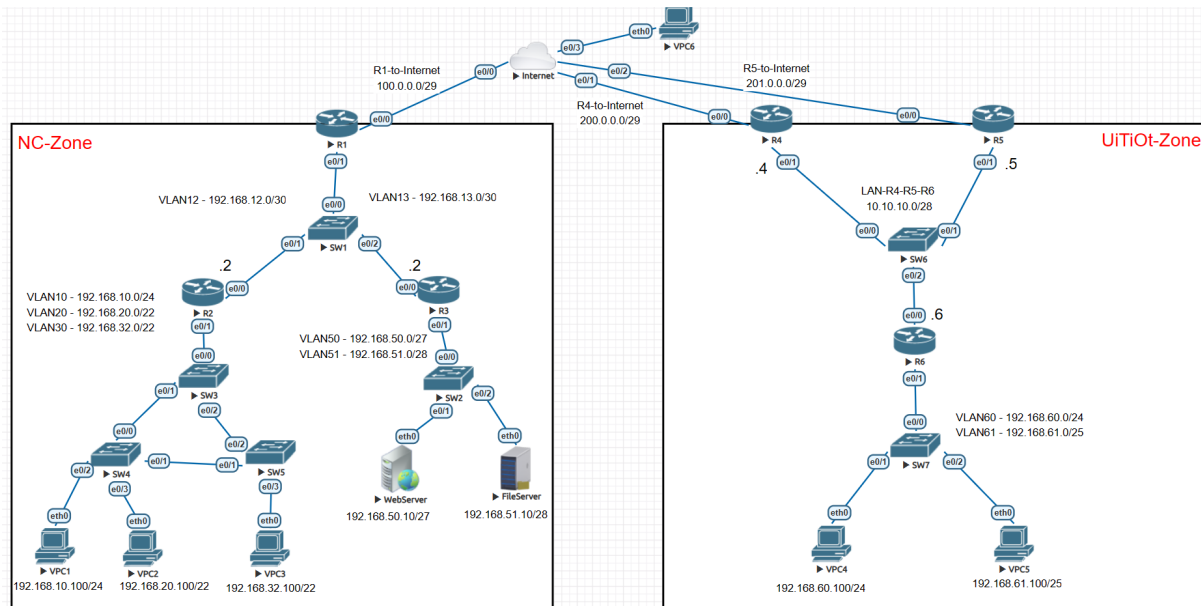


# Net challenge 2023 vòng 2



Bảng subnet:

STT	Subnet	IP Subnet	Prefix
1	R1-to-Internet	DHCP	
2	R4-to-Internet	DHCP	
3	R5-to-Internet	DHCP	
4	VLAN12	192.168.12.0	/30
5	VLAN13	192.168.13.0	/30
6	VLAN10 NC-Staff	192.168.10.0	/24
7	VLAN20 NC-Student	192.168.20.0	/22
8	VLAN30 NC-Guest	192.168.32.0	/22
9	VLAN50 Web	192.168.50.0	/27
10	VLAN51 FTP	192.168.51.0	/28
11	LAN-R4-R5	192.168.45.0	/30
12	LAN-R4-R5-R6	10.10.10.0	/29
13	VLAN60 Network-Team	192.168.60.0	/24
14	VLAN61 IoT-Team	192.168.61.0	/25

Bảng địa chỉ IP:

Devices	Interfaces	IP Address	Prefix length	Default Gateway
R1	e0/0	DHCP		N/A
	e0/1.12	192.168.12.1	/30	N/A
	e0/1.13	192.168.13.1	/30	N/A
R2	e0/0	192.168.12.2	/30	N/A
	e0/1.10	192.168.10.1	/24	N/A
	e0/1.20	192.168.20.1	/22	N/A
	e0/1.30	192.168.32.1	/22	N/A
R3	e0/0	192.168.13.2	/30	N/A
	e0/1.50	192.168.50.1	/27	N/A
	e0/1.51	192.168.51.1	/28	N/A
R4	e0/0	DHCP		N/A
	e0/1	10.10.10.4	/28	N/A
R5	e0/0	DHCP	/30	N/A
	e0/1	10.10.10.5	/28	N/A
R6	e0/0	10.10.10.6	/28	N/A
	e0/1.60	192.168.60.1	/24	N/A
	e0/1.61	192.168.61.1	/25	N/A
VPC1	eth0	192.168.10.100	/24	192.168.10.1
VPC2	eth0	192.168.20.100	/22	192.168.20.1
VPC3	eth0	192.168.32.100	/22	192.168.32.1
VPC4	eth0	192.168.60.100	/24	192.168.60.1
VPC5	eth0	192.168.61.100	/25	192.168.61.1
WebServer	eth0	192.168.50.10	/27	192.168.50.1
FileServer	eth0	192.168.51.10	/28	192.168.51.1

## 1. Router on a stick

a/

**b/**

## **SW1:**

! Create VLAN 12, 13

```
SW1(config-vlan)#vlan 12
```

```
SW1(config-vlan)#name VLAN12
```

```
SW1(config-vlan)#vlan 13
```

```
SW1(config-vlan)#name VLAN13
```

! Configure trunk for port to R1

```
SW1(config-if)# switchport trunk encapsulation dot1q
```

```
SW1(config-if)#switchport mode trunk
```

! Assign int to VLAN 12, mode access

```
SW1(config)#int e0/1
```

```
SW1(config-if)#switchport mode access
```

```
SW1(config-if)#switchport access vlan 12
```

```
SW1(config-if)#no shut
```

! Assign int to VLAN 13, mode access

```
SW1(config-if)#int e0/2
```

```
SW1(config-if)#switchport access vlan 13
```

```
SW1(config-if)#switchport mode access
```

```
SW1#sh vlan
```

VLAN Name	Status	Ports
-----------	--------	-------

1	default	active	Et0/3, Et1/0, Et1/1, Et1/2, Et1/3
12	VLAN12	active	Et0/1
13	VLAN13	active	Et0/2
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	-	0	0
12	enet	100012	1500	-	-	-	-	-	0	0
13	enet	100013	1500	-	-	-	-	-	0	0

1002	fddi	101002	1500	-	-	-	-	-	0	0
1003	tr	101003	1500	-	-	-	-	-	0	0
1004	fdnet	101004	1500	-	-	-	ieee	-	0	0
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

Primary	Secondary	Type	Ports
---------	-----------	------	-------

SW1#sh int trunk

Port	Mode	Encapsulation	Status	Native vlan
Et0/0	on	802.1q	trunking	1

Port Vlans allowed on trunk

Et0/0 1-4094

Port Vlans allowed and active in management domain

Et0/0 1,12-13

Port Vlans in spanning tree forwarding state and not pruned

Et0/0 1,12-13

**c/**

**R1:**

R1(config)#int e0/1

R1(config-if)#no shut

R1(config-if)#

\*Nov 7 18:00:26.934: %LINK-3-UPDOWN: Interface Ethernet0/1, changed state to up

\*Nov 7 18:00:27.938: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/1, changed state to up

R1(config-if)#int e0/1.12

R1(config-subif)#encapsulation dot1Q 12

R1(config-subif)#ip add 192.168.12.1 255.255.255.252

R1(config-subif)#no shut

R1(config)#int e0/1.13

R1(config-subif)#encapsulation dot1Q 13

R1(config-subif)#ip add 192.168.13.1 255.255.255.252

R1(config-subif)#no shut

**d/**

**R2:**

```
R2(config-if)#int e0/0
```

```
R2(config-if)#no shut
```

```
R2(config-if)#ip addr 192.168.12.2 255.255.255.252
```

```
R2#ping 192.168.12.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.12.1, timeout is 2 seconds:
```

```
.!!!!
```

```
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/2/4 ms
```

**R3:**

```
R3(config)#int e0/0
```

```
R3(config-if)#no shut
```

```
R3(config-if)#ip add 192.168.13.2 255.255.255.252
```

```
R3#ping 192.168.13.1
```

```
Type escape sequence to abort.
```

```
Sending 5, 100-byte ICMP Echos to 192.168.13.1, timeout is 2 seconds:
```

```
.!!!!
```

```
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/2 ms
```

