

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_

组 名 _____ 第 26 组 饭友组

组 员 _____ 杨浩然

学 号 _____ 24320182203309

实验时间 _____ 2020 年 4 月 8 日

2020 年 4 月 8 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

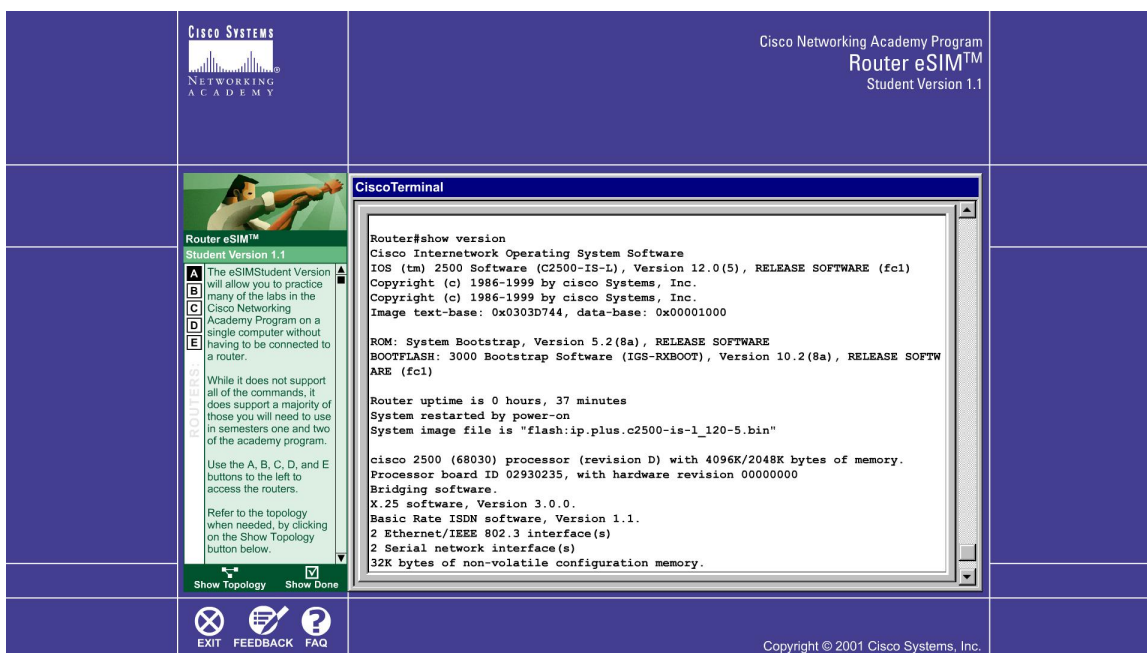
Windows 10, Router eSIM v1.1, CCNA Network Visualizer 6.0

3 实验结果

使用 Router eSIM v1.1 模拟器来模拟路由器的配置环境

用 show 命令检查路由器各部分工作状态














在路由器内建立 IP 地址的映射表



为路由器的一个接口配置 IP 地址

	<div>Cisco Networking Academy Program Router eSIM™ Student Version 1.1</div>	
<div></div> <div>Router eSIM™</div> <div>Student Version 1.1</div> <div><p>The eSIMStudent Version will allow you to practice many of the labs in the Cisco Networking Academy Program on a single computer without having to be connected to a router.</p><p>While it does not support all of the commands, it does support a majority of those you will need to use in semesters one and two of the academy program.</p><p>Use the A, B, C, D, and E buttons to the left to access the routers.</p><p>Refer to the topology when needed, by clicking on the Show Topology button below.</p></div> <div><input type="checkbox"/> Show Topology <input checked="" type="checkbox"/> Show Done</div> <div><div> EXIT</div><div> FEEDBACK</div><div> FAQ</div></div>		<div>CiscoTerminal</div> <div><pre>32K bytes of non-volatile configuration memory. Router#config t Enter configuration commands, one per line. End with END. Router(config)#hostname lab_A lab_A(config)#banner motd % Incomplete command. lab_A(config)#banner motd # Enter TEXT message. End with the character '#'. Accounting # 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 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 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)#</pre></div>

查看串口配置情况:

