

# Wireless LAN Controller (WLC) Software Upgrade

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## Introduction

This document explains the procedure and requirements for when you upgrade software on a Wireless LAN Controller (WLC). The upgrade procedure is basically the same for versions 3.2, 4.0, 4.1, and later versions. But, there are additional requirements that must be met before you upgrade to 4.1 and later versions, so carefully review each section.

## Prerequisites

### Requirements

In addition to basic networking knowledge and familiarity with the basic configuration and installation of Cisco Wireless LAN Controllers, ensure that you meet these requirements before you attempt to upgrade your WLC. Note that each main requirement also includes a version-specific requirement:

- **A TFTP server on your network that is reachable from the management IP address of the WLC**

Make sure that you have a TFTP server available for the software upgrade. Keep these guidelines in mind when you set up a TFTP server:

- ◆ If you upgrade through the service port, the TFTP server must be on the same subnet as the service port because the service port is not routable; otherwise, you must create static routes on the controller.
- ◆ If you upgrade through the distribution system network port, the TFTP server can be on the same or a different subnet because the distribution system port is routable.
- ◆ A third-party TFTP server cannot run on the same computer as the WCS because the WCS built-in TFTP server and the third-party TFTP server require the same communication port.

- ◆ The newer controller software releases are greater than 32 MB in size, so you must make sure that your TFTP server supports files larger than 32 MB. Some TFTP servers that support files of this size are tftpd32 and the TFTP server within the WCS.
- **Software upgrade files downloaded from the Wireless Software Center ( registered customers only) and placed in the root directory of your TFTP server**

**Upgrades to 3.2 and 4.0** The primary software image and bootloader software image are bundled into a single file. The file name is controller and software version dependent.

This naming syntax is used for the upgrade images in 3.2 and 4.0:

- ◆ *AIR-WLCxxx-K9-3-2-x-x.aes* This is the syntax of the 3.2 upgrade image.
- ◆ *AIR-WLCxxx-K9-4-0-x-x.aes* This is the syntax of the 4.0 upgrade image.

**Upgrades to 4.1** The main software image and boot software image are separate files in version 4.1, so you must upgrade the files separately. The boot software image consists of the controller boot kernel and boot menu script. For the Cisco Wireless Services Module (WiSM), Catalyst 3750G Wireless LAN Controller, and 4400 Series Controllers, this image also contains the controller's bootloader. An upgrade of the boot software is a required step on the WiSM, Catalyst 3750G Wireless LAN Controller, and 4400 Series Controllers when you first upgrade to version 4.1.

This naming syntax is used for the main and boot software images in 4.1:

- ◆ *AIR-WLCxxx-K9-4-1-x-x.aes* This is the syntax of the main software image for 4.1.
- ◆ *AIR-WLCxxx-K9-4-1-x-x\_ER.aes* This is the syntax of the boot image for 4.1.
- **Upgrades to 4.1 only Wireless LAN Controller runs at least 3.2.195.10 (or later 3.2 software) or 4.0.206.0 (or later 4.0 software)**

You cannot directly upgrade a controller from any 3.2 software version earlier than 3.2.195.10 or from any 4.0 software version earlier than 4.0.206.0 because the built-in TFTP client software of the controller does not support file transfers larger than 32 MB. See Table 1 for more information. If you do not meet this requirement, you must upgrade your controller to version 3.2.195.10 (or a later 3.2 version) or 4.0.206.0 (or a later 4.0 version) before you upgrade to version 4.1.

The software images 3.2.195.10 and 4.0.206.0 are the first images that support a software upgrade to version 4.1. If they are deferred or removed from the Software Center in the future, you can use the latest available version.

- **Upgrades to 4.2** If your controller runs software release 3.2.195.10 (or a later 3.2 release), 4.0.206.0 (or a later 4.0 release), or 4.1.171.0 (or a later 4.1 release), you can upgrade your controller directly to software release 4.2.61.0. If your controller runs an earlier 3.2 or 4.0 release, you must upgrade your controller to an intermediate release prior to an upgrade to 4.2.61.0. The table below shows the upgrade path that you must follow before you download software release 4.2.61.0.

*Upgrade Path to Controller Software Release 4.2.61.0*

Current Software Release	Upgrade Path to 4.2.61.0 Software
3.2.78.0	Upgrade to 4.0.206.0 (or a later 4.0 release) before upgrading to 4.2.61.0.
3.2.116.21	
3.2.150.10	
3.2.171.6	
3.2.193.5	
3.2.195.10 or later 3.2 release	You can upgrade directly to 4.2.61.0.
4.0.155.5	Upgrade to 4.0.206.0 (or a later 4.0 release) before upgrading to 4.2.61.0.
4.0.179.11	
4.0.206.0 or later 4.0 release	You can upgrade directly to 4.2.61.0.
4.1.171.0 or later 4.1 release	You can upgrade directly to 4.2.61.0.

