

# 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 1 班

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实验时间 2020 年 4 月 8 日

2020 年 4 月 16 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）。

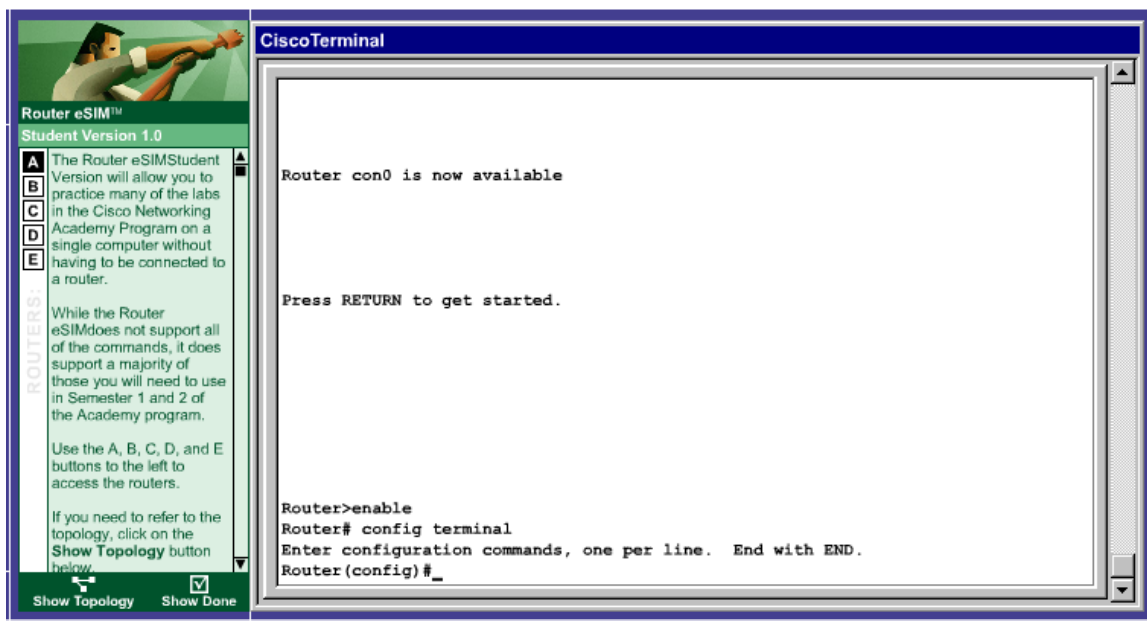
## 2 实验环境

Windows10, Router eSIM v1.1, CCNA Network Visualizer 6.0。

