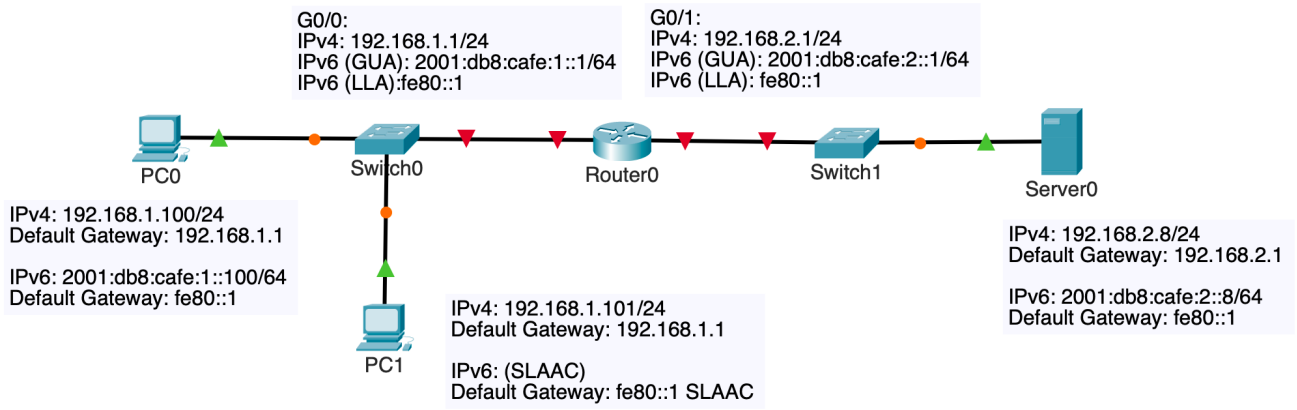
Lab - Configuring Cisco IOS

Topology



Objectives

Part 1: Introduction to IOS and Configuring the Switch

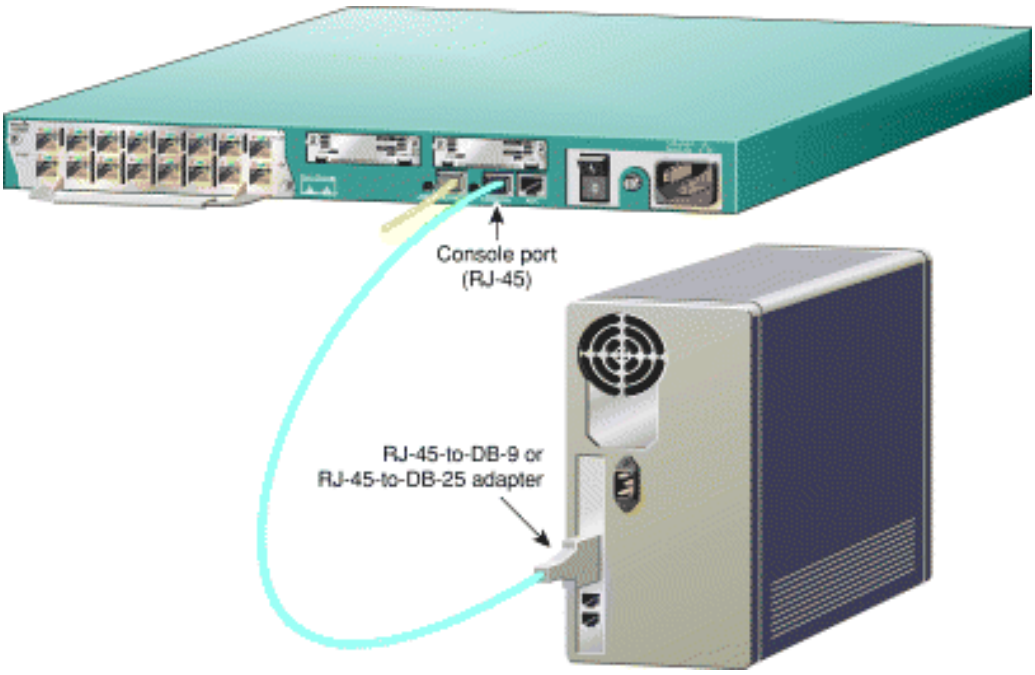
Part 2: Configuring the Router

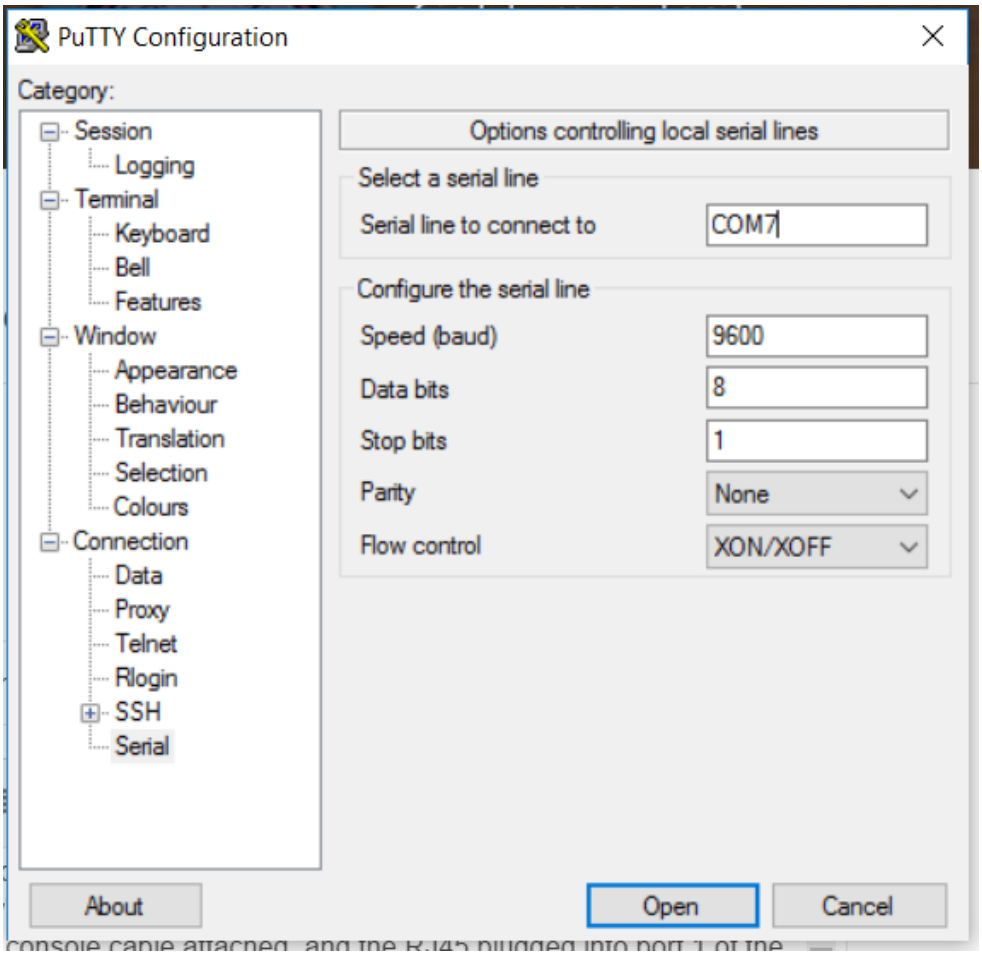
Part 3: Configuring PCs, Ping, Telnet

Part 4: Verify Reachability

Packet Tracer

- **Download**: Lab-1-Using-Cisco-IOS.pkt



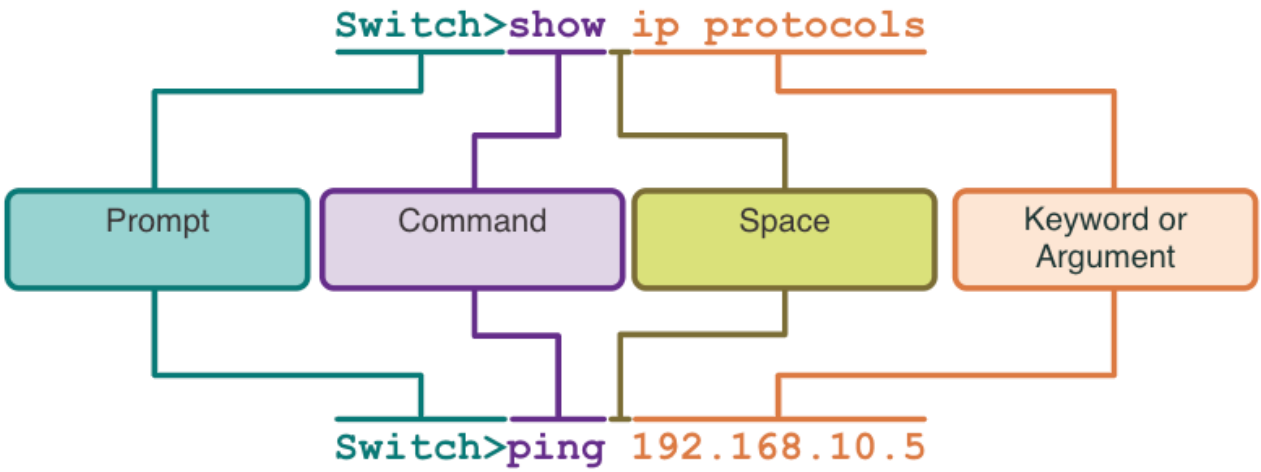

PuTTY Configuration
Category:
Session
Logging
Terminal
Keyboard
Bell
Features
Window
Appearance
Behaviour
Translation
Selection
Colours
Connection
Data
Proxy
Telnet
Rlogin
SSH
Serial
Options controlling local serial lines
Select a serial line
Serial line to connect to
COM7
Configure the serial line
Speed (baud)
9600
Data bits
8
Stop bits
1
Parity
None
Flow control
XON/XOFF
About
Open
Cancel

