

Troubleshoot COS AP Boot Issues and AP Image Download

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Introduction

This document describes the detailed process of AP Boot Process, AP Upgrade Path, and AP Image Download Methods.

Prerequisites

Requirements

Cisco recommends that you have knowledge of these topics:

- Basic knowledge of Catalyst Wireless LAN Controllers

Components Used

- Catalyst 9800-CL, Cisco IOS® XE 17.15.3

- Catalyst 9162 Access Point
- Cisco Aironet 3802 Access Point

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

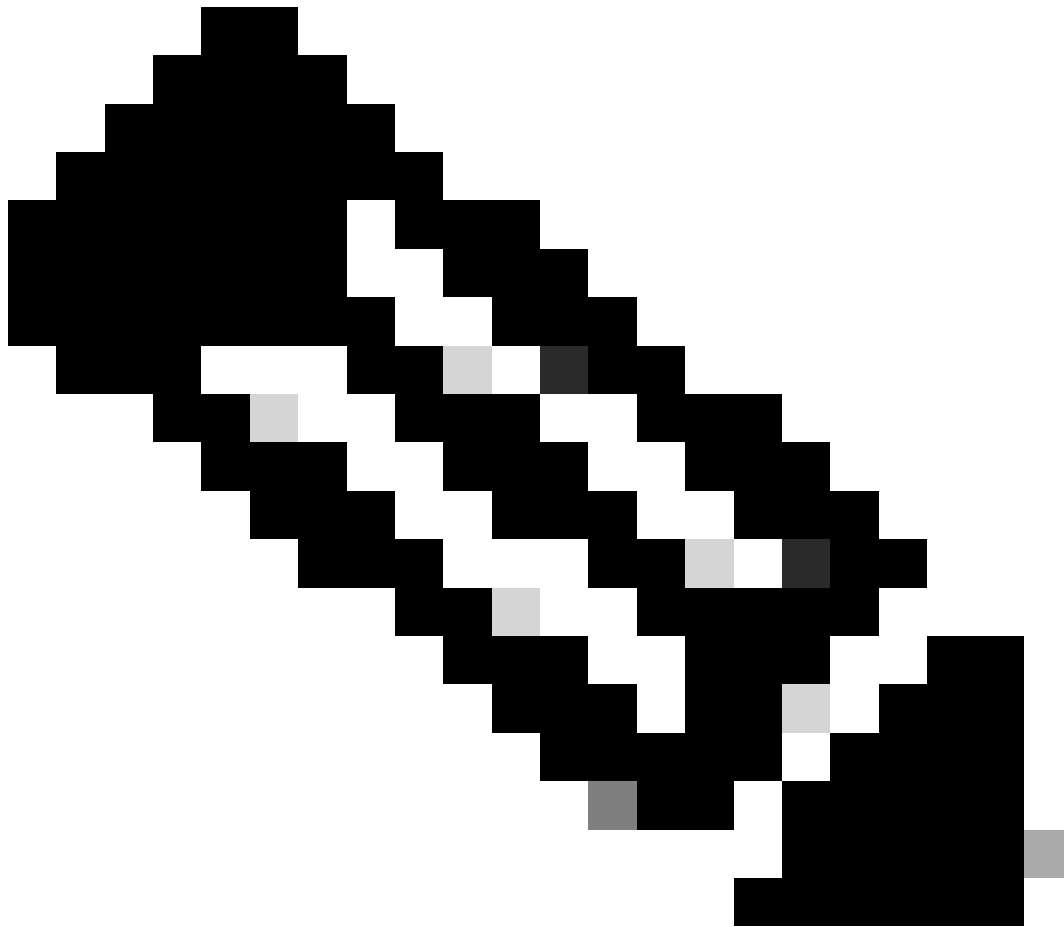
AP Boot Process

U-Boot

U-Boot Startup Sequence

Cisco APs begin the boot process in U-BOOT mode which occurs prior to the main COS shell. To reach U-BOOT mode, review these steps.

1. Connect a console cable to the AP console port.
2. Open a terminal emulator program on your PC and set the session to the proper serial COM port.
Verify the COM port to be used on your device.
3. Set the terminal emulator software to use 115200 bps baud rate.



Note: If there is no output from the AP, set the baud rate to 9600.

4. Connect power to the AP.

5. Enter U-Boot mode by via the escape (esc) button on your keyboard, you see the option to **Hit ESC to stop autoboot** as seen in the screenshot. This message appears upon reboot of the Access Point while connected to the console port.



```
** LOADER **

U-Boot 2013.01-ge1c49d93a (Jul 28 2023 - 09:08:14) SDK version: 2015_T2.0p10

Board: Barbados-3K
SoC:   MV88F6920 Rev A1
      running 2 CPUs
CPU:   ARM Cortex A9 MPCore (Rev 1) LE
      CPU 0
      CPU @ 1800 [MHz]
      L2 @ 900 [MHz]
      TClock @ 250 [MHz]
      DDR4 @ 900 [MHz]
      DDR4 32 Bit Width, FastPath Memory Access, DLB Enabled, ECC Disabled
DRAM:  1 GiB

RST I2C0
NAND:  ECC 4bits, 256 MiB
SF: Detected N25Q32A with page size 64 KiB, total 4 MiB
PCI-e 1 (IF 0 - bus 0) Root Complex Interface, Detected Link X1, GEN 2.0
PCI-e 2 (IF 1 - bus 1) Root Complex Interface, Detected Link X1, GEN 2.0

Map:   Code:           0x3fed7000:0x3ffad848
      BSS:             0x3ffef314
      Stack:           0x3f9c6f20
      Heap:             0x3f9c7000:0x3fed7000
      U-Boot Environment: 0x00100000:0x00110000 (SPI)

Board configuration:
| port | Interface | PHY address |
|-----|-----|-----|
| egiga1 | SGMII | 0x01 |
| egiga2 | SGMII | In-Band |
Net:    , egiga1, egiga2 [PRIME]
Hit ESC key to stop autoboot:  0
u-boot>>
```

U-Boot Startup Screen

Use the command **printenv** from U-Boot mode to list the various U-Boot environment details for the Access Point.

```
u-boot>> printenv
```

```
BOOT=part 1  
CASset=max  
ENABLE_BREAK=1  
FACTORY_RESET=0  
MALLOC_len=5  
MANUAL_BOOT=0  
MEMORY_DEBUG=0  
MPmode=SMP  
PART_BOOTCNT=3  
autoload=yes  
baudrate=9600
```

U-Boot printenv

This output indicates that the boot partition is **part1**. This boot partition can be modified within U-Boot mod.

