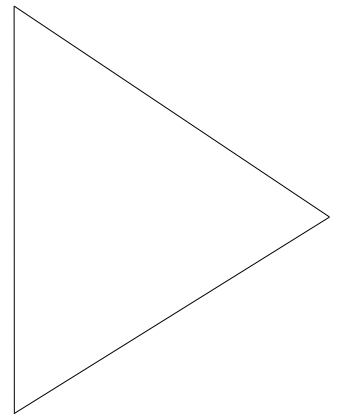


# Design Implementation Guide

February, 1994



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## Cisco 2500 Flash Upgrade

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### Overview

This document provides information on how to upgrade the Cisco 2500 router system software and detailed information on RxBoot image, a key element needed to perform the Cisco 2500 system software Flash upgrade.

### What Is RxBoot?

Some Cisco routers, including the Cisco 2500, are designed to run from Flash memory and can only boot from the first file in Flash. Therefore, to upgrade the system image, the following events must take place:

- 1 The Flash memory must be erased so the new system image can be written as the first file.
- 2 Because of the requirements stated in item 1), the upgrade must be performed while running from a different media. A ROM-based image called RxBoot is used for this purpose.

Because of the limited ROM size on the Cisco 2500, RxBoot will have only a limited subset of the functionality of a complete router system image.

### What RxBoot supports:

- Telnet/TFTP operation
- In any WAN encapsulation mode (Frame Relay/X.25/SMDS/HDLC/PPP), an IP default gateway must be manually added for correct operation. Otherwise, RxBoot-mode routers will lose routes to the network to which they are connected, and TFTP servers may not be able to reach them.

### What RxBoot *does not* support:

- Routing—No packets are routed or forwarded.
- SNMP—The CiscoWorks™ 2.0 Device Software Manager application cannot be used at this stage. The capability to upgrade the system image using CiscoWorks is under development.
- Multiple Serial Links Support—When in RxBoot mode, IP packets will only go through the first port initialized. If the TFTP server is not on this path, connectivity to the TFTP server is lost. To ensure connectivity to the TFTP server, shut down all interfaces except the one serial port that has the optimal path to the TFTP server.
- AUX port SLIP operation—This has been DDTSed. (CSCdi16944)

- TACACS—TACACS is not supported.
- IP unnumbered option—If there are any interfaces with this option enabled, IP routes will not be complete between the TFTP server and the router to be upgraded. Explicit IP numbers must be completed before the upgrade. Otherwise you will be locked out of the in-band connection to your router. If that happens, the only way to get back to the router is to use the console port via a modem.

## Availability of TFTP Server

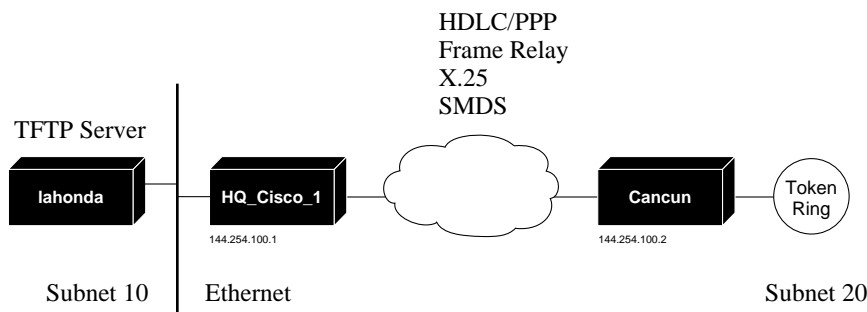
A TFTP server is required to download the new system image. This server can also hold original system images for backup purposes. A route must be established between this server and the router to be upgraded.

## A Sample Network Diagram

The sample diagram shown in Figure 1 assumes the following:

- 1 144.254.0.0 is a class B network.
- 2 An 8-bit subnet scheme is used with netmask 255.255.255.0.
- 3 144.254.20.0 is subnet 20 with Token Ring media.
- 4 144.254.10.0 is subnet 10 with Ethernet media.
- 5 Lahonda is the TFTP server with IP address 144.254.10.10.
- 6 HQ\_Cisco\_1 is the Cisco router on subnet 10.
- 7 Cancun is the remote Cisco 2500 router that needs to be upgraded.
- 8 The two sites are connected via a WAN cloud with serial interfaces IP numbered as shown below.

Figure 1. A Sample Network Map



## Cancun System Image Upgrade Procedure

The following conventions are assumed:

- Text in boldface are commands that users type in.
- The router output is shown in a different font, with key information in italics.

