

廈門大學



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 2 班

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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）。

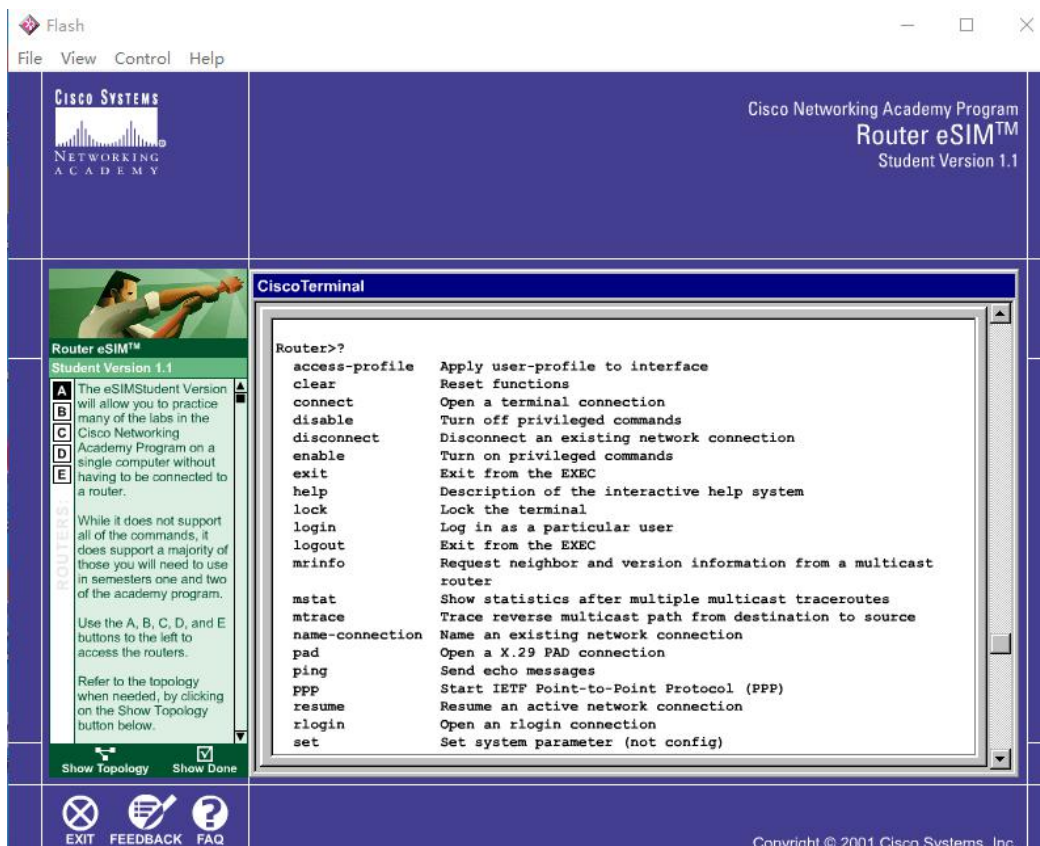
2 实验环境

操作环境：Router eSIM v1.1 模拟器、CCNA Network Visualizer 6.0

3 实验结果

1、Cisco IOS 的基本操作和路由器的常规配置：

(1) 以普通用户身份查看路由器状态，截图如下：

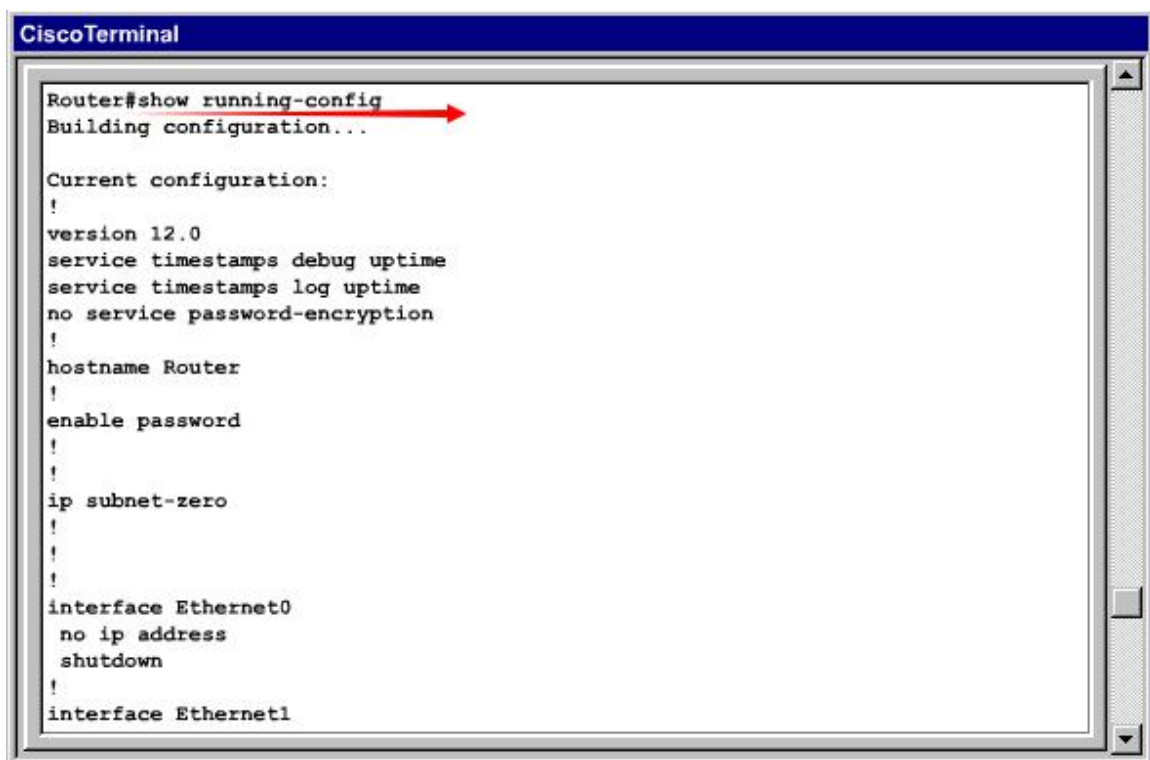


(2) 路由器配置模式切换，截图如下：

```
Router>
Router>
Router>enable
Router#
Router# disable
Router>enable
Router#
```

