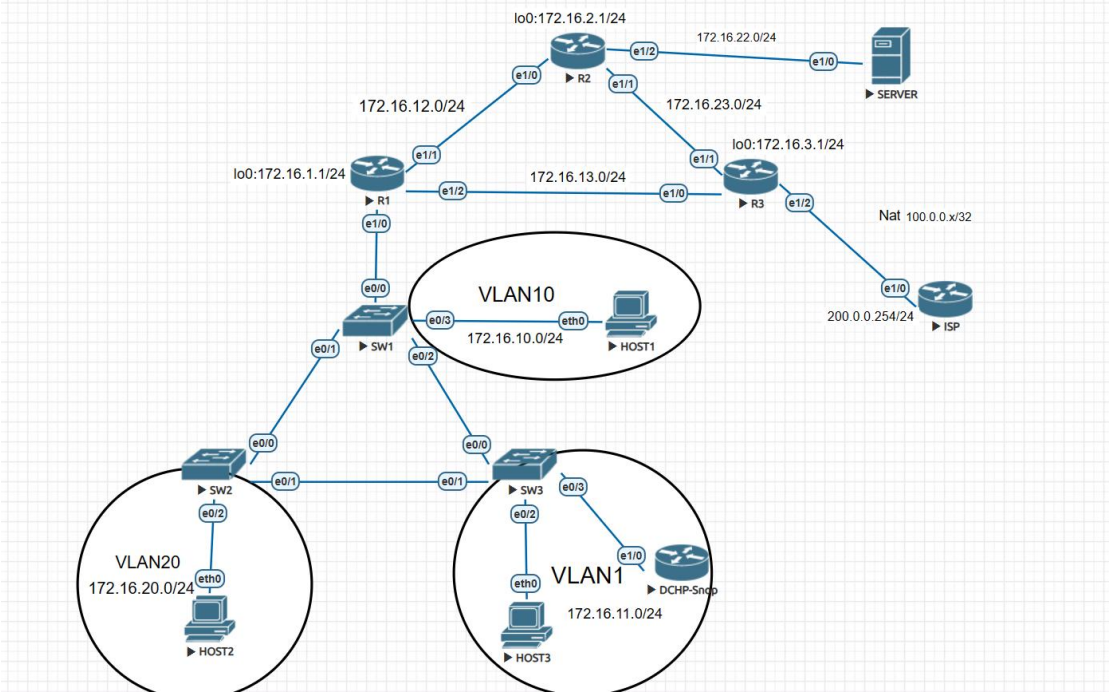
Triển khai mô hình mạng cơ bản

Mô hình



Nội dung mô phỏng

- Cấu hình các đường link đầu nối giữa các switch thành đường Trunking Dot1Q. Khai báo VLAN 10, 20 trên SW1 và các VLAN này tự động đồng bộ đến SW2, SW3.
- Cấu hình STP trên VLAN 10, 20. Đối với VLAN 10 thì cổng E0/0 của SW2 là Blocking Port còn VLAN 20 thì cổng E0/1 của SW3 là Blocking Port.
- Trên R1 thực hiện cấu hình định tuyến giữa các VLAN (Router on Stick).
- Cấu hình định tuyến OSPF trên Router R1, R2, R3 và đảm bảo các subnet thuộc dải IP 172.16.0.0/16 có thể đi đến với nhau. Đường đi giữa R1 và R3 qua mạng 172.16.13.0/24 là đường backup.
- Cấu hình DHCP của VLAN 20, VLAN 1 trên R2. Đảm bảo host của VLAN 1 nhận IP từ DHCP trên R2 chứ không phải từ DHCP giả mạo.
- ACL:

    - Cấm các ip thuộc VLAN 10 Telnet đến R2 nhưng cho phép các địa chỉ ip khác.

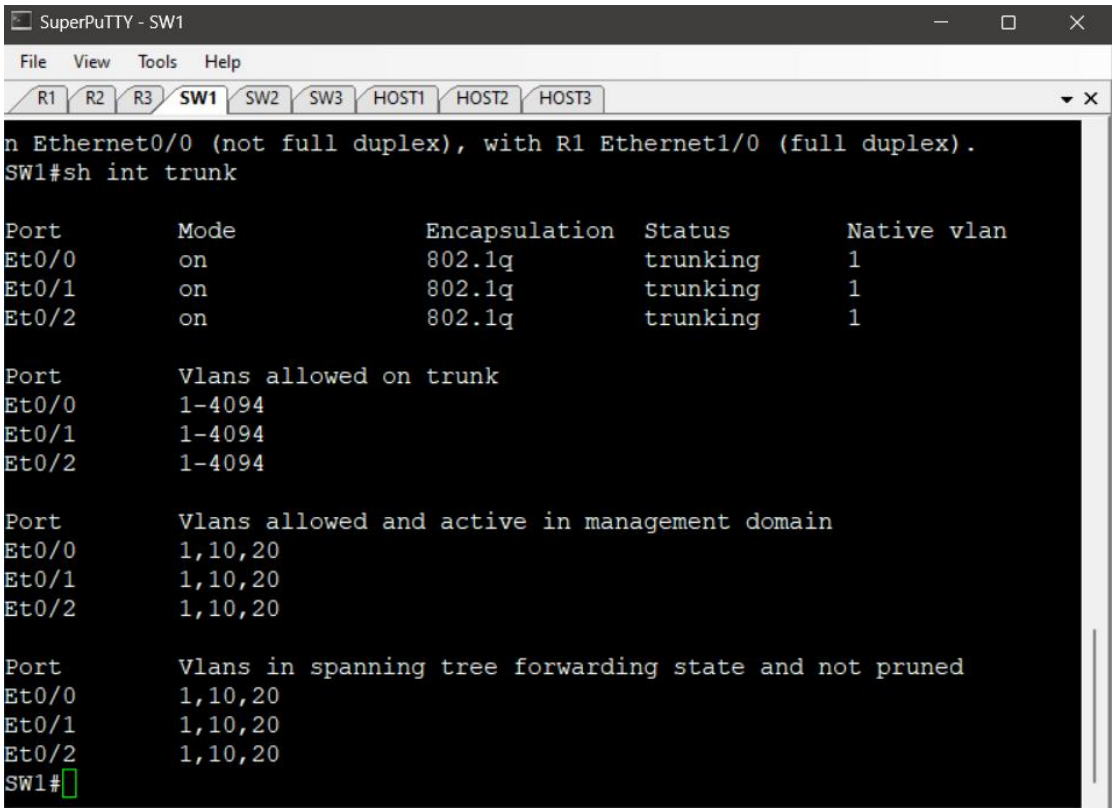
- R2 chỉ cho phép các user thuộc VLAN 20 truy cập web đến Server 172.16.22.2, cấm mọi lưu lượng khác. Và cho phép Server ping đến được host 1 nhưng ngược lại thì không.