**e/**

**R3:**

```
R3(config-if)#int e0/1.50
```

```
R3(config-subif)#no shut
```

```
R3(config-subif)#encapsulation dot1Q 50
```

```
R3(config-subif)#ip addr 192.168.50.1 255.255.255.224
```

```
R3(config-subif)#int e0/1.51
```

```
R3(config-subif)#encapsulation dot1Q 51
```

```
R3(config-subif)#ip addr 192.168.51.1 255.255.255.240
```

```
R3(config-subif)#no shut
```

```
R3#sh ip int e0/1.50
Ethernet0/1.50 is up, line protocol is up
Internet address is 192.168.50.1/27
Broadcast address is 255.255.255.255
```

```
R3#sh ip int e0/1.51
Ethernet0/1.51 is up, line protocol is up
Internet address is 192.168.51.1/28
Broadcast address is 255.255.255.255
```

## SW2

```
SW2(config)#vlan 50
SW2(config-vlan)#name VLAN50
SW2(config-vlan)#vlan 51
SW2(config-vlan)#name VLAN51
SW2(config)#int e0/0
SW2(config-if)#switchport trunk encapsulation dot1q
SW2(config-if)#switchport mode trunk
SW2(config)#int e0/1
SW2(config-if)#switchport mode access
SW2(config-if)#switchport access vlan 50
SW2(config-if)#int e0/2
SW2(config-if)#switchport mode access
SW2(config-if)#switchport access vlan 51
```

**f/**

## SW3 (cấu hình sai, đã no vlan)

```
figuration commands, one per line. End with CNTL/Z.
SW3(config)#int e0/0
SW3(config-if)#no shut
SW3(config-if)#swi
SW3(config-if)#switchport e
SW3(config-if)#switchport e?
% Unrecognized command
SW3(config-if)#switchport trunk encapsulation dot1q
SW3(config-if)#swit
SW3(config-if)#switchport mode trunk
SW3(config-if)#
*Nov 7 18:34:37.878: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Ethernet0/0, changed state to down
SW3(config-if)#
```

```
*Nov 7 18:34:40.893: %LINEPROTO-5-UPDOWN: Line protocol on Interface
Ethernet0/0, changed state to up
SW3(config-if)#int e0/1
SW3(config-if)#swi
SW3(config-if)#vlan 10

SW3(config-vlan)#name VLAN10
SW3(config-vlan)#vlan 20
SW3(config-vlan)#name VLAN20
SW3(config-vlan)#vlan 30
SW3(config-vlan)#name VLAN30
SW3(config-vlan)#
```

## **R6:**

```
R6(config)#int e0/1
R6(config-if)#no shut
R6(config-if)#int e0/1.60
R6(config-subif)#no shut
R6(config-subif)#encapsulation dot1Q 60
R6(config-subif)#ip addr 192.168.60.0 255.255.255.0
Bad mask /24 for address 192.168.60.0
R6(config-subif)#ip addr 192.168.60.1 255.255.255.0
R6(config-subif)#int e0/1.61

R6(config-subif)#encapsulation dot1Q 61

R6(config-subif)#no shut
R6(config-subif)#ip addr 192.168.61.1 255.255.255.0
```

## **SW7:**

```
SW7(config)#vlan 60
SW7(config-vlan)#name VLAN60
SW7(config-vlan)#vlan 61
SW7(config-vlan)#name VLAN61

SW7(config-if)#int e0/1
SW7(config-if)#no shut
SW7(config-if)#switchport access vlan 60
SW7(config-if)#int e0/2
SW7(config-if)#no shut
SW7(config-if)#switchport access vlan 61
```

```
SW7(config-if)#int e0/0
SW7(config-if)#no shut
SW7(config-if)#switchport trunk encapsulation dot1q
SW7(config-if)#switchport mode trunk
```

## VPC4

```
VPCS> ip 192.168.60.100 24 192.168.60.1
VPCS> save
```

## VPC5

```
VPCS> ip 192.168.61.100 25 192.168.61.1
VPCS> save
```

# 2. VTP

**a/**

## SW4:

! Configure trunk

```
SW4(config)#int e0/1
SW4(config-if)#no shut
```

```
SW4(config-if)#switchport trunk encapsulation dot1q
SW4(config-if)#switchport mode trunk
SW4(config-if)#int e0/0
SW4(config-if)#switchport trunk encapsulation dot1q
```

```
SW4(config-if)#switchport mode trunk
SW4(config-if)#no shut
```

SW4#sh int trunk

Port	Mode	Encapsulation	Status	Native vlan
Et0/0	on	802.1q	trunking	1
Et0/1	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Et0/0	1-4094
Et0/1	1-4094

Port	Vlans allowed and active in management domain
Et0/0	1
Et0/1	1

Port	Vlans in spanning tree forwarding state and not pruned
Et0/0	1
Et0/1	none

### SW3:

```
! Configure trunk
SW3(config)#int e0/1
SW3(config-if)#no shut
SW3(config-if)#switchport trunk encapsulation dot1q
SW3(config-if)#switchport mode trunk
SW3(config-if)#int e0/2
SW3(config-if)#no shut
SW3(config-if)#switchport trunk encapsulation dot1q
SW3(config-if)#switchport mode trunk
SW3(config-if)#do copy run start
```

### SW5:

```
! Configure trunk
SW5(config)#int e0/2
SW5(config-if)#no shut
SW5(config-if)#switchport trunk encapsulation dot1q
SW5(config-if)#switchport mode trunk
SW5(config-if)#int e0/1
SW5(config-if)#no shut
SW5(config-if)#switchport trunk encapsulation dot1q
SW5(config-if)#switchport mode trunk
SW5(config-if)#do wr
```

```
SW5#sh int trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Et0/1	on	802.1q	trunking	1
Et0/2	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Et0/1	1-4094
Et0/2	1-4094



Port	Vlans allowed and active in management domain
Et0/1	1
Et0/2	1

Port	Vlans in spanning tree forwarding state and not pruned
Et0/1	1
Et0/2	1

## **b/ Lưu ý cấu hình VTP server trước (default mode là server)**

### **SW3:**

```
SW3(config)#vtp domain NetChallenge
Changing VTP domain name from NULL to NetChallenge
SW3(config)#vtp password NetChallenge
```

### **SW4:**

```
SW4(config)#vtp mode client
SW4(config)#vtp domain NetChallenge
Changing VTP domain name from NULL to NetChallenge
SW4(config)#vtp password NetChallenge
SW4(config)#do wr
```

### **SW5:**

như SW4

## **c/**

### **SW3:**

```
SW3(config)#vlan 10
SW3(config-vlan)#name NC-Staff
SW3(config-vlan)#vlan 20
SW3(config-vlan)#name NC-Student
SW3(config-vlan)#vlan 30
SW3(config-vlan)#name NC-Guest
```

### **SW4: (check vtp)**

SW4#sh vlan

VLAN Name			Status	Ports					
1	default		active	Et0/2, Et0/3, Et1/0, Et1/1 Et1/2, Et1/3					
10	NC-Staff		active						
20	NC-Student		active						
30	NC-Guest		active						
1002	fddi-default		act/unsup						
1003	token-ring-default		act/unsup						
1004	fddinet-default		act/unsup						
1005	trnet-default		act/unsup						
VLAN Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet 100001	1500	- - -	-	-	0	0		
10	enet 100010	1500	- - -	-	-	0	0		
20	enet 100020	1500	- - -	-	-	0	0		
30	enet 100030	1500	- - -	-	-	0	0		
1002	fddi 101002	1500	- - -	-	-	0	0		
1003	tr 101003	1500	- - -	-	srb	0	0		
1004	fdnet 101004	1500	- - -	ieee	-	0	0		
1005	trnet 101005	1500	- - -	ibm	-	0	0		
Primary Secondary		Type	Ports						

## SW5: (check vtp)

SW5#sh vlan

VLAN Name		Status	Ports
1	default	active	Et0/0, Et0/3, Et1/0, Et1/1 Et1/2, Et1/3
10	NC-Staff	active	
20	NC-Student	active	
30	NC-Guest	active	

