Installation Tasks

This section contains the following topics:

Installation Workflow

To set up Cisco Crosswork Optimization Engine and Cisco Crosswork Data Gateway complete the below installation tasks in the order of their listing:

1. Install Cisco Crosswork Optimization Engine , on page 2
   a. Verify the VM Configuration, on page 17
   b. Log In to the UI From a Browser, on page 17
   c. Troubleshoot the Installation, on page 18
2. Install Cisco Crosswork Data Gateway, on page 21
   a. Log In and Log Out, on page 40
   b. Generate An Enrollment Package, on page 42
   c. Export Enrollment Package, on page 43
3. Enroll Cisco Crosswork Data Gateway With Cisco Crosswork Optimization Engine, on page 45
   a. Enroll Cisco Crosswork Data Gateway, on page 45
   b. Cisco Crosswork Data Gateway Authentication and Bootstrap, on page 49
   c. Troubleshoot the Cisco Crosswork Data Gateway Installation and Enrollment, on page 50

Install Cisco Crosswork Optimization Engine

This section explains the procedure to install using vCenter.

Before you begin, ensure that:

- You are creating the Cisco Crosswork Optimization Engine VM on VMware ESXi 6.5 (Update 2 or later), and using the VMware vCenter Server 6.5 (Update 2d or later) or 6.7 (Update 3b).

  Note VMware vCenter supports vSphere Web Client (flash mode) and vSphere Client (HTML5 mode), however vSphere Web Client (flash mode) is recommended for the Cisco Crosswork Optimization Engine VM deployment and is explained in this procedure. The vSphere Client (HTML5 mode) is supported only on VMware vCenter Server 6.7 Update 3b.

- You have a public IP address (IPv4) to assign to the Cisco Crosswork Optimization Engine VM's management network virtual interface. The default gateway must be reachable via this IP address.

  Note It is preferred that the DNS and NTP servers are reachable via the Management Network Interface. However, it is not mandatory. The only requirement is that they are reachable on one of the network interfaces connected to the server.

- You have a public or private IP address (IPv4) to assign to the Cisco Crosswork Optimization Engine VM's data network virtual interface. This IP address must be able to reach the gateway address for the network where Cisco Crosswork Data Gateway will be installed.
- The NTP server you will use to synchronize the Cisco Crosswork Optimization Engine VM clock is reachable on the network.

Note During the installation and first-time booting of the VM, the links to the specified gateways will be validated. VM configuration will fail if the links are inaccessible.

Also during installation, Cisco Crosswork Optimization Engine creates two special administrative IDs:

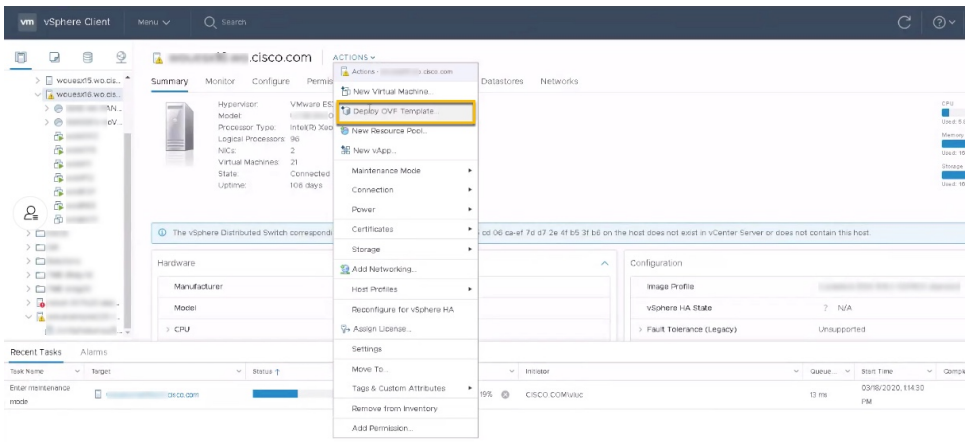
1. The **virtual machine (VM) administrator**, with the username **`cw-admin`**, and the default password **`cw-admin`**. Data center administrators use this ID to log in to and troubleshoot the Cisco Crosswork Optimization Engine VM. You will use it to verify that the VM has been properly set up (see Verify the VM Configuration, on page 17).
2. The **Crosswork administrator**, with the username **`admin`** and the default password **`admin`**. Product administrators use this ID to log in to and configure the Cisco Crosswork Optimization Engine user interface, and to perform special operations, such as stopping and restarting services.

While this section describes installation, you must also set up Cisco SR-PCE in order to use Cisco Crosswork Optimization Engine. Refer to the appropriate device configuration guide (for example, Segment Routing Configuration Guide for Cisco ASR 9000 Series Routers).

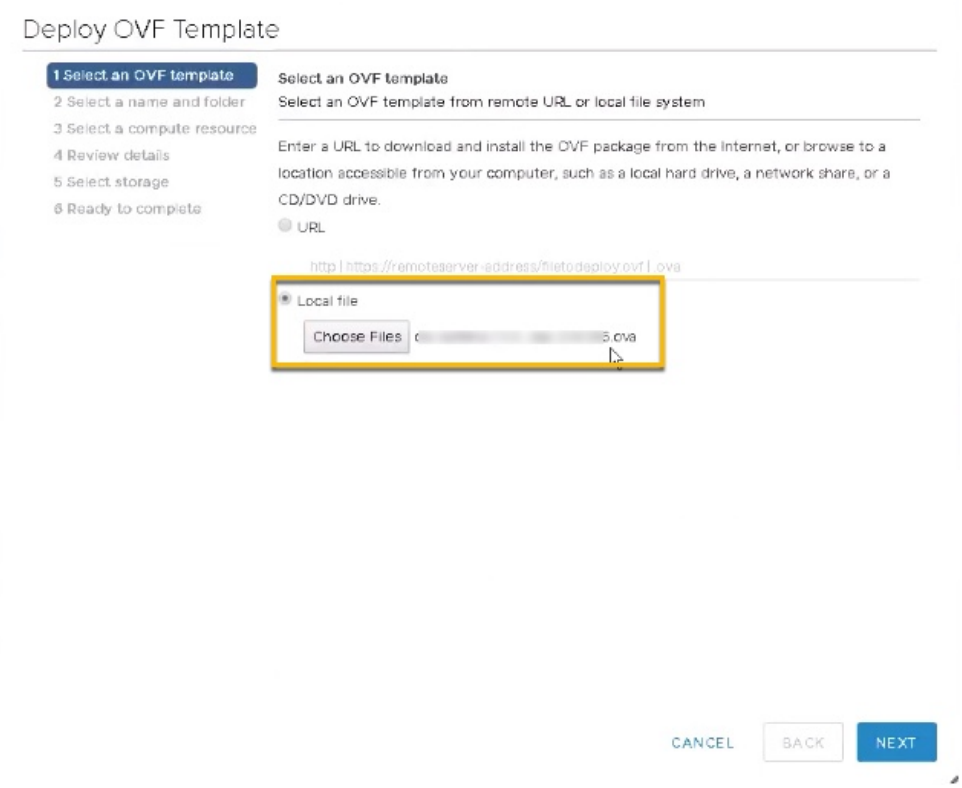
Step 1 Download the latest available Cisco Crosswork Optimization Engine image file (*.ova) to your system.

Warning The default VMware vCenter deployment timeout is 15 minutes. The total time needed to deploy the OVA image file may take much longer than 15 minutes, depending on your network speed and other factors. If vCenter times out during deployment, the resulting VM will be unbootable. To prevent this, Cisco recommends that you either set the vCenter deployment timeout to a much longer period (such as one hour), or unTAR the OVA file before continuing and then deploy using the OVA's four separate Open Virtualization Format and Virtual Machine Disk component files: `cw.ovf`, `cw_rootfs.vmdk`, `cw_dockerfs.vmdk`, and `cw_extrafs.vmdk`.

Step 2 With VMware ESXi running, log in to the VMware vSphere Web Client. On the left side, choose the ESXi host on which you want to deploy the VM, then select **Actions** > **Deploy OVF Template**, similar to the following figure.

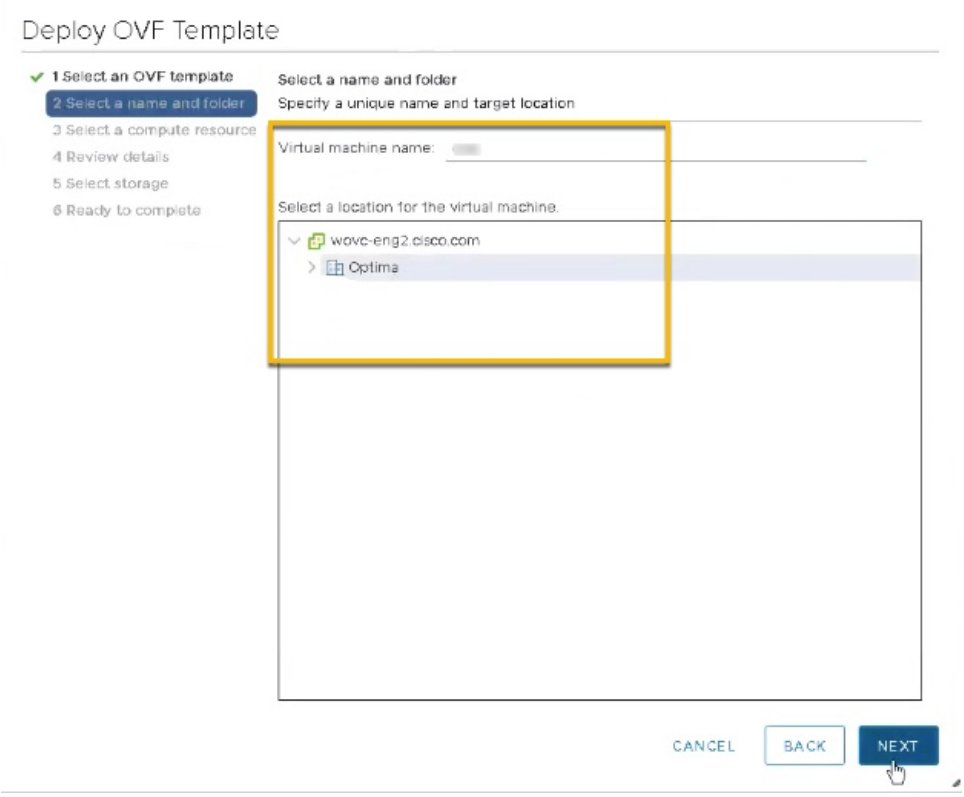


Step 3 The VMware **Deploy OVF Template** wizard appears and highlights the first step, **1 - Select template**, similar to the following figure. Click **Browse** to navigate to the location where you downloaded the OVA image file and select it. Once selected, the file name is displayed in the window.

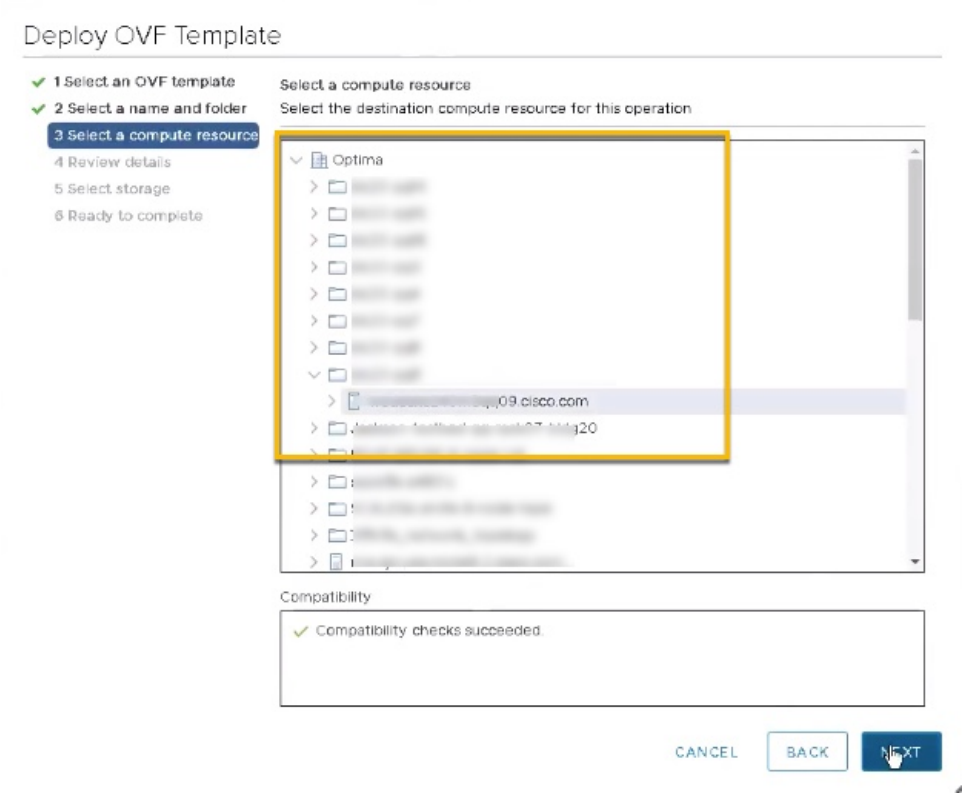


Step 4 Click **Next** to go to **2 - Select name and location**, as shown in the following figure. Enter a name for the Cisco Crosswork Optimization Engine VM you are creating.

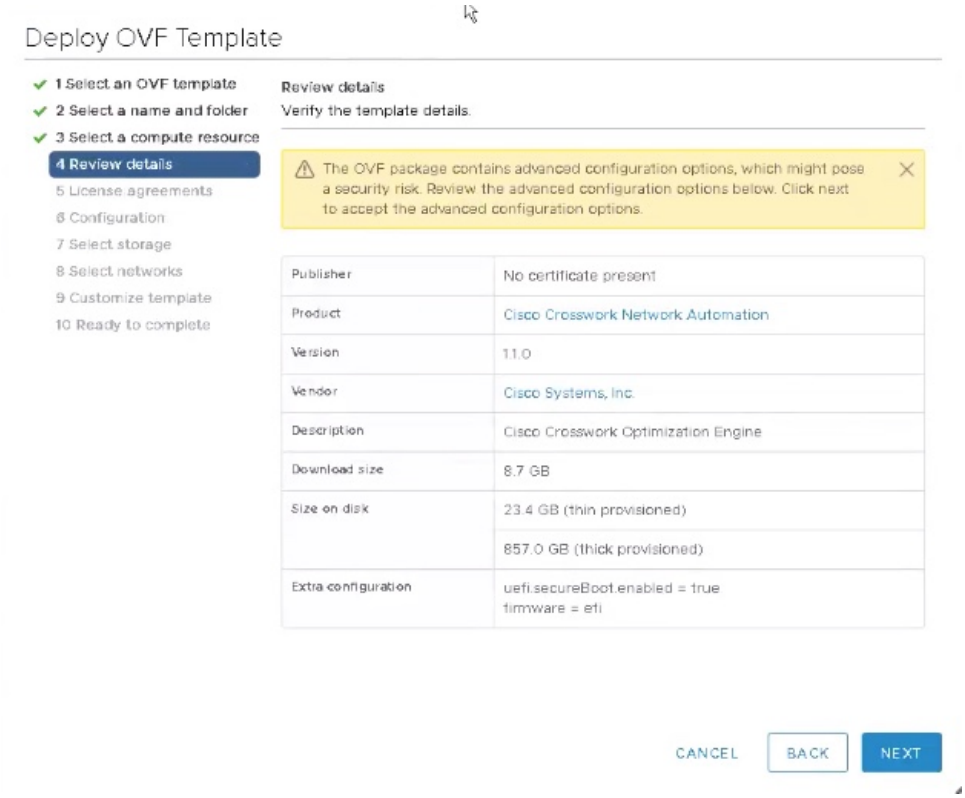
Cisco recommends that you include the Cisco Crosswork Optimization Engine version and build number in the name (for example: **`CW Optimization Engine 1.1 Build 123`**).



Step 5 Click **Next** to go to **3 - Select a resource**, similar to the following figure. Choose the Cisco Crosswork Optimization Engine VM's host.



Step 6 Click **Next**. The VMware vCenter Server validates the OVA. Network speed will determine how long validation takes. When validation is complete, the wizard moves to **4 - Review details**, similar to the following figure. Take a moment to review the OVF template you are deploying. Note that this information is gathered from the OVF and cannot be modified.

