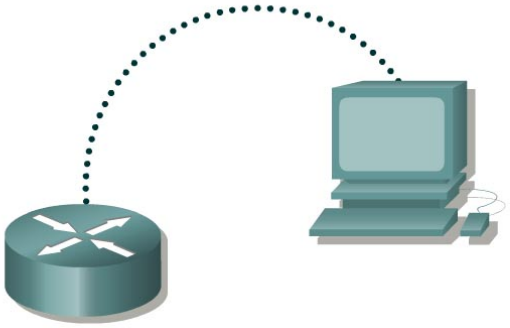
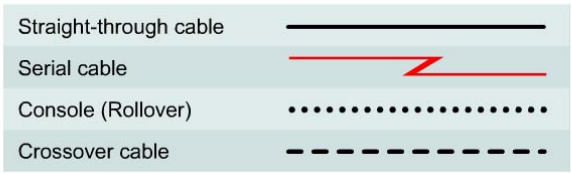
Lab 5.1.3 Using the `boot system` Command – Instructor Version 2500



Router designation	Router name	Enable secret passwor	Enable/VTY/ and Console passwords
Router 1	GAD	class	cisco



Objective

- Display information about the Cisco IOS Image (software) that is currently running.
- Determine where the IOS is booting from.
- Check the amount of RAM, Flash and NVRAM memory the router has.
- Check the IOS image and Flash for space used and available.
- Document the parts of the IOS image file name.
- Check and document the configuration register settings related to boot method.
- Document a fallback boot sequence.

Background/Preparation

Setup a network as displayed in the figure. Any router that meets the interface requirements may be used. Possible routers include 800, 1600, 1700, 2500, 2600 routers, or a combination. Refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce slightly different output. Start a HyperTerminal session as performed in the Establishing a HyperTerminal session lab.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on the router in this lab assignment before continuing.

Step 1 Login to the router

a. Connect to the router and login.

Step 2 Enter privileged EXEC mode

a. Enter **enable** at the command prompt.

Step 3 Save the existing running-config to the startup-config

a. At the privileged EXEC command prompt enter:

```
Router#copy running-config startup-config
Destination filename [startup-config]? Enter
```

This will save the current blank configuration.

Step 4 Configure the router and view the running configuration file

a. Configure the router with the information in the table on page 1.

b. Enter **show running-config** at the router prompt. The router will display information on the running configuration file stored in RAM.

c. Does the configuration display the changes entered? Yes

Step 5 Show information about the backup configuration file

a. Enter **show startup-config** at the router prompt. The router will display information on the backup configuration file stored in NVRAM.

b. Does the configuration display the changes entered? No

c. If not, why? The configuration was not saved.

d. What command would make the running-config file and startup-config file identical?

copy running-config startup-config

e. Why is the startup-config file so important? Used during boot to be loaded as the running-config

f. Is there any indication of the configuration register setting? No, its not listed

Step 6 Display IOS version and other important information

a. Enter **show version** command at the router prompt.

These answers will vary depending on IOS, hardware…

The router will return information about the IOS that is running in RAM.

b. What is the IOS version and revision level? IOS 12.1(18)

c. What is the name of the system image (IOS) file? flash:c2500-i-l.121-18.bin

d. Where was the router IOS image booted from? IOS booted from flash.

e. What type of processor and how much RAM does this router have?

cisco 2500 (68030) processor (revision N) with 14336K/2048K bytes of memory.

f. What kind of router (platform type) is this? Cisco 2500

g. The router backup configuration file is stored in Non-Volatile Random Access Memory (NVRAM). How much NVRAM does this router have? 32K bytes of non-volatile configuration memory.

h. The router operating system (IOS) is stored in Flash memory. How much flash memory does this router have? 16384K bytes of processor board System flash.

i. What is the configuration register set to? What boot type does this setting specify?

Configuration register is 0x2102.

Step 7 Create the statements to perform the following functions

a. Assuming that the **config-register** is set to 0x2102, write the global configuration commands specifying that the IOS image should be loaded from:

ROM Monitor: config-register 0x2100

Flash (without checking for **boot system** commands): config-register 0x2101

Flash (checks for **boot system** commands first):

config-register 0x2102 – 0x210f

ROM IOS: config-register 0x2101

Note: ROM IOS is the default on older platforms.

