

陕西科技大学

路由与交换 实验报告



实验[二]: 静态路由协议配置

学 生: _____

班 级: _____

系 别: 网络工程

学 院: 电子信息与人工智能学院

实验二 静态路由协议配置 预习报告

一、实验目的

- (1) 掌握路由器在网络中的作用、组成以及路由器设备选型；
- (2) 掌握 PacketTrace 仿真软件的使用方法；
- (3) 掌握路由器的静态路由配置命令。

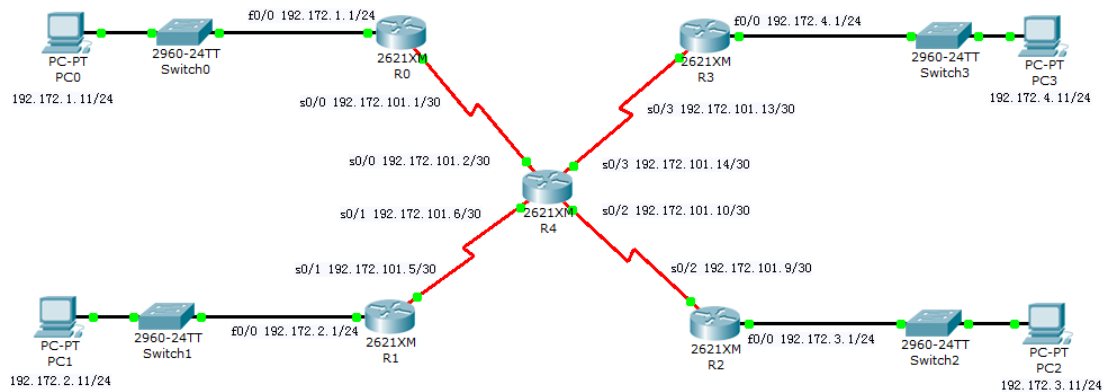
二、实验条件

Cisco2621 Router、PacketTrace 仿真软件、具备 Windows 操作系统的 PC 机

三、实验原理及相关知识

掌握 PacketTrace 路由仿真软件的使用、静态路由配置方法

四、实验内容



配置路由器接口和静态路由，使全网连通。

五、常用路由器状态查询命令（在特权模式下输入命令）

Show version	//查看 IOS 版本号，已启动时间，flash 中的 IOS 的文件名，router 里面共有什么的端口，寄存器的值等等。
show protocol	//显示与 IP 有关的路由协议信息。各个端口的情况。
show flash	//查看 flash 中的内容，IOS 的长度，文件名，剩余空间，总空间。
show running-config	//查看路由器当前的配置信息。
show startup-config	//查看 nvram 中的路由器配置信息。
show ip route	//查看路由器的路由配置情况
show hosts	//查看 IP host 表
show interface	//查看路由器上的各个端口的状态信息。（很多重要信息）
show controller	//查看接口控制器的状态，可看到连接的是 DTE 还是 DCE
show history	//查看 history buffer 里面的命令列表

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, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is not set

192.172.101.0/30 is subnetted, 4 subnets
 C 192.172.101.0 is directly connected, Serial1/0
 C 192.172.101.4 is directly connected, Serial1/1
 C 192.172.101.8 is directly connected, Serial1/2
 C 192.172.101.12 is directly connected, Serial1/3

2. 配置路由器静态路由

(1) 配置路由器 R0 路由

```
Router(config)#ip route 0.0.0.0 0.0.0.0 192.172.101.2
```

(2) 配置路由器 R1 路由

```
Router(config)#ip route 0.0.0.0 0.0.0.0 192.172.101.6
```

(3) 配置路由器 R2 路由

```
Router(config)#ip route 0.0.0.0 0.0.0.0 192.172.101.10
```

(4) 配置路由器 R3 路由

```
Router(config)#ip route 0.0.0.0 0.0.0.0 192.172.101.14
```

(5) 配置路由器 R4 路由

```
Router(config)#ip route 192.172.4.0 255.255.255.0 192.172.101.13
```

```
Router(config)#ip route 192.172.1.0 255.255.255.0 192.172.101.1
```

```
Router(config)#ip ro
```

```
Router(config)#ip route 192.172.2.0 255.255.255.0 192.172.101.5
```

```
Router(config)#ip route 192.172.3.0 255.255.255.0 192.172.101.9
```

