Name:Harsh Kadu

Roll No : 33

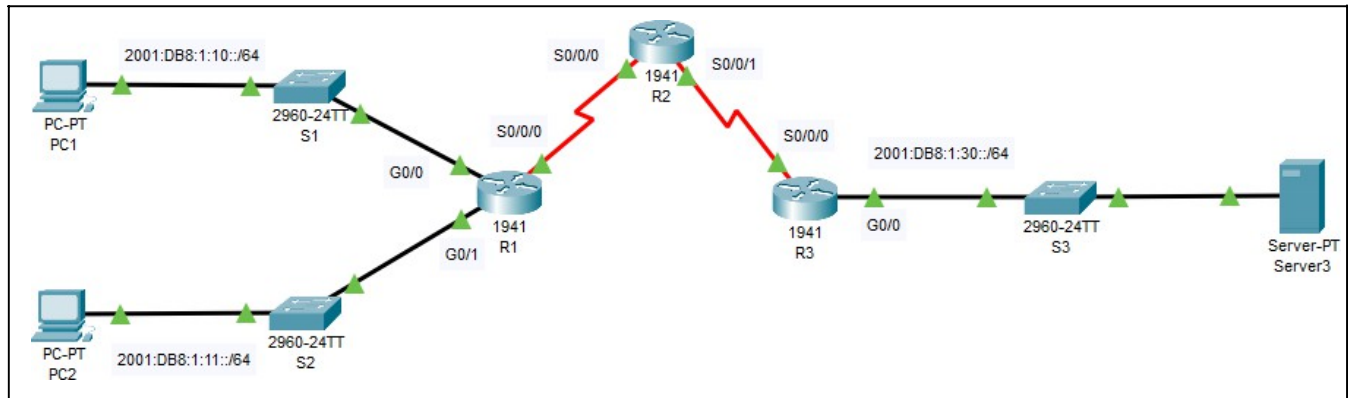## PRACTICAL 5

Aim: Configuring IPv6 ACLs.

TOPOLOGY

AddressingTable:

Device	Interface	IPv6 Address/Prefix	Default Gateway
Server 3	NIC	2001:DB8:1:30::30/64	FE80::30

Step1: Placethecomponentsasshowninthefigureaboveandsetupanetwork.Itisnecessary to configure eachcomponents placed in the network . Use proper connection wire to connect between the devices.

ToConfigurePC1

ClickonPC1→SelectDesktopTab→ClickonIPv6Configuration→GiveIPv6Address as (2001:DB8:1:10::2/64) → Give default gateway as (2001:DB8:1:10::1).

Name:Harsh Kadu   Roll No : 33

ToConfigurePC2

ClickonPC2→SelectDesktopTab→ClickonIPv6Configuration→GiveIPv6Address as (2001:DB8:1:11::2/64) → Give default gateway as (2001:DB8:1:11::1).

```
IPv6 Configuration
 ◯ Automatic        ◉ Static
 IPv6 Address          2001:DB8:1:11::2           / 64
 Link Local Address    FE80::200:CFF:FED4:C56
 Default Gateway       2001:DB8:1:11::1
 DNS Server
```

ToConfigureRoutersR1,R2,R3:

For Router R1

Click on Router R1→Go to CLI tab →Enter the following commands to configure each port

For GigabitEthernet0/0

```
R1>ena
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 unicast-routing
R1(config)#interface g0/0
R1(config-if)#ipv6 enable
R1(config-if)#ipv6 address 2001:DB8:1:10::1/64
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up

R1(config-if)#exit
```

For GigabitEthernet0/1

```
R1(config)#interface g0/1
R1(config-if)#ipv6 enable
R1(config-if)#ipv6 address 2001:DB8:1:11::1/64
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up
```

```
R1(config)#interface s0/0/0
R1(config-if)#ipv6 enable
R1(config-if)#ipv6 address 2001:DB8:1:28::1/64
R1(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
R1(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

Usingshowipv6interfacebriefcommanditwilllistalltheipaddressesassociatedwiththe router

