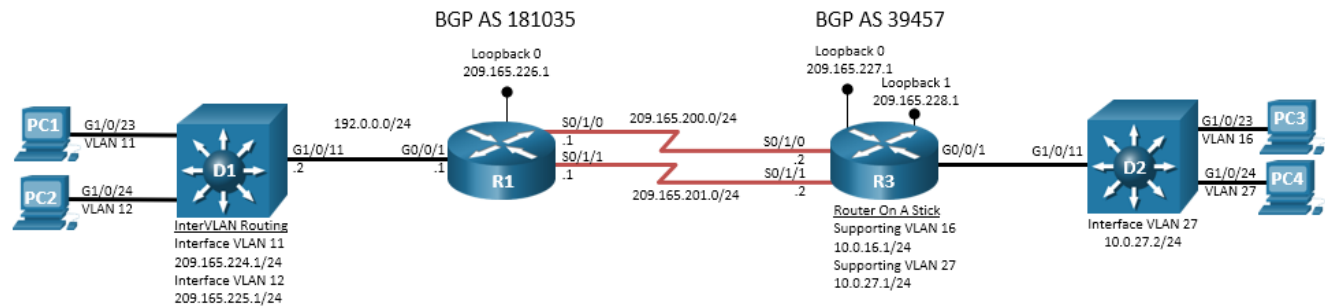


## Lab - Troubleshoot IPv4 ACLs

### Topology



### Addressing Table

Device	Interface	IP Address	Subnet Mask
R1	G0/0/1	192.0.0.1	255.255.255.0
	S0/1/0	209.165.200.1	255.255.255.0
	S0/1/1	209.165.201.1	255.255.255.0
	Loopback0	209.165.226.1	255.255.255.0
R3	G0/0/1.16	10.0.16.1	255.255.255.0
	G0/0/1.27	10.0.27.1	255.255.255.0
	S0/1/0	209.165.200.2	255.255.255.0
	S0/1/1	209.165.201.2	255.255.255.0
	Loopback0	209.165.227.1	255.255.255.0
	Loopback1	209.165.228.1	255.255.255.0
D1	G1/0/11	192.0.0.2	255.255.255.0
	VLAN 11	209.165.224.1	255.255.255.0
	VLAN 12	209.165.225.1	255.255.255.0
PC1	NIC	DHCP	
PC2	NIC	DHCP	
PC3	NIC	DHCP	
PC4	NIC	DHCP	

### Objectives

Troubleshoot network issues related to the configuration and operation of ACLs for IPv4.

## Background / Scenario

In this topology, R1 and D1 are OSPF neighbors, while R1 and R3 are BGP neighbors. Switch D1 provides inter-VLAN routing for two subnets. R3 provides inter-VLAN routing for two subnets, and switch D2 provides connectivity for the two VLANs supporting those subnets. The BGP relationship between R1 and R3 is established using EBGP multihop between the router's respective Loopback 0 interfaces. 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 devices 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)
- 2 Switches (Cisco 3560 with Cisco IOS XE Release 16.9.4 universal image or comparable)
- 4 PCs (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 21.1.2.1

#### Scenario:

A security consultant worked overnight making R1 and R3 compliant with RFC 1918. After the consultant finished the task, a business-critical connection between PC1 and PC3 is no longer operational. The task of finding and fixing the error(s) is now your job.

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

Device	Command
R1	<code>copy flash:/enarsi/21.1.2.1-r1-config.txt run</code>
R3	<code>copy flash:/enarsi/21.1.2.1-r3-config.txt run</code>
D1	<code>copy flash:/enarsi/21.1.2.1-d1-config.txt run</code>
D2	<code>copy flash:/enarsi/21.1.2.1-d2-config.txt run</code>

- PCs 1, 2, 3, and 4 receive their addressing via DHCP for IPv4.
- 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 21.1.2.2

#### Scenario:

A junior network administrator has attempted to tune access control lists to improve security. After doing so, PC2 is no longer able to communicate with devices with the IPv4 addresses 209.165.227.1 or 209.165.228.1. This problem needs to be solved to allow for business operations to continue.

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

Device	Command
R1	<b>copy flash:/enarsi/21.1.2.2-r1-config.txt run</b>
R3	<b>copy flash:/enarsi/21.1.2.2-r3-config.txt run</b>
D1	<b>copy flash:/enarsi/21.1.2.2-d1-config.txt run</b>
D2	<b>copy flash:/enarsi/21.1.2.2-d2-config.txt run</b>

- PCs 1, 2, 3, and 4 receive their addressing via DHCP for IPv4.
- 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 3: Trouble Ticket 21.1.2.3

#### Scenario:

Security is an important consideration in your network. Over the weekend, a junior network administrator was working to improve remote access security with BGP AS 181035. It is 8:00 Monday morning, and router R1 and switch D1 are refusing Telnet connections. You need to find and fix this error as soon as possible.

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

Device	Command
R1	<b>copy flash:/enarsi/21.1.2.3-r1-config.txt run</b>
R3	<b>copy flash:/enarsi/21.1.2.3-r3-config.txt run</b>
D1	<b>copy flash:/enarsi/21.1.2.3-d1-config.txt run</b>

Device	Command
D2	<code>copy flash:/enarsi/21.1.2.3-d2-config.txt run</code>

- PCs 1, 2, 3, and 4 receive their addressing via DHCP for IPv4.
- 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.