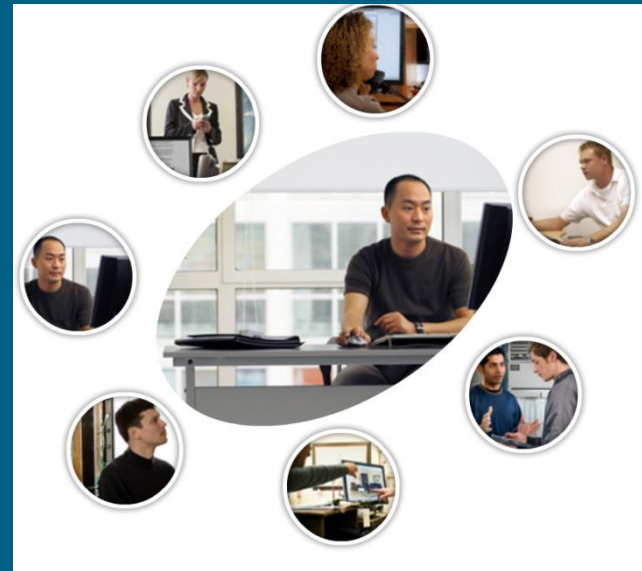




Basic configuration



CLI Configuration

- Basic Router Configuration:
 - Naming the router
 - Setting passwords
 - Configuring interfaces
 - Configuring a banner
 - Saving changes on a router
 - Verifying basic configuration and router operations

Configuring Router Identification

Router Name

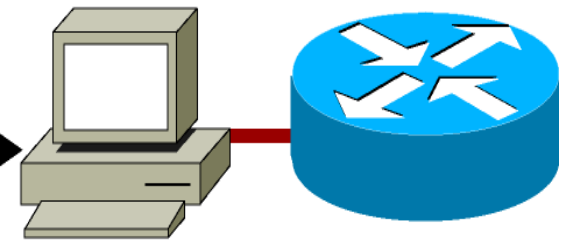
```
Router(config)#hostname wg_ro_c  
wg_ro_c(config)#
```

Message-of-the-Day Banner

```
wg_ro_c(config)#banner motd #  
Enter TEXT message. End with  
the character #
```

Interface Description

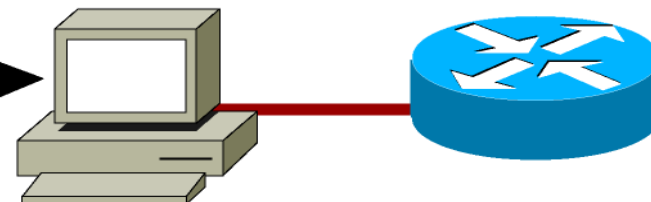
```
wg_ro_c(config)#interface ethernet 0  
wg_ro_c(config-if)#description Engineering LAN
```



Configuring a Router Password

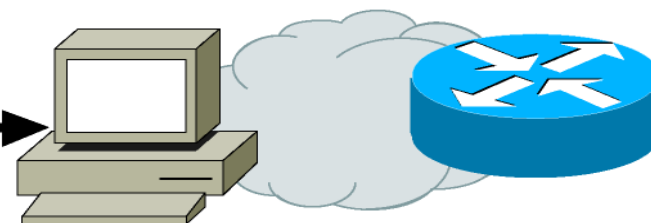
Console Password

```
Router (config) #line console 0  
Router (config-line) #login  
Router (config-line) #password cisco
```



Virtual Terminal Password

```
Router (config) #line vty 0 4  
Router (config-line) #login  
Router (config-line) #password sanjose
```



Enable Password

```
Router (config) #enable password cisco
```



Secret Password

```
Router (config) #enable secret sanfran
```

Service Password-Encryption Commands

```
Router (config) #service password encryption  
Router (config) #no service password-encryption
```

022P_256

Configuring Interfaces

- Identify the role of a router in a network.

Configuring Router Interfaces

All interfaces are accessed by issuing the `interface` command at the global configuration prompt.

In the following commands, the `type` argument includes `serial`, `ethernet`, `fastethernet`, and others:

```
Router(config)#interface type port
Router(config)#interface type slot/port
Router(config)#interface type slot/subslot/port
```

The following command is used to administratively turn off the interface:

```
Router(config-if)#shutdown
```

The following command is used to turn on an interface that has been shutdown:

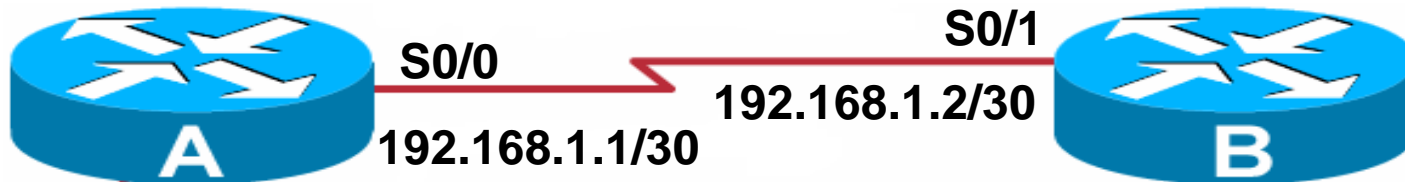
```
Router(config-if)#no shutdown
```

The following command is used to quit the current interface configuration mode:

```
Router(config-if)#exit
```

When the configuration is complete, the interface is enabled and interface configuration mode is exited.