```

1002 fddi-default          act/unsup
1003 token-ring-default    act/unsup
1004 fddinet-default       act/unsup
1005 trnet-default         act/unsup

```

VLAN	Type	SAID	MTU	Parent	RingNo	BridgeNo	Stp	BrdgMode	Trans1	Trans2
1	enet	100001	1500	-	-	-	-	0	0	
10	enet	100010	1500	-	-	-	-	0	0	
20	enet	100020	1500	-	-	-	-	0	0	
30	enet	100030	1500	-	-	-	-	0	0	
1002	fddi	101002	1500	-	-	-	-	0	0	
1003	tr	101003	1500	-	-	-	srb	0	0	
1004	fdnet	101004	1500	-	-	-	ieee	0	0	
1005	trnet	101005	1500	-	-	-	ibm	0	0	

```

Primary Secondary Type      Ports

```

d/

## VPC1:

```

VPCS> show ip
NAME       : VPCS[1]
IP/MASK    : 192.168.10.100/24
GATEWAY    : 192.168.10.1
DNS        :
MAC        : 00:50:79:66:68:28
LPORT      : 20000
RHOST:PORT : 127.0.0.1:30000
MTU        : 1500

```

## VPC2:

Checking for duplicate address...

VPCS : 192.168.20.100 255.255.252.0 gateway 192.168.20.1

## VPC3:

```

VPCS> ip 192.168.32.100/22 192.168.32.1
Checking for duplicate address...
VPCS : 192.168.32.100 255.255.252.0 gateway 192.168.32.1

```

## SW4:

```
SW4(config)#int e0/2
SW4(config-if)#switchport mode access
SW4(config-if)#switchport access vlan 10
SW4(config-if)#int e0/3
SW4(config-if)#switchport mode access
SW4(config-if)#switchport access vlan 20
```

## SW5:

! na ná

## SW2:

## SW7:

## Kiểm tra:

```
SW5#sh vlan
```

VLAN	Name	Status	Ports
1	default	active	Et0/0, Et1/0, Et1/1, Et1/2 Et1/3
10	NC-Staff	active	
20	NC-Student	active	
30	NC-Guest	active	Et0/3

```
SW4#sh vlan
```

VLAN	Name	Status	Ports
1	default	active	Et1/0, Et1/1, Et1/2, Et1/3
10	NC-Staff	active	Et0/2
20	NC-Student	active	Et0/3
30	NC-Guest	active	

```
SW5#sh int trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Et0/1	on	802.1q	trunking	1
Et0/2	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Et0/1	1-4094
Et0/2	1-4094

Port	Vlans allowed and active in management domain
Et0/1	1,10,20,30
Et0/2	1,10,20,30

Port	Vlans in spanning tree forwarding state and not pruned
Et0/1	1,10,20,30
Et0/2	1,10,20,30

```
SW3>en  
SW3#sh int trunk
```

Port	Mode	Encapsulation	Status	Native vlan
Et0/0	on	802.1q	trunking	1
Et0/1	on	802.1q	trunking	1
Et0/2	on	802.1q	trunking	1

Port	Vlans allowed on trunk
Et0/0	1-4094
Et0/1	1-4094
Et0/2	1-4094

Port	Vlans allowed and active in management domain
Et0/0	1,10,20,30
Et0/1	1,10,20,30
Et0/2	1,10,20,30

Port	Vlans in spanning tree forwarding state and not pruned
Et0/0	1,10,20,30
Et0/1	1,10,20,30
Et0/2	1,10,20,30

```

Port      Mode      Encapsulation  Status      Native vlan
Et0/0     on        802.1q         trunking    1
Et0/1     on        802.1q         trunking    1

Port      Vlans allowed on trunk
Et0/0     1-4094
Et0/1     1-4094

Port      Vlans allowed and active in management domain
Et0/0     1,10,20,30
Et0/1     1,10,20,30

Port      Vlans in spanning tree forwarding state and not pruned
Et0/0     1,10,20,30
Et0/1     none
SW4#

```

VPC4 → VPC5 ⇒ R6, SW7 hoạt động VLAN 60, 61

```

Bad command: "pipe2 failed". Use ? for help.

VPCS>
VPCS> ping 192.168.61.100

84 bytes from 192.168.61.100 icmp_seq=1 ttl=63 time=4.429 ms
84 bytes from 192.168.61.100 icmp_seq=2 ttl=63 time=1.524 ms
84 bytes from 192.168.61.100 icmp_seq=3 ttl=63 time=4.961 ms
^C
VPCS>

```

VPC1 → SW1 (int e0/2 ip .2):

```

VPCS> ping 192.168.10.2

192.168.10.2 icmp_seq=1 timeout
84 bytes from 192.168.10.2 icmp_seq=2 ttl=255 time=1.108 ms
84 bytes from 192.168.10.2 icmp_seq=3 ttl=255 time=2.587 ms
84 bytes from 192.168.10.2 icmp_seq=4 ttl=255 time=0.406 ms
84 bytes from 192.168.10.2 icmp_seq=5 ttl=255 time=0.918 ms

```

SW5 (int e0/3 ip.2) → VPC2 :

```

SW5#ping 192.168.32.100
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.32.100, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 1/1/1 ms
SW5#

```

FileServer → WebServer:

```
VPCS> ping 192.168.50.10
84 bytes from 192.168.50.10 icmp_seq=1 ttl=63 time=2.957 ms
84 bytes from 192.168.50.10 icmp_seq=2 ttl=63 time=3.546 ms
84 bytes from 192.168.50.10 icmp_seq=3 ttl=63 time=2.432 ms
84 bytes from 192.168.50.10 icmp_seq=4 ttl=63 time=2.427 ms
84 bytes from 192.168.50.10 icmp_seq=5 ttl=63 time=2.031 ms
```

PC1 → R2:

```
VPCS> ping 192.168.10.1
84 bytes from 192.168.10.1 icmp_seq=1 ttl=255 time=0.986 ms
84 bytes from 192.168.10.1 icmp_seq=2 ttl=255 time=1.244 ms
84 bytes from 192.168.10.1 icmp_seq=3 ttl=255 time=1.656 ms
```

PC1 → interface Vlan30 của R2:

```
VPCS> ping 192.168.32.1
84 bytes from 192.168.32.1 icmp_seq=1 ttl=255 time=1.066 ms
84 bytes from 192.168.32.1 icmp_seq=2 ttl=255 time=1.246 ms
```

PC1 → interface Vlan20 của R2:

```
VPCS> ping 192.168.20.1
84 bytes from 192.168.20.1 icmp_seq=1 ttl=255 time=1.066 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=255 time=1.312 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=255 time=1.731 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=255 time=1.579 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=255 time=1.288 ms
```

PC1 → PC3:

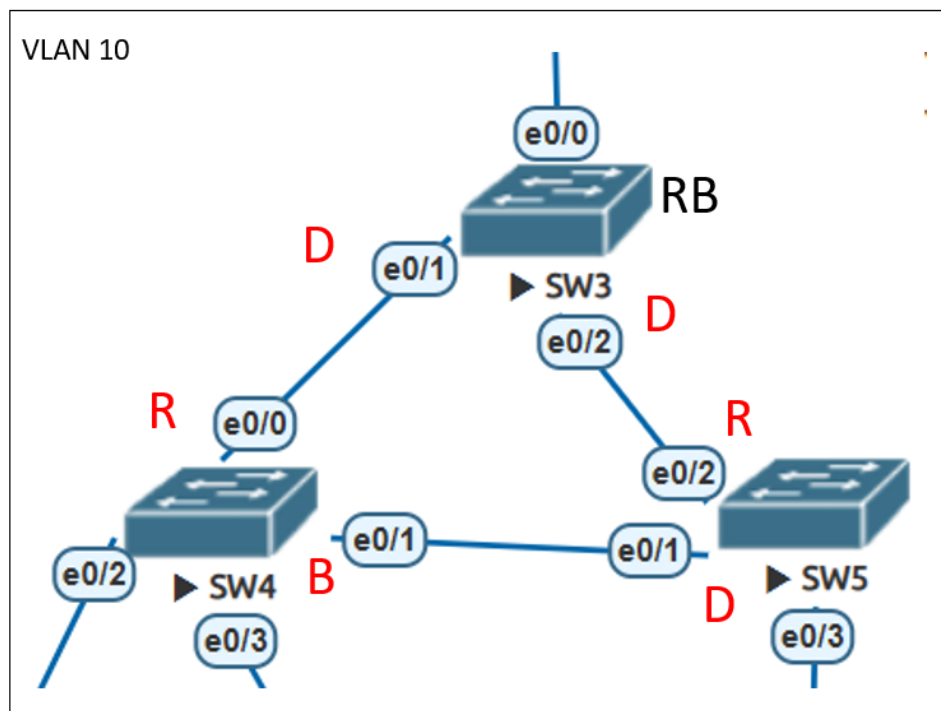
```
VPCS> ping 192.168.32.100
84 bytes from 192.168.32.100 icmp_seq=1 ttl=63 time=3.210 ms
84 bytes from 192.168.32.100 icmp_seq=2 ttl=63 time=2.768 ms
84 bytes from 192.168.32.100 icmp_seq=3 ttl=63 time=1.673 ms
84 bytes from 192.168.32.100 icmp_seq=4 ttl=63 time=2.200 ms
84 bytes from 192.168.32.100 icmp_seq=5 ttl=63 time=1.910 ms
```

