



# Upgrading Device Firmware



**Note**

The firmware subtabs may not be visible to some users. Your login determines whether you can use firmware options.

You can use the WLSE to upgrade the firmware on multiple access points. Upgrading firmware involves:

- Downloading software images to the WLSE or to a remote TFTP server—See [Managing Firmware Images, page 9-3](#).
- Running firmware jobs—See [Managing Firmware Jobs, page 9-11](#).
- Setting firmware parameters, if required—See [Setting Advanced Parameters, page 9-9](#)

You can also view and update the firmware versions supported by the WLSE—See [Viewing and Updating Firmware Versions Supported by the WLSE, page 9-10](#).

## About Firmware Upgrades

The topics covered in this section are:

- [How Firmware Upgrades Work, page 9-1](#)
- [Recommendations For Running Firmware Upgrades, page 9-2](#)

## How Firmware Upgrades Work

To use the firmware upgrade feature, you must:

1. Download the firmware image to the desktop and import it to the WLSE or import the image directly from Cisco.com to the WLSE. You can also download images to a remote TFTP server.
2. Configure the upgrade job.
3. Schedule the upgrade job or run it immediately.

Usually when a firmware job runs, the WLSE instructs each access point in the upgrade job to download the new firmware from the WLSE. You may want to initiate a TFTP download from a server other than the WLSE if your access points are located remotely.

After an access point downloads new firmware, it reboots. The WLSE tries to contact the access point periodically after the reboot until it verifies that the device has resumed normal operation. The WLSE assumes the upgrade is successful if the access point reboots successfully.

For IOS access points, the WLSE usually initiates the download by using an SNMP set operation, then the access point is rebooted using Telnet/SSH.

## Recommendations For Running Firmware Upgrades

For information about the number of devices to include in firmware jobs and the amount of time it takes to run a job, see:

- [Number of Devices in a Job, page 9-2](#)
- [How Much Time to Allocate, page 9-2](#)
- [Calculating the Estimated Time, page 9-2](#)

### Number of Devices in a Job

Because the WLSE firmware upgrade feature is multi-threaded with up to 20 allotted threads, it can upgrade as many as twenty access points simultaneously. For example, a firmware upgrade job with 100 devices will begin by upgrading twenty devices, one thread per device. When a device upgrade completes, that thread will start on a new device immediately, even if the other firmware upgrade tasks are in progress.

### How Much Time to Allocate

When calculating the amount of time it takes to upgrade an access point, the factors to consider are:

- How long does it take to download the firmware via TFTP?  
TFTP download is dependent on network performance. If you have high latency issues or a congested network, allow extra time for the download.
- How long does it take for the access point to reboot and load the new firmware?  
The amount of time to reboot and load new firmware is usually constant. However, if the access point uses DHCP to get an IP address or retrieve a configuration file when it comes up after a reboot, this time is affected by network performance.

Here are some other factors that might influence firmware upgrade times:

- In some cases, you may need to change the WLSE firmware upgrade timeout setting to get accurate upgrade job status (see the *FAQ and Troubleshooting Guide for the CiscoWorks Wireless LAN Solution Engine, Release 2.13*). The default setting is usually adequate, but in cases where there are congested and high latency links, the timeout usually needs to be increased.
- If you have access points deployed remotely, consider using the TFTP staging server option, especially if the remote site is at the other end of a slow WAN link or behind a firewall. When you configure the WLSE upgrade job, you select the remote TFTP server option and input the remote TFTP server address.

### Calculating the Estimated Time

Assume that a WLAN administrator plans to upgrade 200 AP1100 access points. Preliminary testing has revealed that it takes approximately 5 minutes over a 100 Mbps Ethernet network to upgrade one access point. In this example, 100 Mbps is the slowest connection that the upgrade process will need to traverse; and because the upgrade will be done late at night, network congestion will probably not cause delays in the upgrade. Therefore, a rough estimate of the amount of time needed for the upgrade might be:

$(200 \text{ APs} / 20 \text{ threads}) * 5 \text{ minutes per AP} = 50 \text{ minutes}$

Consider adding a safety factor into the equation. In this example, the WLAN administrator might want to add an additional 45 minutes, in case one device rejects the new firmware and a separate upgrade needs to be started after the first upgrade job completes.

The estimated change window formula can be calculated as follows:

$$T = (n / 20) * t + s$$

where:

- T is the total time for the change window
- n is the number of devices in the upgrade job
- t is the estimated time to upgrade a single device
- s is the safety factor.

In this formula, T is often a constant defined by IT policies. For example, many campuses allow for a change window of no more than two hours. If you determine that it will take more than T to upgrade the access points, plan the upgrades in phases, each of which can be completed well within the change window. It is always a good idea to plan upgrades conservatively. One conservative way to use this formula is to use the firmware upgrade timeout setting as your value for t.

## Managing Firmware Images

The options under the Images subtab allow you to:

- Download images to the WLSE—See [Importing Images to the WLSE, page 9-6](#).
- View images downloaded to the WLSE—See [Viewing Images Downloaded to the WLSE, page 9-3](#).
- Edit images on the WLSE—See [Editing Image Details on the WLSE, page 9-4](#).
- Delete images from the WLSE—See [Deleting Images from the WLSE, page 9-5](#).
- Download images to a remote TFTP server if you are updating devices that are located remotely—See [Using a Remote TFTP Server for Updating Devices, page 9-9](#).

