BÁO CÁO THỰC HÀNH

Môn học: Quản trị mạng và hệ thống

Kỳ báo cáo: Lab 2

Tên chủ đề: VLANs, Trunking và Định tuyến động

GVHD: Đỗ Hoàng Hiển

Nhóm: 11

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2. NỘI DUNG THỰC HIỆN:[1]

STT	Công việc	Kết quả tự đánh giá
1	Yêu cầu 1	100%
2	Yêu cầu 2	100%
3	Yêu cầu 3	100%
4	Yêu cầu 4	100%

Phần bên dưới của báo cáo này là tài liệu báo cáo chi tiết của nhóm thực hiện.

[1] Ghi nội dung công việc, các kịch bản trong bài Thực hành

BÁO CÁO CHI TIẾT

Yêu cầu 1: Sử dụng lớp mạng 172.x.0.0/22, với x là số nhóm, để chia các mạng con và gắn IP cho các thiết bị theo yêu cầu bên dưới

Số host	Network	Subnet Mask	Dải IP	Broadcast
200	172.11.2.0/24	255.255.255.0	.2.1 - .2.254	.2.255
32	172.11.3.0/26	255.255.255.192	.3.1 - .3.62	.3.63
30	172.11.3.64/27	255.255.255.224	.3.65 - .3.94	.3.95
10	172.11.3.96/28	255.255.255.240	.3.97 - .3.110	.3.111
7	172.11.3.112/28	255.255.255.240	.3.113 - .3.126	.3.127
2	172.11.0.0/30	255.255.255.252	.0.1 - .0.2	.0.3
2	172.11.0.4/30	255.255.255.252	.0.5 - .0.6	.0.7
2	172.11.0.8/30	255.255.255.252	.0.9 - .0.10	.0.11

Thiết bị	Interface	Địa chỉ IP	Subnet Mask	Default Gateway
R1 (CT-R1)	G0/2	172.11.0.1	255.255.255.252	N/A
	G0/0.30	172.11.3.65	255.255.255.224	N/A
R2 (HN-R1)	G0/1	172.11.0.5	255.255.255.252	N/A
	G0/0.20	172.11.3.1	255.255.255.192	N/A
	G0/0.21	172.11.3.113	255.255.255.240	N/A
R3	G0/1	172.11.0.6	255.255.255.252	N/A
	G0/2	172.11.0.2	255.255.255.252	N/A

(HCM-R1)	G/0/0	172.11.0.9	255.255.255.252	N/A
R4 (HCM-R2)	G0/0	172.11.0.10	255.255.255.252	N/A
	G0/1.10	172.11.3.97	255.255.255.240	N/A
	G0/1.11	172.11.2.1	255.255.255.0	N/A
S1 (CT-S1)	VLAN30	172.11.3.66	255.255.255.224	N/A
S2 (HN-S1)	VLAN20	172.11.3.2	255.255.255.192	N/A
	VLAN21	172.11.3.114	255.255.255.240	N/A
S3 (HCM-S1)	VLAN10	172.11.3.98	255.255.255.240	N/A
S4 (HCM-S2)	VLAN11	172.11.2.2	255.255.255.0	N/A
CT-PC-A	NIC	172.11.3.94	255.255.255.224	172.11.3.65
HN-PC-A	NIC	172.11.3.62	255.255.255.192	172.11.3.1
HN-PC-B	NIC	172.11.3.126	255.255.255.240	172.11.3.113
HCM-ServerA	NIC	172.11.3.110	255.255.255.240	172.11.3.97
HCM-PC-A	NIC	172.11.2.254	255.255.255.0	172.11.2.1

Yêu cầu 2: Thực hiện cấu hình VLAN và Trunking cho các thiết bị theo yêu cầu bên dưới

- Cấu hình VLAN:
  - CT-S1

```
Switch(config)#hostname S1
S1(config)#vlan 30
S1(config-vlan)#name VLAN30
S1(config-vlan)#interface f0/6
S1(config-if)#
S1(config-if)#no shutdown
S1(config-if)#switchport mode access
S1(config-if)#switchport access vlan 30
S1(config-if)#exit
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/7, Fa0/8, Fa0/9
                                                Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                Gig0/2
30   VLAN30                           active    Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S1#
```

- HN-S1

```
S2(config)#vlan 20
S2(config-vlan)#name VLAN20
S2(config-vlan)#interface f0/6
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 20
S2(config-if)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#vlan 21
S2(config-vlan)#name VLAN21
S2(config-vlan)#interface f0/11
S2(config-if)#switchport mode access
S2(config-if)#switchport access vlan 21
S2(config-if)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console
show vlan brief

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                 Fa0/5, Fa0/7, Fa0/8, Fa0/9
                                                 Fa0/10, Fa0/12, Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16, Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20, Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24, Gig0/1, Gig0/2
20   VLAN20                            active    Fa0/6
21   VLAN21                            active    Fa0/11
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
S2#
```

- HCM-S1

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#vlan 10
Switch(config-vlan)#name VLAN10
Switch(config-vlan)#interface f0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 10
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S3
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/7, Fa0/8, Fa0/9
                                                Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                Gig0/2
10   VLAN10                           active    Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S3#
```

- HCM-S2

```
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname S4
S4(config)#vlan 11
S4(config-vlan)#name VLAN11
S4(config-vlan)#switchport mode access
                ^
% Invalid input detected at '^' marker.

S4(config-vlan)#interface f0/6
S4(config-if)#switchport mode access
S4(config-if)#switchport access vlan 11
S4(config-if)#exit
S4(config)#exit
S4#
%SYS-5-CONFIG_I: Configured from console by console

S4#show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/3, Fa0/4
                                                Fa0/5, Fa0/7, Fa0/8, Fa0/9
                                                Fa0/10, Fa0/11, Fa0/12, Fa0/13
                                                Fa0/14, Fa0/15, Fa0/16, Fa0/17
                                                Fa0/18, Fa0/19, Fa0/20, Fa0/21
                                                Fa0/22, Fa0/23, Fa0/24, Gig0/1
                                                Gig0/2
11   VLAN11                           active    Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
S4#
```

- Cấu hình Trunking:

  - CT-S1 && CT-R1

```
S1>enable
S1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#interface GigabitEthernet 0/1
S1(config-if)#switchport mode trunk

S1(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down

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

S1(config-if)#exit
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/1      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/1      1-1005

Port        Vlans allowed and active in management domain
Gig0/1      1,30

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/1      1,30

S1#
```

Copy

- HN-S1 && HN-R1

```
S2>enable
S2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#switchport mode trunk
                ^
% Invalid input detected at '^' marker.

