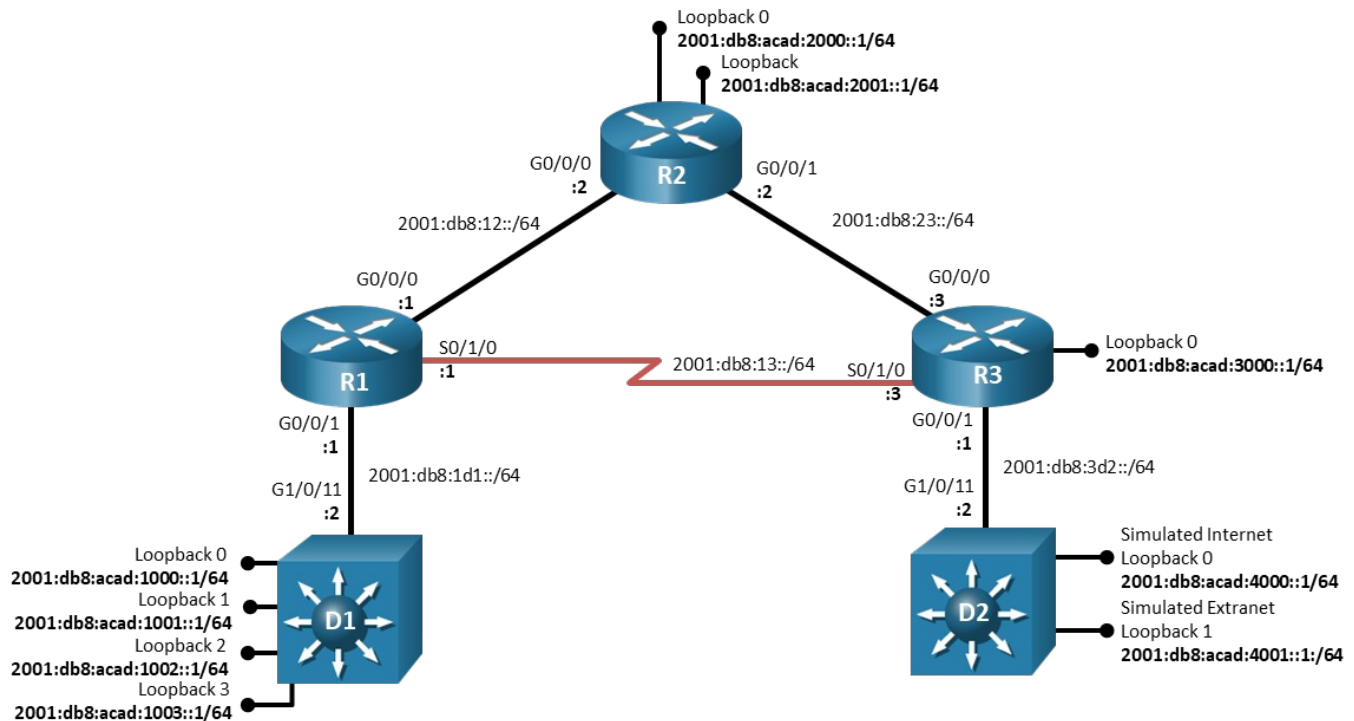


Lab - Troubleshoot EIGRP for IPv6 (Instructor Version)

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

Topology



Addressing Table

Device	Interface	IPv6 Address/Prefix Length	Link-Local Address
R1	G0/0/0	2001:db8:12::1/64	fe80::1:1
	G0/0/1	2001:db8:1d1::1/64	fe80::1:2
	S0/1/0	2001:db8:13::1/64	fe80::1:3
R2	G0/0/0	2001:db8:12::2/64	fe80::2:1
	G0/0/1	2001:db8:23::2/64	fe80::2:2
	Loopback 0	2001:db8:acad:2000::1/64	fe80::2:3
	Loopback 1	2001:db8:acad:2001::1/64	fe80::2:4
R3	G0/0/0	2001:db8:23::3/64	fe80::3:1
	G0/0/1	2001:db8:3d2::1/64	fe80::3:2
	S0/1/0	2001:db8:13::3/64	fe80::3:3
	Loopback 0	2001:db8:acad:3000::1/64	fe80::3:4

