

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

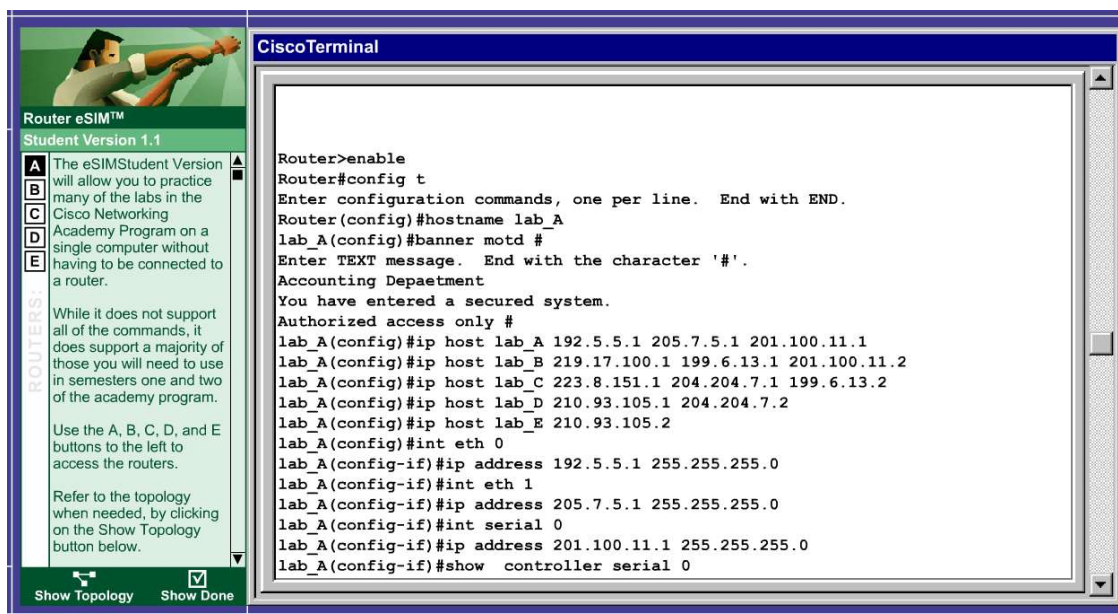
Router eSIM v1.1 模拟器；CCNA Network Visualizer 6.0

3 实验结果

5.2 CISCO IOS 的基本操作

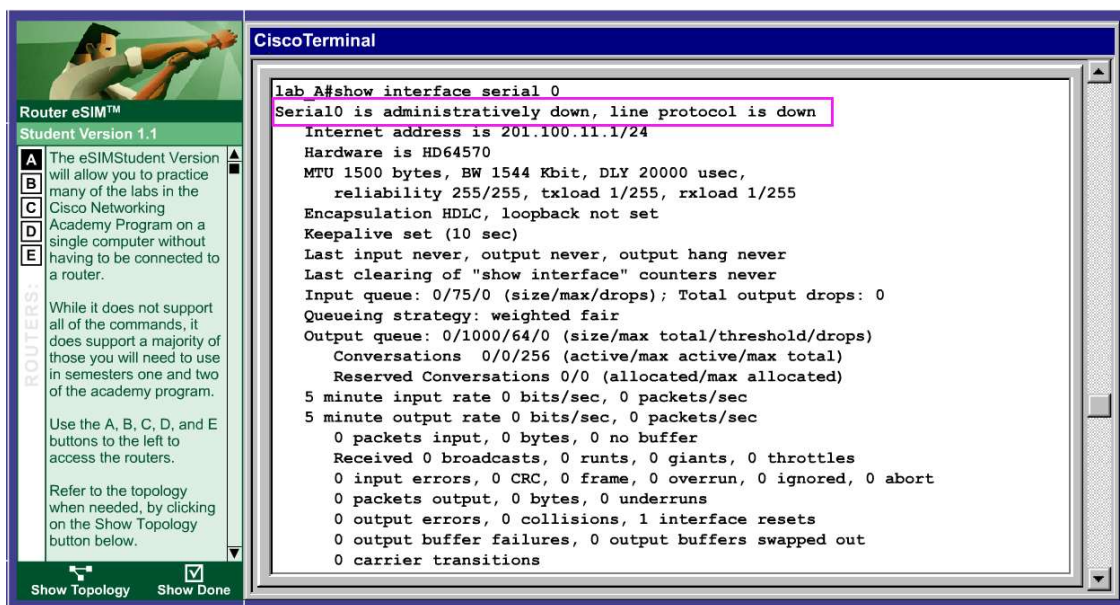
在路由器内建立一个 IP 地址的映射表，静态指定机器名与 IP 地址的映射关系。