	<div>Cisco Networking Academy Program Router eSIM™ Student Version 1.1</div>	
<div></div> <div>Router eSIM™</div> <div>Student Version 1.1</div> <div><p>The eSIMStudent Version will allow you to practice many of the labs in the Cisco Networking Academy Program on a single computer without having to be connected to a router.</p><p>While it does not support all of the commands, it does support a majority of those you will need to use in semesters one and two of the academy program.</p><p>Use the A, B, C, D, and E buttons to the left to access the routers.</p><p>Refer to the topology when needed, by clicking on the Show Topology button below.</p></div> <div><input type="checkbox"/> Show Topology <input checked="" type="checkbox"/> Show Done</div> <div><div> EXIT</div><div> FEEDBACK</div><div> FAQ</div></div>		<div>CiscoTerminal</div> <div><pre>00:146:21: %SYS-5-CONFIG I: Configured from console by console 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, reliability 255/255, txload 1/255, rxload 1/255 Encapsulation HDLC, loopback not set Keepalive set (10 sec) Last input never, output never, output hang never Last clearing of "show interface" counters never Input queue: 0/75/0 (size/max/drops); Total output drops: 0 Queueing strategy: weighted fair Output queue: 0/1000/64/0 (size/max total/threshold/drops) Conversations 0/0/256 (active/max active/max total) Reserved Conversations 0/0 (allocated/max allocated) 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 runs, 0 giants, 0 throttles 0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 0 packets output, 0 bytes, 0 underruns 0 output errors, 0 collisions, 1 interface resets 0 output buffer failures, 0 output buffers swapped out</pre></div>