S2(config)#interface GigabitEthernet 0/1
S2(config-if)#switchport mode trunk

S2(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to down

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

S2(config-if)#
S2(config-if)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/1      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/1      1-1005

Port        Vlans allowed and active in management domain
Gig0/1      1,20,21

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/1      1,20,21

S2#
```

Copy

- HCM-S1 && HCM-R2

```
S3>enable
S3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#interface GigabitEthernet 0/1
S3(config-if)#switchport mode trunk
```

- HCM-S1 && HCM-S2

```
S3(config-if)#interface GigabitEthernet 0/2
S3(config-if)#switchport mode trunk
S3(config-if)#exit
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/1      on           802.1q         trunking      1
Gig0/2      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/1      1-1005
Gig0/2      1-1005

Port        Vlans allowed and active in management domain
Gig0/1      1,10
Gig0/2      1,10

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/1      1,10
Gig0/2      1,10

S3#
```

```
S4>enable
S4#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S4(config)#interface GigabitEthernet 0/2
S4(config-if)#switchport mode trunk

S4(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to down

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

S4(config-if)#exit
S4(config)#exit
S4#
%SYS-5-CONFIG_I: Configured from console by console

S4#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/2      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/2      1-1005

Port        Vlans allowed and active in management domain
Gig0/2      1,11

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/2      1,11

S4#
```

- Thêm VLAN 11 vào HCM-S1

```
S3>enable
S3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#int vlan 11
S3(config-if)#ip add 172.11.2.2 255.255.255.0
S3(config-if)#int g0/2
S3(config-if)#switchport access vlan 11
S3(config-if)#exit
S3(config)#exit
S3#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/1      on           802.1q         trunking      1
Gig0/2      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/1      1-1005
Gig0/2      1-1005

Port        Vlans allowed and active in management domain
Gig0/1      1,10,11
Gig0/2      1,10,11

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/1      1,10
Gig0/2      none

S3#
```

- Thêm VLAN 10 vào HCM-S2

```
S4>enable
S4#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
S4(config)#int vlan 10
S4(config-if)#ip add 172.11.3.98 255.255.255.240
S4(config-if)#int g0/2
S4(config-if)#switchport access vlan 10
% Access VLAN does not exist. Creating vlan 10
S4(config-if)#exit
S4(config)#exit
S4#show int trunk
Port        Mode         Encapsulation  Status        Native vlan
Gig0/2      on           802.1q         trunking      1

Port        Vlans allowed on trunk
Gig0/2      1-1005

Port        Vlans allowed and active in management domain
Gig0/2      1,10,11

Port        Vlans in spanning tree forwarding state and not pruned
Gig0/2      none

S4#
```

Yêu cầu 3: Sử dụng bảng địa chỉ IP của các thiết bị ở Yêu cầu 1, sinh viên thực hiện cấu hình địa chỉ IP cho các thiết bị.

- CT-R1

```
R1>enable
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface g0/0.30
R1(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.30, changed state to up

R1(config-subif)#encapsulationdot1Q 30
                 ^
% Invalid input detected at '^' marker.

R1(config-subif)#encapsulation dot1Q 30
R1(config-subif)#ip add 172.11.3.65 255.255.255.224
R1(config-subif)#interface g0/2
R1(config-if)#no shutdown
R1(config-if)#ip add 172.11.0.1 255.255.255.252
R1(config-if)#exit
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.30  172.11.3.65     YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     172.11.0.1      YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
R1#
```

Copy

- HN-R1

```
R2>enable
R2#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#int g0/0.20
R2(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.20, changed state to up

R2(config-subif)#encapsulation dot1Q 20
R2(config-subif)#ip add 172.11.3.1 255.255.255.192
R2(config-subif)#int g0/0.21
R2(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0.21, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0.21, changed state to up

R2(config-subif)#encapsulation dot1Q 21
R2(config-subif)#ip add 172.11.3.113 255.255.255.240
R2(config-subif)#int g0/1
R2(config-if)#no shutdown
R2(config-if)#ip add 172.11.0.5 255.255.255.252
R2(config-if)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console

R2#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.20  172.11.3.1      YES manual up                    up
GigabitEthernet0/0.21  172.11.3.113    YES manual up                    up
GigabitEthernet0/1     172.11.0.5      YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R2#
```

Copy

- HCM-R1

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#int g0/1
Router(config-if)#ip add exit
                      ^
% Invalid input detected at '^' marker.

Router(config-if)#exit
Router(config)#hostname R3
R3(config)#int g0/1
R3(config-if)#ip add 172.11.0.6 255.255.255.252
R3(config-if)#int g0/2
R3(config-if)#ip add 172.11.0.2 255.255.255.252
R3(config-if)#int g0/0
R3(config-if)#ip add 172.11.0.9 255.255.255.252
R3(config-if)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     172.11.0.9      YES manual up                    up
GigabitEthernet0/1     172.11.0.6      YES manual up                    up
GigabitEthernet0/2     172.11.0.2      YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
R3#
```

- HCM-R2

```
Router>enable
Router#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname R4
R4(config)#int g0/1.10
R4(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.10, changed state to up

R4(config-subif)#encapsulation dot1Q 10
R4(config-subif)#ip add 172.11.3.97 255.255.255.240
R4(config-subif)#int g0/1.11
R4(config-subif)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1.11, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1.11, changed state to up
\
                ^
% Invalid input detected at '^' marker.

R4(config-subif)#encapsulation dot1Q 11
R4(config-subif)#ip add 172.11.2.1 255.255.255.0
R4(config-subif)#int g0/0
R4(config-if)#ip add 172.11.0.10 255.255.255.252
R4(config-if)#exit
R4(config)#exit
R4#
%SYS-5-CONFIG_I: Configured from console by console

R4#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     172.11.0.10     YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  up                    up
GigabitEthernet0/1.10  172.11.3.97     YES manual up                    up
GigabitEthernet0/1.11  172.11.2.1      YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
R4#
```

