



Cisco Prime Network Registrar Virtual Appliance

The Cisco Prime Network Registrar virtual appliance includes all the functionality available in a version of Cisco Prime Network Registrar 8.3.6 installed on any Linux operating system.

This chapter describes how to install Cisco Prime Network Registrar virtual appliance and includes the following sections:

- [System Requirements, on page 1](#)
- [Installing and Upgrading Cisco Prime Network Registrar Virtual Appliance, on page 2](#)
- [Upgrading the Cisco Prime Network Registrar Virtual Appliance, on page 6](#)
- [Next Steps: Cisco Prime Network Registrar Virtual Appliance, on page 7](#)

System Requirements

There are three kits that can be used to install the virtual appliance:

- An OVA which runs on VMware ESXi 5.5 or later
- A KVM kit which runs on a KVM hypervisor running on CentOS 7.x or Red Hat (RHEL)

These kits are effectively identical, and in this guide, when the OVA is discussed, the discussion applies to all three kits unless otherwise noted.

Each of these kits were created to require limited resources: 1 virtual CPU, 8 GB main memory, 6 GB swap partition, and a 7.5 GB system partition with 5.4 GB available (free). The total disk storage required is 14 GB. You will almost certainly want to increase the size of the system disk, and giving the virtual appliance additional virtual CPU's can increase the performance considerably. You should ensure that sufficient resources are available on the host that you are targeting for the deployment to meet these requirements.

You must increase the resources used by the virtual appliance or it will not function successfully. There are two different regimes: running a local cluster, or running a regional cluster and local cluster on the same machine. The recommendations below are for running the virtual appliance(s) on a Jumpstart, but these are also useful starting points for any local or regional cluster deployment. For a local cluster:

- CPU: 1 socket, 8 CPUs
- Memory: 12 GB
- Disk: 100 GB or greater

For a regional cluster running on the same Jumpstart as a local cluster:

- CPU: 1 socket, 7 CPUs
- Memory: Minimum 8 GB
- Disk: 35 GB

You may need substantially more disk space than listed above based on the size of your deployment. You can increase the disk space by resizing the allocated disk and rebooting the appliance.

Installing and Upgrading Cisco Prime Network Registrar Virtual Appliance

You can deploy the virtual appliance in any of three environments, VMware ESXi 5.5 or later, CentOS/RHEL 7.4 KVM hypervisor. After discussing the information that you will need to determine for any deployment, the individual environments are discussed in detail.

Preparing to Deploy the Cisco Prime Network Registrar Virtual Appliance

In order to deploy the Cisco Prime Network Registrar virtual appliance and configure its network connection, you have to answer several questions. Some of these questions concern the networking environment in which the virtual appliance is being deployed, and some of them concern values which are unique to the particular virtual appliance being deployed.

The questions that are unique to the installation of this particular virtual appliance are listed below. You must decide on answers to these questions before you deploy the virtual appliance.

- A virtual machine name for the deployed virtual appliance.
- A root password for the underlying Linux CentOS operating system.
- An IPv4 address for the virtual appliance.
- A DNS name associated with the IPv4 address of the virtual appliance.
- A username and password for the initial administrator account for the Cisco Prime Network Registrar application.

The questions concerning the networking environment are as follows. The answers to these questions are not unique to the virtual appliance, but are instead values that are determined by the environment in which you will deploy the virtual appliance:

- The network mask associated with the IP address of the virtual appliance itself.
- The default gateway address for the virtual appliance.
- The IP address of at least one DNS server that can be accessed by the virtual appliance, although it is best if you have the IP addresses of two DNS servers to provide additional availability.
- Any proxy values necessary for the virtual appliance to access the Internet (if you want the virtual appliance to have access to the Internet).

- If this is a local cluster installation, you will need to determine the IP address of the Cisco Prime Network Registrar regional cluster to which this local cluster will connect in order to receive its license information. If this is a regional cluster installation, you can ignore this requirement.

Deploying the Regional Cluster OVA or Local Cluster OVA on VMware

The Cisco Prime Network Registrar virtual appliance is supported for production use on VMware ESXi 5.5 or later and can be accessed or managed using the VMware vSphere client. The Cisco Prime Network Registrar virtual appliance is made available in an Open Virtual Appliance (OVA) package.

The VMware vSphere client can be connected directly to your ESXi installation, or it can be connected to a vCenter server which in turn is connected to your vSphere installation. Connecting through vCenter provides a number of capabilities that connecting directly to ESXi does not. If a vCenter server is available and associated with the ESXi installation, it should be used.

