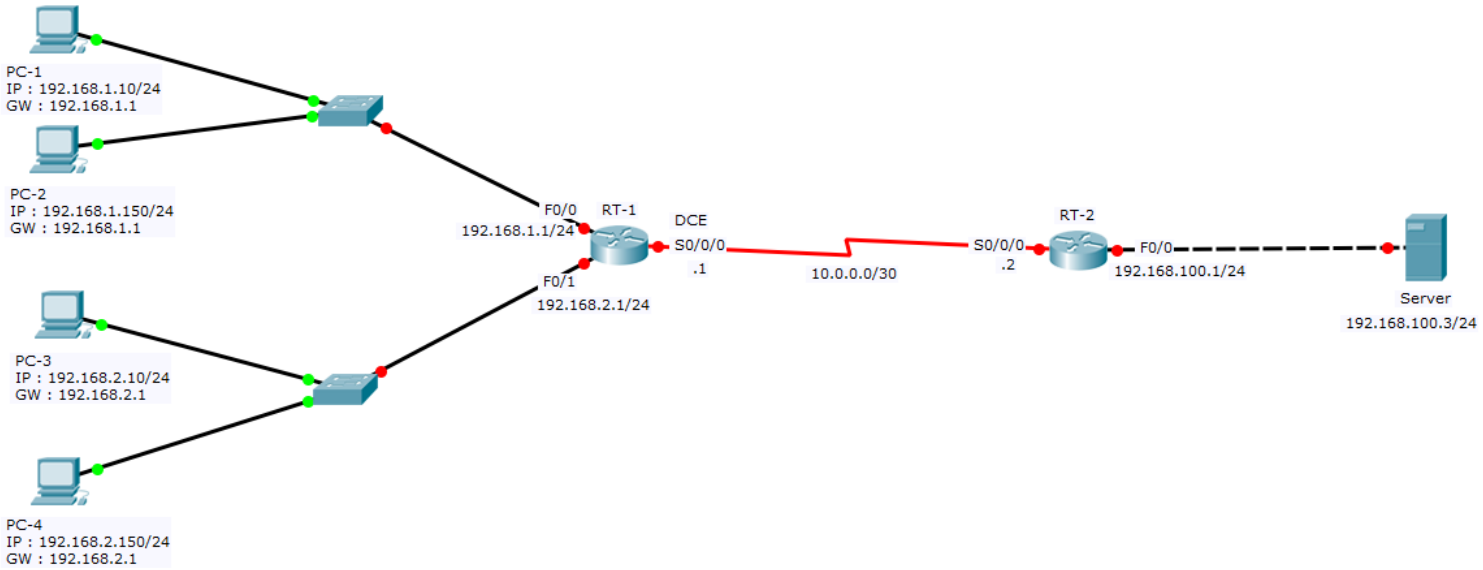
HƯỚNG DẪN LAB
LAB 5 – Access List

Designed by : Nguyễn Phú Thịnh

Sơ đồ LAB :



Thiết bị

Tên thiết bị	Chủng loại
RT-1	Router 2911
RT-2	Router 2911
PC-1	PC Generic
PC-2	PC Generic
PC-3	PC Generic
PC-4	PC Generic
Server	Server Generic
Switch1	Switch 2960
Switch2	Switch 2960

Yêu cầu

- Đấu nối và đặt tên thiết bị như sơ đồ
- Đặt IP như sau :

