Installation Tasks

This section contains the following topics:

- Install Cisco Crosswork Optimization Engine, on page 1
- Verify the VM Configuration, on page 11
- Log In to the UI From a Browser, on page 12
- Troubleshoot the Installation, on page 13

Install Cisco Crosswork Optimization Engine

Before you begin, ensure that:

- You are creating the Cisco Crosswork Network Automation VM on VMware ESXi 6.5 (Update 2d or later), and using the VMware vCenter Server 6.5 (Update 2d or later). .
- The Cisco Crosswork Network Automation VM has allocated to it a minimum of 96 GB of RAM, 16 vCPUs, and 1 TB of hard drive space.
- You have a public IPv4 address to assign to the Cisco Crosswork Network Automation VM's management network virtual interface. The DNS and NTP servers, and the default gateway, must be reachable via this IP address.
- You have a public or private IPv4 address to assign to the Cisco Crosswork Network Automation VM's data network virtual interface. This IP address must be able to reach your managed devices, and be reachable by Cisco Network Services Orchestrator.

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 Network Automation VM hosting the Cisco Crosswork Optimization Engine server. You will use it to verify that the VM has been properly set up (see Verify the VM Configuration, on page 11).
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.

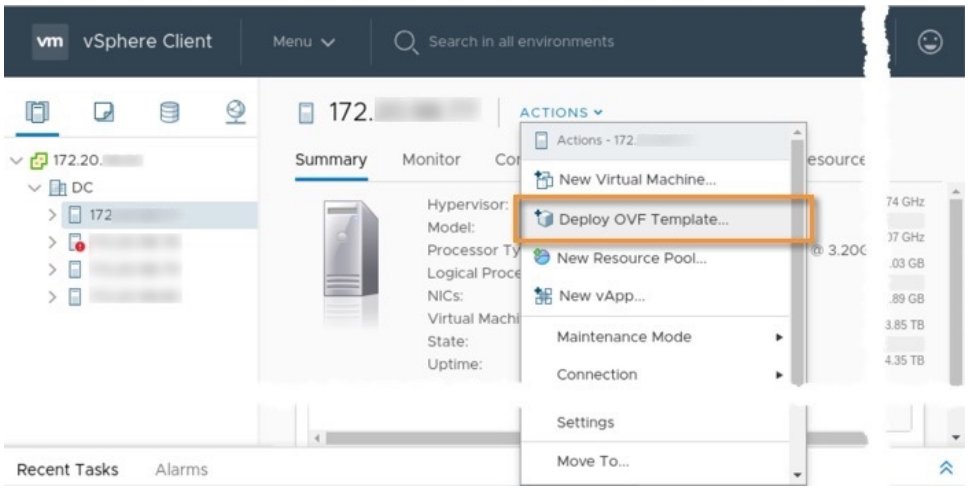
These two administrative usernames are reserved and cannot be changed. The first time you log in using either of these administrative IDs, you will be prompted to change that ID's password.

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).

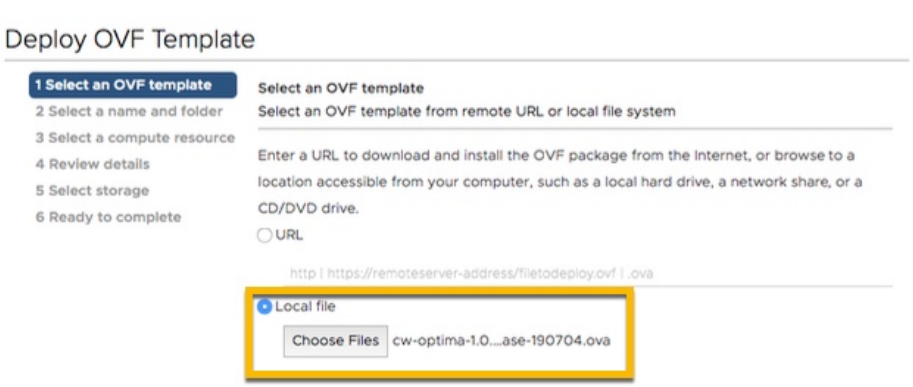
Step 1 Download the latest available Cisco Crosswork Optimization Engine image file (*.ova) to your system.

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 three separate Open Virtualization Format and Virtual Machine Disk component files: `cw.ovf`, `cw_rootfs.vmdk`, and `cw_dockerfs`.vmdk.

Step 2 With VMware ESXi running, log in to the VMware vSphere Client or vSphere Web Client. Then select **Actions** > **Deploy OVF Template**, as shown in the following figure.