- Các user thuộc VLAN 20, VLAN 1 có thể đi được đến Internet bằng IP đầu nối E1/2 của R3 và host của VLAN 10 truy cập Internet bằng địa chỉ IP public 100.0.0.x

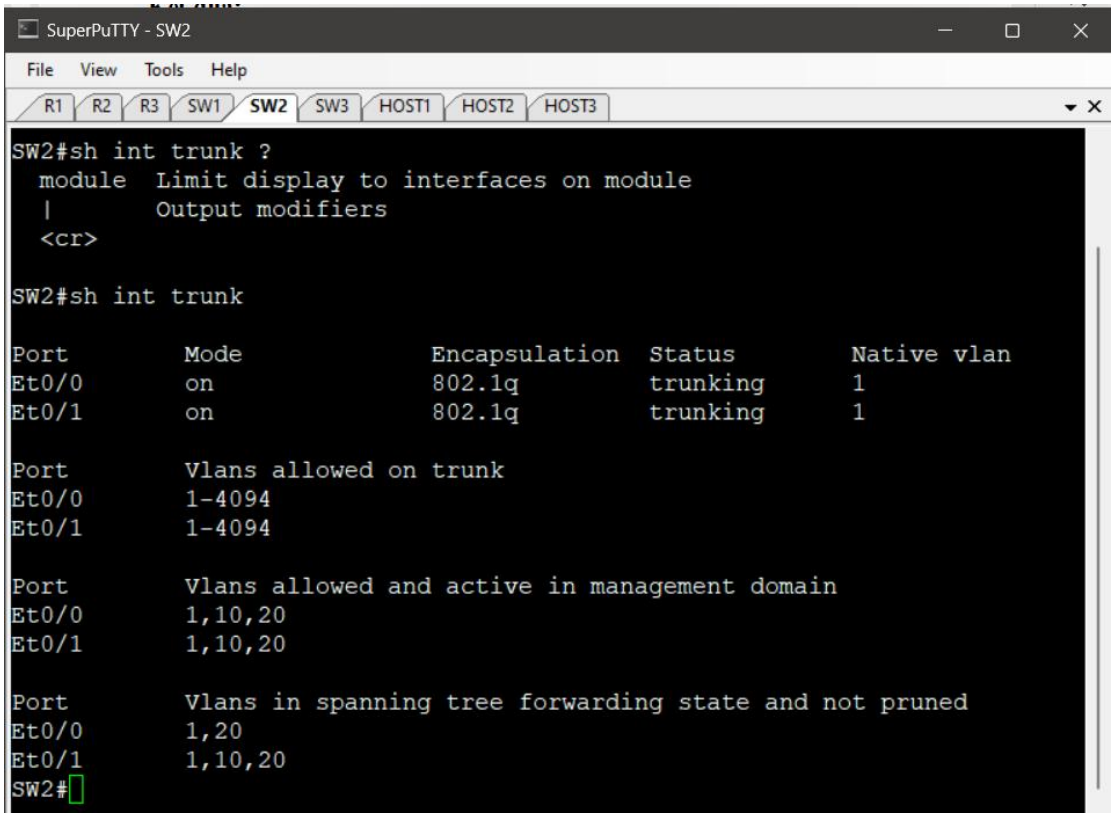
Kết quả:

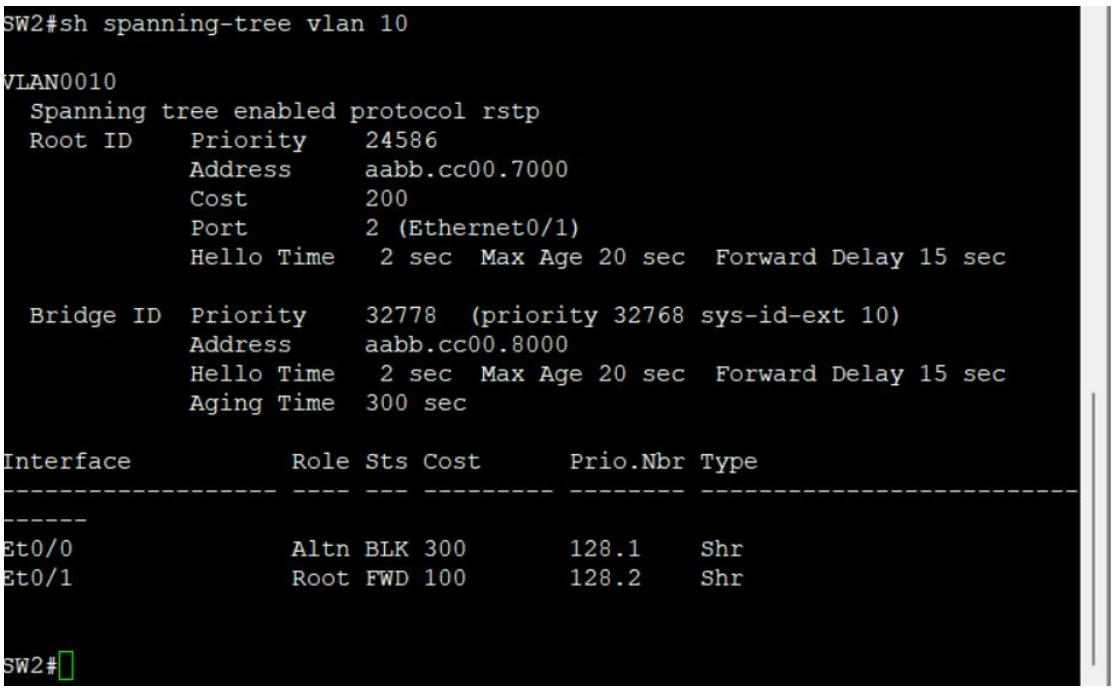
- **Kết quả cấu hình đường trunk và STP:**

