BÁO CÁO THỰC HÀNH

Môn học: Quản trị mạng và hệ thống

Buổi báo cáo: Lab 02

Tên chủ đề: VLAN, Trunking và Định tuyến động

GVHD: Đỗ Hoàng Hiển

Ngày thực hiện: 10/10/2023

THÔNG TIN CHUNG:

(Liệt kê tất cả các thành viên trong nhóm)
Lớp: NT132.O11.1

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BÁO CÁO CHI TIẾT

Yêu cầu 1. Sử dụng lớp mạng 172.x.y.0/22, với x và y là 2 số cuối MSSV của 2 thành viên trong nhóm, để chia các mạng con và gắn IP cho các thiết bị theo yêu cầu bên dưới

Lớp mạng: 172.95.40.0/22

Số host	Network	Subnet mask	Dải IP	Broadcast
300	172.95.40.0/24	255.255.255.0	40.1 – 40.254	40.255
32	172.95.41.0/26	255.255.255.192	41.1 – 41.62	41.63
30	172.95.41.64/27	255.255.255.224	41.65 – 41.94	41.95
10	172.95.41.96/28	255.255.255.240	41.97 – 41.110	41.111
7	172.95.41.112/28	255.255.255.240	41.113 – 41.126	41.127
2	172.95.41.128/30	255.255.255.252	41.129 – 41.130	41.131
2	172.95.41.132/30	255.255.255.252	41.133 – 41.134	41.135
2	172.95.41.136/30	255.255.255.252	41.137 – 41.138	41.139

Thiết bị	Interface	Địa chỉ IP	Subnet mask	Default Gateway
HN-R1	G0/0.20	41.1	255.255.255.192	N/A
	G0/0.21	41.113	255.255.255.240	N/A
	G0/1	41.129	255.255.255.252	N/A
HCM-R1	G0/0	41.137	255.255.255.252	N/A
	G0/1	41.130	255.255.255.252	N/A
	G0/2	41.133	255.255.255.252	N/A
HCM-R2	G0/0	41.138	255.255.255.252	N/A
	G0/1.10	41.97	255.255.255.240	N/A
	G0/1.11	40.1	255.255.255.0	N/A
CT-R1	G0/0.30	41.65	255.255.255.224	N/A
	G0/2	41.134	255.255.255.252	N/A
HN-S1	VLAN 20	41.2	255.255.255.192	N/A
	VLAN 21	41.114	255.255.255.240	N/A
HCM-S1	VLAN 10	41.98	255.255.255.240	N/A
HCM-S2	VLAN 11	40.2	255.255.255.0	N/A
CT-S1	VLAN 30	41.66	255.255.255.224	N/A
HN-PC-A	NIC	41.62	255.255.255.192	41.1
HN-PC-B	NIC	41.126	255.255.255.240	41.113
HCM-Server-A	NIC	41.110	255.255.255.240	41.97
HCM-PC-A	NIC	40.254	255.255.255.0	40.1
CT-PC-A	NIC	41.94	255.255.255.224	41.65

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

• Cấu hình VLAN trên các switch và gán các interface vào VLAN theo mô hình đã cho.

- HN-S1

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname HN-S1
HN-S1(config)#vlan 20
HN-S1(config-vlan)#name VLAN20
HN-S1(config-vlan)#exit
HN-S1(config)#int f0/6
HN-S1(config-if)#switchport mode access
HN-S1(config-if)#switchport access vlan 20
HN-S1(config-if)#exit
HN-S1(config)#vlan 21
HN-S1(config-vlan)#name VLAN21
HN-S1(config-vlan)#exit
HN-S1(config)#int f0/11
HN-S1(config-if)#switchport mode access
HN-S1(config-if)#switchport access vlan 21
```

- HCM-S1

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname HCM-S1
HCM-S1(config)#vlan 10
HCM-S1(config-vlan)#name VLAN10
HCM-S1(config-vlan)#exit

HCM-S1(config)#vlan 11
HCM-S1(config-vlan)#name VLAN11
HCM-S1(config-vlan)#exit

HCM-S1(config)#int f0/6
HCM-S1(config-if)#switchport mode access
HCM-S1(config-if)#switchport access vlan 10

HCM-S1(config)#int g0/2
HCM-S1(config-if)#switchport mode access
HCM-S1(config-if)#switchport access vlan 11
```

