厦門大學

信息学院软件工程系

《计算机网络》实验报告

题　　目 实验五　CISCO IOS 路由器基本配置

班　　级 软件工程 2018 级 B 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

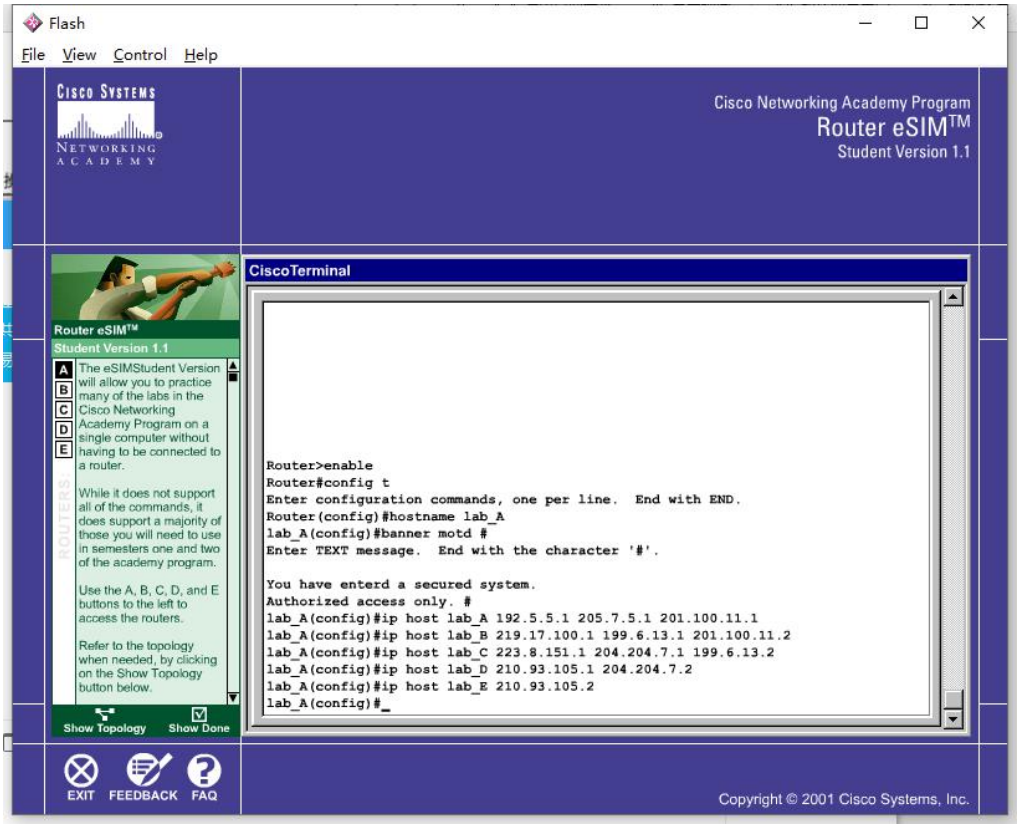
Windows 10 操作系统

-Router eSIM v1.1 模拟器

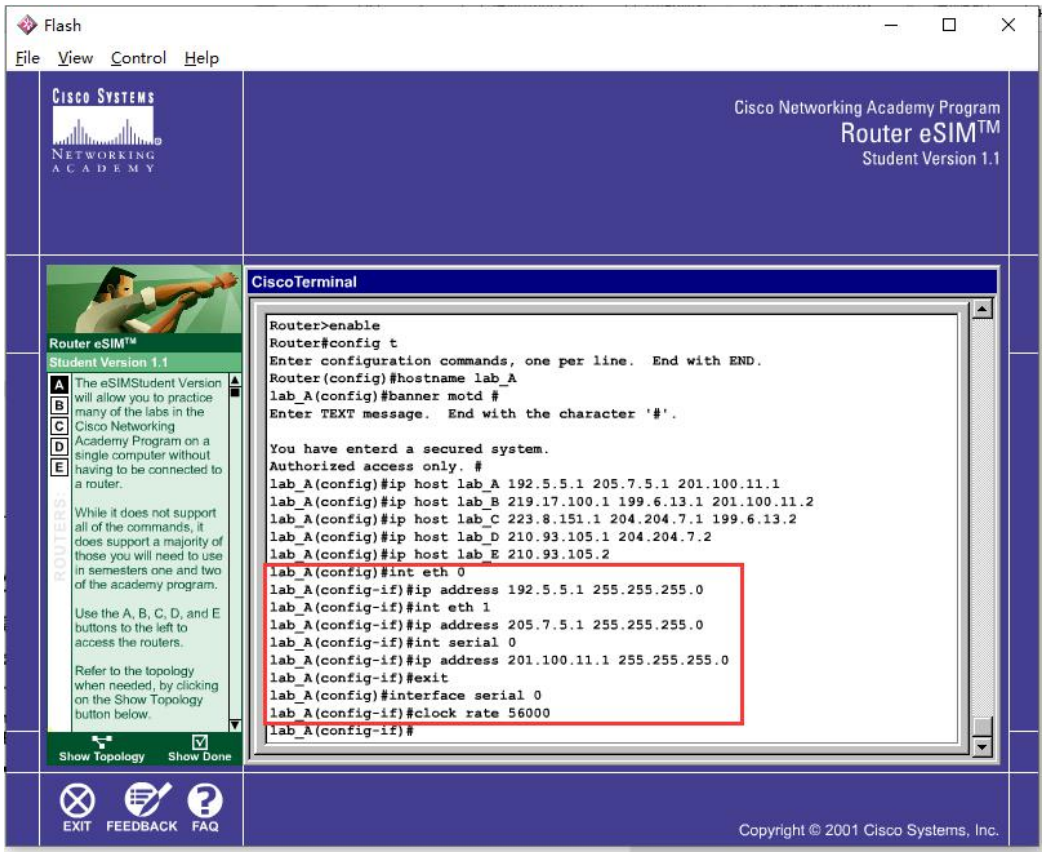
-CCNA Network Visualizer 6.0

3 实验结果

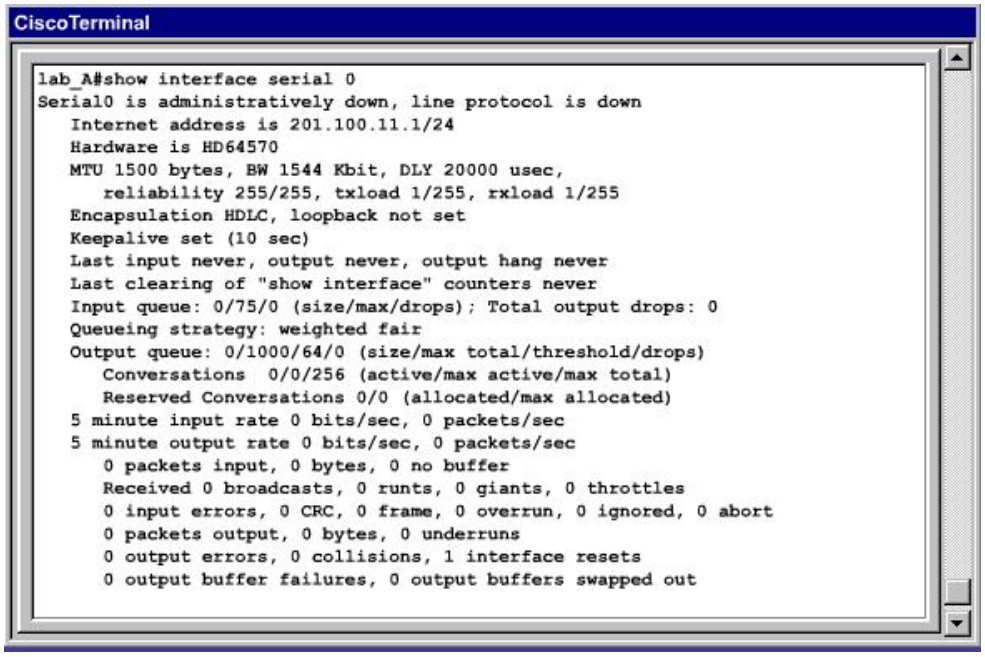
