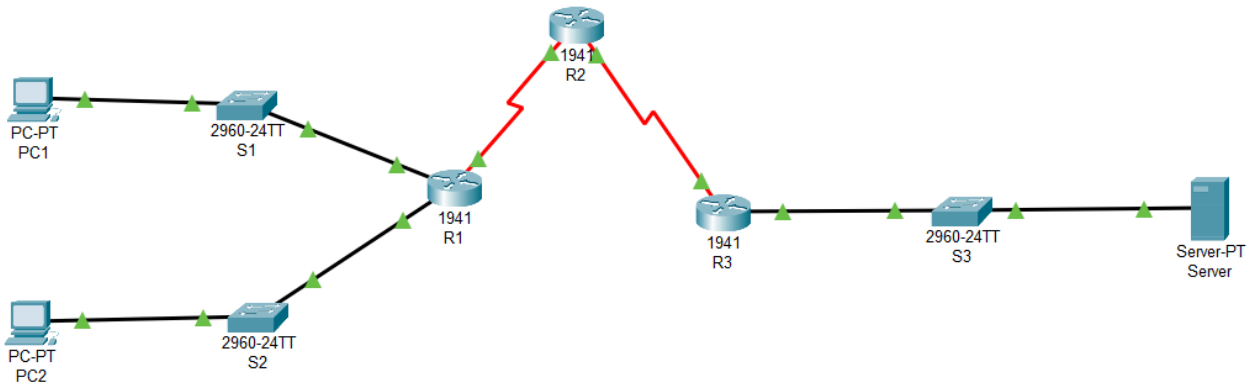
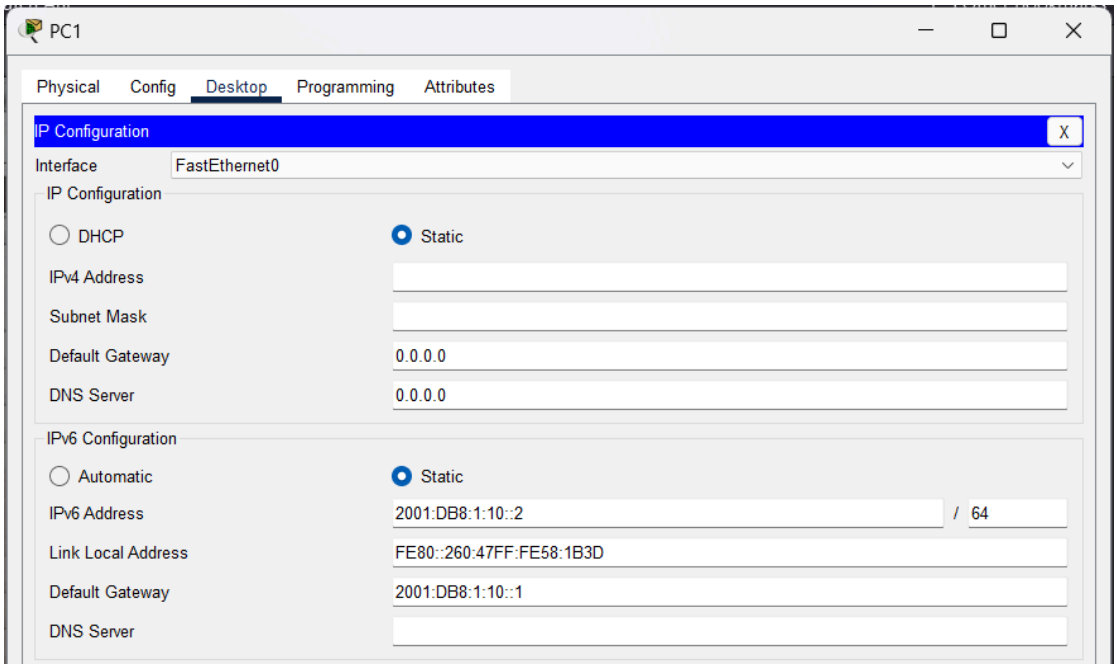
Security in Computing
Practical - 5