Copy

- CT-S1

```
S1>enable
S1#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
S1(config)#int vlan 30
S1(config-if)#ip add 172.11.3.66 255.255.255.224
S1(config-if)#exit
S1(config)#exit
S1#
%SYS-5-CONFIG_I: Configured from console by console

S1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual down                  down
FastEthernet0/2        unassigned      YES manual down                  down
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual up                    up
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual up                    up
GigabitEthernet0/2     unassigned      YES manual down                  down
Vlan1                  unassigned      YES manual administratively down down
Vlan30                 172.11.3.66     YES manual up                    up
S1#
```

- HN-S1

```
S2>enable
S2#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
S2(config)#int vlan 20
S2(config-if)#ip add 172.11.3.2 255.255.192
                                ^
% Invalid input detected at '^' marker.

S2(config-if)#ip add 172.11.3.2 255.255.255.192
S2(config-if)#int vlan 21
S2(config-if)#ip add 172.11.3.114 255.255.255.240
S2(config-if)#exit
S2(config)#exit
S2#
%SYS-5-CONFIG_I: Configured from console by console

S2#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual down                  down
FastEthernet0/2        unassigned      YES manual down                  down
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual up                    up
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual up                    up
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual up                    up
GigabitEthernet0/2     unassigned      YES manual down                  down
Vlan1                  unassigned      YES manual administratively down down
Vlan20                 172.11.3.2      YES manual up                    up
Vlan21                 172.11.3.114    YES manual up                    up
S2#
S2#
```

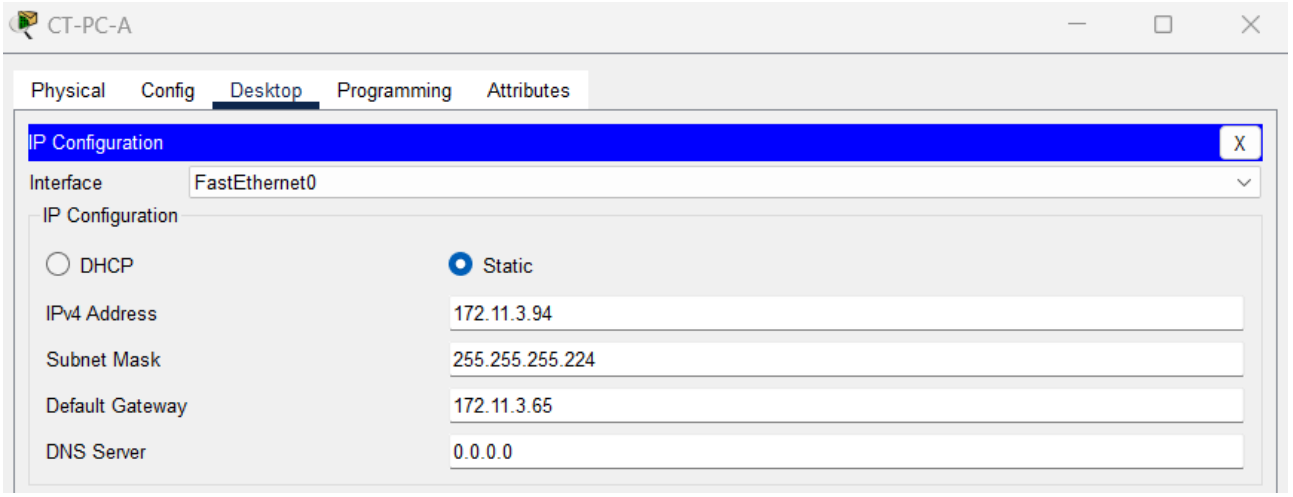
- HCM-S1

```
S3>enable
S3#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
S3(config)#int vlan 10
S3(config-if)#ip add 172.11.3.98 255.255.255.240
S3(config-if)#exit
S3(config)#exit
S3#
%SYS-5-CONFIG_I: Configured from console by console

S3#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual down                  down
FastEthernet0/2        unassigned      YES manual down                  down
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual up                    up
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual up                    up
GigabitEthernet0/2     unassigned      YES manual up                    up
Vlan1                  unassigned      YES manual administratively down down
Vlan10                 172.11.3.98     YES manual up                    up
S3#
S3#
```