SW1:

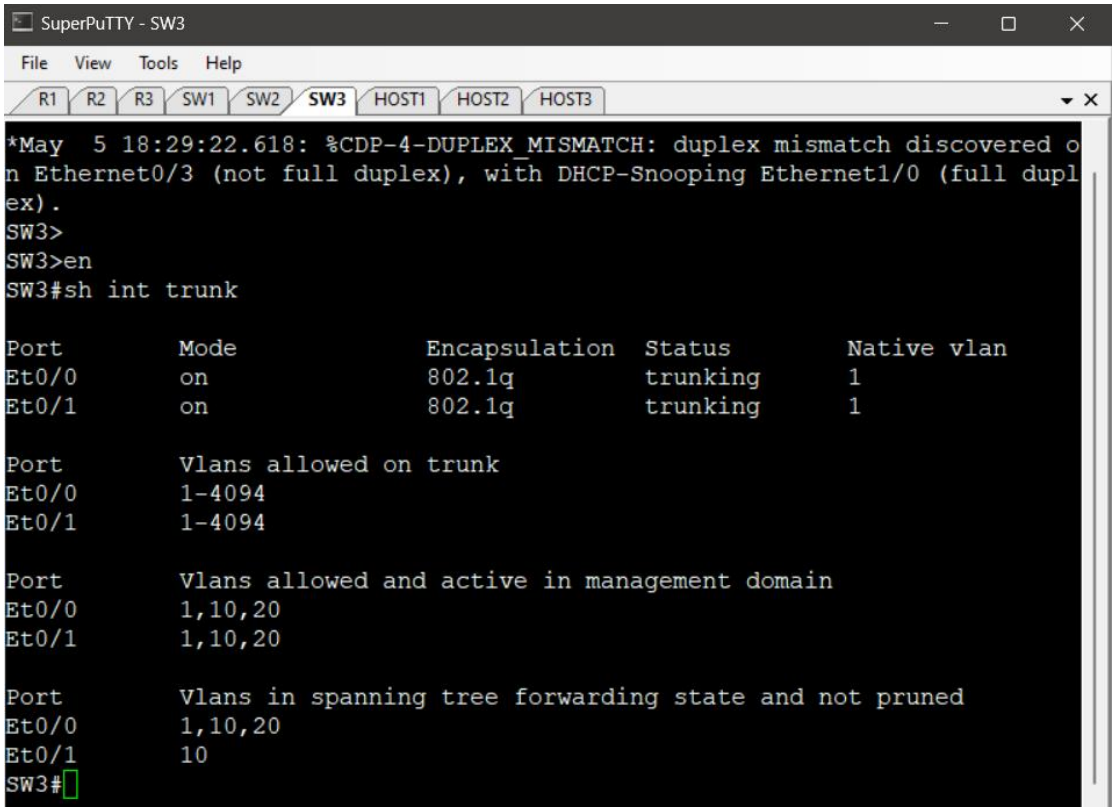


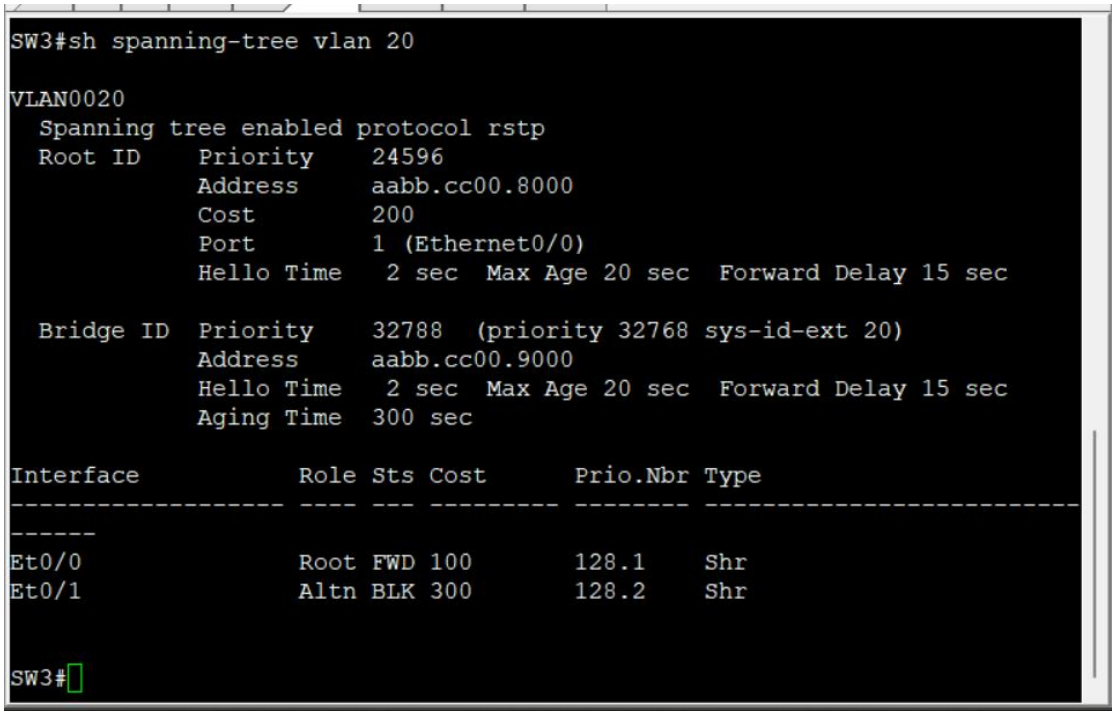
SW2:


SuperPuTTY - SW2
File View Tools Help
R1 R2 R3 SW1 SW2 SW3 HOST1 HOST2 HOST3
SW2#sh int trunk ?
module Limit display to interfaces on module
| Output modifiers
<cr>
SW2#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 1,10,20
Et0/1 1,10,20
Port Vlans in spanning tree forwarding state and not pruned
Et0/0 1,20
Et0/1 1,10,20
SW2#


SW2#sh spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol rstp
Root ID Priority 24586
Address aabb.cc00.7000
Cost 200
Port 2 (Ethernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address aabb.cc00.8000
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 300 128.1 Shr
Et0/1 Root FWD 100 128.2 Shr
SW2#

SW3:

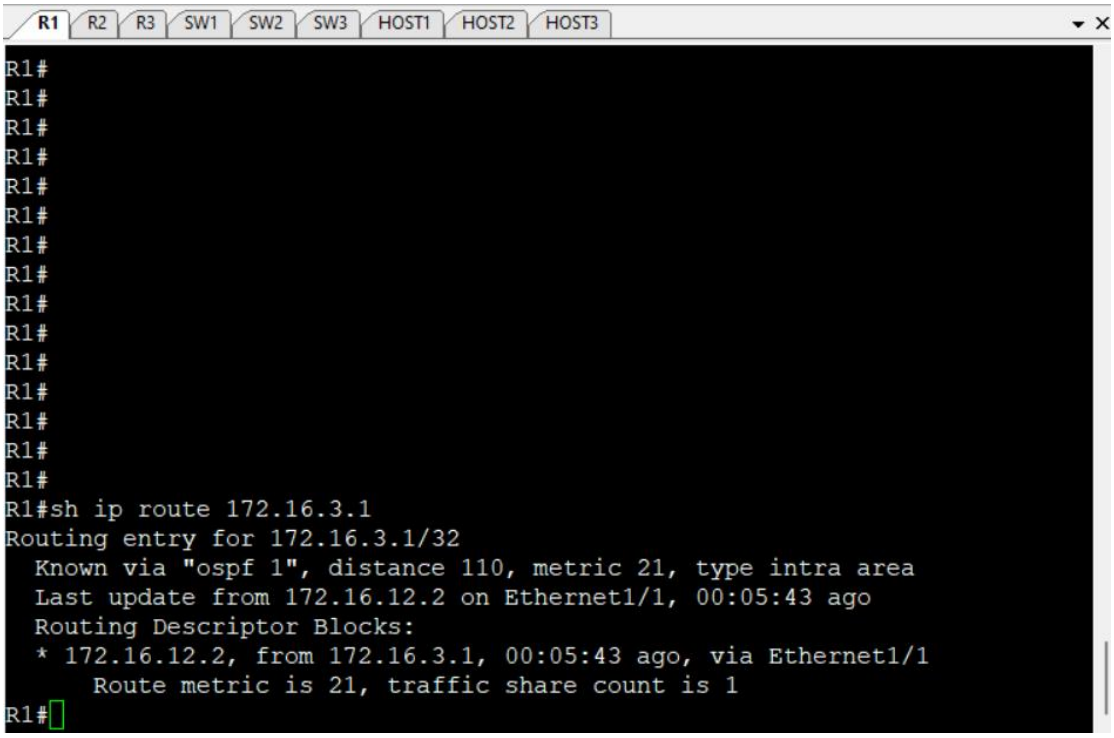


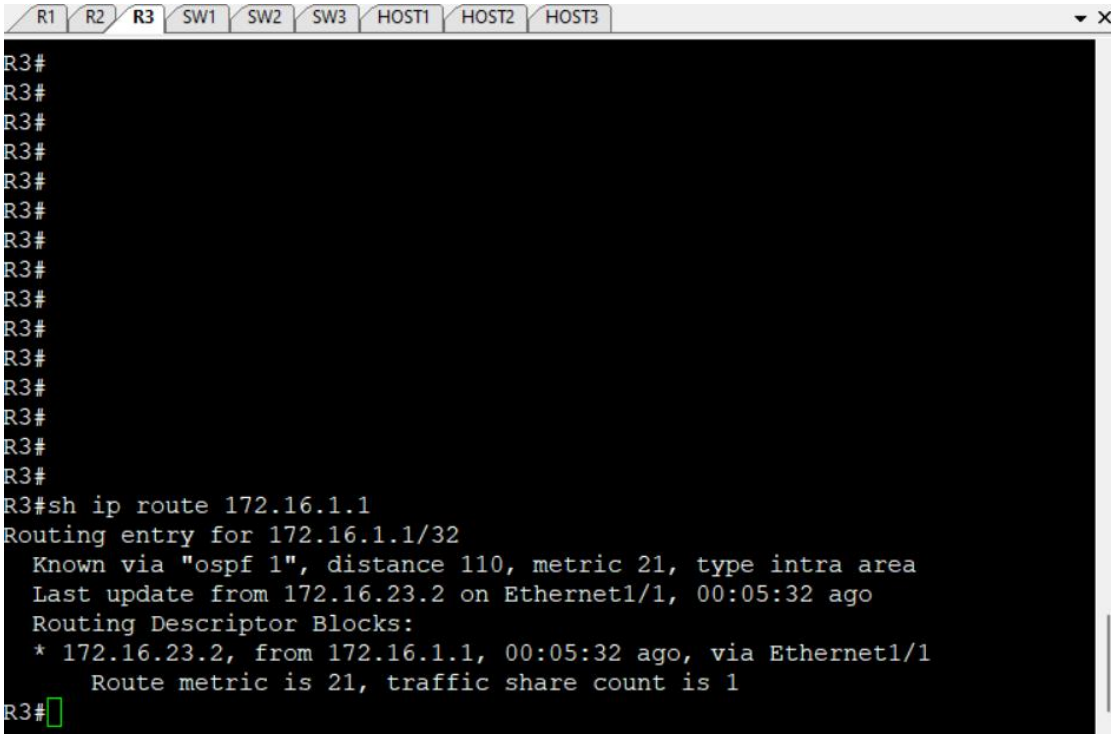


- **Kết quả thực hiện Router on Stick trên R1:**

```
R1>
R1>
R1>en
R1#sh ip int bri
Interface              IP-Address      OK? Method Status                Pr
otocol
FastEthernet0/0        unassigned      YES NVRAM  administratively down do
wn
Ethernet1/0            172.16.11.1     YES NVRAM  up                    up

Ethernet1/0.10         172.16.10.1     YES NVRAM  up                    up

Ethernet1/0.20         172.16.20.1     YES NVRAM  up                    up

Ethernet1/1            172.16.12.1     YES NVRAM  up                    up

Ethernet1/2            172.16.13.1     YES NVRAM  up                    up

Ethernet1/3            unassigned      YES NVRAM  administratively down do
wn
Ethernet1/4            unassigned      YES NVRAM  administratively down do
wn
Ethernet1/5            unassigned      YES NVRAM  administratively down do
```

