



## **Cisco UCS Performance Manager Installation Guide**

**First Published:** October 2017

Release 2.5.1

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: <http://www.cisco.com/go/trademarks>. Third-party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)

Any Internet Protocol (IP) addresses used in this document are not intended to be actual addresses. Any examples, command display output, and figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses in illustrative content is unintentional and coincidental.

© 2014-2017 Cisco Systems, Inc. All rights reserved.

# Contents

<b>About this guide.....</b>	<b>4</b>
<b>How to use this guide.....</b>	<b>5</b>
<b>Chapter 1: Installing a Control Center master host.....</b>	<b>6</b>
Creating a virtual machine.....	6
Configuring the Control Center master host.....	10
Edit a connection to configure static IPv4 addressing.....	11
Setting the system hostname.....	13
Adding the master host to a resource pool.....	14
Deploying Cisco UCS Performance Manager.....	14
<b>Chapter 2: Installing delegate hosts.....</b>	<b>18</b>
Creating a virtual machine.....	18
Configuring the virtual machine.....	21
Edit a connection to configure static IPv4 addressing.....	22
Setting the system hostname.....	25
Editing the /etc/hosts file.....	26
<b>Chapter 3: Configuring a multi-host Control Center cluster.....</b>	<b>27</b>
Enabling NTP on Microsoft Hyper-V guests.....	27
Adding hosts to the default resource pool.....	31
<b>Chapter 4: Configuring a ZooKeeper ensemble.....</b>	<b>32</b>
ZooKeeper and Control Center.....	32
Understanding the configuration process.....	32
Configuring the master host as a ZooKeeper node.....	34
Configuring delegate host A as a ZooKeeper node.....	35
Configuring delegate host B as a ZooKeeper node.....	36
Starting a ZooKeeper ensemble for the first time.....	37
Updating delegate hosts.....	38

## About this guide

*Cisco UCS Performance Manager Installation Guide* provides detailed procedures for installing Cisco UCS Performance Manager or Cisco UCS Performance Manager Express. Please read the *Cisco UCS Performance Manager Planning Guide* before using this guide.

### Related publications

Title	Description
<i>Cisco UCS Performance Manager Planning Guide</i>	Provides general and specific information for preparing to deploy Cisco UCS Performance Manager.
<i>Cisco UCS Performance Manager Installation Guide</i>	Provides detailed information and procedures for installing Cisco UCS Performance Manager.
<i>Cisco UCS Performance Manager Upgrade Guide</i>	Provides detailed procedures for upgrading your existing Cisco UCS Performance Manager 2.x instance to a newer version.
<i>Cisco UCS Performance Manager Migration Guide</i>	Provides detailed information about, and where applicable, procedures for migrating data from Cisco UCS Performance Manager version 1.x into a version 2.x instance.
<i>Cisco UCS Performance Manager Getting Started Guide</i>	Provides instructions for configuring Cisco UCS Performance Manager to monitor your environment after installation.
<i>Cisco UCS Performance Manager User Guide</i>	Provides specific instructions for using Cisco UCS Performance Manager in the UCS environment.
<i>Cisco UCS Performance Manager Administration Guide</i>	Provides an overview of Cisco UCS Performance Manager architecture and features, as well as procedures and examples to help you use the system.
<i>Cisco UCS Performance Manager Release Notes</i>	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](mailto:ucs-docfeedback@cisco.com). We appreciate your feedback.

# How to use this guide

Cisco UCS Performance Manager 2.5.1 is a hotfix version and not a full release build. As such, there are special instructions listed in the *Cisco UCS Performance Manager Release Notes* if you are upgrading from version 2.5.0.

If you do not have a running Cisco UCS Performance Manager 2.5.0 system, you must first install version 2.5.0 before applying the hotfix to upgrade to version 2.5.1. Follow the procedures in this guide to install an appliance-based deployment to version 2.5.0.

This guide includes instructions for creating a single-host or multi-host deployment of Cisco UCS Performance Manager.

- To create a single-host deployment, perform the procedures in the first chapter only (*Installing a Control Center master host* on page 6).
- To create a multi-host deployment, perform the procedures in all of the chapters in this guide, in order.

## 1

## Installing a Control Center master host

---

This chapter describes how to install a Cisco UCS Performance Manager appliance package as a Control Center master host. All Cisco UCS Performance Manager deployments require a Control Center master host.

### Creating a virtual machine

---

You can create a virtual machine for the Cisco UCS Performance Manager appliance with VMware vSphere or Microsoft Hyper-V. Choose one of the procedures in this section.

#### Creating a virtual machine with vSphere

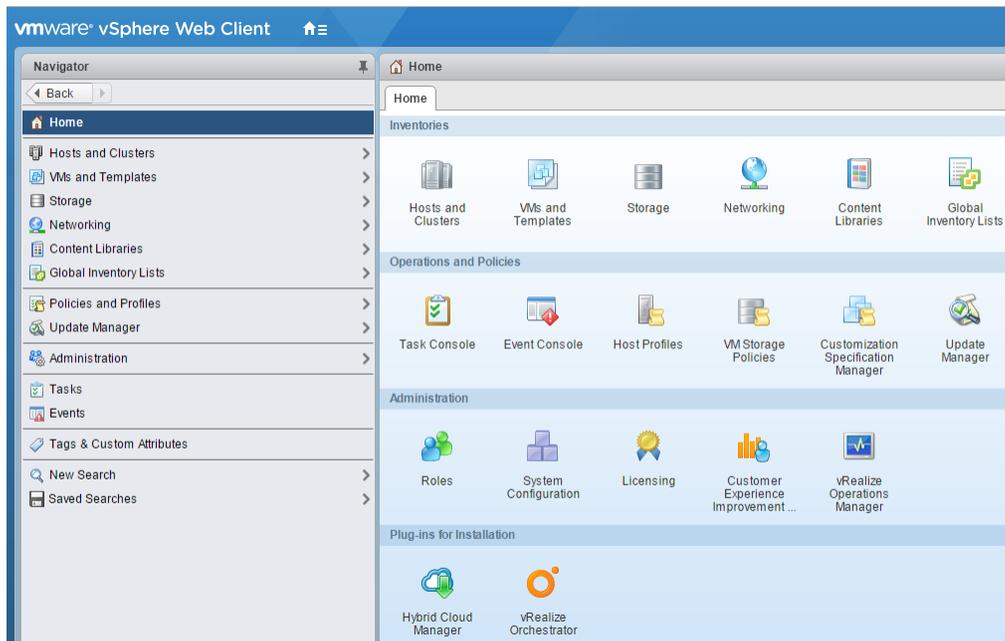
To perform this task, you need

- A VMware vSphere client
- Permission to download Cisco UCS Performance Manager software from the [Cisco Support](#) site

This procedure installs Cisco UCS Performance Manager OVA packages as a virtual machine managed by vSphere Server version 6.5.0, using VMware vSphere Web Client 6.5. The procedure might differ with other versions of VMware vSphere Client.

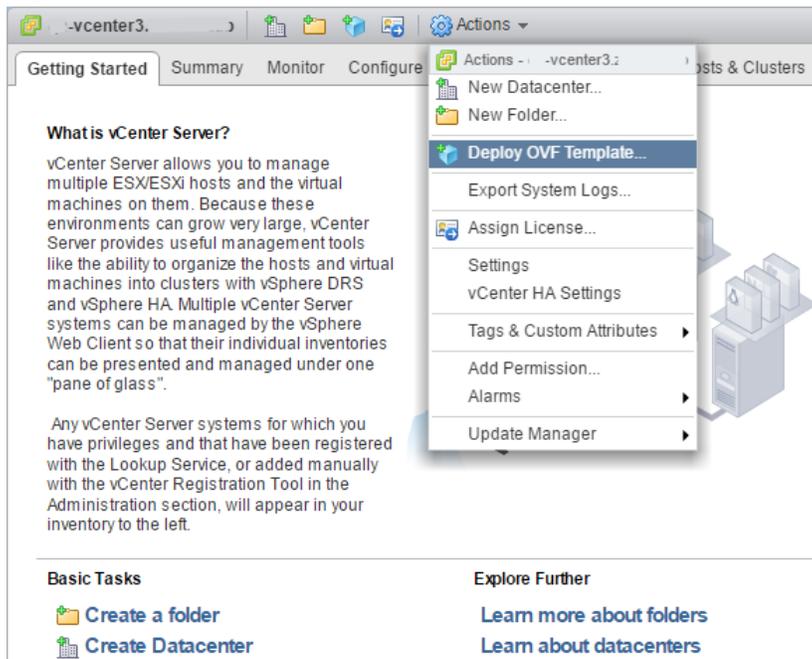
There are two separate OVA packages: one for the master host and one for delegates.

- 1 Download the Cisco UCS Performance Manager *master* host OVA file from the [Cisco Support](#) site to your workstation.
- 2 Use the VMware vSphere Client to log in to vCenter as `root`, or as a user with superuser privileges, and then display the **Home** view.



- 3 Choose **VMs and Templates**.
- 4 In the top navigation bar, choose **Actions > Deploy OVF Template**.