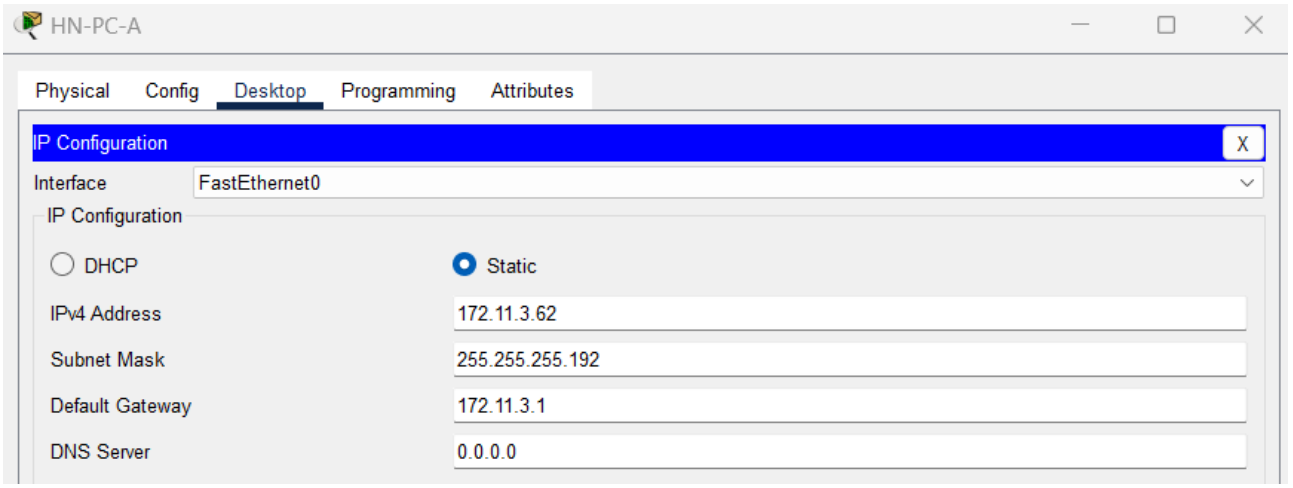
- HCM-S2

```
S4>enable
S4#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
S4(config)#int vlan 11
S4(config-if)#
%LINK-5-CHANGED: Interface Vlan11, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan11, changed state to up

S4(config-if)#ip add 172.11.2.2 255.255.255.0
S4(config-if)#exit
S4(config)#exit
S4#
%SYS-5-CONFIG_I: Configured from console by console

S4#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/1        unassigned      YES manual down                  down
FastEthernet0/2        unassigned      YES manual down                  down
FastEthernet0/3        unassigned      YES manual down                  down
FastEthernet0/4        unassigned      YES manual down                  down
FastEthernet0/5        unassigned      YES manual down                  down
FastEthernet0/6        unassigned      YES manual up                    up
FastEthernet0/7        unassigned      YES manual down                  down
FastEthernet0/8        unassigned      YES manual down                  down
FastEthernet0/9        unassigned      YES manual down                  down
FastEthernet0/10       unassigned      YES manual down                  down
FastEthernet0/11       unassigned      YES manual down                  down
FastEthernet0/12       unassigned      YES manual down                  down
FastEthernet0/13       unassigned      YES manual down                  down
FastEthernet0/14       unassigned      YES manual down                  down
FastEthernet0/15       unassigned      YES manual down                  down
FastEthernet0/16       unassigned      YES manual down                  down
FastEthernet0/17       unassigned      YES manual down                  down
FastEthernet0/18       unassigned      YES manual down                  down
FastEthernet0/19       unassigned      YES manual down                  down
FastEthernet0/20       unassigned      YES manual down                  down
FastEthernet0/21       unassigned      YES manual down                  down
FastEthernet0/22       unassigned      YES manual down                  down
FastEthernet0/23       unassigned      YES manual down                  down
FastEthernet0/24       unassigned      YES manual down                  down
GigabitEthernet0/1     unassigned      YES manual down                  down
GigabitEthernet0/2     unassigned      YES manual up                    up
Vlan1                  unassigned      YES manual administratively down down
Vlan11                 172.11.2.2      YES manual up                    up
S4#
S4#
```

