厦門大學

信息学院软件工程系

《计算机网络》实验报告

题　　目 实验五　CISCO IOS 路由器基本配置

班　　级 软件工程 2018 级 1 班

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实验时间 2020 年 4 月 8 日

2020 年　4 月　8 日

1 实验目的

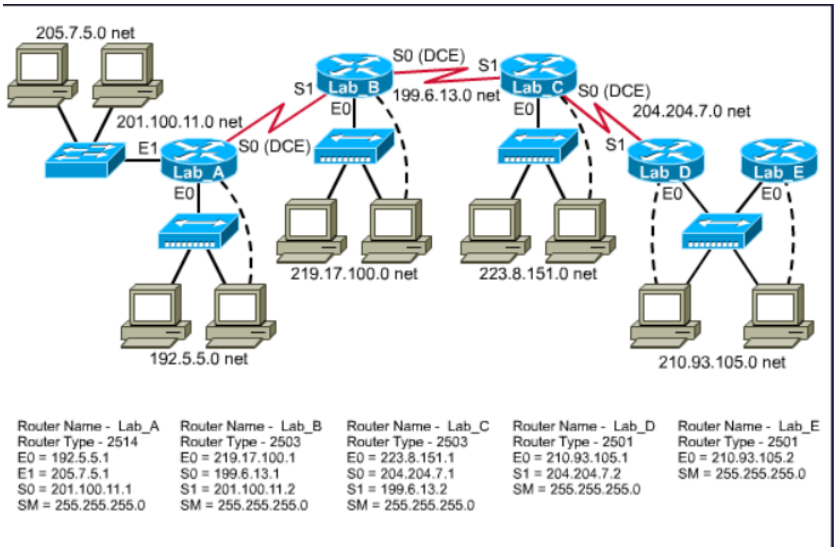
使用 Router eSIM v1.1 模拟器来模拟路由器的配置环境；使用 CCNA Network Visualizer 6.0 配置静态路由、动态路由和交换机端口的 VLAN（虚拟局域网）。

2 实验环境

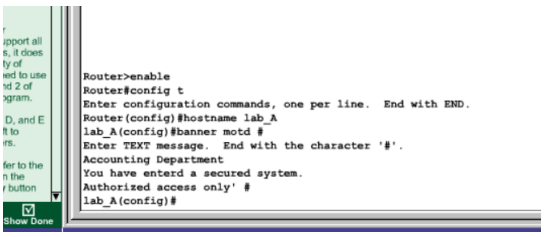
操作系统：windows

3 实验结果

5.2 Cisco IOS 的基本操作和路由器的常规配置



①



③

```
Authorized access only' #
lab_A(config)#ip host lab_A 192.5.5.1 205.7.5.1 201.100.11.1
lab_A(config)#ip host lab_B 219.17.100.1 199.6.13.1 201.100.11.2
lab_A(config)#ip host lab_C 223.8.151.1 204.204.7.2
lab_A(config)#ip host lab_C 223.8.151.1 204.204.7.1 199.6.13.2
lab_A(config)#ip host lab_D 210.93.105.1 204.204.7.2
lab_A(config)#ip host lab_E 210.93.105.2
lab_A(config)#s
```

⑤

```
lab_A(config)#int eth 0
lab_A(config-if)#ip address 192.5.5.1 255.255.255.0
lab_A(config-if)#int eth 1
lab_A(config-if)#ip address 205.7.5.1 255.255.255.0
lab_A(config-if)#int serial 0
lab_A(config-if)#ip address 201.100.11.1 255.255.255.0
lab_A(config-if)#
```

```
lab_A#show interface serial 0
Serial0 is administratively down, line protocol is down
   Internet address is 201.100.11.1/24
   Hardware is HD64570
   MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
      reliability 255/255, txload 1/255, rxload 1/255
   Encapsulation HDLC, loopback not set
   Keepalive set (10 sec)
   Last input never, output never, output hang never
   Last clearing of "show interface" counters never
   Input queue: 0/75/0 (size/max/drops); Total output drops: 0
   Queueing strategy: weighted fair
   Output queue: 0/1000/64/0 (size/max total/threshold/drops)
      Conversations  0/0/256 (active/max active/max total)
      Reserved Conversations 0/0 (allocated/max allocated)
   5 minute input rate 0 bits/sec, 0 packets/sec
   5 minute output rate 0 bits/sec, 0 packets/sec
      0 packets input, 0 bytes, 0 no buffer
      Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
      0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
      0 packets output, 0 bytes, 0 underruns
      0 output errors, 0 collisions, 1 interface resets
      0 output buffer failures, 0 output buffers swapped out
 --More--
```