Step 8 Show information about the Flash memory device

a. Enter **show flash** at the router prompt.

These answers will vary depending on Flash Image and memory.

The router will respond with information about the flash memory and what IOS image file(s) are stored there.

b. Document the following information:

How much flash memory is available and used? 8023524 bytes used, 8753692 available

What is the file that is stored in flash memory? c2500-i-l.121-18.bin (The router IOS)

What is the size in bytes of the flash memory? 16777216 bytes total Flash memory

Step 9 Specify a fallback boot sequence

a. Write the **boot system** command to specify that the IOS image should load from:

Flash: GAD(config)#**boot system Flash** *IOS_filename*

A TFTP server: GAD(config)#**boot system tftp** *IOS_filename tftp_filename*

ROM: GAD(config)#**boot system rom**.

Will this be a full IOS image? No

b. To ensure that these commands are available for the router to use the next time it is restarted, which task would need to be completed before reloading or power cycling the router?

copy running-config startup-config

Upon completion of the previous steps, logoff by typing **exit**. Turn the router off.

Erasing and reloading the router

Enter into the privileged EXEC mode by typing **enable**.

```
Router>enable
```

If prompted for a password, enter **class**. If “class” does not work, ask the instructor for assistance.

At the privileged EXEC mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged EXEC mode, enter the command **reload**.

```
Router#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

The router is ready for the assigned lab to be performed.

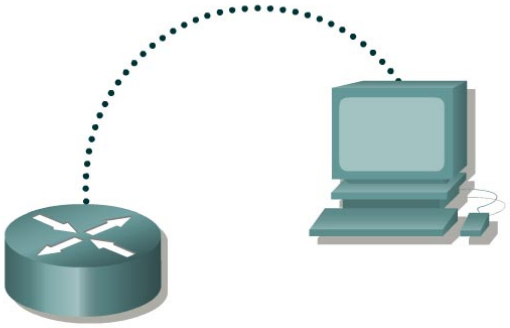
Router Interface Summary					
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2	Interface #5
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)			
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
1700	FastEthernet 0 (FA0)	FastEthernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)	
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
2600	FastEthernet 0/0 (FA0/0)	FastEthernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)	
In order to find out exactly how the router is configured, look at the interfaces. This will identify the type of router as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in IOS command to represent the interface.					


```
GAD#show version
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-I-L), Version 12.1(18), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Mon 02-Dec-02 23:45 by kellythw
Image text-base: 0x03041E94, data-base: 0x00001000

ROM: System Bootstrap, Version 11.0(10c), SOFTWARE
BOOTLDR: 3000 Bootstrap Software (IGS-BOOT-R), Version 11.0(10c), RELEASE
SOFTWARE (fc1)

GAD uptime is 29 minutes
System returned to ROM by reload
System image file is "flash:c2500-i-l.121-18.bin"

cisco 2500 (68030) processor (revision N) with 14336K/2048K bytes of memory.
Processor board ID 08026577, with hardware revision 00000001
Bridging software.
X.25 software, Version 3.0.0.
Basic Rate ISDN software, Version 1.1.
1 Ethernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
1 ISDN Basic Rate interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read ONLY)

Configuration register is 0x2102



GAD#show flash
GAD#show flash
System flash directory:
File  Length    Name/status
  1   8023460   c2500-i-l.121-18.bin
[8023524 bytes used, 8753692 available, 16777216 total]
16384K bytes of processor board System flash (Read ONLY)



GAD#show running-config
GAD#show running-config
Building configuration...