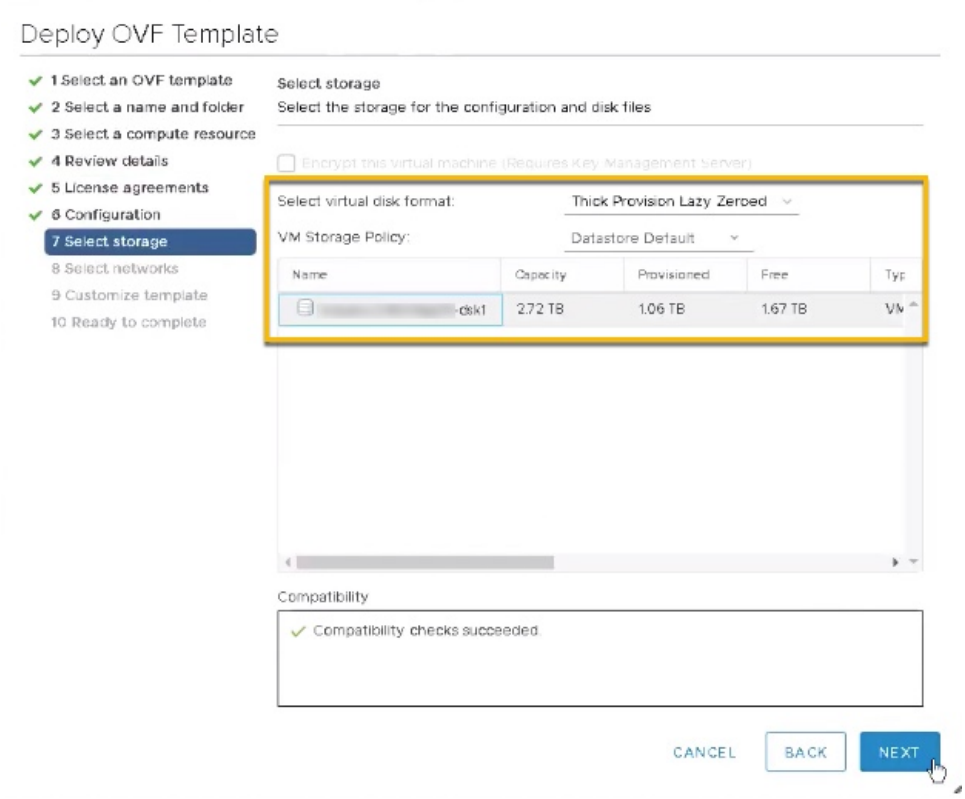


Step 7 Click **Next** to go to **5 - Accept license agreements**. Review the End User License Agreement and click on **Accept** before you continue.

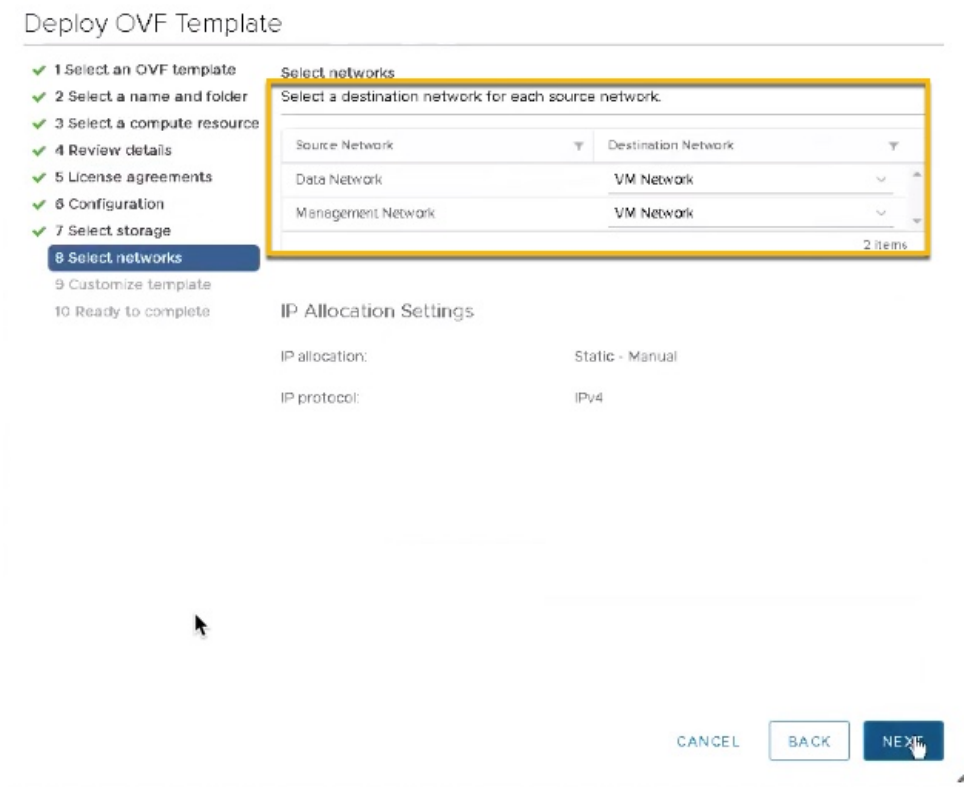
Step 8 Click **Next** to go to **6 - Select configuration**, similar to the following figure. Select the desired deployment configuration (IPv4). IPv6 or an IPv4 network on a single interface is not currently supported.

Step 9 Click **Next** to go to **7 - Select Storage**, similar to the following figure. Select the relevant option from the **Select virtual disk format** drop-down list. From the table, choose the datastore you want to use and review its properties to ensure there is enough available storage.

Note For production deployment, choose **Thick provision eager zeroed** as it will preallocate disk space and provide the best performance. For development purposes, **Thin provision** is recommended as it saves disk space.

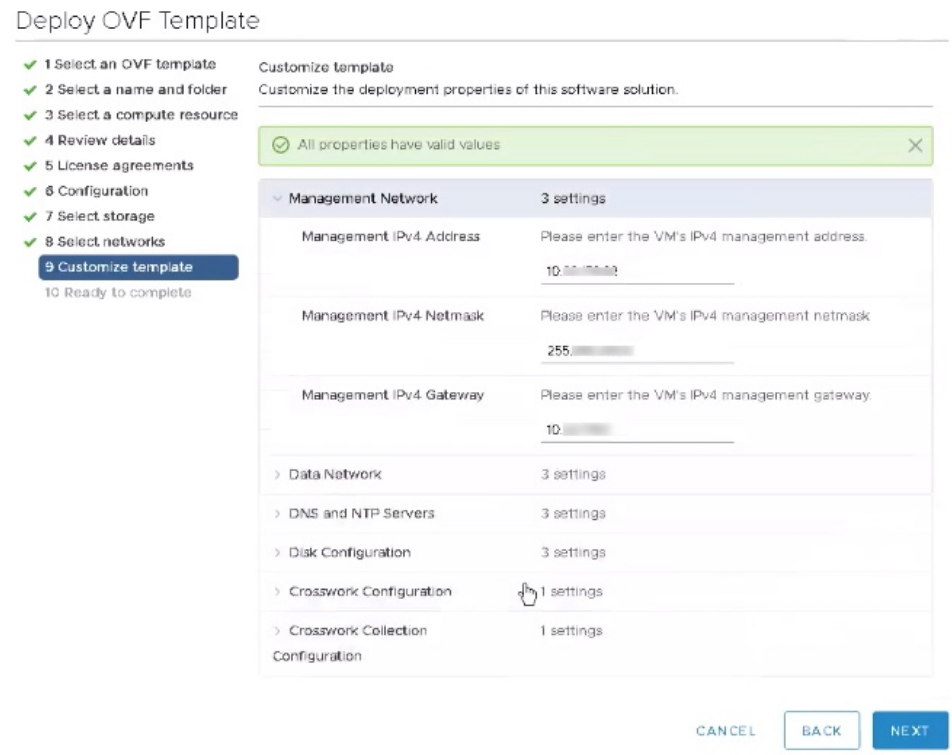


Step 10 Click **Next** to go to **8 - Select networks**, similar to the following figure. In the dropdown table at the top of the page, choose the appropriate destination network for the source **Data Network** and **Management Network**, respectively.

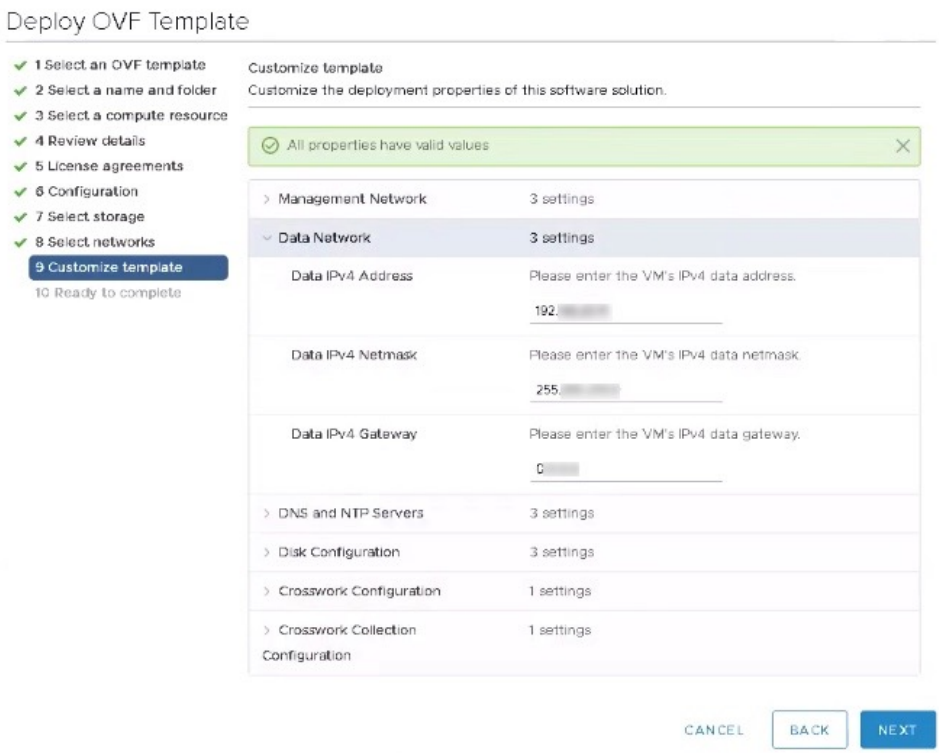


Step 11 Click **Next** to go to **9 - Customize template**.

Step 12 Expand the **Management Network** settings. According to your deployment configuration, the fields displayed are different, similar to the following figures. Make relevant entries for IPv4 deployment (**Management IPv4 Address**, **Management IPv4 Gateway**, and **Management IPv4 Netmask** fields).



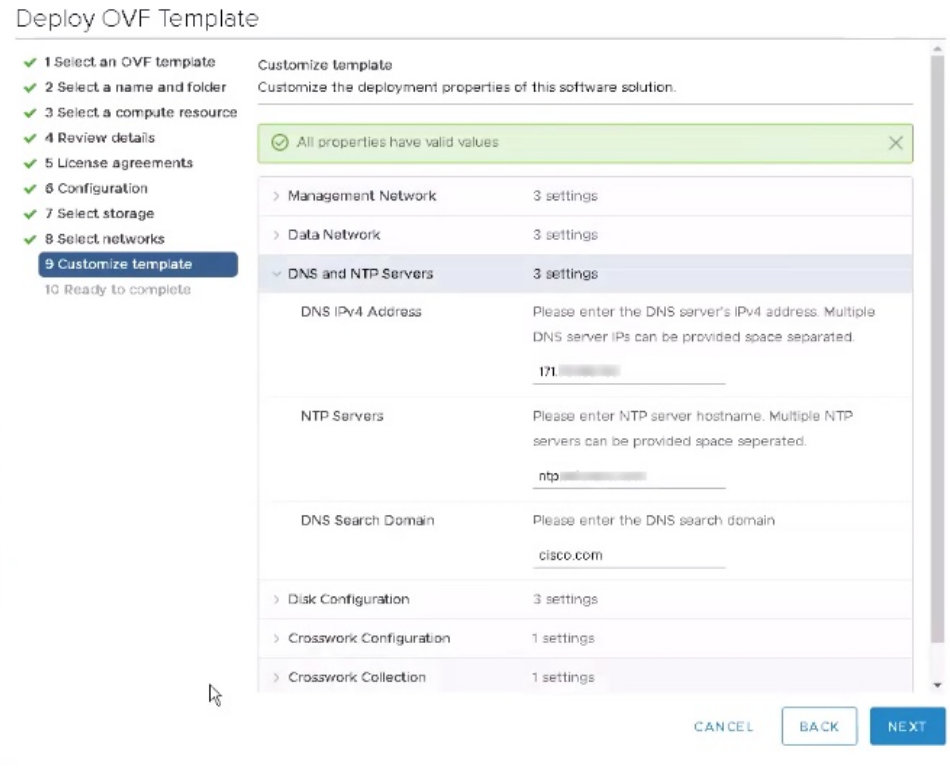
Step 13 Expand the **Data Network** settings. According to your deployment configuration, the fields displayed are different, similar to the following figures. Make relevant entries for IPv4 deployment (**Data IPv4 Address**, **Data IPv4 Gateway**, and **Data IPv4 Netmask** fields) respectively.



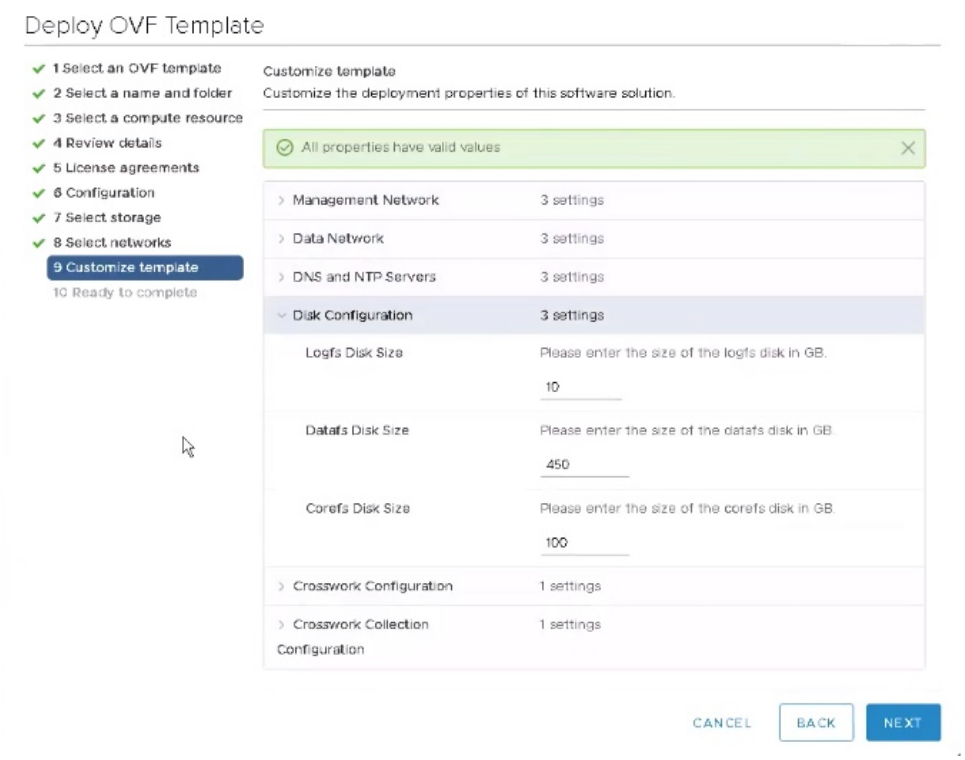
Step 14 Expand the **DNS and NTP Servers** settings, similar to the following figure. According to your deployment configuration (IPv4), the fields displayed are different. Make entries in three fields:

- **DNS IP Address**: The IP addresses of the DNS servers you want the Cisco Crosswork Optimization Engine server to use. Separate multiple IP addresses with spaces.
- **DNS Search Domain**: The name of the DNS search domain.
- **NTP Servers**: The IP addresses or host names of the NTP servers you want to use. Separate multiple IPs or host names with spaces.

Note The DNS and NTP servers must be reachable via the network interfaces you have mapped on the host or the configuration of the VM will fail.



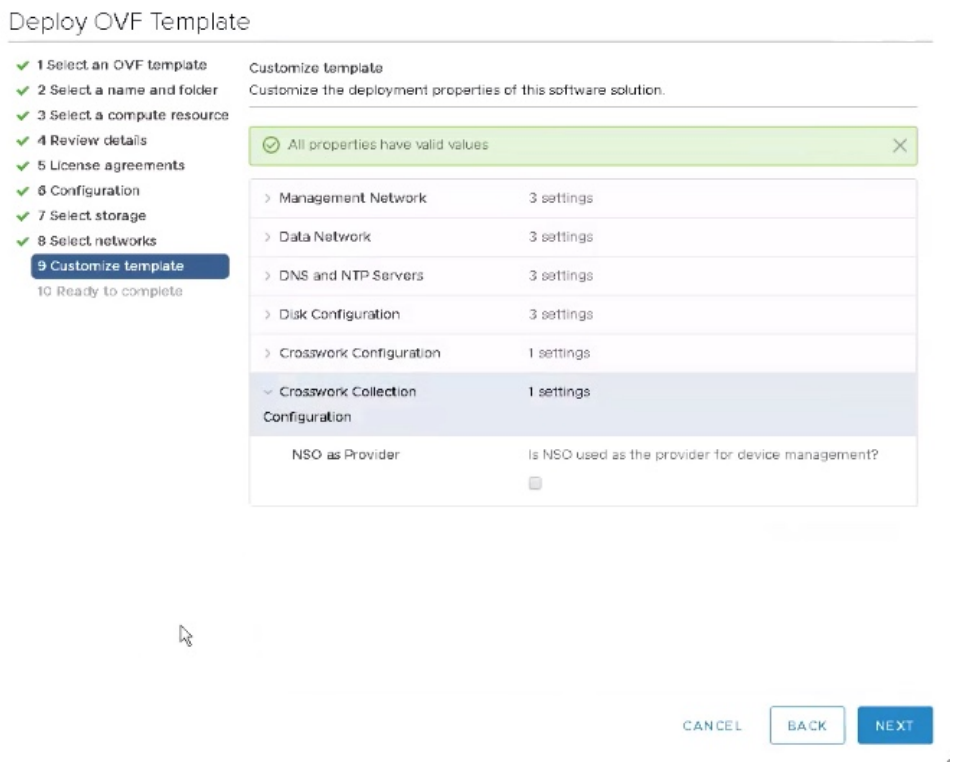
Step 15 **Disk Configuration** settings allows you to adjust the amount of storage space available to Cisco Crosswork Optimization Engine. The default settings should work for most environments. For assistance in adding additional storage, contact the Cisco Customer Experience team.