(2) 查看路由器运行状态，截图如下：

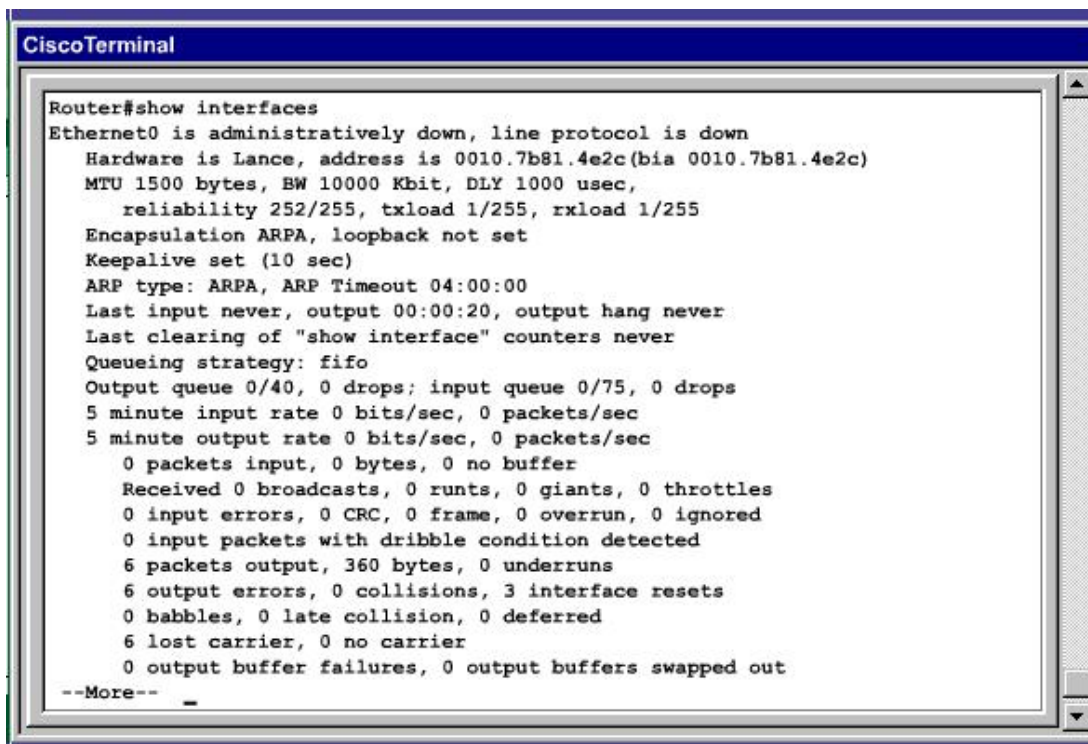
1.show running-config



```
CiscoTerminal
Router#show running-config
Building configuration...

Current configuration:
!
version 12.0
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
!
hostname Router
!
enable password
!
!
ip subnet-zero
!
!
!
interface Ethernet0
  no ip address
  shutdown
!
interface Ethernet1
```

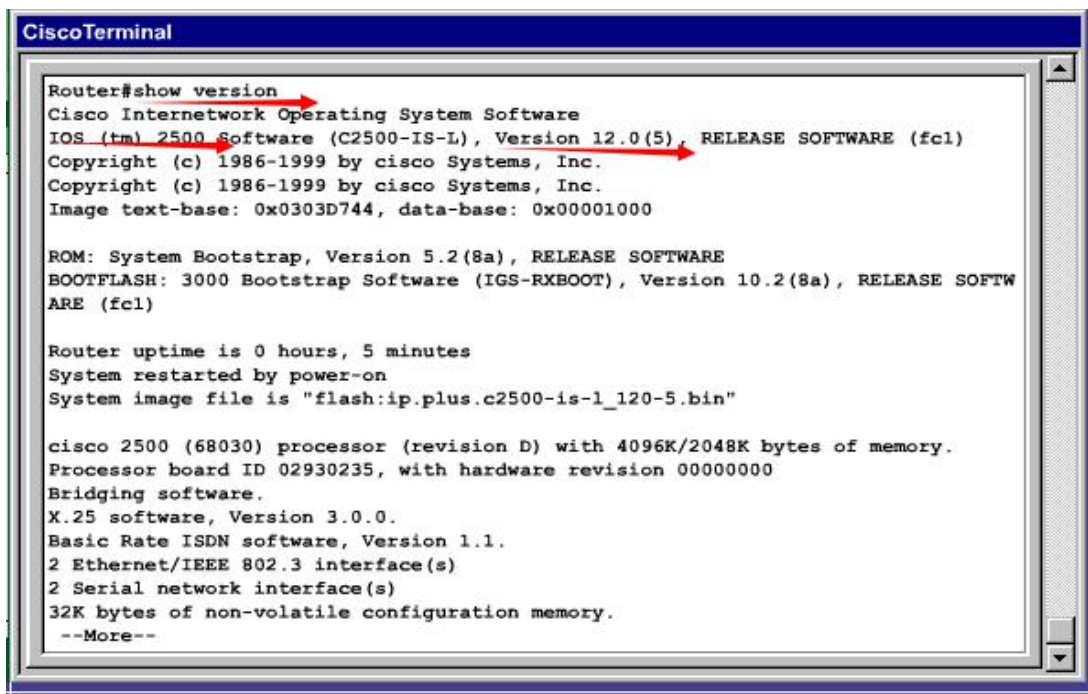
2.show interfaces



```
CiscoTerminal

Router#show interfaces
Ethernet0 is administratively down, line protocol is down
  Hardware is Lance, address is 0010.7b81.4e2c(bia 0010.7b81.4e2c)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
    reliability 252/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input never, output 00:00:20, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 0 drops; input queue 0/75, 0 drops
  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 input packets with dribble condition detected
    6 packets output, 360 bytes, 0 underruns
    6 output errors, 0 collisions, 3 interface resets
    0 babbles, 0 late collision, 0 deferred
    6 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
--More--
```

3.show version



```
CiscoTerminal

Router#show version
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-IS-L), Version 12.0(5), RELEASE SOFTWARE (fcl)
Copyright (c) 1986-1999 by cisco Systems, Inc.
Copyright (c) 1986-1999 by cisco Systems, Inc.
Image text-base: 0x0303D744, data-base: 0x00001000

ROM: System Bootstrap, Version 5.2(8a), RELEASE SOFTWARE
BOOTFLASH: 3000 Bootstrap Software (IGS-RXBOOT), Version 10.2(8a), RELEASE SOFTWARE (fcl)

Router uptime is 0 hours, 5 minutes
System restarted by power-on
System image file is "flash:ip.plus.c2500-is-l_120-5.bin"

cisco 2500 (68030) processor (revision D) with 4096K/2048K bytes of memory.
Processor board ID 02930235, with hardware revision 00000000
Bridging software.
X.25 software, Version 3.0.0.
Basic Rate ISDN software, Version 1.1.
2 Ethernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
32K bytes of non-volatile configuration memory.
--More--
```

(3) 路由器一些常规配置

1. 更改路由器名字，设置当日消息标题：

```
Router#
Router#config t
Enter configuration commands, one per line. End with END.
Router(config)#hostname lab A
lab_A(config)#banner motd #
Enter TEXT message. End with the character '#'.
You have entered a secured system.
Authorized access only' #
lab_A(config)#_
```

2. 建立 ip 地址映射表

```
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 233.8.151.1 204.204.7.1 199.6.13.2
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)#
```