Configuring Interfaces

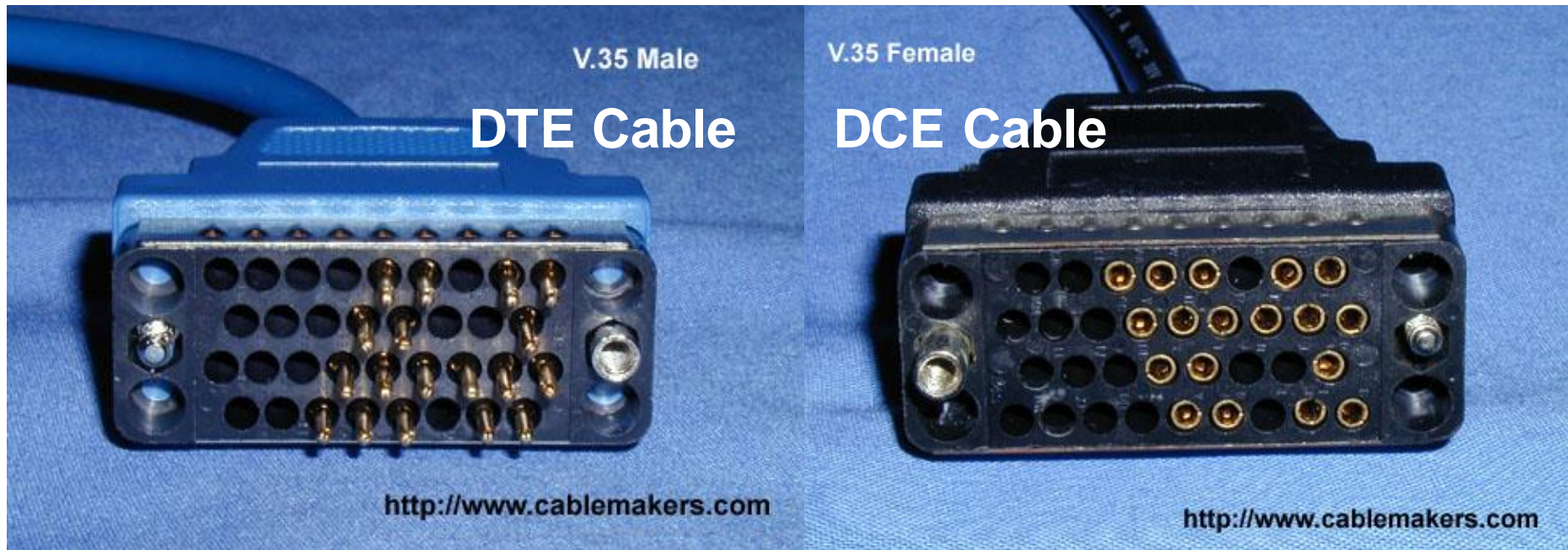


```
Router#config t
RouterA(config)# interface serial 0/0
RouterA(config-if)# ip address 192.168.1.1 255.255.255.0
RouterA(config-if)# no shutdown
RouterA(config-if)# clock rate 56000      (required for serial DCE only)
RouterA(config-if)# bandwidth 64          (a value in kbps)
RouterA(config-if)# exit

RouterB(config)# int serial 0/1
RouterB(config-if)# ip address 192.168.1.2 255.255.255.252
RouterB(config-if)# no shutdown
RouterB(config-if)# exit
RouterB(config)# exit
Router#

To know which interface is the DCE :
RouterA# show controller s0/0
```

Configuring a serial interface



How can you tell which end is the DTE and which end is the DCE?

- Look at the label on the cable.
- Look at the connector between the two cables - The DTE cable will always be male and the DCE cable will always be female.

Serial Interface show controller Command


```
Router#show controller serial 0/0
HD unit 0, idb = 0x121C04, driver structure at 0x127078
buffer size 1524  HD unit 0, V.35 DTE cable
.
.
.
```

- Shows the cable type of serial cables

Interfaces

```
Router#show ip interface brief
Interface                IP-Address      OK? Method Status          Protocol
FastEthernet0/0          unassigned      YES unset    administratively down  down
Serial0/0                 unassigned      YES unset    administratively down  down
BRI0/0                   unassigned      YES unset    administratively down  down
BRI0/0:1                 unassigned      YES unset    administratively down  down
BRI0/0:2                 unassigned      YES unset    administratively down  down
Serial0/1                 unassigned      YES unset    administratively down  down
Router#
```

Interpreting the Interface Status

Router#show interfaces serial 0/1 

Serial0/1 is up, line protocol is up

Interface
is working
properly

Layer 1 status

Layer 2 status

Other interface status :

- Serial0/1 is administratively down , line protocol is down
interface is shut down
- Serial0/1 is down , line protocol is down
interface or cable H/W failure (no keep-alives)
- Serial0/1 is up , line protocol is down
different encapsulation type (PPP , HDLC , FR) or no clock rate on the DCE device.

Verification tools

- You have to verify all config. steps
 - **Verify host identification.**
 - **Verify router password setting**
 - **Verify interface configuration**

Managing Console Input

```
Router(config)#line console 0
```

```
Router(config-line)#logging synchronous
```

```
Router(config-line)#exec-timeout 0 0
```

```
Router(config-line)#exit
```

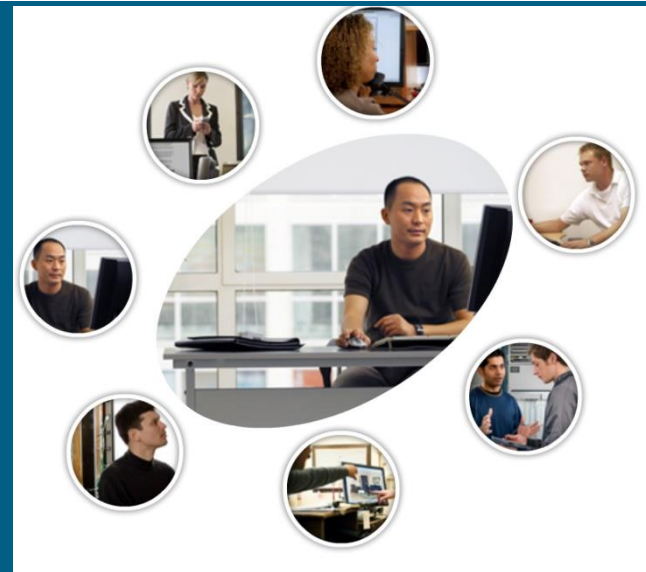
```
Router(config)#no ip domain-lookup
```

SECTION SUMMARY

- 1. Configuring Router Identification**
- 2. Configuring a Router Password**
- 3. Configuring Interfaces**
- 4. Basic Switch configuration**



Viewing, Saving and Erasing the Configurations



Router#show running-config

Current configuration : 542 bytes

```
!  
version 12.2  
!  
interface FastEthernet0/0  
  no ip address  
  shutdown  
  duplex auto  
  speed auto  
!  
interface Serial0/0  
  no ip address  
  shutdown  
!  
line con 0  
line aux 0  
line vty 0 4  
!  
end  
Router#
```

running-config

- The running-config file is the configuration in RAM memory.
- All changes are made to the running-config file.
- This is the configuration that the router is currently using.
- The running-config is lost when the router loses power or reloads.
- Privilege mode command.

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

```
startup-config is not present  
Router#
```

startup-config

- The startup-config file is the saved configuration in NVRAM.
- If there is a startup-config file in NVRAM when the router boots up, this file will be copied into running-config.
- The running-config is what the router will use.
- Privilege mode command.