PC1 → PC2:

```
VPCS> ping 192.168.20.100
84 bytes from 192.168.20.100 icmp_seq=1 ttl=63 time=2.661 ms
84 bytes from 192.168.20.100 icmp_seq=2 ttl=63 time=1.775 ms
84 bytes from 192.168.20.100 icmp_seq=3 ttl=63 time=1.728 ms
^C
```

### 3. STP

a



**SW3:**

spanning-tree vlan 10 priority 4096

! Due to the default configuration, there is no more to configure to match flow SW4 → SW3

**Check:**

**SW4:**



```

SW4#sh spanning-tree vlan 10

VLAN0010
  Spanning tree enabled protocol ieee
  Root ID    Priority    32778
             Address     aabb.cc00.3100
             Cost        100
             Port        1 (Ethernet0/0)
             Hello Time   2 sec   Max Age 20 sec   Forward Delay 15 sec

  Bridge ID  Priority    32778 (priority 32768 sys-id-ext 10)
             Address     aabb.cc00.5100
             Hello Time   2 sec   Max Age 20 sec   Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Root FWD 100      128.1    Shr
Et0/1                    Altn BLK 100      128.2    Shr
Et0/2                    Desg FWD 100      128.3    Shr

```

## SW5:

```

SW5#sh spanning-tree vlan 10

VLAN0010
  Spanning tree enabled protocol ieee
  Root ID    Priority    32778
             Address     aabb.cc00.3100
             Cost        100
             Port        3 (Ethernet0/2)
             Hello Time   2 sec   Max Age 20 sec   Forward Delay 15 sec

  Bridge ID  Priority    32778 (priority 32768 sys-id-ext 10)
             Address     aabb.cc00.4100
             Hello Time   2 sec   Max Age 20 sec   Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/1                    Desg FWD 100      128.2    Shr
Et0/2                    Root FWD 100      128.3    Shr

```

## SW3:

```

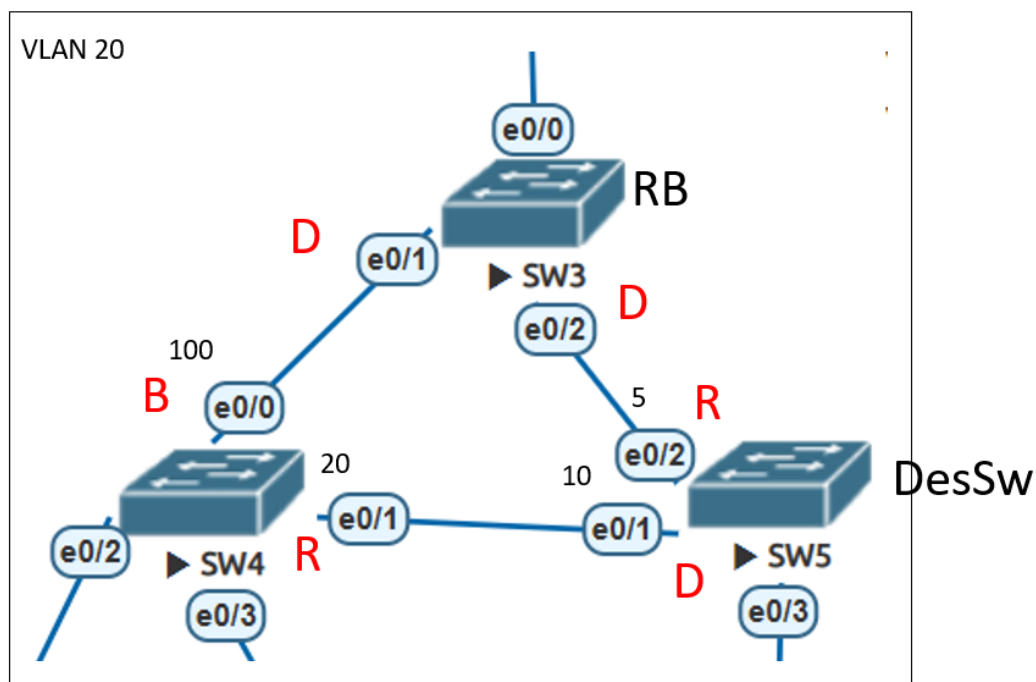
VLAN0010
Spanning tree enabled protocol ieee
Root ID    Priority    4106
           Address    aabb.cc00.3100
           This bridge is the root
           Hello Time  2 sec    Max Age 20 sec    Forward Delay 15 sec

Bridge ID  Priority    4106    (priority 4096 sys-id-ext 10)
           Address    aabb.cc00.3100
           Hello Time  2 sec    Max Age 20 sec    Forward Delay 15 sec
           Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Desg FWD 100      128.1 Shr
Et0/1                    Desg FWD 100      128.2 Shr
Et0/2                    Desg FWD 100      128.3 Shr

```

**b/ VPC2 → SW4 → SW5 → SW3 ⇒ vlan 20**



**SW3:**

(conf-t): spanning-tree vlan 20 priority 4096

**SW4:**

```
SW4(config)#spa
SW4(config)#int e0/1
SW4(config-if)#sp
SW4(config-if)#spanning-tree vlan 20 cost 20
SW4(config-if)#
```

**SW5:**

```
SW5(config)#int e0/1
```

```
SW5(config-if)#spanning-tree vlan 20 cost 10
SW5(config-if)#int e0/2
SW5(config-if)#spanning-tree vlan 20 cost 5
SW5(config-if)#
```

**Kiểm tra:**

**SW3:**

```
VLAN0020
Spanning tree enabled protocol ieee
Root ID    Priority      4116
           Address      aabb.cc00.3100
           This bridge is the root
           Hello Time   2 sec    Max Age 20 sec    Forward Delay 15 sec

Bridge ID   Priority      4116    (priority 4096 sys-id-ext 20)
           Address      aabb.cc00.3100
           Hello Time   2 sec    Max Age 20 sec    Forward Delay 15 sec
           Aging Time   300 sec

Interface    Role Sts Cost      Prio.Nbr Type
-----
Et0/0        Desg FWD 100       128.1    Shr
Et0/1        Desg FWD 100       128.2    Shr
Et0/2        Desg FWD 100       128.3    Shr
```

**SW4:**

```

SW4#sh spanning-tree vlan 20

VLAN0020
  Spanning tree enabled protocol ieee
  Root ID    Priority    4116
             Address     aabb.cc00.3100
             Cost        25
             Port        2 (Ethernet0/1)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32788 (priority 32768 sys-id-ext 20)
             Address     aabb.cc00.5100
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Altn BLK 100      128.1   Shr
Et0/1                    Root FWD 20       128.2   Shr
Et0/3                    Desg FWD 100      128.4   Shr

