实验 13：RIP 路由配置实验

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【实验目的】

本次实验的目的是在一个配置了多台计算机和路由器的网络环境中，实现并验证 RIP（Routing Information Protocol）路由协议的功能和效果。RIP 是一种内部网关协议（IGP），主要应用于小型同类网络，它使用跳数作为衡量路径开销的指标。通过本实验，学生将学习如何规划网络地址和拓扑图，配置 PC 机、服务器及路由器的 IP 地址，并在路由器上配置 RIP 协议。实验的关键步骤包括检查 PC 间的连通性，配置 RIP 路由表，并最终验证配置后网络中主机之间的互通性。这将帮助学生理解路由协议在网络通信中的作用和重要性，以及如何在实际网络环境中部署和调试路由协议。

【实验原理】

RIP 技术原理

RIP（Routing Information Protocol，路由信息协议）是一种经典的内部网关协议（IGP），广泛应用于小型同类网络中。作为一种距离矢量路由协议，RIP 使用跳数来衡量到达目的网络的路径开销，其中规定的最大跳数限制为 15。跳数过多（超过 15 跳）的路由被认为是不可达的，这有助于防止路由循环。

RIP 具有两个主要的版本：

RIPv1：这是 RIP 的初版，属于有类路由协议。RIPv1 不支持可变长度子网掩码（VLSM），并且它通过广播的方式更新路由信息，每 30 秒更新一次。由于它是有类的，RIPv1 在处理不同大小的子网时存在限制，这在多子网环境中可能导致地址资源浪费。

RIPv2：作为 RIPv1 的改进版本，RIPv2 是一个无类路由协议，支持 VLSM，这使得它能更有效地使用 IP 地址空间，并适用于更复杂的网络结构。与 RIPv1 相比，RIPv2 采用组播地址（而非广播）来发送路由更新信息，这减少了网络上的广播风暴问题，提高了网络效率。

RIP 的工作机制基于距离矢量算法，路由器通过交换彼此的整个路由表来学习远程网络的存在和距离。每个路由器根据从邻居路由器接收到的信息，计算到

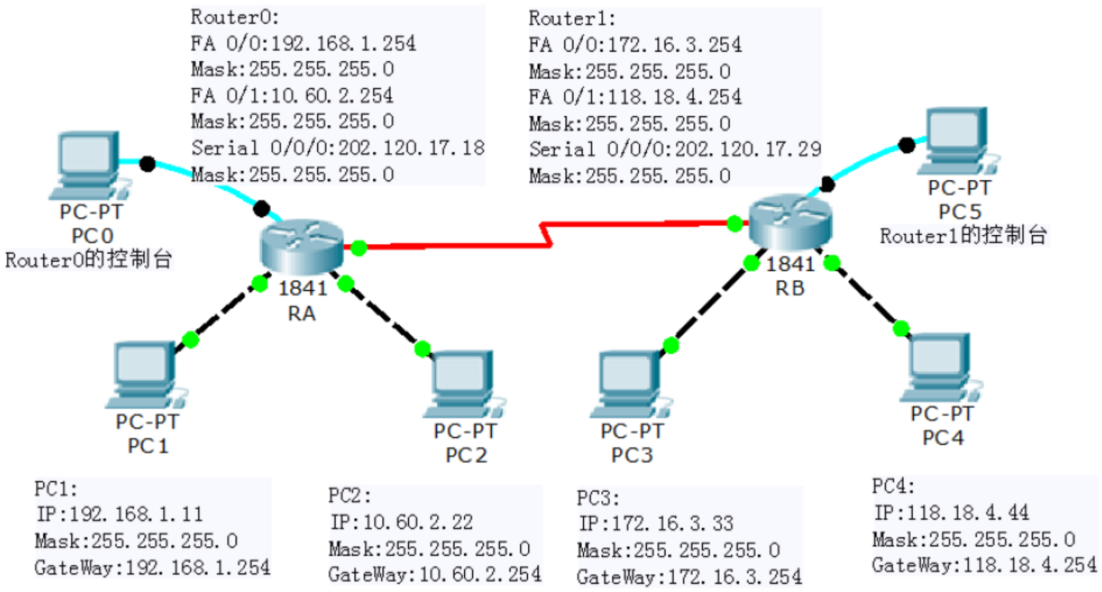
每个目的地的最短距离，并根据这些信息更新自己的路由表。

【实验设备】

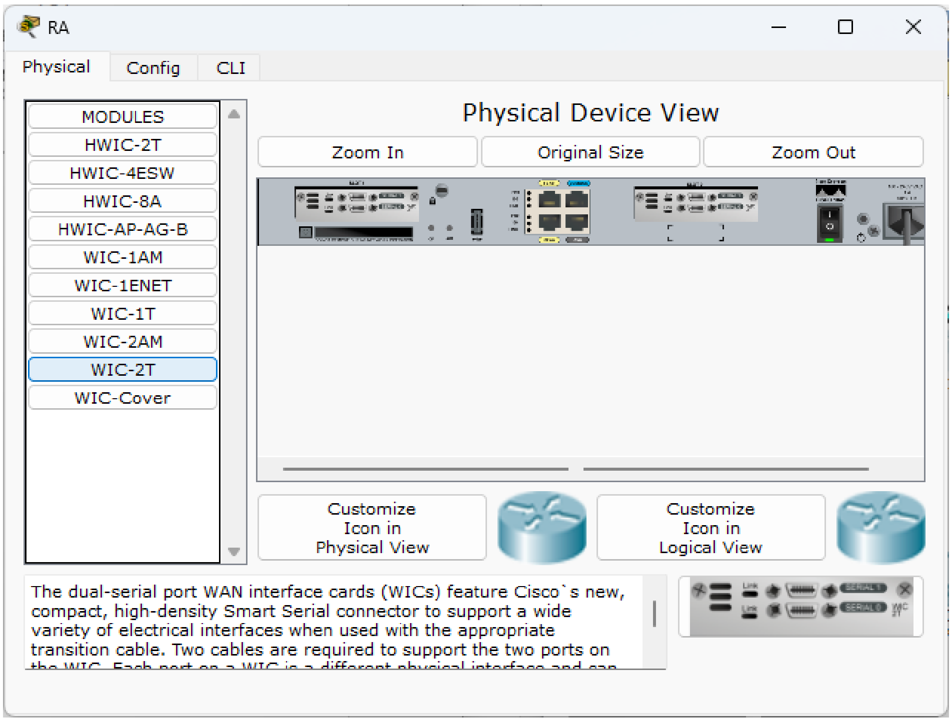
1. 操作系统：Windows 10
2. 网络环境：局域网
3. 应用程序：Cisco Packet Tracer 6.0