Copy running-config to startup-config

```
Router#copy running-config startup-config
```

```
Destination filename [startup-config]? <Press Enter>
```

```
Building configuration...
```

```
[OK]
```

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

```
Current configuration : 542 bytes
```

```
!
```

```
version 12.2
```

```
!
```

```
interface FastEthernet0/0
```

```
<text omitted>
```

Erase startup-config

```
Router#erase startup-config  
Erasing the nvram filesystem will remove all files!  
Continue? [confirm] <Press Enter>  
[OK]
```

Erase of nvram: complete

Router#

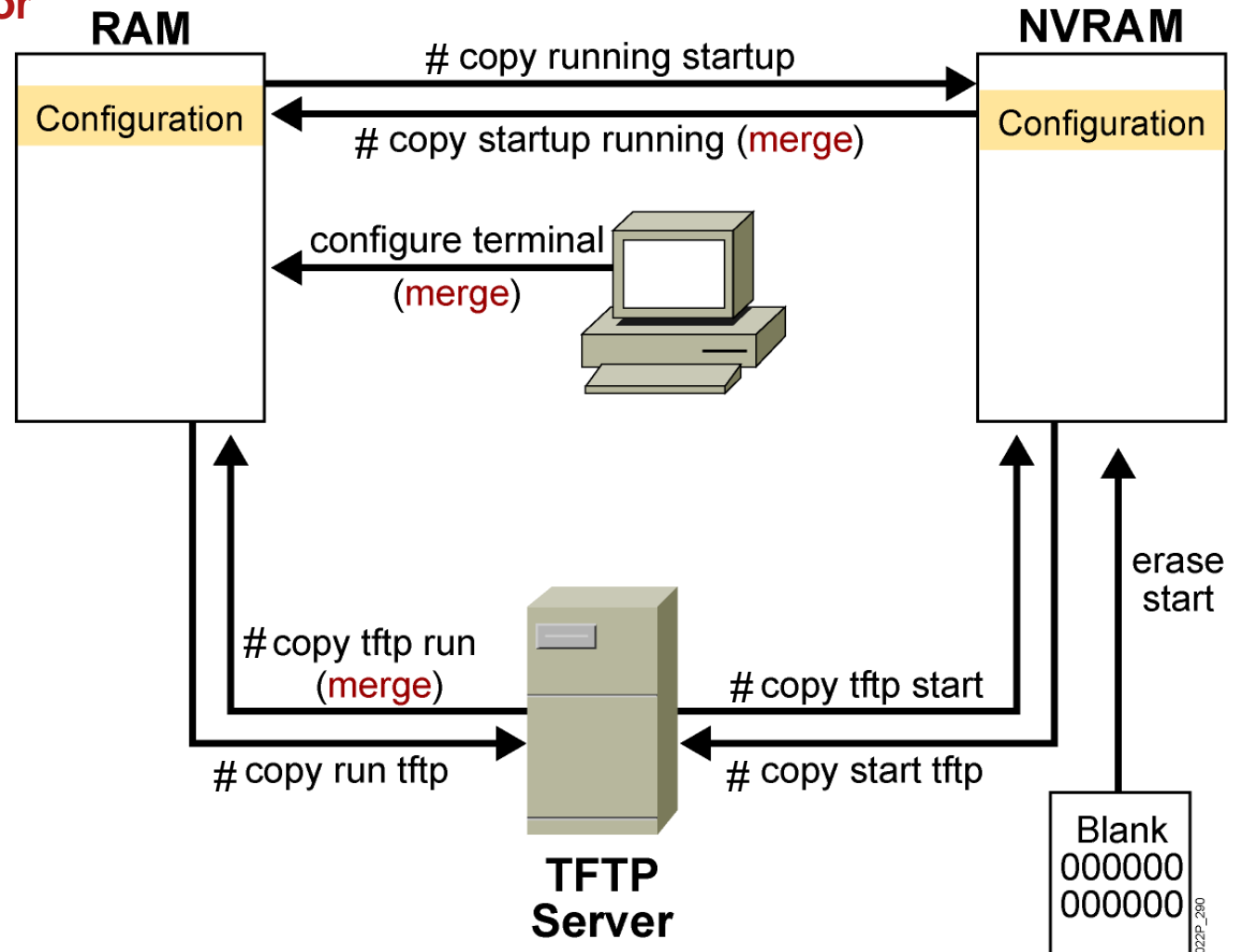
- When you are done with the routers in the lab, please be sure to erase the startup-config.
- If you are starting a lab, and you do not get the message:

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

- You will need to erase the startup-config and reboot.
- Privilege mode command.

Cisco IOS copy Command

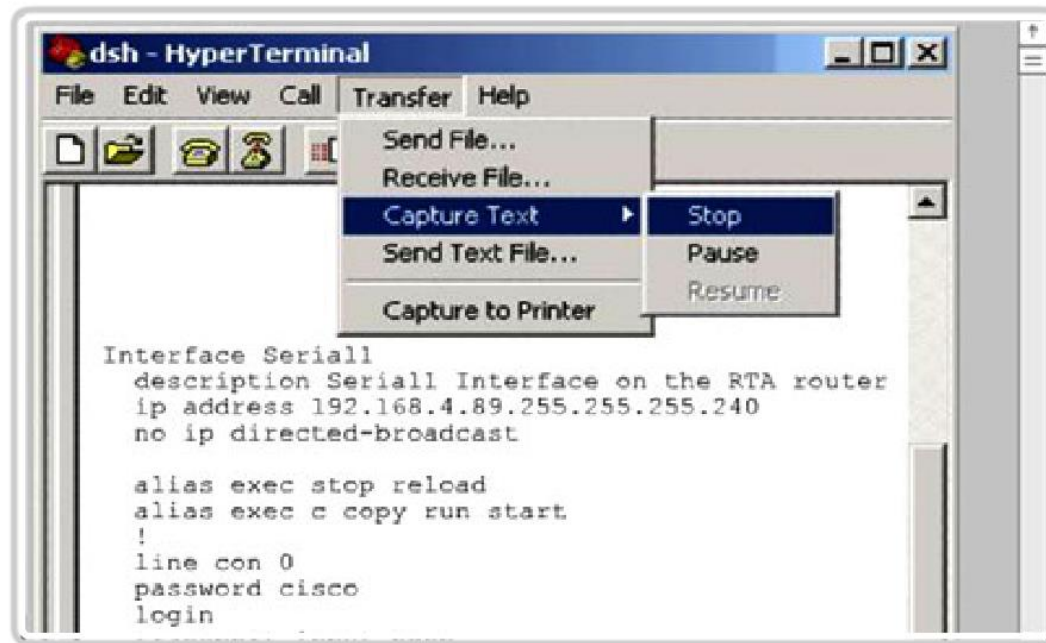
To save IOS image or configuration file



Managing configuration files

- Use a text file to backup and restore config settings

Saving to a Text File in Hyperterminal



In the terminal session:

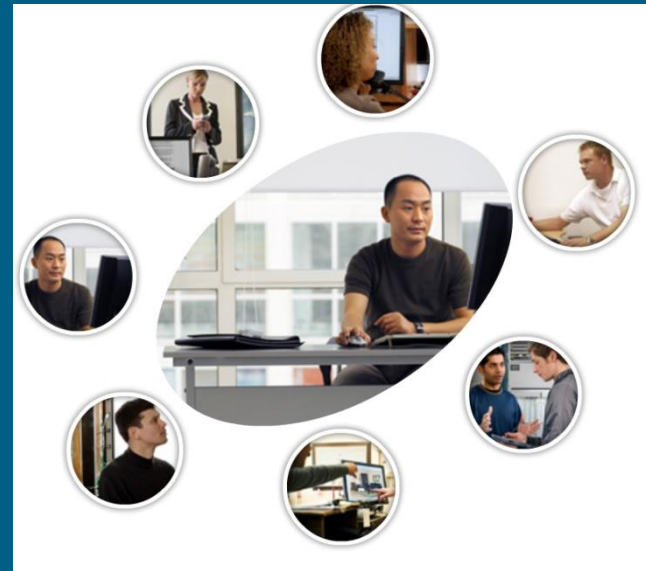
1. Start the text capture process
2. Issue a `show running-config` command
3. Stop the capture process
4. Save the text file

Return the Device to Its Original Configuration

- Router#reload
- System configuration has been modified. Save?
[yes/no]: n
- Proceed with reload? [confirm]
- To erase the startup configuration file use erase NVRAM:startup-config or erase startup-config at the privileged EXEC mode prompt:
- Router#erase startup-config



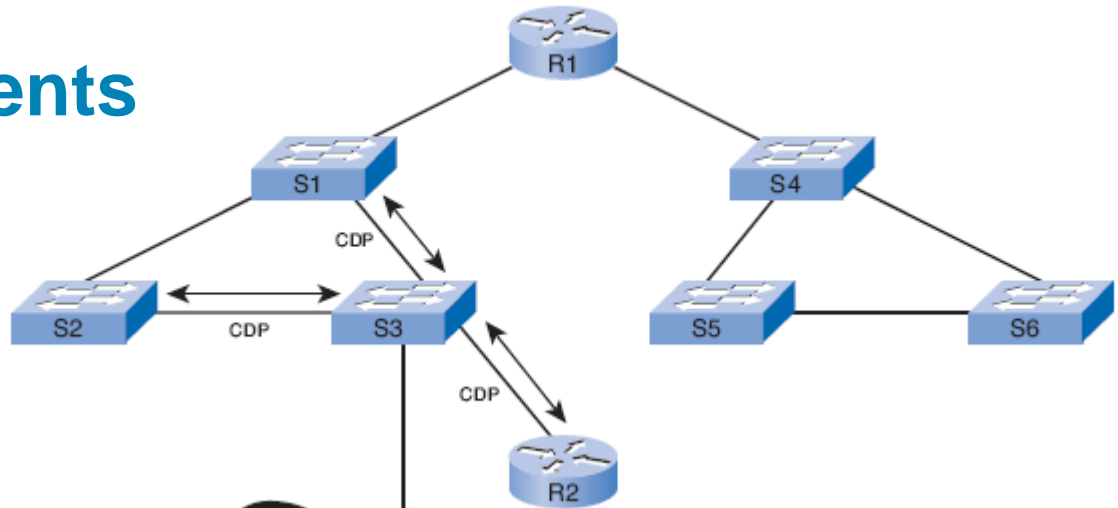
Discovering & testing the network



Cisco Discovery Protocol (CDP)

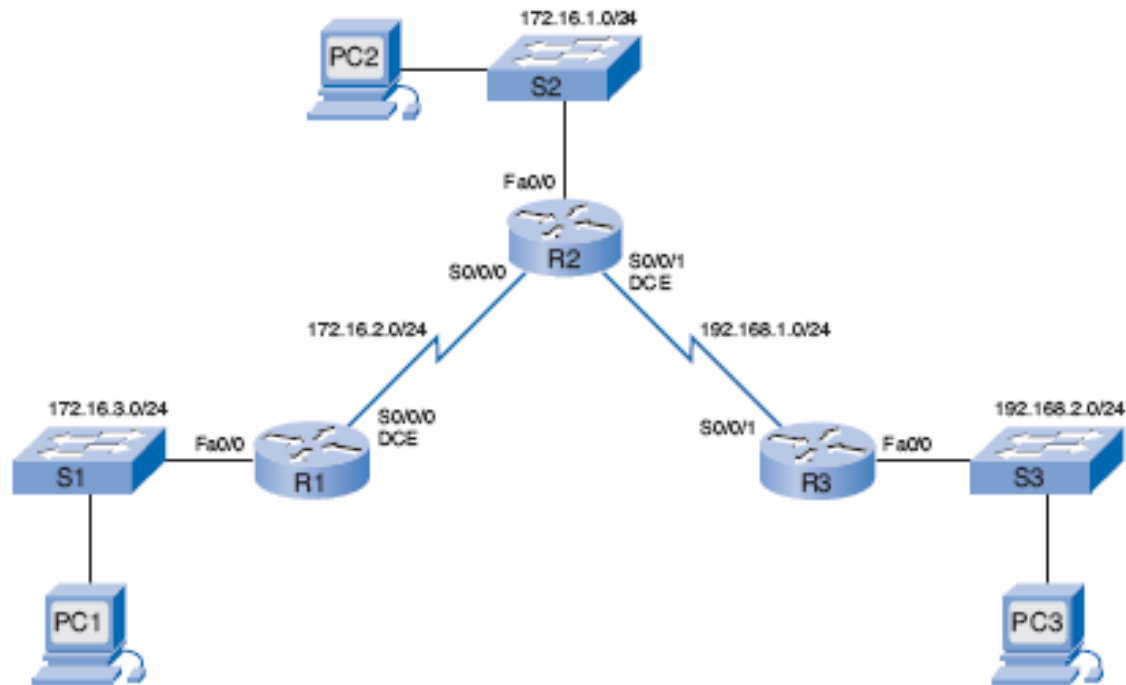
- Cisco Discovery Protocol (CDP) is a powerful network-monitoring and –troubleshooting tool.
- CDP is an information-gathering tool used by network administrators to get information about directly connected Cisco devices.
- CDP is a proprietary tool that enables you to access a summary of protocol and address information about Cisco devices that are directly connected.

