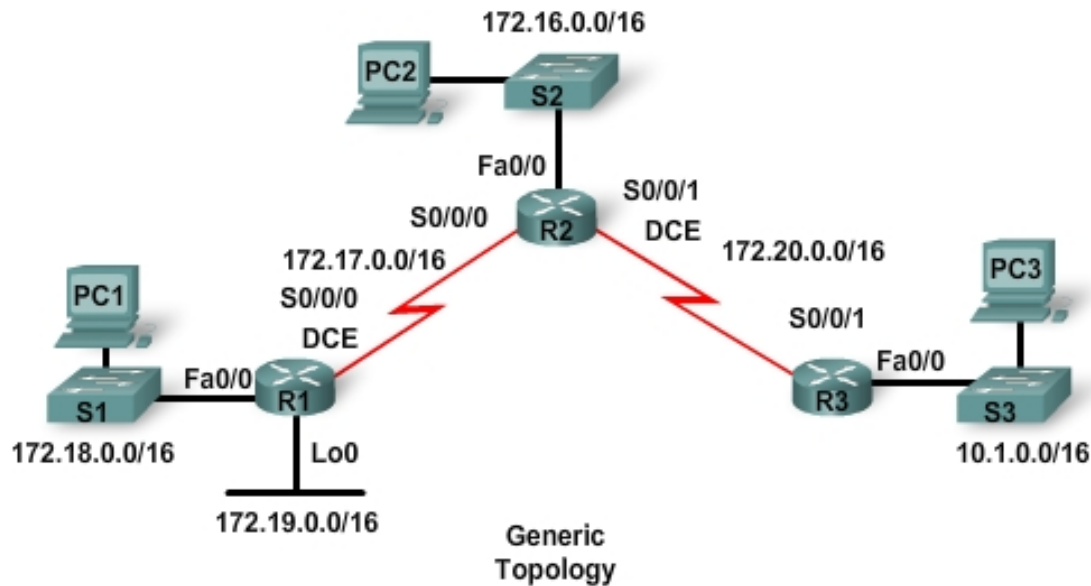


Lab 6.1.4 Using CIDR to Ensure Route Summarization

Classless Routing



Straight-through cable

Serial cable

Console (Rollover)

Crossover cable



Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	Fa0/0	172.18.0.1	255.255.0.0	N/A
	S0/0/0	172.17.0.1	255.255.0.0	N/A
	Lo0	172.19.0.1	255.255.0.0	N/A
R2	Fa0/0	172.16.0.1	255.255.0.0	N/A
	S0/0/0	172.17.0.2	255.255.0.0	N/A
	S0/0/1	172.20.0.2	255.255.0.0	N/A
R3	Fa0/0	10.1.0.1	255.255.0.0	N/A
	S0/0/1	172.20.0.1	255.255.0.0	N/A
PC1	NIC	172.18.0.254	255.255.0.0	172.18.0.1
PC2	NIC	172.16.0.254	255.255.0.0	172.16.0.1

Device	Interface	IP Address	Subnet Mask	Default Gateway
PC3	NIC	10.1.0.254	255.255.0.0	10.1.0.1

Objectives

- Configure routers, including EIGRP routing protocol.
- Configure EIGRP for manual CIDR route summarization.
- Verify EIGRP default operation and with manual summarization.
- Test and verify full connectivity.
- Reflect upon and document the network implementation.

640-802 CCNA Exam Objectives

This lab contains skills that relate to the following CCNA exam objectives:

- Determine the appropriate classless addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment.
- Perform and verify routing configuration tasks for a static or default route given specific routing requirements.
- Configure, verify, and troubleshoot EIGRP.

Expected Results and Success Criteria

Before starting this lab, read through the tasks that you are expected to perform. What do you expect the result of performing these tasks will be?

Background / Preparation



In this lab activity, you will configure and examine the operation of routes to take advantage of Classless Interdomain Routing (CIDR). You will configure the routers and observe the default operation of EIGRP with automatic summarization. Then you will configure manual summarization to create a supernet. The following individual network routes on R1 and R2 will be summarized: 172.16.0.0, 172.17.0.0, 172.18.0.0, and 172.19.0.0.

Step 1: Cable and configure the network

NOTE: If the PCs used in this lab are also connected to your Academy LAN or to the Internet, ensure that you record the cable connections and TCP/IP settings so that these can be restored at the conclusion of the lab.