Device	Interface	IPv6 Address/Prefix Length	Link-Local Address
D1	G1/0/11	2001:db8:1d1::2/64	fe80::d1:1
	Loopback 0	2001:db8:acad:1000::1/64	fe80::d1:2
	Loopback 1	2001:db8:acad:1001::1/64	fe80::d1:3
	Loopback 2	2001:db8:acad:1002::1/64	fe80::d1:4
	Loopback 3	2001:db8:acad:1003::1/64	fe80::d1:5
D2	G1/0/11	2001:db8:3d2::2/64	fe80::d2:1
	Loopback 0	2001:db8:acad:4000::1/64	fe80::d2:2
	Loopback 1	2001:db8:acad:4001::1/64	fe80::d2:3

Objectives

Troubleshoot network issues related to the configuration and operation of EIGRP for IPv6.

Background / Scenario

In this topology, R1, R2, R3, D1, and D2 are EIGRP neighbors. Switch D1 provides connectivity for a large branch of the network, R2 provides connectivity for a small branch, R3 supports a single LAN enclave, and switch D2 provides both an internet connection and an extranet connection. You will be loading configurations with intentional errors onto the network. Your tasks are to FIND the error(s), document your findings and the command(s) or method(s) used to fix them, FIX the issue(s) presented here and then test the network to ensure both of the following conditions are met:

- 1) the complaint received in the ticket is resolved
- 2) full reachability is restored

Note: The routers used with CCNP hands-on labs are Cisco 4221 with Cisco IOS XE Release 16.9.4 (universalk9 image). The switches used in the labs are Cisco Catalyst 3650 with Cisco IOS XE Release 16.9.4 (universalk9 image). Other routers, switches, and Cisco IOS versions can be used. Depending on the model and Cisco IOS version, the commands available and the output produced might vary from what is shown in the labs. Refer to the Router Interface Summary Table at the end of the lab for the correct interface identifiers.

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

Instructor Note: Refer to the Instructor Lab Manual for the procedures to initialize and reload devices.

Required Resources

- 3 Routers (Cisco 4221 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 2 Switches (Cisco 3560 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 1 PC (Choice of operating system with terminal emulation program installed)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet and serial cables as shown in the topology

Instructions

Part 1: Trouble Ticket 5.1.3.1

Scenario:

You took a spring break vacation, leaving the junior network administrator with some seemingly simple tasks. The routing table was to be reduced in size while the extranet on D2 and the enclave on R3 would not be visible in the routing table at all. Routing to the internet via D2 should work. Future additions to the large branch at R1 should be accounted for in the routing table so that when those networks are added (the network addresses are 2001:db8:acad:1004::/64, 2001:db8:acad:1005::/64, 2001:db8:acad:1006::/64, and 2001:db8:acad:1007::/64), there is no change to the routing table. The junior network administrator was not very successful. Now it is up to you to find and fix the misconfigurations before the CIO returns.

Use the commands listed below to load the configuration files for this trouble ticket:

Instructor Note: Commands for uploading the configuration are provided at the end of this document.

Device	Command
R1	<code>copy flash:/enarsi/5.1.3.1-r1-config.txt run</code>
R2	<code>copy flash:/enarsi/5.1.3.1-r2-config.txt run</code>
R3	<code>copy flash:/enarsi/5.1.3.1-r3-config.txt run</code>
D1	<code>copy flash:/enarsi/5.1.3.1-d1-config.txt run</code>
D2	<code>copy flash:/enarsi/5.1.3.1-d2-config.txt run</code>

- Passwords on all devices are **cisco12345**. If a username is required, use **admin**.
- When you have fixed the ticket, change the MOTD on EACH DEVICE using the following command:
banner motd # This is \$(hostname) FIXED from ticket <ticket number> #
- Then save the configuration by issuing the **wri** command (on each device).
- Inform your instructor that you are ready for the next ticket.
- After the instructor approves your solution for this ticket, issue the **reset.now** privileged EXEC command. This script will clear your configurations and reload the devices.