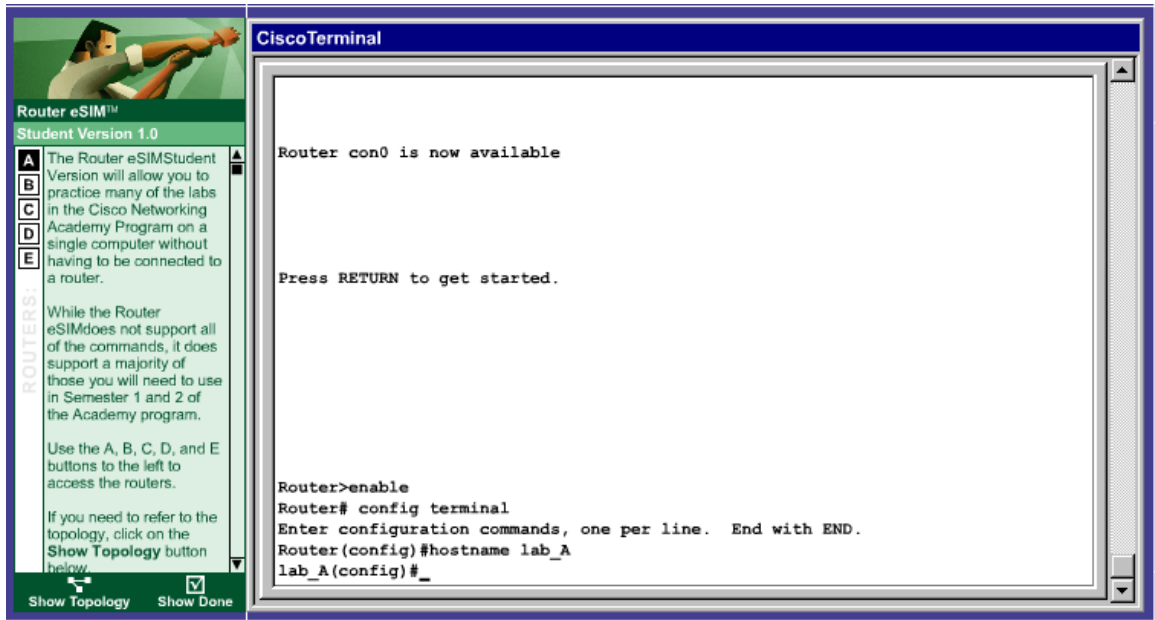
## 3 实验结果

1.使用 Router eSIM v1.1 模拟器来模拟路由器的配置环境。

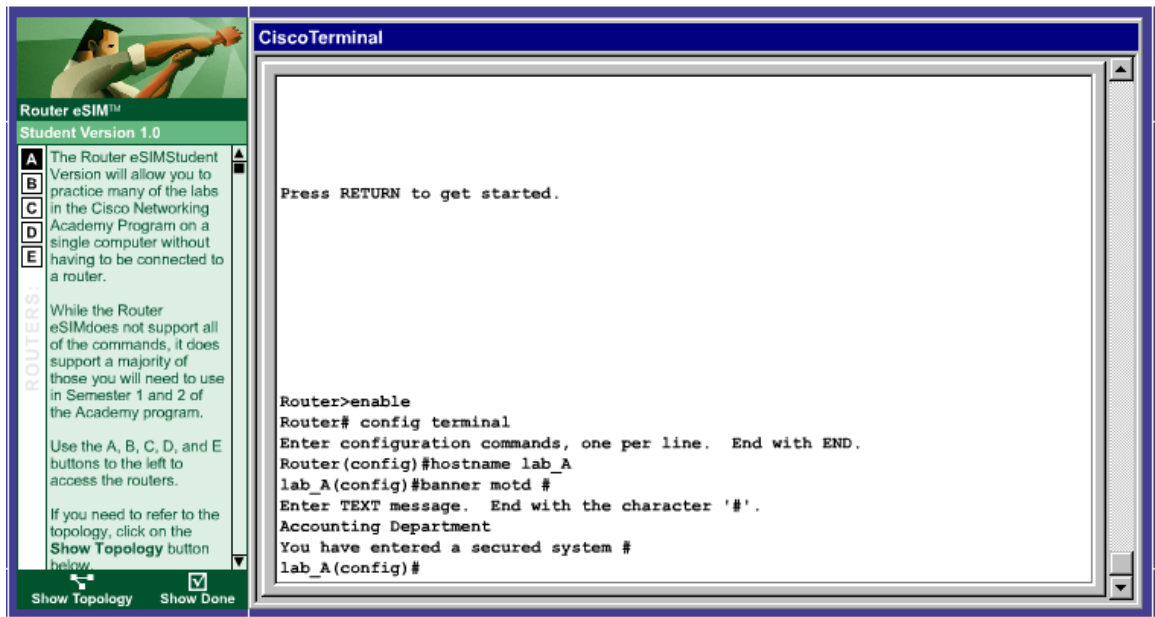
进入全局配置模式



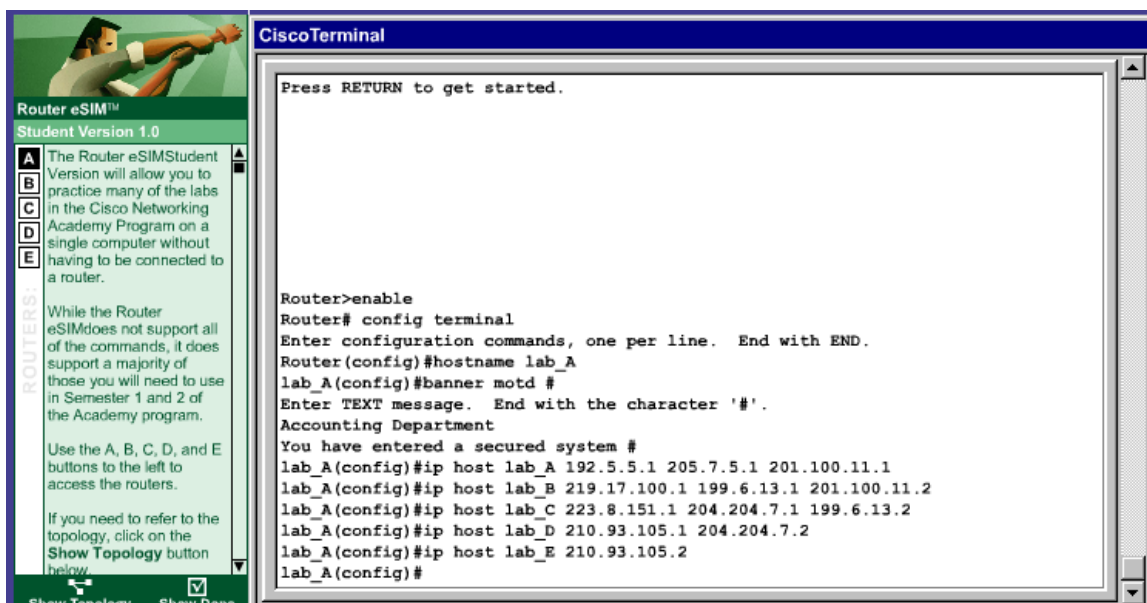
改变路由器名字



设置当日消息标题



建立名字解析的映射表



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
```

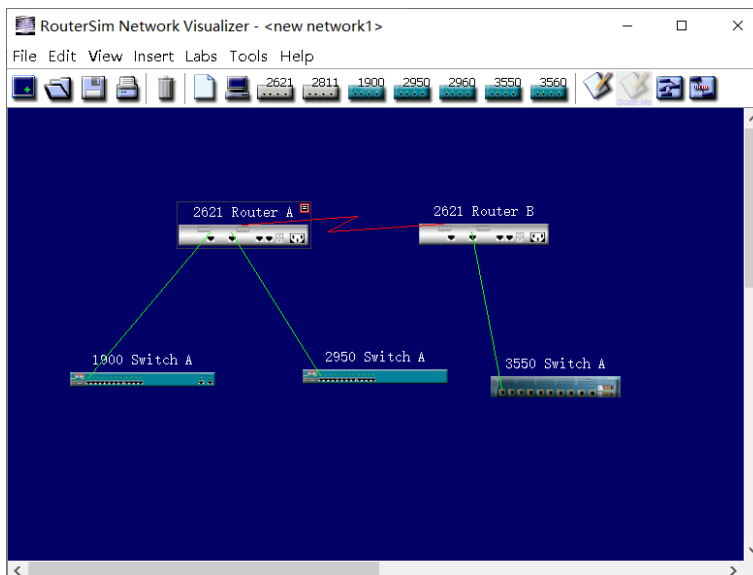
配置充当 DCE 端的串行端口

