



## Use Plug and Play to Deploy New Devices

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## About Plug and Play

Cisco Prime Infrastructure helps automate the deployment of new devices on the network by obtaining and applying the necessary software image and configuration on a new network device. The Prime Infrastructure uses APIC-EM (Application Policy Infrastructure Controller) call-home and Cisco IOS auto-install (which uses DHCP and TFTP) features thus reducing the time a new device takes to join the network and become functional.

The Plug and Play feature of Prime Infrastructure uses the templates defined in **Configuration > Templates > Features and Technologies** that you can reuse and apply to new devices. You can streamline new device deployment by creating bootstrap templates, which define the necessary initial configurations to enable the device to communicate with Prime Infrastructure. You can specify (and *predeploy*) software images and configurations that will be added to the devices in the future.

### Related Topics

- [Prerequisites for Using Plug and Play, on page 2](#)
- [Plug and Play Workflow, on page 2](#)

# Prerequisites for Using Plug and Play

You must complete the following prerequisites.

- Configure DHCP with the appropriate settings in the network as described in [Sample DHCP Server Settings, on page 26](#).
- You must have an existing network connection (distribution/core) available in the branch or campus to where the new device is connecting.
- The branch must have direct connectivity to the Cisco Prime Infrastructure server, or you must use the Plug and Play external server to connect to Cisco Prime Infrastructure.

## Related Topics

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

# Plug and Play Workflow

Cisco Prime Infrastructure allows you to perform an initial provisioning of a software image and configuration on a new device. To automate the deployment of a new device on your network, follow this workflow:

1. Specify that Cisco Prime Infrastructure uses APIC-EM server for Plug and Play. See [Integrate Map View With the Plug and Play Dashboard, on page 27](#) for information about setting up APIC-EM.
2. Create a Plug and Play profile for your devices. The profiles are categorized as Routers, Switches, Wireless AP and Nexus Profiles. See [Create Plug and Play Profiles That Define Device Deployments, on page 7](#).
3. Power on the device.
4. Apply a bootstrap configuration to the device. The bootstrap configuration is a minimal configuration that is required for devices to establish a connection to the Cisco Prime Infrastructure gateway (APIC-EM). See [Create a Bootstrap Configuration for Plug and Play, on page 20](#).

In the case of Wireless AP profiles, the Primary, Secondary and Tertiary WLC details are required. See [Create Wireless AP Plug and Play Profiles, on page 10](#).



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### Note

In the case of Nexus devices, the Plug and Play workflow differs as these devices do not support bootstrap configuration. See [Create Nexus Device Plug and Play Profiles, on page 11](#) for more details.

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After you apply the initial configuration:

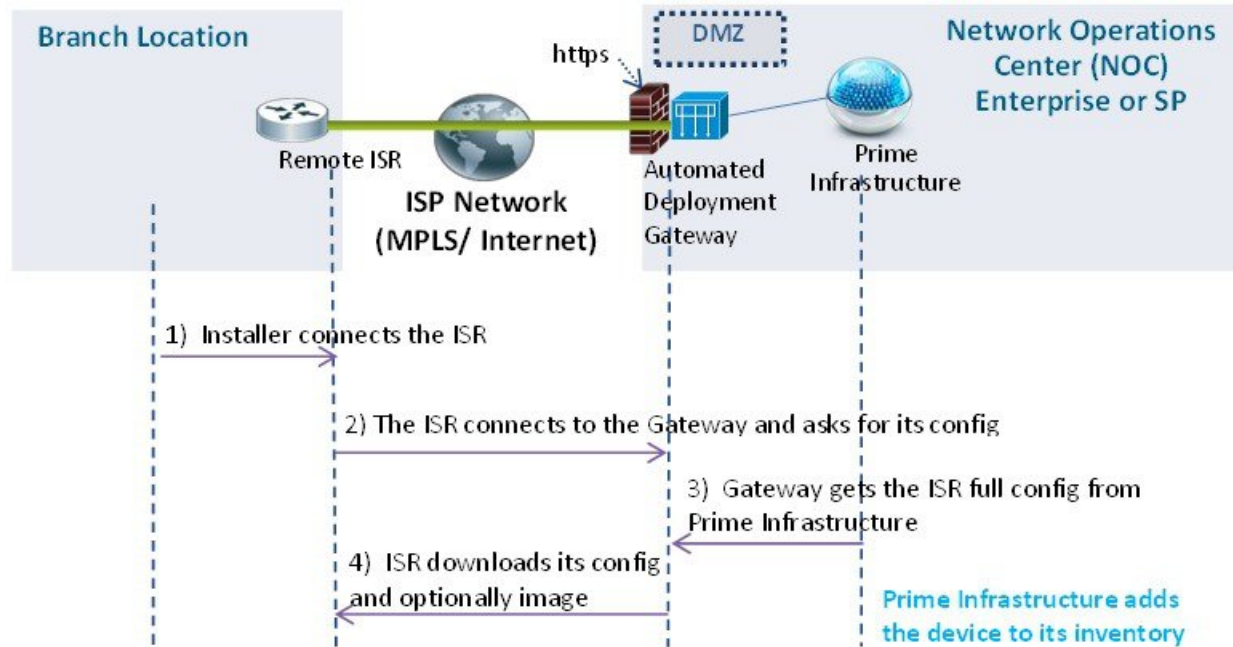
1. The device communicates with the Cisco Prime Infrastructure server.
2. Based on the Device Plug and Play ID / serial number, Cisco Prime Infrastructure verifies if this matches with the device ID in any of the Plug and Play preprovisioning definitions.
3. If there is a match, Cisco Prime Infrastructure applies the upgraded software image and the configuration specified in the matched Plug and Play profile on the device.

If there is no match for the device ID, Cisco Prime Infrastructure matches the device type with any of the existing type-based Plug and Play preprovisioning definitions.

4. The device is added to its inventory and is managed by Cisco Prime Infrastructure.
5. Plug and Play does not affect the inventory workflow. Cisco Prime Infrastructure applies the post Plug and Play configurations, if specified in the Plug and Play profile, on the device, only after the inventory is collected. See the chapter [Add and Organize Devices](#).

After the bootstrap configuration is applied to the device, the installer connects the device to a WAN at the remote site. The device connects to the Plug and Play gateway using its serial number, and downloads the full configuration and (optional) Cisco IOS image (see the following image).

**Figure 1: Plug and Play Branch Deployment**



**Note** The Automated Deployment Gateway is APIC-EM controller.

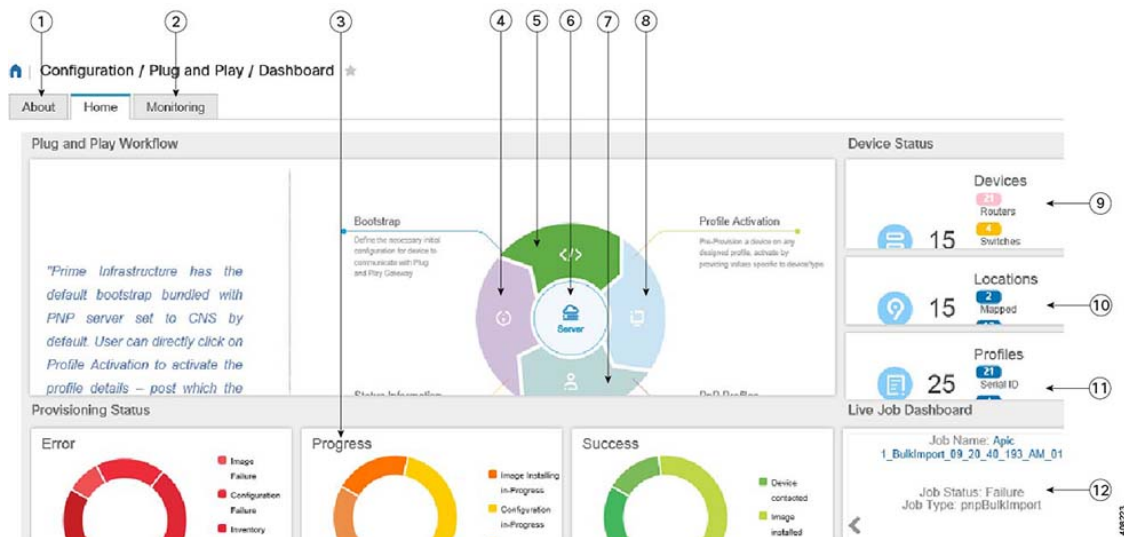
#### Related Topics

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

## Use the Plug and Play Dashboard to Monitor New Device Deployments

Choose **Configuration > Plug and Play > Dashboard** and select the **Home** tab to view the dashboard of the Plug and Play application.



