

CCNA 2 v3.1 Module 2 Introduction to Routers

Objectives

Upon completion of this module, the student will be able to perform tasks related to the following:

2.1 Operating Cisco IOS Software

2.2 Starting a Router

The Purpose of Cisco IOS Software

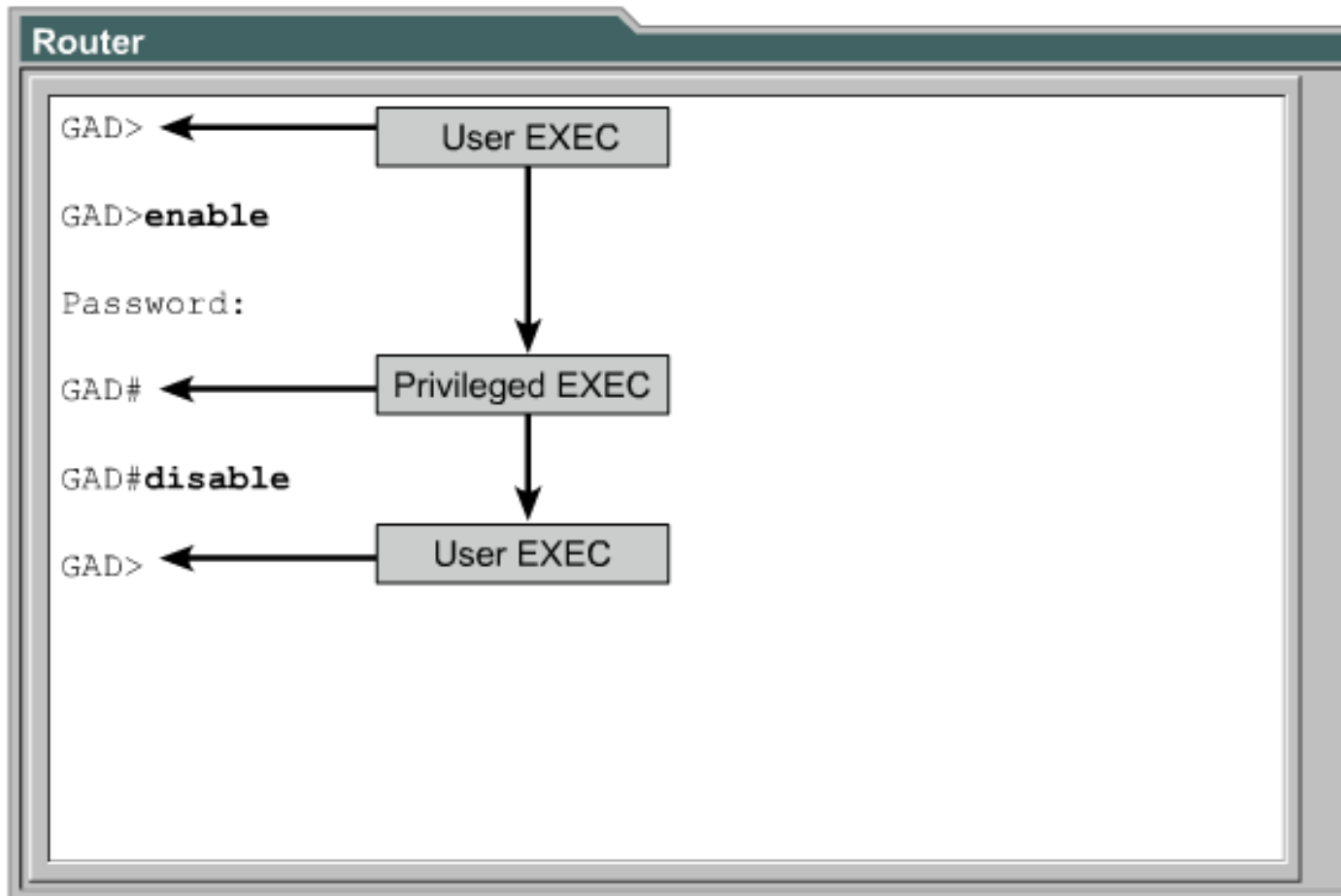
- **Basic routing and switching functions**
- **Reliable and secure access to networked resources**
- **Network scalability**

Router User Interface



A user interface to a router or switch requires an ASCII terminal or a PC running a terminal-emulation program such as Windows HyperTerminal.

