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PT Lab – Basic Static Route Configuration Solutions

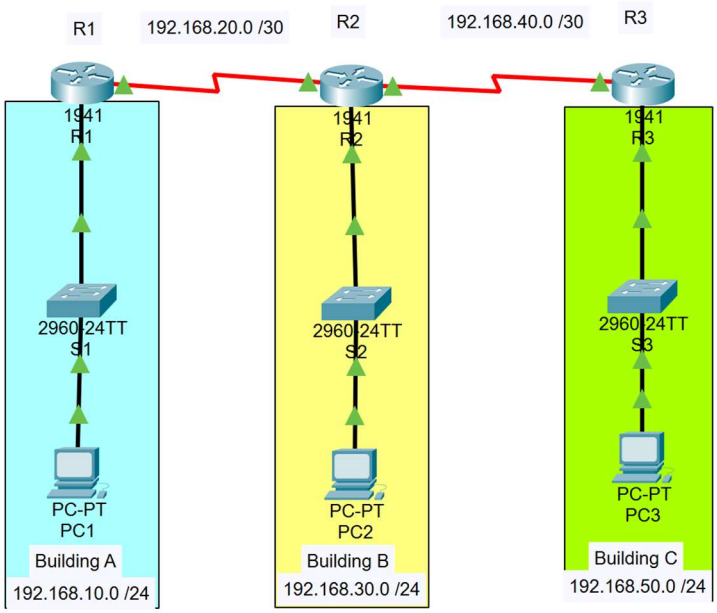
BACKGROUND

What is the difference between a router and a switch? A switch works at Layer 2, or ethernet frames. A switch uses MAC addresses to get frames where they need to go. However, a switch can only send information to devices on the same local-area network. For example, a device with a 192.168.10.1 IP address can communicate with a second device with an IP address of 192.168.10.2. That's great for Halo LAN parties! But not so great for the internet…

So, how is information sent between different networks? That's where routers come in! Routers work at Layer 3, or IP addresses. A router's primary purposes are to route, and to forward information to other networks. One way to do this is to configure static routes on a router. A static route is just that, it is a route that does not change. This lab aims to show how static routes can be configured, and the basic idea behind routing.

The picture below shows a basic idea for routing. Without routing, devices on different LANs would not be able to communicate with each other.

Building A = 192.168.10.0 /24 network.
Building B = 192.168.30.0 /24 network
Building C = 192.168.50.0/24 network



ADDRESSING TABLE

Use the below addresses to help get started.

DEVICE	INTERFACE	IP ADDRESS / VLAN	SUBNET MASK
PC1	NIC	192.168.10.2	255.255.255.0
PC2	NIC	192.168.30.2	255.255.255.0
PC3	NIC	192.168.50.2	255.255.255.0
R1	G0/0	192.168.10.1	255.255.255.0
R1	S0/0/0	192.168.20.1	255.255.255.252
R2	G0/0	192.168.30.1	255.255.255.0
R2	S0/0/0	192.168.20.2	255.255.255.252
R2	S0/0/1	192.168.40.1	255.255.255.252
R3	G0/0	192.168.50.1	255.255.255.0
R3	S0/0/1	192.168.40.2	255.255.255.252

The switch connections between the router and PC can be connected to any ports on the switch.

OBJECTIVES

- Configure R1, R2, and R3 with basic configurations
  - Add hostnames to the routers
  - Enable password encryption
  - Configure no IP domain lookups
  - Configure an enable password [Password: Cisco]
  - Configure a console password [Password: Cisco]
  - Add synchronous logging to the console
  - Configure a VTY password [Password: Cisco]
  - Add synchronous logging to the VTY lines

R1 Configuration
enable
config t
hostname R1
no ip domain-lookup
service password encryption
enable secret Cisco
line con 0
logging synchronous
password Cisco
login
line vty 0 15
password Cisco
login

R2 Configuration
enable
config t
hostname R2
no ip domain-lookup
service password encryption
enable secret Cisco
line con 0
logging synchronous
password Cisco
login
line vty 0 15
password Cisco
login