思考题：

设置密码保护：

```
lab_A(config)#enable password ciso
lab_A(config)#enable secret class
lab_A(config)#line console 0
lab_A(config-line)#login
lab_A(config-line)#password cisco
lab_A(config-line)#exit
lab_A(config)#line vty 0 4
lab_A(config-line)#login
lab_A(config-line)#password cisco
```

show 命令判定网络故障

```
00:82:37: %SYS-5-CONFIG_I: Configured from console by console
lab_A#show interface serial 0
Serial0 is administratively down, line protocol is down
   Internet address is 201.100.11.1/24
   Hardware is HD64570
```

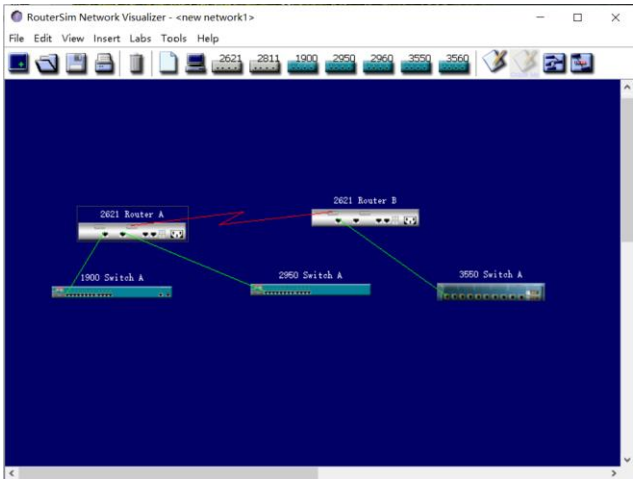
显示网络工作状况。

各个配置模式切换

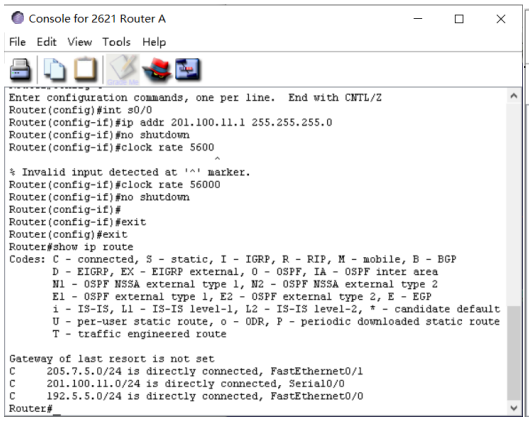
```
lab_A(config)#line console 0
lab_A(config-line)#exit
lab_A(config)#int eth 0
lab_A(config-if)#exit
lab_A(config)#interface serial 0
lab_A(config-if)#exit
lab_A(config)#
```

Show controller serial X (Router eSIM 不支持，但可从拓扑图看出)

