

路由器基本配置大作业

Boson NetSim

实验目的

- 1.掌握路由器的基本知识；
- 2.掌握路由器端口的配置；
- 3.掌握路由协议的基本配置；
- 4.熟悉使用 Boson Netsim 模拟器。

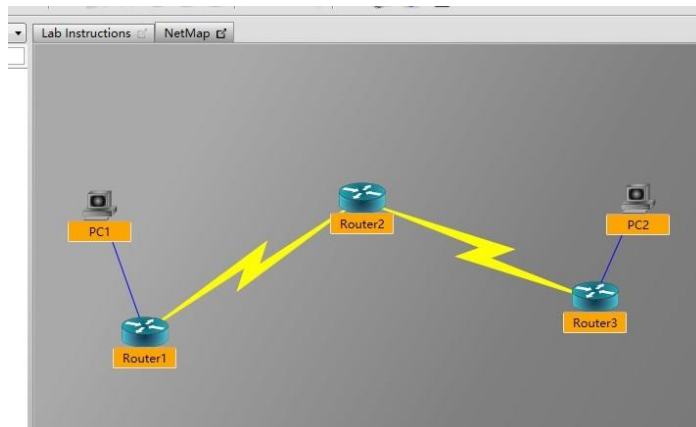
实验内容

- 1.本实验要求自行构建一个网络拓扑,要求包括3个以上路由器(路由器采用串行连接),用于连接两个以太网,每个以太网至少包括1台主机;
- 2.完成路由器、主机等设备的配置;使用 RIP 或 OSPF 来维护路由器的路由表。
- 3.实验配置完成后,两台主机要能够相互 ping 通
- 4.实验报告要包括网络拓扑、配置以及结果

实验步骤

1. 绘制拓扑图

选择 3620 型路由器,将 PC1 连接到 Router1 的 Ethernet 接口上。将 PC2 连接到 Router3 的 Ethernet 接口上。通过 Router1 的 Serial 接口将 Router1 与 Router3 连接起来。通过 Router3 的 Serial 接口将 Router3 与 Router2 连接起来。如图所示:



2. 配置路由

	PC1	Router1	Router2	Router3	PC2
Ethernet 0	192.168.2.1	192.168.1.1		192.168.4.1	192.168.4.2
Serial 0		192.168.2.1	192.168.2.2	192.168.3.2	
Serial 1			192.168.3.1		

由上表配置路由器 1:

```
Press Enter to Start
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Router1
Router1(config)#interface ethernet0/0
Router1(config-if)#ip address 192.168.1.1 255.255.255.0
Router1(config-if)#no shutdown
00:00:53: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
00:00:53: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
Router1(config-if)#interface serial0/0
Router1(config-if)#ip address 192.168.2.1 255.255.255.0
Router1(config-if)#clock rate 64000
Router1(config-if)#no shutdown
00:01:20: %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
00:01:21: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up
Router1(config-if)#ip route 192.168.3.0 255.255.255.0 192.168.2.2
00:01:27: %LINK-3-UPDOWN: Interface Serial0/0, changed state to down
00:01:27: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to down
Router1(config)#ip route 192.168.4.0 255.255.255.0 192.168.2.2
00:02:31: %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
00:02:31: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up
Router1(config)#end
```

由上表配置路由器 2:

```
Devices: Router2 [Device #2] Settings...

Press Enter to Start
Router>enablw
^
% Invalid input detected at '^' marker.

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Route2
Route2(config)#interface serial0/0
Route2(config-if)#ip address 192.168.2.2 255.255.255.0
Route2(config-if)#clock rate 64000
Route2(config-if)#no shutdown
00:02:28: %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
00:02:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up
Route2(config-if)#interface serial0/1
Route2(config-if)#ip address 192.168.3.1 255.255.255.0
Route2(config-if)#clock rate 64000
Route2(config-if)#no shutdown
00:03:16: %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
00:03:17: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up
00:03:23: %LINK-3-UPDOWN: Interface Serial0/1, changed state to down
00:03:23: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to down
Route2(config-if)#ip route 192.168.1.0 255.255.255.0 192.168.2.1
Route2(config)#ip route 192.168.4.0 255.255.255.0 192.168.3.2
00:04:29: %LINK-3-UPDOWN: Interface Serial0/1, changed state to up
00:04:29: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1, changed state to up
Route2(config)#end
```