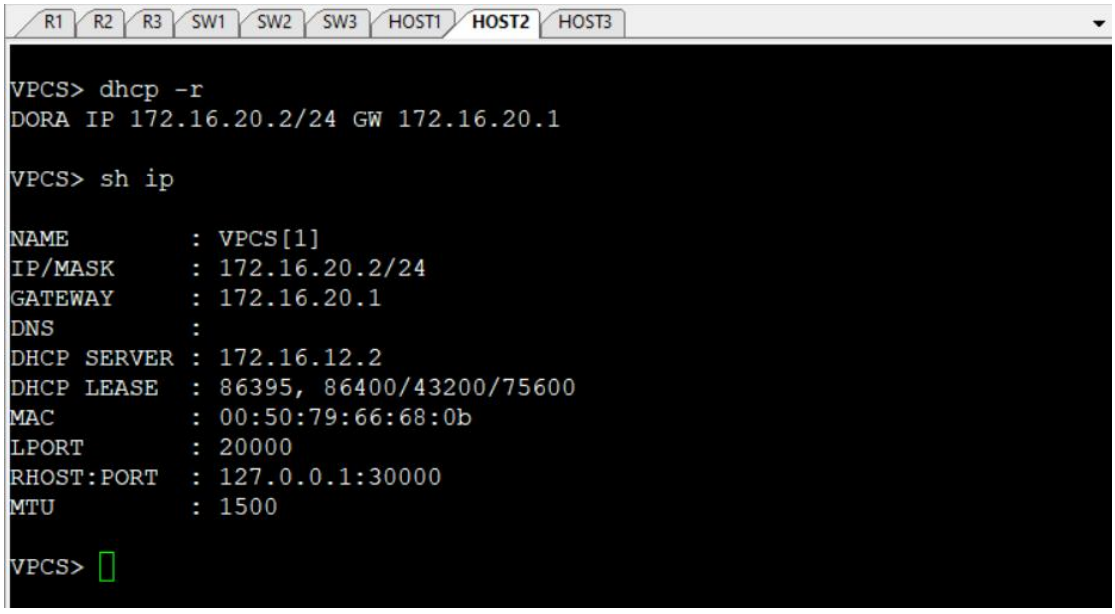
- **Kết quả định tuyến Ospf, đường đi giữa R1 và R3 không đi qua đường Backup**

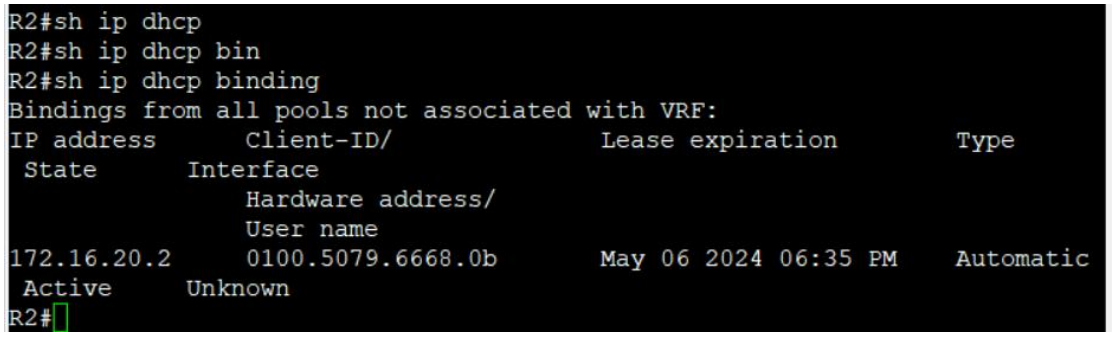




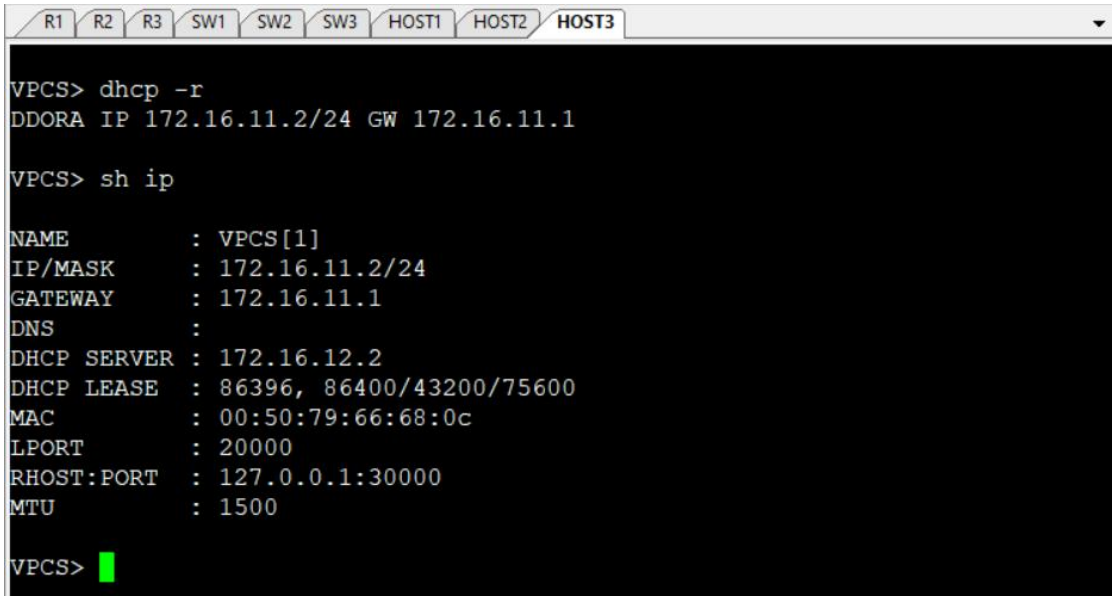
- **Kết quả thực hiện DHCP VLAN 20 và VLAN 1:**