```

## SW5:

```

Nov 30 18:29:24.282: %SYS-5-CONF:18_1: Configured from console by console
SW5#sh spanning-tree vlan 20

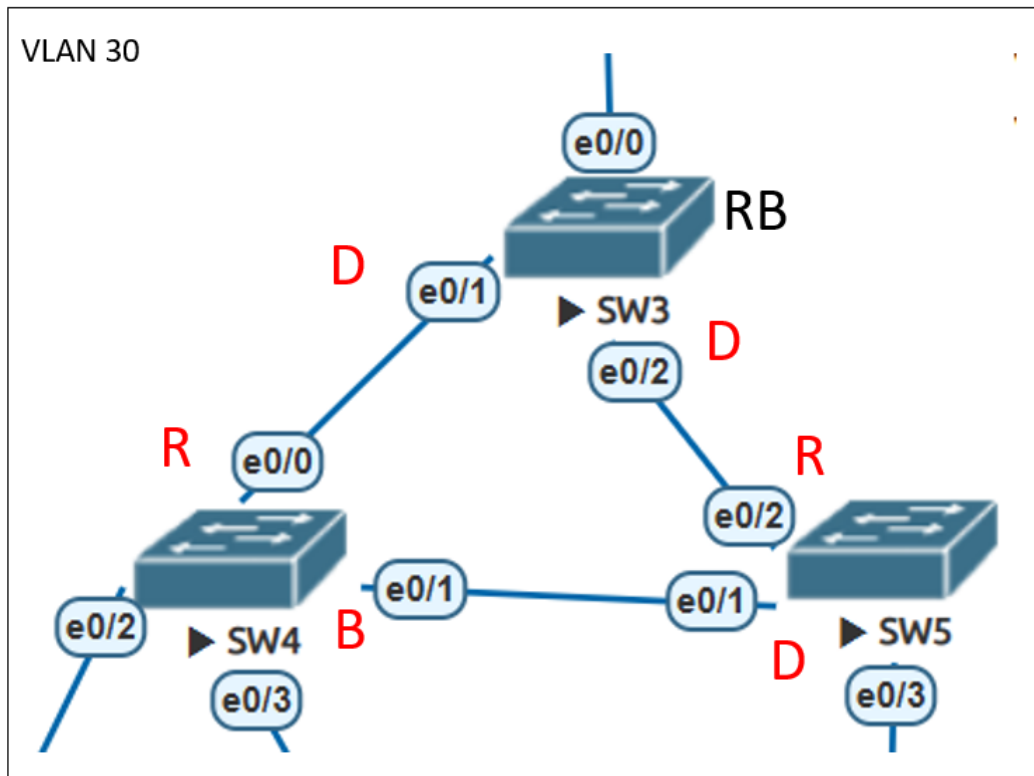
VLAN0020
  Spanning tree enabled protocol ieee
  Root ID    Priority    4116
             Address     aabb.cc00.3100
             Cost        5
             Port        3 (Ethernet0/2)
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID   Priority    32788 (priority 32768 sys-id-ext 20)
             Address     aabb.cc00.4100
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time   300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/1                    Desg FWD 10       128.2   Shr
Et0/2                    Root FWD 5        128.3   Shr

```

**c/ VPC3 → SW5 → SW3 → R2**



**SW3:**

```
SW3(config)#spanning-tree vlan 30 priority 4096
```

! The default configuration matches the requirement: VPC3 → SW5 → SW3 → R2

**Kiểm tra:**

**SW3:**

```

VLAN0030
  Spanning tree enabled protocol ieee
  Root ID    Priority    4126
            Address     aabb.cc00.3100
            This bridge is the root
            Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    4126 (priority 4096 sys-id-ext 30)
            Address     aabb.cc00.3100
            Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
            Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Et0/0                    Desg FWD 100      128.1   Shr
Et0/1                    Desg FWD 100      128.2   Shr
Et0/2                    Desg FWD 100      128.3   Shr

```

PC1 → PC3:

```

VPCS> ping 192.168.32.100

84 bytes from 192.168.32.100 icmp_seq=1 ttl=63 time=2.354 ms
84 bytes from 192.168.32.100 icmp_seq=2 ttl=63 time=2.043 ms
84 bytes from 192.168.32.100 icmp_seq=3 ttl=63 time=2.020 ms
84 bytes from 192.168.32.100 icmp_seq=4 ttl=63 time=2.121 ms
84 bytes from 192.168.32.100 icmp_seq=5 ttl=63 time=1.713 ms

```

PC1 → R2 interface vlan 30:

```

VPCS> ping 192.168.32.1

84 bytes from 192.168.32.1 icmp_seq=1 ttl=255 time=1.293 ms
84 bytes from 192.168.32.1 icmp_seq=2 ttl=255 time=1.243 ms
84 bytes from 192.168.32.1 icmp_seq=3 ttl=255 time=1.259 ms
84 bytes from 192.168.32.1 icmp_seq=4 ttl=255 time=1.448 ms
84 bytes from 192.168.32.1 icmp_seq=5 ttl=255 time=1.183 ms

```

PC2 → R2 interface vlan 20:

```
VPCS> ping 192.168.20.1

84 bytes from 192.168.20.1 icmp_seq=1 ttl=255 time=1.209 ms
84 bytes from 192.168.20.1 icmp_seq=2 ttl=255 time=1.782 ms
84 bytes from 192.168.20.1 icmp_seq=3 ttl=255 time=1.247 ms
84 bytes from 192.168.20.1 icmp_seq=4 ttl=255 time=1.945 ms
84 bytes from 192.168.20.1 icmp_seq=5 ttl=255 time=2.295 ms
```

## 4. Routing

**a/**

**R1:**

```
router ospf 100
network 192.168.12.1 0.0.0.0 area 0
network 192.168.13.1 0.0.0.0 area 0
```

**R2:**

```
router ospf 100
network 192.168.10.1 0.0.0.0 area 0
network 192.168.12.2 0.0.0.0 area 0
network 192.168.20.1 0.0.0.0 area 0
network 192.168.32.1 0.0.0.0 area 0
```

**R3:**

```
R3(config)#router ospf 100
R3(config-router)#network 192.168.13.2 0.0.0.0 area 0
R3(config-router)#network 192.168.13.2 0.0.0.0 area 0
```

```
R3(config-router)#network 192.168.50.1 0.0.0.0 area 0
R3(config-router)#network 192.168.51.1 0.0.0.0 area 0
R3(config-router)#do ip
```

**Check:**

**R1:**

```

R1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is 100.0.0.1 to network 0.0.0.0

S*    0.0.0.0/0 [254/0] via 100.0.0.1
      100.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C      100.0.0.0/29 is directly connected, Ethernet0/0
L      100.0.0.2/32 is directly connected, Ethernet0/0
O      192.168.10.0/24 [110/20] via 192.168.12.2, 02:11:35, Ethernet0/1.12
      192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.12.0/30 is directly connected, Ethernet0/1.12
L      192.168.12.1/32 is directly connected, Ethernet0/1.12
      192.168.13.0/24 is variably subnetted, 2 subnets, 2 masks
C      192.168.13.0/30 is directly connected, Ethernet0/1.13
L      192.168.13.1/32 is directly connected, Ethernet0/1.13
O      192.168.20.0/22 [110/20] via 192.168.12.2, 02:11:35, Ethernet0/1.12
O      192.168.32.0/22 [110/20] via 192.168.12.2, 00:00:30, Ethernet0/1.12
      192.168.50.0/27 is subnetted, 1 subnets
O      192.168.50.0 [110/20] via 192.168.13.2, 02:11:45, Ethernet0/1.13
      192.168.51.0/28 is subnetted, 1 subnets
O      192.168.51.0 [110/20] via 192.168.13.2, 02:11:45, Ethernet0/1.13

```

**R2:**



```

R2#
R2#sh 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
        i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is not set

    192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.10.0/24 is directly connected, Ethernet0/1.10
L       192.168.10.1/32 is directly connected, Ethernet0/1.10
    192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.12.0/30 is directly connected, Ethernet0/0
L       192.168.12.2/32 is directly connected, Ethernet0/0
    192.168.13.0/30 is subnetted, 1 subnets
O       192.168.13.0 [110/20] via 192.168.12.1, 00:26:05, Ethernet0/0
C       192.168.20.0/22 is directly connected, Ethernet0/1.20
    192.168.20.0/32 is subnetted, 1 subnets
L       192.168.20.1 is directly connected, Ethernet0/1.20
C       192.168.32.0/22 is directly connected, Ethernet0/1.30
    192.168.32.0/32 is subnetted, 1 subnets
L       192.168.32.1 is directly connected, Ethernet0/1.30
    192.168.50.0/27 is subnetted, 1 subnets
O       192.168.50.0 [110/30] via 192.168.12.1, 00:24:16, Ethernet0/0
    192.168.51.0/28 is subnetted, 1 subnets
O       192.168.51.0 [110/30] via 192.168.12.1, 00:24:06, Ethernet0/0
R2#