- HCM-S2

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname HCM-S2
HCM-S2(config)#vlan 11
HCM-S2(config-vlan)#name VLAN11

HCM-S2(config)#vlan 10
HCM-S2(config-vlan)#name VLAN10
HCM-S2(config-vlan)#exit

HCM-S2(config)#int f0/6
HCM-S2(config-if)#switchport mode access
HCM-S2(config-if)#switchport access vlan 11

HCM-S2(config)#int g0/2
HCM-S2(config-if)#switchport mode access
HCM-S2(config-if)#switchport access vlan 10
```

- CT-S1

```
Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#hostname CT-S1
CT-S1(config)#vlan 30
CT-S1(config-vlan)#name VLAN30
CT-S1(config-vlan)#exit
CT-S1(config)#int f0/6
CT-S1(config-if)#switchport mode access
CT-S1(config-if)#switchport access vlan 30
CT-S1(config-if)#end
CT-S1#
%SYS-5-CONFIG_I: Configured from console by console

CT-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
```

• Cấu hình các đường trunk trên các switch cho phù hợp.

- HN-S1 và HN-R1

```
HN-S1>en
HN-S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
HN-S1(config)#int g0/1
HN-S1(config-if)#switchport mode trunk
```

- HCM-S1 và HCM-R2

```
HCM-S1>en
HCM-S1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
HCM-S1(config)#int g0/1
HCM-S1(config-if)#switchport mode trunk
```

- HCM-S1 và HCM-S2

```
HCM-S1(config-if)#int g0/2
HCM-S1(config-if)#switchport mode trunk

HCM-S2(config)#int g0/2
HCM-S2(config-if)#switchport mode trunk
```

- CT-S1 và CT-R1

```
CT-S1(config)#int g0/1
CT-S1(config-if)#switchport mode trunk
```

• Kiểm tra cấu hình VLAN và đường trunk trên các switch.

- HN-S1

```
HN-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, Fa0/12, 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
```

- HCM-S1

```
HCM-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
10   VLAN10                           active    Fa0/6
11   VLAN11                           active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

- HCM-S2

```
HCM-S2#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
```

- CT-S1

```
CT-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
```

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.

• Thực hiện cấu hình địa chỉ IP cho các thiết bị: router, interface VLAN và PC.

- HN-R1

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname HN-R1
HN-R1(config)#int g0/0
HN-R1(config-if)#no shutdown

HN-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

HN-R1(config-if)#int g0/0.20
HN-R1(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

HN-R1(config-subif)#no shutdown
HN-R1(config-subif)#encapsulation dot1Q 20
HN-R1(config-subif)#ip add 172.95.41.1 255.255.255.192
HN-R1(config-subif)#int g0/0.21
HN-R1(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

HN-R1(config-subif)#no shutdown
HN-R1(config-subif)#encapsulation dot1Q 21
HN-R1(config-subif)#ip add 172.95.41.113 255.255.255.240
HN-R1(config-subif)#int g0/1
HN-R1(config-if)#no shutdown

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

HN-R1(config-if)#ip add 172.95.41.129 255.255.255.252
```

- HCM-R1

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname HCM-R1
HCM-R1(config)#int g0/0
HCM-R1(config-if)#no shutdown

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

HCM-R1(config-if)#ip add 172.95.41.137 255.255.255.252
HCM-R1(config-if)#int g0/1
HCM-R1(config-if)#no shutdown

HCM-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

HCM-R1(config-if)#ip add 172.95.41.130 255.255.255.252
HCM-R1(config-if)#int g0/2
HCM-R1(config-if)#no shutdown

HCM-R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

HCM-R1(config-if)#ip add 172.95.41.133 255.255.255.252
```