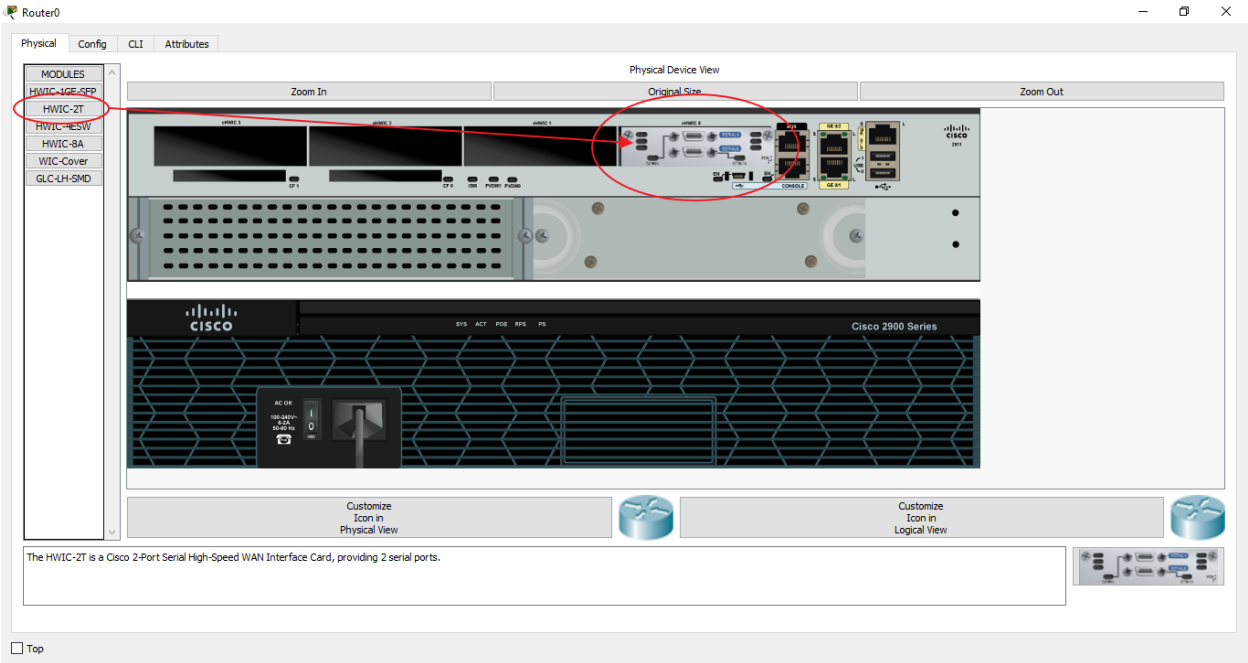
Thiết bị	Port	IP
RT-1	Gi0/0	192.168.1.1/24
	Gi0/1	192.168.2.1/24
	S0/0/0 (DCE, clock rate 128000)	10.0.0.1/30
RT-2	Gi0/0	192.168.100.1/24
	S0/0/0	10.0.0.2/30
PC-1	F0	192.168.1.10/24
PC-2	F0	192.168.1.150/24
PC-3	F0	192.168.2.10/24
PC-4	F0	192.168.2.150/24
Server	F0	192.168.100.3/24

- Cấu hình định tuyến tĩnh và default gateway cho router, PC và Server để PC và Server có thể trao đổi dữ liệu với nhau
- Cấu hình telnet cho 2 router, sử dụng password để login
- Cấu hình Standard Access list đáp ứng các yêu cầu sau (Có thể sử dụng nhiều access list):
    - Chặn tất cả máy trong mạng 192.168.1.0/24 truy cập vào mạng của Server nhưng các máy tính trong mạng này vẫn trao đổi dữ liệu với nhau được
    - Chặn các máy trong mạng 192.168.1.0/24 và 192.168.2.0/24 trao đổi dữ liệu với nhau
- Cấu hình Extended Access list đáp ứng các yêu cầu sau (vẫn giữ các standard access list):
    - Các máy tính trong mạng 192.168.2.0/24 CHỈ có thể truy cập web vào server. Riêng các máy có IP từ 192.168.2.1 đến 192.16.2.127 có thể ping server.

Các bước thực hiện

Bước 1 : đấu nối và đặt tên thiết bị như sơ đồ

Để có port Serial 0/0/0 như hình, lắp card HWIC-2T vào slot 0 (bên phải) của router như sau :



Bước 2 : đặt hostname và IP cho các interface

RT-1

```
Router(config)#hostname RT-1
RT-1(config)#interface Gi0/0
RT-1(config-if)#ip address 192.168.1.1 255.255.255.0
RT-1(config-if)#no shutdown
RT-1(config-if)#exit
RT-1(config)#interface Gi0/1
RT-1(config-if)#ip address 192.168.2.1 255.255.255.0
RT-1(config-if)#no shutdown
RT-1(config-if)#exit
RT-1(config)#interface S0/0/0
RT-1(config-if)#ip address 10.0.0.1 255.255.255.252
RT-1(config-if)#clock rate 128000
RT-1(config-if)#no shutdown
```