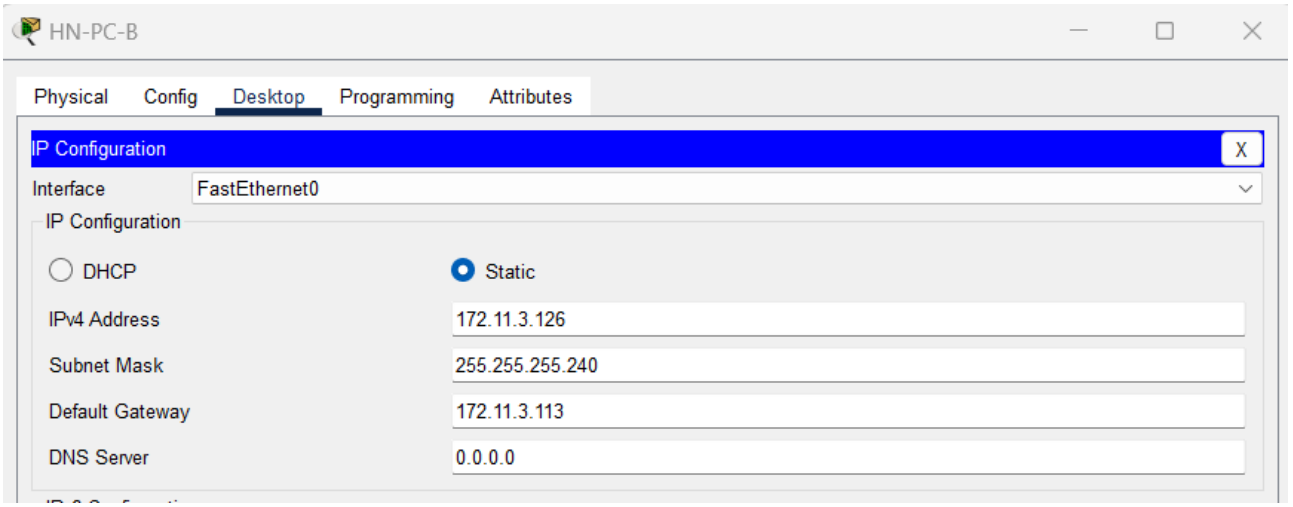
- CT-PC-A



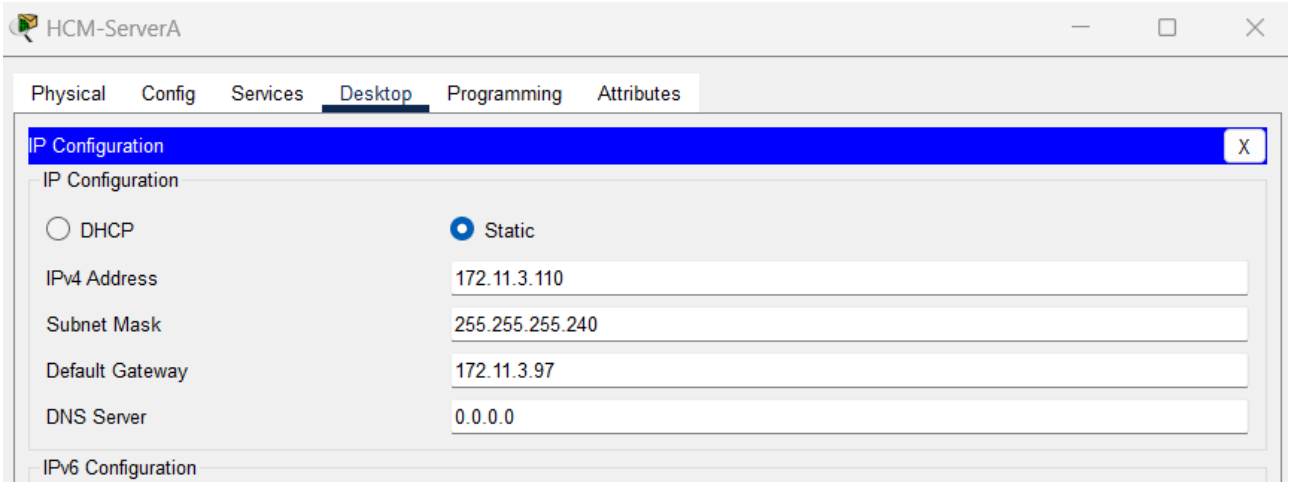
- HN-PC-A



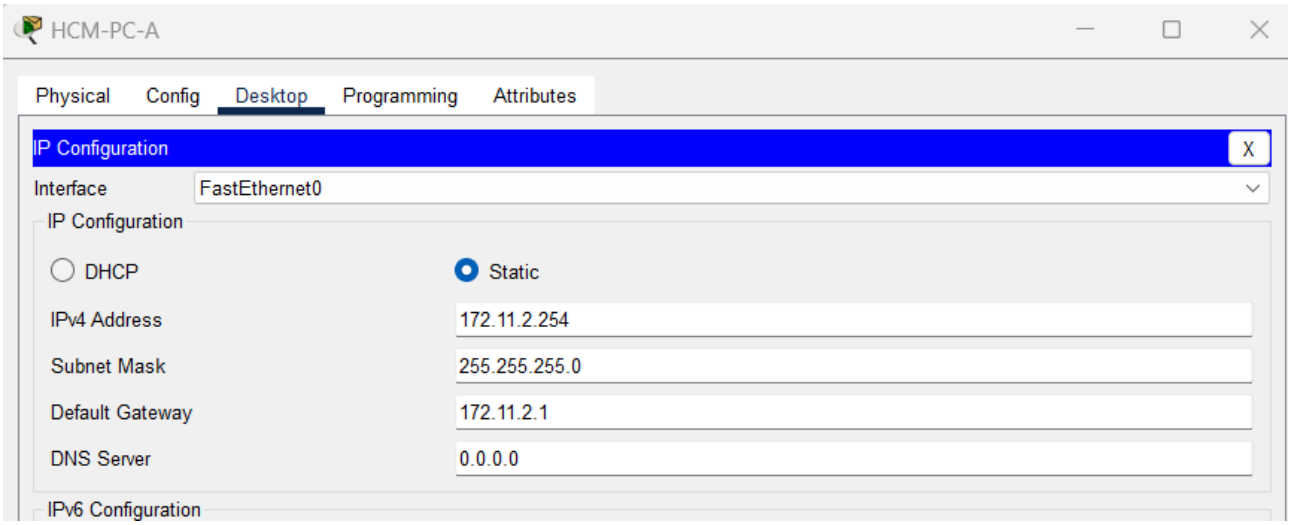
- HN-PC-B



- HCM-ServerA



- HCM-PC-A



Yêu cầu 4: Sinh viên cấu hình định tuyến OSPF trên các router để thỏa các yêu cầu bên dưới

- Cấu hình định tuyến OSPF cho các router và thực hiện kiểm tra

- CT-R1

```
R1>enable
R1#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#router ospf 1
R1(config-router)#network 172.11.0.1 0.0.0.0 area 0
R1(config-router)#network 172.11.3.65 0.0.0.0 area 0
R1(config-router)#exit
R1(config)#exit
```

➢ **Check:**

```
R1#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

     172.11.0.0/16 is variably subnetted, 10 subnets, 6 masks
C       172.11.0.0/30 is directly connected, GigabitEthernet0/2
L       172.11.0.1/32 is directly connected, GigabitEthernet0/2
O       172.11.0.4/30 [110/2] via 172.11.0.2, 00:02:40, GigabitEthernet0/2
O       172.11.0.8/30 [110/2] via 172.11.0.2, 00:02:29, GigabitEthernet0/2
O       172.11.2.0/24 [110/3] via 172.11.0.2, 00:00:54, GigabitEthernet0/2
O       172.11.3.0/26 [110/3] via 172.11.0.2, 00:02:40, GigabitEthernet0/2
C       172.11.3.64/27 is directly connected, GigabitEthernet0/0.30
L       172.11.3.65/32 is directly connected, GigabitEthernet0/0.30
O       172.11.3.96/28 [110/3] via 172.11.0.2, 00:00:54, GigabitEthernet0/2
O       172.11.3.112/28 [110/3] via 172.11.0.2, 00:02:40, GigabitEthernet0/2

R1#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.11.3.65
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.11.0.1 0.0.0.0 area 0
    172.11.3.65 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.11.0.9           110      00:01:13
    172.11.3.65          110      00:02:49
    172.11.3.97          110      00:00:59
    172.11.3.113         110      00:02:56
  Distance: (default is 110)

R1#
```

- HN-R1

```
R2>enable
R2#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R2(config)#router ospf 1
R2(config-router)#network 172.11.0.5 0.0.0.0 area 0
R2(config-router)#network 172.11.3.1 0.0.0.0 area 0
R2(config-router)#network 172.11.3.113 0.0.0.0 area 0
R2(config-router)#exit
R2(config)#exit
```

➢ **check:**

```
R2#show ip protocols

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.11.3.113
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.11.0.5 0.0.0.0 area 0
    172.11.3.1 0.0.0.0 area 0
    172.11.3.113 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.11.0.9           110      00:02:33
    172.11.3.65          110      00:04:09
    172.11.3.97          110      00:02:19
    172.11.3.113         110      00:04:15
  Distance: (default is 110)

R2#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

     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
O       172.11.0.0/30 [110/2] via 172.11.0.6, 00:04:02, GigabitEthernet0/1
C       172.11.0.4/30 is directly connected, GigabitEthernet0/1
L       172.11.0.5/32 is directly connected, GigabitEthernet0/1
O       172.11.0.8/30 [110/2] via 172.11.0.6, 00:03:52, GigabitEthernet0/1
O       172.11.2.0/24 [110/3] via 172.11.0.6, 00:02:21, GigabitEthernet0/1
C       172.11.3.0/26 is directly connected, GigabitEthernet0/0.20
L       172.11.3.1/32 is directly connected, GigabitEthernet0/0.20
O       172.11.3.64/27 [110/3] via 172.11.0.6, 00:04:02, GigabitEthernet0/1
O       172.11.3.96/28 [110/3] via 172.11.0.6, 00:02:21, GigabitEthernet0/1
C       172.11.3.112/28 is directly connected, GigabitEthernet0/0.21
L       172.11.3.113/32 is directly connected, GigabitEthernet0/0.21
 --More--
```