```

### R3:

```

R3>sh 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
        i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is 192.168.13.1 to network 0.0.0.0

O*E2   0.0.0.0/0 [110/1] via 192.168.13.1, 02:15:39, Ethernet0/0
O       192.168.10.0/24 [110/30] via 192.168.13.1, 02:15:29, Ethernet0/0
    192.168.12.0/30 is subnetted, 1 subnets
O       192.168.12.0 [110/20] via 192.168.13.1, 02:15:29, Ethernet0/0
    192.168.13.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.13.0/30 is directly connected, Ethernet0/0
L       192.168.13.2/32 is directly connected, Ethernet0/0
O       192.168.20.0/22 [110/30] via 192.168.13.1, 02:15:29, Ethernet0/0
O       192.168.32.0/22 [110/30] via 192.168.13.1, 00:04:29, Ethernet0/0
    192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.50.0/27 is directly connected, Ethernet0/1.50
L       192.168.50.1/32 is directly connected, Ethernet0/1.50
    192.168.51.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.51.0/28 is directly connected, Ethernet0/1.51
L       192.168.51.1/32 is directly connected, Ethernet0/1.51
R3>

```

**b/**

**R6:**

```
Enter configuration commands, one per line. End with a blank line.
R6(config)#ip route 0.0.0.0 0.0.0.0 10.10.10.10
R6(config)#do wr
```

**c/**

! R1 has a static replicated route, perhaps received from DHCP.

! New knowledge note:

redistribute <routing process> (static, EIGRP, BGP, RIP, etc) will redistribute only classful subnets (like /8, /16, /24). If want to redistribute classless subnets, please append keyword “subnets” into the command.

redistribute static will not include the default static route. Refer to [Here](#).

**R1:**

```
router ospf 100
redistribute static subnets
network 192.168.12.1 0.0.0.0 area 0
network 192.168.13.1 0.0.0.0 area 0
default-information originate
```

**Check:**

```
R2#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is 192.168.12.1 to network 0.0.0.0
O*E2  0.0.0.0/0 [110/1] via 192.168.12.1, 00:09:35, Ethernet0/0
    192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.10.0/24 is directly connected, Ethernet0/1.10
L     192.168.10.1/32 is directly connected, Ethernet0/1.10
    192.168.12.0/24 is variably subnetted, 2 subnets, 2 masks
C     192.168.12.0/30 is directly connected, Ethernet0/0
L     192.168.12.2/32 is directly connected, Ethernet0/0
    192.168.13.0/30 is subnetted, 1 subnets
O     192.168.13.0 [110/20] via 192.168.12.1, 19:23:29, Ethernet0/0
C     192.168.20.0/22 is directly connected, Ethernet0/1.20
L     192.168.20.0/32 is subnetted, 1 subnets
C     192.168.20.1 is directly connected, Ethernet0/1.20
C     192.168.32.0/22 is directly connected, Ethernet0/1.30
L     192.168.32.0/32 is subnetted, 1 subnets
C     192.168.32.1 is directly connected, Ethernet0/1.30
L     192.168.32.2 is subnetted, 1 subnets
```

```

R3#sh 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
        i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
        a - application route
        + - replicated route, % - next hop override

Gateway of last resort is 192.168.13.1 to network 0.0.0.0

O*E2 0.0.0.0/0 [110/1] via 192.168.13.1, 00:11:42, Ethernet0/0
O    192.168.10.0/24 [110/30] via 192.168.13.1, 19:24:04, Ethernet0/0
O    192.168.12.0/30 is subnetted, 1 subnets
O        192.168.12.0 [110/20] via 192.168.13.1, 19:24:04, Ethernet0/0
O    192.168.13.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.13.0/30 is directly connected, Ethernet0/0
L        192.168.13.2/32 is directly connected, Ethernet0/0
O    192.168.20.0/22 [110/30] via 192.168.13.1, 19:24:04, Ethernet0/0
O    192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.50.0/27 is directly connected, Ethernet0/1.50
L        192.168.50.1/32 is directly connected, Ethernet0/1.50
O    192.168.51.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.51.0/28 is directly connected, Ethernet0/1.51

```

R3 → interface e0/0 of R1:

```

R3#ping 100.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 100.0.0.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/1 ms
R3#

```

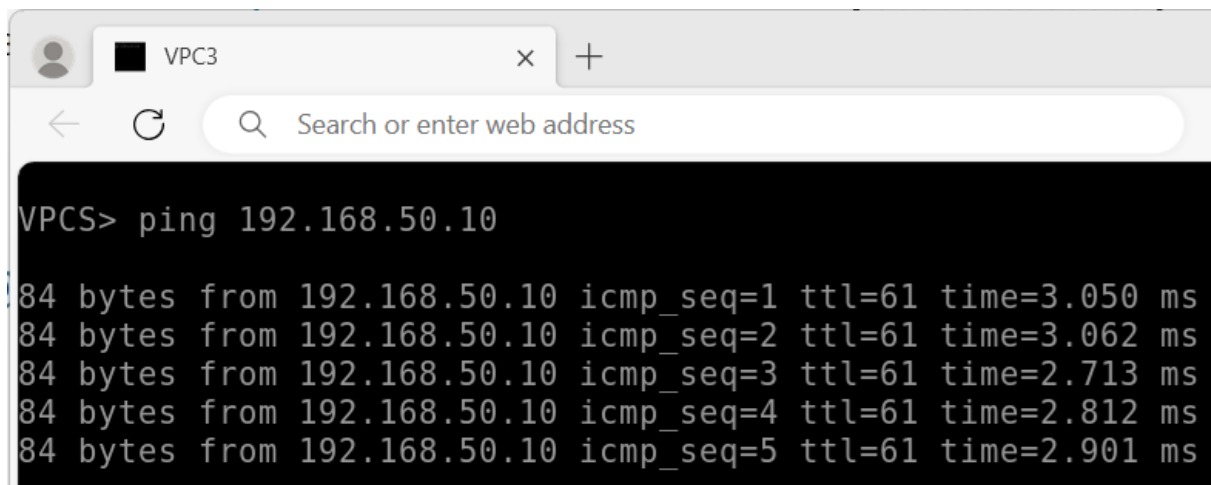
R2 → interface e0/0 of R1:

```

R2>ping 100.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 100.0.0.2, timeout is 2 seconds:
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms

```

VPC 3 → Web Server:



```
VPC3> ping 192.168.50.10
84 bytes from 192.168.50.10 icmp_seq=1 ttl=61 time=3.050 ms
84 bytes from 192.168.50.10 icmp_seq=2 ttl=61 time=3.062 ms
84 bytes from 192.168.50.10 icmp_seq=3 ttl=61 time=2.713 ms
84 bytes from 192.168.50.10 icmp_seq=4 ttl=61 time=2.812 ms
84 bytes from 192.168.50.10 icmp_seq=5 ttl=61 time=2.901 ms
```

## 5. NAT

### a.1/ NAT for R1

#### R1:

```
R1(config-if)#int e0/0
R1(config-if)#ip nat outside
R1(config)#int e0/1.12
R1(config-subif)#ip nat inside
R1(config-subif)#int e0/1.13
R1(config-subif)#ip nat inside

R1(config)#access-list 1 permit 192.168.10.100
R1(config)#access-list 1 permit 192.168.20.100
R1(config)#access-list 1 permit 192.168.32.100
R1(config)#access-list 1 permit 192.168.50.10
R1(config)#access-list 1 permit 192.168.51.10

R1(config)#ip nat inside source list 1 interface e0/0 overload
R1#sh access-lists 1
```

```
Standard IP access list 1
 10 permit 192.168.10.100
 20 permit 192.168.20.100
 30 permit 192.168.32.100
 40 permit 192.168.50.10
 50 permit 192.168.51.10
```

