Add and Organize Devices

- Which Devices Are Supported by Cisco EPN Manager?, on page 1
- Which Device Software Versions Are Supported by Cisco EPN Manager ?, on page 2
- How Is Inventory Collected?, on page 3
- Configure Devices So They Can Be Modeled and Monitored, on page 4
- Apply Device Credentials Consistently Using Credential Profiles, on page 12
- Add Devices to Cisco EPN Manager, on page 14
- Check a Device's Reachability State and Admin Status, on page 22
- Move a Device To and From Maintenance State, on page 23
- Validate Added Devices and Troubleshoot Problems, on page 24
- Export Device Information to a CSV File, on page 25
- Create Groups of Devices for Easier Management and Configuration, on page 25
- Delete Devices, on page 32

Which Devices Are Supported by Cisco EPN Manager?

Cisco Evolved Programmable Network Manager Supported Devices provides complete information about items such as:

- Supported device types and their sysObjectIDs
- Supported device software versions (see Which Device Software Versions Are Supported by Cisco EPN Manager ?, on page 2)
- Supported inventory elements, such as modules, ports, and interfaces (physical and logical)
- Supported device configuration tasks (interfaces, routing protocols, and so forth)
- Supported configuration file archiving and software image management features
- Supported monitoring areas, such as device and interface health, reachability and availability, performance, and technology-specific monitoring
- Supported topology features, such as LLDP and CDP
- Supported MIBs used by monitoring policies

The table also provides information about all new support that is provided in Cisco EPN Manager maintenance packs.
Use either of these methods to view the device support table:

- From the web GUI—Click  at the top right corner of the window and choosing  Help > Supported Devices.
- From Cisco.com—See Cisco Evolved Programmable Network Manager Supported Devices.

Note
For the most current information, use the table that is on Cisco.com.

Which Device Software Versions Are Supported by Cisco EPN Manager?

All devices should be running a certified device software version. However, certain devices must be running the minimum device software version. Follow the instructions in the table below on how to find out about a device software version.

Cisco EPN Manager may report that a device is running an uncertified device software version. You will likely notice no differences in how Cisco EPN Manager manages devices running an uncertified device software version. It depends on whether the device software version contains fundamental changes (changes to XML interfaces, SNMP commands, MIBs, CLI commands, and so forth). In some cases, Cisco EPN Manager will recognize the device software version but may not provide full support for the device NEs such as new modules.

<table>
<thead>
<tr>
<th>To find this information:</th>
<th>Do the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A list of all certified device software versions</td>
<td>Refer to Cisco Evolved Programmable Network Manager Supported Devices. Choose Help &gt; Supported Devices and hover over the &quot;i&quot; in the Software Version column to display a popup.</td>
</tr>
<tr>
<td>If a managed device is running an uncertified device software version</td>
<td>Choose Monitor &gt; Managed Elements &gt; Network Devices, locate the device, and hover your cursor over the &quot;i&quot; in the Last Inventory Collection column. Check if the popup displays Uncertified Software Version. From the device's Device Details page, under the Device Details tab, choose System &gt; Summary. Check if the Inventory area displays [Uncertified Software Version].</td>
</tr>
<tr>
<td>Devices that require a minimum device software version</td>
<td>Choose Help &gt; Supported Devices and check the Software Version column for text similar to &gt;=x.x (For example, &gt;=12.2 would indicate that the device must run at least device software version 12.2).</td>
</tr>
</tbody>
</table>
How Is Inventory Collected?

After devices are added and discovered, Cisco EPN Manager will collect physical and logical inventory information and save it to the database. The following table describes how inventory collection is triggered.

<table>
<thead>
<tr>
<th>Inventory Collection Trigger</th>
<th>Description</th>
</tr>
</thead>
</table>
| In response to incoming events | Cisco EPN Manager receives an incoming NE SNMP trap, syslog, or TL1 message that signals a change on the NE. These incoming events include:  
  • Configuration change events that signal a change in the device configuration. These events are normally syslogs or traps.  
  • Other inventory events, such as tunnel up/down, link up/down, module in/out, and so forth.  
  Cisco EPN Manager reacts to these incoming events by collecting NE inventory and state information to make sure that information in its database conforms to that of the NE. Most events trigger granular inventory collection, where Cisco EPN Manager only collects data relevant to the change event; other events will trigger a complete collection (sync) of the NE physical and logical inventory. The data that Cisco EPN Manager collects is determined by information in the incoming event, along with metadata that is defined in Cisco EPN Manager. The metadata in Cisco EPN Manager uses a combination of mechanisms—expedited events, reactive inventory, and granular polling—to fine-tune what is collected.  
  For example, if Cisco EPN Manager receives a GMPLS Tunnel State Change event, it will collect ODU tunnel inventory information to discover midpoints and the Z endpoint of the tunnel. |
| On demand | Users can perform an immediate inventory collection (called Sync) from:  
  • Network Devices page—Select one or more devices (by checking check boxes) and click Sync.  
  • Device 360 view—Choose Actions > Sync Now.  
  See Collect a Device's Inventory Now (Sync). |
| Scheduled (daily) | Normal inventory collection is usually performed overnight. Users with sufficient privileges can check when inventory is collected and the status of collection jobs by choosing Administration > Dashboards > Job Dashboard and choosing System Jobs > Inventory and Discovery Jobs. |

Enable archive logging on devices

Follow these steps to enable archive logging on devices so that granular inventory can be enabled for those devices on Cisco EPN Manager:

For Cisco IOS-XR devices:

```
logging <epnm server ip> vrf default severity alerts
```
Configure Devices So They Can Be Modeled and Monitored

- Configure Devices To Forward Events To Cisco EPN Manager, on page 4
- Required Settings—Cisco IOS Device Operating System, on page 4
- Required Settings—Cisco IOS XE Device Operating System, on page 5
- Required Settings—Cisco IOS XR Device Operating System, on page 6
- Required Settings—Cisco NCS Series Devices, on page 7
- Required Settings—Cisco ONS Device Operating System, on page 12
- Required Configuration for IPv6 Devices, on page 12

Note
For information on the supported configuration of different device families, see, Cisco Evolved Programmable Network Manager Supported Devices.

Configure Devices To Forward Events To Cisco EPN Manager

To ensure that Cisco EPN Manager can query devices and receive events and notifications from them, you must configure devices to forward events to the Cisco EPN Manager server. For most devices, this means you must configure the devices to forward SNMP traps and syslogs.

For other devices (such as some optical devices), it means you must configure the devices to forward TL1 messages.

If you have a high availability deployment, you must configure devices to forward events to both the primary and secondary servers (unless you are using a virtual IP address; see Using Virtual IP Addressing With HA).

In most cases, you should configure this using the `snmp-server host` command. Refer to the topics in this document that list the prerequisites for the different device operating systems.

Note
For information on the required configuration for enabling granular inventory on devices, see, Cisco Evolved Programmable Network Manager Supported Syslogs.

Required Settings—Cisco IOS Device Operating System

`snmp-server host server_IP`
snmp-server community public-cmty RO
snmp-server community private-cmty RW
snmp-server ifindex persist

Do not change the device's default packet size (which is 1500 bytes). SNMP requests are sent in bulk by default. A small packet size could result in truncated responses.

