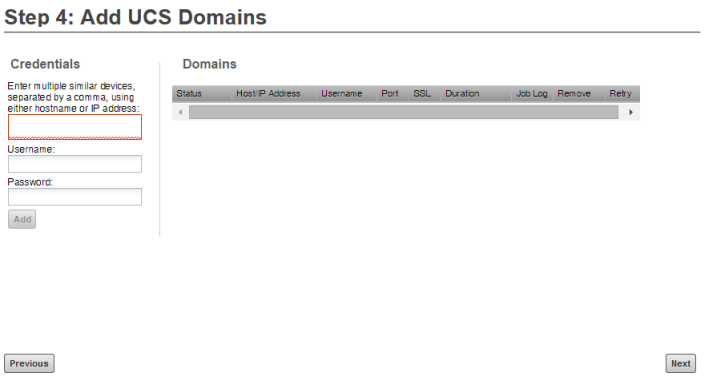
- If the final message in the **Status** column is `Failure`, click the button in the **Remove** column, and then try again to add a domain.
- If the final message in the **Status** column is `Success`, you may add another domain or continue to the next page.

Click **Next** to continue to the **Add UCS Domains** step.

Adding UCS Domains

This procedure is optional. If you don't have your connection credentials or you want to enter them later, click **Next** to skip to the next step. Otherwise, follow this procedure to add your UCS Domains.

1 On the **Add UCS Domains** page, provide connection credentials for one or more UCS domains.



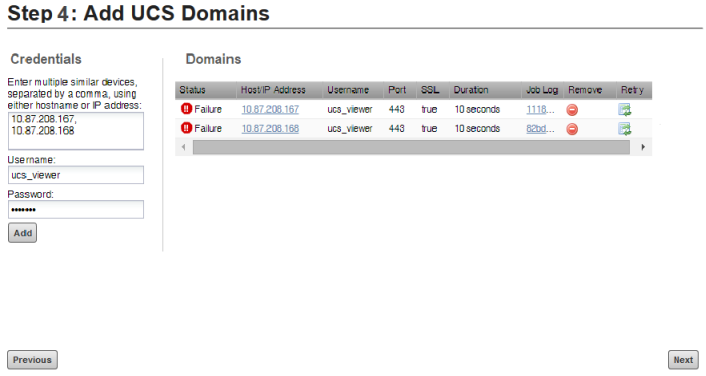
a In the **Enter multiple similar devices, separated by a comma, using either hostname or IP address** field, enter the fully-qualified domain name or IP address of a UCS domain server.

b In the **Username** field, enter the name of a user account in the UCS domain that is authorized for read access to the resources you plan to monitor.

c In the **Password** field, enter the password of the user account specified in the preceding step.

d Click **Add**.

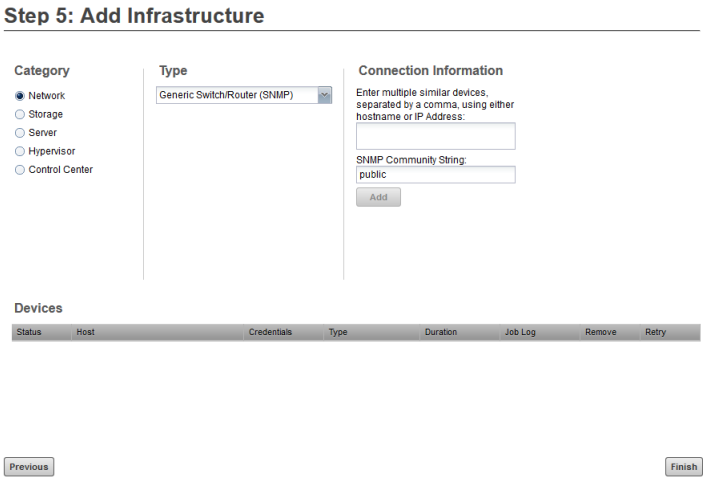
2 Review the information in the **Status** column of the **Domains** table, and then remove a domain, add a domain, or continue.



- If the final message in the **Status** column is `Failure`, click the button in the **Remove** column, and then try again to add a domain.
- If the final message in the **Status** column is `Success`, you may add another domain or continue to the next page.

Click **Next** to continue to the **Add Infrastructure** step.

Adding Infrastructure Devices



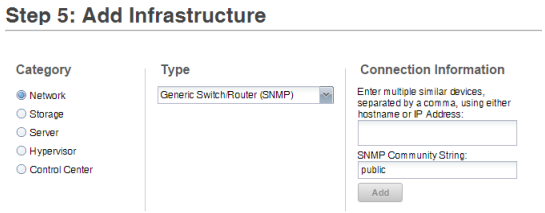
- This step is optional. If you want to skip this step, click **Next** to continue with the Setup Wizard.
- If you want to complete the **Add Infrastructure** step, be aware that the Setup Wizard times out after 20 minutes if you have not completed it. You may restart Setup Wizard by closing its browser window or tab, and then logging in again. Also, you may add devices through the **Infrastructure > Add Devices** page at a later time.

Adding Network Devices

To perform this procedure, you need a license for Cisco UCS Performance Manager. If your license is Cisco UCS Performance Manager Express, proceed to *Adding Server Devices* on page 26.

This option is part of step 5 of the Setup Wizard.

1 In the **Category** area, select **Network**.



2 In the **Type** list, select the product model of the switch or router to add.

The protocol used to gather data from the device is included in the list, in parentheses.

Note Some of the devices in the **Type** list, such as the Nexus 7000 and 9000 switches, represent a large number of discrete monitoring endpoints. If you are unsure whether the Cisco UCS Performance Manager virtual machine size you have selected supports the number of high-density devices you wish to monitor, contact your Cisco representative.

---

3 In the **Connection Information** area, specify the devices to add. Depending on the type of network device you select, you will have different connection information fields to enter. If the field described below is not present, then it does not apply to your selection. If applicable, be sure to scroll down to the bottom of area to display all the fields and the **Add** button.

a In the **Enter multiple similar devices, separated by a comma, using either hostname or IP Address** field, enter the hostname or IP address of one or more switch or router devices on your network.

b In the **SNMP Community String** field, change the default (`public`) if necessary.

This field is not used if the selected device supports both SNMP and NETCONF, and you provide a user name and password.

c In the **Username** or **Netconf Username** field, enter the name of a user account on the device.

d In the **Password** or **Netconf Password** field, enter the password of the user account specified in the previous field.

e Click **Add**.

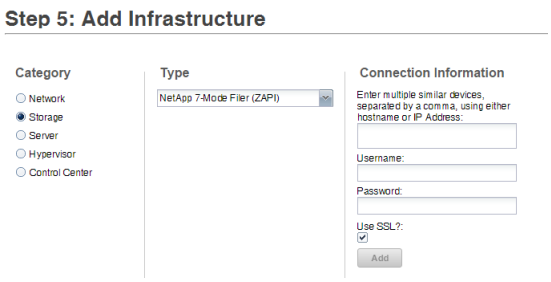
If you are finished adding network devices, click **Next**.

Adding Storage Devices

To perform this procedure, you need a license for Cisco UCS Performance Manager. If your license is Cisco UCS Performance Manager Express, proceed to *Adding Server Devices* on page 26.

This option is part of step 5 of the Setup Wizard.

1 In the **Category** area, select **Storage**.



2 In the **Type** list, select the product model of the storage device to add.

The protocol used to gather data from the device is included in the list, in parentheses.

3 In the **Connection Information** area, specify the devices to add. If applicable, be sure to scroll down to the bottom of area to display all the fields and the **Add** button.

a In the **Enter multiple similar devices, separated by a comma, using either hostname or IP Addresses** field, enter the hostname or IP address of one or more storage devices on your network.

b Optional: In the **Username** field, enter the name of a user account on the device.

This field is not present when the device protocol is SNMP.

c Optional: In the **Password** field, enter the password of the user account specified in the previous field.

This field is not present when the device protocol is SNMP.

d Optional: In the **Port** field, enter the port at which the device listens for data collection requests.

This field is present only when the device protocol is SMIS Proxy.

e Check the **Use SSL?** check box to use secure communications to collect data, or uncheck the check box to use insecure communications.

This field is not present when the device protocol is SNMP.

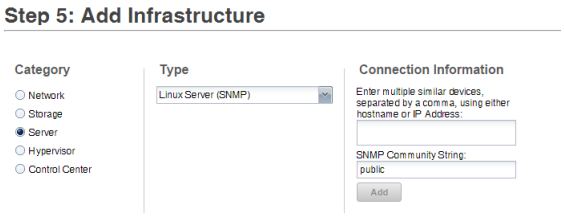
f Click **Add**.

If you are finished adding storage devices, click **Next**.

Adding Server Devices

This option is part of step 5 of the Setup Wizard.

1 In the **Category** area, select **Servers**.



2 In the **Type** list, select the operating system and monitoring protocol of the server to add. WinRM and SSH are primary options with SNMP provided as a legacy option.

   The protocol used to gather data from the device is included in the list, in parentheses.

3 In the **Connection Information** area, specify the servers to add. If applicable, be sure to scroll down to the bottom of area to display all the fields and the **Add** button.

   a In the **Enter multiple similar devices, separated by a comma, using either hostname or IP Addresses** field, enter the hostname or IP address of one or more server devices on your network.

   b Optional: In the **SNMP Community String** field, change the default (`public`) if necessary.

   This field is only present when the device protocol is SNMP.

   c Optional: In the **Username** field, enter the name of a user account on the device.

   This field is not present when the device protocol is SNMP.

   d Optional: In the **Password** field, enter the password of the user account specified in the previous field.

   This field is not present when the device protocol is SNMP.

   e Optional: In the **AD Domain Controller** field, enter the IP address or hostname of the Active Directory Domain Controller on your network.

   This field is only present when the device protocol is WinRM.

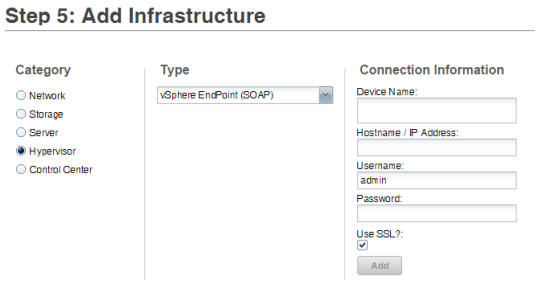
   f Click **Add**.

If you are finished adding server devices, click **Next**.

Adding Hypervisor Devices

This option is part of step 5 of the Setup Wizard.

1 In the **Category** area, select **Hypervisor**.



2 In the **Type** list, select the hypervisor service to add.

3 In the **Connection Information** area, specify the service to add. If applicable, be sure to scroll down to the bottom of area to display all the fields and the **Add** button.

   a In the **Device Name** field, enter the name of the hypervisor service.

   b In the **Hostname / IP Address** field, enter the hostname or IP address of the hypervisor service.

   c In the **Username** field, enter the name of a user account on the host.

   d In the **Password** field, enter the password of the user account specified in the previous field.

   e Optional: Check the **Use SSL?** check box to use secure communications to collect data (recommended).

   This field is only present when the device protocol is SOAP.

   f Optional: Enter information in the **AD Domain Controller**, **Version**, **HTTP or HTTPS**, and **Port** fields.

These fields are only present when the device protocol is WinRM.

g Click **Add**.

If you are finished adding hypervisor devices, click **Next**.