Part 1: Introduction to IOS and Configuring the Switch

Select Switch S1

User Mode

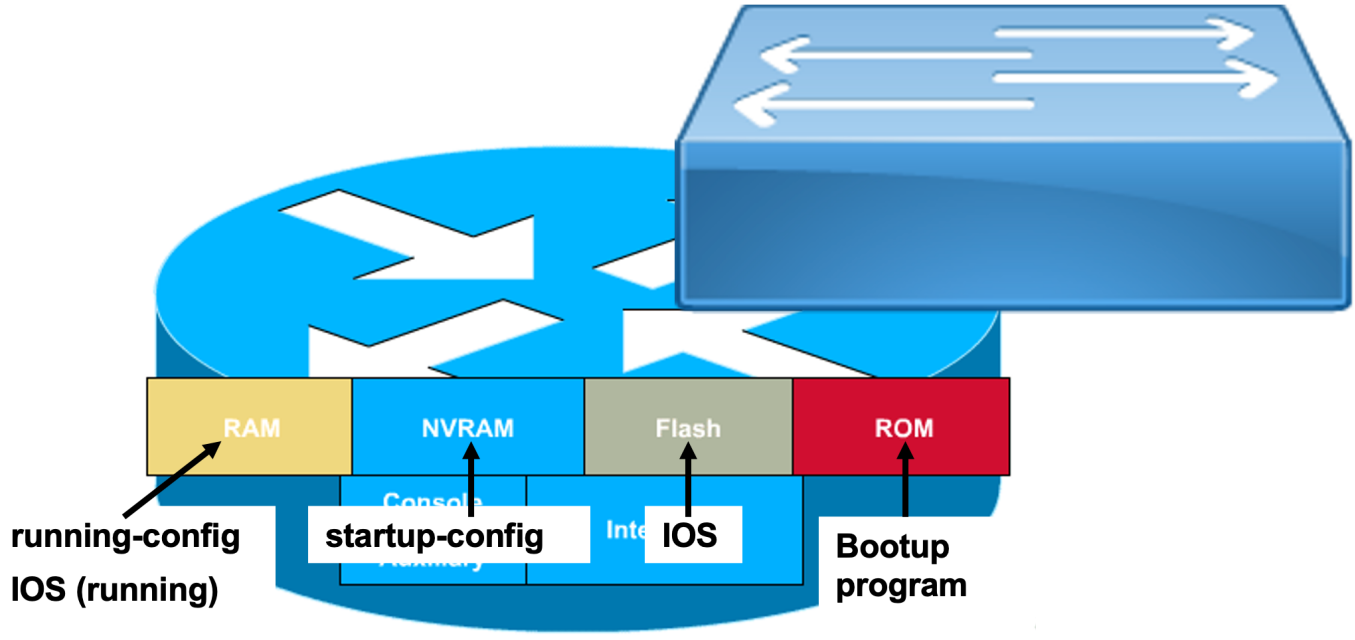
```
Switch> ?
Exec commands:
  access-enable     Create a temporary Access-List entry
  clear             Reset functions
  connect           Open a terminal connection
  <output omitted>
  tunnel            Open a tunnel connection
  where             List active connections

Options:
      a)    Press the Space Bar to scroll a "screen's worth" of more commands.
      b)    Press the Enter or Return key to scroll down just one line of the
      list.
      c)    Press any other key to halt the list output.


Switch> show ?
  aaa               Show AAA values
  arp               ARP table
  auto              Show Automation Template
  cca               CCA information
  class-map         Show QoS Class Map
  clock             Display the system clock
  cns               CNS agents
  <output omitted>
  vmps              VMPS version information
  vstack            Vstack show commands
  vtp               VTP information
  xsd-format        Show the ODM XSD for the command
```



```
Switch> show mac-add<tab>
Switch> show mac-address-table
Switch>show mac-address-table
      Mac Address Table
-------------------------------------------

Vlan    Mac Address    Type        Ports
----    -----------    --------    -----

Switch>
```

Privileged Exec Mode

```
Switch> enable
Switch#
Switch# ?
Exec commands:
  access-enable     Create a temporary Access-List entry
  access-template   Create a temporary Access-List entry
  archive           manage archive files
  beep              Blocks Extensible Exchange Protocol commands
<output omitted>

Switch# show running-config
Building configuration...

Current configuration : 1224 bytes
!
version 15.2
<output omitted>
```



