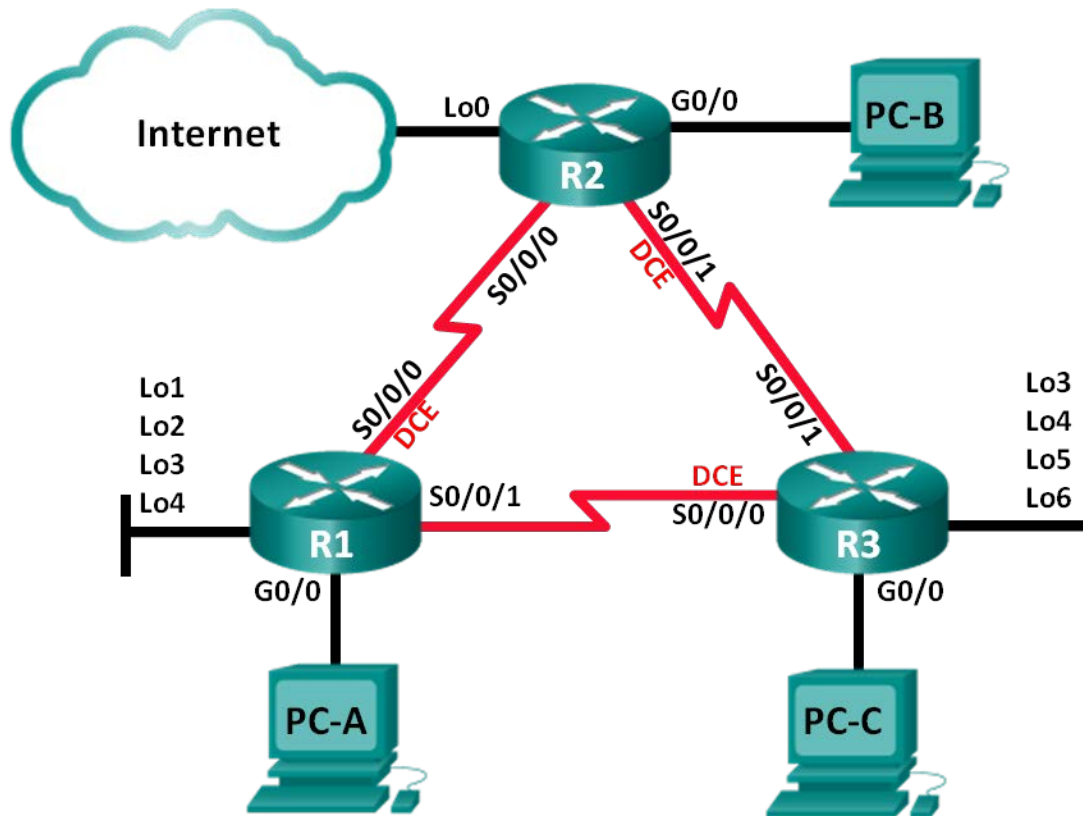


Lab – Troubleshooting Advanced EIGRP

Topology



Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.1.1	255.255.255.0	N/A
	Lo1	172.16.11.1	255.255.255.0	N/A
	Lo2	172.16.12.1	255.255.255.0	N/A
	Lo3	172.16.13.1	255.255.255.0	N/A
	Lo4	172.16.14.1	255.255.255.0	N/A
	S0/0/0 (DCE)	192.168.12.1	255.255.255.252	N/A
	S0/0/1	192.168.13.1	255.255.255.252	N/A
R2	G0/0	192.168.2.1	255.255.255.0	N/A
	Lo0	209.165.200.225	255.255.255.252	N/A
	S0/0/0	192.168.12.2	255.255.255.252	N/A
	S0/0/1 (DCE)	192.168.23.1	255.255.255.252	N/A
R3	G0/0	192.168.3.1	255.255.255.0	N/A
	Lo3	172.16.33.1	255.255.255.0	N/A
	Lo4	172.16.34.1	255.255.255.0	N/A
	Lo5	172.16.35.1	255.255.255.0	N/A
	Lo6	172.16.36.1	255.255.255.0	N/A
	S0/0/0 (DCE)	192.168.13.2	255.255.255.252	N/A
	S0/0/1	192.168.23.2	255.255.255.252	N/A
PC-A	NIC	192.168.1.3	255.255.255.0	192.168.1.1
PC-B	NIC	192.168.2.3	255.255.255.0	192.168.2.1
PC-C	NIC	192.168.3.3	255.255.255.0	192.168.3.1

Objectives

Part 1: Build the Network and Load Device Configurations

Part 2: Troubleshoot EIGRP

Background / Scenario

The Enhanced Interior Gateway Routing Protocol (EIGRP) has advanced features to allow changes related to summarization, default route propagation, bandwidth utilization, and metrics.

In this lab, you will troubleshoot a network that is running EIGRP. Advanced EIGRP features have been implemented, but the network is now experiencing problems. You must find and correct the network issues.

Note: The routers used with CCNA hands-on labs are Cisco 1941 Integrated Services Routers (ISRs) with Cisco IOS, Release 15.2(4)M3 (universalk9 image). Other routers and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and output produced might vary.

from what is shown in the labs. Refer to the Router Interface Summary Table at the end of this lab for the correct interface identifiers.

Note: Ensure that the routers have been erased and have no startup configurations. If you are unsure, contact your instructor.