Adding Control Center

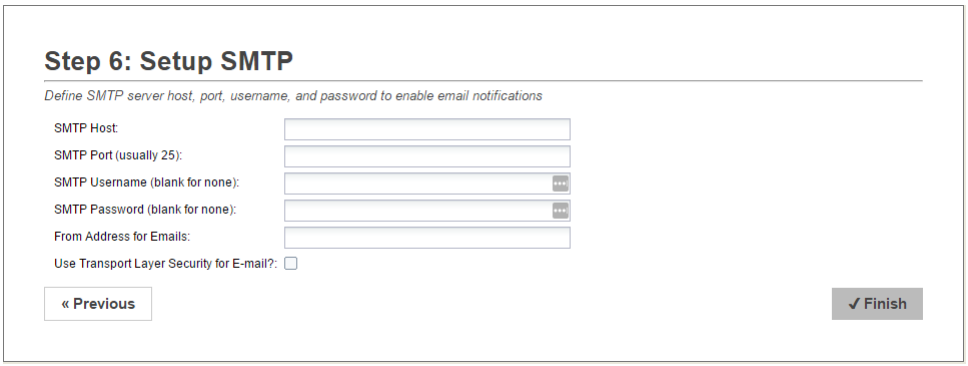
The Control Center is the internal application management and orchestration system for Cisco UCS Performance Manager. It is automatically added as a managed resource so that you can see the internal components and their performance data. You do not have to add the Control Center on the Add Infrastructure Wizard. Click **Next** to continue with the Setup Wizard. You can always add more devices at a later date. See the "Adding, Discovering and Modeling Devices" chapter in the *Cisco UCS Performance Manager Administration Guide*.

Setup SMTP

This option is step 6 of the Setup Wizard. You will define the SMTP server host, port, username, and password to enable email generation from Cisco UCS Performance Manager.

Note This step is optional. If you want to add this information later, click **Finish** and in the Cisco UCS Performance Manager user interface, navigate to **Advanced > Settings** to enter the information about SMTP.

1 In the **SMTP Host** field, enter the name of the SMTP host.



2 In the **SMTP Port** field, enter the SMTP port number (typically 25).

3 In the **SMTP Username** field, enter the appropriate username. Leave field blank for none.

4 In the **SMTP Password** field, enter the appropriate passwork. Leave field blank for none.

5 In the **From Address for Emails** field, enter the sender's email address.

6 Check the **Use Transport Layer Security for E-mail** box to use TLS for e-mail communication. (Required)

7 Click **Finish** to exit the Setup Wizard.

Appendix: Preparing Windows Systems

This appendix includes procedures for preparing Microsoft Windows Server 2012 R2, 2012, and 2008R2 for monitoring in Cisco UCS Performance Manager. The procedures are standardized around a low security configuration using local system credentials, rather than domain credentials, and no encryption of credentials or payload. This scenario provides a good base configuration for ease of setup and testing, but in production the use of a single domain service for authentication simplifies administration. The use of a domain service account requires the use of Kerberos to encrypt credentials, which improves security. Security can be improved further still by configuring WinRM to encrypt its payload using SSL. Each section of this document includes these additional configurations for administrators who need to implement them. These higher security configurations are recommended in production environments.

About Windows Authentication for WinRM Monitoring

Cisco UCS Performance Manager must authenticate to the Windows systems it will monitor using either local system or Windows domain credentials. The Windows user account used for WinRM authentication must have specific permissions granted on each Windows system to be monitored. By default, Windows Administrator accounts already have the necessary permissions, but best practices dictate that Administrator accounts not be used for purposes such as WinRM monitoring. Instead, a dedicated User account (a "service account") should be created specifically for the purpose of WinRM monitoring with only the necessary permissions granted to the account.

Instead of manually editing the necessary permissions, a Windows PowerShell®, hereafter referred to as *PowerShell*, script can be used to modify the necessary permissions in a single step. For convenience, Cisco provides a sample script that modifies the permissions necessary for an example service. The script is available at the following Zenoss GitHub location: https://github.com/zenoss/microsoft.tools/blob/develop/lpu/zenoss-lpu.ps1. The file can be edited as necessary to suit specific production environments.

Note: The sample script includes two lines that must be located and deleted before the functions in the script will execute. These lines have been deliberately included to encourage administrators to thoroughly review the script before deploying it to ensure (i) that administrators fully understand the functions it performs and (ii) they have made any necessary edits before deploying it.

The relevant sections below describe methods to configure Windows system permissions using a PowerShell script such as *zenoss-lpu.ps1* that has been tailored to a specific environment.

Windows Server 2012 & 2012 R2

The following sections describe how to configure Windows Server 2012 and Windows Server 2012 R2.

Note: Windows 2012 R2 is specifically called out only when there is a difference in method between the two Windows server versions.

Configuring Windows Server 2012 Using Group Policy (Basic Authentication, no Encryption)

Note: This configuration uses a local user account on each monitored Windows system for authentication instead of a domain account. The local user account must be present on each system before Cisco UCS Performance Manager can monitor it.

1. Log on to a domain controller as a user with 'Domain Admin' privileges.
2. On Server 2012 (non R2), press the **Windows** key on the keyboard to display the *Start* screen, then click the **Group Policy Management** tile.
3. On Server 2012 R2, press the **Windows** key on the keyboard to display the *Start* screen, then click Server Manager. Click **Tools** in the upper right, then choose **Group Policy Management**.
4. Navigate to your target domain in the tree at the left:

    i. Expand the section for the domain Forest you want to edit.
    ii. Expand **Domains**.
    iii. Expand your target domain.

5. Right-click **Group Policy Objects** and select *New*. In the form that displays:

    i. Enter a name for your new Group Policy Object, for example, *WinRM_Monitoring*.
    ii. Leave "(none)" in the **Source Starter GPO** field.
    iii. Click **OK** to save and exit the form.

6. Select your new **Group Domain Policy Object**, *WinRM_Monitoring*, for example.
7. Right click your new **Group Domain Policy Object** and select *Edit* to open the Group Policy Management Editor.
8. Expand the **Computer Configuration** section of the tree and navigate the tree to:

    ```
    Policies\Administrative Templates:Policy...\Windows
    Components\Windows Remote Management(WinRM)
    ```

9. Enable remote server management:

    i. Click on **WinRM Service** to access the *WinRM Service Group Policy* settings in the right pane.
    ii. Double-click the **Allow remote server management through WinRM** property.
    iii. Click the **Enabled** radio button.
    iv. Place an asterisk as a wildcard (' * ') in the *IPv4 filer* and *IPv6 fields* or specify a range of IP addresses for WinRM to listen on.
    v. Click **OK** at the bottom to submit the form.

10. Enable authentication:

    i. Double-click the **Allow Basic authentication** property in the right pane.
    ii. Select the **Enabled** radio button.
    iii. Click **OK** at the bottom to submit the form.

11. Specify unencrypted traffic:

    i. Double-click the **Allow unencrypted traffic** property.
    ii. Select the **Enabled** radio button.
    iii. Click **OK** at the bottom to submit the form.

12. Select *Windows Remote Shell* in the left pane to set its **Group Policy** settings. This is located in the

group policy tree in the following location (which might be located right below *WinRM* service in the tree):

```
Computer Configuration\Policies\Administrative Templates\Windows
Components\Windows Remote Shell
```

13. Configure remote shell access:

    i. In the right pane, double-click **Allow Remote Shell Access**.
    ii. Select the **Enabled** radio button.
    iii. Click **OK** at the bottom to submit the form.

14. Configure shell processes:

    i. In the right pane, double-click **Specify maximum number of processes per Shell**.
    ii. Select the **Enabled** radio button.
    iii. Enter the value **2,000,000,000** (without commas or spaces) in the *MaxProcessPerShell* field.
    iv. Click **OK** at the bottom to submit the form.

15. Configure the number of remote shells:

    i. In the right pane, double-click **Specify maximum number of remote shells per user**.
    ii. Select the **Enabled** radio button.
    iii. Enter the value **2,000,000,000** (without commas or spaces) in the *MaxShellsPerUser* field.
    iv. Click **OK** at the bottom to submit the form.

16. Configure shell timeout value:

    i. In the Right pane, double-click **Specify Shell Timeout**.
    ii. Select the **Enabled** radio button.
    iii. Enter the value **7,200,000** (without commas or spaces) in the *ShellTimeOut* field.
    iv. Click **OK** at the bottom to submit the form.

Windows Server 2012: Configuring Firewall Group Policies

WinRM listens on port 5985 when data payload encryption is not used and on port 5986 when encryption is used. Additionally, ICMP (ping) requests must be enabled because Cisco UCS Performance Manager uses them as a source of availability monitoring.

The appropriate port must be opened on the firewalls of monitored servers. You can use Group Policy to open the required ports on all servers across the organization.

1. In the Group Policy Manager Editor, navigate to:

   ```
   Computer Configuration\Policies\Windows Settings\Security Settings\Windows
   Firewall with Advanced Security\Windows Firewall with Advanced Security -
   LDAP;...\Inbound Rules
   ```

2. Create a new *Inbound Rules* policy for **Windows Remote Management**:

   i. Right click **Inbound Rules** in the left pane.
   ii. Select **New Rule...**
   iii. Select the **Predefined** radio button.
   iv. Select **Windows Remote Management** from the drop down list.
   v. Click **Next**.
   vi. Ensure that all items in the list are checked.
   vii. Click **Next**.
   viii. Ensure that the **Allow the connection** radio button is selected.
   ix. Click **Finish**.

3. Create a new *Inbound Rules* policy for **Echo Request ICMP** (ping) requests:

   i. Right click **Inbound Rules** in the left pane.
   ii. Select **New Rule...**
   iii. Select the **Predefined** radio button.
   iv. Select **File and Printer Sharing** from the drop down list.
   v. Click **Next**.
   vi. Ensure the check boxes for the following items are selected:

   - **File and Printer Sharing (Echo Request-ICPMv4-IN)**
   - **File and Printer Sharing (Echo Request-ICPMv6-IN)**
     You can de-select any additional check boxes unless you require them specifically.

   vii. Click **Next**.
   viii. Ensure that the **Allow the connection** radio button is selected.
   ix. Click **Finish**.

4. Exit the *Group Policy Management Editor*:

   Select **File > Exit**

5. Link your new GPO to one or more Organizational Units (OU) containing servers to which you wish to have the policies applied. Alternatively, you can apply the policies to all Windows servers in the domain by linking the new GPO to the domain itself. To link the GPO to the domain, complete the following process.

   Note: Substitute a specific OU for the domain if you want to link only to a subset of servers.

   i. Right-click your domain in the left pane of the *Group Policy Management* window.
   ii. Choose **Link an Existing GPO...**
   iii. Select your new GPO, *WinRM_Monitoring* for example, from the list that displays.

iv. Click **OK** to complete the process.

6. Exit the Group Policy Management window:

   Select **File > Exit**

7. Before adding servers to Cisco UCS Performance Manager for monitoring, wait a sufficient amount of time for Group Policy to automatically refresh on the server(s). Alternatively, you can manually refresh Group Policy from the command prompt of target servers using this command:

```
gpupdate /force
```

Windows Server 2012: Configuring Windows Credentials in Cisco UCS Performance Manager

When one or more servers are ready for addition to Cisco UCS Performance Manager, perform the following steps within the Cisco UCS Performance Manager web interface. If the same user account name was created on each server, the following procedure will specify it for all servers in the device class:

1. Navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class.
3. Click the **Details** icon.
4. Click **Configuration Properties** in the left pane.
5. In the right pane, set the configuration properties for *zWinRMUser* and *zWinRMPassword*, supplying the appropriate Windows credentials.

   Note: For ease of setup and testing, the local Administrator account can be used in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring* for more on WinRM authentication.

   To configure Windows to allow monitoring using a non-Administrator service account, see the section below titled *Windows Server 2012: Configuring a WinRM Service Account on Individual Windows Systems* or the section titled *Windows Server* 2012: Group Policy Deployment of a PowerShell Script for Service Account Configuration.
6. Click **See All**.
7. Add windows servers using the web interface or `ZenBatchload`.

