

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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2020 年 4 月 20 日


```
Router>enable
Router#config t
Enter configuration commands, one per line. End with END.
Router(config)#hostname lab_A
lab_A(config)#
```

设置当日消息标题:

```
lab_A(config)#banner motd #
Enter TEXT message. End with the character '#'.
Accounting Department
you have entered a secured system
Authorized access only' #
lab_A(config)#_
```

查看配置文件以及版本信息等:

```
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
!
```

```
Router#show version
Cisco Internetwork Operating System Software
IOS (tm) 2500 Software (C2500-IS-L), Version 12.0(5), RELEASE SOFTWARE (fc1)
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 (fc1)

Router uptime is 0 hours, 14 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.
2 Ethernet/IEEE 802.3 interface(s)
2 Serial network interface(s)
32K bytes of non-volatile configuration memory.
8192K bytes of processor board System flash (Read ONLY)
```

建立名字解析的映射表:

```
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 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
```

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

手工开启端口：

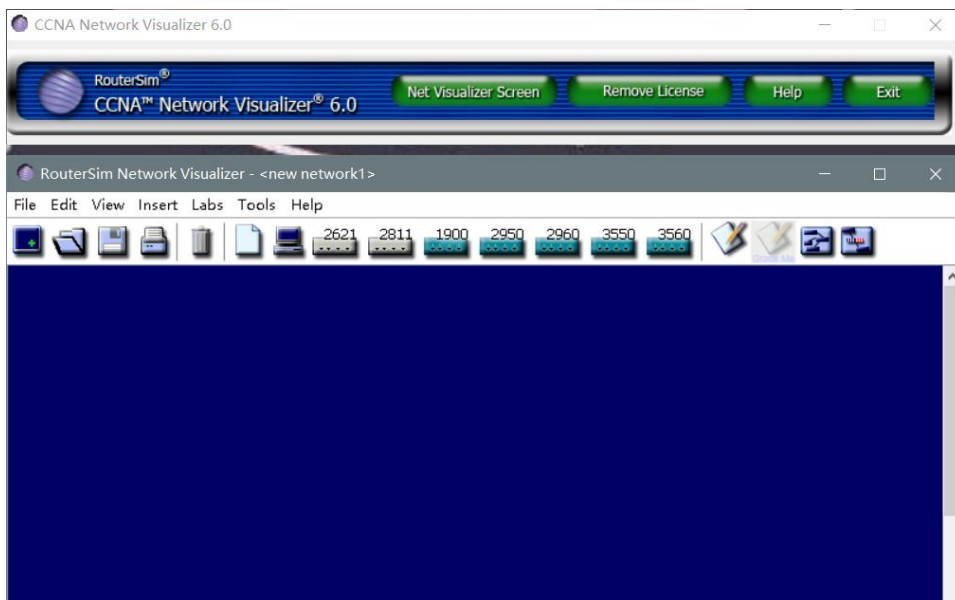
```
lab_A#config t
Enter configuration commands, one per line.  End with END.
lab_A(config)#interface serial 0
lab_A(config-if)#no shutdown
```

检查串口的配置情况（已完成）：

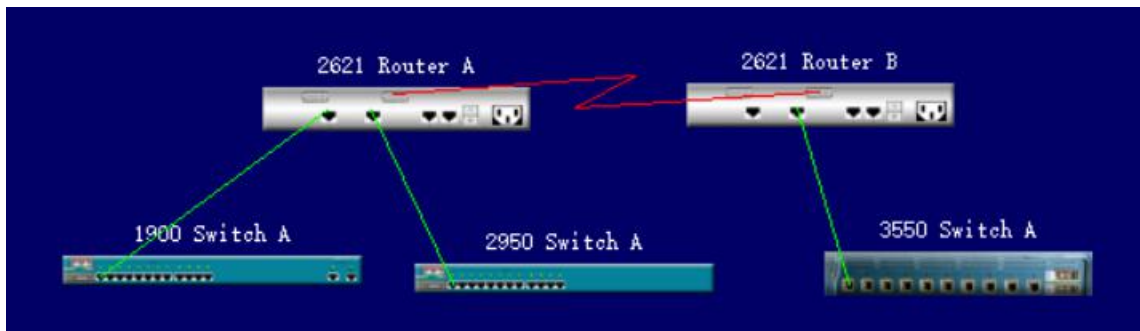
```
lab_A#show interface serial 0
Serial0 is up, line protocol is up
  Internet address is 201.100.11.1/24
  Hardware is HD64570
  MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
```