Modify U-Boot Boot Partition

1. Adjust the current boot partition with the **setenv BOOT part <1-2>** command.
2. Save the partition adjustment with the command **saveenv** command.
3. Verify the current boot partition with the **printenv** command.

```
u-boot>> setenv BOOT part 2  
u-boot>> saveenv
```

```
Saving Environment to SPI Flash...
SF: Detected N25Q32A with page size 64 KiB, total 4 MiB
Erasing SPI flash.....Writing to SPI flash.....done
u-boot>> printenv
BOOT=part 2
```

4. Boot the AP with the newly configured boot partition with the **boot** command.

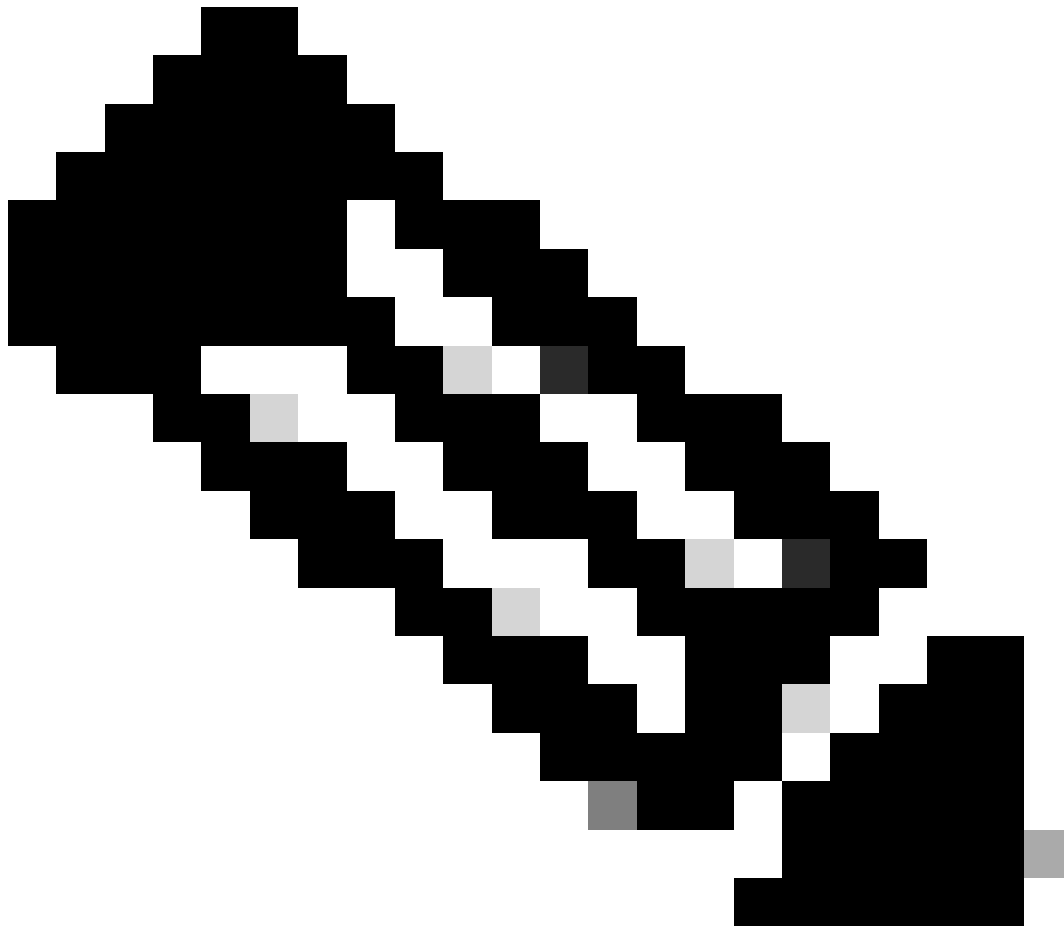
```
u-boot>> boot
Creating 1 MTD partitions on "nand0":
0x0000000200000-0x0000100000000 : "mtd=2"
UBI: attaching mtd1 to ubi0
ubifsmount - mount UBIFS volume

Usage:
ubifsmount <volume-name>
    - mount 'volume-name' volume
Unable to ubi mount UBIFS partition part 2
Trying alternate partition part2
UBIFS: mounted UBI device 0, volume 0, name "part2"
```

5. Access point boots from the selected boot partition.

COS Shell

AP Filesystem Check



Note: It is recommended to reload the AP(s) prior to the upgrade. This allows all cached filesystems to be refreshed and temporary files to be flushed prior to the upgrade.

From CLI on the AP, enter Privilegedmode and run these commands to verify the current AP images and tmp directory size.

show image integrity Command

This output indicates the current versions on the AP.

The **Primary** partition version indicates the current AP boot version.

The **Backup** partition version indicates the AP backup version.

```
AP-CW9162#show image integrity
/part1(primary) 17.15.3.28
  part.bin : Good
  ramfs_data_cisco.squashfs : Good
  iox.tar.gz : Good
```

```
/part2(Backup) 17.9.6.40
part.bin : Good
ramfs_data_cisco.squashfs : Good
iox.tar.gz : Good
```

You can switch between the current AP boot version with the bold commands. The AP boots with the selected partition after the next AP reload:

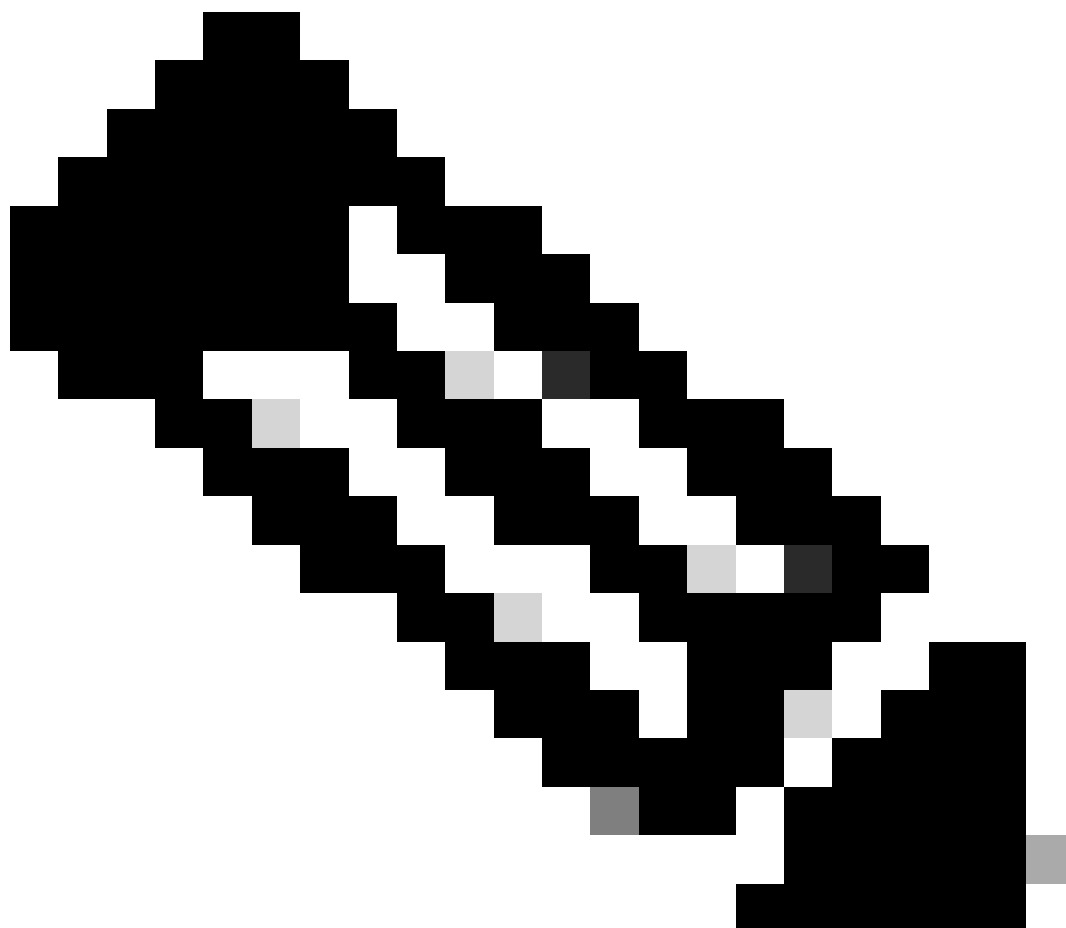
configure boot path 1 (boots AP with part1 version)

