

CCNA 200-301, Volume I

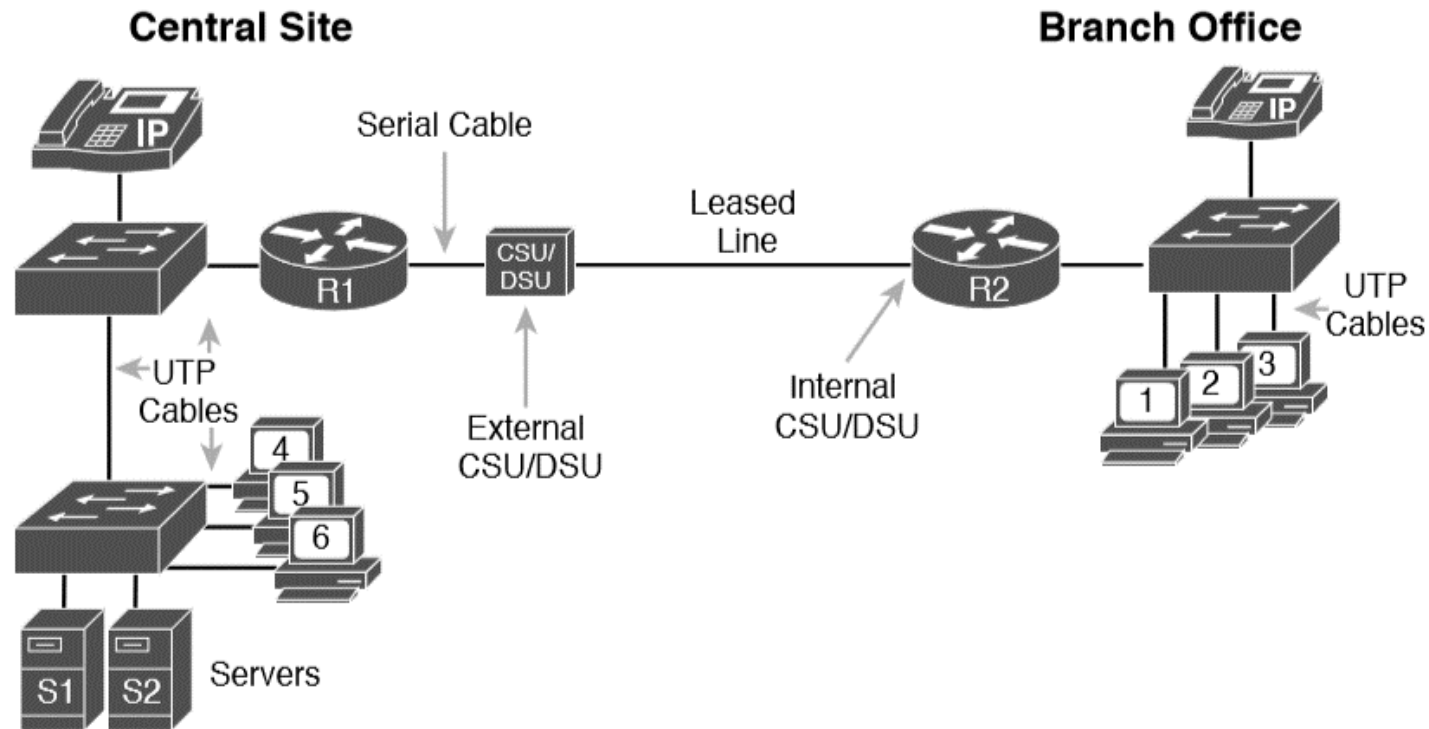
Chapter 15

Operating Cisco Routers

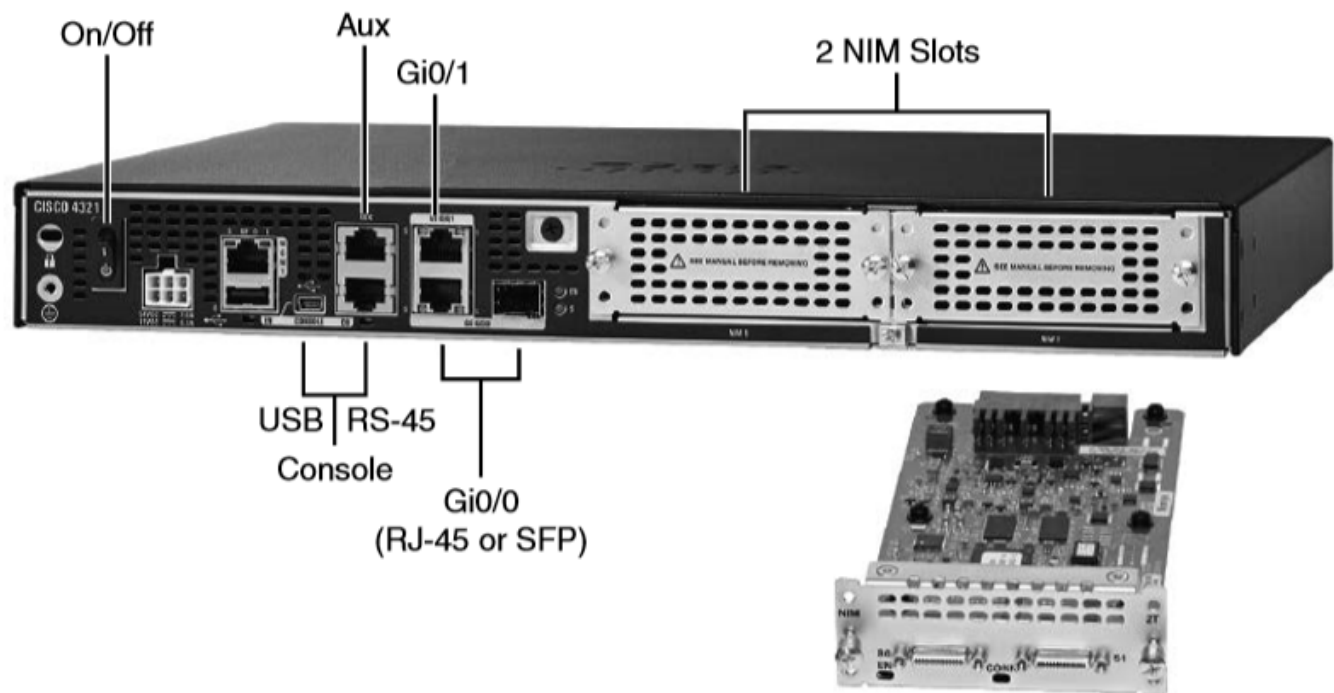
Objectives