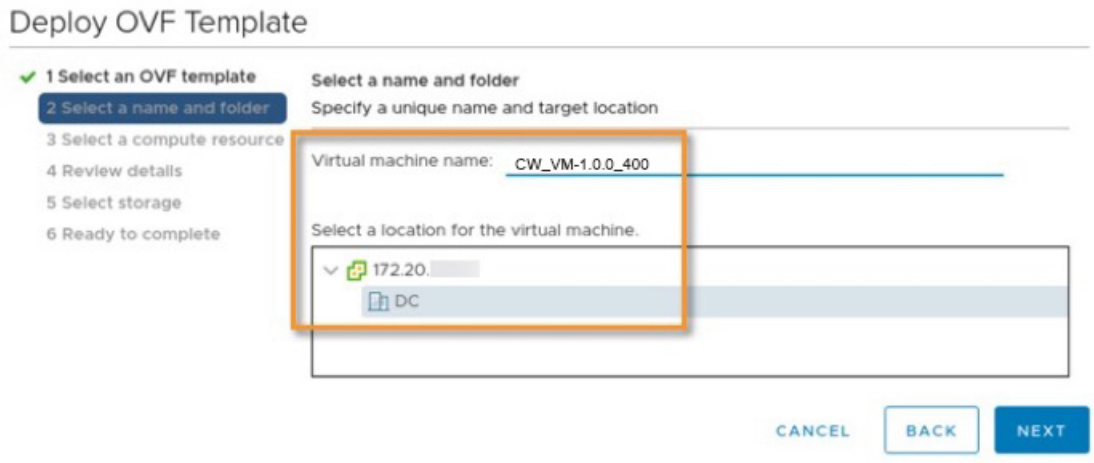
Step 3 The VMware **Deploy OVF Template** wizard appears and highlights the first step, **1 - Select an OVF Template**, as shown in the following figure. Click **Browse** to navigate to the location where you downloaded the OVA image file and select it. Once selected, the file name is displayed in the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



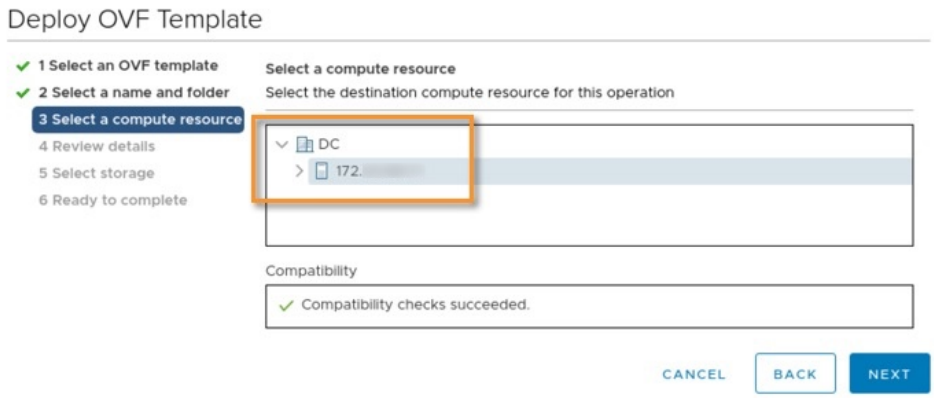
Step 4 Click **Next** to go to **2 - Select a name and folder**, as shown in the following figure. Enter a name for the Cisco Crosswork Network Automation VM you are creating. In the **Select a location for the virtual machine** list, choose the location under which the Cisco Crosswork Network Automation VM will reside.

Cisco recommends that you include the Cisco Crosswork Optimization Engine version and build number in the name (for example: `CW_VM-1.0.0_400`).

