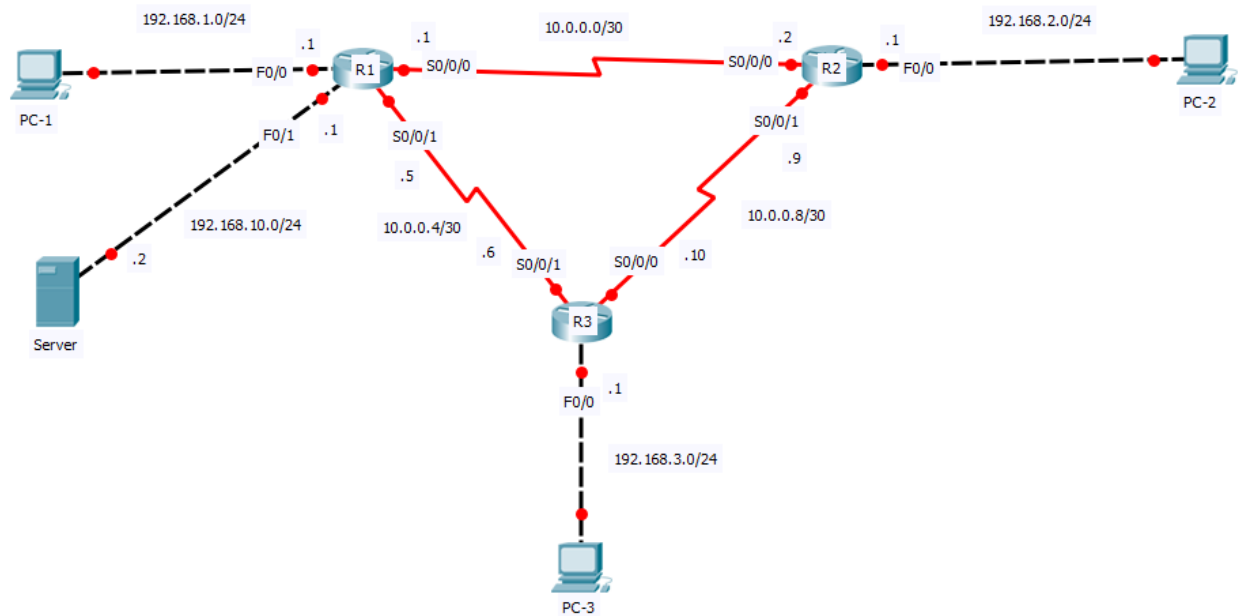


HƯỚNG DẪN LAB

LAB 4b – Ôn tập 1

Designed by : Nguyễn Phú Thịnh

Sơ đồ LAB :



Thiết bị

Tên thiết bị	Chủng loại
R1	Router 2811
R2	Router 2811
R3	Router 2811
PC-1	PC Generic
PC-2	PC Generic
PC-3	PC Generic
Server	Server Generic

Quy hoạch IP

Tên thiết bị	Cổng	IP
R1	S0/0/0	10.0.0.1/30
	S0/0/1	10.0.0.5/30
	F0/0	192.168.1.1/24
	F0/1	192.168.10.1/24
R2	S0/0/0	10.0.0.2/30
	S0/0/1	10.0.0.9/30
	F0/0	192.168.2.1/24
R3	S0/0/0	10.0.0.10/30
	S0/0/1	10.0.0.6/30
	F0/0	192.168.3.1/24
PC-1	F0	DHCP
PC-2	F0	DHCP
PC-3	F0	DHCP
Server	F0	192.168.10.2/24

Yêu cầu

- Đấu nối như sơ đồ
- Cấu hình các Router theo yêu cầu sau :
 - Đặt hostname cho Router như hình
 - Đặt password enable cho Router, sử dụng enable secret
 - Đặt password cho line console
Lưu ý : Học viên tự chọn password tùy thích
 - Đặt IP cho các cổng của Router như quy hoạch
 - Cấu hình telnet cho các Router, sử dụng username/password để đăng nhập. học viên có thể tự chọn username/password
 - Mã hóa tất cả password trên router bằng dịch vụ Password Encryption
- Cấu hình DHCP Server cho ba Router như sau :

R1	R2	R3
<ul style="list-style-type: none"> • Network : 192.168.1.0/24 • Default GW : 192.168.1.1 • DNS : 8.8.8.8 	<ul style="list-style-type: none"> • Network : 192.168.2.0/24 • Default GW : 192.168.2.1 • DNS : 8.8.8.8 	<ul style="list-style-type: none"> • Network : 192.168.3.0/24 • Default GW : 192.168.3.1 • DNS : 8.8.8.8

