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　路由器模拟配置

班　　级 软件工程 2018 级 2 班

姓　　名 陈岩松

学　　号 20420172201759

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2020 年 4 月 21 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）。

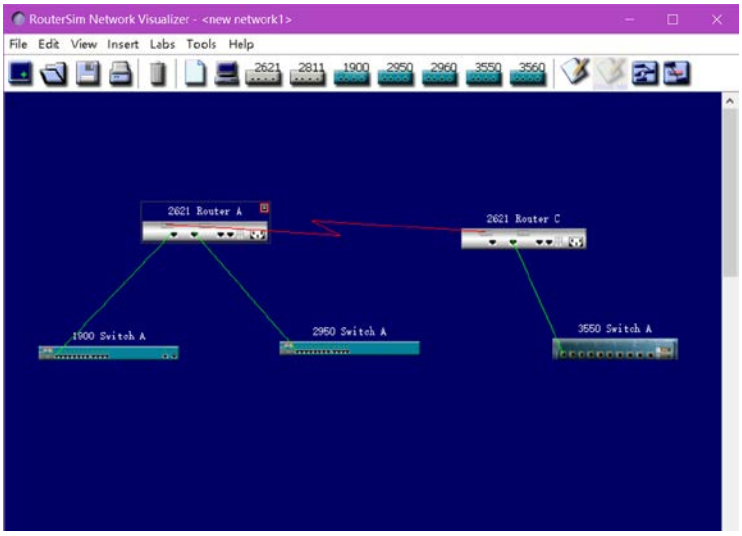
2 实验环境

Windows

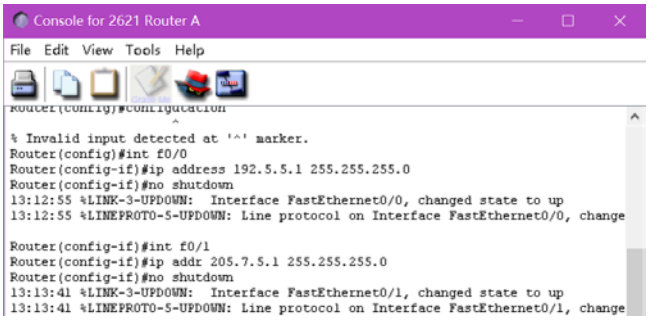
3 实验结果

配置静态路由：

连接设备图，参考资料上使用 Router2600，但实际实验软件中只有 2621



配置 RouterA：DCE 端



```
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
13:21:27 %LINK-3-UPDOWN:  Interface Serial0/0, changed state to up
13:21:27 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed stat

Router(config-if)#exit
Router(config)#exit
Router#
```

```
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
C     192.5.5.0/24 is directly connected, FastEthernet0/0
C     201.100.11.0/24 is directly connected, Serial0/0
Router#
```

RouterB:DTE 端

Console for 2621 Router C

File Edit View Tools Help

```
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#int f0/0
Router(config-if)#ip address 199.6.13.1 255.255.255.0
Router(config-if)#no shutdown
13:58:50 %LINK-3-UPDOWN:  Interface FastEthernet0/0, changed state to up
13:58:50 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, change

Router(config-if)#int s0/0
Router(config-if)#ip addr 201.100.11.1 255.255.255.0
Router(config-if)#no shutdown
13:59:21 %LINK-3-UPDOWN:  Interface Serial0/0, changed state to up
13:59:21 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed stat

Router(config-if)#exit
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     199.6.13.0/24 is directly connected, FastEthernet0/0
C     201.100.11.0/24 is directly connected, Serial0/0
Router#
```

