
A Few IOS Exercises for Cisco 7000 Routers

Jianping Wang, Haiyong Wang
University of Virginia

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Overview

This document describes a few tasks which may be helpful when setting up a Cisco 7000 router.

Disclaimers

If you use the information in this document for your own equipment, you will do so at your own risk. We are not responsible for any damage that may result from following the instructions or suggestions in this document.

This is the first revision of the document. We appreciate any feedback on the usefulness of the document and corrections of typos.

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1. Working with IOS image files

Cisco 7000 routers use flash memory to store binary executable IOS image files that constitute the operating system for the device. There are two kinds of flash memory: built-in flash memory (internal flash memory), and flash memory card (external flash memory). Each kind of flash memory can hold multiple IOS image files. You can specify which image will be used when you reboot (reload) the router. You can copy an IOS image file from/to an IOS device (or a flash file system) to/from a Trivial File Transfer Protocol (TFTP) server.

Finding image files

Assuming the router has been booted normally:

(1) Enter into privilege exec mode:

```
Router> enable      (if a password is required, input the password)
Router#
```

(2) To find the image files, execute the following commands:

- List the files stored in the internal flash memory:

```
Router# dir bootflash:  (or Router# show flash)
```

- List the files stored on the flash card on the Cisco 7000 RP or the first flash card of a Cisco 7000 RSP:

```
Router# dir slot0:
```

- List the files stored on the second flash card on Cisco 7000 RSP:

```
Router# dir slot1:
```

- Here is an example output of the dir command:

```
Router# dir slot0:
Directory of slot0:/
 1 -rw-   4720148  Aug 29 1997 17:49:36 hampton/nitro/c7200-jmz
 2 -rw-   4767328  Oct  1 1997 18:42:53 c7200-js-mz
 5 -rw-      639  Oct  2 1997 12:09:32 test-file1
 7 -rw-      639  Oct  2 1997 12:37:13 the_time
```

- On the Cisco 7000 series routers, for commands that have an optional *device:* argument, the system uses the current default device or file system specified by the cd command when the optional device: argument is omitted.
- Initially, the default file system is flash:, you can change the default directory or file system using the cd command:

```
Router# cd slot0:
Router# pwd
slot0:/
```

Deleting image files

Assuming you have run the previous steps:

- (1) List the configuration information of a specified file:

```
Router# show file slot0:test-file1
```

- (2) Delete an image file from a flash memory device:

```
Router# delete slot0:test-file1 (or Router# erase slot0:test-file1)
```

The above command just marks the file slot0:test-file1 as "deleted" and doesn't physically remove it.

- (3) You can view and undelete an image file on a flash memory device as follows.

- Lists deleted files, undeleted files, and files with errors on slot0:

```
Router# dir /all slot0:
```

- Below is an example of the output of command dir /all:

Directory of slot0:/

```
 1 -rw- 4720148 Aug 29 1997 17:49:36 hampton/nitro/c7200-j-mz
 2 -rw- 4767328 Oct 01 1997 18:42:53 c7200-js-mz
 3 -rw- 7982828 Oct 01 1997 18:48:14 [rsp-jsv-mz] //deleted
 4 -rw-      639 Oct 02 1997 12:09:17 [test_file1] //deleted
 5 -rw-      639 Oct 02 1997 12:09:32 rally
 6 -rw-      639 Oct 02 1997 12:37:01 [test_file1] //deleted
```

- To undelete an image file marked "deleted", execute the "undelete" command with the index of the image file. For example, to undelete slot0:test-file1, type:

```
Router# undelete 4 slot0:
```

- The above command removes the "deleted" mark from the file slot0:test-file1.
- The following command permanently erases all files marked "deleted" on slot0:

```
Router# squeeze slot0:
```

Formatting a flash file system

- (1) Format a flash memory card inserted in slot 0:

```
Router# format slot0:
```

- (2) Format the internal flash memory:

```
Router# format bootflash:
```

Configure the system to boot a specific image file

(1) There are three ways to load a system image

- From flash memory: This is the most common way to boot the system.
- From a network server: If the flash memory is corrupted, you can specify that a system image be loaded from a network server as a backup boot method.
- From ROM: This provides a final backup boot method.

Note: Booting from ROM is faster and more reliable than booting from flash memory, and booting from flash memory is faster and more reliable than booting from a network server. Here we only summarize the method for booting from a specific image file residing in flash memory.

On the Cisco 7000 series routers, flash memory is located on the RP or RSP card (internal, usually 4 MB) or on a flash memory cards inserted in one of the PCMCIA slots (slot0 or slot 1, external). The internal flash and the flash memory card are independent file systems. Below are the steps to configure the system to boot a specific image file in flash memory:

(2) Power on and boot the router.

(3) Enter into global configuration mode:

```
Router# configure terminal
```

```
Router(config)#
```

(4) Specify to boot the image file stored in flash memory.

- Boot the first bootable file found in any partition:

```
Router(config)# boot system flash or
```

```
Router(config)# boot system flash:
```

- Boot the first bootable file from the specified partition.

Boot the first bootable file from slot0:

```
Router(config)# boot system flash slot0:
```

Boot the first bootable file from internal flash memory:

```
Router(config)# boot system flash bootflash:
```

- Boot the specified file from the specified partition.

```
Router(config)# boot system flash bootflash:filename or
```

```
Router(config)# boot system flash slot0:filename or
```

```
Router(config)# boot system flash slot1:filename
```

If you enter more than one image filename, the router will try all image filenames in the order you have entered them.