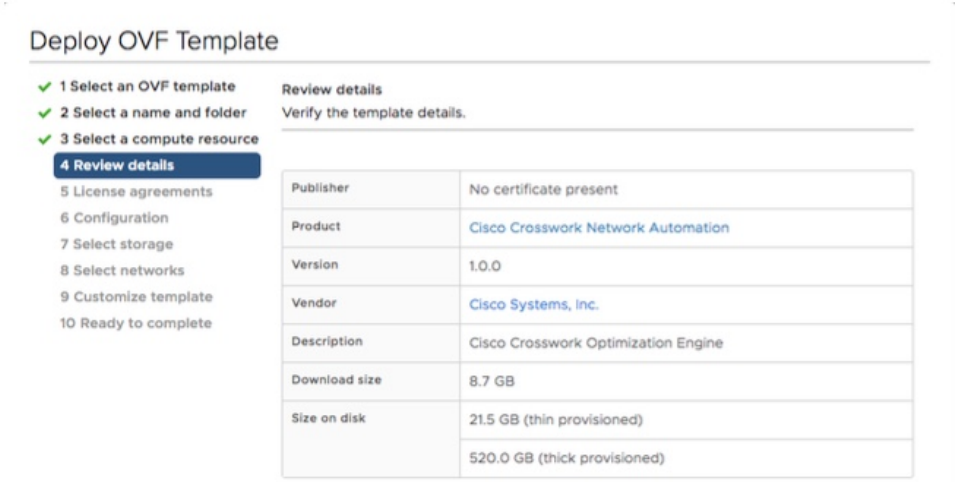
Figure 1: VM Name



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

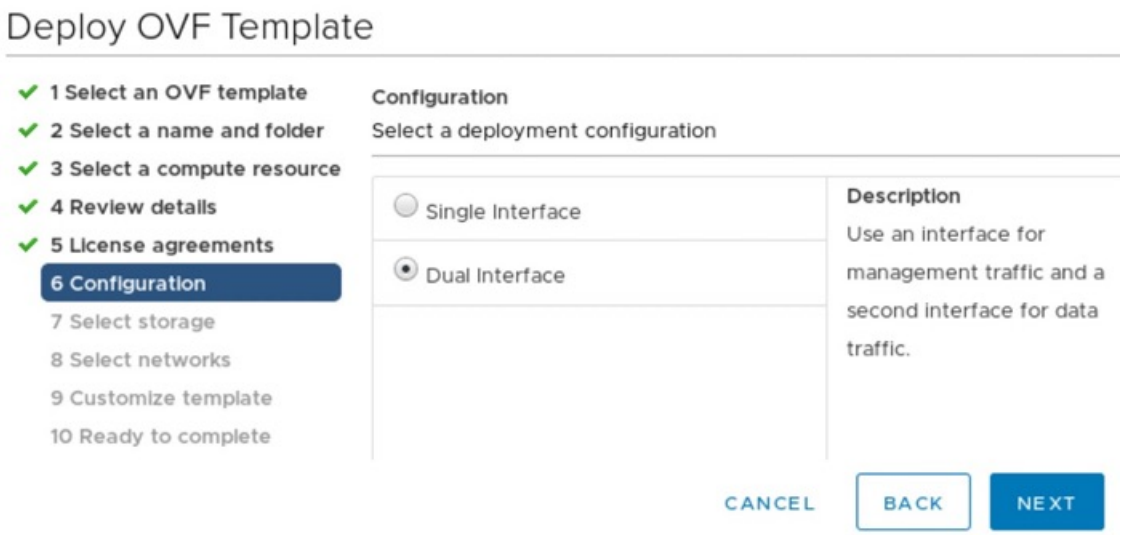


Step 6 Click **Next**. The VMware vCenter Server validates the OVA. Network speed will determine how long validation takes. When validation is complete, the wizard moves to **4 - Review details**, as shown in the following figure. Take a moment to review the OVF template you are deploying. Note that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

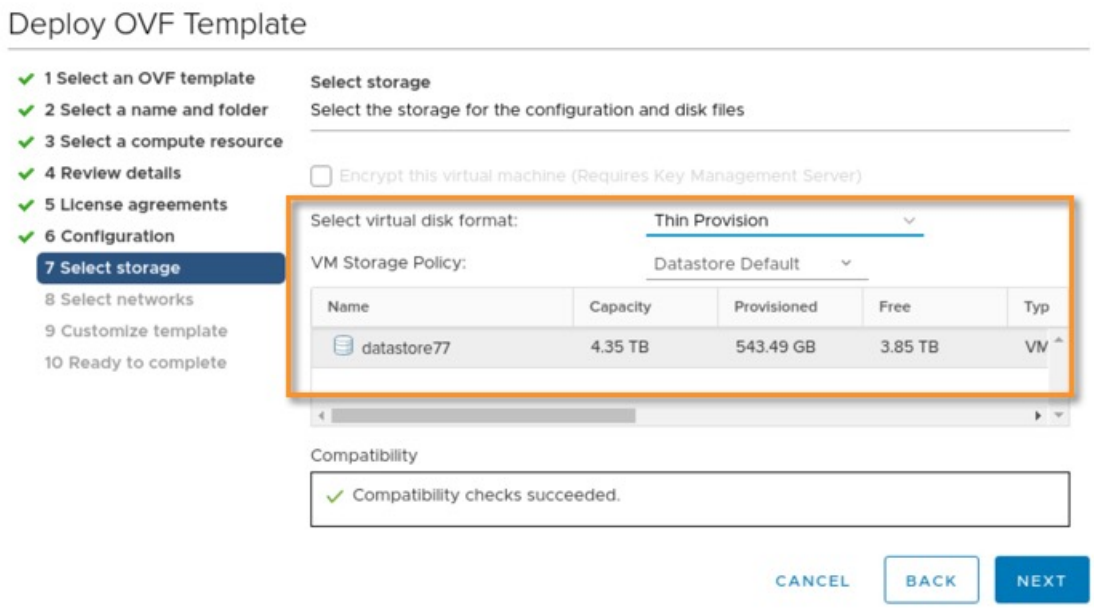


Step 7 Click **Next** to go to **5 - License Agreements**. Review the End User License Agreement and ensure that the **I accept all license agreements** checkbox is checked before you continue.

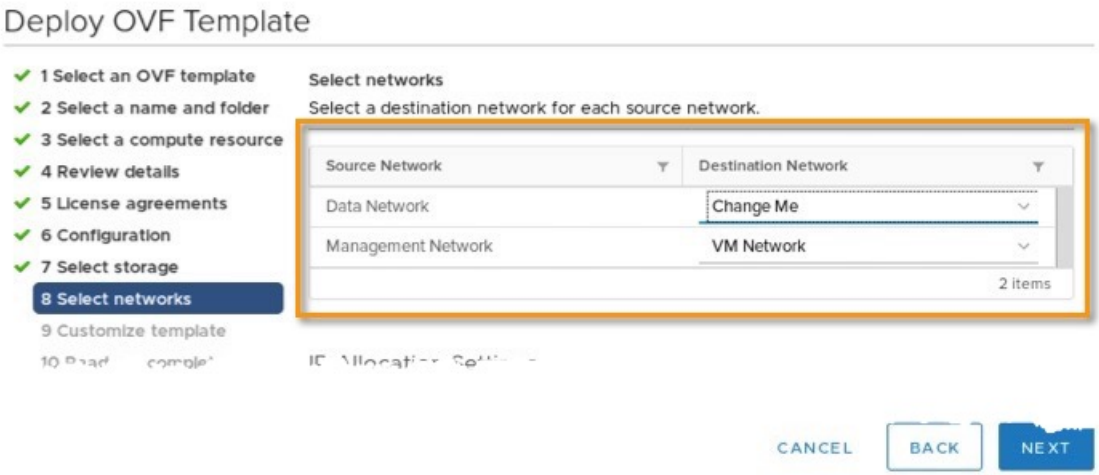
Step 8 Click **Next** to go to **6 - Configuration**, as shown in the following figure. Select the number of interfaces (VMNICs) to use. Cisco recommends that you choose the default **Dual Interface** configuration.