The following setting disables domain lookups (which can cause Telnet command delays):

no ip domain-lookup

The following syslog settings are required.

logging server_IP
logging on
logging trap informational
logging buffered 64000 informational
logging event link-status default

The following syslog settings are required if the device has a management IP address (interface_name is the active management IP address):

logging source-interface interface_name
If you are using Cisco NCS 4000 Series devices, do not complete the steps in this topic. Instead, complete the steps described in Required Settings—Cisco NCS 4000 Series Devices, on page 8

```
line default
no cli whitespace completion
snmp-server host server_IP
domain ipv4 host server_name server_IP
telnet ipv4 server max-Servers no-limit
snmp-server community community_name SystemOwner
snmp-server community community_name RO
snmp-server entityindex persist
snmp-server ifindex persist
vty-pool default 0 99
xml agent tty
netconf agent tty
service timestamps log datetime show-timezone msec year
telnet vrf default ipv4 server max-Servers 100
```

Do not change the device's default packet size (which 1500 MB). SNMP requests are sent in bulk by default. A small packet size could result in truncated responses.

In addition to the required settings, you must follow these guidelines:

- Install the Cisco IOS XR Manageability Package (MGBL) on top of the Cisco IOS XR version. You can get information on this package from the release notes for your Cisco IOS XR version.
- Use the device login user that is a member of group `root-system` and `cisco-support`.
- User should use the admin user unique Telnet login `user@admin` (and also be a member of groups `root-system` and `cisco-support`).
- The devices must have one of the following SNMP community privileges: `SDROwner`, `SystemOwner` or the default (which means no specific level was specified). You may configure this as needed, using the following guidelines. (The following command is one line.)
- The SNMP and Telnet timeout values can be increased to 300 seconds using the Cisco EPN Manager GUI (Add Devices page).

```
snmp-server community [clear | encrypted] community-string [view view_name] [RO | RW] [SDROwner | SystemOwner] [access_list_name]
```

The snmp-server command takes the following arguments.

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[clear</td>
<td>encrypted] community-string</td>
</tr>
<tr>
<td></td>
<td>- clear — community-string is clear text and should be encrypted when displayed by <code>show running</code></td>
</tr>
<tr>
<td></td>
<td>- encrypted — community-string is encrypted text and should be displayed as such by <code>show running</code></td>
</tr>
</tbody>
</table>
**Argument** | **Description**
--- | ---
(view view-name ] | Specifies the previously-defined view view-name which defines the objects available to the community

[SDROwner | SystemOwner] | Controls what Cisco EPN Manager users can see in web GUI:
- SDROwner—Limits access to the Service Domain Router (SDR) owner. In other words, user will be able to view SDR owner modules and ports and SDR child modules. But the user will not be able to see the contents under SDR child modules and utility cards, such as fans, power supplies, and so forth.
- SystemOwner—Does not limit access. Users will be able to see the entire physical inventory (including utility cards) in the web GUI.

[access-list-name ] | List that contains IP addresses that are allowed to use community-string to access the SNMP agent.

The following syslog settings are also required.

```
logging server_IP
logging on
logging trap informational
logging facility local7
logging events level informational
logging events link-status software-interfaces
```

In the following syslog setting, the range indicates the minimum of 307200 and maximum of 125000000 log messages that can be stored on the device.

```
logging buffered <307200-125000000>
```

This syslog is required if the device has a management IP address (interface_name is the active management IP address):

```
logging source-interface interface_name
```

If the device was added using its virtual IP address, configure it as follows:

```
ipv4 virtual address use-as-src-addr
```

---

**Required Settings—Cisco NCS Series Devices**

- Required Settings—Cisco NCS 4000 Series Devices, on page 8
- Required Settings—Cisco NCS 4200 Series Devices, on page 10
Required Settings—Cisco NCS 4000 Series Devices

Ensure that both the MPLS and K9 packages are installed on the device before completing the following steps.

- Cisco EPN Manager uses SSH to secure communication with Cisco NCS 4000 series devices. To enable SSH, apply the following configuration settings on the device:

  ```
  ssh server v2
  ssh server rate-limit 600
  ```

- In MPLS traffic engineering configuration mode, enable event logging:

  ```
  mpls traffic-eng logging events all
  ```

- Set the VTY options:

  ```
  line default
  exec-timeout 10 0
  session-limit 10
  session-timeout 100
  transport input ssh
  transport output ssh
  vty-pool default 0 99 line-template default
  ```

- Configure the Netconf and XML agents:

  ```
  xml agent tty
  netconf agent tty
  ```

- Configure SNMP on the device:

  ```
  snmp-server host server_IP
  snmp-server community public RO SystemOwner
  snmp-server community private RW SystemOwner
  snmp-server ifindex persist
  ```

  You can use either SNMPv2 or SNMPv3:

  - For SNMPv2 only, configure the community string:

    ```
    snmp-server community ReadonlyCommunityName RO SystemOwner
    ```

  - For SNMPv3 only, configure the following settings:

    ```
    snmp-server user User Group v3 auth sha encrypted Password priv des56 encrypted Password SystemOwner
    snmp-server view Group 1.3.6 included
    snmp-server group Group v3 priv notify Group read Group
    ```

    For configuring the polling and configuration view, choose one of the following configuration options:

    - SNMPv3 default configuration (used for SNMPv3 polling and viewing of the default configuration):

      ```
      snmp-server group Group v3 priv read v1default write v1default notify v1default
      ```

    - SNMPv3 specific configuration:

      - For SNMPv3 polling only:

        ```
        snmp-server group Group v3 priv
        ```
• For viewing configuration for SNMPv3 set, polling, and for traps/informs notifications:
  snmp-server group Group v3 priv notify epnm read epnm write epnm

• For viewing SNMPv3 - LLDP MIB OID configuration:
  snmp-server view Group 1.0.8802.1.1.2 included

Note: In the first line, User and Group are two distinct variables that you need to enter values for.

• Configure the stats command to improve the SNMP interface stats response time using the configuration
  Snmp-server ifmib stats cache

• Configure SNMP traps for virtual interfaces to ensure that link-down scenarios are captured:
  snmp-server interface subset 1 regular-expression Hun* notification linkupdown
  snmp-server interface subset 2 regular-expression Forty* notification linkupdown
  snmp-server interface subset 3 regular-expression Ten* notification linkupdown

• Syslogs are used by Cisco EPN Manager for alarm and event management. NTP settings ensure that Cisco EPN Manager receives the correct timestamps for events. To configure syslogs on the device, add the following settings:
  clock timezone TimeZone
  service timestamps log datetime show-timezone msec year
  ntp server NTP_Server
  logging facility local7
  logging Server_IP vrf name

  Note the following:
  • When specifying the time zone, enter the time zone's acronym and its difference (in hours) from Coordinated Universal Time (UTC). For example, to specify the time zone for a device located in Los Angeles, you would enter clock timezone PDT -7.
  • Replace Server_IP with the IP address of the host Cisco EPN Manager is installed on.