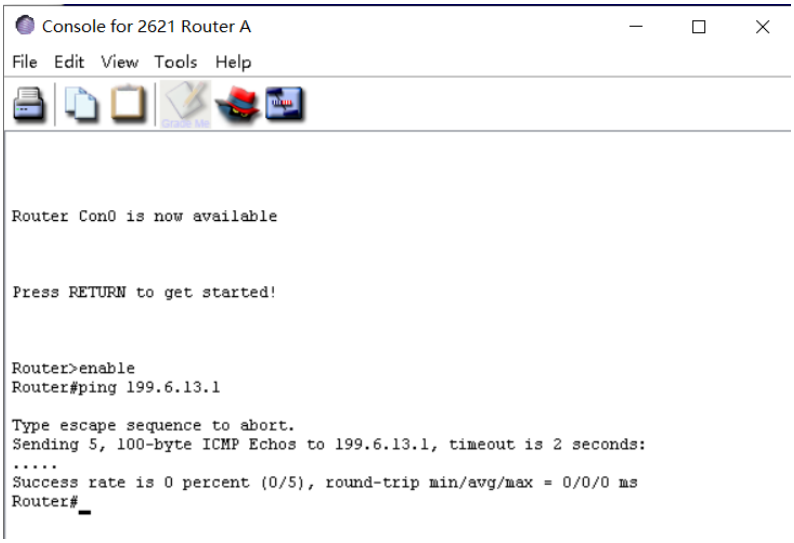
5.3



RouteA RouteB

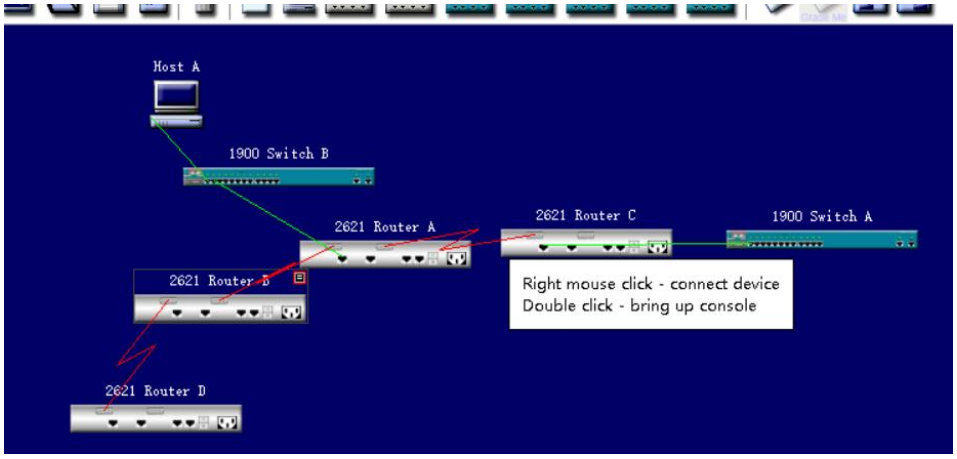


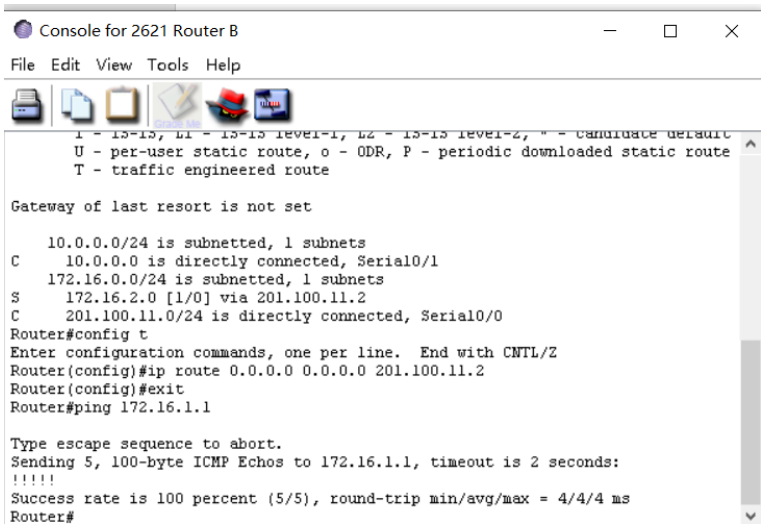
Ping

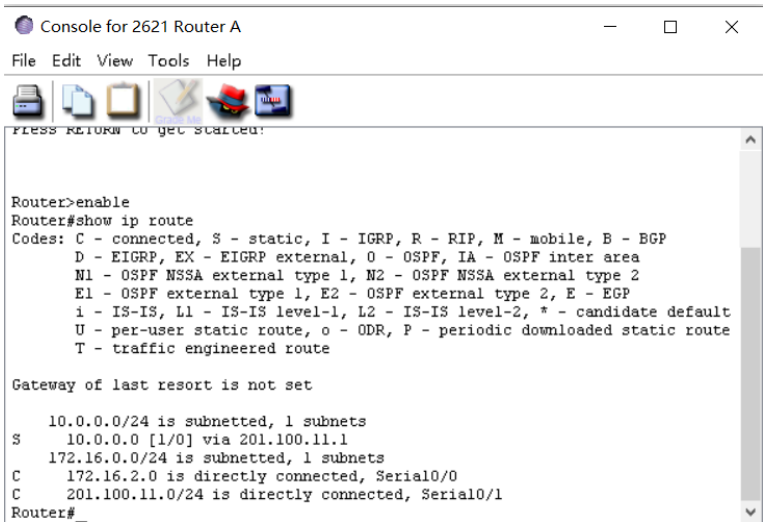


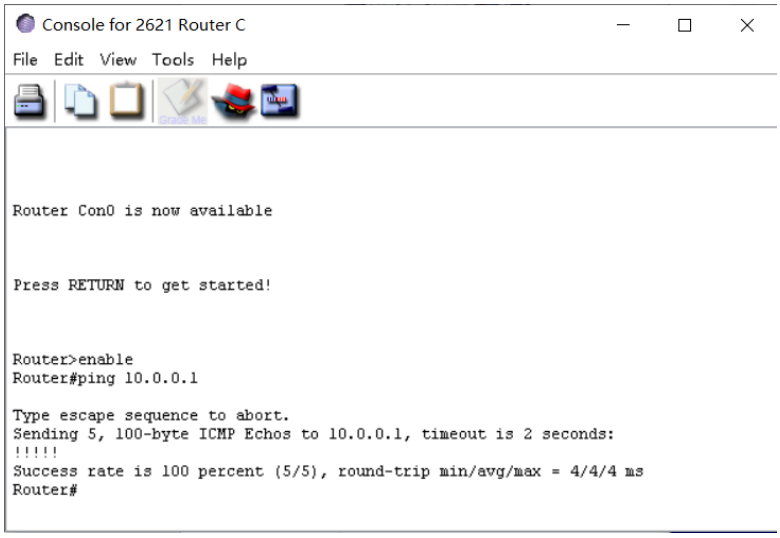
```
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 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, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

Gateway of last resort is not set
C     205.7.5.0/24 is directly connected, FastEthernet0/1
S     199.6.13.0 [1/0] via 201.100.11.2
C     201.100.11.0/24 is directly connected, Serial0/0
C     192.5.5.0/24 is directly connected, FastEthernet0/0


Router>enable
Router#ping 199.6.13.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 199.6.13.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