Lưu ý : đảm bảo các router ping trực tiếp được với nhau. Các PC phải nhận được IP bằng DHCP và phải ping được Gateway

- Cấu hình định tuyến để các subnet 192.168.1.0/24, 192.168.2.0/24, 192.168.3.0/24 và 192.168.10.0/24 thông được với nhau. Học viên có thể chọn đường đi tùy ý
- Lưu cấu hình Router vào Server
- Nâng cấp IOS cho Router, sử dụng phiên bản : **c2800nm-advipservicesk9-mz.151-4.M4.bin** trên Server

Các bước thực hiện :

Bước 1: Đầu nối như sơ đồ

Bước 2: Cấu hình hostname cho Router

R1
Router (config) # hostname R1 R1 (config) #

R2
Router (config) # hostname R2 R2 (config) #

R3
Router (config) # hostname R3 R3 (config) #

Bước 3 : Đặt password enable cho Router, sử dụng enable secret

Lưu ý : học viên có thể tự chọn password khác

R1
R1 (config) # enable secret New\$tar Kiểm tra : R1 (config) # exit R1 # disable R1 > enable Password: [New\$tar] !Password sẽ không hiển thị khi nhập R1 # Khi show cấu hình sẽ thấy password bị mã hóa : R1 # show run Building configuration... Current configuration : 737 bytes ! version 12.4 no service timestamps log datetime msec no service timestamps debug datetime msec no service password-encryption ! hostname R1 ! ! ! enable secret 5 \$1\$mERr\$FpLB0oMT0c1tfe4OqQ5u9. ! ! !

R2
R2 (config) # enable secret New\$tar

Kiểm tra :

```
R2(config)#exit
```

```
R2#disable
```

```
R2>enable
```

```
Password: [New$tar]
```

```
!Password sẽ không hiển thị khi nhập
```

```
R2#
```

R3

```
R3(config)#enable secret New$tar
```

Kiểm tra :

```
R3(config)#exit
```

```
R3#disable
```

```
R3>enable
```

```
Password: [New$tar]
```

```
!Password sẽ không hiển thị khi nhập
```

```
R3#
```

Bước 4 : Đặt password cho Line Console

Lưu ý : học viên có thể tự chọn password khác

R1

```
R1(config)#line console 0
```

```
R1(config-line)#password New$tar123
```

```
R1(config-line)#login
```

Kiểm tra :

```
R1(config-line)#end
```

```
R1#
```

```
R1#exit
```

```
R1 con0 is now available
```

```
Press RETURN to get started.
```

```
User Access Verification
```

```
Password: [New$tar123]
```

```
!Password sẽ không hiển thị khi nhập
```

```
R1>
```

R2

```
R2(config)#line console 0
```

```
R2(config-line)#password New$tar123
```

```
R2(config-line)#login
```

Kiểm tra :

```
R2(config-line)#end
```

```
R2#
R2#exit

R2 con0 is now available

Press RETURN to get started.

User Access Verification

Password: [New$tar123]
!Password sẽ không hiển thị khi nhập

R2>
```

R3

```
R3(config)#line console 0
R3(config-line)#password New$tar123
R3(config-line)#login

Kiểm tra :

R3(config-line)#end
R3#
R3#exit

R3 con0 is now available

Press RETURN to get started.

User Access Verification

Password: [New$tar123]
!Password sẽ không hiển thị khi nhập

R3>
```

Bước 5 : Đặt IP

R1

```
R1(config)#interface S0/0/0
R1(config-if)#ip address 10.0.0.1 255.255.255.252
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface S0/0/1
R1(config-if)#ip address 10.0.0.5 255.255.255.252
R1(config-if)#no shut
R1(config-if)#exit
R1(config)#interface F0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shut
```

```
R1(config-if)#exit
R1(config)#interface F0/1
R1(config-if)#ip address 192.168.10.1 255.255.255.0
R1(config-if)#no shut
```

R2

```
R2(config)#interface S0/0/0
R2(config-if)#ip address 10.0.0.2 255.255.255.252
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface S0/0/1
R2(config-if)#ip address 10.0.0.9 255.255.255.252
R2(config-if)#no shut
R2(config-if)#exit
R2(config)#interface F0/0
R2(config-if)#ip address 192.168.2.1 255.255.255.0
R2(config-if)#no shut
```

R3

```
R3(config)#interface S0/0/0
R3(config-if)#ip address 10.0.0.10 255.255.255.252
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#interface S0/0/1
R3(config-if)#ip address 10.0.0.6 255.255.255.252
R3(config-if)#no shut
R3(config-if)#exit
R3(config)#interface F0/0
R3(config-if)#ip address 192.168.3.1 255.255.255.0
R3(config-if)#no shut
```