or

configure boot path 2 (boots AP with part2 version)

show filesystems Command

The output indicates the filesystem structure of the AP.



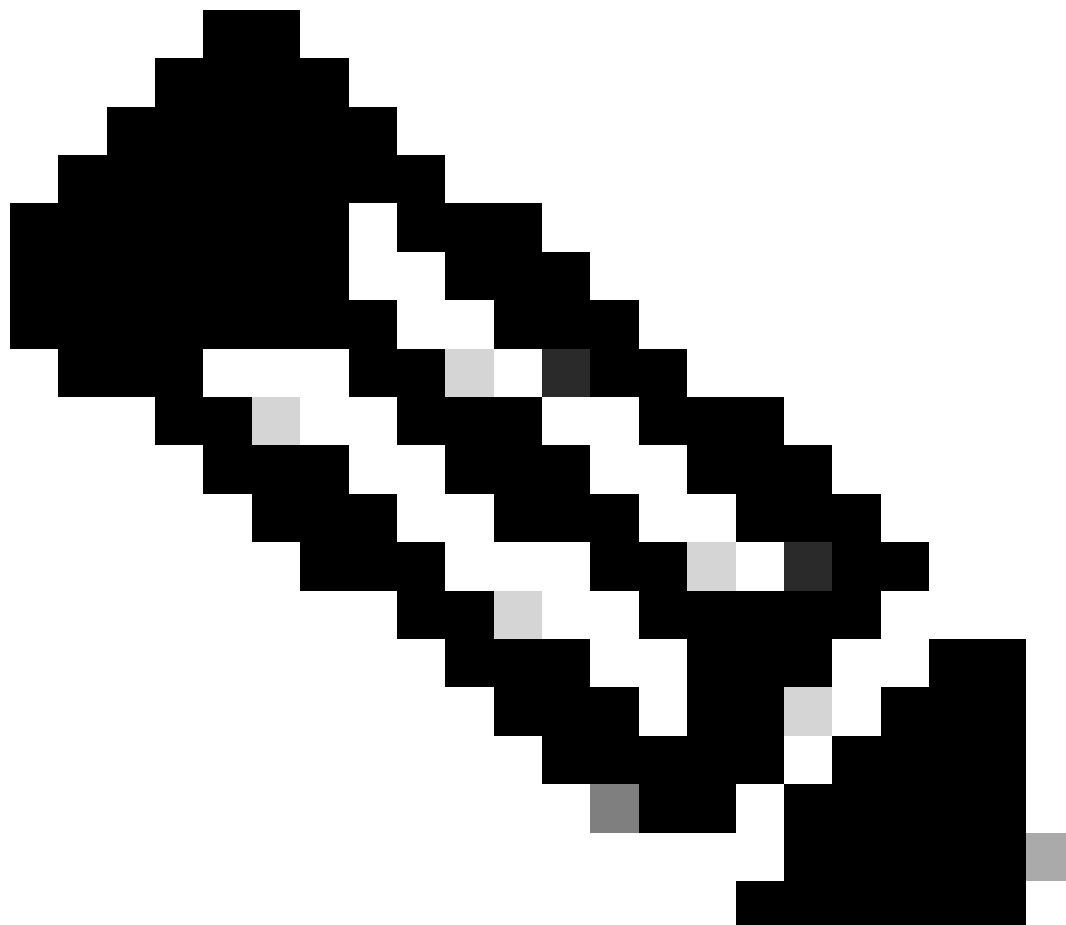
Note: The **/tmp** row within the **Mounted on** column shows the filesystem entry that is used for AP

image storage for an AP upgrade.

<#root>

```
AP-CW9162#show filesystems
Filesystem              Size      Used Available Use% Mounted on
.....
none                    114.4M    4.7M    109.7M    4% /tmp
.....
```

It is important that the AP /tmp filesystem has a size of 100M or higher. The /tmp filesystem is used to store the AP image upgrade.