1. 1、为路由器取名字并创建一个 IP 地址映射表



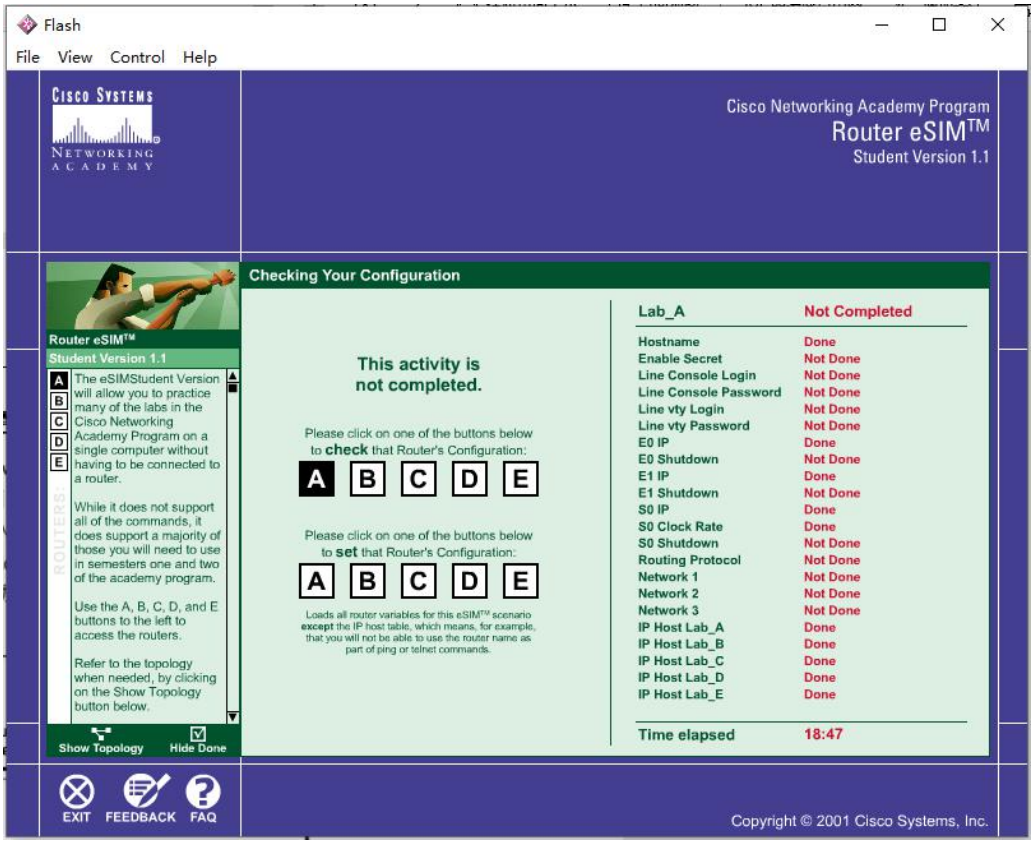
1.2、为路由器的一个接口配置 ip 地址并设置 clock rate



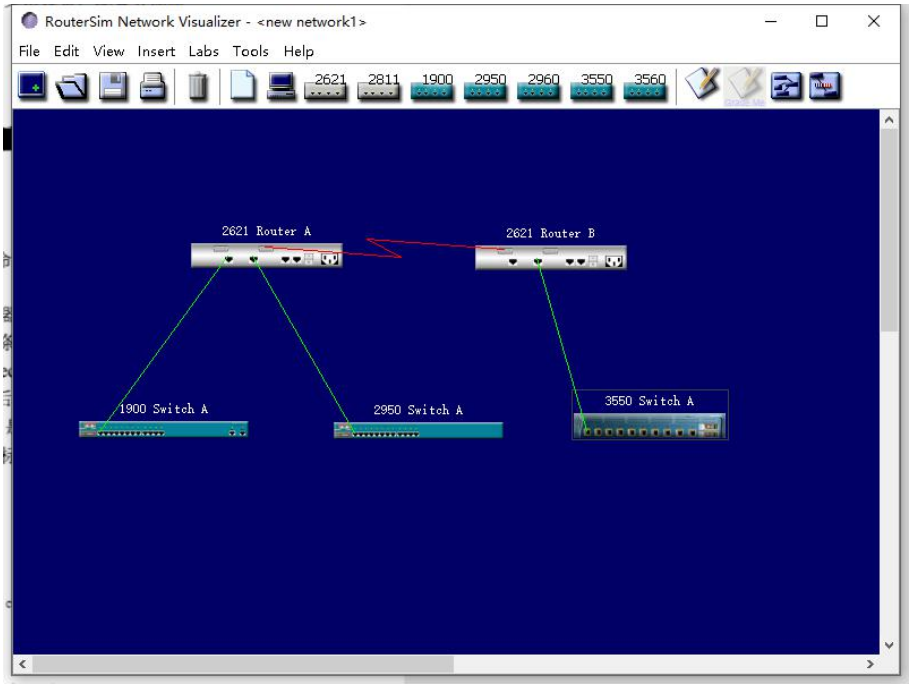
1.3、用 show 命令查看串口的配置情况



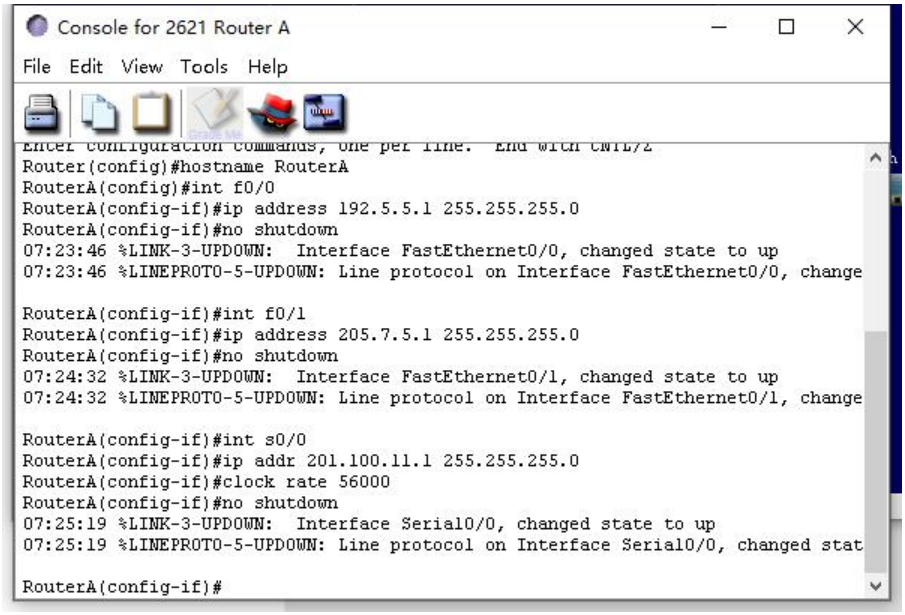
1.4、路由器 A 的配置情况



2.1、实现路由器与交换机之间的连接

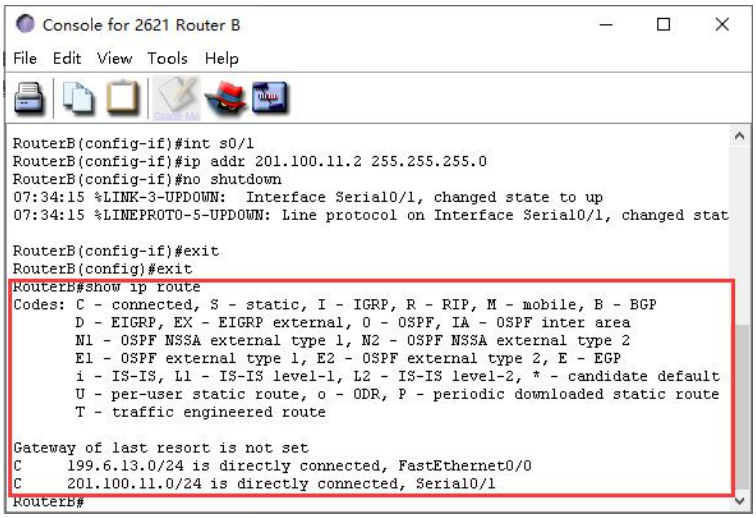


2.2、静态路由配置之前的准备工作