3. 给路由器接口配置 ip 地址

```
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
```

4. 配置充当 DCE 端的串行端口，查看串口配置情况

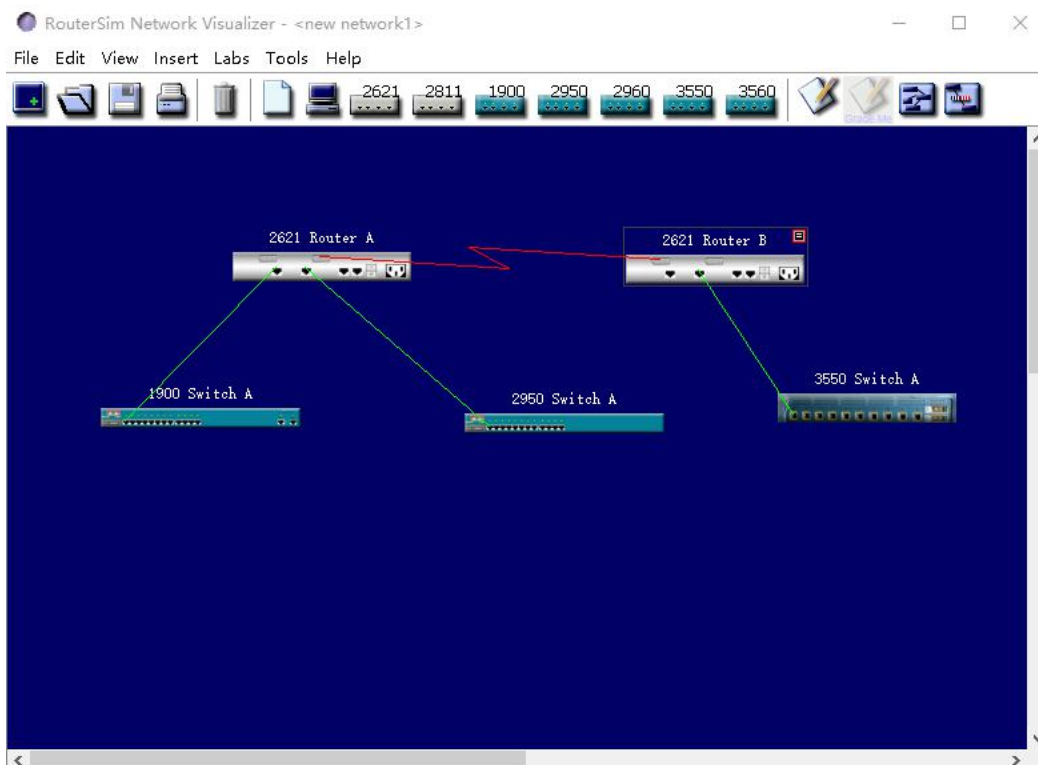
```
lab_A#config t
Enter configuration commands, one per line. End with END.
lab_A(config)#interface serial 0
lab_A(config-if)#clock rate 56000
```

```
CiscoTerminal

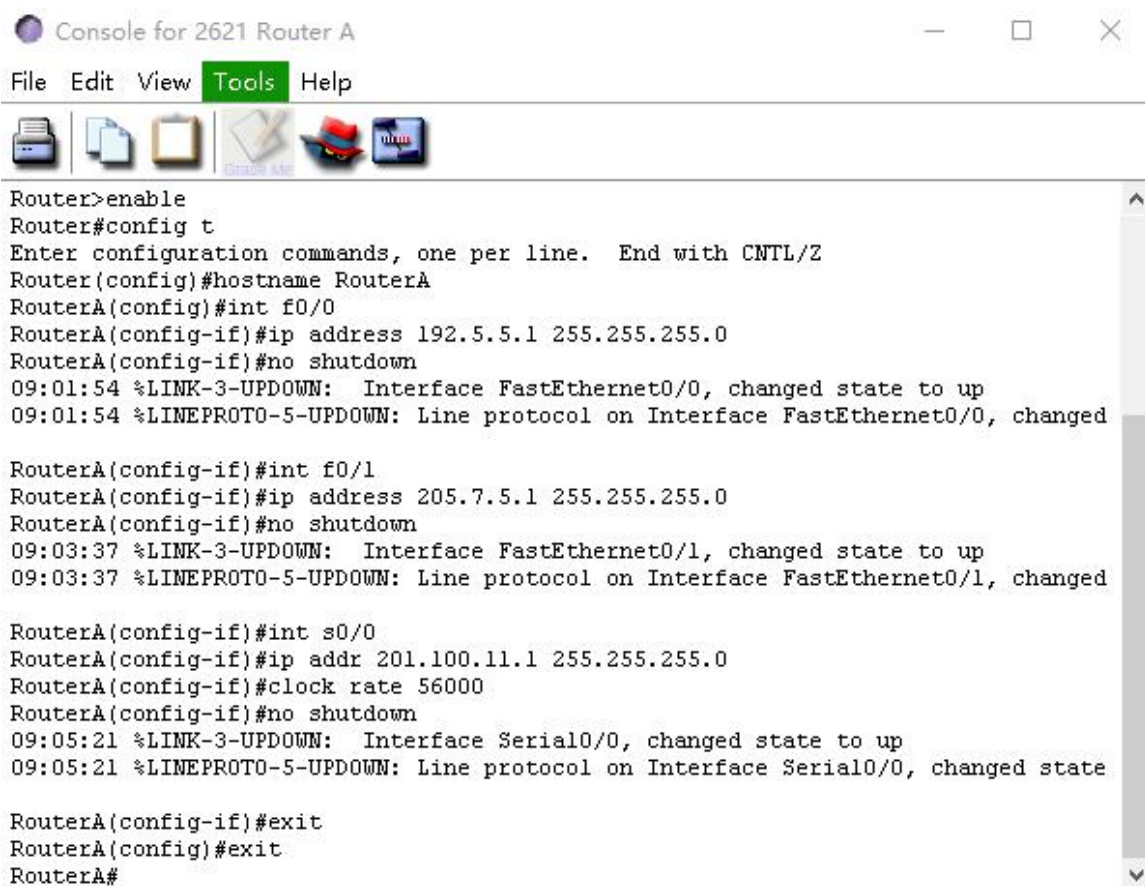
lab_A#show interface serial 0
Serial0 is administratively down, line protocol is down
 Internet address is 201.100.11.1/24
 Hardware is HD64570
 MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
   reliability 255/255, txload 1/255, rxload 1/255
 Encapsulation HDLC, loopback not set
 Keepalive set (10 sec)
 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--
```

2、静态路由配置

(1) 在模拟器上进行实验设备的连接



(2) 进行静态路由配置之前的工作



```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname RouterA
RouterA(config)#int f0/0
RouterA(config-if)#ip address 192.5.5.1 255.255.255.0
RouterA(config-if)#no shutdown
09:01:54 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
09:01:54 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

RouterA(config-if)#int f0/1
RouterA(config-if)#ip address 205.7.5.1 255.255.255.0
RouterA(config-if)#no shutdown
09:03:37 %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
09:03:37 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

RouterA(config-if)#int s0/0
RouterA(config-if)#ip addr 201.100.11.1 255.255.255.0
RouterA(config-if)#clock rate 56000
RouterA(config-if)#no shutdown
09:05:21 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
09:05:21 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state
to up

RouterA(config-if)#exit
RouterA(config)#exit
RouterA#_
```

Console for 2621 Router A

File Edit View Tools Help

RouterA console is now available

Press RETURN to get started!

```
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, Serial0/0
C    192.5.5.0/24 is directly connected, FastEthernet0/0
C    205.7.5.0/24 is directly connected, FastEthernet0/1
RouterA>
```

