1.1 – ENSA – Training - PacketKnows – Configuring IPv4 Static and Default Routes

Addressing Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.31.1.1	255.255.255.128	N/A
	S0/0	172.31.1.194	255.255.255.252	N/A
R2	Fa0/0	172.31.0.1	255.255.255.0	N/A
	S0/0	172.31.1.193	255.255.255.252	N/A
	S0/1	172.31.1.197	255.255.255.252	N/A
R3	Fa0/0	172.31.1.129	255.255.255.192	N/A
	S0/0	172.31.1.198	255.255.255.252	N/A
PC1	E0	172.31.1.126	255.255.255.128	172.31.1.1
PC2	E0	172.31.0.254	255.255.255.0	172.31.0.1
PC3	E0	172.31.1.190	255.255.255.192	172.31.1.129

Objectives

- **Part 1: Examine the Network and Evaluate the Need for Static Routing**
- **Part 2: Configure Static and Default Routes**
- **Part 3: Verify Connectivity**

NOTE

- **Power all the devices first by clicking the triangle button on the upper navbar.**
- **Right click the device then click the web console first to configure on the device**
- **Always type "save" when configuring IP addresses of PC's**

Background

In this activity, you will configure static and default routes. A static route is a route that is entered manually by the network administrator to create a reliable and safe route. There are four different static routes that are used in this activity: a recursive static route, a directly attached static route, a fully specified static route, and a default route.

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Part 1: Configure Static and Default Routes

Step 1: Configure recursive static routes on R1.

a. Configure a recursive static route to every network not directly connected to R1, including the WAN link between R2 and R3.

ip route 172.31.0.0 255.255.255.0 172.31.1.193

ip route 172.31.1.196 255.255.255.252 172.31.1.193

ip route 172.31.1.128 255.255.255.192 172.31.1.193

Step 2: Configure directly attached static routes on R2.

a. How does a directly attached static route differ from a recursive static route?
A directly attached static route relies on its exit interface in order for packets to be sent to its destination, while a recursive static route uses the IP address of the next hop router.

b. Configure a directly attached static route from R2 to every network not directly connected.

ip route 172.31.1.0 255.255.255.128 Serial0/0

ip route 172.31.1.128 255.255.255.192 Serial0/1

c. Which command only displays directly connected networks?

show ip route connected

d. Which command only displays the static routes listed in the routing table?

show ip route static

e. When viewing the entire routing table, how can you distinguish between a directly attached static route and a directly connected network?
The static route has an S and a directly connected network has a C.

Step 3: Configure a default route on R3.

a. How does a default route differ from a regular static route?
A default route, also known as the gateway of last resort, is the network route used by a router when no other known route exists for a destination network. A static route is used to route traffic to a specific network.

b. Configure a default route on R3 so that every network not directly connected is reachable.

ip route 0.0.0.0 0.0.0.0 Serial0/1

c. How is a static route displayed in the routing table?
S* 0.0.0.0/0

Step 4: Document the commands for fully specified routes.

Note: Packet Tracer does not currently support configuring fully specified static routes. Therefore, in this step, document the configuration for fully specified routes.

a. Explain a fully specified route.
A fully specified route is a static route that is configured with an exit interface and the next hop address.

b. Which command provides a fully specified static route from R3 to the R2 LAN?

R3(config)# ip route 172.31.0.0 255.255.255.0 s1/0 172.31.1.197

c. Write a fully specified route from R3 to the network between R2 and R1. Do not configure the route; just calculate it.

R3(config)# ip route 172.31.1.192 255.255.255.252 s1/0 172.31.1.197

d. Write a fully specified static route from R3 to the R1 LAN. Do not configure the route; just calculate it.

R3(config)# ip route 172.31.1.0 255.255.255.128 s1/0 172.31.1.197

Step 5: Verify static route configurations.

Use the appropriate **show** commands to verify correct configurations.

Which show commands can you use to verify that the static routes are configured correctly?

show ip route, show ip route static, and the show ip route [network] commands

Part 3: Verify Connectivity

Every device should now be able to ping every other device. If not, review your static and default route configurations.

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R1 configuration:

R1#Configure Terminal

R1(config)#ip route 172.31.0.0 255.255.255.0
172.31.1.193

R1(config)#ip route 172.31.1.196 255.255.255.252
172.31.1.193

R1(config)#ip route 172.31.1.128 255.255.255.192
172.31.1.193

R1(config)#end

R1#copy running-config startup-config


ip route 172.31.0.0 255.255.255.0 172.31.1.193

ip route 172.31.1.196 255.255.255.252 172.31.1.193

ip route 172.31.1.128 255.255.255.192 172.31.1.193

end

copy running-config startup-config


interface FastEthernet0/0

ip address 172.31.1.1 255.255.255.128

no shutdown


interface Serial0/0

ip address 172.31.1.194 255.255.255.252

no shutdown
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R2 configuration:

R2#Configure Terminal

R2(config)#ip route 172.31.1.0 255.255.255.128
Serial0/0

R2(config)#ip route 172.31.1.128 255.255.255.192
Serial0/1

R2(config)#end

R2#copy running-config startup-config



interface FastEthernet0/0

ip address 172.31.0.1 255.255.255.0

no shutdown



interface Serial0/0

ip address 172.31.1.193 255.255.255.252

no shutdown



interface Serial0/1

ip address 172.31.1.197 255.255.255.252

no shutdown
```

```
R3 configuration:

R1#Configure Termina0

R3(config)#ip route 0.0.0.0 0.0.0.0 Serial0/0
```

```
R3(config)#ip route 172.31.0.0 255.255.255.0 s0/0
172.31.1.197

R3(config)#ip route 172.31.1.192 255.255.255.252 s0/0
172.31.1.197

R3(config)#ip route 172.31.1.0 255.255.255.128 s0/0
172.31.1.197

R1(config)#end

R1#copy running-config startup-config




interface FastEthernet0/0

ip address 172.31.1.129 255.255.255.192

no shutdown


interface Serial0/0

ip address 172.31.1.198 255.255.255.252

no shutdown
```