**Figure 1:** Deploy OVF Template



- 5 Use panels in the **Deploy OVF Template** wizard to select the OVF package:
  - a **Select template:** To download and install the package from the internet, enter a URL. To choose the package from a drive on your workstation or network share, browse to the location and choose the OVA file. Click **Next**.
  - b **Select name and location:** Specify a name for the OVF, select a datacenter or folder as the deployment location, and then click **Next**.
  - c **Select a resource:** Select the host, cluster, or other resource on which to run the deployed template, and then click **Next**.

- d **Review details:** Verify the template details, and then click **Next**.
- e **Select storage:** In **Select virtual disk format**, choose **Thin Provision**, accept defaults for other fields, and then click **Next**.
- f **Select networks:** Accept defaults and click **Next**.
- g **Ready to Complete:** Verify the deployment settings, and then click **Finish**.

The **Recent Tasks** pane displays deployment progress and status information.

- 6 Navigate to the new virtual machine's **Getting Started** tab, and then click **Edit virtual machine settings**.
- 7 Edit **Virtual Hardware** settings for the virtual machine as follows. Accept default settings for other options.
  - **CPU:** For single-host deployments, specify 8; for multi-host deployments, specify 4.
  - **Cores per socket:** Specify 1.
  - **Memory:** For single-host deployments, specify 64GB; for multi-host deployments, specify 16GB.

Click **OK**.

- 8 On the new virtual machine's **Getting Started** tab, click **Power on virtual machine**.
- 9 In the top navigation bar, choose **Actions > Open console**.

Proceed with [Configuring the Control Center master host](#) on page 10.

## Creating a virtual machine with Hyper-V

To perform this task, you need:

- A Microsoft Remote Desktop Connection
- Administrator privileges on a Microsoft Hyper-V server
- Permission to download Cisco UCS Performance Manager software from the [Cisco Support](#) site

This procedure installs the Cisco UCS Performance Manager appliance as a virtual machine managed by Microsoft Hyper-V. There are separate ISO files for the master host and delegates.

In this procedure, you download and install the master ISO file. A separate procedure provides instructions for installing delegates.

- 1 Use a Microsoft Remote Desktop Connection to log in to a Hyper-V host as Administrator, or as a user with Administrator privileges.
- 2 Download the Cisco UCS Performance Manager ISO file from the [Cisco Support](#) site to the Hyper-V host. Choose the *master* ISO file.
- 3 Open **Hyper-V Manager**.
- 4 In the left navigation pane, choose a server to host the virtual machine.
- 5 In the **Actions** pane, choose **New > Virtual Machine**. The **New Virtual Machine Wizard** opens.
- 6 Use panels in the wizard to create the virtual machine:
  - a **Specify Name and Location:** Provide a name for the virtual machine, and then click **Next**.
  - b **Specify Generation:** Choose **Generation 1**, and then click **Next**.
  - c **Assign Memory:** Specify memory information as follows:
    - **Startup memory**
      - Multi-host deployment: 16384 (16GB).
      - Single-host deployments: 65536 (64GB).
    - Check **Use Dynamic Memory for this virtual machine**.
    - Click **Next**.
  - d **Configure Networking:** For **Connection**, choose a virtual switch, and then click **Next**.

- e **Connect Virtual Hard Disk:** Create a new disk on which to install the guest operating system as follows:

- 1 Choose **Create a virtual hard disk**.
- 2 Specify a name.
- 3 **Size:** Enter 30.
- 4 Click **Next**.

In a later step, you will create additional disks.

- f **Installation Options:** Access the master ISO file as follows:

- 1 Choose **Install an operating system from a bootable CD/DVD-ROM**.
- 2 Choose **Image file (.iso)**.
- 3 Specify or browse to the location of the ISO image file.

- g **Summary/Completing the New Virtual Machine Wizard:** Verify the description, and then click **Finish**.

Hyper-V Manager creates the new virtual machine, and then closes the wizard.

- 7 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Settings**.
- 8 In the **Hardware** area on the left, configure as follows:
  - a Ensure that the virtual hard disk that you created is attached to an IDE controller.  
A Hyper-V guest machine can only boot from an IDE drive.
  - b Choose **Processor**.
  - c In the **Processor** area on the right, in **Number of virtual processors**, enter the following value for your deployment type:
    - Multi-host deployment: 4
    - Single-host deployment: 8
  - d Click **Apply**.
- 9 Create additional virtual hard disks as follows:
  - a In the **Hardware** area on the left, choose any controller and location that will accommodate the disk.
  - b In the controller area on the right, choose **Hard Drive**, and then click **Add**.
  - c In the area on the right, choose **Virtual hard disk**, and then click **New**.
  - d Complete panels in the **New Virtual Hard Disk Wizard** as follows:
    - 1 **Choose Disk Format:** Choose **VHDX**, and then click **Next**.
    - 2 **Choose Disk Type:** Choose **Dynamically expanding**, and then click **Next**.
    - 3 **Specify Name and Location:** Enter the disk name, and then click **Next**.
    - 4 **Configure Disk:**
      - a Choose **Create a new blank virtual hard disk**.
      - b **Size:** Enter 50.
      - c Click **Next**.
    - 5 **Summary/New Virtual Hard Disk Wizard:** Verify the description, and then click **Finish**.
  - e In the **Settings** window, click **Apply**.
  - f Repeat this step to create additional virtual hard disks in the following sizes (for a total of seven disks):
    - 150GB
    - 50GB
    - 200GB
    - 16GB

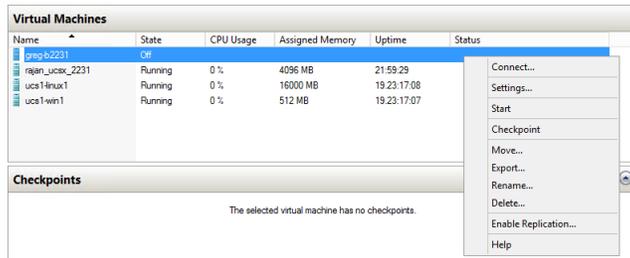
- 16GB

When viewed from the Linux system, the disks might be reordered; however, the installation is not affected by disk order.

g In the **Settings** dialog box, click **Apply**, and then click **OK**.

- 10 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Start**.

**Figure 2:** Starting a virtual machine



- 11 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Connect**.

- 12 In the **Virtual Machine Connection** window, press **Enter**.

The appliance installation process takes about 15 minutes, and should complete with no additional input.

If received, disregard the Fast TSC calibration failure message.

## Configuring the Control Center master host

Perform this procedure immediately after creating and starting a Control Center host. All Control Center deployments must include one system that is configured as the master host.

- 1 Gain access to the console interface of the Control Center host through your hypervisor console interface.

**Figure 3:** Initial hypervisor console login prompt

```

YOU HAVE NOT ACTIVATED THIS APPLIANCE.
PLEASE LOGIN TO ACTIVATE UCS Performance Manager

Welcome to UCS Performance Manager

After initial setup, the Control Center UI can be accessed by
browsing to:

    https://ucspm-master:50443

Ensure that ucspm-master is resolvable to 172.16.53.197, either through your
DNS system or through a HOSTS entry on the browser client. For more
information refer to the installation notes.

You can log in to this console to perform administrative tasks such
as setting up networking and safely rebooting this system.

Control Center UI login credentials are ccuser/ucspm.
To log into the console as root, use the default password 'ucspm'.

Linux Kernel 3.10.0-514.16.1.el7.x86_64 on an x86_64
ucspm-master login: _

```

- 2 Log in as the **root** user.  
The initial password is provided in the console.
- 3 The system prompts you to enter a new password for **root**.

---

**Note** Passwords must include a minimum of eight characters, with at least one character from three of the following character classes: uppercase letter, lowercase letter, digit, and special.

---

- 4 The system prompts you to enter a new password for `ccuser`.  
The `ccuser` account is the default account for gaining access to the Control Center browser interface.

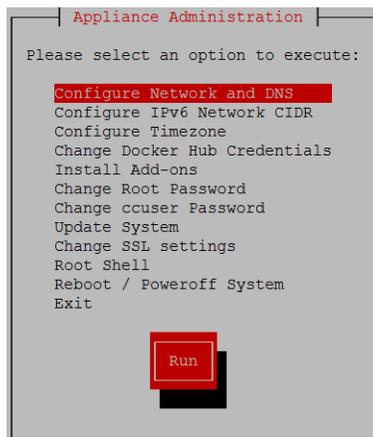
## Edit a connection to configure static IPv4 addressing

---

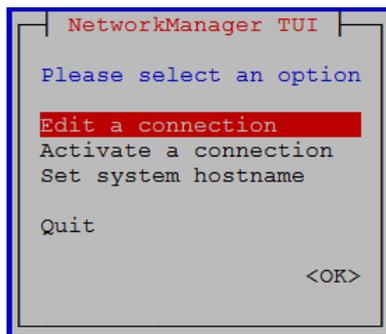
The default configuration for network connections is DHCP. To configure static IPv4 addressing, perform this procedure.