R3 Configuration
enable
config t
hostname R3
no ip domain-lookup
service password encryption
enable secret Cisco
line con 0
logging synchronous
password Cisco
login
line vty 0 15
password Cisco
login

exit exit exit

- Configure R1 with static routes to reach other networks
  - Configure R1 with a static route to reach the 192.168.30.0 /24 network
  - Configure R1 with a static route to reach the 192.168.40.0 /24 network
  - Configure R1 with a static route to reach the 192.168.50.0 /24 network

```
ip routing
ip route 192.168.30.0 255.255.255.0 s0/0/0
ip route 192.168.40.0 255.255.255.0 s0/0/0
ip route 192.168.50.0 255.255.255.0 s0/0/0
```

- Configure R1 – G0/0 interface
  - Add a description to the interface [Description: Link to Floor 1]
  - Configure an interface IP address [IP Address: See above table – this will be the default gateway for PC1]
  - Turn on the interface

```
int g0/0
description Link to Floor 1
ip address 192.168.10.1 255.255.255.0
no shutdown
```

- Configure R1 – S0/0/0 interface
  - Add a description to the interface [Description: Link to Building B]
  - Configure an interface IP address [IP Address: See above table]
  - Configure a clock rate for the DCE-Serial Connection [Clock Rate: 56000]
  - Turn on the interface

```
int s0/0/0
description Link to Building B
ip address 192.168.20.1 255.255.255.252
clock rate 56000
no shutdown
exit
do copy running-config startup-config
```

- Configure R2 with static routes to reach other networks
  - Configure R2 with a static route to reach the 192.168.10.0 /24 network
  - Configure R2 with a static route to reach the 192.168.50.0 /24 network

```
ip routing
ip route 192.168.10.0 255.255.255.0 s0/0/0
ip route 192.168.50.0 255.255.255.0 s0/0/1
```

- Configure R2 – G0/0 interface
  - Add a description to the interface [Description: Link to Floor 1]
  - Configure an interface IP address [IP Address: See above table – this will be the default gateway for PC2]
  - Turn on the interface

```
int g0/0
description Link to Floor 1
ip address 192.168.30.1 255.255.255.0
no shutdown
```

- Configure R2 – S0/0/0 interface
  - Add a description to the interface [Description: Link to Building A]
  - Configure an interface IP address [IP Address: See above table]
  - Turn on the interface

```
int s0/0/0
description Link to Building A
ip address 192.168.20.2 255.255.255.252
clock rate 56000
no shutdown
exit
```

- Configure R2 – S0/0/1 interface
  - Add a description to the interface [Description: Link to Building C]
  - Configure an interface IP address [IP Address: See above table]
  - Turn on the interface

```
int s0/0/1
description Link to Building C
ip address 192.168.40.1 255.255.255.252
no shutdown
exit
do copy running-config startup-config
```

- Configure R3 with static routes to reach other networks
  - Configure R3 with a static route to reach the 192.168.10.0 /24 network
  - Configure R3 with a static route to reach the 192.168.20.0 /24 network
  - Configure R3 with a static route to reach the 192.168.30.0 /24 network

```
ip routing
ip route 192.168.10.0 255.255.255.0 s0/0/1
ip route 192.168.20.0 255.255.255.0 s0/0/1
ip route 192.168.30.0 255.255.255.0 s0/0/1
```

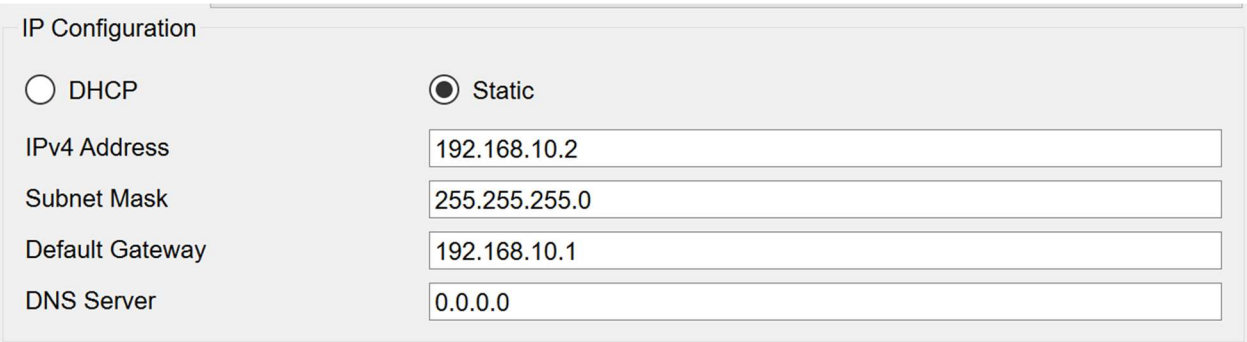
- Configure R3 – G0/0 interface
  - Add a description to the interface [Description: Link to Floor 1]
  - Configure an interface IP address [IP Address: See above table – this will be the default gateway for PC3]
  - Turn on the interface

```
int g0/0
description Link to Floor 1
ip address 192.168.50.1 255.255.255.0
no shutdown
```