### Related Topics

- [Managing Firmware Jobs, page 9-11](#)
- [About Firmware Upgrades, page 9-1](#)

## Viewing Images Downloaded to the WLSE



### Note

Your login determines whether you can use this option.

You can view the list of images stored on the WLSE and view image details.

### Procedure

- Step 1** Select **Firmware > Images**. The Imported Firmware Images selector shows the images that have been imported into the WLSE.

**Step 2** To view the list of available images for a type of device, expand its folder.



**Note** Images that you download to the WLSE are automatically listed in the Firmware Images selector.

**Step 3** To view details, select an image. The Image Details window shows the image name, image version, image size, and a description.

#### Related Topics

[Editing Image Details on the WLSE, page 9-4](#)

## Editing Image Details on the WLSE



**Note** Your login determines whether you can use this option.

#### Procedure

**Step 1** Select **Firmware > Images**.

**Step 2** Expand the folder that contains the image you want to edit, then select the image.

**Step 3** You can edit the image name, image version, device type, and description as described in [Table 9-1 on page 9-4](#).

**Table 9-1** *Image Details*

Field	Description
Name	By default, the name of the image file. <b>Note</b> The image name should be in the following format: <code>*-tar</code> or <code>*-tar.*</code> , where * (asterisk) is any word.
Device Type	The device type to which the firmware applies. Be careful when changing the version; proper uploading of firmware to devices requires accurate version information. You can enter the version in uppercase or lowercase characters. If you change the device type of an image, the image is removed from the former device type folder and added to the new one. For example, if you change the device type from AP340 to AP350, the image is removed from the AP340 folder and added to the AP350 folder.

**Table 9-1** Image Details (continued)

Field	Description
Version	<p>The image version. Be careful when editing the version; proper uploading of firmware to devices requires accurate version information. You can enter the version in uppercase or lowercase characters.</p> <p><b>Note</b> To prevent errors when importing, do not rename IOS images.</p> <p>There are several valid formats for image version. You must retain all of the digits and letters and the first decimal point. For example:</p> <ul style="list-style-type: none"> <li>• Official format—12.2(4)JA1</li> <li>• Cisco.com format—12.2.4-JA1</li> </ul>
Size	Size of the image (read-only field).
Description	An optional description. This field is blank by default.

- Step 4** When you finish editing, click **Save**.  
Click **Reset** to cancel your edits.

**Related Topics**

- [Deleting Images from the WLSE, page 9-5](#)
- [Viewing and Updating Firmware Versions Supported by the WLSE, page 9-10](#)

## Deleting Images from the WLSE



**Note** Your login determines whether you can use this option.

**Procedure**

- Step 1** Select **Firmware > Images**.
- Step 2** Expand the folder that contains the image you want to delete, then select the image.
- Step 3** Click **Delete**, then click **OK**.
- Result: The image is deleted from the list of images in the folder and deleted from the WLSE.

**Related Topics**

- [Viewing Images Downloaded to the WLSE, page 9-3](#)
- [Editing Image Details on the WLSE, page 9-4](#)

## Importing Images to the WLSE

This option allows you to:

- Download images to the WLSE from the desktop—see [Importing Images from the Client System Desktop to the WLSE](#), page 9-6.
- Download images to the WLSE directly from Cisco.com—see [Importing Images Directly from Cisco.com to the WLSE](#), page 9-7.

### Related Topics

- [Viewing Images Downloaded to the WLSE](#), page 9-3
- [Editing Image Details on the WLSE](#), page 9-4

## Importing Images from the Client System Desktop to the WLSE



**Note** Your login determines whether you can use this option.

### Procedure

- Step 1** Download the desired firmware images to your client system from Cisco.com. You can download firmware images from the following URL:
- `http://tools.cisco.com/support/downloads/pub/MDFTree.x?butype=wireless`
- For information about supported versions of images, see the Supported Devices Table on Cisco.com and the Firmware Supported Versions table in **Administration > System > Firmware Supported Versions**.
- Step 2** Select **Firmware > Images > Import > From Desktop**. Enter information as described in [Table 9-2 on page 9-6](#).

**Table 9-2 Desktop Import Window**

Field	Description
Device Type	Select the device type from the list. <b>Note</b> If you have an AP 1231 or AP1232, select AP1210.
Version	Enter the image version. Be careful when entering the version; proper uploading of firmware to devices requires accurate version information. You can enter the version in uppercase or lowercase characters. <b>Note</b> To prevent errors when importing, do not rename IOS images. There are several valid formats for image version. You must retain all of the digits and letters and the first decimal point must be present. For example: <ul style="list-style-type: none"> <li>• Official format—12.2(4)JA1</li> <li>• Cisco.com format—12.2.4-JA1</li> </ul>

**Table 9-2** Desktop Import Window (continued)

Field	Description
File Location	Enter the path to the image on the desktop or click <b>Browse</b> . Images for Cisco Aironet 350 wireless bridges may be named as images for access points (that is, names begin with <i>AP</i> ). To avoid confusion, you can rename these images. See <a href="#">Editing Image Details on the WLSE, page 9-4</a> .
Overwrite Existing Image	Select this if you are importing an image that is already stored on the WLSE. Otherwise, the image import will fail if the same image is already stored on the WLSE.

**Step 3** Click **Import**. *Do not close the popup window until you receive a message that the import was successful or the import failed.*

If the import is successful, a confirmation message appears and the image is saved on the WLSE.