Note: If the user names and passwords used on servers are different, each server must be added and its individual *zWinRMUser* and *zWinRMPassword* configuration properties must be set. Perform the following steps to add the server information:

i. Add the server to the **Server/Microsoft/Windows** device class, but opt out of modeling the device when adding as follows:
   - If you are adding via the web interface, leave the **Model Device:** box unchecked.
   - If you are adding through the `zenbatchload` command, be sure the device has the `--nomodel` flag set.

ii. When the device displays in the device list, click on its name.
iii. Click on **Configuration Properties** in the left pane, and set the configuration properties for *zWinRMUser* and *zWinRMPassword*, supplying the appropriate Windows credentials.
iv. Model the device by clicking the Action Wheel (gear-shaped) icon in the lower left and select **Model Device...**

Windows Server 2012: Improving Security by Using a Domain Service Account & Encrypting Credentials with Kerberos

Note: When switching from the use of local system accounts for authentication to a single domain service account, the use of Kerberos to encrypt credentials is mandatory.

The Kerberos authentication process requires an available ticket granting server. In the Microsoft Active Directory (AD) environment the AD Server also acts as the Key Distribution Center (KDC). The `zWinKDC` configuration property in Cisco UCS Performance Manager must be set to the IP address of the AD Server. Each collector used to monitor Windows servers must be able to send Kerberos packets to this server. To specify the ticket granting server in Cisco UCS Performance Manager, perform the following steps:

1. In the Cisco UCS Performance Manager web UI, navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class in the left pane.
3. Click the **Details** icon.
4. Click **Configuration Properties** in the left pane.
5. Edit the configuration property in the right pane for *zWinKDC*. Double click *zWinKDC* and specify the IP address of your Active Directory Server.
6. Edit the value for *zWinRMUser* name to be the *complete domain name* of the user, for example, *user@test.loc*.

   Note: A *zWinRMUser* name value in the form of *user@domain* is the trigger for Cisco UCS Performance Manager to (i) use a domain account rather than a local system account and (ii) to use Kerberos encryption for credentials. When the value of *zWinRMUser* name takes the form of *user*[only] instead of *user@domain,* Cisco UCS Performance Manager will use a local user account on the system being monitored.

   Note: For ease of setup and testing, the local Administrator account might be preferable to use in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring* for more on WinRM authentication.

   To configure Windows to allow monitoring using a non-Administrator service account, see the section below titled *Windows Server 2012: Configuring a WinRM Service Account on Individual Windows Systems* or the section titled *Windows Server* 2012: Group Policy Deployment of a PowerShell Script for Service Account Configuration.

   Note: The Cisco UCS Performance Manager server and collectors must be able to resolve the target server's pointer records (PTR) to their Active Directory fully qualified domain name. Administrators can meet this requirement by using one of three methods:

   i. Configuring the Cisco UCS Performance Manager server to access the Windows DNS server for its DNS resolutions.
   ii. Manually entering PTR records for each server in to the `/etc/hosts` file.

   For example, the server *r2d2.example.com* at the IP address **77.77.77.77** has the following PTR record:

   77.77.77.77 r2d2.example.com

iii. Using the zWinRMServerName property as follows:

- Specify the monitored server's name with the zWinRMServerName property field.

  Note: The `zWinRMServerName` property should only be used in conjunction with domain authentication when the DNS PTR record for a monitored server's managed IP address does not resolve to the name by which the server is known in Active Directory. For example, if *myserver1* is known as **myserver1.ad.example.com** by Active Directory and is being managed by IP address *192.51.100.21*, but IP address 192.51.100.21 resolves to *www.example.com*, you must set the `zWinRMServerName` property to **myserver1.ad.example.com** for domain authentication to work.

- If many Windows servers in your environment do not have DNS PTR records that match Active Directory, it is recommended that you:
  - set the monitored device's name to be the fully-qualified Active Directory name in Cisco UCS Performance Manager
  - set *zWinRMServerName* to `${here/titleOrId}` at the */Server/Microsoft/Windows* device class.

This method avoids setting the `zWinRMServerName` property on every device.

We recommend that you leave the `zWinRMServerName` property blank if local authentication is used, or DNS PTR records match the Active Directory listings. The result is that Cisco UCS Performance Manager does not have to rely on DNS resolution while monitoring and it avoids the additional overhead of configuring the `zWinRMServerName` properties.

Note: You can add custom Kerberos configurations if your settings differ from the default settings used by UCS Performance Manager. To use a custom configuration file, place it in the `/opt/zenoss/var/krb5/config` directory. You must be using Kerberos 5 release 1.10 or higher. For more information, see http://wiki.zenoss.org/ZenPack:Microsoft_Windows

Windows Server 2012: Configuring WinRM and WinRS on Individual Servers (Basic Authentication, no Encryption)

Perform the following steps to configure WinRM and WinRS:

1. Log on to the target server as a user with *Domain Admin* or local *Admin* privileges.
2. Press the **Windows** key on the keyboard to display the *Start* screen.
3. Click the **Windows PowerShell** tile.

    i. Configure the system to accept WS-Management requests from other systems. Enter the following at the command prompt:

    ```
    winrm quickconfig
    ```

    ii. Specify *http* instead of *https* (SSL) connections. Enter the following command:

    ```
    winrm s winrm/config/service '@{AllowUnencrypted="true"}'
    ```

    iii. Configure the maximum number of concurrent operations per user. Use the following command:

    ```
    winrm s winrm/config/service
    '@{MaxConcurrentOperationsPerUser="4294967295"}'
    ```

    iv. Configure the *maximum number of shells per user*. Enter the following command:

    ```
    winrm s winrm/config/winrs '@{MaxShellsPerUser="2147483647"}'
    ```

    v. Configure the *idle timeout*. Enter the following command:

    ```
    winrm s winrm/config/winrs '@{IdleTimeout="7200000"}'
    ```

    vi. Specify *Basic Authentication*. Enter the following command:

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

    vii. Exit PowerShell:

    ```
    exit
    ```

4. Configure the firewall to allow connections on port 5985.

    i. Press the **Windows** key on the keyboard to display the *Start* screen.
    ii. Click the **Server Manager** tile.
    iii. Click **Local Server** on the left.
    iv. Edit the firewall profile currently in use. Click the value to the right of **Windows Firewall** to change it.
    For example, "Windows Firewall" might display in grey font and to the right of it, in blue colored font, "Domain: On." In this case, click the blue **Domain On** value to display the *Windows Firewall* page.
    v. In the left pane of the *Windows Firewall* page, click **Allow an app or feature through Windows Firewall**.

vi. Scroll down through the list that displays and confirm that **Windows Remote Management** is checked for the current firewall profile in use (and any other profiles required).
Note: Remote management includes allowing connections on port 5985.

vii. Click **OK**.

5. If your firewall settings are NOT set by group policy, perform the following, depending on your server, to enable response to ping requests that are necessary for Cisco UCS Performance Manager to perform availability monitoring:

Windows 2012 R2:

i. In *Server Manager*, click **Local Server** in the left pane.

ii. In the right pane, click the entry for *Windows Firewall* **Domain: On** (in blue letters) to display the *Windows Firewall* dialog.

iii. Click **Allow an app or feature through Windows Firewall** to display the *Allowed apps* dialog.

iv. Click **File and Printer Sharing**.

v. Click **Next.**

vi. Ensure the boxes are checked for:

- **File and Printer Sharing (Echo Request - ICMPv6-In)**
- **File and Printer Sharing (Echo Request - ICMPv4-In)**

This enables the response to ping requests, you can uncheck any additional boxes unless you require them specifically.

vii. Click **OK.**

Windows 2012

i. In *Server Manager*, click **Local Server** in the left pane.

ii. In the right pane, click the entry for *Windows Firewall* **Domain: On** (in blue letters) to display the *Windows Firewall* dialog.

iii. In the left pane of the *Windows Firewall* page, click **Allow an app or feature through Windows Firewall** to display the *Allowed apps* dialog.

iv. Scroll down through the list that displays and confirm that **Windows Remote Management** is checked for the current firewall profile in use (and any other profiles required).
Note: Choosing remote management opens port 5985.

v. Click **OK.**

6. Configure Cisco UCS Performance Manager to monitor the server. Perform the following steps within the Cisco UCS Performance Manager web interface:

i. Navigate to the **Infrastructure** page.
ii. Select the **Server/Microsoft/Windows** device class.
iii. Click the **Details** icon.
iv. Click **Configuration Properties** in the left pane.
v. In the right pane, confirm that the configuration properties for *zWinRMUser* and *zWinRMPassword* match the appropriate Windows credentials on the system being monitored.

Note: For ease of setup and testing, the local Administrator account may be preferable to use in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring*

for more on WinRM authentication.

To configure Windows to allow monitoring using a non-Administrator service account, see the section below titled *Windows Server 2012: Configuring a WinRM Service Account on Individual Windows Systems* or the section titled *Windows Server* 2012: Group Policy Deployment of a PowerShell Script for Service Account Configuration.

If the credentials listed are correct, click **See All** and add the server to Cisco UCS Performance Manager.

vi. If the credentials listed are not appropriate to the target server, the server must be added and the server's individual *zWinRMUser* and *zWinRMPassword* configuration properties must be set. Perform the following steps to add the server information:
    a. Add the server to the **Server/Microsoft/Windows** device class, but opt out of modeling the device when adding it:
        - If you are adding via the web interface, leave the **Model Device:** box unchecked.
        - If you are adding via the zenbatchload command, be sure the device has the --nomodel flag set.
    b. When the device displays in the device list, click on its name.
    c. Click on **Configuration Properties**, and set the configuration properties for *zWinRMUser* and *zWinRMPassword*, supplying the appropriate Windows credentials.
    d. Model the device by clicking the Action Wheel (gear-shaped) icon in the lower left and select **Model Device...**

Windows Server 2012: Configuring Individual Servers to Use a Domain Service Account & Encrypt Credentials with Kerberos

The Kerberos authentication process requires an available ticket granting server. In the Microsoft Active Directory (AD) environment, the AD Server also acts as the Key Distribution Center (KDC). The *zWinKDC* configuration property in Cisco UCS Performance Manager must be set to the IP address of the AD Server. Each collector that monitors Windows servers must be able to send Kerberos packets to this server. To specify the ticket granting server in Cisco UCS Performance Manager, perform the following steps:

1. In the Cisco UCS Performance Manager web UI, navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class.
3. Click **Details**.
4. Edit the configuration property for *zWinKDC* to specify the IP address of your Active Directory Server.
5. Edit the value for *zWinRMUserName* to be the complete domain name of the user, for example, *administrator@test.loc*.

   Note: A *zWinRMUserName* value in the form of *user@domain* is the trigger for Cisco UCS Performance Manager to use Kerberos encryption for credentials. When the value of *zWinRMUsername* takes the form of *user*[only] instead of *user@domain,* Cisco UCS Performance Manager will not use Kerberos.

   Note: For ease of setup and testing, the local Administrator account can be used in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring* for more on WinRM authentication.

   To configure Windows to allow monitoring using a non-Administrator service account, see the section below titled *Windows Server 2012: Configuring a WinRM Service Account on Individual Windows Systems* or the section titled *Windows Server* 2012: Group Policy Deployment of a PowerShell Script for Service Account Configuration.

Note: The Cisco UCS Performance Manager server and collectors must be able to resolve the target server's pointer records (PTR) to their Active Directory fully qualified domain name. Administrators can meet this requirement by using one of three methods:

i. Configuring the Cisco UCS Performance Manager server to access the Windows DNS server for its DNS resolutions.
ii. Manually entering PTR records for each server in to the /etc/hosts file.

    For example, the server *r2d2.example.com* at the IP address **77.77.77.77** has the following PTR record:

    ```
    77.77.77.77 r2d2.example.com
    ```

iii. Using the `zWinRMServerName` property as follows:

    - Specify the monitored server's name with the `zWinRMServerName` property field.