A 端测试不连通：

```
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#
```

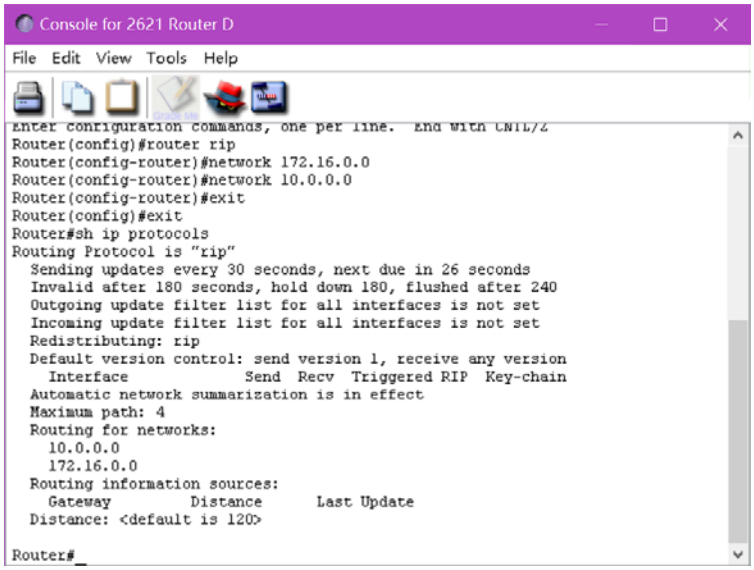
配置静态路由：

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

测试连通

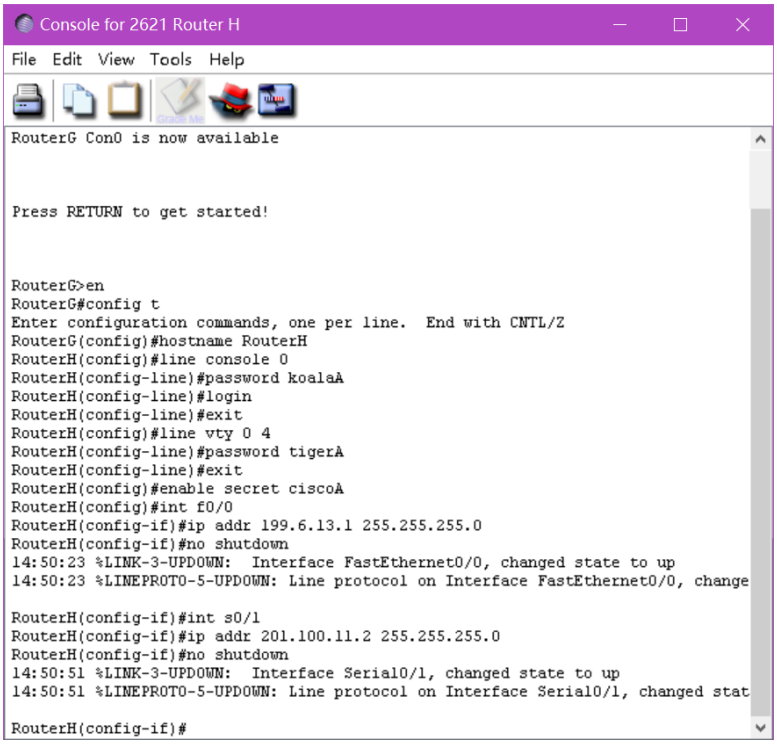
```
Router#ping 199.6.13.1

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

动态路由 RIP 配置：



Cisco 路由器访问列表配置：

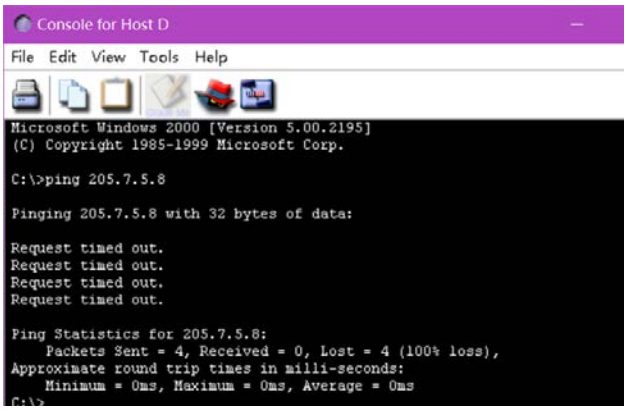
按照材料中进行基本配置之后，路由器有了密码



路由器的 rip 配置示例

