Packet Filtering Using ACL

IP packets can be filtered using Access Control Lists (ACLs) to control what traffic enters and leaves a network. ACLs can be configured and applied in inbound and outbound directions on an interface for packet filtering.

Tool used: Cisco Packet Tracer

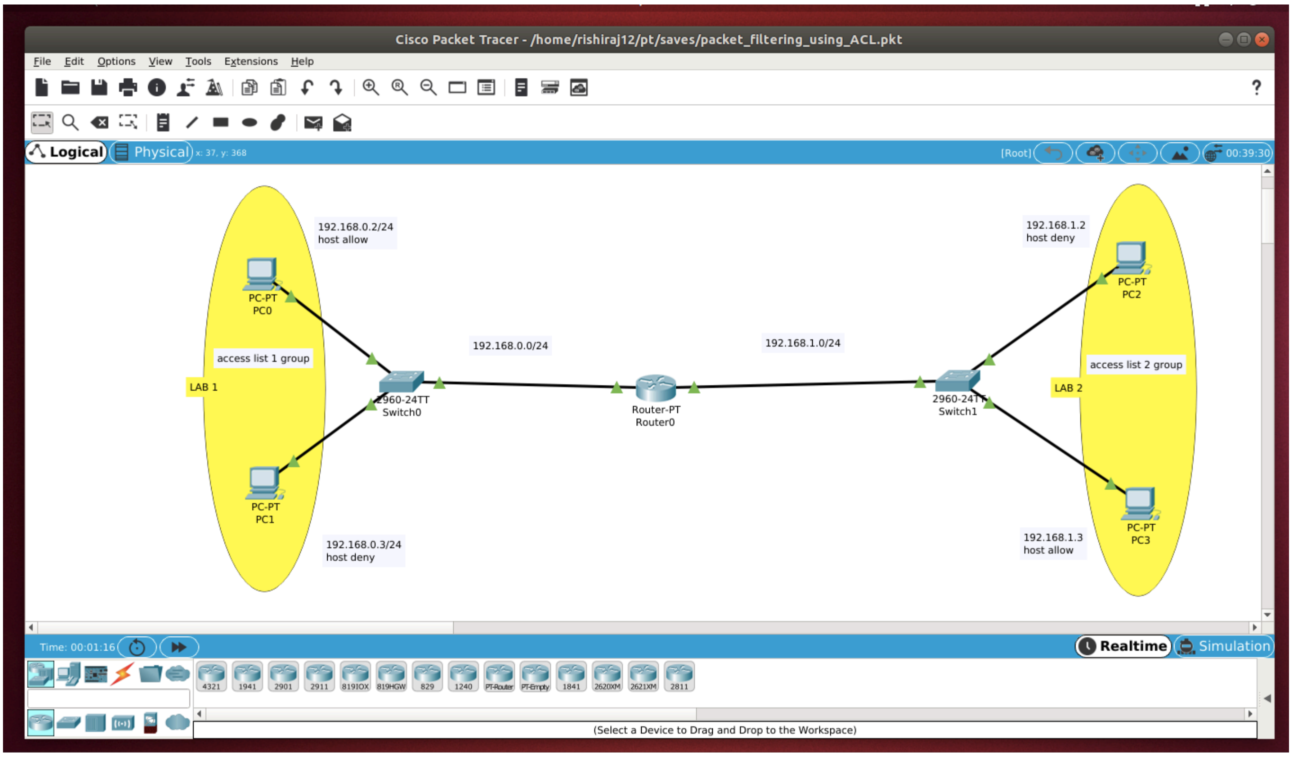
Steps:

1. Setting up network topology.
2. Filtering IP packets with standard ACL

Setting up network topology:

Network Topology:

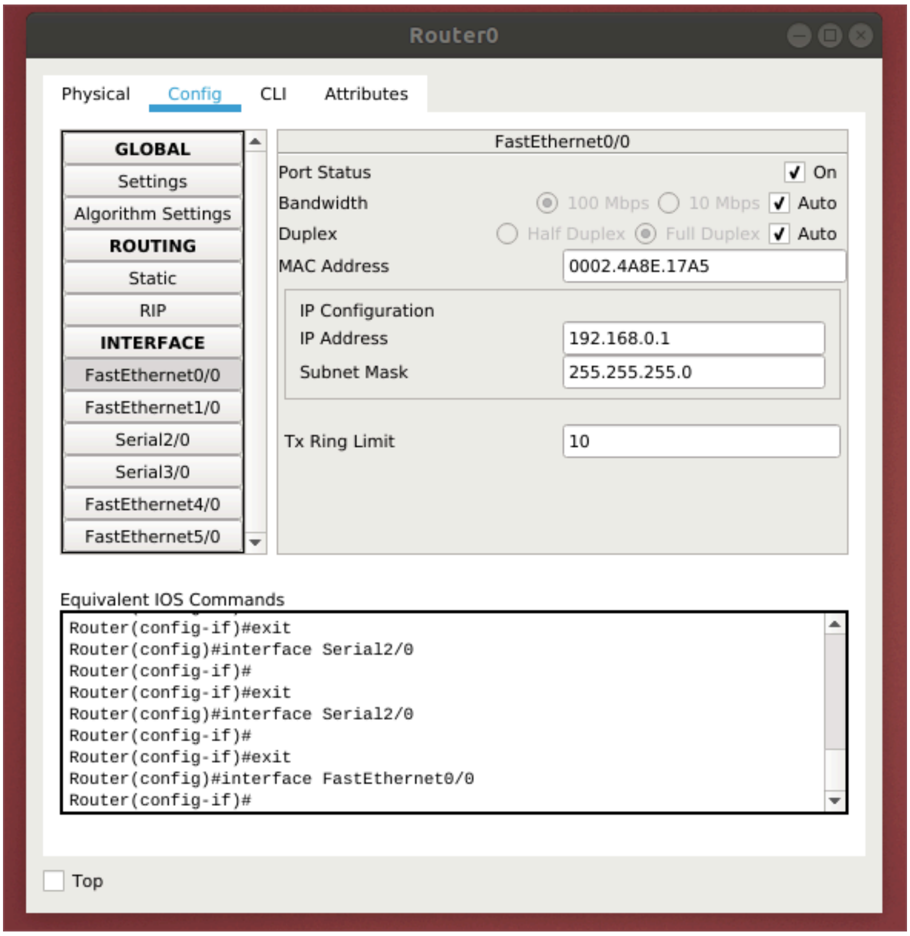
Setup the network topology as shown in the figure by dragging all the components from the component bar.



For each access list group setup at least two PCs with one switch for each group and one router and use automatically chosen type to connect the PCs with the switches and routers.

Configure the router as follows:

1. Click the router and navigate towards config, select fastEthernet 0/0 and enter the value of IP Address with 192.168.0.1, Subnet Mask is automatically assigned, and turn on the Port Status.
2. Do the same for fastEthernet 1/0, but enter the IP Address with the value 192.168.1.1.