1	Click <b>About</b> to know about Plug and Play feature. See <a href="#">About Plug and Play, on page 1</a> .
2	Click <b>Monitoring</b> to view the details of devices in a map view. See <a href="#">Integrate Map View With the Plug and Play Dashboard, on page 27</a> .
3	Click <b>Errors / Progress / Success</b> to navigate to <b>Device Status</b> page. The details will be filtered and displayed accordingly.
4	Click to navigate to <b>Device Status</b> page to monitor the devices and its status.
5	Click to navigate to <b>Bootstrap</b> page to create bootstrap templates for profiles.
6	Click to navigate to <b>Administration &gt; Servers &gt; APIC-EM Controller</b> page.
7	Click to navigate to <b>Plug and Play Profiles</b> page to create profile for a device type.
8	Click to navigate to <b>Profile Activation</b> page to activate by providing values specific to device/type.
9	Click to navigate to <b>Device Status</b> page.
10	Click to navigate to <b>Map View</b> page to view the devices and their site locations.
11	Click to navigate to <b>Plug and Play Profiles</b> page.
12	Click to navigate to <b>Administration &gt; Dashboard &gt; Jobs Dashboard</b> page to view the job status.

### Related Topics

[Integrate Map View With the Plug and Play Dashboard, on page 27](#)

[Integrate APIC-EM Policy Information into Plug and Play, on page 6](#)

[Create Plug and Play Profiles That Define Device Deployments, on page 7](#)

[Associate Devices with Plug and Play Profiles, on page 12](#)

[Create a Bootstrap Configuration for Plug and Play, on page 20](#)

[Verify Devices After They Have Been Deployed Using Plug and Play, on page 26](#)

## Prerequisites for Using Plug and Play with APIC-EM

Cisco Prime Infrastructure supports APIC-EM GA Release 1.0, APIC-EM GA Release 1.1, APIC-EM GA Release 1.2, APIC-EM GA Release 1.3, APIC-EM GA Release 1.4 and APIC-EM GA Release 2.0.



**Note** Any APIC-EM configuration or settings must be done only in the Prime Infrastructure GUI and not in the APIC-EM.

You must preconfigure a profile which determines what is deployed on the devices (configurations, images, etc.). When the device calls home, based on the device's serial number, the profile is matched and the device is provisioned with the same pre-configured image and configuration from Cisco Prime Infrastructure using APIC-EM's Plug and Play.

With APIC-EM Plug and Play integration, devices can be provisioned with http/https. If applicable, when the profile is created, you can also choose to install PKI (Public Key Infrastructure) and SUDI (Secure Unique Device Identifier) certificates on the device to use PKI and SUDI based authentication.

### Related Topics

[Integrate APIC-EM Policy Information into Plug and Play](#), on page 6

[Plug and Play Workflow](#), on page 2

## Prerequisites for Using Plug and Play with Nexus Devices

The following prerequisites should be met before connecting the Nexus device to the network:

- A DHCP server to bootstrap the interface IP address, gateway address, script server (Cisco Prime Infrastructure 3.2) and script file (Plug and Play). See [Configure DHCP Server, on page 5](#).
- A TFTP or HTTP server containing the configuration script used to automate the software image installation and configuration process. See [Configure HTTP Server, on page 6](#).
- Cisco Prime Infrastructure 3.2 server with created Plug and Play Nexus profile containing the software images and configuration files. See [Create Nexus Device Plug and Play Profiles, on page 11](#).
- The Nexus device version must be higher than 6.2(12) or later to manage all the Nexus features in Cisco Prime Infrastructure.

### Configure DHCP Server

The Nexus device sends out DHCP discover messages on all of the active interfaces (including the management interface) soliciting DHCP offers from the DHCP server or servers. The DHCP client on the Nexus device uses the device serial number or its MAC address in the client-identifier option to identify itself to the DHCP server. The DHCP server uses this identifier to send information, such as the IP address and script file name, back to the DHCP client.

The DHCP discover message also mandates the following options:

- Option 66 (TFTP server name) or Option 150 (TFTP server address)—The DHCP server relays the TFTP server name or TFTP server address to the DHCP client. The DHCP client uses this information to contact the TFTP server to obtain the script file.
- IP address
- Default Gateway

- Option 67 (Bootfile name)—The DHCP server relays the bootfile name to the DHCP client. The bootfile name includes the complete path to the bootfile on the TFTP server which is used by the DHCP client to download the script file.

#### Related Topics

[Configure HTTP Server](#), on page 6

[Create Nexus Device Plug and Play Profiles](#), on page 11

[Prerequisites for Using Plug and Play with Nexus Devices](#), on page 5

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Configure HTTP Server

Choose **Administration** > **Settings** > **System Settings** > **General** and select **Server** from the left navigation menu.

In the **HTTP Forward** section, select **Enable** to enable the device to contact the Plug and Play Gateway for downloading initial configuration and image. The default port is 80 but you can still change the port configuration on the device.




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**Note** Restart Cisco Prime Infrastructure for the changes to reflect.

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#### Related Topics

[Configure DHCP Server](#), on page 5

[Create Nexus Device Plug and Play Profiles](#), on page 11

[Prerequisites for Using Plug and Play with Nexus Devices](#), on page 5

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Integrate APIC-EM Policy Information into Plug and Play

Prime Infrastructure communicates with APIC-EM via HTTPs and REST API's exposed by APIC-EM.




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**Note** Prime Infrastructure requires a dedicated APIC-EM server. Hence you must not integrate the APIC-EM server with more than one Prime Infrastructure server to prevent data corruption and out of sync condition.

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To integrate APIC-EM controller to Prime Infrastructure, follow these steps:

#### Procedure

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- Step 1** Choose **Configuration** > **Plug and Play** > **Dashboard**.
- Step 2** In the **Home** tab, click on **Server** to view the **Administration** > **Servers** > **APIC-EM Controller** page.
- Step 3** Click **Add**.
- Step 4** Enter the APIC-EM controller IPv4 address.
- Step 5** Enter the HTTPS port number to connect with APIC-EM.
- Step 6** Enter your user name.

**Step 7** Enter your password and confirm it.

The polling interval is not editable. The APIC-EM controller is polled periodically (every 5 minutes) to check the status of its connection / integration with Prime Infrastructure. The device status is also updated from the APIC-EM for every 5 minutes.

After the APIC-EM controller is added to Prime Infrastructure, you can view the reachability status of the APIC controller in same page. You can select a specific APIC-EM controller to view the history of the connection polling status. Make sure the APIC-EM connection is successful before using the service.

To navigate to **Configuration > Plug and Play > Dashboard**, click the link **Please Click here to create Plug and Play Profiles**.

The global option in **Administration > Servers > APIC-EM Controller Global PnP/ZTD Settings** is automatically set to APIC-EM when you add a valid APIC-EM controller into Prime Infrastructure.

The APIC-EM integration is not bi-directional, hence you should not make any changes in the APIC-EM for integration.

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#### Related Topics

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

## APIC-EM Site Sync

Prime Infrastructure can integrate and synchronize its inventory with APIC-EM. You need to have a dedicated instance of Prime Infrastructure that integrates with APIC-EM. The dedicated Prime Infrastructure instance can be used for monitoring the network only, not for provisioning.

From the dedicated instance of Prime Infrastructure, specify the APIC-EM instance from the **Administration > Servers > APIC-EM Controller** page. This Prime Infrastructure instance periodically syncs the sites, devices, device and location groups, WAN interface port groups, and endpoint associations with the APIC-EM instance. Prime Infrastructure collects inventory and other monitoring information for the synced devices and creates a new folder under All Devices > Location and adds the devices to the corresponding sites. Prime Infrastructure monitors the devices by collecting assurance and syslog information.

