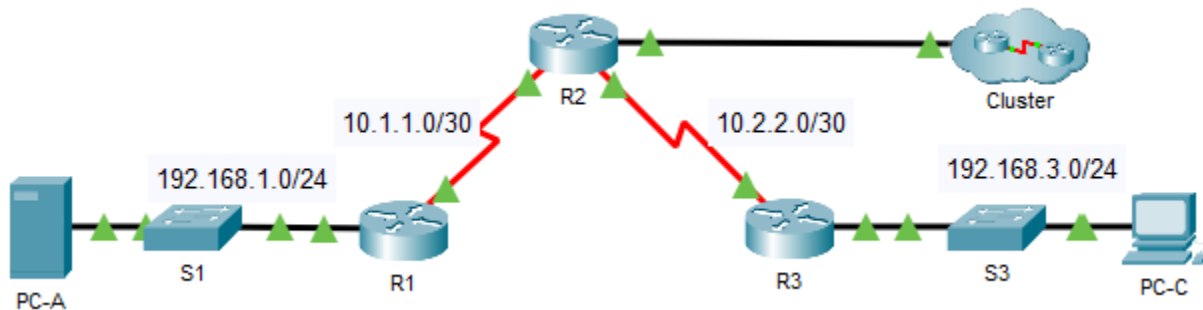# Packet Tracer - Configure IP ACLs to Mitigate Attacks

Topology

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway	Switch Port
R1	G0/1	192.168.1.1	255.255.255.0	N/A	S1 F0/5
	S0/0/0 (DCE)	10.1.1.1	255.255.255.252		N/A
R2	S0/0/0	10.1.1.2	255.255.255.252	N/A	N/A
	S0/0/1 (DCE)	10.2.2.2	255.255.255.252		
	G0/0	209.165.200.225	255.255.255.224		
	Lo0	192.168.2.1	255.255.255.0		
R3	G0/1	192.168.3.1	255.255.255.0	N/A	S3 F0/5
	S0/0/1	10.2.2.1	255.255.255.252		N/A
PC-A	NIC	192.168.1.3	255.255.255.0	192.168.1.1	S1 F0/6
PC-C	NIC	192.168.3.3	255.255.255.0	192.168.3.1	S3 F0/18

Objectives

- Verify connectivity among devices before firewall configuration.
- Use ACLs to ensure remote access to the routers is available only from management station PC-C.
- Configure ACLs on R1 and R3 to mitigate attacks.
- Verify ACL functionality.

Background/Scenario

Access to routers R1, R2, and R3 should only be permitted from PC-C, the management station. PC-C is also used for connectivity testing to PC-A, which is a server providing DNS, SMTP, FTP, and HTTPS services.

Standard operating procedure is to apply ACLs on edge routers to mitigate common threats based on source and destination IP address. In this activity, you will create ACLs on edge routers R1 and R3 to achieve this goal. You will then verify ACL functionality from internal and external hosts.

The routers have been pre-configured with the following:

- o Enable password: **ciscoenpa55**
- o Password for console: **ciscoconpa55**
- o SSH logon username and password: **SSHadmin**/**ciscosshpa55**
- o IP addressing
- o Static routing

Part 1: Verify Basic Network Connectivity

Verify network connectivity prior to configuring the IP ACLs.

Step 1: From PC-A, verify connectivity to PC-C and R2.

a. From the command prompt, ping **PC-C** (192.168.3.3).

b. From the command prompt, establish an SSH session to **R2** Lo0 interface (192.168.2.1) using username **SSHadmin** and password **ciscosshpa55**. When finished, exit the SSH session.

```
SERVER> ssh -l SSHadmin 192.168.2.1
```

Step 2: From PC-C, verify connectivity to PC-A and R2.

a. From the command prompt, ping **PC-A** (192.168.1.3).

b. From the command prompt, establish an SSH session to **R2** Lo0 interface (192.168.2.1) using username **SSHadmin** and password **ciscosshpa55**. Close the SSH session when finished.

c. Establish another SSH session to R2 G0/0 interface (209.165.200.225) using username **SSHadmin** and password **ciscosshpa55**. When finished, exit the SSH session.

d. Open a web browser to the **PC-A** server (192.168.1.3) to display the web page. Close the browser when done.

