

Software Installation and Upgrade Procedure for the AS5350 and AS5400

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Introduction

This document explains how to install Cisco IOS® software using a TFTP server or Remote Copy Protocol (RCP) server application. This document also explains the procedure for upgrading your software image on access servers.

Prerequisites

Requirements

- To use the troubleshooting tools described in this document, you must be a registered user and you must be logged in.
- A TFTP server or an RCP server application must be installed on a TCP/IP-ready workstation or PC. Once the application is installed, a minimal level of configuration must be performed by following the steps listed below:

Step 1: Install a TFTP Server

1. Configure the TFTP application to operate as a TFTP *server* as opposed to a TFTP *client*.
2. Specify the outbound file directory. This is the directory in which the Cisco IOS software images are stored (see step 2 below). Most TFTP applications provide a set-up routine to assist in these configuration tasks.

Note: A number of TFTP or RCP applications are available from independent software vendors or as shareware from public sources on the World Wide Web.

Step 2: Download the Cisco IOS Software Image

Download the Cisco IOS software image into your workstation or PC from the Download Software Area.

Make sure the newly downloaded image supports your hardware, has the required software features, and that your router has enough memory to run this image. If you do not yet have a Cisco IOS software image, or if you are not sure the image you have meets all the necessary requirements, refer to How to Choose a Cisco IOS® Software Release.

Components Used

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

- AS5350 and AS5400 Access Servers
- Cisco IOS Software Release 12.1(3)T (5400) / 12.1.5–XM (5350) or later
- In this document, the AS5400 is being upgraded from c5400–is–mz.121–5.T9 to c5400–is–mz.121–5.T10.

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.

Conventions

For more information on document conventions, see the Cisco Technical Tips Conventions.

Software Installation or Upgrade Procedure

Step-by-Step Procedure

Step 1: Establish a console session to the router

This can be done with a direct console connection or a virtual Telnet connection. A direct console connection is preferred over a Telnet connection because a Telnet connection gets lost during the reboot phase of the software installation. The console connection is made with a rolled cable (usually a flat black cable), and connects the console port of the router to the COM port of the PC. Open **Hyperterminal** on the PC, and use these settings:

- Speed 9600 bits per second
- 8 data bits
- 0 parity bits
- 1 stop bit
- No Flow Control

Note: If you are getting any garbage characters in the hyperterminal, this means that you have not set the hyperterminal properties properly. Make sure the hyperterminal properties match the ones above. For more information on setting the hyperterminal properties, refer to Applying Correct Terminal Emulator Settings for Console Connections.

If the router is currently in Rommon mode, proceed to the section What to do if the Router is in Rommon Mode below.

Step 2: Verify that the TFTP server has IP connectivity to the router

Check the IP addresses of the TFTP server and the access server targeted for the TFTP software upgrade to be sure the addresses are valid. Ping the TFTP server from the access server to verify that a network connection exists between them.

Step 3: Copy the new image into the Flash memory card through the TFTP server

1. Now that you have IP connectivity and can ping between the computer acting as a TFTP server and the routers, you can now copy the image into the Flash by executing the **copy tftp flash** command to

copy from the TFTP server to your Flash.

Note: Before copying, make sure you have started the TFTP server software on your PC and that you have the filename mentioned in the TFTP server root directory. We recommend that you keep a copy of the access server configuration before upgrading the access server software. The upgrade itself does not affect the configuration (which is stored in nonvolatile RAM – NVRAM).

For RCP applications, substitute RCP for every occurrence of TFTP. For example, use the **copy rcp flash** command instead of the **copy tftp flash** command.

If necessary, you can copy an image from one device to another.

2. Specify the IP address of the TFTP server.

When prompted, enter the IP address of the TFTP server as in this example:

```
Address or name of remote host []? 172.16.125.3
```

3. Specify the filename of the new Cisco IOS software image.

When prompted, enter the filename of the Cisco IOS software image to be installed, as in this example:

```
Source filename []? c5400-is-mz.121-5.T10
```

4. Specify the destination filename.

This is the name the new software image has when it is loaded onto the router. The image can be named anything, but common practice is to enter the same image filename.

Note: By default, the router uses the source name. If you wish to keep the destination file name the same as the source file name, just press **Enter**.

```
Destination filename [c5400-is-mz.121-5.T10]?
```

Note: If you see this error message:

```
%Error copying tftp://172.16.125.3/c5400-is-mz.121-5.T10
(Not enough space on device)
```

This indicates that there is not enough room available in Flash to copy the image. You need to erase one or more files from Flash to make room for the new image. The "Erase Files from Flash" section in Step 5 explains the procedure to accomplish this.