Router User Interface Modes



Cisco IOS Naming Conventions

The name has three parts, separated by dashes: e.g. xxxx-yyyy-ww:

- xxxx = Platform
- yyyy = Features
- ww = Format - where it executes from if compressed

Name Codes

Platform (Hardware) (Partial list)

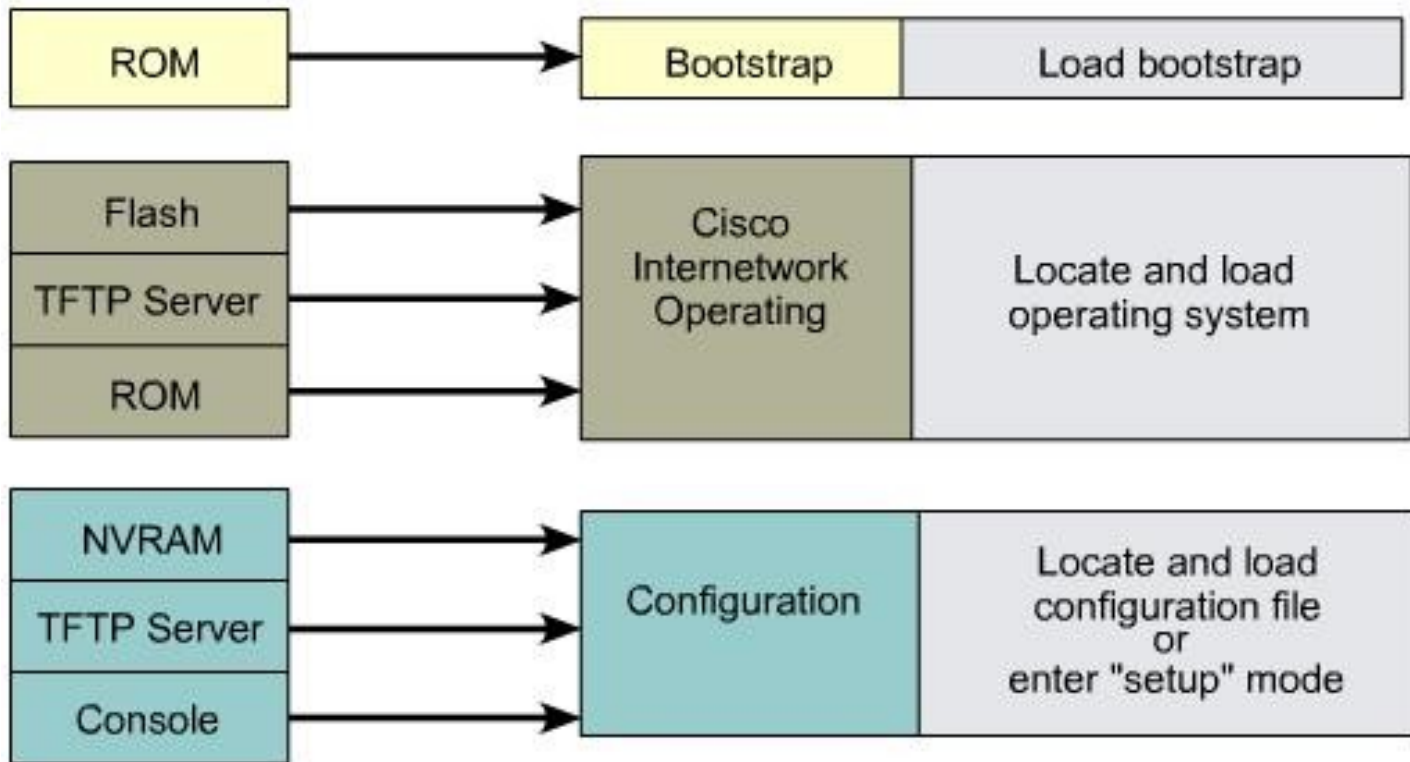
c1005	1005
c1600	1600
c1700	1700, 1720, 1750
c2500	25xx, 3xxx, 5100, AO (11.2 and later only)
c2600	2600
c2800	Catalyst 2800
c2900	2910, 2950
c3620	3620
c3640	3640
c3750	3750 (11.2 and later only)