Instructor Notes:

This trouble ticket contains 4 intentional errors:

- 1) Stub router D1 is configured as Receive-Only, so its summary for Lo0-Lo4 is not being advertised. Because that summary is not being advertised, R1's summary for the future range of networks is not being advertised.
- 2) R2 is configured to advertise a summary route of ::/0, when it should be a summary route of 2001:db8:acad:2000::/63.
- 3) R3 Loopback0 is being advertised into EIGRP, but it should not be.
- 4) The prefix list used by the distribute list on D2 is incorrectly configured, resulting in the default route that D2 is redistributing not being advertised. If the student does not fix the prefix list correctly, the extranet routes will appear in internal routing tables, which is not desired.

The commands used to fix these errors should be:

```
R2(config)# interface g0/0/0
R2(config-if)# no ipv6 summary-address eigrp 513 ::/0
```

```

R2(config-if)# ipv6 summary-address eigrp 513 2001:db8:acad:2000::/63
R2(config-if)# exit
R2(config)# interface g0/0/1
R2(config-if)# no ipv6 summary-address eigrp 513 ::/0
R2(config-if)# ipv6 summary-address eigrp 513 2001:db8:acad:2000::/63
R2(config-if)# end

R3(config)# router eigrp LAB513
R3(config-router)# address-family ipv6 unicast autonomous-system 513
R3(config-router-af)# af-interface loopback 0
R3(config-router-af-interface)# shutdown
R3(config-router-af-interface)# exit
R3(config-router-af)# exit
R3(config-router)# exit
R3(config)# end

D1(config)# router eigrp LAB513
D1(config-router)# address-family ipv6 unicast autonomous-system 513
D1(config-router-af)# no eigrp stub receive-only
D1(config-router-af)# eigrp stub
D1(config-router-af)# exit
D1(config-router)# exit
D1(config)# end

D2(config)# no ipv6 prefix-list NO-EXTRA
D2(config)# ipv6 prefix-list NO-EXTRA seq 5 permit ::/0
D2(config)# end

```

Router Interface Summary Table

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)
4221	Gigabit Ethernet 0/0/0 (G0/0/0)	Gigabit Ethernet 0/0/1 (G0/0/1)	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)
4300	Gigabit Ethernet 0/0/0	Gigabit Ethernet 0/0/1	Serial 0/1/0 (S0/1/0)	Serial 0/1/1 (S0/1/1)

Router Model	Ethernet Interface #1	Ethernet Interface #2	Serial Interface #1	Serial Interface #2
	(G0/0/0)	(G0/0/1)		

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.

Uploading Configuration Files

Use the commands below to create the configuration files on the lab devices for each trouble ticket in this lab. The TCL script commands help create and copy the configurations. However, the configuration commands could also be copied and pasted directly into global config mode on each device. Simply remove the TCL script commands, enter the **enable** and **configure t** commands on the device, and copy and paste the configuration commands.

Important: The device requires a folder in flash named **enarsi**. Use the **dir** command to verify. If the folder is missing, then create it using the **mkdir flash:/enarsi** privileged exec command. For all switches, make sure the **vlan.dat** file is set to the default. Use the **delete vlan.dat** privileged EXEC command, if necessary.

Reset scripts

These TCL scripts will completely clear and reload the device in preparation for the next ticket. Copy and paste the appropriate script to the appropriate device.