- **Upgrades to 5.0** If your controller runs a 4.1 or 4.2 software release, you can upgrade your controller directly to software release 5.0.148.0. If your controller runs a 3.2 or 4.0 release, you must upgrade your controller to an intermediate release prior to an upgrade to 5.0.148.0. The upgrade path that you must follow before you download software release 5.0.148.0 is illustrated in the table below.

*Upgrade Path to Controller Software Release 5.0.148.0*

Current Software Release	Upgrade Path to 5.0.148.0 Software
3.2.78.0 or later 3.2 release	Upgrade to a 4.1 release before upgrading to 5.0.148.0.
4.0.155.5 or later 4.0 release	Upgrade to a 4.1 or 4.2 release before upgrading to 5.0.148.0
4.1.171.0 or later 4.1 release	You can upgrade directly to 5.0.148.0.
4.2.61.0 or later 4.2 release	You can upgrade directly to 5.0.148.0.

Cisco recommends that you also install the Cisco Unified Wireless Network Controller Boot Software 5.0.148.0 ER.aes file on the controller. This file resolves defect CSCsd52483 and is necessary to ensure proper operation of the controller. The ER.aes file can be installed on all controller platforms.

Unlike previous ER images, a new bootloader file is not loaded when you install the 5.0.148.0 ER.aes file. This is true for all controllers. The 4.2.112.0 ER.aes file is the last ER file to contain a bootloader. If you want the latest bootloader, install the 4.2.112.0 ER.aes file. If you want to obtain the fix for CSCsd52483, also install the 5.0.148.0 ER.aes file.

The ER.aes files are independent from the controller software files. You can run any controller software file with any ER.aes file, but when you install the latest boot software file (5.0.148.0 ER.aes), it ensures that the boot software modifications in all of the previous and current boot software ER.aes files are installed.

- **Upgrades to 5.2** Before you upgrade your controller to software release 5.2.157.0, you must comply with these rules.
  - ◆ Before you use an AP801 Series Lightweight Access Point with controller software release 5.2.157.0, you must upgrade the software in the Cisco 800 Series Integrated Services Router (ISR) to Cisco IOS® Software Release 12.4(22)T.
  - ◆ The upgrade path that you must complete before you download software release 5.2.157.0 is illustrated in this table:

Current Software Release	Upgrade Path to 5.2.157.0 Software
3.2.78.0 or later 3.2 release	First upgrade to a 4.1 release and then upgrade to 4.2.176.0 before upgrading to 5.2.157.0.
4.0.155.5 or later 4.0 release	Upgrade to 4.2.176.0 before upgrading to 5.2.157.0.
4.1.171.0 or later 4.1 release	Upgrade to 4.2.176.0 before upgrading to 5.2.157.0.
4.1.191.xM or 4.1.192.xM	You can upgrade directly to 5.2.157.0.
4.2.61.0, 4.2.99.0, or 4.2.112.0	Upgrade to 4.2.176.0 or to a 5.1 release before upgrading to 5.2.157.0.
4.2.130.0	Upgrade to 4.2.176.0 before upgrading to 5.2.157.0.
4.2.173.0 or 4.2.176.0	You can upgrade directly to 5.2.157.0.
5.0.149.0 or later 5.0 release	You can upgrade directly to 5.2.157.0.
5.1.151.0 or later 5.1 release	You can upgrade directly to 5.2.157.0.

Cisco recommends that you install the Cisco Unified Wireless Network Controller Boot Software 5.2.157.0 ER.aes file on all controller platforms. This file resolves CSCsm03461 and is necessary to view the version information for ER.aes files in the output of the show sysinfo CLI command. If you do not install this ER.aes file, your controller does not obtain the fix for this defect, and "Error-dev" appears in the Emergency Image Version field in the output of this command.

- **Upgrades to 6.0**– Before you upgrade your controller to software release 6.0.182.0, you must comply with these rules:
  - ◆ Before you download a software image or an ER.aes file to a 2100 series controller or a controller network module, use the **show memory statistics** CLI command in order to see the current amount of free memory. If the controller has less than 90 MB of free memory, you need to reboot it before you download the file.
  - ◆ Before you use an AP801 series lightweight access point with controller software release 6.0.182.0, you must upgrade the software in the Cisco 860 and 880 Series Integrated Services Routers (ISRs) to Cisco IOS Software Release 12.4(22)T and the software in the Cisco 890 Series Integrated Services Router to Cisco IOS Software Release 12.4(22)YB. This table shows the upgrade path that you must complete before you download software release 6.0.182.0.

<b>Current Software Release</b>	<b>Upgrade Path to 6.0.182.0 Software</b>
3.2.78.0 or later 3.2 release	Upgrade to a 4.1 release and then upgrade to 4.2.176.0 before upgrading to 6.0.182.0.
4.0.155.5 or later 4.0 release	Upgrade to 4.2.176.0 before upgrading to 6.0.182.0.
4.1.171.0 or later 4.1 release	Upgrade to 4.2.176.0 before upgrading to 6.0.182.0.
4.1.191.xM	Upgrade to 4.1.192.35M before upgrading to 6.0.182.0.
4.1.192.xM	You can upgrade directly to 6.0.182.0.
4.2.130.0 or earlier 4.2 release	Upgrade to 4.2.176.0 before upgrading to 6.0.182.0.
4.2.173.0 or later 4.2 release	You can upgrade directly to 6.0.182.0.
5.0.148.0 or later 5.0 release	You can upgrade directly to 6.0.182.0.
5.1.151.0 or later 5.1 release	You can upgrade directly to 6.0.182.0.
5.2.157.0 or later 5.2 release	You can upgrade directly to 6.0.182.0.

