Verifying Basic Setup

Note The information herein applies to the Cisco AS5350, Cisco AS5400, and Cisco AS5400HPX universal gateways. Note that the latter requires use of Cisco IOS release 12.2(2)XB or later.

This chapter details the tasks required to verify that your basic system components are functioning normally:

Analyzing the System Boot Dialog

The Cisco AS5350 and Cisco AS5400 have a specific boot sequence. To view the boot sequence through a terminal session, you must have a console connection to the gateway before it powers up.

Note If you observe no messages on the console port, check that the baud rate is configured correctly. The Cisco AS5350 and Cisco AS5400 console port can support a baud rate up to 115200.

The following boot sequence occurs. Step numbers and comments are inserted in the example to describe the boot sequence.

Step 1 In the following segment, the gateway decompresses the system boot image, tests the NVRAM for validity, and decompresses the Cisco IOS image.

```
System Bootstrap, Version 12.0(20000106:234457) [tombnyg-rommon_1_6 106],
SOFTWARE REV 1.6
Copyright (c) 1994-2000 by cisco Systems, Inc.
AS5350 platform with 131072 Kbytes of main memory

Self decompressing the image : ##############################################
################################################## [OK]
Self decompressing the image : ##############################################
##############################################################################
############################################################## [OK]
```

Step 2   Cisco IOS release, available memory, hardware interfaces, and modem lines are displayed:

> ✎
>
> **Note**   If a card type is not recognized, verify that you are running the optimum version of Cisco IOS software. Refer to the hardware-software compatibility matrix, available online at
> http://cco-sj-1.cisco.com/cgi-bin/front.x/Support/HWSWmatrix/hwswmatrix.cgi

```
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           cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (tm) 5350 Software (C5350-JS-M), Version 12.1(3)T,  RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Thu 20-Jul-00 03:02 by ccai
Image text-base: 0x60008968, data-base: 0x61000000
cisco AS5400 (R7K) processor (revision O) with 131072K/65536K bytes of memory.
Processor board ID JAB0351040G
R7000 CPU at 250Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
Last reset from IOS reload
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
Manufacture Cookie Info:
 EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x31,
 Board Hardware Version 3.21, Item Number 800-5171-01,
 Board Revision 017, Serial Number JAB0351040G,
 PLD/ISP Version 1.0,  Manufacture Date 6-Jan-2000.
Processor 0xFF, MAC Address 0x03096F818
Backplane HW Revision FF.FF, Flash Type 5V
2 FastEthernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
108 terminal line(s)
8 Channelized T1/PRI port(s)
512K bytes of non-volatile configuration memory.
32768K bytes of processor board System flash (Read/Write)
8192K bytes of processor board Boot flash (Read/Write)
```

Step 3   Because the gateway has never been configured, it cannot find a startup-config file. Therefore, the software asks, "Would you like to enter the initial configuration dialog? [yes/no]"

Enter **no**. In this example, the Cisco IOS software is configured manually. The automatic setup script is not used. Configuring the Cisco IOS software manually develops your expertise.

Enter **yes** to terminate autoinstall.

```
--- System Configuration Dialog ---

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

Would you like to terminate autoinstall? [yes]: yes
```