Router Reset Script

```
tclsh
puts [ open "flash:/enarsi/reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
typeahead "\n"
erase startup-config
puts "Reloading the router"
typeahead "\n"
reload
}
tclquit
```

D1/D2 (Cisco 3650) Reset Script - The default 3650 SDM template supports IPv6 by default, so it is not set by this script.

```
tclsh
puts [ open "flash:/enarsi/reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
typeahead "\n"
erase startup-config
delete /force vlan.dat
puts "Reloading the switch"
typeahead "\n"
```

```
reload
}
tclquit
```

A1 (Cisco 2960 Script) - The default 2960 SDM template does not support IPv6, so this script includes that setting.

```
tclsh
puts [ open "flash:reset.tcl" w+ ] {
typeahead "\n"
copy running-config startup-config
typeahead "\n"
erase startup-config
delete /force vlan.dat
delete /force multiple-fs
ios_config "sdm prefer lanbase-routing"
typeahead "\n"
puts "Reloading the switch in 1 minute, type reload cancel to halt"
typeahead "\n"
reload
}
tclquit
```

R1 Configuration File Scripts

! R1 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/5.1.3.1-r1-config.txt" w+ ] {
hostname R1
ipv6 unicast-routing
no ip domain lookup
enable secret cisco12345
username admin algorithm-type scrypt secret cisco12345
interface g0/0/0
    ipv6 address fe80::1:1 link-local
    ipv6 address 2001:db8:12::1/64
    no shutdown
    exit
interface g0/0/1
    ipv6 address fe80::1:2 link-local
    ipv6 address 2001:db8:1d1::1/64
    no shutdown
    exit
interface s0/1/0
    ipv6 address fe80::1:3 link-local
    ipv6 address 2001:db8:13::1/64
    no shutdown
    exit
```

```
router eigrp LAB513
 address-family ipv6 unicast autonomous-system 513
 eigrp router-id 1.1.1.1
 af-interface g0/0/0
  summary-address 2001:db8:acad:1000::/60
 exit
 af-interface s0/1/0
  summary-address 2001:db8:acad:1000::/60
 exit
 exit
line con 0
 logging synchronous
 exec-timeout 0 0
 exit
line vty 0 4
 login local
 transport input telnet
 exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

R2 Configuration File Scripts

! R2 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/5.1.3.1-r2-config.txt" w+ ] {
hostname R2
ipv6 unicast-routing
no ip domain lookup
enable secret cisco12345
username admin algorithm-type scrypt secret cisco12345
interface g0/0/0
  ipv6 address fe80::2:1 link-local
  ipv6 address 2001:db8:12::2/64
  no shutdown
  exit
interface g0/0/1
  ipv6 address fe80::2:2 link-local
  ipv6 address 2001:db8:23::2/64
  no shutdown
  exit
interface loopback 0
  ipv6 address fe80::2:3 link-local
  ipv6 address 2001:db8:acad:2000::1/64
```

```
no shutdown
exit
interface loopback 1
  ipv6 address fe80::2:4 link-local
  ipv6 address 2001:db8:acad:2001::1/64
no shutdown
exit
ipv6 router eigrp 513
  eigrp router-id 2.2.2.2
exit
interface g0/0/0
  ipv6 eigrp 513
  ipv6 summary-address eigrp 513 ::/0
exit
interface g0/0/1
  ipv6 eigrp 513
  ipv6 summary-address eigrp 513 ::/0
exit
interface loopback 0
  ipv6 eigrp 513
exit
line con 0
  logging synchronous
  exec-timeout 0 0
exit
line vty 0 4
  login local
  transport input telnet
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

R3 Configuration File Scripts

!R3 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/5.1.3.1-r3-config.txt" w+ ] {
hostname R3
ipv6 unicast-routing
no ip domain lookup
enable secret cisco12345
username admin algorithm-type scrypt secret cisco12345
interface g0/0/0
  ipv6 address fe80::3:1 link-local
```