- Configure R3 – S0/0/1 interface
  - Add a description to the interface [Description: Link to Building B]
  - Configure an interface IP address [IP Address: See above table]
  - Configure a clock rate for the DCE-Serial Connection [Clock Rate: 56000]
  - Turn on the interface

```
int s0/0/1
description Link to Building B
ip address 192.168.40.2 255.255.255.252
clock rate 56000
no shutdown
exit
do copy running-config startup-config
```

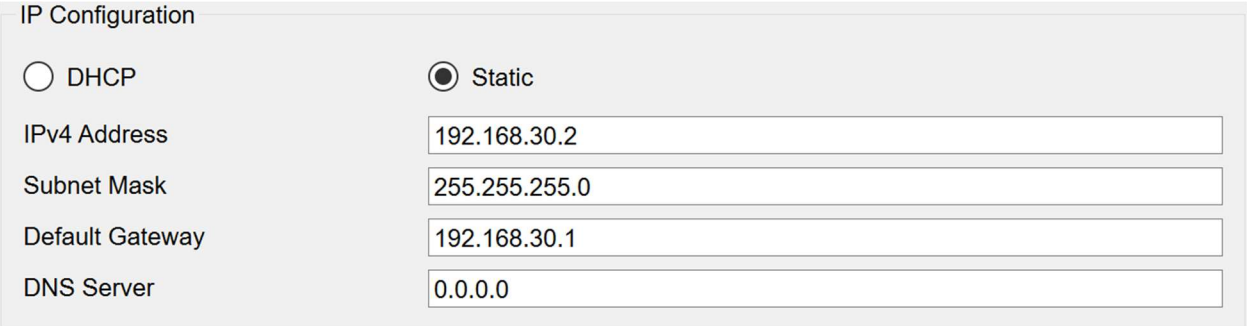
- Configure the PCs with the correct IP address configurations
  - PC1
    - IP Address: 192.168.10.2
    - Subnet Mask: 255.255.255.0
    - Default Gateway: 192.168.10.1



PC1 Configuration

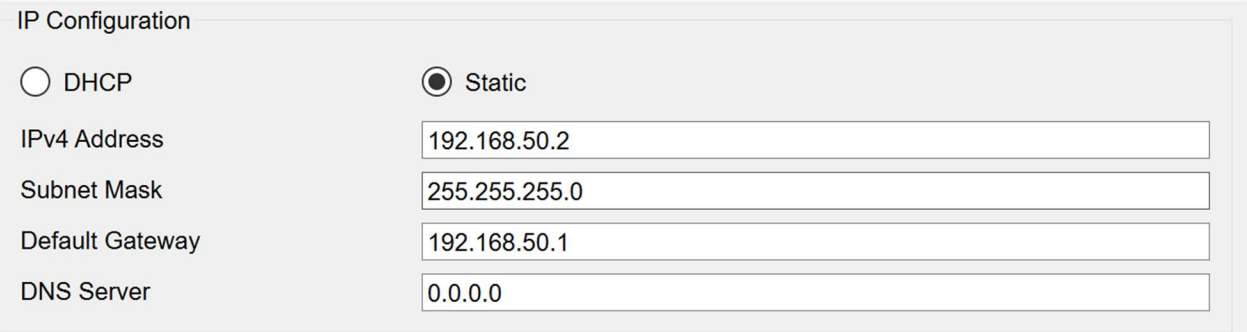
  - PC2
    - IP Address: 192.168.30.2
    - Subnet Mask: 255.255.255.0