Kiểm tra :

```
RT-1#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     192.168.1.1     YES manual up                    up
GigabitEthernet0/1     192.168.2.1     YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Serial0/0/0            10.0.0.1        YES manual down                  down
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

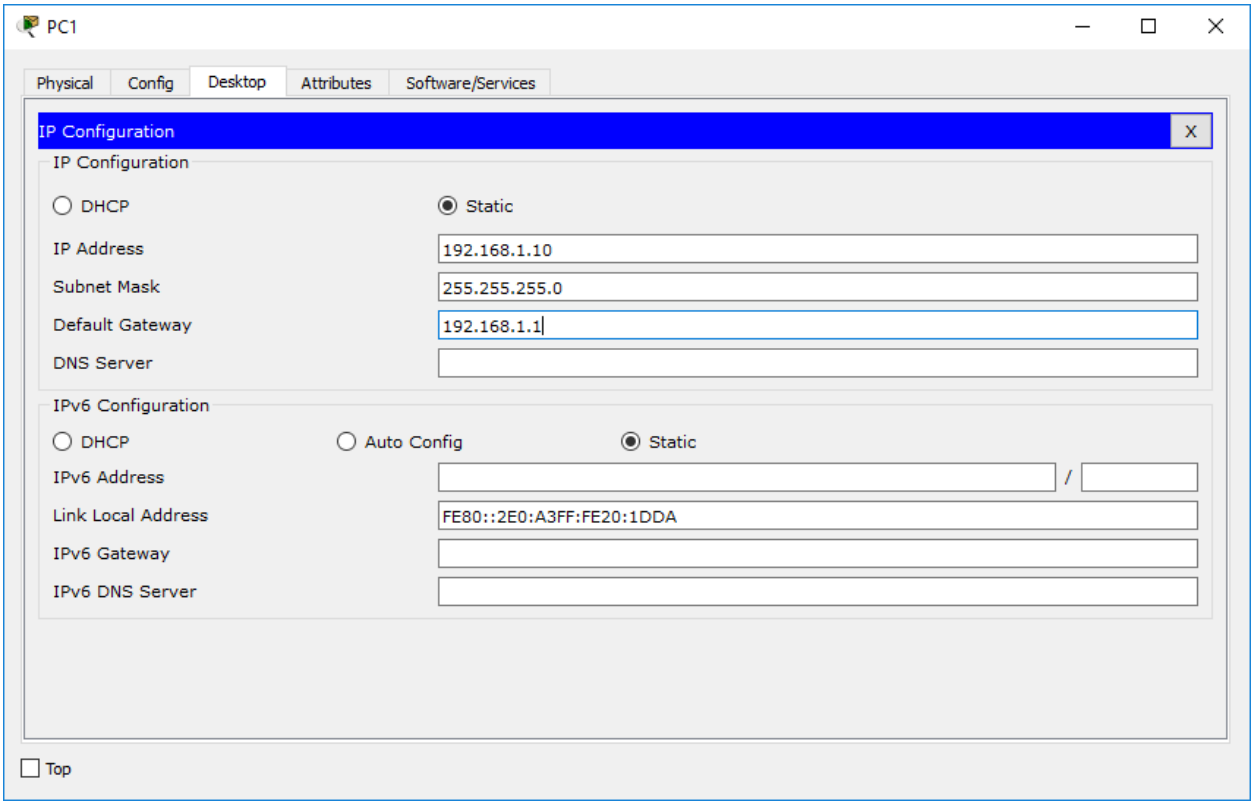