```
R1#show ipv6 interface brief
GigabitEthernet0/0         [up/up]
    FE80::201:64FF:FE8D:4D01
    2001:DB8:1:10::1
GigabitEthernet0/1         [up/up]
    FE80::201:64FF:FE8D:4D02
    2001:DB8:1:11::1
Serial0/0/0                [down/down]
    FE80::201:64FF:FE8D:4D01
    2001:DB8:1:28::1
Serial0/0/1                [administratively down/down]
Serial0/1/0                [administratively down/down]
Serial0/1/1                [administratively down/down]
Vlan1                      [administratively down/down]
```

For Router R2

Click on Router R2→Go to CLI tab →Enter the following commands to configure each port

For S0/0/0

```
R2>ena
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ipv6 unicast-routing
R2(config)#interface s0/0/0
R2(config-if)#ipv6 enable
R2(config-if)#ipv6 address 2001:DB8:1:28::2/64
R2(config-if)#no shut

R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
state to up

R2(config-if)#exit
```

Name:Harsh Kadu   Roll No : 33

```
R2(config)#interface s0/0/1
R2(config-if)#ipv6 enable
R2(config-if)#ipv6 address 2001:DB8:1:29::2/64
R2(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/1, changed state to down
R2(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/1, changed state to up
```

Usingshowipv6interfacebriefcommanditwilllistalltheipaddressesassociatedwiththe router

```
R2>show ipv6 interface brief
GigabitEthernet0/0         [administratively down/down]
    unassigned
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [up/up]
    FE80::2D0:BCFF:FE63:D801
    2001:DB8:1:28::2
Serial0/0/1                [up/up]
    FE80::2D0:BCFF:FE63:D801
    2001:DB8:1:29::2
Serial0/1/0                [administratively down/down]
    unassigned
Serial0/1/1                [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned
```

For Router R3

For GigabitEthernet0/0

Click on Router R3→Go to CLI tab →Enter the following commands to configure each port

```
R3>ena
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 unicast-routing
R3(config)#interface g0/0
R3(config-if)#ipv6 enable
R3(config-if)#ipv6 address 2001:DB8:1:30::1/64
R3(config-if)#no shut

R3(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0,
changed state to up

R3(config-if)#exit
```

Name:Harsh Kadu   Roll No : 33

For S0/0/0

Click on Router R3→Go to CLI tab →Enter the following commands to configure each port

```
R3(config)#interface s0/0/0
R3(config-if)#ipv6 enable
R3(config-if)#ipv6 address 2001:DB8:1:29::1/64
R3(config-if)#no shut

R3(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
```

Usingshowipv6interfacebriefcommanditwilllistalltheipaddressesassociatedwiththe router

```
R3>show ip interface brief
Interface              IP-Address      OK? Method Status
Protocol
GigabitEthernet0/0     unassigned      YES unset  up
up
GigabitEthernet0/1     unassigned      YES unset  administratively
down down
Serial0/0/0            unassigned      YES unset  up
up
Serial0/0/1            unassigned      YES unset  administratively
down down
Serial0/1/0            unassigned      YES unset  administratively
down down
Serial0/1/1            unassigned      YES unset  administratively
down down
Vlan1                  unassigned      YES unset  administratively
down down
```

TohaveacommunicationoveranetworkbetweenthedevicessetRIProutingbetweenroutersto have communication.

For Router R1:

Click on Router R1→Go to CLI tab →Enter the following commands step by step

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Name:Harsh Kadu   Roll No : 33

```
R1>enable
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 router rip RIPng
R1(config-rtr)#interface g0/0
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#exit
R1(config)#interface g0/1
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#exit
R1(config)#interface s0/0/0
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console
```

Using show ipv6 route command verify the routing

```
R1#show ipv6 route
IPv6 Routing Table - 7 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS
summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr -
Redirect
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF
ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
C   2001:DB8:1:10::/64 [0/0]
     via GigabitEthernet0/0, directly connected
L   2001:DB8:1:10::1/128 [0/0]
     via GigabitEthernet0/0, receive
C   2001:DB8:1:11::/64 [0/0]
     via GigabitEthernet0/1, directly connected
L   2001:DB8:1:11::1/128 [0/0]
     via GigabitEthernet0/1, receive
C   2001:DB8:1:28::/64 [0/0]
     via Serial0/0/0, directly connected
L   2001:DB8:1:28::1/128 [0/0]
     via Serial0/0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

For Router R2:

Click on Router R2→Go to CLI tab →Enter the following commands step by step

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EMPOWERED AUTONOMOUS.

