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 2019 级 3 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）。

按照课本描述使用 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）。

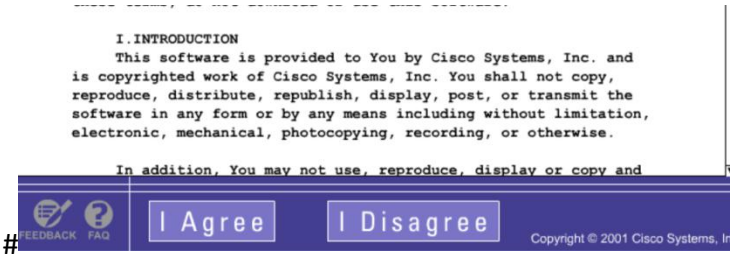
2 实验环境

Windows 10

3 实验结果

一、 Cisco IOS 的基本操作和路由器的常规配置

启动 RoutereSIM 软件



#

查看路由器完成操作

```
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 223.8.151.1 201.201.7.1 199.6.13.2
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
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 eth 0
lab_A(config-if)#noshutdown
                ^
% Invalid input detected at '^' marker.

lab_A(config-if)#no shutdown
lab_A(config-if)#int eth 1
lab_A(config-if)#no shutdown
lab_A(config-if)#int serial 0
lab_A(config-if)#ip address 201.100.11.1 255.255.255.0
lab_A(config-if)#no shutdown
lab_A(config-if)#clock rate 56000
lab_A(config-if)#
```

Hostname	Not 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	Not Done
E0 Shutdown	Not Done
E1 IP	Not Done
E1 Shutdown	Not Done
S0 IP	Not Done
S0 Clock Rate	Not 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	Not Done
IP Host Lab_B	Not Done
IP Host Lab_C	Not Done
IP Host Lab_D	Not Done

```
Router#config t
Enter configuration commands, one per line.  End with END.
Router(config)#hostname lab4
lab4(config)#
```

路由器配置接口描述

```
lab4(config)#interface ethernet 0
lab4(config-if)#description shiyan4
lab4(config-if)#exit
```

配置路由器交换机密码

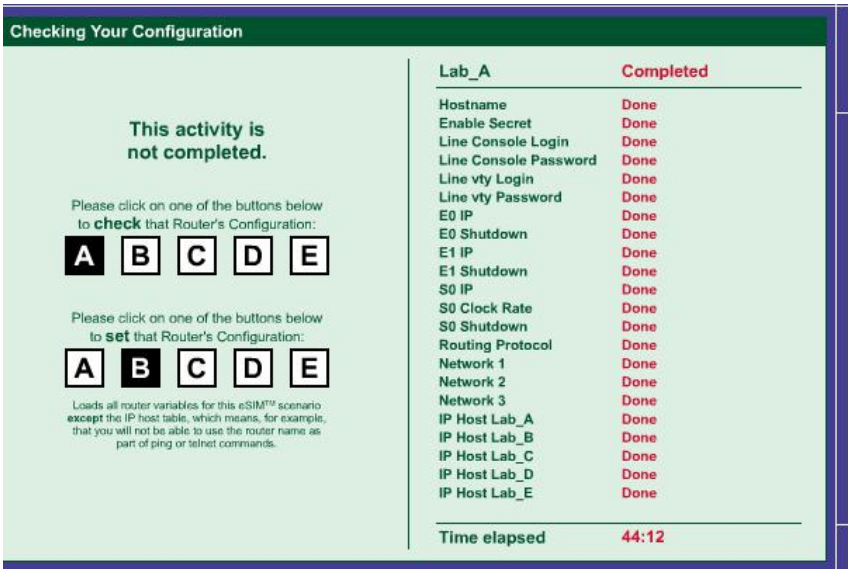
```
lab4(config)#enable password cisco
lab4(config)#enable secret cisco1
lab4(config)#end
00:31:20: %SYS-5-CONFIG_I: Configured from console by console
lab4#
```

```
Router#show interfaces
Ethernet0 is administratively down, line protocol is down
   Hardware is Lance, address is 0010.7b81.4e2c(bia 0010.7b81.4e2c)
   MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
      reliability 252/255, txload 1/255, rxload 1/255
   Encapsulation ARPA, loopback not set
   Keepalive set (10 sec)
   ARP type: ARPA, ARP Timeout 04:00:00
   Last input never, output 00:00:20, output hang never
   Last clearing of "show interface" counters never
   Queueing strategy: fifo
   Output queue 0/40, 0 drops; input queue 0/75, 0 drops
   5 minute input rate 0 bits/sec, 0 packets/sec
   5 minute output rate 0 bits/sec, 0 packets/sec
      0 packets input, 0 bytes, 0 no buffer
      Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
      0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
      0 input packets with dribble condition detected
      6 packets output, 360 bytes, 0 underruns
      6 output errors, 0 collisions, 3 interface resets
      0 babbles, 0 late collision, 0 deferred
      6 lost carrier, 0 no carrier
```

```
lab_A#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

Gateway of last resort is not set

C   201.100.11.0    /24 is directly connected, Serial0
R   219.17.100.0    /24 [120/1] via 201.100.11.2, 00:00:04, Serial0
C   192.5.5.0       /24 is directly connected, Ethernet0
R   199.6.13.0      /24 [120/1] via 201.100.11.2, 00:00:04, Serial0
C   205.7.5.0       /24 is directly connected, Ethernet1
lab_A#conf t
Enter configuration commands, one per line.  End with END.
lab_A(config)#router rip
lab_A(config-router)#version v2
lab_A(config-router)#version 2
lab_A(config-router)#network 205.7.5.0
lab_A(config-router)#network 201.100.11.0
lab_A(config-router)#network 192.5.5.0
lab_A(config-router)#
```