为路由器的一个接口配置 IP 地址。

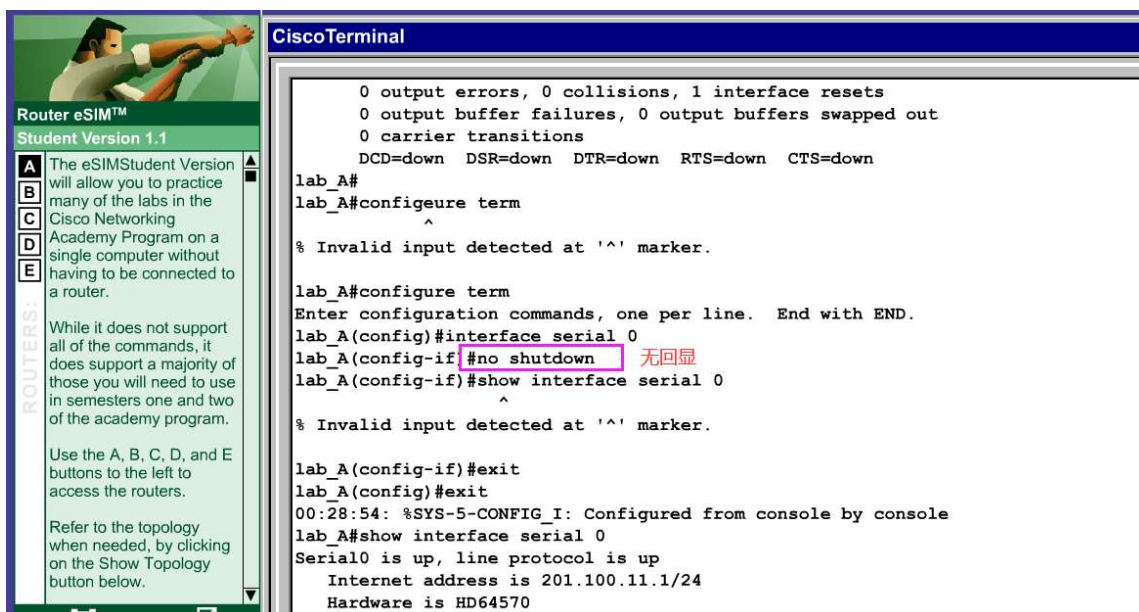


用 show 命令来查看串口的配置情况。

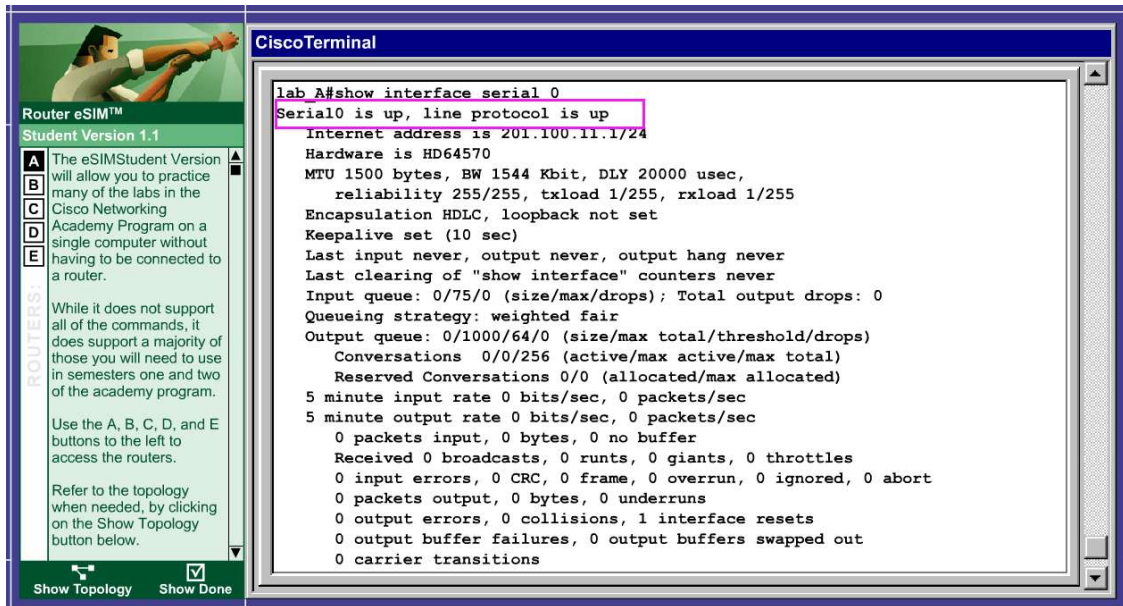
回显的第一行显示了网络的工作状态：管理员手动关闭该端口。



键入 `no shutdown` 手工开启端口，在模拟软件输入这两条命令之后路由器是没有回显的。

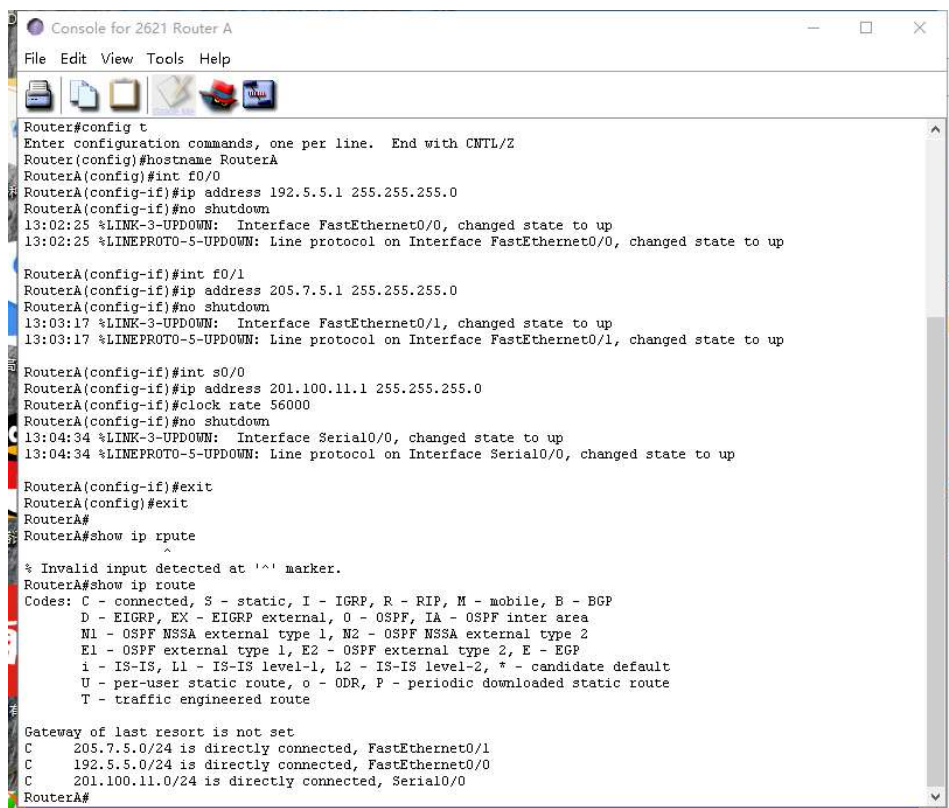


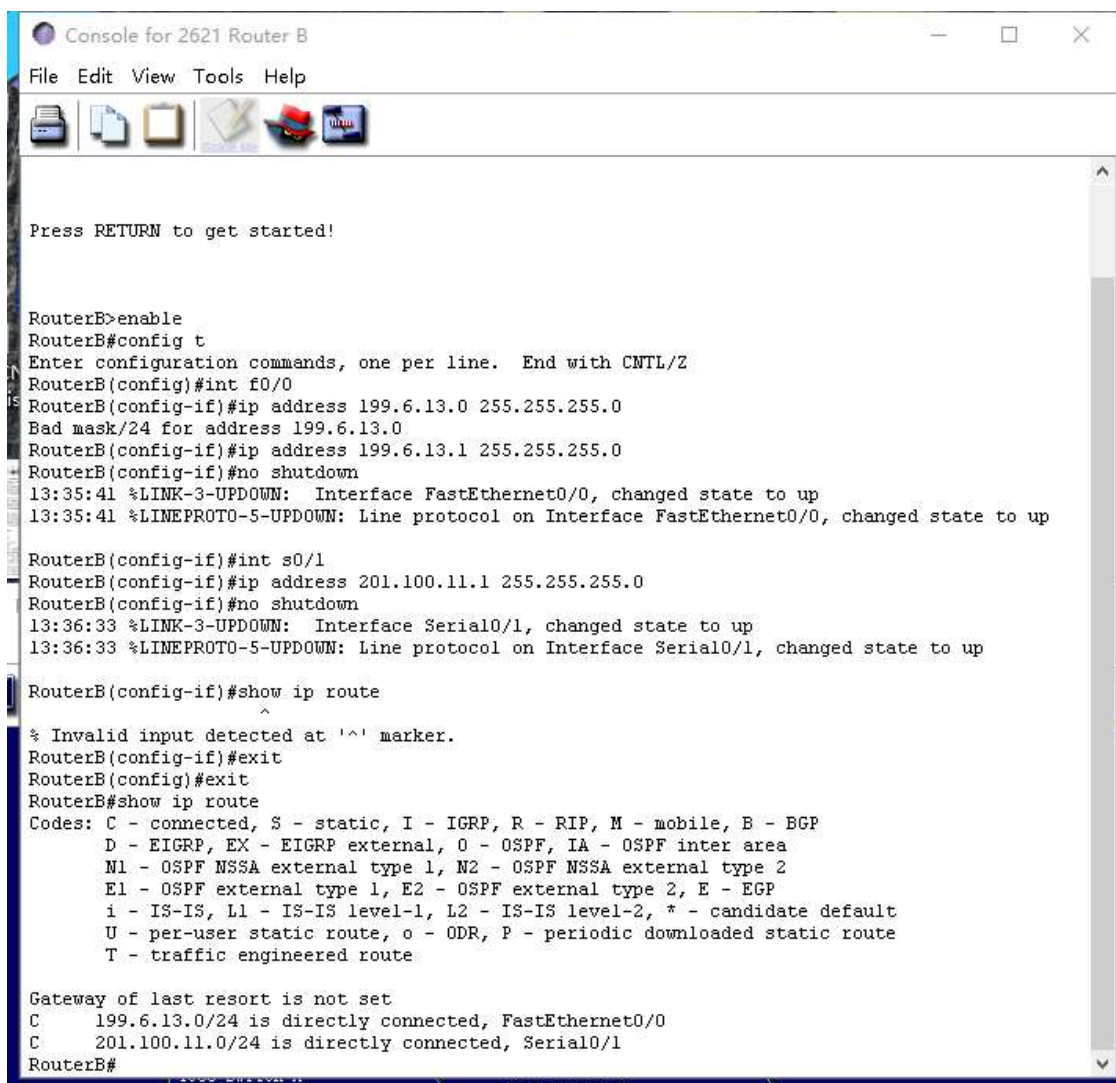
回显的第一行显示了网络的工作状态：接口工作正常。



5.3 静态路由配置

配置 RouterA RouterB





```

Console for 2621 Router B
File Edit View Tools Help

Press RETURN to get started!

RouterB>enable
RouterB#config t
Enter configuration commands, one per line. End with CNTL/Z
RouterB(config)#int f0/0
RouterB(config-if)#ip address 199.6.13.0 255.255.255.0
Bad mask/24 for address 199.6.13.0
RouterB(config-if)#ip address 199.6.13.1 255.255.255.0
RouterB(config-if)#no shutdown
13:35:41 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
13:35:41 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

RouterB(config-if)#int s0/1
RouterB(config-if)#ip address 201.100.11.1 255.255.255.0
RouterB(config-if)#no shutdown
13:36:33 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
13:36:33 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up

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    199.6.13.0/24 is directly connected, FastEthernet0/0
C    201.100.11.0/24 is directly connected, Serial0/1
RouterB#

```

在 Router A 上,通过 ping 命令测试到路由器 Router B 的直连网络地址 199.6.13.1 是否连通。


```
Console for 2621 Router A
File Edit View Tools Help

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 0 percent (0/5), round-trip min/avg/max = 0/0/0 ms
RouterA#
```

配置静态路由。

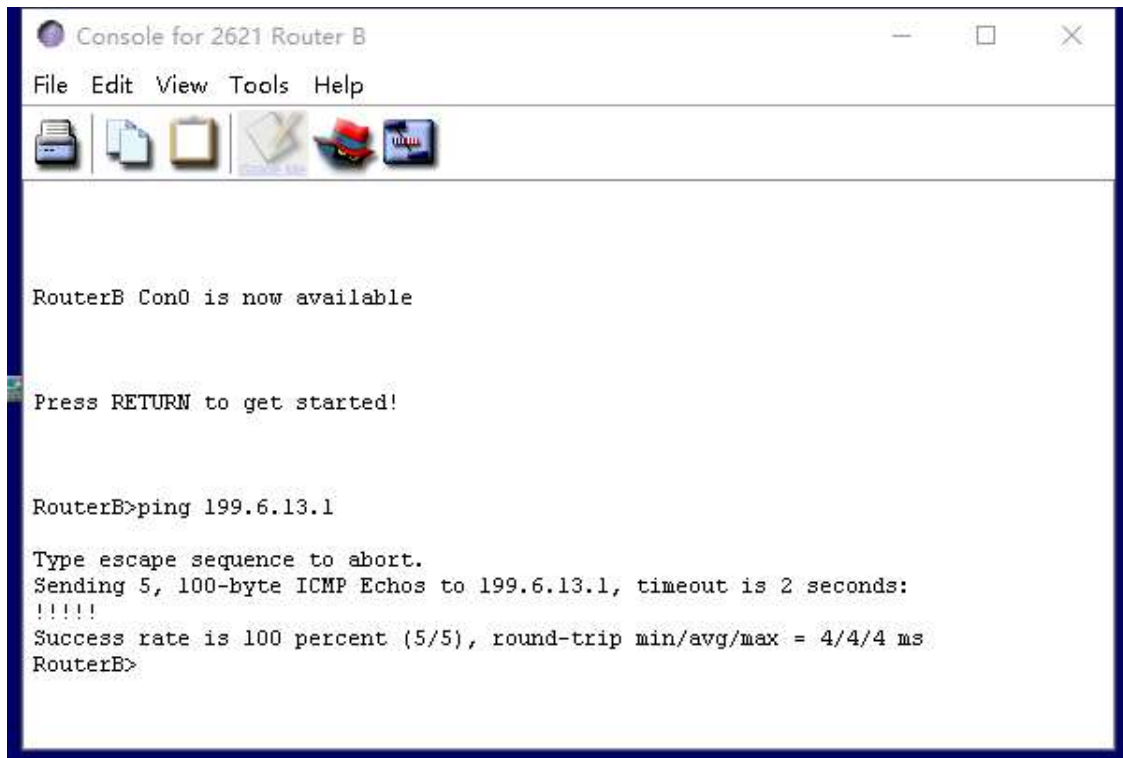
```
Console for 2621 Router A
File Edit View Tools Help

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
S    199.6.13.0 [1/0] via 201.100.11.2
RouterA>
```