By default, Prime Infrastructure runs an APIC-EM integration sync job every six hours. If you remove sites and devices from APIC-EM, they are also deleted from Prime Infrastructure. If devices are added or updated in APIC-EM, Prime Infrastructure will also add and update them.

## Create Plug and Play Profiles That Define Device Deployments

Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**. The detailed summary of the list of plug and play profiles are displayed.

Cisco Prime Infrastructure helps you create a Plug and Play Profile that allows any newly connected device to “call home” to the Cisco Prime Infrastructure server so that the device can be discovered, added to the inventory, and configured. This profile, also known as a Bootstrap Profile, places credentials on the device, eliminating the need to “console” into every device to setup before the device can be managed by Cisco Prime Infrastructure.



You can create any of the following Plug and Play profiles under the specific folders:

- Router profiles - See [Add Device Profiles into Router and Switches Plug and Play Profiles](#), on page 14
- Switch profiles - See [Add Device Profiles into Router and Switches Plug and Play Profiles](#), on page 14
- Wireless AP profiles - See [Create Wireless AP Plug and Play Profiles](#), on page 10
- Nexus profiles - See [Create Nexus Device Plug and Play Profiles](#), on page 11
- Mobility Express WLC profiles - See [Create Mobility Express WLC Plug and Play Profiles](#), on page 12

Depending on the type, you can create Plug and Play profiles that contain:

- Software images only.
- Configurations only.
- Both software images and configurations.
- PKI certificates and SUDI certificates.
- Primary and Secondary Controllers, AP and Flexconnect groups (For Wireless AP only).

The profile can include additional post Plug and Play configurations (optional), that can be applied on the device only after the device is managed by Cisco Prime Infrastructure.




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**Note** You cannot create a profile under the root **Plug and Play** folder. Depending on the profile-type, you can create profiles only under the specific folders - Nexus Profiles, Switch Profiles, Router Profiles and Wireless AP Profiles.

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**Note**

- PnP scale supports any number of devices distributed across profiles, but a profile can support maximum of 500 devices per profile instance. If you want to increase this scale, create additional profile and add devices to the new profile.
- A maximum of 50 devices will be provisioned simultaneously irrespective of the profile. The PnP agent will pick next set of devices after provisioning of the current 50 devices.
- Cisco Prime Infrastructure stores details of the virtual domains under which profiles and profile instances are created and updated. The provisioned devices will be added to the inventory under the respective virtual domains and ROOT-DOMAIN.
- Ensure that the management IP address is unique for each profile instance.
- Adding location groups to profile instances while bulk importing or exporting of device profiles, is not supported. You can create rules under corresponding location groups to dynamically add the managed devices.

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### Related Topics

- [Prerequisites for Using Plug and Play with Nexus Devices](#), on page 5
- [Associate Devices with Plug and Play Profiles](#), on page 12
- [Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3



[Verify Devices After They Have Been Deployed Using Plug and Play](#), on page 26  
[Delete Plug and Play Profiles](#), on page 28

## Create Router and Switch Plug and Play Profiles

A Plug and Play profile must have *at least one* of the following:

- A bootstrap configuration—Prime Infrastructure provides a standard bootstrap configuration, or you can create your own. See [Create a Bootstrap Configuration for Plug and Play](#), on page 20.
- Software image—See [How to Control Images that are Saved to the Image Repository During Inventory Collection](#).
- Configuration CLI template (PnP and Post PnP configuration)—See [Create a New CLI Configuration Template Using a Blank Template](#).

### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** Select the required profile (**Router Profiles** or **Switch Profiles**) from the left navigation pane, then click **Add** to view the details in **Profile Summary** tab.
- Step 3** Provide the required information in the Profile Basic section.
- You can select the required credential profile from the **Credential Profile** drop-down list to associate the credentials common to the device.
- Step 4** (Optional) In the Profile Detail section, check the **Enable Terminal Server** check box to provision devices with terminal server IP and port.
- Step 5** (Optional) In the Profile Detail section, check the **Enable PKI** check box to provision devices with PKI certificates. PKI certificates are installed on the device after the Image provision and configuration are complete. See [Cisco Open Plug-n-Play Agent Configuration Guide, Cisco IOS XE Release 3E](#) for more information.
- If the **Enable PKI** check box is unchecked, the device is not provisioned with PKI certificates.
- Note** **Enable PKI** check box will be disabled for Switch Profiles.
- Step 6** (Optional) In the Profile Detail section, check the **Enable SUDI** check box to provision devices with SUDI certificates. By enabling this option, you can specify that the APIC-EM controller must validate the SUDI certificate to authenticate the device.
- Note** If you select **Enable SUDI**, ensure that the device supports SUDI and add the device using the SUDI serial number.una
- Step 7** From the **Bootstrap Template** drop-down list, select the bootstrap templates. You can also create a customized bootstrap template which will be saved in PnP Bootstrap Templates (User Defined). See [Create a Bootstrap Configuration for Plug and Play](#), on page 20.
- Step 8** (Optional) From the **Software Image** drop-down list, select the required software images. This step is required only if you want to provision the device with images. See [Import Software Images for Plug and Play Profiles](#), on page 10.
- Step 9** (Optional) From the **Configuration Template** drop-down list, select a previously created configuration template.
- Step 10** (Optional) From the **Post PnP Configuration Template** drop-down list, select the required configuration template. This configuration is applied on the device once it is managed by Prime Infrastructure.

- Step 11** Click **Save as New Plug and Play Profile**.
- Step 12** The profile is created and the details in **Profile Summary** tab is displayed. You can edit the details and click **Save** to save the details in the same profile and click **Save as New** to create a new profile.
- Step 13** Click **Profile Instances** tab.
- Step 14** Click **Add** to add details for the devices for which you want to pre-provision the Plug and Play Profile. See [Add Device Profiles into Router and Switches Plug and Play Profiles, on page 14](#).

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#### Related Topics

- [Add Device Profiles into Router and Switches Plug and Play Profiles, on page 14](#)
- [Export, Edit and Import Device Profiles into Plug and Play Profiles, on page 15](#)
- [Associate Devices with Plug and Play Profiles, on page 12](#)
- [Create a Bootstrap Configuration for Plug and Play, on page 20](#)

## Import Software Images for Plug and Play Profiles

You can import a software image to include it as part of a Plug and Play profile.

#### Procedure

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- Step 1** Choose **Inventory > Device Management Software > Software Images**.
- Step 2** Click **Import**, then specify the source from which the software image is to be imported.
- Step 3** Specify the collection options and when to import the image file. You can run the job immediately or schedule it to run at a later time.
- The image import job will run only once.
- Step 4** Click **Submit**.
- Step 5** To view the details of image management job, choose **Administration > Dashboard > Jobs Dashboard**.

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#### Related Topics

- [Create Router and Switch Plug and Play Profiles, on page 9](#)

## Create Wireless AP Plug and Play Profiles

You can create a plug and play profile for a wireless AP to provision thousands of devices at a time.

#### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard**, and in the **Home** tab, click **PnP Profiles**.
- Step 2** Select **Wireless AP Profiles** from the left navigation pane and click **Add** to view the details in the **Profile Summary** tab.
- Step 3** Provide the required information in the Profile Basic section.
- In the **Device Type** field, **Autonomous AP** is auto-populated and is non-editable. It is mandatory to provide the PID value for Wireless AP profiles.

- Step 4** Provide the required information in the Profile Detail section.
- Step 5** Click **Save as New Plug and Play Profile**.
- Step 6** The profile is created and the details in **Profile Summary** tab is displayed. You can edit the details and click **Save** to save the details in the same profile and click **Save as New** to create a new profile.
- Step 7** Click **Profile Instances** tab.
- Step 8** Click **Add** to add details for the devices for which you want to pre-provision the Plug and Play Profile. See [Add Device Profiles into Wireless AP Plug and Play Profiles, on page 17](#).