- Default Gateway: 192.168.30.1



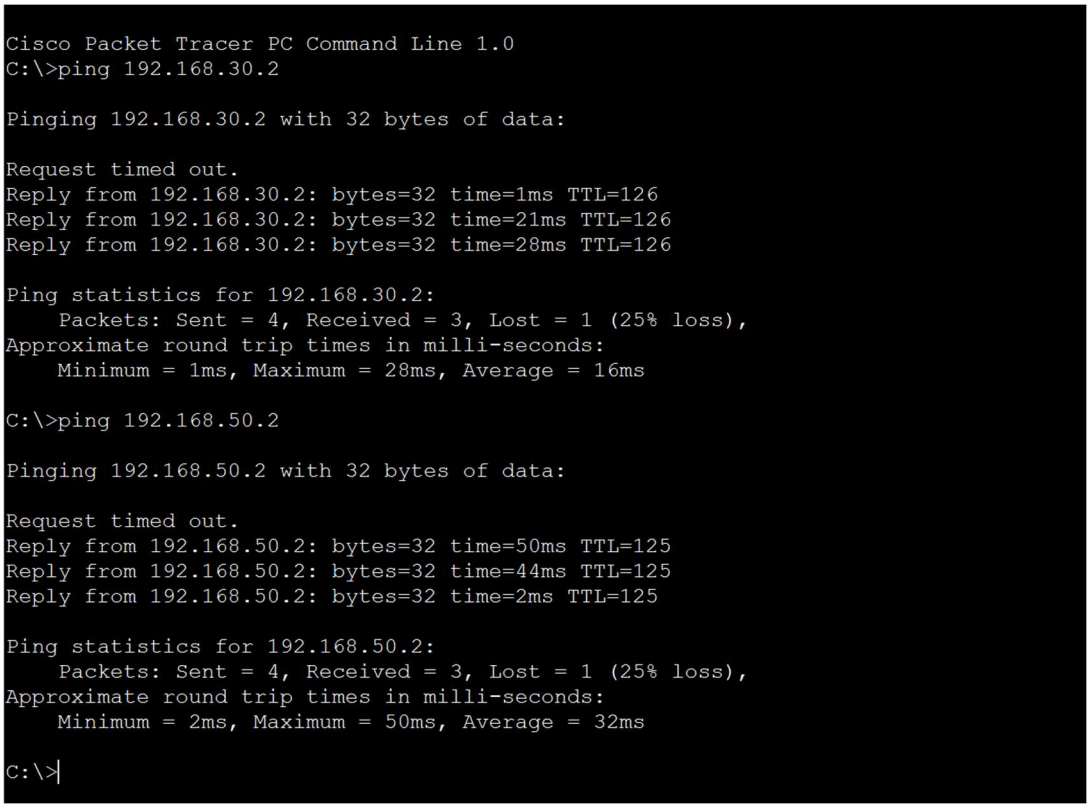
PC2 Configuration

- PC3
  - IP Address: 192.168.50.1
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.50.1



PC3 Configuration

- Test PC Connectivity



PC1 – Testing Connectivity to PC2 and PC3

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=31ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=27ms TTL=126

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 31ms, Average = 15ms

C:\>ping 192.168.50.2

Pinging 192.168.50.2 with 32 bytes of data:

Reply from 192.168.50.2: bytes=32 time=30ms TTL=126
Reply from 192.168.50.2: bytes=32 time=38ms TTL=126
Reply from 192.168.50.2: bytes=32 time=1ms TTL=126
Reply from 192.168.50.2: bytes=32 time=29ms TTL=126

Ping statistics for 192.168.50.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 38ms, Average = 24ms

C:\>
```

PC2 – Testing Connectivity to PC1 and PC3

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Reply from 192.168.10.2: bytes=32 time=2ms TTL=125
Reply from 192.168.10.2: bytes=32 time=2ms TTL=125
Reply from 192.168.10.2: bytes=32 time=50ms TTL=125
Reply from 192.168.10.2: bytes=32 time=49ms TTL=125

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 50ms, Average = 25ms

C:\>ping 192.168.30.2

Pinging 192.168.30.2 with 32 bytes of data:

Reply from 192.168.30.2: bytes=32 time=30ms TTL=126
Reply from 192.168.30.2: bytes=32 time=27ms TTL=126
Reply from 192.168.30.2: bytes=32 time=1ms TTL=126
Reply from 192.168.30.2: bytes=32 time=31ms TTL=126

Ping statistics for 192.168.30.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 31ms, Average = 22ms

C:\>
```

PC3 – Testing Connectivity to PC1 and PC2