Referring to the topology diagram, connect the console (or rollover) cable to the console port on the router and the other cable end to the host computer with a DB-9 or DB-25 adapter to the COM 1 port. Ensure that power has been applied to both the host computer and router.

Step 2: Perform basic router configurations

Establish a HyperTerminal, or other terminal emulation program, from PC1 to each of the three routers in turn and perform the following configuration functions:

- Clear any existing configurations on the routers.
- Configure the router hostname.
- Disable DNS lookup.
- Configure an EXEC mode password.
- Configure a message-of-the-day banner.
- Configure a password for console connections.
- Configure a password for vty connections.

Step 3: Configure the interfaces on the three routers

- Configure the interfaces on the three routers with the IP addresses from the table.
- Save the running configuration to the NVRAM of the router.

Step 4: Configure the Ethernet interfaces

Configure the Ethernet interfaces of Hosts PC1, PC2, and PC3 with the IP addresses from the addressing table provided under the topology diagram.

Step 5: Verify connectivity of routers

- Verify that each router can ping each of the neighboring routers across the WAN links. You should *not* have connectivity between end devices yet. However, you can test connectivity between two routers and between an end device and its default gateway.
- Troubleshoot if connectivity is not achieved.

Step 6: Verify connectivity of Host PCs

- Verify that PC1, PC2, and PC3 can ping their respective default gateways.
- Troubleshoot if connectivity is not achieved.

Step 7: Configure EIGRP routing on router R1

Consider the networks that need to be included in the EIGRP updates that are sent out by the R1 router.

What directly connected networks exist on R1?

What commands are required to enable EIGRP and include the connected networks in the routing updates?

Are there any router interfaces that do not need to have EIGRP updates sent out? _____

If yes, which ones? _____

What command is used to disable EIGRP updates on these interfaces?

Step 8: Configure EIGRP on router R2

Consider the networks that need to be included in the EIGRP updates that are sent out by the R2 router.

What directly connected networks exist on R2?

What commands are required to enable EIGRP and include the connected networks in the routing updates?

Are there any router interfaces that do not need to have EIGRP updates sent out? _____

If yes, which ones? _____

What command is used to disable EIGRP updates on these interfaces?

Step 9: Configure EIGRP routing on the R3 router

Consider the networks that need to be included in the EIGRP updates that are sent out by the R3 router.

What directly connected networks exist on R3?

What commands are required to enable EIGRP and include the connected networks in the routing updates?

Are there any router interfaces that do not need to have EIGRP updates sent out? _____

If yes, which ones? _____

What command is used to disable EIGRP updates on these interfaces?

Step 10: Verify the configurations

Ping between devices to confirm that each router can reach each device on the network and that there is connectivity between all the PCs.

If any of the above pings failed, check your physical connections and configurations. Troubleshoot until connectivity is achieved.

Step 11: Display the EIGRP routing table for each router

Are there summary routes in any of the routing tables? _____

Are there any summary routes for the 172.x.0.0 networks? _____

Step 12: Remove automatic summarization

On each of the three routers, remove automatic summarization to force EIGRP to report all subnets. A sample command is given for R1.

```
R1(config)#router eigrp 1
R1(config-router)#no auto-summary
```

Step 13: Configure manual summarization on R2

On R2, configure manual summarization so that EIGRP summarizes the four networks 172.16.0.0/16, 172.17.0.0/16, 172.18.0.0/16, and 172.19.0.0/16 as one CIDR route, or 172.16.0.0/14.

You are summarizing multiple classful networks, which creates a supernet, and results in a classless (/14) network address being advertised.

```
R2(config)#interface s0/0/1
R2(config-if)#ip summary-address eigrp 1 172.16.0.0 255.252.0.0
```

Step 14: Confirm that R2 is advertising a CIDR summary route

Examine the routing table of each router using the `show ip route` command.

Which router has a summarized route to the 172.x.0.0 networks in its routing table? _____

Step 15: Clean up

Erase the configurations and reload the routers. Disconnect and store the cabling. For PC hosts that are normally connected to other networks (such as the school LAN or to the Internet), reconnect the appropriate cabling and restore the TCP/IP settings.

Reflection

In this lab, automatic summarization was used. Could route summarization still be applied if more effective use of the IPv4 address space had been made by using VLSM for those networks requiring fewer addresses, such as the serial links between routers?