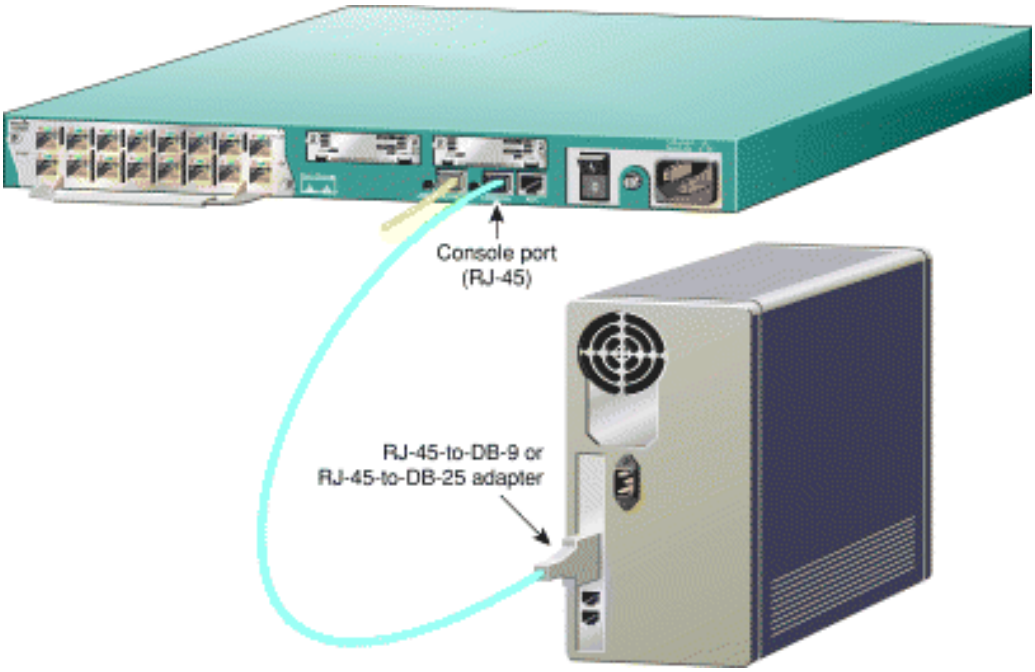
```
Switch# disable

Switch> show running-config
              ^
% Invalid input detected at '^' marker.

Switch> enable
Switch# show ?
  aaa                 Show AAA values
  access-lists        List access lists
  accounting          Accounting data for active sessions
  aliases             Display alias commands
  archive             Archive functions
<output omitted>

Switch# show clock
*00:18:34.812 UTC Mon Mar 1 1993
Switch# clock ?
  set  Set the time and date

Switch# clock set ?
  hh:mm:ss  Current Time

Switch# clock set 13:30:00 ?
  <1-31>  Day of the month
  MONTH   Month of the year

Switch# clock set 13:30:00 April 4 ?
  <1-31>  Day of the month

Switch# clock set 13:30:00 April 4 ?
  <1993-2035>  Year

Switch# clock set 13:30:00 April 4 2023 ?
  <cr>

Switch# clock set 13:30:00 April 4 2023
Switch#
*Mar 25 13:30:00.000: %SYS-6-CLOCKUPDATE: System clock has been updated from
00:20:42 UTC Mon Mar 1 1993 to 13:30:00 UTC Tue Apr 4 2023, configured from
console by console.
Switch#

Switch# show clock
13:30:07.079 UTC Tue Apr 4 2023
Switch#
```

Global Configuration Mode

```
Switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

Switch(config)#
Switch(config)# exit
Switch#
```

```
Switch# conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)# hostname S1
S1(config)#

S1(config)# no ip domain-lookup
```

Configuring the Console port




```
S1(config)# line console 0
S1(config-line)# logging synchronous
S1(config-line)# exec-timeout 0 0
S1(config-line)# password cisco
S1(config-line)# login
S1(config-line)# exit
```

Configuring the Banner Message Of The Day (motd)

```
S1(config)# banner motd $
Enter TEXT message. End with the character '$'.
########################################

      Authorized Access Only!

########################################
$

S1(config)#


S1(config)# exit
S1#
S1#exit
```

```
S1 con0 is now available

Press RETURN to get started.

########################################

   Authorized Access Only!

########################################

User Access Verification

Password: cisco
S1> ena

S1#
```

Copy the running-config (RAM) to startup-config (NVRAM)

```
S1# show running-config
Building configuration...

Current configuration : 1332 bytes
!
<output omitted>

S1# show startup-config
startup-config is not present  (Note: NetLab devices may have a startup-config)


S1# copy running-con<tab>
S1# copy running-config startup-<tab>
S1# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
0 bytes copied in 0.847 secs (0 bytes/sec)
S1#
S1#show startup-config
Using 1392 out of 65536 bytes
!
<output omitted>
```

Privileged Exec Password

```
S1#conf t
S1(config)#enable secret class
S1(config)#exit
S1#
S1#disable
S1>enable
Password: class
S1#
S1#show running-config
Building configuration...

Current configuration : 1439 bytes
!
<output omitted>
```

Configure an IP address to access the switch remotely

```
S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#
S1(config)# interface vlan 1
S1(config-if)# ip address 192.168.1.5 255.255.255.0
S1(config-if)# no shutdown
S1(config-if)# exit
S1(config)#
```

Configure Telnet (non-production networks only)

```
S1(config)# line vty 0 4
S1(config-line)# password cisco
S1(config-line)# transport input telnet
S1(config-line)# login
S1(config-line)# end
S1#
```

```
S1#show running-config
Building configuration...

Current configuration : 1489 bytes
!
<output omitted>
!
line con 0
 password cisco
 logging synchronous
 login
line vty 0 4
 password cisco
 login
line vty 5 15
 login
!
end
```