If the import fails, an error message appears. The import may fail for one of the following reasons:

- The image you are trying to import is not valid. An error message appears.
- There is insufficient space on the WLSE to store images.
- You specified an image that already exists in the image library and you did not select the Overwrite Existing Image checkbox in Step 2.
- For an IOS image, you renamed the file or the file is not recognized.

**Step 4** Repeat Steps 2 and 3 to import more images.

**Step 5** For information on uploading firmware to access points and bridges, see [Managing Firmware Jobs, page 9-11](#).

## Importing Images Directly from Cisco.com to the WLSE



### Note

Your login determines whether you can use this option.

The first time you attempt to download firmware for IOS access points from Cisco.com, an error message is displayed and you must acknowledge that you have the required cryptography permissions. See the following procedure for the text of the message.

### Procedure

**Step 1** Select **Firmware > Images > Import > From Cisco.com**. Complete the following:

**Table 9-3** Cisco.com Import Window

Field	Description
Cisco.com Username	Your Cisco.com username.
Cisco.com Password	Your Cisco.com password

**Table 9-3 Cisco.com Import Window (continued)**

Field	Description
Proxy IP/Hostname <sup>1</sup>	The IP address of the proxy server used to mediate between the web browser and Cisco.com. The proxy port used by the proxy server (if required on your network).
Proxy Port	
Proxy Username	The username and password for contacting the proxy server (if required on your network).
Proxy Password	

1. Some proxy server software does not work properly while importing firmware from Cisco.com. If you have problems using your proxy server with this feature, download the firmware image to your desktop from Cisco.com and import the image from the desktop (see [Importing Images from the Client System Desktop to the WLSE](#), page 9-6).

**Step 2** To clear all of your entries in the window, click **Clear**.

**Step 3** To proceed with image download, click **Login**. The Import window changes to allow you to select the device type.

- If the following message appears under Image Details and you are downloading IOS images, log in to Cisco.com and provide the required information. After that, you can proceed to download IOS images.

```
Error while selecting or displaying image details.
Please log into cisco.com at
http://www.cisco.com/cgi-bin/Software/Crypto/crypto_main.pl
and make sure your username has acknowledged cryptography
permissions for downloading IOS Aironet images.
```

- If a “connectivity failed” message appears, make sure that domain name service (DNS) is configured on the WLSE and DNS can resolve the cisco.com domain name.

**Step 4** Click the device type; the firmware versions available on Cisco.com are displayed. Select a firmware version; the image details are displayed.



**Note** If you have an AP1231 or AP1232, select AP1210.



**Note** Images for Cisco Aironet 350 bridges are listed in the Import window as Cisco Aironet 350 access point images (that is, the names begin with *AP*). To avoid confusion, you can rename these images after importing them. For more information, see [Editing Image Details on the WLSE](#), page 9-4.

**Step 5** To add the image to the Selected Images list, click **Add**.

**Step 6** Repeat steps 4 and 5 to add more images.

**Step 7** To remove an image from the Selected Images list, click **Remove**.

**Step 8** Select **Overwrite Existing Images** if you are importing an image version that is already stored on the WLSE. Otherwise, the image import will fail if the same version is already stored on the WLSE.

**Step 9** Click **Import**. The Import Status window appears. *Do not close this window until you receive a message that either says the import was successful or the import failed.*

If the import is successful, a confirmation message appears and the image is saved on the WLSE.

If the import fails, an error message appears. The import may fail for one of the following reasons:

- The image you are trying to import is not valid. In that case, an error message appears.
- There is insufficient space on the WLSE to store images.
- You specified an image that already exists in the image library and you did not select **Overwrite Existing Image** in Step 7.
- This is the first time you have tried to download software that has cryptographic features. You will be directed to log into Cisco.com and fill out a form to provide more information about your organization.

**Step 10** Click **Refresh** to refresh the Import Status window; click **Close** to close it.

**Step 11** For information on uploading firmware to access points and bridges, see [Managing Firmware Jobs, page 9-11](#).

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## Using a Remote TFTP Server for Updating Devices

You can download firmware images to a TFTP server and then upload them to access points and bridges. This method of uploading may be quicker than uploading from the WLSE if you have a slow link between the WLSE and the access points and bridges in your network.

To download firmware images from Cisco.com, go to the following URL:

<http://www.cisco.com/public/sw-center/sw-wireless.shtml>

The image file must reside in the main directory for TFTP access on the server (usually the /tftpboot directory).

To make sure you are downloading a supported firmware release, see the list of supported devices and firmware versions at **Administration > System > Firmware Supported Versions**.

Use the normal procedure for creating firmware jobs described in [Managing Firmware Jobs, page 9-11](#). You specify the TFTP server and provide the filename when you specify job options (for more information, see [5. Set Options, page 9-14](#)).

## Setting Advanced Parameters

If a firmware job times out before completion, you can increase the values in [Table 9-4 on page 9-10](#) to extend the job timeout and allow the upgrade to complete. The values to use for these parameters depend on:

- How fast the image is pushed to the access point
- The size of the firmware image
- Network latency
- Size of the access point configuration

The default values should suffice for a network in which devices are connected by fast links. Users who have access points in remote locations or branch offices might be familiar with the time it takes to upgrade a single access point without using the WLSE and can increase the timeout values accordingly.

**Note**

Your login determines whether you can use this option.

To set timing parameters for firmware jobs:

**Procedure**

- Step 1** Select **Firmware > Advanced Parameters**.  
Firmware Job parameters apply to all firmware jobs.
- Step 2** Set the desired parameters as explained in [Table 9-4 on page 9-10](#).