```
lab_A(config-if)#exit
lab_A(config)#interface serial 0
lab_A(config-if)#clock rate 56000
lab_A(config-if)#
```

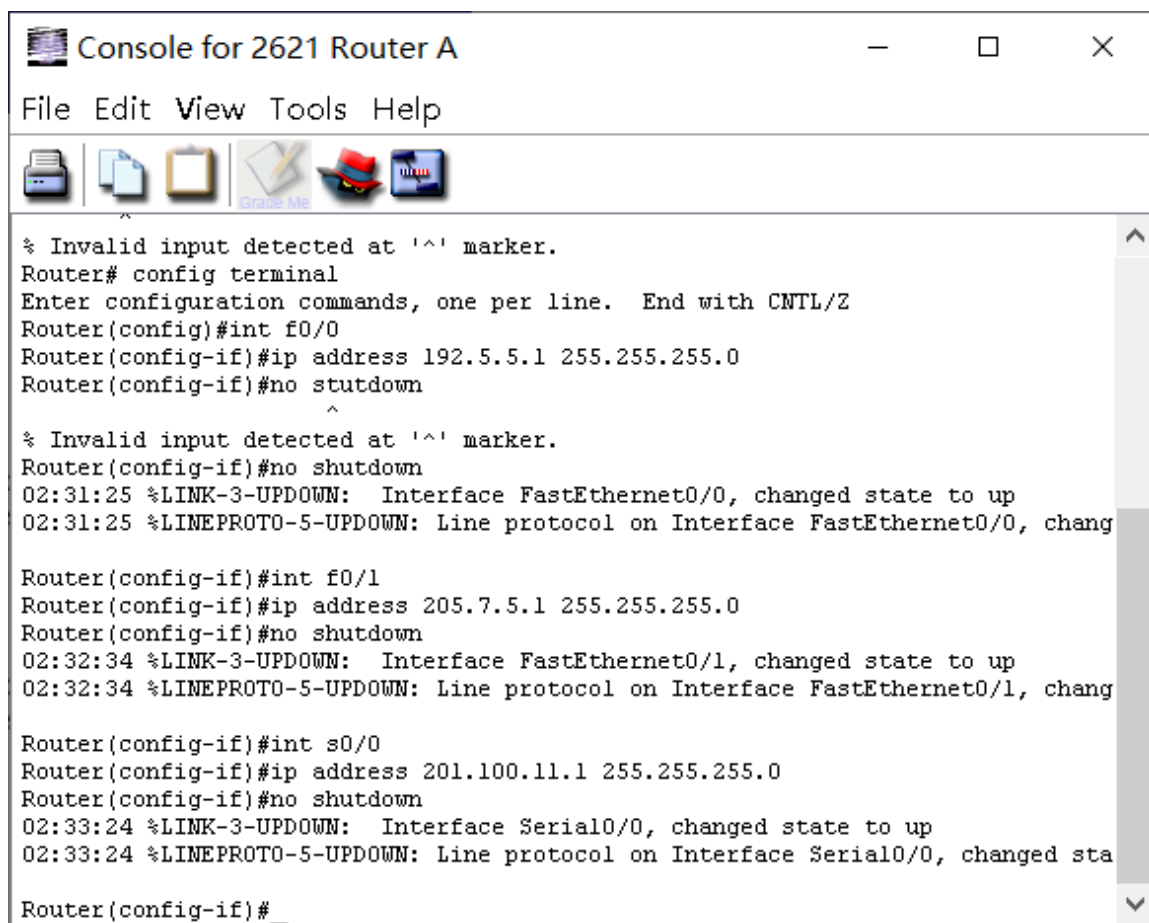
Lab_A	Not Completed
Hostname	Done
Enable Secret	Not Done
Line Console Login	Not Done
Line Console Password	Not Done
Line vty Login	Not Done
Line vty Password	Not Done
E0 IP	Done
E0 Shutdown	Not Done
E1 IP	Done
E1 Shutdown	Not Done
S0 IP	Done
S0 Clock Rate	Done
S0 Shutdown	Not Done
Routing Protocol	Not Done
Network 1	Not Done
Network 2	Not Done
Network 3	Not Done
IP Host Lab_A	Done
IP Host Lab_B	Done
IP Host Lab_C	Done
IP Host Lab_D	Done
IP Host Lab_E	Done
Time elapsed	27:35

2. 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）

### ①静态路由



配置路由器 A,B 各端口 IP 地址



```
% Invalid input detected at '^' marker.
Router# config terminal
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#int f0/0
Router(config-if)#ip address 192.5.5.1 255.255.255.0
Router(config-if)#no shutdown
^
% Invalid input detected at '^' marker.
Router(config-if)#no shutdown
02:31:25 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
02:31:25 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#int f0/1
Router(config-if)#ip address 205.7.5.1 255.255.255.0
Router(config-if)#no shutdown
02:32:34 %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
02:32:34 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router(config-if)#int s0/0
Router(config-if)#ip address 201.100.11.1 255.255.255.0
Router(config-if)#no shutdown
02:33:24 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
02:33:24 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

Router(config-if)#_
```

```

Router>enable
Router#config terminal
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#int s0/1
Router(config-if)#ip address 201.100.11.2 255.255.255.0
^
% Invalid input detected at '^' marker.
Router(config-if)#ip address 201.100.11.2 255.255.255.0
Router(config-if)#no shutdown
02:40:31 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
02:40:31 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed sta

Router(config-if)#int f0/0
Router(config-if)#ip address 199.6.13.1 255.255.255.0
Router(config-if)#no shutdown
02:41:13 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
02:41:13 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, chang

Router(config-if)#_

```

### 配置路由表

```

Router(config)#ip route 199.6.13.0 255.255.255.0 201.100.11.2
Router(config)#exit
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

Router(config)#ip route 0.0.0.0 0.0.0.0 201.100.11.1
Router(config)#exit
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 201.100.11.1 to network 0.0.0.0
C    199.6.13.0/24 is directly connected, FastEthernet0/0
S*   0.0.0.0 [1/0] via 201.100.11.1