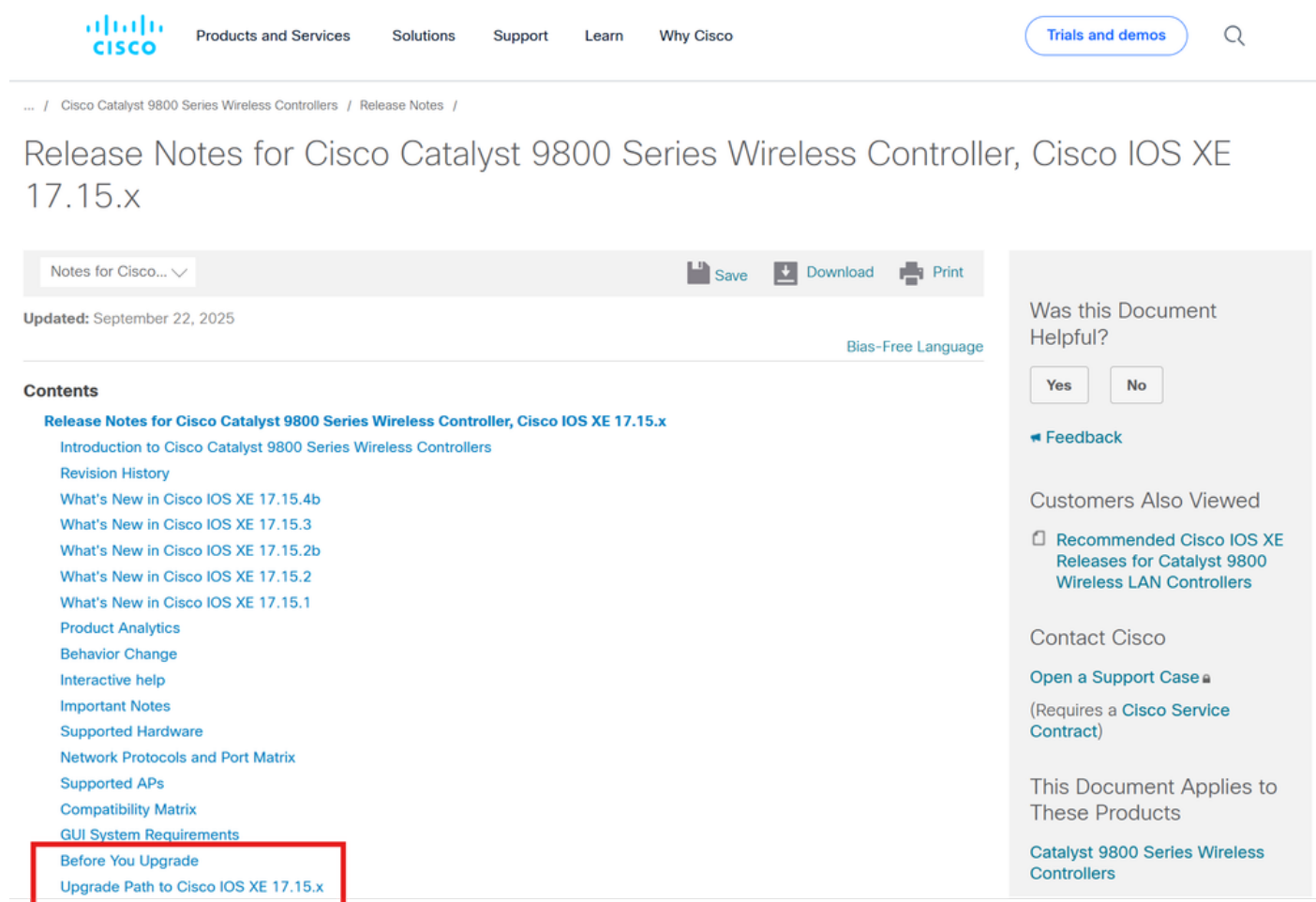


Note: If the /tmp filesystem entry is not 100M or larger, there could be issues with AP images that are too large for the partition. You need to upgrade the AP to version 17.6.6 via any of the AP Image Download Methods which expands the partition.

AP Upgrade Path

Cisco APs require a specific upgrade path with reference to the current and destination version. In this guide, Cisco IOS XE version 17.15.3 is used.

1. Browse for the [release notes](#) document and **Upgrade Path to Cisco IOS XE** for your chosen upgrade version.



The screenshot displays the Cisco Catalyst 9800 Series Wireless Controller Release Notes for Cisco IOS XE 17.15.x. The page features a navigation bar with links to Products and Services, Solutions, Support, Learn, and Why Cisco. A search bar and a 'Trials and demos' button are also present. The main content area includes a breadcrumb trail, the document title, and a table of contents. The 'Before You Upgrade' and 'Upgrade Path to Cisco IOS XE 17.15.x' sections are highlighted with a red box. The right sidebar contains a feedback form and a list of related documents.

... / Cisco Catalyst 9800 Series Wireless Controllers / Release Notes /

Release Notes for Cisco Catalyst 9800 Series Wireless Controller, Cisco IOS XE 17.15.x

Notes for Cisco... ▾ Save Download Print

Updated: September 22, 2025 [Bias-Free Language](#)

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[Catalyst 9800 Series Wireless Controllers](#)

Release Notes 17.15.X

2. The Before You Upgrade section provides key details about the upgrade version. It is recommended to review this information.
3. The Upgrade Path to Cisco IOS XE Cupertino 17.15.X table contains details about which versions you can directly upgrade from.

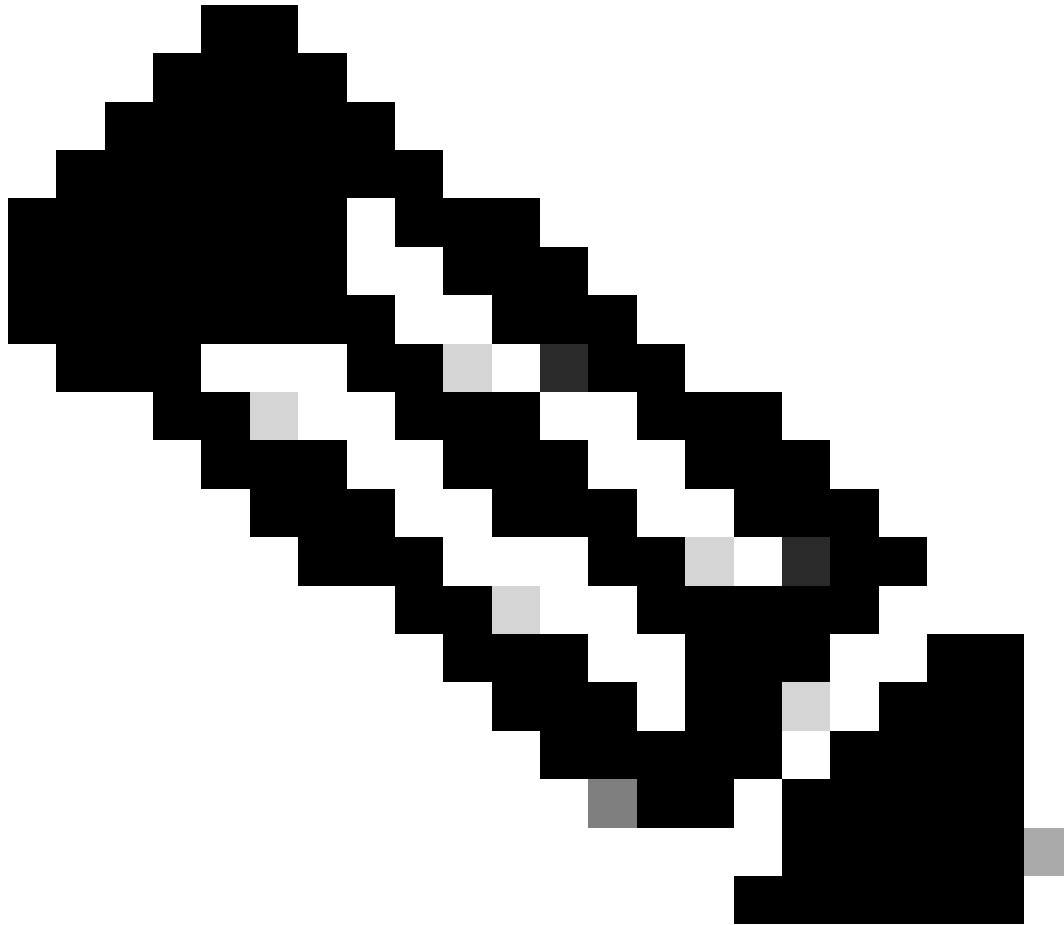
Upgrade Path to Cisco IOS XE 17.15.x

Table 15. Upgrade Path to Cisco IOS XE Dublin 17.15.x (where x > 1)