检验连通性。



```
RouterB Con0 is now available

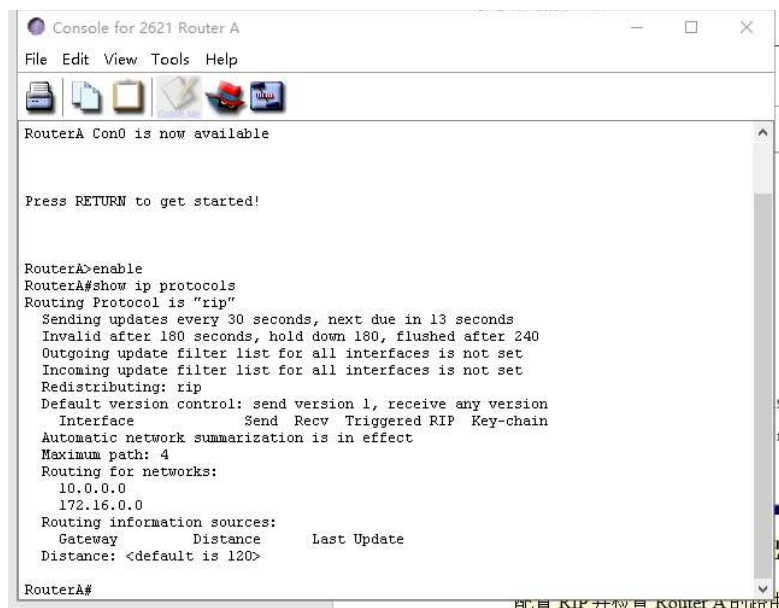
Press RETURN to get started!

RouterB>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
RouterB>
```

5.4 动态路由协议 RIP 的配置

配置 RIP 并检查 Router A 的路由表。



```
RouterA Con0 is now available

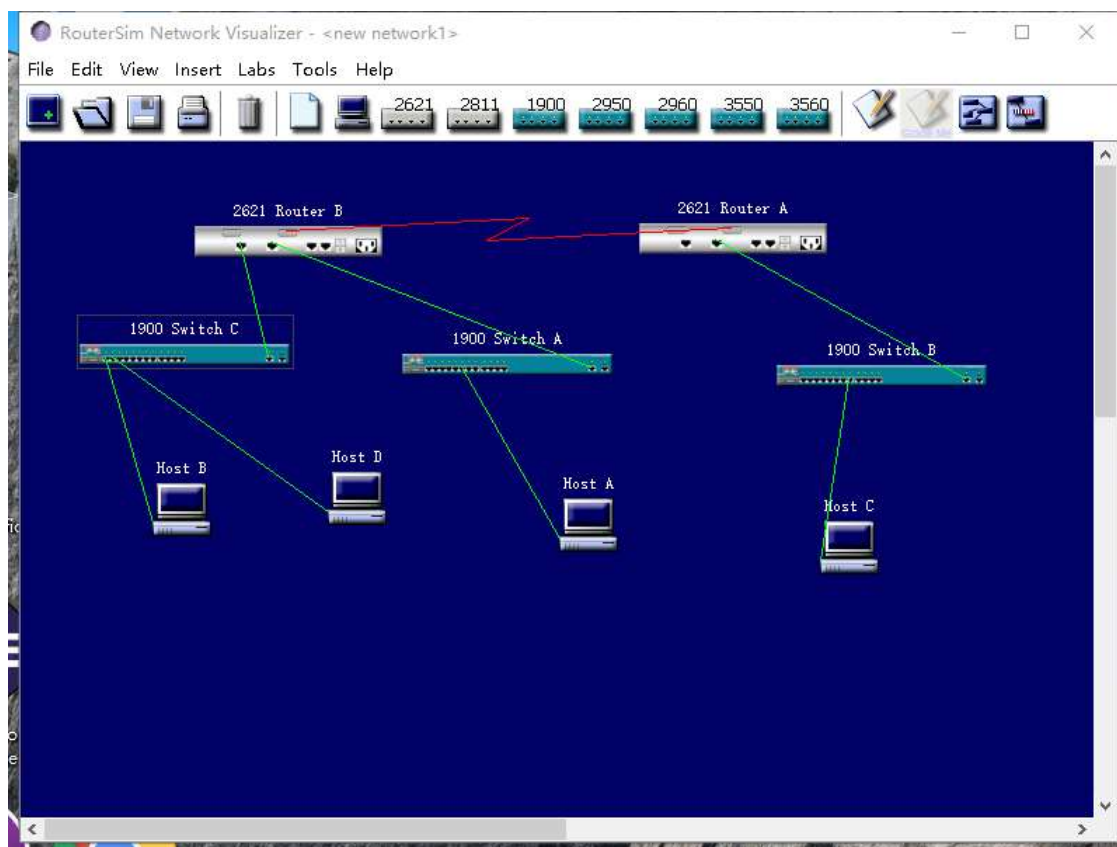
Press RETURN to get started!

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>

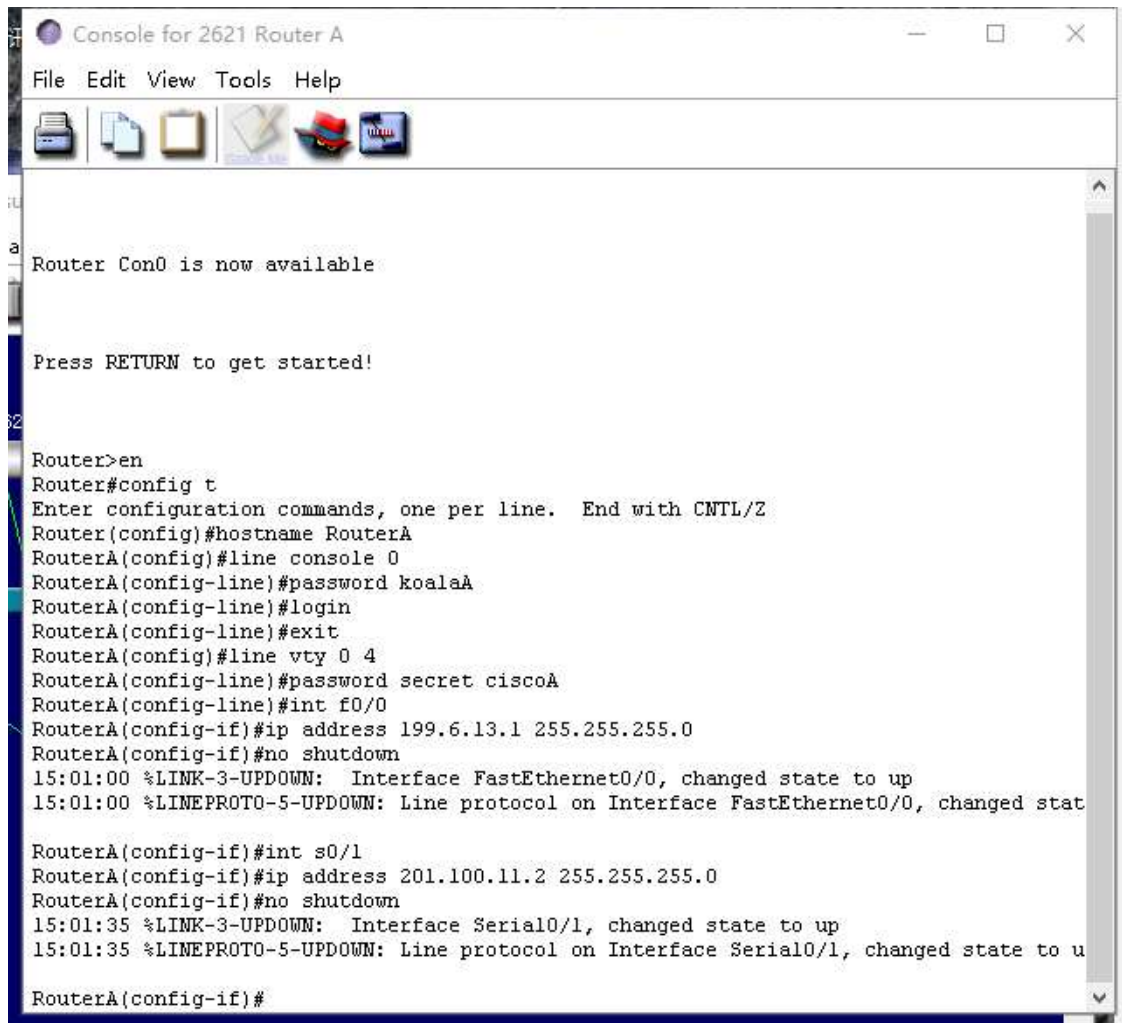
RouterA#
```