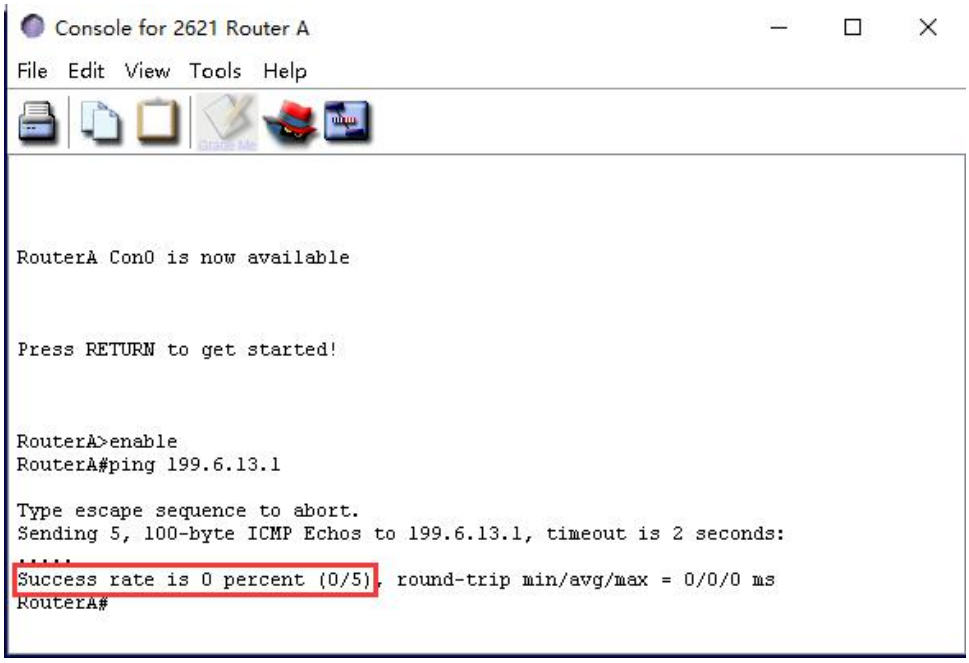


2.3、查看两个路由器的路由表

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



2.4、通过 ping 命令查看是否连通（未连通）



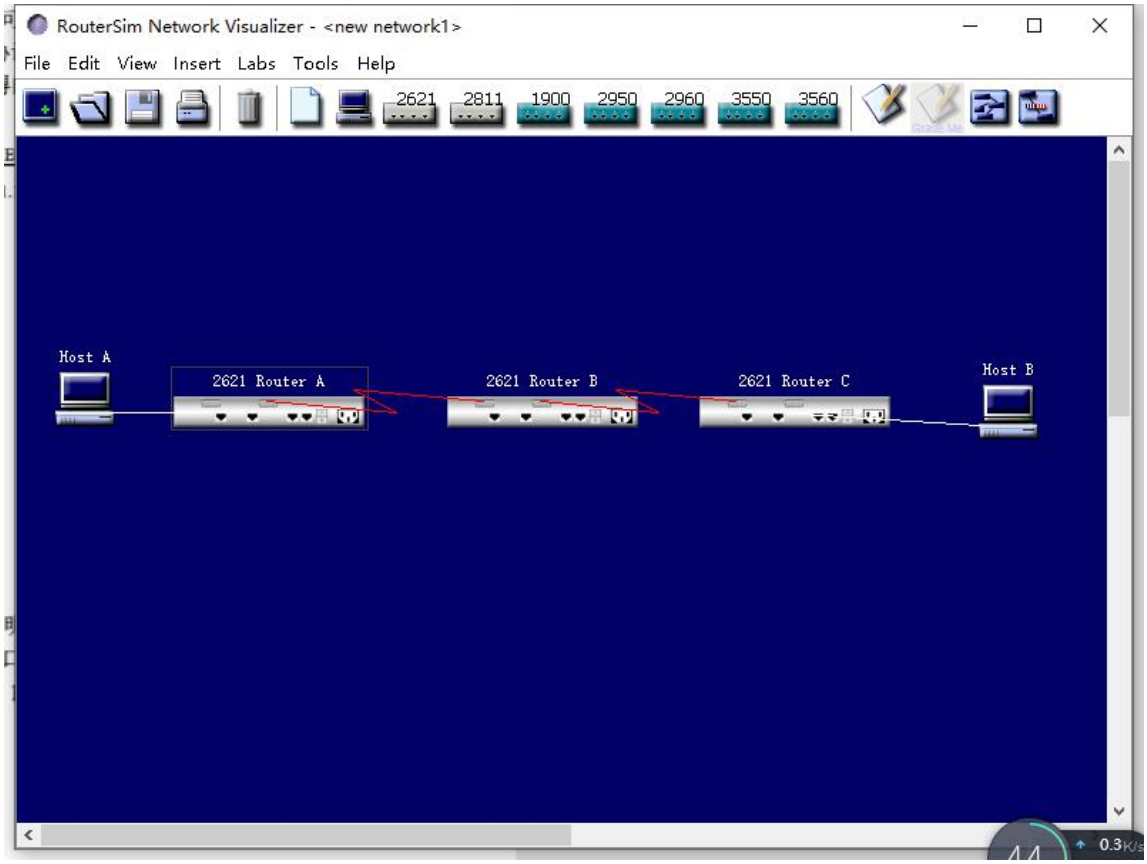
2.5、配置静态路由表

```
RouterA#config t
Enter configuration commands, one per line.  End with CNTL/Z
RouterA(config)#ip route 199.6.13.0 255.255.255.0 201.100.11.2
RouterA(config)#exit
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
S     199.6.13.0 [1/0] via 201.100.11.2
C     201.100.11.0/24 is directly connected, Serial0/0
C     205.7.5.0/24 is directly connected, FastEthernet0/1
C     192.5.5.0/24 is directly connected, FastEthernet0/0
```