Kiểm tra : các interface phải được đặt đúng IP và ở trạng thái up/up

R1

```
R1#show ip interface brief
Interface      IP-Address      OK? Method Status          Protocol
FastEthernet0/0 192.168.1.1     YES manual up              up
FastEthernet0/1 192.168.10.1    YES manual up              up
Serial0/0/0     10.0.0.1        YES manual up              up
Serial0/0/1     10.0.0.5        YES manual up              up
Vlan1           unassigned      YES unset  administratively down down
```

R2

```
R2#show ip interface brief
Interface      IP-Address      OK? Method Status          Protocol
FastEthernet0/0 192.168.2.1     YES manual up              up
FastEthernet0/1 unassigned      YES unset  administratively down down
Serial0/0/0     10.0.0.2        YES manual up              up
Serial0/0/1     10.0.0.9        YES manual up              up
Vlan1           unassigned      YES unset  administratively down down
```

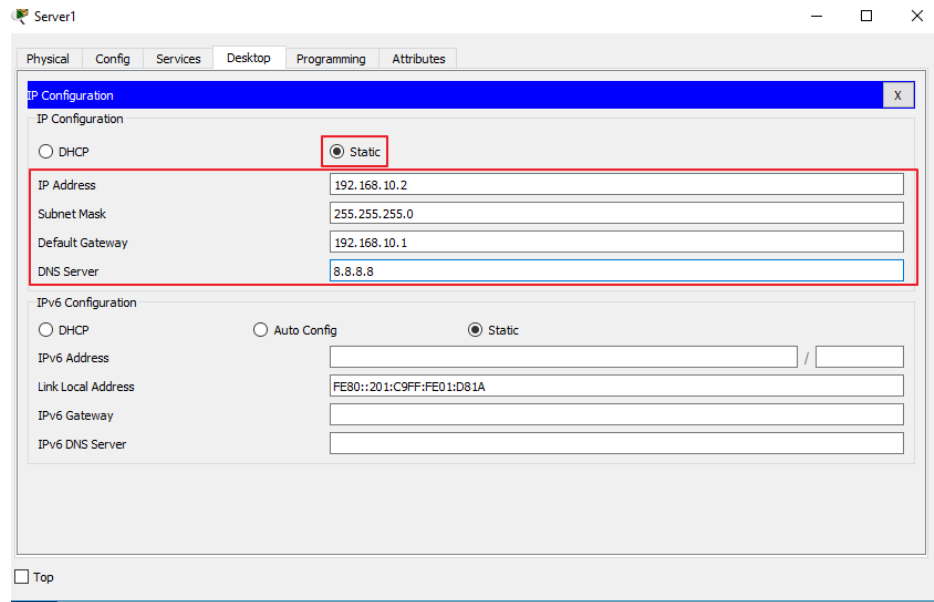
R3

```
R3#show ip interface brief
Interface      IP-Address      OK? Method Status          Protocol
```

FastEthernet0/0	192.168.3.1	YES	manual	up	up
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/0/0	10.0.0.10	YES	manual	up	up
Serial0/0/1	10.0.0.6	YES	manual	up	up
Vlan1	unassigned	YES	unset	administratively down	down

Đặt IP cho server :

Click vào icon **Server** > vào tab **Desktop** > chọn **IP Configuration** và đặt IP như sau :



Bước 6 : Cấu hình Telnet cho các router

Tạo username/password :

Học viên có thể chọn username/passwor khác

```
R1
R1(config)#username admin password cisco
```

```
R2
R2(config)#username admin password cisco
```

```
R3
R3(config)#username admin password cisco
```

Cấu hình Telnet :

```
R1
R1(config)#line vty 0 4
R1(config-line)#login local
```

```
R2
R2(config)#line vty 0 4
R2(config-line)#login local
```

R3
<pre>R3(config)#line vty 0 4 R3(config-line)#login local</pre>

Kiểm tra : telnet thử

R1
<pre>R1#telnet 10.0.0.2 Trying 10.0.0.2 ...Open User Access Verification Username: admin Password: [cisco] !password sẽ không xuất hiện khi gõ R2> R2>exit [Connection to 10.0.0.2 closed by foreign host] R1#</pre>

R2
<pre>R2#telnet 10.0.0.10 Trying 10.0.0.10 ...Open User Access Verification Username: admin Password: [cisco] !password sẽ không xuất hiện khi gõ R3> R3>exit [Connection to 10.0.0.10 closed by foreign host] R2#</pre>

R3
<pre>R3#telnet 10.0.0.5 Trying 10.0.0.5 ...Open User Access Verification Username: admin Password: [cisco] !password sẽ không xuất hiện khi gõ R1> R1>exit [Connection to 10.0.0.5 closed by foreign host] R3#</pre>

Bước 7 : Mã hóa password

Khi show cấu hình, có thể thấy chỉ có password enable là bị mã hóa (do câu lệnh enable secret), còn password của user admin và của line console vẫn ở dạng clear text.