Encrypt passwords in running-config

```
S1#conf t
S1(config)# service password-encryption
S1(config)# exit
S1#

S1#show running-config
Building configuration...

Current configuration : 1504 bytes
!
<output omitted>
!
line con 0
 password 7 01100F175804
 logging synchronous
 login
line vty 0 4
 password 7 01100F175804
 login
line vty 5 15
 login
!
end

S1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
0 bytes copied in 0.872 secs (0 bytes/sec)
S1#
```

Part 2: Configuring the Router

Select Router R1

Similar to the switch, configure the following:

- **hostname R1**
- **no ip domain-lookup**
- Console 0 **logging synchronous** and **exec-timeout 0 0**
- Console 0 password of ***cisco***
- Telnet password of ***cisco***
- Privileged password of ***class***

Configure GigabitEthernet 0/0 interface

```
R1# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES NVRAM  administratively down down
GigabitEthernet0/1     unassigned      YES NVRAM  administratively down down
GigabitEthernet0/2     unassigned      YES NVRAM  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R1#


R1(config)# inter<tab>
R1(config)# interface gi<tab>
R1(config)# interface gigabitEthernet 0/0
R1(config-if)# ip address 192.168.1.1 255.255.255.0
R1(config-if)# ipv6 address 2001:db8:cafe:1::1/64
R1(config-if)# ipv6 address fe80::1 link-local
R1(config-if)# no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state
to up

R1(config-if)# exit
R1(config)#

R1(config)# inter g 0/1
R1(config-if)# ip add 192.168.2.1 255.255.255.0
R1(config-if)# ipv6 add 2001:db8:cafe:2::1/64
R1(config-if)# ipv6 add fe80::1 link-local
R1(config-if)# no shutdown

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state
to up

R1(config-if)# end
R1#
```

Verify IP addressing on the Router

```
R1# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     192.168.1.1     YES manual up                    up
GigabitEthernet0/1     192.168.2.1     YES manual up                    up
GigabitEthernet0/2     unassigned      YES NVRAM  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R1#


R1# show ipv6 interface brief
GigabitEthernet0/0 [up/up]
FE80::1
2001:DB8:CAFE:1::1
GigabitEthernet0/1 [up/up]
FE80::1
2001:DB8:CAFE:2::1
GigabitEthernet0/2 [administratively down/down]
unassigned
Vlan1 [administratively down/down]
unassigned
R1#
```