RT-2

```
Router(config)#hostname RT-2
RT-2(config)#interface Gi0/0
RT-2(config-if)#ip address 192.168.100.1 255.255.255.0
RT-2(config-if)#no shutdown
RT-2(config-if)#exit
RT-2(config)#interface S0/0/0
RT-2(config-if)#ip address 10.0.0.2 255.255.255.252
RT-2(config-if)#no shutdown
RT-2(config-if)#exit
```

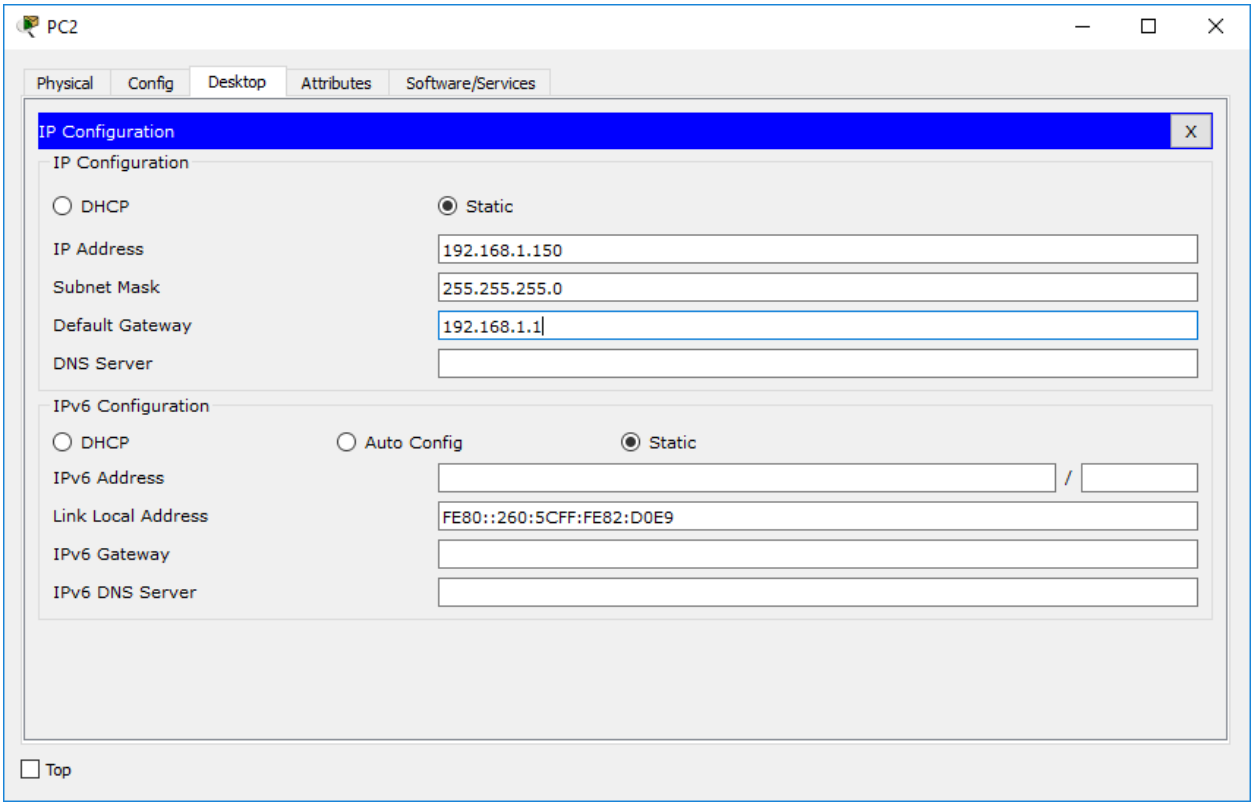
Kiểm tra :