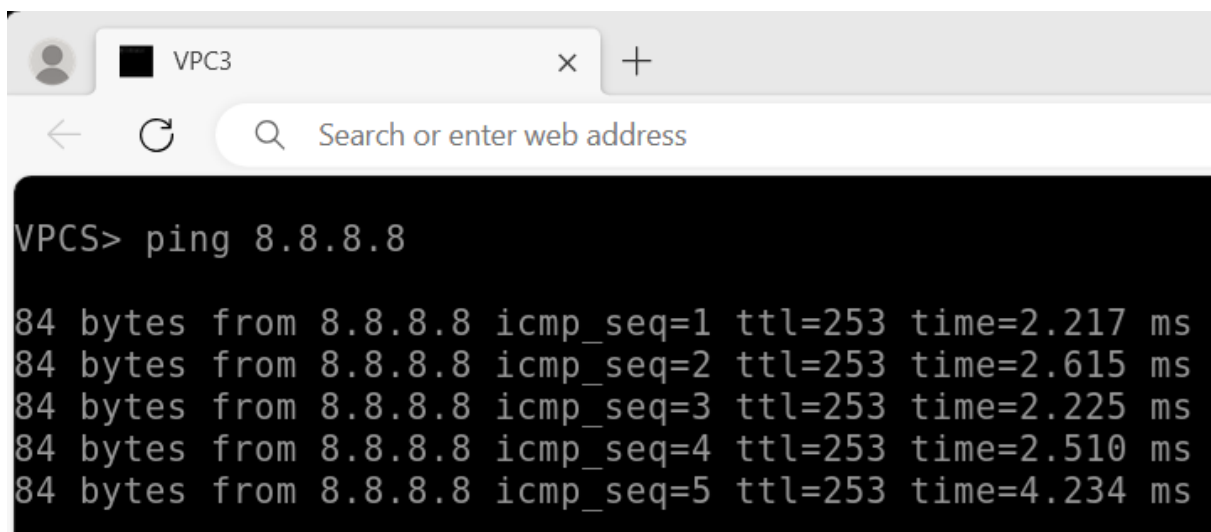
## Check:

VPC1 → 8.8.8.8:

```
VPCS> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=253 time=2.333 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=253 time=2.142 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=253 time=2.222 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=253 time=2.057 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=253 time=1.995 ms
```

VPC3 → 8.8.8.8:

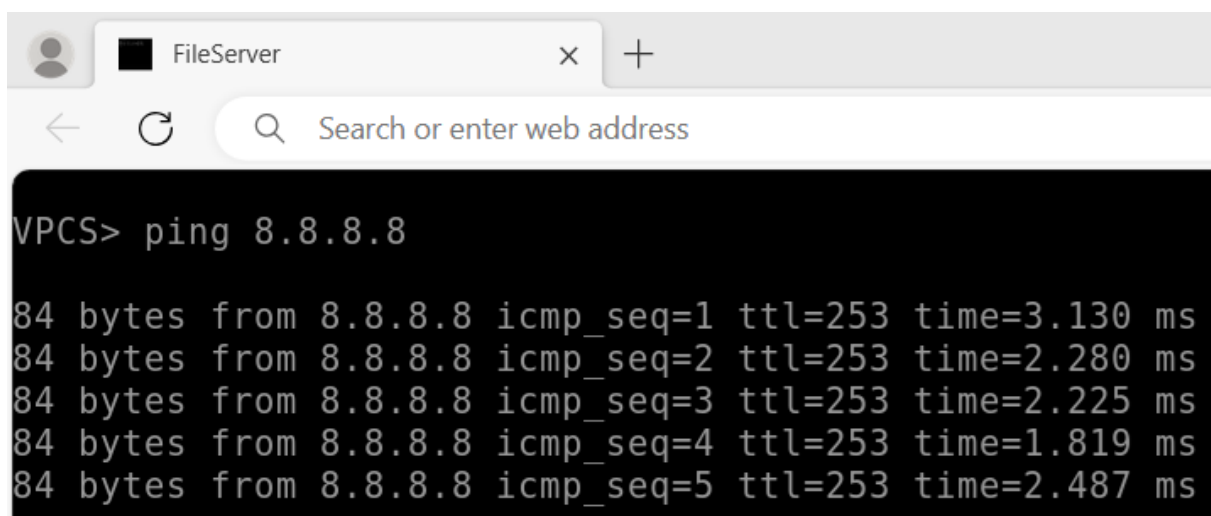


A screenshot of a terminal window titled 'VPC3'. The terminal shows the command 'VPCS> ping 8.8.8.8' and its output, which consists of five lines of ping results. Each line shows '84 bytes from 8.8.8.8' followed by 'icmp\_seq' (1 to 5), 'ttl=253', and 'time' in milliseconds. The times are 2.217, 2.615, 2.225, 2.510, and 4.234 ms respectively.

```
VPCS> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=253 time=2.217 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=253 time=2.615 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=253 time=2.225 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=253 time=2.510 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=253 time=4.234 ms
```

File Server → 8.8.8.8:

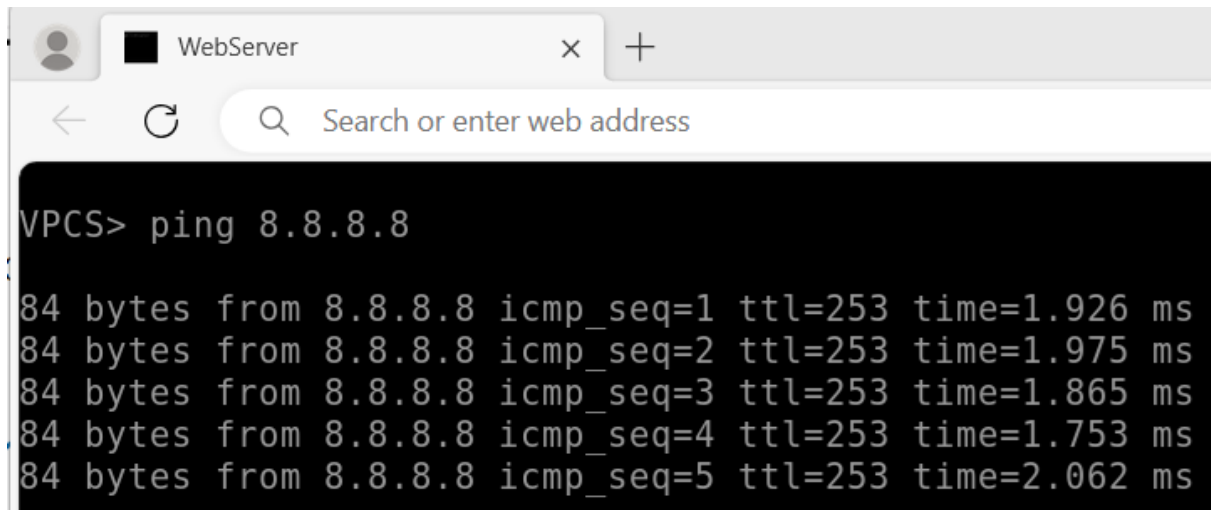


A screenshot of a terminal window titled 'FileServer'. The terminal shows the command 'VPCS> ping 8.8.8.8' and its output, which consists of five lines of ping results. Each line shows '84 bytes from 8.8.8.8' followed by 'icmp\_seq' (1 to 5), 'ttl=253', and 'time' in milliseconds. The times are 3.130, 2.280, 2.225, 1.819, and 2.487 ms respectively.

```
VPCS> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=253 time=3.130 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=253 time=2.280 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=253 time=2.225 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=253 time=1.819 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=253 time=2.487 ms
```