5.5 CISCO 路由器访问列表配置

拓扑结构如下图。



路由器 Router A 基本配置



```
Router Con0 is now available

Press RETURN to get started!

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)#
```

路由器 RouterB.上路由协议 RIP 的配置

```
Console for 2621 Router B
File Edit View Tools Help

RouterB Con0 is now available

Press RETURN to get started!

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

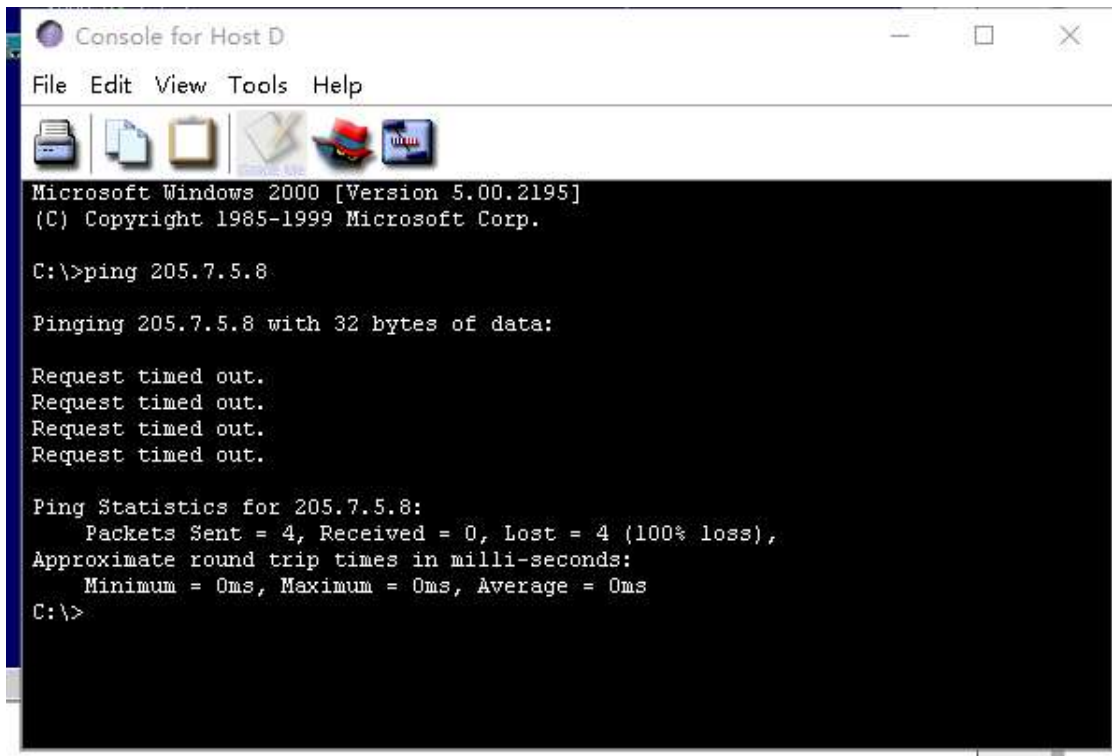
RouterB>enable
Password:
RouterB#config t
Enter configuration commands, one per line. End with CNTL/Z
RouterB(config)#router rip
RouterB(config-router)#network 192.5.5.0
RouterB(config-router)#network 205.7.5.0
RouterB(config-router)#network 201.100.11.0
RouterB(config-router)#exit
RouterB(config)#
```

限制后主机 HostB 已不能访问子网 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

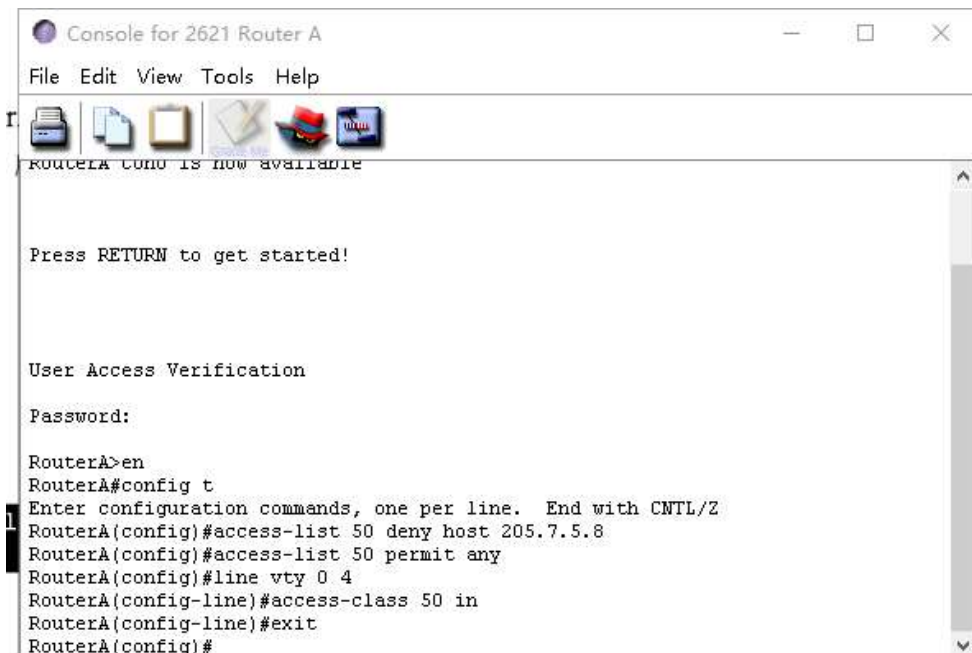
Pinging 205.7.5.8 with 32 bytes of data:

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:\>
```

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

Host A 试图远程登录到路由器 Router A 上的请求被拒绝了。



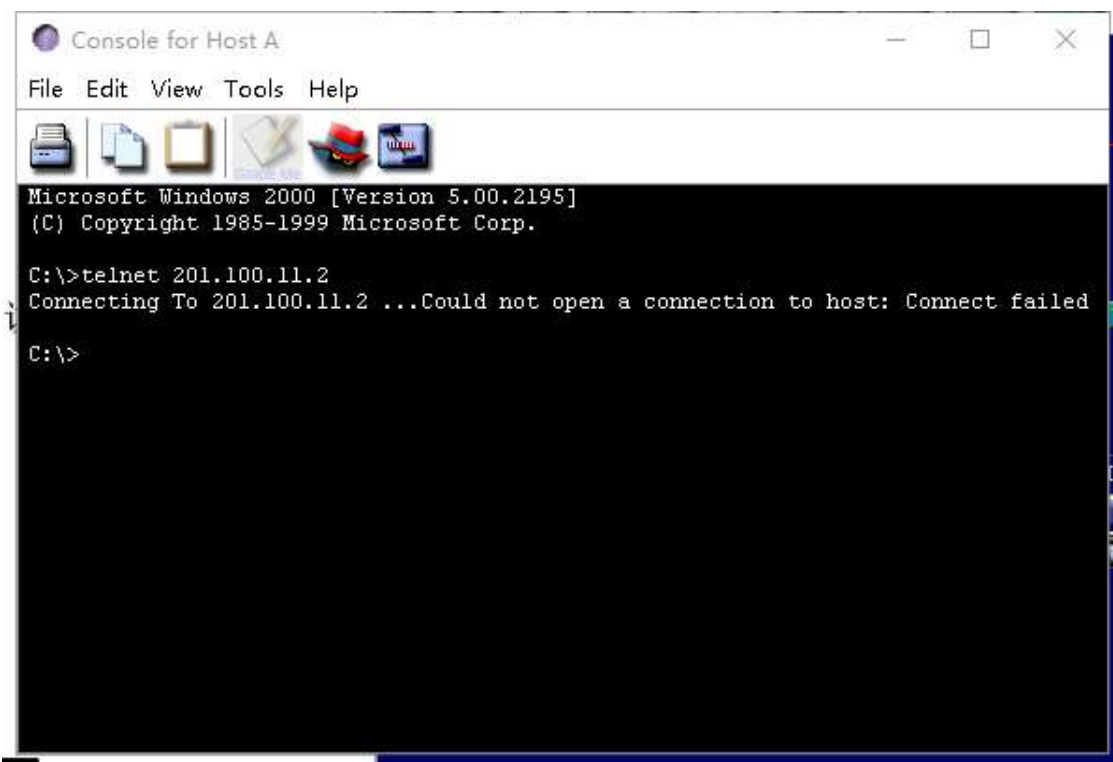
```
RouterA console is now available

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)#
```



5.6 基于交换机端口的 VLAN 设置

实例一：

全部设置如下图