**Table 9-4**      **Advanced Firmware Parameters**

Field	Range and Default	Description
Firmware Jobs		
Per device job operation timeout	Default: 7200 seconds	How much time to allow for each device in a firmware job before declaring a job timeout. You should increase this value if: <ul style="list-style-type: none"> <li>• Devices are in remote locations such as branch offices.</li> <li>• Devices are connected through slow network links.</li> </ul>
Device reboot wait timeout	Default: 360 seconds	After a new firmware image is installed, the device is rebooted. This parameter indicates how much time to wait for a device to reboot before attempting to contact it again.
Job confirmation retries	Default: 3 tries	How many times the WLSE attempts to contact a device and confirm the newly installed firmware version.

- Step 3** Select **Save** to save your settings.
- Step 4** Select **Refresh** to clear any changes you have made but not saved, and restore the settings that were previously saved.
- Step 5** Select **Job Status Check** to view firmware job status.

## Viewing and Updating Firmware Versions Supported by the WLSE

The WLSE maintains an internal list of officially supported firmware versions. You can view version support by selecting **Admin > System > Firmware Supported Versions**. See [Managing Firmware Version Support](#), page 16-49.

# Managing Firmware Jobs

The Jobs subtab allows you to:

- Create firmware jobs—See [Creating and Running a Firmware Job](#), page 9-11.
- View a list of firmware jobs—See [Viewing Job Status Information](#), page 9-20.
- Filter the list of firmware jobs—See [Filtering Jobs](#), page 9-22.
- Edit firmware jobs—See [Editing a Job](#), page 9-22.
- Copy firmware jobs—see [Copying a Job](#), page 9-23.
- Delete firmware jobs—See [Deleting a Job](#), page 9-23.
- View firmware jobs details—See [Viewing Job Run Details and Rerunning/Reverifying Jobs](#), page 9-24.

## Related Topics

[Managing Firmware Images](#), page 9-3

## Creating and Running a Firmware Job

**Note**

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After a new image is downloaded to an access point, the access point will automatically reboot.

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Use the following procedure to create firmware jobs for routine upgrades of the firmware on access points.

**Note**

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Your login determines whether you can use this option.

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### Procedure

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**Step 1** Select **Firmware > Jobs**.

**Step 2** Enter a name for the job and click **Create Job**.

**Note**

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Job names must be unique. Do not use the same job name for firmware jobs and other jobs (such as configuration and radio management jobs).

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For other guidelines on job names, see [Appendix B, “Naming Guidelines.”](#)

**Step 3** The window refreshes with the Job Creation menu in the left pane and the Job Name dialog box in the right pane.

**Step 4** Select the numbered choices in the left pane to create and run a firmware job. For information on these choices, see [Job Creation Tasks](#), page 9-12.

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## Job Creation Tasks

When you create or edit a firmware upload job, the following tasks appear in the left pane of the Jobs window. All tasks must be completed whether you are uploading images from the WLSE or from a remote TFTP server. You can omit scheduling the job and edit the job later to provide a schedule. You can complete tasks 1 through 5 in any order.

It is recommended that you download the latest version support file before beginning a firmware job. If the image is not recognized; however, you can still proceed by ignoring the warnings that are displayed in Step 6, Save the Job. For information about versions currently supported by the WLSE and downloading the support file to update the supported versions, see [Managing Firmware Version Support, page 16-49](#).

1. **Job Name**—See [1. Name the Job, page 9-12](#).
2. **Select Image**—See [2. Select the Image, page 9-13](#).
3. **Select Devices**—See [3. Select Devices, page 9-13](#).
4. **Schedule Job**—See [4. Schedule the Job, page 9-14](#).
5. **Options**—See [5. Set Options, page 9-14](#).
6. **Save the Job and Finish**—After completing tasks 1 through 5, you can save the job. After you save the job, it will run if it is an immediate job. If it is scheduled for a later time, it will be added to the schedule of jobs—See [6. Save the Job and Finish, page 9-15](#).



### Caution

Clicking on a any subtab (for example, Jobs or Images) before you have saved your entries in the Jobs window will cause the window to reset and you will lose all the information you entered.

## 1. Name the Job

### Procedure

- Step 1** Select **JOB NAME** from the left pane.



**Note** Clicking **Clear** removes all the current entries in the window and any entries you have made in other Job windows up until that point.

- Step 2** Enter the data described in [Table 9-5 on page 9-12](#).

**Table 9-5** *Job Name Parameters*

Field	Description
Job Name	Enter a name for the job. For guidelines on naming jobs, see <a href="#">Appendix B, “Naming Guidelines.”</a>  <b>Note</b> Job names must be unique. Do not use the same job name for firmware jobs and other jobs (such as configuration and radio management jobs).
Description	Enter a description of the job. For guidelines on entering descriptions, see <a href="#">Appendix B, “Naming Guidelines.”</a>

**Step 3** Go to the next step, Select Image. See [2. Select the Image, page 9-13](#).

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## 2. Select the Image

### Procedure

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**Step 1** Select **SELECT IMAGE** from the left pane.

**Step 2** Expand the device folder and select the image you want to upload. The Image Detail window opens. If the desired image does not appear in the tree, you must import it to the WLSE unless the image is located on a remote TFTP server. For more information, see [Importing Images to the WLSE, page 9-6](#).