To navigate in the text user interface (TUI):

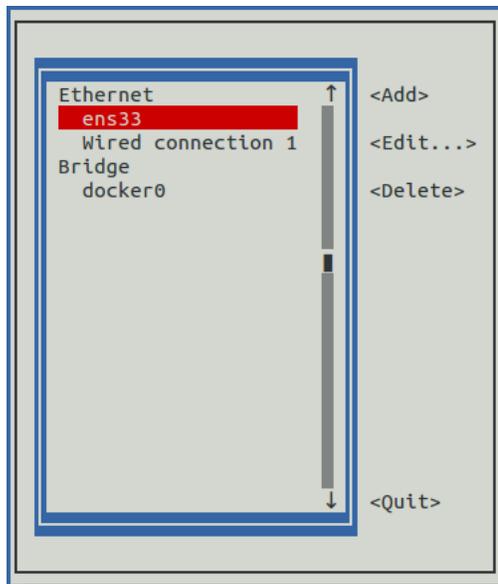
- To move forward or backward through options, press the arrow keys.
  - To display a menu or choose an option, press **Enter**.
- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
  - 2 Log in as the `root` user.



- 3 Select the **NetworkManager TUI** menu as follows:
  - a In the **Appliance Administration** menu, select **Configure Network and DNS**, and then press **Enter**.

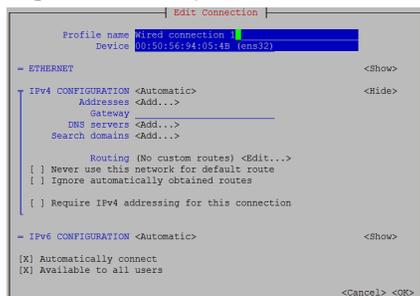


- 4 On the **NetworkManager TUI** menu, select **Edit a connection**, and then press **Enter**.  
The TUI displays the connections that are available on the host.

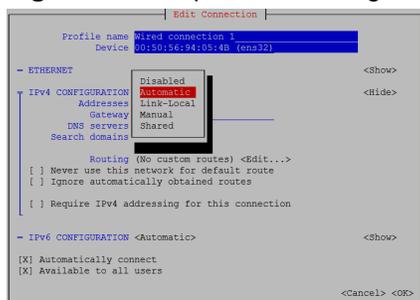
**Figure 4:** Example: Available connections

**Note** Do not use this procedure to modify the `docker0` connection.

- 5 Select the virtual connection, and then press **Enter**.

**Figure 5:** Example: Edit Connection screen

- 6 Optional: If the **IPv4 CONFIGURATION** area is not visible, select its display option (**<Show>**), and then press **Enter**.
- 7 In the **IPv4 CONFIGURATION** area, select **<Automatic>**, and then press **Enter**.

**Figure 6:** Example: IPv4 Configuration options

- 8 Configure static IPv4 networking as follows:
  - a Select **Manual**, and then press **Enter**.
  - b Beside **Addresses**, select **<Add>**, and then press **Enter**.

- c In the **Addresses** field, enter an IPv4 address for the virtual machine, and then press **Enter**.
- d Repeat the preceding two steps for the **Gateway** and **DNS servers** fields.
- 9 Tab to the bottom of the **Edit Connection** screen to select **<OK>**, and then press **Enter**.
- 10 Return to the **Appliance Administration** menu: On the **NetworkManager TUI** screen, select **<Quit>**, and then press **Enter**.
- 11 Reboot the operating system as follows:
  - a In the **Appliance Administration** menu, select **Reboot / Poweroff System**.
  - b Select **Reboot**.
  - c Select **OK**, and then press **Enter**.

## Setting the system hostname

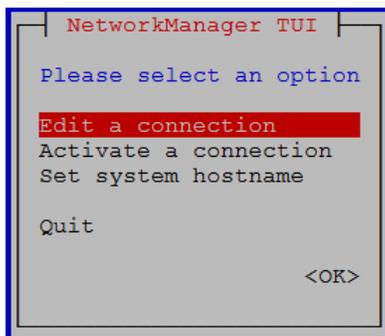
---

Default hostnames are as follows:

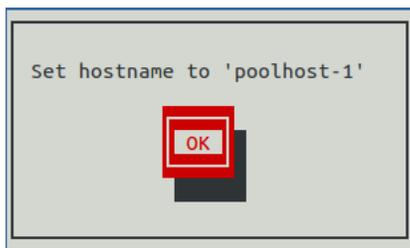
- Master host: `ucspm-master`
- Delegate hosts: `ucspm-delegate`

To change the default hostname, perform this procedure.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Select the **NetworkManager TUI** menu as follows:
  - a In the **Appliance Administration** menu, select **Configure Network and DNS**, and then press **Enter**.



- 3 Display the hostname entry field.
  - a In the **NetworkManager TUI** menu, select **Set system hostname**.
  - b Select **OK**, and then press **Enter**.
- 4 In the **Hostname** field, enter the hostname or a fully qualified domain name.
- 5 Press **Tab** twice to select **OK**, and then press **Enter**.



- 6 In the confirmation dialog box, press **Enter**.
- 7 Return to the **Appliance Administration** menu: On the **NetworkManager TUI** screen, select **<Quit>**, and then press **Enter**.
- 8 Reboot the operating system as follows:
  - a In the **Appliance Administration** menu, select **Reboot / Poweroff System**.

- b Select **Reboot**.
- c Select **OK**, and then press **Enter**.

## Adding the master host to a resource pool

---

Complete this procedure to add the Control Center master host to the `default` resource pool or to a new resource pool named `master`.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

- 3 Optional: Create a new resource pool, if necessary.
  - For single-host deployments, skip this step.
  - For multi-host deployments, perform the following substeps.
    - a Create a new pool named `master`.

```
serviced pool add master
```

- b Assign administrative and distributed file system (DFS) permissions to the new resource pool.

```
serviced pool set-permission --admin --dfs master
```

- 4 Add the master host to a resource pool.
 

**For single-host deployments**, add the master host to the `default` resource pool.

Replace *Hostname-Or-IP* with the hostname or IP address of the Control Center master host:

```
serviced host add Hostname-Or-IP:4979 default
```

If you enter a hostname, all hosts in your Control Center cluster must be able to resolve the name, either through an entry in `/etc/hosts`, or through a nameserver on your network.

**For multi-host deployments**, add the master host to the `master` resource pool and register its authentication token.

Replace *Hostname-Or-IP* with the hostname or IP address of the Control Center master host:

```
serviced host add --register Hostname-Or-IP:4979 master
```

If you enter a hostname, all hosts in your Control Center cluster must be able to resolve the name, either through an entry in `/etc/hosts`, or through a nameserver on your network.

- 5 To exit the command-line session, at the command prompt, enter `exit`.

## Deploying Cisco UCS Performance Manager

---

You can use the browser interface or the command-line interface to deploy Cisco UCS Performance Manager. Choose one of the procedures in this section.

## Using the CLI to deploy

This procedure adds the Cisco UCS Performance Manager application to the list of applications that Control Center manages.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

- 3 Add the `ucspm` application to Control Center.

```
myPath=/opt/serviced/templates
serviced template add $myPath/zenoss-ucspm-*.json
```

On success, the `serviced` command returns the template ID. Make note of the template ID to use in the next step.

- 4 Deploy the application as shown in the following example command, replacing variables with your values as shown.
  - Replace *Template-ID* with the template identifier that was returned in the previous step.
  - Replace *Deployment-ID* with a name for this deployment (for example, `Dev` or `Test`).

```
serviced template deploy Template-ID default Deployment-ID
```

Control Center tags Cisco UCS Performance Manager images in the local registry.

- If you are creating a single-host deployment, proceed to the *Cisco UCS Performance Manager Getting Started Guide*.
- If you are creating a multi-host deployment, proceed to the next chapter.

## Using the browser interface to deploy

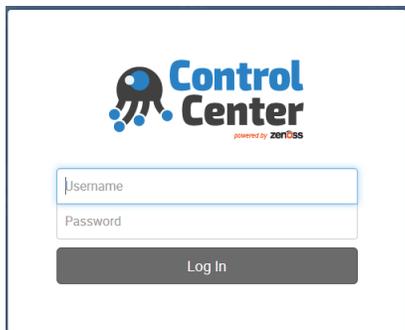
When you log in to the Control Center browser interface for the first time, perform this procedure.

- 1 Display the login page of the Control Center browser interface.

```
https://IP-Address:50443
```

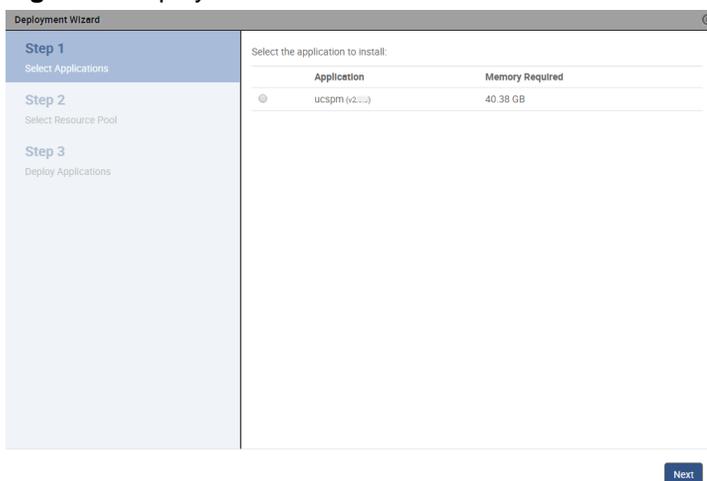
Replace *IP-Address* with the IP address or, if name resolution of the hostname is configured in your environment, the hostname of the Control Center virtual machine. The Control Center web server listens at the hostname or IP address of the Control Center master host and port 50443.