Web Server → 8.8.8.8:



```
VPCS> ping 8.8.8.8

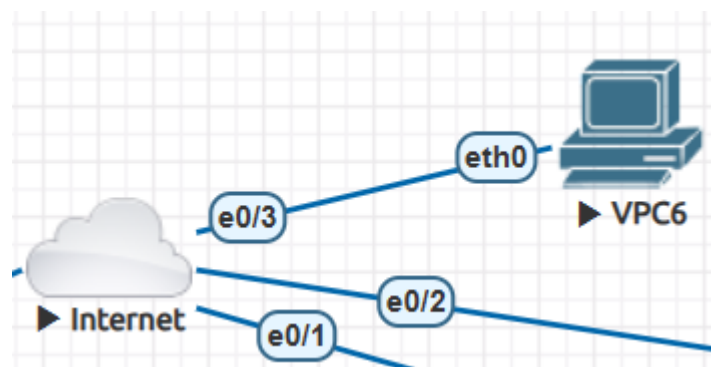
84 bytes from 8.8.8.8 icmp_seq=1 ttl=253 time=1.926 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=253 time=1.975 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=253 time=1.865 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=253 time=1.753 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=253 time=2.062 ms
```

**a.2/**

**R3:**

```
ip nat inside source static 192.168.50.10 100.100.100.100
```

**Check: (vpc6 → 100.100.100.100)**



! I don't know how to configure IP in VPC6 until check the cloud "Internet"

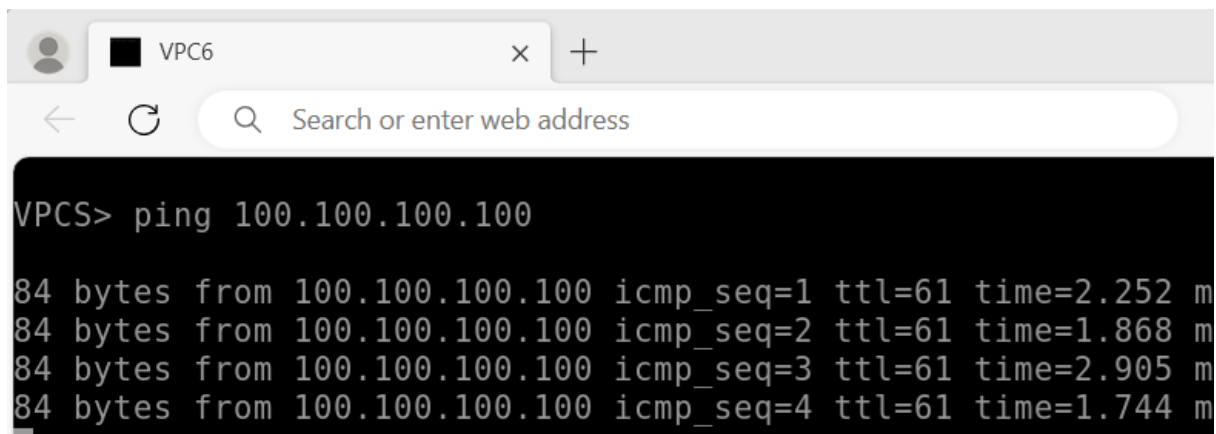
! Turn out the cloud is a router, with configuration is:

```
Internet>show ip int br
Interface                               IP-Address
Ethernet0/0                             100.0.0.1
Ethernet0/1                             200.0.0.1
Ethernet0/2                             201.0.0.1
Ethernet0/3                             111.111.111.111
Loopback0                               8.8.8.8
```

## VPC6:

```
VPCS> ip 111.111.111.120/24 111.111.111.111
```

```
ping 100.100.100.100
```



## 6. ACL

**a/**

! advice: "extended ACLs approved as close to the src as possible" ⇒ R1 interface e0/1 direction in

**R1:**

```
access-list 100 permit tcp 192.168.20.0 0.0.3.255 host 192.168.51.10 eq ftp
```

```
access-list 100 permit ip 192.168.10.0 0.0.0.255 host 192.168.51.10
```

```
access-list 100 deny ip any host 192.168.51.10
```

```
access-list 100 permit ip any any
```

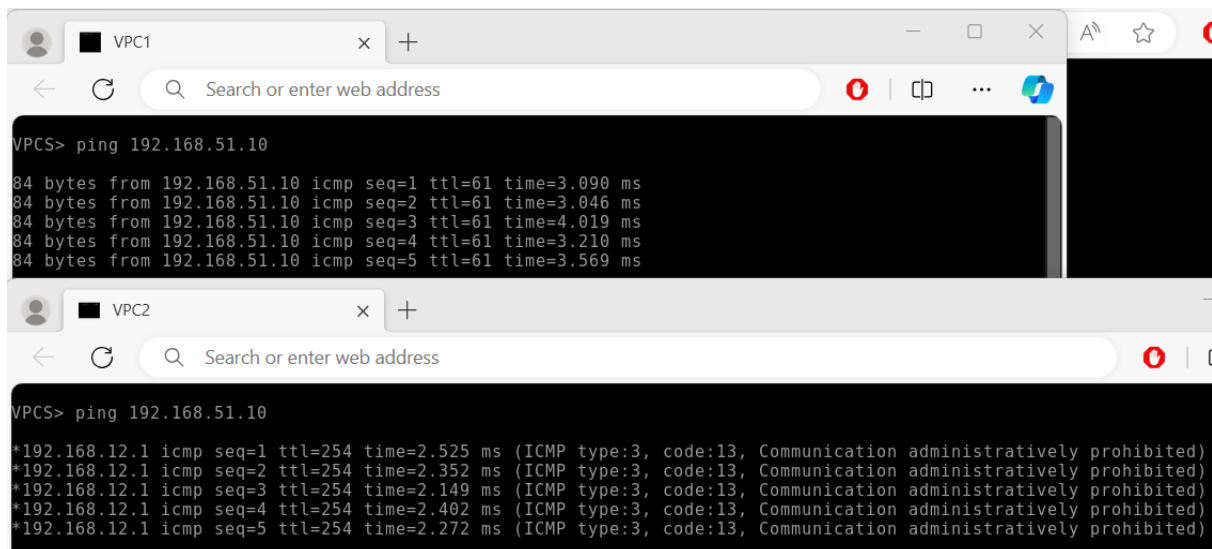
```
R1(config)#int e0/1.12
```

```
R1(config-subif)#ip access-group 100 in
```

```
R1#sh ip access-lists 100
Extended IP access list 100
 10 permit tcp 192.168.20.0 0.0.3.255 host 192.168.51.10 eq ftp
 20 permit ip 192.168.10.0 0.0.0.255 host 192.168.51.10
 30 deny ip any host 192.168.51.10
 40 permit ip any any (14 matches)
```

## Check:

VPC 1, VPC2 → File server:



The image shows two terminal windows side-by-side, both with a black background and white text. The top window is titled 'VPC1' and shows the command 'VPCS> ping 192.168.51.10'. The output shows five successful ping requests from 192.168.51.10 with varying times (3.090 ms to 3.569 ms). The bottom window is titled 'VPC2' and shows the command 'VPCS> ping 192.168.51.10'. The output shows five failed ping requests from 192.168.12.1 with a message: '(ICMP type:3, code:13, Communication administratively prohibited)'.

```
VPC1> ping 192.168.51.10
84 bytes from 192.168.51.10 icmp seq=1 ttl=61 time=3.090 ms
84 bytes from 192.168.51.10 icmp seq=2 ttl=61 time=3.046 ms
84 bytes from 192.168.51.10 icmp seq=3 ttl=61 time=4.019 ms
84 bytes from 192.168.51.10 icmp seq=4 ttl=61 time=3.210 ms
84 bytes from 192.168.51.10 icmp seq=5 ttl=61 time=3.569 ms

VPC2> ping 192.168.51.10
*192.168.12.1 icmp seq=1 ttl=254 time=2.525 ms (ICMP type:3, code:13, Communication administratively prohibited)
*192.168.12.1 icmp seq=2 ttl=254 time=2.352 ms (ICMP type:3, code:13, Communication administratively prohibited)
*192.168.12.1 icmp seq=3 ttl=254 time=2.149 ms (ICMP type:3, code:13, Communication administratively prohibited)
*192.168.12.1 icmp seq=4 ttl=254 time=2.402 ms (ICMP type:3, code:13, Communication administratively prohibited)
*192.168.12.1 icmp seq=5 ttl=254 time=2.272 ms (ICMP type:3, code:13, Communication administratively prohibited)
```