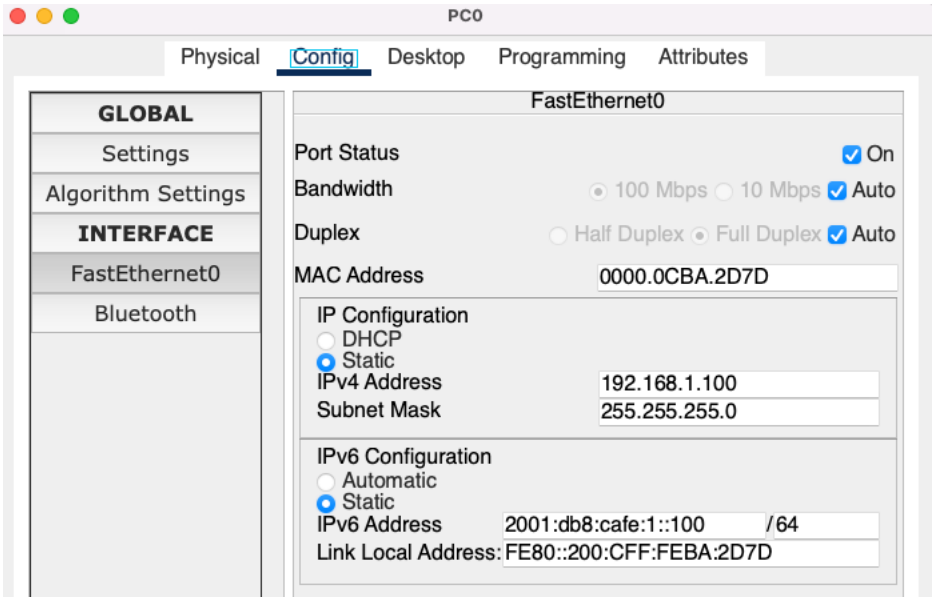
Enable R1 as an IPv6 router

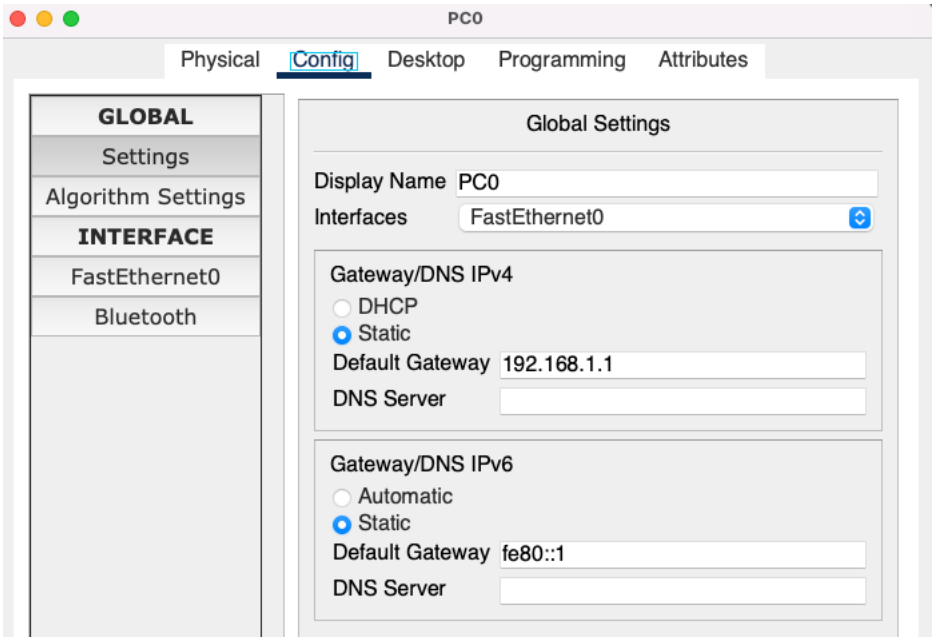
```
R1(config)# ipv6 unicast-routing

R1# copy run start
Destination filename [startup-config]?
Building configuration...
[OK]
R1#
```

Part 3: Configuring PCs, Ping, Telnet

Select PC0

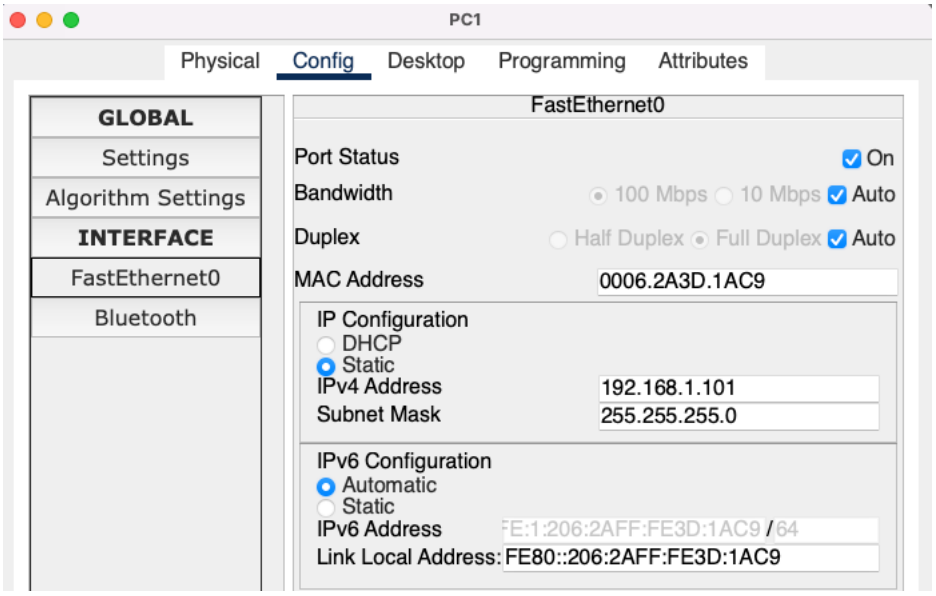
Configuring IPv4 and IPv6 address information