Step 9 Click **Next** to go to **7 - Select Storage**, as shown in the following figure. Cisco recommends that you select **Thin Provision** 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.

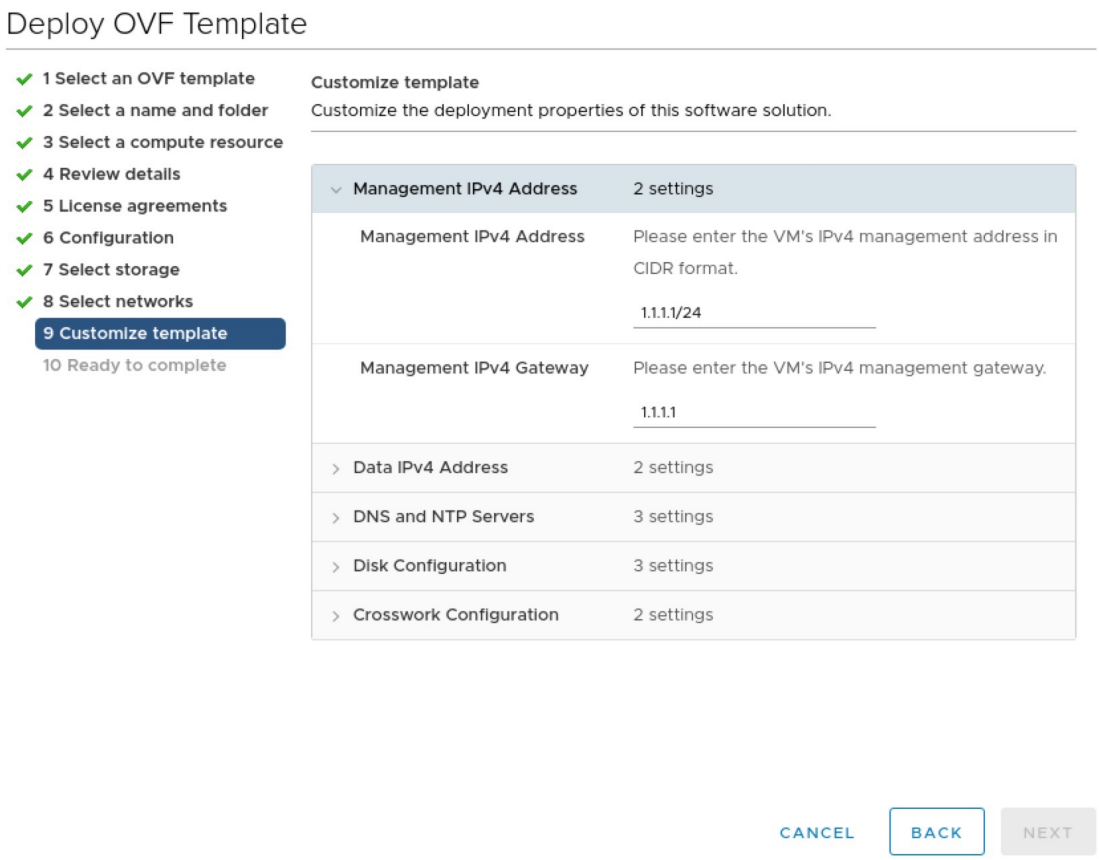


Step 10 Click **Next** to go to **8 - Select networks**, as shown in the following figure. In the dropdown table at the top of the page, choose the appropriate destination network for the source **Data Network** and **Management Network**, respectively.



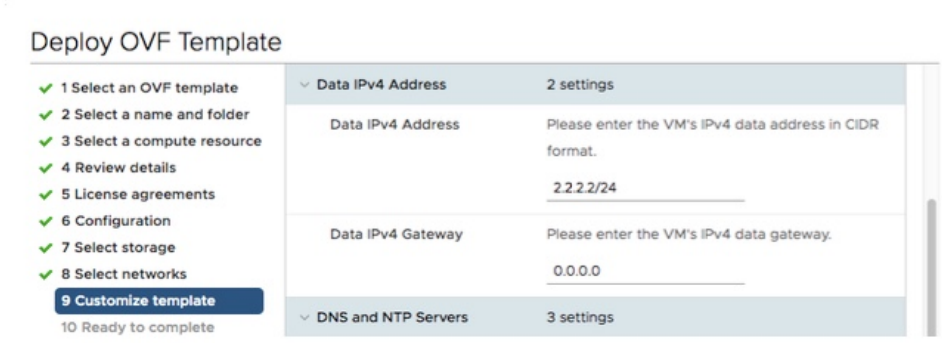
Step 11 Click **Next** to go to **9 - Customize template**, with the **Management IPv4 Address** settings already expanded, as shown in the following figure. Make entries in both fields:

- The **Management IPv4 Address** is the IP address for managing and interacting with the Cisco Crosswork Optimization Engine user face. Enter it in CIDR format.
- The **Management IPv4 Gateway** is the IPv4 address of the primary gateway to the Cisco Crosswork Optimization Engine management IP and the management network.