• Configure the Virtual IP address:
  ipv4 virtual address NCS4K_Virtual_IP_Address/Subnet_Mask
  ipv4 virtual address use-as-src-addr

  Note: NCS4K_Virtual_IP_Address and Subnet_Mask are two distinct variables separated by a slash. Be sure to enter a value for both of these variables.

• Enable performance management on all optical data unit (ODU) controllers:
controller oduX R/S/I/P
per-mon enable

• Enable event logging of link status messages for optics controllers of Cisco NCS4000 devices running Cisco IOS release 6.1.42 or later:
  controller Optics <x/y/z/w>
  logging events link-status

• Enable performance management for Tandem Connection Monitoring (TCM):
  tcmon id {1-6}
  perf-mon enable

• Configure the Telnet or SSH rate limit for accepting service requests:
  - For Telnet, set the number of requests accepted per second (between 1-100; the default is 1):
    cinetd rate-limit 100
  - For SSH, set the number of request accepted per minute (between 1-600; the default is 60):
    ssh server rate-limit 600

• To open Cisco Transport Controller (CTC) from Cisco EPN Manager (from a Device 360 view), enable the HTTP/HTTPS server:
  http server ssl

• If you plan to use the Configuration Archive feature, devices must be configured as secured. To do this from CTC:
  1. Choose Provisioning > Security > Access
  2. Set EMS Access to secure.

• If you notice any performance issues because multiple Cisco NCS 4000 Series devices are sending information simultaneously, increase the number of Telnet sessions per second:
  cinetd rate-limit 100

Example: Cisco NCS 4000 Device Settings
This example configures Telnet on a Cisco NCS 4000 device using the VRF option, with no timeout:

telnet vrf default ipv4 server max-servers 1-100
vty-pool default 0 99 line-template default
line default
exec-timeout 0 0

Required Settings—Cisco NCS 4200 Series Devices

• Cisco EPN Manager uses SSH to secure communication with Cisco NCS 4200 series devices. To enable SSH, apply one the following configuration settings on the device:
  • enable
    configure terminal
    hostname name
    ip domain-name name
    crypto key generate rsa
• enable
  configure terminal
  ip ssh rsa keypair-name keypair-name
  crypto key generate rsa usage-keys label key-label modulus modulus-size
  ip ssh version [1 | 2]

• Set the VTY options:
  line vty <#>
  exec-timeout
  session-timeout
  transport input ssh
  transport output ssh

• Configure SNMP on the device:
  snmp-server host server_IP
  snmp-server community public RO
  snmp-server community private RW

You can use either SNMPv2 or SNMPv3:

• For SNMPv2 only, configure the community string:
  snmp-server community ReadonlyCommunityName RO

• For SNMPv3 only, configure the following settings:
  snmp-server user User Group v3 auth sha Password priv des Password
  snmp-server view Group 1.3.6 included
  snmp-server group Group v3 priv notify Group

For configuring the polling and configuration view, choose one of the following configuration options:

• SNMPv3 default configuration (used for SNMPv3 polling and viewing of the default configuration):
  snmp-server group Group v3 priv read v1default write v1default notify v1default

• SNMPv3 specific configuration:
  • For SNMPv3 polling only:
    snmp-server group Group v3 priv
  • For viewing configuration for SNMPv3 set, polling, and for traps/informs notifications:
    snmp-server group Group v3 priv notify epnm read epnm
  • For viewing SNMPv3 - LLDP MIB OID configuration:
    snmp-server view Group 1.0.8802.1.1.2 included

Note: In the first line, User and Group are two distinct variables that you need to enter values for.

• Configure the cache settings at a global level to improve the SNMP interface response time using the configuration Snmp-server cache
Syslogs are used by Cisco EPN Manager for alarm and event management. NTP settings ensure that Cisco EPN Manager receives the correct timestamps for events. To configure syslogs on the device, add the following settings:

```yaml
.clock timezone TimeZone
.service timestamps log datetime show-timezone msec year
.ntp server NTP_Server
.update-calendar
.logging facility local7
.logging Server_IP vrf default severity info [port default]
.mpls traffic-eng logging events all
.mpls traffic-eng logging lsp setups
.mpls traffic-eng logging lsp teardowns
```

Note the following:

- When specifying the time zone, enter the time zone's acronym and its difference (in hours) from Coordinated Universal Time (UTC). For example, to specify the time zone for a device located in Los Angeles, you would enter `clock timezone PDT -7`.

- Replace `Server_IP` with the IP address of the host Cisco EPN Manager is installed on.

### Required Settings—Cisco ONS Device Operating System

If you plan to use the Configuration Archive feature, devices must be configured as secured. You can do this from CTC:

1. From CTC, choose **Provisioning > Security > Access**.
2. Set EMS Access to secure.

### Required Configuration for IPv6 Devices

If you want to access a device that uses IPv6 addresses, configure the IPv6 address and static route on the Cisco EPN Manager server (virtual machine) by performing these steps:

1. Remove the ipv6 address autoconfig from the interface.
2. Configure the IPv6 address on the Cisco EPN Manager server.
3. Add a static route to the Cisco EPN Manager server.

### Apply Device Credentials Consistently Using Credential Profiles

Credential profiles are collections of device credentials for SNMP, Telnet/SSH, HTTP, and TL1. When you add devices, you can specify the credential profile the devices should use. This lets you apply credential settings consistently across devices.

If you need to make a credential change, such as changing a device password, you can edit the profile so that the settings are updated across all devices that use that profile.

To view the existing profiles, choose **Inventory > Device Management > Credential Profiles**.
Create a New Credential Profile

Use this procedure to create a new credential profile. You can then use the profile to apply credentials consistently across products, or when you add new devices.

**Step 1** Select **Inventory > Device Management > Credential Profiles**.

**Step 2** If an existing credential profile has most of the settings you need, select it and click **Copy**. Otherwise, click **Add**.

**Step 3** Enter a profile name and description. If you will have many credential profiles, make the name and description as informative as possible because that information will be displayed on the Credential Profiles page.

**Step 4** Enter the credentials for the profile. When a device is added or updated using this profile, the content you specify here is applied to the device.

The SNMP read community string is required.

**Step 5** Click **Save Changes**.

---

Apply a New or Changed Profile to Existing Devices

Use this procedure to perform a bulk edit of devices and change the credential profile the devices are associated with. This operation overwrites any existing association between a device and a credential profile. You can also use this operation to synchronize device configurations with the new settings.

**Note** Make sure the profile’s credential settings are correct before following this procedure and selecting **Update and Sync**. That operation will synchronize the devices with the new profile.

**Step 1** Configure the credential profile using one of these methods:

- Create a new credential profile by choosing **Inventory > Device Management > Credential Profiles**, and clicking **Add**.

- Edit an existing profile by choosing **Inventory > Device Management > Credential Profiles**, selecting the profile, and clicking **Edit**.

**Step 2** When you are satisfied with the profile, choose **Inventory > Device Management > Network Devices**.

**Step 3** Filter and select all of the devices you want to change (bulk edit).

**Step 4** Click **Edit**, and select the new credential profile from the Credential Profile drop-down list.

**Step 5** Save your changes:

- **Update** saves your changes to the Cisco EPN Manager database.