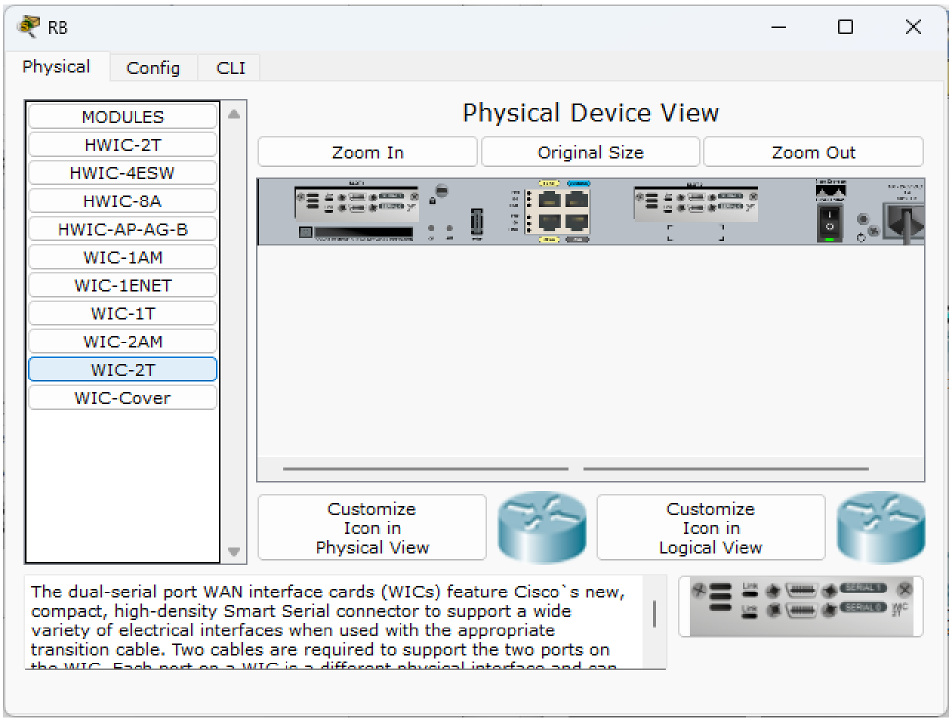
【实验步骤】

1. 规划网络地址及拓扑图。

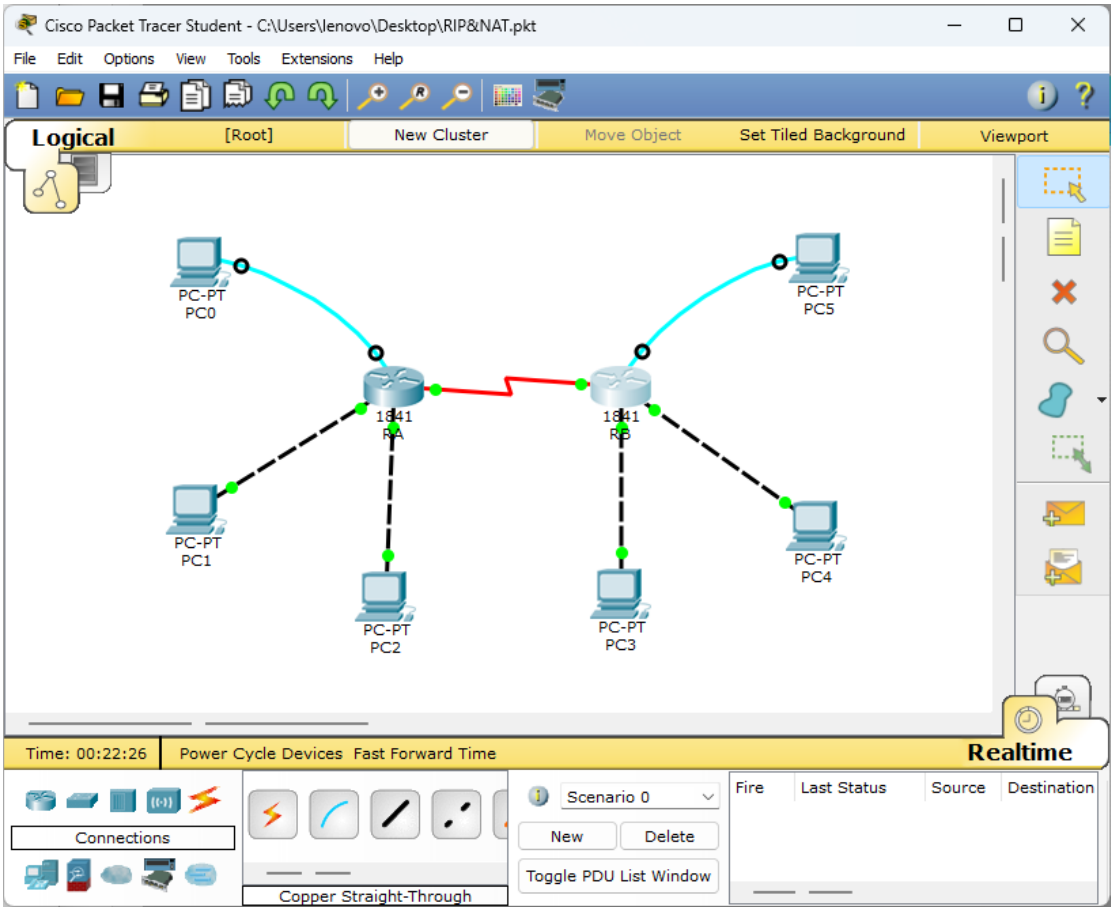


2. 在路由器 A 和路由器 B 中分别安装 WIC-2T，并重启设备。

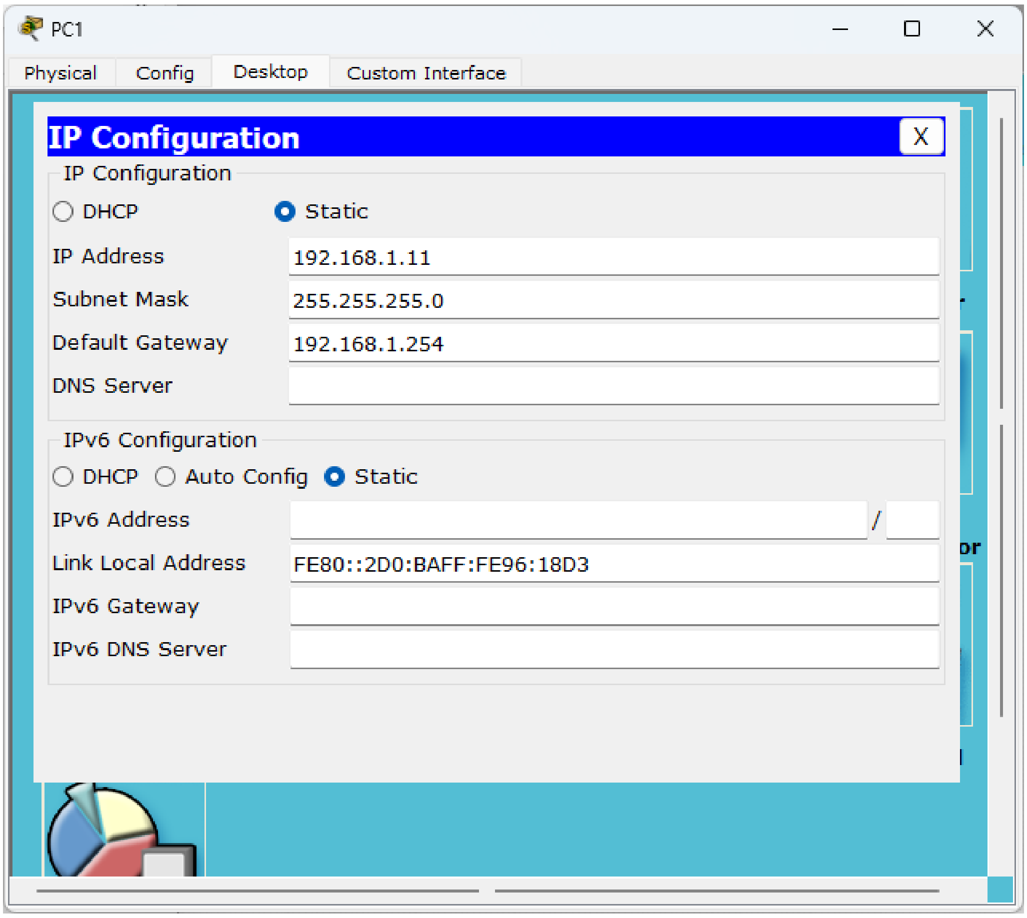


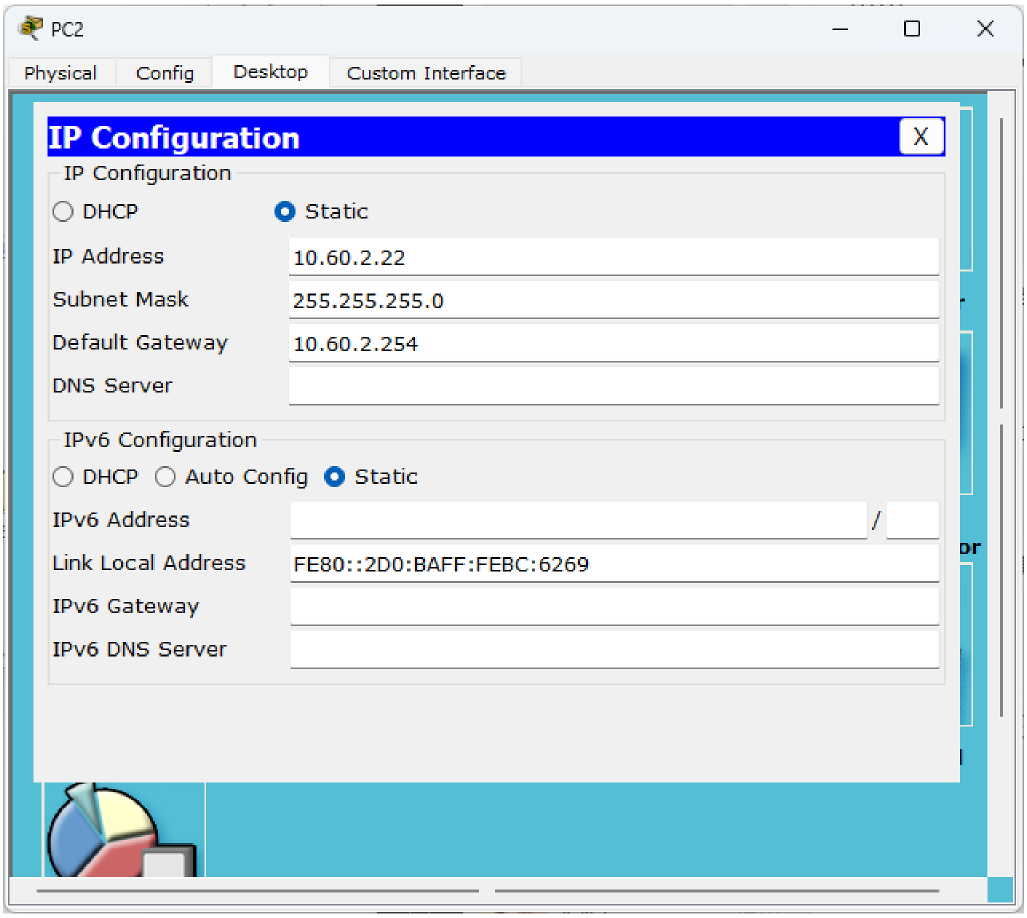


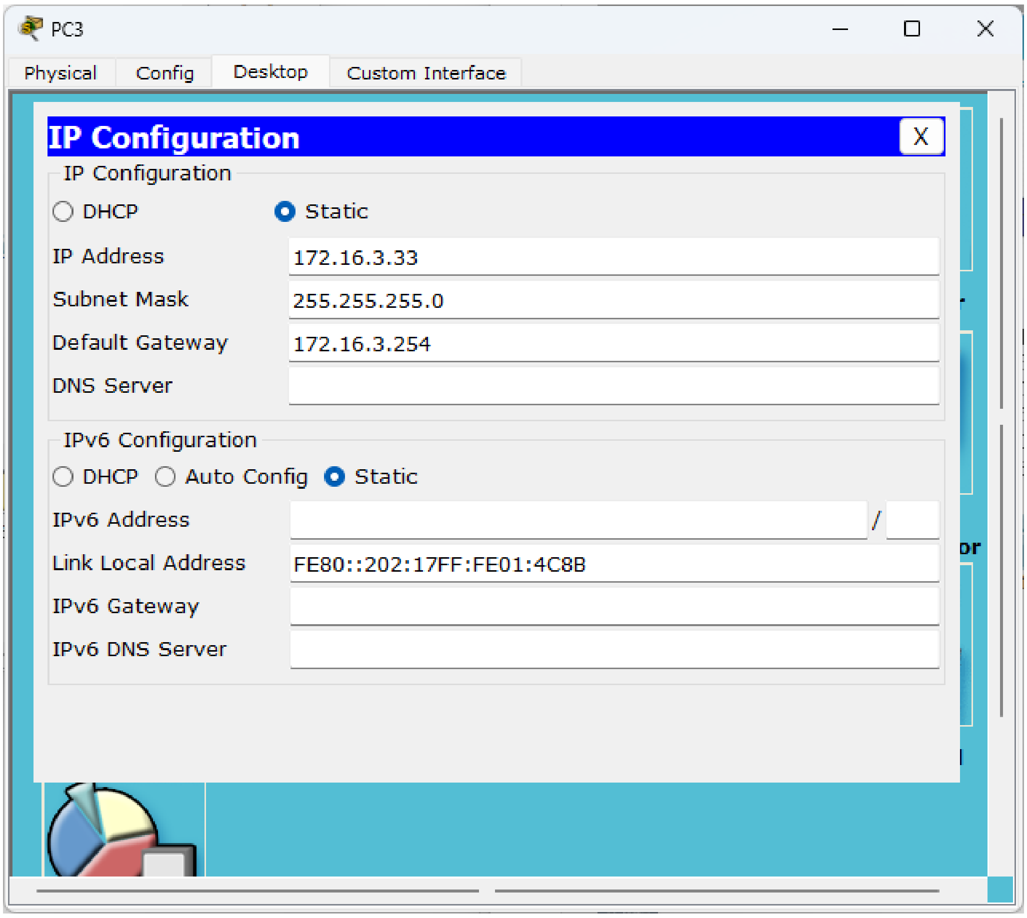
3. 启动 Cisco Packet Tracer，按照上述拓扑结构连接设备。

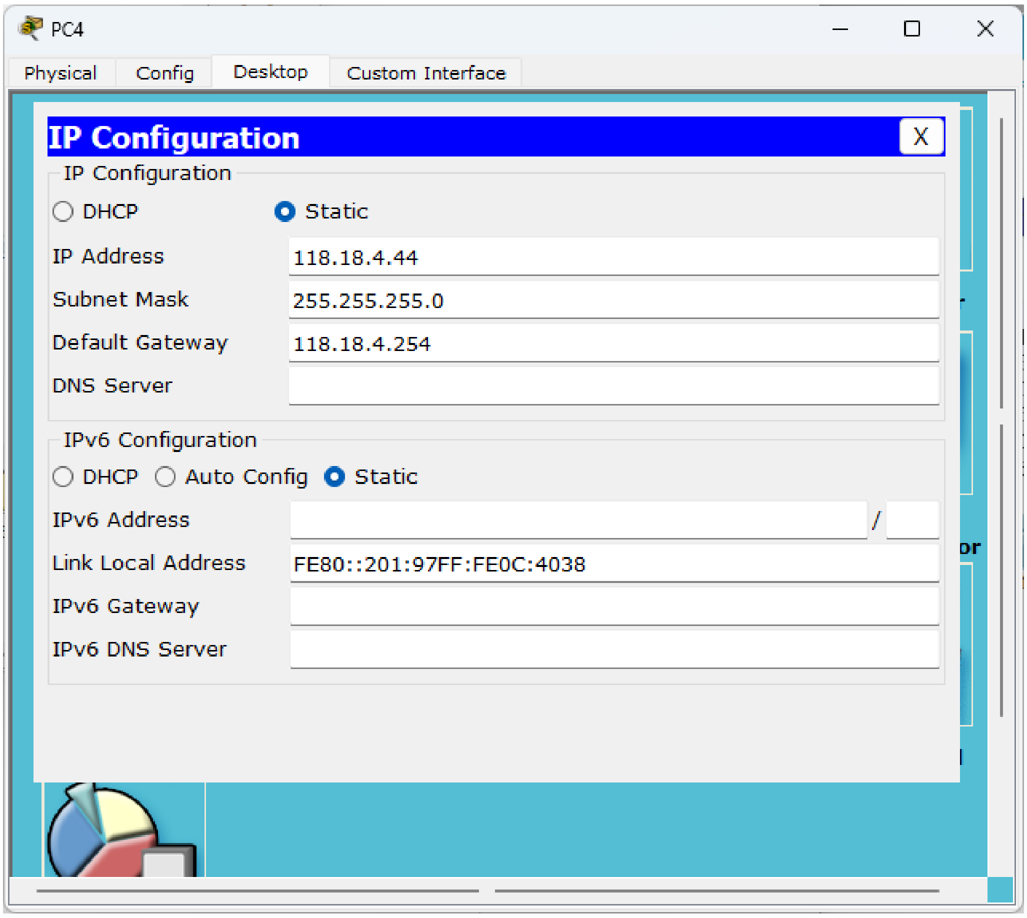


4. 配置 PC 机的 IP 地址、子网掩码和网关。


PC1
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
192.168.1.11
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.254
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::2D0:BAFF:FE96:18D3
IPv6 Gateway
IPv6 DNS Server


PC2
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
10.60.2.22
Subnet Mask
255.255.255.0
Default Gateway
10.60.2.254
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::2D0:BAFF:FEBC:6269
IPv6 Gateway
IPv6 DNS Server


PC3
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
172.16.3.33
Subnet Mask
255.255.255.0
Default Gateway
172.16.3.254
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::202:17FF:FE01:4C8B
IPv6 Gateway
IPv6 DNS Server


PC4
Physical
Config
Desktop
Custom Interface
IP Configuration
X
IP Configuration
DHCP
Static
IP Address
118.18.4.44
Subnet Mask
255.255.255.0
Default Gateway
118.18.4.254
DNS Server
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::201:97FF:FE0C:4038
IPv6 Gateway
IPv6 DNS Server