进一步了解路由器的工作过程，了解静态路由的优缺点及适用范围。掌握配置静态路由实现网络互通的方法，并能够通过查看路由表了解数据包在路由器中的转发过程。

将实验设备在模拟器的设计界面上按拓扑图连接完成。

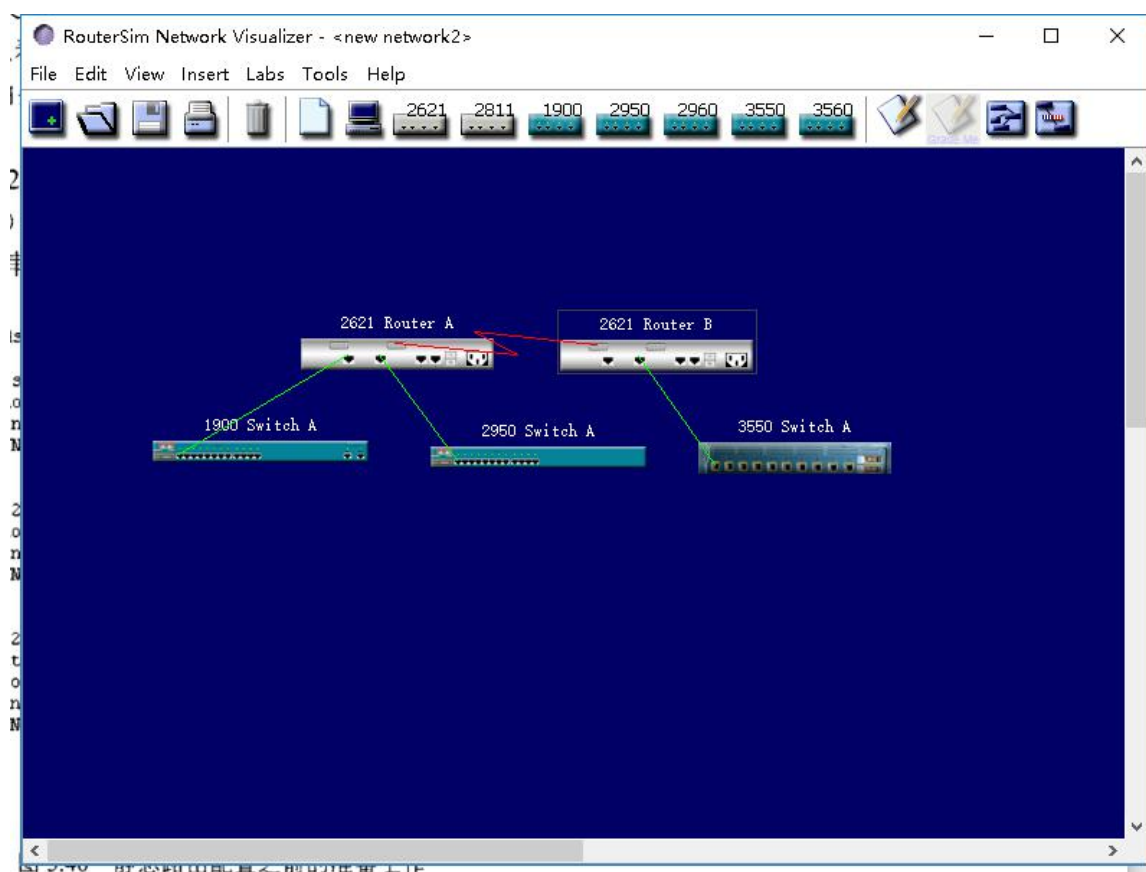
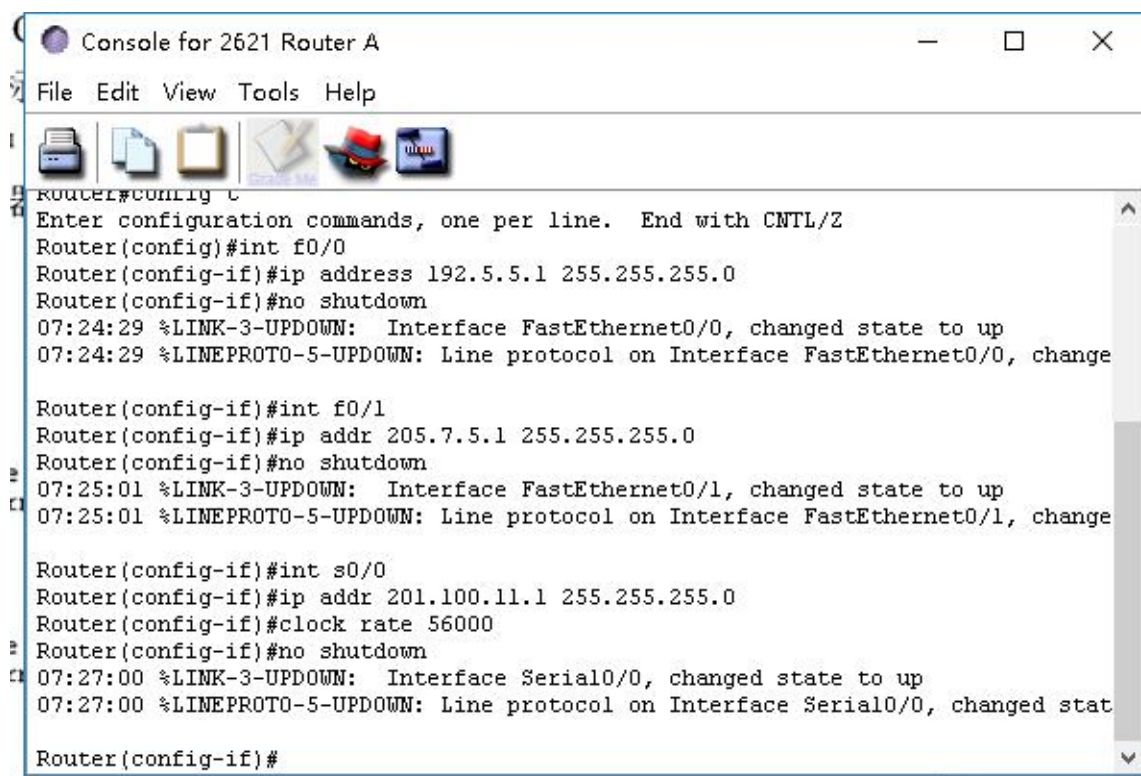