Router#
```

思考题：



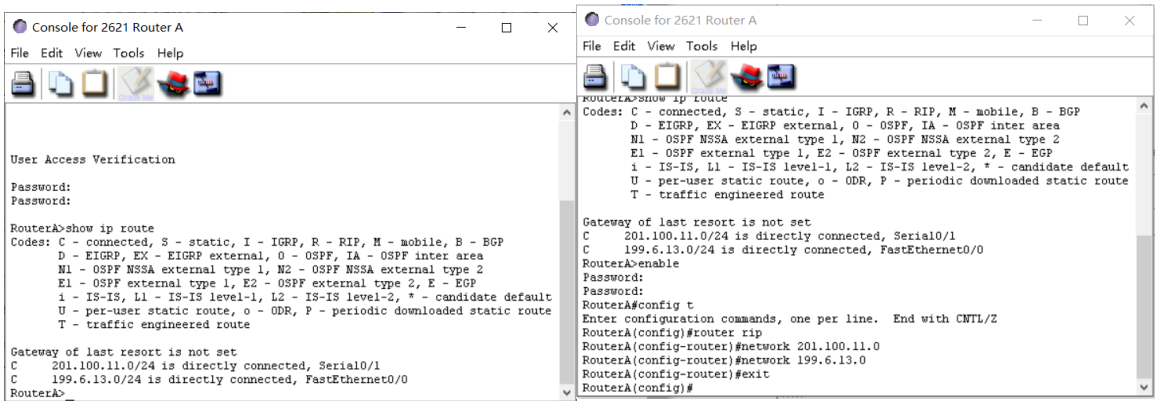


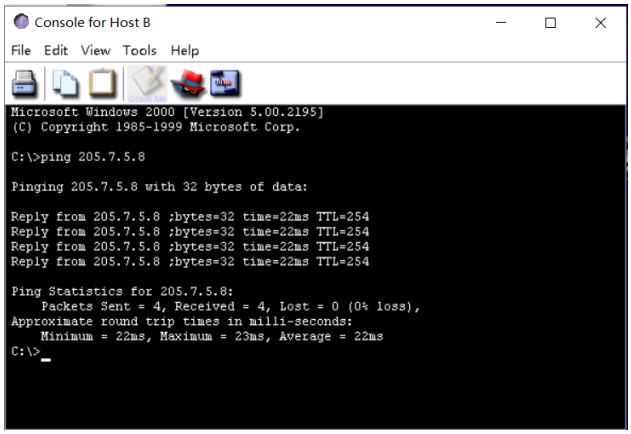

Console for 2621 Router A
File Edit View Tools Help
Press RETURN to get started!
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external 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, * - candidate default
U - per-user static route, o - ODR, P - periodic downloaded static route
T - traffic engineered route
Gateway of last resort is not set
10.0.0.0/24 is subnetted, 1 subnets
S 10.0.0.0 [1/0] via 201.100.11.1
172.16.0.0/24 is subnetted, 1 subnets
C 172.16.2.0 is directly connected, Serial0/0
C 201.100.11.0/24 is directly connected, Serial0/1
Router#_