## Components Used

The information in this document is based on these software and hardware versions:

- A PC on the network that runs TFTP server **Tftpd32** version 3.22
- In this example, the upgrade is to version 5.2.178.0. So, both the main image (AIR-WLC4400-K9-5-2-178-0.aes) and boot image (AIR-WLC4400-K9-5-2-157-0-ER.aes) are placed in the root directory of the TFTP server ( **Tftpd32** version 3.22). For upgrades to 3.2 and 4.0, you only require the main image because the bootloader is bundled in the main image.
- A 4400 WLC that runs 5.0.148.0, which allows a direct upgrade to software release 5.2.178.0.

## Platforms Supported

This document is also applicable to these hardware platforms:

1. Cisco 2000 Series Wireless LAN Controllers
2. Cisco 2100 Series Wireless LAN Controllers
3. Cisco 4100 Series Wireless LAN Controllers
4. Cisco 4400 Series Wireless LAN Controllers
5. Cisco Airespace 3500 Series WLAN Controller

6. Cisco Airespace 4000 Series Wireless LAN Controller
7. Cisco Wireless LAN Controller Module
8. Cisco Catalyst 3750 Series Integrated Wireless LAN Controllers
9. Cisco Catalyst 6500 Series/7600 Series Wireless Services Module (WiSM)

## Conventions

Refer to the Cisco Technical Tips Conventions for more information on document conventions.

## LWAPP Mode Changes

When you upgrade to controller software release 5.0.148.0 or later, the LWAPP mode changes to Layer 3 if it was previously configured for Layer 2.

If you downgrade from controller software release 6.0.196.0, 6.0.188.0, 5.2.178.0, 5.2.157.0, 5.1.151.0, or 5.0.148.0 to 4.2.61.0 or an earlier release, the LWAPP mode changes from Layer 3 to Layer 2. Access points might not join the controller, and you must manually reset the controller to Layer 3 in order to resolve this issue.

## WLC Software Upgrade Procedure

You can use either one of these two methods in order to upgrade the Cisco WLC:

- Graphical User Interface (GUI)
- Command Line interface (CLI)

This sequence is recommended for your WLC software upgrade:

1. Upload a backup of your controller configuration to a TFTP server.
2. Disable the 802.11a and 802.11b/g networks on your controller.
3. Upgrade the primary image on your controller.
4. Upgrade the boot image on your controller.

**Note:** This is a required step for upgrades to 4.1 on the WiSM, 3750G Wireless LAN Controller, and 4400 Series Controllers.

5. Re-enable the 802.11a and 802.11b/g networks on your controller.

**Note:** It is highly recommended to back up the configuration on the Wireless LAN controller before you perform the upgrade.

## GUI Upgrade Procedure

In this section, you are presented with the information to upgrade the WLC with the use of the GUI on the controller.

When you upgrade the WLC with use of the GUI, you lose Layer 3 (IP) connectivity within the periods of time when the controller reboots. For this reason, it is recommended that you use a console port connection to check the state of the controller during the upgrade process and expedite any recovery procedures, if necessary.

When you upgrade the controller's software, the software on the controller's associated access points is also automatically upgraded. When an access point is loading software, each of its LEDs blinks in succession. Up

to 10 access points can be concurrently upgraded from the controller. Do not power down the controller or any access point during this process; otherwise, you might corrupt the software image. When you upgrade the controller to an intermediate software release (for example, to 4.0.217.0), wait until all the access points joined to the controller are upgraded to the intermediate release before you install the next release of the software. Upgrading a controller with a large number of access points can take as long as 30 minutes, depending on the size of your network. However, with the increased number of concurrent access point upgrades supported in software release 4.0.206.0 and later, the upgrade time should be significantly reduced. The access points must remain powered, and the controller must not be reset during this time.

For information on some of the best practices to upgrade code on the Wireless LAN Controller, refer to Best Practices for Upgrading WLC Software.

## Step-by-Step Instructions

Complete these steps:

1. Complete these steps in order to log into the controller through your browser:

- a. HTTPS to the management IP address of your controller (for example, <https://10.77.244.204>).

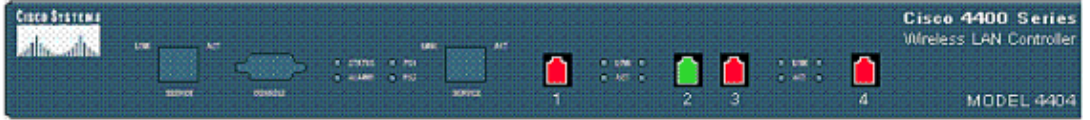
You are prompted for user credentials.