```

Console for 3550 Switch A
File Edit View Tools Help
Press RETURN to get started:

switch>en
switch#config 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#

```

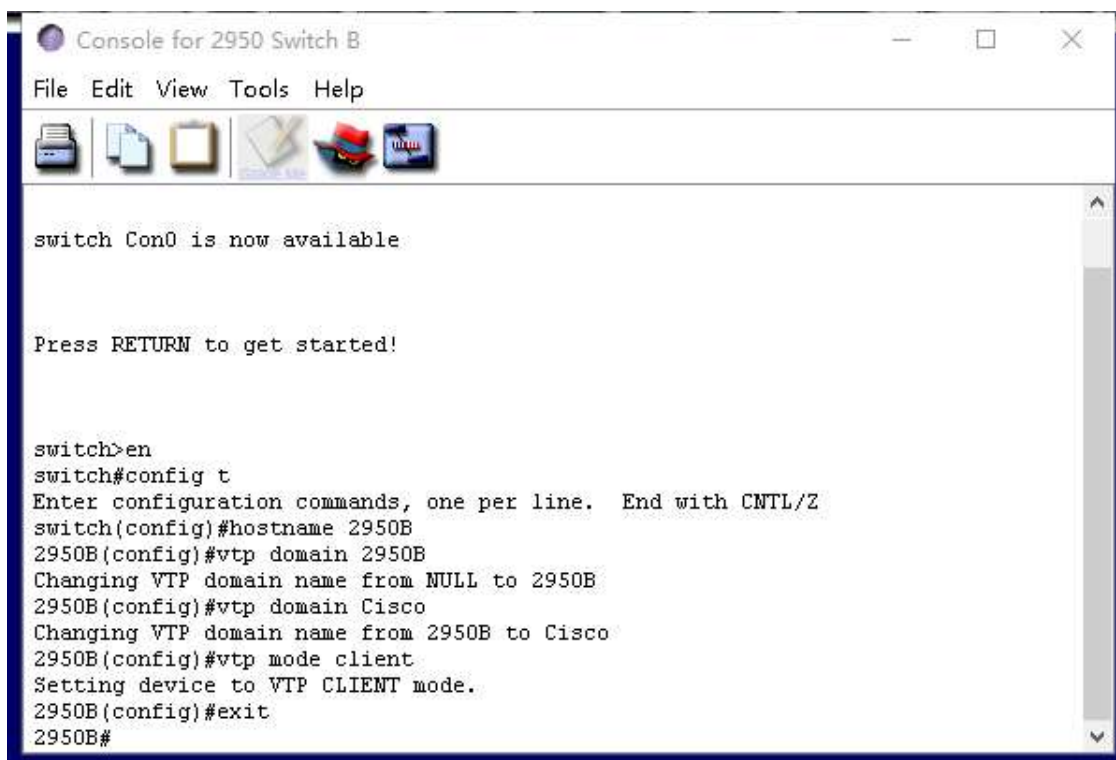
```

Console for 2950 Switch A
File Edit View Tools Help
server Set the device to server mode.
transparent Paste 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 V11 (lowest numbered VLAN interface found)
2950A#

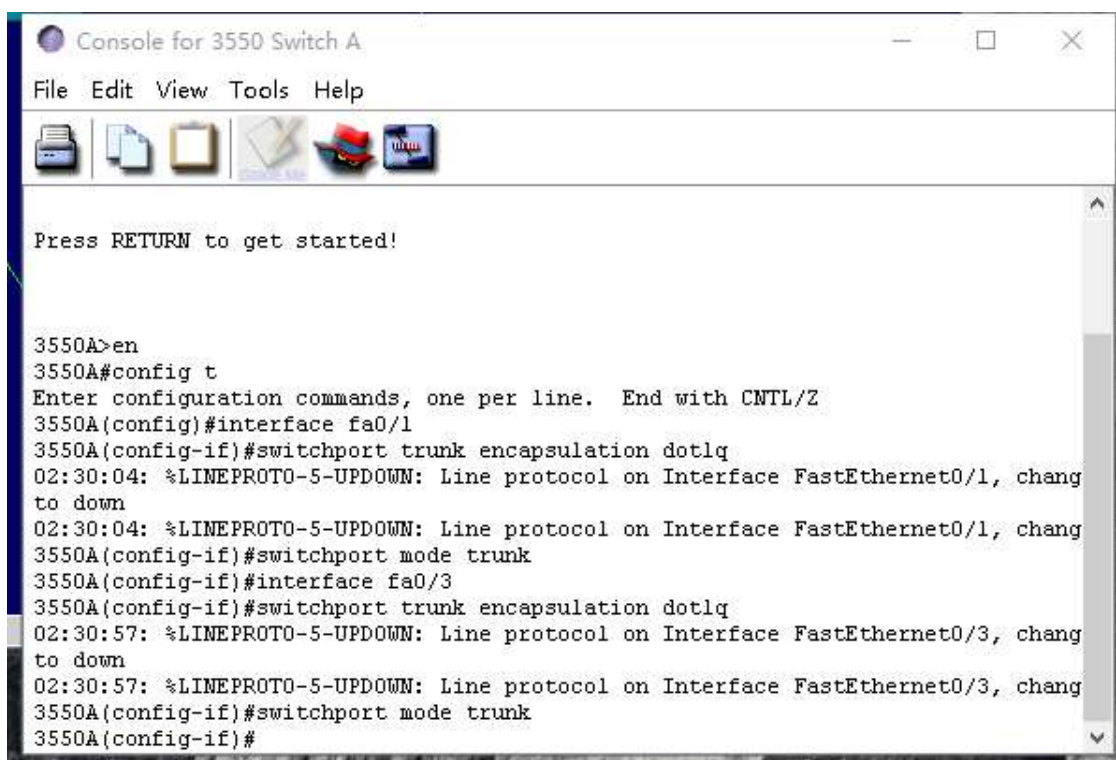
```

```
switch Con0 is now available

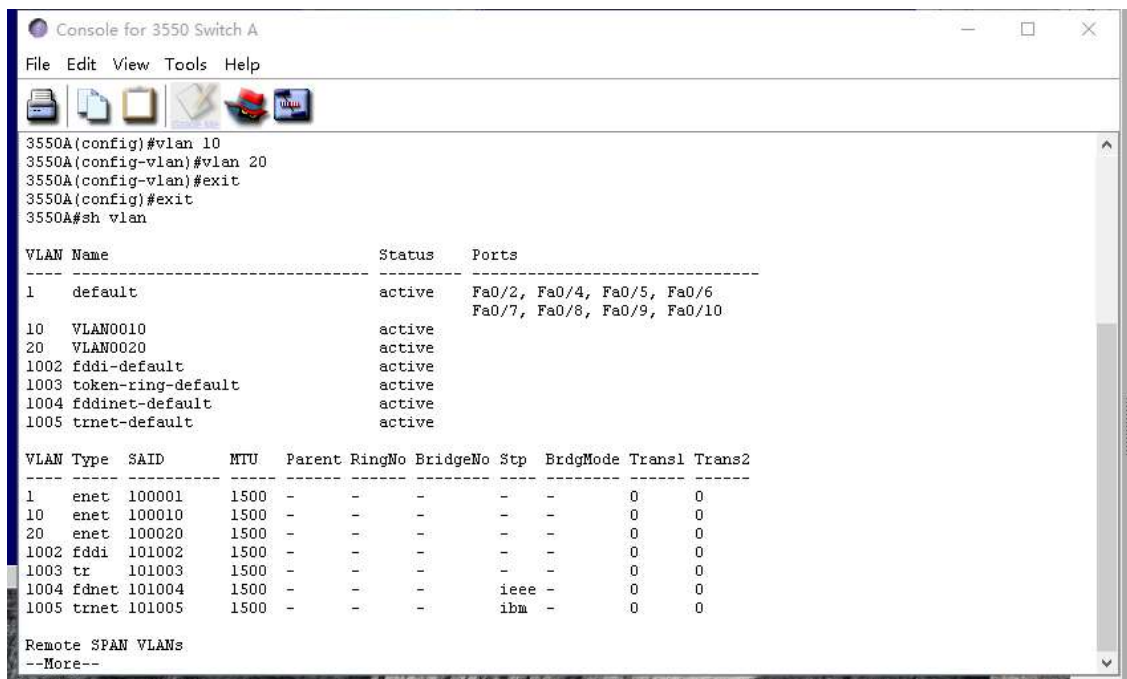
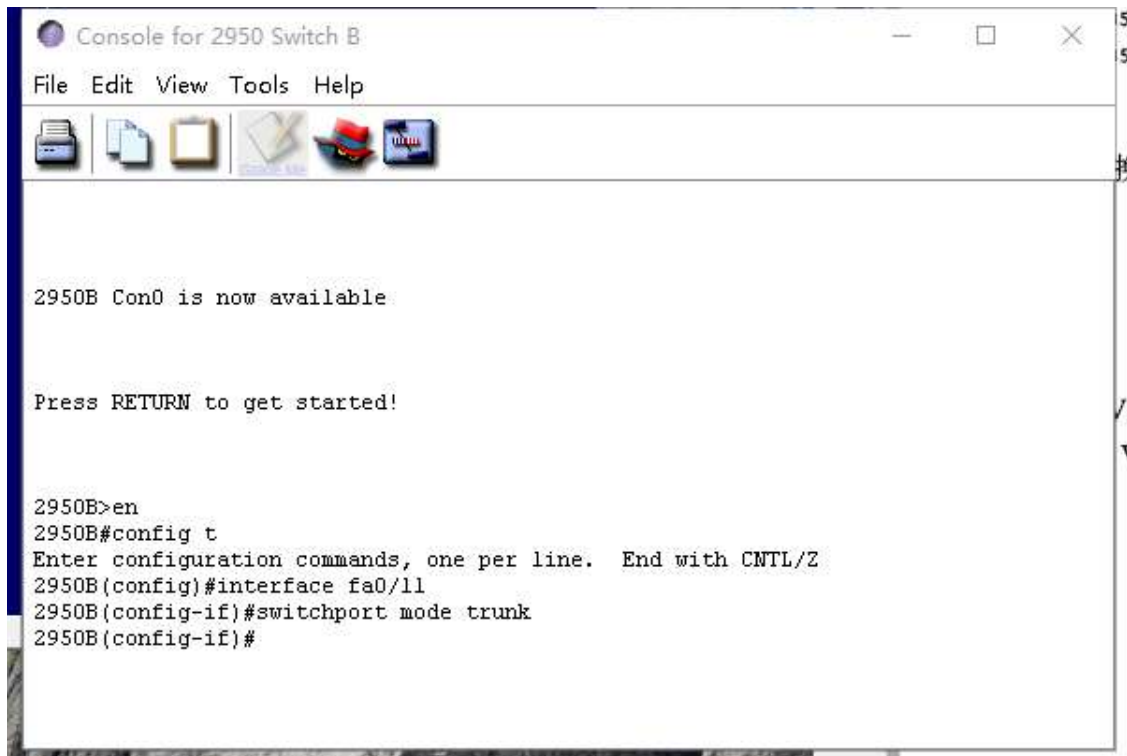
Press RETURN to get started!