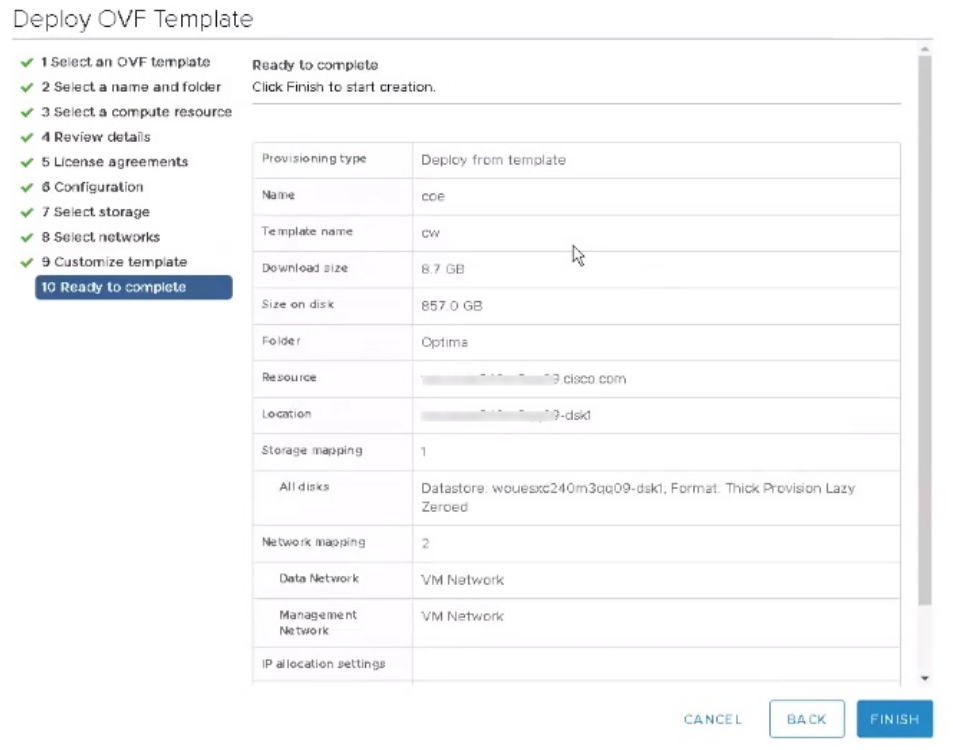
Step 16 Expand the **Crosswork Configuration** and enter any legal disclaimer text (users will see this text if they log into the CLI).

Step 17 Expand the **Crosswork Collection Configuration** settings, similar to the following figure.

Check this option if you plan to use Cisco NSO. For more guidance and information on which mode to select, see Collection Considerations).



Step 18 Click **Next** to go to **10 - Ready to Complete**, similar to the following figure (template name will depend on the version you are installing). Review your settings and then click **Finish** if you are ready to begin deployment.



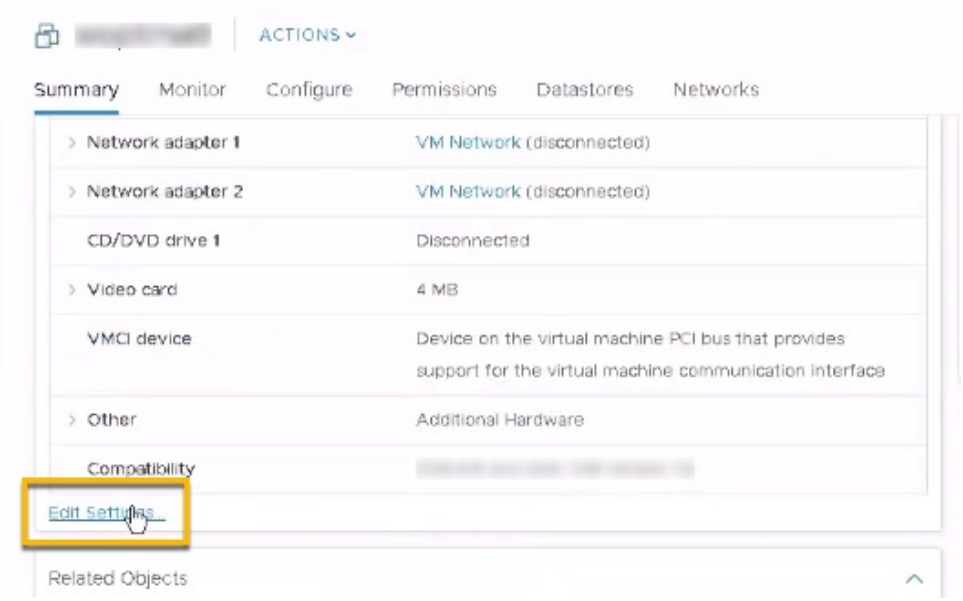
Step 19 Wait for the deployment to finish before continuing. To check on the deployment status:

a) Open a VMware vCenter client.

b) In the **Recent Tasks** tab for the host VM, view the status for the **Deploy OVF template** and **Import OVF package** jobs.

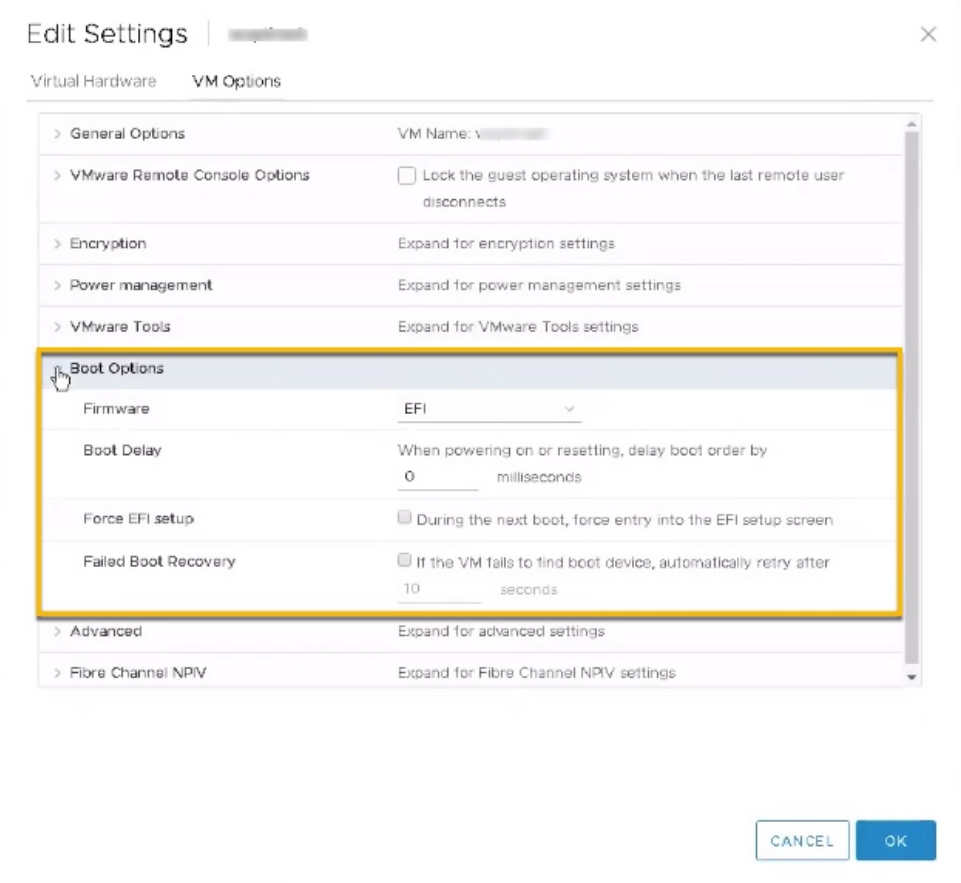
Step 20 After the deployment tasks are complete, check the host's VM settings to permit boot from EFI Firmware:

a) On the host VM **Summary** tab, below the **VM Hardware** table, click **Edit Settings**, similar to the following figure.



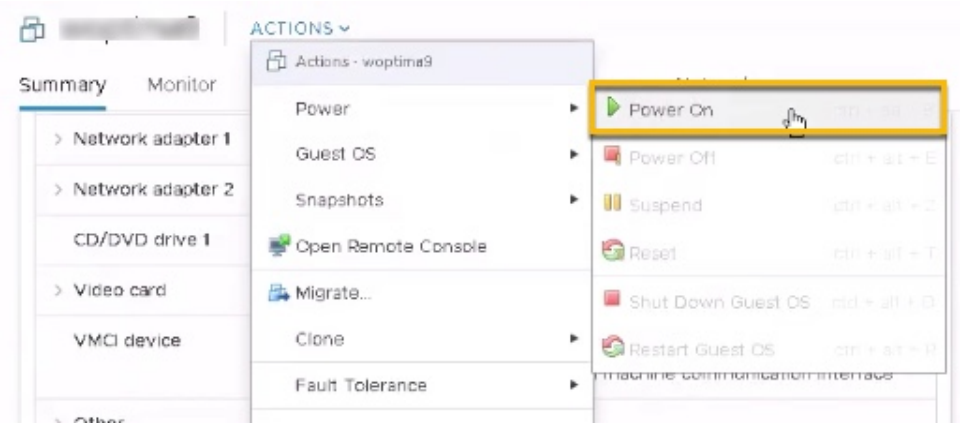
b) On the **Edit Settings** page, click the **VM Options** tab.

c) Expand the **Boot Options** dropdown list and change the **Firmware** setting to **EFI**, if it not set by default. When you are finished, click **OK**. You may want to take a snapshot of the VM at this point.



Step 21 You can now power on the Cisco Crosswork Optimization Engine VM to complete the deployment process. Expand the host's entry so you can click the Cisco Crosswork Optimization Engine VM and then choose **Actions** > **Power** > **Power On**, similar to the following figure.

Figure 1: Power On



From this point, it will take 20 minutes for the Cisco Crosswork Optimization Engine VM to become operational. Please wait for the process to finish before continuing.

Verify the VM Configuration

Before trying to log in to the new installation, verify that the VM is properly configured. You will be prompted to change the VM administrator's password during first login via the console.

Step 1 After the VM is powered on, wait for 20 minutes, and then launch the console.

Step 2 In the password prompt, enter the default cw-admin user password, **`cw-admin`**. When prompted to change the cw-admin user's password, enter the default password again for verification. Then enter and confirm the new password as prompted.

Step 3 If you see instructions to check `firstBoot.log`, use the command `sudo cat /var/log/firstBoot.log` to view the log file. If you find any discrepancy and want to investigate further, refer to Troubleshoot the Installation, on page 18. After you have identified the error, perform the following:

a) Power off the Cisco Crosswork Optimization Engine VM.
b) Delete the Cisco Crosswork Optimization Engine VM from the disk.
c) Repeat the installation procedure, while rectifying the error(s) that prevented the installation from completing.
d) Launch the console (go to step 1).

Log In to the UI From a Browser

To log in to the Cisco Crosswork Optimization Engine web-based user interface from a browser, perform these steps. If you are unable to display the user interface, see Troubleshoot the Installation, on page 18.

Step 1 Launch one of the supported browsers (see Supported Web Browsers).

Step 2 In the browser's address bar, enter:

`https://<Crosswork_VM_management_IP_adddress>:30603/`

The **Log In** window opens.

When you access Cisco Crosswork Optimization Engine for the first time, some browsers display a warning that the site is untrusted. When this happens, follow the prompts to add a security exception and download the self-signed certificate from the Cisco Crosswork Optimization Engine server. After you add a security exception, the browser accepts the server as a trusted site in all future login attempts. If you want to use a CA signed certificate, see the "Manage Certificates"section in the *Cisco Crosswork Optimization Engine User Guide*.

Step 3 Log into Cisco Crosswork Optimization Engine as follows:

a) Enter the Cisco Crosswork Optimization Engine administrator username **`admin`** and the default password **`admin`**.
b) Click **Log In**.
c) When prompted to change the Cisco Crosswork Optimization Engine administrator's default password, enter the new password in the fields provided and then click **OK**.

Step 4 To exit the web GUI, close the browser window or click at the top right of the home page and choose **Log out**.

Troubleshoot the Installation

The following table lists common problems experienced while installing Cisco Crosswork Optimization Engine, and approaches to identifying the source of the problem and solving it.

Note You need to login as a super user to perform the troubleshooting.

Table 1: Troubleshoot the Installation

Issue	Action
Cannot Connect to the VM	
VM cannot be reached by the provided gateways due to IP misconfiguration	1. You will see error messages in the login banner indicating this problem when you try to connect to the VM via SSH following the steps in as explained in Verify the VM Configuration, on page 17. 2. Redeploy the VM from scratch, using the correct IP configuration.
Configure NTP after installation	

User wants to configure NTP after the VM deployment, in the scenario of giving the wrong NTP address, or the server being down.	1. You need to edit the `/etc/chrony/chrony.conf` file. Add the pool line at the bottom of the file with relevant NTP server details.
	`keyfile /etc/chrony/chrony.keys`
	`driftfile /var/lib/chrony/chrony.drift`
	`logdir /var/log/chrony`
	`maxupdateskew 100.0`
	`rtcsync`
	`makestep 1 -1`
	`pool <ntp address> iburst maxsources 1`
	2. Restart the `chronyd` service (`systemctl restart chronyd`).
	3. Please verify that the NTP server has been configured (`chronyc sources`).

Cannot Display the User Interface	

Issue	Action
Browser does not display the login screen.	1. Make sure you are using a supported browser (see Supported Web Browsers and that you entered the correct IP address in the browser (this should be the same as the management IP4 address and port number (30603) you entered during installation). 2. Log in to the VM using SSH, as explained in Verify the VM Configuration, on page 17. 3. At the prompt, enter the command **collect**. This generates a file. 4. Open a ticket with the Cisco Customer Experience team and attach the file to the ticket.
Unable to resolve other network addresses on the local network.	1. While connected to the VM, open the file `/etc/resolv.conf` file and check that it contains the correct DNS name server and search domain. 2. If it does not, redeploy the VM using the correct DNS name server and search domain configuration.
Running `kubectl get nodes` does not display the correct VM management IP address.	1. While connected to the VM, open the file `/etc/hosts` file and check if the IP address assigned to the VM is correct. 2. If the address is wrong, redeploy the VM using the correct management IP address.
Running `kubectl get nodes` does not display a `Ready` status for the VM IPv4 address.	1. While connected to the VM, check the login banner for any error messages. 2. If there are error messages in the login banner, they will be recorded in `/var/log/firstBoot.log` file, along with recommended remediation steps. Open the log and follow the steps given for the error message found in the banner. 3. If this does not help, run `kubectl get pods --namespace kube-system` and look for mismatched `Ready` counts.
Running `kubectl get pods --namespace kube-system` displays one or more system containers that are not in `Running` status.	1. Check for user input errors in the `/var/log/boot.log` file and perform the log's recommended remediation steps. 2. If this does not help, please contact the Cisco Customer Experience team.
Running `kubectl get pods` displays one or more system containers that are not launched properly.	Please contact the Cisco Customer Experience team.
Able to Display the User Interface	

Issue	Action
I cannot log in.	1. Make sure you are using the Crosswork administrator default user ID and password (**admin** and **admin**). 2. If the Crosswork administrator default password has already been changed, use the new password.
I can log in but cannot access some features.	Make sure all the applications and their underlying services are up and running by selecting **Admin** > **Crosswork Manager** and checking the status of the applications and services. See the *Cisco Crosswork Optimization Engine User Guide* topic "Monitor Cisco Crosswork Infrastructure and Resources".
Crosswork Manager shows one or more applications or their underlying services are not running.	1. In Crosswork Manager, check the description of the application or service issue and, if possible, try restarting the application or service. See the *Cisco Crosswork Optimization Engine User Guide* topic "Monitor Cisco Crosswork Infrastructure and Resources". 2. Gather log and metric information about the application or service with issues. See the *User Guide* topic "View, Control and Log Cisco Crosswork Applications and Services". 3. Contact Cisco Customer Experience team.
CPU Overcommitment	
CPU/memory overcommitment occurs when the vCPUs are running on a host are more than the total number of physical processor cores in that host. VMware vCenter/ESXi allows this for the flexibility in deploying and running the VMs on physical hosts. It is natural to assume that the vCenter users will try to maximize the physical resources usage by deploying and running a reasonably high amount of VMs on a specific ESXi host. However, it can lead to a problem manifested in a "soft lockup" situation, where a VM will not be able to get a vCPU allocated in a reasonable amount of time.	1. Perform an analysis to confirm that an overcommitment has led to the manifested problem. The vSphere ESXi host Monitor screens have a **Performance** > **Advanced** tab which can display several views and performance counters to illustrate. For example, CPU usage in MHz displays the spike in CPU usage at a particular date and time compared to the average usage. 2. After you confirm the analysis, use a CPU or Memory reservation to resolve an overcommitment. The CPU reservation specifies the CPU allocation (in MHz) for your VM, while Memory reservation specifies the guaranteed minimum allocation for a VM (in MB). If the reservation is not met, the VM cannot be turned on.