静态路由配置：

CCNA Network Visualizer 6.0 界面：



连接各模拟器设备：



配置路由器 A、B 的环境

Console for 2621 Router A

File Edit View Tools Help

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#int f0/1
Router(config-if)#ip addr 205.7.5.1 255.255.255.0
Router(config-if)#no shutdown
09:56:16 %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
09:56:16 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

Router(config-if)#int f0/0
Router(config-if)#ip addr 192.5.5.1 255.255.255.0
Router(config-if)#no shutdown
09:57:41 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
09:57:41 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#int s0/0
Router(config-if)#ip addr 201.100.11.1 255.255.255.0
Router(config-if)#clock rate 56000
Router(config-if)#no shutdown
09:58:25 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
09:58:25 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

Router(config-if)#end
Router#

```

Console for 2621 Router B

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 f0/0
Router(config-if)#ip addr 199.6.13.1 255.255.255.0
Router(config-if)#no shutdown
10:02:41 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
10:02:41 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

Router(config-if)#int s0/0
Router(config-if)#ip addr 201.100.11.1 255.255.255.0
Router(config-if)#no shutdown
10:03:45 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
10:03:45 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up

Router(config-if)#

```

Console for 2621 Router A

File Edit View Tools Help

```

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        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
Router#

```

Console for 2621 Router B

File Edit View Tools Help

```

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

```

查看是否连通：

Console for 2621 Router A

File Edit View Tools Help

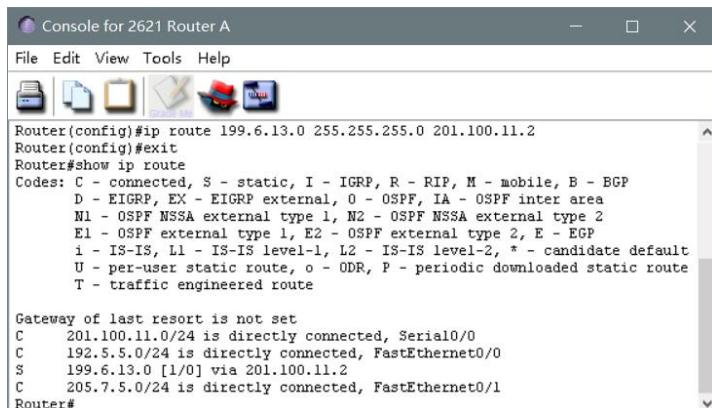
```

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

```

配置静态路由表:



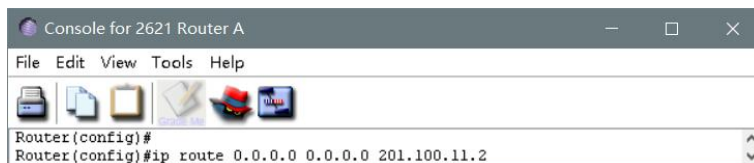
```

Console for 2621 Router A
File Edit View Tools Help
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    201.100.11.0/24 is directly connected, Serial0/0
C    192.5.5.0/24 is directly connected, FastEthernet0/0
S    199.6.13.0 [1/0] via 201.100.11.2
C    205.7.5.0/24 is directly connected, FastEthernet0/1
Router#

```

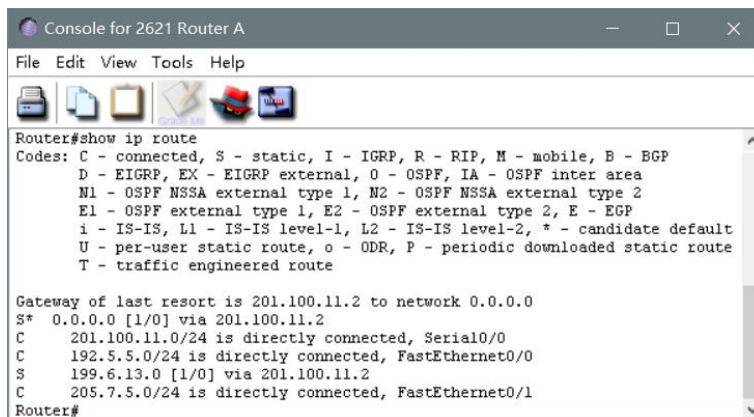
配置默认路由:



```

Console for 2621 Router A
File Edit View Tools Help
Router(config)#
Router(config)#ip route 0.0.0.0 0.0.0.0 201.100.11.2