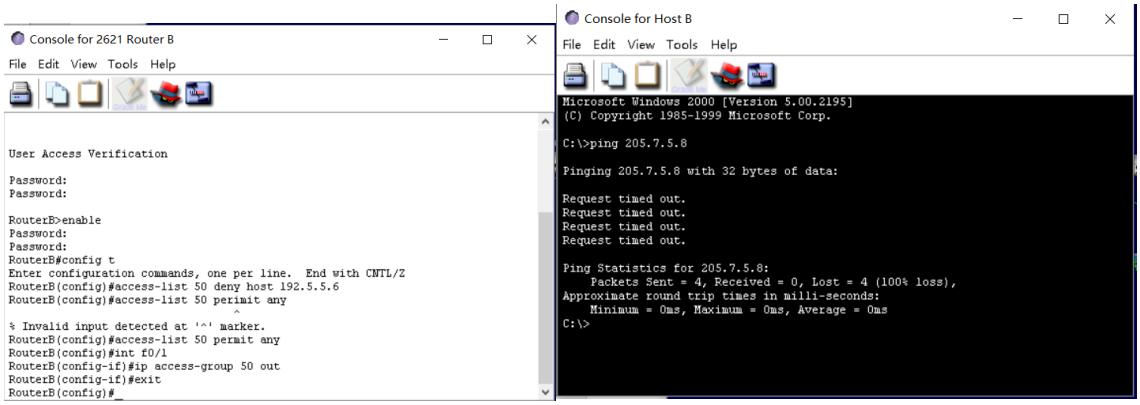

Console for 2621 Router C
File Edit View Tools Help
Router Con0 is now available
Press RETURN to get started!
Router>enable
Router#ping 10.0.0.1
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.1, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
Router#

5.5

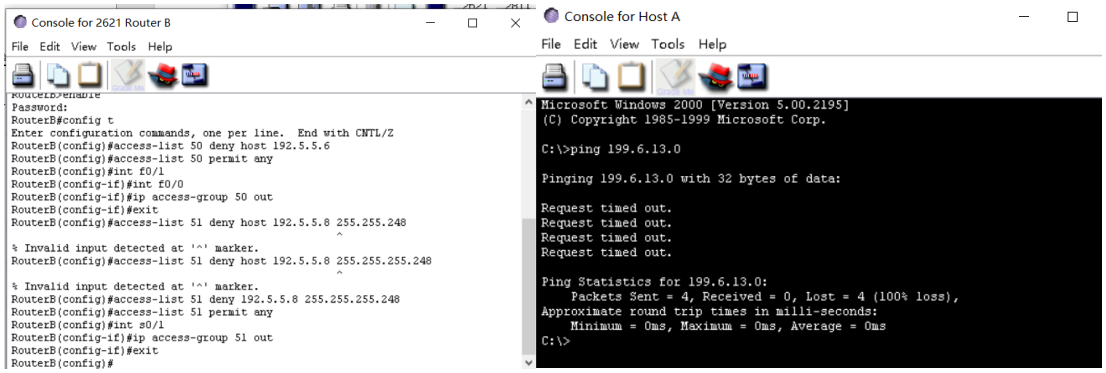
①


Console for 2621 Router A
File Edit View Tools Help
User Access Verification
Password:
Password:
RouterA>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, * - candidate default
U - per-user static route, o - ODR, P - periodic downloaded static route
T - traffic engineered route
Gateway of last resort is not set
C 201.100.11.0/24 is directly connected, Serial0/1
C 199.6.13.0/24 is directly connected, FastEthernet0/0
RouterA>_
Console for 2621 Router A
File Edit View Tools Help
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, * - candidate default
U - per-user static route, o - ODR, P - periodic downloaded static route
T - traffic engineered route
Gateway of last resort is not set
C 201.100.11.0/24 is directly connected, Serial0/1
C 199.6.13.0/24 is directly connected, FastEthernet0/0
RouterA>enable
Password:
Password:
RouterA#config t
Enter configuration commands, one per line. End with CNTL/Z
RouterA(config)#router rip
RouterA(config-router)#network 201.100.11.0
RouterA(config-router)#network 199.6.13.0
RouterA(config-router)#exit
RouterA(config)#