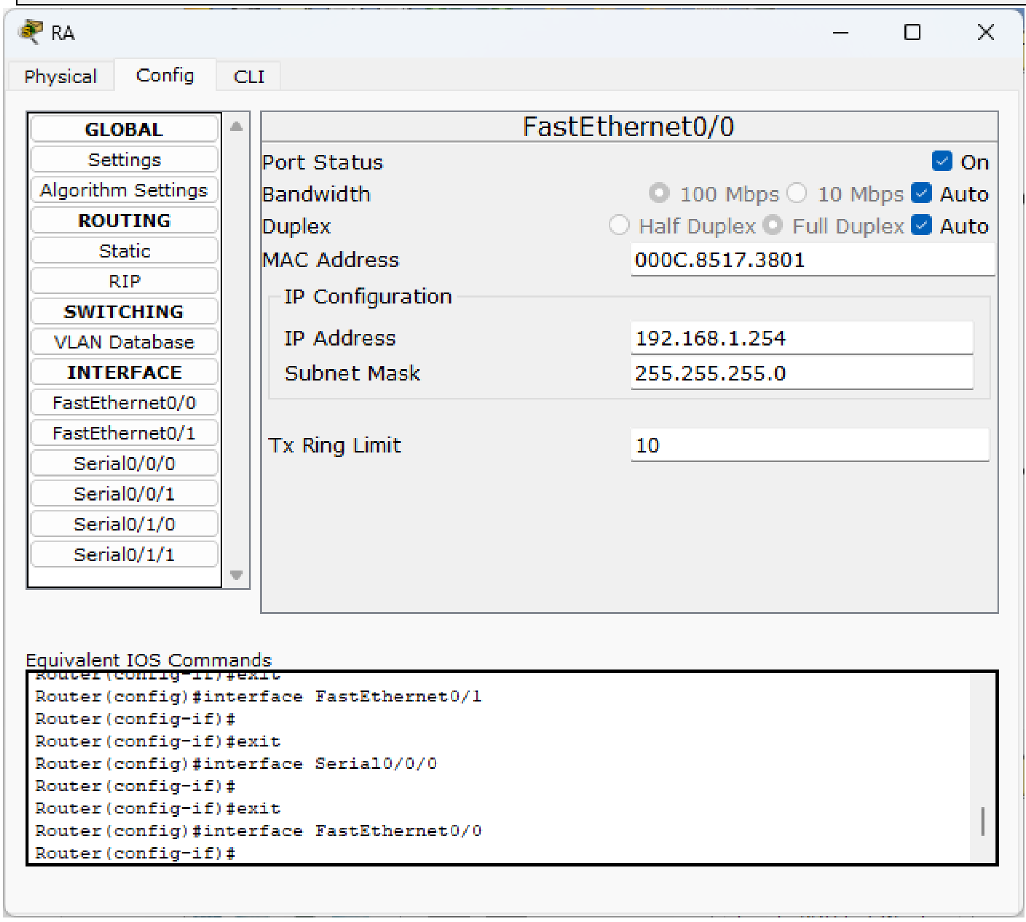
5. 配置路由器的端口地址和串口端口地址。

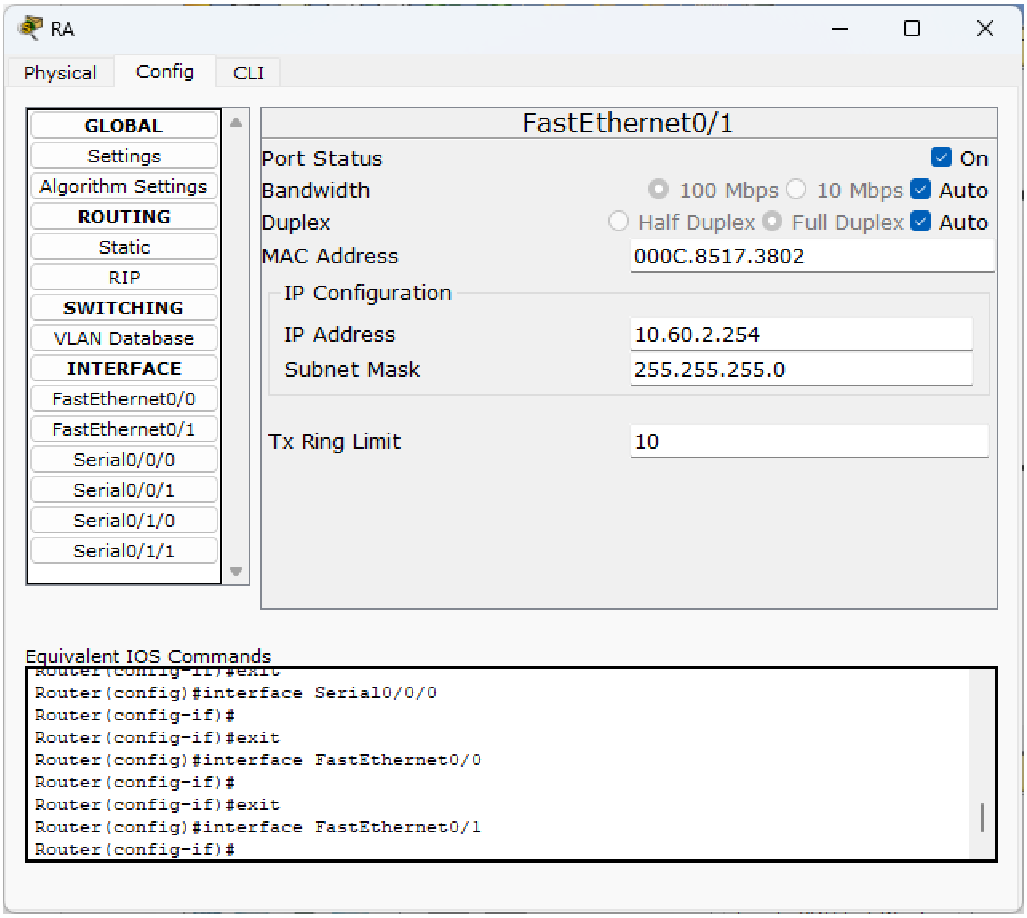
- 在路由器 A 的 CLI 中输入以下命令：

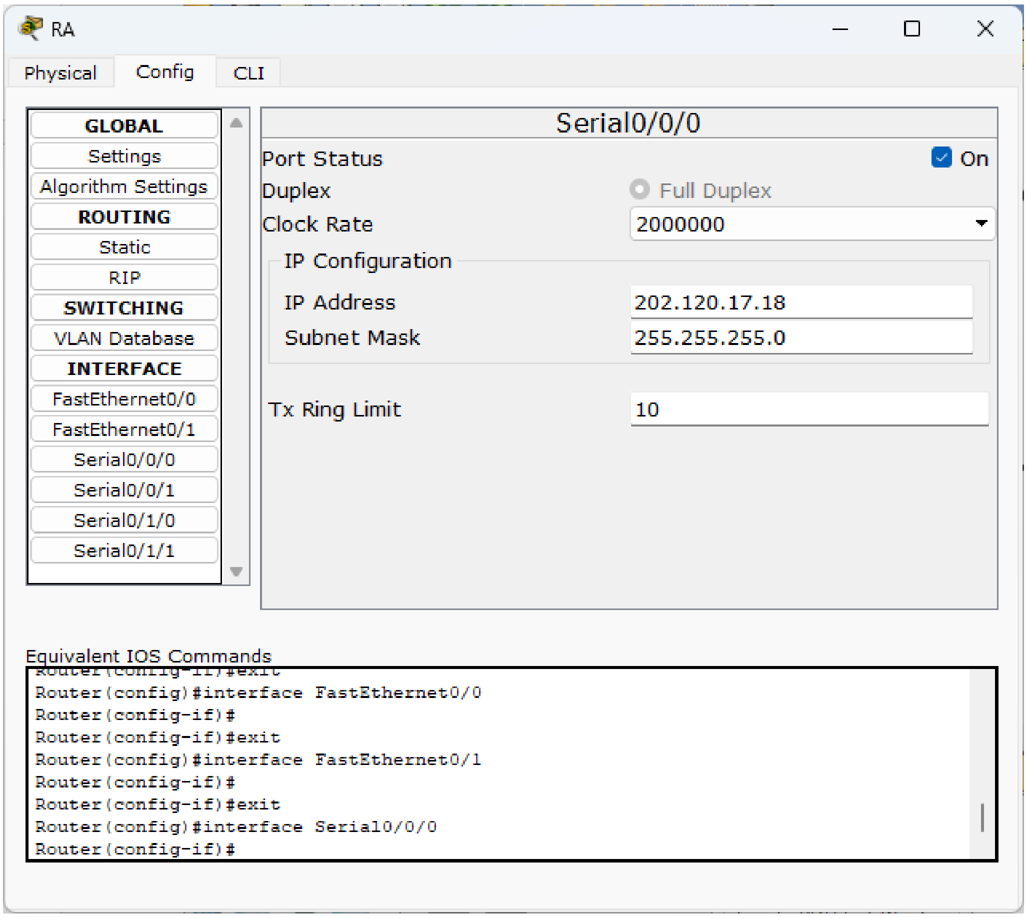
```
interface FastEthernet0/0
ip address 192.168.1.254 255.255.255.0
interface FastEthernet0/1
ip address 10.60.2.254 255.255.255.0
interface Serial 0/0/0
ip address 202.120.17.18 255.255.255.0
Clock rate 56000
```