- HCM-R1

```
R3>enable
R3#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#network 172.11.0.6 0.0.0.0 area 0
R3(config-router)#network 172.11.0.2 0.0.0.0 area 0
R3(config-router)#network 172.11.0.2 0.0.0.0 area 0
11:22:23: %OSPF-5-ADJCHG: Process 1, Nbr 172.11.3.113 on GigabitEthernet0/1 from LOADING to FULL, Loading Done

R3(config-router)#
11:22:29: %OSPF-5-ADJCHG: Process 1, Nbr 172.11.3.65 on GigabitEthernet0/2 from LOADING to FULL, Loading Done

R3(config-router)#network 172.11.0.9 0.0.0.0 area 0
R3(config-router)#exit
R3(config)#exit
```

- **Check:**

```
R3#show ip protocol

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.11.0.9
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.11.0.6 0.0.0.0 area 0
    172.11.0.2 0.0.0.0 area 0
    172.11.0.9 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.11.0.9           110      00:03:47
    172.11.3.65          110      00:05:23
    172.11.3.97          110      00:03:33
    172.11.3.113         110      00:05:30
  Distance: (default is 110)

R3#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

     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
C       172.11.0.0/30 is directly connected, GigabitEthernet0/2
L       172.11.0.2/32 is directly connected, GigabitEthernet0/2
C       172.11.0.4/30 is directly connected, GigabitEthernet0/1
L       172.11.0.6/32 is directly connected, GigabitEthernet0/1
C       172.11.0.8/30 is directly connected, GigabitEthernet0/0
L       172.11.0.9/32 is directly connected, GigabitEthernet0/0
O       172.11.2.0/24 [110/2] via 172.11.0.10, 00:03:29, GigabitEthernet0/0
O       172.11.3.0/26 [110/2] via 172.11.0.5, 00:05:23, GigabitEthernet0/1
O       172.11.3.64/27 [110/2] via 172.11.0.1, 00:05:23, GigabitEthernet0/2
O       172.11.3.96/28 [110/2] via 172.11.0.10, 00:03:44, GigabitEthernet0/0
O       172.11.3.112/28 [110/2] via 172.11.0.5, 00:05:23, GigabitEthernet0/1
 --More--
```

- HCM-R2

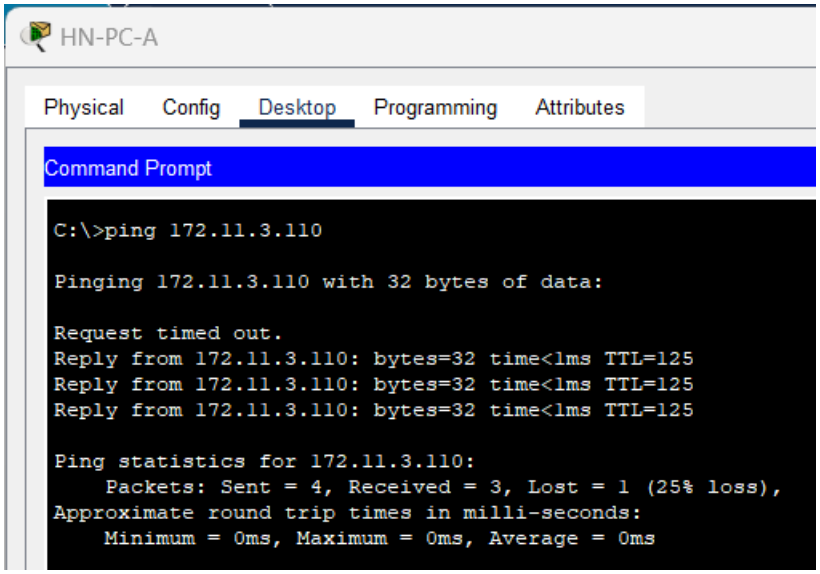
```
R4>enable
R4#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R4(config)#router ospf 1
R4(config-router)#network 172.11.0.10 0.0.0.0 area 0
R4(config-router)#network 172.11.3.97 0.0.0.0 area 0
R4(config-router)#network 172.11.3.97 0.0.0.0 area 0
11:24:05: %OSPF-5-ADJCHG: Process 1, Nbr 172.11.0.9 on GigabitEthernet0/0 from LOADING to FULL, Loading Done

R4(config-router)#network 172.11.2.1 0.0.0.0 area 0
R4(config-router)#exit
R4(config)#exit
R4#
```