Current Software	Upgrade Path for Deployments with 9130 or 9124	Upgrade Path for Deployments Without 9130 or 9124
16.10.x	— ⁴	Upgrade first to 16.12.5 or 17.3.x and then to 17.15.x.
16.11.x	—	Upgrade first to 16.12.5 or 17.3.x and then to 17.15.x.
16.12.x	Upgrade first to 17.3.5 or later or 17.6.x or later, then to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade first to 17.3.5 or later or 17.6.x or later, and then to 17.15.x.
17.1.x	Upgrade first to 17.3.5 or later, then to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade first to 17.3.5 or later and then to 17.15.x.
17.2.x	Upgrade first to 17.3.5 or later, then to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade first to 17.3.5 or later and then to 17.15.x.
17.3.1 to 17.3.4	Upgrade first to 17.3.5 or later or 17.6.x or later, then to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade directly to 17.15.x.
17.3.4c or later	Upgrade to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade directly to 17.15.x.
17.4.x	Upgrade first to 17.6.x and then to 17.15.x.	Upgrade directly to 17.15.x.
17.5.x	Upgrade first to 17.6.x and then to 17.15.x.	Upgrade directly to 17.15.x.
17.6.x	Upgrade to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade directly to 17.15.x.
17.7.x	Upgrade to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade directly to 17.15.x.
17.8.x	Upgrade to 17.9.6 or later or 17.12.x or later, and then to 17.15.x.	Upgrade directly to 17.15.x.
17.9.1 to 17.9.5	Upgrade to 17.9.6 or later or 17.12.x or later, and then to 17.15.x	Upgrade directly to 17.15.x
17.9.6 or later	Upgrade directly to 17.15.x	Upgrade directly to 17.15.x
17.10.x	Upgrade to 17.12.x or later, and then to 17.15.x	Upgrade directly to 17.15.x
17.11.x	Upgrade to 17.12.x or later, and then to 17.15.x	Upgrade directly to 17.15.x
17.12.x	Upgrade directly to 17.15.x	Upgrade directly to 17.15.x
17.13.x	Upgrade directly to 17.15.x	Upgrade directly to 17.15.x
17.14.x	Upgrade directly to 17.15.x	Upgrade directly to 17.15.x
8.9.x or any 8.10.x version prior to 8.10.171.0	Upgrade first to 8.10.171.0 or later, 17.3.5 or later or 17.6.x or later, then to 17.9.6 or later or 17.12.x or later, and then to 17.15.x	Upgrade directly to 17.15.x.

Upgrade Path to 17.15.X

3. The [Cisco Wireless Solutions Software Compatibility Matrix](#) indicates which AP models are compatible with your chosen version.



Note: The **Access Point Release** column corresponds to the AP version codename. This Access Point Release is used via the Manual AP Image Download method and must be notated.

Table 5. Cisco Catalyst 9800 Wireless Controller and Supported Access Points

IOS XE Release	Access Point Image Version Number	Access Point Release	Supported Access Points
-----------------------	--	-----------------------------	--------------------------------

Wireless Compatibility Matrix 17.9.6 - Table Heading.png

Cisco IOS XE 17.15.3	17.15.3.28	15.3(3)JPT2	Cisco Wireless Wi-Fi 7 APs: 9176 (I/D1), 9178I, 9172(I) Cisco Catalyst Wi-Fi 6E APs: 9136 (I) 9162 (I), 9163 (E), 9164 (I), 9166 (I/D1) Cisco Catalyst Wi-Fi 6 APs: 9105AX (I/W), 9115AX (I/E), 9117AX (I), 9120AX (I/E/P), 9130AX (I/E) Cisco Aironet APs: 1815 (I/W/M/T), 1830 (I), 1840 (I), 1852 (I/E), 1800i, 2800 (I/E), 3800 (I/E/P), 4800 (I) Outdoor and Industrial APs: 1542, 1560, 1570, and IW3702 Integrated Access Point in Cisco 1100 ISR (ISR-AP1100AC, ISR-AP1101AC, and ISR-AP1101AX) Cisco Catalyst Industrial Wireless 6300 Heavy Duty Series Access Point, Cisco 6300 Series Embedded Services Access Point, Cisco Catalyst 9124AX (I/D/E) Access Points, Cisco Catalyst Industrial Wireless 9167 (I/E) Heavy Duty Access Points, Cisco Catalyst IW9165D Heavy Duty Access Points, Cisco Catalyst IW9165E Rugged Access Points Sensors: Cisco Aironet 1800s Active Sensor Pluggable Modules: Wi-Fi 6 Pluggable Module for Industrial Routers
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Wireless Compatibility Matrix 17.15.3

4. Utilize the [Software Download webpage](#) to obtain the upgrade package, then proceed with an AP Image Download method .

AP Image Download Methods

Utilize the 9800 WLC to upgrade the AP. This process involves download of the Cisco IOS XE upgrade on the 9800 chassis and initiation of the image download to joined access points.

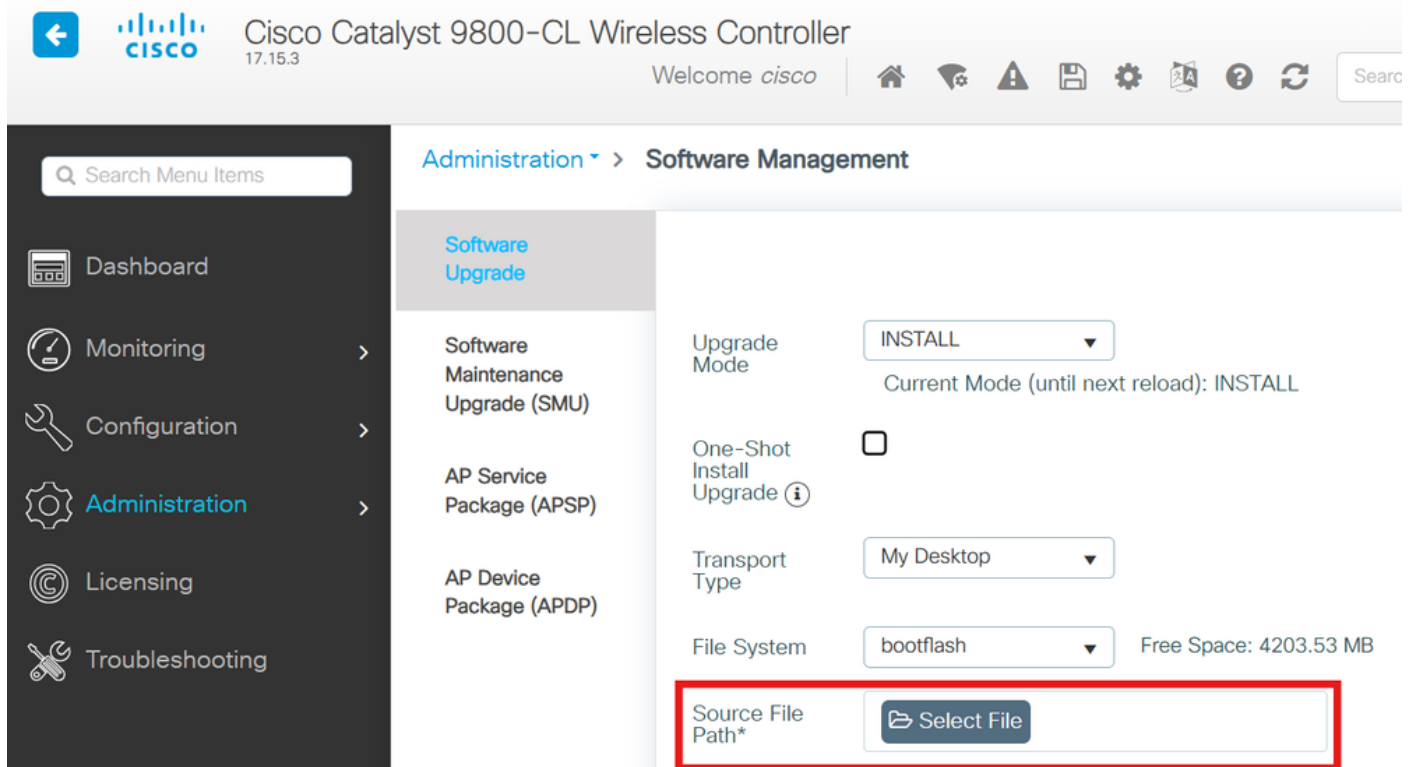
There are two methods to upgrade AP images: AP Image Predownload and Standard WLC Upgrade.