Step 12 Expand the **Data Network IPv4 Address** settings, as shown in the following figure. Make entries in both fields:

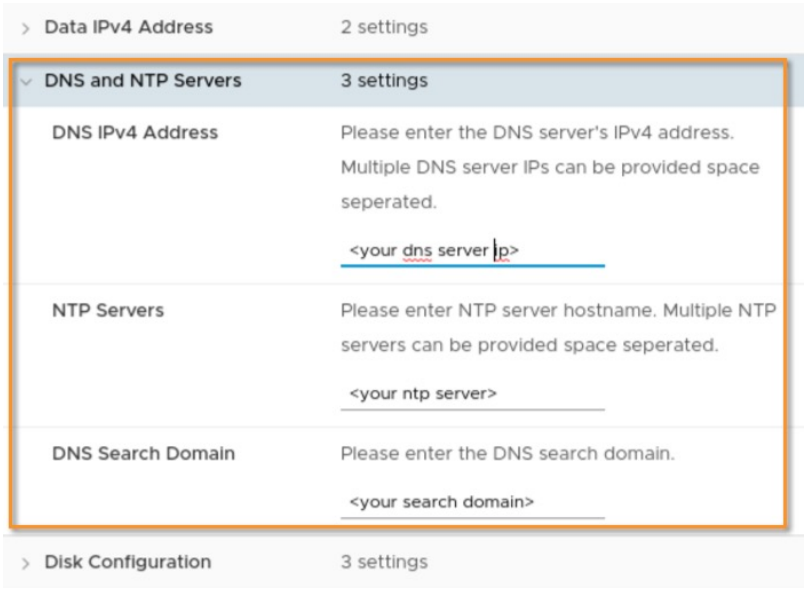
- The **Data IPv4 Address** is the IP address for managing and interacting with the managed devices and with Cisco Crosswork Optimization Engine providers. Enter it in CIDR format.
- The **Data IPv4 Gateway** is the IPv4 address of the primary gateway to the Cisco Crosswork Optimization Engine data IP address, and to the managed devices and providers.



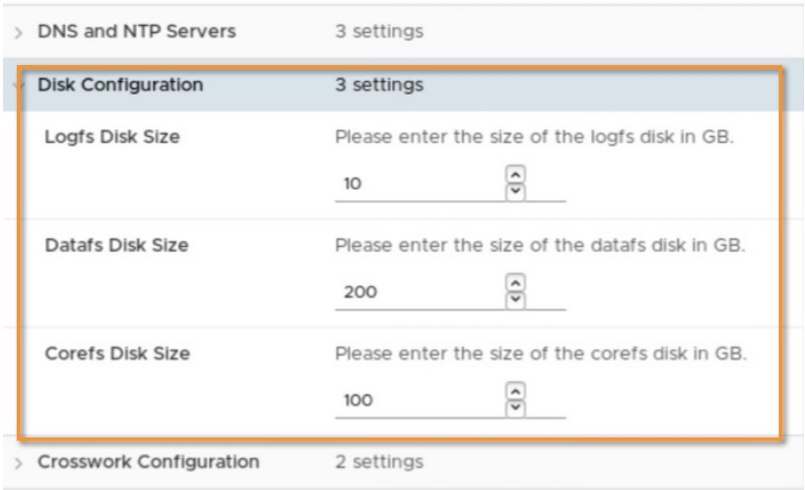
Step 13 Expand the **DNS and NTP Servers** settings, as shown in the following figure. Make entries in three fields:

- **DNS IPv4 Address**: The IPv4 addresses of the DNS servers you want the Cisco Crosswork Optimization Engine server to use. Separate multiple IP addresses with spaces.

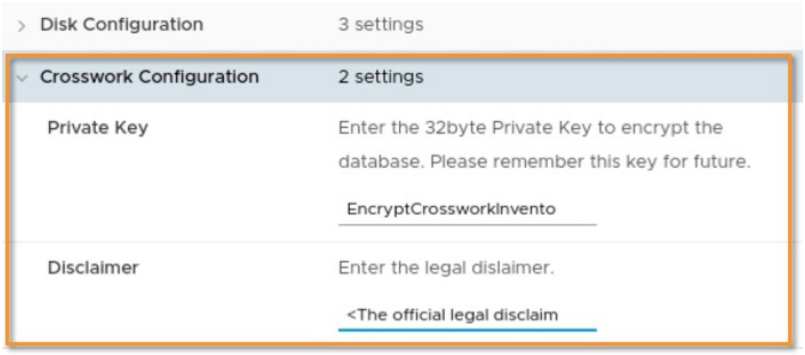
- **DNS Search Domain**: The name of the DNS search domain.
- **NTP Servers**: The IP addresses or host names of the NTP servers you want to use. Separate multiple IPs or host names with spaces.



Step 14 Expand the **Disk Configuration** settings, as shown in the following figure. Make entries in all three fields. . The settings shown in the figure should work for most environments.