Part 2: Secure Access to Routers

Step 1: Configure ACL 10 to block all remote access to the routers except from PC-C.

a. Use the **access-list** command to create a numbered IP ACL on **R1**, **R2**, and **R3**.

Step 2: Apply ACL 10 to ingress traffic on the VTY lines.

Use the **access-class** command to apply the access list to incoming traffic on the VTY lines.

Step 3: Verify exclusive access from management station PC-C.

a. Establish an SSH session to 192.168.2.1 from **PC-C** (should be successful).

b. Establish an SSH session to 209.165.200.225 from **PC-C** (should be successful).

c. Establish an SSH session to 192.168.2.1 from **PC-A** (should fail).

Part 3: Create a Numbered IP ACL 120 on R1

Create an IP ACL numbered 120 with the following rules:

- o   Permit any outside host to access DNS, SMTP, and FTP services on server **PC-A.**
- o   Deny any outside host access to HTTPS services on **PC-A.**
- o   Permit **PC-C** to access **R1** via SSH.

Step 1: Verify that PC-C can access the PC-A via HTTPS using the web browser.

Be sure to disable HTTP and enable HTTPS on server **PC-A**.

Step 2: Configure ACL 120 to specifically permit and deny the specified traffic.

Use the **access-list** command to create a numbered IP ACL.

Step 3: Apply the ACL on the correct interface.

Use the **ip access-group** command to apply the access list on the correct interface.

On which interface should the ACL be applied, and in which direction?

Step 4: Verify that PC-C cannot access PC-A via HTTPS using the web browser.

Part 4: Modify an Existing ACL on R1

Permit ICMP echo replies and destination unreachable messages from the outside network (relative to **R1**). Deny all other incoming ICMP packets.

Step 1: Verify that PC-A cannot successfully ping the loopback interface on R2.

Step 2: Make any necessary changes to ACL 120 to permit and deny the specified traffic.

Use the **access-list** command to create a numbered IP ACL.

Step 3: Verify that PC-A can successfully ping the loopback interface on R2.

Part 5: Create a Numbered IP ACL 110 on R3

Deny all outbound packets with source address outside the range of internal IP addresses on **R3**.

Step 1: Configure ACL 110 to permit only traffic from the inside network.

Use the **access-list** command to create a numbered IP ACL.

Step 2: Apply the ACL on the correct interface.

Use the **ip access-group** command to apply the access list on the correct interface.

On which interface should the ACL be applied, and in which direction?

Part 6: Create a Numbered IP ACL 100 on R3

On **R3**, block all packets containing the source IP address from the following pool of addresses: any RFC 1918 private addresses, 127.0.0.0/8, and any IP multicast address. Because **PC-C** is being used for remote administration, permit SSH traffic from the 10.0.0.0/8 network to return to the host **PC-C**.

Step 1: Configure ACL 100 to block all specified traffic from the outside network.

You should also block traffic sourced from your own internal address space if it is not an RFC 1918 address. In this activity, your internal address space is part of the private address space specified in RFC 1918.

Use the **access-list** command to create a numbered IP ACL.

Step 2: Apply the ACL on the correct interface.

Use the **ip access-group** command to apply the access list on the correct interface.

On which interface should the ACL be applied, and in which direction?

Step 3: Confirm that the specified traffic entering interface Serial 0/0/1 is handled correctly.

a. From the PC-C command prompt, ping the PC-A server. The ICMP echo replies are blocked by the ACL. Why?

b. Establish an SSH session to 192.168.2.1 from **PC-C**. What's the result? Why?

c. Establish an SSH session to 209.165.200.225. What's the result? Why?