Install Cisco Crosswork Data Gateway

Cisco Crosswork Data Gateway is initially deployed as a VM called Base VM (containing only enough software to register itself with Crosswork).

Before installing Cisco Crosswork Data Gateway, it is helpful to be familiar with Cisco Crosswork Data Gateway OVF Parameters and Deployment Scenarios, on page 21.

You can use either of the following two ways to install Cisco Crosswork Data Gateway:

- Install Cisco Crosswork Data Gateway Via vCenter, on page 27
- Install Cisco Crosswork Data Gateway Via OVF Tool, on page 38

Cisco Crosswork Data Gateway OVF Parameters and Deployment Scenarios

Before you begin installing Cisco Crosswork Data Gateway, read below about OVF parameters and possible deployment scenarios.

Note

- Mandatory parameters are denoted by an *. Others are optional. You might choose them based on the kind of deployment scenrio you require. Deployment scenarios are explained wherever applicable.
- Although Cisco Crosswork Data Gateway supports both IPv6 and IPv4, it is recommended to use IPv4 as Cisco Crosswork Optimization Engine supports only IPv4.

OVF Parameter	Description	Deployment Scenario
Host Information		
Hostname*	Hostname of the server specified as a fully qualified domain name (FQDN). **Note** For larger systems it is likely that you will have more than one Cisco Crosswork Data Gateway instance. The Cisco Crosswork Data Gateway hostname should, therefore, be unique and created in a way that makes identifying a specific instance easy.	
Description*	A detailed description of the Cisco Crosswork Data Gateway instance.	

OVF Parameter	Description	Deployment Scenario
Label	Label used by Crosswork to categorize and group multiple Cisco Crosswork Data Gateway instances.	
Private Key URI	SCP URI to private key file for session key signing. You can retrieve this using SCP (user@host:path/to/file).	Crosswork uses self-signed certificates for handshake with Cisco Crosswork Data Gateway. These certificates are generated upon installation. However, if you want to use third-party or your own certificate files, then you must input these three parameters. **Note** The host with the URI files must be reachable on the network and files must be present at the time of install.
Certificate File URI	SCP URI to PEM formatted signing certificate chain for this VM. You can retrieve this using SCP (user@host:path/to/file).	
Certificate File and Key Passphrase	SCP user passphrase to retrieve the Cisco Crosswork Data Gateway PEM formatted certificate file and private key.	
Passphrases		
dg-admin Password*	The password you have chosen for the dg-admin user.	
dg-oper Password*	The password you have chosen for the dg-oper user.	
Note *For Management, Southbound, and Northbound interfaces, Cisco Crosswork Data Gateway supports both IPv4 and IPv6. For the protocol you choose to use, select **Method** as **Static** and enter information in **Address**, **Netmask**, and **Gateway** fields. Also, for the protocol you are not using, set **Method** as **none** and leave **Address**, **Netmask**, and **Gateway** fields blank.*		
[1]**Management IPv4 Address**		
Management IPv4 Method*	How the management interface gets its IPv4 address.	
Management IPv4 Address	IPv4 address of the management interface.	
Management IPv4 Netmask	IPv4 netmask of the management interface in dotted quad format.	
Management IPv4 Gateway	IPv4 address of the management gateway.	
[1]**Management IPv6 Address**		

OVF Parameter	Description	Deployment Scenario
Management IPv6 Method*	How the Management interface gets its IPv6 address.	
Management IPv6 Address	IPv6 address of the management interface.	
Management IPv6 Netmask	IPv6 prefix of the management interface.	
Management IPv6 Gateway	IPv6 address of the management gateway.	
[1]**Southbound Data IPv4 Address**		
Southbound Data IPv4 Method*	How the southbound data interface gets its IPv4 address.	
Southbound Data IPv4 Address	IPv4 address of the southbound data interface.	
Southbound Data IPv4 Netmask	IPv4 netmask of the southbound data interface in dotted quad format.	
Southbound Data IPv4 Gateway	IPv4 address of the southbound Cisco Crosswork Data Gateway.	
[1]**Southbound Data IPv6 Address**		
Southbound Data IPv6 Method*	How the southbound data interface gets its IPv6 address.	
Southbound Data IPv6 Address	IPv6 address of the southbound data interface.	
Southbound Data IPv6 Netmask	IPv6 netmask of the southbound data interface in dotted quad format.	
Southbound Data IPv6 Gateway	IPv6 address of the southbound data gateway.	
[1]**Northbound Data IPv4 Address**		
Northbound Data IPv4 Method*	How the Northbound data interface gets its IPv4 address.	
Northbound Data IPv4 Address	IPv4 address of the Northbound data interface.	
Northbound Data IPv4 Netmask	IPv4 netmask of the Northbound data interface in dotted quad format.	

OVF Parameter	Description	Deployment Scenario
Northbound Data IPv4 Gateway	IPv4 address of the Northbound data gateway.	
[1]**Northbound Data IPv6 Address**		
Northbound Data IPv6 Method*	How the Northbound data interface gets its IPv6 address.	
Northbound Data IPv6 Address	IPv6 address of the Northbound data interface.	
Northbound Data IPv6 Netmask	IPv6 netmask of the Northbound data interface in dotted quad format.	
Northbound Data IPv6 Gateway	IPv6 address of the Northbound data gateway.	
DNS and NTP		
DNS Address*	Space-delimited list of IPv4/IPv6 addresses of the DNS server accesible from the management interface.	
DNS Search Domain*	DNS search domain	
NTP Servers*	Space-delimited list of IPv4/IPv6 addresses or hostnames of the NTP servers accessible from the management interface.	You must enter a value here, such as pool.ntp.org. NTP server is important for time synchronization between Cisco Crosswork Data Gateway VM and Cisco Crosswork Optimization Engine. Using a non-functional or dummy address may cause issues when Crosswork and Cisco Crosswork Data Gateway try to communicate with each other. If you are not using an NTP server, ensure that time gap between Cisco Crosswork Data Gateway and Cisco Crosswork Optimization Engine is not more than 10 minutes. Else, Cisco Crosswork Data Gateway will fail to pull images.
Syslog Servers		

OVF Parameter	Description	Deployment Scenario
Server Address	IPv4 or IPv6 address of a syslog server accessible from the management interface. **Note** If you are using an IPv6 addres, it must be surrounded by square brackets ([1::1]).	If you want to use an external syslog server, you must specify these 7 settings. **Note** If you have configured an external syslog server, the service (CLI/MDT/SNMP) events are sent to that external syslog server. Otherwise, they are logged in `/optdg/log` in Cisco Crosswork Data Gateway VM. **Note** The host with the URI files must be reachable on the network and files must be present at the time of install.
Syslog Port	Port number of the syslog server.	
Syslog Protocol	Use UDP, TCP, or RELP when sending syslog.	
Use Syslog over TLS?	Use TLS to encrypt syslog traffic.	
TLS Peer Name	Syslog server's hostname exactly as entered in the server certificate SubjectAltName or subject common name.	
Syslog Root Certificate File URI	PEM formatted root cert of syslog server retrieved using SCP.	
Syslog Certificate File Passphrase	Password of SCP user to retrieve Syslog certificate chain.	
Controller Settings		
Controller IP*	IP address of the Crosswork controller i.e., Cisco Crosswork Optimization Engine. **Note** If you are using an IPv6 address, it must be surrounded by square brackets ([1::1]).	
Controller Port*	Port of the Crosswork controller i.e., Cisco Crosswork Optimization Engine.	

OVF Parameter	Description	Deployment Scenario
Controller Signing Certificate File URI	PEM formatted root cert of Cisco Crosswork Optimization Engine to validate signing certs retrived using SCP. PEM file is generated by Crosswork and is available at the following location: `cw-admin@<Crosswork_VM_Management_IP_Address>:/home/cw-admin/controller.pem` **Note** Theoretically, it can be placed on any host where the SCP server is running but best practice is uploading from Crosswork, directly.	
SSL/TLS Certificate File URI	Crosswork controller PEM formatted SSL/TLS certificate file retrieved using SCP.	
Controller Certificate File Passphrase	Password of SCP user to retrieve Cisco Crosswork Optimization Engine certificate chain.	
Proxy Server URL	URL of management network proxy server.	If you want to use a proxy server, you must specify these parameters.
Proxy Server Bypass List	Space-delimited list of subnets and domains that will not be sent to the proxy server.	
Authenticated Proxy Username	Username for authenticated proxy servers.	
Authenticated Proxy Passphrase	Passphrase for authenticated proxy servers.	
HTTPS Proxy SSL/TLS Certificate File URI	HTTPS proxy PEM formatted SSL/TLS certificate file retrieved using SCP.	
HTTPS Proxy SSL/TLS Certificate File passphrase	Password of SCP user to retrieve proxy certificate chain.	
Auto Enrollment Package		

OVF Parameter	Description	Deployment Scenario
Enrollment Destination Host and Path	SCP host and path to transfer the enrollment package using SCP (`user@host:/path/to/file`).	Enrollment package is required for enrolling Cisco Crosswork Data Gateway with Crosswork. The enrollment package is automatically transferred once Cisco Crosswork Data Gateway boots up for the first time if you specify these parameters during the installation. If you do not specify these parameters during installation, then you must export enrollment package manually following the procedure Export Enrollment Package, on page 43. **Note:** • The host must run SCP server. If no alternative SCP server is available, then Crosswork can be used. An example URI is given below: `cw-admin@<Crosswork_VM_ Management_IP_ Address> :/home/cw-admin`
Enrollment Passphrase	SCP user passphrase to transfer enrollment package.	

[1]Either an IPv4 or IPv6 address must be specified. Selecting None for both will result in a non-functional deployment.

Install Cisco Crosswork Data Gateway Via vCenter

Before you begin

Note Although Cisco Crosswork Data Gateway supports both IPv6 and IPv4, it is recommended to use IPv4 as Cisco Crosswork Optimization Engine supports only IPv4.

Ensure the following:

- You are creating the Cisco Crosswork Data Gateway VM on a recommended VMware version (See Virtual Machine (VM) Requirements for supported versions). To know which vCenter build you have, check on the vSphere web client under **Help** menu.
- The Cisco Crosswork Data Gateway VM has allocated to it a minimum of 32 GB of RAM, 8 vCPUs, and 50 GB of hard drive space.

- You have a public/private IPv4/IPv6 address to assign to the Cisco Crosswork Data Gateway VM's management network virtual interface. The DNS servers, NTP servers, and the Crosswork application must be reachable via this IP address.
- You have two public or private IPv4/IPv6 addresses to assign to the Cisco Crosswork Data Gateway VM's Northbound and Southbound data network virtual interfaces. Your managed devices must be reachable via the Southbound data network interface and your output destinations (either Crosswork, external Kafka, or gRPC server) must be reachable via the Northbound data network interface.

During installation, Cisco Crosswork Data Gateway creates two default accounts:

1. A **Cisco Crosswork Data Gateway administrator**, with the username **dg-admin** and password set during installation. The product administrator uses this ID to log in to and troubleshoot the Cisco Crosswork Data Gateway.
2. A **Cisco Crosswork Data Gateway operator**, with the username **dg-oper** and password set during installation. This is a read-only user and has permissions to perform all 'read' operations and some limited 'action' commands. To know what operations can an operator perform, see *Table: Permissions Per Role* in the *Cisco Crosswork Optimization Engine 1.1 User Guide*.

Note These two pre-defined usernames are reserved and cannot be changed.

Change of password would be allowed from the console for both the accounts.

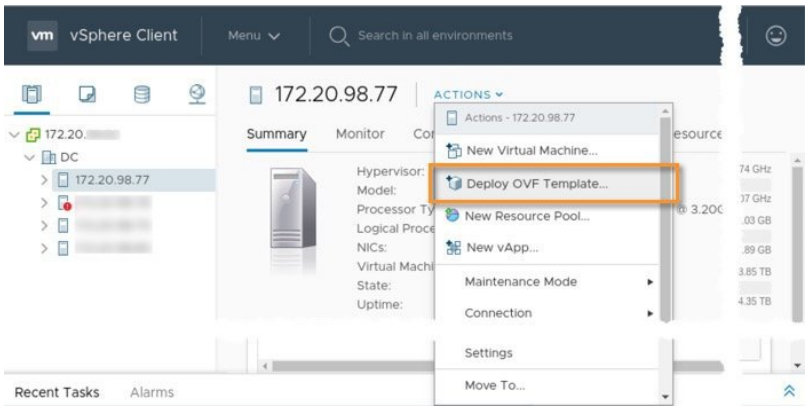
In case of lost or forgotten passwords, the user would have to create a new VM, destroy the current VM, and re-enroll the new one on the Cisco Crosswork Optimization Engine.

Step 1 Download the Cisco Crosswork Data Gateway 1.1.0 image file from CCO (*.ova).

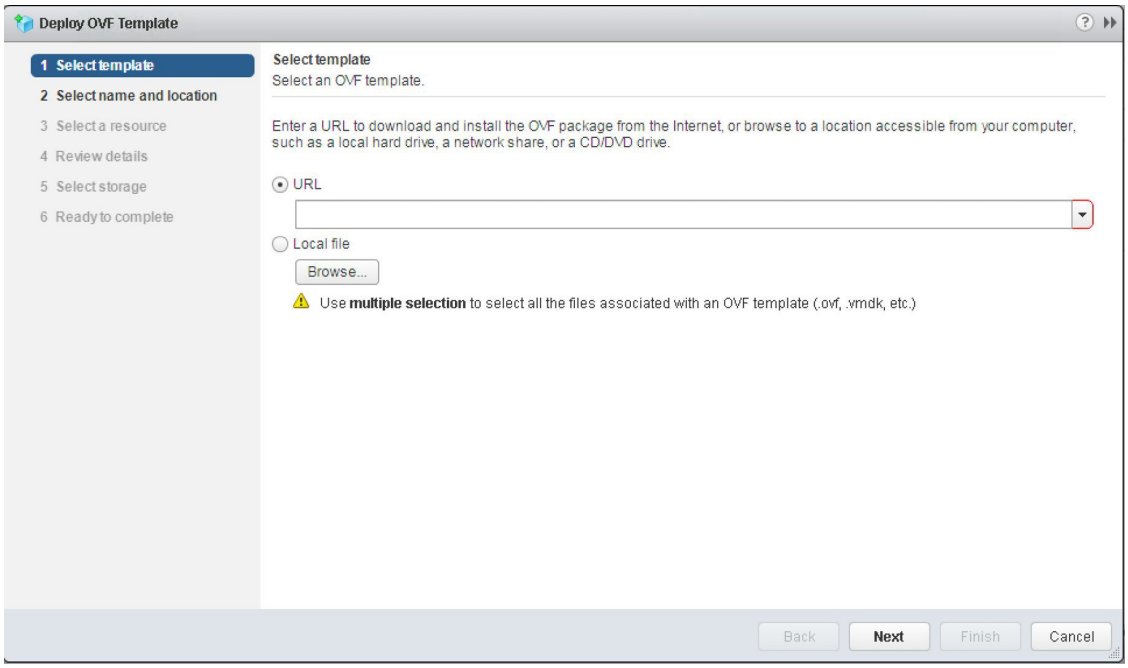
Note Crosswork Optimization Engine is designed and tested to be used with only the Cisco Crosswork Data Gateway 1.1.0 release.

Warning The default VMware vCenter deployment timeout is 15 minutes. If the time taken to fill the OVF template exceeds 15 minutes, vCenter times out and you will have to start over again. To prevent this, Cisco recommends that you set the vCenter deployment timeout to a much longer period (such as one hour). Refer your vCenter guide.

Step 2 Connect to vCenter vSphere Client. Then select **Actions** > **Deploy OVF Template**, as shown in the following figure:



Step 3 The VMware **Deploy OVF Template** wizard appears and highlights the first step, **1 Select template**, as shown in the following figure.



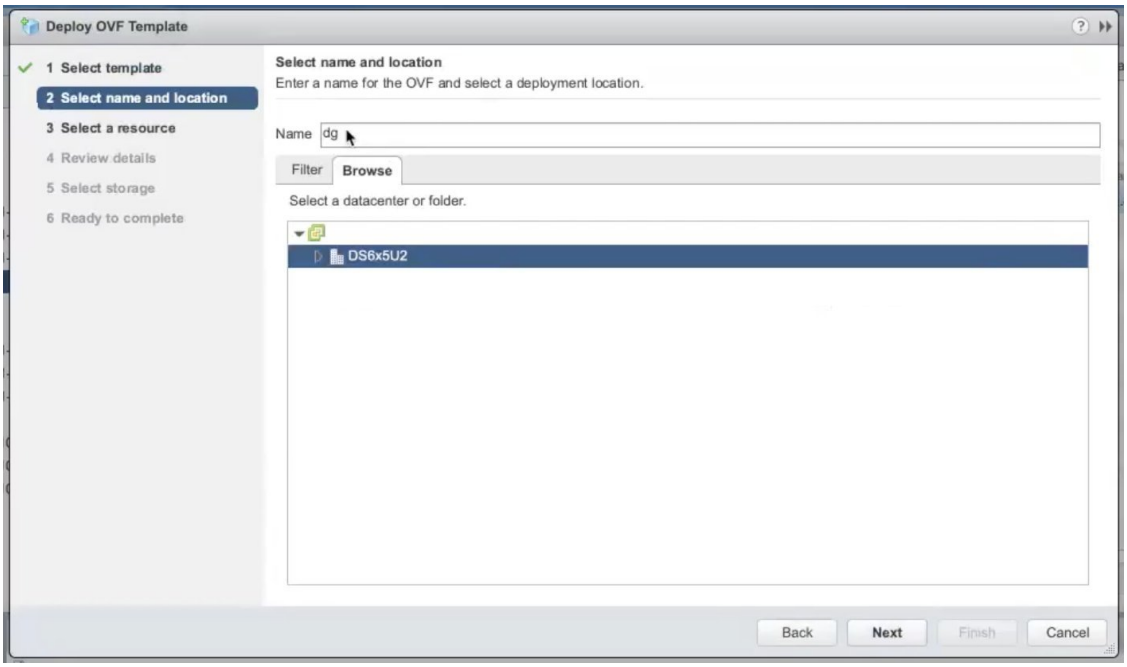
a) Click **Browse** to navigate to the location where you downloaded the OVA image file and select it.