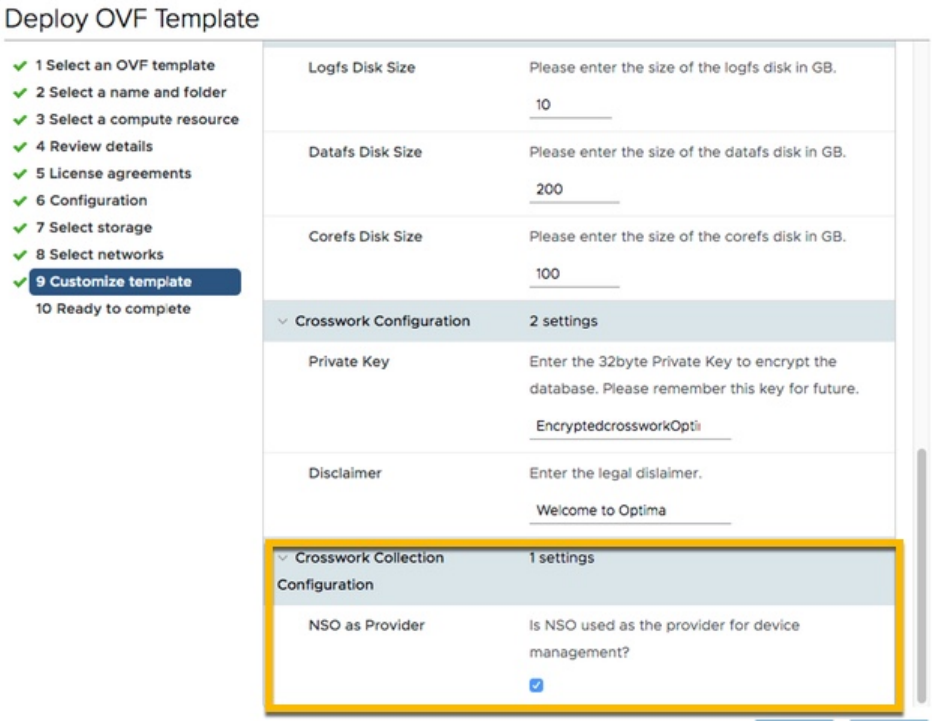


Step 15 Expand the **Crosswork Configuration** settings, as shown in the following figure. Make entries in both fields. The **Private Key** encrypts the inventory database.

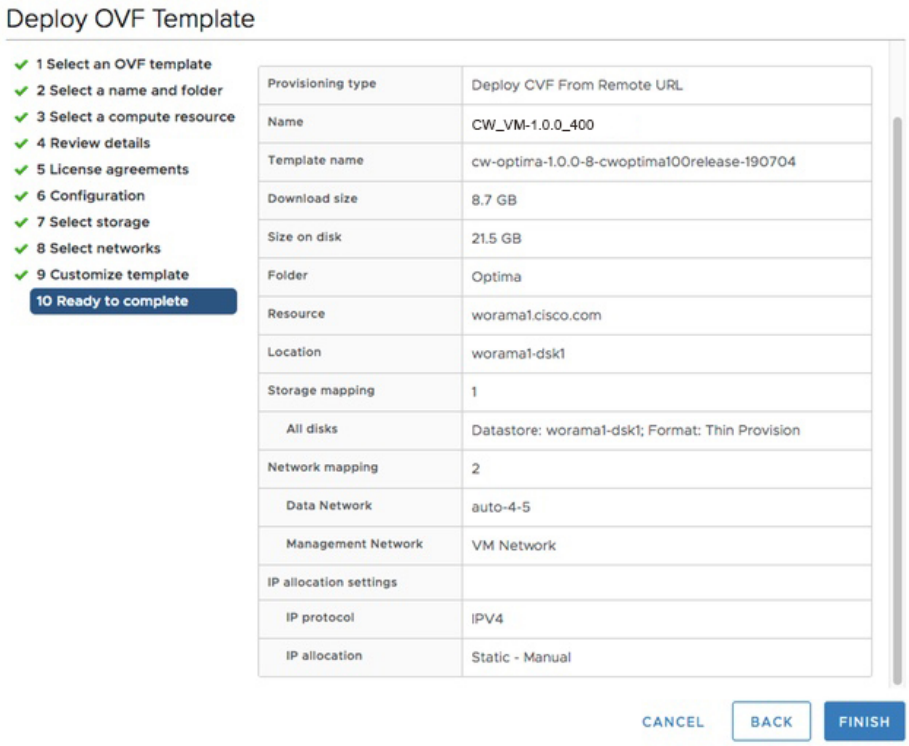


Step 16 Expand the **Crosswork Collection Configuration** settings, as shown in the following figure.

Check this option if you plan to use Cisco NSO and want to manage more than 500 MDT capable devices. By selecting this option, you will have enabled the multiple collection mode which uses multiple MDT collectors (depending on the number of devices that are added). Do not check this option if you do not plan to add Cisco NSO as a provider. When this option is deselected, you will have enabled the single collection mode where only one MDT collector is used and Cisco NSO cannot be mapped to devices. For more guidance and information on which mode to select, see Collection Modes).



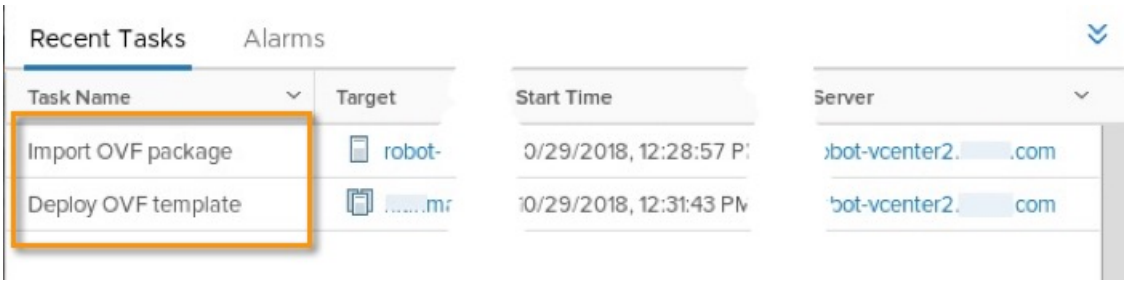
Step 17 Click **Next** to go to **10 - Ready to Complete**, as shown in the following figure. Review your settings and then click **Finish** if you are ready to begin deployment.