R1
<pre>R1#show running-config Building configuration... Current configuration : 895 bytes ! version 12.4 no service timestamps log datetime msec no service timestamps debug datetime msec no service password-encryption ! hostname R1 ! no logging console ! ! enable secret 5 \$1\$mERr\$FpLB0oMT0c1tfe4OqQ5u9. ! ! ! ! ! ! no ip cef no ipv6 cef ! ! ! username admin password 0 cisco ! ! ! ! ! ! no ip domain-lookup ! ! spanning-tree mode pvst ! ! ! ! ! interface FastEthernet0/0 ip address 192.168.1.1 255.255.255.0 duplex auto speed auto ! interface FastEthernet0/1 ip address 192.168.10.1 255.255.255.0</pre>

```

duplex auto
speed auto
!
interface Serial0/0/0
ip address 10.0.0.1 255.255.255.252
clock rate 2000000
!
interface Serial0/0/1
ip address 10.0.0.5 255.255.255.252
clock rate 2000000
!
interface Vlan1
no ip address
shutdown
!
ip classless
!
ip flow-export version 9
!
!
!
!
!
!
!
line con 0
password New$tar123
login
!
line aux 0
!
line vty 0 4
login local
!
!
!
end

```

Để mã hóa tất cả password, bật dịch vụ password encryption :

R1
R1(config)# service password-encryption

Lúc này password của user và của line console đã bị mã hóa :

R1
<pre> R1#show running-config Building configuration... Current configuration : 913 bytes ! version 12.4 no service timestamps log datetime msec no service timestamps debug datetime msec service password-encryption ! hostname R1 ! no logging console ! </pre>

```
!  
enable secret 5 $1$mERr$FpLB0oMToc1tfe4OqQ5u9.
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
no ip cef
```

```
no ipv6 cef
```

```
!
```

```
!
```

```
!
```

```
username admin password 7 0822455D0A16
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
no ip domain-lookup
```

```
!
```

```
!
```

```
spanning-tree mode pvst
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
interface FastEthernet0/0
```

```
ip address 192.168.1.1 255.255.255.0
```

```
duplex auto
```

```
speed auto
```

```
!
```

```
interface FastEthernet0/1
```

```
ip address 192.168.10.1 255.255.255.0
```

```
duplex auto
```

```
speed auto
```

```
!
```

```
interface Serial0/0/0
```

```
ip address 10.0.0.1 255.255.255.252
```

```
clock rate 2000000
```

```
!
```

```
interface Serial0/0/1
```

```
ip address 10.0.0.5 255.255.255.252
```

```
clock rate 2000000
```

```
!
```

```
interface Vlan1
```

```
no ip address
```

```
shutdown
```

```
!
```

```
ip classless
```

```
!
```

```
ip flow-export version 9
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```
!
```

```

!
line con 0
  password 7 080F49594D0D040543595F
  login
!
line aux 0
!
line vty 0 4
  login local
!
!
!
end

```

Thực hiện tương tự cho R2 và R3 :

R2
R2(config)# service password-encryption

R3
R3(config)# service password-encryption

Bước 8 : Cấu hình DHCP cho Router

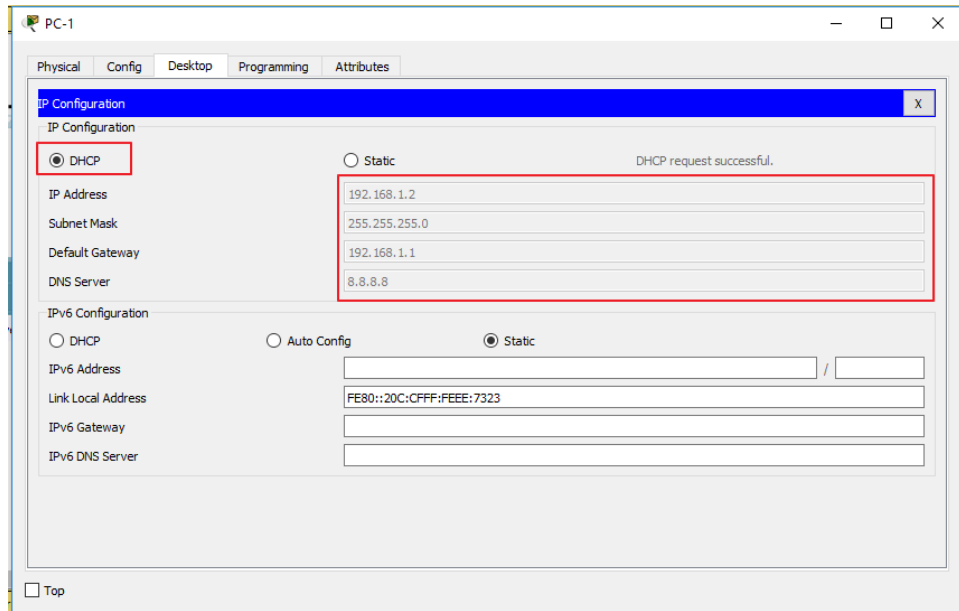
R1
R1(config)# ip dhcp pool LAN-1
R1(dhcp-config)# network 192.168.1.0 255.255.255.0
R1(dhcp-config)# default-router 192.168.1.1
R1(dhcp-config)# dns 8.8.8.8