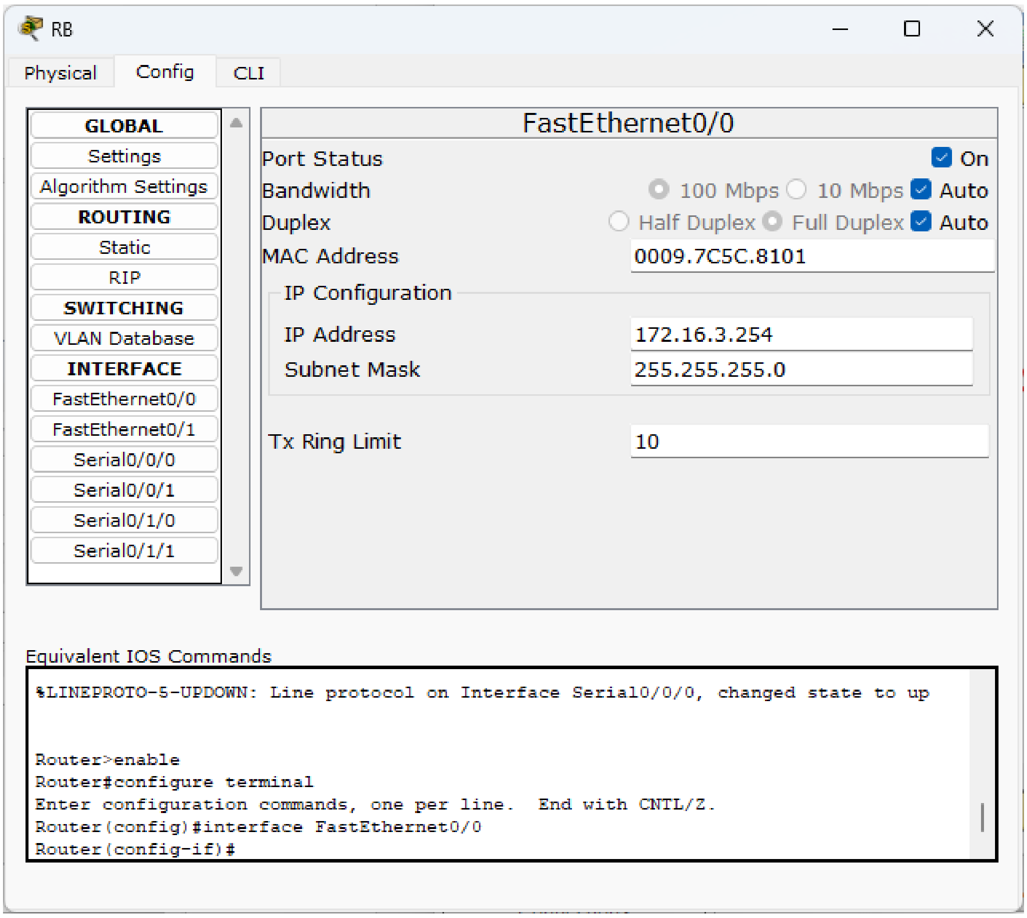
- 在路由器 B 的 CLI 中输入以下命令：

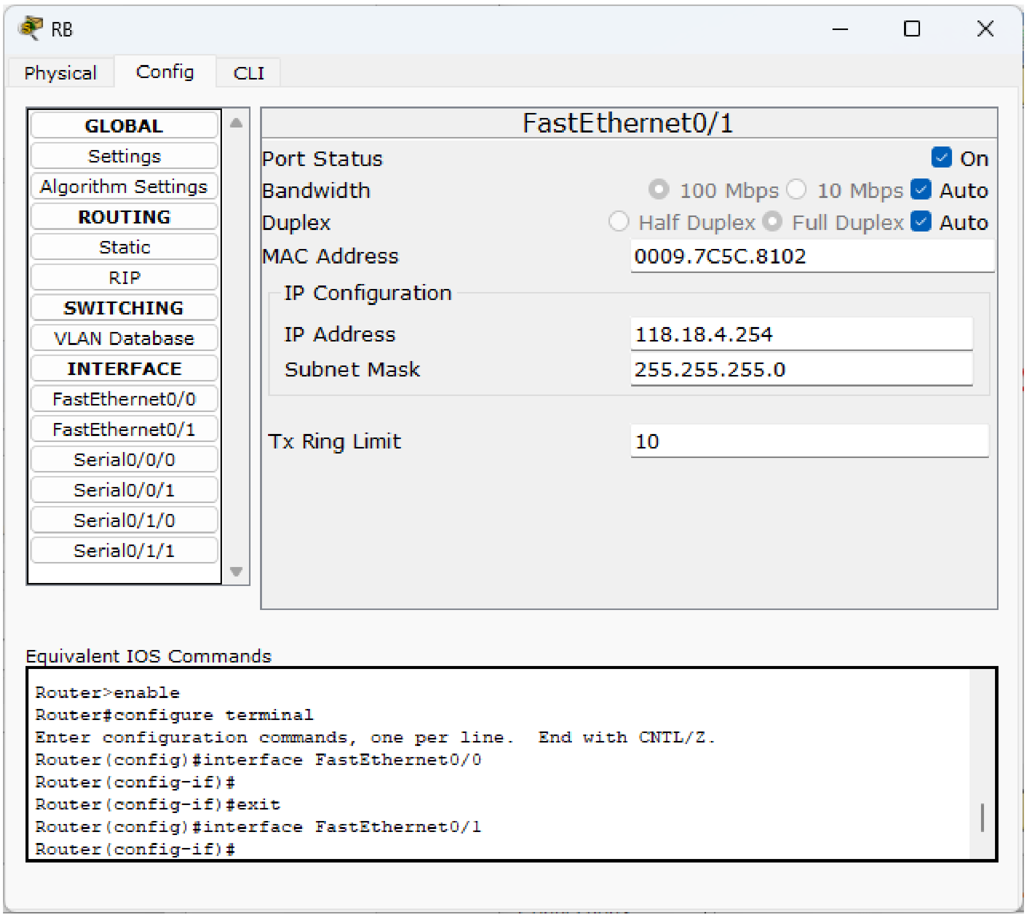
```
interface FastEthernet0/0
ip address 172.16.3.254 255.255.255.0
interface FastEthernet0/1
ip address 118.18.4.254 255.255.255.0
interface Serial 0/0/0
ip address 202.120.17.29 255.255.255.0
Clock rate 56000
```

