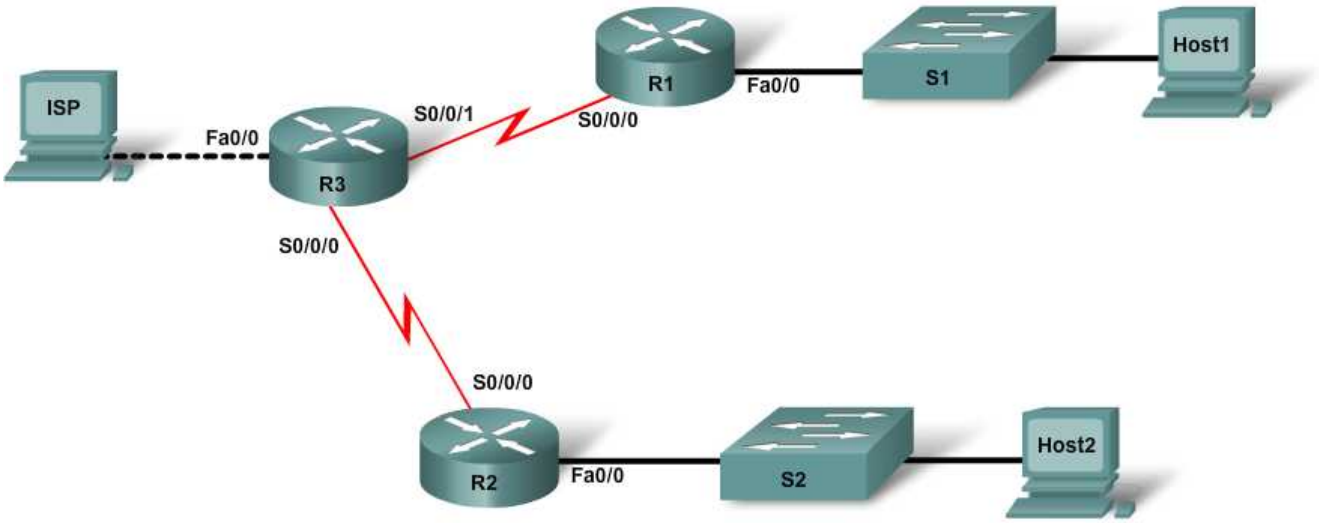
Lab 5.2.3.2 Configuring RIPv2 with VLSM and Default Route Propagation



Device	Host Name	Interface Fa0/0 / Subnet Mask	Interface S0/0/0 / Subnet Mask	Interface S0/0/1 / Subnet Mask	Serial Interface Type	Default Gateway	Enable Secret Password	VTY, Console Password
Router1	R1	172.16.1.1/24	172.16.3.1/30	N/A	DTE		class	cisco
Router2	R2	172.16.2.1/24	172.16.3.5/30	N/A	DTE		class	cisco
Router3	R3	209.165.201.1 /24	172.16.3.6/30	172.16.3.2/30	DCE		class	cisco
Switch1	S1						class	cisco
Switch2	S2						class	cisco
PC 1	Host1	172.16.1.2/24				172.16.1.1/24		
PC 2	Host2	172.16.2.2/24				172.16.2.1/24		
PC 3	ISP	209.165.201.2 /24				209.165.201.1/ 24		

Objectives

- Configure a three-router topology using VLSM.
- Configure RIP version 2 as the routing protocol.
- Configure and propagate a default route through RIP.

Background / Preparation

Set up a network similar to the one in the topology diagram. This lab presents a three-router corporate network using variably-subnetted private IP addressing. From one router, a public network connection to a

host PC simulates the corporate network's Internet connection. You will configure RIPv2 as the routing protocol for the corporate network, and a pathway for Internet traffic will be established through a default route.

The following resources are required:

- Three Cisco 1841 routers or comparable routers
- Two Cisco 2960 switches or other comparable switches
- Three Windows-based PCs, at least one with a terminal emulation program
- Minimum of one RJ-45-to-DB-9 connector console cable
- Two serial cables to connect R3 to both R1 and R2
- One crossover Ethernet cable (PC3 to R3)
- Four straight-through Ethernet cables (PC1 to S1, PC2 to S2, S1 to R1, and S2 to R2)
- Access to the PC command prompt
- Access to PC network TCP/IP configuration

NOTE: Make sure that the routers and the switches have been erased and have no startup configurations. Instructions for erasing both switch and router are provided in the Lab Manual, located on Academy Connection in the Tools section.