**Step 3** From the menu in the left pane, go to the next step, Select Devices. See [3. Select Devices, page 9-13](#).

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## 3. Select Devices

The maximum number of devices that can be configured in a single job is 500.

### Procedure

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**Step 1** Select **SELECT DEVICES** from the left pane. All managed devices are listed in the Device selector in the middle pane.



**Note** Clicking **Clear** removes all the current entries in the window and any entries you have made in other Job windows up until that point.

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**Step 2** Select devices from the device selector or use Search. For information on using the device selector or search, see [Using the Device Selector, page 1-12](#).

**Step 3** Expand the folder for the group that contains the devices you want to include in the job. Then click the group folder. The group and all its devices are added to the Available Devices list.

For more information on device grouping, see [Managing Groups, page 4-74](#).

**Step 4** From the Available Devices list, select the group or individual devices, then click >>.

- The devices you selected are moved to the Selected Devices list.



**Note** Devices that are moved to the Selected list are removed from the Available Devices list. You can repopulate the Selected list by clicking on the group again.

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- The devices in the Selected Devices list box will receive the image you selected.

**Step 5** To add devices from other groups, repeat steps 3 and 4.

**Step 6** To remove devices, select them from the Selected Devices list, then click <<.

**Step 7** Go to the next step, Schedule Job. See [4. Schedule the Job, page 9-14](#).

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**Related Topics**

[Managing Groups, page 4-74](#)

## 4. Schedule the Job

When scheduling a firmware job, you can select Run Now to start the job in 2 minutes, or you can schedule the job for a future date and time.

**Note**

You can save a job without scheduling it. You can edit the job later to add the scheduling information. To edit a job, select **Firmware > Jobs**; then select the job from the list and click **Edit Job**.

**Procedure**

**Step 1** Select **SCHEDULE JOB** from the left pane.

**Note**

Clicking **Clear** removes all the current entries in the window and any entries you have made in other Job windows until now.

**Step 2** Schedule the job as follows:

- To run the job now, select the **Run Now** checkbox. The job will begin running immediately.

**Note**

Selecting this option ignores any date and time that you enter from the Start Date and Start Time lists.

- To schedule the job for a later date and time, select the month, day, and year from the Start Date lists and select the hour and minutes from the Start Time lists.

**Step 3** Go to the next task, Set Options. See [5. Set Options, page 9-14](#).

## 5. Set Options

In this task, you can select email notification (optional) and specify the remote server (if you are uploading the image from a remote TFTP server instead of uploading from the WLSE).

**Procedure**

**Step 1** Select **OPTIONS** in the left pane.

**Step 2** **Email settings**

If you want to be notified by email when the job finishes, enter the following information in this section.

**Table 9-6** Email Notification Settings for Firmware Jobs

Field	Description
On completion, mail to	Enter a comma-separated list of email addresses to be notified when the job completes.
Email only if job fails	Select this checkbox if you want recipients to be notified only if the job fails.



**Tip** If email notification is not working, you may need to set up the mail route by specifying an SMTP server. See [Configuring the Mail Route, page 16-45](#).

### Step 3 Remote server settings section

If images will be uploaded to devices from a remote TFTP server (instead of being uploaded from the WLSE), enter the information described in [Table 9-7 on page 9-15](#). For information about storing images on the remote TFTP server, see [Using a Remote TFTP Server for Updating Devices, page 9-9](#).



**Note** When you use this option, the access point might report an Invalid checksum error or Unknown failure. If this happens verify that the image filename entered in the job matches the image filename on the remote TFTP server.

**Table 9-7** Remote TFTP Server Settings for Firmware Jobs

Field	Description
Use remote server	Select this checkbox to upload the image from a TFTP server. The remote server must have a tftp server running.
Remote server IP address	Enter the IP address of the TFTP server or select a server from the list of recently used servers. Every time you enter a remote server IP address, the address will be added to the Recently used servers list.
Recently used servers	
Remote server firmware image filename	The filename of the firmware image file on a remote server. The image file must reside in the main directory for TFTP access on the server (usually the /tftpboot directory).

**Step 4** Go to the last task, [6. Save the Job and Finish, page 9-15](#).

## 6. Save the Job and Finish

### Procedure

**Step 1** Select **SAVE** from the left pane.



**Note** If a warning message appears saying that WLSE server is ahead of or behind your local time, see [Understanding Time Discrepancy Problems in Job Scheduling, page 1-11](#).

The Save window shows information about the job and the results of the validation tests that the WLSE runs on all firmware jobs. The window may contain warnings or errors:

- A warning usually indicates one of the following problems. You can go back and edit your job choices or choose to proceed in spite of warnings.
  - The action is not advisable; for example, you are downgrading the image version on the devices.
  - You selected an image version that is unknown to the WLSE.

For information about versions currently supported by the WLSE or updating the versions supported by the WLSE, see [Managing Firmware Version Support, page 16-49](#).

- Errors indicate that the job will always fail for those devices.