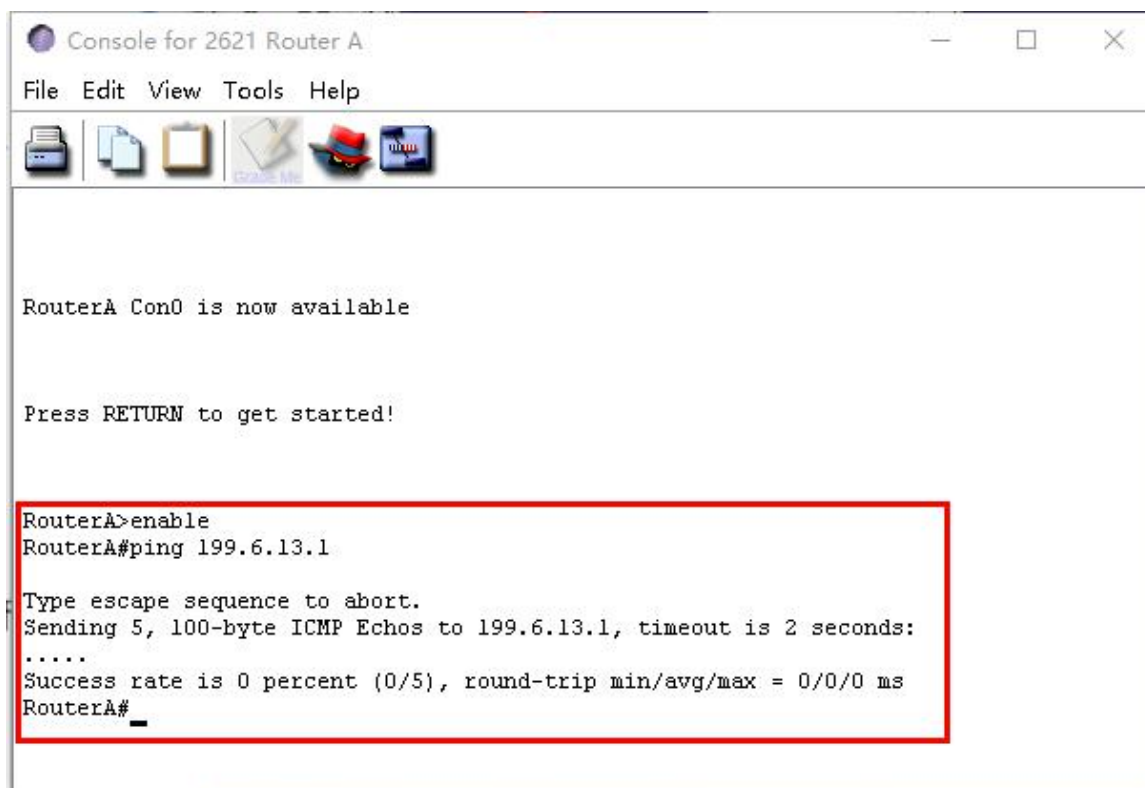
Console for 2621 Router B

File Edit View Tools Help

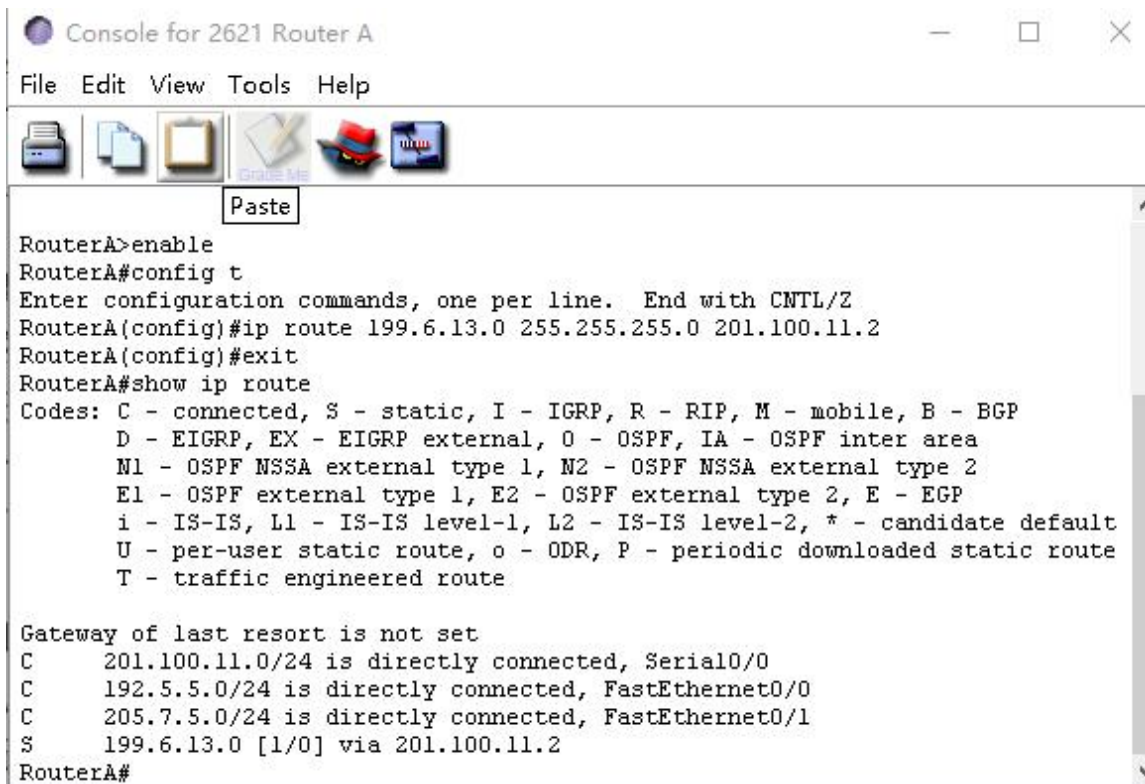
09:26:30 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up

```
RouterB(config-if)#show route
^
% Invalid input detected at '^' marker.
RouterB(config-if)#show ip route
^
% Invalid input detected at '^' marker.
RouterB(config-if)#exit
RouterB(config)#exit
RouterB#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

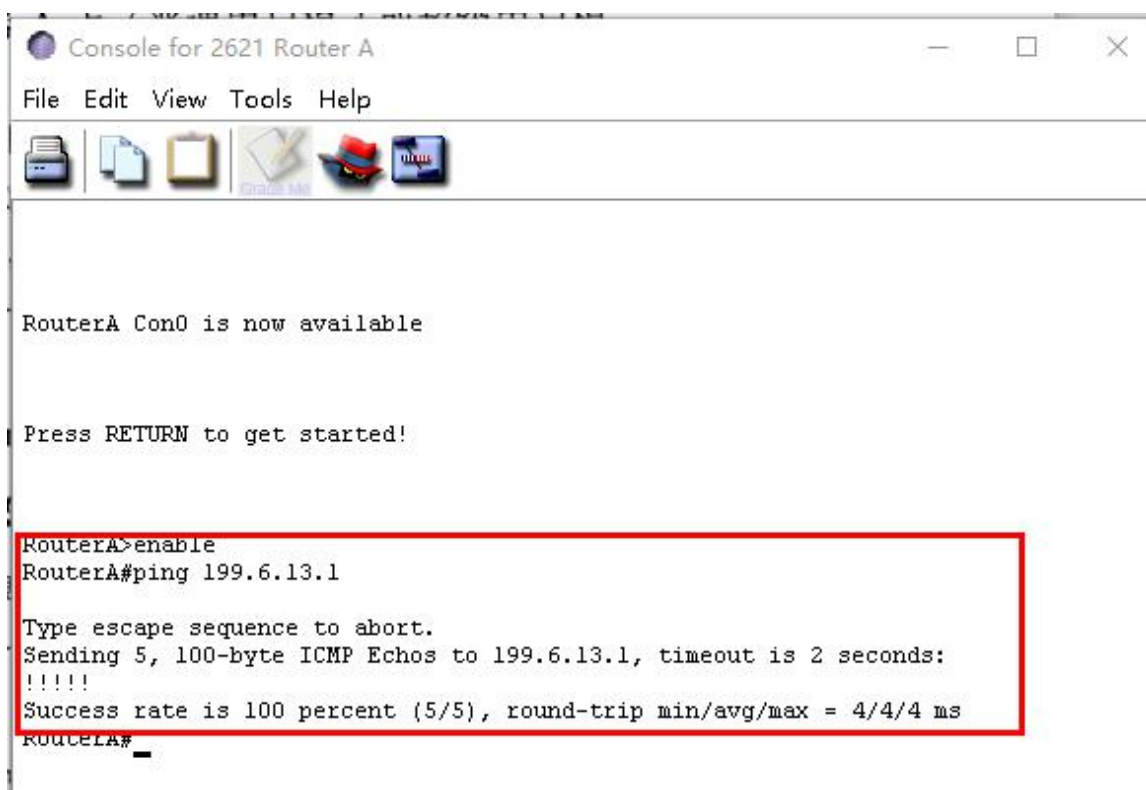
Gateway of last resort is not set
C    201.100.11.0/24 is directly connected, Serial0/1
C    199.6.13.0/24 is directly connected, FastEthernet0/0
RouterB#
```