R2
R2(config)# ip dhcp pool LAN-2
R2(dhcp-config)# network 192.168.2.0 255.255.255.0
R2(dhcp-config)# default-router 192.168.2.1
R2(dhcp-config)# dns 8.8.8.8

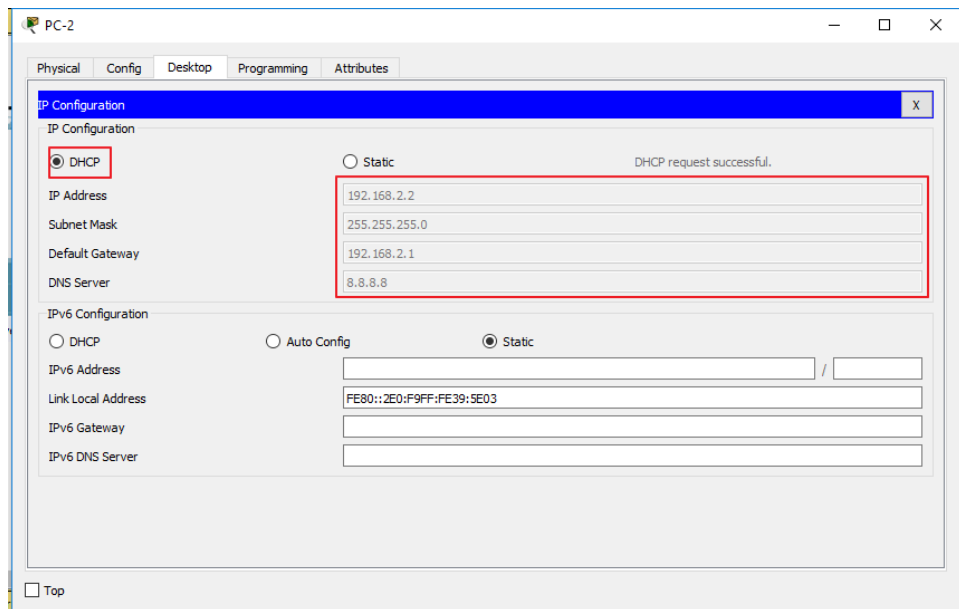
R3
R3(config)# ip dhcp pool LAN-3
R3(dhcp-config)# network 192.168.3.0 255.255.255.0
R3(dhcp-config)# default-router 192.168.3.1
R3(dhcp-config)# dns 8.8.8.8

Kiểm tra : Cho các PC nhận IP bằng DHCP

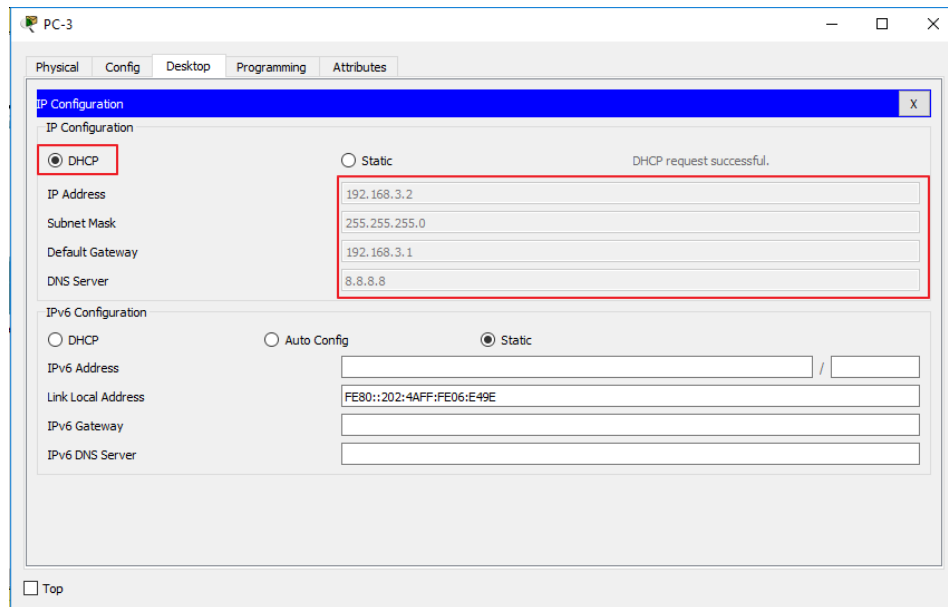
PC-1 : Click vào icon **PC-1** > chọn tab **Desktop** > Chọn **IP Configuration** > Click chọn **DHCP**