Operating Cisco IOS Software

Router

```
BHM#show flash
PCMCIA flash directory:
File Length Name/status
  1 6007232 c1700-bnsy-1.212-11.p
[6007296 bytes used, 284160 available, 6291456
total]
6144K bytes of processor board PCMCIA flash (Read
ONLY)
BHM#
```

Steps in Router Initialization



Setup Mode

```
Router
#setup

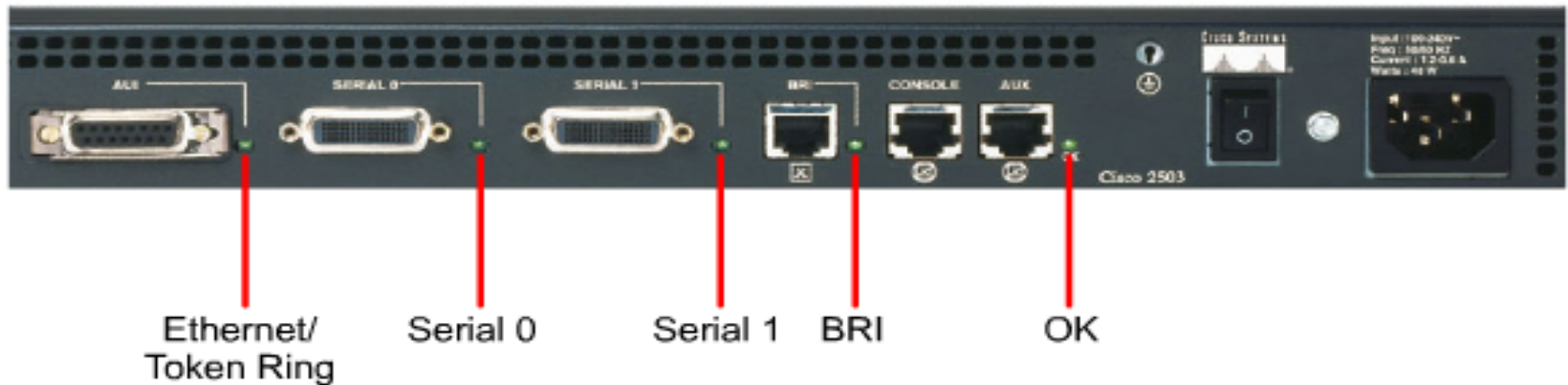
--System Configuration Dialog--
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.
Default settings are in square brackets '['].

Continue with configuration dialog? [yes].

First, would you like to see the current interface summary?
[yes]

Interface      IP-Address      OK?      Method      Status      Protocol
TokenRing0     unassigned      NO       not set     down        down
Ethernet0      unassigned      NO       not set     down        down
Serial0        unassigned      NO       not set     down        down
Fddi0          unassigned      NO       not set     down        down
```

Router LED Indicators



Cisco routers use LED indicators to provide status information. LED indicators will vary for different Cisco router models.

The Initial Router Bootup

Router

```
System Bootstrap, Version X.X(XXXX) [XXXXXX XX], RELEASE  
SOFTWARE
```

```
Copyright (c) 1986-199X by Cisco Systems  
2500 processor with 4096 Kbytes of main memory
```

```
Notice: NVRAM invalid, possibly due to write erase.
```

```
F3: 5797928+162396+258800 at 0x3000060
```

```
Restricted Rights Legend
```

```
Use, duplication, or disclosure by the Government is  
subject to restrictions as set forth in subparagraph  
(c) of the Commercial Computer Software - Restricted  
Rights clause at FAR sec. 52.227-19 and subparagraph  
(c) (1) (ii) of the Rights in Technical Data and Computer  
Software clause at DFARS sec. 252.227-7013.
```

Examining the Initial Bootup Output

```
Router
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706
Cisco Internetwork Operating System Software
IOS (tm) X000 Software (XXX-X-X), Version XX.X(XXXX)
[XXXXX XXX]
Copyright (c) 1986-199X by Cisco Systems, Inc.
Compiled Fri 20-Oct-9X 16:02 by XXXXX
Image text-base: 0x03030FC0, data-base: 0x00001000
Cisco 25XX (68030) processor (revision A) with 4092K/2048K
bytes of memory.
Processor board ID 00000000 X.25 software, Version X.X,
NET2, BFE and GOSIP compliant.
TN3270 Emulation software (copyright 1994 by TGV Inc).
Basic Rate ISDN software, Version X.X.
X Ethernet/IEEE 802.3 interface.
2 Serial network interfaces.
```