**Note** For more information about the messages in the Save window, see [About the Save Window, page 9-18](#).

**Step 2** Click **Save**.

- If there are no errors or warnings, the job runs or is scheduled and the Job Summary window appears. Go to Step 3 for more information.
- If there are uncorrected errors or warnings, the Save Confirmation window appears. Proceed as follows, according to whether there are errors or warnings:



**Note** To remove all of your settings for the job, click **Clear**.

- **If there are only warnings:**

Desired Action	Steps
Apply image to all devices, including those with warnings.	Click <b>Yes</b> . The Job Summary window appears.
Skip devices with warnings and only apply image to devices without warnings.	Click <b>No</b> . The Job Summary window appears.
Correct warnings before proceeding.	<ol style="list-style-type: none"> <li>1. Click <b>Cancel</b>. The Save window appears.</li> <li>2. Return to job choices, make corrections, and save job again.</li> </ol>

- **If there are warnings and errors:**

Desired Action	Steps
Skip devices with errors. Apply image to all other devices, including those with warnings.	<p>Click <b>Yes</b>. The Job Summary window appears.</p> <p><b>Note</b> Image will <i>not</i> be applied to devices with errors.</p>

Skip devices with warnings or errors. Apply image to all other devices.	Click <b>No</b> . The Job Summary window appears. <b>Note</b> Image will <i>not</i> be applied to devices with errors.
Correct warnings or errors before proceeding.	<ol style="list-style-type: none"> <li>1. Click <b>Cancel</b>. The Save window appears.</li> <li>2. Return to the job choices, make corrections, and save the job again.</li> </ol>

– If there are only errors:

Desired Action	Steps
Skip devices with errors. Apply image to all other devices.	Click <b>OK</b> . The Job Summary window appears. <b>Note</b> Image will <i>not</i> be applied to devices with errors.
Correct errors before proceeding.	<ol style="list-style-type: none"> <li>1. Click <b>Cancel</b>. The Save window appears.</li> <li>2. Return to job choices, make corrections, and save job again.</li> </ol>

- Step 3** When the job is ready to run, the Job Summary window displays the following information and the main Jobs window appears. All new jobs are added to the list of jobs, and immediate jobs start running. For more information about the main Jobs window, see [Viewing Job Status Information, page 9-20](#).

**Table 9-8 Save Summary Window**

Field	Description
Name	Name of the job.
Description	Job description, if any.
Image	Name of the image selected for the job.
Devices	Names of the devices selected for the job.
Groups	Names of groups selected for the job.
Schedule	Scheduled date and time for the job, or <i>No Schedule</i> if the job has not been scheduled.

- Step 4** After the image is downloaded to the device, the device will be rebooted using SSH. If the attempt to reboot by using SSH fails, the device will be rebooted using Telnet.
- Step 5** For information about job status, see [Viewing Job Status Information, page 9-20](#).

To view the status of jobs at any time, select **Firmware > Jobs**.

**Related Topics**

- [Deleting a Job, page 9-23](#)
- [Viewing Job Status Information, page 9-20](#)
- [Viewing Job Run Details and Rerunning/Reverifying Jobs, page 9-24](#)

## About the Save Window

The Save window shows information on the firmware job, including errors and warnings. Messages indicate whether the job has passed the validation tests. For the meaning of the messages, see [Table 9-10 on page 9-18](#).

**Table 9-9 Save Window**

Information type	Description
Image selected, Version, and Device type	Image name, image version, and device type that you selected when creating the job. Usage notes about this image version may also appear.
Duration estimate	Maximum amount of time required to complete the job is indicated by the following message: <i>This job can take as long as xx minutes to complete.</i>
Image version validation	Whether the image version is valid for the selected device type. This field is marked <i>Warning</i> if the image is not recognized. For information on supported firmware versions and viewing information on versions supported by the WLSE, see <a href="#">Managing Firmware Version Support, page 16-49</a> .
Image known bugs validation	Any major caveats for this image.
Device-Image validation	Whether the selected image is valid for this device: <ul style="list-style-type: none"> <li>• <i>Error</i> if the image is not valid for the selected device type.</li> <li>• <i>Warning</i> if the image is not recognized by the WLSE.</li> <li>• <i>Information</i> if the same image is already installed on the devices.</li> </ul>

Messages in the Save window show the status of each item that is tested by the job validation process:

**Table 9-10 Messages in the Save Window**

Message Type	Description and Solution
<i>Passed</i>	No problems were found.
<i>Information</i>	No problems were found, but there is information you might want to know. For example, the image version you selected is already installed on the device.

Table 9-10 Messages in the Save Window (continued)

Message Type	Description and Solution
<i>Warning</i>	<p>The operation is permitted but may not be advisable; for example, downgrading to an earlier image.</p> <p>The image will not be applied to devices that have warnings, unless you choose to ignore warnings. A popup window will be displayed after you click <b>Save</b> in this window and you can decide whether to ignore warnings.</p> <p>The warning messages are:</p> <ul style="list-style-type: none"> <li>• Device is running a software version that is not currently supported by WLSE—The WLSE does not recognize this software version. You can click <b>Yes</b> when prompted to ignore warnings.</li> <li>• Selected image version has an older version the one currently existing on the device—You are attempting to downgrade the device firmware. You can click <b>Yes</b> when prompted to ignore warnings.</li> <li>• Selected firmware image version is the same as the image running on the device—You can click <b>Yes</b> when prompted to ignore warnings.</li> </ul>
<i>Error</i>	<p>The operation is not permitted. The image will not be applied to devices that have errors associated with them. It is recommended that you eliminate the errors before saving the job. If you save a job with errors, the corresponding devices will be ignored during the job run.</p> <ul style="list-style-type: none"> <li>• Selected image may not valid for device type—The image is not valid for the type of device you selected; for example, you are trying to apply an AP1100 image to an AP350. Remove this device from the job or verify that the image was imported as the appropriate device type.</li> <li>• Select image may not be valid for device type, not supported—Firmware upgrade is not supported for this type of device; for example, the device is a switch. Remove the device from the job.</li> <li>• SNMP protocol not supported for firmware upload on device—Remove the device from the job.</li> <li>• Telnet/SSH credentials are not provided to reboot this device during upgrade, please add them to WLSE before creating the job—An IOS device’s Telnet or SSH credentials were not added to the WLSE; therefore, the device cannot be rebooted after the upgrade. You must add the credentials under <b>Devices &gt; Discover &gt; Device Credentials</b> before you can upgrade this device. For more information, see <a href="#">Enter Telnet/SSH Usernames and Passwords—Access Points, page 4-10</a>.</li> </ul>