- b. Enter the username and password of the controller and click **OK**.

The default username and password on the WLC are both **admin**.

The Monitor window appears. The Controller Summary information shows you the current software version that runs on the WLC.

### Summary



### Controller Summary

Management IP Address	10.77.244.204
Service Port IP Address	0.0.0.0
Software Version	5.0.148.0
System Name	Cisco_48:53:c3
Up Time	7 days, 21 hours, 37 minutes
System Time	Fri Mar 13 12:09:00 2009
Internal Temperature	+37 C
802.11a Network State	Enabled
802.11b/g Network State	Enabled
Local Mobility Group	TSWeb

2. Complete these steps in order to define the download parameters for the software upgrade:

- a. Click **Commands** in the menu at the top of the window.

The Download File to Controller window appears.

- b. Enter the download parameters.

The parameters to define include:

- ◇ TFTP server IP Address
- ◇ File Path
- ◇ Maximum retries
- ◇ Timeout
- ◇ File Name

The parameters used in this example are:

- ◇ TFTP server IP Address; 10.77.244.196
- ◇ Maximum retries; 10
- ◇ Timeout; 6
- ◇ File Path ./
- ◇ File Name AIR-WLC4400-K9-5-2-178-0.aes

c. Click **Download** in order to start the upgrade process.

Here is an example:

The screenshot shows a web form titled "Download file to Controller". It has a "File Type" dropdown menu set to "Code". Below this is a section titled "TFTP Server" with several input fields: "IP Address" (10.77.244.196), "Maximum retries" (10), "Timeout (seconds)" (6), "File Path" (./), and "File Name" (AIR-WLC4400-K9-5-2-178-0.aes).

**Note:** When you perform the upgrade from the GUI, for File Path, you can insert a dot (.) as long as the image is in the root directory of your TFTP server. This way, you do not have to enter the path where the image is saved.

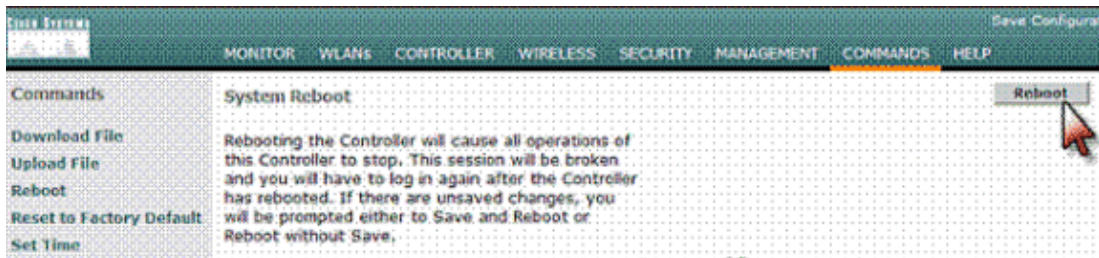
3. Reboot the system after the file transfer is complete in order for the new software to take effect.

Click **Click Here** in order to reboot, as this example shows:

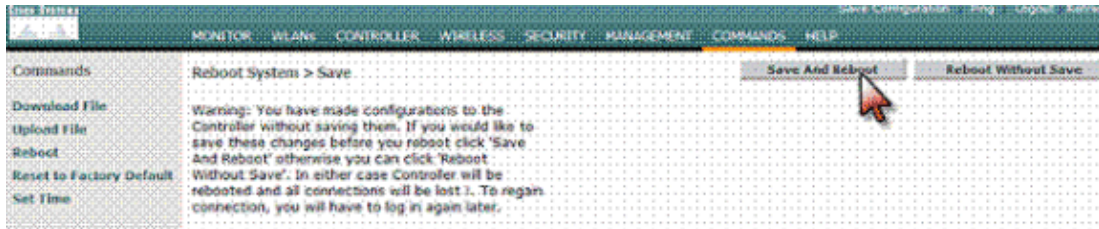
This screenshot shows the same "Download file to Controller" form, but with a success message at the bottom: "TFTP File transfer is successful. Reboot the switch for update to complete. For the new Code to take effect, you need to reboot system. [Click Here](#) to get redirected to reboot page." The input fields remain the same as in the previous screenshot.

4. In the the System Reboot window, click **Reboot** at the top right side of the window.





5. Click **Save and Reboot** in the Reboot System > Save window.



After the reboot, you can log back into the controller and verify that the new version runs.

**Note:** The new version is 4.1.170.0.

**Summary**

100 Access Points S

**Cisco 440 Wireless LAN Controller**

**Controller Summary**

Management IP Address	10.77.244.204
Service Port IP Address	0.0.0.0
Software Version	5.2.178.0
System Name	Cisco_48:53:c3
Up Time	0 days, 0 hours, 2 minutes
System Time	Fri Mar 13 15:23:28 2009
Internal Temperature	+38 C
802.11a Network State	Enabled
802.11b/g Network State	Enabled
Local Mobility Group	TSWeb
CPU Usage	0%
Memory Usage	44%

6. Upgrade the boot image (version 4.1 and later version upgrades only). The procedure is identical to steps 1 through 5 of this procedure, except you load the AIR-WLCxxxx-K9-5-2-157-0-ER.aes image.