②

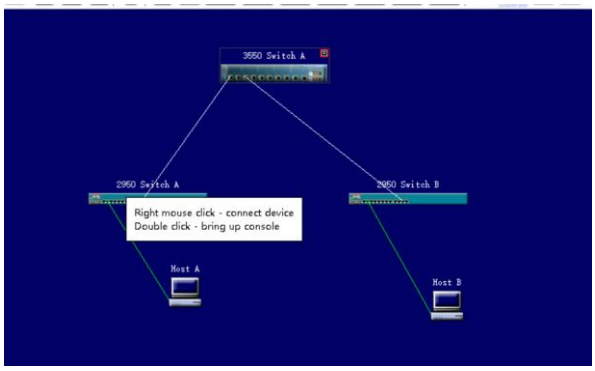


③

```
RouterA#config t
Enter configuration commands, one per line.  End with CNTL/Z
RouterA(config)#access-list 50 deny host 205.7.5.8
RouterA(config)#access-list 50 permit any
RouterA(config)#line vty 0 4
RouterA(config-line)#access-class 50 in
RouterA(config-line)#exit
RouterA(config)#
```

```
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>telnet 201.100.11.2
Connecting To 201.100.11.2 ...Could not open a connection to host: Connect failed

C:\>_
```

5.6



①

Console for 3550 Switch A

File Edit View Tools Help

```
switch>en
switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#hostname 3550A
3550A(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
3550A(config)#exit
3550A#sh vtp status
VTP Version                     : 2
Configuration Revision          : 1
Maximum VLANs supported locally : 64
Number of existing VLANs        : 5
VTP Operating Mode              : Server
VTP Domain Name                 : Cisco
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x70 0x01 0xF2 0x72 0x97 0xA1 0x35 0xEB
Configuration last modified by: 0.0.0.0 at 11-29-93 20:39:24
Local updater ID is 0.0.0.0 on interface Vl1 (lowest numbered VLAN interface
found)
3550A#
```

Console for 2950 Switch A

File Edit View Tools Help

```
switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#hostname 2950A
2950A(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
2950A(config)#vtp mode ?
  client       Set the device to client mode.
  server       Set the device to server mode.
  transparent  Set the device to transparent mode.

2950A(config)#vtp mode
% Incomplete command.
2950A(config)#vtp mode ?
  client       Set the device to client mode.
  server       Set the device to server mode.
  transparent  Set the device to transparent mode.

2950A(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950A(config)#exit
2950A#sh vtp status
VTP Version                     : 2
Configuration Revision          : 1
Maximum VLANs supported locally : 64
Number of existing VLANs        : 5
VTP Operating Mode              : Client
VTP Domain Name                 : Cisco
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
MD5 digest                      : 0x70 0x01 0xF2 0x72 0x97 0xA1 0x35 0xEB
Configuration last modified by: 2950 SwitchA at 11-29-93 20:39:24
Local updater ID is 2950 SwitchA on interface Vl1 (lowest numbered VLAN interfac
found)
2950A#
```

```
switch>en
switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#hostname 2950B
2950B(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
2950B(config)#vtp mde client
                  ^
% Invalid input detected at '^' marker.
2950B(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950B(config)#
```

②

```
3550A(config-if)#interface fa0/1
3550A(config-if)#switchport trunk encapsulation dot
3550A(config-if)#switchport mode trunk
3550A(config-if)#interface fa0/3
3550A(config-if)#switchport trunk encapsulation dot
3550A(config-if)#switchport mode trunk
3550A(config-if)#
```

```
2950B(config)#interface fa0/11
2950B(config-if)#switchport mode trunk
2950B(config-if)#
```

③

```
% Invalid input detected at '^' marker.
3550A(config)#exit
3550A#sh vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/2, Fa0/4, Fa0/5, Fa0/6
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
10   VLAN0010                         active
20   VLAN0020                         active
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active
```

④

```
2950A#config
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface fa0/2
2950A(config-if)#switchport access clan 10
                                    ^
% Invalid input detected at '^' marker.
2950A(config-if)#switchport access vlan 10
```

```
2950B>en
2950B#conf
Enter configuration commands, one per line.  End with CNTL/Z
2950B(config)#interface fa0/2
2950B(config-if)#switchport access vlan 20
2950B(config-if)#
```

⑤

```
3550A#conf
Enter configuration commands, one per line.  End with CNTL/Z
3550A(config)#ip address 10.10.10.1 255.255.255.0
               ^
% Invalid input detected at '^' marker.
3550A(config)#int vlan10
3550A(config-if)#ip address 10.10.10.1 255.255.255.0
3550A(config-if)#int vlan 20
3550A(config-if)#ip address 20.20.20.1 255.255.255.0
3550A(config-if)#no shut
3550A(config-if)#int vlan10
3550A(config-if)#no shut
3550A(config-if)#
```