➢ **Check:**

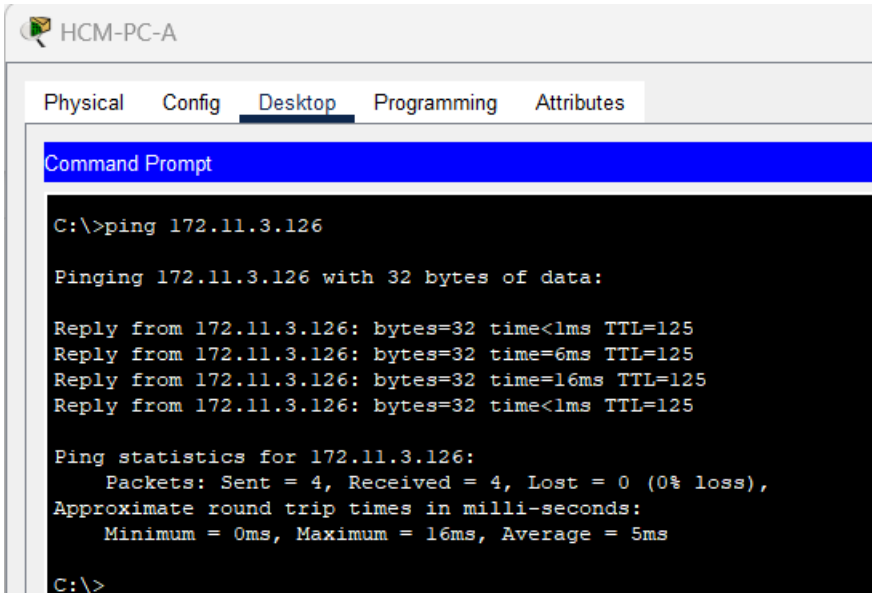
```
R4#show ip protocol

Routing Protocol is "ospf 1"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.11.3.97
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.11.0.10 0.0.0.0 area 0
    172.11.3.97 0.0.0.0 area 0
    172.11.2.1 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.11.0.9           110      00:04:33
    172.11.3.65          110      00:06:09
    172.11.3.97          110      00:04:18
    172.11.3.113         110      00:06:16
  Distance: (default is 110)

R4#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

     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
O       172.11.0.0/30 [110/2] via 172.11.0.9, 00:04:30, GigabitEthernet0/0
O       172.11.0.4/30 [110/2] via 172.11.0.9, 00:04:30, GigabitEthernet0/0
C       172.11.0.8/30 is directly connected, GigabitEthernet0/0
L       172.11.0.10/32 is directly connected, GigabitEthernet0/0
C       172.11.2.0/24 is directly connected, GigabitEthernet0/1.11
L       172.11.2.1/32 is directly connected, GigabitEthernet0/1.11
O       172.11.3.0/26 [110/3] via 172.11.0.9, 00:04:30, GigabitEthernet0/0
O       172.11.3.64/27 [110/3] via 172.11.0.9, 00:04:30, GigabitEthernet0/0
C       172.11.3.96/28 is directly connected, GigabitEthernet0/1.10
L       172.11.3.97/32 is directly connected, GigabitEthernet0/1.10
O       172.11.3.112/28 [110/3] via 172.11.0.9, 00:04:30, GigabitEthernet0/0
 --More--
```

- Ping kiểm tra giữa các PC và server

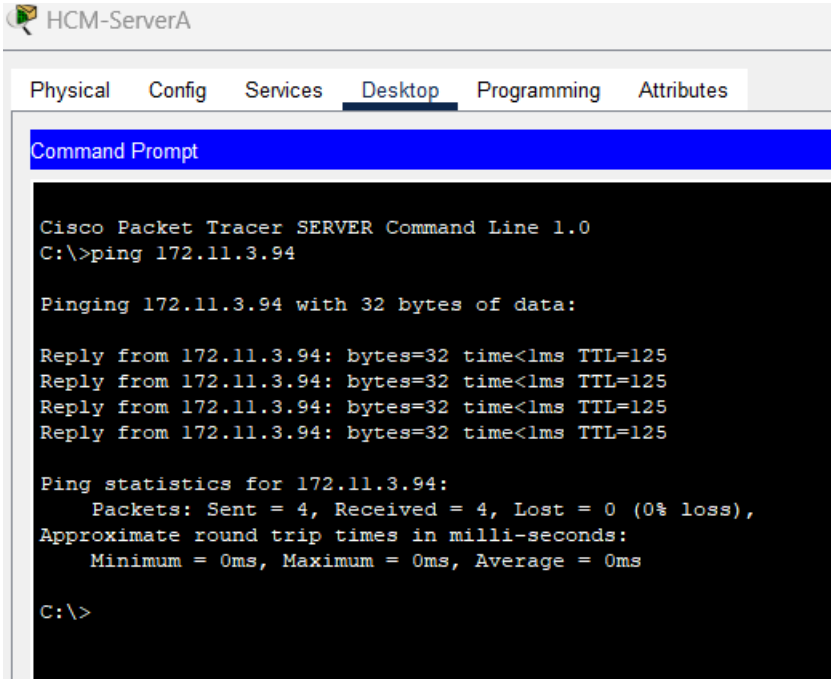
  - HN-PC-A ping HCM-ServerA



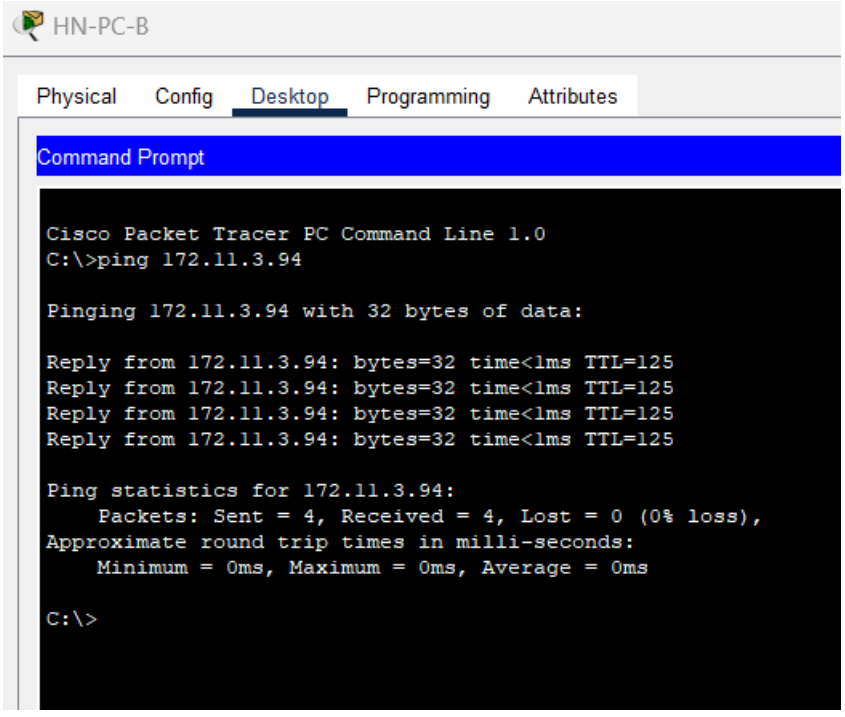
- HCM-PC-A ping HN-PC-B



- HCM-ServerA ping CT-PC-A



- HN-PC-B ping CT-PC-A



- Quảng bá default static route cho các router khác bằng OSPF

- Tạo cổng loopback 0 trên router HCM-R1

```
R3>enable
R3#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#int loopback 0

R3(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Loopback0, changed state to up

R3(config-if)#no shutdown
R3(config-if)#ip add 8.8.8.8 255.255.255.255
R3(config-if)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console

R3#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     172.11.0.9      YES manual up                    up
GigabitEthernet0/1     172.11.0.6      YES manual up                    up
GigabitEthernet0/2     172.11.0.2      YES manual up                    up
Loopback0              8.8.8.8         YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
R3#
```

