# 试验1:静态路由

## 实验目的：

在所有的路由器上添加静态路由。

能够在小型的网络环境中配置路由表。

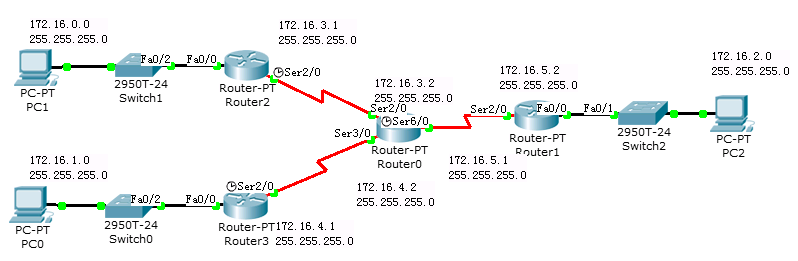
能够使用ping测试静态路由配置

使用Tracert跟踪数据包

排除网络故障

删除在Router3上删除到172.16.0.0/24网段的路由信息

## 网络拓扑



## 基本配置步骤

试验环境应经将路由器的所有接口和计算机的Ip地址已经按着网络拓扑配置。

只需在路由器上添加静态路由表即可。

### 在Router2上

Router#show ip route 查看现有的路由表,发现只有直连的网段的路由信息

Router#config t

Router(config)#ip route 172.16.1.0 255.255.255.0 172.16.3.2

Router(config)#ip route 172.16.4.0 255.255.255.0 172.16.3.2

Router(config)#ip route 172.16.5.0 255.255.255.0 172.16.3.2

Router(config)#ip route 172.16.2.0 255.255.255.0 172.16.3.2

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

172.16.0.0/24 is subnetted, 6 subnets

C 172.16.0.0 is directly connected, FastEthernet0/0 C 直连的网络

S 172.16.1.0 [1/0] via 172.16.3.2 S 添加的静态路由

S 172.16.2.0 [1/0] via 172.16.3.2

C 172.16.3.0 is directly connected, Serial2/0

S 172.16.4.0 [1/0] via 172.16.3.2

S 172.16.5.0 [1/0] via 172.16.3.2

Router#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

### 在Router3上添加静态路由

Router#config t

Router(config)#ip route 172.16.0.0 255.255.255.0 172.16.4.2

Router(config)#ip route 172.16.3.0 255.255.255.0 172.16.4.2

Router(config)#ip route 172.16.2.0 255.255.255.0 172.16.4.2

Router(config)#ip route 172.16.5.0 255.255.255.0 172.16.4.2

Router(config)#exit

%SYS-5-CONFIG\_I: Configured from console by console

Router#show ip rout 显示路由表

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

172.16.0.0/24 is subnetted, 6 subnets

S 172.16.0.0 [1/0] via 172.16.4.2

C 172.16.1.0 is directly connected, FastEthernet0/0

S 172.16.2.0 [1/0] via 172.16.4.2

S 172.16.3.0 [1/0] via 172.16.4.2

C 172.16.4.0 is directly connected, Serial2/0

S 172.16.5.0 [1/0] via 172.16.4.2

Router#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

### [OK]在Router0上添加静态路由

Router#config t

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ip route 172.16.0.0 255.255.255.0 172.16.3.1

Router(config)#ip route 172.16.1.0 255.255.255.0 172.16.4.1

Router(config)#ip route 172.16.2.0 255.255.255.0 172.16.5.2

Router(config)#

Router#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

### 在Router1上添加静态路由

Router#configure

Configuring from terminal, memory, or network [terminal]?

Enter configuration commands, one per line. End with CNTL/Z.

Router(config)#ip route 172.16.0.0 255.255.255.0 172.16.5.1

Router(config)#ip route 172.16.1.0 255.255.255.0 172.16.5.1

Router(config)#ip route 172.16.3.0 255.255.255.0 172.16.5.1

Router(config)#ip route 172.16.4.0 255.255.255.0 172.16.5.1

Router#copy running-config startup-config

Destination filename [startup-config]?

Building configuration...

[OK]

## 测试静态路由

### 在PC1上测试到PC0的连接

PC>ping 172.16.1.1 静态路由配置正确

Pinging 172.16.1.1 with 32 bytes of data:

Reply from 172.16.1.1: bytes=32 time=27ms TTL=253

Reply from 172.16.1.1: bytes=32 time=14ms TTL=253

Reply from 172.16.1.1: bytes=32 time=20ms TTL=253

Reply from 172.16.1.1: bytes=32 time=16ms TTL=253

PC>tracert 172.16.1.2 使用Tracert跟踪数据包

Tracing route to 172.16.1.2 over a maximum of 30 hops:

1 9 ms 6 ms 8 ms 172.16.0.1

2 13 ms 10 ms 10 ms 172.16.3.2

3 17 ms 16 ms 16 ms 172.16.4.1

4 23 ms 24 ms 25 ms 172.16.1.2

Trace complete.

### 在PC1上测试到PC2的连接

PC>ping 172.16.2.1 静态路由配置正确

Pinging 172.16.2.1 with 32 bytes of data:

Reply from 172.16.2.1: bytes=32 time=15ms TTL=253

Reply from 172.16.2.1: bytes=32 time=13ms TTL=253

Reply from 172.16.2.1: bytes=32 time=16ms TTL=253

Reply from 172.16.2.1: bytes=32 time=19ms TTL=253

### 在Router3上删除到172.16.0.0/24网段的路由

Router(config)#no ip route 172.16.0.0 255.255.255.0

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

172.16.0.0/24 is subnetted, 5 subnets

C 172.16.1.0 is directly connected, FastEthernet0/0

S 172.16.2.0 [1/0] via 172.16.4.2

S 172.16.3.0 [1/0] via 172.16.4.2

C 172.16.4.0 is directly connected, Serial2/0

S 172.16.5.0 [1/0] via 172.16.4.2 没有到172.16.0.0/24网段的路由信息

### 在PC1上测试到PC0的连接 发现数据包不能返回

PC>ping 172.16.1.1

Pinging 172.16.1.1 with 32 bytes of data:

Request timed out.

Request timed out.

Request timed out.

Request timed out.

PC>tracert 172.16.1.2 使用tracert跟踪数据包路径

Tracing route to 172.16.1.2 over a maximum of 30 hops:

1 9 ms 7 ms 8 ms 172.16.0.1

2 12 ms 14 ms 14 ms 172.16.3.2

3 \* \* \* Request timed out.

4 \* \* \* Request timed out.

5 \* \* \* Request timed out.

### 在PC0上测试到PC1的连接

PC>ping 172.16.0.2

Pinging 172.16.0.2 with 32 bytes of data:

Reply from 172.16.1.1: Destination host unreachable. 提示目标主机不可到达

Reply from 172.16.1.1: Destination host unreachable.

Reply from 172.16.1.1: Destination host unreachable.

Reply from 172.16.1.1: Destination host unreachable.