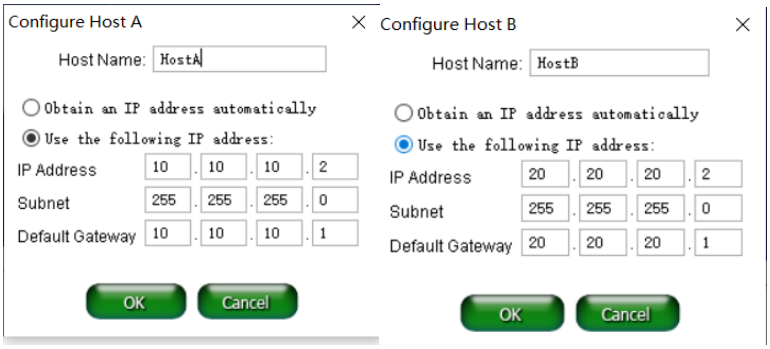
⑥

```
3550A(config)#int vlan 1
3550A(config-if)#ip address 192.168.10.1 255.255.255.0
3550A(config-if)#no shut
```

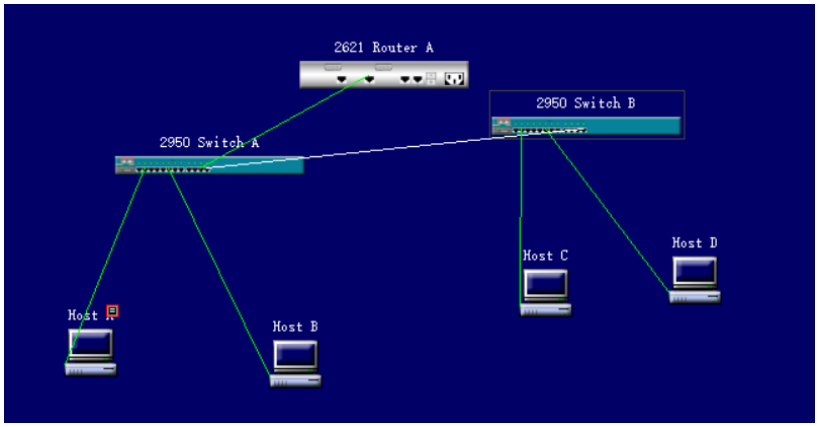
```
2950A(config-if)#int vlan 1
2950A(config-if)#ip address 192.168.10
                             ^
% Invalid input detected at '^' marker.
2950A(config-if)#ip address 192.168.10.2 255.255.255.0
2950A(config-if)#no shut
```

```
2950B(config-if)#int vlan 1
2950B(config-if)#ip address 192.168.10.3 255.255.255.0
2950B(config-if)#no shut
```

⑦




```
3550A#ping 192.168.10.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
3550A#ping 192.168.10.3

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms
3550A#
```



②

```
2950A>en
2950A#config
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface
% Incomplete command.
2950A(config)#interface fa0/12
2950A(config-if)#switchport mode trunk
2950A(config-if)#interface fa0/11
2950A(config-if)#switchport mode trunk
2950A(config-if)#exit
2950A(config)#
```

```
switch>en
switch#config
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#hostname 2950B
2950B(config)#interface fa0/12
2950B(config-if)#switchport mode trunk
2950B(config-if)#
```

③

```
% Unknown command or computer name, or unable
2950A#
2950A#vlan database
2950A(vlan)#vlan 2 name vlan2
VLAN 2 added:
    Name: vlan2
2950A(vlan)#vlan 3 name vlan3
VLAN 3 added:
    Name: vlan3
2950A(vlan)#exit
APPLY completed.
Exiting....
2950A#
```

④

```
% Unknown command or computer name, or unable to find computer add
2950A#conf t
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface fa0/2
2950A(config-if)#switchport access vlan 2
2950A(config-if)#switchport mode access
2950A(config-if)#interface fa0/6
2950A(config-if)#switchport access vlan 3
2950A(config-if)#switchport mode access
2950A(config-if)#
```

```
2950A(config)#exit
2950A#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/3, Fa0/4, Fa0/5
                                                Fa0/7, Fa0/8, Fa0/9, Fa0/10
2    vlan2                            active    Fa0/2
3    vlan3                            active    Fa0/6
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default                  active
1005 trnet-default                    active

VLAN Type  SAID       MTU   Parent RingNo BridgeNo Stp  BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
2    enet  100002     1500  -      -      -        -    -        0      0
3    enet  100003     1500  -      -      -        -    -        0      0
1002 fddi  101002     1500  -      -      -        -    -        0      0
1003 tr    101003     1500  -      -      -        -    -        0      0
1004 fdnet 101004     1500  -      -      -        ieee -        0      0
```