## Using the Functions in the Main Jobs Window

To check job status, view job details, filter the job list, edit jobs, copy jobs, or delete jobs, select **Firmware > Jobs**. The main jobs window appears.

Job data is retained for 6 months; this parameter is not configurable.

- To check the status of jobs, see [Viewing Job Status Information, page 9-20](#).
- To filter the list of jobs, see [Filtering Jobs, page 9-22](#).
- To edit a job, see [Editing a Job, page 9-22](#).
- To delete a job, see [Deleting a Job, page 9-23](#).
- To see the details of a job, see [Viewing Job Run Details and Rerunning/Reverifying Jobs, page 9-24](#).

### Related Topics

[Creating and Running a Firmware Job, page 9-11](#)

## Viewing Job Status Information

For information about specific job states, see [Understanding Job Status Information and Job Run Log Messages, page 9-25](#).

Job data is retained for six months, then purged; this parameter is not configurable.



### Note

Your login determines whether you can use this option.

### Procedure

**Step 1** Select **Firmware > Jobs**.

**Step 2** From the Job State list, select the type of job whose status you want to check. The window refreshes and the jobs are displayed.

The information displayed depends on which Job State you selected: •**Scheduled**, •**Unscheduled**, •**Running**, or •**All**.

- Scheduled

Field	Description
Job Name	The job name.
Next Schedule	For scheduled jobs, this indicates when the job will run. For completed jobs, this is the time the job ran.
Last Run Status	The status of the last run.
User	The user who created the job.

- **Unscheduled**

Field	Description
Job Name	The job name.
Next Schedule	For scheduled jobs, this indicates when the job will run. For completed jobs, this is the time the job ran.
Last Run Status	The status of the last run.
User	The user who created the job.

- **Running**

Field	Description
Job Name	The job name.
Job Start Time	The time the job started.
Percent Complete	The percent of the job that has completed running.
Next Schedule	Firmware jobs are not recurring.
User	The user who created the job.

- **All**

Field	Description
Job Name	The job name.
Job State	The state of the job. <b>Note</b> A job in the DidNotStart state must be rescheduled.
Next Schedule	For scheduled jobs, this indicates when the job will run. For completed jobs, this is when the job ran.
Last Run Status	The status of the job the last time it ran.
As Of	The time the WLSE polled information from the device.
User	The user who created the job.

**Step 3** The following options are provided:

- Filter jobs—See [Filtering Jobs](#), page 9-22.
- Edit a job—See [Editing a Job](#), page 9-22.
- Delete a job—See [Deleting a Job](#), page 9-23.
- Copy a job—See [Table 9-10 on page 9-23](#).
- View job run details—See [Viewing Job Run Details and Rerunning/Reverifying Jobs](#), page 9-24.

**Step 4** To refresh the screen, click **Refresh**.

**Related Topics**

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Filtering Jobs

Use this option to display a limited set of jobs, making it easier to search for a particular job by name.

**Note**

Your login determines whether you can use this option.

**Procedure**

- Step 1** Select **Firmware > Jobs**.
- Step 2** Click **Filter Job**.
- Step 3** Enter the name, or part of the name. You can use % as a wildcard: for example, entering %name% displays all the jobs that contain the word “name.”
- Step 4** Click **Apply filter**. The Job window refreshes and the matching jobs are displayed in the Jobs list.

**Note**

The filter remains in effect until the page is refreshed.

**Related Topics**

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Editing a Job

Use this option to edit jobs from the displayed list of jobs.

**Note**

If you have deleted the image that was associated with the job you are editing, the job will show that no image has been selected.

**Note**

Your login determines whether you can use this option.

**Procedure**

- Step 1** Select **Firmware > Jobs**.
- Step 2** From the list of jobs, select the job that you want to edit.
- Step 3** Click **Edit Job**.
- Step 4** Select choices in the Job Creation Menu. For descriptions of the choices, see [Job Creation Tasks, page 9-12](#).

**Related Topics**

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Deleting a Job

Use this option to delete jobs from the displayed list of jobs. Jobs that are scheduled, unscheduled, completed, or did not start can be deleted. Jobs that are running cannot be deleted.

**Note**

---

Your login determines whether you can use this option.

---

**Procedure**

- 
- Step 1** Select **Firmware > Jobs**.
- Step 2** From the list of jobs, select the job that you want to delete.
- Step 3** Click **Delete Job**.
- Step 4** Click **OK** in the popup windows.
- 

**Related Topics**

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Copying a Job

Use this option to copy a job.

**Note**

---

If you have deleted the image associated with the job that you want to copy, the job will show that no image has been selected.

---

**Note**

---

Your login determines whether you can use this option.