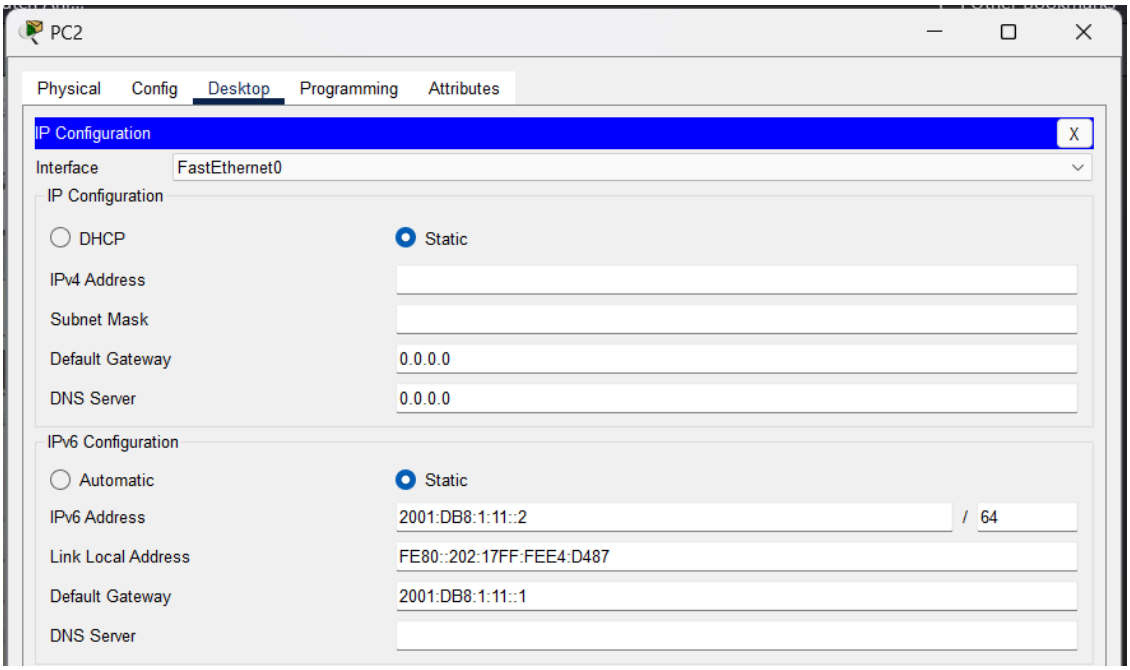
➢Aim: Configuring IPv6 ACLs

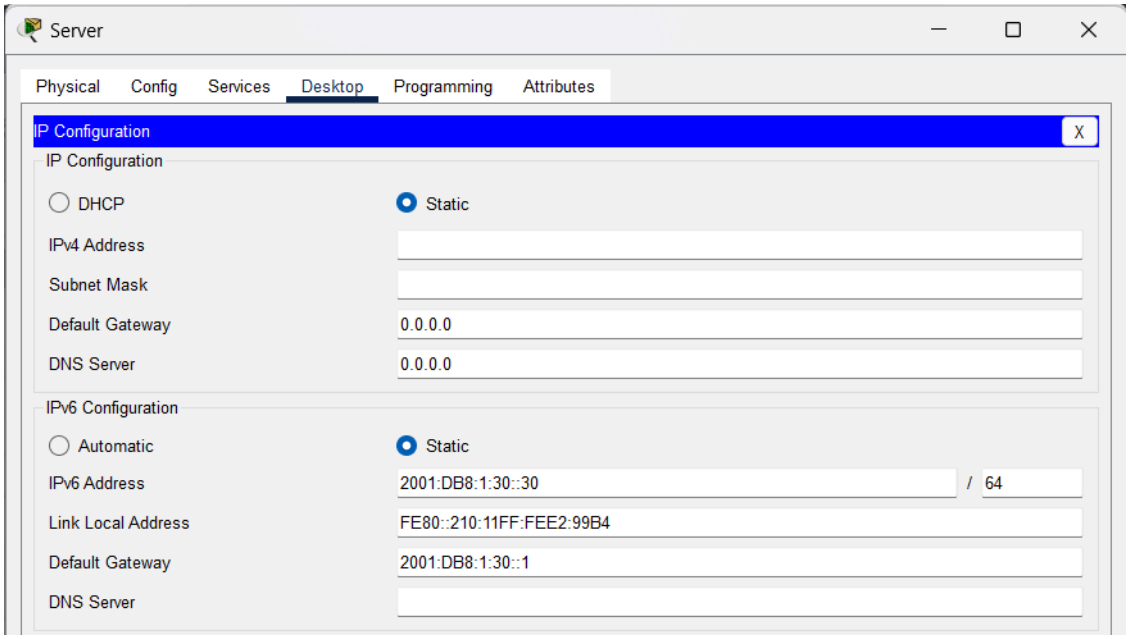
Topology Diagram:



Assign IP Addresses:




PC2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:DB8:1:11::2
/
64
Link Local Address
FE80::202:17FF:FEE4:D487
Default Gateway
2001:DB8:1:11::1
DNS Server


Server
Physical
Config
Services
Desktop
Programming
Attributes
IP Configuration
X
IP Configuration
DHCP
Static
IPv4 Address
Subnet Mask
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
2001:DB8:1:30::30
/
64
Link Local Address
FE80::210:11FF:FEE2:99B4
Default Gateway
2001:DB8:1:30::1
DNS Server

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#host R1
R1(config)#ipv6 unicast-routing
R1(config)#interface GigabitEthernet0/0
R1(config-if)#ipv6 enable
R1(config-if)#ipv6 address 2001:DB8:1:10::1/64
R1(config-if)#no shut'
                     ^
% Invalid input detected at '^' marker.

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)#interface GigabitEthernet0/1
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

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

R1(config-if)#interface Serial0/0/0
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)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#exit
```

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#host R2
R2(config)#ipv6 unicast-routing
R2(config)#interface Serial0/0/0
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

R2(config-if)#interface Serial0/0/1
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0,
R2(config-if)#interface Serial0/0/1
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)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#exit
```

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#host R3
R3(config)#ipv6 unicast-routing
R3(config)#interface GigabitEthernet0/0
R3(config-if)#ipv6 enable
R3(config-if)#ipv6 address 2001:DB8:1:30::1/64
R3(config-if)#no shut
R3(config-if)#interface Serial0/0/0
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

R3(config-if)#^Z
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#exit
```

Displaying IP Address Details of Routers:

```
R1>show ipv6 interface brief
GigabitEthernet0/0         [up/up]
    FE80::202:17FF:FEAA:CE01
    2001:DB8:1:10::1
GigabitEthernet0/1         [up/up]
    FE80::202:17FF:FEAA:CE02
    2001:DB8:1:11::1
Serial0/0/0                [up/up]
    FE80::202:17FF:FEAA:CE01
    2001:DB8:1:28::1
Serial0/0/1                [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned
R2>show ipv6 interface brief
GigabitEthernet0/0         [administratively down/down]
    unassigned
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [up/up]
    FE80::260:70FF:FEBB:EA01
    2001:DB8:1:28::2
Serial0/0/1                [up/up]
    FE80::260:70FF:FEBB:EA01
    2001:DB8:1:29::2
Vlan1                      [administratively down/down]
    unassigned
R3>show ipv6 interface brief
GigabitEthernet0/0         [up/up]
    FE80::2E0:F7FF:FEE3:8901
    2001:DB8:1:30::1
GigabitEthernet0/1         [administratively down/down]
    unassigned
Serial0/0/0                [up/up]
    FE80::2E0:F7FF:FEE3:8901
    2001:DB8:1:29::1
Serial0/0/1                [administratively down/down]
    unassigned
Vlan1                      [administratively down/down]
    unassigned
```

Configure RIPng on routers:

```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 router rip RIPng
R1(config-rtr)#interface GigabitEthernet0/0
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#interface GigabitEthernet0/1
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#interface Serial0/0/0
R1(config-if)#ipv6 rip RIPng enable
R1(config-if)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#exit
```

```
R2>en
R2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#ipv6 router rip RIPng
R2(config-rtr)#interface Serial0/0/0
R2(config-if)#ipv6 rip RIPng enable
R2(config-if)#interface Serial0/0/1
R2(config-if)#ipv6 rip RIPng enable
R2(config-if)#^Z
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#exit
```

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 router rip RIPng
R3(config-rtr)#interface GigabitEthernet0/0
R3(config-if)#ipv6 rip RIPng enable
R3(config-if)#interface Serial0/0/0
R3(config-if)#ipv6 rip RIPng enable
R3(config-if)#^Z
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#exit
```