2.6、检验连通性（已连通）

```
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
```

3.1、连接好路由器和网络



3.2、给每个路由器配置好 rip

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

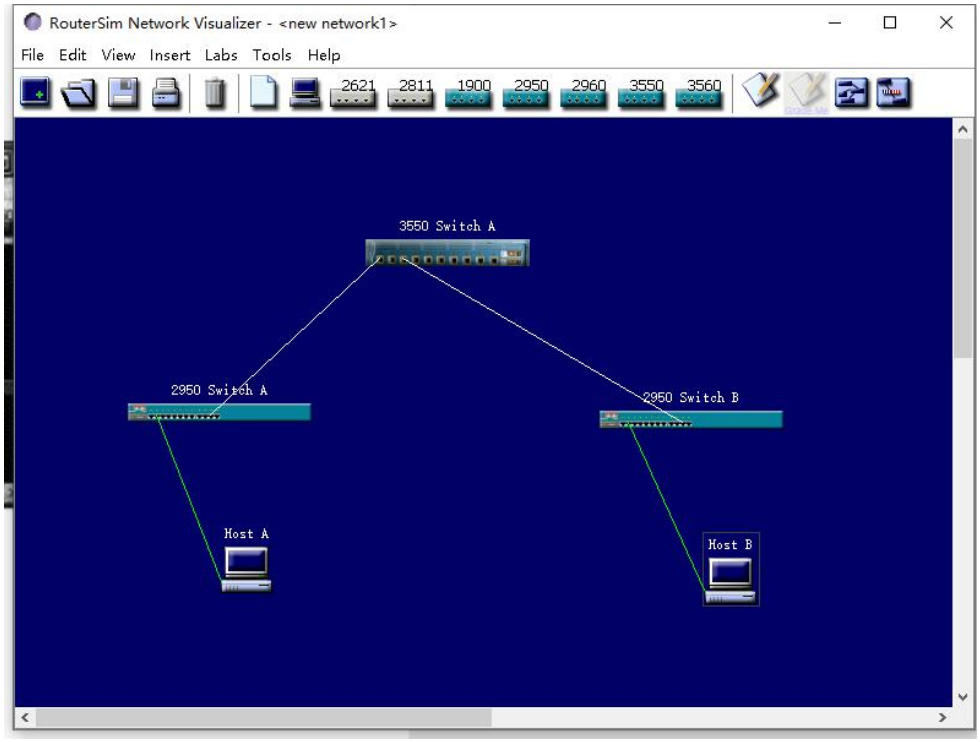
```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#hostname RouterB
RouterB(config)#router rip
RouterB(config-router)#network 10.0.0.0
RouterB(config-router)#exit
RouterB(config)#exit
```

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#hostname RouterC
RouterC(config)#router rip
RouterC(config-router)#network 192.168.1.0
RouterC(config-router)#network 10.0.0.0
RouterC(config-router)#exit
RouterC(config)#exit
```

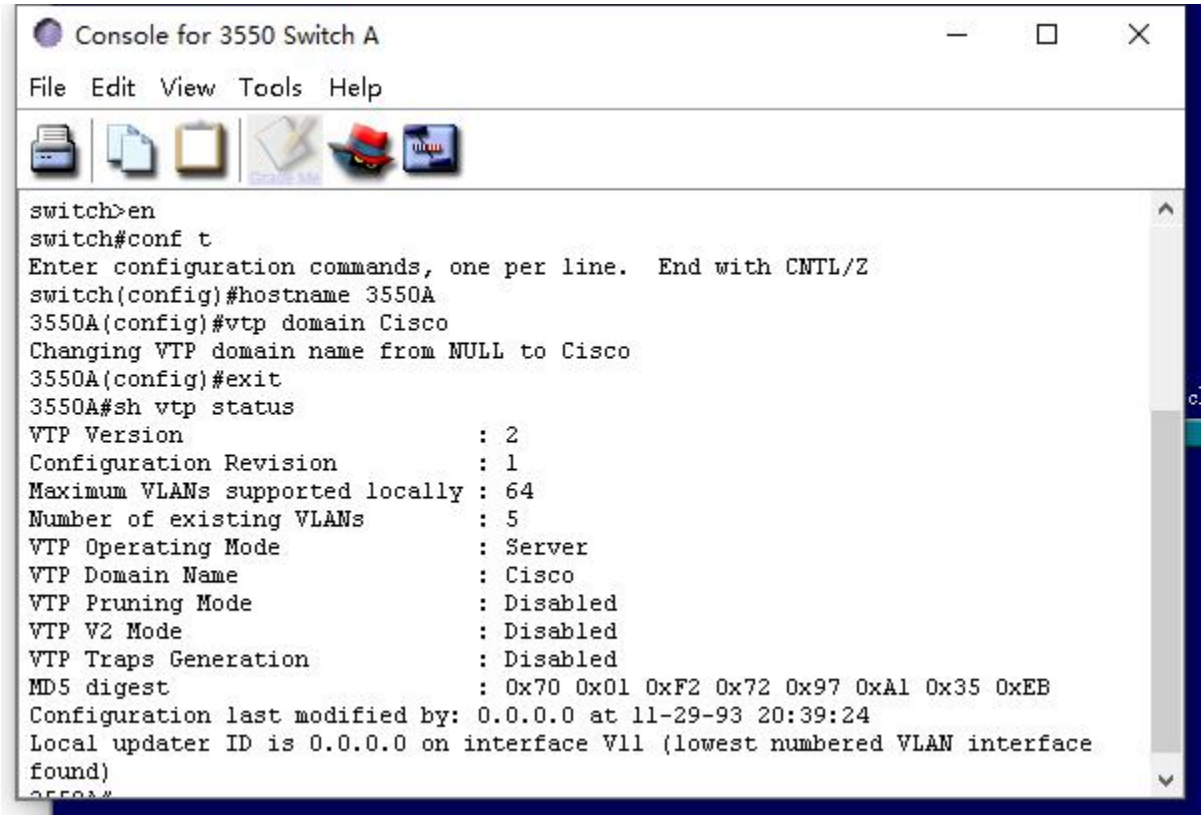
3.3、查看路由协议 rip 的工作情况