Step 4   This example shows the LAN interfaces and the slots in which port cards are not inserted. The universal-port-card (formerly called NextPort) module firmware version is displayed (version 1.1.6.81). The gateway attempts to switch to a better clock source but does not find a suitable source because the T1s are not yet configured.

```
00:00:03: %NP_MD-6-SLOT_INSERTED: Slot 1 (108 ports max) inserted
00:00:16: %CARRIER-3-NO_DFC: DFC is not present - DFC 3
00:00:16: %CARRIER-3-NO_DFC: DFC is not present - DFC 4
00:00:16: %CARRIER-3-NO_DFC: DFC is not present - DFC 5
00:00:16: %CARRIER-3-NO_DFC: DFC is not present - DFC 6
00:00:16: %CARRIER-3-NO_DFC: DFC is not present - DFC 7
00:00:19: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
00:00:19: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
00:00:19: %LINK-3-UPDOWN: Interface Serial0/0, changed state to down
00:00:19: %LINK-3-UPDOWN: Interface Serial0/1, changed state to down
00:00:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to up
00:00:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state
to down
00:00:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to down
00:00:20: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to down
00:00:23: %NP_BS-6-MODULE_STARTED: NextPort module 1/0/0 Started - 1.1.6.81
00:00:26: %NP_BS-6-MODULE_STARTED: NextPort module 1/0/1 Started - 1.1.6.81
00:00:30: %NP_MD-6-MODULE_UP: NextPort module 1/0/0 up
00:00:30: %NP_BS-6-MODULE_STARTED: NextPort module 1/0/2 Started - 1.1.6.81
00:00:33: %NP_MD-6-MODULE_UP: NextPort module 1/0/1 up
00:00:37: %NP_MD-6-MODULE_UP: NextPort module 1/0/2 up
00:01:05: %LINK-5-CHANGED: Interface Serial0/0, changed state to administratively down
00:01:05: %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to administratively
down
00:01:05: %LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively
down
00:01:05: %LINK-5-CHANGED: Interface Serial0/1, changed state to administratively down
00:01:06: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state
to down
00:01:10: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (tm) 5350 Software (C5350-JS-M), Version 12.1(1)XD1, EARLY DEPLOYMENT RELEASE SOFTWARE
(fc2)
TAC:Home:SW:IOS:Specials for info
Copyright (c) 1986-2000 by cisco Systems, Inc.
Compiled Sun 09-Jul-00 07:06 by beliu
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 1 priority 205 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 2 priority 204 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 3 priority 205 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 4 priority 204 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 5 priority 205 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 6 priority 204 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-SWITCH: Switching to the clock on slot 2 port 7 priority 205 as
the current primary has gone bad
00:01:10: %TRUNK_CLOCK-6-BAD_CLOCKS: There are no good clocks in the system. Remain in
HOLDOVER mode
00:01:10: %TRUNK_CLOCK-6-BAD_CLOCKS: There are no good clocks in the system. Remain in
HOLDOVER mode
00:01:10: %TRUNK_CLOCK-6-BAD_CLOCKS: There are no good clocks in the system. Remain in
HOLDOVER mode
```

```
00:01:10: %TRUNK_CLOCK-6-BAD_CLOCKS: There are no good clocks in the system. Remain in
HOLDOVER mode
00:01:10: %TRUNK_CLOCK-6-BAD_CLOCKS: There are no good clocks in the system. Remain in
HOLDOVER mode
```

Step 5   Enter the **show version** command to check the system hardware, Cisco IOS image name, uptime, and restart reason:

```
Router> show version

Cisco Internetwork Operating System Software
IOS (tm) 5350 Software (C5350-JS-M), Version 12.1(20001028:174051)]
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Mon 19-Feb-01 04:10 by
Image text-base: 0x60008968, data-base: 0x61180000

ROM: System Bootstrap, Version 12.0(19991122:230447)
BOOTFLASH: 5350 Software (C5350-BOOT-M), Version 12.0(19991112:131]

AS5400 uptime is 1 day, 4 hours, 29 minutes
System returned to ROM by reload at 12:34:33 UTC Tue Nov 30 1999
System image file is "flash:c5350-js-mz.xm.Feb19"

cisco AS5400 (R7K) processor (revision L) with 131072K/65536K bytes of memory.
Processor board ID 99290068
R7000 CPU at 250Mhz, Implementation 39, Rev 1.0, 256KB L2, 2048KB L3 Cache
Last reset from warm-reset
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
Primary Rate ISDN software, Version 1.1.
Manufacture Cookie Info:
 EEPROM Type 0x0001, EEPROM Version 0x01, Board ID 0x31,
 Board Hardware Version 1.21, Item Number 800-5171-01,
 Board Revision 011, Serial Number 99290068,
 PLD/ISP Version 0.0,  Manufacture Date 2-Aug-1999.
Processor 0xFF, MAC Address 0x0503EFF5F4C
Backplane HW Revision FF.FF, Flash Type 5V
2 FastEthernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
108 terminal line(s)
8 Channelized T1/PRI port(s)
512K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)
8192K bytes of processor board Boot flash (Read/Write)

Configuration register is 0x2102
```

Table 2-1 describes the significant output fields in the previous example.

Table 2-1   Show Version Command Field Descriptions

Field	Description
`AS5400 uptime is....`	Watch for unscheduled reloads by inspecting this field.
`System returned to ROM by reload at....`	Tells you why the gateway last reloaded. If the field displays "power-on," a power interruption caused the reload.
`System image file is....`	The gateway booted from this image location.