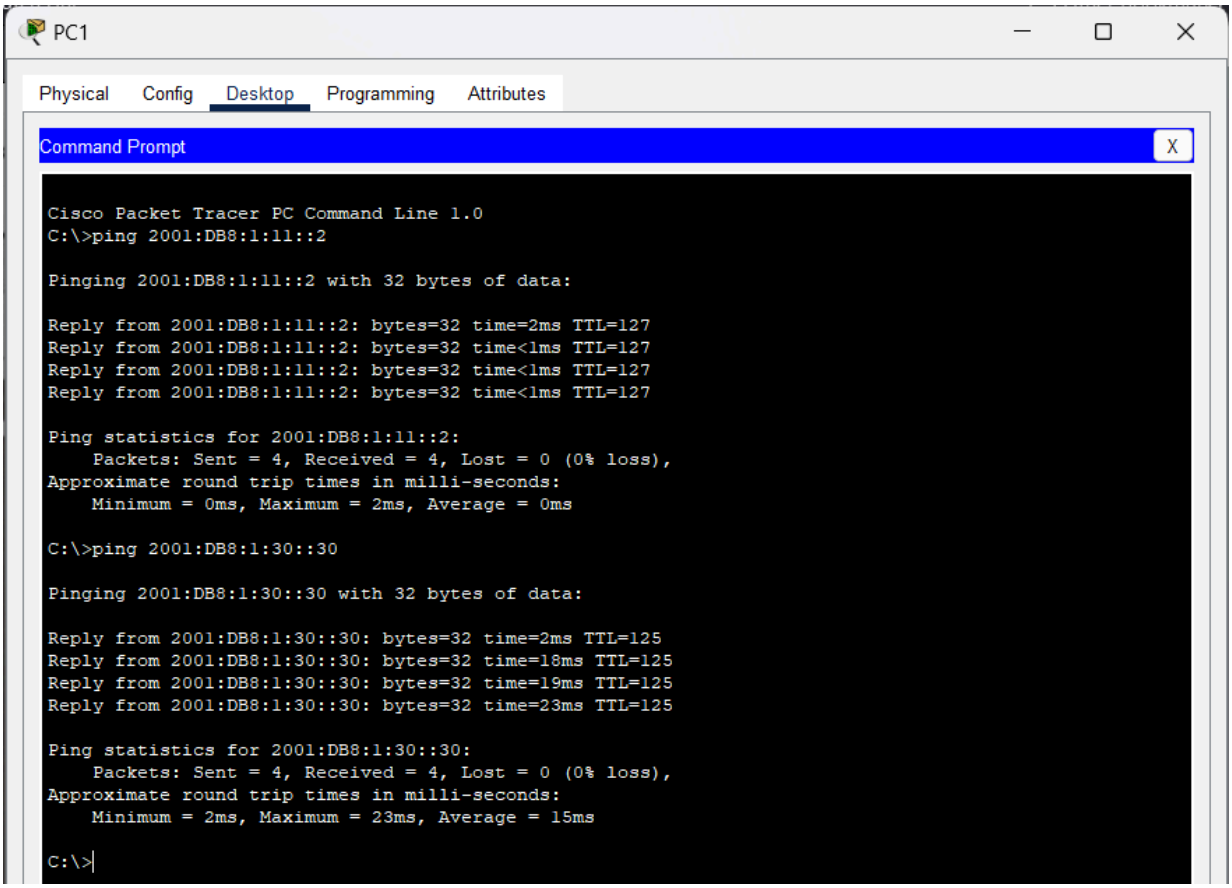
Displaying routing table of routers:

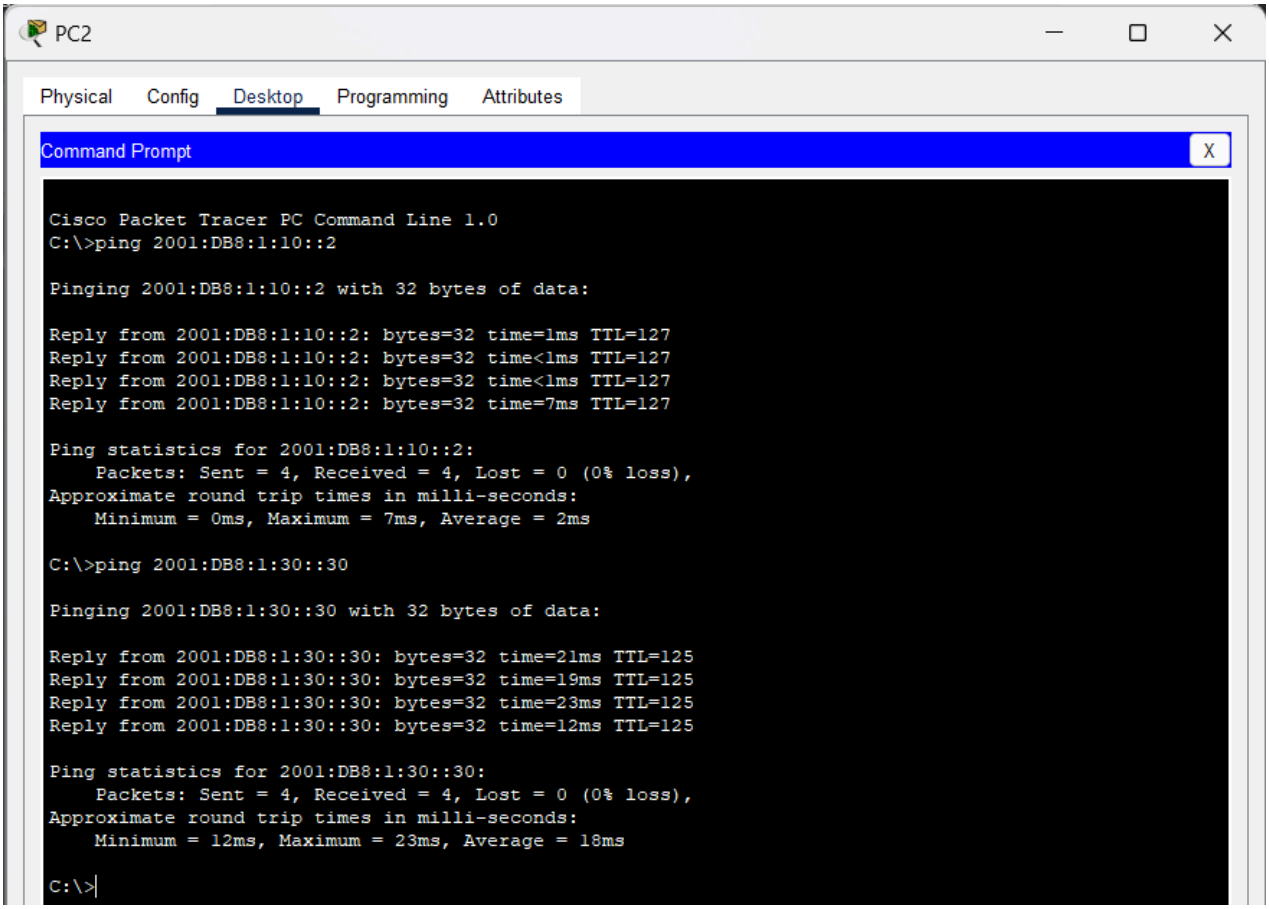
```
R1>show ipv6 route
IPv6 Routing Table - 9 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       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
R   2001:DB8:1:29::/64 [120/2]
     via FE80::260:70FF:FEBB:EA01, Serial0/0/0
R   2001:DB8:1:30::/64 [120/3]
     via FE80::260:70FF:FEBB:EA01, Serial0/0/0
L   FF00::/8 [0/0]
     via Null0, receive
```