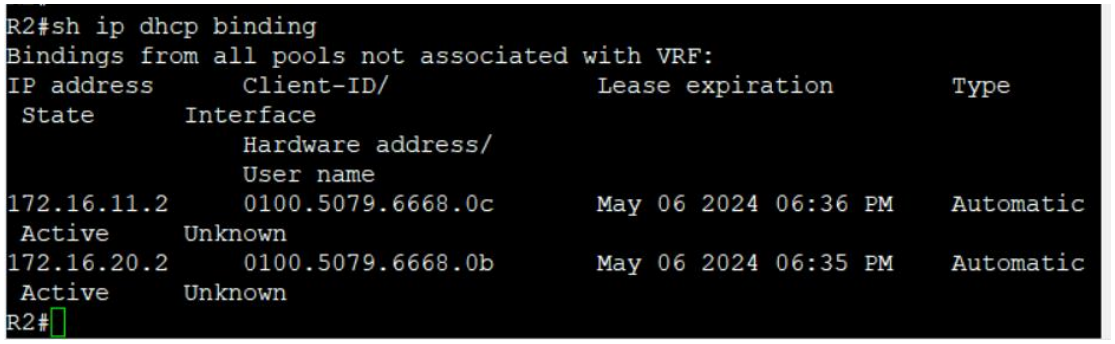
VLAN 20:

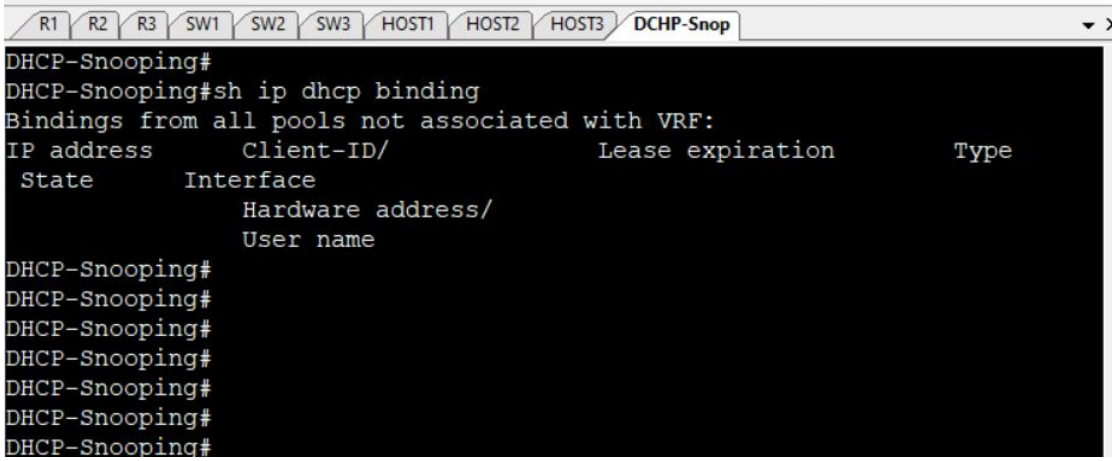


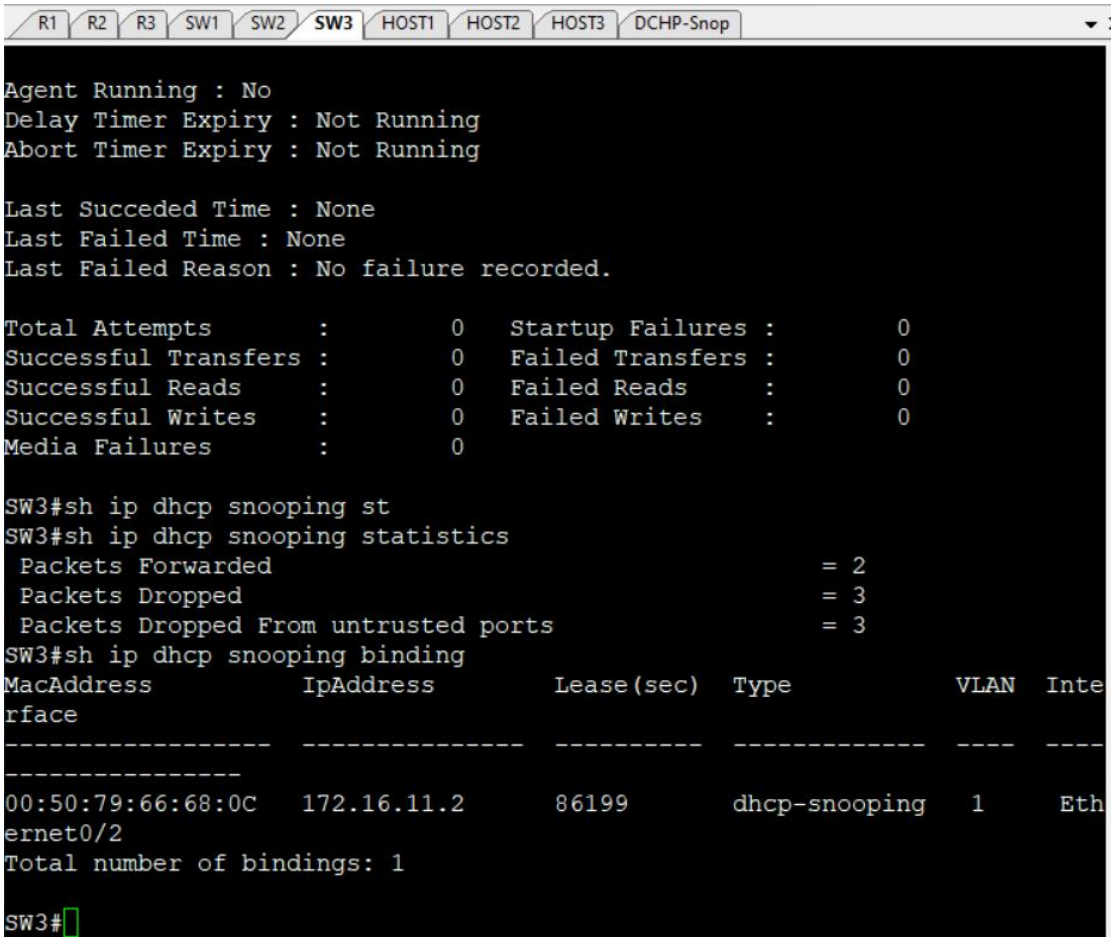


VLAN 1:

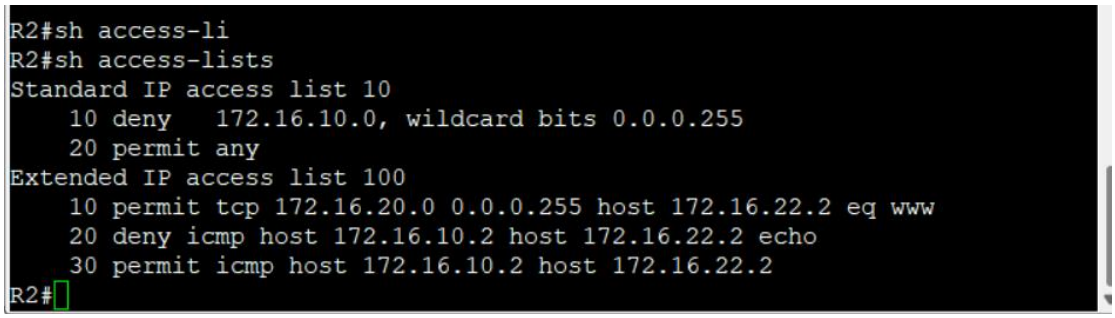

R1
R2
R3
SW1
SW2
SW3
HOST1
HOST2
HOST3
VPCS> dhcp -r
DDORA IP 172.16.11.2/24 GW 172.16.11.1
VPCS> sh ip
NAME : VPCS[1]
IP/MASK : 172.16.11.2/24
GATEWAY : 172.16.11.1
DNS :
DHCP SERVER : 172.16.12.2
DHCP LEASE : 86396, 86400/43200/75600
MAC : 00:50:79:66:68:0c
LPORT : 20000
RHOST:PORT : 127.0.0.1:30000
MTU : 1500
VPCS>


R2#sh ip dhcp binding
Bindings from all pools not associated with VRF:
IP address Client-ID/ Lease expiration Type
State Interface
Hardware address/
User name
172.16.11.2 0100.5079.6668.0c May 06 2024 06:36 PM Automatic
Active Unknown
172.16.20.2 0100.5079.6668.0b May 06 2024 06:35 PM Automatic
Active Unknown
R2#


R1
R2
R3
SW1
SW2
SW3
HOST1
HOST2
HOST3
DCHP-Snop
DHCP-Snooping#
DHCP-Snooping#sh ip dhcp binding
Bindings from all pools not associated with VRF:
IP address Client-ID/ Lease expiration Type
State Interface
Hardware address/
User name
DHCP-Snooping#
DHCP-Snooping#
DHCP-Snooping#
DHCP-Snooping#
DHCP-Snooping#
DHCP-Snooping#
DHCP-Snooping#