Once selected, the filename is displayed in the window.

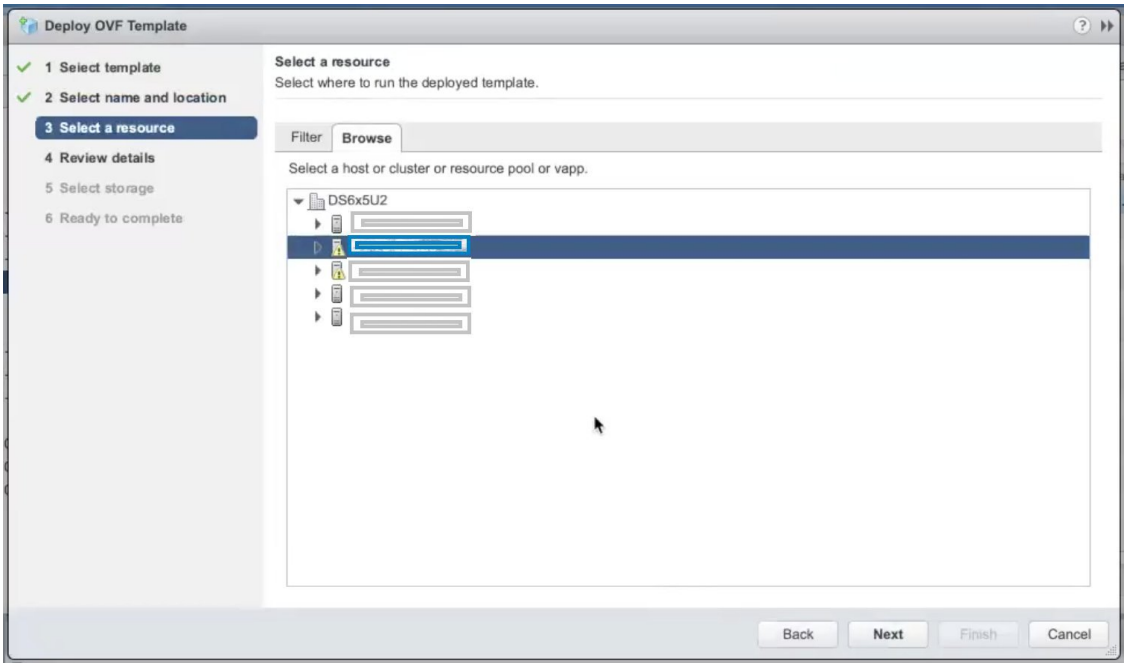
Step 4 Click **Next** to go to **2 Select name and location**, as shown in the following figure.

a) Enter a name for the Cisco Crosswork Data Gateway VM you are creating.

b) In the **Select a location for the virtual machine** list, choose the datacenter under which the Cisco Crosswork Data Gateway VM will reside.



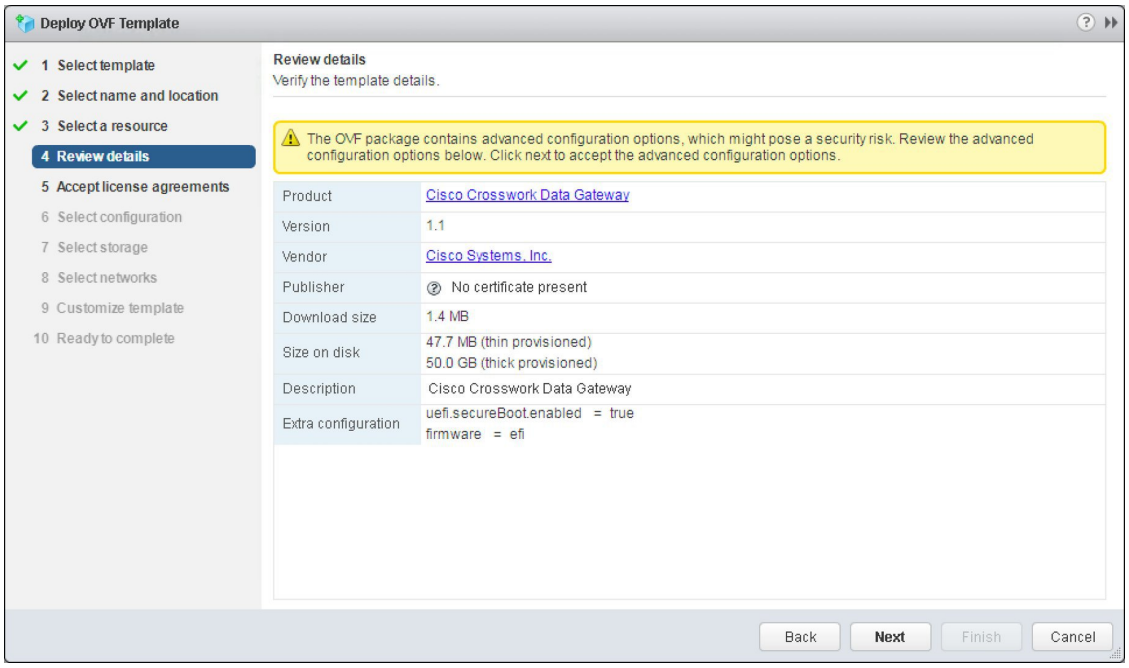
Step 5 Click **Next** to go to **3 Select a resource**, as shown in the following figure. Choose the VM's host.



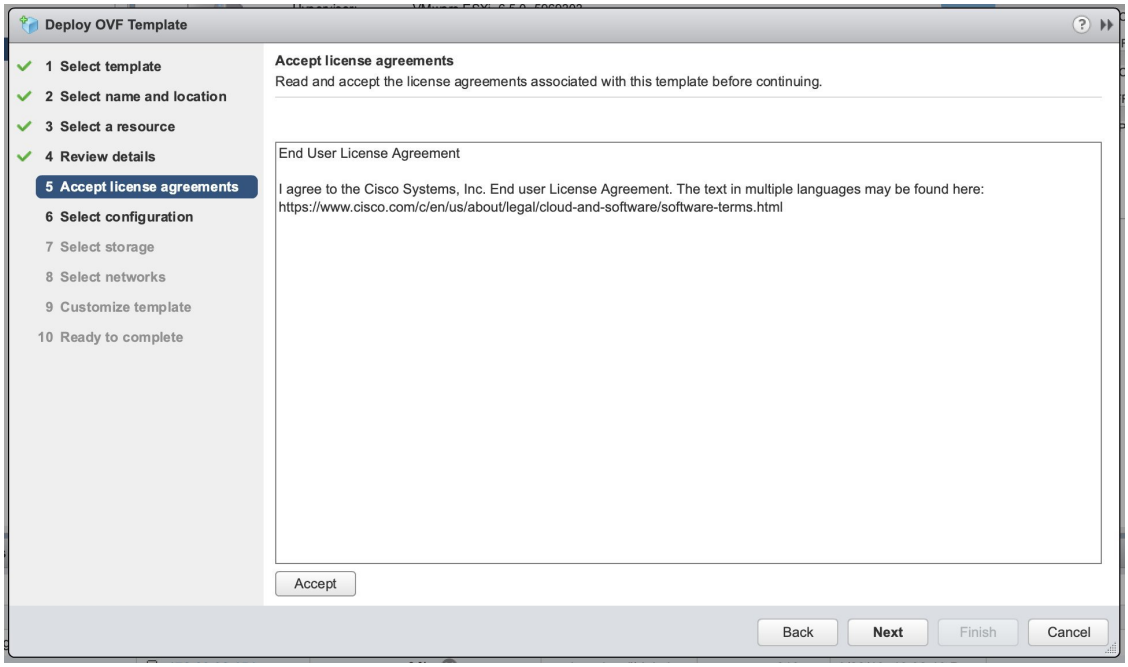
Step 6 Click **Next**. The VMware vCenter Server validates the OVA. Network speed will determine how long validation takes. When the validation is complete, the wizard moves to **4 Review details**, as shown in the following figure. Review the OVA's information and then click **Next**.

Take a moment to review the OVF template you are deploying.

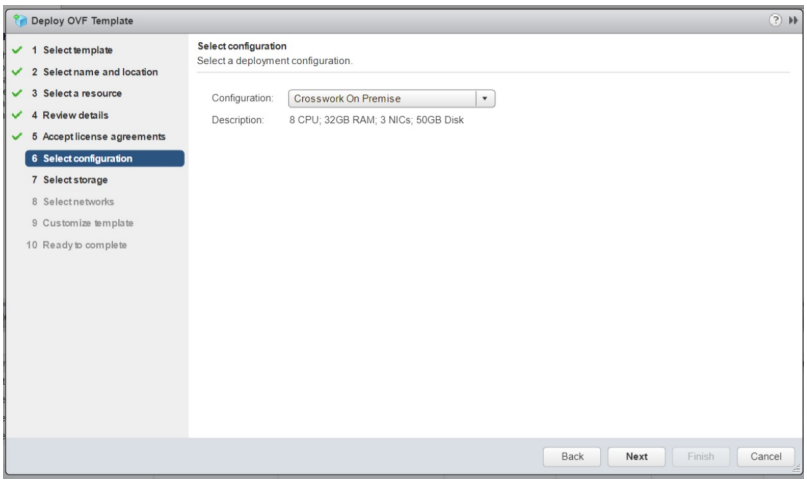
Note This information is gathered from the OVF and cannot be modified.



Step 7 Click **Next** to go to **5 accept license agreements**. Review the End User License Agreement and click **Accept**.



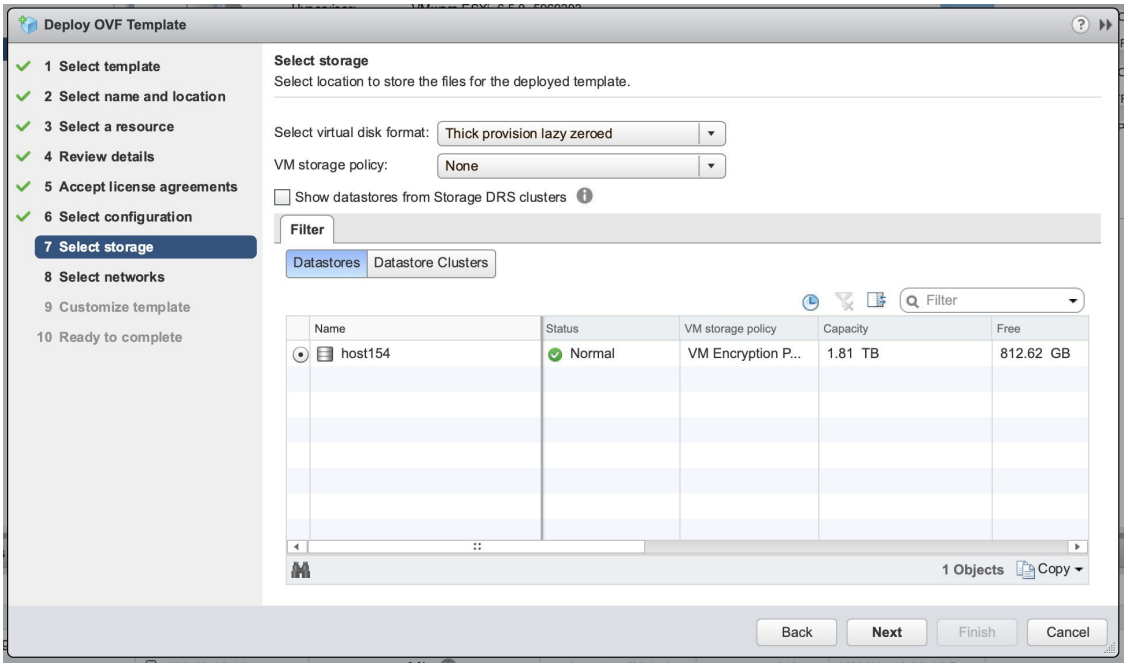
Step 8 Click **Next** to go to **6 Select configuration**, as shown in the following figure. To install Cisco Crosswork Data Gateway for Cisco Crosswork Optimization Engine, you must select **Crosswork On Premise** from the **Configuration** dropdown.



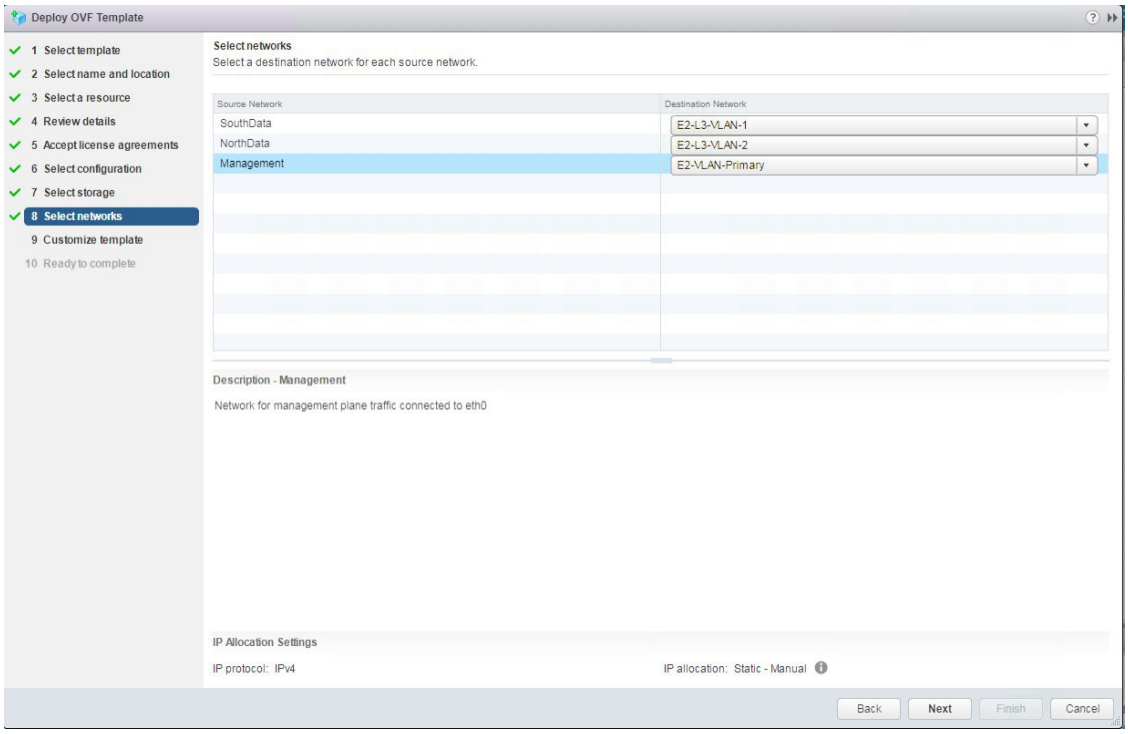
Step 9 Click **Next** to go to **7 Select storage**, as shown in the following figure.

a) Cisco recommends that you select **Thick provision lazy zeroed** from the **Select virtual disk format** drop-down list.

b) From the **Datastores** table, choose the datastore you want to use and review its properties to ensure there is enough available storage.



Step 10 Click **Next** to go to **8 Select networks**, as shown in the following figure. In the dropdown table at the top of the page, choose the appropriate destination network for the source **Management Network**, **Northbound Data Network**, and **Southbound Data Network** respectively.



Step 11 Click **Next** to go to **9 Customize template**, with the **Host Information Settings** already expanded. As per the deployment scenario chosen by you in Section: Cisco Crosswork Data Gateway OVF Parameters and Deployment Scenarios, on page 21, enter the information for the parameters:

Note
- Certificate chains override any preset or generated certificates in the VM and are given as an SCP URI (user:host:/path/to/file).

a) **Host Information**

- Hostname: Hostname of the server specified as a fully qualified domain name (FQDN).

  Note For larger systems it is likely that you will have more than one Cisco Crosswork Data Gateway instance. The Cisco Crosswork Data Gateway hostname should, therefore, be unique and created in a way that makes identifying a specific instance easy.