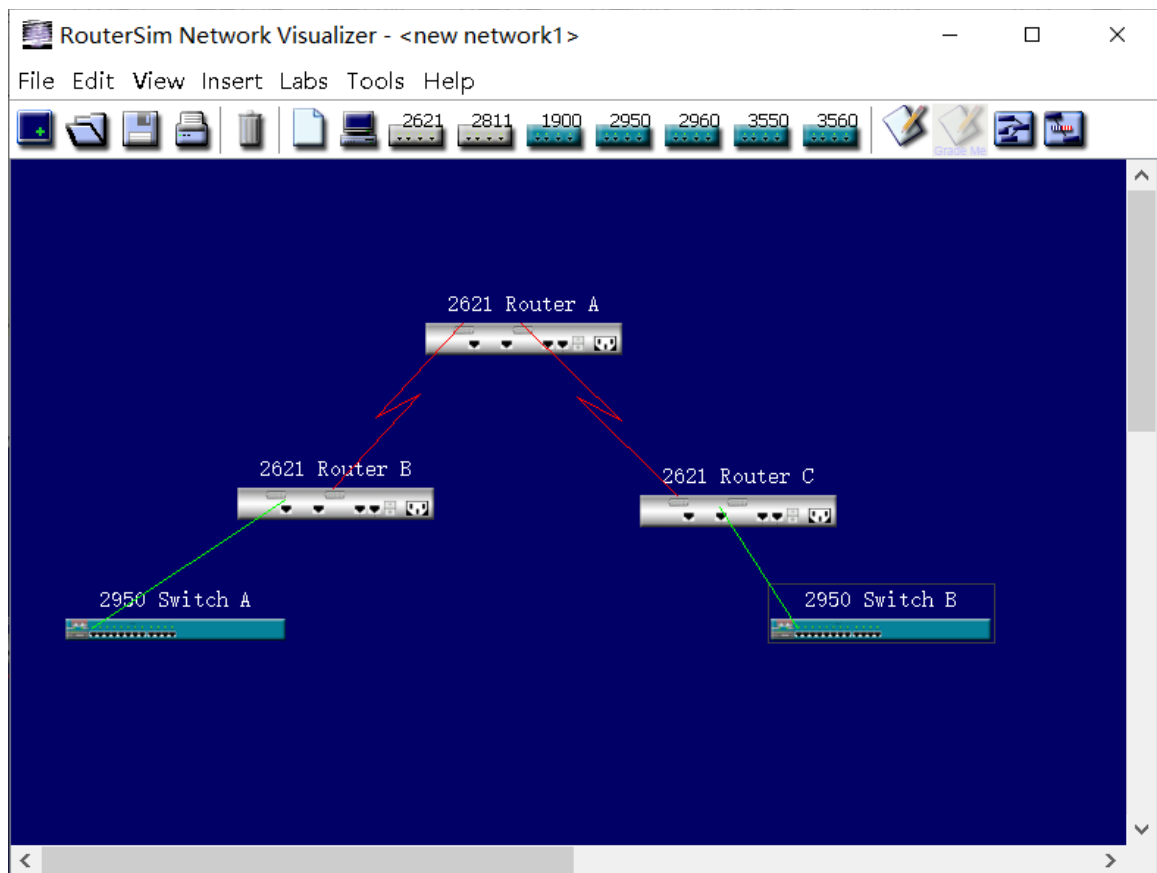
```

## Ping 命令测试

```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 192.5.5.1, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms  
Router#ping 205.7.5.1
```

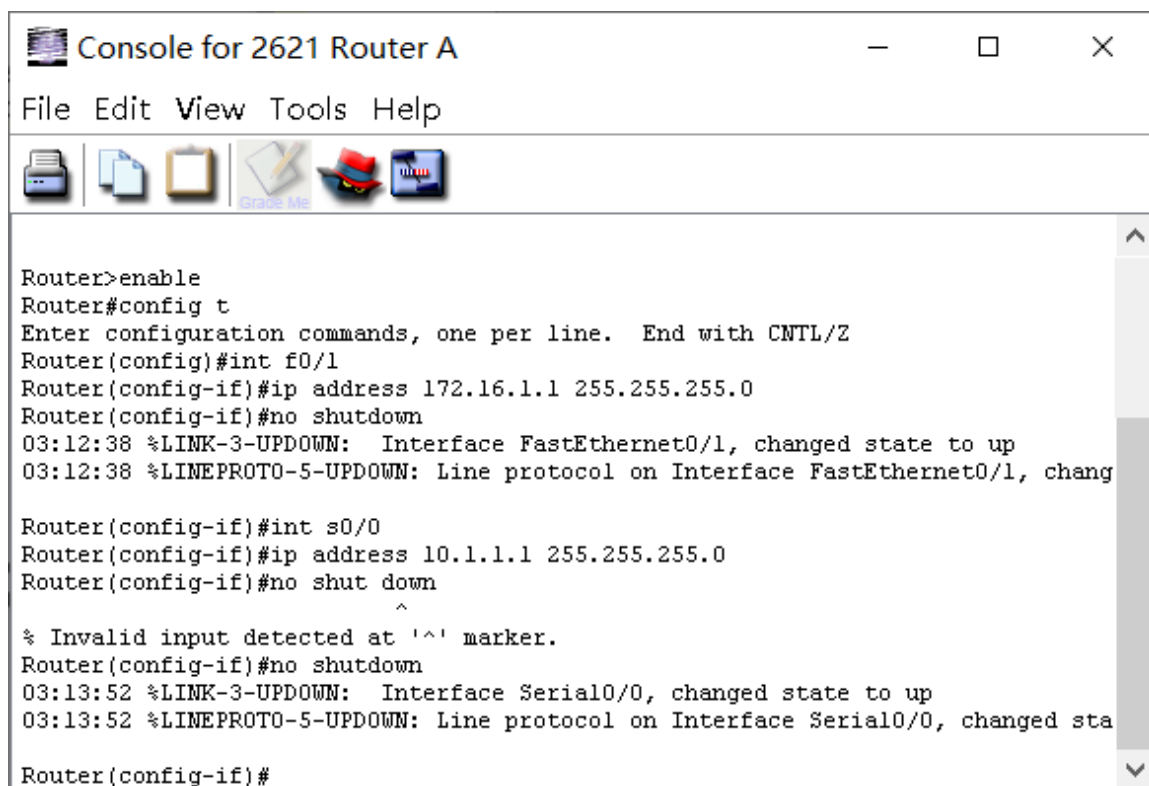
```
Type escape sequence to abort.  
Sending 5, 100-byte ICMP Echos to 205.7.5.1, timeout is 2 seconds:  
!!!!  
Success rate is 100 percent (5/5), round-trip min/avg/max = 4/4/4 ms  
Router#ping 199.6.13.1
```

## ②动态路由



## 路由器端口 IP 配置



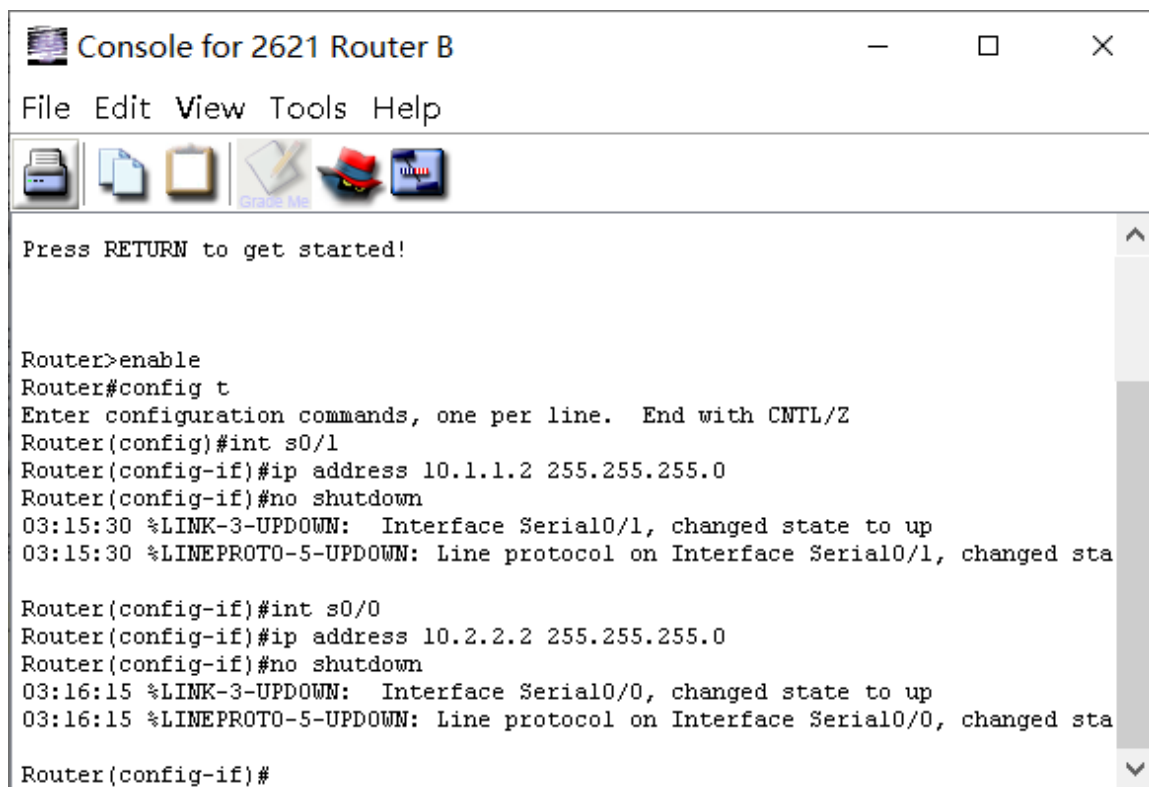


The image shows a window titled "Console for 2621 Router A". It has a menu bar with "File", "Edit", "View", "Tools", and "Help". Below the menu bar is a toolbar with icons for a printer, a document, a folder, a notepad, a red hat, and a blue cube. The main area is a text editor showing the following commands and output:

```
Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#int f0/1
Router(config-if)#ip address 172.16.1.1 255.255.255.0
Router(config-if)#no shutdown
03:12:38 %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
03:12:38 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router(config-if)#int s0/0
Router(config-if)#ip address 10.1.1.1 255.255.255.0
Router(config-if)#no shut down
^
% Invalid input detected at '^' marker.
Router(config-if)#no shutdown
03:13:52 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
03:13:52 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

Router(config-if)#_
```



The image shows a window titled "Console for 2621 Router B". It has a menu bar with "File", "Edit", "View", "Tools", and "Help". Below the menu bar is a toolbar with icons for a printer, a document, a folder, a notepad, a red hat, and a blue cube. The main area is a text editor showing the following commands and output:

```
Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#int s0/1
Router(config-if)#ip address 10.1.1.2 255.255.255.0
Router(config-if)#no shutdown
03:15:30 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
03:15:30 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up

Router(config-if)#int s0/0
Router(config-if)#ip address 10.2.2.2 255.255.255.0
Router(config-if)#no shutdown
03:16:15 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
03:16:15 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

Router(config-if)#_
```

```

Console for 2621 Router C
File Edit View Tools Help

Press RETURN to get started!

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#int s0/1
Router(config-if)#ip address 10.2.2.3 255.255.255.0
Router(config-if)#no shutdown
03:17:29 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
03:17:29 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed sta

Router(config-if)#int f0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
03:18:07 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
03:18:07 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, chang

Router(config-if)#_

```

## RIP 配置

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 172.16.0.0