- HCM-R2

```
Router(config)#hostname HCM-R2
HCM-R2(config)#int g0/0
HCM-R2(config-if)#no shutdown

HCM-R2(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

HCM-R2(config-if)#ip add 172.41.138 255.255.255.252
                         ^
% Invalid input detected at '^' marker.

HCM-R2(config-if)#ip add 172.95.41.138 255.255.255.252
HCM-R2(config-if)#int g0/1
HCM-R2(config-if)#no shutdown

HCM-R2(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

HCM-R2(config-if)#int g0/1.10
HCM-R2(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

HCM-R2(config-subif)#no shutdown
HCM-R2(config-subif)#encapsulation dot1Q 10
HCM-R2(config-subif)#ip add 172.95.41.97 255.255.255.240
HCM-R2(config-subif)#int g0/1.11
HCM-R2(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

HCM-R2(config-subif)#no shutdown
HCM-R2(config-subif)#encapsulation dot1Q 11
HCM-R2(config-subif)#ip add 172.95.40.1 255.255.255.0
```

- CT-R1

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#hostname CT-R1
CT-R1(config)#int g0/0
CT-R1(config-if)#no shutdown

CT-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

CT-R1(config-if)#int g0/0.30
CT-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

CT-R1(config-subif)#no shutdown
CT-R1(config-subif)#encapsulation dot1Q 30
CT-R1(config-subif)#ip add 172.95.41.65 255.255.255.224
CT-R1(config-subif)#int g0/2
CT-R1(config-if)#no shutdown

CT-R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

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

CT-R1(config-if)#ip add 172.95.41.134 255.255.255.252
```

- HN-S1

```
HN-S1(config)#int vlan 20
HN-S1(config-if)#
%LINK-5-CHANGED: Interface Vlan20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan20, changed state to up

HN-S1(config-if)#ip add 172.95.41.2 255.255.255.192
HN-S1(config-if)#int vlan 21
HN-S1(config-if)#
%LINK-5-CHANGED: Interface Vlan21, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan21, changed state to up

HN-S1(config-if)#ip add 172.95.41.114 255.255.255.240
```

- HCM-S1

```
HCM-S1(config)#int vlan 10
HCM-S1(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state to up

HCM-S1(config-if)#ip add 172.95.41.98 255.255.255.240
```

- HCM-S2

```
HCM-S2(config)#int vlan 11
HCM-S2(config-if)#
%LINK-5-CHANGED: Interface Vlan11, changed state to up

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

HCM-S2(config-if)#ip add 172.95.40.2 255.255.255.0
```

- CT-S1

```
CT-S1(config)#int vlan 30
CT-S1(config-if)#
%LINK-5-CHANGED: Interface Vlan30, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan30, changed state to up

CT-S1(config-if)#ip add 172.95.41.66 255.255.255.224
```

- HN-PC-A

○ DHCP	● Static
IPv4 Address	172.95.41.62
Subnet Mask	255.255.255.192
Default Gateway	172.95.41.1
DNS Server	0.0.0.0

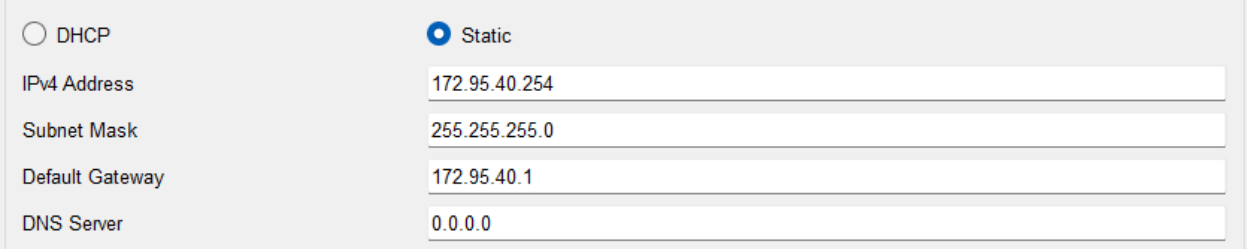
- HN-PC-B

○ DHCP	● Static
IPv4 Address	172.95.41.126
Subnet Mask	255.255.255.240
Default Gateway	172.95.41.113
DNS Server	0.0.0.0

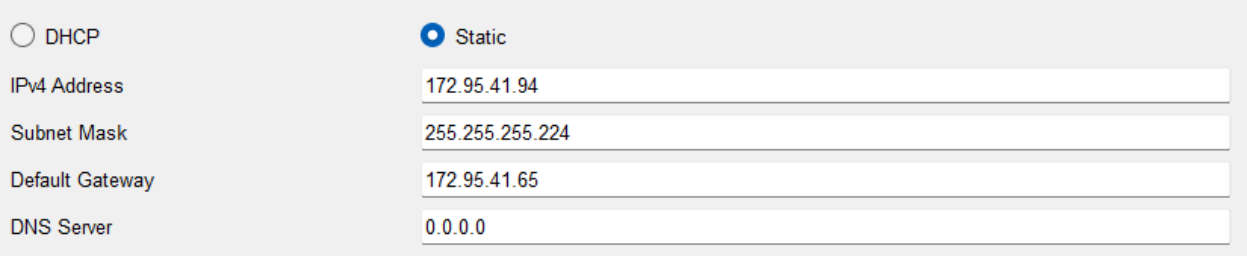
- HCM-ServerA

○ DHCP	● Static
IPv4 Address	172.95.41.110
Subnet Mask	255.255.255.240
Default Gateway	172.95.41.97
DNS Server	0.0.0.0

- HCM-PC-A



- CT-PC-A



• Kiểm tra bằng lệnh show ip interface brief.

- HN-R1