PC-2 :



PC-3 :



Bước 9 : Cấu hình định tuyến tĩnh

Học viên có thể chọn đường đi khác

R1

```
R1(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.2
R1(config)#ip route 192.168.3.0 255.255.255.0 10.0.0.6
```

Kiểm tra :

```
R1#show ip route
```

```
Codes: C - connected, S - static, I - IGRP, 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

```
10.0.0.0/30 is subnetted, 2 subnets
C    10.0.0.0 is directly connected, Serial0/0/0
C    10.0.0.4 is directly connected, Serial0/0/1
C    192.168.1.0/24 is directly connected, FastEthernet0/0
S    192.168.2.0/24 [1/0] via 10.0.0.2
S    192.168.3.0/24 [1/0] via 10.0.0.6
C    192.168.10.0/24 is directly connected, FastEthernet0/1
```

R2

```
R2(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.1
R2(config)#ip route 192.168.10.0 255.255.255.0 10.0.0.1
R2(config)#ip route 192.168.3.0 255.255.255.0 10.0.0.10
```

Kiểm tra :

R2#**show ip route**

Codes: C - connected, S - static, I - IGRP, 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

```
10.0.0.0/30 is subnetted, 2 subnets
C    10.0.0.0 is directly connected, Serial0/0/0
C    10.0.0.8 is directly connected, Serial0/0/1
S    192.168.1.0/24 [1/0] via 10.0.0.1
C    192.168.2.0/24 is directly connected, FastEthernet0/0
S    192.168.3.0/24 [1/0] via 10.0.0.10
S    192.168.10.0/24 [1/0] via 10.0.0.1
```

R3

```
R3(config)#ip route 192.168.1.0 255.255.255.0 10.0.0.5
R3(config)#ip route 192.168.10.0 255.255.255.0 10.0.0.5
R3(config)#ip route 192.168.2.0 255.255.255.0 10.0.0.9
```

Kiểm tra :

R3#**show ip route**

Codes: C - connected, S - static, I - IGRP, 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

```
10.0.0.0/30 is subnetted, 2 subnets
C    10.0.0.4 is directly connected, Serial0/0/1
C    10.0.0.8 is directly connected, Serial0/0/0
S    192.168.1.0/24 [1/0] via 10.0.0.5
S    192.168.2.0/24 [1/0] via 10.0.0.9
C    192.168.3.0/24 is directly connected, FastEthernet0/0
S    192.168.10.0/24 [1/0] via 10.0.0.5
```

Kiểm tra : cho các PC ping lẫn nhau và ping server

PC-1 : Click vào icon **PC-1** > Vào tab **Desktop** > Chọn **Command Prompt** để ping

PC-1

C:\>**ping 192.168.2.2**

Pinging 192.168.2.2 with 32 bytes of data:

```
Request timed out.
Reply from 192.168.2.2: bytes=32 time=3ms TTL=126
Reply from 192.168.2.2: bytes=32 time=2ms TTL=126
```

```
Reply from 192.168.2.2: bytes=32 time=3ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 3ms, Average = 2ms

C:\>ping 192.168.3.2

Pinging 192.168.3.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Reply from 192.168.3.2: bytes=32 time=3ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126

Ping statistics for 192.168.3.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 3ms, Average = 1ms

C:\>ping 192.168.10.2

Pinging 192.168.10.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127
Reply from 192.168.10.2: bytes=32 time<1ms TTL=127

Ping statistics for 192.168.10.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Thực hiện tương tự với PC-2 và PC-3

