

Upgrade Cisco Aironet AP1200 to IOS

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Introduction

In June 2003, Cisco Systems released an upgrade image that allows Cisco Aironet 1200 Series Access Point (AP) products to run Cisco IOS® Software. Cisco later introduced the option to run Cisco IOS Software for Aironet 350 Series APs. In addition to the Release Notes for Cisco Aironet Conversion Tool 2.1 for Cisco IOS Software and the Cisco Aironet Conversion Tool for Cisco IOS Software, 2.1 Administrator Guide for Windows, this document provides background for the upgrade procedure and offers recovery steps in the event that the upgrade does not occur as expected. Although this document focuses on the 1200 Series APs, you can find information for the 350 Series APs in the Conversion Tool documentation.



Caution: The upgrade of VxWorks firmware to Cisco IOS Software is permanent. Because the VxWorks bootloader overwrites, no downgrade procedure exists. Product warranties do not cover unplanned upgrades.

Prerequisites

Requirements

Cisco recommends that you have:

- Familiarity with the general operation of Aironet 1200 Series AP products
- Prior experience with the upgrade of a VxWorks–based AP to a later maintenance release
- General knowledge of file transfers and transfer protocols

Components Used

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

- Aironet 1200 Series AP

- These VxWorks Operating System versions:

- ◆ 11.54T
- ◆ 11.56
- ◆ 12.01T1
- ◆ 12.02T1
- ◆ 12.03T

Versions that are later than 12.03T do not work with the upgrade image.

- The upgrade image itself: AP1200–Cisco–IOS–Upgrade–Image–v3.img

You can download this from Downloads – Cisco Aironet 1200 Series Access Point Firmware and Utilities (VxWorks Software) (registered customers only) .

Note: The version number of the upgrade image may change over time. However, the file name always has the format of AP1200–Cisco–IOS–Upgrade–Image–vx.img.

Note: If you upgrade a VxWorks–based AP with the file c1200–k9w7–tar, 122–15.JA.tar, or any other Cisco IOS Software maintenance release, the upgrade fails with the error Bad File Format. Use the AP1200–Cisco–IOS–Upgrade–Image–v3.img file instead.

Note: In order to upgrade from a VxWorks–based AP to Cisco IOS Software, your AP must run one of these VxWorks firmware versions:

- 12.03T
- 12.02T1
- 12.01T1
- 12.00T
- 11.23T
- 11.21
- 11.56
- 11.54T

If you have VxWorks with a firmware version that is earlier than these versions, you must upgrade your VxWorks to one of these versions. For instructions on how to upgrade the VxWorks firmware, refer to Upgrading VxWorks Firmware from the Console. If you have VxWorks with the firmware version 12.04 or later, you must first downgrade VxWorks to one of the earlier versions. You cannot upgrade to Cisco IOS Software from VxWorks unless you perform this downgrade. As an example, this document includes instructions to downgrade VxWorks firmware to 12.03T.

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, make sure that you understand the potential impact of any command.

System Requirements

In order to run the upgrade process, the AP must have at least 4 MB of DRAM available. Issue the **:vxdiag_memshow** VxWorks command, at the prompt of a console or of a Telnet session, in order to display the amount of free DRAM.

```
(Auto Apply On) :Bottom, :Down, :Back, ^R, =, <ENTER>, or [Link Text]:
:vxdiag_memshow

status   bytes   blocks   avg block   max block
-----
current
```

```

    free   3263544      370      8820   2875056
    alloc  10061376     5490     1832      -
cumulative
    alloc  11956232     16310     733      -

```

This example shows that the free memory is 3,263,544 bytes, or approximately 3.2 MB. The upgrade procedure, therefore, does not run successfully.