Name:Harsh Kadu   Roll No : 33

```
R2>enable
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ipv6 router rip RIPng
R2(config-rtr)#interface s0/0/0
R2(config-if)#ipv6 rip RIPng enable
R2(config-if)#exit
R2(config)#interface s0/0/1
R2(config-if)#ipv6 rip RIPng enable
```

Using show ipv6 route command verify the routing

```
R2#show ipv6 route
IPv6 Routing Table - 7 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS
summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr -
Redirect
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF
ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
R    2001:DB8:1:10::/64 [120/2]
      via FE80::2E0:F9FF:FE85:2B01, Serial0/0/0
R    2001:DB8:1:11::/64 [120/2]
      via FE80::2E0:F9FF:FE85:2B01, Serial0/0/0
C    2001:DB8:1:28::/64 [0/0]
      via Serial0/0/0, directly connected
L    2001:DB8:1:28::2/128 [0/0]
      via Serial0/0/0, receive
C    2001:DB8:1:29::/64 [0/0]
      via Serial0/0/1, directly connected
L    2001:DB8:1:29::2/128 [0/0]
      via Serial0/0/1, receive
L    FF00::/8 [0/0]
      via Null0, receive
```

For Router R3:

Click on Router R3→Go to CLI tab →Enter the following commands step by step

```
R3>enable
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 router rip RIPng
R3(config-rtr)#interface g0/0
R3(config-if)#ipv6 rip RIPng enable
R3(config-if)#interface s0/0/0
R3(config-if)#ipv6 rip RIPng enable
R3(config-if)#^Z
R3#
%SYS-5-CONFIG_I: Configured from console by console
```

Name:Harsh Kadu   Roll No : 33

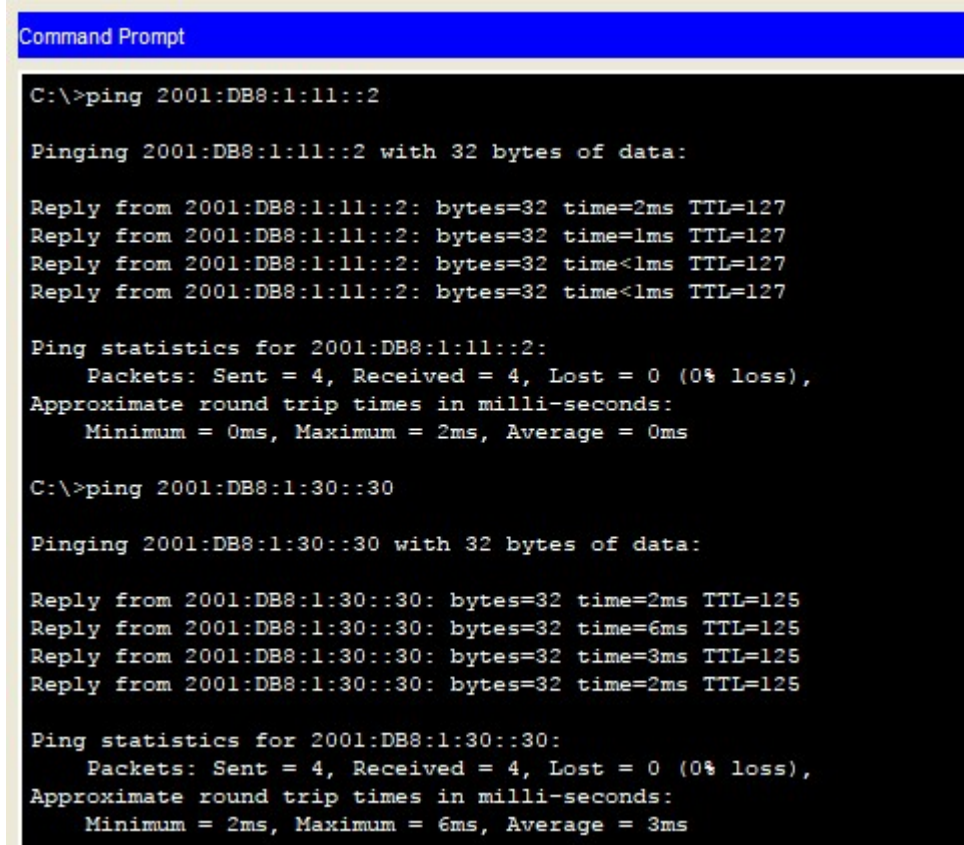Using show ipv6 route command verify the routing

```
R3#show ipv6 route
IPv6 Routing Table - 8 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS
summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr -
Redirect
       O - OSPF intra, OI - OSPF inter, OE1 - OSPF ext 1, OE2 - OSPF
ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
       D - EIGRP, EX - EIGRP external
R   2001:DB8:1:10::/64 [120/3]
     via FE80::2E0:8FFF:FE2A:2901, Serial0/0/0
R   2001:DB8:1:11::/64 [120/3]
     via FE80::2E0:8FFF:FE2A:2901, Serial0/0/0
R   2001:DB8:1:28::/64 [120/2]
     via FE80::2E0:8FFF:FE2A:2901, Serial0/0/0
C   2001:DB8:1:29::/64 [0/0]
     via Serial0/0/0, directly connected
L   2001:DB8:1:29::1/128 [0/0]
     via Serial0/0/0, receive
C   2001:DB8:1:30::/64 [0/0]
     via GigabitEthernet0/0, directly connected
L   2001:DB8:1:30::1/128 [0/0]
     via GigabitEthernet0/0, receive
L   FF00::/8 [0/0]
     via Null0, receive
```