```
HN-R1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.20  172.95.41.1     YES manual up                    up
GigabitEthernet0/0.21  172.95.41.113   YES manual up                    up
GigabitEthernet0/1     172.95.41.129   YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

- HCM-R1

```
HCM-R1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     172.95.41.137   YES manual up                    up
GigabitEthernet0/1     172.95.41.130   YES manual up                    up
GigabitEthernet0/2     172.95.41.133   YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
```

- HCM-R2

```
HCM-R2#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     172.95.41.138   YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  up                    up
GigabitEthernet0/1.10  172.95.41.97    YES manual up                    up
GigabitEthernet0/1.11  172.95.40.1     YES manual up                    up
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
```

- CT-R1

```
CT-R1#show ip int brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  up                    up
GigabitEthernet0/0.30  172.95.41.65    YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     172.95.41.134   YES manual up                    up
Vlan1                  unassigned      YES unset  administratively down down
```

- HN-S1

```
Vlan20                 172.95.41.2     YES manual up                    up
Vlan21                 172.95.41.114   YES manual up                    up
```

- HCM-S1

```
Vlan1                  unassigned      YES manual administratively down down
Vlan10                 172.95.41.98    YES manual up                    up
```

- HCM-S2

```
Vlan1                  unassigned      YES manual administratively down down
Vlan11                 172.95.40.2     YES manual up                    up
```

- CT-S1

```
Vlan1                  unassigned      YES manual administratively down down
Vlan30                 172.95.41.66    YES manual up                    up
```

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

• Cấu hình định tuyến OSPF Trên các router để đảm bảo các PC và Server thấy nhau.

- HN-R1

```
HN-R1(config)#router ospf 10
HN-R1(config-router)#netwoek 172.95.41.1 0.0.0.0 area 0
                     ^
% Invalid input detected at '^' marker.

HN-R1(config-router)#network 172.95.41.1 0.0.0.0 area 0
HN-R1(config-router)#network 172.95.41.113 0.0.0.0 area 0
HN-R1(config-router)#network 172.95.41.129 0.0.0.0 area 0
```

- HCM-R1

```
HCM-R1(config)#router ospf 10
HCM-R1(config-router)#network 172.95.41.137 0.0.0.0 area 0
HCM-R1(config-router)#network 172.95.41.130 0.0.0.0 area 0
HCM-R1(config-router)#network 172.95.41.
00:31:19: %OSPF-5-ADJCHG: Process 10, Nbr 172.95.41.129 on GigabitEthernet0/1 from LOADING to F
HCM-R1(config-router)#no network 172.95.41.
                           ^
% Invalid input detected at '^' marker.

HCM-R1(config-router)#network 172.95.41.133 0.0.0.0 area 0
```

- HCM-R2

```
HCM-R2(config)#router ospf 10
HCM-R2(config-router)#network 172.95.41.138 0.0.0.0 area 0
HCM-R2(config-router)#network 172.95.41
00:33:01: %OSPF-5-ADJCHG: Process 10, Nbr 172.95.41.137 on GigabitEthernet0/0 from LOADING to FULL,
Loading Done
                              ^
% Invalid input detected at '^' marker.

HCM-R2(config-router)#network 172.95.41.97 0.0.0.0 area 0
HCM-R2(config-router)#network 172.95.40.1 0.0.0.0 area 0
```

- CT-R1

```
CT-R1(config)#router ospf 10
CT-R1(config-router)#network 172.95.41.65 0.0.0.0 area 0
CT-R1(config-router)#network 172.95.41.134 0.0.0.0 area 0
CT-R1(config-router)#
00:35:24: %OSPF-5-ADJCHG: Process 10, Nbr 172.95.41.137 on GigabitEthernet0/2 from LOADING to FULL,
Loading Done
```

• Kiểm tra cấu hình định tuyến và bảng định tuyến.