The web server that listens for Control Center interface requests typically takes a few minutes to start after the Control Center master host is started.

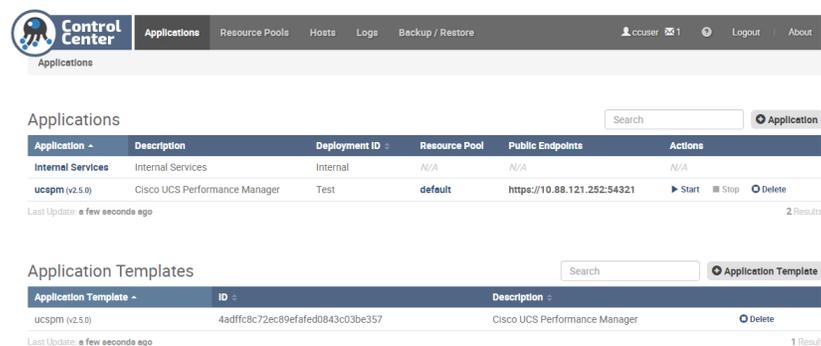
**Figure 7:** Control Center login page

- At the login page, enter `ccuser` and its password.

If the **Deployment Wizard** does not display automatically, click **Application**, located at the right side of the page.

**Figure 8:** Deployment Wizard

- In the **Select Applications** step, select `ucspm`, and then click **Next**.
- In the **Select Resource Pool** step, select `default`, and then click **Next**.
- In the **Deployment Applications** step, enter an identifier for this deployment of Cisco UCS Performance Manager, and then click **Deploy**.

**Figure 9:** Cisco UCS Performance Manager is deployed

- At the top of the page, click **Logout**.

- If you are creating a single-host deployment, proceed to the *Cisco UCS Performance Manager Getting Started Guide*.
- If you are creating a multi-host deployment, proceed to the next chapter.

## 2

## Installing delegate hosts

---

This chapter describes how to install a Cisco UCS Performance Manager appliance package as a Control Center delegate host. You can add three delegate hosts to a Cisco UCS Performance Manager deployment.

Perform the procedures in *Installing a Control Center master host* on page 6 before performing the procedures in this chapter.

### Creating a virtual machine

---

You can create a virtual machine for the Cisco UCS Performance Manager delegate appliance with VMware vSphere or Microsoft Hyper-V. Choose one of the procedures in this section.

#### Creating a virtual machine with vSphere

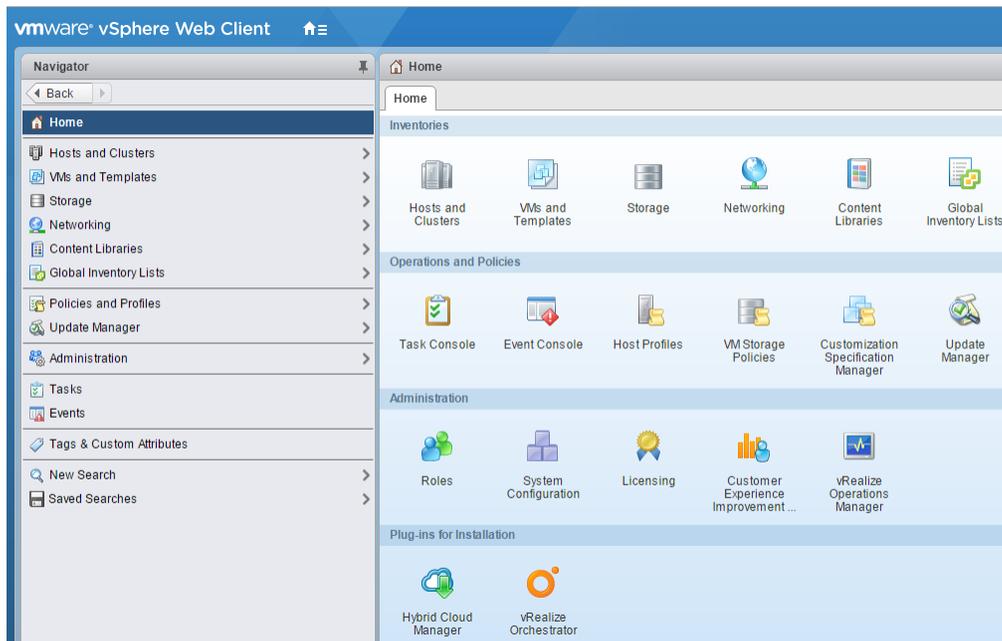
To perform this task, you need

- A VMware vSphere client
- Permission to download Cisco UCS Performance Manager software from the [Cisco Support](#) site

This procedure installs Cisco UCS Performance Manager OVA packages as a virtual machine managed by vSphere Server version 6.5.0, using VMware vSphere Web Client 6.5. The procedure might differ with other versions of VMware vSphere Client.

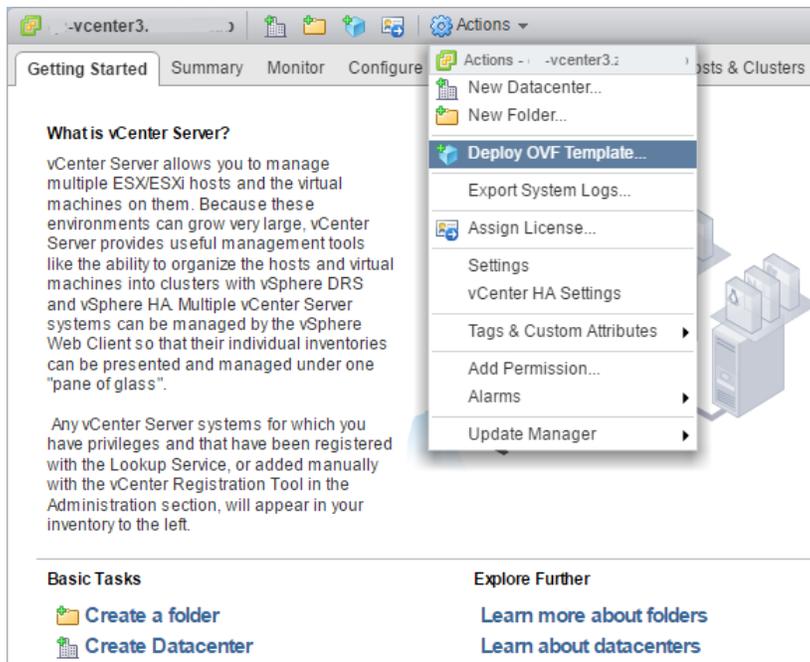
There are two separate OVA packages: one for the master host and one for delegates.

- 1 Download the Cisco UCS Performance Manager delegate OVA file from the [Cisco Support](#) site to your workstation, if necessary.
- 2 Use the VMware vSphere Client to log in to vCenter as `root`, or as a user with superuser privileges, and then display the **Home** view.



- 3 In the top navigation bar, choose **Actions > Deploy OVF Template**.

**Figure 10: Deploy OVF Template**



- 4 Use panels in the **Deploy OVF Template** wizard to select the OVF package:
- Select template:** To download and install the package from the internet, enter a URL. To choose the package from a drive on your workstation or network share, browse to the location and choose the OVA file. Click **Next**.
  - Select name and location:** Specify a name for the OVF, select a datacenter or folder as the deployment location, and then click **Next**.
  - Select a resource:** Select the host, cluster, or other resource on which to run the deployed template, and then click **Next**.
  - Review details:** Verify the template details, and then click **Next**.

- e **Select storage:** In **Select virtual disk format**, choose **Thin Provision**, accept defaults for other fields, and then click **Next**.
  - f **Select networks:** Accept defaults and click **Next**.
  - g **Ready to Complete:** Verify the deployment settings, and then click **Finish**.  
The **Recent Tasks** pane displays deployment progress and status information.
- 5 Navigate to the new virtual machine's **Getting Started** tab, and then click **Edit virtual machine settings**.
  - 6 Update the memory assigned to the machine to 32GB, and then click **OK**.
  - 7 On the new virtual machine's **Getting Started** tab, click **Power on virtual machine**.

## Creating a virtual machine with Hyper-V

To perform this task, you need:

- A Microsoft Remote Desktop Connection
- Administrator privileges on a Microsoft Hyper-V server
- Permission to download Cisco UCS Performance Manager software from the [Cisco Support](#) site

This procedure installs the Cisco UCS Performance Manager appliance as a virtual machine managed by Microsoft Hyper-V. There are separate ISO files for the master host and delegates.

In this procedure, you download and install the delegate ISO file. A separate procedure provides instructions for installing the master.