Current configuration : 599 bytes
!
version 12.1
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname GAD
!
enable secret 5 $1$C5ZS$ASh31M2FyWGIZL4P2Ba.c/
enable password cisco
!
ip subnet-zero
!
interface Ethernet0
```



```
 no ip address
 shutdown
!
interface Serial0
 no ip address
 shutdown
 no fair-queue
!
interface Serial1
 no ip address
 shutdown
!
interface BRI0
 no ip address
 shutdown
!
ip classless
ip http server
!
line con 0
 password cisco
 logging synchronous
 login
line aux 0
line vty 0 4
 password cisco
 login
!
end
```


Lab 5.1.3 Using the `boot system` Command – Instructor Version 2600



Router designation	Router name	Enable secret passwor	Enable/VTY/ and Console passwords
Router 1	GAD	class	cisco

Straight-through cable	
Serial cable	
Console (Rollover)	
Crossover cable	

Objective

- Display information about the Cisco IOS Image (software) that is currently running.
- Determine where the IOS is booting from.
- Check the amount of RAM, Flash and NVRAM memory the router has.
- Check the IOS image and Flash for space used and available.
- Document the parts of the IOS image file name.
- Check and document the configuration register settings related to boot method.
- Document a fallback boot sequence.

Background/Preparation

Setup a network as displayed in the figure. Any router that meets the interface requirements may be used. Possible routers include 800, 1600, 1700, 2500, 2600 routers, or a combination. Refer to the chart at the end of the lab to correctly identify the interface identifiers to be used based on the equipment in the lab. The configuration output used in this lab is produced from 1721 series routers. Any other router used may produce slightly different output. Start a HyperTerminal session as performed in the Establishing a HyperTerminal session lab.

Note: Go to the erase and reload instructions at the end of this lab. Perform those steps on the router in this lab assignment before continuing.

Step 1 Login to the router

a. Connect to the router and login.

Step 2 Enter privileged EXEC mode

a. Enter **enable** at the command prompt.

Step 3 Save the existing running-config to the startup-config

a. At the privileged EXEC command prompt enter:

```
Router#copy running-config startup-config
Destination filename [startup-config]? Enter
```

This will save the current blank configuration.

Step 4 Configure the router and view the running configuration file

a. Configure the router with the information in the table on page 1.

b. Enter **show running-config** at the router prompt. The router will display information on the running configuration file stored in RAM.

c. Does the configuration display the changes entered? Yes

Step 5 Show information about the backup configuration file

a. Enter **show startup-config** at the router prompt. The router will display information on the backup configuration file stored in NVRAM.

b. Does the configuration display the changes entered? No

c. If not, why? The configuration was not saved.

d. What command would make the running-config file and startup-config file identical?

copy running-config startup-config

e. Why is the startup-config file so important? Used during boot to be loaded as the running-config.

f. Is there any indication of the configuration register setting? No, its not listed.

Step 6 Display IOS version and other important information

a. Enter **show version** command at the router prompt.

These answers will vary depending on IOS, hardware, and so on.

The router will return information about the IOS that is running in RAM.

b. What is the IOS version and revision level? IOS 12.2(12)

c. What is the name of the system image (IOS) file? flash:c2600-is-mz.122-12.bin

d. Where was the router IOS image booted from? IOS booted from flash.

e. What type of processor and how much RAM does this router have?

(MPC860) processor 64 MB

f. What kind of router (platform type) is this? Cisco 2600

g. The router backup configuration file is stored in Non-Volatile Random Access Memory (NVRAM). How much NVRAM does this router have? 32K bytes of non-volatile configuration memory.

h. The router operating system (IOS) is stored in Flash memory. How much flash memory does this router have? 16384K bytes of processor board System flash.

i. What is the configuration register set to? What boot type does this setting specify?

Configuration register is 0x2102.

Step 7 Create the statements to perform the following functions

a. Assuming that the **config-register** is set to 0x2102, write the global configuration commands specifying that the IOS image should be loaded from:

ROM Monitor: config-register 0x2100

Flash (without checking for **boot system** commands): config-register 0x2101

Flash (checks for **boot system** commands first):

config-register 0x2102 – 0x210f

ROM IOS: config-register 0x2101

Note: ROM IOS is the default on older platforms.

Step 8 Show information about the Flash memory device

a. Enter **show flash** at the router prompt.

These answers will vary depending on Flash Image and memory.

The router will respond with information about the flash memory and what IOS image file(s) are stored there.

b. Document the following information:

How much flash memory is available and used? 10132856 bytes used, 6120072 available

What is the file that is stored in flash memory? 10132792

What is the size in bytes of the flash memory? 16252928

Step 9 Specify a fallback boot sequence

a. Write the **boot system** command to specify that the IOS image should load from:

Flash: boot system flash

A TFTP server: boot system tftp

ROM: boot system rom

Will this be a full IOS image? No

b. To ensure that these commands are available for the router to use the next time it is restarted, which task would need to be completed before reloading or power cycling the router?

copy running-config startup-config

Upon completion of the previous steps, logoff by typing **exit**. Turn the router off.

Erasing and reloading the router

Enter into the privileged EXEC mode by typing **enable**.