```
RT-2#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     192.168.100.1   YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Serial0/0/0            10.0.0.2        YES manual up                    up
Serial0/0/1            unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

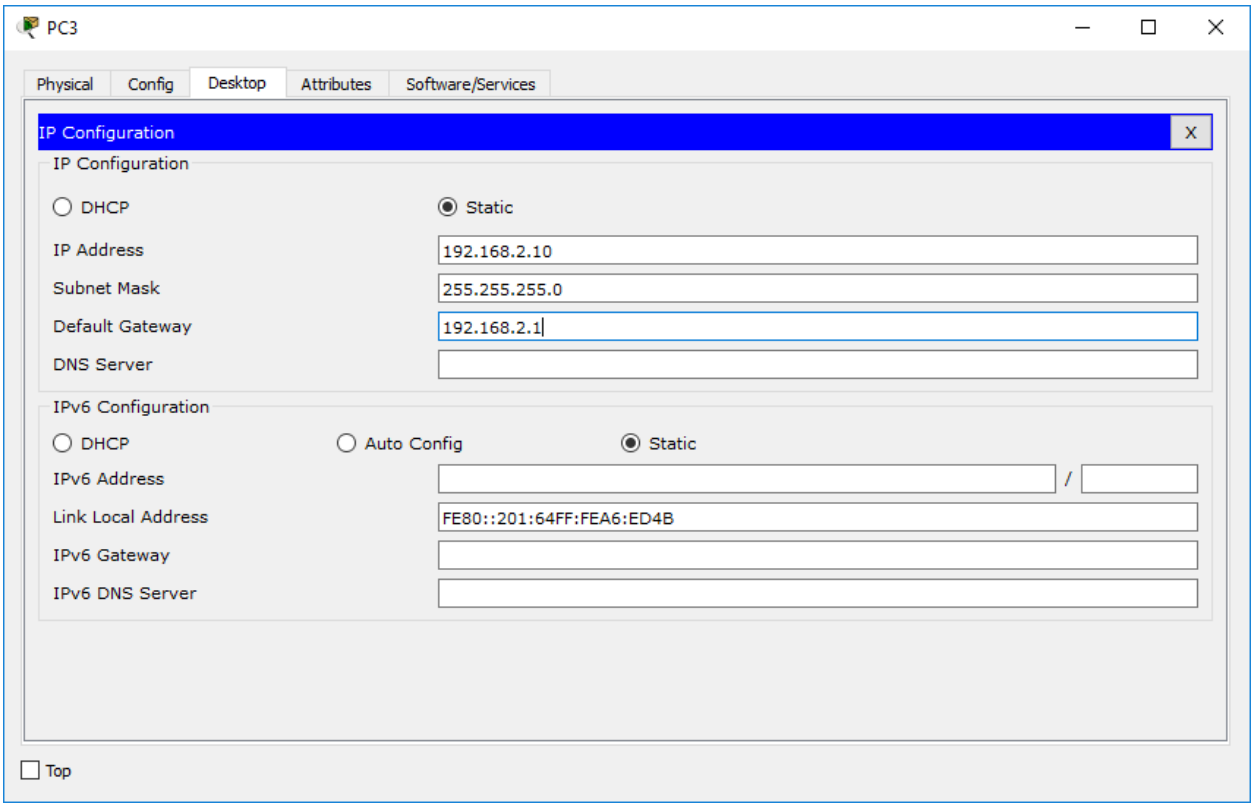
PC-1



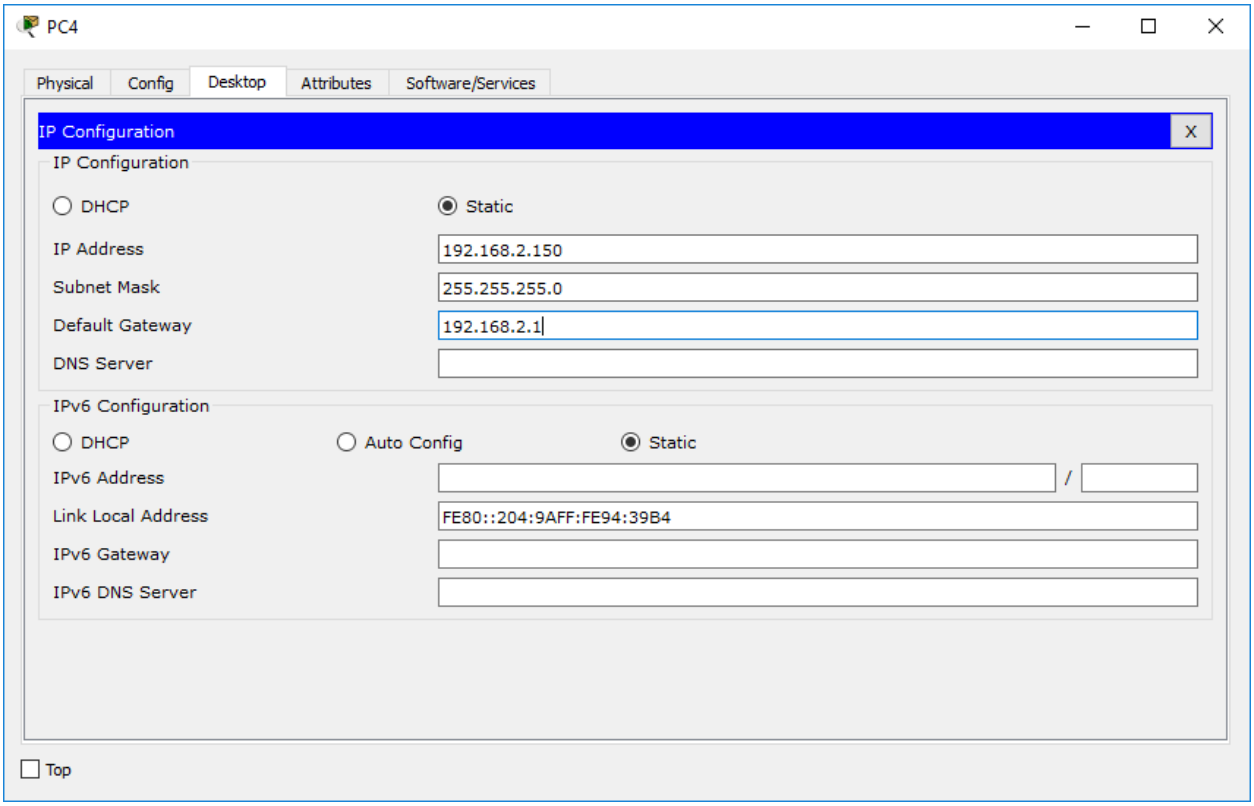
PC-2


PC2
Physical
Config
Desktop
Attributes
Software/Services
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
192.168.1.150
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::260:5CFF:FE82:D0E9
IPv6 Gateway
IPv6 DNS Server
Top