      Note: The `zWinRMServerName` property should only be used in conjunction with domain authentication when the DNS PTR record for a monitored server's managed IP address does not resolve to the name by which the server is known in Active Directory.
      For example, if *myserver1* is known as **myserver1.ad.example.com** by Active Directory and is being managed by IP address *192.51.100.21*, but IP address 192.51.100.21 resolves to *www.example.com*, you must set the zWinRMServerName property to **myserver1.ad.example.com** for domain authentication to work.

    - If many Windows servers in your environment do not have DNS PTR records that match Active Directory, it is recommended that you:
        - set the monitored device's name to be the fully-qualified Active Directory name in Cisco UCS Performance Manager
        - set **zWinRMServerName** to `${here/titleOrId}` at the */Server/Microsoft/Windows* device class.

This method avoids setting the `zWinRMServerName` property on every device.

We recommend that you leave the `zWinRMServerName` property blank if local authentication is used, or DNS PTR records match the Active Directory listings. The result is that Cisco UCS Performance Manager does not have to rely on DNS resolution while monitoring and it avoids the additional overhead of configuring the `zWinRMServerName` properties.

Windows Server 2012: Improving Individual Server Security - Specify SSL for WinRM & WinRS

To successfully encrypt the payload between Cisco UCS Performance Manager and Windows clients, you must install a *Server Authentication* certificate on each monitored server. Log on to your Certificate Authority server as a user with Administrator privileges to create a Certificate Template for use in creating each server's certificate. This step only needs to be completed once because the new Certificate Template is then used repeatedly to create each server's certificate. In the following steps, the standard *Web Server Certificate Template* is duplicated to create a new Certificate Template.

1. Press the **Windows** key on the keyboard to display the *Start* screen.
2. Click the **Windows PowerShell** tile.
3. Launch the **Microsoft Management Console** (mmc). Enter the following command:

   ```
   mmc
   ```

   Within the mmc create the duplicate template:

   i. Click the **File** menu, and select **Add/Remove Snap-in...** to display the *Add or Remove Snap-ins* dialog.
   ii. From the list on the left, select **Certificate Templates**.
   Note: If the **Certificate Templates** option does not display in the list, you must add the CA role to your server.
   iii. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
   iv. Click **OK**.
   v. Click on **Certificate Templates ([server name])** in the window on the left to display the full list of Certificate Templates.
   vi. Scroll down the list and locate **Web Server**.
   vii. Right click the *Web Server* template and select **Duplicate Template** to display the *Properties of New Template* window.
   viii. Select the **Request Handling** tab, and check the box next to *Allow private key to be exported*.
   ix. Select the **General** tab and specify a value for *Template display name*.
   x. Select the **Security** tab and add the certificate authority computer account to the template with at minimum *Enroll* permissions.
   xi. Click **OK** to save the changes and exit the *Properties of New Template* window.

4. In the mmc, configure the *Certificate Template*:

   i. Click the **File** menu.
   ii. Select **Add/Remove Snap-in...**
   iii. From the list on the left, select **Certification Authority**.
   iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
   If a window titled *Certification Authority* displays:

      a. Select the radio button next to *Local computer* under *This snap-in will always manage*:
      b. Click **Finish**.
      c. Click **OK**.

   v. Expand the list under **Certification Authority (Local)** and the list under your server name.
   vi. Right click **Certificate Templates** in the list under your server name.
   vii. Select **New => Certificate Template to Issue**.
   viii. In the *Enable Certificate Templates* window, select the new template you created in the

previous steps.

ix. Click **OK**.

x. Exit the mmc:

Select **File > Exit**

Creating a Certificate for Each Server

In the following steps, use the new certificate template to create a certificate for each server you want to monitor using SSL encryption. These steps are repeated for each server.

1. If necessary, launch the Microsoft Management Console (mmc). Press the **Windows** key on the keyboard to display the *Start* screen.
2. Click the Windows PowerShell tile.
3. Launch the **Microsoft Management Console** (mmc) with the following command:

   ```
   mmc
   ```

   In the mmc:

   i. Click the **File** menu.
   ii. Select **Add/Remove Snap-in...**.
   iii. From the list on the left, select **Certificates**.
   iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
   v. In the *Certificates* snap-in window, select *Compute account* under **This snap-in will always manage certificates for:**
   vi. Click **Next** (or **Finish** if your using an existing mmc console).
   vii. Click **Local computer** under **This snap-in will always manage:** if you are presented with the *Select Computer* dialogue (which occurs if opening a new mmc console).
   viii. Click **Finish**.
   ix. Click **OK**.

4. Request and enroll the new certificate. In the *Certificate* mmc:

   i. Navigate to **Console Root > Certificates (Local Computer) > Personal > Certificates**.
   ii. Select **Action** in the menus at the top of the mmc to display the drop down list.
   iii. Select **All Tasks > Request New Certificate**.
   iv. Click **Next** to display the next window with *Active Directory Enrollment Policy* highlighted.
   v. Click **Next**.
   vi. Place a check mark in the box next to your copied certificate template and click the link to launch the *Properties* edit window.

      a. In the **Subject** tab, choose **Common name** from *the Type:* drop-down of the *Subject name* field. Enter the fully qualified domain name of the server to be monitored (for example, *mytestmachine.mynetwork.com*) in the **Value:** field.

      b. Click **Add**.

      c. If desired, enter additional identification information, including the organization, street address, etc., in the same manner.

      d. Select the **General** tab and populate the *friendly name* field.

   vii. Click **OK**.

viii. Click **Enroll**.

ix. Click **Finish**.

5. Expand the tree under **Certificates**.
6. Expand the tree under **Personal**.
7. Click on **Certificates** to highlight it and display a list of certificates on the right.
8. Right click the new certificate and select **All Tasks**.

    i. Select **Export**.
    ii. In the *Certificate Export Wizard* window, click **Next**.
    iii. Select the radio button next to **Yes, export the private key**.
    iv. Click **Next**.

9. On the next page:

    i. Verify that the radio button next to **Personal Identification Exchange - PKCS #12 (.pfx)** is selected.
    ii. Verify that the checkbox next to Include all certificates in the certification path if possible is checked.
    iii. Click **Next**.

10. On the *Security* page of the wizard:

    i. Check the box next to **Password**.
    ii. Create a password to secure the private key.
    iii. Click **Next**.

11. On the *File to Export* page:

    i. Select a *destination* for the key export.
    ii. Create a *file name*.
    iii. Click **Save**
    iv. Click **Next**.

12. On the *Completing the Certificate Export Wizard* page, click **Finish**.
13. Click **OK** to close *the Certificate Export Wizard*.
14. Move or copy the exported certificate to the target (monitored) server.

Installing the Certificate on the Target Computer

1. On the target computer, launch the Microsoft Management Console (mmc) with the following command:

    ```
    mmc
    ```

2. In the mmc:

    i. Click the **File** menu.
    ii. Select **Add/Remove Snap-in...**
    iii. From the list on the left, select **Certificates**.
    iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
    v. In the *Certificates* snap-in window, select **Computer account** under **This snap-in will always**

manage certificates for:.

vi. Click **Next**.
vii. On the *Select a computer page*, click the radio button next to **Local computer**.
viii. Click **Finish**.
ix. Click **OK** on the *Add or Remove Snap-ins* page.

Importing the Certificate

1. In the mmc console, expand the **Certificates (Local Computer)** branch of the tree.
2. Right click **Personal**.
3. Select **All Tasks => Import**.
4. On the first page of the *Certificate Import Wizard*, click **Next**.
5. On the *File to import* page:

   i. Click **Browse**.
   ii. Navigate to the location of the certificate copied to the target system above.
   iii. Select the file.
   Note: You might need to change the file type in the file browser window to *Personal Information Exchange* for the file to display.
   iv. Select the certificate file.
   v. Click **Open**.
   vi. Click **Next**.

6. On the *Private key protection* page:

   i. Enter the password for the key.
   ii. Verify that the checkboxes for **Include all Extended Properties** and **Mark this key as exportable** are selected.
   iii. Click **Next**.

7. On *the Certificate Store* page:

   i. Select the radio button next to **Place all certificates in the following store**.
   ii. Verify that *Personal* appears in the field for **Certificate Store**.
   iii. Click **Next**.

8. On the *Completing the Certificate Import Wizard* page, click **Finish**.
9. Click **OK** to exit the *Certificate Wizard*.

Verifying the Details and Copying the Thumbprint

1. In the mmc console:

   i. Expand the *Certificates (Local Computer)* branch of the tree.
   ii. Expand *Personal*.
   iii. Click on **Certificates**.
   iv. Double click on the certificate to view its details.

2. In the **General** tab of the *Certificate* window:

   i. Verify that the *hostname* is correct for the target server.
   ii. Select the **Details** tab

iii. Scroll down to **Thumbprint** in the *Field* list.
iv. Click on **Thumbprint**.
v. Copy the thumbprint from the lower window for use in later steps.

3. If the server has not been previously configured for monitoring using WinRM, complete the steps listed above in the section Windows Server 2012: Configuring WinRM and WinRS on Individual Servers (Basic Authentication, no Encryption) on page 37 and omit the step that specifies SSL not be used. Substitute the steps in the following section, Configuring the Firewall (below) for firewall configuration. If the server has previously been configured for monitoring but without using SSL, proceed directly to the section, Configuring the Firewall (below).

Configuring the Firewall

1. Configure the firewall to allow connections on port 5986 on individual servers. If desired, use these instructions to instead modify a Group Policy object (for example as directed in Page 4 of this document) to make the change on large numbers of servers.

   i. Press the **Windows** key on the keyboard to display the *Start* screen.
   ii. Click the **Server Manager** tile.
   iii. Click **Local Server** on the left.
   iv. Edit the Firewall profile currently in use. Click the value to the right of **Windows Firewall** to change the value.
   For example, you might see *Windows Firewall* in grey font and to the right of it, in blue font, **Domain: On**.
   In this case, click the blue **Domain On** value.
   v. Click on **Advanced Settings** on the left.

2. In the *Windows Firewall with Advanced Security* window:

   i. Click on **Inbound Rules** on the left.
   ii. Click on **New Rule...** on the far right under **Actions**.

3. In the *New Inbound Rule Wizard* window:

   i. Select the radio button next to **Port**.
   ii. Click **Next**.
   iii. Verify that the radio buttons next to **TCP** and **Specific local ports** are selected.
   iv. Enter the value `5986` in the field for **Specific local ports**.
   v. Click **Next**.
   vi. On the next page, verify that the radio button next to **Allow the connection** is selected.
   vii. Click **Next**.
   viii. On the next page, select the firewall profiles for which the rule should apply.
   ix. Click **Next**.
   x. On the next page, give the rule a name.
   xi. Click **Finish**.

Creating the WinRM Listener Using SSL

1. Press the **Windows** key on the keyboard to display the *Start* screen.
2. Click the *Windows PowerShell* tile.
3. At the PowerShell command line, type the following command, substituting your values for the certificate *thumbprint* and *serverfqdn* (server fully qualified domain name of the monitoring server):

```
winrm create
winrm/config/Listener?Address=*+Transport=HTTPS  '@{Hostname="[serverfqdn]";C
ertificateThumbprint="[thumbprint]"}'
```

for example:

```
winrm create winrm/config/Listener?Address=*+Transport=HTTPS '@{Hostname="
mytestmachine.mynetwork.com";CertificateThumbprint="07bfff656edab6d9b4dd27f02
0f768f54fee5eb8"}'
```

Note: The thumbprint value must be entered without the spaces displayed in the *Detail* tab of the *Certificate information* window. For example, the displayed value: `07 bf ff 65 6e da …` must be entered as: `07bfff656eda…`

4. Specify *https (SSL)* instead of *http* connections. Enter the following command:

```
winrm s winrm/config/service '@{AllowUnencrypted="false"}'
```

Note: If this is already controlled through a policy, an error displays. In that case, modify the appropriate GPO. The instructions on Page 2 of this document can be used as a guide.