- **Update and Sync** saves your changes to the Cisco EPN Manager database, collects the device physical and logical inventory, and saves all inventory changes to the Cisco EPN Manager database.
**Delete a Credential Profile**

This procedure deletes a credential profile from Cisco EPN Manager. If the profile is currently associated with any devices, you must disassociate them from the profile.

---

**Step 1**  
Check whether any devices are using the profile.  
a) Go to Inventory > Device Management > Credential Profiles.  
b) Select the credential profile to be deleted.  
c) Click `Edit`, and check if any devices are listed on the Device List page. If any devices are listed, make note of them.

**Step 2**  
If required, disassociate devices from the profile.  
a) Go to Inventory > Device Management > Network Devices.  
b) Filter and select all of the devices you want to change (bulk edit).  
c) Click `Edit`, and choose `--Select--` from the Credential Profile drop-down list.  
d) Disassociate the devices from the old profile by clicking `OK` in the warning dialog box.

**Step 3**  
Delete the credential profile by choosing Inventory > Device Management > Credential Profiles, selecting the profile, and clicking `Delete`.

---

**Add Devices to Cisco EPN Manager**

Cisco EPN Manager uses device, location, and port groups to organize elements in the network. When you view devices in a table or on a map (network topology), the devices are organized in terms of the groups they belong to. When a device is added to Cisco EPN Manager, it is assigned to a group named **Unassigned Group**. You can then move the device into the desired groups as described in Create Groups of Devices for Easier Management and Configuration, on page 25.

---

**Note**  
To add a Cisco WLC to Cisco EPN Manager, make sure it does not have any unsupported Access Points (APs), otherwise Cisco EPN Manager will not discover any APs from that WLC.

---

**Table 1: Methods for Adding Devices**

<table>
<thead>
<tr>
<th>Supported Methods for Adding Devices</th>
<th>See:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add multiple devices by discovering the neighbors of a seed device using:</td>
<td>Add Devices Using Discovery, on page 15.</td>
</tr>
<tr>
<td>- Ping sweep and SNMP polling (Quick Discovery)</td>
<td>Run Quick Discovery, on page 17</td>
</tr>
<tr>
<td>- Customized protocol, credential, and filter settings (useful when you will be repeating the discovery job)</td>
<td>Run Discovery With Customized Discovery Settings, on page 17</td>
</tr>
<tr>
<td>Add multiple devices using the settings specified in a CSV file</td>
<td>Import Devices Using a CSV File, on page 19.</td>
</tr>
</tbody>
</table>
Add Cisco ME1200 devices in Cisco EPN Manager

Follow these settings while adding Cisco ME1200 devices in Cisco EPN Manager:

- SNMP - Use the same SNMP settings as that of other devices.
- CLI - Ensure that the protocol setting is set to SSH2. Though the device can be reached via telnet using a port, it is recommended to use SSH protocol. If telnet is used, then the custom telnet port used must be 2323.
- HTTP - Ensure you specify the right http credentials.
- Remember that configuration changes to Cisco ME1200 devices are not automatically discovered by Cisco EPN Manager. After making a change, you must manually sync the device. To do this, select the required device(s) in the Network Devices table and click Sync.

Add Devices Using Discovery

Cisco EPN Manager supports two discovery methods:

- Ping sweep from a seed device (Quick Discovery). The device name, SNMP community, seed IP address and subnet mask are required. This method is not supported for discovering optical devices. See Run Quick Discovery, on page 17
- Using customized discovery methods (Discovery Settings)—This method is recommended if you want to specify settings and rerun discovery in the future. If you want to discover optical devices, use this method. See Run Discovery With Customized Discovery Settings, on page 17.

Note

- If a discovery job rediscovers an existing device and the device's last inventory collection status is Completed, Cisco EPN Manager does not overwrite the existing credentials with those specified in the Discovery Settings. For all other statuses (on existing devices), Cisco EPN Manager overwrites the device credentials with those specified in the Discovery Settings.
- Service discovery might take longer than usual when a large number of devices is added during database maintenance windows. Therefore, we recommend that you avoid large-scale operations during the night and on weekends.
- Autonomous APs are filtered out of the discovery process to optimise the discovery time. You need to manually add Autonomous APs using Import Devices or Credential Profile.
The discovery process of a device is carried out in the sequence of steps listed below. As Cisco EPN Manager performs discovery, it sets the reachability state of a device, which is: Reachable, Ping Reachable, or Unreachable. A description of the states is provided in Device Reachability and Admin States, on page 22.

1. Cisco EPN Manager determines if a device is reachable using ICMP ping. If a device is not reachable, its reachability state is set to **Unreachable**.

2. Server checks if SNMP communication is possible or not.
   - If a device is reachable by ICMP but its SNMP communication is not possible, its reachability state is set to **Ping Reachable**.
   - If a device is reachable by both ICMP and SNMP, its reachability state is **Reachable**.

3. Verifies the device's Telnet and SSH credentials. If the credentials fail, details about the failure are provided in the Network Devices table in the **Last Inventory Collection Status** column (for example, **Wrong CLI Credentials**). The reachability state is not changed.

4. Modifies the device configuration to add a trap receiver so that Cisco EPN Manager can receive the necessary notifications (using SNMP).

5. Starts the inventory collection process to gather all device information.

6. Displays all information in the web GUI, including whether discovery was fully or partially successful.

---

**Verify SNMP Communication**

Follow these steps if the reachability state of a device is set as **Ping Reachable**.

---

**Note** When Cisco EPN Manager verifies a device’s SNMP read-write credentials, the device log is updated to indicate that a configuration change has been made by Cisco EPN Manager (identified by its IP address).

---

**Step 1** Ensure that the credentials used by Cisco EPN Manager for device verification are correct.

**Step 2** Verify that SNMP is enabled on the device and that the SNMP credentials configured on the device match those configured on Cisco EPN Manager.

**Step 3** Check whether SNMP packets are being dropped due to configuration errors or due to your security settings (default behavior) in all the network devices that are participating in transporting SNMP packets between the managed devices and the Cisco EPN Manager server.

---

**Specify the Management IP Address Type (IPv4/IPv6) for Discovered Devices**

For discovered dual-home (IPv4/IPv6) devices, specify whether you want Cisco EPN Manager to use IPv4 or IPv6 addresses for management IP addresses.
Step 1 Choose Administration > Settings > System Settings, then choose Inventory > Discovery.

Step 2 From the IPv4/IPv6 Preference for Management Address drop-down list, choose either V4 or V6.

Step 3 Click Save.

---

**Run Quick Discovery**

Use this method when you want to perform a ping sweep using a single seed device. Only the device name, SNMP community, seed IP address and subnet mask are required. If you plan to use the configuration management features, you must provide the protocol, user name, password, and enable password.

**Before you begin**

See Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure your devices are configured correctly.

---

Step 1 Choose Inventory > Device Management > Discovery, then click the Quick Discovery link at the top right of the window.

Step 2 At a minimum, enter the name, SNMP community, seed IP address, and subnet mask.