```



```

Console for 2621 Router A
File Edit View Tools Help
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 201.100.11.2 to network 0.0.0.0
S*  0.0.0.0 [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
S    199.6.13.0 [1/0] via 201.100.11.2
C    205.7.5.0/24 is directly connected, FastEthernet0/1
Router#

```

配置动态路由:

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#router rip
Router(config-router)#network 201.100.11.0

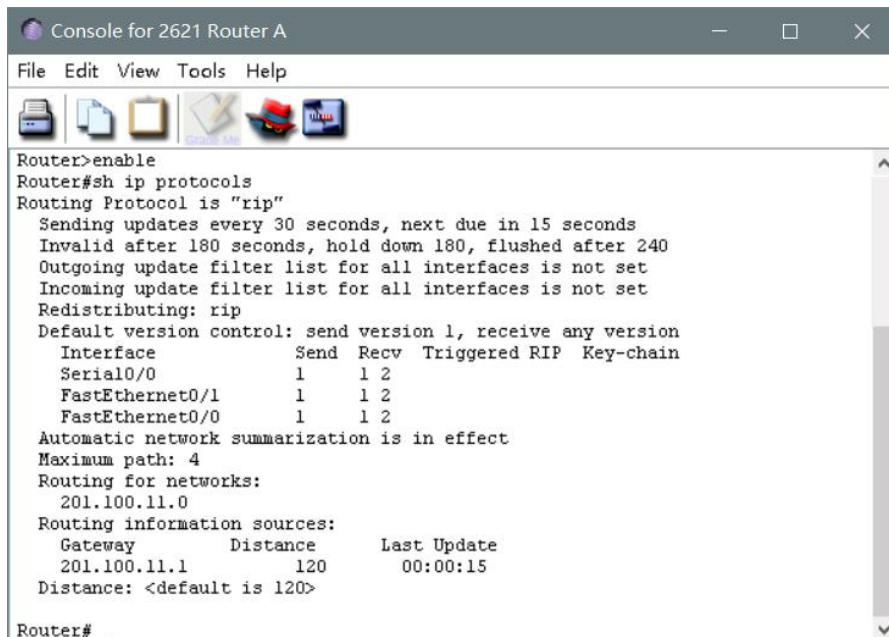
```

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#router rip
Router(config-router)#network 199.6.13.0
Router(config-router)#

```


查看 RIP 协议路由信息：



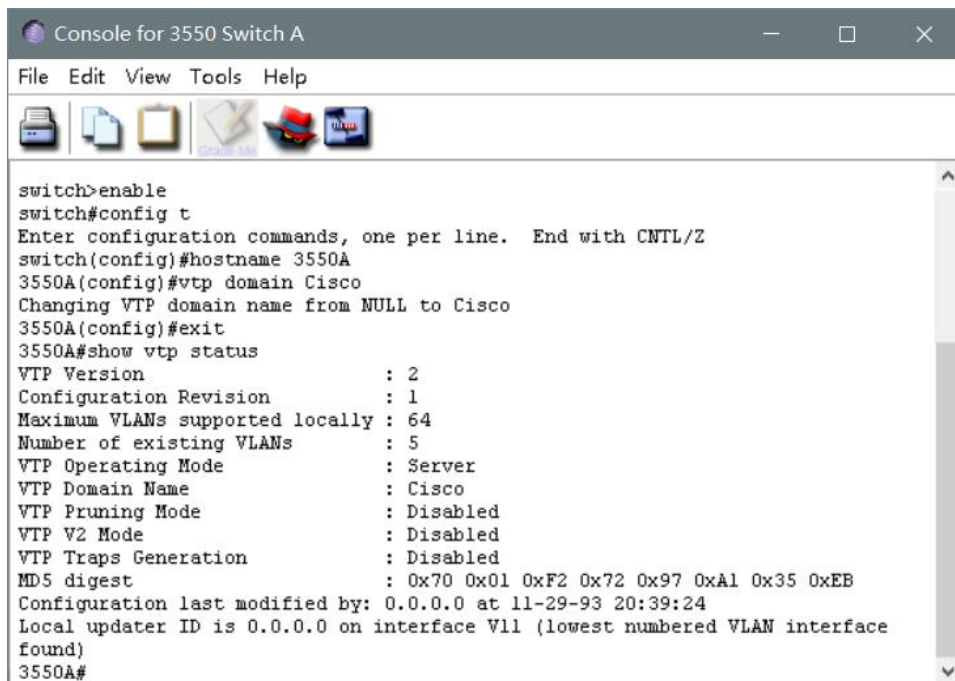
```

Console for 2621 Router A
File Edit View Tools Help
Router>enable
Router#sh ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 15 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
    Serial0/0         1      1 2
    FastEthernet0/1    1      1 2
    FastEthernet0/0    1      1 2
  Automatic network summarization is in effect
  Maximum path: 4
  Routing for networks:
    201.100.11.0
  Routing information sources:
    Gateway          Distance  Last Update
    201.100.11.1      120      00:00:15
  Distance: <default is 120>

Router#
  