Adding the Server to Cisco UCS Performance Manager

In the Cisco UCS Performance Manager web UI:

1. Navigate to the **Infrastructure** page.
2. If the server has not yet been added to Cisco UCS Performance Manager, add it the **Server/Microsoft/Windows** device class and opt out of modeling.
3. Click on the name of the target (monitored) server (or on the **Server/Microsoft/Windows** device class if you would like these changes to apply to all Windows servers).
4. Click on Configuration Properties.
5. Edit the configuration property for *zWinScheme* to be *https*.
6. Edit the value for *zWinRMPort* to be *5986*.
7. Verify that the values for *zWinRMUser* and *zWinRMPassword* are correct. Correct means the appropriate Windows credentials. Edit as necessary.
8. To verify that all settings are correct, model the device. Click the **Action Wheel** (gear-shaped) icon in the lower left and select **Model Device...**

Windows Server 2012: Configuring a WinRM Service Account on Individual Windows Systems

See the section above titled *About Windows Authentication for WinRM Monitoring* if necessary for more background on Windows permissions requirements when monitoring with WinRM.

Note: You cannot create a local service account if the machine is configured as a domain controller (AD DS) because the *local users and groups* options no longer exist in that configuration. There are no local accounts on a domain controller, only domain accounts.

Complete the following steps on each non-domain controller server to configure your service account:

1. Add a new local user for use as a service account:
    i. Open *Server Manager*.
    ii. Click on **Tools** in the upper right and select **Computer Management** from the menu that displays.
    iii. In the left pane of the *Computer Management* window, expand **Local Users and Groups**.
    iv. Right click on **User** and select **New User** from the menu that displays.
    v. Complete the *New User* form. Uncheck **User must change password at next logon** and check (if desired) the **Password never expires** box.
    vi. Click **Create.**
    vii. Click **Close** to exit the *New User* form.
2. Copy your permissions configuration script, for example an edited version of the *zenoss-lpu.ps1* script, to the target server.
3. Run the PowerShell Script:
    i. Press the **Windows** key on the keyboard to display the *Start* screen.
    ii. Click the **Windows PowerShell** tile.
    iii. Run your service account configuration script by typing the full path to the script in the command line, then appending the script with the `-u` option and the name of your service account. For example, if you are using an edited version of the zenoss-lpu.ps1 script and your service account is named “benny,” enter the command at the PowerShell prompt:

    ```
    C:\tmp\zenoss-lpu-ps1 -u benny
    ```

    Note: depending on the security policies enforced on your server, you might encounter an error such as:

    ```
    File C:\tmp\zenoss-lpu-ps1 cannot be loaded because running scripts is disabled on this system…..
    ```

    If you encounter this error, you can bypass the security restrictions for this script by including the `-executionpolicy bypass` option, for example:

    ```
    Powershell -executionpolicy bypass -file C:\tmp\zenoss-lpu.ps1 -u benny
    ```

Windows Server 2012: Group Policy Deployment of a PowerShell Script for Service Account Configuration

Refer to the section above titled *About Windows Authentication for WinRM Monitoring* for background on service account requirements.

Prerequisites for Configuring a Service Account

The prerequisites for configuring a service account include:

- Creation of a domain user account for use as the service account.
- Completion of the appropriate preparatory sections.

Creating the Domain User (Service) Account

Perform the following to create a new domain user (service) account, if necessary:

1. Log on to an Active Directory server for the domain.
2. Open *Server Manager* and click **Tools** in the upper right**.**
3. Select **Active Directory Users and Computers** from the drop-down list.
4. In the left pane of the *Active Directory Users and Computers* window, find and expand your domain, for example, *doctest.loc.*
5. Right-click *Users* and select **New > User**
6. In the *New Object – User* window, provide a **First name** and a **User logon name**, *zenny* for example.
7. Verify the domain field has the correct domain identification. For example, *@doctest.loc*
8. Click **Next** to display the password dialog for the new user.
9. In the *Password* fields, enter and verify the new user password.
10. Uncheck the **User must change password at next logon**.
11. Check the option for **Password never expires**. We recommend this option to prevent issues later on because your new domain user (*zenny* in this example) never logs on as a human user.
12. Click **Next**.
13. Click **Finish**. Your new user, *zenny* for example, displays in the list of users for the domain.

Completing Preparatory Sections

The following procedure assumes that you have completed the following preparatory sections:

- Windows Server 2012: Configuring Firewall Group Policies

Note: This method of deploying a PowerShell script across a large group of Windows systems is most likely to be employed in combination with the use of a single domain service account for WinRM authentication. The use of a domain service account mandates the use of Kerberos to encrypt credentials. See the relevant section in this document for instructions on configuring a domain service account and Kerberos if you have not already:

- Windows Server 2012: Improving Security

PowerShell Script Deployment

Perform the following procedure to create a new GPO and to deploy the PowerShell script.

1. Create your service account configuration script (or edit, as appropriate, the sample script referenced above in the section titled *About Windows Authentication for WinRM Monitoring*).

2. Copy the script (for example "`zenoss-lpu.ps1`") to a *Netlogon* folder such as

   `\\yourdomain\SYSVOL\yourdomain\scripts`

3. Open *Group Policy Management*, from the **Server Manager** console:

Click **Tools** in the upper right, and then choose **Group Policy Management.**

4. Create a new policy.
   i. In the left pane, navigate to:

      Forest: *yourdomain* **> Domains >** *yourdomain* **> Group Policy Objects**

   ii. Right click **Group Policy Objects**
   iii. Select **New** to display the *NEW GPO* dialog.
   iv. Name your policy, for example: *zenoss_lpu*
   v. Click **OK** to save and exit the *New Policy* window.

5. Edit your new policy.
   i. In the left pane, navigate to your new *Group Policy Object*. For example:

      Forest: *yourdomain* **> Domains >** *yourdomain* **> Group Policy Objects > zenoss_lpu**

   ii. Right click the policy and select **Edit** to display the *Group Policy Management Editor*.
   iii. In the left pane of the Group Policy Management window, navigate to:

      Computer Configuration\Policies\Windows Settings\Scripts (Startup/Shutdown)

   iv. Click **Scripts (Startup/Shutdown)**.
   v. In the right pane (Scripts (Startup/Shutdown), double-click **Startup** to launch the *Startup Properties* dialog.
   vi. In the *Startup Properties* dialog box, select the **PowerShell Scripts** tab.
   vii. Click **Add** to display the *Add a Script* dialog box:
      a. Specify the script name and path. In the *Script Name* field, enter the path to the script, or click Browse to locate the script file.
      Note: Scripts should be located in the Netlogon shared folder on the domain controller. For example:
      yourdomain\SYSVOL\yourdomain\scripts

      b. Select the `zenoss-lpu.ps1` PowerShell script.
      c. Click **Open**.
      d. In the **Script Parameters** box, enter *-u yourusername@yourdomain* for a domain user or *-u yourusername* for basic authentication of a local computer account user.

      Note: Basic authentication relies on local computer accounts. To successfully authenticate to any particular computer, you must have a local account on that machine.

      e. Click **OK** to save the information and exit the *Add a Script* window.

      If you have multiple scripts and want them to run in a particular order, use the Up and Down buttons in the Startup Properties window to set their run order.

      f. Click **OK** to exit the *Startup Properties* window.
6. Exit the *Local Group Policy Editor*:

   File > Exit

7. Link your new GPO to one or more Organizational Units (OU) containing servers to which you want to have the policies applied. Alternatively, you can apply the policies to all Windows servers in the domain by linking the new GPO to the domain itself. To link the GPO to the domain, complete the following process.

   Note: Substitute a specific OU for the domain if you want to link only to a subset of servers.

      i. Right-click your domain in the left pane of the *Group Policy Management* window.
      ii. Choose **Link an Existing GPO...**

iii. Select your new GPO from the list that displays.
iv. Click **OK** to complete the process.

8. Exit the Group Policy Management window:

   File > Exit

9. Manually refresh Group Policy from the command prompt of target servers:

```
gpupdate /force
```

10. Reboot your member servers to have the script run for the first time.

Windows Server 2008R2

Configuring Windows Server 2008 Using Group Policy (Basic Authentication, no Encryption)

1. Log on to a domain controller as a user with 'Domain Admin' privileges.
2. Launch the Group Policy Editor. Use one of the following methods:

   - Click the **Start** button and navigate to **All Programs > Administrative Tools > Group Policy Management**.
   - Click **Start**, enter the word *Group* in the search field and select **Group Policy Management**.

3. Right-click **Group Policy Objects** and select *New*. In the form that displays:

   i. Enter a name for your new Group Policy Object, for example, *WinRM_Monitoring*.
   ii. Leave "(none)" in the **Source Starter GPO** field.
   iii. Click **OK** to save and exit the form.

4. Select your new **Group Domain Policy Object**, *WinRM_Monitoring*, for example.
5. Right click your new **Group Domain Policy Object** and select *Edit* to open the Group Policy Management Editor.
6. In the Group Policy Management Editor window, expand the Computer Configuration section of the tree and navigate the tree to:

   ```
   Policies\Administrative Templates:Policy...\Windows Components\Windows Remote Management(WinRM)
   ```

7. Enable remote server management:

   i. Click on **WinRM Service** to access the *WinRM Service Group Policy* settings in the right pane.
   ii. Double-click the Allow automatic configuration of listeners property.
   iii. Click the **Enabled** radio button.
   iv. Place an asterisk as a wildcard (' * ') in the *IPv4 filer* and *IPv6 fields* or specify a range of IP addresses for WinRM to listen on.
   v. Click **OK** at the bottom to submit the form.

8. Enable authentication:

   i. Double-click the **Allow Basic authentication** property in the right pane.
   ii. Select the **Enabled** radio button.
   iii. Click **OK** at the bottom to submit the form.

9. Specify unencrypted traffic:

   i. Double-click the **Allow unencrypted traffic** property.
   ii. Select the **Enabled** radio button.
   iii. Click **OK** at the bottom to submit the form.

10. Select *Windows Remote Shell* in the left pane to set its **Group Policy** settings. This is located in the group policy tree at the following path, which should be located right below *WinRM* service in the tree:
    `Computer Configuration\Policies\Administrative Templates\Windows`

```
Components\Windows Remote Shell
```

11. Configure remote shell access:

    i. In the right pane, double-click **Allow Remote Shell Access**.
    ii. Select the **Enabled** radio button.
    iii. Click **OK** at the bottom to submit the form.

12. Configure shell processes:

    i. In the right pane, double-click Specify maximum number of processes per Shell.
    ii. Select the **Enabled** radio button.
    iii. Enter the value `2,000,000,000` (without commas or spaces) in the *MaxProcessesPerShell* field.
    iv. Click **OK** at the bottom to submit the form.

13. Configure the number of remote shells:

    i. In the right pane, double-click Specify maximum number of remote shells per user.
    ii. Select the **Enabled** radio button.
    iii. Enter the value `2,000,000,000` (without commas or spaces) in the *MaxShellsPerUser* field.
    iv. Click **OK** at the bottom to submit the form.

14. Configure the shell timeout value:

    i. In the Right pane, double-click **Specify Shell Timeout**.
    ii. Select the **Enabled** radio button.
    iii. Enter the value `7,200,000` (without commas or spaces) in the **ShellTimeOut field**.
    iv. Click **OK** at the bottom to submit the form.