图 2-10 静态路由配置之前的设备工作

配置静态路由之前，先配置路由器各个端口的 IP 地址，并且用 no shutdown 激活端口



```

Console for 2621 Router A
File Edit View Tools Help

Router#config t
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
07:24:29 %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
07:24:29 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, change

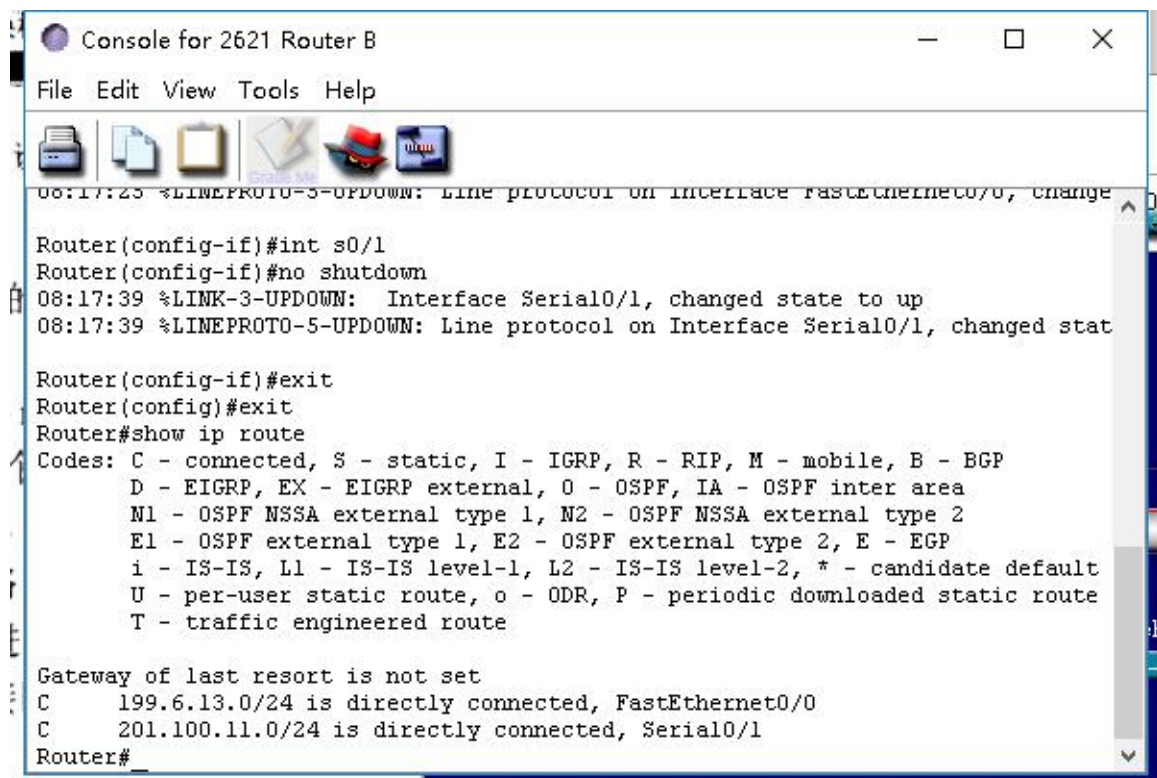
Router(config-if)#int f0/1
Router(config-if)#ip addr 205.7.5.1 255.255.255.0
Router(config-if)#no shutdown
07:25:01 %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
07:25:01 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, change

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
07:27:00 %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
07:27:00 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed stat

Router(config-if)#

```

配置 RouteB 各个端口的 IP 地址



```

Console for 2621 Router B
File Edit View Tools Help

08:17:25 %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, change

Router(config-if)#int s0/1
Router(config-if)#no shutdown
08:17:39 %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
08:17:39 %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, 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, Serial0/1
Router#

```


配置静态路由

```

Router>enable
Router#config t
Enter configuration commands, one per line. End with CNTL/Z
Router(config)#ip route 199.6.13.1 255.255.255.0 201.100.11.2
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
S    199.6.13.1 [1/0] via 201.100.11.2
C    192.5.5.0/24 is directly connected, FastEthernet0/0
C    205.7.5.0/24 is directly connected, FastEthernet0/1

```

配置默认路由

```
Router(config)#ip route 0.0.0.0 0.0.0.0 172.16.2.2
```

```
Router(config)#ip classless
```

检测连通性

```

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
Router#_

```

4 实验总结

1. Esim使用过程中，可以用 show interfaces 显示各接口的配置参数和工作数据，查看网络故障，确定故障所在。

2. 路由器有四种配置模式，用户模式，特权模式，配置模式和端口配置模式。
3. DCE 端口需要配置 `clock rate`，DTE 不需要。