## CLI Upgrade Procedure

In this section, you are presented with the information to upgrade the WLC with use of the CLI on the controller.

## Step-by-Step Instructions

Complete these steps:

1. Make sure that the TFTP server is reachable from the controller, and make sure the upgrade file resides in the Root directory of the TFTP server.

Refer to the Wireless Software Center (registered customers only) in order to download the latest software images. Copy the files to the default directory on the TFTP server.

2. It is best to complete this procedure via the console port, but you can also SSH or Telnet (if enabled) to the controller's management IP address in order to complete the procedure. The use of SSH or Telnet results in the loss of connectivity with the controller during the reboot process following the image download. Therefore, console access should be available in order to expedite troubleshooting and recovery of the controller if the upgrade fails. Login to the controller and issue the **show sysinfo** command in order to verify the current software that runs on the controller.

This is sample output of the **show sysinfo** command, which shows that the controller runs 4.0.217.0:

```
(Cisco Controller) >show sysinfo

Manufacturer's Name..... Cisco Systems Inc.
Product Name..... Cisco Controller
Product Version..... 5.0.148.0
RTOS Version..... 5.0.148.0
Bootloader Version..... 4.2.99.0
Build Type..... DATA + WPS

System Name..... Cisco_48:53:c3
System Location.....
System Contact.....
System ObjectID..... 1.3.6.1.4.1.14179.1.1.4.3
IP Address..... 10.77.244.204
System Up Time..... 0 days 0 hrs 1 mins 58 sec
System Timezone Location.....
Current Boot License Level.....
Next Boot License Level.....

Configured Country..... IN - India
Operating Environment..... Commercial (0 to 40 C)
Internal Temp Alarm Limits..... 0 to 65 C
```

3. Complete these steps in order to define the download parameters:
  - a. Issue the **transfer download mode tftp** command in order to define the mode of file transfer.
  - b. Issue the **transfer download serverip *TFTP\_server\_IP\_address*** command in order to define the TFTP server IP address.
  - c. Issue the **transfer download path '*TFTP\_server\_path*'** command in order to define the path of the TFTP default directory where the controller OS software is located.
  - d. Issue the **transfer download filename *filename*** command in order to specify the name of the image.

Here is an example:

```
(Cisco Controller) >transfer download datatype code

(Cisco Controller) >transfer download mode tftp

(Cisco Controller) >transfer download serverip 10.77.244.196

(Cisco Controller) >transfer download path .
```

- (Cisco Controller) >transfer download filename AIR-WLC4400-K9-5-2-178-0.aes
4. Issue the **transfer download start** command in order to initiate the upgrade process.

Here is an example of the upgrade process:

```
(Cisco Controller) >transfer download start

Mode..... TFTP
Data Type..... Code
TFTP Server IP..... 10.77.244.196
TFTP Packet Timeout..... 6
TFTP Max Retries..... 10
TFTP Path..... ./
TFTP Filename..... AIR-WLC4400-K9-5-2-178-0.aes

This may take some time.
Are you sure you want to start? (y/N) y

TFTP Code transfer starting.

TFTP receive complete... extracting components.

Executing backup script.

Writing new RTOS to flash disk.

Writing new Code to flash disk.

Writing new APiB to flash disk.

Executing install_apib script.

Executing fini script.

TFTP File transfer is successful.
Reboot the switch for update to complete.
```

5. Reboot the controller after the upgrade process is complete in order for the new code to take effect.
6. Issue the **reset system** command, and enter **y** or **yes** in response to the question "Would you like to save them now?".
7. Upgrade the bootloader version (4.1 and later version upgrades only) using the AIR-WLCxxx-K9-5-2-157-0-ER.aes file. The process is identical to steps 1 through 6 of this procedure.

**Note:** In the 2100 Series WLC, you cannot upgrade the bootloader version due to hardware limitations. Also, this model does not require a bootloader upgrade as do the larger WLC models.

**Note:** You can upgrade the boot image before or after the main image.

Here is an example of the boot image CLI upgrade process:

```
(Cisco Controller) >transfer download start

Mode..... TFTP
Data Type..... Code
TFTP Server IP..... 10.77.244.196
TFTP Packet Timeout..... 6
TFTP Max Retries..... 10
TFTP Path..... ./
TFTP Filename..... AIR-WLC4400-K9-5-2-157-0-ER.aes
```

```
This may take some time.
Are you sure you want to start? (y/N) y

TFTP Code transfer starting.

TFTP receive complete... extracting components.

Writing new Emergency Bootloader to flash disk.

Writing new Emergency Bootloader RTOS to flash disk.

TFTP File transfer is successful.
Reboot the switch for update to complete.
```

The configuration is not kept when you downgrade versions of controller code. Controllers can be upgraded from one release to another. Should you require a downgrade from one release to another, you possibly cannot use the higher release configuration. The workaround is to reload the previous controller configuration files that were saved on the backup server or reconfigure the controller.