1) 路由器一些常规的配置

改变路由器名字

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

显示消息

```
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)#_
```

建立 Ip 映射表

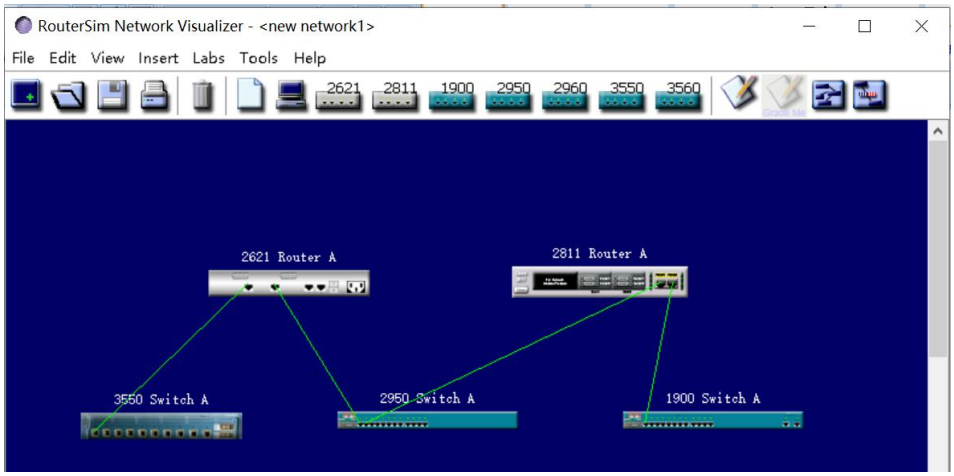
```
lab_A(config)#ip host lab_A 192.5.5.1 205.7.5.1 201.100.11.1
lab_A(config)#ip host lab_B 219.17.100.1 199.6.13.1 201.100.11.2
lab_A(config)#ip host lab_C 223.8.151.1 204.204.7.1 199.6.13.2
lab_A(config)#ip host lab_D 210.93.105.1 204.204.7.2
lab_A(config)#ip host lab_E 210.93.105.2
```

在 show done 的界面上可以看到变化：

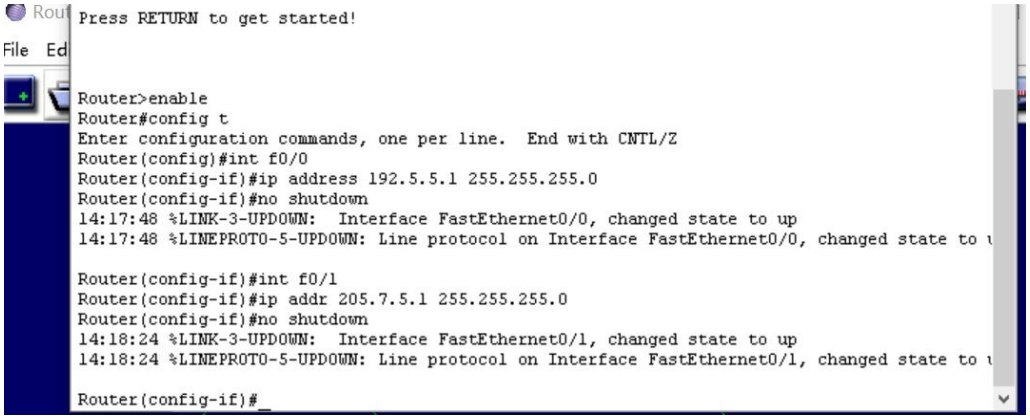
Lab_A	Completed
Hostname	Done
Enable Secret	Done
Line Console Login	Done
Line Console Password	Done
Line vty Login	Done
Line vty Password	Done
E0 IP	Done
E0 Shutdown	Done
E1 IP	Done
E1 Shutdown	Done
S0 IP	Done
S0 Clock Rate	Done
S0 Shutdown	Done
Routing Protocol	Done
Network 1	Done
Network 2	Done
Network 3	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