Required Resources

- 3 Routers (Cisco 1941 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
- 3 PCs (Windows with terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

Part 1: Build the Network and Load Device Configurations

Step 1: Cable the network as shown in the topology.

Step 2: Configure PC hosts.

Step 3: Load router configurations.

Load the following configurations into the appropriate router. All routers have the same passwords. The privileged EXEC password is **class**, and **cisco** is the console and vty password.

Router R1 Configuration:

```
conf t
hostname R1
enable secret class
no ip domain lookup
line con 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
banner motd @
    Unauthorized Access is Prohibited! @
interface lo1
description Connection to Branch 11
ip add 172.16.11.1 255.255.255.0
interface lo2
description Connection to Branch 12
ip add 172.16.12.1 255.255.255.0
interface lo3
description Connection to Branch 13
ip add 172.16.13.1 255.255.255.0
interface lo4
```

```
description Connection to Branch 14
ip add 172.16.14.1 255.255.255.0
interface g0/0
description R1 LAN Connection
ip add 192.168.1.1 255.255.255.0
no shutdown
interface s0/0/0
description Serial Link to R2
ip add 192.168.12.1 255.255.255.252
no shutdown
interface s0/0/1
description Serial Link to R3
ip add 192.168.13.1 255.255.255.252
no shutdown
router eigrp 1
router-id 1.1.1.1
network 192.168.1.0 0.0.0.255
network 192.168.12.0 0.0.0.3
network 192.168.13.0 0.0.0.3
network 172.16.11.0 0.0.0.255
network 172.16.12.0 0.0.0.255
network 172.16.13.0 0.0.0.255
network 172.16.14.0 0.0.0.255
passive-interface g0/0
end
```

Router R2 Configuration:

```
conf t
hostname R2
enable secret class
no ip domain lookup
line con 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
banner motd @
  Unauthorized Access is Prohibited! @
interface g0/0
description R2 LAN Connection
ip add 192.168.2.1 255.255.255.0
no shutdown
interface s0/0/0
description Serial Link to R1
```

```
ip add 192.168.12.2 255.255.255.252
no shutdown
interface s0/0/1
description Serial Link to R3
ip add 192.168.23.1 255.255.255.252
no shutdown
interface lo0
ip add 209.165.200.225 255.255.255.252
description Connection to ISP
router eigrp 1
router-id 2.2.2.2
network 192.168.2.0 0.0.0.255
network 192.168.12.0 0.0.0.3
network 192.168.23.0 0.0.0.3
passive-interface g0/0
ip route 0.0.0.0 0.0.0.0 lo0
end
```

Router R3 Configuration:

```
conf t
hostname R3
enable secret class
no ip domain lookup
line con 0
password cisco
login
logging synchronous
line vty 0 4
password cisco
login
banner motd @
    Unauthorized Access is Prohibited! @
interface lo3
description Connection to Branch 33
ip add 172.16.33.1 255.255.255.0
interface lo4
description Connection to Branch 34
ip add 172.16.34.1 255.255.255.0
interface lo5
description Connection to Branch 35
ip add 172.16.35.1 255.255.255.0
interface lo6
description Connection to Branch 36
ip add 172.16.36.1 255.255.255.0
interface g0/0
description R3 LAN Connection
```

```
ip add 192.168.3.1 255.255.255.0
no shutdown
interface s0/0/0
description Serial Link to R1
ip add 192.168.13.2 255.255.255.252
no shutdown
interface s0/0/1
description Serial Link to R2
ip add 192.168.23.2 255.255.255.252
no shutdown
router eigrp 1
router-id 3.3.3.3
network 192.168.3.0 0.0.0.255
network 192.168.13.0 0.0.0.3
network 192.168.23.0 0.0.0.3
network 172.16.33.0 0.0.0.255
network 172.16.34.0 0.0.0.255
network 172.16.35.0 0.0.0.255
network 172.16.36.0 0.0.0.255
passive-interface g0/0
end
```

Step 4: Verify end-to-end connectivity.

Note: It may be necessary to disable the PC firewall to ping between PCs.

Step 5: Save the configuration on all routers.

Part 2: Troubleshoot EIGRP

In Part 2, verify that all routers have established neighbor adjacencies, and that all network routes are available.

Additional EIGRP Requirements:

- All serial interface clock rates should be set at 128 Kb/s and a matching bandwidth setting should be available to allow EIGRP cost metrics to be calculated correctly.
- Automatic route summarization of the branch networks.
- EIGRP should redistribute the static default route to the Internet. This is simulated by using Loopback 0 interface on R2.
- EIGRP should be configured to use no more than **40** percent of the available bandwidth on the serial interfaces.
- EIGRP Hello/Hold timer intervals should be set to **30/90** on all serial interfaces.

List the commands used during your EIGRP troubleshooting process:

List the changes made to resolve the EIGRP issues. If no problems were found on the device, then respond with “no problems were found”.

R1 Router:

R2 Router:

R3 Router:

Reflection

1. How can the **auto-summary** command create routing issues in EIGRP?
2. Why would you want to change the EIGRP Hello and Hold time intervals on an interface?

Router Interface Summary Table

Router Interface Summary				
Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
1800	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
1900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2801	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
2811	Fast Ethernet 0/0 (F0/0)	Fast Ethernet 0/1 (F0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
2900	Gigabit Ethernet 0/0 (G0/0)	Gigabit Ethernet 0/1 (G0/1)	Serial 0/0/0 (S0/0/0)	Serial 0/0/1 (S0/0/1)
Note: To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface.				