```

```

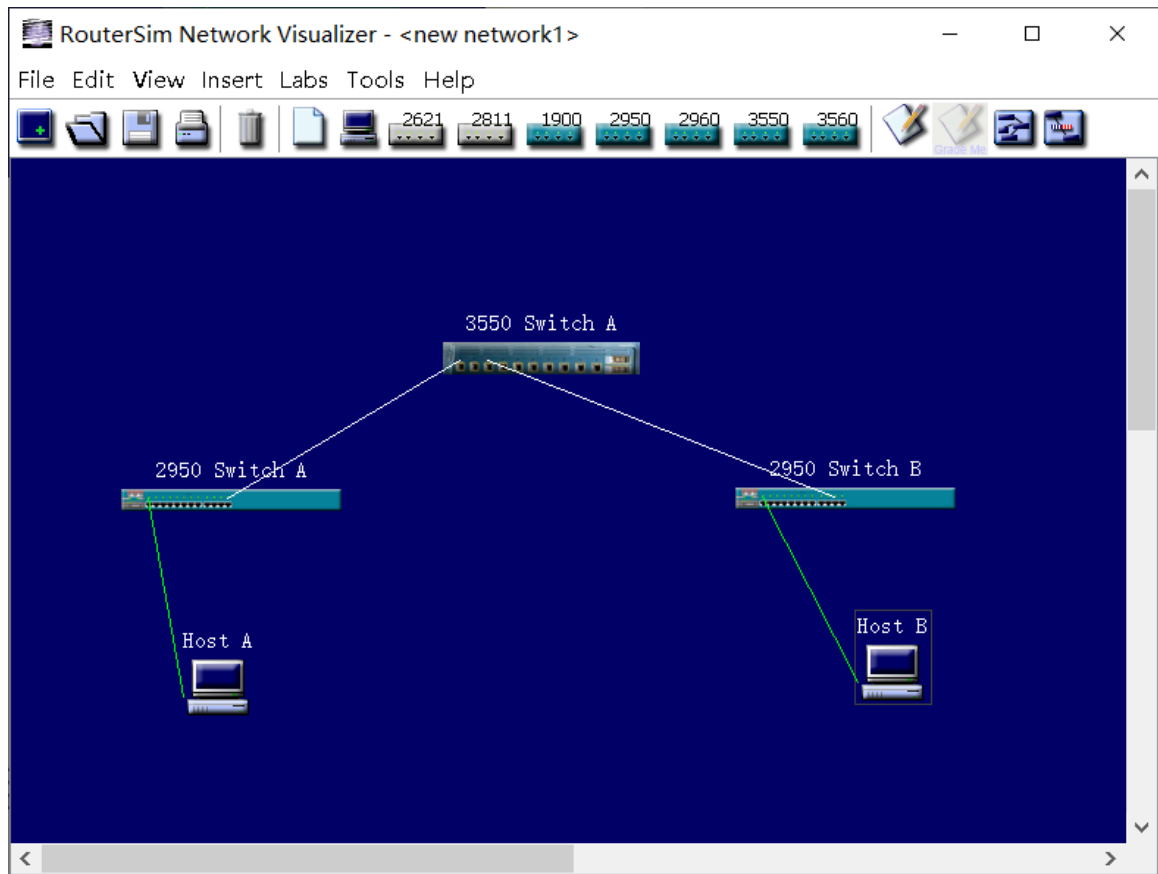
Router>enable
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external 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

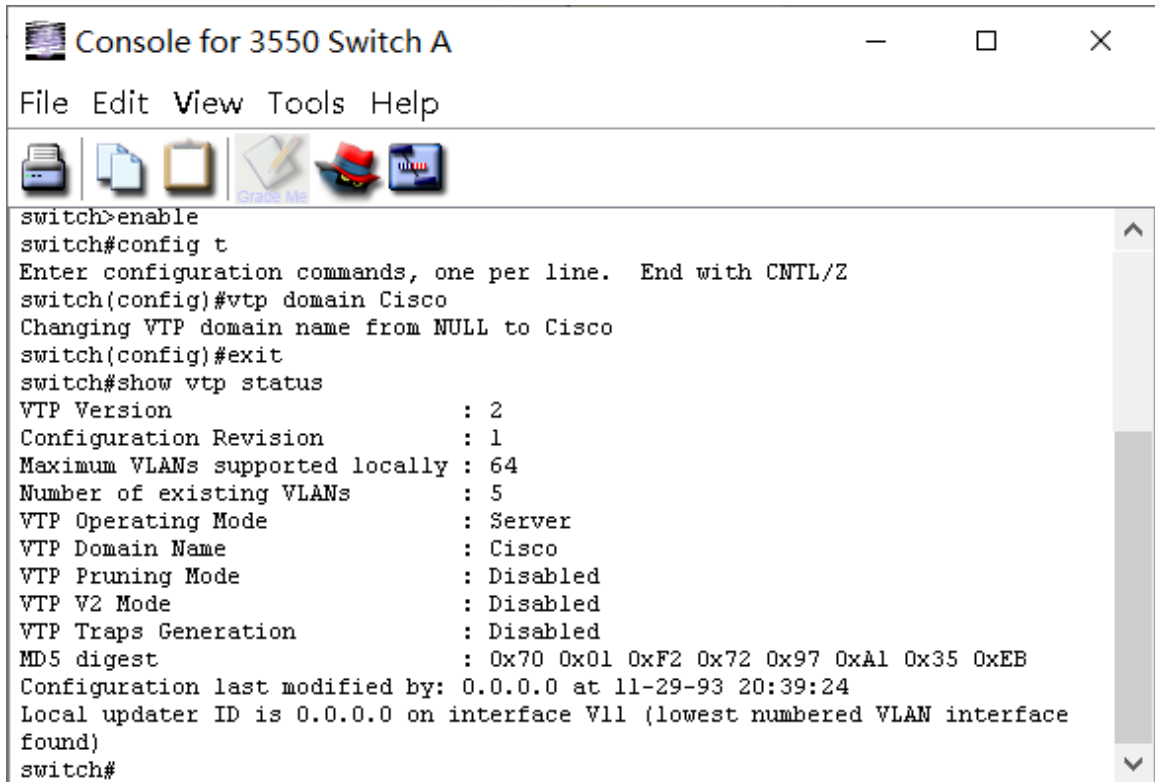
    172.16.0.0/24 is subnetted, 1 subnets
C       172.16.1.0 is directly connected, FastEthernet0/1