```
Router>enable
```

If prompted for a password, enter **class**. If “class” does not work, ask the instructor for assistance.

At the privileged EXEC mode, enter the command **erase startup-config**.

```
Router#erase startup-config
```

The responding line prompt will be:

```
Erasing the nvram filesystem will remove all files! Continue?
[confirm]
```

Press **Enter** to confirm.

The response should be:

```
Erase of nvram: complete
```

Now at the privileged EXEC mode, enter the command **reload**.

```
Router#reload
```

The responding line prompt will be:

```
System configuration has been modified. Save? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Proceed with reload? [confirm]
```

Press **Enter** to confirm.

In the first line of the response will be:

```
Reload requested by console.
```

After the router has reloaded the line prompt will be:

```
Would you like to enter the initial configuration dialog? [yes/no]:
```

Type **n** and then press **Enter**.

The responding line prompt will be:

```
Press RETURN to get started!
```

Press **Enter**.

The router is ready for the assigned lab to be performed.

Router Interface Summary					
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2	Interface #5
800 (806)	Ethernet 0 (E0)	Ethernet 1 (E1)			
1600	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
1700	FastEthernet 0 (FA0)	FastEthernet 1 (FA1)	Serial 0 (S0)	Serial 1 (S1)	
2500	Ethernet 0 (E0)	Ethernet 1 (E1)	Serial 0 (S0)	Serial 1 (S1)	
2600	FastEthernet 0/0 (FA0/0)	FastEthernet 0/1 (FA0/1)	Serial 0/0 (S0/0)	Serial 0/1 (S0/1)	
In order to find out exactly how the router is configured, look at the interfaces. This will identify the type of router as well as how many interfaces the router has. There is no way to effectively list all of the combinations of configurations for each router class. What is provided are the identifiers for the possible combinations of interfaces in the device. This interface chart does not include any other type of interface even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in IOS command to represent the interface.					


```
GAD#show version
01:05:33: %SYS-5-CONFIG_I: Configured from console by consolesho ver
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-IS-M), Version 12.2(12), RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Wed 21-Aug-02 03:01 by pwade
Image text-base: 0x8000808C, data-base: 0x810CE168

ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)

GAD uptime is 1 hour, 5 minutes
System returned to ROM by reload
System image file is "flash:c2600-is-mz.122-12.bin"

cisco 2621 (MPC860) processor (revision 0x600) with 60416K/5120K bytes of
memory.
Processor board ID JAD054304U6 (196842265)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
2 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

GAD#


GAD#show flash
System flash directory:
File  Length   Name/status
  1   5413832  c2600-is-mz.122-12.bin
[5413896 bytes used, 11101176 available, 16515072 total]
16384K bytes of processor board System flash (Read/Write)
```



```
GAD#show running-config
Building configuration...

Current configuration : 565 bytes
!
version 12.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname GAD
!
enable secret 5 $1$aHvM$o4LE90z/kRJkaXMzOJ7DQ/
enable password cisco
!
ip subnet-zero
!
!
interface FastEthernet0/0
 no ip address
 shutdown
 speed auto
!
interface Serial0/0
 no ip address
 shutdown
 no fair-queue
!
interface Serial0/1
 no ip address
 shutdown
!
ip classless
no ip http server
!
no cdp run
!
line con 0
 password cisco
 login
line aux 0
line vty 0 4
 password cisco
 login
!
no scheduler allocate
!
end
```