---

**Procedure**

- 
- Step 1** Select **Firmware > Jobs**.
- Step 2** From the list of jobs, select the job that you want to copy.
- Step 3** Click **Copy Job**.
- Step 4** Enter a name for the job in the popup window. The copy will be unscheduled. To schedule it, select the job and click Edit Job.
- 

**Related Topics**

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Viewing Job Run Details and Rerunning/Reverifying Jobs

Use this option to view details about a job.



### Note

Your login determines whether you can use this option.

### Procedure

**Step 1** Select **Firmware > Jobs**.

**Step 2** From the All Jobs table displayed in the **Firmware > Jobs** window, select a job, then click **Job Run Detail**.

**Step 3** The details window shows the following:

Field	Description
Select Run	Select a job to see its details.
Job Start Time	The time the job started.
Job End Time	The time the job ended.
Job Status	The status of the job. For more information, see <a href="#">Understanding Job Status Information and Job Run Log Messages, page 9-25</a> .
Percent Complete	The percent of the job that completed.

**Step 4** Select a job and click the following options:

- **Show Run Details**—Displays the following details for the selected job run: device name, start and end times, and status.
- **Job Run Log**—Displays the job run log in a separate window for the selected job run. For information on the messages in the job run log, see [Understanding Job Status Information and Job Run Log Messages, page 9-25](#). This information is retained 30 days by default. To modify the number of days job run logs are retained, select **Devices > Discover > Inventory > Polling**.
- **Refresh**—Refreshes the screen.
- **Rerun for all Failed Devices**—Re-runs all failed jobs.
- **Rerun for all Selected Devices**—Re-runs selected jobs.
- **Reverify for Not Verified Devices**—Re-verifies jobs that ended with “not verified” status.

### Related Topics

[Using the Functions in the Main Jobs Window, page 9-20](#)

## Understanding Job Status Information and Job Run Log Messages

This section provides information about:

- [Job Status, page 9-25](#)
- [Job Run Log Messages, page 9-26](#)

### Job Status

[Table 9-11 on page 9-25](#) describes the jobs status states for each device in the job and for the overall firmware job.

**Table 9-11 Job Status**

Status	Meaning
Status for individual devices	
Success	Device was upgraded successfully.
Failed	Upgrade failed.
Not verified	The firmware image was pushed to the device, but the WLSE may have timed out before verifying whether the job succeeded. See <a href="#">Understanding “Not Verified” Job Status, page 9-25</a> .
Aborted	An unexpected failure occurred and the upgrade did not succeed.
Status for overall firmware job	
Success	All devices in the job were upgraded successfully.
Failed	Upgrade failed for all devices in the job.
Partial Success	Upgrade failed for some devices in the job or ended as “not verified” for some devices in the job. See <a href="#">Understanding “Not Verified” Job Status, page 9-25</a> .
Not verified	For all devices in the job, the firmware was pushed to the devices, but the WLSE may have timed out before verifying whether the job succeeded. See <a href="#">Understanding “Not Verified” Job Status, page 9-25</a> .
Aborted	The job aborted because of some unexpected failure.

### Understanding “Not Verified” Job Status



#### Note

A status of “not verified” may not mean that the job failed. The WLSE may have timed out before verifying whether the job succeeded.

If a job ends with the status “not verified,” or fails because of timeouts caused by slow links, you can:

- Use the Reverify option. See [Viewing Job Run Details and Rerunning/Reverifying Jobs, page 9-24](#).
- Rerun the job. See [Viewing Job Run Details and Rerunning/Reverifying Jobs, page 9-24](#).
- Change the values of the job properties parameters in the WLSE, as described below and then rerun the job.

To change job properties parameters that affect timeouts, select **Firmware > Advanced Parameters**.

- If the job ended as “not verified” and the job failed, increase the value of the **Device Reboot Wait Timeout** parameter and run the job again.
- If the job is timing out and failing because the access point and WLSE are connected through a slow link (less than 1.544 Mbps), first increase the value of the **Per device job operation timeout** parameter. For example, for a 56 kbps link, the recommended value is 2400 seconds (40 minutes). For a 128 kbps link, the recommended value is 1200 seconds (20 minutes). Then, run the job again.

## Job Run Log Messages

For a normal, successful firmware upgrade, the job run log contains messages similar to the following:

```
Device: 110.80.cisco.com Initiating firmware upgrade.
Device: 110.80.cisco.com Uploading new firmware image, please wait.
Device:110.80.cisco.com Upload completed, proceeding to reboot AccessPoint.
Device: 110.80.cisco.com Waiting for firmware update confirmation.
Device: 110.80.cisco.com Attempting to confirm version installed.
Device: 110.80.cisco.com Actual version is 12.2(11)JA1, expected version is 1.2.211-JA1.
Device: 110.80.cisco.com Firmware update completed successfully.
```

The following error messages may appear in the job run log:

**Table 9-12 Error Messages—Firmware Job Run Log**

Message	Meaning
SNMP error while initiating firmware upgrade. SNMP write community string was not provided or is incorrect.	The job failed. Enter the correct write community string for the device in <b>Devices &gt; Device Credentials</b> . For more information about the required community strings, see the <i>Installation and Configuration Guide for the CiscoWorks Wireless LAN Solution Engine, 2.12</i> on Cisco.com.
SNMP error while confirming version for <i>access_point</i> . Device could have been rebooting. See the documentation on how to increase the Job Timeout Properties.	The job may or may not have failed. See job status. Also, see the job timeout information in <a href="#">Job Status, page 9-25</a> .