To install the Cisco Prime Network Registrar virtual appliance, you must first download the correct installation file. There are two files available, a regional virtual appliance and a local cluster virtual appliance. Each of these virtual appliances are provided as a .ova file.

The names are:

- *cpnr_8_3_6_local.ova* for the local virtual appliance
- *cpnr_8_3_6_regional.ova* for the regional virtual appliance

Download the virtual appliance of your choice. Every Cisco Prime Network Registrar local cluster installation must connect to a Cisco Prime Network Registrar regional cluster in order to receive the necessary license information required to operate. Thus, before you install a Cisco Prime Network Registrar local virtual appliance you must identify the IP address of the regional cluster to which it will connect to receive the license information.

Using vSphere, connect directly to the ESXi installation or the vCenter server, and select the ESXi installation where the OVA is to be deployed.

If you have a vCenter server available, you can connect the ESXi hypervisor to your existing vCenter server and manage it through that vCenter server. Managing all your VMware hypervisors through a common vCenter server provides many benefits.

The screens that you see while managing the ESXi hypervisor with a vSphere client through a vCenter server are different from the screens that you see while connecting the vSphere client directly to the ESXi hypervisor. You can see additional screens if connected through vCenter server. These screens do not actually provide any benefit for the operations in which you will engage to deploy the Cisco Prime Network Registrar virtual appliance. The benefits to using the vCenter server approach come after the initial deployment of the virtual appliance.

To deploy a Regional Cluster OVA or Local Cluster OVA:

Step 1 From vSphere menu, choose **File > Deploy OVF Template**.

The Deploy OVF Template Source window appears.

Step 2 To deploy the OVA file, click **Browse** and navigate to select the OVA file (.ova) available on the local machine where vSphere is running.

Note You cannot browse for URLs and you must enter the full path to the file.

Step 3 Click **Next**.

The OVF Template Details window appears. It displays the product name, the size of the OVA file, and the amount of disk space that needs to be available for the virtual appliance.

Step 4 Verify the OVA template details and click **Next**.

Step 5 Provide a name to the new virtual appliance and click **Next**.

Note You must enter the same name while configuring the virtual appliance, so make sure you remember this name.

Step 6 Click **Next** to continue.

Note The virtual appliance is only supported when deployed with thick provisioning.

Step 7 To map the networks used in this OVA template to the networks in your inventory, select the current destination network and choose the destination network from the Destination Networks drop-down list. Click **Next**.

The Ready to Complete window appears.

Step 8 Click **Finish** to begin deployment of the OVF Template.


Booting and Configuring Cisco Prime Network Registrar Virtual Appliance

To boot and then configure the Cisco Prime Network Registrar virtual appliance:



Note You must set the memory and CPUs based on the requirements prior to clicking the power on. Once you start the VM you cannot change the memory or CPU settings until you shut down.

Step 1 After deploying the Virtual Appliance OVA, select the virtual machine name in vSphere, right-click on it and select **Open Console**.

Step 2 Click the **Power on** button () on the console and click in the window after clicking the Power on button.

During the initial boot of the newly deployed machine, you will be prompted to enter a root (system) password, which is not the Cisco Prime Network Registrar application password.

Note This is the root password for the underlying Linux operating system on which the Cisco Prime Network Registrar 8.3.6 application is installed. You will be asked to enter this password twice. You will need root access to the underlying Linux operating system at various times in the future, so make sure that you remember this password.

The boot process can take a while, both before you are asked for a root password, as well as after you enter the root password.

The End User License Agreement window appears on the first boot. Read the license agreement in its entirety, and only if you understand and accept the license terms, enter y (Yes).

Step 3 Log into the server as the root user.

- Step 4** To configure the network for the Virtual Appliance, see the appendix [Configuring Network Access on RHEL/CentOS 7.x Using nmcli](#).
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Deploying the Regional Cluster or Local Cluster on a KVM Hypervisor

To install the Cisco Prime Network Registrar virtual appliance, you must first download the correct installation file. There are two files available, a regional virtual appliance and a local cluster virtual appliance. Each of these virtual appliances are provided as a .bz2 file.

The names are:

- `cpnr_8_3_6_local.kvm.tar.bz2` for the local virtual appliance
- `cpnr_8_3_6_regional.kvm.tar.bz2` for the regional virtual appliance

Download the virtual appliance of your choice. Every Cisco Prime Network Registrar local cluster installation must connect to a Cisco Prime Network Registrar regional cluster in order to receive the necessary license information required to operate. Thus, before you install a Cisco Prime Network Registrar local virtual appliance you must identify the IP address of the regional cluster to which it will connect to receive the license information.