```

配置 VLAN：

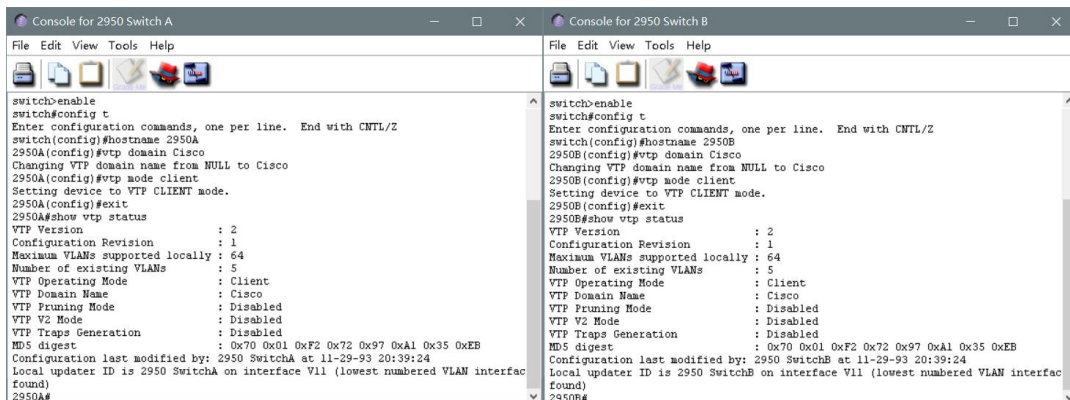
配置 3 5 5 0 A 的 VTP：



```

Console for 3550 Switch A
File Edit View Tools Help
switch>enable
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#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 V11 (lowest numbered VLAN interface found)
3550A#
  
```

配置 2950A 与 2950B 的 VTP:



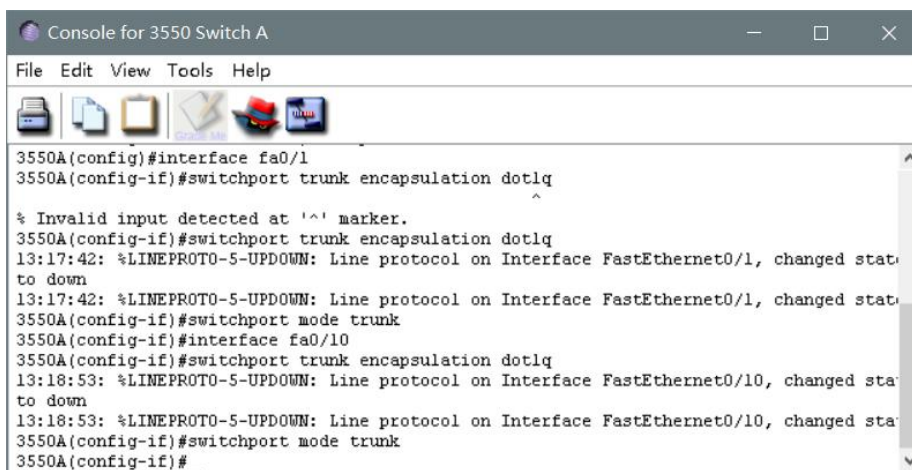
```

switch>enable
switch#config 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
Setting device to VTP CLIENT mode.
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          : 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>enable
switch#config 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#show 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#

