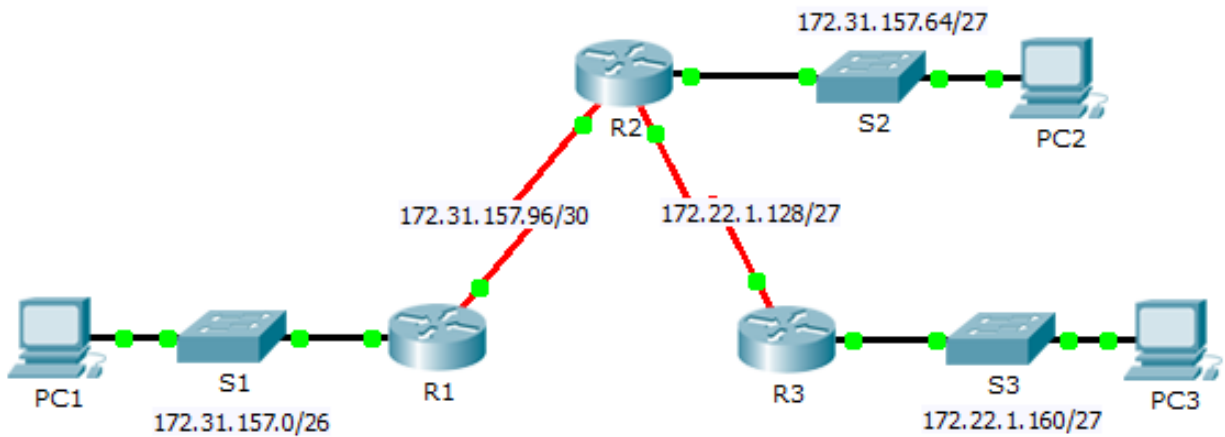# Packet Tracer - Configuring IPv4 Route Summarization - Scenario 1 (Instructor Version)

Instructor Note: Red font color or Gray highlights indicate text that appears in the instructor copy only.

Topology

Addressing Table

Device	Interface	IPv4 Address	Subnet Mask	Default Gateway
R1	G0/0	172.31.157.1	255.255.255.192	N/A
	S0/0/0	172.31.157.97	255.255.255.252	N/A
R2	G0/0	172.31.157.65	255.255.255.224	N/A
	S0/0/0	172.31.157.98	255.255.255.252	N/A
	S0/0/1	172.22.1.129	255.255.255.224	N/A
R3	G0/0	172.22.1.161	255.255.255.224	N/A
	S0/0/1	172.22.1.158	255.255.255.224	N/A
PC1	NIC	172.31.157.62	255.255.255.192	172.31.157.1
PC2	NIC	172.31.157.94	255.255.255.224	172.31.157.65
PC3	NIC	172.22.1.190	255.255.255.224	172.22.1.161

Objectives

Part 1: Calculate Summary Routes

Part 2: Configure Summary Routes

Part 3: Verify Connectivity

Background

In this activity, you will calculate and configure summary routes. Router summarization, also known as route aggregation, is the process of advertising a contiguous set of addresses as a single address.

Part 1: Calculate Summary Routes

Step 1: Calculate a summary route on R1 to reach LANs on R3.

a. List the 172.22.1.128/27 and 172.22.1.160/27 networks in binary format.

```
172.22.1.128: 10101100.00010110.00000001.10000000
172.22.1.160: 10101100.00010110.00000001.10100000
```

b. Count the left-most matching bits to determine the mask for the summary route. They have 26 left-most bits in common.

```
172.22.1.128: 10101100.00010110.00000001.10000000
172.22.1.160: 10101100.00010110.00000001.10100000
```

c. Copy the matching bits and fill in the remaining bits with zeros to determine the summarized network address.

```
10101100.00010110.00000001.10000000
```

d. What is the summarized network address and subnet mask? 172.22.1.128 255.255.255.192

Step 2: Calculate a summary route on R3 to reach LANs on R1 and R2.

a. Calculate the summary route for the 172.31.157.0/26, 172.31.157.64/27, and 172.31.157.96/30 networks. List the networks in binary format. Then, count the left-most matching bits to determine the mask for the summary route.

```
10101100.00011111.10011101.00000000
10101100.00011111.10011101.01000000
10101100.00011111.10011101.01100000
```

b. What is the summarized network address and subnet mask? 172.31.157.0 255.255.255.128

Part 2: Configure Summary Routes

Step 1: Configure a summary route for R1.

Configure the recursive summary route that you calculated in Part 1, Step 1.

```
R1(config)# ip route 172.22.1.128 255.255.255.192 172.31.157.98
```

Step 2: Configure a summary route for R3.

Configure the directly attached summary route that you calculated in Part 1, Step 2.

```
R3(config)# ip route 172.31.157.0 255.255.255.128 serial 0/0/1
```

Part 3: Verify Connectivity

Verify that all PC hosts and routers can ping other PC hosts and routers in the topology. If not, troubleshoot and correct the issues.