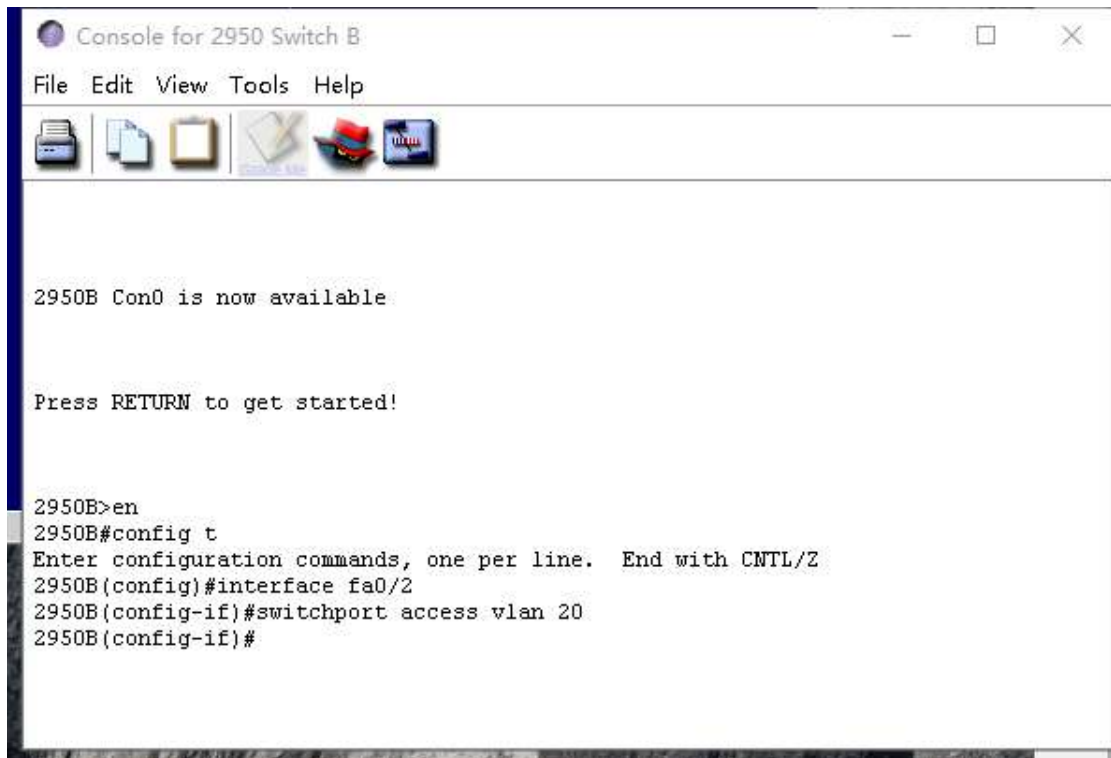
switch>en
switch#config t
Enter configuration commands, one per line. End with CNTL/Z
switch(config)#hostname 2950B
2950B(config)#vtp domain 2950B
Changing VTP domain name from NULL to 2950B
2950B(config)#vtp domain Cisco
Changing VTP domain name from 2950B to Cisco
2950B(config)#vtp mode client
Setting device to VTP CLIENT mode.
2950B(config)#exit
2950B#
```



```
Press RETURN to get started!

3550A>en
3550A#config t
Enter configuration commands, one per line. End with CNTL/Z
3550A(config)#interface fa0/1
3550A(config-if)#switchport trunk encapsulation dot1q
02:30:04: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, chang
to down
02:30:04: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, chang
3550A(config-if)#switchport mode trunk
3550A(config-if)#interface fa0/3
3550A(config-if)#switchport trunk encapsulation dot1q
02:30:57: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, chang
to down
02:30:57: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, chang
3550A(config-if)#switchport mode trunk
3550A(config-if)#
```





测试，在 3550 交换机上分别 ping 2950 交换机：

```
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

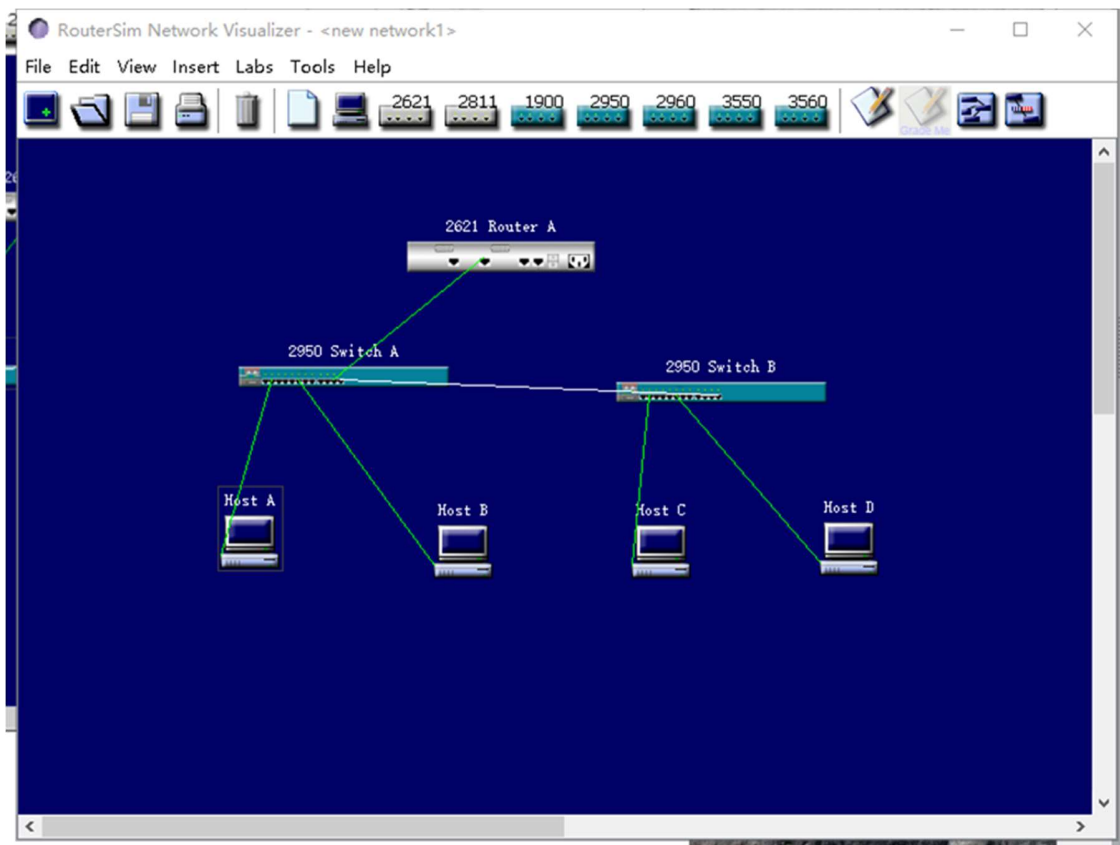
Pinging 20.20.20.2 with 32 bytes of data:

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
```

实例二:

全部设置如下图:



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

switch>en
switch#config 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
% Incomplete command.
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#
```

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

2950A Con0 is now available

Press RETURN to get started!

2950A>en
2950A#config t
Enter configuration commands, one per line. End with CNTL/Z
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)#
```



```

Console for 2950 Switch A
File Edit View Tools Help

Press RETURN to get started!

2950A>en
2950A#config
Enter configuration commands, one per line. End with CNTL/Z
2950A(config)#vlan database
% Incomplete command.
2950A(config)#exit
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#

```

```

Console for 2950 Switch A
File Edit View Tools Help

Press RETURN to get started!