In order to increase free DRAM, you must terminate noncritical processes or temporarily disable other resources (like a second radio). Try some or all of these actions in order to increase free DRAM:

- Temporarily remove the IEEE 802.11a radio module (AIR-RM20A) during the upgrade procedure.
- Disable extra memory allocations that are intended for use by some Simple Network Management Protocol (SNMP) functions:

1. Click **Setup**.
2. Click **Event Handling**.
3. Confirm that Maximum number of bytes stored per Alert packet is set to 0.
4. Confirm that Maximum memory reserved for Detailed Event Trace Buffer (bytes) is set to 0.

Note: When you apply these changes, the unit must reboot. But the process frees up sufficient DRAM resources in order to reach the 4 MB minimum.

- Set non-IP-related configuration items back to factory default values.

After you make these changes, the **:vxdiag_memshow** command indicates that sufficient free DRAM is available.

```

(Auto Apply On) ^R, =, <ENTER>, or [Link Text]:
:vxdiag_memshow

  status   bytes      blocks   avg block  max block
  -----  -
current
  free     4336584      252      17208     3943792
  alloc    8988336      4355      2063      -
cumulative
  alloc    9663568      8914      1084      -

```

In this example, the free DRAM memory contains 4,336,584 bytes, or approximately 4.3 MB.

In addition, the upgrade does not require AP installation keys. If a unit has inadvertently had the installation keys deleted, you can still upgrade to Cisco IOS Software without issue.

Conventions

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

Downgrade VxWorks Firmware Version to 12.03T

You must follow this procedure if you have an AP that runs VxWorks firmware versions 12.04 or later. In order to downgrade the AP to 12.03T code, perform these steps:

1. Download the file with the name AP1200v1203T.exe from Downloads – Cisco Aironet 1200 Series Access Point Firmware and Utilities (VxWorks Software) (registered customers only).
2. Unzip the file AP1200v1203T.exe.
3. In the GUI of your AP, choose **Setup > Cisco Services**.
4. Click **Fully Update Firmware Through Browser**.

5. Browse for and select the downloaded AP1200v1203T.exe file, and click **Browser Update Now**.

After you have followed this procedure, you can use the procedure in the Use the Aironet Conversion Tool to Upgrade from VxWorks to Cisco IOS Software section of this document in order to convert the VxWorks firmware to Cisco IOS Software.

Use the Aironet Conversion Tool to Upgrade from VxWorks to Cisco IOS Software

The Conversion Tool is a special utility that administrators use to do these actions:

- Create a Cisco IOS configuration from the configuration of an existing VxWorks 350 or 1200 Series AP.
- Store a Cisco IOS configuration file on your PC for later use.
- Combine a Cisco IOS configuration file with a 350 Series helper image in order to upgrade VxWorks 350 Series APs to Cisco IOS operation.
- Combine a Cisco IOS configuration file with a 1200 Series helper image in order to upgrade VxWorks 1200 Series APs to Cisco IOS operation.

Note: This document does not cover the use of the Aironet Conversion Tool. Refer to the Release Notes for Cisco Aironet Conversion Tool 2.1 for Cisco IOS Software and the Cisco Aironet Conversion Tool for Cisco IOS Software, 2.1 Administrator Guide for Windows.

Upgrade to Cisco IOS Software Without the Conversion Tool

If you want only to upgrade a VxWorks 350 or 1200 Series AP to Cisco IOS Software and you do not want to preserve the previous configuration, use the 350 or 1200 Series helper image file in order to upgrade the AP. You can find this procedure in Upgrading an Access Point to Cisco IOS Operation Without the Conversion Tool.

Note: Ensure that firewalls are not enabled on the TFTP server PC which is used for the upgrade. The firewall could block the broadcast TFTP request and therefore cause the upgrade to fail.

Note: Although this document focuses on the Aironet 1200, you can use the Conversion Tool to upgrade both the 1200 and 350 Series APs. Therefore, there are references to the Aironet 350 in this document. You can find information about how to upgrade the 350 Series in the Release Notes for Cisco Aironet Conversion Tool 2.1 for Cisco IOS Software and the Cisco Aironet Conversion Tool for Cisco IOS Software, 2.1 Administrator Guide for Windows.