(3) 配置静态路由



(4) 检验连通性



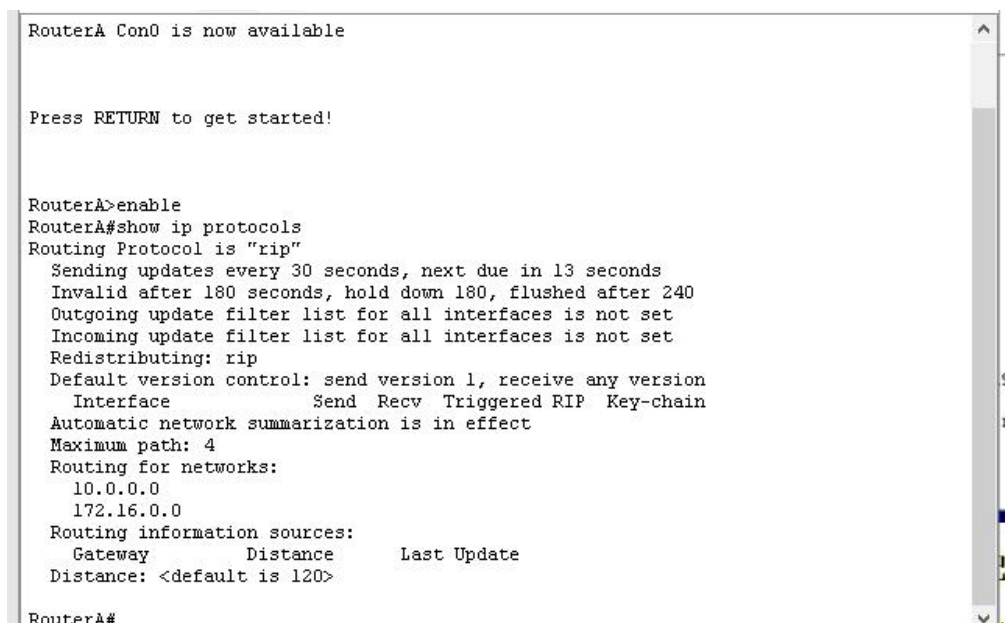
```
RouterA Con0 is now available

Press RETURN to get started!

RouterA>enable
RouterA#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
RouterA#
```

3、动态路由协议 RIP 的配置



```
RouterA Con0 is now available

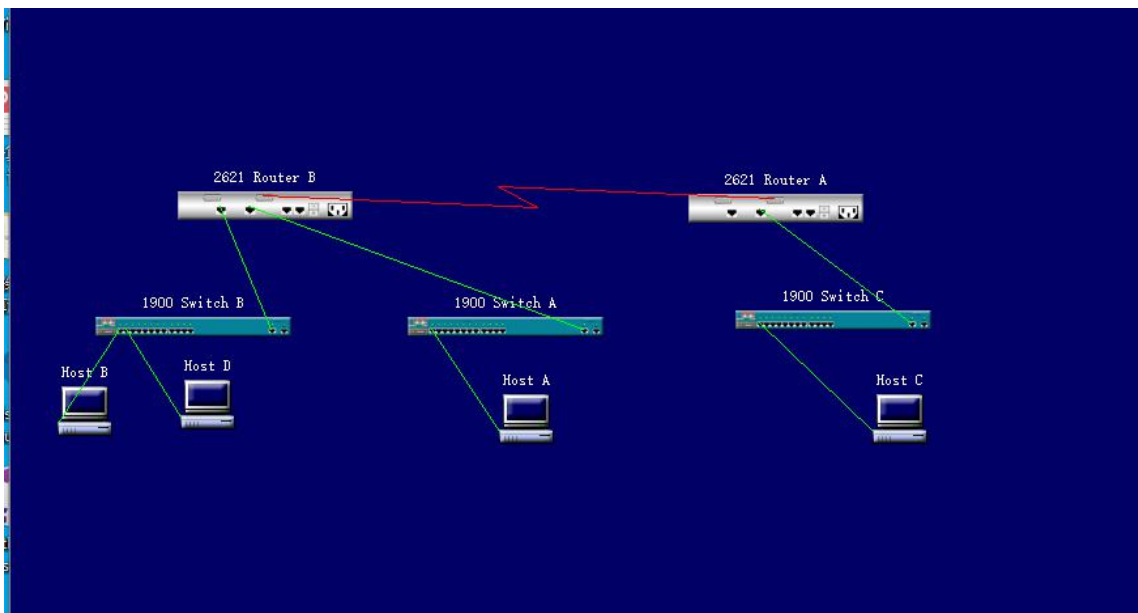
Press RETURN to get started!

RouterA>enable
RouterA#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 13 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set
  Redistributing: rip
  Default version control: send version 1, receive any version
    Interface          Send Recv Triggered RIP Key-chain
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for networks:
    10.0.0.0
    172.16.0.0
  Routing information sources:
    Gateway      Distance      Last Update
  Distance: <default is 120>

RouterA#
```

4、Cisco 路由器访问列表配置

(1) 实验环境配置



```

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname RouterA
RouterA(config)#line console 0
RouterA(config-line)#password koalaA
RouterA(config-line)#login
RouterA(config-line)#exit
RouterA(config)#line vty 0 4
RouterA(config-line)#password secret ciscoA
RouterA(config-line)#int f0/0
RouterA(config-if)#ip address 199.6.13.1 255.255.255.0
RouterA(config-if)#no shutdown
15:01:00 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
15:01:00 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

RouterA(config-if)#int s0/1
RouterA(config-if)#ip address 201.100.11.2 255.255.255.0
RouterA(config-if)#no shutdown
15:01:35 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
15:01:35 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up

RouterA(config-if)#

```


```
User Access Verification

Password:

RouterB>config t
^
% Invalid input detected at '^' marker.
RouterB>en
Password:
Password:
Password:
% Bad Secrets

RouterB>enable
Password:
RouterB#config t
Enter configuration commands, one per line. End with CNTL/Z
RouterB(config)#router rip
RouterB(config-router)#network 192.5.5.0
RouterB(config-router)#network 205.7.5.0
RouterB(config-router)#network 201.100.11.0
RouterB(config-router)#exit
RouterB(config)#
```