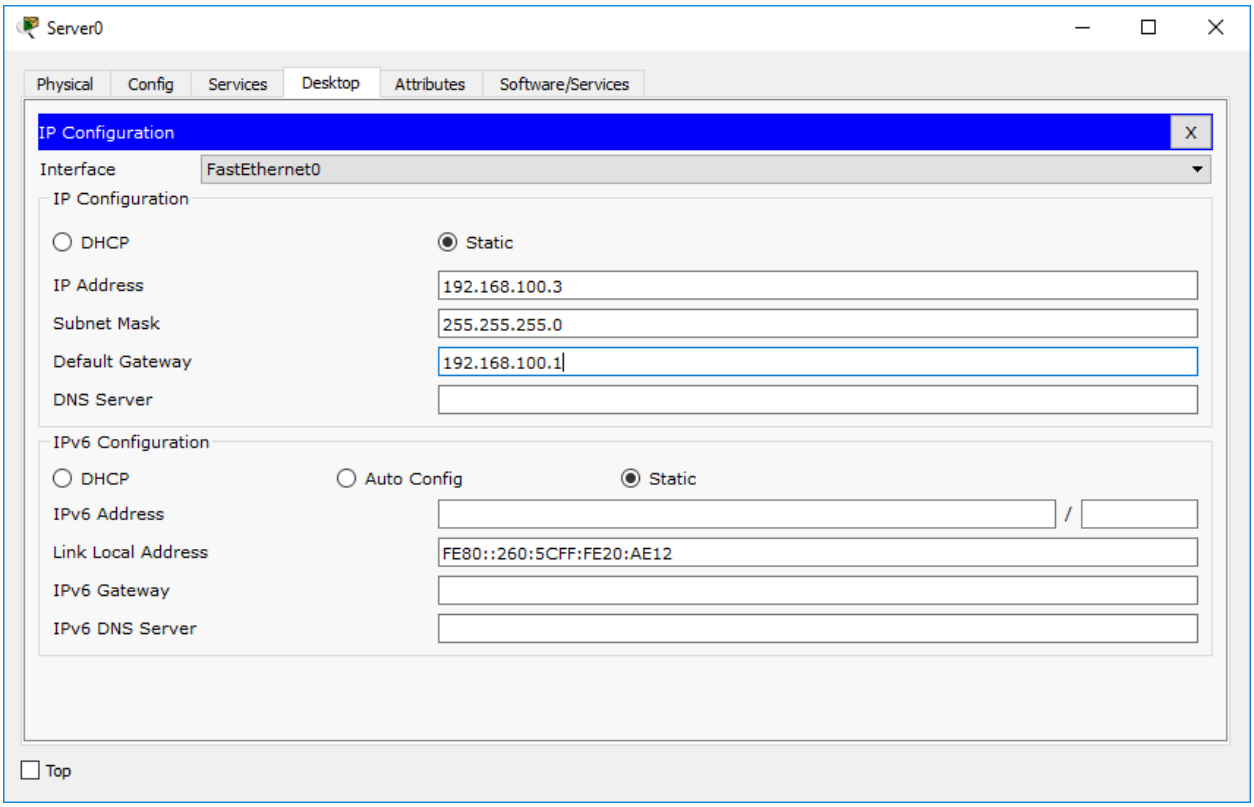
PC-3


PC3
Physical
Config
Desktop
Attributes
Software/Services
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
192.168.2.10
Subnet Mask
255.255.255.0
Default Gateway
192.168.2.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::201:64FF:FEA6:ED4B
IPv6 Gateway
IPv6 DNS Server
Top

PC-4


PC4
Physical
Config
Desktop
Attributes
Software/Services
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
192.168.2.150
Subnet Mask
255.255.255.0
Default Gateway
192.168.2.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::204:9AFF:FE94:39B4
IPv6 Gateway
IPv6 DNS Server
Top

Server


Server0
Physical
Config
Services
Desktop
Attributes
Software/Services
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.100.3
Subnet Mask
255.255.255.0
Default Gateway
192.168.100.1
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
Link Local Address
FE80::260:5CFF:FE20:AE12
IPv6 Gateway
IPv6 DNS Server
Top

Bước 3 : Cấu hình định tuyến tĩnh

RT-1

```
RT-1(config)#ip route 192.168.100.0 255.255.255.0 S0/0/0
```

Kiểm tra :

```
RT-1#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/30 is directly connected, Serial0/0/0
L       10.0.0.1/32 is directly connected, Serial0/0/0
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, GigabitEthernet0/0
L       192.168.1.1/32 is directly connected, GigabitEthernet0/0
     192.168.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.2.0/24 is directly connected, GigabitEthernet0/1
L       192.168.2.1/32 is directly connected, GigabitEthernet0/1
S    192.168.100.0/24 is directly connected, Serial0/0/0
```

RT-2

```
RT-2(config)#ip route 192.168.1.0 255.255.255.0 S0/0/0
RT-2(config)#ip route 192.168.2.0 255.255.255.0 S0/0/0
```

Kiểm tra :

```
RT-2#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       10.0.0.0/30 is directly connected, Serial0/0/0
L       10.0.0.2/32 is directly connected, Serial0/0/0
S    192.168.1.0/24 is directly connected, Serial0/0/0
S    192.168.2.0/24 is directly connected, Serial0/0/0
     192.168.100.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.100.0/24 is directly connected, GigabitEthernet0/0
L       192.168.100.1/32 is directly connected, GigabitEthernet0/0
```

Bước 4 : Kiểm tra kết nối

PC-1 ping Server :

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=2ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

PC-1 ping PC-3 :

```
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.10: bytes=32 time=14ms TTL=127
Reply from 192.168.2.10: bytes=32 time<1ms TTL=127
Reply from 192.168.2.10: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 14ms, Average = 5ms
```

PC-3 ping Server :

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=12ms TTL=126
Reply from 192.168.100.3: bytes=32 time=4ms TTL=126

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 4ms
```

Bước 5 : Cấu hình telnet cho router

Lưu ý : khi cấu hình telnet, phải đặt password enable, và password cho line vty. Nếu không đặt password enable, khi telnet, sẽ không vào mode enable được. Nếu không đặt password trên line vty sẽ không telnet được.

Học viên có thể chọn password khác.

RT-1
RT-1(config)#**enable secret newstar** RT-1(config)#**line vty 0 4** RT-1(config-line)#**password newstar** RT-1(config-line)#**login**

RT-2
RT-2(config)#**enable secret newstar** RT-2(config)#**line vty 0 4** RT-2(config-line)#**password newstar** RT-2(config-line)#**login**

Bước 6 : Kiểm tra telnet

PC-1 telnet RT-1