To install Cisco Prime Network Registrar on a KVM Hypervisor, extract the distribution tar archive (`cpnr_8_3_6_local.kvm.tar.bz2` or `cpnr_8_3_6_regional.kvm.tar.bz2`) using the following command:

```
root$ tar xvjf cpnr_8_3_6_local.kvm.tar.bz2
```

If you are unpacking both the local and the regional KVM kits, you must untar them in separate directories to avoid filename conflicts.



Note The extraction takes a few minutes and it requires a minimum of 14 GB free disk space. You should see the following files:

- `cpnr_8_3_6_local-disk1.raw`—contains the disk for the virtual machine
- `installonkvm`—installs the virtual machine
- `readme.kvm.txt`—contains the installation instructions

The first file (`-disk1.raw`) is the actual file that will be used as the disk file for the resulting CPNR KVM virtual machine. This file should be placed in the directory where you want it to reside long-term as the "source path" for the virtual disk in the CPNR KVM virtual machine. While you can move it even after the virtual machine is installed, it is easier to start with it in the correct location. You should move the `installonkvm` script along with it. The `installonkvm` script needs to be executable in order to operate correctly. To proceed with the installation, follow the instructions as specified in the `readme.kvm.txt` file. Once the installation is complete, see [Configuring Network Access on RHEL/CentOS 7.x Using nmcli](#).

Upgrading the Cisco Prime Network Registrar Virtual Appliance

This section describes the procedure for upgrading Cisco Prime Network Registrar to Cisco Prime Network Registrar virtual appliance and upgrading the operating system to CentOS 7.4 using the data from an existing virtual appliance.

Upgrading a Cisco Prime Network Registrar Installation to run on a Cisco Prime Network Registrar Virtual Appliance

This section describes how to upgrade an existing installation of Cisco Prime Network Registrar to become a Cisco Prime Network Registrar virtual appliance.



Note This procedure upgrades a current version of Cisco Prime Network Registrar running on a Linux operating system to a current version of the Cisco Prime Network Registrar virtual appliance. If you need to move from a different platform, you have to first convert to the Linux platform prior to upgrading to a virtual appliance. If you need to move from a different version of Cisco Prime Network Registrar to the current version of the virtual appliance, you have to first upgrade to the current version of Cisco Prime Network Registrar on an external Linux system before upgrading to the virtual appliance. See [Installing and Upgrading Cisco Prime Network Registrar](#).

- Step 1** Install the Cisco Prime Network Registrar virtual appliance.
- Step 2** Shut down the Cisco Prime Network Registrar application being upgraded using the following command: **systemctl stop nwreglocal**
- Step 3** If the version of Cisco Prime Network Registrar which you are moving to the virtual appliance is a version earlier than Cisco Prime Network Registrar 7.2, then perform the following steps:
- Note** If you are upgrading from 7.2, you do not require the `cnr_mcdexport` kit because 7.2 clusters do not use the MCD DB database technology and you can skip this step.
- a) Download the upgrade preparation kit, `cnr_mcdexport_linux5.tar`, from Cisco.com.
 - b) Untar the downloaded archive and run the script `cnr_mcdexport`.
- Step 4** Tar the existing ***install-path/local/data*** directory using the command:
- ```
tar cvf tarfile.tar data
```
- Step 5** Copy the tar file created to the new virtual appliance.
- Step 6** Shut down Cisco Prime Network Registrar on the new virtual appliance using the command:
- ```
systemctl stop nwreglocal
```
- Step 7** Rename the existing database to ***.orig*** using the command:
- ```
mv /var/nwreg2/local/data /var/nwreg2/local/data.orig
```
- Step 8** Untar the latest database, transferred in **Step 4**, using ***tar xvf tarfile.tar***.
- Step 9** Copy any existing extensions from the system being upgraded to the correct directories on the new virtual appliance.

**Step 10** Reboot the Cisco Prime Network Registrar virtual appliance using VMware vSphere.

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## Upgrading to a new Version of the Virtual Appliance Operating System

To upgrade and to use a new version of the Cisco Network Registrar virtual appliance, install a new virtual appliance which has the new operating system version on it, and then move the data and configuration from the existing virtual appliance to the new virtual appliance.

To do this, follow the steps in: [Upgrading a Cisco Prime Network Registrar Installation to run on a Cisco Prime Network Registrar Virtual Appliance, on page 6](#)

You can now reboot the new virtual machine. It will have the entire data directory of the existing virtual machine.