2.利用标准访问列表限制主机 HostB 访问 205.7.5.0



Console for 2621 Router B

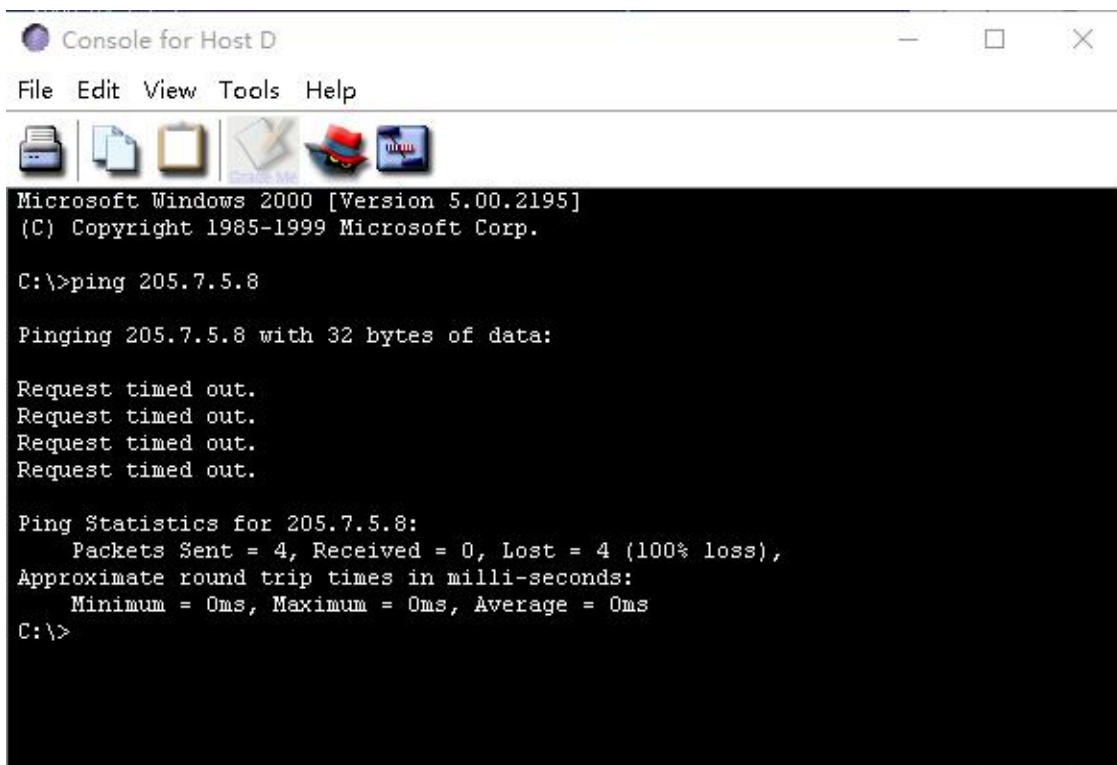
File Edit View Tools Help

Press RETURN to get started!

```
User Access Verification

Password:

RouterB>en
Password:
Password:
RouterB#config t
Enter configuration commands, one per line. End with CNTL/Z
RouterB(config)#access-list 50 deny host 192.5.5.6
RouterB(config)#access-list 50 permit any
RouterB(config)#int f0/1
RouterB(config-if)#ip access-group 50 out
RouterB(config-if)#exit
RouterB(config)#
```



```
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-1999 Microsoft Corp.

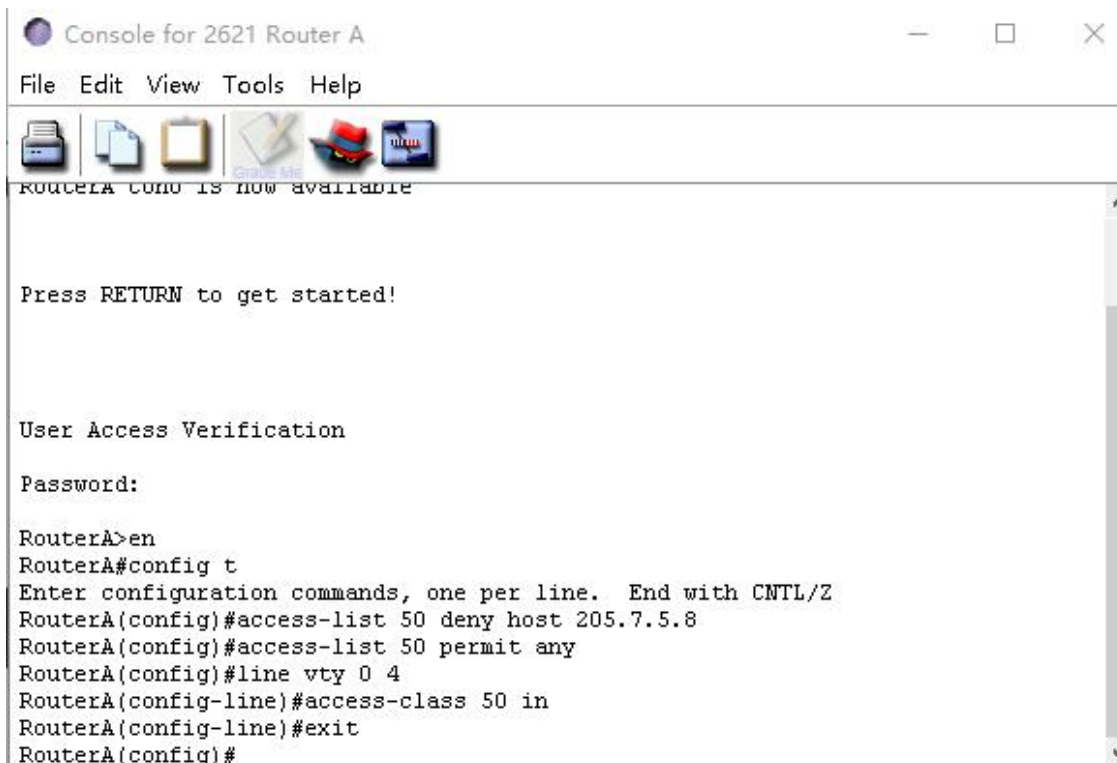
C:\>ping 205.7.5.8

Pinging 205.7.5.8 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping Statistics for 205.7.5.8:
    Packets Sent = 4, Received = 0, Lost = 4 (100% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

3.配置 Router A，使 Host A 不能 Telnet 到 Router A 上。



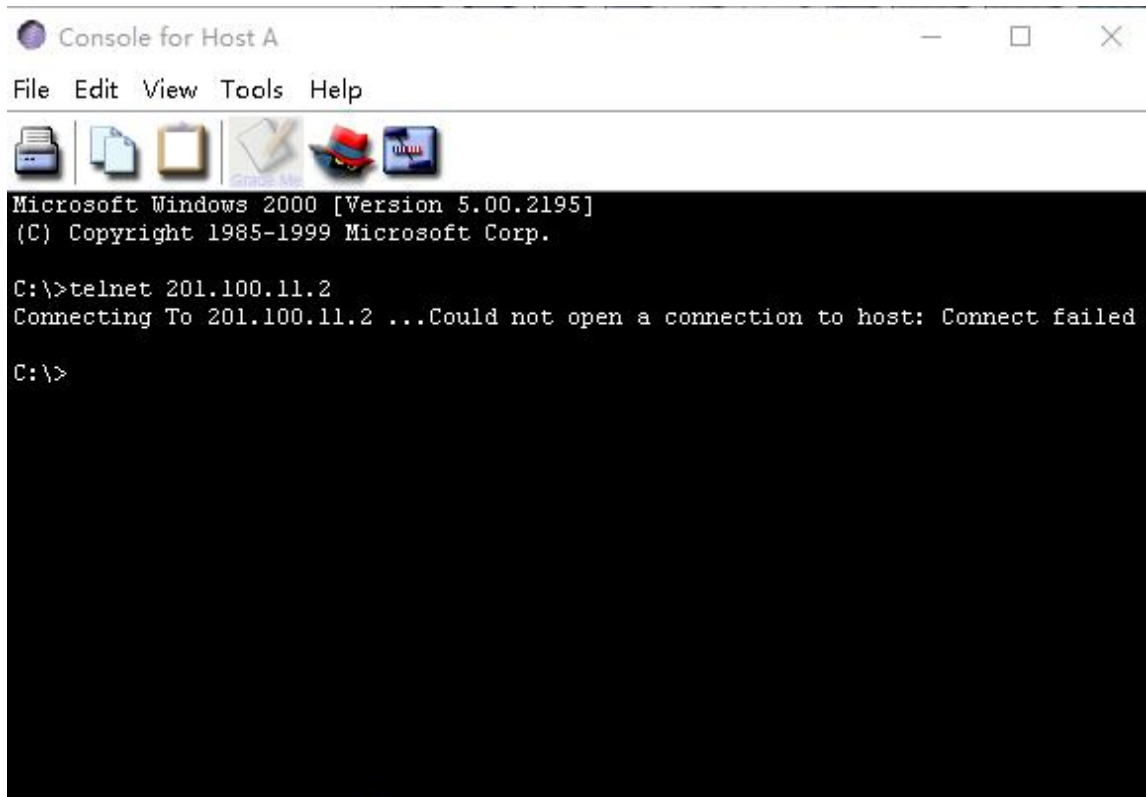
```
ROUTER1A CON0 IS NOW AVAILABLE

Press RETURN to get started!