- AP Image Predownload allows preload of the AP image software prior to reload of the AP.
- Standard WLC Upgrade completes the upgrade on the WLC, reloads the WLC and then APs download the new version upon the AP join process.

AP Image Predownload

AP Image Predownload via GUI

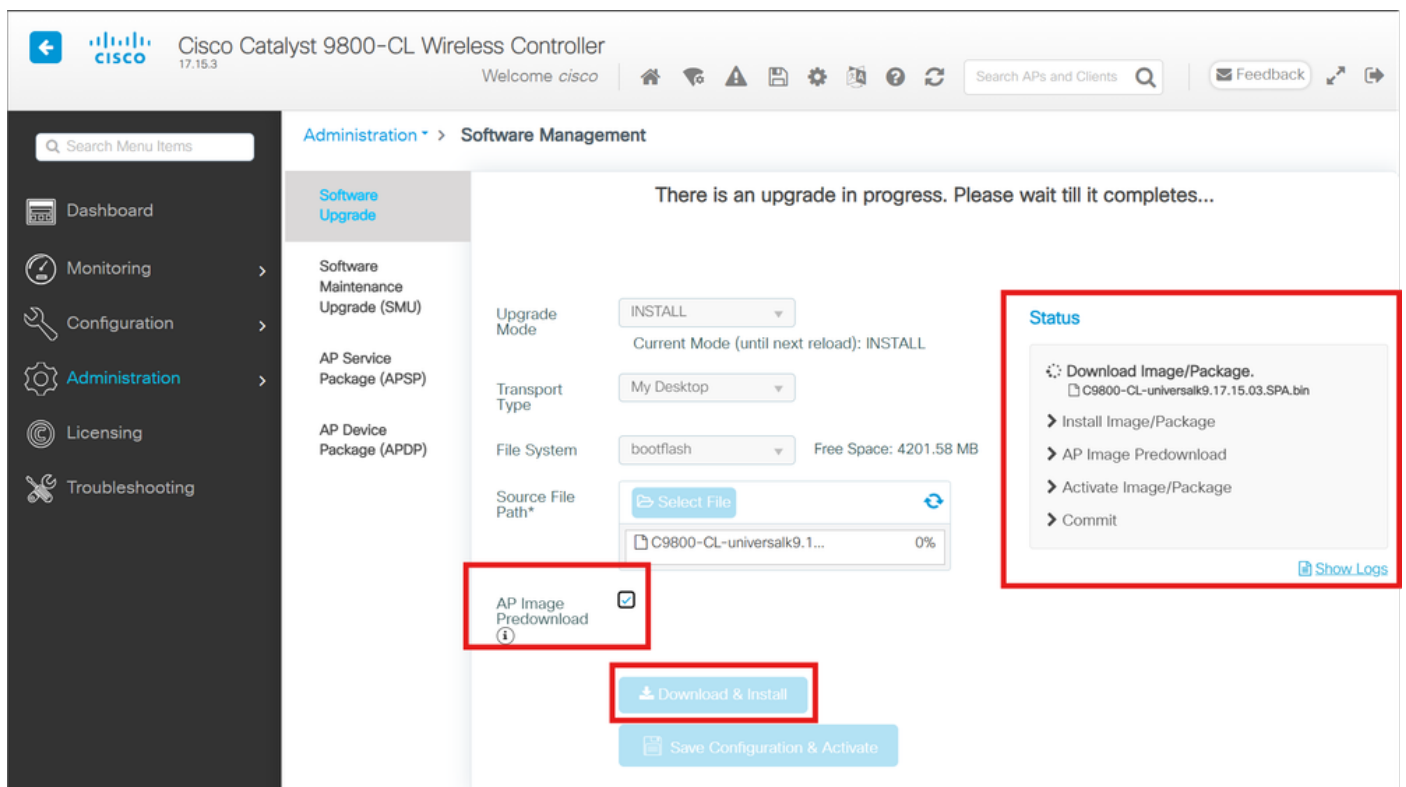
1. Download the preferred Cisco IOS XE image version from the [Cisco Software Download Site](#) .
2. Upload the Cisco IOS XE image to the WLC via Web GUI Administration > Software Management > Software Upgrade > Source File Path > Select File > Select the 9800 Upgrade File to be uploaded to the controller.



