



# Deploying Templates and Devices

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## Applying and Scheduling Templates

After you create a template and want to apply it to one or many devices, you can specify the devices, values, and scheduling information to tailor your deployment.

To apply and manage a template:

- Step 1** Choose **Configuration > Templates > Scheduled Configuration Task**.
- Step 2** From the left sidebar menu, open the folder that contains the type of template that you want to apply.
- Step 3** Select the check box of the template that you want to apply, then click **Deploy**.
- Step 4** Provide the information described in the [Table 17-1](#), then click **OK**.
- Step 5** To view the details of the job, choose **Administration > Jobs**.

**Table 17-1** Configuration Templates > Scheduled Configuration Task Options

Option	Description
Device Selection	Displays the list of devices to which you want to apply the template.
Value Assignment	<p>Allows you to specify a variable other than what was previously defined in the configuration template. Click a name, and the previously defined variables are displayed. To change any of the values, click the variable that you want to change, enter a new value, and click <b>Apply</b>.</p> <p>You can also update the variables for all selected devices. Click <b>All Selected Devices</b> and update variables to apply the changes on all selected devices at the same time. If you want to update variables for a particular device in the list that need not be applicable to other devices, then choose the device and update its variables. All of the other devices will continue to use the variables that were previously defined except for the device for which variables are updated.</p> <p><b>Note</b> The changes that you make apply only to the specific configuration that you are deploying. To change the configuration template for all future deployments, choose <b>Configuration &gt; Templates &gt; Features &amp; Technologies</b> and change the template.</p>

Table 17-1 Configuration Templates &gt; Scheduled Configuration Task Options

Option	Description
Schedule	Allows you to create a meaningful deployment job name, then specify whether to run the job now or in the future. You can also schedule the job to run periodically on hourly, daily, weekly, monthly or yearly basis.
Job Option	The following job options are available: <ul style="list-style-type: none"> <li>• Failure Policy <ul style="list-style-type: none"> <li>– Ignore failure and continue—This is the default option. The devices are randomly picked up for template deployment. If the job fails on a device, the job skips the device and continues with the remaining devices. The Job results show success/failure information for all the selected devices.</li> <li>– Stop on failure—If the job fails to execute on a device, the job is stopped. The job results are updated only for the devices on which the job was executed successfully and for other devices which didn't undergo template deployment, "Not Attempted" message is shown. The order of devices chosen for deployment will be same as the device order in Value assignment pane.</li> </ul> </li> <li>• Copy Running Config to Startup—If the template deployment job succeeds, the running configuration of the device is copied to startup configuration.</li> <li>• Archive Config after deploy—Creates a new config archive job and archives the configuration of devices after successfully deploying the template.</li> </ul>
Summary	Summarizes your deployment option selections.

**Note**

The undeploy option is applicable only for the controller templates listed under **Templates > Features and Technologies > Controller** and will be active only if the controller template has been deployed to a device.

## Automating Device Deployment

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. Using features such as Cisco Network Services (CNS) call-home and Cisco IOS auto-install (which uses DHCP and TFTP), Prime Infrastructure reduces the time a new device takes to join the network and become functional.

The Plug and Play feature of Prime Infrastructure allows you to create templates to define features and configurations that you can reuse and apply to new devices. You can streamline new device deployment by creating bootstrap templates, which define the necessary initial configuration, to communicate with Prime Infrastructure. You can specify (and *predeploy*) software images and configurations for devices that will be added to the network in the future.

## Automating Device Deployment Using Plug and Play Profiles

The Prime Infrastructure Plug and Play feature 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:

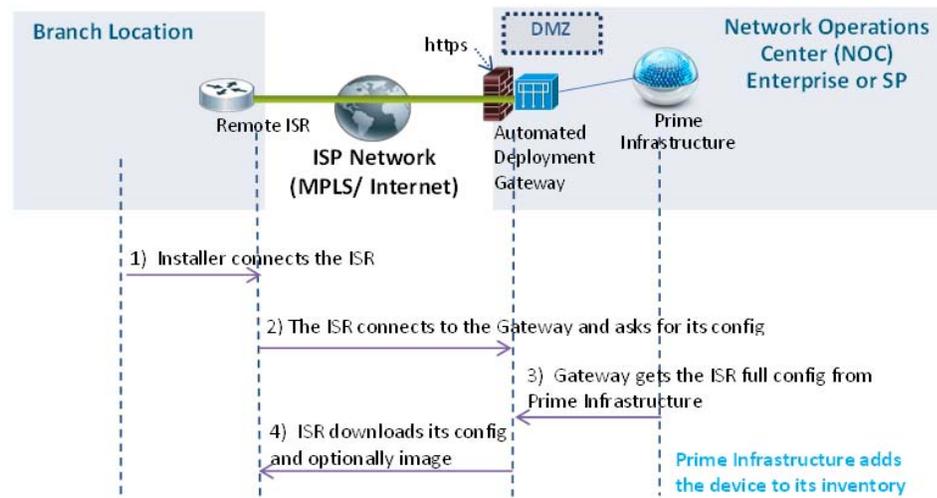
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- Step 1** Create a Plug and Play profile (see [Creating Plug and Play Profiles](#)).
- Step 2** Based on the Plug and Play method, add a new device with CNS capabilities to the network, and apply a bootstrap configuration to activate the CNS agent on the device. Use any of the bootstrap delivery methods that Prime Infrastructure supports, or use your own mechanism (see [Delivering and Applying the Bootstrap](#)).
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When you apply the bootstrap configuration:

1. The device uses the call-home agent capability to connect to the Prime Infrastructure server.
2. Automated deployment is initiated.
3. The Prime Infrastructure server receives the ID of the new device and verifies that the device ID matches the device ID in any of the Plug and Play preprovisioning definitions. If there is no match for the device ID, Prime Infrastructure matches the device type with any of the existing type-based Plug and Play preprovisioning definitions.
4. If there is a match, Prime Infrastructure applies the software image and the configuration specified in the matched Plug and Play profile on the device and adds the device to its inventory.

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 [Figure 17-1](#)).

**Figure 17-1 Plug and Play Branch Deployment**



## Prerequisites for Using Plug and Play Profiles

Before you can use the Plug and Play feature, you must:

1. Set up the Cisco Prime Plug and Play gateway.

**Note**

It is not mandatory to set up Cisco Prime Plug and Play gateway. In Cisco Prime Infrastructure Release 2.0, Plug and Play gateway is integrated with Prime Infrastructure. If the user explicitly wants the gateway setup, then Cisco Prime Plug and Play gateway can be set up. Do not execute the **cns config retrieve** or **cns image retrieve** command on a device that has been added using the Plug and Play feature.

2. Use a CLI template to create a bootstrap configuration template (see [Creating a Bootstrap Configuration Template](#)).
3. Download the software image (see [Downloading Software Images](#)). This step is optional.
4. Create a configuration template (see [Creating a Configuration Template](#)).

## Creating a Bootstrap Configuration Template

A bootstrap configuration template should have the minimum required CLI configurations so that the new device can communicate with the Prime Infrastructure Plug and Play gateway server.

**Note**

You can also use the **Configuration > Templates > Features & Technologies > CLI Templates > System Templates-CLI > Plug And Play Bootstrap** to create the bootstrap template.

To create a bootstrap configuration template for CNS devices:

- Step 1** Choose **Configuration > Templates > Features & Technologies > CLI Templates > CLI**.
- Step 2** When you create the bootstrap template, enter “Bootstrap” in the tag field associated with the CLI template. Then the new bootstrap template will be listed in the Bootstrap Template column when a Plug and Play profile is being created.

The CLI template should have these configurations for the device CNS agent to connect to the Prime Infrastructure Plug and Play gateway server:

- IP reachability to the Prime Infrastructure Plug and Play gateway server (if required)
- CNS configurations

For more information, see [Creating CLI Configuration Templates](#).