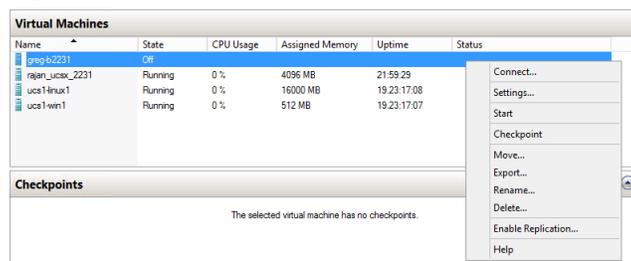
- 1 Use a Microsoft Remote Desktop Connection to log in to a Hyper-V host as Administrator, or as a user with Administrator privileges.
- 2 Download the Cisco UCS Performance Manager ISO file from the [Cisco Support](#) site to the Hyper-V host. Choose the *delegate* ISO file.
- 3 Open **Hyper-V Manager**.
- 4 In the left navigation pane, choose a server to host the virtual machine.
- 5 In the **Actions** pane, choose **New > Virtual Machine**.  
The **New Virtual Machine Wizard** opens.
- 6 Use panels in the wizard to create the virtual machine:
  - a **Specify Name and Location:** Provide a name for the virtual machine, and then click **Next**.
  - b **Specify Generation:** Choose **Generation 1**, and then click **Next**.
  - c **Assign Memory:** Specify memory information as follows:
    - **Startup memory:** Enter 32768 (32GB).
    - Check **Use Dynamic Memory for this virtual machine**.
    - Click **Next**.
  - d **Configure Networking:** For **Connection**, choose a virtual switch, and then click **Next**.
  - e **Connect Virtual Hard Disk:** Create a new disk on which to install the guest operating system as follows:
    - 1 Choose **Create a virtual hard disk**.
    - 2 Specify a name.
    - 3 **Size:** Enter 30.
    - 4 Click **Next**.

In a later step, you will create additional disks.

- f **Installation Options:** Access the delegate ISO file as follows:
  - 1 Choose **Install an operating system from a bootable CD/DVD-ROM**.
  - 2 Choose **Image file (.iso)**.

- 3 Specify or browse to the location of the ISO image file.
- g **Summary/Completing the New Virtual Machine Wizard:** Verify the description, and then click **Finish**.
- 7 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Settings**.
- 8 In the **Hardware** area on the left, configure as follows:
  - a Ensure that the virtual hard disk that you created is attached to an IDE controller.  
A Hyper-V guest machine can only boot from an IDE drive.
  - b Choose **Processor**.
  - c In **Number of virtual processors**, enter 8, and then click **Apply**.
- 9 Create additional virtual hard disks as follows:
  - a In the **Hardware** area on the left, choose any controller and location that will accommodate the disk.
  - b In the controller area on the right, choose **Hard Drive**, and then click **Add**.
  - c In the area on the right, choose **Virtual hard disk**, and then click **New**.
  - d Complete panels in the **New Virtual Hard Disk Wizard** as follows:
    - 1 **Choose Disk Format:** Choose **VHDX**, and then click **Next**.
    - 2 **Choose Disk Type:** Choose **Dynamically expanding**, and then click **Next**.
    - 3 **Specify Name and Location:** Enter the disk name, and then click **Next**.
    - 4 **Configure Disk:**
      - a Choose **Create a new blank virtual hard disk**.
      - b **Size:** Enter 50.
      - c Click **Next**.
  - e In the **Settings** window, click **Apply**.
  - f Repeat this step to create two 16GB virtual hard disks (for a total of four disks).  
When viewed from the Linux system, the disks might be reordered; however, the installation is not affected by disk order.
  - g In the **Settings** dialog box, click **Apply**, and then click **OK**.
- 10 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Start**.

**Figure 11: Starting a virtual machine**



- 11 In the Hyper-V Manager **Virtual Machines** area, right-click the new virtual machine, and then choose **Connect**.
- 12 In the **Virtual Machine Connection** window, press **Enter**.  
The appliance installation process takes about 15 minutes, and should complete with no additional input.  
If received, disregard the Fast TSC calibration failure message.

## Configuring the virtual machine

This procedure configures the new virtual machine as a delegate host.

- 1 Gain access to the console interface of the Control Center host through your hypervisor console interface.

**Figure 12:** Initial hypervisor console login prompt

```

Welcome to UCS Performance Manager

After initial setup, the Control Center UI can be accessed by
browsing to:

  https://ucspm-delegate:58443
  (default username/password is ccuser/ucspm)

Ensure that ucspm-delegate is resolvable to 172.16.53.198, either through your
DNS system or through a HOSTS entry on the browser client. For more
information refer to the installation notes.

You can log in to this console to perform administrative tasks such
as setting up networking and safely rebooting this system. The
root password defaults to 'ucspm'

Linux Kernel 3.10.0-514.6.2.el7.x86_64 on an x86_64
ucspm-delegate login: _

```

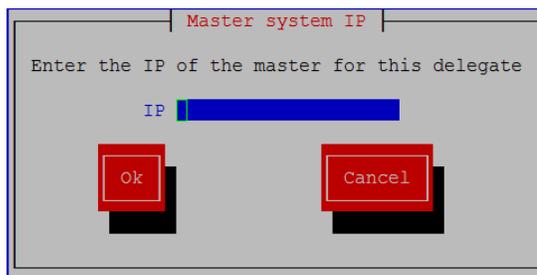
- 2 Log in as the `root` user.  
The initial password is provided in the console.
- 3 The system prompts you to enter a new password for `root`.

---

**Note** Passwords must include a minimum of eight characters, with at least one character from three of the following character classes: uppercase letter, lowercase letter, digit, and special.

---

- 4 The system prompts you to enter a new password for `ccuser`.  
The `ccuser` account is the default account for gaining access to the Control Center browser interface.
- 5 In the **IP** field, enter the hostname, fully qualified domain name, or IPv4 address of the master host.




---

**Note** If you enter the hostname or fully qualified domain name of the master host, you need an entry in the `/etc/hosts` file of the delegate host or a nameserver on your network that resolves the name to its IPv4 address.

---

- a Press **Tab** to select **Ok**, and then press **Enter**.  
The system reboots.

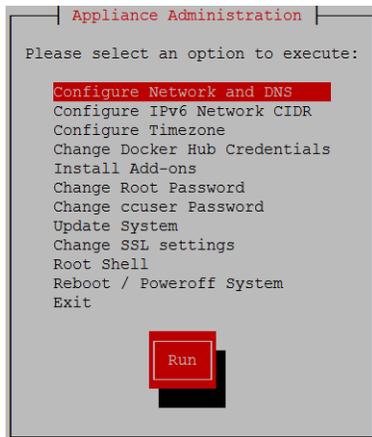
## Edit a connection to configure static IPv4 addressing

---

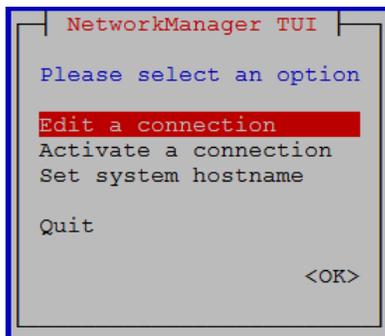
The default configuration for network connections is DHCP. To configure static IPv4 addressing, perform this procedure.

To navigate in the text user interface (TUI):

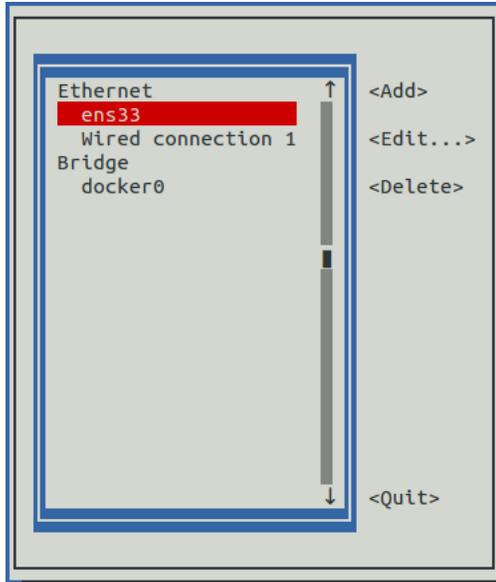
- To move forward or backward through options, press the arrow keys.
  - To display a menu or choose an option, press **Enter**.
- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
  - 2 Log in as the `root` user.



- 3 Select the **NetworkManager TUI** menu as follows:
  - a In the **Appliance Administration** menu, select **Configure Network and DNS**, and then press **Enter**.

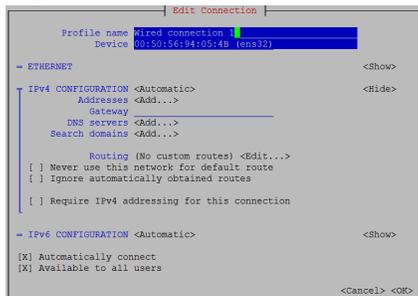


- 4 On the **NetworkManager TUI** menu, select **Edit a connection**, and then press **Enter**. The TUI displays the connections that are available on the host.