- Installing Cisco Routers
- Enabling IPv4 Support on Cisco Router

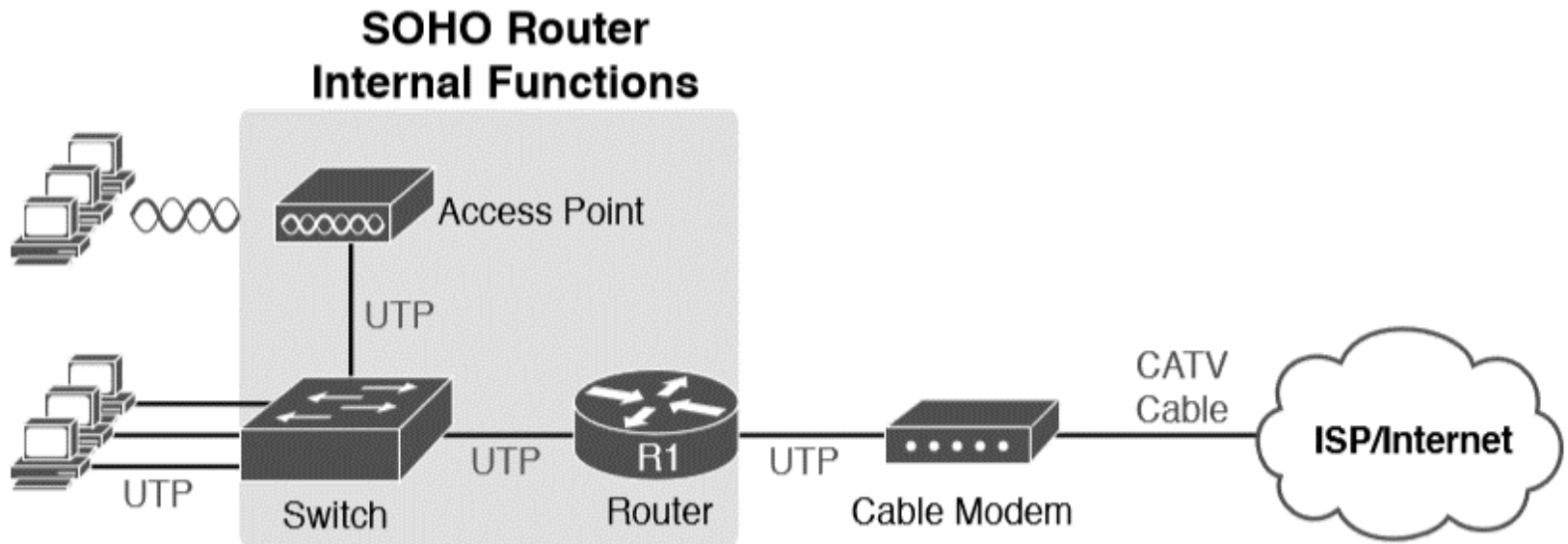
Cabling Diagram of an Enterprise Network