**Step 1** Log in on the router Cancun via Telnet or console port via a modem.

```
cancun> en
Password: < type in your password>
cancun#
```

**Step 2** Add in an IP default gateway and allow only one serial link enabled.

```
cancun# config terminal
```

Enter configuration commands, one per line.

Edit with DELETE, CTRL/W, and CTRL/U; end with CTRL/Z

```
int ser 1
```

```
shutdown
```

```
int t 0
```

```
shutdown
```

```
ip default-gateway 144.254.100.1
```

```
^Z
```

```
cancun# write memory
```

```
[ok]
```

```
cancun#
```

This procedure will guarantee that a route is established between a TFTP server and Cancun when forced into RxBoot mode. In this example, serial 0 is assumed as the best path to Lahonda, so serial 1 is shut down.

**Step 3** Change Cancun into RxBoot mode.

Write down the configuration register value and original system image name in the "show version" command output as shown below. You need this configuration register value to restore the router to its normal operation status later.

```
cancun# show version
```

```
System image file is "igs-bfpx.914-3.1", booted via Flash.
```

```
Configuration register is 0x2102
```

Note: If you do not have this system image on your TFTP server, copy it to your TFTP server before proceeding any farther. This way, you have a backup image in case you need it. Reference the *Cisco Router Products Configuration and Reference Manual* for instructions.

```
cancun# config terminal
```

Enter configuration commands, one per line.

Edit with DELETE, CTRL/W, and CTRL/U; end with CTRL/Z

```
config-reg 0x2101
```

```
^Z
```

```
cancun#
```

```
%SYS-5-CONFIG_I: Configured from console by console ()
```

Note: The X in "0x2101" is significant to indicate hex input to the router. Omitting the X will have an unexpected effect on the router. You can verify that you are entering it correctly by using the "show version" command.

```
cancun# show version
```

```
System image file is "igs-bfpx.914-3.1", booted via Flash
```

```
Configuration register is 0x2102 (will be at 0x2101 next reboot)
```

If the output is different from that shown above, stop here and repeat the previous step until it is correct. When verification is done, proceed as follows:



This completes the actual TFTP download. Now you need to change Cancun from Rxboot mode back to the normal mode of operation.

**Step 6** Change the configuration register back to original and reload.

```
cancun(boot)# config terminal
```

Enter configuration commands, one per line.

Edit with DELETE, CTRL/W, and CTRL/U; end with CTRL/Z

```
config-reg 0x2102
```

```
^Z
```

```
cancun(boot)# reload
```

```
[confirm]
```

**Step 7** Test the new upgraded image.

```
cancun> en
```

Password:

```
cancun# show version
```

```
3000 Software (IGS-BFPX), Version 9.14(3.5), MAINTENANCE TEST SOFTWARE
```

```
Copyright (c) 1986-1993 by Cisco Systems, Inc.
```

```
Compiled Mon 15-Nov-93 13:26 by mlw
```

```
System Bootstrap, Version (2.1), SOFTWARE
```

```
cancun uptime is 0 minutes
```

```
System restarted by reload
```

```
System image file is "igs-bfpx.914-3.5", booted via Flash
```

```
Cisco 3000 (68030) processor (revision A) with 1024K/1024K bytes of memory.
```

```
Processor board serial number 00782152
```

```
DDN X.25 software, Version 2.0, NET2 and BFE compliant.
```

```
ISDN software, Version 1.0.
```

```
Bridging software.
```

```
SuperLAT software (copyright 1990 by Meridian Technology Corp).
```

```
1 Ethernet/IEEE 802.3 interface.
```

```
2 Serial network interfaces.
```

```
1 ISDN Basic Rate interface.
```

```
32K bytes of non-volatile configuration memory.
```

```
4096K bytes of Flash address space sized on CPU board.
```

```
Configuration register is 0x2102
```

Notice the words in italics that confirm that the upgrade is successful. Delete "ip default-gateway" from the configuration and re-enable those ports that were turned off during the RxBoot. This completes the upgrade of the Cisco 2500 system image.

# Conclusion

Upgrading the Cisco 2500 requires understanding of RxBoot mode operation and availability of a TFTP server.

## References

- 1 *Router Products Release Notes for Software Release 9.14*, Doc. No.78-1156-05
- 2 *Cisco Router Products Configuration and Reference*, Vol I, II, III, DOC-R9.1

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### Corporate Headquarters

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 526-4100

Cisco Systems has over 100 sales offices worldwide. Call the company's corporate headquarters (California, USA) at 408 526-4000 to contact your local account representative or, in North America, call 800 553-NETS (6387).