PC-2
<pre>C:\>ping 192.168.1.2 Pinging 192.168.1.2 with 32 bytes of data: Reply from 192.168.1.2: bytes=32 time=18ms TTL=126 Reply from 192.168.1.2: bytes=32 time=2ms TTL=126 Reply from 192.168.1.2: bytes=32 time=2ms TTL=126 Reply from 192.168.1.2: bytes=32 time=1ms TTL=126 Ping statistics for 192.168.1.2: Packets: Sent = 4, Received = 4, Lost = 0 (0% loss), Approximate round trip times in milli-seconds: Minimum = 1ms, Maximum = 18ms, Average = 5ms C:\>ping 192.168.10.2 Pinging 192.168.10.2 with 32 bytes of data: Reply from 192.168.10.2: bytes=32 time=2ms TTL=126 Reply from 192.168.10.2: bytes=32 time=3ms TTL=126 Reply from 192.168.10.2: bytes=32 time=3ms TTL=126 Reply from 192.168.10.2: bytes=32 time=3ms TTL=126 Ping statistics for 192.168.10.2:</pre>


```
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

```
C:\>ping 192.168.3.2
```

```
Pinging 192.168.3.2 with 32 bytes of data:
```

```
Reply from 192.168.3.2: bytes=32 time=2ms TTL=126
Reply from 192.168.3.2: bytes=32 time=3ms TTL=126
Reply from 192.168.3.2: bytes=32 time=3ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
```

```
Ping statistics for 192.168.3.2:
```

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

PC-3

```
C:\>ping 192.168.1.2
```

```
Pinging 192.168.1.2 with 32 bytes of data:
```

```
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=3ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
```

```
Ping statistics for 192.168.1.2:
```

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

```
C:\>ping 192.168.10.2
```

```
Pinging 192.168.10.2 with 32 bytes of data:
```

```
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=3ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
Reply from 192.168.10.2: bytes=32 time=1ms TTL=126
```

```
Ping statistics for 192.168.10.2:
```

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

```
C:\>ping 192.168.2.2
```

```
Pinging 192.168.2.2 with 32 bytes of data:
```

```
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=2ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
```

```
Ping statistics for 192.168.2.2:
```

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

Bước 10 : Lưu cấu hình Router vào Server

```
R1
R1#copy running-config tftp:
Address or name of remote host []? 192.168.10.2
Destination filename [R1-config]?

Writing running-config...!!
[OK - 1105 bytes]

1105 bytes copied in 0.012 secs (92083 bytes/sec)
```

```
R2
R2#copy running-config tftp:
Address or name of remote host []? 192.168.10.2
Destination filename [R2-config]?

Writing running-config...!!
[OK - 1080 bytes]

1080 bytes copied in 0.022 secs (49090 bytes/sec)
```

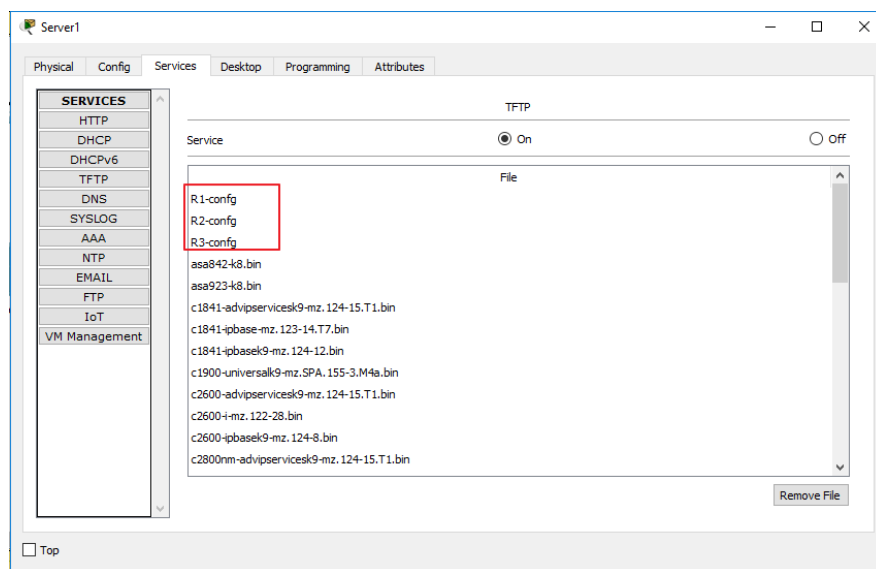
```
R3
R3#copy running-config tftp:
Address or name of remote host []? 192.168.10.2
Destination filename [R3-config]?