Photos of a Model 4321 Cisco Integrated Services Router (ISR)

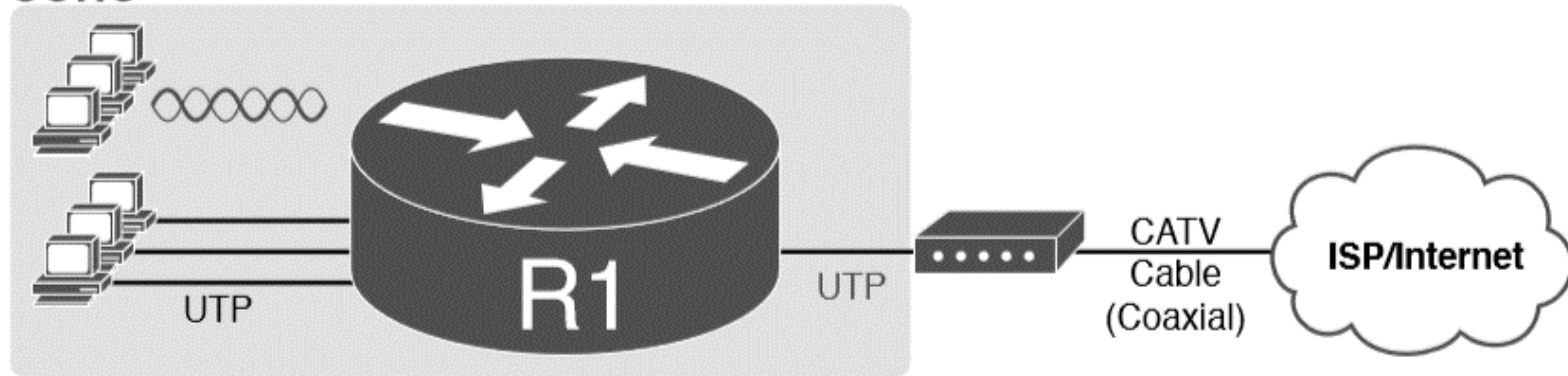


Devices in a SOHO Network with High-Speed CATV Internet



SOHO Network, Using Cable Internet and an Integrated Device

SOHO



Listing the Interfaces in a Router

```
R1# show ip interface brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
Embedded-Service-Engine0/0	unassigned	YES	NVRAM	administratively down	down
GigabitEthernet0/0	172.16.1.1	YES	NVRAM	up	up
GigabitEthernet0/1	unassigned	YES	NVRAM	administratively down	down
Serial0/0/0	172.16.4.1	YES	manual	up	up
Serial0/0/1	unassigned	YES	unset	administratively down	down
GigabitEthernet0/1/0	172.16.5.1	YES	NVRAM	up	up

```
R1# show interfaces gigabitEthernet 0/1/0
```

```
GigabitEthernet0/1/0 is up, line protocol is up
```

```
Hardware is EHWIC-1GE-SFP-CU, address is 0201.a010.0001 (bia 30f7.0d29.8570)
```

```
Description: Link in lab to R3's G0/0/0
```

```
Internet address is 172.16.5.1/24
```

Listing the Interfaces in a Router (Continued)