Checking the Initial Running Configuration

The Cisco IOS software creates an initial running configuration. Inspect the configuration to get familiar with the default settings. User input is shown in boldface type.

```
Router> enable
Password:
Router# show running-config

Building configuration...

Current configuration : 7653 bytes
!
version 12.1
no service single-slot-reload-enable
no service pad
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
no boot startup-test
logging rate-limit console 10 except errors
!
!
resource-pool disable
!
!
voice-fastpath enable
ip subnet-zero
no ip routing
no ip finger
ip name-server 172.16.11.48
ip name-server 172.16.2.132
ip name-server 172.16.2.133
!
call rsvp-sync
!
!
fax interface-type modem
mta receive maximum-recipients 0
!
!
controller T1 1/0
!
controller T1 1/1
```

```
!
controller T1 1/2
!
controller T1 1/3
!
controller T1 1/4
!
controller T1 1/5
!
controller T1 1/6
!
controller T1 1/7
!
!
interface FastEthernet0/0
 ip address 172.21.101.21 255.255.255.0
 no ip route-cache
 no ip mroute-cache
 duplex auto
 speed 100
 no mop enabled
!
interface FastEthernet0/1
 no ip address
 no ip route-cache
 no ip mroute-cache
 shutdown
 duplex auto
 speed auto
!
interface Serial0/0
 no ip address
 no ip route-cache
 no ip mroute-cache
 shutdown
 fair-queue
 clockrate 2000000
!
interface Serial0/1
 no ip address
 no ip route-cache
 no ip mroute-cache
 shutdown
 clockrate 2000000
!
interface Async4/00
 no ip address
 no ip route-cache
!
interface Async4/01
 no ip address
 no ip route-cache
!
interface Async4/02
 no ip address
 no ip route-cache
.
.
.
interface Async4/107
 no ip address
 no ip route-cache
!
```

```
interface Group-Async0
 no ip address
 no ip route-cache
 no group-range
!
ip kerberos source-interface any
ip classless
no ip http server
!
!
line con 0
 logging synchronous
 transport input none
line aux 0
 logging synchronous
line vty 0 4
 password cisco
 login
line 4/00 4/107
 no flush-at-activation
 modem InOut
!
scheduler allocate 10000 400
end
```

The Cisco AS5350 or Cisco AS5400 displays every asynchronous interface it recognizes. Therefore, if your system has a large number of asynchronous interfaces, the running-configuration will be very long. To aggregate the asynchronous interfaces, you must assign them to a Group-Async Interface using the command **group-range**. See the "Configuring the Asynchronous Group Interface" section on page 3-7.

Group-async interfaces are templates used to control the configuration of multiple asynchronous interfaces on the gateway. Each asynchronous interface corresponds to one of the modem lines and uses the same number as its corresponding line. Configuring the asynchronous interfaces as a group-async saves you time and configuration file size.

Investigating Memory Usage

Use the **show memory summary** command to:

- Understand how memory is used for different processor and I/O memory processes.

- Identify memory fragmentation and memory leaks.

  - Memory leak—Memory that is not released back to the processor. Memory leaks are indicated by steady decreases of free memory. However, the preferred way to track memory leaks is to monitor the FreeMem variable in the OID MIB (object-identifier management information base).

  - Memory fragmentation—Indicated by the largest block of memory not being equal to the lowest block. Fragmentation increases as the numbers grow further apart.

```
Router# show memory summary

              Head      Total(b)     Used(b)      Free(b)    Lowest(b)   Largest(b)
Processor   61952B00   107664640    24210716     83453924    82827184    82866768
      I/O   40000000    67108880    28952352     38156528    38156528    38156412
.
.
.
```

The sum of the used and free memory equals the total memory. Most of the **show memory summary** command output has been removed for brevity.

Note Do not enter the **show memory summary** command with the **terminal length 0** command enabled. If you do, many screens of output might interrupt your session.

Note To learn more about management information bases (MIBs), see the online references at http://www.cisco.com/univercd/cc/td/doc/product/software/.
Select your Cisco IOS release and search under new feature documentation.