静态路由设置

打开模拟器模拟的 Cisco 设备



在配置静态路由之前，要配置路由器各个端口的 IP 地址，还要用命令 no shutdown 激活端口。串口如果充当 DCE 端，还需要配置时钟频率，在准备工作做完之后，如果查看路由表(show ip route)，会看到路由器直连网络的情况。



查看路由表：

```
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 de
       U - per-user static route, o - ODR, P - periodic downloaded static
       T - traffic engineered route

Gateway of last resort is not set
C     192.5.5.0/24 is directly connected, FastEthernet0/0
C     205.7.5.0/24 is directly connected, FastEthernet0/1
C     201.100.11.0/24 is directly connected, Serial0/0
Router#_
```

查看 ping 是否连通

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

继续配置静态路由

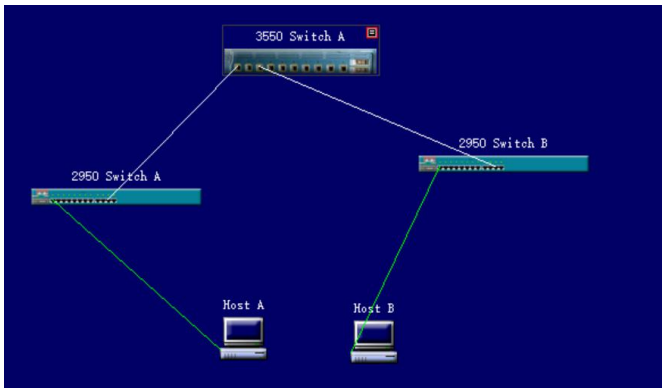
```
Router(config)#ip route 199.6.13.0 255.255.255.0 201.100.11.2
Router(config)#exit
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
```

ping 测试联通

```
Router(config)#ip route 0.0.0.0 0.0.0.0 201.100.11.2
Router(config)#exit
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mo
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA exter
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2,
       U - per-user static route, o - ODR, P - periodic dow
       T - traffic engineered route

Gateway of last resort is 201.100.11.2 to network 0.0.0.0
C     205.7.5.0/24 is directly connected, FastEthernet0/1
C     192.5.5.0/24 is directly connected, FastEthernet0/0
S     199.6.13.1 [1/0] via 201.100.11.2
S     199.6.13.0 [1/0] via 201.100.11.2
C     201.100.11.0/24 is directly connected, Serial0/0
S*  0.0.0.0 [1/0] via 201.100.11.2
```

动态路由及 VLAN 配置



```
switch>en
switch#conf 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)#hostname switch_A
switch_A(config)#exit
switch_A#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
```

设置为客户模式

```
switch_B(config)#vtp mode client
Setting device to VTP CLIENT mode.
```

```
switch(config)#interface fa0/11
switch(config-if)#switchport mode trunk
```

客户端 trunk 处理

创建 VLAN

创建两个 VLAN:， VLAN 10 和 VLAN 20，并用 show vlan 命令验证

```
3550A(config)#vlan 10
3550A(config-vlan)#vlan 20
3550A(config-vlan)#exit
3550A(config)#exit
3550A#sh vlan

VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
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
```

客户端配置：

```
switch(config)#interface fa0/2
switch(config-if)#switchport access vlan 20
```

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
```

客户端：

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

启动验证

```
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#
```

4 实验代码

本次实验的代码已上传于以下代码仓库：https://github.com/aLily11/cnii

5 实验总结

这次实验学会配置路由器的静态路由、动态路由和 VLAN