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#### Related Topics

- [Add Device Profiles into Wireless AP Plug and Play Profiles, on page 17](#)
- [Create a Bootstrap Configuration for Plug and Play, on page 20](#)
- [Verify Devices After They Have Been Deployed Using Plug and Play, on page 26](#)

## Create Nexus Device Plug and Play Profiles

To create a Plug and Play profile for Nexus devices, follow these steps:

#### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** Select **Nexus Profiles** from the left navigation pane and click **Add** to view the details in the **Profile Summary** tab.
- Step 3** Provide the required information in the Profile Basic section.  
Select the required credential profile from the **Credential Profile** drop-down list to associate the credentials common to the device. See [Apply Device Credentials Consistently Using Credential Profiles](#).
- Step 4** From the **System Image** and **Kick Start Image** drop-down lists, select the required software images. See [Import Software Images for Plug and Play Profiles, on page 10](#).  
**Note** While downloading from Cisco.com, ensure that both system and kick start images have the same image version.
- Step 5** From the **Configuration Template** drop-down list, select either the system-defined Nexus POAP Configuration Template or a previously created configuration template and make additional changes.
- Step 6** Click **Save as New Plug and Play Profile**.
- Step 7** The profile is created and the details in **Profile Summary** tab is displayed. You can edit the details and click **Save** to save the details in the same profile and click **Save as New** to create a new profile.
- Step 8** Click **Profile Instances** tab.
- Step 9** Click **Add** to add details for the devices for which you want to pre-provision the Plug and Play Profile. See [Add Device Profiles into Nexus Plug and Play Profiles, on page 17](#).

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#### Related Topics

- [Prerequisites for Using Plug and Play with Nexus Devices, on page 5](#)
- [Import Software Images for Plug and Play Profiles, on page 10](#)
- [Use the Plug and Play Dashboard to Monitor New Device Deployments, on page 3](#)

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Create Mobility Express WLC Plug and Play Profiles

To create a Plug and Play profile for Mobility Express WLC devices, follow these steps:

### Before you begin

Ensure that the APIC-EM is synchronized with Prime Infrastructure.

### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** Select **Mobility Express WLC Profiles** from the left navigation pane and click **Add** to view the details in the **Profile Summary** tab.
- Step 3** Provide the required information in the Profile Basic section.  
(Optional) Select the required credential profile from the **Credential Profile** drop-down list to associate the credentials common to the device.
- Step 4** From the **Configuration Template** drop-down list, select either the Mobility Express Day Zero Configuration Template.  
If you want to import a raw configuration, do not select any configuration template. See Step 3 of [Add Device Profiles into Mobility Express WLC Plug and Play Profile Instances](#), on page 19.
- Step 5** (Optional) In the **Post Plug and Play Wireless Configuration Groups** area, select the additional configuration to be pushed to the device after the device is managed by Prime Infrastructure, from the **Wireless Configuration group** drop-down list.
- Step 6** (Optional) From the **Software Image** drop-down list, choose the required software images.  
**Note** If you want to deploy the upgraded version of the software image, import the upgraded software image in the **Inventory > Device Management > Software Images** page. See [Add \(Import\) Software Images to the Repository](#) for more information.
- Step 7** Click **Save as New Plug and Play Profile**.
- Step 8** The profile is created and the details in **Profile Summary** tab is displayed. You can edit the details and click **Save** to save the details in the same profile and click **Save as New** to create a new profile.
- Step 9** Click **Profile Instances** tab.
- Step 10** Click **Add** to add details for the devices for which you want to pre-provision the Plug and Play Profile. See [Add Device Profiles into Mobility Express WLC Plug and Play Profile Instances](#), on page 19 for more information.
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## Associate Devices with Plug and Play Profiles

You can pre-provision a device on any defined profile, and activate by providing values specific to device/type. To add devices in bulk, see [Export, Edit and Import Device Profiles into Plug and Play Profiles](#), on page 15.

You can perform either one of the following:

- Create a new plug and play profile and add device profiles to the created plug and play profile. See [Create New Plug and Play Profiles and Add Device Profiles, on page 13](#).
- Add device profiles to an existing plug and play profile. See [Add Device Profiles to an Existing Plug and Play Profile, on page 14](#).

Alternatively, you can choose **Configuration > Plug and Play > Dashboard**, in the **Home** tab, click **PnP Profiles** to create a new Plug and Play profile. After creating the required Plug and Play profile, click **Add** in the **Profile Instances** tab to add device profiles.

#### Related Topics

[Add Device Profiles into Router and Switches Plug and Play Profiles, on page 14](#)

[Add Device Profiles into Wireless AP Plug and Play Profiles, on page 17](#)

[Add Device Profiles into Nexus Plug and Play Profiles, on page 17](#)

## Create New Plug and Play Profiles and Add Device Profiles

### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Profile Activation**.
  - Step 2** In the **Select PnP Profile** page, select **Add device by creating new Profile**.
  - Step 3** Select the type of profile you want to create from the **Profile Type** drop-down list.
  - Step 4** Enter the required information in the **Profile Basic** and **Profile Detail** sections. See [Create Plug and Play Profiles That Define Device Deployments, on page 7](#) for information on profile creation.
  - Step 5** (Optional) Enter the **Terminal Server IP** and **Port** if the **Enable Terminal Server** check box has been selected while creating a Plug and Play profile.
  - Step 6** Click the arrow icon in the right to navigate to the **Plug and Play Profile** page to add device profiles to the created plug and play profile.
  - Step 7** (Optional) If the **Enable Terminal Server** check box is checked, import the raw configuration on the device by:
    - a.** Import the zip files or tar files which contains multiple text files. Each text file will contain raw configuration that needs to be applied to the device. You can also import a single text file if required.  
  
The name of the text file should be DeviceSerialID.txt or DeviceName.txt. For example if the device ID is FGLABCD443f, the text file containing the configuration details must be FGLABCD443f.txt or if the device name is XaaaXX, the text file containing the configuration details must be XaaaXX.txt.
    - b.** A job will be triggered for processing these files and uploading to APIC when the files are uploaded successfully.
    - c.** Verify the configuration has been successfully applied to the corresponding devices in that profiles by going to that particular profile in APIC.

### Related Topics

[Add Device Profiles to an Existing Plug and Play Profile, on page 14](#)

[Add Device Profiles into Router and Switches Plug and Play Profiles, on page 14](#)

[Add Device Profiles into Wireless AP Plug and Play Profiles, on page 17](#)

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Add Device Profiles to an Existing Plug and Play Profile

### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Profile Activation**.
- Step 2** In the **Select PnP Profile** page, select **Add device to an existing profile**.
- Step 3** Select the required profile from the **Select Profile** drop-down list, for which you need to add device profiles. See [Create Plug and Play Profiles That Define Device Deployments, on page 7](#) for information on profile creation.
- Step 4** The details of the profile you selected gets auto-populated and are non-editable.
- Step 5** Click the arrow icon in the right to navigate to the **Plug and Play Profile** page to add device profiles to the created plug and play profile.

### Related Topics

- [Create New Plug and Play Profiles and Add Device Profiles](#), on page 13
- [Add Device Profiles into Router and Switches Plug and Play Profiles](#), on page 14
- [Add Device Profiles into Wireless AP Plug and Play Profiles](#), on page 17
- [Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Add Device Profiles into Router and Switches Plug and Play Profiles

To add a device profile to the required Plug and Play profile, follow these steps:

### Procedure

- 
- Step 1** In the **Plug and Play Device Provisioning Profile** page, provide the required information.
- Select the site location to which the device will be mapped from the **Location** drop-down list. This detail will be displayed in the Map View.
- Note** Before you add a device to a specific location, create a location group in **Inventory > Device Management > Network Devices** or **Inventory > Group Management > Network Device Groups**. See [Create Location Groups](#).
- Step 2** Click the arrow icon in the right to navigate to the **Bootstrap Selection** page.
- Step 3** In the **Bootstrap Selection** page, the bootstrap template you selected in the profile creation phase will get auto-populated. You can edit the values as required.
- Plug and Play Gateway Location—By default, the Prime Infrastructure server acts as the Plug and Play gateway server. You can modify the server by providing the external Plug and Play gateway IP address.
- Click **CLI** to view the CLI summary of the bootstrap configured.
- Step 4** Click the arrow icon in the right to navigate to the next pages.