Nowcheckwhetherthedevicesareconnectedfromonenetworktoanotheronceconnectionis done.

FromPC1:

ClickonPC1→ Gotodesktopoption→ GotoCommandprompt→ enterthecommandas shown below:

Name:Harsh Kadu   Roll No : 33

```
Command Prompt

C:\>ping 2001:DB8:1:11::2

Pinging 2001:DB8:1:11::2 with 32 bytes of data:

Reply from 2001:DB8:1:11::2: bytes=32 time=2ms TTL=127
Reply from 2001:DB8:1:11::2: bytes=32 time=1ms TTL=127
Reply from 2001:DB8:1:11::2: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:1:11::2: bytes=32 time<1ms TTL=127

Ping statistics for 2001:DB8:1:11::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

C:\>ping 2001:DB8:1:30::30

Pinging 2001:DB8:1:30::30 with 32 bytes of data:

Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=6ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=3ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125

Ping statistics for 2001:DB8:1:30::30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 6ms, Average = 3ms
```

FromPC2:

ClickonPC2→ Gotodesktopoption→ GotoCommandprompt→ enterthecommandas shown below:

Name:Harsh Kadu   Roll No : 33

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 2001:DB8:1:10::2

Pinging 2001:DB8:1:10::2 with 32 bytes of data:

Reply from 2001:DB8:1:10::2: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:1:10::2: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:1:10::2: bytes=32 time<1ms TTL=127
Reply from 2001:DB8:1:10::2: bytes=32 time=1ms TTL=127

Ping statistics for 2001:DB8:1:10::2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 2001:DB8:1:30::30

Pinging 2001:DB8:1:30::30 with 32 bytes of data:

Reply from 2001:DB8:1:30::30: bytes=32 time=11ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125

Ping statistics for 2001:DB8:1:30::30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 11ms, Average = 4ms
```

Sinceitsnowgetconnectedandwecansharemessagesfromonenetworktoanotherandfurther Operation can be performed . Hence it is necessary to configure devices within network and outside the network to do further operations on it.

Part1:Configure,Apply,andVerifyanIPv6ACL

Step 1 : Configure an ACL that will block HTTP and HTTPS access.

Configure an ACL named BLOCK_HTTP on R1 with the following statements.

a. BlockHTTPandHTTPS trafficfromreaching **Server3.**

b. AllowallotherIPv6trafficto pass.

