

实验 8.4.2: Show IP Route 挑战实验

地址表

设备	接口	IP 地址	子网掩码
R1			
R2			
R3			
R4			
R5			

学习目标

完成本实验后，您将能够：

- 根据 `show ip route` 命令的输出确定网络拓扑图。
- 根据拓扑图进行网络布线。
- 根据输出确定路由器接口地址。
- 在路由器上执行基本的配置任务。
- 确定 1 级路由和 2 级路由。

场景

在本实验练习中，您将使用 **show ip route** 命令的输出确定网络的拓扑结构。您需要绘制拓扑图并确定每台路由器的接口地址。接下来，您需要根据输出搭建并配置网络。DTE 和 DCE 由您自行指定。完成后，该网络的输出必须与下面给出的输出相符。

任务 1: 查看路由器输出。

步骤 1: 查看 R1 路由器的输出。

```
R1#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

```
10.0.0.0/30 is subnetted, 4 subnets
R    10.10.10.0 [120/1] via 10.10.10.6, 00:00:09, Serial0/0/0
C    10.10.10.4 is directly connected, Serial0/0/0
C    10.10.10.8 is directly connected, Serial0/0/1
R    10.10.10.12 [120/1] via 10.10.10.10, 00:00:09, Serial0/0/1
172.16.0.0/16 is variably subnetted, 10 subnets, 5 masks
C    172.16.1.0/27 is directly connected, FastEthernet0/0
R    172.16.1.32/28 [120/2] via 10.10.10.10, 00:00:09, Serial0/0/1
R    172.16.1.192/26 [120/1] via 10.10.10.6, 00:00:09, Serial0/0/0
R    172.16.2.0/26 [120/2] via 10.10.10.6, 00:00:09, Serial0/0/0
R    172.16.2.64/27 [120/1] via 10.10.10.10, 00:00:09, Serial0/0/1
C    172.16.3.0/25 is directly connected, FastEthernet0/1
R    172.16.3.128/26 [120/1] via 10.10.10.6, 00:00:09, Serial0/0/0
R    172.16.3.192/29 [120/2] via 10.10.10.6, 00:00:09, Serial0/0/0
R    172.16.4.0/27 [120/1] via 10.10.10.10, 00:00:09, Serial0/0/1
R    172.16.4.128/25 [120/2] via 10.10.10.10, 00:00:09, Serial0/0/1
C    192.168.1.0/24 is directly connected, Loopback0
S*   0.0.0.0/0 is directly connected, Loopback0
```

步骤 2: 查看 R2 路由器的输出。

```
R2#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 10.10.10.2 to network 0.0.0.0

```
10.0.0.0/30 is subnetted, 4 subnets
C    10.10.10.0 is directly connected, Serial0/0/0
R    10.10.10.4 [120/1] via 10.10.10.2, 00:00:04, Serial0/0/0
R    10.10.10.8 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0
R    10.10.10.12 [120/3] via 10.10.10.2, 00:00:04, Serial0/0/0
172.16.0.0/16 is variably subnetted, 10 subnets, 5 masks
R    172.16.1.0/27 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0
R    172.16.1.32/28 [120/4] via 10.10.10.2, 00:00:04, Serial0/0/0
R    172.16.1.192/26 [120/1] via 10.10.10.2, 00:00:04, Serial0/0/0
C    172.16.2.0/26 is directly connected, FastEthernet0/0
R    172.16.2.64/27 [120/3] via 10.10.10.2, 00:00:04, Serial0/0/0
R    172.16.3.0/25 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0
R    172.16.3.128/26 [120/1] via 10.10.10.2, 00:00:04, Serial0/0/0
C    172.16.3.192/29 is directly connected, FastEthernet0/1
R    172.16.4.0/27 [120/3] via 10.10.10.2, 00:00:04, Serial0/0/0
R    172.16.4.128/25 [120/4] via 10.10.10.2, 00:00:04, Serial0/0/0
R    192.168.1.0/24 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0
R*   0.0.0.0/0 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0
```