- HN-R1

```
HN-R1#show ip protocol

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.95.41.129
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.95.41.1 0.0.0.0 area 0
    172.95.41.113 0.0.0.0 area 0
    172.95.41.129 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.95.41.129         110      00:07:36
    172.95.41.134         110      00:03:32
    172.95.41.137         110      00:03:32
    172.95.41.138         110      00:05:16
  Distance: (default is 110)
```

- HCM-R1

```
HCM-R1#show ip protocol

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.95.41.137
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.95.41.137 0.0.0.0 area 0
    172.95.41.130 0.0.0.0 area 0
    172.95.41.133 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.95.41.129         110      00:10:01
    172.95.41.134         110      00:05:57
    172.95.41.137         110      00:05:57
    172.95.41.138         110      00:07:41
  Distance: (default is 110)


HCM-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

     172.95.0.0/16 is variably subnetted, 11 subnets, 6 masks
O       172.95.40.0/24 [110/2] via 172.95.41.138, 00:07:45, GigabitEthernet0/0
O       172.95.41.0/26 [110/2] via 172.95.41.129, 00:10:04, GigabitEthernet0/1
O       172.95.41.64/27 [110/2] via 172.95.41.134, 00:06:01, GigabitEthernet0/2
O       172.95.41.96/28 [110/2] via 172.95.41.138, 00:08:03, GigabitEthernet0/0
O       172.95.41.112/28 [110/2] via 172.95.41.129, 00:10:04, GigabitEthernet0/1
C       172.95.41.128/30 is directly connected, GigabitEthernet0/1
L       172.95.41.130/32 is directly connected, GigabitEthernet0/1
C       172.95.41.132/30 is directly connected, GigabitEthernet0/2
L       172.95.41.133/32 is directly connected, GigabitEthernet0/2
C       172.95.41.136/30 is directly connected, GigabitEthernet0/0
L       172.95.41.137/32 is directly connected, GigabitEthernet0/0
```

- HCM-R2

```
HCM-R2#show ip protocol

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.95.41.138
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.95.41.138 0.0.0.0 area 0
    172.95.41.97 0.0.0.0 area 0
    172.95.40.1 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.95.41.129         110      00:10:51
    172.95.41.134         110      00:06:47
    172.95.41.137         110      00:06:47
    172.95.41.138         110      00:08:31
  Distance: (default is 110)
```

```
HCM-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

     172.95.0.0/16 is variably subnetted, 11 subnets, 6 masks
C       172.95.40.0/24 is directly connected, GigabitEthernet0/1.11
L       172.95.40.1/32 is directly connected, GigabitEthernet0/1.11
O       172.95.41.0/26 [110/3] via 172.95.41.137, 00:09:22, GigabitEthernet0/0
O       172.95.41.64/27 [110/3] via 172.95.41.137, 00:06:51, GigabitEthernet0/0
C       172.95.41.96/28 is directly connected, GigabitEthernet0/1.10
L       172.95.41.97/32 is directly connected, GigabitEthernet0/1.10
O       172.95.41.112/28 [110/3] via 172.95.41.137, 00:09:22, GigabitEthernet0/0
O       172.95.41.128/30 [110/2] via 172.95.41.137, 00:09:22, GigabitEthernet0/0
O       172.95.41.132/30 [110/2] via 172.95.41.137, 00:07:01, GigabitEthernet0/0
C       172.95.41.136/30 is directly connected, GigabitEthernet0/0
L       172.95.41.138/32 is directly connected, GigabitEthernet0/0
```