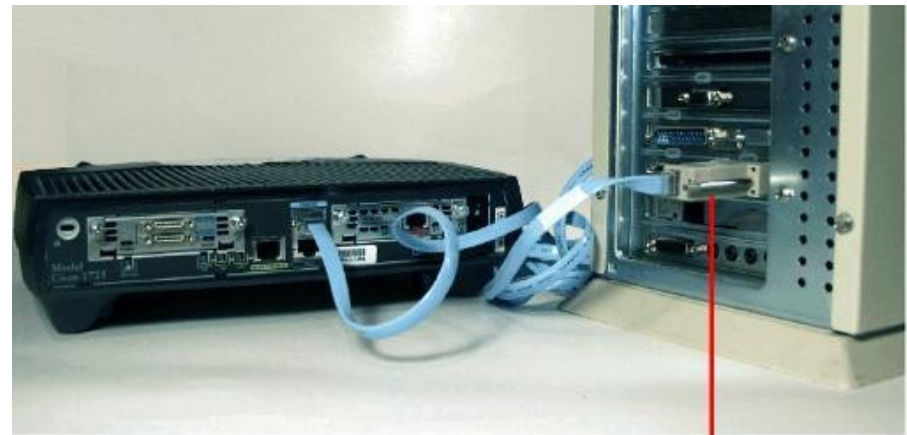
Examining the Initial Bootup Output continued

Router

```
Notice: NVRAM invalid, possibly due to write erase.  
--- System Configuration Dialog ---  
  
At any point you may enter a question mark '?' for help.  
Refer to the 'Getting Started' Guide for additional help.  
Use ctrl-c to abort configuration dialog at any prompt.  
Default settings are in square brackets '['].  
Would you like to enter the initial configuration dialog?  
[yes]:
```

Establish a Console Session

- **All Cisco routers include an EIA/TIA-232 asynchronous serial console port. The console port is an RJ-45.**
- **Use an RJ-45 to RJ45 rollover cable with a female RJ-45 to DB-9 adapter to connect a PC to the console port**