```

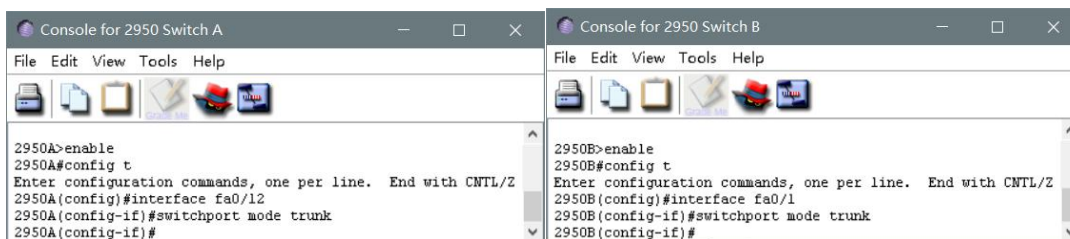
配置 Trunk:



```

3550A(config)#interface fa0/1
3550A(config-if)#switchport trunk encapsulation dot1q
% Invalid input detected at '^' marker.
3550A(config-if)#switchport trunk encapsulation dot1q
13:17:42: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
13:17:42: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
3550A(config-if)#switchport mode trunk
3550A(config-if)#interface fa0/10
3550A(config-if)#switchport trunk encapsulation dot1q
13:18:53: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to down
13:18:53: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/10, changed state to up
3550A(config-if)#switchport mode trunk
3550A(config-if)#

```



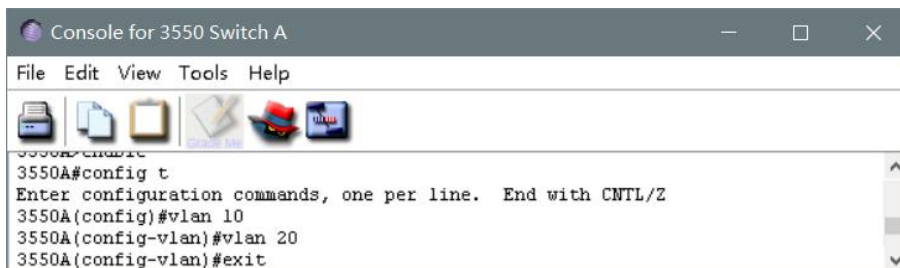
```

2950A>enable
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)#

2950B>enable
2950B#config t
Enter configuration commands, one per line. End with CNTL/Z
2950B(config)#interface fa0/1
2950B(config-if)#switchport mode trunk
2950B(config-if)#

```

创建 VLAN:



```

3550A>enable
3550A#config t
Enter configuration commands, one per line. End with CNTL/Z
3550A(config)#vlan 10
3550A(config-vlan)#vlan 20
3550A(config-vlan)#exit

```



```
3550A#show vlan
```

VLAN Name		Status	Ports
1	default	active	Fa0/2, Fa0/3, Fa0/4, Fa0/5 Fa0/6, Fa0/7, Fa0/8, Fa0/9
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

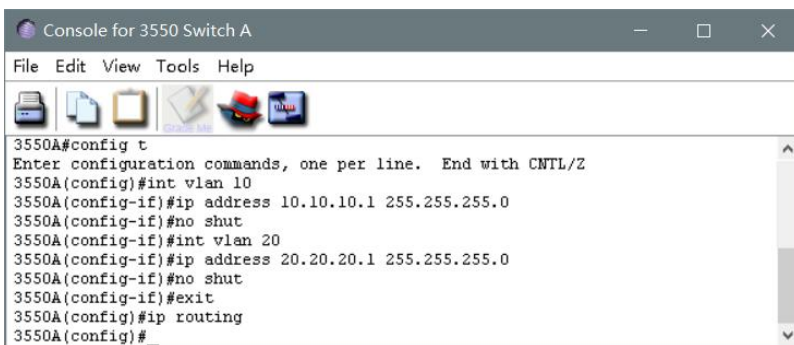
```
--More--
```

分配交换机端口加入 VLAN:

```
2950A(config)#interface fa0/1
2950A(config-if)#switchport access vlan 10

2950B(config)#interface fa0/12
2950B(config-if)#switchport access vlan 20
```

配置第三层交换机:



配置各交换机的管理地址:

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

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

配置主机 Host A 和 Host B 并测试：

Configure Host A	Configure Host B
Host Name: <input type="text" value="A"/>	Host Name: <input type="text" value="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"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>	Subnet: <input type="text"/> . <input type="text"/> . <input type="text"/> . <input type="text"/>
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"/>

测试成功：

```
Console for 3550 Switch A
File Edit View Tools Help
3550A>enable
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#
```

4 实验总结

成功配置了静态路由、动态路由和交换机端口的 VLAN，并通过这些实验了解了路由器的基本结构及其在网络中的作用，对 IOS 配置环境有了一个初步的认识。