- CT-R1

```
CT-R1#show ip protocol

Routing Protocol is "ospf 10"
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Router ID 172.95.41.134
  Number of areas in this router is 1. 1 normal 0 stub 0 nssa
  Maximum path: 4
  Routing for Networks:
    172.95.41.65 0.0.0.0 area 0
    172.95.41.134 0.0.0.0 area 0
  Routing Information Sources:
    Gateway         Distance      Last Update
    172.95.41.129         110      00:12:41
    172.95.41.134         110      00:08:37
    172.95.41.137         110      00:08:37
    172.95.41.138         110      00:10:21
  Distance: (default is 110)
```

```
CT-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

     172.95.0.0/16 is variably subnetted, 10 subnets, 6 masks
O       172.95.40.0/24 [110/3] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
O       172.95.41.0/26 [110/3] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
C       172.95.41.64/27 is directly connected, GigabitEthernet0/0.30
L       172.95.41.65/32 is directly connected, GigabitEthernet0/0.30
O       172.95.41.96/28 [110/3] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
O       172.95.41.112/28 [110/3] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
O       172.95.41.128/30 [110/2] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
C       172.95.41.132/30 is directly connected, GigabitEthernet0/2
L       172.95.41.134/32 is directly connected, GigabitEthernet0/2
O       172.95.41.136/30 [110/2] via 172.95.41.133, 00:08:36, GigabitEthernet0/2
```

- Ping kiểm tra kết nối giữa các PC và server

+ HN-PC-A và HN-PC-B

```
C:\>ping 172.95.41.126

Pinging 172.95.41.126 with 32 bytes of data:

Reply from 172.95.41.126: bytes=32 time<1ms TTL=127
Reply from 172.95.41.126: bytes=32 time<1ms TTL=127
Reply from 172.95.41.126: bytes=32 time<1ms TTL=127
Reply from 172.95.41.126: bytes=32 time<1ms TTL=127

Ping statistics for 172.95.41.126:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HN-PC-A và HCM-ServerA

```
C:\>ping 172.95.41.110

Pinging 172.95.41.110 with 32 bytes of data:

Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.41.110:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HN-PC-A và HCM-PC-A

```
C:\>ping 172.95.40.254

Pinging 172.95.40.254 with 32 bytes of data:

Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.40.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HN-PC-A và CT-PC-A

```
C:\>ping 172.95.41.94

Pinging 172.95.41.94 with 32 bytes of data:

Request timed out.
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.41.94:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HN-PC-B và HCM-ServerA

```
C:\>ping 172.95.41.110

Pinging 172.95.41.110 with 32 bytes of data:

Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time<1ms TTL=125
Reply from 172.95.41.110: bytes=32 time=1ms TTL=125

Ping statistics for 172.95.41.110:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

+ HN-PC-B và HCM-PC-A

```
C:\>ping 172.95.40.254

Pinging 172.95.40.254 with 32 bytes of data:

Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125
Reply from 172.95.40.254: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.40.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HN-PC-B và CT-PC-A

```
C:\>ping 172.95.41.94

Pinging 172.95.41.94 with 32 bytes of data:

Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.41.94:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HCM-ServerA và HCM-PC-A

```
C:\>ping 172.95.40.254

Pinging 172.95.40.254 with 32 bytes of data:

Reply from 172.95.40.254: bytes=32 time<1ms TTL=127
Reply from 172.95.40.254: bytes=32 time<1ms TTL=127
Reply from 172.95.40.254: bytes=32 time<1ms TTL=127
Reply from 172.95.40.254: bytes=32 time<1ms TTL=127

Ping statistics for 172.95.40.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

+ HCM-ServerA và CT-PC-A

```
C:\>ping 172.95.41.94

Pinging 172.95.41.94 with 32 bytes of data:

Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time=6ms TTL=125

Ping statistics for 172.95.41.94:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 6ms, Average = 1ms
```

+ HCM-PC-A và CT-PC-A

```
C:\>ping 172.95.41.94

Pinging 172.95.41.94 with 32 bytes of data:

Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125
Reply from 172.95.41.94: bytes=32 time<1ms TTL=125

Ping statistics for 172.95.41.94:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

• Tạo một cổng loopback 0 trên router HCM-R1 với địa chỉ 8.8.8.8/32 (ta giả sử cổng loopback này là cổng để đi Internet). Tạo một default static route đi ra cổng này. Quảng bá default static route này cho các route khác bằng OSPF (gợi ý: sử dụng lệnh default-information).

- Tạo cổng loopback 0 với địa chỉ 8.8.8.8/32