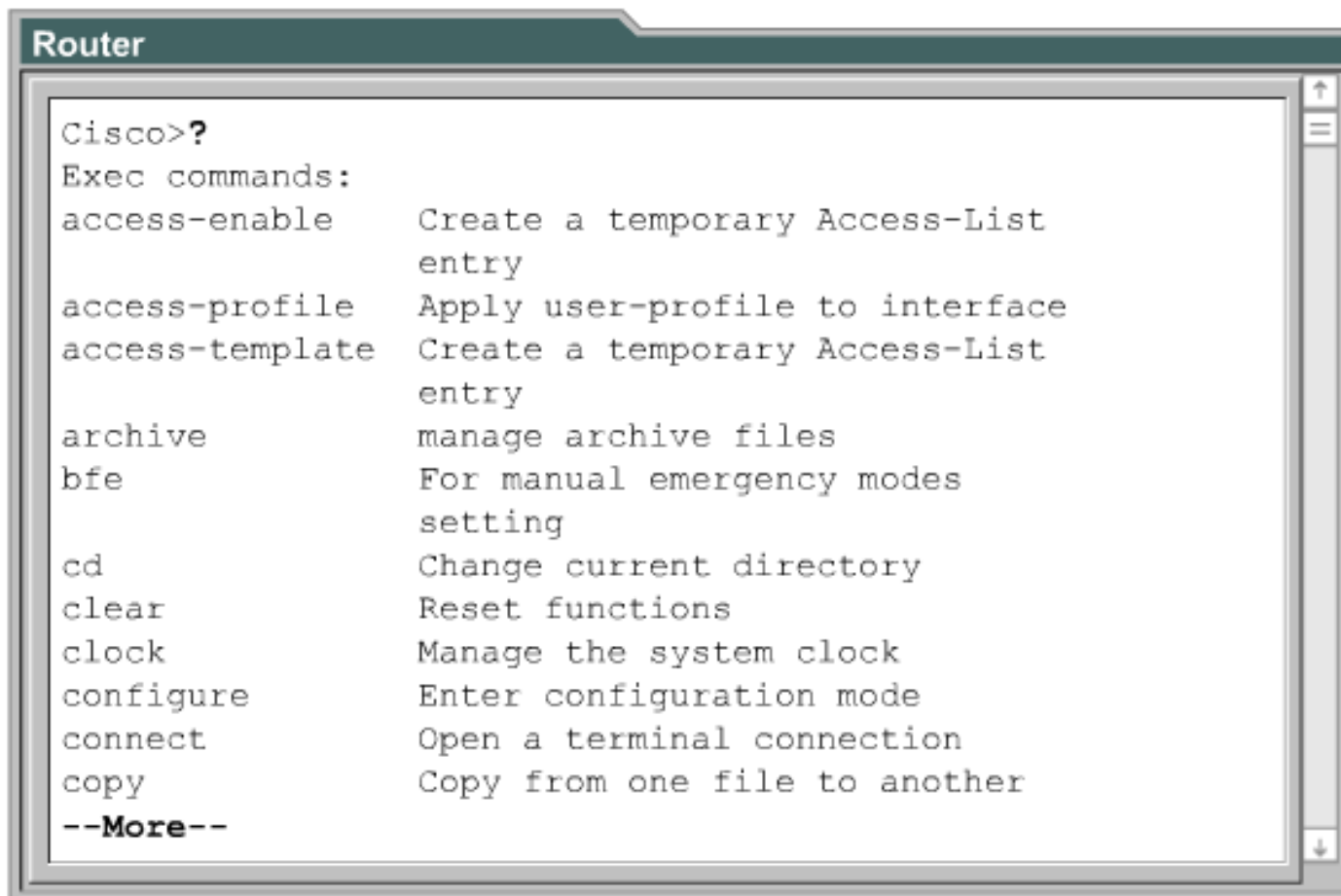


RJ-45 to DB-9
Adapter

Router Modes

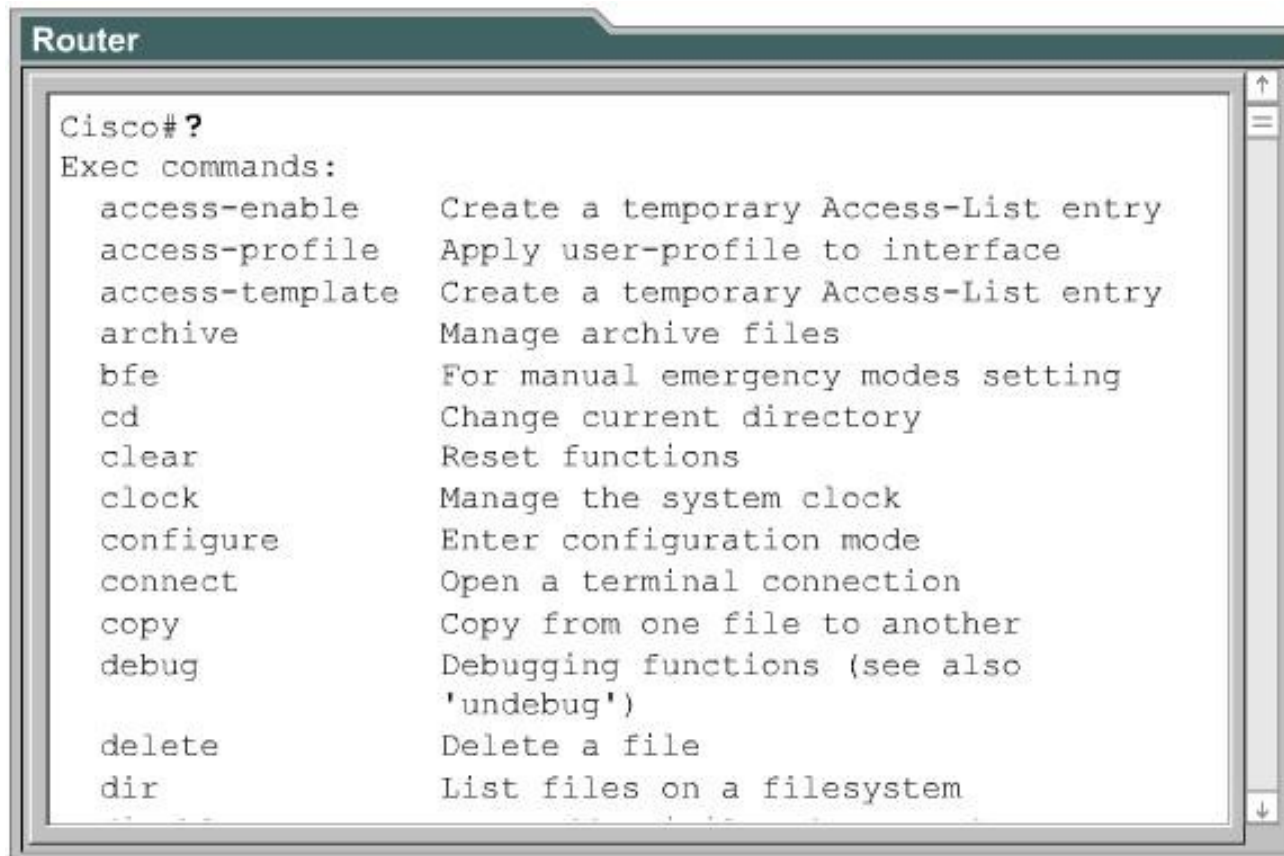
```
Router
Router con0 is now available.
Press RETURN to get started.
User Access Verification
Password:
Router> ← User-Mode Prompt
Router>enable
Password:
Router# ← Privileged-Mode Prompt
Router#disable
Router>
Router>exit
```