- **Kết quả cấu hình ACL:**

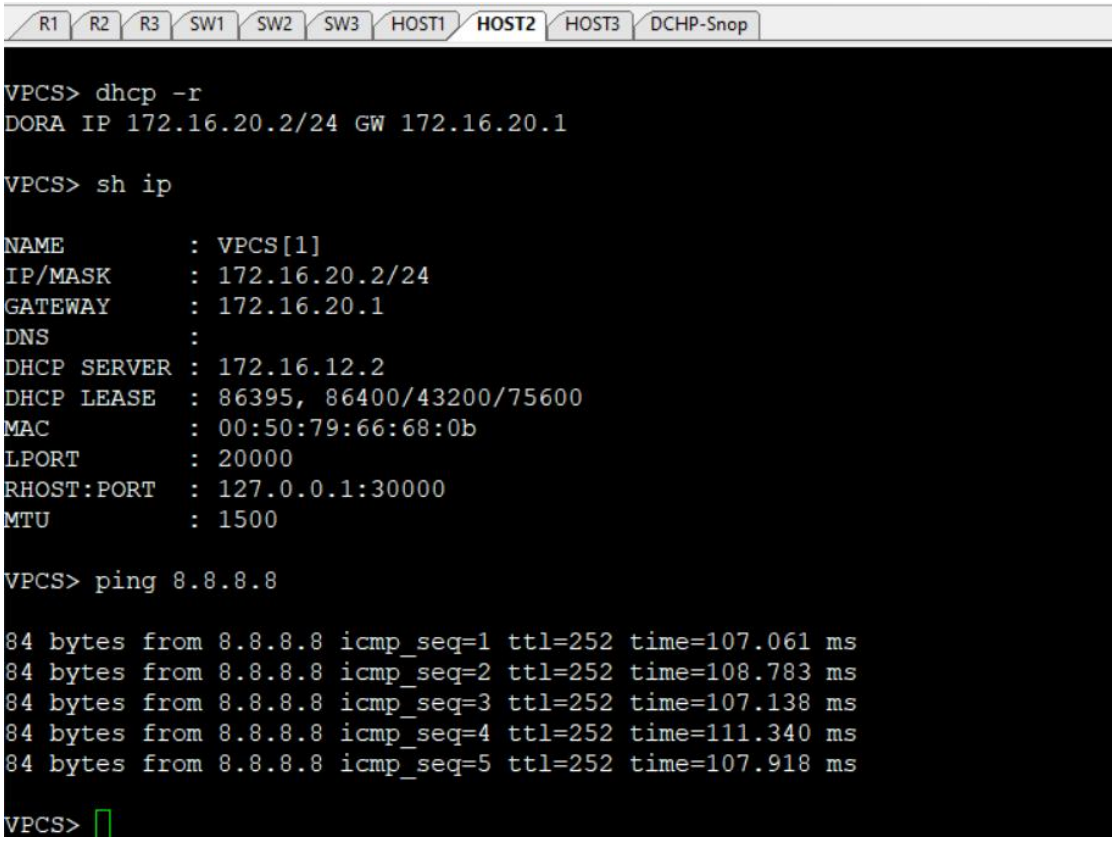


- **Kết quả kết nối ISP:**

R1 | R2 | R3 | SW1 | SW2 | SW3 | **HOST1** | HOST2 | HOST3 | DCHP-Snop

```
Welcome to Virtual PC Simulator, version 1.3 (0.8.1)
Dedicated to Daling.
Build time: May  7 2022 15:27:29
Copyright (c) 2007-2015, Paul Meng (mirnshi@gmail.com)
Copyright (c) 2021, Alain Degreffe (alain.degreffe@eve-ng.net)
All rights reserved.

VPCS is free software, distributed under the terms of the "BSD" licence.
Source code and license can be found at vpcs.sf.net.
For more information, please visit wiki.freecode.com.cn.
Modified version for EVE-NG.

Press '?' to get help.

Executing the startup file


Checking for duplicate address...
VPCS : 172.16.10.2 255.255.255.0 gateway 172.16.10.1

VPCS> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=252 time=122.431 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=252 time=123.454 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=252 time=107.380 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=252 time=106.020 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=252 time=107.800 ms

VPCS>
```

```
R3#sh ip nat trans
R3#sh ip nat translations
Pro Inside global      Inside local       Outside local      Outside globa
l
icmp 100.0.0.3:13781   172.16.10.2:13781  8.8.8.8:13781      8.8.8.8:13781
icmp 100.0.0.3:14037   172.16.10.2:14037  8.8.8.8:14037      8.8.8.8:14037
icmp 100.0.0.3:14549   172.16.10.2:14549  8.8.8.8:14549      8.8.8.8:14549
icmp 100.0.0.3:14805   172.16.10.2:14805  8.8.8.8:14805      8.8.8.8:14805
icmp 100.0.0.3:15061   172.16.10.2:15061  8.8.8.8:15061      8.8.8.8:15061
--- 100.0.0.3          172.16.10.2        ---                ---
R3#
```




```
--- 100.0.0.3          172.16.10.2         ---                 ---
R3#sh ip nat translations
Pro Inside global      Inside local        Outside local       Outside globa
l
icmp 100.0.0.3:14805   172.16.10.2:14805   8.8.8.8:14805       8.8.8.8:14805
icmp 100.0.0.3:15061   172.16.10.2:15061   8.8.8.8:15061       8.8.8.8:15061
--- 100.0.0.3          172.16.10.2         ---                 ---
icmp 200.0.0.3:1024    172.16.20.2:32725   8.8.8.8:32725       8.8.8.8:1024
icmp 200.0.0.3:1025    172.16.20.2:32981   8.8.8.8:32981       8.8.8.8:1025
icmp 200.0.0.3:1026    172.16.20.2:33237   8.8.8.8:33237       8.8.8.8:1026
icmp 200.0.0.3:1027    172.16.20.2:33493   8.8.8.8:33493       8.8.8.8:1027
icmp 200.0.0.3:1028    172.16.20.2:33749   8.8.8.8:33749       8.8.8.8:1028
R3#
```

R1 | R2 | R3 | SW1 | SW2 | SW3 | HOST1 | HOST2 | **HOST3** | DCHP-Snop

```
VPCS> dhcp -r
DDORA IP 172.16.11.2/24 GW 172.16.11.1

VPCS> sh ip

NAME        : VPCS[1]
IP/MASK     : 172.16.11.2/24
GATEWAY     : 172.16.11.1
DNS         :
DHCP SERVER : 172.16.12.2
DHCP LEASE  : 86396, 86400/43200/75600
MAC         : 00:50:79:66:68:0c
LPORT       : 20000
RHOST:PORT  : 127.0.0.1:30000
MTU         : 1500

VPCS> ping 8.8.8.8

84 bytes from 8.8.8.8 icmp_seq=1 ttl=252 time=107.799 ms
84 bytes from 8.8.8.8 icmp_seq=2 ttl=252 time=108.298 ms
84 bytes from 8.8.8.8 icmp_seq=3 ttl=252 time=92.599 ms
84 bytes from 8.8.8.8 icmp_seq=4 ttl=252 time=106.561 ms
84 bytes from 8.8.8.8 icmp_seq=5 ttl=252 time=108.459 ms

VPCS>
```

```
R3#sh ip nat translations
Pro Inside global      Inside local       Outside local      Outside globa
l
--- 100.0.0.3          172.16.10.2        ---                ---
icmp 200.0.0.3:1029    172.16.11.2:45269  8.8.8.8:45269      8.8.8.8:1029
icmp 200.0.0.3:1030    172.16.11.2:45781  8.8.8.8:45781      8.8.8.8:1030
icmp 200.0.0.3:1031    172.16.11.2:46037  8.8.8.8:46037      8.8.8.8:1031
icmp 200.0.0.3:1032    172.16.11.2:46293  8.8.8.8:46293      8.8.8.8:1032
icmp 200.0.0.3:1033    172.16.11.2:46549  8.8.8.8:46549      8.8.8.8:1033
icmp 200.0.0.3:1024    172.16.20.2:32725  8.8.8.8:32725      8.8.8.8:1024
icmp 200.0.0.3:1025    172.16.20.2:32981  8.8.8.8:32981      8.8.8.8:1025
icmp 200.0.0.3:1026    172.16.20.2:33237  8.8.8.8:33237      8.8.8.8:1026
icmp 200.0.0.3:1027    172.16.20.2:33493  8.8.8.8:33493      8.8.8.8:1027
icmp 200.0.0.3:1028    172.16.20.2:33749  8.8.8.8:33749      8.8.8.8:1028
R3#
```