```
RouterA#show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 20 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>
```

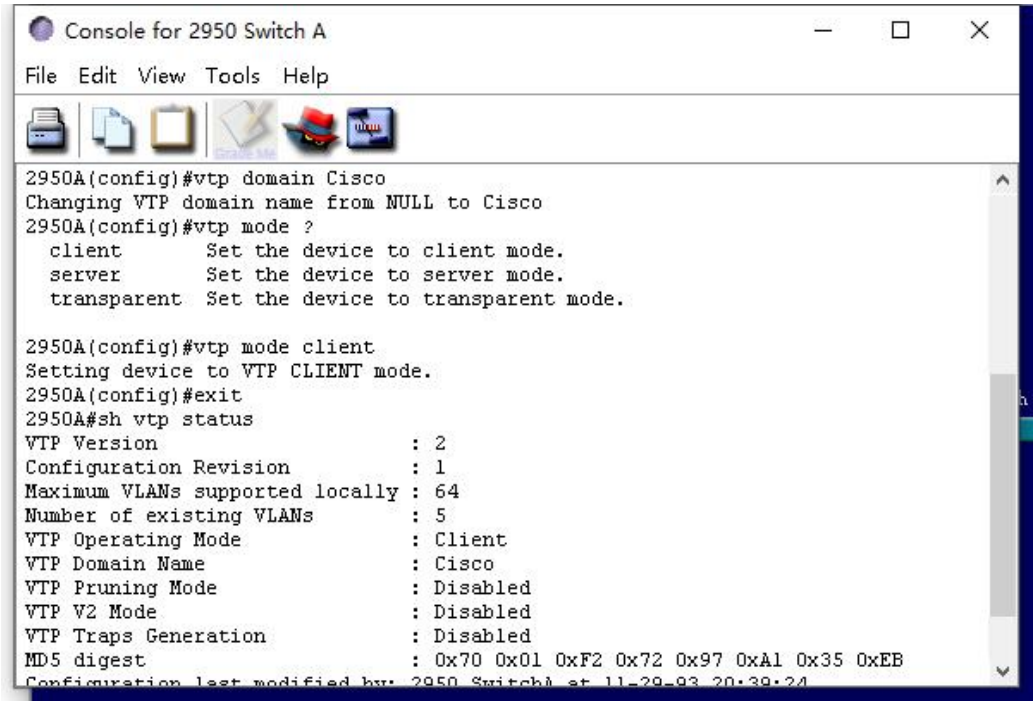
4.1、连接好多个交换机



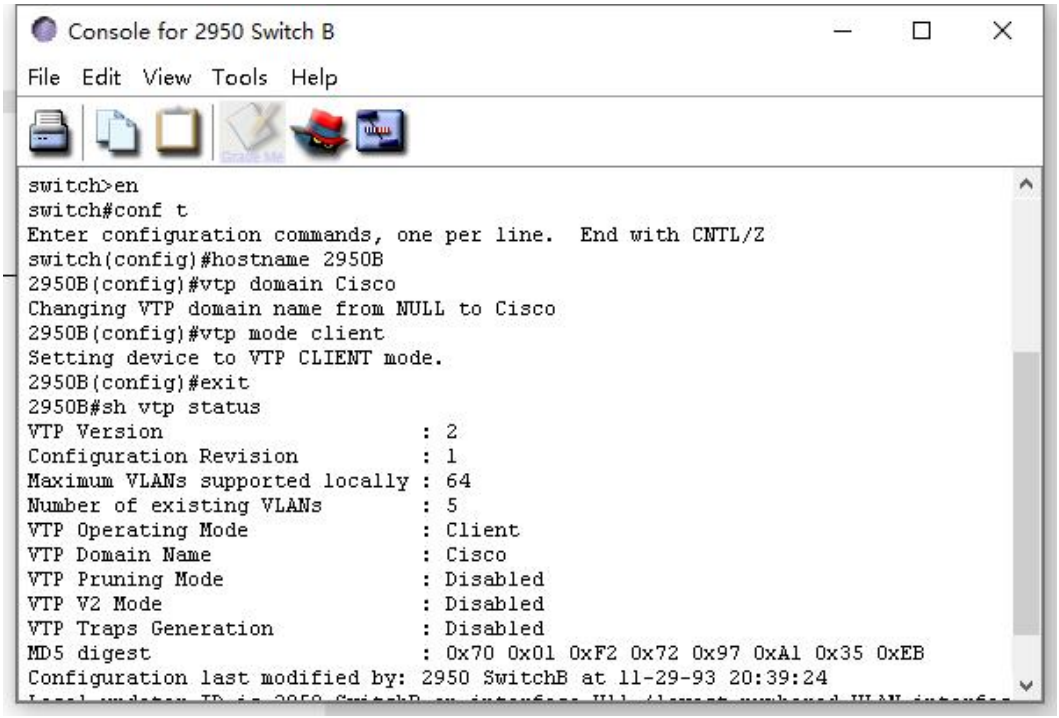
4.2、配置 3550A 的 VTP



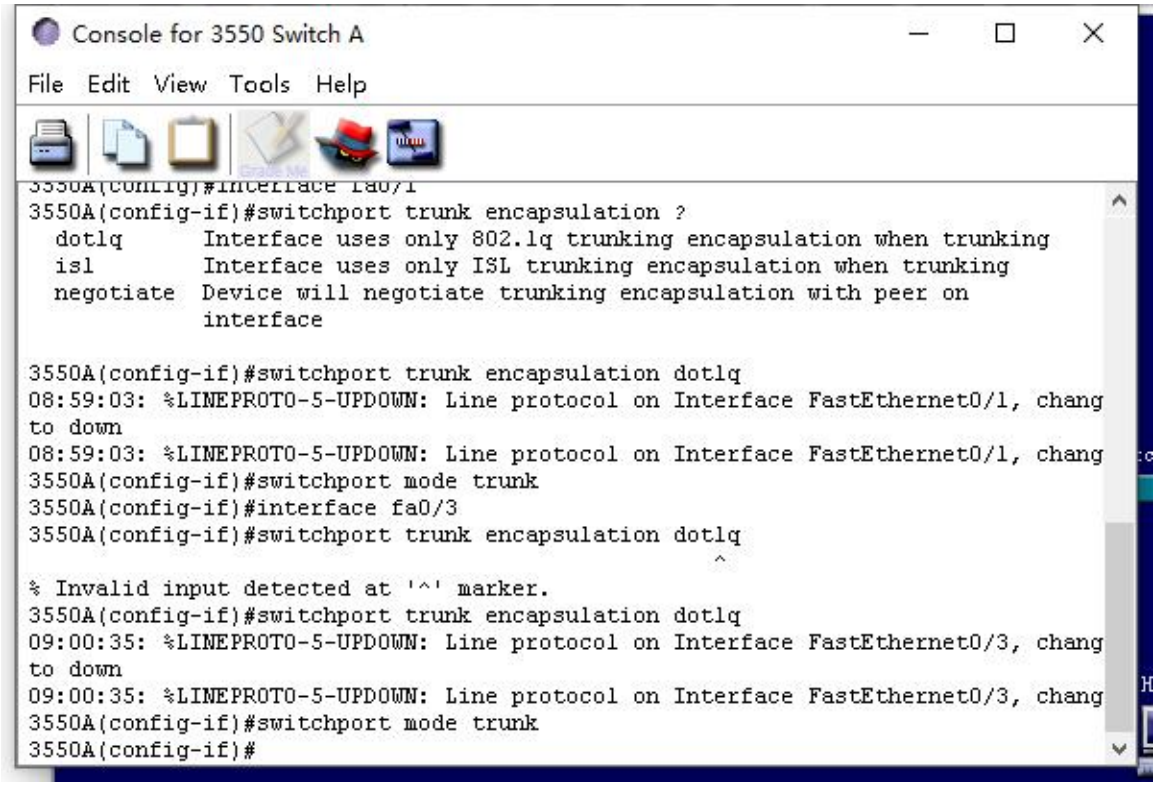
4.3、配置 2950A 的 VTP



