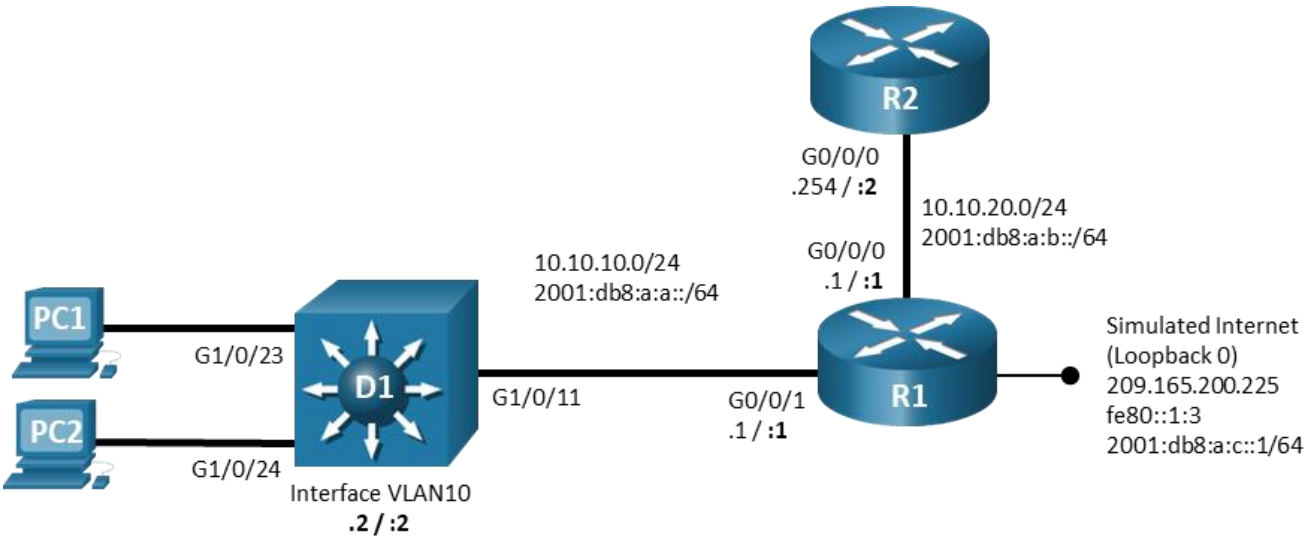
Lab - Troubleshoot IPv4 and IPv6 Addressing Issues

Topology



Addressing Table

Device	Interface	IPv4 Address/Mask	IPv6 Address/Prefix	IPv6 Link Local
R1	G0/0/0	10.10.20.1/24	2001:db8:a:b::1/64	fe80::1:1
	G0/0/1	10.10.10.1/24	2001:db8:a:a::1/64	fe80::1:2
	Lo0	209.165.200.225/29	2001:db8:a:c::1/64	fe80::1:3
R2	G0/0/0	10.10.20.254/24	2001:db8:a:b::1/64	fe80::2:1
D1	VLAN 10	10.10.10.2/24	2001:db8:a:a::2/64	fe80::d1:1
PC1	NIC	DHCP	SLAAC	EUI-64
PC2	NIC	DHCP	SLAAC	EUI-64

Objectives

Troubleshoot network issues related to IPv4 and IPv6 Addressing.

Background / Scenario

In this topology, router R1 provides connectivity to a simulated internet for VLAN 10. R2 serves as a DHCP server. Switch D1 provides connectivity for VLAN 10. 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.

Required Resources

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

Instructions

Part 1: Trouble Ticket 1.1.2.1

Scenario:

PC1 is unable to access resources on web server 209.165.200.225.

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

Device	Command
R1	`copy flash:/enarsi/1.1.2.1-r1-config.txt run`
R2	`copy flash:/enarsi/1.1.2.1-r2-config.txt run`
D1	`copy flash:/enarsi/1.1.2.1-d1-config.txt run`

- PC1 and PC2 should be configured for and receive an address from an IPv4 DHCP server.
- 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.

Part 2: Trouble Ticket 1.1.2.2

Scenario:

PC1 and PC2 are unable to lease IPv4 addresses from the DHCP server.

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

Device	Command
R1	`copy flash:/enarsi/1.1.2.2-r1-config.txt run`
R2	`copy flash:/enarsi/1.1.2.2-r2-config.txt run`
D1	`copy flash:/enarsi/1.1.2.2-d1-config.txt run`

- PC1 and PC2 should be configured for and receive an address from an IPv4 DHCP server.
- 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.

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 (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)

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 (Cisco 3650) Reset Script - The default 3650 SDM template supports IPv6, 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
```

R1 Configuration File Scripts

!R1 - Trouble Ticket # 1

```
tclsh
puts [ open "flash:/enarsi/1.1.2.1-r1-config.txt" w+ ] {
hostname R1
banner motd # This is R1, Trouble Ticket 1.1.2.1 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
ipv6 unicast-routing
interface g0/0/0
ip address 10.10.20.1 255.255.255.0
ipv6 address fe80::1:1 link-local
ipv6 address 2001:db8:a:b::1/64
no shutdown
exit
interface g0/0/1
ip address 10.10.10.1 255.255.255.0
ipv6 address fe80::1:2 link-local
ipv6 address 2001:db8:a:a::1/64
ipv6 nd other-config-flag
ip helper-address 10.10.20.254
ipv6 dhcp relay destination 2001:db8:a:b::2
no shutdown
exit
interface loopback0
ip address 209.165.200.225 255.255.255.248
ipv6 address fe80::1:3 link-local
ipv6 address 2001:db8:a:c::1/64
no shutdown
exit
ip route 0.0.0.0 0.0.0.0 loopback0
ipv6 route ::/0 loopback0
line con 0
 exec-timeout 0 0
 logging synchronous
 exit
line vty 0 4
 login local
 transport input telnet
 exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