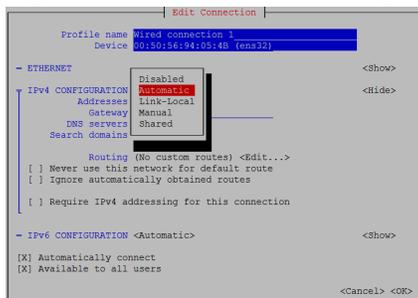
**Figure 13:** Example: Available connections

**Note** Do not use this procedure to modify the `docker0` connection.

- 5 Select the virtual connection, and then press **Enter**.

**Figure 14:** Example: Edit Connection screen

- 6 Optional: If the **IPv4 CONFIGURATION** area is not visible, select its display option (**<Show>**), and then press **Enter**.
- 7 In the **IPv4 CONFIGURATION** area, select **<Automatic>**, and then press **Enter**.

**Figure 15:** Example: IPv4 Configuration options

- 8 Configure static IPv4 networking as follows:
  - a Select **Manual**, and then press **Enter**.
  - b Beside **Addresses**, select **<Add>**, and then press **Enter**.

- c In the **Addresses** field, enter an IPv4 address for the virtual machine, and then press **Enter**.
- d Repeat the preceding two steps for the **Gateway** and **DNS servers** fields.
- 9 Tab to the bottom of the **Edit Connection** screen to select **<OK>**, and then press **Enter**.
- 10 Return to the **Appliance Administration** menu: On the **NetworkManager TUI** screen, select **<Quit>**, and then press **Enter**.
- 11 Reboot the operating system as follows:
  - a In the **Appliance Administration** menu, select **Reboot / Poweroff System**.
  - b Select **Reboot**.
  - c Select **OK**, and then press **Enter**.

## Setting the system hostname

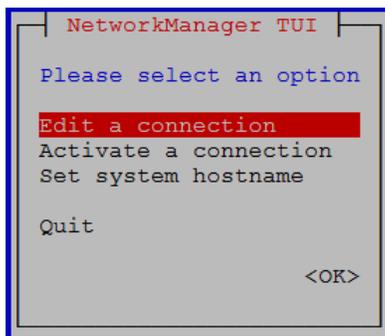
---

Default hostnames are as follows:

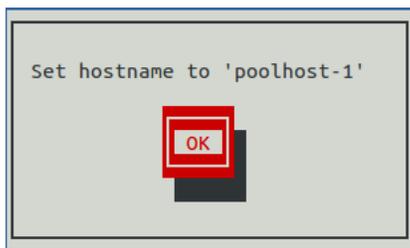
- Master host: `ucspm-master`
- Delegate hosts: `ucspm-delegate`

To change the default hostname, perform this procedure.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Select the **NetworkManager TUI** menu as follows:
  - a In the **Appliance Administration** menu, select **Configure Network and DNS**, and then press **Enter**.



- 3 Display the hostname entry field.
  - a In the **NetworkManager TUI** menu, select **Set system hostname**.
  - b Select **OK**, and then press **Enter**.
- 4 In the **Hostname** field, enter the hostname or a fully qualified domain name.
- 5 Press **Tab** twice to select **OK**, and then press **Enter**.



- 6 In the confirmation dialog box, press **Enter**.
- 7 Return to the **Appliance Administration** menu: On the **NetworkManager TUI** screen, select **<Quit>**, and then press **Enter**.
- 8 Reboot the operating system as follows:
  - a In the **Appliance Administration** menu, select **Reboot / Poweroff System**.

- b Select **Reboot**.
- c Select **OK**, and then press **Enter**.

## Editing the `/etc/hosts` file

This procedure is conditional. Perform this procedure only if you use hostnames or fully qualified domain names instead of IPv4 addresses, and only after all delegate hosts are installed and renamed. Perform this procedure on the Control Center master host and on each delegate host.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

- 3 Open the `/etc/hosts` file in a text editor.

The following steps use the *nano* editor.

- a Start the editor.

```
nano /etc/hosts
```

**Figure 16:** Example nano session

```

GNU nano 2.3.1 File: /etc/hosts
127.0.0.1 localhost localhost.localdomain localhost4 localhost4.localdomain4
::1 localhost localhost.localdomain localhost6 localhost6.localdomain6
10.88.123.181 ucspm-delegate
10.88.123.181 cc.ucspm-delegate
fe80::fe87:abd0:25c2:4e3c ucspm-delegate
fe80::fe87:abd0:25c2:4e3c cc.ucspm-delegate
10.88.123.181 ucspm-delegateRP
10.88.123.181 cc.ucspm-delegateRP
fe80::fe87:abd0:25c2:4e3c ucspm-delegateRP
fe80::fe87:abd0:25c2:4e3c cc.ucspm-delegateRP
[ Read 10 lines ]
^G Get Help ^O WriteOut ^R Read File ^V Prev Page ^K Cut Text ^C Cur Pos
^X Exit ^J Justify ^W Where Is ^J Next Page ^U UnCut Text ^T To Spell

```

- b Optional: On delegate hosts, the file can include two entries with the same IP address. Remove the first of the two entries, which maps the IP address to the `ucspm` hostname.
  - c Add entries for the Control Center master host and for each delegate host.
  - d To save, press **Control-o**.
  - e To exit, press **Control-x**.
- 4 Return to the **Appliance Administration** menu.

```
exit
```

- 5 Exit the **Appliance Administration** menu.
  - a Use the down-arrow key to select **Exit**.
  - b Press **Tab**, and then press **Enter**.

# Configuring a multi-host Control Center cluster

# 3

This chapter describes how to configure a multi-host Control Center cluster. A multi-host Cisco UCS Performance Manager deployment includes one Control Center master host and three Control Center delegate hosts.

- If you are creating a Cisco UCS Performance Manager deployment on a vSphere system, skip ahead to [Adding hosts to the default resource pool](#) on page 31.
- Otherwise, complete all of the procedures in this chapter.

## Enabling NTP on Microsoft Hyper-V guests

**Note** The procedures in this section are required only for multi-host deployments running as Microsoft Hyper-V guests. VMware vSphere guests use an hourly `cron` job to synchronize their system clocks with the host.

Like most distributed applications, Control Center requires a common time source. The procedures in this section enable [NTP](#) to synchronize the system clocks of all hosts in your Control Center cluster.

Configure NTP to rely on a time source as follows, depending on internet access of the hosts in your Control Center cluster:

- If all hosts can access the internet, configure NTP to rely on public time servers.
- If no host can access the internet, configure NTP to rely on a private master server.

## Configuring NTP for public time servers

*(Hyper-V only)* This procedure uses the default configuration of NTP to synchronize system clocks with public time servers. If all hosts in the Control Center cluster can access the internet, repeat this procedure on each host in the cluster, starting with the Control Center master host.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as [PuTTY](#).
- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

**3 Stop Control Center.**

```
systemctl stop serviced
```

**4 Synchronize the system clock and enable the NTP daemon.****a Set the system time.**

```
ntpdate -gq
```

**b Enable the ntpd daemon.**

```
systemctl enable ntpd
```

**c Configure ntpd to start when the system starts.**

Currently, an unresolved issue associated with NTP prevents ntpd from restarting correctly after a reboot, and the following commands provide a workaround to ensure that it does.

```
echo "systemctl start ntpd" >> /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local
```

**d Start ntpd.**

```
systemctl start ntpd
```

**5 Start Control Center.**

```
systemctl start serviced
```

**Configuring an NTP master server**

*(Hyper-V only)* This procedure configures an NTP master server on the Control Center master host. Perform this procedure only if the host does not have internet access.

- 1** Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PutTY*.
- 2** Start a command-line session as `root` as follows:
  - a** In the **Appliance Administration** menu, select **Root Shell**.
  - b** Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

**3 Create a backup of the NTP configuration file.**

```
cp -p /etc/ntp.conf /etc/ntp.conf.orig
```

**4 Edit the NTP configuration file as follows:**

- a** Open `/etc/ntp.conf` with a text editor.
- b** Replace all lines in the file with the following lines:

```
# Use the local clock
server 127.127.1.0 prefer
fudge 127.127.1.0 stratum 10
driftfile /var/lib/ntp/drift
```

```

broadcastdelay 0.008

# Give localhost full access rights
restrict 127.0.0.1

# Grant access to client hosts
restrict ADDRESS_RANGE mask NETMASK nomodify notrap

```

- c Replace ADDRESS\_RANGE with the range of IPv4 network addresses that are allowed to query this NTP server.

For example, the following IP addresses are assigned to the hosts in a Control Center cluster:

```

203.0.113.10
203.0.113.11
203.0.113.12
203.0.113.13

```

For the preceding addresses, the value for ADDRESS\_RANGE is 203.0.113.0.

- d Replace NETMASK with the IPv4 network mask that corresponds with the address range. For example, the network mask for 203.0.113.0 is 255.255.255.0.
- e Save the file and exit the editor.

## 5 Stop Control Center.

```
systemctl stop serviced
```

## 6 Enable and start the NTP daemon as follows:

- a Enable the ntpd daemon.

```
systemctl enable ntpd
```

- b Configure ntpd to start when the system starts.