```
Router>config t
       ^
% Invalid input detected at '^' marker.
Router>enable
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#router rip
Router(config-router)#nerwork 192.5.5.0
                      ^
% Invalid input detected at '^' marker.
Router(config-router)#network 192.5.5.0
Router(config-router)#network 205.7.5.0
Router(config-router)#network 201.100.11.0
Router(config-router)#exit
```

限制前主机可以访问 205.7.5.0，而限制后：主机 D 的访问

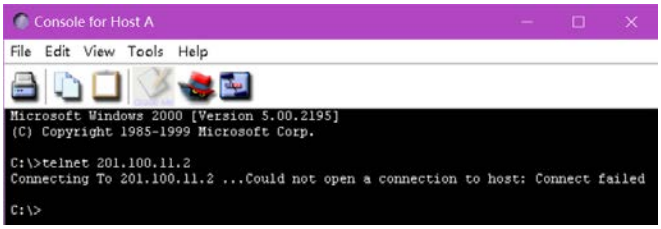


利用访问列表限制子网对子网 199.6.13.0 的访问

```
Router>en
Router#config t
Enter configuration commands, one per line.  End with CNTL/Z
Router(config)#hostname RouterG
RouterG(config)#access-list 51 deny 192.5.5.8 255.255.255.248
RouterG(config)#access-list 51 permit any
RouterG(config)#int s0/0
RouterG(config-if)#ip access-group 51 out
RouterG(config-if)#exit
RouterG(config)#
```

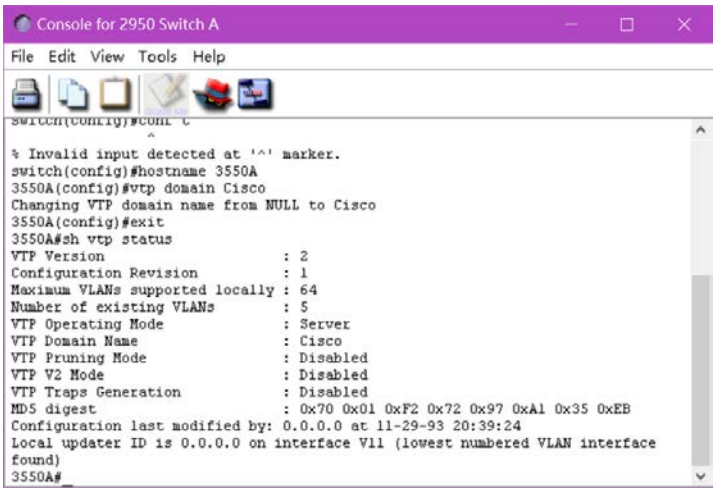
A 远程登录

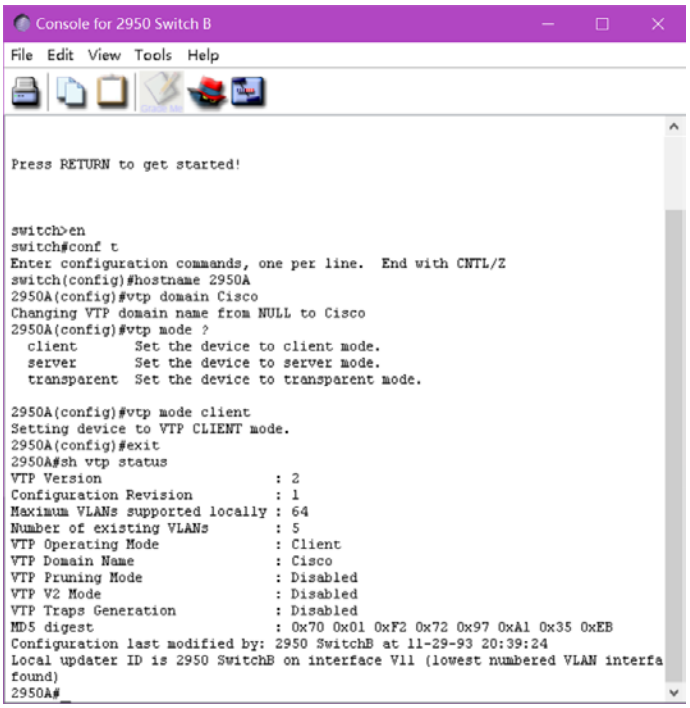
在 RouterH 上拒绝 A 访问后



IOS 路由和 VLAN 配置

设置 VTP 域：






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

创建 VLAN，将交换机加入 VLAN

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

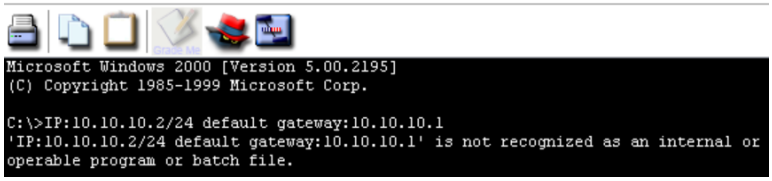
配置第三层交换机：