Writing running-config...!!
[OK - 1100 bytes]

1100 bytes copied in 0.007 secs (157142 bytes/sec)
```

Kiểm tra trên Server :

Click vào icon **Server** > Chọn Tab **Services** > Chọn Dịch vụ **TFTP**. Có thể thấy cấu hình đã được lưu vào server.



Bước 11 : Nâng cấp IOS cho Router :

Lưu ý : lưu lại cấu hình trước khi thực hiện nâng cấp

R1
R1# write Building configuration... [OK]

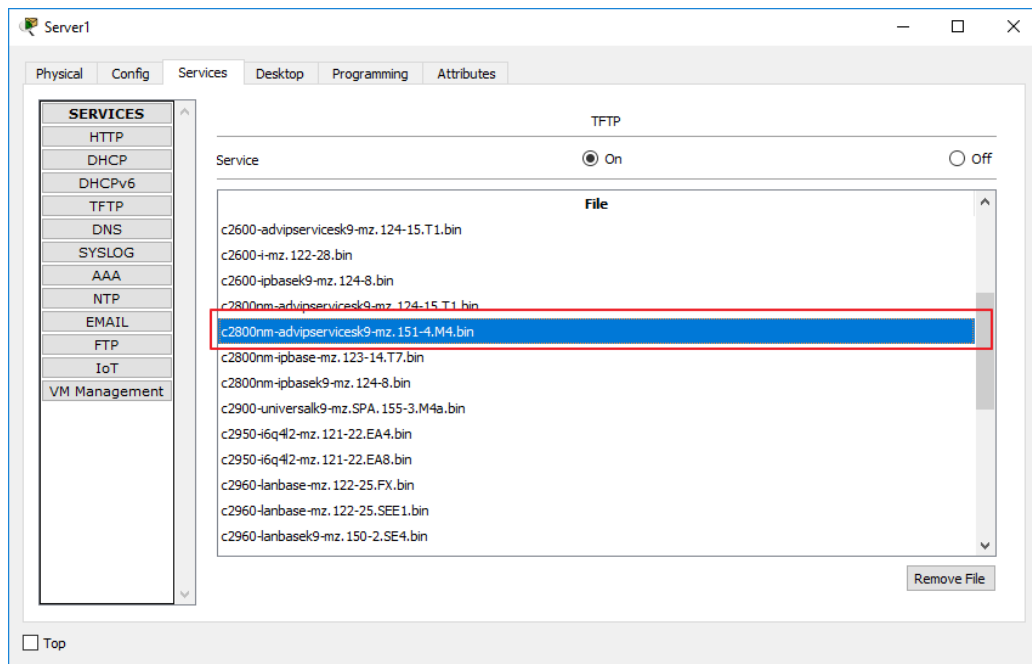
R2
R2# write Building configuration... [OK]

R3
R3# write Building configuration... [OK]

Kiểm tra file IOS trên Server :

Click vào icon **Server** > Chọn Tab **Services** > Chọn Dịch vụ **TFTP**.

Check xem đã có file IOS chưa : **c2800nm-advipservicesk9-mz.151-4.M4.bin**



Thực hiện nâng cấp :

R1
! Kiểm tra phiên bản IOS hiện tại
R1# show version Cisco IOS Software, 2800 Software (C2800NM-ADVIPSERVICESK9-M), Version 12.4(15)T1, RELEASE SOFTWARE (fc2) Technical Support: http://www.cisco.com/techsupport

Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 06:21 by pt_rel_team

ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
Copyright (c) 2000 by cisco Systems, Inc.

```
System returned to ROM by power-on
System image file is "c2800nm-advipservicesk9-mz.124-15.T1.bin"
```

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

```
cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory
Processor board ID JAD05190MTZ (4292891495)
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
239K bytes of NVRAM.
62720K bytes of processor board System flash (Read/Write)
```

Configuration register is 0x2102

! Copy IOS mới vào Flash

```
R1#copy tftp: flash:
Address or name of remote host []? 192.168.10.2
Source filename []? c2800nm-advipservicesk9-mz.151-4.M4.bin
Destination filename [c2800nm-advipservicesk9-mz.151-4.M4.bin]?
```

[illegible]

```
33591768 bytes copied in 2.361 secs (1493857 bytes/sec)
%Error copying tftp://192.168.10.2/c2800nm-advipservicesk9-mz.151-4.M4.bin (Not
enough space on device)
```

```
! Router báo lỗi không đủ bộ nhớ => Cần phải xóa IOS hiện tại
! Lưu ý : không khuyến cáo xóa ISO hiện tại, vì nếu lỡ nâng cấp bị lỗi thì
! vẫn còn IOS dự phòng
```

```
R1#dir flash:
```


This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.
cisco 2811 (MPC860) processor (revision 0x200) with 60416K/5120K bytes of memory
Processor board ID JAD05190MTZ (4292891495)
2 FastEthernet interface(s)
2 Low-speed serial(sync/async) network interface(s)
DRAM configuration is 64 bits wide with parity disabled.
255K bytes of non-volatile configuration memory.
63488K bytes of ATA System CompactFlash 0 (Read/Write)

License Info:

License UDI:

Device#	PID	SN
*0	CISCO2811/K9	FTX1017CVJQ

Configuration register is 0x2102

Thực hiện tương tự cho R2 và R3