## Use the Wireless Control System to Upgrade the Wireless LAN Controller

Complete these steps in order to update controller (and access points) software using the Wireless Control System (WCS).

1. Enter **ping** *ip address* in the command prompt window in order to be sure that the WCS server can reach the controller. If you use an external TFTP server, enter **ping** *ip address* in order to be sure that the WCS server can reach TFTP server.
2. In the GUI interface, choose **Configure > Controllers** in order to navigate to the All Controllers page.
3. Check the check box of the desired controller, choose **Download Software** from the Select a Command drop-down menu, and click **Go**. The WCS displays the Download Software to Controller page.
4. If you use the built-in WCS TFTP server, check the **TFTP Server on WCS System** check box. If you use an external TFTP server, uncheck this check box and add the external TFTP server IP address.
5. Click **Browse** and navigate to the software update file (for example, AS\_2000\_release.aes for 2000 series controllers).

The files are uploaded to the root directory which was configured for use by the TFTP server. You can change to a different directory.

6. Click **Download**.

WCS downloads the software to the controller, and the controller writes the code to Flash RAM. As WCS performs this function, it displays its progress in the Status field.

Refer to Performing System Tasks for more information.

## Verify

In order to verify the version of WLC software that is running, log in to the controller after the system reboots.

From the GUI:

## Summary



### Controller Summary

Management IP Address	10.77.244.204
Service Port IP Address	0.0.0.0
Software Version	5.2.178.0
System Name	Cisco_48:53:c3
Up Time	0 days, 0 hours, 2 minutes
System Time	Fri Mar 13 15:23:28 2009
Internal Temperature	+38 C
802.11a Network State	Enabled
802.11b/g Network State	Enabled
Local Mobility Group	TSWeb
CPU Usage	0%
Memory Usage	44%

## Troubleshoot

Use this section to troubleshoot your software upgrade.

During the upgrade process, you might encounter errors. This section explains several common errors, along with typical causes and corrective actions you can take to complete the WLC software upgrade.

- **Code file transfer failed – No reply from the TFTP server** You get this error message if the TFTP server is not active. Check to determine if the TFTP service is enabled on the server.
- **Code file transfer failed – Error from server: File not found. Aborting transfer** You get this error message if the software upgrade file is not present in the default directory of the TFTP server or if you have entered the incorrect file name in the 'File Name' field of the controller upgrade page. In order to eliminate this error, copy the image file to the default directory on the TFTP server and verify that the name and file extension are exactly the same on the TFTP server and the 'File Name' field of the Controller Upgrade page.
- **TFTP Failure while storing in flash!** You get this error if there is a problem with the TFTP server or TFTP client. When you upgrade to version 4.1, it is particularly important to have a TFTP server that supports file transfers greater than 32 MB. Also, it is required to upgrade your controller to 3.2.195.10 (or a later 3.2 code) or 4.0.206.0 (or a later 4.0 code) before you attempt to upgrade to version 4.1. Earlier releases of the controller code do not support file transfers greater than 32 MB. It is recommended that you use the TFTP server Tftpd32 for controller upgrades.

You can also receive this error message when the upgrade was attempted over a WAN link, and the complete image was not downloaded from the daemon. This is a rather common error that occurs because of a failed transfer. It does not necessarily indicate a 'bad flash' on the controller. It is recommended that the upgrade be performed over a LAN or other high-speed, low-latency link. A very slow network connection can cause the TFTP server to timeout and make the upgrade unsuccessful. If remote upgrade is the only option available, ensure to have a good link speed, match the setting for maximum number of retries and timeout on the TFTP server and controller. If you

increase these values, that can help.

**Note:** Proper TFTP servers send result codes to the controller if they do not support the size of the file transfer. The controller shows the result code in the CLI output, but not necessarily in the GUI output. Examples of result codes to look for in your TFTP server log include:

- ◆ The File too large for TFTP Protocol error, which is seen in SolarWinds TFTP server version 8.2.4.
- ◆ The File is too big, try increasing block size. error, which is seen in Pumpkin TFTP server version 2.7.2.

These two errors are visible in the TFTP server logs and are reported to the controller when the upgrade fails. These errors indicate that the TFTP server does not support large file transfers to support controller upgrades.

- **Sanity check failed on file. The file was not downloaded completely!** You get this error when the file does not completely download. You see this error if you try to upgrade directly to version 4.1 software from versions earlier than 3.2.195.10 or from versions earlier than 4.0.206.0. You must follow the correct upgrade path to 4.1 by first ensuring that you run 3.2.195.10 (or a later 3.2 code) or 4.0.206.0 (or a later 4.0 code) before you upgrade to version 4.1. You can also see this error if you have a TFTP server that does not support file transfers greater than 32 MB, but fails to properly report a result code to the controller.
- **The install partitions are destroyed or the image is corrupted** If you are still unsuccessful after an attempt to upgrade the software, there is a possibility that your image is corrupted or that you have faulty hardware. You should try to download another copy of the upgrade image in order to rule out a corrupt file. This is not a common issue, so it is important to verify you do not hit one of these listed issues before you contact Cisco Technical Support for assistance. If you do require assistance, see this Debugging Options section for helpful debugging options.
- **Firewall blocking the TFTP transfer** Ensure that the TFTP traffic is not blocked by any firewall in the network. In some cases the machine that runs the TFTP server application might have the firewall turned on. By default, firewalls block all TFTP traffic. This could be one reason why the WLC upgrade does not happen as expected.