```
C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open


User Access Verification

Password:
RT-1>enable
Password:
RT-1#
RT-1#
```

PC-1 telnet RT-2

```
C:\>telnet 10.0.0.2
Trying 10.0.0.2 ...Open


User Access Verification

Password:
RT-2>
RT-2>en
Password:
RT-2#
```

Bước 7 : Cấu hình Standard Access List chặn các máy trong mạng 192.168.1.0/24 truy cập vào mạng của Server

ACL dưới đây sẽ được áp vào cổng Gi0/0 trên RT-2, theo chiều out

RT-2
RT-2(config)#**access-list 1 deny 192.168.1.0 0.0.0.255** RT-2(config)#**access-list 1 permit any** Kiểm tra : RT-2#**show access-lists** Standard IP access list 1 10 deny 192.168.1.0 0.0.0.255 20 permit any

Áp ACL 1 vào port Gi0/0 trên RT-2, theo chiều out

RT-2
RT-2(config)#**interface Gi0/0** RT-2(config-if)#**ip access-group 1 out**

Bước 8 : Kiểm tra ACL 1

PC-1 ping Server

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC-2 ping Server

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.
Reply from 10.0.0.2: Destination host unreachable.

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC-1 ping PC-2

```
C:\>ping 192.168.1.150

Pinging 192.168.1.150 with 32 bytes of data:

Reply from 192.168.1.150: bytes=32 time<1ms TTL=128
Reply from 192.168.1.150: bytes=32 time<1ms TTL=128
Reply from 192.168.1.150: bytes=32 time<1ms TTL=128
Reply from 192.168.1.150: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.1.150:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC-3 ping Server

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 10ms, Average = 3ms
```

PC-4 ping Server

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=10ms TTL=126

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 10ms, Average = 3ms
```

PC-3 ping PC-4

```
C:\>ping 192.168.2.150

Pinging 192.168.2.150 with 32 bytes of data:

Reply from 192.168.2.150: bytes=32 time=1ms TTL=128
Reply from 192.168.2.150: bytes=32 time<1ms TTL=128
Reply from 192.168.2.150: bytes=32 time<1ms TTL=128
Reply from 192.168.2.150: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.2.150:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

PC-1 ping RT-1

```
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

PC-1 ping RT-2

```
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=1ms TTL=254
Reply from 10.0.0.2: bytes=32 time=1ms TTL=254
Reply from 10.0.0.2: bytes=32 time=1ms TTL=254
Reply from 10.0.0.2: bytes=32 time=1ms TTL=254

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms
```

PC-1 ping PC-3

```
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.10: bytes=32 time<1ms TTL=127
Reply from 192.168.2.10: bytes=32 time=10ms TTL=127
Reply from 192.168.2.10: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 10ms, Average = 3ms
```

Bước 9: cấu hình Standard Access List chặn không cho máy tính trong mạng 192.168.1.0/24 và 192.168.2.0/24 trao đổi dữ liệu với nhau

Access List dưới đây sẽ được áp vào cổng Gi0/1 trên RT-1 theo chiều out

RT-1
RT-1(config)#**access-list 1 deny 192.168.1.0 0.0.0.255** RT-1(config)#**access-list 1 permit any** RT-1(config)#**interface Gi0/1** RT-1(config-if)#**ip access-group 1 out**

