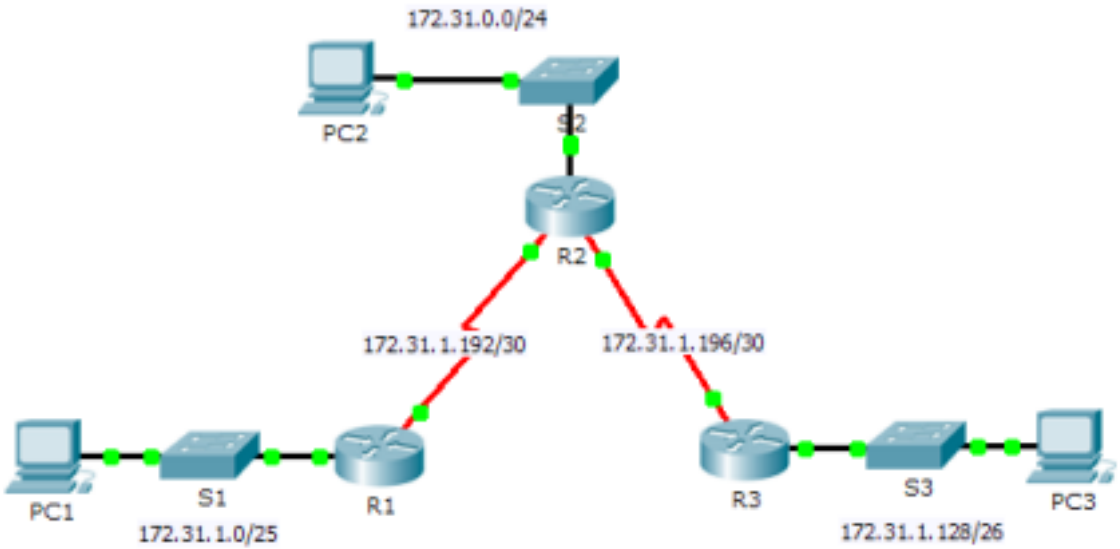
Packet Tracer - Configuring IPv4 Static and Default Routes

Topology



Addressing Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
R1	G0/0	172.31.1.1	255.255.255.128	N/A
	S0/0/0	172.31.1.194	255.255.255.252	N/A
R2	G0/0	172.31.0.1	255.255.255.0	N/A
	S0/0/0	172.31.1.193	255.255.255.252	N/A
	S0/0/1	172.31.1.197	255.255.255.252	N/A
R3	G0/0	172.31.1.129	255.255.255.192	N/A
	S0/0/1	172.31.1.198	255.255.255.252	N/A
PC1	NIC	172.31.1.126	255.255.255.128	172.31.1.1
PC2	NIC	172.31.0.254	255.255.255.0	172.31.0.1
PC3	NIC	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

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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.

Part 1: Examine the Network and Evaluate the Need for Static Routing a.

Looking at the topology diagram, how many networks are there in total?

ANSWER: 5

b. How many networks are directly connected to R1, R2, and R3?

R1 is connected to 2 networks.R2 is connected to 3 networks and R3 is connected to 2 networks.

c. How many static routes are required by each router to reach networks that are not directly connected?

R1 needs to set up 3 static routes.

R2 needs to set up 2 static routes.

R3 needs to set up 3 static routeS.

d. Test connectivity to the R2 and R3 LANs by pinging PC2 and PC3 from PC1.

Why were you unsuccessful?

It was unsuccessful because the PCs were not configured properly.

Part 2: Configure Static and Default Routes

Step 1: Configure recursive static routes on R1.

a. What is the recursive static route?

The destination network and next hop of a recursive static route are frequently covered by another route.

b. Why does a recursive static route require two routing table lookups?

The recursive static route requires two routing table look lookups because first, it needs to look for the destination network in the routing table then it will loop up for the exit interface for the next-hop router

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

d. Test connectivity to the R2 LAN and ping the IP addresses of PC2 and PC3.

Why were you unsuccessful?

It failed because R1 has to route both R2 and R3, whereas R3 does not have to route back to R2 and R1.

Step 2: Configure directly attached static routes on R2.

a. How does a directly attached static route differ from a recursive static route?

Recursive static routes mainly use next hop router IP address. On the other hand, a directly attached static route relies on its exit interface which is to be sent to its destination.

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

ANSWER: show IP route static show

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

While viewing the entire routing table to distinguish directly attached static route and directly connected network - Static route has a S and directly connected network has C letter.

Step 3: Configure a default route on R3.

a. How does a default route differ from a regular static route?

Packets sent to an unknown destination are sent to a single next-hop address using the default route, whereas packets sent to any known destination are sent to a single next-hop address using the standard static route.

b. Configure a default route on R3 so that every network not directly connected is reachable. c. How is a static route displayed in the routing table?

The static route are displayed using S*

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.

It's a type of static route that has a next-hop address and an exit interface specified.

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

IP route - 172.31.0.0 255.255.255.0 s0/0/1 172.31.1.197

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

IP route - 172.31.1.192 255.255.255.252 s0/0/1 172.31.1.197

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

IP route - 172.31.1.0 255.255.255.128 s0/0/1 172.31.1.197

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?

1. Show IP route,2. Show IP route static

Part 3: Verify Connectivity

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

Suggested Scoring Rubric

Activity Section	Question Location	Possible Points	Earned Points
Part 1: Examine the Network and Evaluate the Need for Static Routing	a - d	10	
	Part 1 Total	**10**	
Part 2: Configure Static and Default Routes	Step 1	7	
	Step 2	7	
	Step 3	3	
	Step 4	10	
	Step 5	3	
	Part 2 Total	**30**	
	Packet Tracer Score	**60**	
	Total Score	**100**	