CDP Advertisements



- By default, each Cisco device sends periodic messages to directly connected Cisco devices.
- These messages are known as CDP advertisements.
- A Cisco device frequently has other Cisco devices as *neighbors* on the network.
- Information gathered from other devices can assist you:
 - in making network design decisions
 - in troubleshooting
 - in making changes to equipment.
 - CDP can be used as a network discovery tool

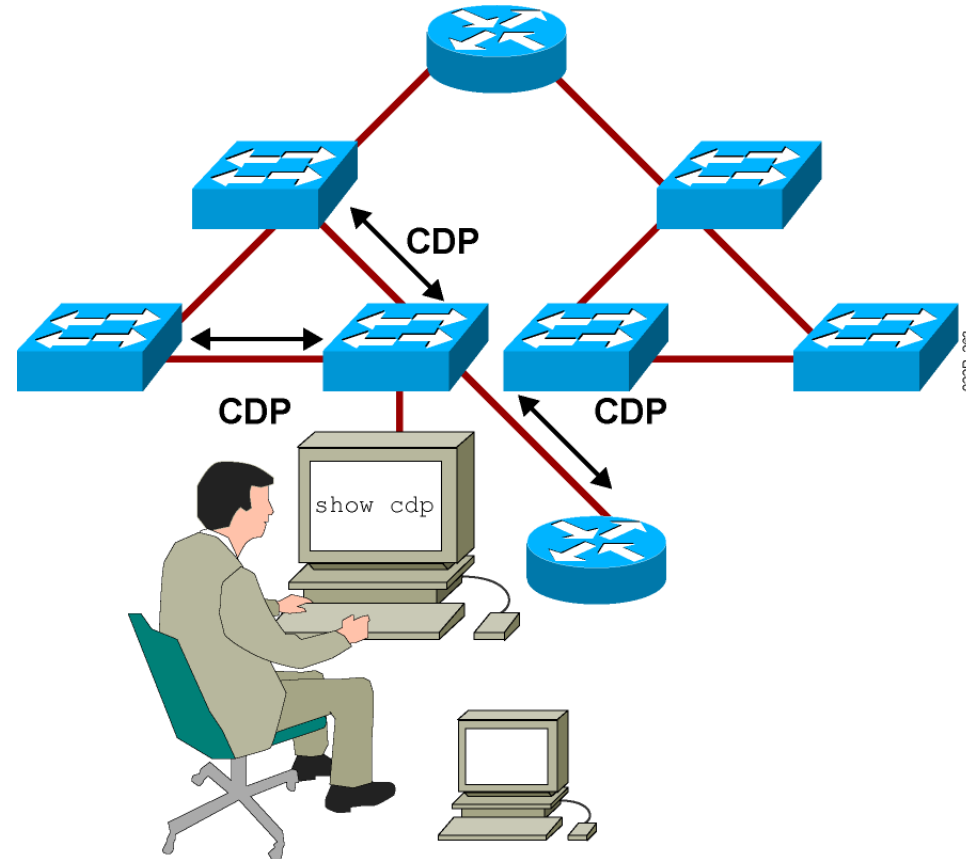
Layer 2 Neighbors



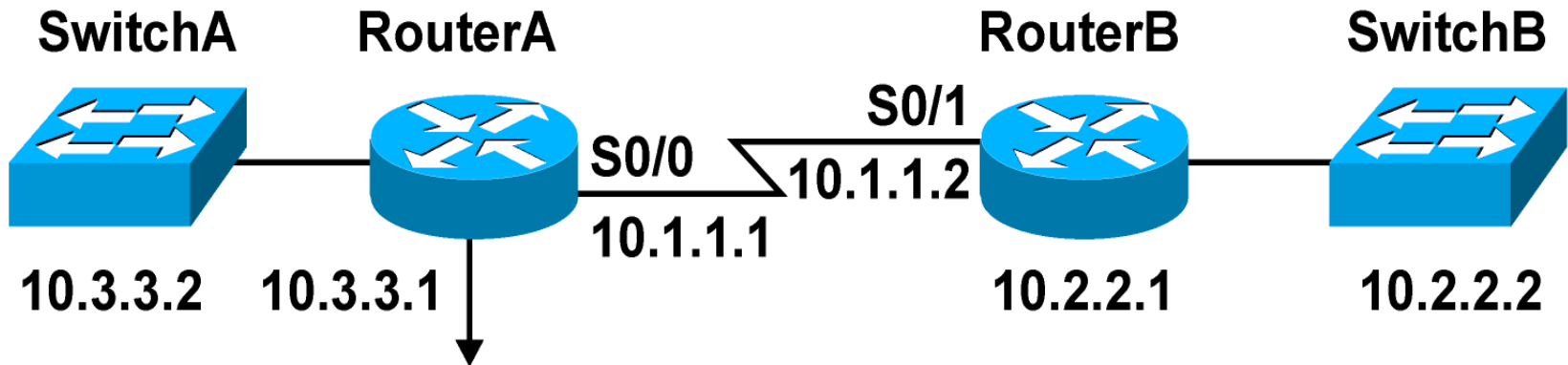
- CDP operates at Layer 2 only.
- Therefore, CDP neighbors are Cisco devices that are directly connected physically and share the same data link.
 - R1 ,S1, R2 are CDP neighbors
 - R2 , R1 , S2, R3 are CDP neighbors
 - R3 ,R2 S3 are CDP neighbors

Discovering Neighbors with CDP

- CDP runs on routers with Cisco IOS to get information about the direct connected Cisco devices.
- Summary information includes:
 - Device identifiers
 - Address list
 - Port identifier
 - Capabilities list
 - Platform



Using the show cdp neighbors Command



```
RouterA#show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID         Local Intrfce   Holdtme    Capability   Platform   Port ID
RouterB           Ser 0/0        148        R            2610       Ser 0/1
SwitchA          Eth 0/0        167        S I          WS-C2950-2Fas 0/2
```

RouterA# show cdp neighbors detail

provide also the neighbors ip addresses.

SH CDP Neighbor detail

- **Cairo# sh cdp entry -----**
- **Device ID: tanta**
- **Entry address(es):**
 - **IP address : 192.168.2.1**
 - **Platform: cisco C2800, Capabilities: Router**
 - **Interface: FastEthernet0/0, Port ID (outgoing port): FastEthernet0/1**
 - **Hold time: 155**
- **Version :**
 - **Cisco IOS Software, 2800 Software (C2800NM-IPBASE-M), Version 12.3(14)T7, RELEASE SOFTWARE (fc2)**
- **advertisement version: 2**
- **Duplex: full**
- **-----**

Enabling CDP on a Router

To enable CDP, use the `cdp run` global configuration command. CDP is on by default. Use the `no` form of this command to disable CDP.

```
Router(config)#cdp run
```