## Debugging Options

You can use the **debug transfer trace enable** command in order to view the events that occur during the controller software upgrade process. Here is an example, which shows the **debug** command output used and the for a successful software upgrade:

```
(Cisco Controller) >debug transfer trace enable
(Cisco Controller) >transfer download datatype code
(Cisco Controller) >transfer download mode tftp
(Cisco Controller) >transfer download serverip 10.77.244.04
(Cisco Controller) >transfer download path .
(Cisco Controller) >transfer download filename AIR-WLC4400-K9-5-2-157-0-ER.aes
(Cisco Controller) >transfer download start
```

```
Mode..... TFTP
Data Type..... Code
TFTP Server IP..... 10.7.244.204
TFTP Packet Timeout..... 6
TFTP Max Retries..... 10
TFTP Path..... ./
TFTP Filename..... AIR-WLC4400-K9-5-2-157-0-ER.aes
```

This may take some time.

Are you sure you want to start? (y/N) y

Thu Apr 26 19:21:21 2007: RESULT\_STRING: **TFTP Code transfer starting.**

Thu Apr 26 19:21:21 2007: RESULT\_CODE:1

```

TFTP Code transfer starting.
Thu Apr 26 19:21:24 2007: Still waiting! Status = 2
Thu Apr 26 19:21:25 2007: Locking tftp semaphore,
    pHost=10.7.244.204 pFilename=./
    AIR-WLC4400-K9-5-2-157-0-ER.aes
Thu Apr 26 19:21:26 2007: Semaphore locked, now unlocking,
    pHost=10.7.244.204 pFilename=./
    AIR-WLC4400-K9-5-2-157-0-ER.aes
Thu Apr 26 19:21:26 2007: Semaphore successfully unlocked,
    pHost=10.7.244.204 pFilename=./
    AIR-WLC4400-K9-5-2-157-0-ER.aes
Thu Apr 26 19:21:26 2007: TFTP: Binding to local=0.0.0.0
    remote=10.7.244.204
Thu Apr 26 19:21:36 2007: Still waiting! Status = 1
Thu Apr 26 19:21:39 2007: Still waiting! Status = 1
Thu Apr 26 19:21:42 2007: Still waiting! Status = 1
Thu Apr 26 19:21:48 2007: Still waiting! Status = 1
Thu Apr 26 19:22:23 2007: TFTP End: 33862788 bytes transferred
    (1 retransmitted packets)
Thu Apr 26 19:22:23 2007: tftp rc=0, pHost=10.7.244.204
    pFilename=./AIR-WLC4400-K9-5-2-157-0-ER.aes
    pLocalFilename=/mnt/download/local.tgz
Thu Apr 26 19:22:23 2007: tftp = 6, file_name=.
    /AIR-WLC4400-K9-5-2-157-0-ER.aes,
    ip_address=10.7.244.204,
    msg=Unknown error - refer to log
Thu Apr 26 19:22:23 2007: upd_get_code_via_tftp =
    6 (target=268435457
    msg=Unknown error - refer to log)
Thu Apr 26 19:22:23 2007: RESULT_STRING:
    TFTP receive complete...
    extracting components.
Thu Apr 26 19:22:23 2007: RESULT_CODE:6

TFTP receive complete... extracting components.
Thu Apr 26 19:22:24 2007: Still waiting! Status = 2
Thu Apr 26 19:22:27 2007: Still waiting! Status = 1
Thu Apr 26 19:22:28 2007: RESULT_STRING: Executing product check script.
Thu Apr 26 19:22:28 2007: RESULT_STRING: Executing init script.
Thu Apr 26 19:22:28 2007: RESULT_STRING: Executing backup script.

Executing backup script.
Thu Apr 26 19:22:30 2007: Still waiting! Status = 2
Thu Apr 26 19:22:33 2007: Still waiting! Status = 1
Thu Apr 26 19:22:37 2007: Still waiting! Status = 1
Thu Apr 26 19:23:18 2007: RESULT_STRING: Writing new RTOS to flash disk.

Writing new RTOS to flash disk.
Thu Apr 26 19:23:19 2007: Still waiting! Status = 2
Thu Apr 26 19:23:19 2007: RESULT_STRING: Writing new Code to flash disk.

Writing new Code to flash disk.
Thu Apr 26 19:23:22 2007: Still waiting! Status = 2
Thu Apr 26 19:23:24 2007: Still waiting! Status = 1
Thu Apr 26 19:23:24 2007: Still waiting! Status = 1
Thu Apr 26 19:23:41 2007: RESULT_STRING: Writing new APIB to flash disk.

Writing new APIB to flash disk.
Thu Apr 26 19:23:44 2007: Still waiting! Status = 2
Thu Apr 26 19:23:47 2007: Still waiting! Status = 1
Thu Apr 26 19:23:50 2007: Still waiting! Status = 1
Thu Apr 26 19:24:12 2007: RESULT_STRING: Executing install_apib script.

Executing install_apib script.
Thu Apr 26 19:24:15 2007: Still waiting! Status = 2