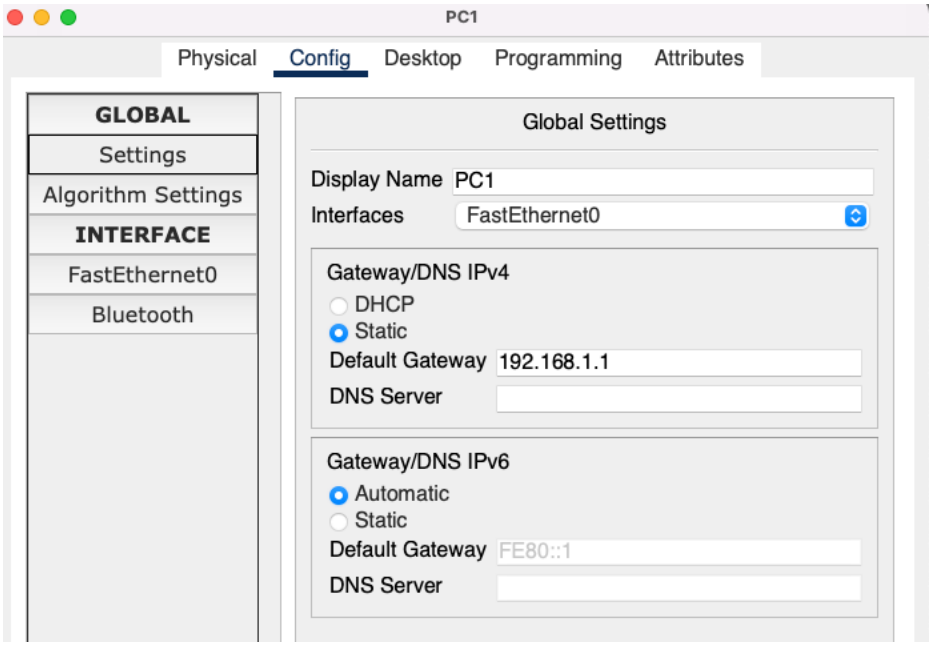




Select PC1

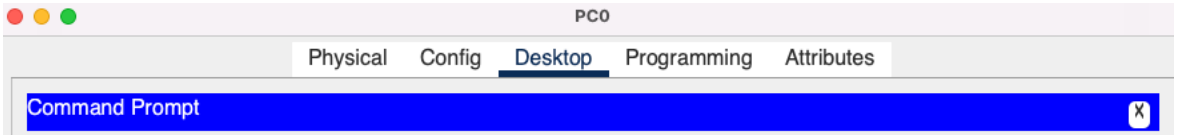
Configuring IPv4 and IPv6 address information



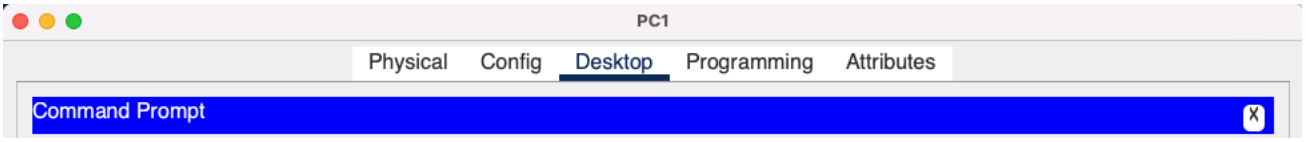


Verifying the IP address information

```
IPv4: Statically configured
IPv6: Statically configured
```



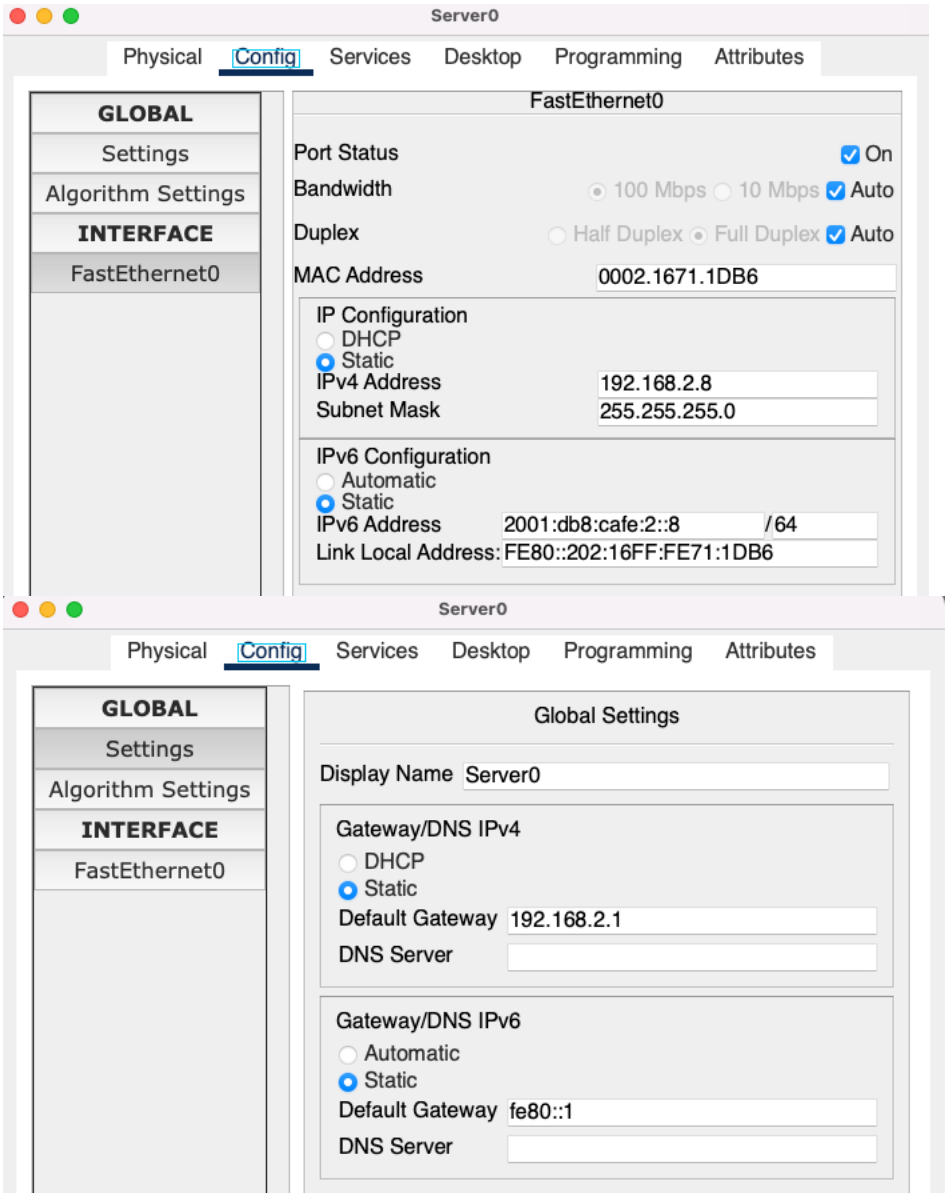

```
C:\>ipconfig

FastEthernet0 Connection:(default port)

Connection-specific DNS Suffix..:
Link-local IPv6 Address.....: FE80::200:CFF:FEBA:2D7D
IPv6 Address.....: 2001:DB8:CAFE:1::100
IPv4 Address.....: 192.168.1.100
Subnet Mask.....: 255.255.255.0
Default Gateway.....: FE80::1
                      192.168.1.1

IPv4: Statically configured
IPv6: SLAAC (Stateless Address Autoconfiguration)
```




```
C:\>ipconfig

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::206:2AFF:FE3D:1AC9
   IPv6 Address.....: 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9
   IPv4 Address.....: 192.168.1.101
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: FE80::1
                         192.168.1.1
```