```
MTU 1500 bytes, BW 1000000 Kbit/sec, DLY 10 usec,  
    reliability 255/255, txload 1/255, rxload 1/255  
Encapsulation ARPA, loopback not set  
Keepalive set (10 sec)  
Full Duplex, 1Gbps, media type is RJ45  
output flow-control is XON, input flow-control is XON  
ARP type: ARPA, ARP Timeout 04:00:00  
Last input 00:00:29, output 00:00:08, output hang never  
Last clearing of "show interface" counters never  
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0  
Queueing strategy: fifo  
Output queue: 0/40 (size/max)  
5 minute input rate 0 bits/sec, 0 packets/sec  
5 minute output rate 0 bits/sec, 0 packets/sec  
    12 packets input, 4251 bytes, 0 no buffer  
    Received 12 broadcasts (0 IP multicasts)  
    0 runts, 0 giants, 0 throttles  
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored  
    0 watchdog, 0 multicast, 0 pause input  
    55 packets output, 8098 bytes, 0 underruns  
    0 output errors, 0 collisions, 0 interface resets  
    0 unknown protocol drops  
    0 babbles, 0 late collision, 0 deferred  
    0 lost carrier, 0 no carrier, 0 pause output  
    0 output buffer failures, 0 output buffers swapped out
```

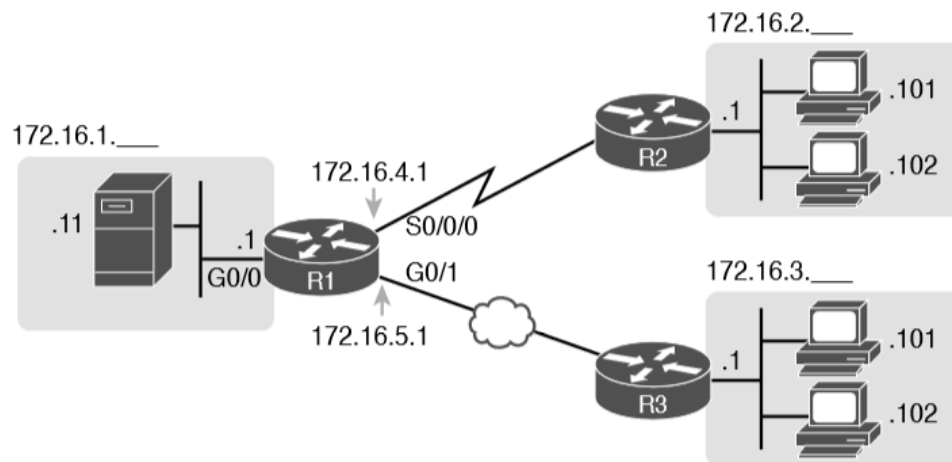

Interface Status Codes

Name	Location	General Meaning
Line status	First status code	Refers to the Layer 1 status. (For example, is the cable installed, is it the right/wrong cable, is the device on the other end powered on?)
Protocol status	Second status code	Refers generally to the Layer 2 status. It is always down if the line status is down. If the line status is up, a protocol status of down is usually caused by a mismatched data-link layer configuration.

Typical Combinations of Interface Status Codes

Line Status	Protocol Status	Typical Reasons
Administratively down	Down	The interface has a shutdown command configured on it.
Down	Down	The interface is not shutdown , but the physical layer has a problem. For example, no cable has been attached to the interface, or with Ethernet, the switch interface on the other end of the cable is shut down, or the switch is powered off, or the devices on the ends of the cable use a different transmission speed.
Up	Down	Almost always refers to data-link layer problems, most often configuration problems. For example, serial links have this combination when one router was configured to use PPP and the other defaults to use HDLC.
Up	Up	Layer 1 and Layer 2 of this interface are functioning.

Configuring IP Addresses on Cisco Routers



```
R1# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)# interface G0/0
R1(config-if)# ip address 172.16.1.1 255.255.255.0
R1(config-if)# no shutdown
R1(config-if)# interface S0/0/0
R1(config-if)# ip address 172.16.4.1 255.255.255.0
R1(config-if)# no shutdown
R1(config-if)# interface G0/1/0
R1(config-if)# ip address 172.16.5.1 255.255.255.0
R1(config-if)# no shutdown
R1(config-if)# ^Z
R1#
```

Verifying IP Addresses on Cisco Routers

```
R1# show protocols
```

```
Global values:
```

```
Internet Protocol routing is enabled
```

```
Embedded-Service-Engine0/0 is administratively down, line protocol is down
```

```
GigabitEthernet0/0 is up, line protocol is up
```

```
Internet address is 172.16.1.1/24
```

```
GigabitEthernet0/1 is administratively down, line protocol is down
```

```
Serial0/0/0 is up, line protocol is up
```

```
Internet address is 172.16.4.1/24
```

```
Serial0/0/1 is administratively down, line protocol is down
```

```
GigabitEthernet0/1/0 is up, line protocol is up
```

```
Internet address is 172.16.1.1/24
```

Key Commands to List Router Interface Status

Command	Lines of Output per Interface	IP Configuration Listed	Interface Status Listed?
show ip interface brief	1	Address	Yes
show protocols [<i>type number</i>]	1 or 2	Address/mask	Yes
show interfaces [<i>type number</i>]	Many	Address/mask	Yes