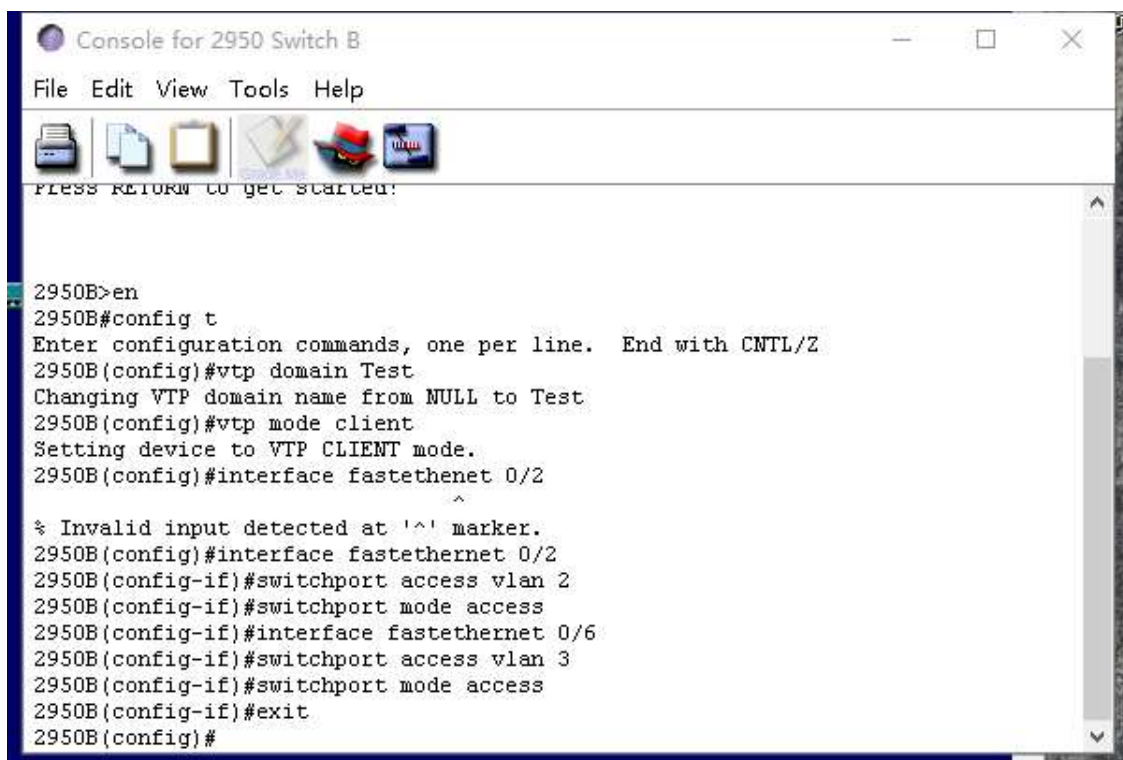
2950A>en
2950A#config t
Enter configuration commands, one per line. End with CNTL/Z
2950A(config)#interface fastethernet 0/2
2950A(config-if)#switchport access vlan 2
2950A(config-if)#switchport mode access
2950A(config-if)#interface fastethernet 0/6
2950A(config-if)#switchport access vlan 3
2950A(config-if)#switchport mode access
2950A(config-if)#show vlan
^
% Invalid input detected at '^' marker.
2950A(config-if)#exit
2950A(config)#exit
2950A#show vlan

VLAN Name                Status    Ports
-----
1    default                active    Fa0/1, Fa0/3, Fa0/4, Fa0/5
2    vlan2                  active    Fa0/7, Fa0/8, Fa0/9, Fa0/10
3    vlan3                  active    Fa0/2
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  BrgdMode Transl 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

Remote SPAN VLANs
--More--

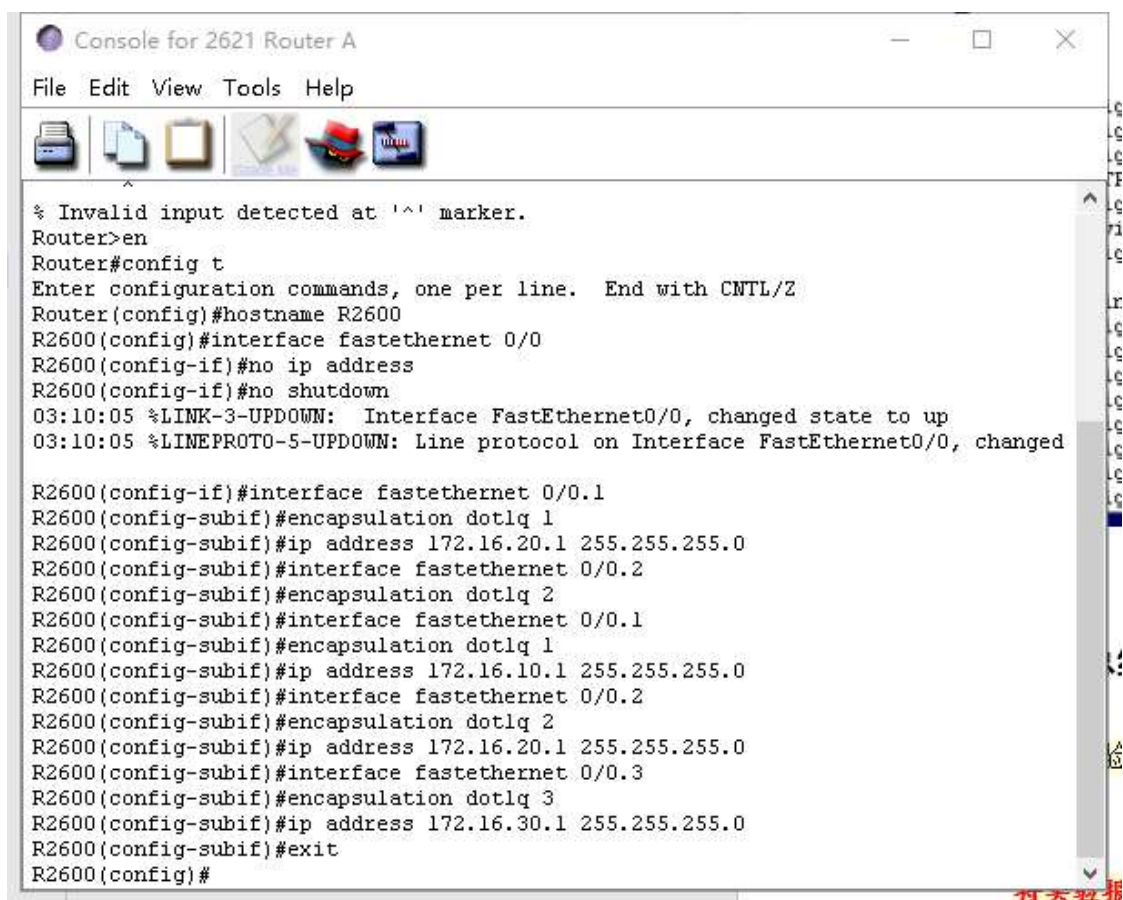
```



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

Press RETURN to get started:

2950B>en
2950B#config t
Enter configuration commands, one per line. End with CNTL/Z
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)#interface fastethernet 0/2
^
% Invalid input detected at '^' marker.
2950B(config)#interface fastethernet 0/2
2950B(config-if)#switchport access vlan 2
2950B(config-if)#switchport mode access
2950B(config-if)#interface fastethernet 0/6
2950B(config-if)#switchport access vlan 3
2950B(config-if)#switchport mode access
2950B(config-if)#exit
2950B(config)#
```



```
Console for 2621 Router A
File Edit View Tools Help

% Invalid input detected at '^' marker.
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#hostname R2600
R2600(config)#interface fastethernet 0/0
R2600(config-if)#no ip address
R2600(config-if)#no shutdown
03:10:05 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
03:10:05 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
to down

R2600(config-if)#interface fastethernet 0/0.1
R2600(config-subif)#encapsulation dot1q 1
R2600(config-subif)#ip address 172.16.20.1 255.255.255.0
R2600(config-subif)#interface fastethernet 0/0.2
R2600(config-subif)#encapsulation dot1q 2
R2600(config-subif)#interface fastethernet 0/0.1
R2600(config-subif)#encapsulation dot1q 1
R2600(config-subif)#ip address 172.16.10.1 255.255.255.0
R2600(config-subif)#interface fastethernet 0/0.2
R2600(config-subif)#encapsulation dot1q 2
R2600(config-subif)#ip address 172.16.20.1 255.255.255.0
R2600(config-subif)#interface fastethernet 0/0.3
R2600(config-subif)#encapsulation dot1q 3
R2600(config-subif)#ip address 172.16.30.1 255.255.255.0
R2600(config-subif)#exit
R2600(config)#
```

配置主机：

The image displays four separate configuration windows for network hosts, arranged in a 2x2 grid. Each window has a title bar with the host name and a close button (X). The configuration options are as follows:

- Configure Host B:** Host Name: Host B. Radio buttons: ☐ Obtain an IP address automatically, ☒ Use the following IP address: IP Address: 172.16.30.3, Subnet: 255.255.255.0, Default Gateway: 172.16.30.1.
- Configure Host C:** Host Name: Host a. Radio buttons: ☐ Obtain an IP address automatically, ☒ Use the following IP address: IP Address: 172.16.20.5, Subnet: 255.255.255.0, Default Gateway: 172.16.20.1.
- Configure Host A:** Host Name: Host A. Radio buttons: ☐ Obtain an IP address automatically, ☒ Use the following IP address: IP Address: 172.16.20.3, Subnet: 255.255.255.0, Default Gateway: 172.16.20.1.
- Configure Host D:** Host Name: Host b. Radio buttons: ☐ Obtain an IP address automatically, ☒ Use the following IP address: IP Address: 172.16.30.5, Subnet: 255.255.255.0, Default Gateway: 172.16.30.1.