Process Failure

If you do not have sufficient system DRAM resources, the upgrade process fails. Unless you make a console connection during the upgrade process, such a failure may not be readily visible. The only clear failure symptom is an unfamiliar blink pattern in the LEDs on the top of the unit.

If you have a console connection during such a failure, you can see warnings that are similar to these:

```
Retrieving file "10.0.0.11:UpgradeImage10.0.0.108Jun20.img" via TFTP.  
*** Suppressing console event log display due to low memory.  
*** Restarting System in 5 seconds...  
*** Recovered from low-memory condition. Restoring normal console event log display.
```

Note: This is normal output that indicates that the process runs correctly and as designed:

```
flashfs[0]: Checking block 25...bad block number (-1)
flashfs[0]: erasing block 25...done.
flashfs[0]: Checking block 26...bad block number (-1)
flashfs[0]: erasing block 26...done.
flashfs[0]: Checking block 27...bad block number (-1)
flashfs[0]: erasing block 27...done.
```

If you reboot the unit during the upgrade or after a failure, the boot process appears similar to this:

```
Problem Description: System ID: 0009E8D2698E
Motherboard: IBM405 200MHz, 8192KB FLASH, 16384KB DRAM, Revision 03
Bootstrap Ver. 1.00: FLASH, CRC 1C914641 (OK)
Initialization: OK

Memory Bank  total      used      left
  DRAM      16742624         0  16742624
  Config      524288         0   524288
  FLASH      7602176         0   7602176

Memory Bank:File                                address      size  encoding type  flags

Type '=' for main menu.

c -- Copy file
f -- File dir
l -- downLoad file into DRAM
u -- Upload file
p -- xfer Protocol
n -- coNsole
r -- Run
s -- System info.
```

Recover from a Failure

The menu that displays after the boot process is the VxWorks bootloader, which is functionally equivalent to ROM monitor (ROMmon) in Cisco IOS Software. Neither of the full operating systems is loaded or available, so neither of the full command sets is available.

Note: If the VxWorks bootloader has been upgraded to Cisco IOS Software ROMmon but Flash memory has no operating system available, the unit displays the `ap:` prompt. In order to recover from this condition, refer to the *Using the MODE button* section in the Troubleshooting chapter of the Configuration Guide.

Use these steps to restart the conversion process and get the unit back up:

1. If there is an 802.11a radio module installed (AIR-RM20A), remove it during the rest of this procedure.
2. Verify that the connection settings in the terminal application are **9600-8-None-1** and **NO** flow control (not hardware or software).
3. Format the Flash memory for the unit to accept the VxWorks upgrade image:
 - a. Press **Ctrl-Z** in order to bring up the hidden Format menu.
 - b. Press exclamation point (**!**, **Shift-1**) in order to choose Format.
 - c. Press **3** in order to choose Flash memory.

Note: **3** is usually the choice for Flash memory. But you may have to enter a different number, which depends on your setup.

- d. Press **Y** (**Shift-y**) in order to confirm the decision to reformat the Flash memory.

- The reformat takes a few moments, after which the bootloader menu appears again.
4. Transfer the upgrade image onto the AP.

Complete these steps in order to start the transfer of the upgrade image:

- a. Press **l** (lowercase L) in order to put the AP into receive mode.

The file transfer protocol appears, and characters scroll across the line as the unit waits for data to flow to it.

- b. In Microsoft Windows HyperTerminal, choose **Transfer > Send**.
- c. Choose an appropriate file transfer protocol.
- d. Browse to the location of the AP1200–Cisco–IOS–Upgrade–Image–v3.img file on the hard drive.
- e. Select the AP1200–Cisco–IOS–Upgrade–Image–v3.img file and click **Send**.