**Note** The new virtual machine with the upgraded operating system will pause during the boot process and instruct you to upgrade the Cisco Prime Network Registrar database to match the database version of the Cisco Prime Network Registrar application that resides on the new virtual machine.

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**Step 1** Press return on the console to complete the boot process.

**Step 2** Log in as root and run the displayed command.

After boot completion, you should see your existing configuration running with the new version of Cisco Prime Network Registrar on the new virtual machine.

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## Upgrading the Cisco Prime Network Registrar Application

If you want to upgrade the installation of Cisco Prime Network Registrar that currently exists on the virtual appliance to a new version of Cisco Prime Network Registrar, follow the procedure in Cisco Prime Network Registrar 8.3.6 Installation Guide to perform a straightforward software product upgrade. The installation of Cisco Prime Network Registrar delivered on the virtual appliance is a regular installation of the Cisco Prime Network Registrar software product.

## Next Steps: Cisco Prime Network Registrar Virtual Appliance

### Configuring Cisco Prime Network Registrar with the CLI on Virtual Appliance

The Cisco Prime Network Registrar command line interpreter (CLI) can be used to configure the virtual appliance in two ways:

- You can use the nrcmd CLI on the virtual appliance directly by first using SSH to connect into the underlying Linux operating system on the virtual appliance. You can use any username and password which you have created on the virtual appliance for the SSH login, and you must use an administrator

username and password for the Cisco Prime Network Registrar to use the nrcmd CLI to configure Cisco Prime Network Registrar.




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**Note** As distributed, there is only one valid user for the Linux operating system—root. While you can login as root to use the Cisco Prime Network Registrar CLI, you might want to add additional users to the system. Use the useradd program to add additional users. You can type **man useradd** for more information on how to add additional users.

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- Alternatively, you can use the nrcmd CLI on some other system in the network to configure and manage Cisco Prime Network Registrar on the virtual appliance the same way that you would use it to manage any remote installation of Cisco Prime Network Registrar. This requires installing Cisco Prime Network Registrar (typically only the client-only installation) on the other system.

## Configuring the Virtual Appliance to Automatically Power Up

You can configure the ESXi hypervisor to automatically power up the Cisco Prime Network Registrar virtual appliance when power is restored to the ESXi hypervisor layer.




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**Note** The KVM kit is installed with automatic power up enabled.

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To configure automatic power up:

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- Step 1** In the vSphere client, select the ESXi machine to which you are connected. It is not a specific virtual machine that you have to select but the ESXi hypervisor on which they reside.
  - Step 2** Select the **Configuration** tab.
  - Step 3** Click the **Virtual Machine Startup/Shutdown** link under the **Software** area. You should see the virtual machine in the list shown in window.
  - Step 4** Click the **Properties...** link present at the top right corner of the page. If you do not see that, resize the window until you do.  
The Virtual Machine Startup and Shutdown page is displayed.
  - Step 5** Check the **Allow virtual machines to start and stop automatically with the system** check box.
  - Step 6** Select the virtual machine running the Cisco Prime Network Registrar virtual appliance and use the **Move Up** button on the right to move it up into the group labelled **Automatic Startup**.
  - Step 7** Click **OK**.

This ensures that whenever power is restored to the ESXi hypervisor the Cisco Prime Network Registrar appliance powers up automatically.

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## Managing the Cisco Prime Network Registrar Virtual Appliance

You can manage the underlying Linux operating system, which is based on CentOS 7.4, by logging in as the root user. You may use SSH to log into the virtual appliance with the username root and the root password you specified when you first booted the virtual appliance.

You will probably want to create additional users on the Linux system so that people can access the Linux system with a username other than root.

The Linux system which is included on the virtual appliance is stripped down to a considerable degree and thus does not include things that are not required to run or manage the Cisco Prime Network Registrar application, such as a window system manager and its associated GUI user interface. However, all the tools necessary to support and manage the Cisco Prime Network Registrar application are included on the Linux operating system used inside of the virtual appliance.

You may also want to take additional steps to secure the SSH connection. For instance, configuring it to prevent logging on as root, and requiring a user to **su** to gain root privileges after logging on as another user.

You may wish to perform other configuration changes on the underlying Linux operating system in order to lock it down in ways appropriate to your environment.



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**Note** Cisco Prime Network Registrar customers are solely responsible for keeping their OS up to date regarding patches that they desire to apply and Cisco is not responsible for the same.

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