Currently, an unresolved issue associated with NTP prevents ntpd from restarting correctly after a reboot, and the following commands provide a workaround to ensure that it does.

```

echo "systemctl start ntpd" >> /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local

```

- c Start ntpd.

```
systemctl start ntpd
```

## 7 Start Control Center.

```
systemctl start serviced
```

## Configuring NTP clients

*(Hyper-V only)* This procedure configures delegates to synchronize their clocks with the NTP server on the Control Center master host. Perform this procedure only if the delegates do not have internet access. Repeat this procedure on each delegate in your Control Center cluster.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.

- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

- 3 Create a backup of the NTP configuration file.

```
cp -p /etc/ntp.conf /etc/ntp.conf.orig
```

- 4 Edit the NTP configuration file as follows:

- a Open `/etc/ntp.conf` with a text editor.
- b Replace all lines in the file with the following lines:

```
# Point to the master time server
server MASTER_ADDRESS

restrict default ignore
restrict 127.0.0.1
restrict MASTER_ADDRESS mask 255.255.255.255 nomodify notrap noquery

driftfile /var/lib/ntp/drift
```

- c Replace both instances of `MASTER_ADDRESS` with the IPv4 address of the host where the NTP server is running (the Control Center master host).
- d Save the file and exit the editor.

- 5 Stop Control Center.

```
systemctl stop serviced
```

- 6 Synchronize the clock with the master server.

```
ntpdate -gq
```

- 7 Enable and start the NTP daemon as follows:

- a Enable the `ntpd` daemon.

```
systemctl enable ntpd
```

- b Configure `ntpd` to start when the system starts.

Currently, an unresolved issue associated with NTP prevents `ntpd` from restarting correctly after a reboot, and the following commands provide a workaround to ensure that it does.

```
echo "systemctl start ntpd" >> /etc/rc.d/rc.local
chmod +x /etc/rc.d/rc.local
```

- c Start `ntpd`.

```
systemctl start ntpd
```

- 8 Start Control Center.

```
systemctl start serviced
```

## Adding hosts to the default resource pool

---

This procedure adds one or more hosts to the default resource pool.

- 1 Gain access to the Control Center host, through the console interface of your hypervisor, or through a remote shell utility such as *PuTTY*.
- 2 Start a command-line session as `root` as follows:
  - a In the **Appliance Administration** menu, select **Root Shell**.
  - b Select **Run**, and then press **Enter**.

The menu is replaced by a command prompt similar to the following example:

```
[root@hostname ~]#
```

- 3 Add and register a delegate host.

Replace *Hostname-Or-IP* with the hostname or IP address of the delegate host to add and include the register flag to authenticate the delegate host:

```
serviced host add Hostname-Or-IP:4979 default --register
```

If you enter a hostname, all hosts in your Control Center cluster must be able to resolve the name through an entry in `/etc/hosts` or through a nameserver on your network.

- 4 Repeat the preceding command for each delegate in your Control Center cluster.

## 4

## Configuring a ZooKeeper ensemble

---

This chapter describes how to create a ZooKeeper ensemble (cluster) for a multi-host Control Center deployment that includes a minimum of three hosts. If your deployment includes just one host or two hosts, skip this chapter.

### ZooKeeper and Control Center

---

Control Center relies on *Apache ZooKeeper* to distribute and manage application services. ZooKeeper maintains the definitions of each service and the list of services assigned to each host. The scheduler, which runs on the master host, determines assignments and sends them to the ZooKeeper node that is serving as the ensemble leader. The leader replicates the assignments to the other ensemble nodes, so that the other nodes can assume the role of leader if the leader node fails.

All of the hosts in a Control Center cluster retrieve assignments and service definitions from the ZooKeeper ensemble leader and then start services in Docker containers as required. So, the Control Center configuration files of all Control Center cluster hosts must include a definition for the *SERVICED\_ZK* variable, which specifies the ZooKeeper endpoints of the ensemble nodes. Additional variables are required on ensemble nodes.

A ZooKeeper ensemble requires a minimum of three nodes, which is sufficient for most environments. An odd number of nodes is recommended and an even number of nodes is strongly discouraged. A five-node ensemble improves failover protection during maintenance windows but larger ensembles yield no benefits.

The Control Center master host is always an ensemble node. All ensemble nodes should be on the same subnet.

### Understanding the configuration process

---

The procedures in this chapter instruct you to create temporary variables that are used as building blocks, to construct Control Center configuration variables accurately. You append the Control Center variables to `/etc/default/serviced`, and then edit the file to move the variables to more appropriate locations.

The most important temporary variables specify the IP address or hostname of each host in the ZooKeeper ensemble. The following table identifies these important variables, the names and values of which must be identical on every Control Center cluster host.

Variable name	Placeholder value	Actual value
node1	<i>Master</i>	The IP address or hostname of the master host.
node2	<i>Delegate-A</i>	The IP address or hostname of delegate host A.

Variable name	Placeholder value	Actual value
node3	<i>Delegate-B</i>	The IP address or hostname of delegate host B.

**Note** All ensemble hosts should be on the same subnet.

## ZooKeeper variables

The variables in the following table are set only on ZooKeeper ensemble nodes, except *SERVICED\_ZK*, which must be identical on all Control Center cluster hosts.

Variable	Where to set
<i>SERVICED_ISVCS_START</i>	ZooKeeper ensemble nodes
<i>SERVICED_ISVCS_ZOOKEEPER_ID</i>	ZooKeeper ensemble nodes
<i>SERVICED_ISVCS_ZOOKEEPER_QUORUM</i>	ZooKeeper ensemble nodes
<i>SERVICED_ZK</i>	All Control Center cluster hosts
<i>SERVICED_ZK_SESSION_TIMEOUT</i>	ZooKeeper ensemble nodes

## Example multi-host ZooKeeper configuration

This example shows the ZooKeeper variables in the `/etc/defaults/serviced` configuration file of each host in a 4-node Control Center cluster. For convenience, the relevant settings for each node or host are also included in subsequent procedures.

**Note** The value of the *SERVICED\_ISVCS\_ZOOKEEPER\_QUORUM* variable is formatted to fit the available space. In the configuration file, the variable and value are on the same line.

Master host and ZooKeeper ensemble node, 198.51.100.135:

```
SERVICED_ISVCS_ZOOKEEPER_ID=1
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@0.0.0.0:2888:3888,\
 2@198.51.100.136:2888:3888,3@198.51.100.137:2888:3888
SERVICED_ZK_SESSION_TIMEOUT=15
```

Delegate host and ZooKeeper ensemble node, 198.51.100.136:

```
SERVICED_ISVCS_START=zookeeper
SERVICED_ISVCS_ZOOKEEPER_ID=2
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@198.51.100.135:2888:3888,\
 2@0.0.0.0:2888:3888,3@198.51.100.137:2888:3888
SERVICED_ZK_SESSION_TIMEOUT=15
```

Delegate host and ZooKeeper ensemble node, 198.51.100.137:

```
SERVICED_ISVCS_START=zookeeper
SERVICED_ISVCS_ZOOKEEPER_ID=3
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@198.51.100.135:2888:3888,\
 2@198.51.100.136:2888:3888,3@0.0.0.0:2888:3888
```

```
SERVICED_ZK_SESSION_TIMEOUT=15
```

Delegate host, 198.51.100.138:

```
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
```

## Configuring the master host as a ZooKeeper node

This procedure configures the Control Center master host as a node in a ZooKeeper ensemble.

- 1 Log in to the master host as `root`, or as a user with superuser privileges.
- 2 Define the IP address variables for each node in the ZooKeeper ensemble.  
Replace *Master* with the IP address or hostname of the Control Center master host, and replace *Delegate-A* and *Delegate-B* with the IP addresses or hostnames of the delegate hosts to include in the ensemble:

```
node1=Master
node2=Delegate-A
node3=Delegate-B
```

- 3 Set the ZooKeeper node ID to 1.

```
echo "SERVICED_ISVCS_ZOOKEEPER_ID=1" >> /etc/default/serviced
```

- 4 Specify the nodes in the ZooKeeper ensemble.  
You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK=${node1}:2181,${node2}:2181,${node3}:2181" \
>> /etc/default/serviced
```

- 5 Specify the nodes in the ZooKeeper quorum.

ZooKeeper requires a unique quorum definition for each node in its ensemble. To achieve this, replace the IP address or hostname of the master host with `0.0.0.0`.

You can copy the following text and paste it in your console:

```
q1="1@0.0.0.0:2888:3888"
q2="2@${node2}:2888:3888"
q3="3@${node3}:2888:3888"
echo "SERVICED_ISVCS_ZOOKEEPER_QUORUM=${q1},${q2},${q3}" \
>> /etc/default/serviced
```

- 6 Specify the timeout for inactive connections.  
You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK_SESSION_TIMEOUT=15" >> /etc/default/serviced
```

- 7 Verify the ZooKeeper environment variables.

```
grep -E '^\\b*SERVICED' /etc/default/serviced | grep -E '_Z(OO|K)'
```

The following example shows the environment variables for a master host with IP address 198.51.100.135.

---

**Note** The value of the `SERVICED_ISVCS_ZOOKEEPER_QUORUM` variable is formatted to fit the available space. The result of the `grep` command shows the variable and value on the same line.