User Mode Commands



```
Router
Cisco>?
Exec commands:
access-enable      Create a temporary Access-List
                   entry
access-profile     Apply user-profile to interface
access-template   Create a temporary Access-List
                   entry
archive            manage archive files
bfe                For manual emergency modes
                   setting
cd                 Change current directory
clear              Reset functions
clock              Manage the system clock
configure          Enter configuration mode
connect            Open a terminal connection
copy               Copy from one file to another
--More--
```


Privileged Mode Commands



```
Router
Cisco#?
Exec commands:
  access-enable      Create a temporary Access-List entry
  access-profile     Apply user-profile to interface
  access-template    Create a temporary Access-List entry
  archive            Manage archive files
  bfe                For manual emergency modes setting
  cd                 Change current directory
  clear              Reset functions
  clock              Manage the system clock
  configure          Enter configuration mode
  connect            Open a terminal connection
  copy               Copy from one file to another
  debug              Debugging functions (see also
                    'undebug')
  delete             Delete a file
  dir                List files on a filesystem
```

clock set Command

Router

```
Cisco#cl?  
clear clock  
Cisco#clock  
% Incomplete command.  
Cisco#clock ?  
  set  Set the time and date  
Cisco#clock set  
% Incomplete command.  
Cisco#clock set ?  
  hh:mm:ss  Current Time
```

Using IOS Command history

Command	Description
Ctrl-P or up arrow key	Recalls last (previous) command
Ctrl-N or down arrow key	Recalls most recent command in the history buffer
Router> show history	Shows command buffer
Router> terminal history size <i>number-of-lines</i>	Sets the command history buffer size*
Router> terminal no editing	Disables advanced editing features
Router> terminal editing	Re-enables advanced editing
<Tab>	Completes the entry

*The number will vary depending on what is displayed on the user's screen

The User Interface Error Indicator

```
Router
Router#configure terminal
      ^
% Invalid input detected at '^' marker.
Router#configure terminal
```

The show version Command

```
Router
GAD#show version
Cisco Internetwork Operating System Software
IOS (tm) 1700 Software (C1700-BNSY-L), Version
12.2(11)P, RELEASE SOFTWARE (fcl)
... <output omitted>...
ROM: System Bootstrap, Version 11.1(10)AA, EARLY
DEPLOYMENT RELEASE SOFTWARE (fcl)
ROM: 1700 Software (C1700-BOOT-R), Version
11.1(10)AA, EARLY DEPLOYMENT RELEASE SOFTWARE
(fcl)
GAD uptime is 3 weeks 6 days 2 hours, 11 minutes
System restarted by power-on
System image file is "flash:c1700-bnsy-1.122-
11.p", booted via flash
```

Summary

Summary

- Cisco IOS Software is the software that controls the routing and switching functions of internetworking devices.
- Cisco IOS Software uses a command-line interface (CLI) as its traditional console environment.
- Cisco IOS Software has two access levels: user EXEC mode and privileged EXEC mode.
- A router initializes by loading the bootstrap, the operating system, and a configuration file.
- Cisco routers use LED indicators to provide status information.