```

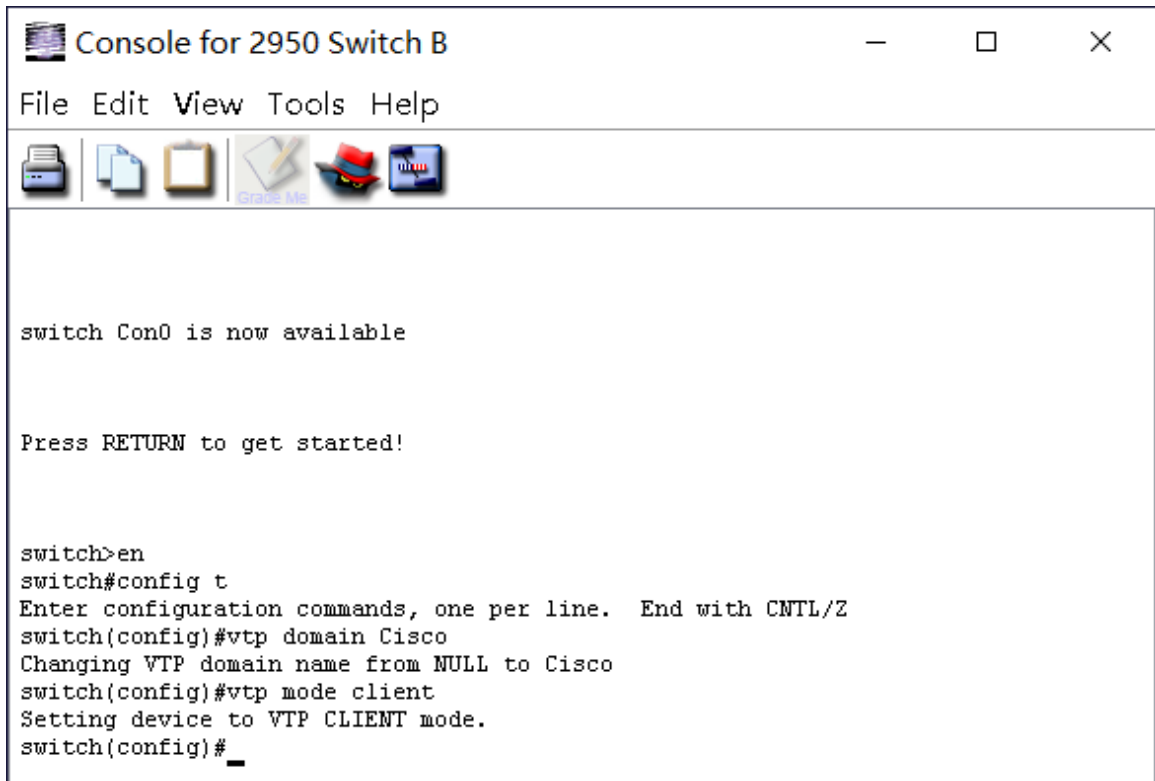
## ③交换机端口 VLAN



设置 VTP

A screenshot of a terminal window titled "Console for 3550 Switch A". The window has a menu bar with "File", "Edit", "View", "Tools", and "Help". Below the menu bar is a toolbar with icons for a printer, a document, a folder, a notepad, a red hat, and a "Grade Me" button. The terminal text shows the following commands and output:

```
switch>enable
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
switch(config)#exit
switch#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             : 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 Vll1 (lowest numbered VLAN interface found)
switch#
```

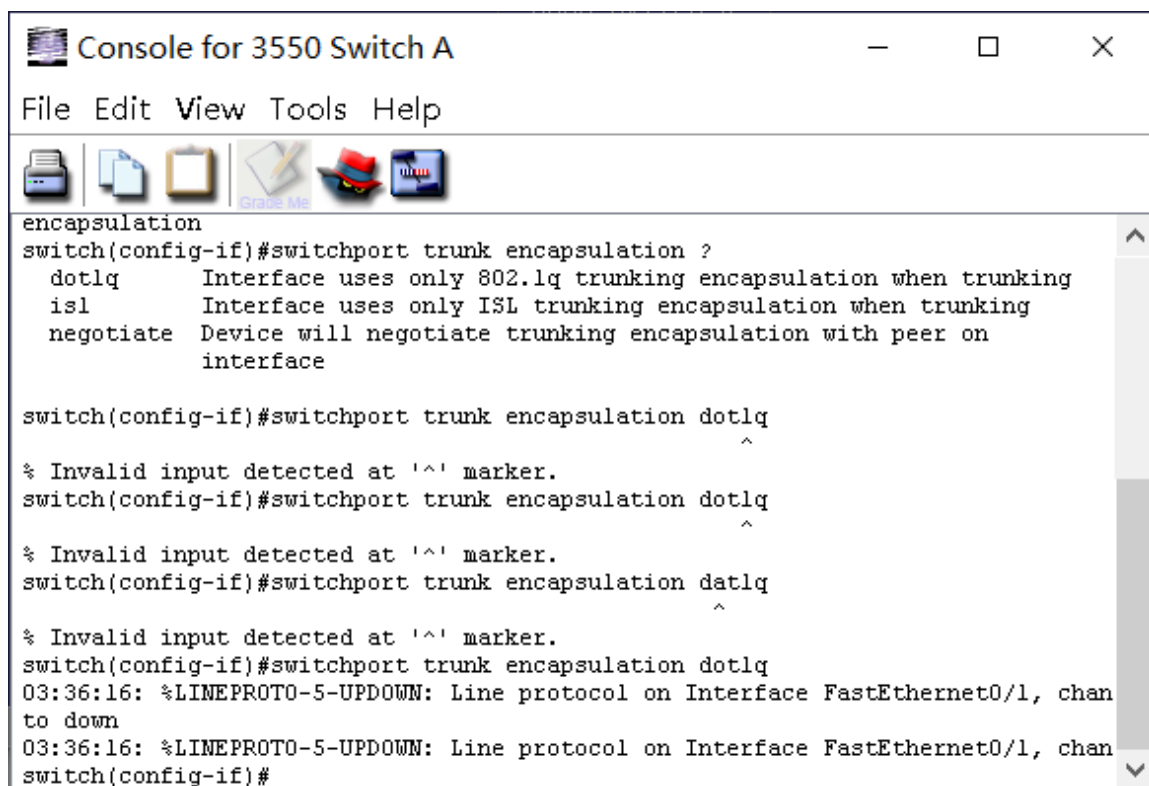
A screenshot of a terminal window titled "Console for 2950 Switch B". The window has a menu bar with "File", "Edit", "View", "Tools", and "Help". Below the menu bar is a toolbar with icons for a printer, a document, a folder, a notepad, a red hat, and a "Grade Me" button. The terminal text shows the following commands and output:

```
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)#vtp domain Cisco
Changing VTP domain name from NULL to Cisco
switch(config)#vtp mode client
Setting device to VTP CLIENT mode.
switch(config)#
```