**Note** If you had selected **Software Image** and **Configuration Template** in the profile creation phase, the **Software Image**, **Configurationu** and **Post PnP Configuration** tabs will be displayed in the **Profile Activation** page.

**Step 5** (Optional) In the **Software Image** page, provide the required information.

**Step 6** (Optional) In the **Configurationu** page, the configuration template you selected in the profile creation phase will be auto-populated. Provide the required information and navigate to the next page.

Click **CLI** to view the CLI summary.

**Step 7** (Optional) In the **Post PnP Configuration** page, the configuration template you selected in the profile creation phase will be auto-populated. Provide the required information and navigate to the next page.

Click **CLI** to view the CLI summary.

**Step 8** In the **Management Credentials** page, provide the required information. These device parameters will be applied on the devices on provisioning.

**Note** If the device type is a router or switch, then in the **Management Credentials** page, the credential profile you selected in the profile creation phase will be auto-populated and the values cannot be edited.

**Step 9** In the **Profile Activation Summary** page, the device details with their configurations is displayed.

**Step 10** Click **Finish** to provision the device profile.

On successful provisioning, the device profile will be displayed in the **Profile Instances** page of the specific profile. Alternatively, the provisioning status of the device can be viewed at the **Device Status** page.

After the device is provisioned successfully, the device is added to the Prime Infrastructure inventory so that the device can be managed. The device is added to the Prime Infrastructure inventory based on the management parameters provided in the Plug and Play Profile. After the device is added successfully to the inventory, additional post Plug and Play configurations (if applicable) are applied on the device.

If there is a mismatch in credentials, the device is added to the inventory, but it will not have “Managed” status.

---

### Related Topics

[Export, Edit and Import Device Profiles into Plug and Play Profiles](#), on page 15

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Create Router and Switch Plug and Play Profiles](#), on page 9

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

[Add Device Profiles into Wireless AP Plug and Play Profiles](#), on page 17

## Export, Edit and Import Device Profiles into Plug and Play Profiles

You can perform import and export operations on device profiles in bulk. Instead of adding devices and specifying their attributes one at a time, you can import a CSV file that includes all the devices and their attributes. By performing bulk import, you can update the existing profiles and add new profiles. To update more than one device profile at a time, you can perform bulk export.



## Procedure

---

- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** Select the required Plug and Play profile from the left navigation menu. The details in **Profile Summary** tab is displayed.
- Step 3** Click **Profile Instances** tab.
- Step 4** Select the device profiles check-boxes you need to edit and click **Export**.
- The CSV file with the device properties will be exported. The exported CSV file will not have the configuration information. You can add devices or edit the properties of the existing devices in the spreadsheet. Do not change the attribute names while editing the spreadsheet.
- For Mobility Express WLC profiles, you can enter either the serial number or MAC address of the device.
- Note** If you want to export a blank CSV file, click **Export** without selecting any device profiles. A blank csv file will be exported even if there are no device profiles in the **Profile Instances** page.
- Step 5** Click **Import** and choose the CSV file in which you entered the device details. Click **Upload**.
- The CSV file is uploaded and a link to **Administration > Dashboard > Jobs Dashboard** is displayed.
- Step 6** In the **Jobs Dashboard** page, click **PnP Bulk Import** from the left navigation menu to view the job status of the bulk imported file.

---

## Related Topics

- [Create Router and Switch Plug and Play Profiles](#), on page 9
- [Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17
- [Add Device Profiles into Wireless AP Plug and Play Profiles](#), on page 17
- [Deployment Based on Device Type](#), on page 16

## Deployment Based on Device Type

To deploy a Plug and Play profile based on the device type, you do not have to associate the device ID with the deployment profile. Device type-based deployment is useful primarily for switches that use the same set of images and configurations. Matching profiles are identified by the device type (PID) of the incoming device that is specified in the profile during the design phase.

During device type-based deployment:

1. The device type is matched hierarchically; Cisco Prime Infrastructure searches for a profile with the same device type as that of the incoming device. If the profile does not match the device type, Cisco Prime Infrastructure searches for a profile that is defined for a higher level of the device type in the hierarchy. For example:
  - If the 'switch\_profile' in Cisco Prime Infrastructure is defined for 'Switches and Hubs' and the incoming device is of type Switches and Hubs > Catalyst 2928 Series Switches > Catalyst 2928-24TC-C switch, and
  - If there is no profile defined specifically for this switch (Catalyst 2928-24TC-C or Catalyst 2928 Series Switches), then the 'switch\_profile' is considered for deployment
2. If Cisco Prime Infrastructure has multiple matching deployment profiles for a given device type, then Cisco Prime Infrastructure chooses the deployment profile that is created or has been recently updated.

### Related Topics

[Export, Edit and Import Device Profiles into Plug and Play Profiles](#), on page 15

## Add Device Profiles into Wireless AP Plug and Play Profiles

Cisco Prime Infrastructure supports only APIC-EM for Wireless AP profiles. You must preconfigure a plug and play profile which determines the primary, secondary and tertiary WLC details that is required to be provisioned on the devices. See [Create Wireless AP Plug and Play Profiles](#), on page 10.

When the AP (Access Point) is connected to a network, the AP contacts the DHCP of the network to know the APIC-EM details. The AP then contacts the APIC-EM and based on the device's serial number and PID, the profile is matched. AP contacts WLC which then pushes the image and configurations to the device.

To add a device profile to the required Plug and Play profile, follow these steps:

### Procedure

- 
- Step 1** In the **Plug and Play Device Provisioning Profile** page, provide the required information.
- Select the site location to which the device will be mapped from the **Location** drop-down list. This detail will be displayed in the Map View.
- Note** Before you add a device to a specific location, create a location group in **Inventory > Device Management > Network Devices** or **Inventory > Group Management > Network Device Groups**. See [Create Location Groups](#).
- Step 2** In the **Profile Activation Summary** page, the device details with their configurations is displayed.
- Step 3** Click **Finish** to provision the device profile.
- On successful provisioning, the device profile will be displayed in the **Profile Instances** page of the specific profile. Alternatively, the provisioning status of the device can be viewed at the **Device Status** page.

---

### Related Topics

[Associate Devices with Plug and Play Profiles](#), on page 12

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Create Wireless AP Plug and Play Profiles](#), on page 10

[Add Device Profiles into Router and Switches Plug and Play Profiles](#), on page 14

[Add Device Profiles into Nexus Plug and Play Profiles](#), on page 17

## Add Device Profiles into Nexus Plug and Play Profiles

Before you begin, there is a set of prerequisites to be met. See [Prerequisites for Using Plug and Play with Nexus Devices](#), on page 5.

When a Nexus device is connected to the network, it follows the below workflow:

1. Locates the configured DHCP server and establishes communication to get the IP Address, gateway, script server (Prime Infrastructure 3.2) and the script file (Nexus Plug and Play profile).
2. The device then communicates with the Prime Infrastructure and downloads the created Plug and Play profile for Nexus device. See [Create Nexus Device Plug and Play Profiles](#), on page 11.

- The device then obtains the IP address of a TFTP server or URL of an HTTP server from which it downloads the image and the necessary configuration files.

To add a device profile to the required Plug and Play profile, follow these steps:

### Procedure

---

- Step 1** In the **Plug and Play Device Provisioning Profile** page, provide the required information.
- Select the site location to which the device will be mapped from the **Location** drop-down list. This detail will be displayed in the Map View.
- Note** Before you add a device to a specific location, create a location group in **Inventory > Device Management > Network Devices** or **Inventory > Group Management > Network Device Groups**. See [Create Location Groups](#).
- Step 2** Click the arrow icon in the right to navigate to the **Image Selection** page.
- The selected system and kick start images are auto-populated and cannot be edited.
- Step 3** Click the arrow icon in the right to navigate to the **Configuration** page.
- The configuration template you selected in the profile creation phase will be auto-populated. You should provide the Management Interface IP Address, Management Route IP Address and the other required information. This management IP address is configured to enable d to reach the Nexus device.
- Click **CLI** to view the CLI summary.
- Step 4** Click the arrow icon in the right to navigate to the **Management Credentials** page.
- For Nexus devices, it is mandatory to specify the **Management IP Address** so that the device can be managed. Provide the other required information and navigate to the next page. These device parameters will be applied on the devices on provisioning.
- Step 5** In the **Profile Activation Summary** page, the device details with their configurations is displayed.
- Step 6** Click **Finish** to provision the device profile.