- Description:A detailed description of the Cisco Crosswork Data Gateway instance.
- Label: Label used by Crosswork to categorize and group multiple Cisco Crosswork Data Gateway instances.
- Private Key URI: SCP URI to private key file for session key signing. You can retrieve this using SCP (user@host:path/to/file).
- Certificate File URI: SCP URI to PEM formatted signing certificate chain for this VM. You can retrieve this using SCP (user@host:path/to/file).
- Certificate File and Key Passphrase: SCP user passphrase to retrieve the Cisco Crosswork Data Gateway PEM formatted certificate file and private key.

b) **Passphrases**

- dg-admin Password: The password you have chosen for the dg-admin user.
- dg-oper Password: The password you have chosen for the dg-oper user.

Note *For Management, Southbound, and Northbound interfaces, Cisco Crosswork Data Gateway supports both IPv4 and IPv6. For the protocol you choose to use, select **Method** as **Static** and enter information in **Address**, **Netmask**, and **Gateway** fields. Also, for the protocol you are not using, set **Method** as **none** and leave **Address**, **Netmask**, and **Gateway** fields blank.*

c) **Management IPv4 Address**

- Management IPv4 Method: How the Management interface gets its IPv4 address.
- Management IPv4 Address: IPv4 address of the Management interface.
- Management IPv4 Netmask: IPv4 netmask of the Management interface in dotted quad format.
- Management IPv4 Gateway: IPv4 address of the Management gateway.

d) **Management IPv6 Address**

- Management IPv6 Method: How the Management interface gets its IPv6 address.
- Management IPv6 Address: IPv6 address of the Management interface.
- Management IPv6 Netmask: IPv6 netmask of the Management interface in dotted quad format.
- Management IPv6 Gateway: IPv6 address of the Management gateway.

e) **Southbound Data IPv4 Address**

- Southbound Data IPv4 Method: How the Southbound data interface gets its IPv4 address.
- Southbound Data IPv4 Address: IPv4 address of the Southbound data interface.
- Southbound Data IPv4 Netmask: IPv4 netmask of the Southbound data interface in dotted quad format.
- Southbound Data IPv4 Gateway: IPv4 address of the Southbound data gateway.

f) **Southbound Data IPv6 Address**

- Southbound Data IPv6 Method: How the Southbound data interface gets its IPv6 address.
- Southbound Data IPv6 Address: IPv6 address of the Southbound data interface.
- Southbound Data IPv6 Netmask: IPv6 netmask of the Southbound data interface in dotted quad format.
- Southbound Data IPv6 Gateway: IPv6 address of the Southbound data gateway.

g) **Northbound Data IPv4 Address**

- Northbound Data IPv4 Method: How the Northbound data interface gets its IPv4 address.
- Northbound Data IPv4 Address: IPv4 address of the Northbound data interface.
- Northbound Data IPv4 Netmask: IPv4 netmask of the Northbound data interface in dotted quad format.
- Northbound Data IPv4 Gateway: IPv4 address of the Northbound data gateway.

h) **Northbound Data IPv6 Address**

- Northbound Data IPv6 Method: How the Northbound data interface gets its IPv6 address.
- Northbound Data IPv6 Address: IPv6 address of the Northbound data interface.
- Northbound Data IPv6 Netmask: IPv6 netmask of the Northbound data interface in dotted quad format.
- Northbound Data IPv6 Gateway: IPv6 address of the Northbound data gateway.

i) **DNS and NTP**

- DNS Address: Space-delimited list of IPv4/IPv6 addresses of the DNS server accesible from the management interface.
- DNS Search Domain: DNS search domain
- NTP Servers: Space-delimited list of IPv4/IPv6 addresses or hostnames of the NTP servers accessible from the management interface.

  Note You must enter a value here, such as pool.ntp.org. NTP server is important for time synchronization between Cisco Crosswork Data Gateway VM and Cisco Crosswork Optimization Engine. Using a non-functional or dummy address may cause issues when Crosswork and Cisco Crosswork Data Gateway try to communicate with each other. If you are not using an NTP server, ensure that time gap between Cisco Crosswork Data Gateway and Cisco Crosswork Optimization Engine is not more than 10 minutes. Else, Cisco Crosswork Data Gateway will fail to pull images.

j) **Syslog Servers**

- Server Address: IPv4 or IPv6 address of a syslog server accessible from the management interface.

  Note If you are using an IPv6 addres, it must be surrounded by square brackets ([1::1]).

- Syslog Port: Port number of the syslog server.
- Syslog Protocol: Use UDP, TCP, or RELP when sending syslog.
- Use Syslog over TLS?: Use TLS to encrypt syslog traffic.
- TLS Peer Name: Syslog server's hostname exactly as entered in the server certificate SubjectAltName or subject common name.
- Syslog Root Certificate File URI: PEM formatted root cert of syslog server retrieved using SCP.
- Syslog Certificate File Passphrase: Password of SCP user to retrieve Syslog certificate chain.

k) **Controller Settings**

- Controller IP: IP address of the Crosswork controller i.e., Cisco Crosswork Optimization Engine.

  Note If you are using an IPv6 address, it must be surrounded by square brackets ([1::1]).

- Controller Port: Port of the Crosswork controller i.e., Cisco Crosswork Optimization Engine.
- Controller Signing Certificate File URI: PEM formatted root cert of Cisco Crosswork Optimization Engine to validate signing certs retrived using SCP. PEM file is generated by Crosswork and is available at the following location:

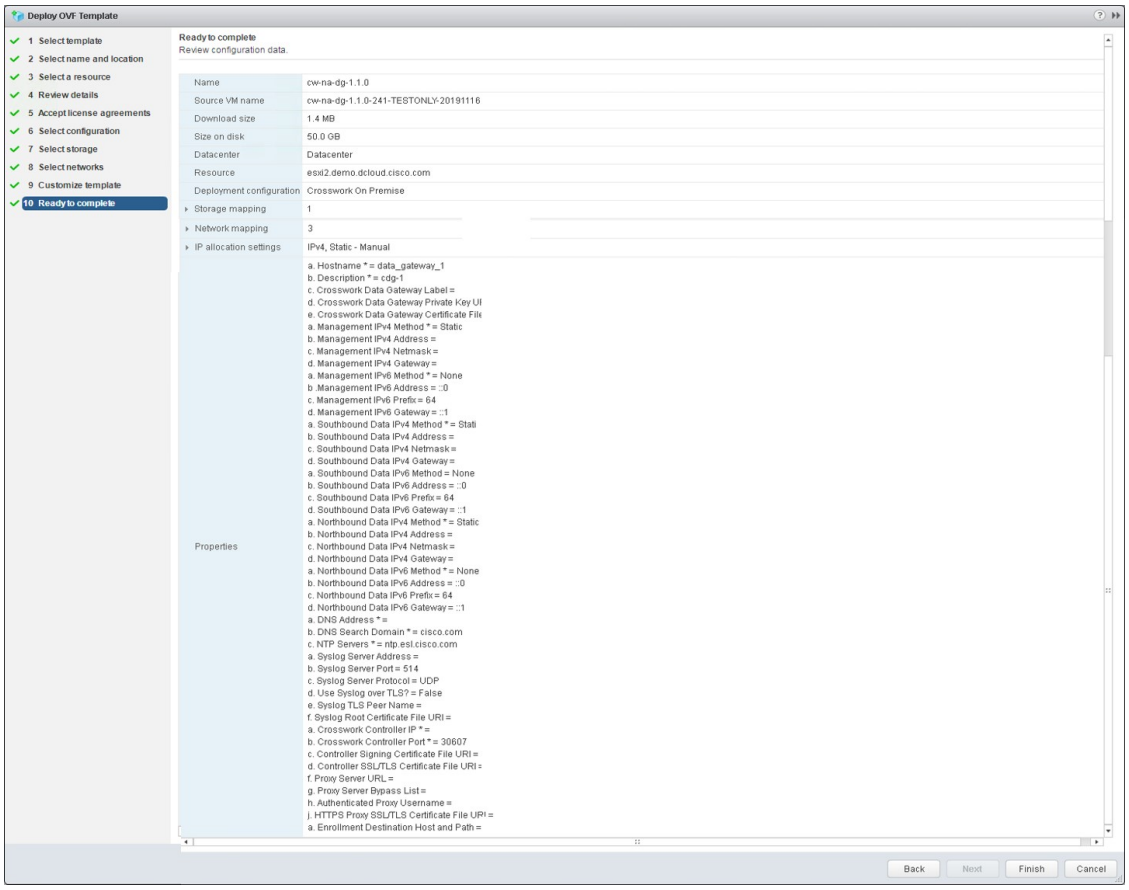
`cw-admin@<Crosswork_VM_ Management_IP_Address>:/home/cw-admin/controller.pem`

- SSL/TLS Certificate File URI: Crosswork controller PEM formatted SSL/TLS certificate file retrieved using SCP.
- Controller Certificate File Passphrase: Password of SCP user to retrieve Cisco Crosswork Optimization Engine certificate chain.
- Proxy Server URL: URL of management network proxy server.
- Proxy Server Bypass List: Space-delimited list of subnets and domains that will not be sent to the proxy server.
- Authenticated Proxy Username: Username for authenticated proxy servers.
- Authenticated Proxy Passphrase: Passphrase for authenticated proxy servers.
- HTTPS Proxy SSL/TLS Certificate File URI: HTTPS proxy PEM formatted SSL/TLS certificate file retrieved using SCP.
- HTTPS Proxy SSL/TLS Certificate File passphrase: Password of SCP user to retrieve proxy certificate chain.

l) **Auto Enrollment Package**

- Enrollment Passphrase: SCP user passphrase to transfer enrollment package.
- Enrollment Destination Host and Path: SCP host and path to transfer the enrollment package using SCP (`user@host:/path/to/file`).

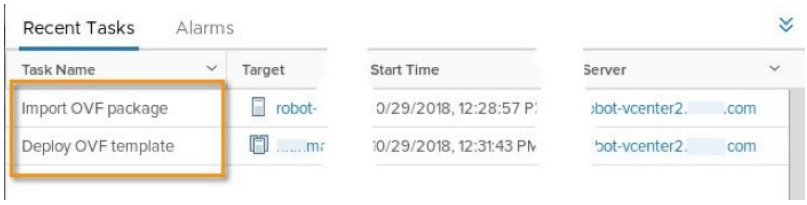
Step 12 Click **Next** to go to **10 Ready to complete**, as shown in the following figure. Review your settings and then click **Finish** if you are ready to begin deployment.



Step 13 Wait for the deployment to finish before continuing. To check the deployment status:

a) Open the vCenter vSphere client.

b) In the **Recent Tasks** tab for the host VM, view the status for the **Deploy OVF template** and **Import OVF package** jobs, as shown in the following figure:



Wait for the deployment status to become 100%.

Note If you are deploying Cisco Crosswork Data Gateway on VCenter 6.7U1 and above, you also need to set boot option to EFI before powering on the VM. Follow these steps:

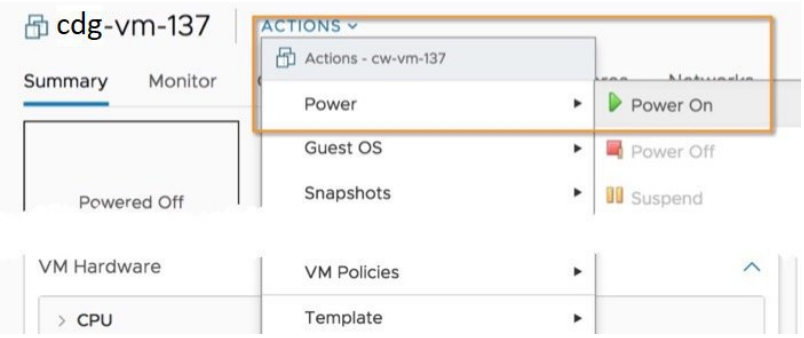
a. On the host VM **Summary** tab, below the **VM Hardware** table, click **Edit Settings**.

b. On the **Edit Settings** page, click the **VM Options** tab.

c. Expand the **Boot Options** dropdown list and change the **Firmware** setting to **EFI**, if it not set by default. When you are finished, click **OK**. You may want to take a snapshot of the VM at this point.

You can now proceed to power on the VM.

Step 14 Once the deployment status is 100%, power on the VM to complete the deployment process. Expand the host's entry so you can click the VM and then choose **Actions** > **Power** > **Power On**, as shown in the following figure:



Wait for at least 5 minutes for the Cisco Crosswork Data Gateway VM to come up and then login via vCenter or SSH as explained in the Section Log In and Log Out, on page 40.

Install Cisco Crosswork Data Gateway Via OVF Tool

This is an alternative way to install Cisco Crosswork Data Gateway. You can modify mandatory/optional parameters in the script as per your requirement and run the OVF Tool.

Below is a sample script for installing using this method:

```
#!/usr/bin/env bash

# robot.ova path
ROBOT_OVA_PATH="<mention the orchestrator path>"

# Download robot.ova
# Change the path to a convenient location for download
ova_path=<mention the ova path>

mkdir -p $ova_path

echo "Delete ova image if exists"
rm -rf $ova_path/*.ova

# Download robot.ova
cd $ova_path
echo "Downloading ova image"
wget -d --proxy=off -r -l1 -H -t1 -nd -N -np -A.ova -erobots=off ${ROBOT_OVA_PATH}

filename=`find $ova_path -name \*.ova`

VM_NAME="dg-42"
DM="thin"
Deployment="onpremise"


Hostname="Hostname"
ManagementIPv4Address="<management_ipv4_address>"
ManagementIPv4Gateway="<management_ipv4_gateway>"
ManagementIPv4Netmask="<management_ipv4_netmask>"
ManagementIPv4Method="Static"
SouthDataIPv4Address="<southdata_ipv4_address>"
```

```
SouthDataIPv4Gateway="<southdata_ipv4_gateway>"
SouthDataIPv4Netmask="<southdata_ipv4_netmask>"
SouthDataIPv4Method="Static"
NorthDataIPv4Address="<northdata_ipv4_address>"
NorthDataIPv4Gateway="<northdata_ipv4_gateway>"
NorthDataIPv4Netmask="<northdata_ipv4_netmask>"
NorthDataIPv4Method="Static"

DNS="<DNS_ip_address>"
NTP="<NTP Server>"
Domain="cisco.com"

ControllerIP="<controller_ipv4_address>"
ControllerPort="<controller_port>"
ControllerSignCertChain="cw-admin@<management_ip_address>:/home/cw-admin/controller.pem"
ControllerCertChainPwd="<Password>"


Description="Description for Cisco Crosswork Data Gateway for 42"
Label="Label for Cisco Crosswork Data Gateway dg-42"

dg_adminPassword="<dg-admin_password>"
dg_operPassword="<dg-oper_password>"

EnrollmentURI="<enrollment_package_URI>"
EnrollmentPassphrase="<password>"

# Please replace this information according to your vcenter setup

VCENTER_LOGIN="<vCenter login details>"
VCENTER_PATH="<vCenter path>"
DS="<DS details>"

ovftool --acceptAllEulas --X:injectOvfEnv --skipManifestCheck --overwrite --noSSLVerify
--powerOffTarget --powerOn \
--allowExtraConfig --extraConfig:firmware=efi --extraConfig:uefi.secureBoot.enabled=true \
--datastore="$DS" --diskMode="$DM" \
--name=$VM_NAME \
--net:"Management=VM Network" \
--net:"SouthData=DPortGroupVC-1" \
--net:"NorthData=DPortGroupVC-2" \
--deploymentOption=$Deployment \
--prop:"ControllerIP=$ControllerIP" \
--prop:"ControllerPort=$ControllerPort" \
--prop:"ControllerSignCertChain=$ControllerSignCertChain" \
--prop:"ControllerCertChainPwd=$ControllerCertChainPwd" \
--prop:"EnrollmentURI=$EnrollmentURI" \
--prop:"EnrollmentPassphrase=$EnrollmentPassphrase" \
--prop:"Hostname=$Hostname" \
--prop:"Description=$Description" \
--prop:"Label=$Label" \
--prop:"ManagementIPv4Address=$ManagementIPv4Address" \
--prop:"ManagementIPv4Gateway=$ManagementIPv4Gateway" \
--prop:"ManagementIPv4Netmask=$ManagementIPv4Netmask" \
--prop:"ManagementIPv4Method=$ManagementIPv4Method" \
--prop:"SouthDataIPv4Address=$SouthDataIPv4Address" \
--prop:"SouthDataIPv4Gateway=$SouthDataIPv4Gateway" \
--prop:"SouthDataIPv4Netmask=$SouthDataIPv4Netmask" \
--prop:"SouthDataIPv4Method=$SouthDataIPv4Method" \
--prop:"NorthDataIPv4Address=$NorthDataIPv4Address" \
--prop:"NorthDataIPv4Gateway=$NorthDataIPv4Gateway" \
--prop:"NorthDataIPv4Netmask=$NorthDataIPv4Netmask" \
--prop:"NorthDataIPv4Method=$NorthDataIPv4Method" \
--prop:"DNS=$DNS" \
```

```
--prop:"NTP=$NTP" \
--prop:"dg-adminPassword=$dg_adminPassword" \
--prop:"dg-operPassword=$dg_operPassword" \
--prop:"Domain=$Domain" $ROBOT_OVA_PATH "vi://$VCENTER_LOGIN/$VCENTER_PATH"
```

Step 1 Open a command prompt.

Step 2 Navigate to the location where you installed the OVF Tool.