User Access Verification

Password:

RouterA>en
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)#
```



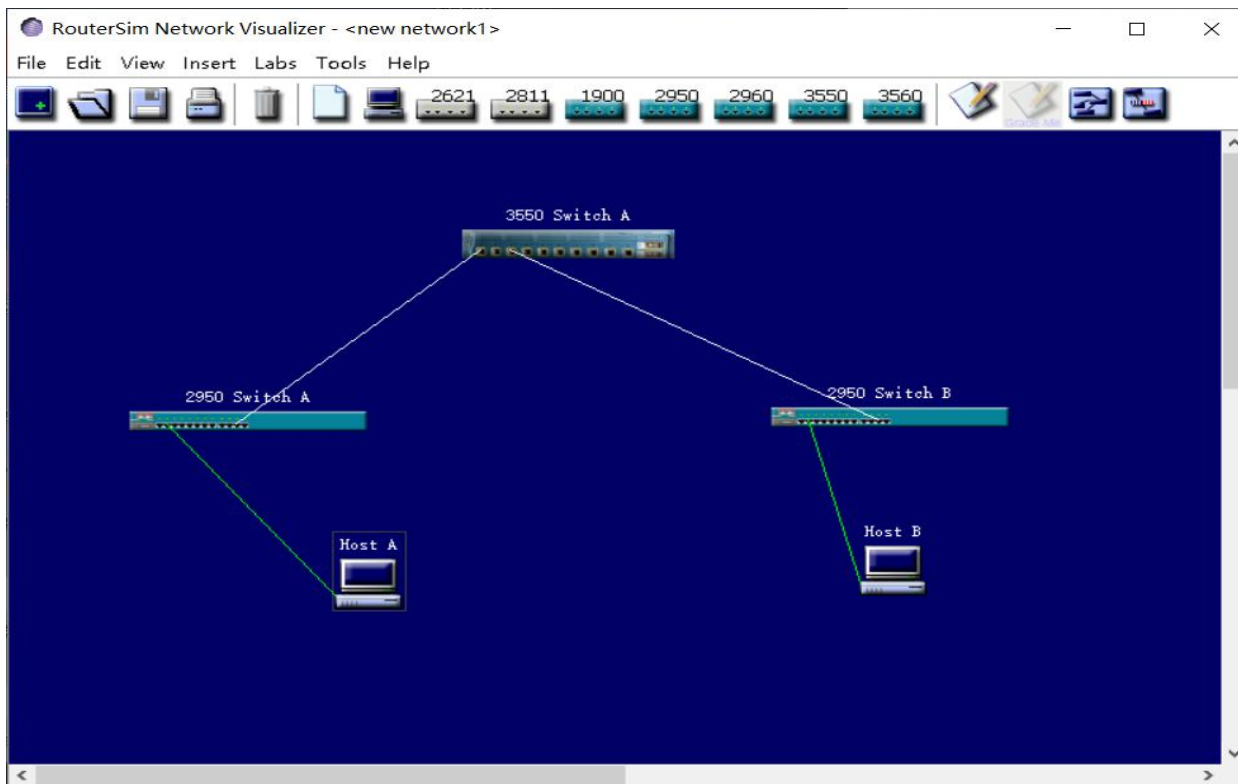
```
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-1999 Microsoft Corp.

C:\>telnet 201.100.11.2
Connecting To 201.100.11.2 ...Could not open a connection to host: Connect failed

C:\>
```


5、基于交换机端口的 VLAN 设置

(1) 实例一配置:



```
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 V11 (lowest numbered VLAN interface found)
3550A#
```

```
Console for 2950 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 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 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 V11 (lowest numbered VLAN interface found)
2950A#
```

```
Console for 2950 Switch B
File Edit View Tools Help

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 mode client
Setting device to VTP CLIENT mode.
2950B(config)#exit
2950B#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 SwitchB at 11-29-93 20:39:24
Local updater ID is 2950 SwitchB on interface V11 (lowest numbered VLAN interface found)
2950B#
```

2. 启动 Trunk:

```

3550A(config)#interface fa0/1
3550A(config-if)#switchport trunk encapsulation ?
    dot1q      Interface uses only 802.1q trunking encapsulation when trunking
    isl        Interface uses only ISL trunking encapsulation when trunking
    negotiate   Device will negotiate trunking encapsulation with peer on
                interface

3550A(config-if)#switchport trunk encapsulation dot1q
05:39:37: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state
to down
05:39:37: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
3550A(config-if)#switchport mode trunk
3550A(config-if)#interface fa0/3
3550A(config-if)#switchport trunk encapsulation dot1q
05:41:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state
to down
05:41:12: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
3550A(config-if)#switchport mode trunk

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

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

```

3. 创建 VLAN

```

3550A(config)#vlan 10
3550A(config-vlan)#vlan 20
3550A(config-vlan)#exit
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	

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
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

4.分配交换机端口加入 VLAN:

```
2950A(config)#interface fa0/2
2950A(config-if)#switchport access vlan 10
2950B(config)#interface fa0/2
2950B(config-if)#switchport access vlan 20
```

5.配置第三层交换机:

```
3550A(config)#int vlan 10
3550A(config-if)#ip address 10.10.10.1 255.255.255.0
3550A(config-if)#no shut
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)#exit
```

6.配置各交换机的管理地址:

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

2950A(config)#int vlan 1
2950A(config-if)#ip address 192.168.10.2 255.255.255.0
2950A(config-if)#no shut

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

7.配置主机 Host A 和 Host B:

Configure Host A	Configure Host B
Host Name: <input type="text" value="Host A"/>	Host Name: <input type="text" value="Host B"/>
<input type="radio"/> Obtain an IP address automatically	<input type="radio"/> Obtain an IP address automatically
<input checked="" type="radio"/> Use the following IP address:	<input checked="" type="radio"/> Use the following IP address:
IP Address: <input type="text" value="10"/> . <input type="text" value="10"/> . <input type="text" value="10"/> . <input type="text" value="2"/>	IP Address: <input type="text" value="20"/> . <input type="text" value="20"/> . <input type="text" value="20"/> . <input type="text" value="2"/>
Subnet: <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="0"/>	Subnet: <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="255"/> . <input type="text" value="0"/>
Default Gateway: <input type="text" value="10"/> . <input type="text" value="10"/> . <input type="text" value="10"/> . <input type="text" value="1"/>	Default Gateway: <input type="text" value="20"/> . <input type="text" value="20"/> . <input type="text" value="20"/> . <input type="text" value="1"/>
<input type="button" value="OK"/> <input type="button" value="Cancel"/>	<input type="button" value="OK"/> <input type="button" value="Cancel"/>