NOTE: SDM Enabled Routers - If the startup-config is erased in an SDM enabled router, SDM will no longer come up by default when the router is restarted. It will be necessary to build a basic router configuration using IOS commands. The steps provided in this lab use IOS commands and do not require the use of SDM. If you wish to use SDM, refer to the instructions in the Lab Manual, located on the Academy Connection in the Tools section or contact your instructor if necessary.

Step 1: Connect the equipment.

a. Connect Router3 to Router1 and Router2 with serial cables.

b. Connect Router1's Fa0/0 interface with a straight-through cable to Switch1's Fa0/1 interface.

c. Connect Router2's Fa0/0 interface with a straight-through cable to Switch2's Fa0/1 interface

d. Connect PC1 to Switch1 and PC2 to Switch 2 with straight-through cables.

e. Connect PC3 to Router3's Fa0/0 interface with a crossover cable.

f. Connect a PC with a console cable to perform configurations on the routers and switches.

Step 2: Perform basic configurations on the routers.

a. Establish a console session with Router1 and configure hostname, passwords, and interfaces as described in the table. Save the configuration.

b. Establish a console session with Router2 and perform a similar configuration, using the addresses and other information from the table. Save the configuration.

c. Establish a console session with Router3. Configure hostname, passwords, and interfaces according to the table. Note that both serials are DCE on this router. Save the configuration.

Step 3: Perform basic configurations on the switches.

a. Establish a console session with Switch1 and configure hostname and passwords according to the table. Save the configuration.

b. Perform a similar configuration on Switch2, configuring the hostname and passwords as described for Switch2 in the table. Save the configuration.

Step 4: Configure the hosts with the proper IP address, subnet mask, and default gateway.

a. Configure each host with the proper IP address, subnet mask, and default gateway. Host1 should be assigned 172.16.1.2/24 and Host 2 should be assigned 172.16.2.2 /24. Host3, which is used to simulate Internet access, should be assigned 209.165.201.2/24. All three PCs use their attached router's Fa0/0 interface as the default gateway.

b. Each workstation should be able to ping the attached router. If the ping was not successful, troubleshoot as necessary. Check and verify that the workstation has been assigned a specific IP address and default gateway.

Step 5: Configure RIP v2 routing

a. On R1, configure RIP version 2 as the routing protocol and advertise the appropriate networks:

```
R1(config)#router rip
R1(config-router)#version 2
R1(config-router)#network 172.16.1.0
R1(config-router)#network 172.16.3.0
```

Predict: how will RIP report these subnets in the routing table?

_____

b. From the network commands, which interfaces are participating in RIP routing? _____

c. Perform a similar configuration on R2, setting the version, advertising the appropriate networks, and turning off auto-summarization

d. On R3, perform a similar configuration. Do not advertise the 209.165.201.0/24 network.

Step 6: Configure and redistribute a default route for Internet access.

a. From the R3 router to the host simulating the Internet, create a static route to network 0.0.0.0 0.0.0.0, using the **ip route** command. This will forward any unknown-destination address traffic to the PC simulating the Internet by setting a Gateway of Last Resort on the R3 router.

```
R3(config)#ip route 0.0.0.0 0.0.0.0 209.165.201.2
```

b. R3 will advertise this route to the other routers if this command is added to its RIP configuration:

```
R3(config)#router rip
R3(config-router)#default-information originate
```

Step 7: Verify the routing configuration.

a. View the routing table on R3:

```
R3#show ip route
<<output omitted>>
Gateway of last resort is 209.165.201.2 to network 0.0.0.0

     172.16.0.0/30 is subnetted, 4 subnets
R       172.16.1.0 [120/1] via 172.16.3.1, 00:00:17, Serial0/0/0
R       172.16.2.0 [120/1] via 172.16.3.5, 00:00:12, Serial0/0/1
C       172.16.3.0 is directly connected, Serial0/0/0
C       172.16.3.4 is directly connected, Serial0/0/1
C    209.165.201.0/24 is directly connected, FastEthernet0/0

S*   0.0.0.0/0 [1/0] via 209.165.201.2
```

How can you tell from the routing table that the subnetted network shared by R1, R2 and R3 has a pathway for Internet traffic?

_____

b. View the routing tables on R2 and R1.

How is the pathway for Internet traffic provided in their routing tables?

_____

Step 8: Verify connectivity.

a. Simulate sending traffic to the Internet by pinging from the host PCs to 209.165.201.2.

Were the pings successful? _____

b. Verify that hosts within the subnetted network can reach each other by pinging between Host1 and Host2.

Were the pings successful? _____

Step 9: Reflection.

a. How did R1 and R2 learn the pathway to the Internet for this network?

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