Step 3 Click Run Now.

---

**What to do next**

Click the job hyperlink in the Discovery Job Instances area to view the results.

---

**Run Discovery With Customized Discovery Settings**

Cisco EPN Manager can discover network devices using discovery profiles. A discovery profile contains a collection of settings that instructs Cisco EPN Manager how to find network elements, connect to them, and collect their inventory. For example, you can instruct Cisco EPN Manager to use CDP, LLDP, OSPF to discover devices, or just perform a simple ping sweep (an example of the results of a ping sweep is provided in Sample IPv4 IP Addresses for Ping Sweep, on page 18.) You can also create filters to fine-tune the collection, specify credential sets, and configure other discovery settings. You can create as many profiles as you need.

After you create a profile, create and run a discovery job that uses the profile. You can check the results of the discovery job on the Discovery page. You can also schedule the job to run again at regular intervals.

**Before you begin**

See Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure your devices are configured correctly so that Cisco EPN Manager can discover them.

---

Step 1 Choose Inventory > Device Management > Discovery, then click Discovery Settings at the top right of the window. (If you do not see a Discovery Settings link, click the arrow icon next to the Quick Discovery link.)

Step 2 In the Discovery Settings popup, click New.
Step 3 Enter the settings in the **Discovery Settings** window. Click "?" next to a setting to get information about that setting. For example, if you click "?" next to **SNMPv2 Credentials**, the help pop-up provides a description of the protocol and any required attributes.

Step 4 Click **Run Now** to run the job immediately, or **Save** to save your settings and schedule the discovery to run later.

**Sample IPv4 IP Addresses for Ping Sweep**

The following table provides an example of the results of a ping sweep.

<table>
<thead>
<tr>
<th>Subnet Range</th>
<th>Number of Bits</th>
<th>Number of IP Addresses</th>
<th>Sample Seed IP Address</th>
<th>Start IP Address</th>
<th>End IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>255.255.240.0</td>
<td>20</td>
<td>4094</td>
<td>205.169.62.11</td>
<td>205.169.48.1</td>
<td>205.169.63.254</td>
</tr>
<tr>
<td>255.255.248.0</td>
<td>21</td>
<td>2046</td>
<td>205.169.62.11</td>
<td>205.169.56.1</td>
<td>205.169.63.254</td>
</tr>
<tr>
<td>255.255.252.0</td>
<td>22</td>
<td>1022</td>
<td>205.169.62.11</td>
<td>205.169.60.1</td>
<td>205.169.63.254</td>
</tr>
<tr>
<td>255.255.254.0</td>
<td>23</td>
<td>510</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.254</td>
</tr>
<tr>
<td>255.255.255.0</td>
<td>24</td>
<td>254</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.254</td>
</tr>
<tr>
<td>255.255.255.128</td>
<td>25</td>
<td>126</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.127</td>
</tr>
<tr>
<td>255.255.255.192</td>
<td>26</td>
<td>62</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.62</td>
</tr>
<tr>
<td>255.255.255.224</td>
<td>27</td>
<td>30</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.30</td>
</tr>
<tr>
<td>255.255.255.240</td>
<td>28</td>
<td>14</td>
<td>205.169.62.11</td>
<td>205.169.62.1</td>
<td>205.169.63.14</td>
</tr>
<tr>
<td>255.255.255.248</td>
<td>29</td>
<td>6</td>
<td>205.169.62.11</td>
<td>205.169.62.9</td>
<td>205.169.63.14</td>
</tr>
<tr>
<td>255.255.255.252</td>
<td>30</td>
<td>2</td>
<td>205.169.62.11</td>
<td>205.169.62.9</td>
<td>205.169.63.10</td>
</tr>
<tr>
<td>255.255.255.254</td>
<td>31</td>
<td>0</td>
<td>205.169.62.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>255.255.255.255</td>
<td>32</td>
<td>1</td>
<td>205.169.62.11</td>
<td>205.169.62.11</td>
<td>205.169.62.11</td>
</tr>
</tbody>
</table>

**Example: Add Optical Devices Using Discovery**

The following example shows how to use to use a seed device and the OTS protocol to discover Cisco NCS 2000 devices.
### Step 1
Check [Configure Devices So They Can Be Modeled and Monitored](#) on page 4 to make sure the optical devices are configured correctly.

### Step 2
Choose [Inventory > Device Management > Discovery](#) then click [Discovery Settings](#) at the top right of the window.

### Step 3
In the Discovery Settings window, click [New](#) to create a new discovery profile.

- a) Enter a discovery profile name—for example, `NCS2k_3_OTS`.
- b) Enter the seed device and hop count information for the OTS protocol.
  1. In the Protocol Settings area, click the arrow next to [Advanced Protocols](#) to open the discovery protocols list.
  2. Click the arrow next to [OTS](#) to open the OTS protocol window.
  3. Check the [Enable OTS](#) check box.
  4. Click the Add Row ("+") icon.
  5. Enter the seed device IP address and hop count (for example, `209.165.200.224` and `3`), then click [Save](#) to add the seed device information.
  6. Click [Save](#) in the OTS protocol window to close the window. If necessary, click outside of the OTS Protocol window to close it.

- c) Enter the TL1 device credentials for the Cisco NCS 2000 seed device.
  1. In the Credential Settings area, click the arrow next to [TL1](#) to open the TL1 credentials window.
  2. Check the [Enable TL1](#) check box.
  3. Click the Add Row ("+") icon.
  4. Enter the seed device IP address, username, password, and (if appropriate) proxy IP address.
  5. For Secure TL1 access choose [Enable](#) from the [SSH](#) drop-down list, for Unsecured TL1 choose [Disabled](#).
  6. Click [Save](#) to add the credential information.
  7. Click [Save](#) in the TL1 Credentials window to close the window. If necessary, click outside of the TL1 Credentials window to close it.

### Step 4
Click [Save](#) to save the new discovery profile. The new `NCS2k_3_OTS` profile is added to the Discovery Settings window.

**Note** If you receive an error message, make sure you have enabled the protocols. (This is a common error.)

### Step 5
Select `NCS2k_3_OTS`, then click [Run Now](#) to begin the discovery job.

### Step 6
Check the results of the job by choosing [Inventory > Device Management > Discovery](#).

---

## Import Devices Using a CSV File

Use a CSV file to add devices if you have an existing management system from which you want to import devices, or you want to specify different values in a spreadsheet.

- Create the CSV File, on page 19
- Import the CSV File, on page 20

### Create the CSV File

Follow this procedure to create the CSV file.
**Import the CSV File**

Follow this procedure to import devices using a CSV file.

**Before you begin**

See Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure your devices are configured correctly.

**Step 1** Choose **Inventory > Device Management > Network Devices**.

**Step 2** Click the † icon above the Network Devices table, then choose **Bulk Import**.

**Step 3** In the **Bulk Import** dialog:
   a) Make sure **Device** is chosen from the Operation drop-down list.
   b) Click **Browse**, navigate to the CSV file, then click **Import**.