---

On successful provisioning, the device profile will be displayed in the **Profile Instances** page of the specific profile. Alternatively, the provisioning status of the device can be viewed at the **Device Status** page. The device is added to the Prime Infrastructure inventory so that the device can be managed.

### Related Topics

- [Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3
- [Create Plug and Play Profiles That Define Device Deployments](#), on page 7
- [Prerequisites for Using Plug and Play with Nexus Devices](#), on page 5
- [Create Nexus Device Plug and Play Profiles](#) , on page 11
- [Add Device Profiles into Router and Switches Plug and Play Profiles](#), on page 14
- [Add Device Profiles into Wireless AP Plug and Play Profiles](#), on page 17

## Add Device Profiles into Mobility Express WLC Plug and Play Profile Instances

You can go to the **Profile Activation** page, by clicking the Add icon in the **Profile Instances** tab in the Mobility Express (ME) WLC Plug and Play Profiles page.

ME AP device should get the IP address from the DHCP server. Management IP should be different from the configured IP address on the ME AP. Both DHCP IP and Management IP should be in the same subnet.

### Procedure

---

**Step 1** In the Profile Activation page, provide the required information in the **Plug and Play Device Provisioning Profile** tab.

**Step 2** Click the **Configuration** tab.

The configuration template you selected in the profile creation phase will be auto-populated. You should provide the Interface IP Address and the other required information.

If you had selected the Mobility Express Day Zero Configuration Template while creating the profile, it helps to convert the ME AP into ME WLC.

Click **CLI** to view the CLI summary.

**Note** This **Configuration** tab will not appear if you have not selected any Configuration Template while creating the profile. If you want to import raw configuration on the device, click **Import Raw Config** under the **Profile Instances** tab and import the configuration file from your local system. You can import the raw configuration after creating one profile instance. Ensure that name of raw configuration file is the same as the Serial Number or the Base Ethernet MAC address of the device. If you are providing the MAC address as the name of the file, make sure to provide the symbol "-" instead of ":".

**Step 3** Click the **Management Credentials** tab.

The Management IP Address gets auto populated from Configuration tab if you have selected preloaded configuration file and you will not be able to edit it, else you must provide the Management IP Address so that the device will get added to the Prime Infrastructure inventory. Provide the SNMP and CLI parameters. These parameters will be added as additional commands to be pushed on the devices.

**Step 4** In the **Profile Activation Summary** page, the device details with their configurations is displayed.

**Step 5** Click **Finish** to provision the device profile.

---

On successful provisioning, the device profile will be displayed in the **Profile Instances** page of the specific profile. Alternatively, the provisioning status of the device can be viewed at the **Device Status** page. You can click the info icon next to the Post PNP Status to know the image upgradation status. The device is added to the Prime Infrastructure inventory so that the device can be managed. Once the Mobility Express WLC goes to the managed state, all the APs connected to the WLC will be added to the inventory. The image upgradation will start after the device goes to managed state.

The System job "Post PnP Image Upgrade" under "Infrastructure" runs on demand from Post PnP configuration for Mobility Express Controllers to perform Software Image Distribution and Activation. Once Mobility Express controller inventory collection is completed, this job will get triggered only if applicable. You can check image upgrade status for each devices under the job details.

## Supported Devices and Software Images for Plug and Play

If you are using APIC-EM, the Prime Infrastructure Plug and Play will support only the devices supported by APIC-EM.

Refer [Release Notes for Cisco Network Plug and Play](#) to know the devices and the corresponding software images supported for APIC-EM.

For more Details on all the supported devices and the corresponding sysObjectIDs, see [Cisco Prime Infrastructure Supported Devices](#).

### Related Topics

- [Create Plug and Play Profiles That Define Device Deployments](#), on page 7
- [Plug and Play Workflow](#), on page 2

## Prerequisites for Deploying Bootstrap Configuration into a Device

To deploy bootstrap configuration into a device in a Cisco Prime Infrastructure Server:

- Enable Cipher in Admin mode of the server by entering the following command.

### ncs run pnp-ciphers enable

- Click **Enable** in the HTTP Forward section of the **Administration > Settings > System Settings** page.
- If you are going to use email to deliver either the bootstrap configuration or the PIN, you must have previously configured the mail server settings under **Administration > Settings > System Settings > Mail Server Configuration**.
- Ensure TFTP is enabled on the Cisco Prime Infrastructure server by choosing **Administration > Settings > System Settings > Server**, then clicking **Enable** under TFTP. TFTP is enabled by default.

### Related Topics

- [Create a Bootstrap Configuration for Plug and Play](#), on page 20

## Create a Bootstrap Configuration for Plug and Play

A bootstrap configuration is a minimal configuration that is required for devices to establish a connection to the Prime Infrastructure gateway (APIC-EM). Prime Infrastructure provides a standard bootstrap configuration that you can use.

If you are using the DHCP option, you do not need to create a bootstrap configuration. See [Export Bootstrap Configurations Using DHCP](#), on page 25.

To create a user-defined bootstrap template, follow these steps:

### Procedure

- 
- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Bootstrap**.

By default, an APIC Bootstrap and Plug and Play Bootstrap template will be displayed. These templates cannot be deleted.

**Step 2** Select the specific Bootstrap check-box and click **Clone** to clone a similar template. This new template will be displayed as APIC Bootstrap\_1, APIC Bootstrap\_1\_1, and so on or Plug and Play Bootstrap\_1, Plug and Play Bootstrap\_1\_1 and so on, depending on the bootstrap you cloned.

**Note**

- You can rename the cloned template. Once renamed, you cannot change the template name again.
- Make sure that you do not use the **Configuration > Templates > Features & Technologies > CLI Templates > System Templates-CLI > Plug And Play Bootstrap** to create a customized bootstrap template.

**Step 3** Click **Save**.

**Step 4** Click the pointer beside the Bootstrap template to view or edit the details.

**Step 5** Click **Update** to save the changes. Click **CLI** to view the CLI summary.

**Step 6** To delete any bootstrap template, select the specific bootstrap template check-box and click **Delete**.

These templates that you create will be saved in **PnP Bootstrap Templates (User Defined)**.

You can choose this newly created bootstrap template when adding a profile instance by selecting the specific bootstrap template from **PnP Bootstrap Templates (User Defined)**. The details will automatically be displayed and will be editable.

The bootstrap configurations that Prime Infrastructure provides the following content:

- APIC-EM HTTP Bootstrap

```
pnp profile network-pnp
transport http ipv4 <APIC-EM server IP>
```

- APIC-EM HTTPS Bootstrap

```
crypto ca trustpoint <APIC-EM Server IP>.cisco.com
enrollment mode ra
enrollment terminal
usage ssl-client
exit
crypto ca authenticate <APIC-EM Server IP>.cisco.com
-----BEGIN CERTIFICATE-----
Certificate detail
-----END CERTIFICATE-----
pnp profile network-pnp
transport https ipv4 <APIC-EM Server IP> port 443
!
```

---

## Related Topics

[How to Install Bootstrap Configurations?](#), on page 22

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Associate Devices with Plug and Play Profiles](#), on page 12

[Prerequisites for Deploying Bootstrap Configuration into a Device](#), on page 20

# How to Install Bootstrap Configurations?

A bootstrap configuration is a minimal configuration that is required for devices to establish a connection to the Cisco Prime Infrastructure gateway (APIC-EM). The bootstrap configuration can be installed on the devices using any of the bootstrap delivery methods that Cisco Prime Infrastructure supports:

- Export and download the bootstrap—If you have access to the device console, you can export the bootstrap, and then copy and paste the bootstrap configuration to the device. See [Export](#).
- Deploying bootstrap configuration through terminal server. See [Deploy the Bootstrap Configurations Using Terminal Server](#) in related topics.
- Export and save the bootstrap to a USB flash drive—You can save the bootstrap configuration to a USB drive with the file name `ciscotr.cfg`. Connect the USB drive to the device, and then boot the device. The device will retrieve the bootstrap configuration from the USB drive. See [Export Bootstrap Configurations Using TFTP](#) in related topics.
- Email the bootstrap. See [Email Bootstrap Configuration](#) in related topics..
- DHCP options based on the server you specified. See [Export Bootstrap Configurations Using DHCP](#) in related topics..
  - You can configure DHCP option 43 on the APIC-EM server IP under DHCP Configuration. When a device gets its IP address from DHCP, it will get the bootstrap configuration also.
- Mobile application—You can use the Cisco Network Plug and Play mobile application.