```
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
3550A(config)#
```

配置交换机管理地址：

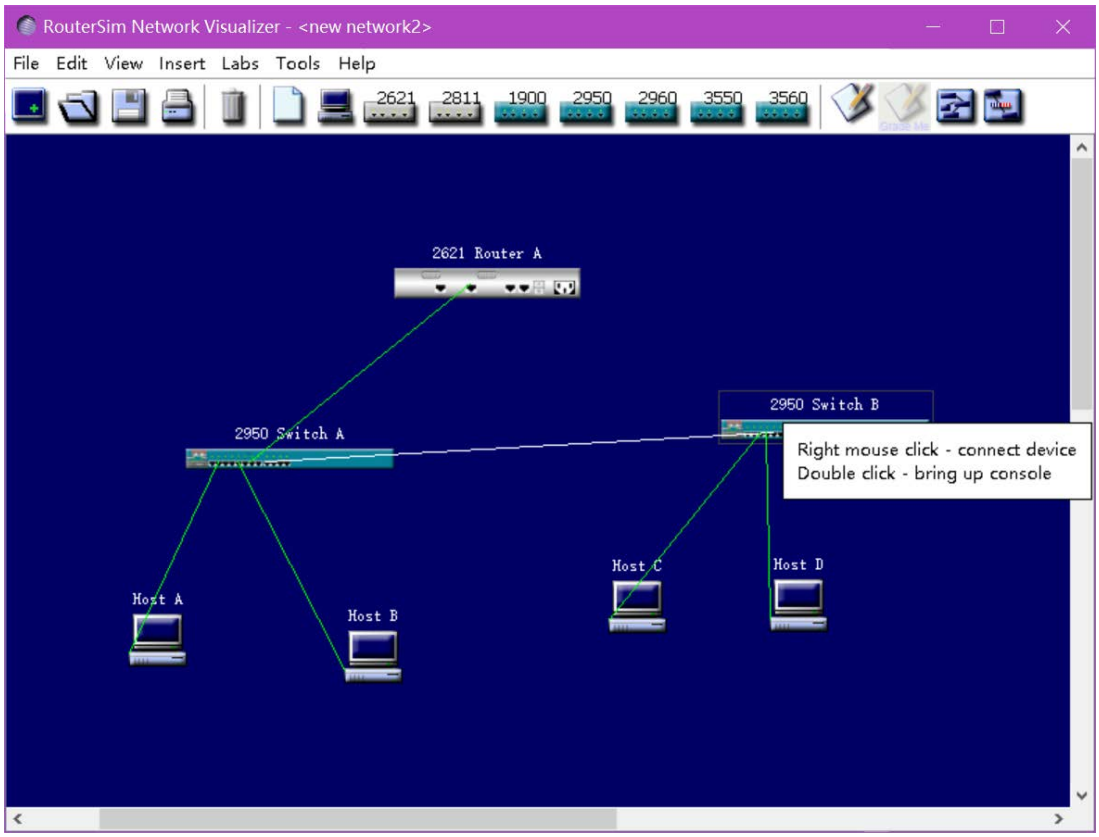
```
3550A(config)#int vlan 1
3550A(config-if)#ip address 192.168.10.1 255.255.255.0
3550A(config-if)#no shut

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

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：



在 3550A 交换机上分别测试两个交换机:

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



实例 2 与 1 过程与结果类似

配置验证 2950A 的 VTP 并启动。

启动 Trunk：2950A\B 的端口，分别为 fa0/12、fa0/11 与 fa0/12。

分配端口 VLAN 并验证

```
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
                                                Fa0/11, Fa0/12
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--
```

配置路由：

```
2600#config t
Enter configuration commands, one per line.  End with CNTL/Z
2600(config)#hostname R2600
R2600(config)#interface fastethernet 0/0
R2600(config-if)#no ip address
R2600(config-if)#no shutdown
R2600(config-if)#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)#
```

最后配置四台主机并验证其连通性。测试结果同实例 1。

4 实验总结

本次实验内容较多，但步骤基本按照参考资料执行的。虽然实验正常完成了，但是对于其中很多的知识点还不是理解十分透彻，需要继续去学习巩固。