To enable Cisco Discovery Protocol (CDP) on an interface, use the `cdp enable` interface configuration command. Use the `no` form of this command to disable CDP on an interface. CDP is enabled by default on all supported interfaces.

```
Router(config)#interface serial 0/0
```

```
Router(config-if)#cdp enable
```

clear cdp counters

```
Rt1#show cdp traffic
CDP counters:
  Total packets output: 6, Input:6
  Hdrsyntax: 0, Chksum error: 0, Encaps failed:0
  No memory: 0, Invalid packet: 0, Fragmented:0
  CDP version1 advertisements output: 0, Input:0
  CDP version2 advertisements output: 6, Input:6

Rt1#clear cdp counters
Rt1#show cdp traffic
CDP counters:
  Total packets output: 0, Input:0
  Hdrsyntax: 0, Chksum error: 0, Encaps failed:0
  No memory: 0, Invalid packet: 0, Fragmented:0
  CDP version1 advertisements output: 0, Input:0
  CDP version2 advertisements output: 0, Input:0

Rt1#
```

show cdp

```
CDP Version 1
Rt3#show cdp
Global CDP information:
    Sending CDP packets every 60 seconds
    Sending a holdtime value of 180 seconds
Rt3#
CDP Version 2
Rt1#show cdp
Global CDP information
    Sending CDP packets every 60 seconds
    Sending a holdtime value of 180 seconds
    Sending CDPv2 advertisements is enabled
Rt1#
```

show cdp interface

```
Rt1#show cdp interface serial0/0
Serial0/0 is up, line protocol is up
  Encapsulation HDLC
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

```
Rt1#show cdp interface fastethernet0/0
FastEthernet0/0 is up, line protocol is up
  Encapsulation ARPA
  Sending CDP packets every 60 seconds
  Holdtime is 180 seconds
```

```
Rt1#
```

Status of the carrier detect signal

Keepalive messages

Other cdp commands

show cdp traffic – shows number of packets sent and received

cdp timer - specifies how often the IOS sends CDP updates

debug cdp - for debugging all aspects of cdp

Disabling CDP

```
Router(config)# no cdp run
```

or

```
Router(config-if)# no cdp enable
```

- **CDP can be a security risk.**
- **To disable CDP globally, for the entire device, use this command: `no cdp run`**
- **To stop CDP advertisements on a particular interface: `no cdp enable`**

Using the ping and trace Commands

```
Router#ping 10.1.1.10
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 10.1.1.10, timeout is 2 seconds:
```

```
!!!!
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
```

```
Router#trace 192.168.101.101
```

```
Type escape sequence to abort.
```

```
Tracing the route to 192.168.101.101
```

```
 0  p1r1 (192.168.1.49)  20 msec  16 msec  16 msec
```

```
 1  p1r2 (192.168.1.18)  48 msec  *    44 msec
```

```
Router#
```

**Ping commands tests the connectivity and path to a remote device
(test layer 3 in TCP/IP)**

IOS Ping Indicators

- A ping from the IOS will yield to one of several indications for each ICMP echo that was sent. The most common indicators are:
 - ! - indicates receipt of an ICMP echo reply
 - . - indicates a timed out while waiting for a reply
 - U - an ICMP unreachable message was received
- the ping command moves from Layer 3 of the OSI model to Layer 2 and then Layer 1. Ping uses the ICMP protocol to check for connectivity.

Test the Stack

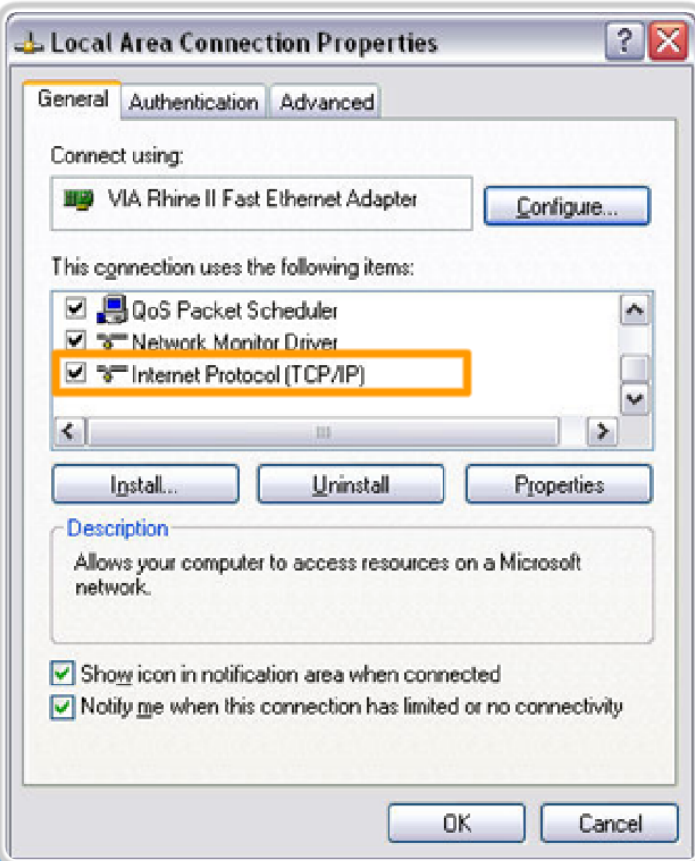
- Given a type of host and a master addressing scheme, trace the steps for assigning host parameters to a host

Testing Local TCP/IP Stack

Pinging the local host confirms that TCP/IP is installed and working on the local network adapter.

C:>ping 127.0.0.1

Pinging 127.0.0.1 causes a device to ping to itself.



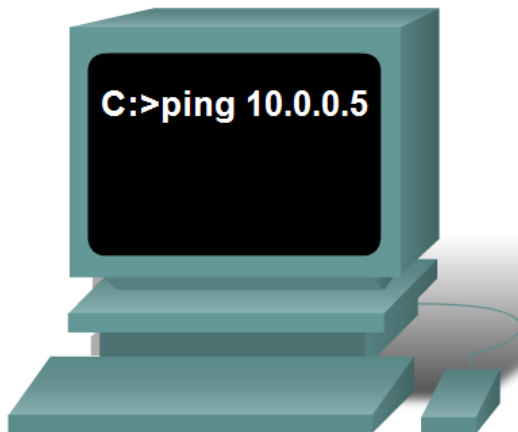
The screenshot shows the 'Local Area Connection Properties' dialog box in Windows. The 'General' tab is selected, and the 'Internet Protocol (TCP/IP)' item is highlighted with an orange box. The 'Description' section states: 'Allows your computer to access resources on a Microsoft network.' The 'Show icon in notification area when connected' and 'Notify me when this connection has limited or no connectivity' options are checked.

NIC

- Use the ping command to determine if the IP protocol is properly bound to an NIC

Testing the Local NIC Assignment