**Step 4** Check the status of the import by choosing **Administration > Dashboards > Job Dashboard**.

**Step 5** Click the arrow to expand the job details and view the details and history for the import job. If you encounter any problems, see Validate Added Devices and Troubleshoot Problems, on page 24.

**Add Devices Manually (New Device Type or Series)**

Use this procedure to add a new device type and to test your settings before applying them to a group of devices.

**Before you begin**

See Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure your devices are configured correctly.

**Step 1** Choose **Inventory > Device Management > Network Devices**.

**Step 2** Click the † icon above the Network Devices table, then choose **Add Device**.
Step 3: In the Add Device dialog box, complete the required fields. Click the "?” next to a field for a description of that field.

**Note:** Telnet/SSH information is mandatory for devices such as most Cisco NCS devices. The following figure shows IPSec parameters to be configured.

Step 4: (Optional) Click Verify Credentials to validate the credentials before adding the device.

Step 5: Click Add to add the device with the settings you specified.

### Example: Add a Single Cisco NCS 2000 or NCS 4000 Series Device

Cisco NCS 2000 series devices are TL1-based devices, and Cisco EPN Manager uses the TL1 protocol to communicate with these devices. Cisco NCS 4000 series devices, on the other hand, are Cisco IOS-XR devices, and Cisco EPN Manager uses the SNMP and Telnet/SSH protocols to communicate with these devices.

Step 1: Check Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure the Cisco NCS devices are configured correctly.

Step 2: Click the + icon above the Network Devices table, then choose Add Device.

Step 3: In the Add Device dialog box, complete the required fields. Click the "?” next to a field for a description of that field.

- Cisco NCS 2000 series and Cisco ONS 15454—Enter TL1 parameters
- Cisco NCS 4000 series—Enter SNMP and Telnet/SSH parameters

Step 4: Click Verify Credentials to validate that Cisco EPN Manager can reach the device.

Step 5: Click Add to add the device to Cisco EPN Manager.

### Example: Add a Network Element as an ENE Using Proxy Settings

Messages sent to a particular network element must pass through other NEs in the network. To pass messages, one or more nodes can be a Gateway Network Element (GNE) and connect other NEs in your network. A node becomes a GNE when you establish a TL1 session and enter a command that must be sent to another node. The node that receives the TL1 message from another node for processing is an End-point Network Element (ENE). Messages from an ENE are transmitted through a GNE to other NEs in the network.

Step 1: Check Configure Devices So They Can Be Modeled and Monitored, on page 4 to make sure your devices are configured correctly.

Step 2: Click the + icon above the Network Devices table, then choose Add Device.

Step 3: In the Add Device dialog box, under the General Parameters, enter the IP address or the DNS name of the ENE that you want to add. Click the "?” next to a field for a description of that field.

Step 4: Under the TL1 Parameters, enter the proxy IP address for the node that you are using as an ENE.

Step 5: Click Verify Credentials to validate that Cisco EPN Manager can connect to the device.

Step 6: Click Add to add the device to Cisco EPN Manager.
Check a Device's Reachability State and Admin Status

Use this procedure to determine whether Cisco EPN Manager can communicate with a device (reachability state) and whether it is managing that device (admin status). The admin status also provides information on whether the device is being successfully managed by Cisco EPN Manager.

Step 1
Choose Inventory > Device Management > Network Devices.

Step 2
Locate your device in the Network Devices table.
   a) From the Show drop-down list (at the top right of the table), choose Quick Filter.
   b) Enter the device name (or part of it) in the text box under the Device Name column.

Step 3
Check the information in the Reachability and Admin Status columns. See Device Reachability and Admin States, on page 22 for descriptions of these states.

Device Reachability and Admin States

Device Reachability State—Indicates whether Cisco EPN Manager can communicate with the device using all configured protocols.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Device Reachability State</th>
<th>Description</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>✔</td>
<td>Reachable</td>
<td>Cisco EPN Manager can reach the device using SNMP, or the NCS 2K device using ICMP.</td>
<td>—</td>
</tr>
<tr>
<td>🔴</td>
<td>Unreachable</td>
<td>Cisco EPN Manager cannot reach the device using Ping.</td>
<td>Verify that the physical device is operational and connected to the network.</td>
</tr>
<tr>
<td>☞</td>
<td>Unknown</td>
<td>Cisco EPN Manager cannot connect to the device.</td>
<td>Check the device.</td>
</tr>
</tbody>
</table>

Table 2: Device Reachability State
**Device Admin State**—Indicates the configured state of the device (for example, if an administrator has manually shut down a device, as opposed to a device being down because it is not reachable by Ping).

**Table 3: Device Admin State**

<table>
<thead>
<tr>
<th>Icon</th>
<th>Device Admin State</th>
<th>Description</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>![icon]</td>
<td>Managed</td>
<td>Cisco EPN Manager is actively monitoring the device.</td>
<td>Not Applicable.</td>
</tr>
<tr>
<td>![icon]</td>
<td>Maintenance</td>
<td>Cisco EPN Manager is checking the device for reachability but is not processing traps, syslogs, or TL1 messages.</td>
<td>To move a device back to Managed state, see <a href="#">Move a Device To and From Maintenance State, on page 23.</a></td>
</tr>
</tbody>
</table>
| ![icon] | Unmanaged         | Cisco EPN Manager is not monitoring the device. | In the Network Devices table, locate the device and click the "i" icon next to the data in the Last Inventory Collection Status column. The popup window will provide details and troubleshooting tips. Typical reasons for collection problems are:  
  • Device SNMP credentials are incorrect.  
  • The Cisco EPN Manager deployment has exceeded the number of devices allowed by its license.  
  • A device is enabled for switch path tracing only.  
If a device type is not supported, its Device Type will be Unknown. You can check if support for that device type is available from Cisco.com by choosing Administration > Licenses and Software Updates > Software Update and then clicking Check for Updates. |
| ![icon] | Unknown            | Cisco EPN Manager cannot connect to the device. | Check the device. |

**Move a Device To and From Maintenance State**

When a device's admin status is changed to Maintenance, Cisco EPN Manager will not poll the device for inventory changes, nor will it process any traps or syslogs that are generated by the device. However, Cisco EPN Manager will continue to maintain existing links and check the device for reachability.

See [Device Reachability and Admin States, on page 22](#) for a list of all admin states and their icons.

**Step 1**  
From the Network Devices table, choose **Admin State > Set to Maintenance State**.
Step 2  To return the device to the fully managed state, choose Admin State > Set to Managed State.

Validate Added Devices and Troubleshoot Problems

To monitor the discovery process, follow these steps:

Step 1  To check the discovery process, choose Inventory > Device Management > Discovery.

Step 2  Expand the job instance to view its details, then click each of the following tabs to view details about that device's discovery:

- **Reachable** - Devices that were reached using ICMP. Devices may be reachable, but not modeled, this may happen due to various reasons as discussed in Add Devices Using Discovery, on page 15. Check the information in this tab for any failures.
- **Filtered** - Devices that were filtered out according to the customized discovery settings.
- **Ping Reachable** - Devices that were reachable by ICMP ping but could not be communicated using SNMP. This might be due to multiple reasons: invalid SNMP credentials, SNMP not enabled in device, network dropping SNMP packets, etc.
- **Unreachable** - Devices that did not respond to ICMP ping, with the failure reason.
- **Unknown** - Cisco EPN Manager cannot connect to the device by ICMP or by SNMP.