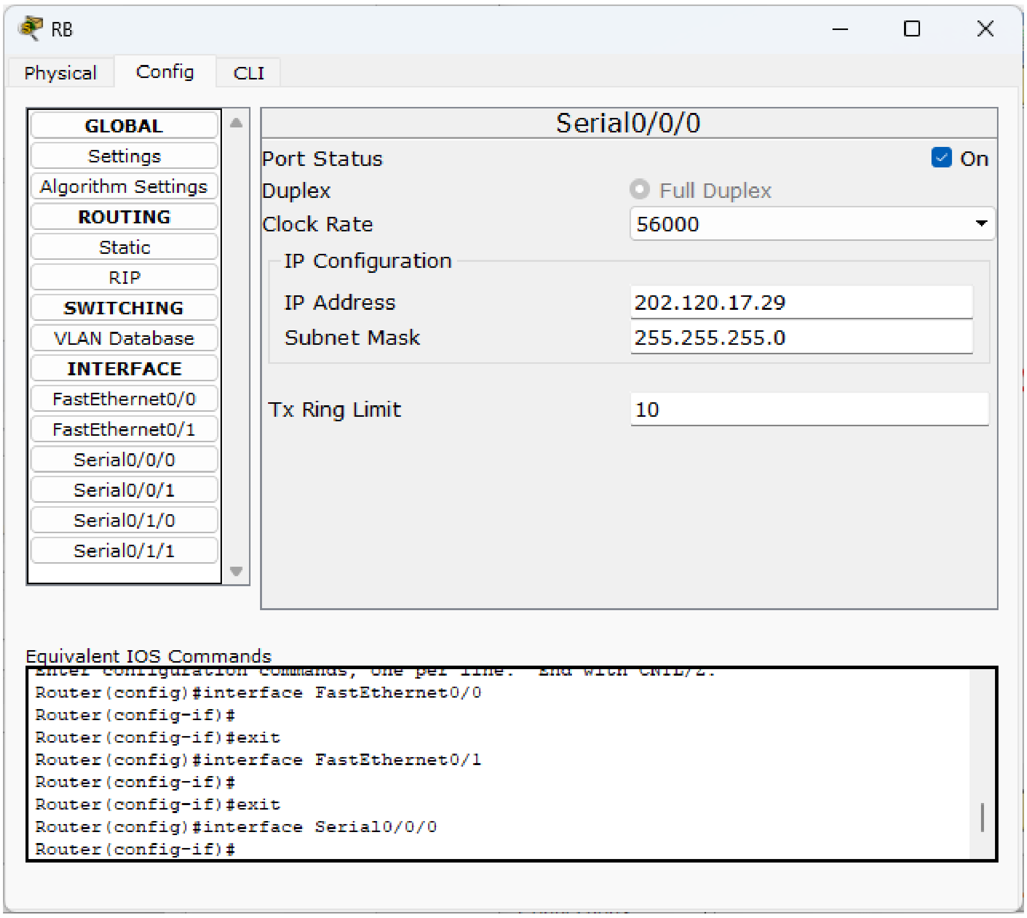



RA
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
Serial0/1/0
Serial0/1/1
FastEthernet0/1
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
000C.8517.3802
IP Configuration
IP Address
10.60.2.254
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config)#interface Serial0/0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#


RA
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
Serial0/1/0
Serial0/1/1
Serial0/0/0
Port Status
On
Duplex
Full Duplex
Clock Rate
2000000
IP Configuration
IP Address
202.120.17.18
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/0/0
Router(config-if)#


RB
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
Serial0/1/0
Serial0/1/1
FastEthernet0/0
Port Status On
Bandwidth 100 Mbps 10 Mbps Auto
Duplex Half Duplex Full Duplex Auto
MAC Address 0009.7C5C.8101
IP Configuration
IP Address 172.16.3.254
Subnet Mask 255.255.255.0
Tx Ring Limit 10
Equivalent IOS Commands
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#


RB
Physical
Config
CLI
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
Serial0/0/0
Serial0/0/1
Serial0/1/0
Serial0/1/1
FastEthernet0/1
Port Status On
Bandwidth 100 Mbps 10 Mbps Auto
Duplex Half Duplex Full Duplex Auto
MAC Address 0009.7C5C.8102
IP Configuration
IP Address 118.18.4.254
Subnet Mask 255.255.255.0
Tx Ring Limit 10
Equivalent IOS Commands
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#

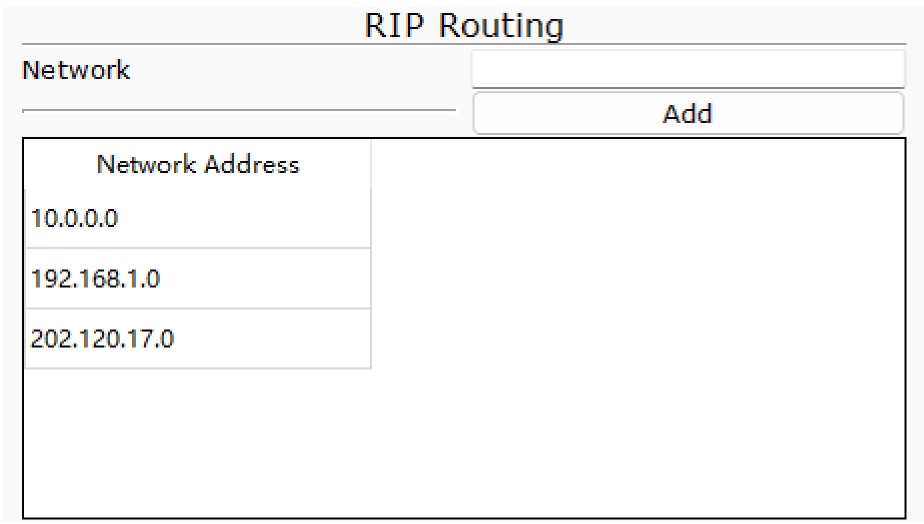


6. 几台 PC 机相互使用 ping 命令，观察实验结果。

7. 配置路由器 A 的 RIP 路由表。

- 在路由器 A 的 CLI 中输入以下命令：

```
router rip
network  192.168.1.11
network  10.60.2.22
network  202.120.17.18
```