```
IP Address . . . . . : 10.0.0.5  
Subnet Mask . . . . . :  
255.255.255.0
```



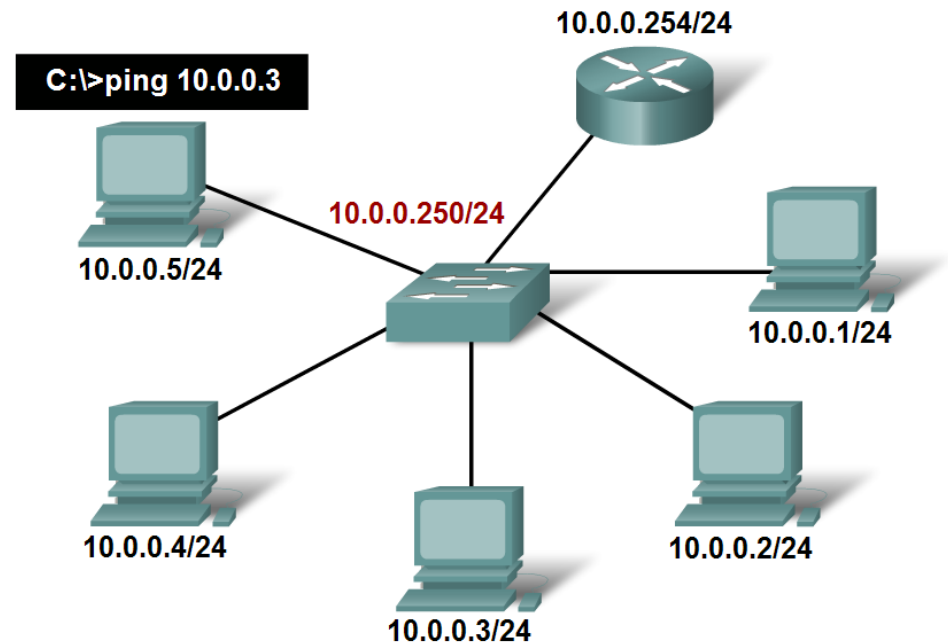
Verify the host NIC address is bound and ready for transmitting signals across the media by pinging its own IP address

Testing the Local Network

- Router#ping
- Protocol [ip]:
- Target IP address:10.0.0.1
- Repeat count [5]:
- Datagram size [100]:
- Timeout in seconds [2]:5
- Extended commands [n]: n

Testing Local Network

Successfully pinging the other host's IPv4 addresses will verify that not only the local host is configured properly but the other hosts are configured correctly as well.





TELNET



To initiate a Telnet session any of the following alternatives can be used:

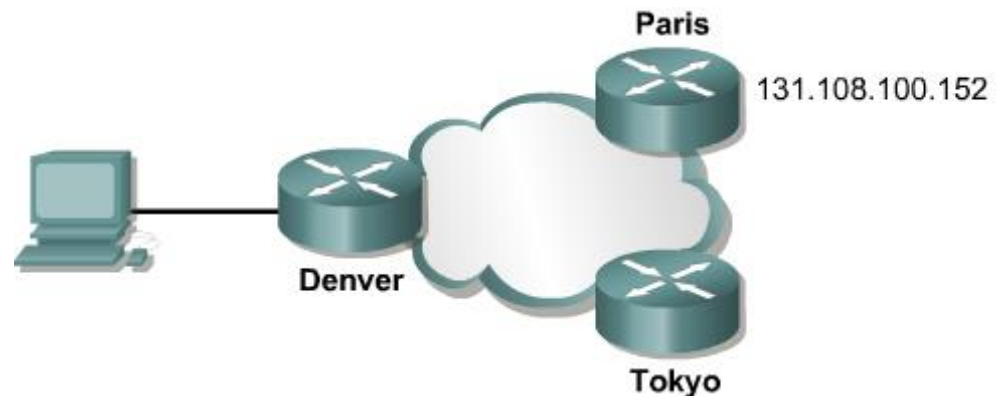
```
Denver>connect paris
```

```
Denver>paris
```

```
Denver>131.108.100.152
```

```
Denver>telnet 131.108.100.152
```

```
Denver>telnet paris
```



Reopening a suspended Telnet session

Initiate a session

```
Denver>telnet paris
```

End a session

```
Paris>exit
```

Suspend a session

```
Paris><Ctrl><Shift><6><x>  
Denver>
```

Resume a session

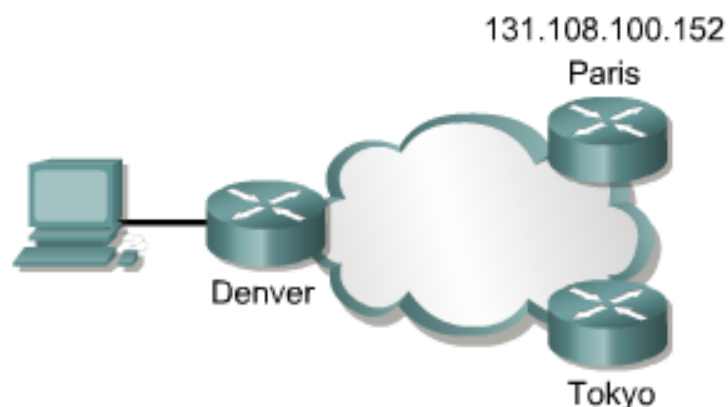
```
Denver><Enter>
```

Disconnect a session

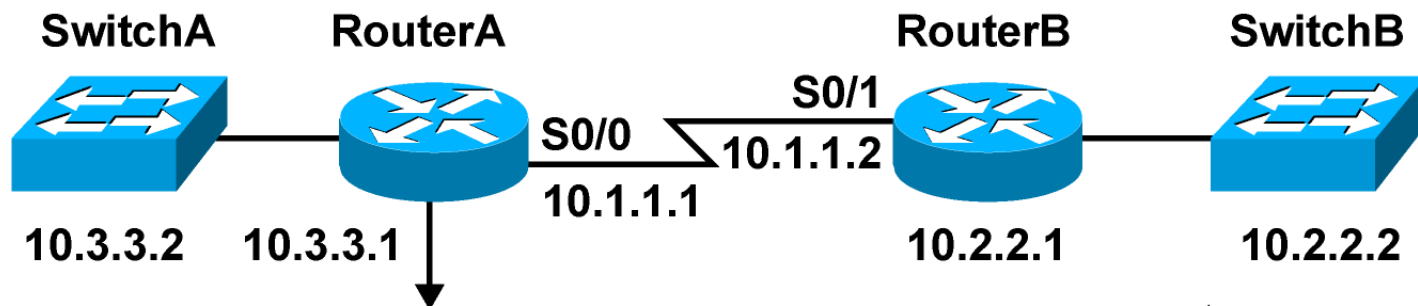
```
Denver>disconnect paris
```

Display sessions