Windows 2008: Configuring Firewall Group Policies

Windows firewall must allow incoming ICMP (ping) requests. Additionally, WinRM listens on port 5985 when SSL is not used and on port 5986 when SSL is used. These ports must be opened on the firewalls of monitored servers. You can use Group Policy to open these ports on all servers across the organization.

```
In the Group Policy Management Editor, navigate to:
Computer Configuration\Policies\Windows Settings\Security Settings\Windows
Firewall with Advanced Security\Windows Firewall with Advanced Security -
LDAP;...\Inbound Rules
```

1. Create a new *Inbound Rules* policy:

    i. Right click **Inbound Rules** in the left pane.
    ii. Select **New Rule...** to display the *New Inbound Rule Wizard*
    iii. Select the **Predefined** radio button in the right pane.
    iv. Select **Windows Remote Management** from the drop down list.
    v. Click **Next**.
    vi. Ensure that all items in the list are checked.
    vii. Click **Next**.
    viii. Ensure that the **Allow the connection** radio button is selected.
    ix. Click **Finish**.

2. Exit the Group Policy Management Editor:
   Select **File > Exit**

3. Link your new GPO to one or more Organizational Units (OU) containing servers to which you want to

have the policies applied. Alternatively, you can apply the policies to all Windows servers in the domain by linking the new GPO to the domain itself. To link the GPO to the domain, complete the following process.

Note: Substitute a specific OU for the domain if you want to link only to a subset of servers.

i. Right-click your domain in the left pane of the *Group Policy Management* window.
ii. Choose Link an Existing GPO...
iii. Select your new GPO from the list that displays, *WinRM_Monitoring*, for example.
iv. Click **OK** to complete the process.

4. Exit the *Group Policy Management* window:
   Select **File > Exit**
5. Before adding servers to Cisco UCS Performance Manager for monitoring, wait a sufficient amount of time for Group Policy to automatically update on the server(s). Alternatively, you can manually refresh Group Policy on target servers by typing the following at the command prompt:

```
gpupdate /force
```

Windows 2008: Configuring Windows Credentials in Cisco UCS Performance Manager

When one or more servers are ready for addition to Cisco UCS Performance Manager, perform the following steps within the Cisco UCS Performance Manager web interface:

1. Navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class.
3. Click the **Details** icon.
4. Click **Configuration Properties** in the left pane.
5. In the right pane, set the configuration properties for *zWinRMUser* and *zWinRMPassword*, supplying the appropriate Windows credentials.

   Note: For ease of setup and testing, the local Administrator account can be used in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring* for more on WinRM authentication.

   To configure Windows to allow monitoring using a non-Administrator account, see the sections below titled *Windows 2008: Configuring a WinRM Service Account on Individual Servers*, or *Windows 2008: Using Group Policy to Configure a Service Account on all Servers*.
6. Click **See All**.
7. Add windows servers using the web interface or `ZenBatchload`.

Windows 2008: Improving Security by Using a Domain Service Account & Encrypting Credentials with Kerberos

Note: When switching from the use of local system accounts for authentication to a single domain service account, the use of Kerberos to encrypt credentials is mandatory.

The Kerberos authentication process requires an available ticket granting server. In the Microsoft Active Directory (AD) environment the AD Server also acts as the Key Distribution Center (KDC). The zWinKDC configuration property in Cisco UCS Performance Manager must be set to the IP address of the AD Server. Each collector used to monitor Windows servers must be able to send Kerberos packets to this server. To specify the ticket granting server in Cisco UCS Performance Manager, perform the following steps:

1. In the Cisco UCS Performance Manager web UI, navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class in the left pane.
3. Click the **Details** icon.
4. Click **Configuration Properties** in the left pane.
5. Edit the configuration property in the right pane for *zWinKDC*. Double click *zWinKDC* and specify the IP address of your Active Directory Server.
6. Edit the value for *zWinRMUser* name to be the *complete domain name* of the user, for example, *administrator@test.loc*.

   Note: A *zWinRMUser* name value in the form of *user@domain* is the trigger for Cisco UCS Performance Manager to use Kerberos encryption for credentials. When the value of *zWinRMUser* name takes the form of *user*[only] instead of *user@domain,* Cisco UCS Performance Manager will not use Kerberos.

   Note: The Cisco UCS Performance Manager server and collectors must be able to resolve the target server's pointer records (PTR) to their Active Directory fully qualified domain name. Administrators can meet this requirement by using one of three methods:

   i. Configuring the Cisco UCS Performance Manager server to access the Windows DNS server for its DNS resolutions.
   ii. Manually entering PTR records for each server in to the /etc/hosts file.

   For example, the server *r2d2.example.com* at the IP address **77.77.77.77** has the following PTR record:

   ```
   77.77.77.77 r2d2.example.com
   ```

   iii. Using the *zWinRMServerName* property by specifying the monitored server's name with the `zWinRMServerName` property field.

   Note: The *zWinRMServerName* property should only be used in conjunction with domain authentication when the DNS PTR record for a monitored server's managed IP address does not resolve to the name by which the server is known in Active Directory.
   For example, if *myserver1* is known as **myserver1.ad.example.com** by Active Directory and is being managed by IP address *192.51.100.21*, but IP address 192.51.100.21 resolves to *www.example.com*, you must set the zWinRMServerName property to **myserver1.ad.example.com** for domain authentication to work.

   - If many Windows servers in your environment do not have DNS PTR records that match Active Directory, it is recommended that you:
     - set the monitored device's name to be the fully-qualified Active Directory name in Cisco UCS Performance Manager.
     - set `zWinRMServerName` to `${here/titleOrId}` at the */Server/Microsoft/Windows*

device class.

This method avoids setting the `zWinRMServerName` property on every device.

We recommend that you leave the `zWinRMServerName` property blank if local authentication is used, or DNS PTR records match the Active Directory listings. The result is that Cisco UCS Performance Manager does not have to rely on DNS resolution while monitoring and it avoids the additional overhead of configuring the `zWinRMServerName` properties.

Note: You can add custom Kerberos configurations if your settings differ from the default settings used by UCS Performance Manager. To use a custom configuration file, place it in the `/opt/zenoss/var/krb5/config` directory. You must be using Kerberos 5 release 1.10 or higher. For more information, see http://wiki.zenoss.org/ZenPack:Microsoft_Windows

Windows 2008: Configuring WinRM and WinRS on Individual Servers (Basic Authentication, no Encryption)

Perform the following steps to configure WinRM and WinRS:

1. Log on to the target server as a user with *Domain Admin* or local *Admin* privileges.
2. Launch Windows PowerShell:

   - Click the **Windows PowerShell** icon if it exists in the tool bar.
   - Click **Start**, enter the word *Power* in the search field and select **Windows PowerShell**.

3. Within Windows PowerShell:

   i. Configure the system to accept WS-Management requests from other systems. Enter the following at the command prompt:

   ```
   winrm quickconfig
   ```

   ii. Specify *http* instead of *https* (SSL) connections. Enter the following command:

   ```
   winrm s winrm/config/service '@{AllowUnencrypted="true"}'
   ```

   iii. Configure the maximum number of concurrent operations per user. Use the following command:

   ```
   winrm s winrm/config/service
   '@{MaxConcurrentOperationsPerUser="4294967295"}'
   ```

   iv. Configure the *maximum number of shells per user*. Enter the following command:

   ```
   winrm s winrm/config/winrs '@{MaxShellsPerUser="2147483647"}'
   ```

   v. Configure the *idle timeout*. Enter the following command:

   ```
   winrm s winrm/config/winrs '@{IdleTimeout="7200000"}'
   ```

   vi. Specify *Basic Authentication*. Enter the following command:

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

   vii. Exit PowerShell:

   ```
   exit
   ```

4. Configure the firewall to allow connections on port 5985.

   i. Click the Start button and navigate to All Programs > Administrative Tools > Server Manager.
   ii. In the left pane, navigate to Server Manager > Configuration > Windows Firewall with Advanced Security>Inbound Rules.
   iii. In the right pane, scroll down through the list that displays and confirm that *Windows Remote Management* is enabled for the current firewall profile in use (and any other profiles required).

   Note: Remote management includes allowing connections on port 5985 when SSL is not being used.

If **Windows Remote Management** does not appear in the right pane:

a. Right click **Inbound Rules** in the left pane.
b. Select New Rule...
c. Select the **Predefined** radio button.
d. Select **Windows Remote Management** from the drop down list.
e. Click **Next**.
f. Ensure that all items in the list are checked.
g. Click **Next**.
h. Ensure that the **Allow the connection** radio button is selected.
i. Click **Finish**.

5. Configure Cisco UCS Performance Manager to monitor the server. Perform the following steps within the Cisco UCS Performance Manager web interface:

i. Navigate to the **Infrastructure** page.
ii. Select the **Server/Microsoft/Windows** device class.
iii. Click the **Details** icon.
iv. Click **Configuration Properties** in the left pane.
v. In the right pane, confirm that the values for the *zWinRMUser* and *zWinRMPassword* properties are populated with the correct Windows credentials for your Windows servers.

Note: For ease of setup and testing, the local Administrator account can be used in test environments. For production environments, the use of a less privileged service account is recommended. See the section above titled *About Windows Authentication for WinRM Monitoring* for more on WinRM authentication.

To configure Windows to allow monitoring using a non-Administrator account, see the section below titled *Windows 2008: Configuring a WinRM Service Account on Individual Servers*.

vi. If the credentials listed are correct, click **See All** and add the server to Cisco UCS Performance Manager.
vii. If the credentials listed are not appropriate to the target server, the server must be added and the server's individual *zWinRMUser* and *zWinRMPassword* configuration properties must be set. Perform the following steps to add the server information:

a. Add the server to the **Server/Microsoft/Windows** device class, but opt out of modeling the device when adding as follows:
    - If you are adding via the web interface, leave the **Model Device:** box unchecked.
    - If you are adding via the `zenbatchload` command, be sure the device has the *--nomodel* flag set.
b. When the device displays in the device list, click on its name.
c. Click on **Configuration Properties**, and set the configuration properties for *zWinRMUser* and *zWinRMPassword*, supplying the appropriate Windows credentials.

viii. Model the device by clicking the Action Wheel (gear-shaped) icon in the lower left and select **Model Device...**

Windows 2008: Configuring Individual Servers to Use a Domain Service Account & Encrypt Credentials with Kerberos

The Kerberos authentication process requires an available ticket granting server. In the Microsoft Active Directory (AD) environment, the AD Server also acts as the Key Distribution Center (KDC). The zWinKDC configuration property in Cisco UCS Performance Manager must be set to the IP address of the AD Server. Each collector that monitors Windows servers must be able to send Kerberos packets to this server. To specify the ticket granting server in Cisco UCS Performance Manager, perform the following steps:

1. In the Cisco UCS Performance Manager web UI, navigate to the **Infrastructure** page.
2. Select the **Server/Microsoft/Windows** device class.
3. Click **Details**.
4. Edit the configuration property for *zWinKDC* to specify the IP address of your Active Directory Server.
5. Edit the value for *zWinRMUserName* to be the complete domain name of the user, for example, *administrator@test.loc*.

   Note: A *zWinRMUserName* value in the form of *user@domain* is the trigger for Cisco UCS Performance Manager to use Kerberos encryption for credentials. When the value of *zWinRMUsername* takes the form of *user*[only] instead of *user@domain,* Cisco UCS Performance Manager will not use Kerberos.

   Note: The Cisco UCS Performance Manager server and collectors must be able to resolve the target server's pointer records (PTR) to their Active Directory fully qualified domain name. Administrators can meet this requirement by using one of three methods:

   i. Configuring the Cisco UCS Performance Manager server to access the Windows DNS server for its DNS resolutions.
   ii. Manually entering PTR records for each server in to the /etc/hosts file.

   For example, the server *r2d2.example.com* at the IP address **77.77.77.77** has the following PTR record:

   77.77.77.77 r2d2.example.com

   iii. Using the zWinRMServerName property as follows:
   - Specify the monitored server's name with the zWinRMServerName property field.

