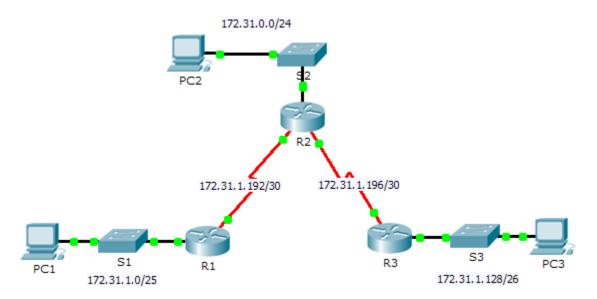


# Packet Tracer - Configuring IPv4 Static and Default Routes

# **Topology**



## **Addressing Table**

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
	G0/0	172.31.1.1	255.255.255.128	N/A
R1	S0/0/0	172.31.1.194	255.255.255.252	N/A
	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
R2	S0/0/1	172.31.1.197	255.255.255.252	N/A
	G0/0	172.31.1.129	255.255.255.192	N/A
R3	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** 

#### **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? 5
- b. How many networks are directly connected to R1, R2, and R3? R1 has 3, R2 has 2, R3 has 2
- c. How many static routes are required by each router to reach networks that are not directly connected? R1 needs 3 static routes, R2 needs 2 static routes, and R3 needs 3 static routes.
- d. Test connectivity to the R2 and R3 LANs by pinging PC2 and PC3 from PC1.
  - Why were you unsuccessful? R1 doesn't have routes

## Part 2: Configure Static and Default Routes

#### Step 1: Configure recursive static routes on R1.

- a. What is recursive static route?
  - When router needs to forward packets to destinations that are not directly connected but are reachable through other routes, these are commonly done via recursive static routes.
- b. Why does a recursive static route require two routing table lookups?
  - The requirement for two routing table lookups in a recursive static route arises from the need to determine the complete path to a destination address that is not directly reachable from the 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?
  - R1 has a route to the R2 and R3 LANs but R2, R3 doesn't have route to R1

#### Step 2: Configure directly attached static routes on R2.

- a. How does a directly attached static route differ from a recursive static route? Directly attached static routes forward packets directly to the next-hop address, which is directly connected to the router. In contrast, recursive static routes forward packets to a next-hop address that is not directly connected, requiring additional routing table lookups to determine the complete path to the
- 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? 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?
  - C is directly connected network and S is static route

#### Step 3: Configure a default route on R3.

- a. How does a default route differ from a regular static route?
  - A default route is used as a fallback for packets with no specific route entry in the routing table, while a regular static route is manually configured for specific destination networks or hosts.
- 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\* 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.
  - They are particularly useful in situations where specific routing requirements exist, such as directing traffic through certain gateways or optimizing traffic flow within a network.
- 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
- 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? show ip route

# 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	Step 1	7	
Default Routes	Step 2	7	
	Step 3	3	
	Step 4	10	
	Step 5	3	
	Part 2 Total	30	
Pa	60		
	100		