```
R1#enable
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 access-list BLOCK_HTTP
R1(config-ipv6-acl)#deny tcp any host 2001:DB8:1:30::30 eq www
R1(config-ipv6-acl)#deny tcp any host 2001:DB8:1:30::30 eq 443
R1(config-ipv6-acl)#permit ipv6 any any
```
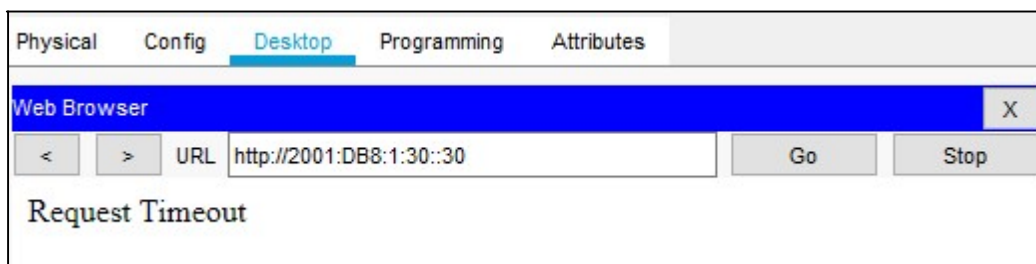
Step 2: Apply the ACL to the correct interface.

 Applythe ACL onthe interface closestto the sourceof the trafficto be blocked.

```
R1(config-ipv6-acl)#interface g0/0
R1(config-if)#ipv6 traffic-filter BLOCK_HTTP in
```
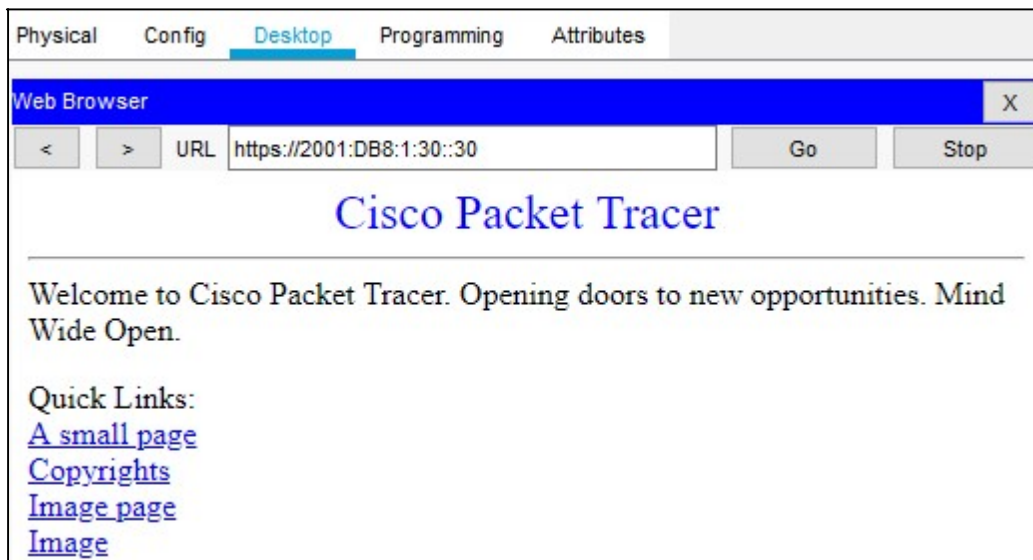
Step3: VerifytheACLimplementation.

VerifythattheACLisoperatingasintendedbyconductingthefollowing tests:

- OpenthewebbrowserofPC1tohttp://2001:DB8:1:30::30orhttps://2001:DB8:1:30::30. The
  website should not appear.

Physical	Config	Desktop	Programming	Attributes	

Web Browser   X

| < | > | URL | http://2001:DB8:1:30::30 | | Go | Stop |

Request Timeout

- OpenthewebbrowserofPC2tohttp://2001:DB8:1:30::30orhttps://2001:DB8:1:30::30. The
  website appear.

Physical	Config	Desktop	Programming	Attributes	

Web Browser   X

| < | > | URL | https://2001:DB8:1:30::30 | | Go | Stop |

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- Ping from PC1 to 2001:DB8:1:30::30. The ping should be successful.