Bước 10 : Kiểm tra

PC-1 ping PC-3

```
C:\>ping 192.168.2.10

Pinging 192.168.2.10 with 32 bytes of data:

Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.
Reply from 192.168.1.1: Destination host unreachable.

Ping statistics for 192.168.2.10:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

Bước 11 : cấu hình Extended Access List

Các máy tính trong mạng 192.168.2.0/24 CHỈ có thể truy cập web vào server. Riêng các máy có IP từ 192.168.2.1 đến 192.168.2.127 có thể ping server.

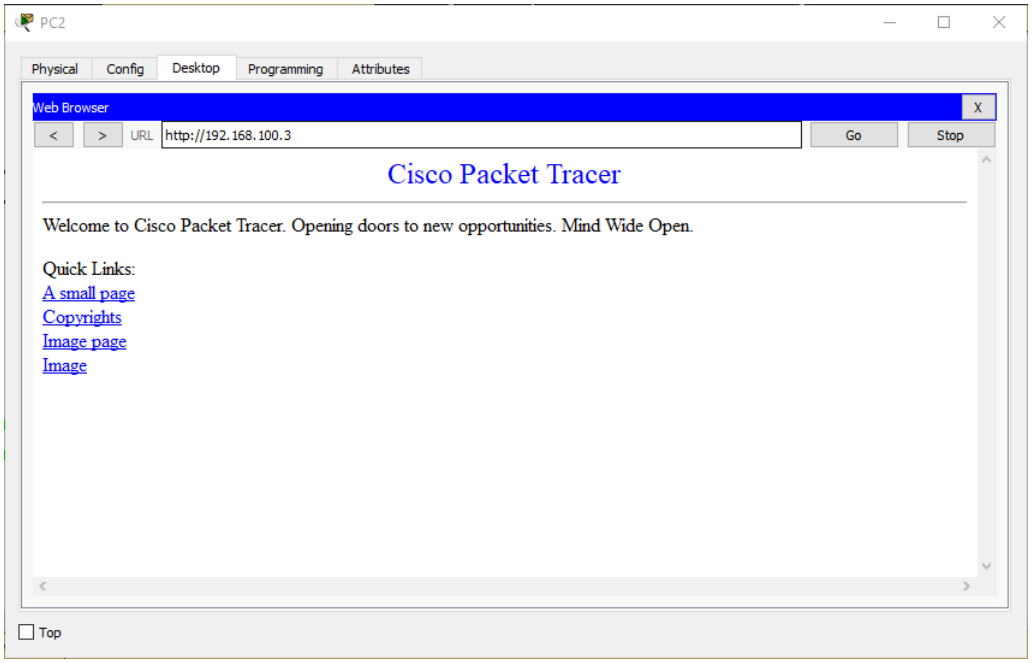
Access List được áp vào cổng S0/0/0 trên RT-1 theo chiều out

RT-1
RT-1(config)#**access-list 101 permit tcp 192.168.2.0 0.0.0.255 host 192.168.100.3 eq 80** RT-1(config)#**access-list 101 permit tcp 192.168.2.0 0.0.0.255 host 192.168.100.3 eq 443** RT-1(config)#**access-list 101 permit icmp 192.168.2.0 0.0.0.127 host 192.168.100.3** RT-1(config)#**interface S0/0/0** RT-1(config-if)#**ip access-group 101 out**

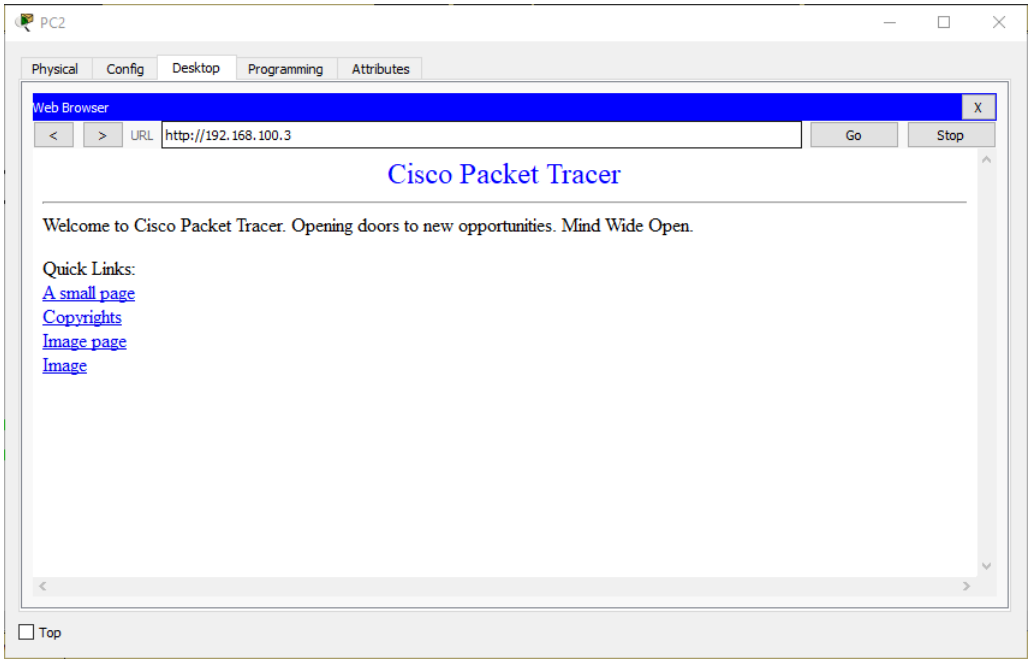
Bước 12 : Kiểm tra Extended Access List 101

PC-3 truy cập web vào Server :

Click chọn icon **PC-3** > chọn tab **Desktop** > Chọn **Web Browser** > Nhập http://192.168.100.3 vào thanh địa chỉ



PC-4 truy cập web vào Server :



PC-3 ping Server :

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 192.168.100.3: bytes=32 time=2ms TTL=126
Reply from 192.168.100.3: bytes=32 time=1ms TTL=126
Reply from 192.168.100.3: bytes=32 time=11ms TTL=126
Reply from 192.168.100.3: bytes=32 time=13ms TTL=126

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 13ms, Average = 6ms
```

PC-4 ping Server

```
C:\>ping 192.168.100.3

Pinging 192.168.100.3 with 32 bytes of data:

Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.
Reply from 192.168.2.1: Destination host unreachable.

Ping statistics for 192.168.100.3:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```