FastEthernet0/0

Port Status ☑ On

Bandwidth ● 100 Mbps ○ 10 Mbps ☑ Auto

Duplex ○ Half Duplex ● Full Duplex ☑ Auto

MAC Address 0002.4A8E.17A5

IP Configuration

IP Address 192.168.0.1

Subnet Mask 255.255.255.0

Tx Ring Limit 10

Equivalent IOS Commands

```
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

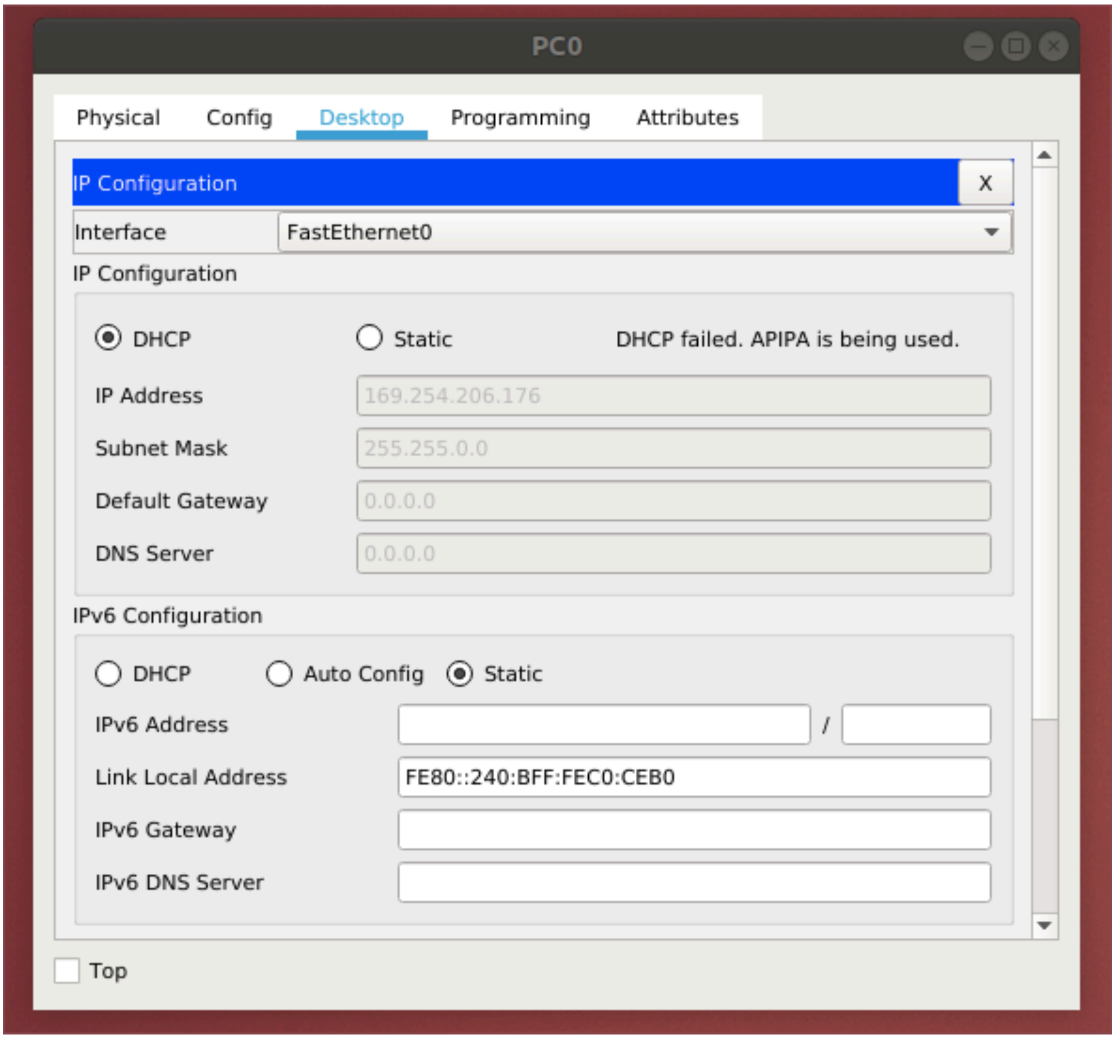
□ Top

3. Navigate towards the CLI.
4. Enter the following command to configure the router for DHCP:

```
# ctrl+z
# conf t
# ip dhcp pool abc
# network 192.168.0.0 255.255.255.0
# default-router 192.168.0.1
# ctrl+z
#  conf t
# ip dhcp pool abcd
# network 192.168.1.0 255.255.255.0
# default-router 192.168.1.1
```

Configure the PCs for DHCP routing:

1. Click the PC icon.
2. Navigate to the Desktop.
3. Select the IP Configuration.
4. Select the DHCP option in IPv4 IP Configuration.



IP Configuration

Interface: FastEthernet0

IP Configuration

● DHCP ○ Static DHCP failed. APIPA is being used.

IP Address: 169.254.206.176

Subnet Mask: 255.255.0.0

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

IPv6 Configuration

○ DHCP ○ Auto Config ● Static

IPv6 Address: /

Link Local Address: FE80::240:BFF:FEC0:CEB0

IPv6 Gateway:

IPv6 DNS Server:

□ Top

Filtering IP packets with standard ACL:

Router ACL Configuration:

Configure the router to filter the IP packets. In each group of PCs give one host permission to transmit and receive packets and deny the permission for the other.

Router ACL Configuration steps:

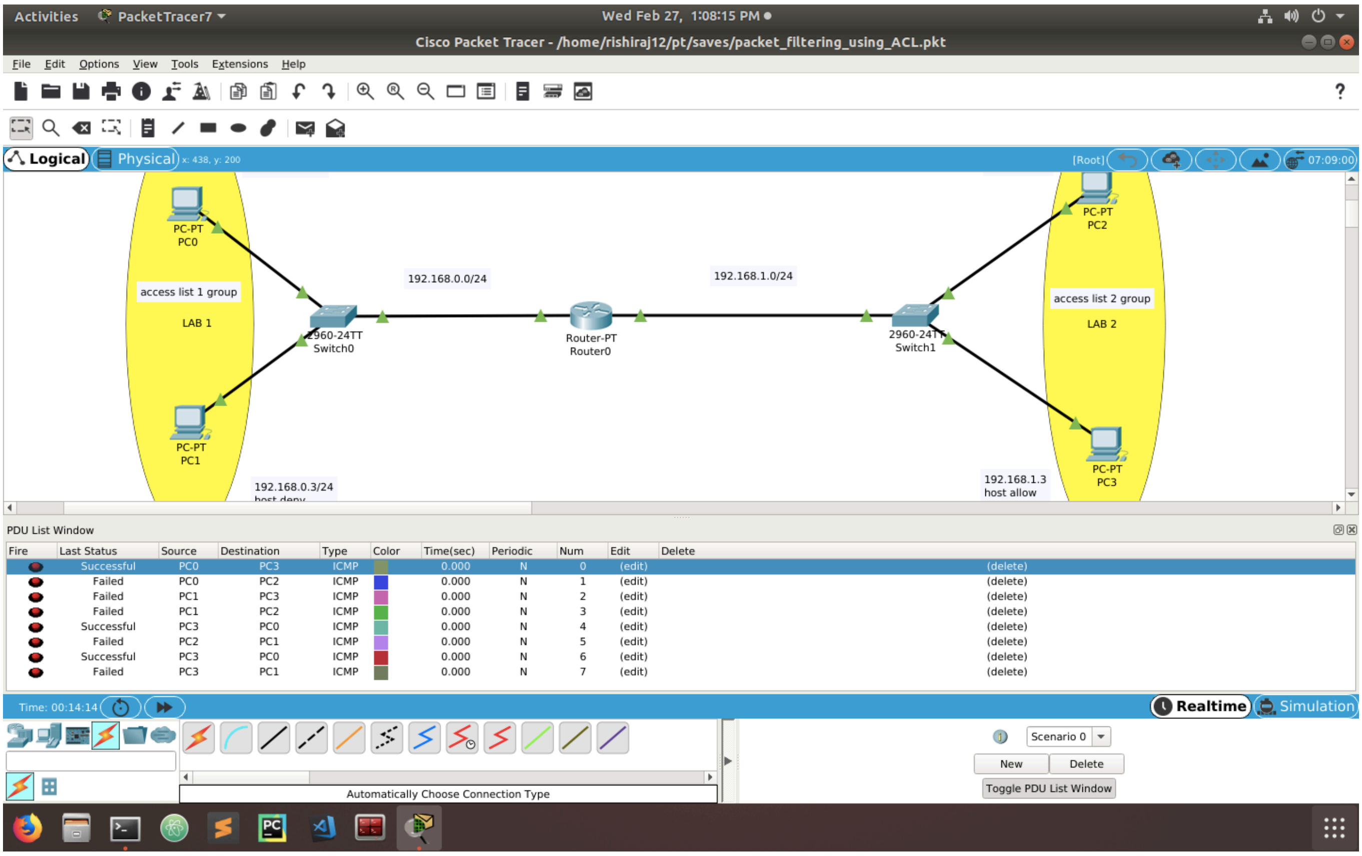
1. Click the router icon.
2. Navigate to the CLI.
3. Type the following command:

```
# ctrl+z
# en (Note: enter this command if the user privilege is not given)
# conf t
# access-list 1 permit host 192.168.0.2
# access-list 1 deny host 192.168.0.3
# interface fastEthernet 0/0
# ip access-group 1 in

# ctrl+Z
# conf t
# access-list 2 permit host 192.168.1.3
# access-list 2 deny host 192.168.1.2
# interface fastEthernet 1/0
# ip access-group 2 in
```

ACL Packet Filtering Test:

After configuring all the above steps test the PCs for packet filtering. Send simple Protocol data unit from each group to the other from all the PCs. PCs marked with “host deny” will neither transmit nor be able to receive from the other group. Check the simulation status for “Successful” or “Failed”. The transmission of simple PDU from permitted PC one group to another permitted PC of another group will show Successful Status and from permitted PC of one group to “host deny” PC of another group will display Failed status.



Cisco Packet Tracer - /home/rishiraj12/pt/saves/packet_filtering_using_ACL.pkt

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC0	PC3	ICMP	🟫	0.000	N	0	(edit)	(delete)
●	Failed	PC0	PC2	ICMP	🟦	0.000	N	1	(edit)	(delete)
●	Failed	PC1	PC3	ICMP	🟪	0.000	N	2	(edit)	(delete)
●	Failed	PC1	PC2	ICMP	🟩	0.000	N	3	(edit)	(delete)
●	Successful	PC3	PC0	ICMP	🟩	0.000	N	4	(edit)	(delete)
●	Failed	PC2	PC1	ICMP	🟪	0.000	N	5	(edit)	(delete)
●	Successful	PC3	PC0	ICMP	🟥	0.000	N	6	(edit)	(delete)
●	Failed	PC3	PC1	ICMP	🟫	0.000	N	7	(edit)	(delete)