由上表配置路由器 3:

```
Press Enter to Start

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#hostname Route3
Route3(config)#interface serial0/0
Route3(config-if)#ip address 192.168.3.2 255.255.255.0
Route3(config-if)#clock rate 64000
Route3(config-if)#no shutdown
00:04:26: %LINK-3-UPDOWN: Interface Serial0/0, changed state to up
00:04:27: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to up
Route3(config-if)#interface ethernet0/0
Route3(config-if)#ip address 192.168.4.1 255.255.255.0
Route3(config-if)#no shutdown
00:04:47: %LINK-3-UPDOWN: Interface Ethernet0/0, changed state to up
00:04:47: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0, changed state to up
Route3(config-if)#ip route 192.168.2.0 255.255.255.0 192.168.3.1
Route3(config)#ip route 192.168.1.0 255.255.255.0 192.168.3.1
Route3(config)#end
```

由上表配置 PC1:

```
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Use the command help to get started

Press Enter to begin
C:>ipconfig /ip 192.168.1.2 255.255.255.0
C:>ipconfig /dg 192.168.1.1
C:>end
```

Router1 ✖ Router2 ✖ Router3 ✖ PC1 ✖ PC2 ✖

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由上表配置 PC2:

```
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Use the command help to get started

Press Enter to begin
C:>enable
^
% Invalid input detected at '^' marker.

C:>ipconfig /ip 192.168.4.2 255.255.255.0
C:>ipconfig /dg 192.168.4.1
C:>end
```

Router1 ✖ Router2 ✖ Router3 ✖ PC1 ✖ PC2 ✖

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3.通过 show ip route 命令查看各个路由器连接情况

```
Route1#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
       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

Gateway of last resort is not set

C    192.168.1.0 is directly connected, Ethernet0/0
S    192.168.3.0/24 [1/0] via 192.168.2.2
S    192.168.4.0/24 [1/0] via 192.168.2.2
C    192.168.2.0 is directly connected, Serial0/0
Route1#
```

```
Route2(config)#end
Route2#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
       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

Gateway of last resort is not set

C    192.168.2.0 is directly connected, Serial0/0
S    192.168.1.0/24 [1/0] via 192.168.2.1
S    192.168.4.0/24 [1/0] via 192.168.3.2
C    192.168.3.0 is directly connected, Serial0/1
Route2#
```

```
Route3#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
       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

Gateway of last resort is not set

C    192.168.3.0 is directly connected, Serial0/0
C    192.168.4.0 is directly connected, Ethernet0/0
S    192.168.2.0/24 [1/0] via 192.168.3.1
S    192.168.1.0/24 [1/0] via 192.168.3.1
Route3#
```

Router1 ✖ Router2 ✖ Router3 ✖ PC1 ✖ PC2 ✖

由图可知连接成功

4.用主机互 ping

PC1 ping PC2

```
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Use the command help to get started

Press Enter to begin
C:>ipconfig /ip 192.168.1.2 255.255.255.0
C:>ipconfig /dg 192.168.1.1
C:>ping 192.168.4.2

Pinging 192.168.4.2 with 32 bytes of data:
Reply from 192.168.4.2: bytes=32 time=51ms TTL=241
Reply from 192.168.4.2: bytes=32 time=49ms TTL=241
Reply from 192.168.4.2: bytes=32 time=69ms TTL=241
Reply from 192.168.4.2: bytes=32 time=54ms TTL=241
Reply from 192.168.4.2: bytes=32 time=49ms TTL=241

Ping statistics for 192.168.4.2:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 49ms, Maximum = 69ms, Average = 54ms

C:>
```

Router1 ✖ Router2 ✖ Router3 ✖ PC1 ✖ PC2 ✖

PC2 ping PC1

```
C:>ipconfig /ip 192.168.1.1 255.255.255.0
C:>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=63ms TTL=241
Reply from 192.168.1.2: bytes=32 time=70ms TTL=241
Reply from 192.168.1.2: bytes=32 time=50ms TTL=241
Reply from 192.168.1.2: bytes=32 time=66ms TTL=241
Reply from 192.168.1.2: bytes=32 time=66ms TTL=241

Ping statistics for 192.168.1.2:
    Packets: Sent = 5, Received = 5, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 50ms, Maximum = 70ms, Average = 63ms

C:>
```

Router1 ✖ Router2 ✖ Router3 ✖ PC1 ✖ PC2 ✖

两主机间互 ping 成功，实验成功！

实验总结

遇到的问题：在安装 **Boson NetSim** 时一定要严格按照 **readme** 执行，不然容易引发 **incomplete command** 问题。在配置路由器时一定要注意相连的是哪个端口。

收获：通过本次实验熟练掌握了 **Boson Netsim** 模拟器的使用，熟悉了路由器的基本配置，加深了对路由协议的理解