## Related Topics

[Prerequisites for Deploying Bootstrap Configuration into a Device](#), on page 20

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[Deploy the Bootstrap Configuration Using Terminal Server](#), on page 23

[Export the Bootstrap Configuration](#), on page 22

[Export Bootstrap Configurations Using DHCP](#), on page 25

[Export the Bootstrap Configuration Using TFTP](#), on page 23

[Email Bootstrap Configuration](#), on page 24

## Export the Bootstrap Configuration

You can export a bootstrap configuration and then manually apply the bootstrap on the device. After the bootstrap configuration is applied, the Plug and Play deployment is initiated and the administrator can view the configuration status on Prime Infrastructure.

### Procedure

- 
- Step 1** Choose **Configuration > Plug and Play > Dashboard**, and in the **Home** tab, click **PnP Profiles**.
  - Step 2** From the **Plug and Play Profiles** page, select a profile from the list.
  - Step 3** Click **Profile Instances**.
  - Step 4** Click **Export Bootstrap > Download Bootstrap**, then click **OKs**.
  - Step 5** After the bootstrap configuration is downloaded and applied, the Plug and Play deployment is initiated.
-



### Related Topics

- [Export the Bootstrap Configuration Using TFTP](#), on page 23
- [Email Bootstrap Configuration](#), on page 24
- [Export Bootstrap Configurations Using DHCP](#), on page 25
- [Create a Bootstrap Configuration for Plug and Play](#), on page 20

## Deploy the Bootstrap Configuration Using Terminal Server

If you have enabled the check box **Enable Terminal Server** while creating a Plug and Play profile you can deploy bootstrap config:

### Procedure

- 
- Step 1** Select the devices from the Plug and Play profile.
  - Step 2** Click **Deploy** button.
  - Step 3** Click **OK** in the pop up dialogue box to trigger a job to execute the bootstrap on to the device directly by using Terminal Server.

You can check the status of the **PnP Terminal Server** job on the Job Dashboard.

The APIC will provision the device when the job is executed successfully. The device will be added to the Prime Infrastructure inventory once the device is provisioned.

---

### Related Topics

- [Create Plug and Play Profiles That Define Device Deployments](#), on page 7

## Export the Bootstrap Configuration Using TFTP

You can use the TFTP protocol to deliver the bootstrap configuration to the Prime Infrastructure TFTP server. You can specify the file name that should be created on the TFTP server; this file is used by the auto-install enabled devices to get the IP address and other Prime Infrastructure details through the DHCP. In the DHCP server, the TFTP server must be configured as the Prime Infrastructure TFTP server. For more information, see [Cisco Open Plug-n-Play Agent Configuration Guide, Cisco IOS XE Release 3E](#).

### Procedure

- 
- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
  - Step 2** From the **Plug and Play Profiles** page, select a profile from the list.
  - Step 3** Click **Profile Instances**.
  - Step 4** Click **Export Bootstrap > TFTP**.
  - Step 5** After the bootstrap configuration is downloaded and applied, the Plug and Play deployment is initiated.

---

### Related Topics

- [Email Bootstrap Configuration](#), on page 24

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[Export Bootstrap Configurations Using DHCP](#), on page 25

## Email Bootstrap Configuration

You can email the bootstrap configuration and then manually apply the bootstrap on the device. After the bootstrap configuration is applied, the automated deployment is initiated. The administrator can view the configuration status on Prime Infrastructure.



**Note** Before you can email the bootstrap configuration, you must set the email settings under **Administration > Settings > System Settings > Mail and Notification > Mail Server Configuration**.

To email the bootstrap configuration to the operator:

### Procedure

- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** From the **Plug and Play Profiles** page, select a profile from the list.
- Step 3** Click **Profile Instances**.
- Step 4** Click **Export Bootstrap > Download Bootstrap**.
- Step 5** Enter the email address to which the bootstrap configuration is be sent, then click **OK**.
- Step 6** After the bootstrap configuration is downloaded and applied, the Plug and Play deployment is initiated.

### Related Topics

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[Export Bootstrap Configurations Using DHCP](#), on page 25

[Export the Bootstrap Configuration](#), on page 22

[Export the Bootstrap Configuration Using TFTP](#), on page 23

## Email PIN for the Bootstrap Configuration

Prime Infrastructure generates a random Personal Identification Number (PIN) per device. This PIN can be used to identify the device and the Plug and Play profile (bootstrap configuration) associated with it. After the pre-provisioning tasks are complete, the administrator must use the Email PIN option (available in the pre-provisioning task of the Prime Infrastructure) to email the unique PIN to the deployment engineer. During installation, the deployment engineer uses this PIN to download the bootstrap configuration from the server.

To deliver the PIN for the bootstrap configuration:

### Procedure

- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **PnP Profiles**.
- Step 2** From the **Plug and Play Profiles** page, select a profile from the list.

- Step 3** Click **Profile Instances** tab.
- Step 4** Click the Email PIN.
- Step 5** Enter the email address to which the PIN should be sent and click OK.
- Step 6** Use one of the following methods to apply the bootstrap configuration:
- If you are applying the bootstrap configuration using the *deployment application*, the Prime Infrastructure Plug and Play deployment application communicates to the Prime Infrastructure and applies the bootstrap configuration on the device.
  - If you are *manually* applying the bootstrap configuration using the PIN:
    - Use the PIN to download the bootstrap configuration from the Prime Infrastructure Plug and Play gateway. You can also register the ISR's serial number during this process.
    - Apply the bootstrap configuration on the device manually, using a console or USB flash.

For detailed information about Plug and Play deployment, see the [Cisco Plug and Play Application User Guide](#).

- Step 7** After the bootstrap configuration is applied, the Plug and Play deployment is initiated.

---

#### Related Topics

- [Email Bootstrap Configuration](#), on page 24
- [Create a Bootstrap Configuration for Plug and Play](#), on page 20
- [Export Bootstrap Configurations Using DHCP](#), on page 25
- [Export the Bootstrap Configuration](#), on page 22
- [Export the Bootstrap Configuration Using TFTP](#), on page 23

## Export Bootstrap Configurations Using DHCP

To use the DHCP option to export a bootstrap configuration, you must have the following configuration on your devices:

- For APIC-EM—DHCP option 43

```
ip dhcp pool <DHCP pool name>
network <subnet> <subnet mask>
default-router <default gateway>
option 43 ascii "5A1D;B2;K4;I<APIC-EM_server_IP>;J80"
```

#### Related Topics

- [Export the Bootstrap Configuration](#), on page 22
- [Sample DHCP Server Settings](#), on page 26
- [Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3
- [Create Plug and Play Profiles That Define Device Deployments](#), on page 7
- [Create a Bootstrap Configuration for Plug and Play](#), on page 20
- [How to Install Bootstrap Configurations?](#), on page 22

## Sample DHCP Server Settings

If you select the DHCP-based method to deliver the Plug and Play Profile, you must configure the DHCP server to redirect the switch to the TFTP server by entering the commands described in the following table.

The DHCP-based method follows these steps:

1. The new switch contacts the DHCP server. You must configure the DHCP server to redirect the switch to the TFTP server. See the following table for more information.
2. The DHCP server points the switch to the new TFTP server where the Plug and Play bootstrap profile resides.
3. The switch loads the bootstrap configuration file, boots up, and then contacts the Plug and Play Gateway.