步骤 3: 查看 R3 路由器的输出。

R3#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 10.10.10.5 to network 0.0.0.0

```
10.0.0.0/30 is subnetted, 4 subnets
C    10.10.10.0 is directly connected, Serial0/0/1
C    10.10.10.4 is directly connected, Serial0/0/0
R    10.10.10.8 [120/1] via 10.10.10.5, 00:00:04, Serial0/0/0
R    10.10.10.12 [120/2] via 10.10.10.5, 00:00:04, Serial0/0/0
172.16.0.0/16 is variably subnetted, 10 subnets, 5 masks
R    172.16.1.0/27 [120/1] via 10.10.10.5, 00:00:04, Serial0/0/0
R    172.16.1.32/28 [120/3] via 10.10.10.5, 00:00:04, Serial0/0/0
C    172.16.1.192/26 is directly connected, FastEthernet0/1
R    172.16.2.0/26 [120/1] via 10.10.10.1, 00:00:03, Serial0/0/1
R    172.16.2.64/27 [120/2] via 10.10.10.5, 00:00:04, Serial0/0/0
R    172.16.3.0/25 [120/1] via 10.10.10.5, 00:00:04, Serial0/0/0
C    172.16.3.128/26 is directly connected, FastEthernet0/0
R    172.16.3.192/29 [120/1] via 10.10.10.1, 00:00:03, Serial0/0/1
R    172.16.4.0/27 [120/2] via 10.10.10.5, 00:00:04, Serial0/0/0
R    172.16.4.128/25 [120/3] via 10.10.10.5, 00:00:04, Serial0/0/0
R    192.168.1.0/24 [120/1] via 10.10.10.5, 00:00:04, Serial0/0/0
R*   0.0.0.0/0 [120/1] via 10.10.10.5, 00:00:04, Serial0/0/0
```

步骤 4: 查看 R4 路由器的输出。

R4#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 10.10.10.9 to network 0.0.0.0

```
10.0.0.0/30 is subnetted, 4 subnets
R    10.10.10.0 [120/2] via 10.10.10.9, 00:00:14, Serial0/0/0
R    10.10.10.4 [120/1] via 10.10.10.9, 00:00:14, Serial0/0/0
C    10.10.10.8 is directly connected, Serial0/0/0
C    10.10.10.12 is directly connected, Serial0/0/1
172.16.0.0/16 is variably subnetted, 10 subnets, 5 masks
R    172.16.1.0/27 [120/1] via 10.10.10.9, 00:00:14, Serial0/0/0
R    172.16.1.32/28 [120/1] via 10.10.10.14, 00:00:17, Serial0/0/1
R    172.16.1.192/26 [120/2] via 10.10.10.9, 00:00:14, Serial0/0/0
R    172.16.2.0/26 [120/3] via 10.10.10.9, 00:00:14, Serial0/0/0
C    172.16.2.64/27 is directly connected, FastEthernet0/1
R    172.16.3.0/25 [120/1] via 10.10.10.9, 00:00:14, Serial0/0/0
R    172.16.3.128/26 [120/2] via 10.10.10.9, 00:00:14, Serial0/0/0
R    172.16.3.192/29 [120/3] via 10.10.10.9, 00:00:14, Serial0/0/0
C    172.16.4.0/27 is directly connected, FastEthernet0/0
R    172.16.4.128/25 [120/1] via 10.10.10.14, 00:00:17, Serial0/0/1
R    192.168.1.0/24 [120/1] via 10.10.10.9, 00:00:14, Serial0/0/0
R*   0.0.0.0/0 [120/1] via 10.10.10.9, 00:00:14, Serial0/0/0
```