!R1 - Trouble Ticket # 2

```
tclsh
puts [ open "flash:/enarsi/1.1.2.2-r1-config.txt" w+ ] {
hostname R1
banner motd # This is R1, Trouble Ticket 1.1.2.2 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
ipv6 unicast-routing
interface g0/0/0
ip address 10.10.20.1 255.255.255.0
ipv6 address fe80::1:1 link-local
ipv6 address 2001:db8:a:b::1/64
ip helper-address 10.10.20.254
no shutdown
exit
interface g0/0/1
ip address 10.10.10.1 255.255.255.0
ipv6 address fe80::1:2 link-local
ipv6 address 2001:db8:a:a::1/64
ipv6 nd other-config-flag
ipv6 dhcp relay destination 2001:db8:a:b::2
no shutdown
exit
interface loopback0
ip address 209.165.200.225 255.255.255.248
ipv6 address fe80::1:3 link-local
ipv6 address 2001:db8:a:c::1/64
no shutdown
exit
ip route 0.0.0.0 0.0.0.0 loopback0
ipv6 route ::/0 loopback0
line con 0
 exec-timeout 0 0
 logging synchronous
 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/1.1.2.1-r2-config.txt" w+ ] {
hostname R2
banner motd # This is R2, Trouble Ticket 1.1.2.1 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
ipv6 unicast-routing
ip dhcp excluded-address 10.10.10.1 10.10.10.100
ip dhcp pool LAN4_10
 network 10.10.10.0 255.255.255.0
 default-router 10.10.10.254
 domain-name ccnp4lab.com
 dns-server 10.10.20.254
 exit
ipv6 dhcp pool LAN6_A
 dns-server 2001:db8:a:b::1
 domain-name ccnp6lab.om
 exit
interface g0/0/0
ip address 10.10.20.254 255.255.255.0
ipv6 address fe80::2:1 link-local
ipv6 address 2001:db8:a:b::2/64
ipv6 dhcp server LAN6_A
no shutdown
exit
ip route 0.0.0.0 0.0.0.0 10.10.20.1
ipv6 route ::/0 2001:db8:a:b::1
line con 0
 exec-timeout 0 0
 logging synchronous
 exit
line vty 0 4
 login local
 transport input telnet
 exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

!R2 - Trouble Ticket # 2

```
tclsh
puts [ open "flash:/enarsi/1.1.2.2-r2-config.txt" w+ ] {
```

```
hostname R2
banner motd # This is R2, Trouble Ticket 1.1.2.2 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
ipv6 unicast-routing
ip dhcp excluded-address 10.10.10.1 10.10.10.100
ip dhcp pool LAN4_10
 network 10.10.10.0 255.255.255.0
 default-router 10.10.10.1
 domain-name ccnp4lab.com
 dns-server 10.10.20.1
 exit
ipv6 dhcp pool LAN6_A
 dns-server 2001:db8:a:b::1
 domain-name ccnp6lab.om
 exit
interface g0/0/0
ip address 10.10.20.254 255.255.255.0
ipv6 address fe80::2:1 link-local
ipv6 address 2001:db8:a:b::2/64
ipv6 dhcp server LAN6_A
no shutdown
exit
ip route 0.0.0.0 0.0.0.0 10.10.20.1
ipv6 route ::/0 2001:db8:a:b::1
line con 0
 exec-timeout 0 0
 logging synchronous
 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/1.1.2.1-d1-config.txt" w+ ] {
hostname D1
banner motd # This is D1, Trouble Ticket 1.1.2.1 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
interface range g1/0/1 - 24
 switchport mode access
 shutdown
 exit
interface g1/0/11
 switchport mode access
 switchport access vlan 10
 no shutdown
 exit
interface range g1/0/23-24
 switchport mode access
 switchport access vlan 10
 no shutdown
 exit
interface vlan 10
 ip address 10.10.10.2 255.255.255.0
 no shutdown
 exit
ip default-gateway 10.10.10.1
line con 0
 exec-timeout 0 0
 logging synchronous
 exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```

!D1 - Trouble Ticket # 2

```
tclsh
puts [ open "flash:/enarsi/1.1.2.2-d1-config.txt" w+ ] {
hostname D1
banner motd # This is D1, Trouble Ticket 1.1.2.2 #
enable secret cisco12345
username admin privilege 15 algorithm-type scrypt secret cisco12345
interface range g1/0/1 - 24
 switchport mode access
```

```
 shutdown
 exit
interface g1/0/11
 switchport mode access
 switchport access vlan 10
 no shutdown
 exit
interface range g1/0/23-24
 switchport mode access
 switchport access vlan 10
 no shutdown
 exit
interface vlan 10
 ip address 10.10.10.2 255.255.255.0
 no shutdown
 exit
ip default-gateway 10.10.10.1
line con 0
 exec-timeout 0 0
 logging synchronous
 exit
alias exec reset.now tclsh flash:/enarsi/reset.tcl
end
}
tclquit
```