```
Denver#show sessions  
Conn  Host      Address          Idle  Conn Name  
1     Paris    131.108.100.152  0    Paris  
2     Tokyo    126.102.57.63   0    Tokyo
```



Using Telnet to Connect to Remote Devices



```
RouterA#telnet 10.2.2.2  
Trying 10.2.2.2 ... Open
```

```
User Access Verification
```

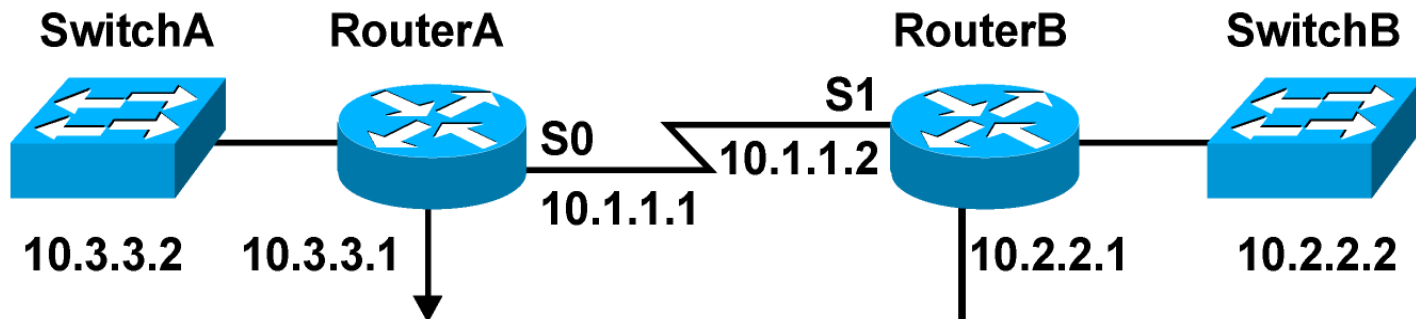
```
Password:
```

```
SwitchB>
```

Remote device

Telnet is used to check all the TCP/IP stack

Viewing Telnet Connections



```
RouterA#show sessions
```

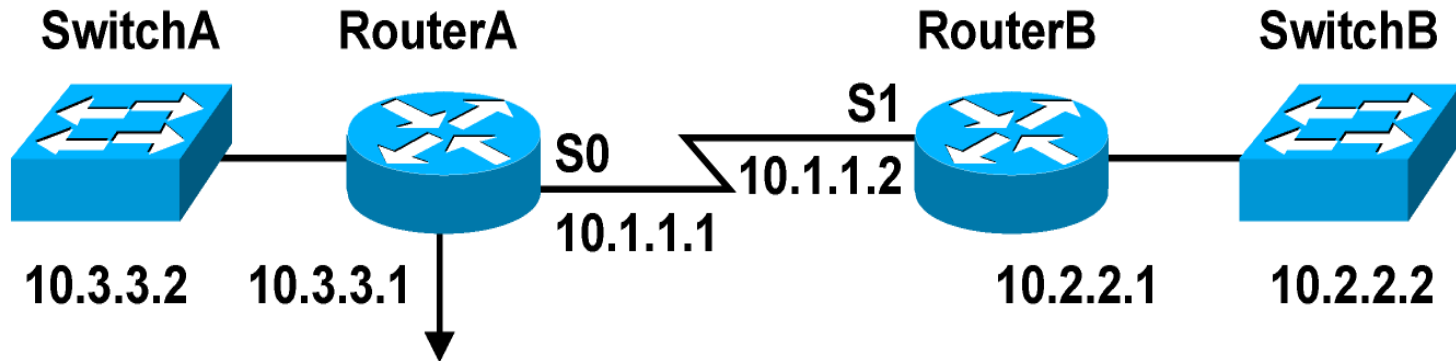
Conn	Host	Address	Byte	Idle	Conn Name
* 1	10.1.1.2	10.1.1.2	0	0	10.1.1.2

```
RouterB#show users
```

Line	User	Host(s)	Idle	Location
* 0 con 0		idle	1w0d	
11 vty 0		idle	00:00:09	10.1.1.1

0028F_270

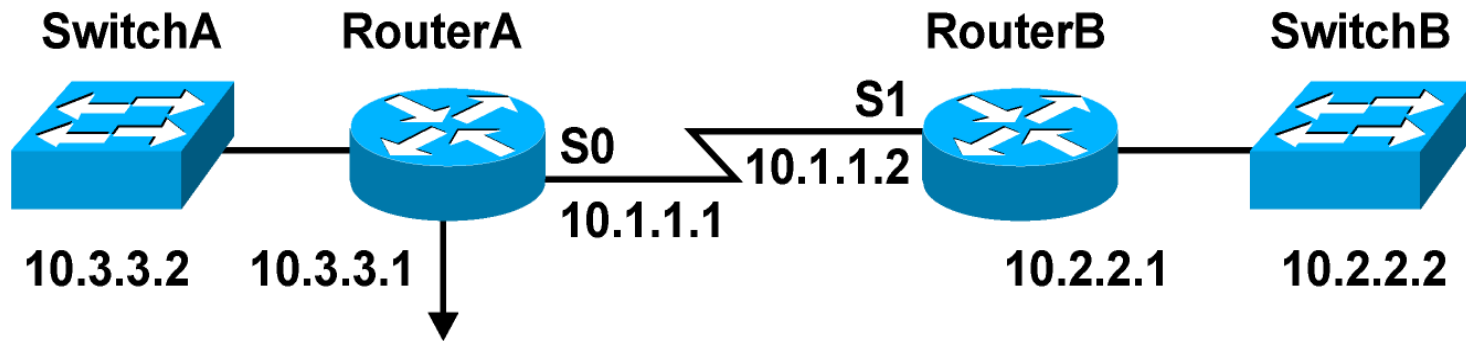
Suspending and Resuming a Telnet Session



```
RouterB#<Ctrl-Shift-6>x
RouterA#show sessions
Conn Host                Address                Byte  Idle Conn Name
*   1 10.1.1.2             10.1.1.2                0    1 10.1.1.2
RouterA#resume 1
RouterB#
```

022P_271

Closing a Telnet Session



```
RouterA#disconnect ← Closes the current session opened by you  
Closing connection to 10.3.3.2 [confirm]
```

```
RouterA#clear line 11 ← Closes a session opened by a remote device  
[confirm]  
[OK]
```

022P_272

Summary

1. Router Initialization.
2. Router Access
3. CLI First look
4. Basic configuration
5. Viewing, Saving and Erasing the Configurations
6. Discovering & testing the network
7. TELNET