The CNS configuration for Plug and Play deployment is:

```
ip host <PnP Gateway server fully qualified host name> <IP address>
ip host <PnP Gateway server short hostname> <PnP Gateway IP address>
cns trusted-server all-agents <PnP Gateway server fully qualified host name>
cns trusted-server all-agents <PnP Gateway server short host name>
cns trusted-server all-agents <PnP Gateway IP address>
cns id hardware-serial
cns id hardware-serial event
cns id hardware-serial image
cns event <PnP Gateway server fully qualified host name> 11011 keep alive 120 2
reconnect-time 60
cns exec 80
cns image server http://<PnP Gateway server fully qualified host
name>/cns/HttpMsgDispatcher status http://<PnP Gateway server fully qualified host
name>/cns/HttpMsgDispatcher
cns config partial <PnP Gateway server fully qualified host name> 80
cns config initial <PnP Gateway server fully qualified host name> 80
```

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## Downloading Software Images

To download software images:

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- Step 1** Choose **Inventory > 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 > Jobs**.
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## Creating a Configuration Template

Use one of the following templates as the configuration template:

- A CLI template (for more information, see [Creating CLI Configuration Templates](#))
- A composite template that contains multiple CLI templates

## Creating Plug and Play Profiles

Before creating a Plug and Play profile, you must satisfy the prerequisites (see [Prerequisites for Using Plug and Play Profiles](#)).

To create a Plug and Play profile:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** Provide the required information. See the [Cisco Prime Infrastructure 2.2 Reference Guide](#) for field descriptions.
  - Step 3** Click **Save as New Plug and Play Profile**, then **Save** to confirm the new profile.
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## Deploying a Plug and Play Profile Based on Device ID

To deploy a Plug and Play profile based on the device ID:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** In the Plug and Play Profiles page, select a profile and click **Publish**.
  - Step 3** In the Device Provisioning Profiles page, click **Add**.  
One profile can have multiple provisioning settings that can be applied for different devices.
  - Step 4** Provide the required information. See the [Cisco Prime Infrastructure 2.2 Reference Guide](#) for field descriptions.
  - Step 5** Click **OK**, then click **Close**.
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## 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; 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, 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 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 Prime Infrastructure has multiple matching deployment profiles for a given device type, then Prime Infrastructure chooses the deployment profile that is created or has been recently updated.

## Delivering and Applying the Bootstrap

Prime Infrastructure lets you define a bootstrap configuration template for a device.

Alternatively, the bootstrap configuration can be defined and delivered outside of Prime Infrastructure; for example, from the factory using Cisco Integrated Customization Services.

## Exporting the Bootstrap Configuration

The operator can 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.

To export the bootstrap configuration:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** From the Plug and Play Profiles page, select a profile from the list.
  - Step 3** From the Device Provisioning Profiles page, select the device profile from the list, click **Bootstrap Configuration > Export Bootstrap**, then click **OK**.
  - Step 4** After the bootstrap configuration is applied, the Plug and Play deployment is initiated. To check the Plug and Play status, do one of following:
    - To check information about all incoming devices, choose **Configuration > Plug and Play > Status**.
    - To check the history of deployment, point to the Quick View icon in the right corner of the Current Status field for the device.
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## Delivering the Bootstrap Configuration Using TFTP

The TFTP protocol can be used 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.

To deliver the bootstrap configuration:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** From the Plug and Play Profiles page, select a profile from the list.
  - Step 3** In the Device Provisioning Profiles page, select the Device Profile from the list, click **Bootstrap Configuration > TFTP**, then click **OK**.
  - Step 4** After the bootstrap configuration is applied, the Plug and Play deployment is initiated. To check the Plug and Play status, choose one of these options:
    - To check information about all incoming devices, choose **Configuration > Plug and Play > Status**.
    - To check the history of deployment, hover your mouse cursor over the Quick View icon in the right corner of the Current Status field for the device.
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## Emailing the Bootstrap Configuration

The operator can 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 > System Settings > Mail Server Configuration**.