Each window includes OK and Cancel buttons at the bottom.

验证连通性：

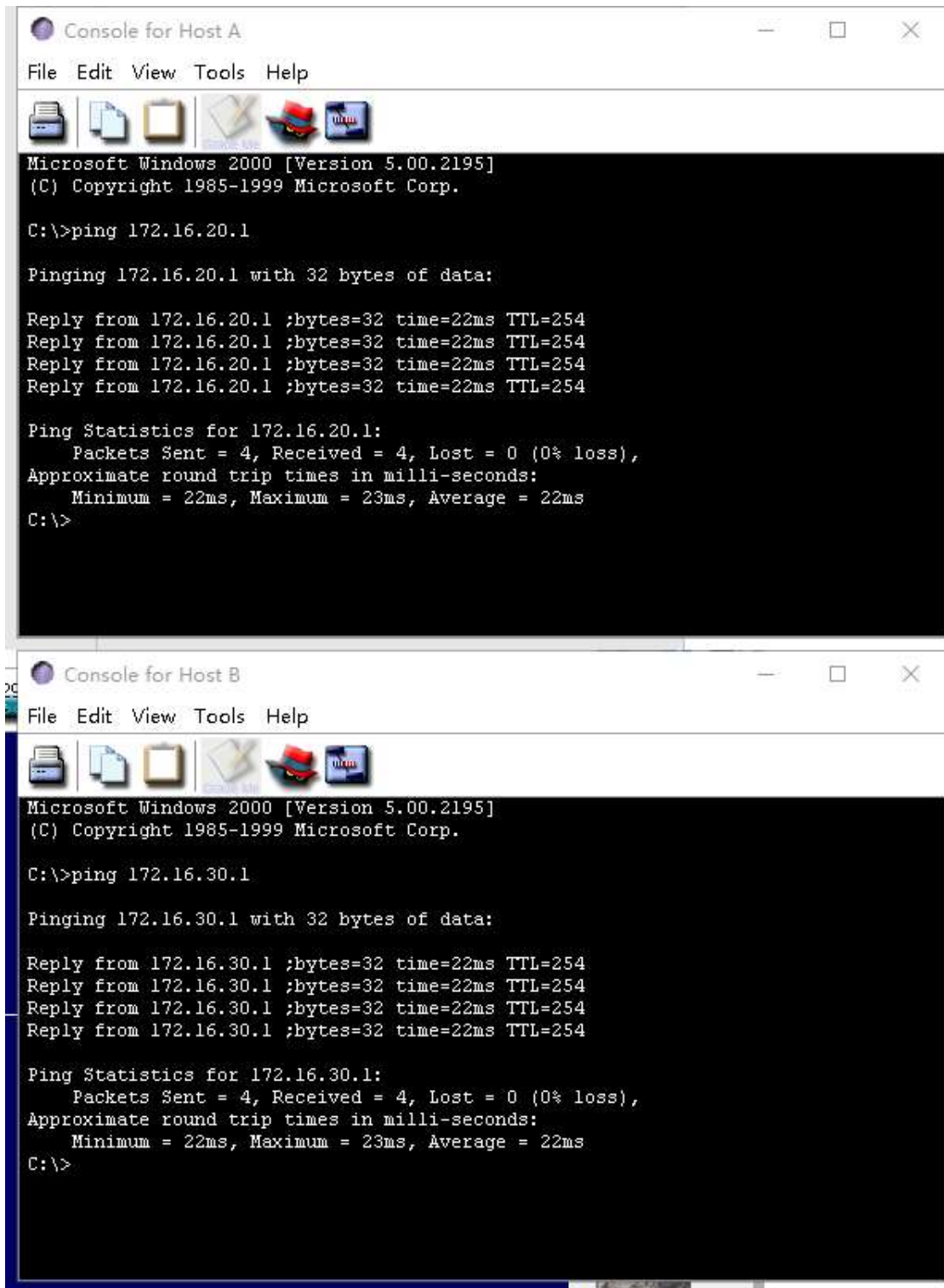
四张图分别是：

在属于 VLAN2 的 Host A 上 ping172.16.20.1；

在属于 VLAN3 的 Host B 上 ping172.16.30.1；

在 Host A 上 ping Host B；

在 Host a 上 ping Host b；



The image shows two overlapping console windows from a Windows 2000 environment. The top window, titled 'Console for Host A', displays the results of a ping command to 172.16.20.1. The bottom window, titled 'Console for Host B', displays the results of a ping command to 172.16.30.1. Both windows show successful pings with 0% loss and consistent round-trip times.

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

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
C:\>
```

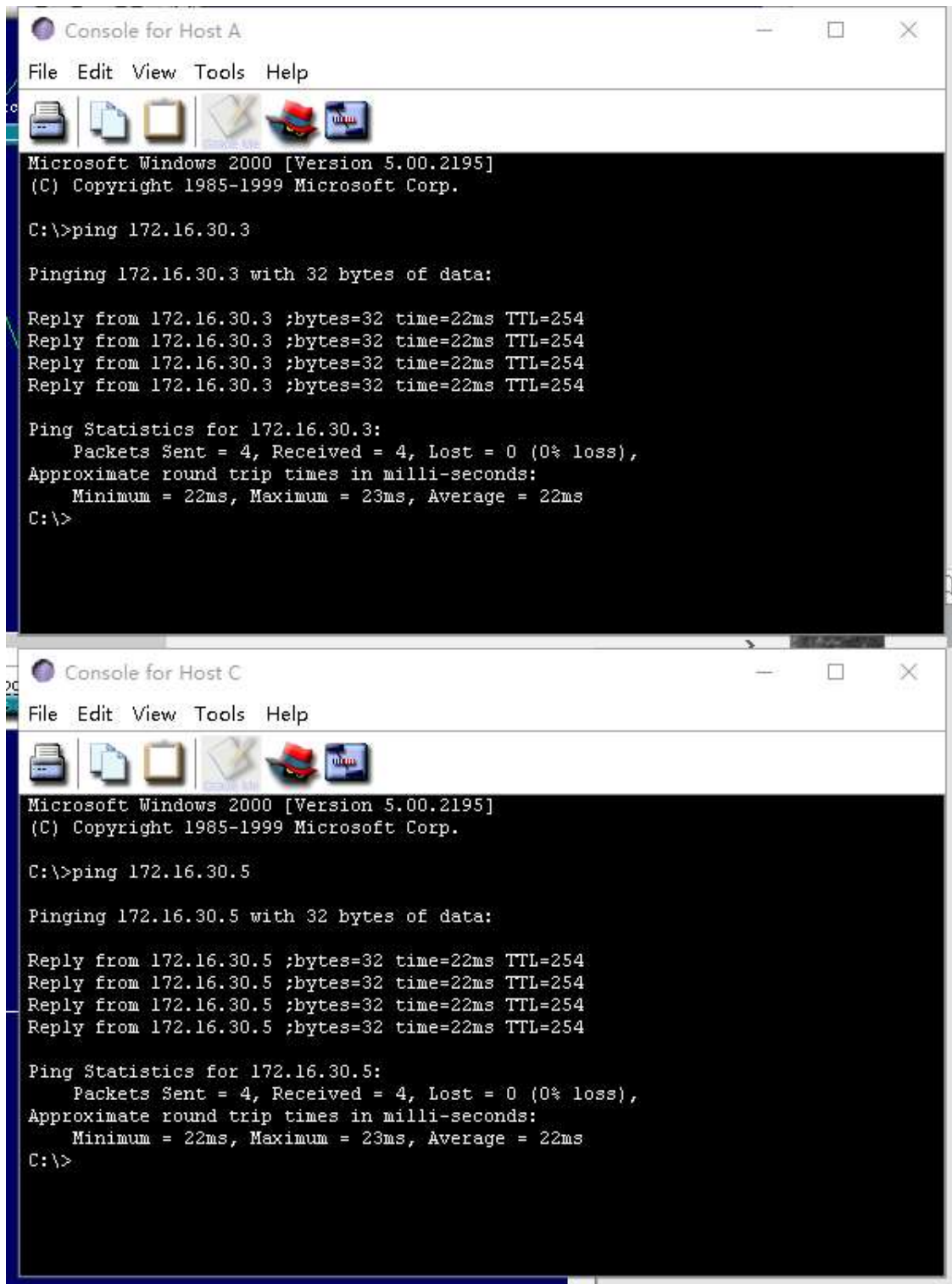
```
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-1999 Microsoft Corp.

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
C:\>
```



The image displays two screenshots of a Windows 2000 command prompt window, titled "Console for Host A" and "Console for Host C". Both windows show the results of a ping command. The top window, "Console for Host A", shows a ping to 172.16.30.3. The bottom window, "Console for Host C", shows a ping to 172.16.30.5. Both pings are successful with 0% loss and a round trip time of approximately 22ms.

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

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
C:\>
```

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

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
C:\>
```


4 实验总结

学会了使用模拟器来模拟路由器的配置环境、配置静态路由、动态路由和交换机端口的 VLAN。学习了有关 CISCO 的基本知识，加深了对路由器、网络层协议的理解。能够在交换机上进行基于端口的 VLAN 配置，并进行验证测试。