Step 3 Run the OVF Tool using the following command:

The command contains the location of the source OVF file and location of the vmx file that will be created as a result of executing the command:

```
ovftool <location_of_source_ovf_file> <location_of_vmx_file>
```

For example,

```
root@cxcloudctrl:/opt# ./cdgovfdeployVM197
```

Post-installation Tasks

Once the Cisco Crosswork Data Gateway is installed, complete the following tasks in the order of their listing:

- Log In and Log Out, on page 40
- Generate An Enrollment Package, on page 42
- Export Enrollment Package

Log In and Log Out

You can use either of the following two ways to access Cisco Crosswork Data Gateway:

- Access Cisco Crosswork Data Gateway Through vCenter, on page 40
- Access Cisco Crosswork Data Gateway Via SSH, on page 41

Access Cisco Crosswork Data Gateway Through vCenter

Follow these steps to log in via vCenter:

Step 1 Locate the VM in vCenter and then right click and select **Open Console**.

The Cisco Crosswork Data Gateway flash screen comes up.

Step 2 Enter username (`dg-admin` or `dg-oper` as per the role assigned to you) and the corresponding password (the one that you created during installation process) and press **Enter**.

```
Cisco Crosswork Data Gateway

  #####  ######  #######  #####   #####  #     # ####### ######  #    #
 #     # #     # #     # #     # #     # #  #  # # #     # #     # #   #
 #       #     # #     # #       #       #  #  # # #     # #     # #  #
 #       ######  #     #  #####   #####  #  #  # # #     # ######  ###
 #       #   #   #     #       #       # #  #  # # #     # #   #   #  #
 #     # #    #  #     # #     # #     # #  #  # # #     # #    #  #   #
  #####  #     # #######  #####   #####   ## ##  ####### #     # #    #

Copyright (c) 2019 by Cisco Systems, Inc.
Version: 1.1.0 (branch dg110dev - build number 245)
Built on: Nov-20-2019 00:06 AM UTC

Password:
```

Access Cisco Crosswork Data Gateway Via SSH

Note The SSH process is protected from brute force attacks by blocking the client IP after a number of login failures. Failures such as incorrect username or password, connection disconnect, or algorithm mismatch are counted against the IP. Up to 4 failures within a 20 minute window will cause the client IP to be blocked for at least 7 minutes. Continuing to accumulate failures will cause the blocked time to be increased. Each client IP is tracked separately.

Follow these steps to login via SSH.

Step 1 Run the following command:

ssh <username>@<ManagementNetworkIP>

where **ManagementNetworkIP** is the management network IP address.

For example,

To login as adminstrator user: **ssh dg-admin@<ManagementNetworkIP>**

To login as operator user: **ssh dg-oper@<ManagementNetworkIP>**

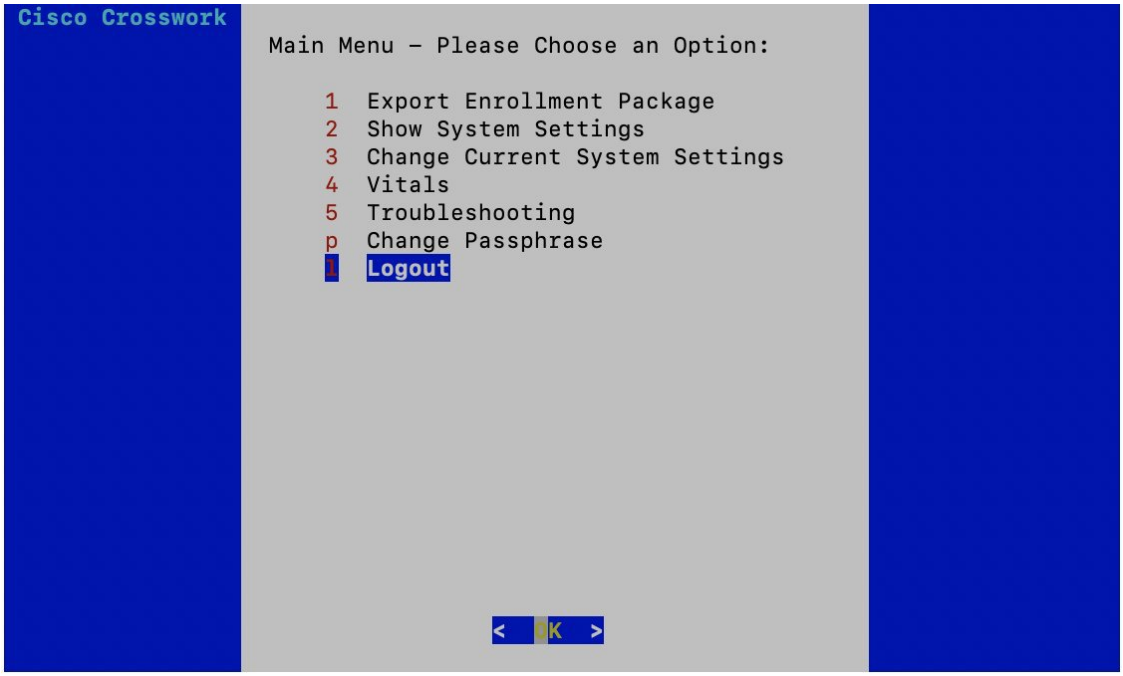
The following Cisco Crosswork Data Gateway flash screen opens prompting for password:

```
Cisco Crosswork Data Gateway

  #####  ######  #######  #####   #####  #     # ####### ######  #    #
 #     # #     # #     # #     # #     # #  #  # # #     # #     # #   #
 #       #     # #     # #       #       #  #  # # #     # #     # #  #
 #       ######  #     #  #####   #####  #  #  # # #     # ######  ###
 #       #   #   #     #       #       # #  #  # # #     # #   #   #  #
 #     # #    #  #     # #     # #     # #  #  # # #     # #    #  #   #
  #####  #     # #######  #####   #####   ## ##  ####### #     # #    #

Copyright (c) 2019 by Cisco Systems, Inc.
Version: 1.1.0 (branch dg110dev - build number 245)
Built on: Nov-20-2019 00:06 AM UTC

Password:
```

Step 2 Input the corresponding password (the one that you created during installation process) and press **Enter**.

Log Out

To log out, select option **l Logout** from the Main Menu and press Enter or click **OK**.



Generate An Enrollment Package

Every Cisco Crosswork Data Gateway instance must be identified by means of an immutable identifier. This requires generation of a Cisco Crosswork Data Gateway enrollment package. The enrollment package can be generated during installation by supplying OVF parameters or by using the **Export Enrollment Package** option from the interactive menu in the console.

The enrollment package is a JSON document created from the information obtained through the OVF template populated by the user during installation. It includes the all necessary information about Cisco Crosswork

Data Gateway required for registering, such as Certificate, UUID of the Cisco Crosswork Data Gateway instance, and metadata like Cisco Crosswork Data Gateway instance name, creation time, version info, and so on.

If you opted not to export the enrollment package during install, then you must export it before you can enroll the Cisco Crosswork Data Gateway instance with Crosswork. The steps to do so are described in Export Enrollment Package, on page 43.

Note The enrollment package is unique to each Cisco Crosswork Data Gateway instance.

A sample enrollment package JSON file is shown below:

```
{
  "name": "dg116.cisco.com",
  "description": "CDG Base VM for Automation",
  "profile": {
    "cpu": 8,
    "memory": 31,
    "nics": 3
  },
  "interfaces": [
    {
      "name": "eth0",
      "mac": "00:50:56:9e:09:7a",
      "ipv4Address": "<ip_address>/24"
    },
    {
      "name": "eth1",
      "mac": "00:50:56:9e:67:c3",
      "ipv4Address": "<ip_address>/16"
    },
    {
      "name": "eth2",
      "mac": "00:50:56:9e:83:83",
      "ipv4Address": "<ip_address>/16"
    }
  ],
  "certChain": [
[redacted]
  ],
  "version": "1.1.0 (branch dg110dev - build number 152)",
  "duuid": "d58fe482-fdca-468b-a7ad-dfbfa916e58b"
}
```

Export Enrollment Package

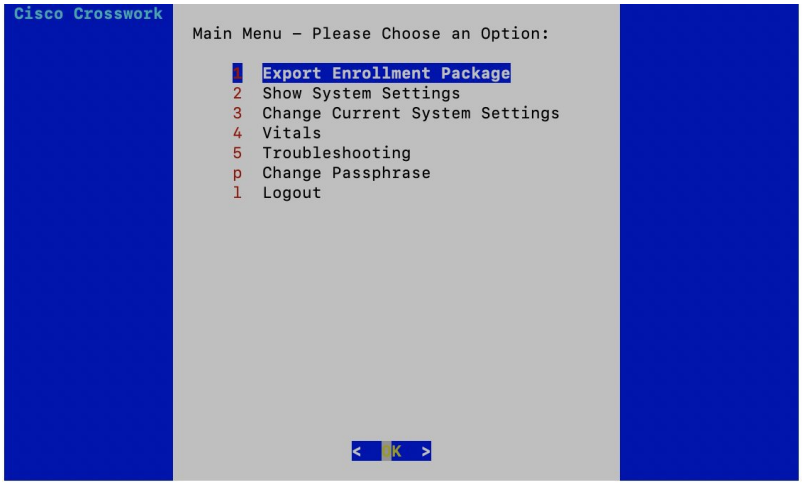
Before enrolling Cisco Crosswork Data Gateway with Cisco Crosswork Optimization Engine, you must export the enrollment package.

Note This is needed only if you have not specified **Auto Enrollment Package Transfer** settings in the OVF template. Otherwise, the file will be at the SCP URI destination after the VM boots.

Follow these steps:

Step 1 Log into the Cisco Crosswork Data Gateway Base VM as explained in Section Log In and Log Out, on page 40.

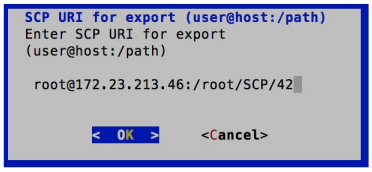
Step 2 From the Main Menu, select **1 Export Enrollment Package** and click **OK**.



Step 3 Enter the SCP URI for exporting the enrollment package and click **OK**.

Note The host must run an SCP server. If no alternative SCP server is available, then Crosswork can be used. An example URI is given below:

```
cw-admin@<Crosswork_VM_Management_IP_Address>:/home/cw-admin
```



Step 4 Enter the SCP passphrase (the SCP user password) and click **OK**.

The enrollment package is exported.

Step 5 Manually copy the enrollment package from the above SCP server to your local computer, to be used in the next task to enroll Cisco Crosswork Data Gateway with Cisco Crosswork Optimization Engine.

Enroll Cisco Crosswork Data Gateway With Cisco Crosswork Optimization Engine

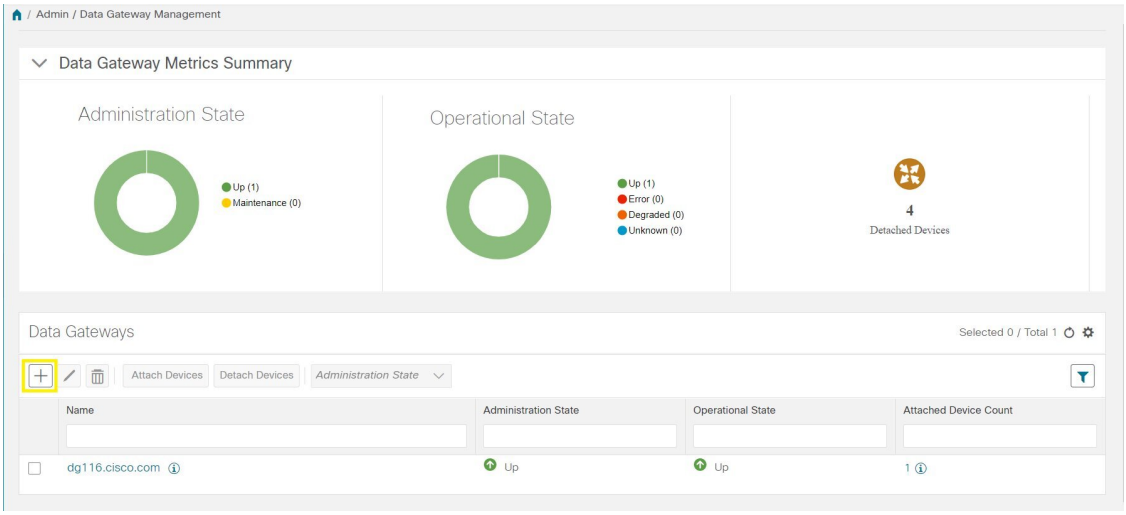
Enroll Cisco Crosswork Data Gateway

Step 1 Log into Cisco Crosswork Optimization Engine as described in Section Log In to the UI From a Browser, on page 17.

Step 2 From the Main Menu, select **Admin** > **Data Gateway Management**.

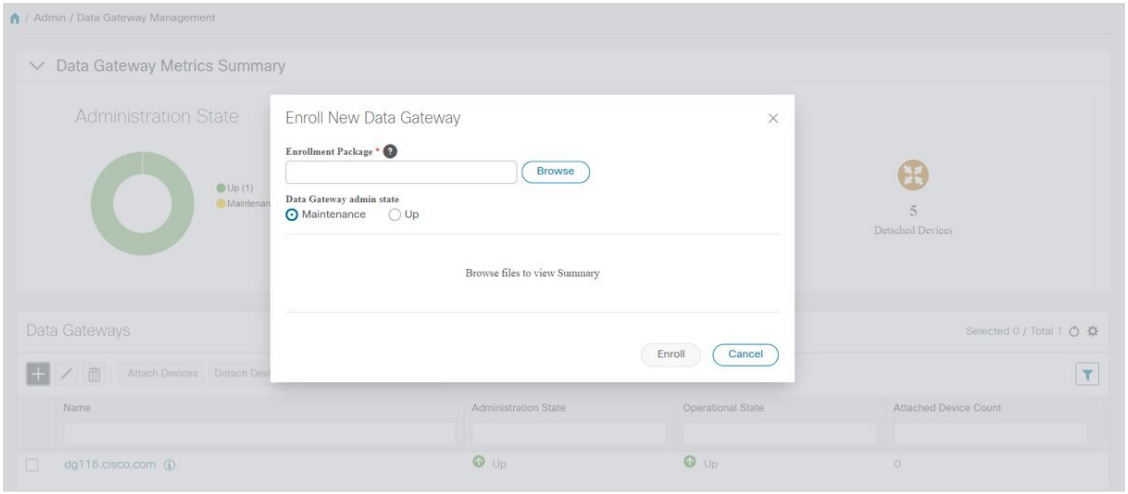
The **Data Gateway Management** page opens.

Step 3 Click the **Add** button.



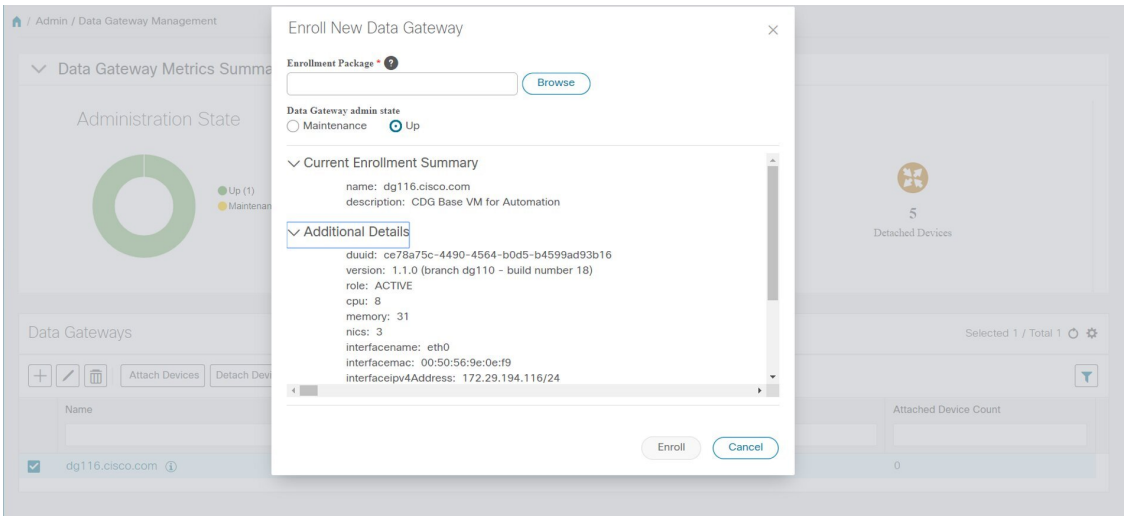
The **Enroll New Data Gateway** dialog opens.

Step 4 Click **Browse** and navigate to the folder to which you copied the enrollment package and select it.



Step 5 Select the **Data gateway admin state** in which you want to bring up the Cisco Crosswork Data Gateway:

- **Up** (recommended): Select this state if you want to bring up the Cisco Crosswork Data Gateway in active mode. Up state moves the operational state of the Cisco Crosswork Data Gateway to up with no intermediate step.
- **Maintenance**: Select this state if you want to bring up the Cisco Crosswork Data Gateway in maintenance mode. Maintenance state moves the operational state of the Cisco Crosswork Data Gateway to up. However, it applies an identifying flag to the Cisco Crosswork Data Gateway while you perform any additional testing and setup.