---

```
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_ZOOKEEPER_ID=1
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@0.0.0.0:2888:3888,\
 2@198.51.100.136:2888:3888,3@198.51.100.137:2888:3888
SERVICED_ZK_SESSION_TIMEOUT=15
```

## Configuring delegate host A as a ZooKeeper node

---

Use this procedure to configure the delegate host designated as *Delegate-A* as a ZooKeeper node.

- 1 Log in to the delegate host as `root`, or as a user with superuser privileges.
- 2 Define the IP address variables for each node in the ZooKeeper ensemble. Replace *Master* with the IP address or hostname of the Control Center master host, and replace *Delegate-A* and *Delegate-B* with the IP addresses or hostnames of the delegate hosts to include in the ensemble:

```
node1=Master
node2=Delegate-A
node3=Delegate-B
```

- 3 Set the ID of this node in the ZooKeeper ensemble.

```
echo "SERVICED_ISVCS_ZOOKEEPER_ID=2" >> /etc/default/serviced
```

- 4 Remove the existing definition of the `SERVICED_ZK` variable, which specifies only the Control Center master host.

```
sed -i.bak '/SERVICED_ZK=/d' /etc/default/serviced
```

- 5 Specify the nodes in the ZooKeeper ensemble. You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK=${node1}:2181,${node2}:2181,${node3}:2181" \
>> /etc/default/serviced
```

- 6 Specify the nodes in the ZooKeeper quorum.

ZooKeeper requires a unique quorum definition for each node in its ensemble. To achieve this, replace the IP address or hostname of delegate host A with `0.0.0.0`.

You can copy the following text and paste it in your console:

```
q1="1@${node1}:2888:3888"
q2="2@0.0.0.0:2888:3888"
q3="3@${node3}:2888:3888"
echo "SERVICED_ISVCS_ZOOKEEPER_QUORUM=${q1},${q2},${q3}" \
>> /etc/default/serviced
```

- 7 Specify the timeout for inactive connections.

You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK_SESSION_TIMEOUT=15" >> /etc/default/serviced
```

- 8 Configure Control Center to start the ZooKeeper service.

You can copy the following text and paste it in your console:

```
echo "SERVICED_ISVCS_START=zookeeper" >> /etc/default/serviced
```

- 9 Verify the ZooKeeper environment variables.

```
grep -E '^\\b*SERVICED' /etc/default/serviced \
| grep -E '(CS_ZO|_ZK|CS_ST)'
```

The following example shows the environment variables for a delegate host with IP address 198.51.100.136.

---

**Note** The value of the `SERVICED_ISVCS_ZOOKEEPER_QUORUM` variable is formatted to fit the available space. The result of the `grep` command shows the variable and value on the same line.

---

```
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_START=zookeeper
SERVICED_ISVCS_ZOOKEEPER_ID=2
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@198.51.100.135:2888:3888,\
2@0.0.0.0:2888:3888,3@198.51.100.137:2888:3888
SERVICED_ZK_SESSION_TIMEOUT=15
```

## Configuring delegate host B as a ZooKeeper node

Use this procedure to configure the delegate host designated as *Delegate-B* as a ZooKeeper node.

- 1 Log in to the delegate host as `root`, or as a user with superuser privileges.
- 2 Define the IP address variables for each node in the ZooKeeper ensemble.  
Replace *Master* with the IP address or hostname of the Control Center master host, and replace *Delegate-A* and *Delegate-B* with the IP addresses or hostnames of the delegate hosts to include in the ensemble:

```
node1=Master
node2=Delegate-A
node3=Delegate-B
```

- 3 Set the ID of this node in the ZooKeeper ensemble.

```
echo "SERVICED_ISVCS_ZOOKEEPER_ID=3" >> /etc/default/serviced
```

- 4 Remove the existing definition of the `SERVICED_ZK` variable, which specifies only the Control Center master host.

```
sed -i.bak '/SERVICED_ZK=/d' /etc/default/serviced
```

- 5 Specify the nodes in the ZooKeeper ensemble.

You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK=${node1}:2181,${node2}:2181,${node3}:2181" \
>> /etc/default/serviced
```

- 6 Specify the nodes in the ZooKeeper quorum.

ZooKeeper requires a unique quorum definition for each node in its ensemble. To achieve this, replace the IP address or hostname of delegate host B with `0.0.0.0`.

You can copy the following text and paste it in your console:

```
q1="1@${node1}:2888:3888"
```

```
q2="2@${node2}:2888:3888"
q3="3@0.0.0.0:2888:3888"
echo "SERVICED_ISVCS_ZOOKEEPER_QUORUM=${q1},${q2},${q3}" \
  >> /etc/default/serviced
```

- 7 Specify the timeout for inactive connections.

You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK_SESSION_TIMEOUT=15" >> /etc/default/serviced
```

- 8 Configure Control Center to start the ZooKeeper service.

You can copy the following text and paste it in your console:

```
echo "SERVICED_ISVCS_START=zookeeper" >> /etc/default/serviced
```

- 9 Verify the ZooKeeper environment variables.

```
grep -E '^\b*SERVICED' /etc/default/serviced \
  | grep -E '(CS_ZO|_ZK|CS_ST)'
```

The following example shows the environment variables for a delegate host with IP address 198.51.100.137.

---

**Note** The value of the `SERVICED_ISVCS_ZOOKEEPER_QUORUM` variable is formatted to fit the available space. The result of the `grep` command shows the variable and value on the same line.

---

```
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
SERVICED_ISVCS_START=zookeeper
SERVICED_ISVCS_ZOOKEEPER_ID=3
SERVICED_ISVCS_ZOOKEEPER_QUORUM=1@198.51.100.135:2888:3888,\
  2@198.51.100.136:2888:3888,3@0.0.0.0:2888:3888
SERVICED_ZK_SESSION_TIMEOUT=15
```

## Starting a ZooKeeper ensemble for the first time

---

Use this procedure to start a ZooKeeper ensemble.

The goal of this procedure is to restart Control Center on each ensemble node at about the same time, so that each node can participate in electing the leader.

- 1 Log in to the Control Center master host as `root`, or as a user with superuser privileges.
- 2 In a separate window, log in to the second node of the ZooKeeper ensemble (*Delegate-A*) as `root`, or as a user with superuser privileges.
- 3 In a different window, log in to the third node of the ZooKeeper ensemble (*Delegate-B*) as `root`, or as a user with superuser privileges.
- 4 On all ensemble hosts, stop `serviced`.

```
systemctl stop serviced
```

- 5 When `serviced` is stopped on all ensemble hosts, start `serviced` on all ensemble hosts at the same time.

```
systemctl start serviced
```

- 6 On the master host, check the status of the ZooKeeper ensemble.

- a Attach to the container of the ZooKeeper service.

```
docker exec -it serviced-isvcs_zookeeper /bin/bash
```

- b Query the master host and identify its role in the ensemble.  
Replace *Master* with the hostname or IP address of the master host:

```
{ echo stats; sleep 1; } | nc Master 2181 | grep Mode
```

The result includes *leader* or *follower*.

- c Query delegate host A and identify its role in the ensemble.  
Replace *Delegate-A* with the hostname or IP address of delegate host A:

```
{ echo stats; sleep 1; } | nc Delegate-A 2181 | grep Mode
```

- d Query delegate host B and identify its role in the ensemble.  
Replace *Delegate-B* with the hostname or IP address of delegate host B:

```
{ echo stats; sleep 1; } | nc Delegate-B 2181 | grep Mode
```

- e Detach from the container of the ZooKeeper service.

```
exit
```

If none of the hosts reports that it is the ensemble leader within a few minutes of starting *serviced*, reboot the hosts.

## Updating delegate hosts

The default configuration of delegate hosts sets the value of the *SERVICED\_ZK* variable to the master host only. Use this procedure to update the setting to include all of the hosts in the ZooKeeper ensemble. Perform this procedure on each delegate host in a Control Center cluster that is not an ensemble node.

- 1 Log in to the delegate host as *root*, or as a user with superuser privileges.
- 2 Define the IP address variables for each node in the ZooKeeper ensemble.  
Replace *Master* with the IP address or hostname of the Control Center master host, and replace *Delegate-A* and *Delegate-B* with the IP addresses or hostnames of the delegate hosts to include in the ensemble:

```
node1=Master
node2=Delegate-A
node3=Delegate-B
```

- 3 Remove the existing definition of the *SERVICED\_ZK* variable, which specifies only the Control Center master host.

```
sed -i.bak '/SERVICED_ZK=/d' /etc/default/serviced
```

- 4 Specify the nodes in the ZooKeeper ensemble.  
You can copy the following text and paste it in your console:

```
echo "SERVICED_ZK=${node1}:2181,${node2}:2181,${node3}:2181" \
>> /etc/default/serviced
```

**5** Verify the setting.

```
grep -E '^\\b*SERVICED_ZK' /etc/default/serviced
```

The following example shows the environment variable for a delegate host that is not a node in the ZooKeeper ensemble:

```
SERVICED_ZK=198.51.100.135:2181,198.51.100.136:2181,198.51.100.137:2181
```

**6** Restart Control Center.

```
systemctl restart serviced
```