```
C:\>ping 2001:DB8:1:30::30

Pinging 2001:DB8:1:30::30 with 32 bytes of data:

Reply from 2001:DB8:1:30::30: bytes=32 time=11ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=2ms TTL=125

Ping statistics for 2001:DB8:1:30::30:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 11ms, Average = 4ms
```

Part2:Configure,Apply,andVerifyaSecondIPv6ACL

Step 1: Create an access list to block ICMP.

Configure an ACL named BLOCK_ICMP on R3 with the following statements:

a. BlockallICMP trafficfrom anyhosts toany destination.

b. AllowallotherIPv6trafficto pass.

Click on Router R3→Go to CLI tab →Enter the following commands step by step

```
R3>ena
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 access-list BLOCK_ICMP
R3(config-ipv6-acl)#deny icmp any any
R3(config-ipv6-acl)#permit ipv6 any any
```

Step 2: Apply the ACL to the correct interface.

Click on Router R3→Go to CLI tab →Enter the following commands step by step

```
R3(config-ipv6-acl)#interface g0/0
R3(config-if)#ipv6 traffic-filter BLOCK_ICMP out
```

Step3: Verifythattheproperaccesslistfunctions.

- Ping from PC2 to 2001:DB8:1:30::30. The ping should fail.

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```
C:\>ping 2001:DB8:1:30::30

Pinging 2001:DB8:1:30::30 with 32 bytes of data:

Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.

Ping statistics for 2001:DB8:1:30::30:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

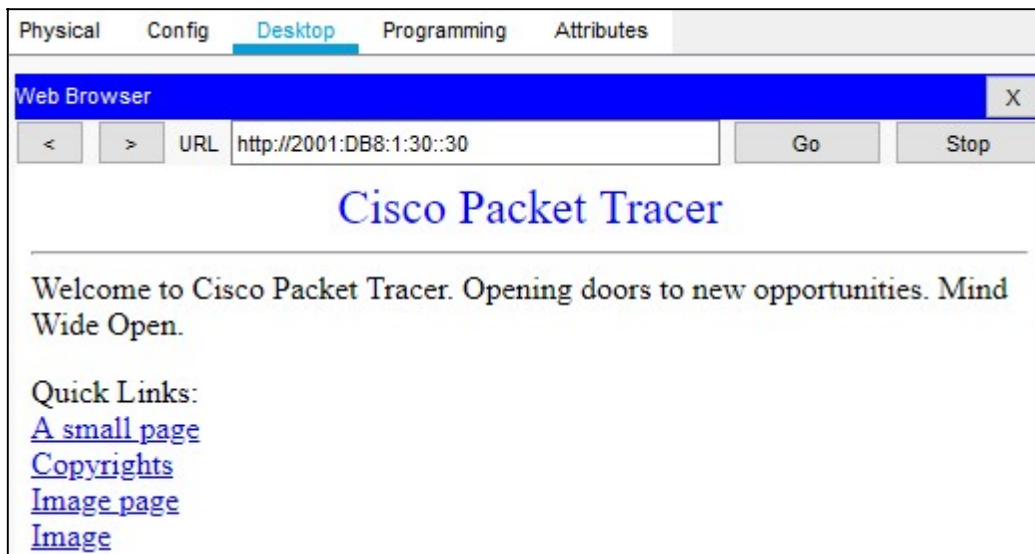- Ping from PC1 to 2001:DB8:1:30::30. The ping should fail.

```
C:\>ping 2001:DB8:1:30::30

Pinging 2001:DB8:1:30::30 with 32 bytes of data:

Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.
Reply from 2001:DB8:1:29::1: Destination host unreachable.

Ping statistics for 2001:DB8:1:30::30:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- OpenthewebbrowserofPC1tohttp://2001:DB8:1:30::30orhttps://2001:DB8:1:30::30. The website should display.

Physical	Config	Desktop	Programming	Attributes		
Web Browser						X
<	>	URL	http://2001:DB8:1:30::30		Go	Stop

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MODEL COLLEGE
EMPOWERED AUTONOMOUS.

Name:Harsh Kadu   Roll No : 33

- OpenthewebbrowserofPC2tohttp://2001:DB8:1:30::30orhttps://2001:DB8:1:30::30. The website should display.

Physical	Config	Desktop	Programming	Attributes	

Web Browser   X

| < | > | URL | http://2001:DB8:1:30::30 | Go | Stop |

Request Timeout