Software Management GUI

3. Check **AP Image Predownload**.

4. Click **Download & Install**.



Predownload WLC Upgrade - Install Image

5. APs are upgraded per the AP Image Predownload method.

AP Image Predownload via CLI

1. Add and expand the controller image to the WLC.

```
install add file bootflash:image.bin
```

2. Download the image to all APs or a specific AP joined to the controller.

```
ap image predownload
```

or

```
ap name <ap-name> image predownload
```

3. Verify the AP predownload status for all APs or a specific AP .

```
show ap image
```

or

```
show ap name <ap-name> image
```

4. Swap images of all APs, specific APs, or APs that have completed pre-download.

```
ap image swap
```

or

```
ap name <ap-name> image swap
```

or

ap image swap completed

5. Activate the newly installed image. This causes the WLC to reload and start with the new version.

install activate

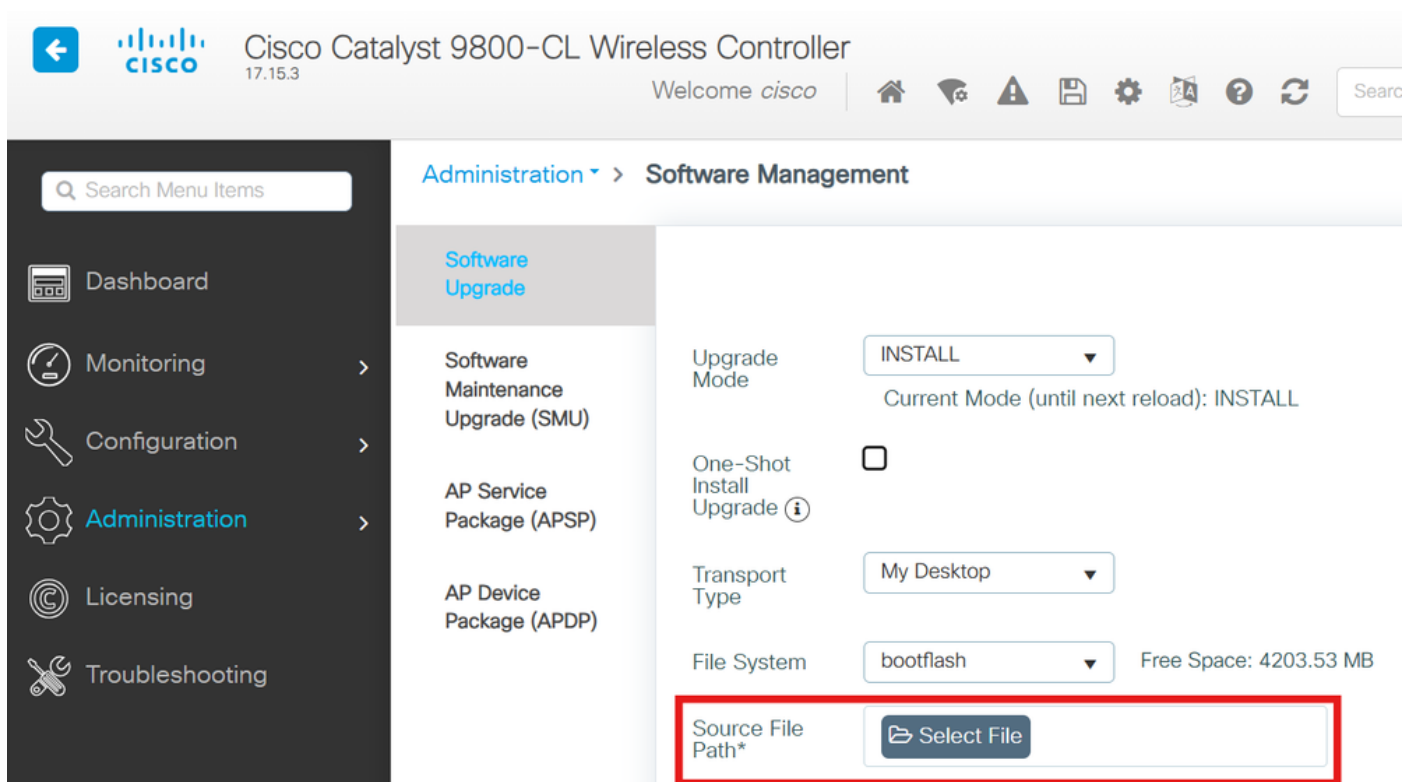
6. Once the WLC is online and reachable, commit the image.

install commit

Standard WLC and AP Upgrade

Standard WLC and AP Upgrade via GUI

1. Download the preferred Cisco IOS XE image version from the [Cisco Software Download Site](#).
2. Upload the Cisco IOS XE image to the WLC via Web GUI Administration > Software Management > Software Upgrade > Source File Path > Select File > Select the 9800 Upgrade File to be uploaded to the controller.



Software Management GUI

3. After the source file is chosen for upload, choose which option best fits your needs: Standard WLC Upgrade or AP Image Predownload .

4. Click **Download and Install**.

5. The progress bar reaches 100% and Install Image/Package status is reached.

Administration > Software Management

Software Upgrade

Software Maintenance Upgrade (SMU)

AP Service Package (APSP)

AP Device Package (APDP)

There is an upgrade in progress. Please wait till it completes...

Upgrade Mode: INSTALL
Current Mode (until next reload): INSTALL

One-Shot Install Upgrade ☐

Transport Type: My Desktop

File System: bootflash Free Space: 5691.86 MB

Source File Path*:

☐ C9800-CL-universalk9.1... 0%

AP Image Predownload ☐

Hitless Software Upgrade (N + 1 Upgrade)

Enable Hitless Upgrade ☐

Status

- Download Image/Package.
C9800-CL-universalk9.17.15.03.SPA.bin
- Install Image/Package
- Activate Image/Package
- Commit

[Show Logs](#)

Standard WLC Upgrade - Install Image

6. After the WLC performs the final checks, click **Save Configuration & Activate**. This causes the WLC to reload and start with the new version.

7. After the WLC is reachable via GUI, **commit** the upgraded version.

Administration > Software Management [Click here for Latest Recommended Software](#)

Software Upgrade

Software Maintenance Upgrade (SMU)
AP Service Package (APSP)
AP Device Package (APDP)

Upgrade Mode: Current Mode (until next reload): INSTALL
One-Shot Install Upgrade: ☐
Transport Type:
File System: Free Space: 1717.17 MB
Source File Path*:
AP Image Predownload: ☐
Hitless Software Upgrade (N + 1 Upgrade)
Enable Hitless Upgrade: ☐