步骤 5: 查看 R5 路由器的输出。

R5#show ip route

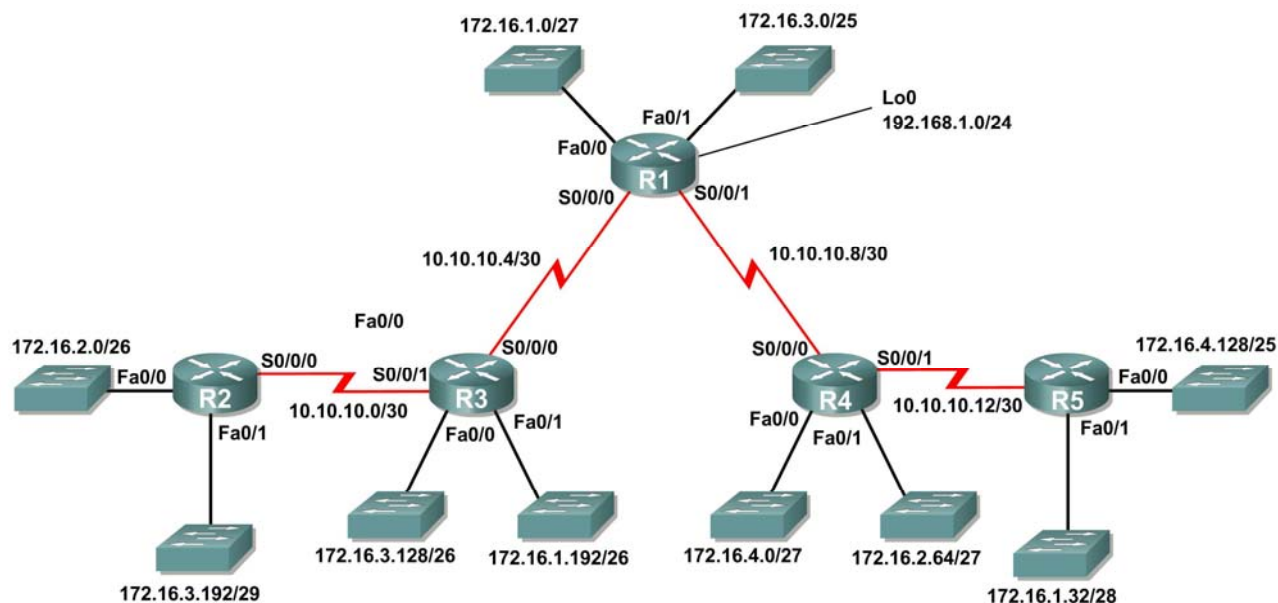
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS 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 10.10.10.13 to network 0.0.0.0

```
10.0.0.0/30 is subnetted, 4 subnets
R    10.10.10.0 [120/3] via 10.10.10.13, 00:00:21, Serial0/0/0
R    10.10.10.4 [120/2] via 10.10.10.13, 00:00:21, Serial0/0/0
R    10.10.10.8 [120/1] via 10.10.10.13, 00:00:21, Serial0/0/0
C    10.10.10.12 is directly connected, Serial0/0/0
172.16.0.0/16 is variably subnetted, 10 subnets, 5 masks
R    172.16.1.0/27 [120/2] via 10.10.10.13, 00:00:21, Serial0/0/0
C    172.16.1.32/28 is directly connected, FastEthernet0/1
R    172.16.1.192/26 [120/3] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.2.0/26 [120/4] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.2.64/27 [120/1] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.3.0/25 [120/2] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.3.128/26 [120/3] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.3.192/29 [120/4] via 10.10.10.13, 00:00:21, Serial0/0/0
R    172.16.4.0/27 [120/1] via 10.10.10.13, 00:00:21, Serial0/0/0
C    172.16.4.128/25 is directly connected, FastEthernet0/0
R    192.168.1.0/24 [120/2] via 10.10.10.13, 00:00:21, Serial0/0/0
R*   0.0.0.0/0 [120/2] via 10.10.10.13, 00:00:21, Serial0/0/0
```

任务 2: 根据路由器的输出创建网络图。

步骤 1: 根据您对路由器输出的分析, 在下面给出的空白处绘制网络图。



步骤 2: 在地址表中记录接口地址。

任务 3：使用 Packet Tracer 构建拓扑图结构并进行配置。

步骤 1：使用 Packet Tracer 构建拓扑图。可以使用 1841 路由器或 2811 路由器。

步骤 2：使用适当的 IP 地址和子网掩码配置路由器接口。

步骤 3：为每台路由器配置适当的路由协议，并通告所有直连网络。

步骤 4：检验所做配置是否与任务 1 中的路由器输出相符。

任务 4：确定路由过程。

步骤 1：查看 R1 路由表。

与 R1 路由器直接相连的邻居的 IP 地址是多少？

R1 从直接相连的邻居中获知了哪些路由？

步骤 2：查看 R2 路由表。

R2 从邻居总共获知了多少个网络/子网？

如果 R2 的路由表中当前没有数据包的目的网络，R2 会将该数据包发往哪里？为什么？

R2 路由表末尾的语句“R* 0.0.0.0/0 [120/2] via 10.10.10.2, 00:00:04, Serial0/0/0”表示什么？

步骤 3: 查看 R3 路由表。

R3 从邻居获知了哪些 2 级路由？

哪些网络直接连接到 R3？

步骤 4: 查看 R4 路由表。

哪个网络离 R4 最远，它们之间的跳数是多少？

离 R4 最远的网络上有多少个可用的主机地址？ _____

步骤 5: 查看 R5 路由表。

从 R5 到网络 172.16.2.0/26，数据包必须经过多少台路由器？ _____

为什么 R5 的“Gateway of last resort”为 10.10.10.13？