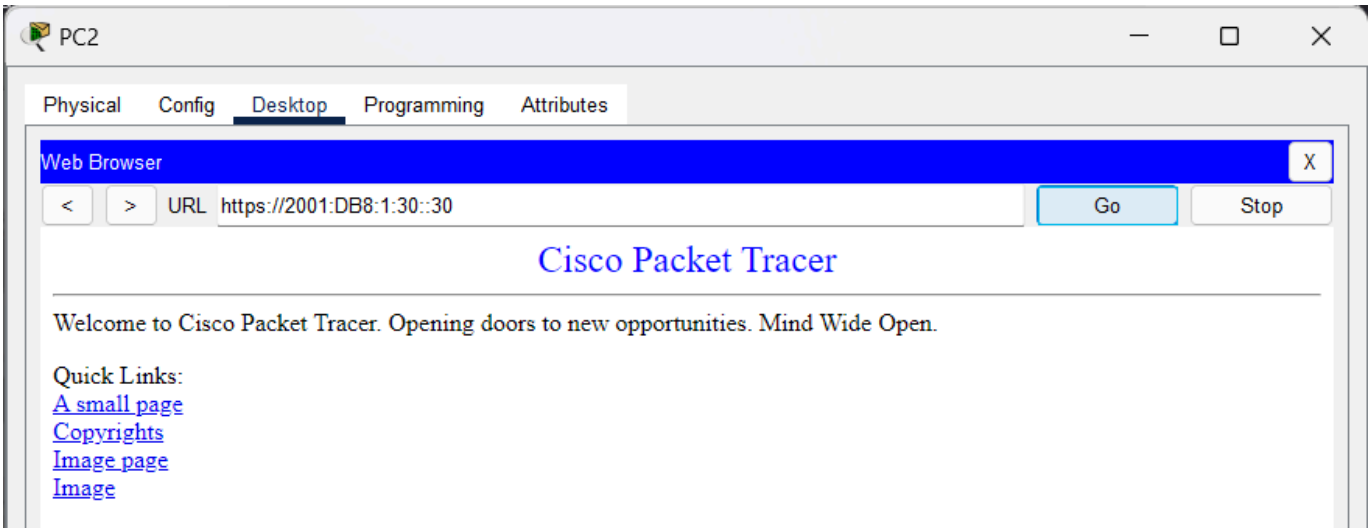
```
R2>show ipv6 route
IPv6 Routing Table - 8 entries
Codes: C - Connected, L - Local, S - Static, R - RIP, B - BGP
       U - Per-user Static route, M - MIPv6
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea, IS - ISIS summary
       ND - ND Default, NDp - ND Prefix, DCE - Destination, NDr - Redirect
       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 [120/2]
     via FE80::202:17FF:FEAA:CE01, Serial0/0/0
R   2001:DB8:1:11::/64 [120/2]
     via FE80::202:17FF:FEAA:CE01, 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
R   2001:DB8:1:30::/64 [120/2]
     via FE80::2E0:F7FF:FEE3:8901, Serial0/0/1
L   FF00::/8 [0/0]
     via Null0, receive
```

```
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::260:70FF:FEBB:EA01, Serial0/0/0
R   2001:DB8:1:11::/64 [120/3]
     via FE80::260:70FF:FEBB:EA01, Serial0/0/0
R   2001:DB8:1:28::/64 [120/2]
     via FE80::260:70FF:FEBB:EA01, 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
```

Checking network connectivity:




PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco 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=7ms 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 = 7ms, Average = 2ms
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=21ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=19ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=23ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=12ms 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 = 12ms, Maximum = 23ms, Average = 18ms
C:\>


PC2
Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
https://2001:DB8:1:30::30
Go
Stop
Cisco Packet Tracer
Welcome to Cisco Packet Tracer. Opening doors to new opportunities. Mind Wide Open.
Quick Links:
A small page
Copyrights
Image page
Image

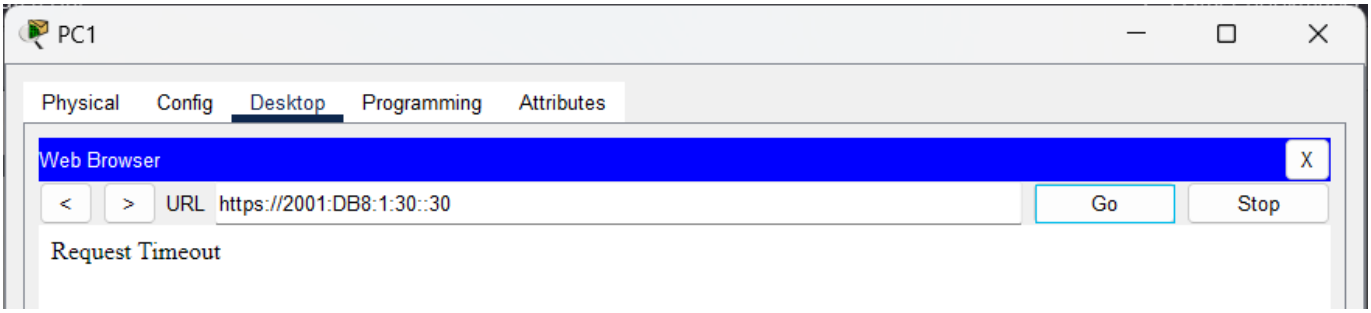
Configuring ACL:

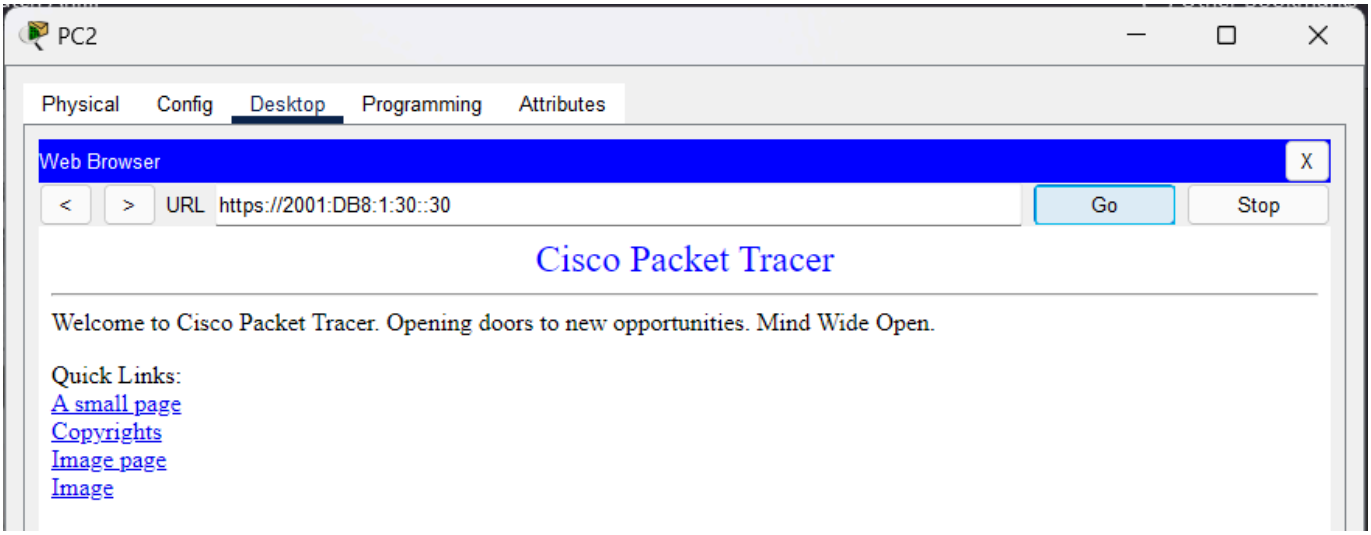
```
R1>en
R1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#ipv6 access-list BLOCK_HTTPS_ACL
R1(config-ipv6-acl)#deny tcp any host 2001:DB8:1:30::30 eq www
R1(config-ipv6-acl)#deny tcp any host 2001:DB8:1:30::30 eq 443
R1(config-ipv6-acl)#permit ipv6 any any
R1(config-ipv6-acl)#interface GigabitEthernet0/0
R1(config-if)#ipv6 traffic-filter BLOCK_HTTPS_ACL in
R1(config-if)#^Z
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#exit
```

Verifying the working of ACL:

```
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=13ms 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 = 13ms, Average = 3ms

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=31ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=34ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=25ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=5ms 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 = 5ms, Maximum = 34ms, Average = 23ms
```

```
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=11ms 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 = 11ms, Average = 3ms

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=24ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=20ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=18ms TTL=125
Reply from 2001:DB8:1:30::30: bytes=32 time=13ms 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 = 13ms, Maximum = 24ms, Average = 18ms
```





Configuring ACL:

```
R3>en
R3#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ipv6 access-list BLOCK_ICMP_ACL
R3(config-ipv6-acl)#deny icmp any any
R3(config-ipv6-acl)#permit ipv6 any any
R3(config-ipv6-acl)#interface GigabitEtherne0/0
R3(config-if)#ipv6 traffic-filter BLOCK_ICMP_ACL in
R3(config-if)#^Z
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#exit
```

Verifying the working of ACL:

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

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

Request timed out.
Request timed out.
Request timed out.
Request timed out.

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

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

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

Request timed out.
Request timed out.
Request timed out.
Request timed out.

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