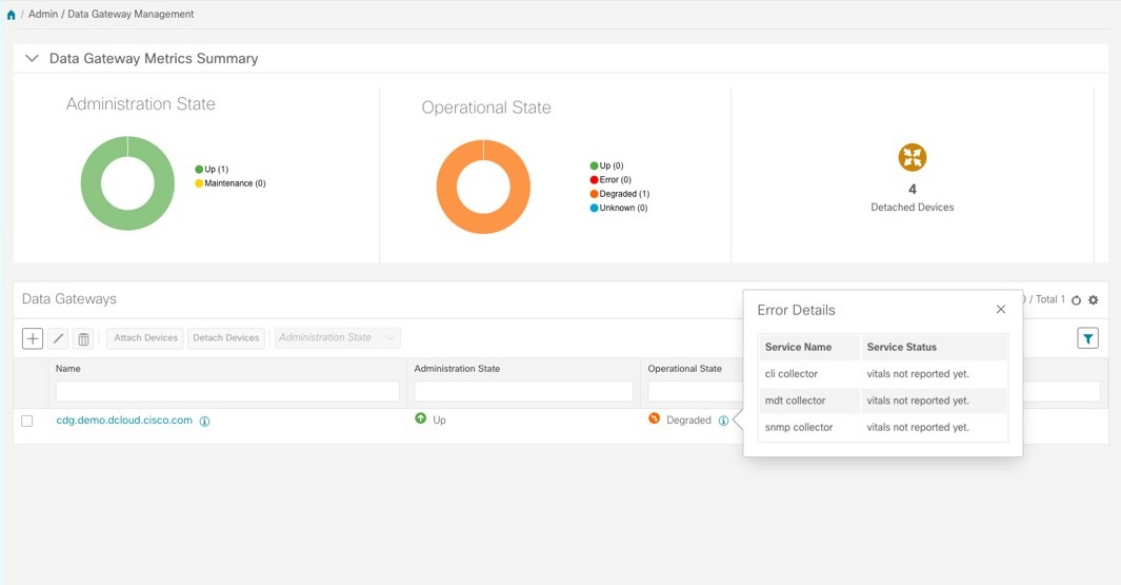
The **Enroll New Data Gateway** dialog displays a summary of the selected enrollment package:

- Name of the Cisco Crosswork Data Gateway instance
- Description of the Cisco Crosswork Data Gateway instance
- Labels associated with the Cisco Crosswork Data Gateway instance

It also displays additional details:

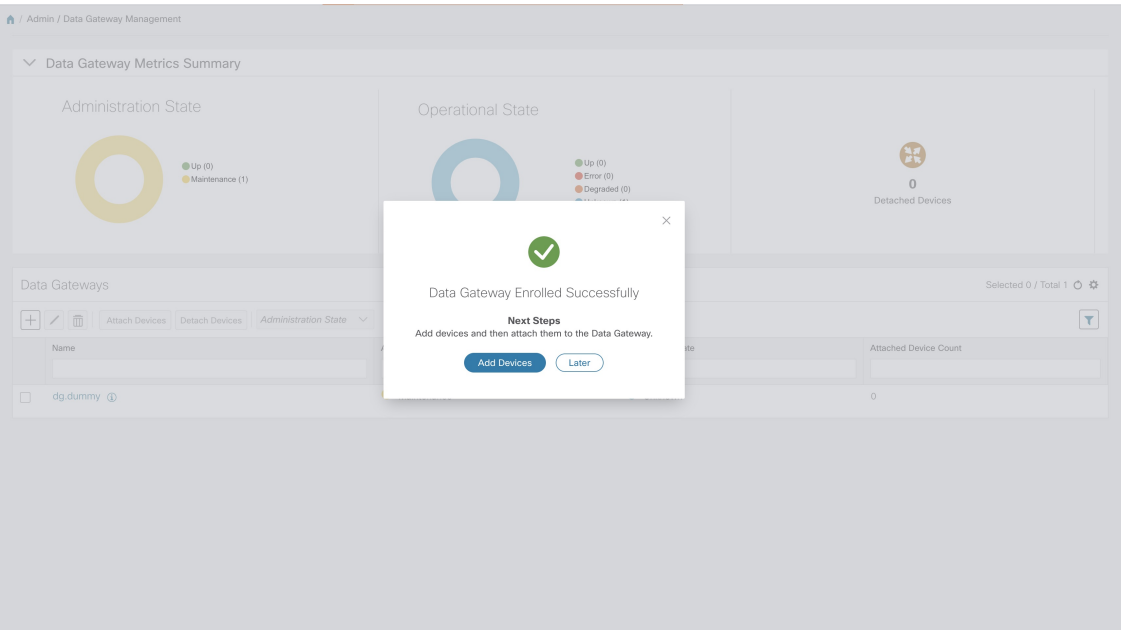
- Number of CPUs
- Memory
- Number of NICs
- Interface name
- Interface MAC address
- Interface IPv4Address
- certChain
- Version
- DUUID

Step 6 Click **Enroll**.Cisco Crosswork Data Gateway displays the following message upon successful enrollment:



Once you click **Enroll**, a dialog pops up asking if you want to attach devices now or later. It is recommended to choose **Later** as devices must only be attached once the operational state of the Cisco Crosswork Data Gateway instance is **Up**.

Note Steps to attach devices to a Cisco Crosswork Data Gateway instance are available in *Cisco Crosswork Change Automation and Health Insights 3.1 User Guide*.



What to do next

The Operational Status of a Cisco Crosswork Data Gateway instance is shown as "**Degraded**" until it establishes a connection with Cisco Crosswork Optimization Engine and downloads collector binary files. While it

depends on the bandwidth between the Cisco Crosswork Data Gateway instance and Cisco Crosswork Optimization Engine, this operation typically takes less than 5 minutes. Click the ↻ icon in the **Data Gateways** pane to refresh the pane to reflect the latest operational status of the Cisco Crosswork Data Gateway instance and wait for it to become **Up**. If the Cisco Crosswork Data Gateway instance fails to enroll, contact Cisco CX for assistance.

Cisco Crosswork Data Gateway Authentication and Bootstrap

During the enrollment process, the enrollment package is uploaded to the controller application, i.e., Cisco Crosswork Optimization Engine, which then instantiates a new Cisco Crosswork Data Gateway instance in its database and waits for a "first-sign-of-life" from the Cisco Crosswork Data Gateway.

Session Establishment

Once the connectivity is established, the Cisco Crosswork Data Gateway instance confirms the identity of the controller and offers its own proof of identity via signed certificates during this initial connection.

Download of Configuration Files

Once the session is established, Cisco Crosswork Data Gateway downloads the following configuration files:

Table 2: Configuration Files

boot-config	A json response created by Crosswork that contains a list of services (docker containers) and functional images should be downloaded on that particular Cisco Crosswork Data Gateway instance.
docker-compose	A YAML file that contains instructions and order to start up the right set of services and functional images.

Download of Functional Images

A functional image represents a collection profile for a protocol, i.e., CLI, SNMP, or MDT. Cisco Crosswork Data Gateway downloads the following functional images:

Table 3: Functional Images

CLI Collection	To connect to a device using SSH/Telnet, collect **show** commands output, and send it to the designated output destination.
SNMP Collection	To connect to a device using SNMP protocol, collect SNMP responses, receive SNMP traps, and send them to a designated output destination.
MDT Collection	To connect to a device and collect model-driven telemetry or event-driven telemetry events, and send them to a designated output destination.

After the downloads, Cisco Crosswork Data Gateway boots the containers.

Cisco Crosswork Data Gateway is now ready to collect data.

Troubleshoot the Cisco Crosswork Data Gateway Installation and Enrollment

The following table lists common problems that might be experienced while installing or enrolling Cisco Crosswork Data Gateway, and provides approaches to identifying the source of the problem and solving it.

Table 4: Troubleshooting the Installation/Enrollment

Issue	Action
1. Cannot enroll Cisco Crosswork Data Gateway with Crosswork	
Cisco Crosswork Data Gateway cannot be enrolled with Cisco Crosswork Optimization Engine due to an NTP issue, i.e., there is a clock-drift between the two. The clock-drift might be with either Cisco Crosswork Data Gateway or Cisco Crosswork Optimization Engine. Also, on the NTP servers for Cisco Crosswork Optimization Engine and Cisco Crosswork Data Gateway, the initial time is set to the ESXi server. For this reason, the ESXi server must also have NTP configured. Sync the clock time on the host and retry.	1. Log into the Cisco Crosswork Data Gateway VM. 2. From the main menu, go to **5 Troubleshooting** > **Run show-tech**. Enter the destination to save the tarball containing logs and vitals and click **OK**. In the show-tech logs (in file `session.log` at location `/opt/dg/data/controller-gateway`), if you see the error `UNAUTHENTICATED:invalid certificate. reason: x509: certificate has expired or is not yet valid`, then there is a clock-drift between Cisco Crosswork Data Gateway and . 3. From the main menu, go to **3 Change Current System Settings** > **1 Configure NTP**. Configure NTP to sync with the clock time on the Cisco Crosswork Optimization Engine server and try re-enrolling Cisco Crosswork Data Gateway. It is also possible that the Cisco Crosswork Optimization Engine's NTP server might be down or its address might be incorrect. To configure NTP on the Cisco Crosswork Optimization Engine side, see Configure NTP after installation.
2. Cisco Crosswork Data Gateway remains in degraded state for more than 10 minutes with reason stated as "Could not collect vitals"	

Issue	Action
Cisco Crosswork Data Gateway remains in degraded state for more than 10 minutes with reason stated as "Could not collect vitals" due to certificate errors.	1. Log into the Cisco Crosswork Data Gateway VM. 2. From the main menu, select **5 Troubleshooting** > **Run show-tech**. Enter the destination to save the tarball containing logs and vitals and click **OK**. In the show-tech logs (in file `gateway.log` at location `/opt/dg/log/controller-gateway/gateway.log`), if you see certificate errors, then re-upload the Controller Signing Certificate, as explained in the steps below: 1. From the main menu, select **3 Change Current System Settings** > **7 Import Certification**. 2. From the **Import Certificates** menu, select **1 Controller Signing Certificate File** and click **OK**. 3. Enter the SCP URI for the certificate file and click **OK**.
3. Cisco Crosswork Data Gateway remains in degraded state for more than 10 minutes with reason stated as "gRPC connection cannot be established"	
Cisco Crosswork Data Gateway remains in degraded state for more than 10 minutes with reason stated as "gRPC connection cannot be established" due to certificate errors.	1. Re-upload the certificate file as explained in the troubleshooting scenario **2.** above. 2. Reboot the Cisco Crosswork Data Gateway VM following the steps below: a. From the main menu, select **5 Troubleshooting** and click **OK**. b. From the Troubleshooting menu, select **7 Reboot VM** and click **OK**. c. Once the reboot is complete, check if the Cisco Crosswork Data Gateway's operational status is **Up**.

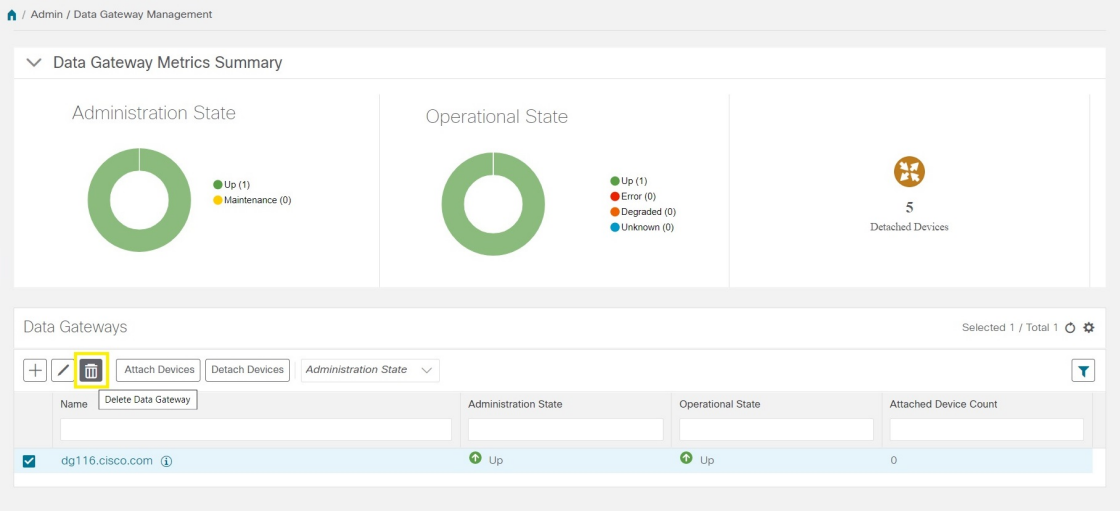
De-enroll Cisco Crosswork Data Gateway

Step 1 Log in to Crosswork UI as desribed in Log In to the UI From a Browser, on page 17.

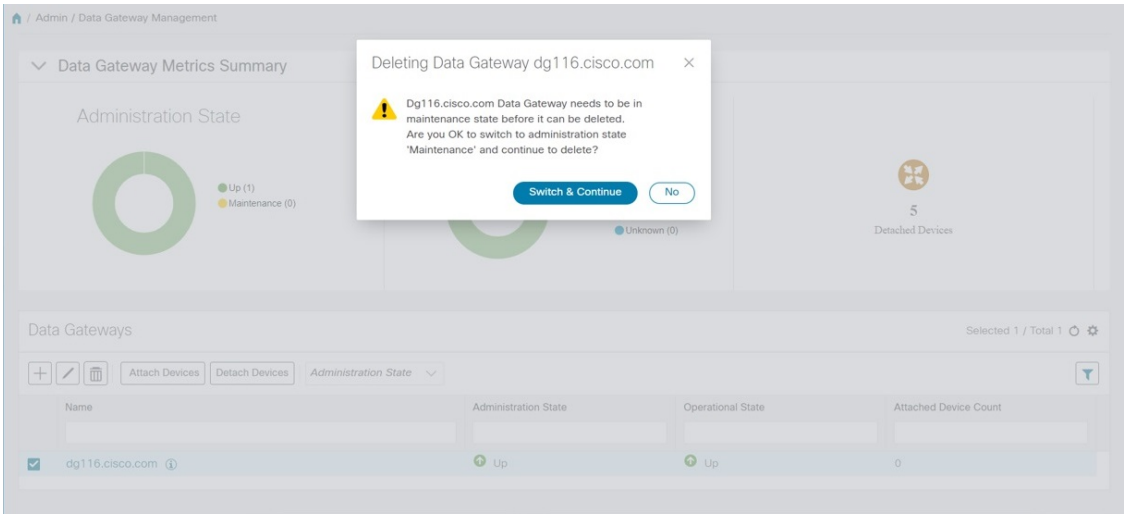
Step 2 From the navigation panel, select **Admin** > **Data Gateway Management**.

The **Data Gateway Management** page opens.

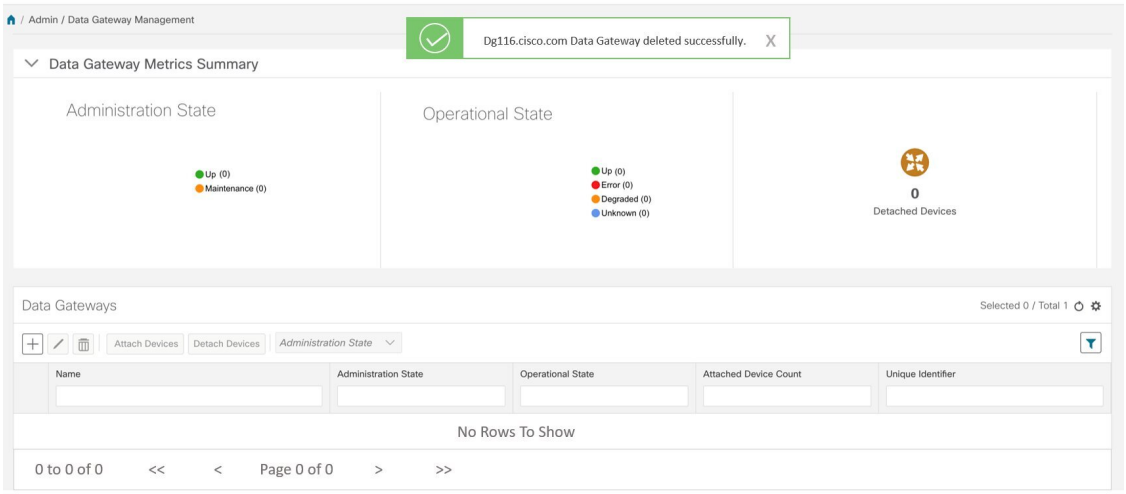
Step 3 In the **Data Gateways** panel, select the Cisco Crosswork Data Gateway VM you want to remove and click **Delete** button.



Step 4 A Cisco Crosswork Data Gateway instance must be in maintenance mode to be deleted. Click **Switch & Continue** when prompted to switch to maintenance mode.



The selected Cisco Crosswork Data Gateway VM is deleted.


/ Admin / Data Gateway Management
Dg116.cisco.com Data Gateway deleted successfully.
X
Data Gateway Metrics Summary
Administration State
Up (0)
Maintenance (0)
Operational State
Up (0)
Error (0)
Degraded (0)
Unknown (0)
0
Detached Devices
Data Gateways
Selected 0 / Total 1
Attach Devices
Detach Devices
Administration State
Name
Administration State
Operational State
Attached Device Count
Unique Identifier
No Rows To Show
0 to 0 of 0
<<
<
Page 0 of 0
>
>>