- Tạo default static route đi ra cổng này

```
R3#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#ip route 0.0.0.0 0.0.0.0 Loopback0
%Default route without gateway, if not a point-to-point interface, may impact performance
R3(config)#
```

- Quảng bá default static route

```
R3#configure
Configuring from terminal, memory, or network [terminal]?
Enter configuration commands, one per line.  End with CNTL/Z.
R3(config)#router ospf 1
R3(config-router)#default-information originate
R3(config-router)#exit
R3(config)#exit
```

- Default static route này đã có trong các router còn lại, kiểm tra bằng lệnh show ip route

➢ **Check R1 (CT-R1):**

```
R1>enable
R1#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 172.11.0.2 to network 0.0.0.0

     172.11.0.0/16 is variably subnetted, 10 subnets, 6 masks
C       172.11.0.0/30 is directly connected, GigabitEthernet0/2
L       172.11.0.1/32 is directly connected, GigabitEthernet0/2
O       172.11.0.4/30 [110/2] via 172.11.0.2, 00:28:31, GigabitEthernet0/2
O       172.11.0.8/30 [110/2] via 172.11.0.2, 00:28:20, GigabitEthernet0/2
O       172.11.2.0/24 [110/3] via 172.11.0.2, 00:26:45, GigabitEthernet0/2
O       172.11.3.0/26 [110/3] via 172.11.0.2, 00:28:31, GigabitEthernet0/2
C       172.11.3.64/27 is directly connected, GigabitEthernet0/0.30
L       172.11.3.65/32 is directly connected, GigabitEthernet0/0.30
O       172.11.3.96/28 [110/3] via 172.11.0.2, 00:26:45, GigabitEthernet0/2
O       172.11.3.112/28 [110/3] via 172.11.0.2, 00:28:31, GigabitEthernet0/2
O*E2 0.0.0.0/0 [110/1] via 172.11.0.2, 00:02:00, GigabitEthernet0/2
 --More--
```

- **Check R2 (HN-R1):**

```
R2>enable
R2#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 172.11.0.6 to network 0.0.0.0

     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
O       172.11.0.0/30 [110/2] via 172.11.0.6, 00:32:15, GigabitEthernet0/1
C       172.11.0.4/30 is directly connected, GigabitEthernet0/1
L       172.11.0.5/32 is directly connected, GigabitEthernet0/1
O       172.11.0.8/30 [110/2] via 172.11.0.6, 00:32:05, GigabitEthernet0/1
O       172.11.2.0/24 [110/3] via 172.11.0.6, 00:30:34, GigabitEthernet0/1
C       172.11.3.0/26 is directly connected, GigabitEthernet0/0.20
L       172.11.3.1/32 is directly connected, GigabitEthernet0/0.20
O       172.11.3.64/27 [110/3] via 172.11.0.6, 00:32:15, GigabitEthernet0/1
O       172.11.3.96/28 [110/3] via 172.11.0.6, 00:30:34, GigabitEthernet0/1
C       172.11.3.112/28 is directly connected, GigabitEthernet0/0.21
L       172.11.3.113/32 is directly connected, GigabitEthernet0/0.21
O*E2 0.0.0.0/0 [110/1] via 172.11.0.6, 00:05:49, GigabitEthernet0/1

R2#
```

- **Check R3(HCM-R1):**

```
R3#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 0.0.0.0 to network 0.0.0.0

     8.0.0.0/32 is subnetted, 1 subnets
C       8.8.8.8/32 is directly connected, Loopback0
     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
C       172.11.0.0/30 is directly connected, GigabitEthernet0/2
L       172.11.0.2/32 is directly connected, GigabitEthernet0/2
C       172.11.0.4/30 is directly connected, GigabitEthernet0/1
L       172.11.0.6/32 is directly connected, GigabitEthernet0/1
C       172.11.0.8/30 is directly connected, GigabitEthernet0/0
L       172.11.0.9/32 is directly connected, GigabitEthernet0/0
O       172.11.2.0/24 [110/2] via 172.11.0.10, 00:25:46, GigabitEthernet0/0
O       172.11.3.0/26 [110/2] via 172.11.0.5, 00:27:40, GigabitEthernet0/1
O       172.11.3.64/27 [110/2] via 172.11.0.1, 00:27:40, GigabitEthernet0/2
O       172.11.3.96/28 [110/2] via 172.11.0.10, 00:26:01, GigabitEthernet0/0
O       172.11.3.112/28 [110/2] via 172.11.0.5, 00:27:40, GigabitEthernet0/1
S*   0.0.0.0/0 is directly connected, Loopback0

R3#
```

- **Check R4(HCM-R2):**

```
R4>enable
R4#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 172.11.0.9 to network 0.0.0.0

     172.11.0.0/16 is variably subnetted, 11 subnets, 6 masks
O       172.11.0.0/30 [110/2] via 172.11.0.9, 00:31:13, GigabitEthernet0/0
O       172.11.0.4/30 [110/2] via 172.11.0.9, 00:31:13, GigabitEthernet0/0
C       172.11.0.8/30 is directly connected, GigabitEthernet0/0
L       172.11.0.10/32 is directly connected, GigabitEthernet0/0
C       172.11.2.0/24 is directly connected, GigabitEthernet0/1.11
L       172.11.2.1/32 is directly connected, GigabitEthernet0/1.11
O       172.11.3.0/26 [110/3] via 172.11.0.9, 00:31:13, GigabitEthernet0/0
O       172.11.3.64/27 [110/3] via 172.11.0.9, 00:31:13, GigabitEthernet0/0
C       172.11.3.96/28 is directly connected, GigabitEthernet0/1.10
L       172.11.3.97/32 is directly connected, GigabitEthernet0/1.10
O       172.11.3.112/28 [110/3] via 172.11.0.9, 00:31:13, GigabitEthernet0/0
O*E2 0.0.0.0/0 [110/1] via 172.11.0.9, 00:06:18, GigabitEthernet0/0

R4#
```

HẾT