Select Server0

Configuring IPv4 and IPv6 address information



Part 4: Verify Reachability

Note: Switch1 – No configuration. Performs layer 2 functions, just not manageable.

Verifying IPv4 Reachability

Select PC0

```
C:\> ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128
Reply from 192.168.1.101: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\> ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\> ping 192.168.2.8

Pinging 192.168.2.8 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.8: bytes=32 time=3ms TTL=127
Reply from 192.168.2.8: bytes=32 time<1ms TTL=127
Reply from 192.168.2.8: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.2.8:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>
```

Verifying IPv6 Reachability

Select PC0

```
C:\>ping 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9

Pinging 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9 with 32 bytes of data:

Reply from 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9: bytes=32 time=18ms TTL=128
Reply from 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9: bytes=32 time=10ms TTL=128
Reply from 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9: bytes=32 time=10ms TTL=128
Reply from 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9: bytes=32 time=9ms TTL=128

Ping statistics for 2001:DB8:CAFE:1:206:2AFF:FE3D:1AC9:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 9ms, Maximum = 18ms, Average = 11ms

C:\>
C:\>ping fe80::1

Pinging fe80::1 with 32 bytes of data:

Reply from FE80::1: bytes=32 time<1ms TTL=255
Reply from FE80::1: bytes=32 time<1ms TTL=255
Reply from FE80::1: bytes=32 time<1ms TTL=255
Reply from FE80::1: bytes=32 time<1ms TTL=255

Ping statistics for FE80::1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
C:\>ping 2001:db8:cafe:2::8

Pinging 2001:db8:cafe:2::8 with 32 bytes of data:

Reply from 2001:DB8:CAFE:2::8: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:CAFE:2::8: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:CAFE:2::8: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:CAFE:2::8: bytes=32 time<1ms TTL=127

Ping statistics for 2001:DB8:CAFE:2::8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Telnet to the switch

```
C:\>telnet 192.168.1.5
Trying 192.168.1.5 ...Open
########################################

     Authorized Access Only!

########################################



User Access Verification

Password:
S1>enable
Password:
S1#
S1#show ?
  aaa                 Show AAA values
  access-lists        List access lists
  arp                 Arp table
  boot                show boot attributes
  cdp                 CDP information
  clock               Display the system clock
  crypto              Encryption module
<output omitted>
  spanning-tree       Spanning tree topology
  ssh                 Status of SSH server connections
  startup-config      Contents of startup configuration
  storm-control       Show storm control configuration
  tcp                 Status of TCP connections
  tech-support        Show system information for Tech-Support
  terminal            Display terminal configuration parameters
  users               Display information about terminal lines
  version             System hardware and software status
  vlan                VTP VLAN status
  vtp                 VTP information
S1# exit

[Connection to 192.168.1.5 closed by foreign host]
C:\>
```

Grading Matrix (30 points)

30 Points Total
13 points 17 points

S1# **show run**	R1# **show run**
1 point service password-encryption	1 point hostname R1
1 point hostname S1	1 point enable secret 5 1mERr$9cTjUIEqNGurQiFU.ZeCi1
1 point enable secret 5 1mERr$9cTjUIEqNGurQiFU.ZeCi1	1 point ipv6 unicast-routing
1 point no ip domain-lookup	1 point no ip domain-lookup
1 point interface Vlan1 ip address 192.168.1.5 255.255.255.0	3 points interface GigabitEthernet0/0 ip address 192.168.1.1 255.255.255.0 ipv6 address FE80::1 link-local ipv6 address 2001:DB8:CAFE:1::1/64
1 point banner motd ^C ## Authorized Access Only! ## ^C	3 points interface GigabitEthernet0/1 ip address 192.168.2.1 255.255.255.0 ipv6 address FE80::1 link-local ipv6 address 2001:DB8:CAFE:2::1/64
4 points (1 point each) line con 0 password 7 0822455D0A16 logging synchronous login exec-timeout 0 0	4 points line con 0 exec-timeout 0 0 password cisco logging synchronous login
3 points (1 point each) line vty 0 4 password 7 0822455D0A16 login transport input telnet	3 points line vty 0 4 password cisco login transport input telnet