```
    ipv6 address 2001:db8:23::3/64
    no shutdown
    exit
interface g0/0/1
    ipv6 address fe80::3:2 link-local
    ipv6 address 2001:db8:3d2::1/64
    no shutdown
    exit
interface s0/1/0
    ipv6 address fe80::3:3 link-local
    ipv6 address 2001:db8:13::3/64
    no shutdown
    exit
interface loopback 0
    ipv6 address fe80::3:4 link-local
    ipv6 address 2001:db8:acad:3000::1/64
    no shutdown
    exit
router eigrp LAB513
    address-family ipv6 unicast autonomous-system 513
    eigrp router-id 3.3.3.3
    exit
    exit
line con 0
    logging synchronous
    exec-timeout 0 0
    exit
line vty 0 4
    login local
    transport input telnet
    exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

D1 Configuration File Scripts

! D1 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/5.1.3.1-d1-config.txt" w+ ] {
hostname D1
ipv6 unicast-routing
no ip domain lookup
enable secret cisco12345
username admin algorithm-type scrypt secret cisco12345
```

```
interface range g1/0/1 - 24
  switchport mode access
  shutdown
  exit
interface g1/0/11
  no switchport
  ipv6 address fe80::d1:1 link-local
  ipv6 address 2001:db8:1d1::2/64
  no shutdown
  exit
interface loopback 0
  ipv6 address fe80::d1:2 link-local
  ipv6 address 2001:db8:acad:1000::1/64
  no shutdown
  exit
interface loopback 1
  ipv6 address fe80::d1:3 link-local
  ipv6 address 2001:db8:acad:1001::1/64
  no shutdown
  exit
interface loopback 2
  ipv6 address fe80::d1:4 link-local
  ipv6 address 2001:db8:acad:1002::1/64
  no shutdown
  exit
interface loopback 3
  ipv6 address fe80::d1:5 link-local
  ipv6 address 2001:db8:acad:1003::1/64
  no shutdown
  exit
router eigrp LAB513
  address-family ipv6 unicast autonomous-system 513
    eigrp router-id 131.131.131.131
    eigrp stub receive-only
    af-interface g1/0/11
      summary-address 2001:db8:acad:1000::/62
    exit
  exit
line con 0
  logging synchronous
  exec-timeout 0 0
  exit
line vty 0 4
  login local
  transport input telnet
```

```
exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

D2 Configuration File Scripts

! D2- Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/5.1.3.1-d2-config.txt" w+ ] {
hostname D2
ipv6 unicast-routing
no ip domain lookup
enable secret cisco12345
username admin algorithm-type scrypt secret cisco12345
interface range g1/0/1 - 24
    switchport mode access
    shutdown
exit
interface g1/0/11
    no switchport
    ipv6 address fe80::d2:1 link-local
    ipv6 address 2001:db8:3d2::2/64
    no shutdown
exit
interface loopback 0
    description SIMULATED INTERNET
    ipv6 address fe80::d2:2 link-local
    ipv6 address 2001:db8:acad:4000::1/64
    no shutdown
exit
interface loopback 1
    description SIMULATED EXTRANET
    ipv6 address fe80::d2:3 link-local
    ipv6 address 2001:db8:acad:4001::1/64
    no shutdown
exit
ipv6 prefix-list NO-EXTRA seq 5 deny 2001:db8:acad:4000::/63
ipv6 route ::/0 loopback 0
ipv6 route 3ff3:db8:acad::/48 loopback 1
router eigrp LAB513
    address-family ipv6 unicast autonomous-system 513
        eigrp router-id 132.132.132.132
    topology base
    redistribute static
```

```
    distribute-list prefix NO-EXTRA out g1/0/11
  exit
line con 0
  logging synchronous
  exec-timeout 0 0
  exit
line vty 0 4
  login local
  transport input telnet
  exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

A1 Configuration File Scripts - Not Used In This Lab