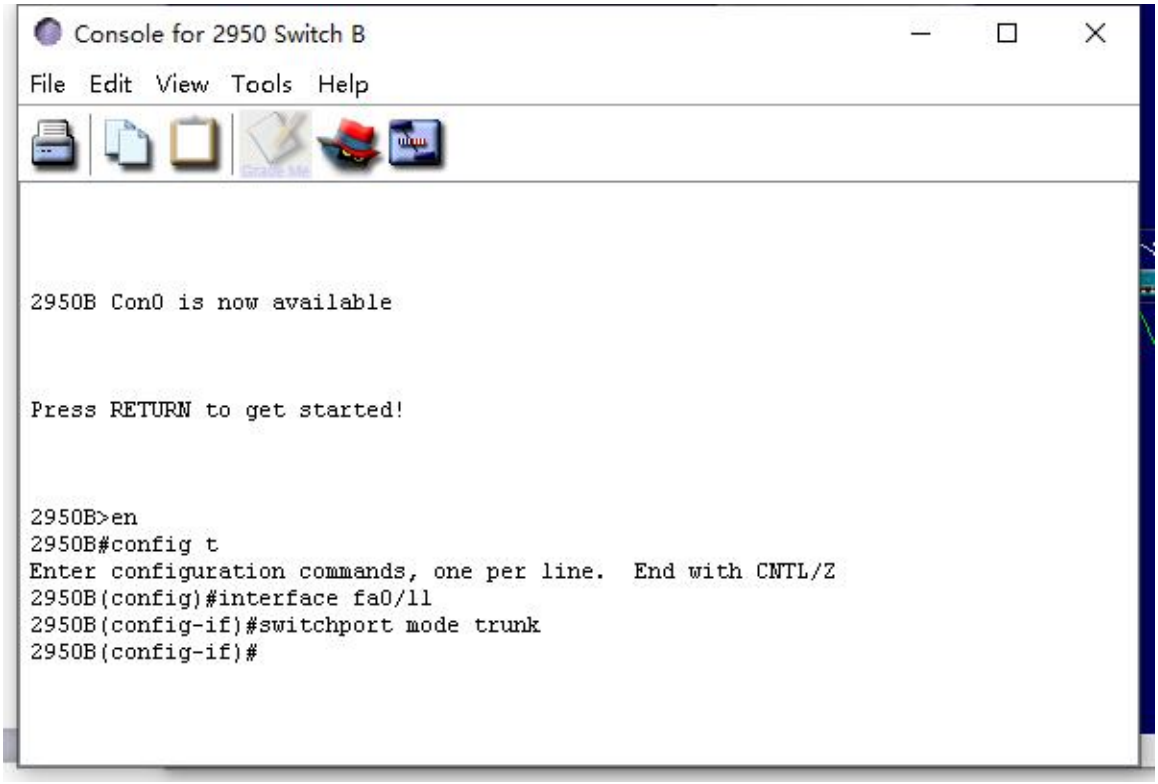
4.4、配置 2950B 的 VTP



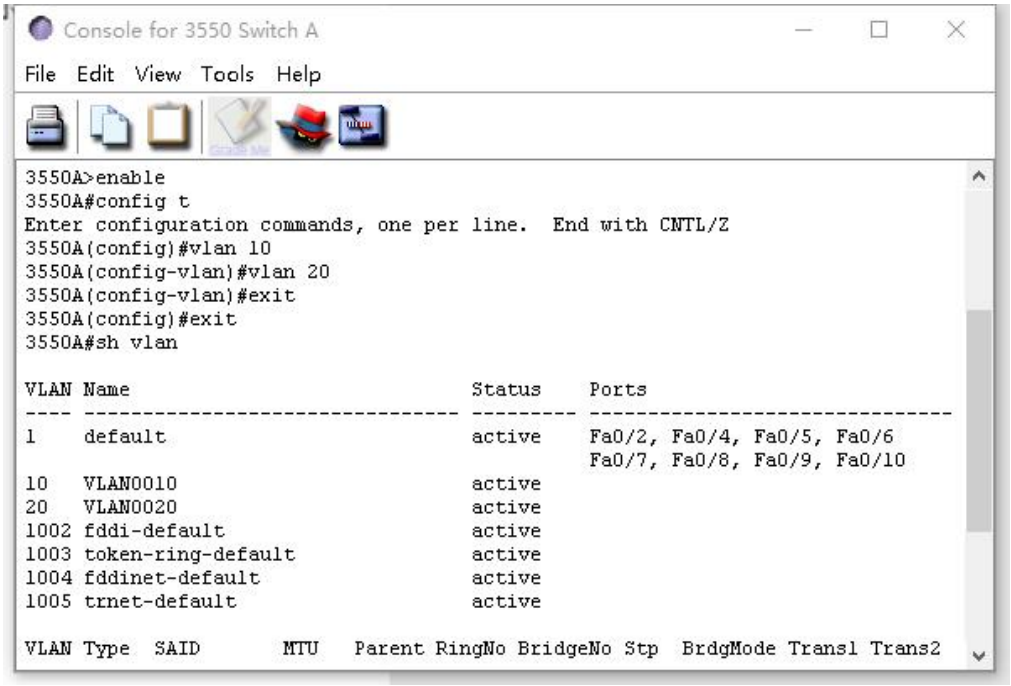
4.5、将交换机 3550A 的 fa0/1 和 fa0/3 配置为 Trunk 端口，并用 802.1q 封装



4.6、分别将 2950A 和 2950B 的端口 fa0/11 设置为 Trunk 端口



4.7、创建两个 VLAN，并用 show vlan 命令验证



4.8、分配交换机端口加入 VLAN

分别将 2950A 和 2950B 的端口 fa0/2 加入 vlan10 和 20

