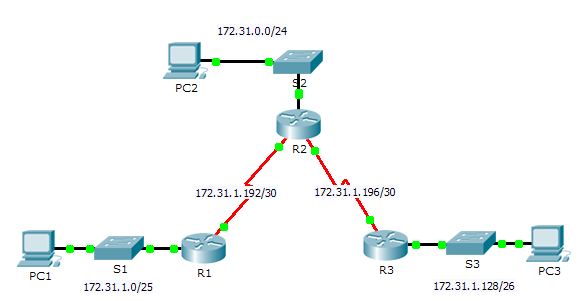
1. Packet Tracer – Basic Static Route Configuration

**Topology Diagram**



1. Addressing table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Device | Interface | IP 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 |

1. 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**

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

**Ans:** **5 (5 network address)**

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

**Ans: R1 has 2, R2 has 3, and R3 has 2. (Red Line)**

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

**Ans: R1 needs 3 static routes, R2 needs 2 static routes, and R3 needs 3 static routes. (Blue Line)**

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

* Why were you unsuccessful?

**Ans: Because there are no routes to these networks on R1.**

**Part 2: Configure Static and Default Routes**

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

1. What is recursive static route?

**Ans:** **A recursive static route relies on the next hop router in order for packets to be sent to its destination. A recursive static route requires two routing table lookups.**

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

**Ans:** **It must first look in the routing table for the destination network and then look up the exit interface/direction of the network for the next hop router.**

1. 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

1. Test connectivity to the R2 LAN and ping the IP addresses of PC2 and PC3.
2. Why were you unsuccessful?

**Ans: R1 has a route to the R2 and R3 LANs, but R2 and R3 do not have a routes to R1.**

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

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

**Ans: 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.**

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

* ip route 172.31.1.0 255.255.255.128 Serial0/0/0
* ip route 172.31.1.128 255.255.255.192 Serial0/0/1

1. Which command only displays directly connected networks?

**Ans: show ip route connected**

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

**Ans: show ip route static**

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

**Ans: The static route has an S and a directly connected network has a C.**

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

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

**Ans: 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.**

1. 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 Serial0/0/1**

1. How is a static route displayed in the routing table?

**Ans: 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.

1. Explain a fully specified route.

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

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

**Ans: R3(config)# ip route 172.31.0.0 255.255.255.0 s0/0/1 172.31.1.197 (exit interface)**

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

**Ans: R3(config)# ip route 172.31.1.192 255.255.255.252 s0/0/1 172.31.1.197**

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

**Ans: R3(config)# 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?

**Ans: 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