This sample output illustrates the procedures described above:

```
AS5400# copy tftp: flash:
Address or name of remote host []? 172.16.125.3
Source filename []? c5400-is-mz.121-5.T10
Destination filename [c5400-is-mz.121-5.T10]?
Loading c5400-is-mz.121-5.T8 from 172.16.125.3
(via FastEthernet0/1): !
%Error copying tftp://172.16.125.3/c5400-is-mz.121-5.T10
(Not enough space on device)
```

5. Erase files from Flash:

Make sure you have enough memory before doing the download by using the **show flash** command. If you do not have enough memory, you need to erase the file and squeeze Flash afterwards.



Caution: Do not reload or powercycle the router if there is not a valid image in the Flash; this causes the router to boot into rommon or bootmode.

```
AS5400# show flash:
```

```
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1  .. image    12605EA3 18AE220   20  8210748 Jan 03 2000 14:25:28 c5400-is-mz.121-
2  .. image    26995739 8555EC    20  8213868 Jan 04 2000 23:13:42 c5400-is-mz.121-
3  .. image    9BF1CEC9 107A370   17  8539396 Jan 13 2000 05:13:04 c5400-is-mz.122-
4  .. unknown  E818E6CC 10D9808   15   390167 Jan 02 2000 21:00:45 128.0.0.144.spe

6623664 bytes available (25357904 bytes used)
!--- Verify the bytes available
```

In the above example, the router has four files in the Flash. If you want to load another image that requires more than **6623664** bytes, you would not have enough available memory. You would need to erase one of the files to create room for an additional image. The example below shows the file **c5400-is-mz.121-5.T8** image being removed from the Flash.

```
AS5400#delete flash:c5400-is-mz.121-5.T8
Delete filename [c5400-is-mz.121-5.T8]? y
Delete flash:c5400-is-mz.121-5.T8? [confirm] y
```

Issue the **delete** command, and then the **show flash** command.

```
AS5400# show flash:
```

```
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1  .D image    12605EA3 18AE220   20  8210748 Jan 03 2000 14:25:28 c5400-is-mz.121-
2  .. image    26995739 8555EC    20  8213868 Jan 04 2000 23:13:42 c5400-is-mz.121-
3  .. image    9BF1CEC9 107A370   17  8539396 Jan 13 2000 05:13:04 c5400-is-mz.122-
4  .. unknown  E818E6CC 10D9808   15   390167 Jan 02 2000 21:00:45 128.0.0.144.spe
```

Notice that there is a **.D** for deleted in the ED field, but the file has not yet been permanently removed. To permanently remove the file from Flash, issue the **squeeze** command.

```
AS5400#squeeze flash:
All deleted files will be removed. Continue? [confirm] y
Squeeze operation may take a while. Continue? [confirm] y
Squeeze of flash complete
```

Note: The **squeeze flash** process may take a few minutes to complete. The router console is unavailable during that time.

6. Upgrade the new image from a TFTP server:

Use the **show flash** command to verify the files in Flash before doing the upgrade.

```
AS5400#show flash:
```

```
-#- ED --type-- --crc--- -seek-- nlen -length- -----date/time----- name
1  .. image    26995739 8555EC    20  8213868 Jan 04 2000 23:13:42 c5400-is-mz.121-
2  .. image    9BF1CEC9 107A370   17  8539396 Jan 13 2000 05:13:04 c5400-is-mz.122-
3  .. unknown  E818E6CC 110CEB8   15   390167 Jan 02 2000 21:00:45 128.0.0.144.spe
```

Continue upgrading the image as specified in Step 3. An example is shown below:

```
AS5400#copy tftp: flash:
Address or name of remote host []? 172.16.125.3
```

```

Source filename []? c5400-is-mz.121-5.T10
Destination filename [c5400-is-mz.121-5.T10]?
Loading c5400-is-mz.121-5.T10 from 172.16.125.3
(via FastEthernet0/1):!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

[OK - 8213960/16427008 bytes]
8213960 bytes copied in 91.996 secs (90263 bytes/sec)

```

Use the **show flash** command to check whether the image has been copied to Flash. In the output below, you can see that the new image **c5400-is-mz.121-5.T10** has been copied on the Flash.

```

AS5400#show flash

-#- ED --type-- --crc--- -seek-- nlen -length- ----date/time----- name
1  .. image      26995739  8555EC   20  8213868 Jan 04 2000 23:13:42 c5400-is-mz.121-
2  .. image      9BF1CEC9 107A370   17  8539396 Jan 13 2000 05:13:04 c5400-is-mz.122-
3  .. unknown    E818E6CC 110CEB8   15   390167 Jan 02 2000 21:00:45 128.0.0.144.spe
4  .. image      A505CB29 10D9864   21  8213960 Jan 01 2000 00:12:22 c5400-is-mz.121-

```

Step 4: Set boot statements to load the new image upon startup

After copying the image through the TFTP server, you may need to tell the router which image to load upon bootup. If you do not specify a boot statement, the router loads the first image in Flash. In this example, without a boot statement, the router loads c5400-is-mz.121-5.T9.

