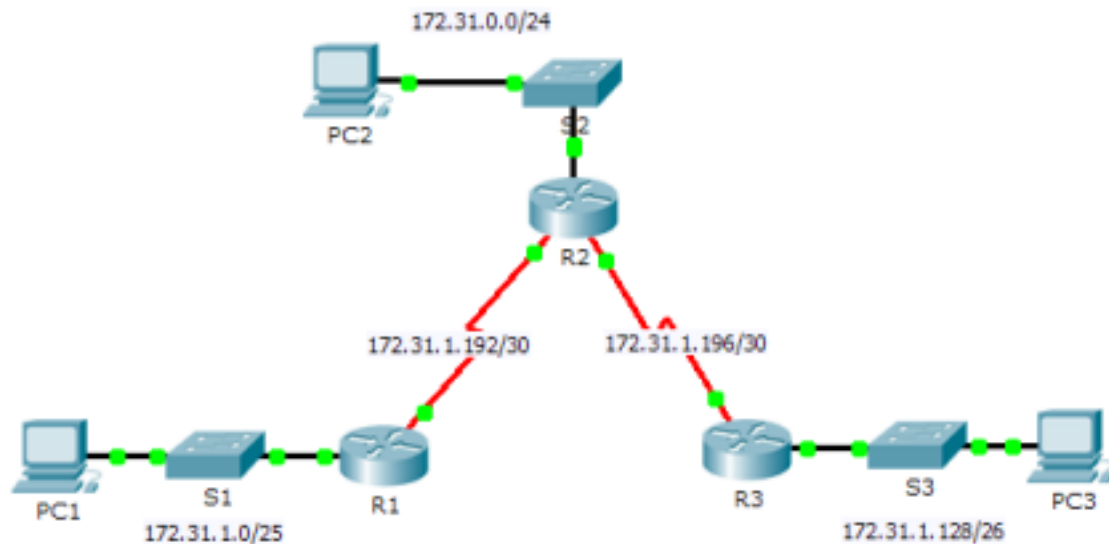


Packet Tracer - Configuring IPv4 Static and Default Routes

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

Packet Tracer - Configuring IPv4 Static and Default Routes

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

- Looking at the topology diagram, how many networks are there in total? 5
- How many networks are directly connected to R1, R2, and R3? R1 =2, R2= 3 and R3 =2
- How many static routes are required by each router to reach networks that are not directly connected?

- R1: 3 static routes
- R2: 2 static routes
- R3: 3 static routes

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

Why were you unsuccessful? Because static routing is missing, that's why PC1 does not know about PC2 or PC3.

Part 2: Configure Static and Default Routes

Step 1: Configure recursive static routes on R1.

- What is recursive static route?

A recursive static route occurs when a router forwards traffic to another router using a statically configured route, and the next-hop address is also reachable via another static route. This creates a recursive loop, requiring careful configuration to avoid network issues.

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

A recursive static route requires two routing table lookups because the first lookup determines the next-hop address based on the static route, and the second lookup is needed to find the actual exit interface or next-hop address for reaching the destination through the resolved next-hop address from the first lookup.

- Configure a recursive static route to every network not directly connected to R1, including the WAN link between R2 and R3.
- Test connectivity to the R2 LAN and ping the IP addresses of PC2 and PC3.

Why were you unsuccessful? Because we set the static route from R1 but R2 still does not know about PC1.

Step 2: Configure directly attached static routes on R2.

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

In a directly attached static route we give the exit interface and on a recursive static route we give the ip address of the next hop.

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 network

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?

In the routing table, a directly connected network is typically denoted with a "C" flag, while a directly attached static route is marked with an "S" flag, indicating that it is a static route pointing to a directly connected next-hop interface.

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Step 3: Configure a default route on R3.

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

A default route is a static route that acts as a gateway of last resort, used when no specific route matches the destination. It is denoted as 0.0.0.0/0. In contrast, a regular static route specifies a specific destination network and next-hop address, providing a more granular path for that particular subnet.

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? 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.

A fully specified route in networking refers to a static route that explicitly defines both the destination network and the next-hop address, leaving no ambiguity. It provides detailed instructions for routing traffic to a specific subnet via a designated next-hop.

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

ip route 172.31.0.0 255.255.255.0 172.31.1.197

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 172.31.1.192 255.255.255.252 172.31.1.197

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

ip route 172.31.1.0 255.255.255.128 172.31.1.197

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?

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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Packet Tracer - Configuring IPv4 Static and Default Routes

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	