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To email the bootstrap configuration to the operator:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** Select a profile from the list and click **Bootstrap Configuration > Email Bootstrap**.
  - Step 3** Enter the email address to which the bootstrap configuration is be sent, then click **OK**.
  - Step 4** After the bootstrap configuration is applied, the Plug and Play deployment is initiated. To check the Plug and Play status, choose one of these options:
    - To check information about all incoming devices, choose **Configuration > Plug and Play> Status**.
    - To check the history of deployment, hover your mouse cursor over the Quick View icon in the right corner of the Current Status field for the device.
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## Emailing the PIN

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 Plug and Play gateway.

To deliver the PIN for the bootstrap configuration:

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- Step 1** Choose **Configuration > Plug and Play > Profiles**.
  - Step 2** Select the device profile from the list and click **Email PIN**.
  - Step 3** Enter the email address to which the PIN should be sent and click **OK**.
  - Step 4** 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: <https://<pnp-gateway-server>/cns/PnpBootstrap.html>. 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 2.0 User Guide*.
  - Step 5** After the bootstrap configuration is applied, the Plug and Play deployment is initiated. To check the Plug and Play status, choose one of these options:
    - To check information about all incoming devices, choose **Configuration > Plug and Play> Status**.
    - To check the history of deployment, hover your mouse cursor over the Quick View icon in the right corner of the Current Status field for the device.
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# Configuring Controller Deployments

To view and manage the devices in your network, Prime Infrastructure must first discover the devices and, after obtaining access, collect information about them. For details, see the [Adding Devices Using Discovery](#).

Prime Infrastructure simplifies WLAN deployments with support for auto-provisioning. Auto provisioning allows Prime Infrastructure to automatically configure a new or replace a current Cisco Wireless LAN Controller (WLC). Prime Infrastructure auto provisioning feature can simplify deployments for customers with a large number of controllers.



## Note

The controller radio and b/g networks are initially disabled by the Prime Infrastructure startup configuration file. You can turn on those radio networks by using a template, which should be included as one of the automated templates.

## Using the Auto Provisioning Filter List

The Auto Provision Filters page allows you to create and edit auto provisioning filters that define the list of allowable devices to be auto provisioned or auto monitored by Prime Infrastructure.

For Auto Provisioning privileges, you must have Admin, Root, or SuperUser status. To allow or disallow a user Auto Provisioning privileges, edit the permitted tasks using **Administration > Users, Roles, & AAA > User Groups > group name > List of Tasks Permitted** in Prime Infrastructure. Select or unselect the check box to allow or disallow these privileges.

Filter parameters include:

Parameter	Description
Filter Name	Identifies the name of the filter.
Filter Enable	Indicates whether or not the filter is enabled. Only enabled filters can participate in the Auto Provisioning process.
Monitor Only	If selected, the Cisco WLC defined in this filter is managed by Prime Infrastructure but not configured by Prime Infrastructure if the Cisco WLC contacts Prime Infrastructure during the auto provisioning process.
Filter Mode	Indicates the search mode for this filter (Host Name, MAC Address, or Serial Number).
Config Group Name	Indicates the Configuration Group name. All Config-Groups used by auto provision filters should not have any controller defined in them.

## Adding an Auto Provisioning Filter

To specify the Auto Provision filter contents, you can directly enter the details in the application or import the details from a CSV file. The auto provisioning feature supports the 5500 and non-5500 series controllers. The non-5500 series controllers have AP manager interface configuration information defined, whereas 5500 series controllers do not have this information.

To add an Auto Provisioning Filter:

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**Step 1** Choose **Configuration > Plug and Play > Controller Auto Provisioning**.

**Step 2** Choose **Add Filter** from the **Select a command** drop-down list, then click **Go**.

**Step 3** Enter the required parameters.

You can specify the Dynamic Interface configuration and Device Specific configuration details only when you input a CSV file. These two configurations cannot be performed using the graphical user interface.

**Step 4** Click **Save**.

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## Auto Provisioning Primary Search Key Settings

Use the Primary Search Key Setting to set the matching criteria search order.

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**Step 1** Choose **Configuration > Plug and Play > Controller Auto Provisioning**, then from the left sidebar menu, choose **Setting**.

**Step 2** Click to highlight the applicable search key, then use the **Move Up** or **Move Down** buttons to move the search key to a higher or lower priority.

**Step 3** Click **Save** to confirm the changes.

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