```
2950A>en
2950A#config t
Enter configuration commands, one per line.  End with CNTL/Z
2950A(config)#interface fa0/2
2950A(config-if)#switchport access vlan 10
2950A(config-if)#
```

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

4.9、在 3550 交换机上分别设置各 VLAN 的接口 ip 地址，并启动路由

```
3550A>en
3550A#config t
Enter configuration commands, one per line.  End with CNTL/Z
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
3550A(config)#ip routing
```

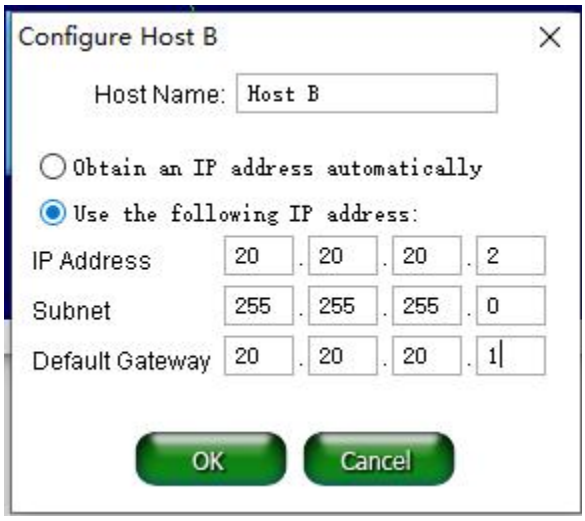
4.10、配置各个交换机的管理地址

```
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
```

4.11、配置主机 Host A 和 Host B，并进行测试




```
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
```

4 实验总结

1、深入学习了路由器的工作原理与连接过程：路由器根据已知的 ip 地址来将数据包发送到下一个节点位置，根据不同的协议选择不同的路径。

2、 静态路由的路由表是管理员自行决定的，适用于简单的网络中，稳定性和安全性较强。

3、动态路由会实时更新自身的配置信息，在复杂的网络中通常使用动态路由，能适应网络上的信息变化。