Note  For devices that use the TL1 protocol, make sure that node names do not contain spaces. Otherwise, you will see a connectivity failure.

Step 3  To verify that devices were successfully added to Cisco EPN Manager, choose Inventory > Device Management > Network Devices. Then:

- Verify that the devices you have added appear in the list. Click a device name to view the device configurations and the software images that Cisco EPN Manager collected from the devices.
- View details about the information that was collected from the device by hovering your mouse cursor over the Inventory Collection Status field and clicking the icon that appears.
- Check the Device Reachability Status and Admin Status columns. See Device Reachability and Admin States, on page 22.

If you need to edit the device information, see Change Basic Device Properties.

To verify that Cisco EPN Manager supports a device, refer to Cisco Evolved Programmable Network Manager Supported Devices.

To verify that Cisco EPN Manager supports a device, click the Settings icon ( ), then choose .

Add and Organize Devices
Find Devices With Inventory Collection or Discovery Problems

Use the quick filter to locate devices that have discovery or collection problems.

Step 1  Choose Monitor > Device Management > Network Devices to open the Network Devices page.
Step 2  Make sure Quick Filter is listed in the Show drop-down at the top left of the table.
Step 3  Place your cursor in the quick filter field above the Collection Status and select a status from the drop-down list that is displayed. The devices are filtered according to that status. For troubleshooting steps, see Validate Added Devices and Troubleshoot Problems, on page 24.

Export Device Information to a CSV File

When you export the device list to a file, all device information is exported into a CSV file. The file is then compressed and encrypted using a password you select. The exported file contains information about the device's SNMP credentials, CLI settings, and geographical coordinates. The exported file includes device credentials but does not include credential profiles.

Caution
Handle the CSV file with care because it lists all credentials for the exported devices. You will want to ensure that only users with special privileges can perform a device export.

Step 1  Choose Inventory > Device Management > Network Devices.
Step 2  Select the devices that you want to export, then click and choose Export Device.
Step 3  In the Export Device dialog box, enter an password that will be used to encrypt the exported CSV file. Users will need to supply this password to open the exported file.
Step 4  Confirm the encryption password and click Export. Depending on your browser configuration, you can save or open the compressed file.

Create Groups of Devices for Easier Management and Configuration

- How Groups Work, on page 26
- Create User-Defined Device Groups, on page 29
- Create Location Groups, on page 30
- Create Port Groups, on page 30
- Make Copies of Groups, on page 31
Organizing your devices into logical groupings simplifies device management, monitoring, and configuration. Because you can apply operations to groups, grouping saves time and ensures that configuration settings are applied consistently across your network. In smaller deployments where all devices can be configured with the same settings, you may only need to create one general device group. The grouping mechanism also supports subgroups. You will see these groups in many of the Cisco EPN Manager GUI windows.

When a device is added to Cisco EPN Manager, it is assigned to a location group named **Unassigned**. If you are managing a large number of devices, be sure to move devices into other groups so that the Unassigned Group membership does not become too large.

### How Groups Work

Groups are logical containers for network elements, such as devices and ports. You can create groups that are specific to your deployment—for example, by device type or location. You can set up a group so that new devices are automatically added if they match your criteria, or you may want to add devices manually.

For information on the specific types of groups, see the related topics [Network Device Groups](#) and [Port Groups](#).

For information on how elements are added to groups, see [How Elements Are Added to Groups: Dynamic, Manual, and Mixed Groups](#).

### Network Device Groups

The following table lists the supported types of network device groups. The device groups can be accessed from the Inventory.

<table>
<thead>
<tr>
<th>Network Device Group Type</th>
<th>Membership Criteria</th>
<th>Can Be Created or Edited By Users?</th>
</tr>
</thead>
</table>
| Device Type              | Devices are grouped by family (for example, Optical Networking, Routers, Switches and Hubs, and so forth). Under each device family, devices are further grouped by series. New devices are automatically assigned to the appropriate family and series groups. For example, a Cisco ASR 9006 would belong to Routers (family) and Cisco ASR 9000 Series Aggregation Services Routers (series). Note the following:  
  - You cannot create a device type group; these are dynamic groups that are system-defined. Instead, use device criteria to create a user-defined group and give it an appropriate device name.  
  - Device type groups are not displayed in Network Topology maps.  
  - Unsupported devices discovered by Cisco EPN Manager are automatically assigned the **Generic Cisco Device** device type and are listed under **Device Type > Generic Cisco Device Family**. | No |
Location groups allow you to group devices by location. You can create a hierarchy of location groups (such as theater, country, region, campus, building, and floor) by adding devices manually or by adding devices dynamically.

A device should appear in one location group only, though a higher level “parent” group will also contain that device. For example, a device that belongs to a building location group might also indirectly belong to the parent campus group.

By default, the top location of the hierarchy is the All Locations group. All devices that have not been assigned to a location appear under the Unassigned group under All Locations.

User Defined Devices are grouped by a customizable combination of device and location criteria. You can customize group names and use whatever device and location criteria you need.

### Port Groups

The following table lists the supported types of port groups.

<table>
<thead>
<tr>
<th>Port Group Type</th>
<th>Membership Criteria</th>
<th>Can be created or edited by users?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Type</td>
<td>Grouped by port type, speed, name, or description. Ports on new devices are automatically assigned to the appropriate port group. You cannot create Port Type groups. Instead, use device criteria to create a user-defined group, and create subgroups under the user-defined group.</td>
<td>No; instead create a User Defined Group</td>
</tr>
</tbody>
</table>
How Elements Are Added to Groups: Dynamic, Manual, and Mixed Groups

How elements are added to a group depends on whether the group is dynamic, manual, or mixed.

<table>
<thead>
<tr>
<th>Method for Adding Devices</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic</td>
<td>Cisco EPN Manager automatically adds a new element to the group if the element meets the group criteria. While there is no limit to the number of rules that you can specify, the performance for updates may be negatively impacted as you add more rules.</td>
</tr>
<tr>
<td>Manual</td>
<td>Users add the elements manually when creating the group or by editing the group.</td>
</tr>
<tr>
<td>Mixed</td>
<td>Elements are added through a combination of dynamic rules and manual additions.</td>
</tr>
</tbody>
</table>

The device inheritance in parent-child user defined and location groups are as follows:

- User Defined Group—When you create a child group:
  - If the parent and child groups are both dynamic, the child group can only access devices that are in the parent group.
  - If the parent group is static and the child group is dynamic, the child group can access devices that are outside of the parent group.
• If the parent and child groups are dynamic and static, the child group "inherits" devices from the
  parent device group.

• Location Group—The parent group inherits the child group devices.

Groups and Virtual Domains

While groups are logical containers for elements, access to the elements is controlled by virtual domains. This
example shows the relationship between groups and virtual domains.

• A group named SanJoseDevices contains 100 devices.

• A virtual domain named NorthernCalifornia contains 400 devices. Those devices are from various
groups and include 20 devices from the SanJoseDevices group.