Inspecting CPU Utilization

Enter the **show process cpu** command and then the **show process cpu history** command to investigate high CPU utilization. High utilization causes network performance problems. For example, knowing when the router is running at over 50% utilization is critical. The router might start dropping packets if an unexpected traffic burst comes through or if Open Shortest Path First (OSPF) is recalculated. Fast switching can also be used to reduce CPU utilization.

```
Router# show process cpu

CPU utilization for five seconds: 0%/0%; one minute: 1%; five minutes: 1%
 PID   Runtime(ms)   Invoked   uSecs    5Sec    1Min    5Min TTY Process
   1          0       20232        0   0.00%   0.00%   0.00%   0 Load Meter
   2          0          12        0   0.00%   0.00%   0.00%   0 EST msg processing
   3     305688       23808    12839   0.00%   0.39%   0.29%   0 Check heaps
   4          0           1        0   0.00%   0.00%   0.00%   0 Chunk Manager
   5          4          10      400   0.00%   0.00%   0.00%   0 Pool Manager
   6          0           2        0   0.00%   0.00%   0.00%   0 Timers
   7        112       20205        5   0.00%   0.00%   0.00%   0 ALARM_TRIGGER_SC
   8          0           2        0   0.00%   0.00%   0.00%   0 Serial Background
   9          0           1        0   0.00%   0.00%   0.00%   0 RM PROCESS
  10          0           1        0   0.00%   0.00%   0.00%   0 RM PROCESS
  11          0           1        0   0.00%   0.00%   0.00%   0 RM PROCESS
  12          0           1        0   0.00%   0.00%   0.00%   0 RM PROCESS
  13          0           2        0   0.00%   0.00%   0.00%   0 CAS Process
  14        220        2803       78   0.00%   0.00%   0.00%   0 ARP Input
  15          0        5058        0   0.00%   0.00%   0.00%   0 HC Counter Timer
  16          0           2        0   0.00%   0.00%   0.00%   0 DDR Timers
  17          0           2        0   0.00%   0.00%   0.00%   0 Dialer event
  18          4           2     2000   0.00%   0.00%   0.00%   0 Entity MIB API
  19          0           1        0   0.00%   0.00%   0.00%   0 SERIAL A'detect
  20          0           1        0   0.00%   0.00%   0.00%   0 Critical Background
  21         72       13826        5   0.00%   0.00%   0.00%   0 Net Background
 PID   Runtime(ms)   Invoked   uSecs    5Sec    1Min    5Min TTY Process
43          0           3        0   0.00%   0.00%   0.00%   0 AAA Accounting
.
.
.
```

The **show processes cpu history** command displays in ASCII graphical form the total CPU usage on the router over a period of time: one minute, one hour, and 72 hours, displayed in increments of one second, one minute, and one hour, respectively. Maximum usage is measured and recorded every second; average usage is calculated on periods over one second.

```
Router# show process cpu history

                                    11111
     44                11111       99999                33333
100
 90
 80
 70
 60
 50
 40
 30
 20                               *****
 10                               *****
   0....5....1....1....2....2....3....3....4....4....5....5....
             0    5    0    5    0    5    0    5    0    5


           CPU% per second (last 60 seconds)


     1
     924444444444444444444344444444444434434444444444443444444424444
100
 90
 80
 70
 60
 50
 40
 30
 20  *
 10  *
   0....5....1....1....2....2....3....3....4....4....5....5....
             0    5    0    5    0    5    0    5    0    5


           CPU% per minute (last 60 minutes)
           * = maximum CPU%   # = average CPU%


                        1
                   1    0
     444444444444444444449444440
100                           *
 90                           *
 80                           *
 70                           *
 60                           *
 50                           *
 40                           *
 30                           *
 20                      *    *
 10                      *    *
   0....5....1....1....2....2....3....3....4....4....5....5....6....6....7.
             0    5    0    5    0    5    0    5    0    5    0    5    0


           CPU% per hour (last 72 hours)
           * = maximum CPU%   # = average CPU%
```

If you see high utilization numbers in the top line of the output, for example over 50%, inspect the columns 5Sec, 1Min, and 5Min. Find the process that uses the most CPU power.

Where to Go Next

At this point you should go to:

- Chapter 3, "Basic Configuration Using the Command-Line Interface" to commission your Cisco AS5350 or Cisco AS5400 universal gateway.

Tip   The following publications are available on the Documentation CD-ROM that shipped with your gateway, or on the World Wide Web from the Cisco home page.

- For additional basic configuration information, refer to *Cisco IOS Dial Technologies Configuration Guide* and *Cisco IOS Dial Technologies Command Reference*, available online at http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/index.htm. For more advanced configuration topics, refer to the Cisco IOS software configuration guide, feature modules, and command reference publications that pertain to your Cisco IOS software release.

- Check *Configuring Selected 12.1 Cisco IOS Software Features*, available online at http://www.cisco.com/univercd/cc/td/doc/product/access/acs_serv/as5400/index.htm

- For troubleshooting information, refer to the *System Error Messages* and *Debug Command Reference* publications.