Download & Install
Save Configuration & Activate
Commit

Manage
Remove Inactive Files
Rollback

Commit Upgrade

Standard WLC and AP Upgrade via CLI

1. Upload image to the controller.

```
copy tftp|ftp|sftp://<SERVER_IP>/<IMAGE_PATH> bootflash:
```

2. Install image on the controller.

```
install add file bootflash:<IMAGE_NAME>
```

3. Activate the new image. This causes the WLC to reload and start with the new version.

```
install activate
```

4. Once the WLC is online and reachable, commit the image.

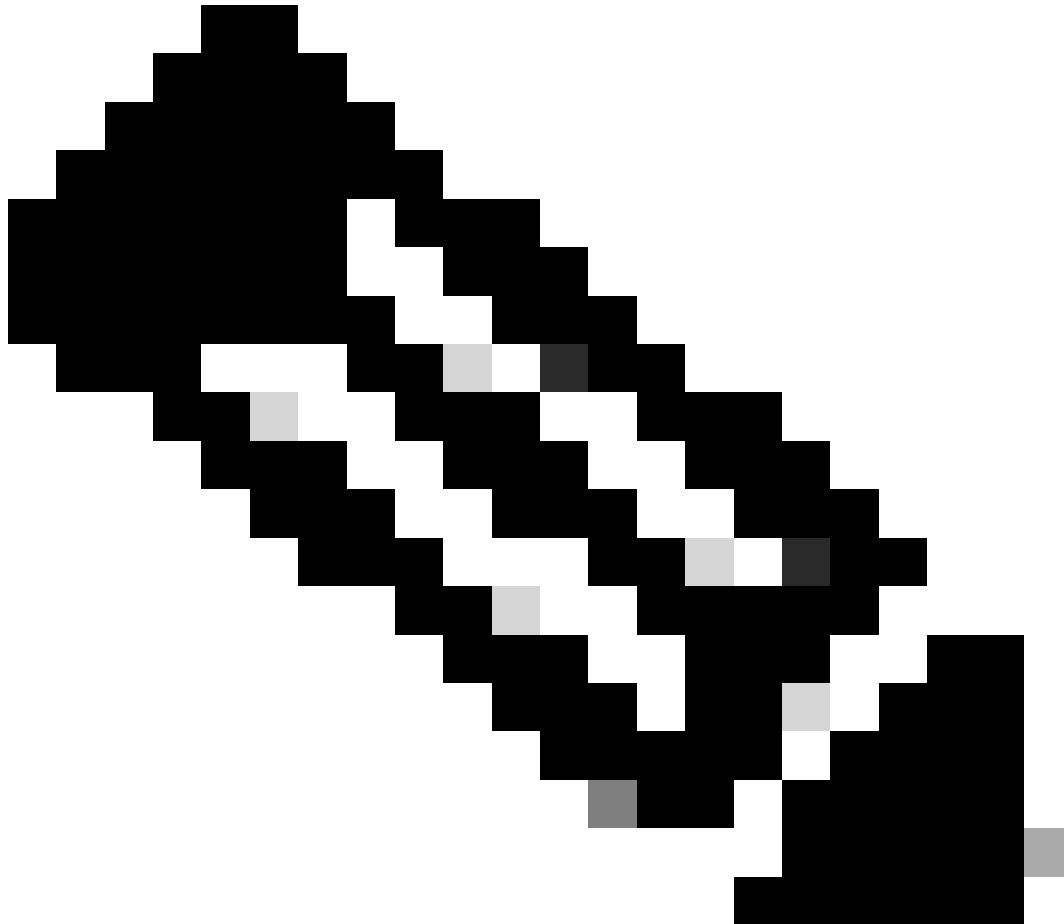
```
install commit
```

Manual AP Image Download

Utilize a file server application of your choice on your computer or server. This file server is the server that

supplies the AP with the preferred upgrade files.

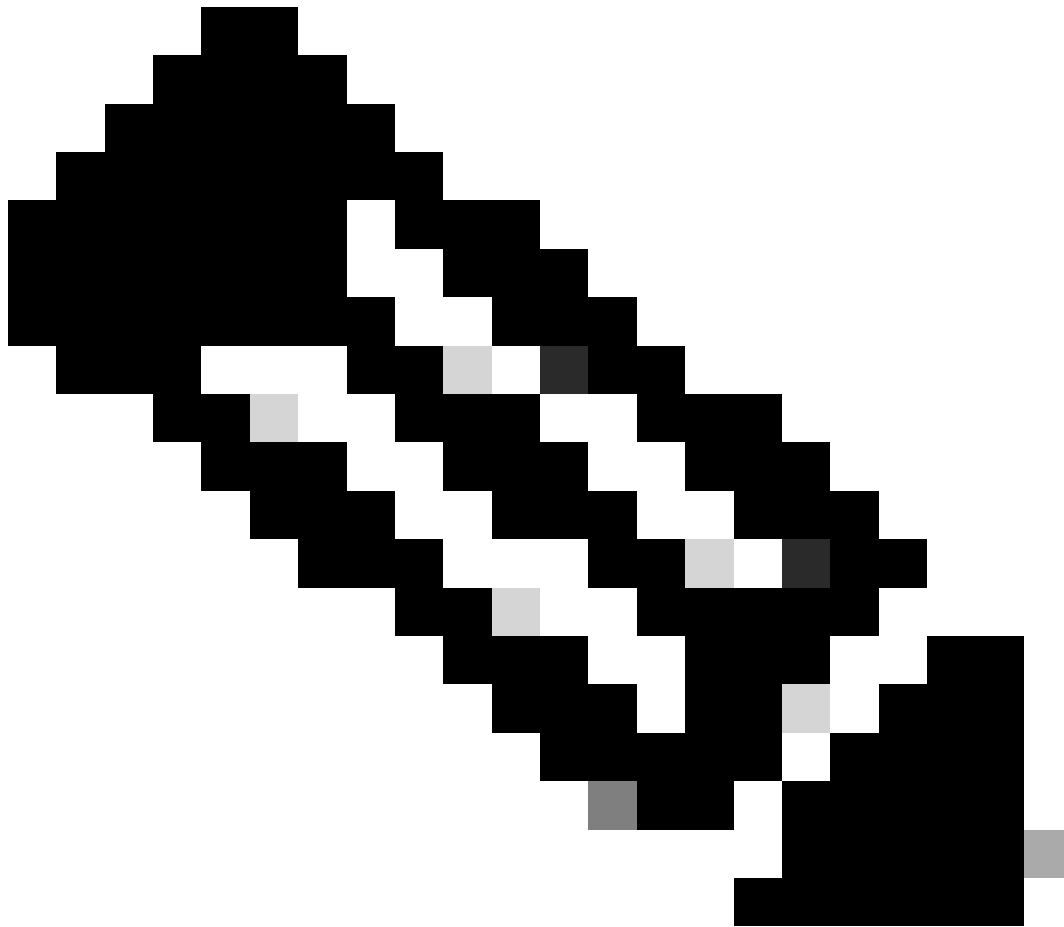
1. Download the preferred AP image version from the [Cisco Software Download Site](#).
 2. Save the AP software file on your file server directory.
 3. Utilize the **archive download-sw** command to initiate the file upgrade from the CLI of your AP.
-



Note: Transport methods available for the **archive download-sw** command are limited to TFTP and SFTP

```
#archive download-sw /reload <tftp|sftp>://[your TFTP server's IP address]/[image filename.tar]
```

4. AP downloads the .tar upgrade file from the file server as directed. This takes some time dependent on the transfer rate between the AP and the file server.
5. Upon completion of the file transfer, the AP automatically reloads and boots the newly downloaded AP image.



Note: If the **archive download-sw** command is not accepted by your AP, enter the command **debug capwap console cli** to enable the **archive download-sw** command

Verify

After the AP upgrade process has completed, verify the AP version, image integrity, and boot partition with the commands.

1. Verify AP version.

```
show version
```

2. Verify image integrity.

```
show image integrity
```

3. Verify boot partition.

show boot

Related Information

- [Repair C9120/C9115 Access Points from U-boot](#)
- [Predownloading an Image to an Access Point](#)
- [Upgrading the Cisco Catalyst 9800 Wireless Controller Software](#)