Users with access to the NorthernCalifornia virtual domain will be able to access the 20 devices from the
SanJoseDevices group, but not the other 80 devices in the group. For more details, see “Create Virtual Domains
to Control User Access to Devices”.

Create User-Defined Device Groups

To create a new device type group, use the user-defined group mechanism. You must use this mechanism
because device type groups are a special category used throughout Cisco EPN Manager. The groups you
create will appear in the User Defined category.

Note
Cisco ASR satellites can only belong to location groups. For more information, see Satellite Considerations
in Cisco EPN Manager.

To create a new group, complete the following procedure:

Step 1
Choose Inventory > Group Management > Network Device Groups.

Step 2
In the Device Groups pane, click the + (Add) icon and then choose Create User Defined Group.

Step 3
Enter the group's name and description. If other user-defined device type groups already exist, you can set one as the
parent group by choosing it from the Parent Group drop-down list. If you do not select a parent group, the new group
will reside in the User-Defined folder (by default).

Step 4
Add devices to the new group:

If you want to add devices that meet your criteria automatically, enter the criteria in the Add Devices Dynamically area.
To group devices that fall within a specific range of IP addresses, enter that range in square brackets. For example, you
can specify the following:

• IPv4-10.[101-155].[1-255].[1-255] and 10.126.170.[1-180]

• IPv6-2014::5217:[0000-ffff]:fe22:[1e40-1f41]

Note
While there is no limit on the number of rules you can specify for a dynamic group, group update performance
could become slower as the number of rules increases.

If you want to add devices manually, do the following:
Create Location Groups

Note: Cisco ASR satellites can only belong to Location Groups. For more information, see Satellite Considerations in Cisco EPN Manager.

To create a location group, follow these steps:

Step 1 Choose Inventory > Group Management > Network Device Groups.
Step 2 In the Device Groups pane on the left, click the Add icon, then choose Create Location Group.
Step 3 Enter the name and description, and choose a group from the Parent Group drop-down list. By default, the group will be an All Locations subgroup (that is, displayed under the All Locations folder).
Step 4 If you are creating a device group based on geographical location, for example, all devices located in a building at a specific address, select the Geographical Location check box and specify the GPS coordinates of the group or click the View Map link and click on the required location in the map. The GPS coordinates will be populated automatically in this case. Note that location groups defined with a geographic location are represented by a group icon in the geo map. The devices you add to the group will inherit the GPS coordinates of the group. See Device Groups in the Geo Map for more information. Note that if geographical location is the primary reason for grouping a set of devices, it is recommended that the devices you add to the group do not have their own GPS coordinates that are different from the group's.
Step 5 If you want devices to be added automatically if they meet certain criteria, enter the criteria in the Add Device Dynamically area. Otherwise, leave this area blank.
While there is no limit on the number of rules that you can specify for a dynamic group, as the number of rules increases, the group update performance could become slower.
Step 6 If you want to add devices manually:
   a) Under Add Devices Manually, click Add.
   b) In the Add Devices dialog box, locate devices you want to add, then click Add.
Step 7 Click the Preview tab to see the group members.
Step 8 Click Save, and the new location group appears under the folder you selected in Step 3 (All Locations, by default).

Create Port Groups

To create a port group, follow these steps:

1. Expand the Add Devices Manually area and then click Add.
2. In the Add Devices dialog box, check the check boxes for the devices you want to add, then click Add.

Step 5 Click the Preview tab to see the members of your group.
Step 6 Click Save.
The new device group appears in the folder you selected in Step 3.
**Step 1**  Choose Inventory > Group Management > Port Groups.

**Step 2**  From Port Groups > User Defined, hover your mouse over the "i" icon next to User Defined and click Add SubGroup from the popup window.

**Step 3**  Enter the name and description, and choose a group from the Parent Group drop-down list. By default, the port group will be under the User Defined folder.

**Step 4**  Choose the devices a port must belong to in order to be added to the group. From the Device Selection drop-down list, you can:

- **Device**—To choose devices from a flat list of all devices.
- **Device Group**—To choose device groups (Device Type, Location, and User Defined groups are listed).

**Step 5**  If you want ports to be added automatically if they meet your criteria, enter the criteria in the Add Port Dynamically area. Otherwise, leave this area blank.

While there is no limit on the number of rules that you can specify for a dynamic group, as the number of rules increases, the group update performance could become slower.

**Step 6**  If you want to add devices manually:

a) Under Add Ports Manually, click Add.

b) In the Add Ports dialog box, locate devices you want to add, then click Add.

**Step 7**  Click the Preview tab to see the group members.

**Step 8**  Click Save, and the new port group appears under the folder you selected in Step 3 (User Defined, by default).

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**Make Copies of Groups**

When you create a duplicate of a group, Cisco EPN Manager names the group CopyOfgroup-name by default. You can change the name, if required.

To duplicate a group follow these steps:

**Step 1**  Choose Inventory > Group Management > Network Device Groups.

**Step 2**  Choose the group from the Device Groups pane on the left.

**Step 3**  Locate the device group you want to copy, then click the "i" icon next to it to open the pop-up window.

**Step 4**  Click Duplicate Group (do not make any changes yet) and click Save. Cisco EPN Manager creates a new group called CopyOfgroup-name.

**Step 5**  Configure your group as described in Create User-Defined Device Groups, on page 29 and Create Location Groups, on page 30.

**Step 6**  Verify your group settings by clicking the Preview tab and examining the group members.

**Step 7**  Click Save to save the group.
Hide Groups That Do Not Have Any Members

By default, Cisco EPN Manager will display a group in the web GUI even if the group has no members. Users with Administrator privileges can change this setting so that empty groups are hidden—that is, they are not displayed in the web GUI. (Hidden groups are not deleted from Cisco EPN Manager.)

**Step 1** Choose Administration > Settings > System Settings, then choose Inventory > Grouping.

**Step 2** Uncheck Display groups with no members, and click Save.

We recommend that you leave the Display groups with no members check box selected if you have a large number of groups and devices. Unselecting it can slow system performance.

Delete Groups

Make sure the group you want to delete has no members, otherwise Cisco EPN Manager will not allow the operation to proceed.

**Step 1** Choose Inventory > Group Management > Network Device Groups.

**Step 2** Locate the device group you want to delete in the Device Groups pane on the left, then click the “i” icon next to it to open the pop-up window.

**Step 3** Click Delete Group and click OK.

Delete Devices

When you delete a device, Cisco EPN Manager will no longer model or monitor it.

Before you begin

If a device has services on it that were provisioned using Cisco EPN Manager, you must delete those services before deleting the device. However, you will be permitted to delete devices that have discovered or provisioned services on it (that is, services that were not created by Cisco EPN Manager). To find out which services are on a device, use the Device 360 view; see View a Specific Device’s Circuits/VCs.

**Step 1** Choose Inventory > Device Management > Network Devices to open the Network Devices page.

**Step 2** Locate the device you want to delete. For example, navigate through the Groups list, or enter some text in the Quick Filter boxes.

**Step 3** Select the device, and click Delete.