When the file transfer is complete, the bootloader menu appears again. A file list also appears, which shows that the files that are compressed inside of the AP1200–Cisco–IOS–Upgrade–Image–v3.img file are now located in DRAM in the AP.

5. Transfer the files to Flash with the copy process.

Note: The files must be in Flash memory.

Complete these steps:

- a. Press **c** in order to copy.
- b. Press **3** in order to choose the Flash memory as the destination.
- c. Choose the appropriate option for each of the files that are listed in DRAM.
- d. Repeat Steps 5a through 5c (the **c ... 3 ... file option** cycle) for each of the files that are in DRAM.

Each time that you repeat the cycle, the bootloader menu and file list appear and show the progress of file copies from DRAM into Flash memory.

6. Power cycle the AP.

The upgrade proceeds as expected. During a successful upgrade, you see output that is similar to this:

```
flashfs[0]: Checking block 25...bad block number (-1)
flashfs[0]: erasing block 25...done.
flashfs[0]: Checking block 26...bad block number (-1)
flashfs[0]: erasing block 26...done.
flashfs[0]: Checking block 27...bad block number (-1)
flashfs[0]: erasing block 27...done.
```

7. After the upgrade finishes successfully, reinstall the RM20A as needed.

After the Successful Upgrade

After the upgrade to Cisco IOS Software finishes successfully, the VxWorks operating system and its menus are no longer present. This can disorient some users because the command structure with which they are familiar is gone.

Cisco IOS Software is a command–line interface (CLI) operating system, although there *is* a GUI available for Aironet AP products.

Access the CLI either through the console port or through a Telnet session. The user–level command prompt displays as `ap>`. In order to reach the higher, privileged–level command prompt, issue the **enable** command at the `ap>` prompt and enter the enable password.

Note: By default, the enable password is **Cisco** (with a capital C).

In order to access the GUI, enter the IP address of the unit into a web browser.

Note: By default, both the user name and password to access the GUI are **Cisco** (with a capital C).

For information on how to get started with Cisco IOS Software on an AP, refer to the Configuring the Access Point for the First Time chapter of the Cisco IOS Software Configuration Guide for Cisco Aironet Access Points, 12.2(15)JA.

Upgrade the IOS AP to the Latest IOS Release

Once you convert the VxWorks-based AP to an IOS AP using the VxWorks to IOS conversion image, you can upgrade the AP to the latest IOS image. Download the latest Cisco IOS release for your AP from the Wireless downloads page.

Refer to Working with Software Images for information on how to upgrade the IOS image on an AP using the CLI.

Note: This error message appears during the upgrade:

```
%Error opening flash:/update/info (no such file or directory)
ERROR: Image is not a valid IOS image archive. download takes about 0 seconds.
```

Note: These are the causes of the error message:

- There is a problem with the TFTP server. Some TFTP servers might not support the transfer of big files. In order to resolve this, use a different TFTP server. You can use the TFTP server available at <http://tftpd32.jounin.net/> for a WLC software upgrade.
- If you use the incorrect image for the upgrade, you have to use the original .tar file (downloaded from Cisco.com) for the upgrade and not the extracted .JA file.

AP Reboot After Upgrade

If you upgrade the AP (with dual radios) from VxWorks to IOS version 12.2.11-JA3, the AP might not completely load the IOS to be configured and will reboot continuously. Often the problem is with the upgraded IOS version and the G radio connected to the AP.

In such cases, first remove the G radio from the AP, and then upgrade the IOS version to 12.2.13-JA4. Once the upgrade is complete, reconnect the G radio in the AP. The AP should work properly.

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Related Information

- **Cisco Aironet Conversion Tool for Cisco IOS Software, 2.1 Administrator Guide for Windows**
 - **Release Notes for Cisco Aironet Conversion Tool 2.1 for Cisco IOS Software**
 - **Cisco IOS Software Configuration Guide for Cisco Aironet Access Points, 12.2(15)JA**
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