配置 trunk



```

encapsulation
switch(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

switch(config-if)#switchport trunk encapsulation dot1q
                                     ^
% Invalid input detected at '^' marker.
switch(config-if)#switchport trunk encapsulation dot1q
                                     ^
% Invalid input detected at '^' marker.
switch(config-if)#switchport trunk encapsulation dat1q
                                     ^
% Invalid input detected at '^' marker.
switch(config-if)#switchport trunk encapsulation dot1q
03:36:16: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, chan
to down
03:36:16: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, chan
switch(config-if)#_

```

```

switch>en
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int fa0/11
switch(config-if)#exit
switch(config)#int fa0/12
switch(config-if)#switchport mode trunk
switch(config-if)#_

switch>en
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int fa0/11
switch(config-if)#switchport mode trunk
switch(config-if)#_

```

## VLAN

```

-----
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

--More--

```

switch>en
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int fa0/1
switch(config-if)#switchport access vlan 10
.
.
.

switch>en
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int fa0/2
switch(config-if)#switchport access vlan 20
switch(config-if)#

```

### 配置交换机管理地址

```

-----
switch(config)#int vlan 1
switch(config-if)#ip address 192.168.10.1 255.255.255.0
switch(config-if)#no shut
.
.
.

```

```

switch>en
switch#config t
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int vlan 1
switch(config-if)#ip address 192.168.10.2 255.255.255.0
switch(config-if)#no shut
.
.
.

```

```

switch>en
switch#config
Enter configuration commands, one per line.  End with CNTL/Z
switch(config)#int vlan 1
switch(config-if)#ip address 192.168.10.3 255.255.255.0
switch(config-if)#no shut
switch(config-if)#

```

### 配置 hostA,hostB,测试

**Configure Host A** ✕

Host Name:

☐ Obtain an IP address automatically

☒ Use the following IP address:

IP Address

Subnet

Default Gateway

**Configure Host B** ✕

Host Name:

☐ Obtain an IP address automatically

☒ Use the following IP address:

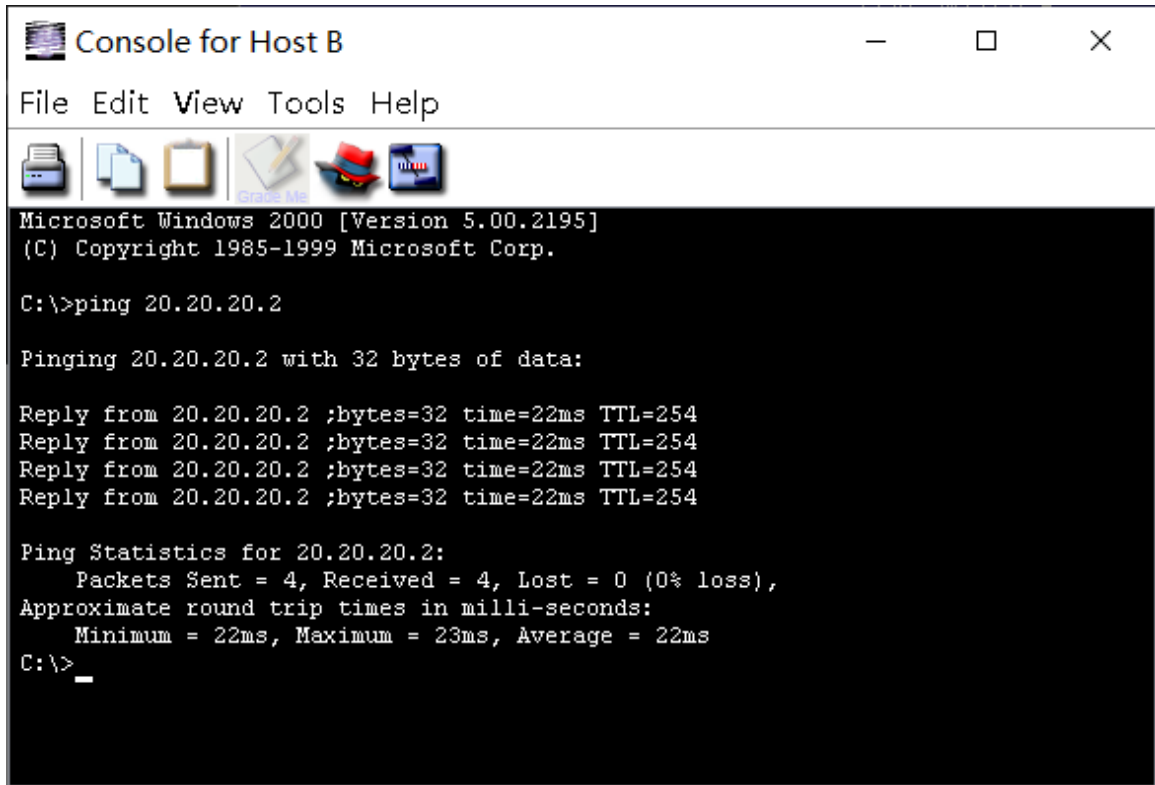
IP Address

Subnet

Default Gateway

```
switch>en
switch#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
```



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

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
C:\>
```

## 4 实验总结

学习到了路由器配置的相关知识，学习到了动态和静态路由以及 VLAN 的一些知识