     Note: The zWinRMServerName property should only be used in conjunction with domain authentication when the DNS PTR record for a monitored server's managed IP address does not resolve to the name by which the server is known in Active Directory.
     For example, if *myserver1* is known as **myserver1.ad.example.com** by Active Directory and is being managed by IP address *192.51.100.21*, but IP address 192.51.100.21 resolves to *www.example.com*, you must set the `zWinRMServerName` property to **myserver1.ad.example.com** for domain authentication to work.

     - If many Windows servers in your environment do not have DNS PTR records that match Active Directory, it is recommended that you:

       - set the monitored device's name to be the fully-qualified Active Directory name in Cisco UCS Performance Manager
       - set `zWinRMServerName` to ${here/titleOrId} at the */Server/Microsoft/Windows* device class.

This method avoids setting the `zWinRMServerName` property on every device.

We recommend that you leave the `zWinRMServerName` property blank if local authentication is used, or DNS PTR records match the Active Directory listings. The result is that Cisco UCS Performance Manager does not have to rely on DNS resolution while monitoring and it avoids the additional overhead of configuring the `zWinRMServerName` properties.

Windows 2008: Improving Individual Server Security - Specify SSL for WinRM & WinRS

Creating a New Certificate Template

To successfully encrypt the payload between Cisco UCS Performance Manager and Windows clients, you must install a *Server Authentication* certificate on each monitored server. Log on to your Certificate Authority server as a user with *Administrator* privileges to create a Certificate Template for use in creating each server's certificate. This step only needs to be completed once because the new Certificate Template is then used repeatedly to create each server's certificate. In the following steps, the standard *Web Server Certificate Template* is duplicated to create a new Certificate Template.

1. Log on to your Certificate Authority server as a user with Administrator privileges.
2. Launch Windows PowerShell:

    i. Click the **Windows PowerShell** icon if it exists in the tool bar.
    ii. Click **Start**, enter the word *Power* in the search field and select **Windows PowerShell**.

3. Launch the **Microsoft Management Console** (mmc). Enter the following command:

    ```
    mmc
    ```

    Within the mmc create the duplicate template:

    i. Click the **File** menu, and select **Add/Remove Snap-in...**
    ii. From the list on the left, select **Certificate Templates**.
    iii. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
    iv. Click **OK**.

4. Click on **Certificate Templates** in the left window to display the full list of Certificate Templates.

    i. Scroll down the list and locate **Web Server**.
    ii. Right click the *Web Server* template and select **Duplicate Template**. The *Duplicate Template* dialog displays with radio button choices.
    iii. Select **Windows Server 2008 Enterprise** and click **OK** to display the *Properties of New Template window.*
    iv. In the **General** tab specify a value for *Template display name*.
    v. Select the **Request Handling** tab, and check the box next to *Allow private key to be exported*.
    vi. Select the **Security** tab and add the certificate authority computer account to the template with at minimum *Enroll* permissions.
    vii. Click **OK**.

5. In the mmc configure the Certificate Template:

    i. Click the **File** menu.
    ii. Select Add/Remove Snap-in...
    iii. From the list on the left, select **Certification Authority**.
    iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
    If a window titled *Certification Authority* displays:

        a. Select the radio button next to *Local computer* under **This snap-in will always manage:**
        b. Click **Finish**.

c. Click **OK**.

v. Expand the list under **Certification Authority (Local)** and the list under your server name.
vi. Right click **Certificate Templates** in the list under your server name.
vii. Select New => Certificate Template to Issue.
viii. In the *Enable Certificate Templates* window, select the new template you created in the previous steps.
ix. Click **OK**.

Creating a Certificate for Each Server

In the following steps, use the new certificate template to create a certificate for each server you want to monitor using SSL encryption. These steps are repeated for each server.

1. If necessary, launch the Microsoft Management Console (mmc) with the following command:

```
mmc
```

2. Open the Certificates MMC:

i. Click the **File** menu.
ii. Select Add/Remove Snap-in...
iii. From the list on the left, select **Certificates**.
iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
v. In the **Certificates** snap-in window, select the option **This snap-in will always manage certificates for Computer account** to display the *Select Computer* window.
vi. Select the radio button for This snap-in will always manage Local Computer.
vii. Click **Finish**
viii. Click **OK**.

3. Request and enroll the new certificate. In the Certificate mmc:

i. Navigate to Console Root > Certificates (Local Computer) > Personal > Certificates.
ii. Select **Action** in the menus at the top of the mmc to display the drop down list.
iii. Select All Tasks > Request New Certificate.
iv. Click **Next** to display the next window with *Active Directory Enrollment Policy* highlighted.
v. Click **Next**.
vi. Place a check mark in the box next to your copied certificate template and click the link to launch the *Properties* edit window.

a. In the **Subject** tab, choose *Common name* from the *Type:* drop-down of the *Subject name* field. Enter the fully qualified domain name (for example, *mytestmachine.mynetwork.com*) in the *Value*: field.
b. Click **Add**.
c. If desired, enter additional identification information, including the *organization*, *street address*, etc., in the same manner.
d. Select the **General** tab and populate the *friendly name* field.

vii. Click **OK**.
viii. Click **Enroll**.
ix. Click **Finish**.

4. Export the certificate. In the *Certificates* mmc:

i. Expand the tree under Certificates - Local Computer > Personal > Certificates.
ii. Right click the new certificate and select **All Tasks**.
iii. Select **Export** to display the *Certificate Export Wizard*.
iv. In the *Certificate Export Wizard* window, click **Next**.
v. Select the radio button for *Yes, export the private key*. Click **Next**.
vi. On the next page:

a. Verify that the **Personal Information Exchange** radio button is selected.
b. Select the check box for Include all certificates in the certification path if possible.
c. Click **Next**.

5. Create and confirm a password.
6. Click **Next** to display the *File to Export* page.

   On the *File to Export page*:

i. Browse to select a *destination* for the exported key.
ii. Create a *file name*.
iii. Click **Save**.
iv. Click **Next**.

7. On the *Completing the Certificate Export Wizard* page, verify the information. Click **<Back** if you need to edit the information.
8. Click **Finish**.
   If the export is successful, the *Certificate Export Wizard* displays a success message.
9. Click **OK** to close the message and exit the wizard.
10. Move or copy the exported certificate to the target server.

Installing the Certificate on the Target Computer

1. On the target computer, launch **Windows PowerShell**:
   - Click the **Windows PowerShell** icon if it exists in the tool bar.
     or
   - Click **Start**, enter the word *Power* in the search field and select **Windows PowerShell**.
2. Launch the Microsoft Management Console (mmc):

   ```
   mmc
   ```
3. Add the **Certificate** snap-in to the mmc:

i. Click the **File** menu.
ii. Select Add/Remove Snap-in...
iii. From the list on the left, select **Certificates**.
iv. Click the **Add>** button in the middle of the window to add it to the *Selected snap-ins* list on the right.
v. In the Certificates snap-in window, select **Computer account** under *This snap-in will always manage certificates for:.*
vi. Click **Next**.
vii. On the *Select a computer* page, select **Local computer**.
viii. Click **Finish**.
ix. Click **OK** on the *Add or Remove Snap-ins* page.

Importing the Certificate

1. In the mmc console, expand the **Certificates (Local Computer)** branch of the tree.
2. Highlight and right click **Personal**.
3. Select **All Tasks => Import** to launch the *Certificate Import Wizard*.
4. On the first page of the *Certificate Import Wizard*, click **Next**.
5. On the *File to import* page:,

    i. Click **Browse**.
    ii. Navigate to the location of the certificate file you copied to the target system and select the file.
    Note: If your file name does not display, change the file type in the file browser window to *Personal Information Exchange*.
    iii. Click **Open**.
    iv. Click **Next** to display the *Private key protection* page.

6. On the Private key protection page:

    i. Enter the password for the key.
    ii. Verify that the checkboxes for Mark this key as exportable and Include all Extended Properties are selected.
    iii. Click **Next**. to display the *Certificate Store* page.

7. On the Certificate Store page:

    i. Select Place all certificates in the following store.
    ii. Verify that *Personal* appears in the field for Certificate Store.
    iii. Click **Next** to display the Completing the Certificate Import Wizard page.

8. On the *Completing the Certificate Import Wizard* page, verify the certificate information.
9. Click **Finish** to exit the wizard.
    If the export is successful, The Certificate Export Wizard displays a success message.
10. Click **OK** to close the message and exit the wizard.

Verifying the Details and Copying the Thumbprint

1. If necessary, launch the mmc with the *Certificate snap-in*. In the mmc console:

    i. Expand the *Certificates (Local Computer)* branch of the tree.
    ii. Expand *Personal*.
    iii. Click on Certificates.
    iv. Double click on the certificate in the right pane to launch the *Certificate* window and view its details.

2. Copy the thumbprint. In the **General** tab of the *Certificate* window:

    i. Verify that the *hostname* is the correct fully qualified domain name for the target server.
    ii. Select the **Details** tab
    iii. Scroll down to **Thumbprint** in the *Field* list.

iv. Click on **Thumbprint**.
v. Copy the 40 digit thumbprint from the lower window for use in later steps, for example:

3a 79 6b ce 83 82 85 55 32 31 30 11 16 e5 bd 14 f0 2d 61 89

Note: The forty digit thumbprint value that displays contains spaces. These spaces must be removed before using it in commands.

Note: If the server has not been configured for monitoring using WinRM, complete the steps listed in the section **Windows 2008: Configuring WinRM and WinRS On Individual Servers (Basic Authentication, no encryption)**, and omit the step that specifies SSL not be used. Substitute the steps in the following section, *Configuring the Firewall* (below) for firewall configuration.

If the server has been configured for monitoring but without using SSL, proceed directly to the section, *Configuring the Firewall* (below).

Configuring the Firewall

1. Configure the firewall to allow connections on port 5986:

   i. Click the Start button and navigate to All Programs > Administrative Tools > Server Manager.
   ii. In the left pane, navigate to Server Manager > Configuration > Windows Firewall with Advanced Security>Inbound Rules.

   i. Create a *New Inbound Rule*. Click on **New Rule...** on the right under **Actions** to display the *New Inbound Rule Wizard* window.

2. Create *New Inbound Rules* and specify ports in the *New Inbound Rule Wizard* window:

   i. Select the radio button next to **Port**.
   ii. Click **Next**.
   iii. Verify that the radio buttons next to **TCP** and **Specific local ports** are selected.
   iv. Enter the value *5986* in the field for **Specific local ports**.
   v. Click **Next**.
   vi. On the next page, verify that the radio button next to **Allow the connection** is selected.
   vii. Click **Next**.
   viii. On the next page, select the firewall profiles for which the rule should apply.
   ix. Click **Next**.
   x. On the next page, give the rule a name.
   xi. Click **Finish**.

Creating the WinRM Listener Using SSL

1. Launch the Windows Power Shell:

   i. Click the **Windows PowerShell** icon if it exists in the tool bar.
   or
   ii. Click **Start**, enter the word *Power* in the search field and select **Windows PowerShell**.

2. Create the listener referencing the newly created Certificate. At the PowerShell command line, type the following command, substituting your values for the certificate *thumbprint* and *serverfqdn* (server fully qualified domain name):

```
winrm create
winrm/config/Listener?Address=*+Transport=HTTPS  '@{Hostname="[serverfq
```

```
dn]";CertificateThumbprint="[thumbprint]"}'
```

For example:

```
winrm create winrm/config/Listener?Address=*+Transport=HTTPS
'@{Hostname="mymachinename.mynetwork.com";CertificateThumbprint="3a796b
ce838285553231301116e5bd14f02d6189"}'
```

Note: The thumbprint value must be entered without the spaces that are displayed in the **Detail** tab of the *Certificate Information* window.