**Table 1: DHCP Server Settings**

Command to Enter	Description
<code>ip dhcp pool PNP</code>	Creates a DHCP pool named PNP.
<code>network 10.106.190.0 255.255.255.224</code>	Defines the network 10.106.190.0 and subnet mask 255.255.255.224. DHCP uses this pool of IP addresses to assign an IP address to the new device.
<code>default-router 10.106.190.17</code>	Configures the default route 10.106.190.17 on the new device.
<code>option 150 ip 10.77.240.224</code>	Specifies that the TFTP server IP address 10.77.240.224 is the Cisco Prime Infrastructure server IP address.

### Related Topics

[Export the Bootstrap Configuration](#), on page 22

[Export Bootstrap Configurations Using DHCP](#), on page 25

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

[How to Install Bootstrap Configurations?](#), on page 22

## Verify Devices After They Have Been Deployed Using Plug and Play

Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Status Information**.

The device details (Serial ID, hostname, IP address, type, profile name, location), current and post Plug and Play statuses, and the graphical representation of the provisioning status are displayed in a **List** view.

Click **Map** in the upper right corner to view the device details and their statuses in map view. See Related topics.

You can choose **Administration > Dashboard > Jobs Dashboard > User Jobs > Post PnP Status** to view the status of post Plug and Play configuration job on a device.

You can provision the device profiles again by selecting a device from the list and clicking the **Reset** button. Choose **Configuration > Plug and Play > Dashboard > Device Status**. The **Reset** button is enabled only

for devices that have been successfully provisioned or when the provisioning has failed. It is not enabled for devices that show the provisioning status as pending.

You can also reset the device profiles in the profile instance page by choosing **Configuration > Plug and Play > Dashboard > Profiles > Router Policies**.

On resetting a device, provisioning status will be reset to pending.

If Cisco Prime Infrastructure is integrated with APIC-EM GA Release 1.2.0.x or higher versions of APIC-EM, on resetting the device, it will first be reloaded if the provisioning had failed earlier.

### Related Topics

[Integrate Map View With the Plug and Play Dashboard](#), on page 27

[Delete Plug and Play Profiles](#), on page 28

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Associate Devices with Plug and Play Profiles](#), on page 12

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

## Integrate Map View With the Plug and Play Dashboard

You can view the details in a map view in any of the following ways:

- Choose **Configuration > Plug and Play > Dashboard** and click **Monitoring** tab.
- Choose **Configuration > Plug and Play > Dashboard** and click **Home** tab. Click **Status Information** and click **Map** from the upper right corner of the **Device Status** page.
- Choose **Configuration > Plug and Play > Dashboard** and click **Home** tab. Click **Locations**.



1	Click to view the map in full screen.
2	You can perform zooming operations using mouse or keyboard. With keyboard, click the + or - signs to zoom in or zoom out. With mouse, use the mouse scroll wheel to zoom in or zoom out or double-click to zoom in.
3	Click to view the provisioning status of the device in detail.

4	Click to view the sites that do not have geographical coordinates specified.
5	Click to view the devices that are not mapped to any location. Drag and drop the devices to a location in the map. The device automatically gets mapped to that location group.
6	Toggle the button to enable edit mode. Once enabled, you can drag and drop the unmapped devices to a location in the map. Before you map a device to a location, create location groups. See <a href="#">Create Location Groups</a> .
7	Select a location from the list.
8	Click to view the cluster details. A cluster represents two or more locations in a geographical area. Hover the mouse over the site to view the number of devices mapped to it. Click the number hyperlink to view the device details.
9	Click List to view the Device Status page.

### Related Topics

[Verify Devices After They Have Been Deployed Using Plug and Play](#), on page 26

[Delete Plug and Play Profiles](#), on page 28

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

[Create Plug and Play Profiles That Define Device Deployments](#), on page 7

[Associate Devices with Plug and Play Profiles](#), on page 12

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

## Delete Plug and Play Profiles

If you are using APIC-EM for Plug and Play, you might need to delete a plug and play profile that is incorrect or outdated.



### Note

- If you delete a device from Prime Infrastructure Plug and Play, it gets deleted from APIC-EM, whereas if you delete a device from APIC-EM, it will remain in Prime Infrastructure.
- You must not create a profile in APIC-EM, when APIC-EM is integrated with Prime Infrastructure.
- If you delete a device from Plug and Play, you can immediately add the device back to Plug and Play.

### Procedure

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- Step 1** Execute the following command from the router CLI to remove the Plug and Play profile from the router:  
**no pnp profile***plug\_and\_play\_profile\_name*.
- Step 2** Delete the provisioning profile by choosing **Configuration > Plug and Play > Dashboard** and click **PnP Profiles**. Select a Plug and Play profile, click **Profile Instances**, then delete the required provisioning profile.
- Step 3** Choose **Configuration > Plug and Play > Dashboard** and click **PnP Profiles**. Select the Plug and Play profile you want to delete, then click **Delete**.

**Note** When you delete a PnP profile with integrated APIC-EM, from the Plug and Play Dashboard, Prime Infrastructure sends a wipe command to APIC-EM to reset the device associated with the PnP profile and deletes it from the list of provisioned devices.

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### Related Topics

[Verify Devices After They Have Been Deployed Using Plug and Play](#), on page 26

[Use the Plug and Play Dashboard to Monitor New Device Deployments](#), on page 3

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[Associate Devices with Plug and Play Profiles](#), on page 12

[Create a Bootstrap Configuration for Plug and Play](#), on page 20

## How to Retrieve Devices and Profiles Deleted in APIC-EM Server

Prime Infrastructure allows you to retrieve the devices and profiles that were accidentally deleted or erased from the system when the APIC-EM server goes down.

To retrieve the deleted devices and profiles in Prime Infrastructure, follow these steps:

### Procedure

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- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Plug and Play Profiles**. The list of detailed summary of all plug and play profiles are displayed.
- Step 2** Click the **PNP APIC EM Sync** button in the **Plug and Play Profiles** tab. You will be prompted for a confirmation, click **OK** to start the sync.
- Step 3** Click the **Job Dashboard** link in the **PNP APIC-EM Sync** pop-up window to view the status of the newly scheduled APIC-EM sync job. Your job will be triggered and available in **PNP APIC-EM SYNC JOB** page.
- Step 4** Click the **i** icon next to the Profile Name to view more details about the job. In case of the sync being successful, the status next to the Profile Instance Name will show as **SUCCESS** in the **Synced Devices for new\_apic\_profile** window.

If the sync is unsuccessful, the status will show as failure and the error details will be displayed in the job summary. If the device is not deleted already the status will be shown as **Already Synced**.

**Note** Only devices in **PENDING** status under Profiles Instances tab will be created/synced with APIC EM. The device in success or failure state, we will not be created/synchronized in APIC EM as they are already provisioned to success and PnP will not be required again.

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# How to Convert CNS Profile to APIC-EM Profile

CNS support for plug and play is deprecated from Prime Infrastructure 3.2. You can convert all the existing CNS profiles to APIC-EM profiles.



**Note** You must be a Root-Domain user to perform the following operations otherwise these operations will fail:

- Convert CNS to APIC-EM
- PnP CNS to APIC-EM sync

To convert a CNS profile to an APIC-EM profile, follow these steps:

## Procedure

- Step 1** Choose **Configuration > Plug and Play > Dashboard** and in the **Home** tab, click **Plug and Play Profiles**. The list of detailed summary of all plug and play profiles are displayed.
- Step 2** Click **Convert CNS to APIC-EM** button in the **Plug and Play Profiles** page. You will be prompted for a confirmation, click **OK** to start the conversion.
- Step 3** Click the **Job Dashboard** link in the **Convert CNS to APIC-EM** pop-up window to view the status of the newly scheduled APIC-EM conversion job. Your job will be triggered and available in the **PNP CNS TO APIC-EM SYNC JOB** page.
- Step 4** Click the **i** icon next to the Profile Name to view more details about the job.

If the conversion is unsuccessful, the status will show as failure and the error details will be displayed in the job summary.

**Note** Only devices in PENDING status under Profiles Instances tab will be converted to APIC EM and created in APIC-EM. The device in success or failure state will not be created/synchronized in APIC EM as they are already provisioned to success state.

The CNS profiles created based on the device type will not be converted to APIC-EM profiles as APIC-EM does not support the profiles created based on the device type.