8.验证连通性

交换机上:

```
3550A>en
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
```

主机 Host A ping 主机 Host B:

```
C:\>ping 20.20.20.2

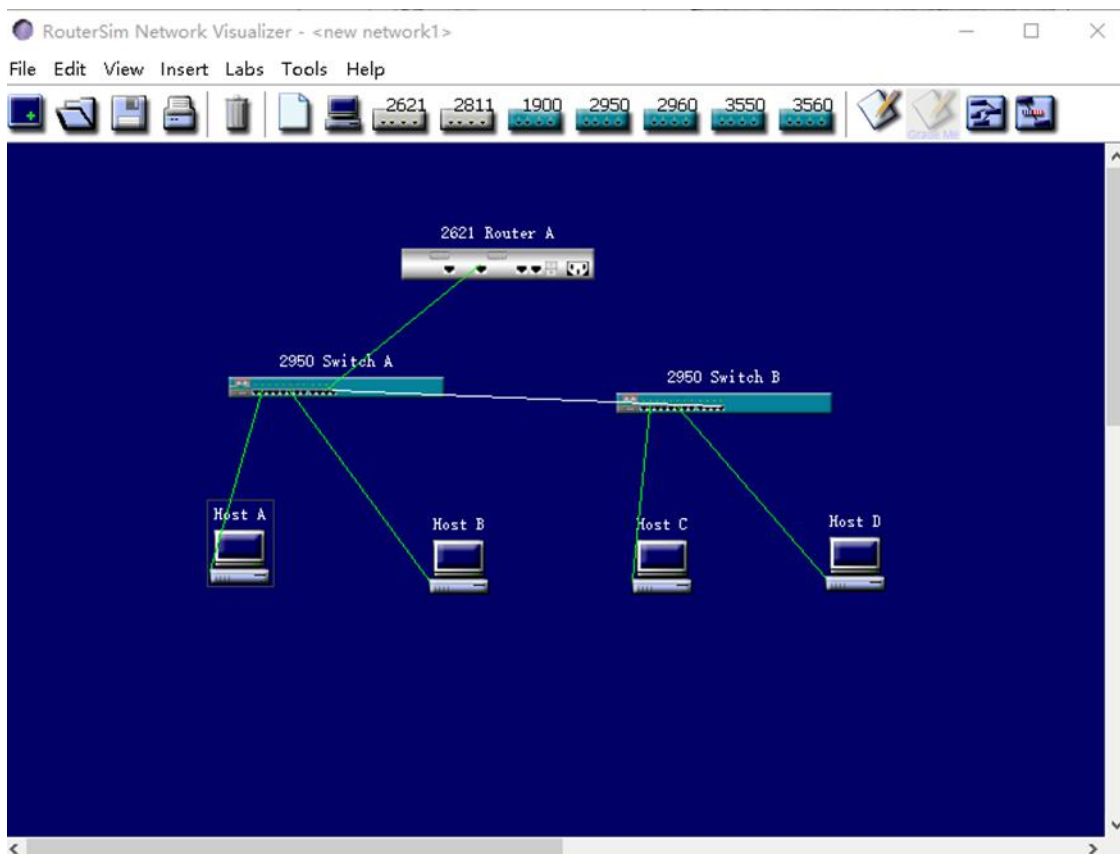
Pinging 20.20.20.2 with 32 bytes of data:

Reply from 20.20.20.2 :bytes=32 time=22ms TTL=254
Reply from 20.20.20.2 :bytes=32 time=22ms TTL=254
Reply from 20.20.20.2 :bytes=32 time=22ms TTL=254
Reply from 20.20.20.2 :bytes=32 time=22ms TTL=254

Ping Statistics for 20.20.20.2:
    Packets Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms
```

(2) 实例二:

1.配置:



```

Console for 2950 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 2950A
2950A(config)#vtp domain Test
Changing VTP domain name from NULL to Test
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 server
Device mode already VTP SERVER.
2950A(config)#exit
2950A#show 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             : Test
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 V11 (lowest numbered VLAN interface found)
2950A#

```


2.启动 Trunk:

```

switch>en
switch#conf t
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)#exit
2950B(config)#_

2950A#config t
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface fa0/12
2950A(config-if)#switchport mode?
mode
2950A(config-if)#switchport mode ?
access    Set trunking mode to ACCESS unconditionally
dynamic   Set trunking mode to dynamically negotiate access or trunk mode
trunk     Set trunking mode to TRUNK unconditionally

2950A(config-if)#switchport mode trunk
2950A(config-if)#interface fa0/11
2950A(config-if)#switchport mode trunk
2950A(config-if)#exit
2950A(config)#

```

3.创建 VLAN:

```

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.

```

4.分配端口到 VLAN:

将 2950A 的端口加入 VLAN:

```

2950A#config t
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface fastethernet 0/2
2950A(config-if)#switchport access vlan 2
2950A(config-if)#switchport mode access
2950A(config-if)#interface fastethernet 0/6
2950A(config-if)#switchport access vlan 3
2950A(config-if)#switchport mode access

```

```
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
1005	trnet	101005	1500	-	-	-	ibm	-	0	0

--More--

5.配置 VLAN 之间的路由:

```
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname R2621
R2621(config)#interface fastethernet 0/0
R2621(config-if)#no ip address
R2621(config-if)#no shutdown
06:31:07 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
06:31:07 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

R2621(config-if)#interface fastethernet 0/0.1
R2621(config-subif)#encapsulation dot1q 1
R2621(config-subif)#ip address 172.16.10.1 255.255.255.0
R2621(config-subif)#interface fastethernet 0/0.2
R2621(config-subif)#encapsulation dot1q 2
R2621(config-subif)#ip address 172.16.20.1 255.255.255.0
R2621(config-subif)#interface fastethernet 0/0.3
R2621(config-subif)#encapsulation dot1q 3
R2621(config-subif)#ip address 172.16.30.1 255.255.255.0
R2621(config-subif)#exit
R2621(config)#
```

6.验证连通性:

在属于 VLAN2 的 Host A 上 ping172.16.20.1:

```
C:\>ping 172.16.20.1

Pinging 172.16.20.1 with 32 bytes of data:

Reply from 172.16.20.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.20.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.20.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.20.1 :bytes=32 time=22ms TTL=254

Ping Statistics for 172.16.20.1:
    Packets Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms
```

在属于 VLAN3 的 Host B 上 ping172.16.30.1:

```
C:\>ping 172.16.30.1

Pinging 172.16.30.1 with 32 bytes of data:

Reply from 172.16.30.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.1 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.1 :bytes=32 time=22ms TTL=254

Ping Statistics for 172.16.30.1:
    Packets Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms
```

在 Host A 上 ping Host B:

```
C:\>ping 172.16.30.3

Pinging 172.16.30.3 with 32 bytes of data:

Reply from 172.16.30.3 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.3 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.3 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.3 :bytes=32 time=22ms TTL=254

Ping Statistics for 172.16.30.3:
    Packets Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 22ms, Maximum = 23ms, Average = 22ms
```

在 Host a 上 ping Host b:

```
C:\>ping 172.16.30.5

Pinging 172.16.30.5 with 32 bytes of data:

Reply from 172.16.30.5 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.5 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.5 :bytes=32 time=22ms TTL=254
Reply from 172.16.30.5 :bytes=32 time=22ms TTL=254

Ping Statistics for 172.16.30.5:
    Packets Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 22ms, Maximum = 23ms, Average = 22ms
```

4 实验总结

学习了使用 Router eSIM v1.1 模拟器来模拟路由器的配置环境；了解并使用 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）。对交换机，路由器的接口及其配置有了更为深入的了解，对数据如何在主机，交换机及路由器进行交换转发有了进一步的认识。