(5) Disable the above boot system commands:

- To disable all **boot system** configuration commands, type:

```
Router(config)# no boot system
```

- To disable a specific **boot system** configuration command such as **boot system flash bootflash:[filename]**, type:

Router(config)# **no boot system flash bootflash:[filename]**

- (6) Set the configuration register to enable loading of the system image in flash memory:

Router(config)# **config-register [value]**

A common value of *value* is 0x2102.

- (7) Exit the configuration mode and enter the privileged exec mode:

Router(config)# **CTRL-Z**

Router#

- (8) Save the current configuration to the startup configuration:

Router# **copy running-config startup-config**

- (9) Reload the machine:

Router# **reload**

Copy image files from or to a tftp server

- (1) Copy image files from a tftp server to the router:

- **Step 1:** Make a backup copy of the current system software image
- **Step 2:** Copy a system image from a tftp server to flash memory using the command:

Router# **copy tftp flash**

- **Step 3:** When prompted, enter the IP address or the domain name of the server.
- **Step 4:** When prompted, enter the filename of the server system image.
- **Step 5:** When prompted, enter the flash memory device that should receive the copy of the system image.

- (2) Copy image files from the router to a tftp server:

- **Step 1:** Copy the system image from flash memory to a tftp server using the command:

Router# **copy flash tftp**

- **Step 2:** When prompted, enter the IP address or domain name of the tftp server
- **Step 3:** When prompted, enter the file name of the system image in the flash memory.

Note: The command `copy flash tftp` cannot create new files on the tftp server. Before executing the command `copy flash tftp`, you need to create an empty target file on the tftp server and make it writable.

2. Breaking in an Cisco 7000 router and reconfigure the system

Sometimes you need to boot the machine without reading the current configuration, e.g., if you lost the enable password or if the image file got damaged. This is done as described in the steps:

- (1) Attach a terminal or the serial port of a PC with terminal emulation (for example, kermit) to the console port of the router.
- (2) Type `show version` and remember the setting of the configuration register (it is usually **0x2102** or **0x102**).
- (3) Reload.
- (4) Press the Break key (CTRL-\ then b) on the terminal within 60 seconds of the power up. The > prompt will appear on the screen.
- (5) If you are working with a Cisco 7000 RP router, type

> o/r 0x42 (or **o/r 0x41**)

This command tells the system to boot from flash (or ROM respectively). If using 0x41, you can only view or erase the configuration, and cannot change the password. Use 0x41 only if the flash is not installed or erased.

If you are working with a Cisco 7000 RSP router, type

rommon 1> **confreg 0x2142**

- (6) If you are working with a Cisco 7000 RP router, type

> i

If you are working with a Cisco 7000 RSP router, type

rommon 2> **reset**

The router will reboot and ignore the saved configuration.

- (7) Answer “no” to all setup questions.
- (8) Enter the privileged exec mode, type
Router> **enable**
Router#
- (9) Enter the global configuration mode, by typing
Router# **config term**
Router(config)#
- (10) Finish all configuration work, return to the privileged EXEC mode.

Router#

Save the currently running configuration to the start up configuration:

Router# **copy running-config startup-config**

- (11) Change the setting of the configuration register to 0x2102:

```
Router# config term  
Router(config)# config-register 0x2102  
Router# CTRL-z
```

- (12) Reboot the router:

```
Router# reload
```

3. Password recovery

- (1) Attach a terminal or the serial port of a PC with terminal emulation (for example, kermi) to the console port of the router.
- (2) Type show version and remember the setting of the configuration register (it is usually **0x2102** or **0x102**).
- (3) Reload.
- (4) Press the Break key(CTRL-\ then b) on the terminal within 60 seconds of the power up. The > prompt will appear on the screen.
- (5) If you are working with a Cisco 7000 RP router, type

> o/r 0x42 (or **o/r 0x41**)

It command tells the system to boot from flash (or ROM respectively). If using 0x41, you just can only view or erase the configuration, and cannot change the password. Use 0x41 only if the flash is not installed or erased.

If you are working with a Cisco 7000 RSP router, type

rommon 1> **confreg 0x2142**

- (6) If you are working with a Cisco 7000 RP router, type

> i

If you are working with a Cisco 7000 RSP router, type

rommon 2> **reset**

The router will reboot and ignore the saved configuration.

- (7) Answer "no" to all setup questions.
- (8) Type

```
Router> enable  
Router#
```

- (9) In privileged EXEC mode, execute the following commands:
- View the start up configuration:

```
Router# show startup-config
```

- Copy the start up configuration into memory:

Router# **copy startup-config running-config**

- View the configuration currently running in memory:

Router# **show running-config**

- If you want to set up a secret password, type

```
Router# config term           (enter into global configure mode)
Router(config)# enable secret <password>
Router(config)# CTRL-z
Router#
```

- If you want to set up a password but no secret password, type

```
Router# config term
Router(config)# enable password <password>
Router(config)# CTRL-z
Router#
```

Note: If a secret password is set, the password will be ignored.

- (10) Save the currently running configuration to the start up configuration:

Router# **copy running-config startup-config**

- (11) Change the setting of the configuration register to 0x2102:

```
Router# config term
Router(config)# config-register 0x2102
Router# CTRL-z
```

- (12) Reboot the router:

Router# **reload**