```

```

Thu Apr 26 19:24:40 2007: Still waiting! Status = 1
Thu Apr 26 19:24:43 2007: Still waiting! Status = 1
Thu Apr 26 19:24:46 2007: RESULT_STRING: Executing fini script.
Thu Apr 26 19:24:46 2007: RESULT_STRING:
TFTP File transfer is successful.
Reboot the switch for update to complete.
Thu Apr 26 19:24:46 2007: RESULT_CODE:11

TFTP File transfer is successful.
Reboot the switch for update to complete.

Thu Apr 26 19:24:46 2007: Still waiting! Status = 2
Thu Apr 26 19:24:49 2007: Still waiting! Status = 1
Thu Apr 26 19:24:50 2007: ummounting: <umount /mnt/download/>
                                cwd = /mnt/application
Thu Apr 26 19:24:50 2007: finished umounting

```

Other common reasons for a WLC software upgrade failure are:

- Network issues like congestion or very slow network connection, which cause TFTP to timeout.
- A TFTP server with multiple IP addresses.
- No route between the TFTP server and the controller.
- No or an incorrect default gateway configured on the TFTP server or the controller.
- There is an issue with the TFTP server application. Some TFTP servers have a limitation on the size of the files that you can transfer. It is recommended that you use the Tftpd32 version 3.0 TFTP server.
- If you download the image from a TFTP server through a WAN or wireless link, it can result in failure since the links are unreliable. In order to have a stable transfer, it is always recommended to use a TFTP server that is available in the LAN through Ethernet.
- In the event of network failure, you can upgrade the WLC with the service port, which is meant for Out-of-Band management. For more information about the service port, refer to the Connecting the Switch's Service Port section of the Quick Start Guide: Cisco 4400 Series Wireless LAN Controllers document.

## Remove the Primary or Secondary Image on the Wireless LAN Controller (WLC)

The WLC, by default, maintains two images. These images are the primary image and the backup image. The primary image is the active image used by the WLC while the backup image is used as a backup for the active image.

When you upgrade the WLC with a new image, the WLC automatically copies the new image over the backup image.

In order to see the active image that your controller is currently running (the primary image), click on **Monitor** from the WLC GUI and look at the Software Version field under Controller Summary on the controller GUI. From the CLI, you can use the command **show boot** to view the primary and backup image present on the WLC. Here is an example.

```

(Cisco Controller) >show boot
Primary Boot Image..... Code 5.2.178.0 <active>
Backup Boot Image..... Code 5.0.148.0

```

In order to remove or overwrite an image on the WLC, boot up the WLC with the image that you want to keep and perform an upgrade. This way, the new image replaces the backup image.

You can also change the active booting image of the WLC manually using the command **config boot <primary/backup>**.



(Cisco Controller) >**config boot ?**

primary	Sets the primary image as active.
backup	Sets the backup image as active.

**Note:** You need to save and reboot the WLC configuration so that the WLC uses the new active image.

## Software Upgrade can Fail if Certain Characters are used in the Previous Configuration

In controller software release 4.2.61.0 and later, the bootup configuration file of the controller is stored in an Extensible Markup Language (XML) format, rather than in binary format. When you upgrade a controller to 4.2.61.0 or a later software release, the binary configuration file migrates and converts to XML, but the configuration file does not migrate correctly if it contains any of these characters as part of a user configuration string: **&**, **<**, **>**, **'**, **""**.

For example, a WLAN profile named **R&D** causes an XML parsing error after the second reboot, even though this profile name is valid in 4.1 and previous configurations.

**Note:** You cannot download a binary configuration file onto a controller that runs software release 5.0.148.0. Also, do not attempt to make changes to the configuration file. If you do so and then download the file to a controller, the controller displays a cyclic redundancy checksum (CRC) error while it reboots and returns the configuration parameters to their default value.

## Predownloading an Image to an Access Point

This feature allows you to download the upgrade image to the controller, and then download the image to the access points while the network is still up. A new CLI allows you to specify the boot image for both devices and to reset the access points when the controller resets. For information on how to configure the WLC and LAPs for this feature read the section Predownloading an Image to an Access Point of the Cisco Wireless LAN Controller Configuration Guide, Release 6.0

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## Related Information

- [Cisco Wireless LAN Controller Configuration Guides](#)
- [Cisco Wireless LAN Controller Command References](#)
- [Cisco Wireless Control System Configuration Guide, Release 4.1](#)
- [Wireless Software Center](#) ( registered customers only)
- [Wireless Support Page](#)
- [Technical Support & Documentation – Cisco Systems](#)

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