```
HCM-R1(config)#int loopback 0

HCM-R1(config-if)#
%LINK-5-CHANGED: Interface Loopback0, changed state to up

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

HCM-R1(config-if)#ip add 8.8.8.8 255.255.255.255
```

- Tạo default static route đi ra cổng này

```
HCM-R1(config)#ip route 0.0.0.0 0.0.0.0 Loopback 0
```

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

```
HCM-R1(config)#router ospf 10
HCM-R1(config-router)#default-information originate
HCM-R1(config-router)#end
```

- Kiểm tra các router khác đã có default static route chưa

+ HN-R1

```
HN-R1>en
HN-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 172.95.41.130 to network 0.0.0.0

     172.95.0.0/16 is variably subnetted, 9 subnets, 5 masks
C       172.95.41.0/26 is directly connected, GigabitEthernet0/0.20
L       172.95.41.1/32 is directly connected, GigabitEthernet0/0.20
O       172.95.41.64/27 [110/3] via 172.95.41.130, 00:00:03, GigabitEthernet0/1
C       172.95.41.112/28 is directly connected, GigabitEthernet0/0.21
L       172.95.41.113/32 is directly connected, GigabitEthernet0/0.21
C       172.95.41.128/30 is directly connected, GigabitEthernet0/1
L       172.95.41.129/32 is directly connected, GigabitEthernet0/1
O       172.95.41.132/30 [110/2] via 172.95.41.130, 00:00:03, GigabitEthernet0/1
O       172.95.41.136/30 [110/2] via 172.95.41.130, 00:00:03, GigabitEthernet0/1
O*E2 0.0.0.0/0 [110/1] via 172.95.41.130, 00:00:03, GigabitEthernet0/1
```

+ HCM-R2

```
HCM-R2>en
HCM-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 172.95.41.137 to network 0.0.0.0

     172.95.0.0/16 is variably subnetted, 11 subnets, 6 masks
C       172.95.40.0/24 is directly connected, GigabitEthernet0/1.11
L       172.95.40.1/32 is directly connected, GigabitEthernet0/1.11
O       172.95.41.0/26 [110/3] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
O       172.95.41.64/27 [110/3] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
C       172.95.41.96/28 is directly connected, GigabitEthernet0/1.10
L       172.95.41.97/32 is directly connected, GigabitEthernet0/1.10
O       172.95.41.112/28 [110/3] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
O       172.95.41.128/30 [110/2] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
O       172.95.41.132/30 [110/2] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
C       172.95.41.136/30 is directly connected, GigabitEthernet0/0
L       172.95.41.138/32 is directly connected, GigabitEthernet0/0
O*E2 0.0.0.0/0 [110/1] via 172.95.41.137, 00:00:40, GigabitEthernet0/0
```

+ CT-R1

```
CT-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 172.95.41.133 to network 0.0.0.0

     172.95.0.0/16 is variably subnetted, 10 subnets, 6 masks
O       172.95.40.0/24 [110/3] via 172.95.41.133, 00:03:45, GigabitEthernet0/2
O       172.95.41.0/26 [110/3] via 172.95.41.133, 00:03:45, GigabitEthernet0/2
C       172.95.41.64/27 is directly connected, GigabitEthernet0/0.30
L       172.95.41.65/32 is directly connected, GigabitEthernet0/0.30
O       172.95.41.96/28 [110/3] via 172.95.41.133, 00:03:45, GigabitEthernet0/2
O       172.95.41.112/28 [110/3] via 172.95.41.133, 00:03:45, GigabitEthernet0/2
O       172.95.41.128/30 [110/2] via 172.95.41.133, 00:03:55, GigabitEthernet0/2
C       172.95.41.132/30 is directly connected, GigabitEthernet0/2
L       172.95.41.134/32 is directly connected, GigabitEthernet0/2
O       172.95.41.136/30 [110/2] via 172.95.41.133, 00:03:45, GigabitEthernet0/2
O*E2 0.0.0.0/0 [110/1] via 172.95.41.133, 00:03:55, GigabitEthernet0/2
```