3. Specify *https (SSL)* instead of *http* connections. Enter the following command:

```
winrm s winrm/config/service '@{AllowUnencrypted="false"}'
```

Note: If this is already controlled through a policy, an error displays.

Adding the Server to Cisco UCS Performance Manager

In the Cisco UCS Performance Manager web UI:

1. Navigate to the **Infrastructure** page.
2. If the server has not yet been added to Cisco UCS Performance Manager, add it the **Server/Microsoft/Windows** device class and opt out of modeling.
3. Click on the name of the target server.
4. Click on the server's Configuration Properties.
5. Edit the configuration property for *zWinScheme* to be *https*.
6. Edit the value for *zWinRMPort* to be *5986*.
7. Verify that the values for *zWinRMUser* and *zWinRMPassword* are correct. This means the appropriate Windows credentials, for example, *Bill* and *billspassword*, respectively. Edit as necessary.
8. To verify that the settings have been successfully entered, model the device. Click the **Action Wheel** (gear-shaped) icon in the lower left and select **Model Device...**

Windows 2008: Configuring a WinRM Service Account on Individual Servers

See the section above titled *About Windows Authentication for WinRM Monitoring* if necessary for more background on Windows permissions requirements when monitoring with WinRM. Complete the following steps on each server to configure your service account:

1. Add a new local user for use as a service account:
    i. Open **Server Manager**.
    ii. Expand *Configuration* in the left pane.
    iii. Expand *Local Users and Groups* in the left pane.
    iv. Right click on **Users** and select **New User** from the menu that displays.
    v. Complete the New User form. Uncheck **User must change password** at next logon and check (if desired) the **Password never expires** box.
    vi. Click **Create**.
    vii. Click **Close** to exit the *New User* form.
2. Copy your permissions configuration script, for example the *zenoss-lpu.ps1* script, to the target server.
3. Run the PowerShell Script:
    i. Click the *Windows PowerShell* icon, if present, in the Taskbar. If the icon is not present, click **Start** in the taskbar and enter "Powershell" in the search field to locate PowerShell.
    ii. Run your service account configuration script by typing the full path to the script in the command line and append the script with the *-u* option and the name of your service account. For example, if you are using an edited version of the *zenoss-lpu.ps1* script and your service account is named "benny," enter the following command at the PowerShell prompt:

        ```
        C:\tmp\zenoss-lpu.ps1 –u benny
        ```

Note: depending on the security policies enforced on your server, you might encounter an error such as:

```
File C:\tmp\zenoss-lpu-ps1 cannot be loaded because running scripts is
disabled on this system…..
```

If you encounter this error, you can bypass the security restrictions for this script by including the `-executionpolicy bypass` option, for example:

```
Powershell -executionpolicy bypass -file C:\tmp\zenoss-lpu.ps1 -u benny
```

Windows 2008: Using Group Policy to Configure a Service Account on all Servers

Important note: If the Group Policies for your Windows 2008R2 domain have been left at their default settings, Windows may block the execution of PowerShell scripts over the network without active user confirmation at the command line that the script should be permitted to run. This request for user intervention can cause Windows systems to hang on boot for an extended period when a startup script is run, pending user intervention (which cannot be given because administrators cannot log on to the system while it waits). Group Policy objects that work around this issue can be created that do the following:

1. Set the PowerShell execution policy to *allow all scripts*.
2. Add the hostname (or the hosts's domain) of the server hosting the script on a shared directory in the Trusted Sites Internet Zone.
3. Edit registry keys to disable Internet Explorer's Enhanced Security Configuration (this is necessary to add items to the Trusted Sites Internet Zone).

Administrators should weigh the security implications of these policies against the benefits of being able to deploy the PowerShell script from a central location using Group Policy instead of running the script manually on each server to be modified. To make these changes, complete the next section.

Enabling Script Execution (If Necessary)

1. Click **Start** in the taskbar and enter *Group Policy Management* in the search bar to locate *Group Policy Management*.

   i. In the left pane of the *Group Policy Manager* window, navigate to **Forest: *yourdomain* > Domains > *yourdomain* > Group Policy Objects**

   For example:

   `Forest: doctest.loc > Domains > doctest.loc > Group Policy Objects`

   ii. Right click *Group Policy Objects* and select **New** to display the *NEW GPO* dialog.
   iii. Name your policy, for example *script_execution.*
   iv. Click **OK** to save and exit the *New Policy* window.

2. Edit your new policy.
   i. In the left pane, navigate to your new Group Policy Object. For example:

   `Forest: doctest.loc > Domains > doctest.loc > Group Policy Objects > script_execution`

   ii. Right click the policy and select **Edit** to display the *Group Policy Management Editor.*

   a. In the left pane of the *Group Policy Management* window, navigate to:

   ```
   Computer Configuration/Policies/Administrative Templates/Windows
   Components/Internet Explorer/Internet Control Panel/Security Page/
   ```

   b. In the right panel, double click **Site to Zone Assignment List**
   c. Click the **Enabled** radio button

d. Add the hostname of the system hosting your PowerShell script (or the domain where it is located if broader permissions are desired) by clicking the **Show** button.
Note: In the right *Help* menu you are provided with guidance on how to add domains or individual hosts.
e. Choose the value '2' for your site or domain to put it into the *Trusted Sites Zone*.
f. Click **OK** at the bottom of the form.

iii. In the left pane of the *Group Policy Management* window, navigate to:

```
Computer Configuration/Policies/Administrative Templates/Windows
Components/Windows PowerShell/
```

a. In the right pane, double-click **Turn on Script Execution**
b. In the *Turn on Screen Execution* dialog window, click the **Enabled** radio button.
c. Click **OK**
d. In the dropdown list under *Execution Policy,* choose **Allow all scripts**.
e. Click **OK** at the bottom.

iv. In the left pane of the *Group Policy Management* window, navigate to:

```
Computer Configuration/Preferences/Windows Settings/Registry/
```

a. Right-click on *Registry* and select **New > Registry Item**.
b. Either enter the following Key Path or use the [**…**] button to use the *Registry Item Bowser* to navigate to:

```
HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Active Setup\Installed
Components\{A509B1A7-37EF-4b3f-8CFC-4F3A74704073}
```

c. In the lower pane, click **IsInstalled**
d. Click the **Select** button to display the *New Registry Properties* dialog box.
e. In the *New Registry Properties* dialog box, select the **General** tab and verify the following settings:
- *Action* is set to **Update**.
- The *Hive* is **HKEY_LOCAL_Machine**
- The *Key Path* is the one specified in step b.
- The *Value name* is **IsInstalled** and the *Default* box is **unchecked**.
- The *Value type is* **REG_DWORD**
- The checkbox for *Base* is set to **Hexadecimal**

f. Change the *Value data* entry from the Default of *00000001* (enabled) to the new value of **00000000** (disabled)
g. Click **OK** to close the dialog and save the changes.

9. Link your new GPO to one or more Organizational Units (OU) containing servers to which you want the policies applied. Alternatively, you can apply the policies to all Windows servers in the domain by linking the new GPO to the domain itself. To link the GPO to the domain, complete the following process.

   Note: Substitute a specific OU for the domain if you want to link only to a subset of servers.

   i. Right-click your domain in the left pane of the *Group Policy Management* window.
   ii. Choose Link an Existing GPO...
   iii. Select your new GPO from the list that displays.
   iv. Click **OK** to complete the process.

10. Exit the Group Policy Management window:

    Select **File > Exit**

11. Manually refresh Group Policy from the command prompt of target servers:

```
gpupdate /force
```

Note: you may need to reboot the server for the Internet Explorer settings to take effect.

Creating the Domain User (Service) Account

Perform the following to create a new domain user (service) account, if necessary:

1. In the left panel of Server Manager, Navigate to your target domain in the tree at the left:
   i. Expand *Roles*
   ii. Expand *Active Directory Domain Services*
   iii. Expand *Active Directory Users and Computers*
   iv. Expand your domain.
2. Right-click *Users* and select **New > User**.
3. In the *New Object – User* window, provide a First name and a User logon name, *zenny* for example.
4. Verify the domain field has the correct domain identification. For example, *@doctest.loc*
5. Click **Next** to display the password dialog for the new user.
6. In the *Password* fields, enter and verify the new user password.
7. Uncheck the selection for **User must change password at next logon.**
8. Check the option for **Password never expires**.
9. Click **Next**.
10. Click **Finish**. Your new user, *zenny* for example, displays in the list of users for the domain.

Completing Preparatory Sections

The following procedure assumes that you have completed the following preparatory sections:

- *Windows 2008: Configuring Firewall Group Policies*
- *Windows 2008: Configuring Windows Credentials in Cisco UCS Performance Manager*

This procedure requires the PowerShell script *zenoss-lpu.ps1*, available from the Cisco UCS Performance Manager support site.

Creating the Script GPO

1. Create your service account configuration script (or edit, as appropriate, the sample script referenced above the section titled *About Windows Authentication for WinRM Monitoring*).
2. Copy your configuration script to an appropriate folders shared on the network, for example:

   ```
   \\[yourdomain]\SYSVOL\[yourdomain]\SCRIPTS
   ```

3. Open Group Policy Management, from the *Server Manager Console*, click **Tools > Group Policy Management**
4. Create a new policy.

   i. In the left pane, navigate to:

   ```
   Forest: yourdomain > Domains > yourdomain > Group Policy Objects
   ```

   For example:

   Forest: *doctest.loc* **> Domains >** *doctest.loc* **> Group Policy Objects**

   ii. Right click *Group Policy Objects* and select **New** to display the *NEW GPO* dialog.
   iii. Name your policy, for example *zenoss-sa*

iv. Click **OK** to save and exit the *New Policy* window.

5. Edit your new policy. In the left pane, navigate to your new Group Policy Object.
   For example:

   Forest: *doctest.loc* **> Domains >** *doctest.loc* **> Group Policy Objects >** *zenoss-sa*

   i. Right click the policy and select **Edit** to display the *Group Policy Management Editor*.
   ii. In the left pane of the *Group Policy Management* window, navigate to:

   ```
   Computer Configuration\Policies\Windows Settings\Scripts
   (Startup/Shutdown)
   ```

   iii. Click Scripts (Startup/Shutdown).
   iv. In the right pane (*Scripts (Startup/Shutdown*), double-click **Startup** to launch the *Startup Properties* dialog.
   v. In the *Startup Properties* dialog box, select the **PowerShell Scripts** tab.
   vi. Click **Add** to display the *Add a Script* dialog box:

   a. Specify the script name and path. In the *Script Name* field, enter the path to the script, or click **Browse** to locate the script file you copied in step 2 above.

   b. Select the script and click **Open**.

   c. In the *Script Parameters* box, enter the domain logon information for your service account user in the form of:
   -u yourusername@yourdomain for a domain user
   or *-u yourusername* for a local user.

   d. Click **OK** to save the information and exit the *Add a Script* window.

   e. If you have multiple scripts and want them to run in a particular order, use the **Up** and **Down** buttons in the *Startup Properties* window to set their run order.

   f. Click **OK** to exit the *Startup Properties* window.

6. Exit the Local Group Policy Editor:

   File > Exit

7. Link your new GPO to one or more Organizational Units (OU) containing servers to which you want the policies applied. Alternatively, you can apply the policies to all Windows servers in the domain by linking the new GPO to the domain itself. To link the GPO to the domain, complete the following process.

   Note: Substitute a specific OU for the domain if you want to link only to a subset of servers.

   i. Right-click your domain in the left pane of the *Group Policy Management* window.
   ii. Choose Link an Existing GPO...
   iii. Select your new GPO from the list that displays.
   iv. Click **OK** to complete the process.

8. Exit the Group Policy Management window:

   Select **File > Exit**

9. Manually refresh Group Policy from the command prompt of target servers:

```
gpupdate /force
```

10. Reboot your member servers to pick up the script changes.