(6) 配置之后路由器 R0 的路由信息

```
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, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 192.172.101.2 to network 0.0.0.0

C 192.172.1.0/24 is directly connected, FastEthernet0/0

192.172.101.0/30 is subnetted, 1 subnets

C 192.172.101.0 is directly connected, Serial1/0

S* 0.0.0.0/0 [1/0] via 192.172.101.2

(7) 配置之后路由器 R1 的路由信息

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, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 192.172.101.6 to network 0.0.0.0

C 192.172.2.0/24 is directly connected, FastEthernet0/0

192.172.101.0/30 is subnetted, 1 subnets

C 192.172.101.4 is directly connected, Serial1/0

S* 0.0.0.0/0 [1/0] via 192.172.101.6

(8) 配置之后路由器 R2 的路由信息

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, ia - IS-IS inter area

* - candidate default, U - per-user static route, o - ODR

P - periodic downloaded static route

Gateway of last resort is 192.172.101.10 to network 0.0.0.0

C 192.172.3.0/24 is directly connected, FastEthernet0/0

192.172.101.0/30 is subnetted, 1 subnets

C 192.172.101.8 is directly connected, Serial1/0

S* 0.0.0.0/0 [1/0] via 192.172.101.10

(9) 配置之后路由器 R3 的路由信息

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, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is 192.172.101.14 to network 0.0.0.0

C 192.172.4.0/24 is directly connected, FastEthernet0/0
 192.172.101.0/30 is subnetted, 1 subnets
 C 192.172.101.12 is directly connected, Serial1/0
 S* 0.0.0.0/0 [1/0] via 192.172.101.14

(00) 配置之后路由器 R4 的路由信息

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, ia - IS-IS inter area
 * - candidate default, U - per-user static route, o - ODR
 P - periodic downloaded static route

Gateway of last resort is not set

S 192.172.1.0/24 [1/0] via 192.172.101.1
 S 192.172.2.0/24 [1/0] via 192.172.101.5
 S 192.172.3.0/24 [1/0] via 192.172.101.9
 S 192.172.4.0/24 [1/0] via 192.172.101.13
 192.172.101.0/30 is subnetted, 4 subnets
 C 192.172.101.0 is directly connected, Serial1/0
 C 192.172.101.4 is directly connected, Serial1/1
 C 192.172.101.8 is directly connected, Serial1/2
 C 192.172.101.12 is directly connected, Serial1/3

3. 测试连通性

(1) 路由器 R0 ping 路由器 R2

Router#ping 192.172.101.9

Type escape sequence to abort.

Sending 5, 100-byte ICMP Echos to 192.172.101.9, timeout is 2 seconds:
!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 86/116/140 ms

(2) 在各主机间使用ping命令，测试主机间的连通性。

pc0 -> pc1:

C:\>ping 192.172.2.11

Pinging 192.172.2.11 with 32 bytes of data:

Reply from 192.172.2.11: bytes=32 time=68ms TTL=125
Reply from 192.172.2.11: bytes=32 time=2ms TTL=125
Reply from 192.172.2.11: bytes=32 time=3ms TTL=125
Reply from 192.172.2.11: bytes=32 time=2ms TTL=125

Ping statistics for 192.172.2.11:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 68ms, Average = 18ms

pc0 -> pc2:

C:\>ping 192.172.3.11

Pinging 192.172.3.11 with 32 bytes of data:

Reply from 192.172.3.11: bytes=32 time=79ms TTL=125
Reply from 192.172.3.11: bytes=32 time=93ms TTL=125
Reply from 192.172.3.11: bytes=32 time=108ms TTL=125
Reply from 192.172.3.11: bytes=32 time=143ms TTL=125

Ping statistics for 192.172.3.11:

Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 79ms, Maximum = 143ms, Average = 105ms

pc0 -> pc3:

C:\>ping 192.172.4.11

Pinging 192.172.4.11 with 32 bytes of data:

Reply from 192.172.4.11: bytes=32 time=67ms TTL=125
Reply from 192.172.4.11: bytes=32 time=104ms TTL=125
Reply from 192.172.4.11: bytes=32 time=2ms TTL=125
Reply from 192.172.4.11: bytes=32 time=2ms TTL=125

Ping statistics for 192.172.4.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 104ms, Average = 43ms

pc1 -> pc2:
C:\>ping 192.172.3.11

Pinging 192.172.3.11 with 32 bytes of data:

Reply from 192.172.3.11: bytes=32 time=100ms TTL=125
Reply from 192.172.3.11: bytes=32 time=122ms TTL=125
Reply from 192.172.3.11: bytes=32 time=126ms TTL=125
Reply from 192.172.3.11: bytes=32 time=82ms TTL=125

Ping statistics for 192.172.3.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 82ms, Maximum = 126ms, Average = 107ms

pc1 -> pc3:
C:\>ping 192.172.4.11

Pinging 192.172.4.11 with 32 bytes of data:

Reply from 192.172.4.11: bytes=32 time=89ms TTL=125
Reply from 192.172.4.11: bytes=32 time=62ms TTL=125
Reply from 192.172.4.11: bytes=32 time=101ms TTL=125
Reply from 192.172.4.11: bytes=32 time=2ms TTL=125

Ping statistics for 192.172.4.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 101ms, Average = 63ms

pc2 -> pc3:
C:\>ping 192.172.4.11

Pinging 192.172.4.11 with 32 bytes of data:

Reply from 192.172.4.11: bytes=32 time=86ms TTL=125
Reply from 192.172.4.11: bytes=32 time=95ms TTL=125
Reply from 192.172.4.11: bytes=32 time=77ms TTL=125
Reply from 192.172.4.11: bytes=32 time=2ms TTL=125

Ping statistics for 192.172.4.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 2ms, Maximum = 95ms, Average = 65ms

五、常用路由器状态查询命令（在特权模式下输入命令）

Show version	//查看 IOS 版本号，已启动时间，flash 中的 IOS 的文件名，router 里面共有什么的端口，寄存器的值等等。
show protocol	//显示与 IP 有关的路由协议信息。各个端口的情况。
show flash	//查看 flash 中的内容，IOS 的长度，文件名，剩余空间，总空间。
show running-config	//查看路由器当前的配置信息。
show startup-config	//查看 nvram 中的路由器配置信息。
show ip route	//查看路由器的路由配置情况
show hosts	//查看 IP host 表
show interface	//查看路由器上的各个端口的状态信息。（很多重要信息）
show controller	//查看接口控制器的状态，可看到连接的是 DTE 还是 DCE
show history	//查看 history buffer 里面的命令列表

六、思考题及其它

(1) 查看路由器的路由协议信息，用什么命令？

答：欲查询路由器的路由协议信息，使用命令：show protocols。