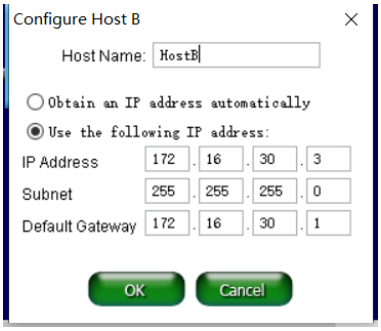
```
% Invalid input detected at '^' marker.
2950B(config-if)#exit
2950B(config)#vtp domain Test
Changing VTP domain name from NULL to Test
2950B(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950B(config)#_
```

```
2950B(config)#interface fa0/2
2950B(config-if)#switchport access vlan 2
2950B(config-if)#switchport mode access
2950B(config-if)#interface fa0/6
2950B(config-if)#switchport access vlan 3
2950B(config-if)#switchport mode access
2950B(config-if)#
```

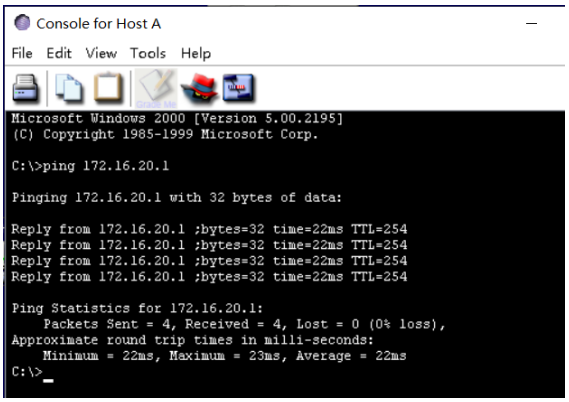
⑤

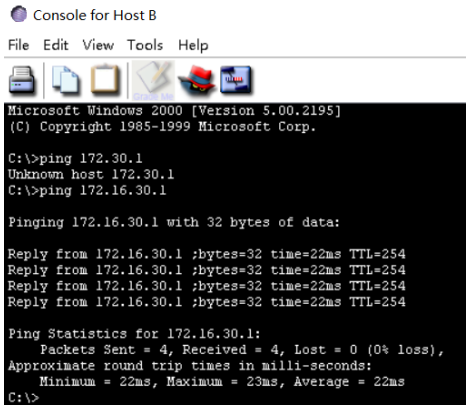
```
2621(config-subif)#encapsulation dotlq 1
2621(config-subif)#ip address 172.16.10.1 255.255.255.0
2621(config-subif)#interface f0/0.2
2621(config-subif)#encapsulation dotlq 2
2621(config-subif)#ip address 172.16.20.1 255.255.255.0
2621(config-subif)#interface f0/0.3
2621(config-subif)#encapsulation dotlq 3
2621(config-subif)#ip address 172.16.30.1 255.255.255.0
2621(config-subif)#_
```

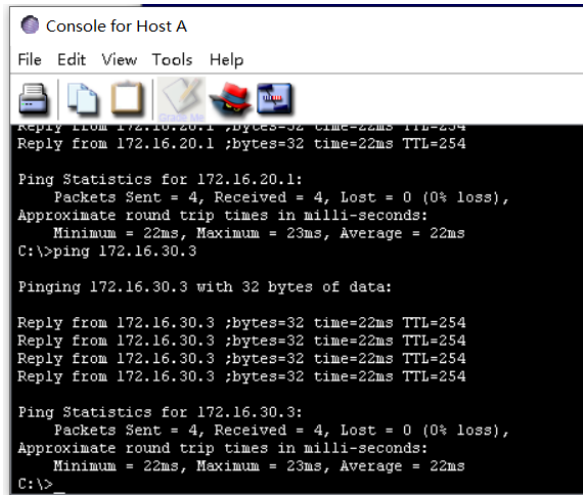
⑥



⑦







4 实验总结

学会了基础的配置路由方法，更加了解了路由器下一跳。