Step 18 Wait for the deployment to finish before continuing. To check on the deployment status:

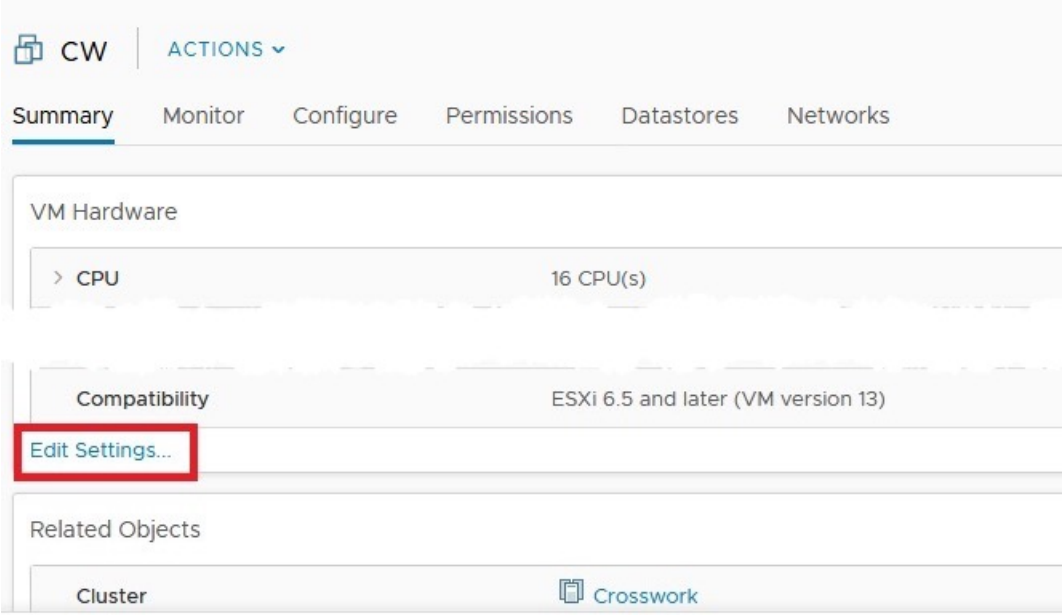
a) Open a VMware vCenter client.

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



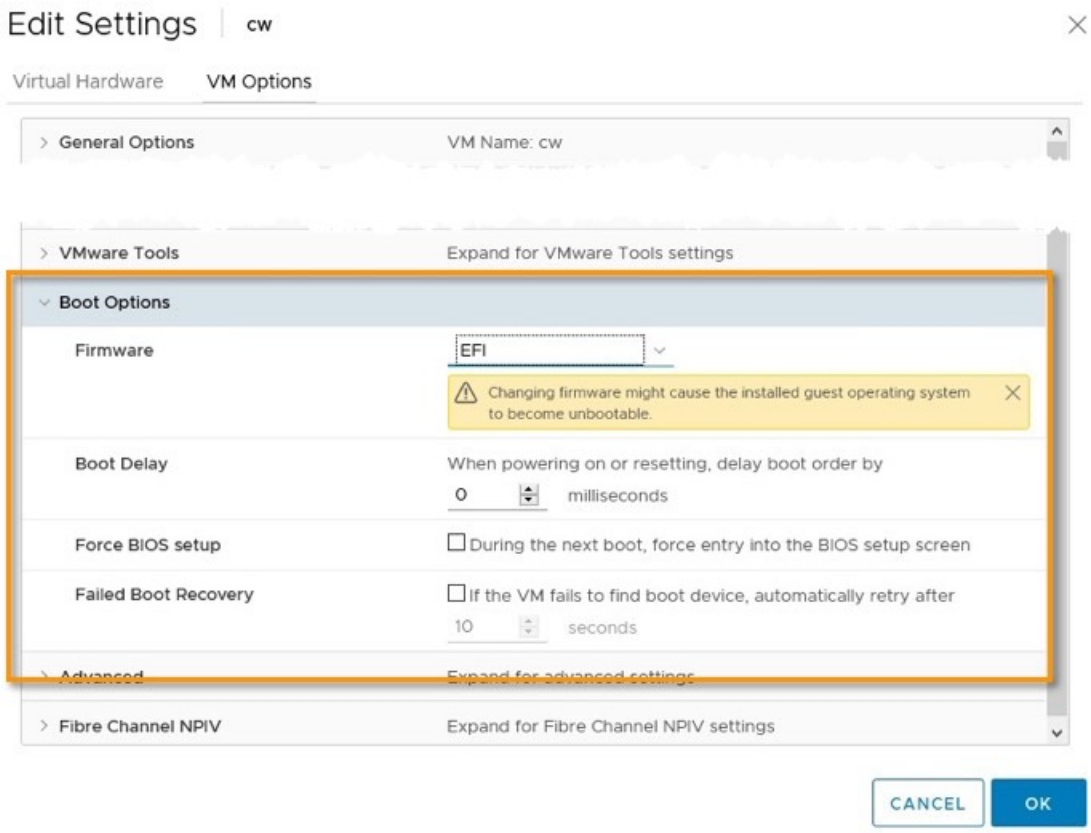
Step 19 After the deployment tasks are complete, edit the host's VM settings to permit boot from EFI Firmware:

a) On the host VM **Summary** tab, below the **VM Hardware** table, click **Edit Settings**, as shown in the following figure.