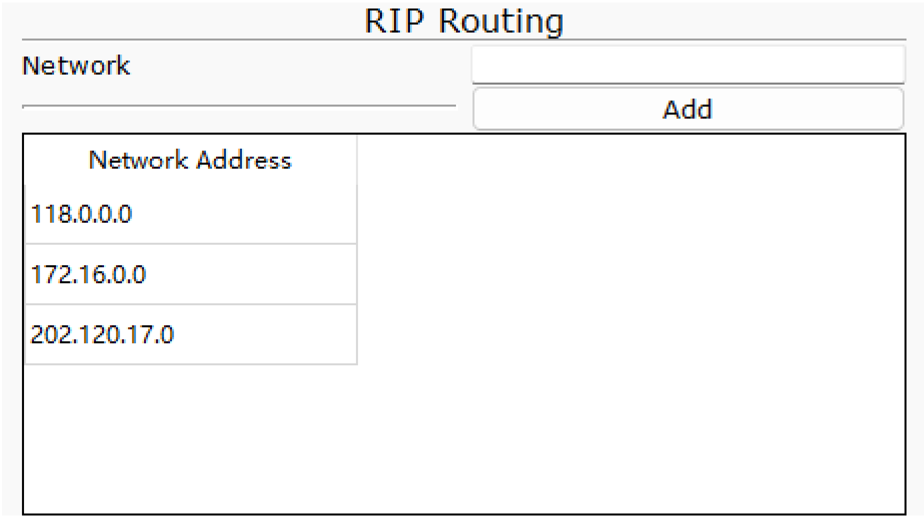


8. 几台 PC 机相互使用 ping 命令，观察实验结果。

9. 配置路由器 B 的 RIP 路由表。

  ● 在路由器 B 的 CLI 中输入以下命令：

```
router rip
network 172.16.3.33
network 118.18.4.44
network 202.120.17.29
```



10. 几台 PC 机相互使用 ping 命令，观察实验结果。

【实验现象】

1. 在配置路由器 A 和路由器 B 的 RIP 路由表之前，几台 PC 机相互使用 ping 命令。观察到如下实验现象：

   通过相同路由器连接的 PC 机之间相互 ping 成功。

   通过不同路由器连接的 PC 机之间相互 ping 失败。

  ● PC1 分别 ping PC2、PC3、PC4：

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- PC2 分别 ping PC1、PC3、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Request timed out.

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- PC3 分别 ping PC1、PC2、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Request timed out.
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127
Reply from 118.18.4.44: bytes=32 time=1ms TTL=127
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC4 分别 ping PC1、PC2、PC3：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 172.16.3.33: bytes=32 time=1ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

2. 在配置路由器 A 或路由器 B 的 RIP 路由表之后，几台 PC 机相互使用 ping 命令。观察到如下实验现象：

   通过相同路由器连接的 PC 机之间相互 ping 成功。

   通过不同路由器连接的 PC 机之间相互 ping 失败。

- PC1 分别 ping PC2、PC3、PC4：

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.
Reply from 192.168.1.254: Destination host unreachable.

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- PC2 分别 ping PC1、PC3、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Reply from 10.60.2.254: Destination host unreachable.
Request timed out.

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- PC3 分别 ping PC1、PC2、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.
Reply from 172.16.3.254: Destination host unreachable.

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Request timed out.
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127
Reply from 118.18.4.44: bytes=32 time=1ms TTL=127
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC4 分别 ping PC1、PC2、PC3：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.
Reply from 118.18.4.254: Destination host unreachable.

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 172.16.3.33: bytes=32 time=1ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

3. 在配置路由器 A 和路由器 B 的 RIP 路由表之后，几台 PC 机相互使用 ping 命令。观察到如下实验现象：

   通过相同和不同路由器连接的 PC 机之间相互都 ping 成功。

- PC1 分别 ping PC2、PC3、PC4：

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 172.16.3.33: bytes=32 time=1ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Request timed out.
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127
Reply from 118.18.4.44: bytes=32 time=1ms TTL=127
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC2 分别 ping PC1、PC3、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 172.16.3.33: bytes=32 time=1ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Request timed out.
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127
Reply from 118.18.4.44: bytes=32 time=1ms TTL=127
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC3 分别 ping PC1、PC2、PC4：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PC>ping 118.18.4.44

Pinging 118.18.4.44 with 32 bytes of data:

Request timed out.
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127
Reply from 118.18.4.44: bytes=32 time=1ms TTL=127
Reply from 118.18.4.44: bytes=32 time=0ms TTL=127

Ping statistics for 118.18.4.44:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- PC4 分别 ping PC1、PC2、PC3：

```
PC>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=0ms TTL=127
Reply from 192.168.1.11: bytes=32 time=3ms TTL=127

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 0ms
```

```
PC>ping 10.60.2.22

Pinging 10.60.2.22 with 32 bytes of data:

Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127
Reply from 10.60.2.22: bytes=32 time=0ms TTL=127

Ping statistics for 10.60.2.22:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
PC>ping 172.16.3.33

Pinging 172.16.3.33 with 32 bytes of data:

Reply from 172.16.3.33: bytes=32 time=1ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127
Reply from 172.16.3.33: bytes=32 time=0ms TTL=127

Ping statistics for 172.16.3.33:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

【分析讨论】

在未配置 RIP 之前，同一路由器下的 PC 机能够相互通信，而不同路由器连接的 PC 机间通信失败。这是因为在未配置 RIP 的情况下，路由器不具备将数据包传递到其他网络的路由信息。

在配置了一个路由器的 RIP 之后，尽管该路由器下的 PC 机之间可以正常通信，但是与另一个未配置 RIP 的路由器下的 PC 机间的通信仍然是失败的。这说明了仅部分配置 RIP 是不足以实现网络间全面互通的。

当两个路由器都配置了 RIP 之后，所有 PC 机无论是连接同一个路由器还是不同路由器，都能够相互成功地通信。这是因为 RIP 配置后，路由器之间能够交换各自的路由表，从而获得到达网络中任何部分的路由信息。此时，数据包可以根据这些路由信息被正确地传递到目的地。