Follow these steps to set boot statements:

1. Check the current boot statements.

If you have existing boot statements, these show up when you issue the **show running-config** command.

```

AS5400#show running-config

version 12.1
no service single-slot-reload-enable
service timestamps debug datetime msec localtime
service timestamps log datetime msec localtime
no service password-encryption
!
hostname AS5400
!
boot system flash c5400-is-mz.121-5.T9
!
ip subnet-zero
...
...
...

```

The boot statement in the configuration above (boot system flash c5400-is-mz.121-5.T9) must be removed, and the image that needs to be loaded must be specified.

2. Remove previous boot statements.

To remove the commands, enter into configuration terminal mode. From configuration mode, you can negate any command by typing **no** in front of each boot statement. The following example illustrates the removal of an existing boot statement.

```
AS5400#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)#no boot system flash c5400-is-mz.121-5.T9
AS5400(config)#^Z
AS5400#
```

The statement "**boot system flash c5400-is-mz.121-5.T9**" has been removed from the configuration. Verify that the command has been removed by issuing the **show running-config** command.

3. Set the new boot statement.

Set the router to boot the new image. Issue this command to set the boot system parameter:

```
boot system flash [flash-fs:][partition-number:][filename]
```

```
AS5400#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)#boot system flash c5400-is-mz.121-5.T10
AS5400(config)#^Z
AS5400#copy running-config startup-config
3d01h: %SYS-5-CONFIG_I: Configured from console by vty0
Building configuration...
AS5400#
```

Be sure to verify that you are using **config-register 0x2102** by issuing the **show version** command. If it is set up differently, you can change it by issuing the following command in configuration mode:

```
AS5400#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
AS5400(config)#config-register 0x2102
AS5400(config)#^Z
AS5400#copy running-config startup-config
```

The **show version** command can be used to verify that the change has been applied:

```
AS5400# show version

...
...
cisco AS5400 (R4K) processor (revision A.22) with 65536K/16384K bytes of memory.
Processor board ID 06467528
R4700 CPU at 150Mhz, Implementation 33, Rev 1.0, 512KB L2 Cache
X.25 software, Version 3.0.0.
Backplane revision 2
Manufacture Cookie Info:
  EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x30,
  Board Hardware Version 1.0, Item Number 73-2414-3,
  Board Revision A0, Serial Number 06467528,
  PLD/ISP Version 255.255, Manufacture Date 7-Nov-1997.
1 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
4 Serial network interface(s)
128K bytes of non-volatile configuration memory.
8192K bytes of processor board System flash (Read/Write)
8192K bytes of processor board Boot flash (Read/Write)
Configuration register is 0x2101 (will be 0x2102 at next reload)
```

Note that the configuration register value that the router uses after a reboot (0x2102) matches what we have configured.

Step 5: Reboot the router to load the new image

For the router to run the new Cisco IOS software image, you need to reload the router. Make sure you have saved the configuration by issuing the **copy running-config starting-config** or **write memory** command.

```
AS5400#reload

Proceed with reload? [confirm]
*Jan 30 15:05:22.467: %SYS-5-RELOAD: Reload requested
```

Step 6: Verify the Upgrade

After the router comes up, make sure you are running the new version of code by issuing the **show version** command.

What To Do if the Router is in Rommon Mode

If the router falls into Rommon mode when the router boots, this means that the router could not successfully load a valid image. This is indicated by the router prompt `rommon1>`.

Note: The Rommon mode is meant for disaster recovery and does not support common Cisco IOS software commands. For more information, refer to the document ROMmon Recovery Procedure for the AS5300, AS5350, and the AS5400.

You may see one of these error messages during the boot process prior to the router booting into Rommon mode:

- "device does not contain a valid magic number"
- "boot: cannot open "flash:""
- "boot: cannot determine first file name on device "flash:""

These error messages indicate that the Flash is empty or the filesystem is corrupted. To upgrade the Cisco IOS[®] software, refer to Xmodem Console Download Procedure Using ROMmon.

For further information regarding ROMmon recovery, refer to ROMmon Recovery Procedure for the Cisco 7200, 7300, 7400, 7500, RSP7000, Catalyst 5500 RSM, uBR7100, uBR7200, uBR10000, and 12000 Series Routers.

Related Information

- [How to Choose a Cisco IOS[®] Software Release](#)
- [Understanding Basic Hardware Architecture and Cisco IOS Software](#)
- [Field Notice: Cisco IOS TFTP Client Cannot Transfer Files Larger than 16MB in Size](#)
- [Hardware Troubleshooting Index Page](#)
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