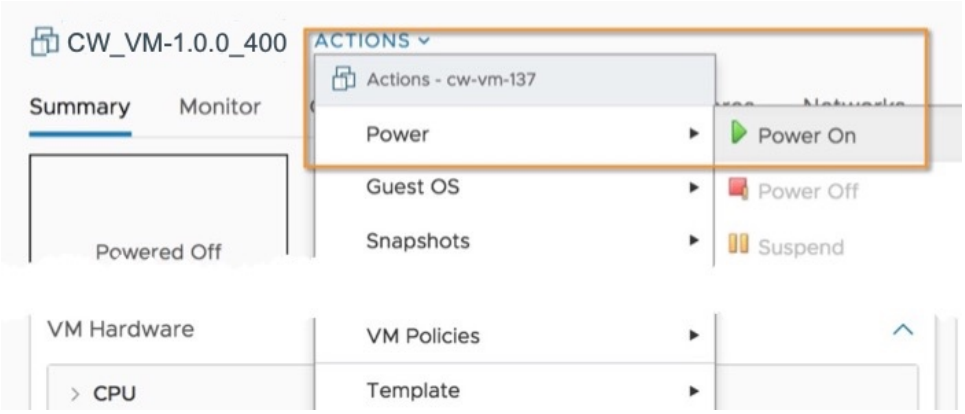
b) On the **Edit Settings** page, click the **VM Options** tab.

c) Expand the **Boot Options** dropdown list and change the **Firmware** setting to **EFI**, as shown in the following figure. When you are finished, click **OK**. You may want to take a snapshot of the VM at this point.



Step 20 You can now power on the Cisco Crosswork Network Automation VM to complete the deployment process. Expand the host's entry so you can click the Cisco Crosswork Network Automation VM and then choose **Actions** > **Power** > **Power On**, as shown in the following figure.

Figure 2: Power On



From this point, it will take 20 minutes for the Cisco Crosswork Network Automation 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 Connect to the Cisco Crosswork Optimization Engine VM via SSH, as follows:

Enter the SSH command using he default VM administrator user name (**cw-admin**) and the IPv4 management network address you specified when deploying the Cisco Crosswork Optimization Engine image, as follows:

```
ssh cw-admin@ManagementNetworkIP
```

Where *ManagementNetworkIP* is the management network IPv4 address. For example:

```
ssh cw-admin@1.1.1.1
```

When prompted, enter the default cw-admin user password, **cw-admin**.

If you cannot connect to the VM at all, see Troubleshoot the Installation, on page 13.

Step 2 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 Shift to sudo user access (`sudo su`), then enter the following commands to verify the Cisco Crosswork Optimization Engine VM:

- `ifconfig eth0`—Shows the management network IP address of the VM. This should match the management network IP address you entered during the installation.

- `ifconfig eth1`—Shows the data network IP address of the VM. This should match the data network IP address you entered during the installation.
- `kubectl get nodes`—Checks the Kubernetes cluster and shows the VM IP address with a `Ready` status.

If the IP addresses do not match what you entered, or you do not get a `Ready` status, see Troubleshoot the Installation, on page 13.

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 13.

Before you begin

Connect to the virtual machine and verify that it is properly configured before attempting to log in to the user interface (see Verify the VM Configuration, on page 11).

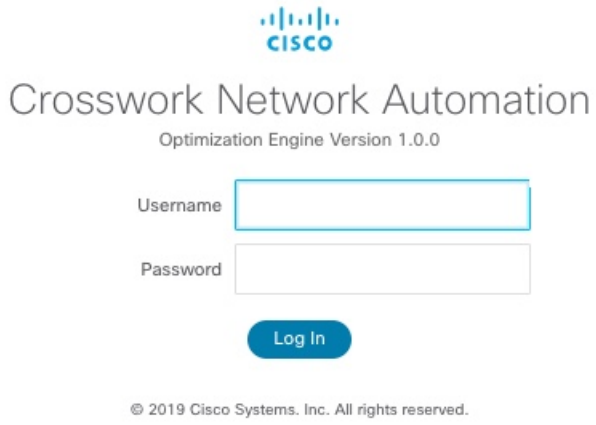
Step 1 Launch one of the supported browsers (see Supported Web Browsers).

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

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

The **Log In** window opens, as shown in the following figure.

Figure 3: Cisco Crosswork Optimization Engine Log In Window



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 Network Automation administrator username **admin** and the default password **admin**.
b) Click **Log In**.
c) When prompted to change the Cisco Crosswork Network Automation 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.

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 11. 2. Redeploy the VM from scratch, using the correct IP configuration.
VM cannot be reached by the provided gateways due to other network issues	1. Log into the VM via the VMware console. 2. Change the IP settings as needed to fix the issue.
Cannot Display the User Interface	
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 you entered during installation). 2. Log in to the VM using SSH, as explained in Verify the VM Configuration, on page 11. 3. At the prompt, enter the command **collect**. 4. Contact Cisco TAC.

Issue	Action
Running `kubectl get nodes` does not display the correct VM IPv4 management and data addresses.	1. While connected to the VM, open the file `/etc/resolve.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 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 mismatched `Ready` status counts (for example: `2/3 Ready` or `0/1 Ready`instead of `3/3 Ready` or `1/1 Ready`).	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, redeploy the VM.
Able to Display the User Interface	
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".

Issue	Action
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 TAC.