

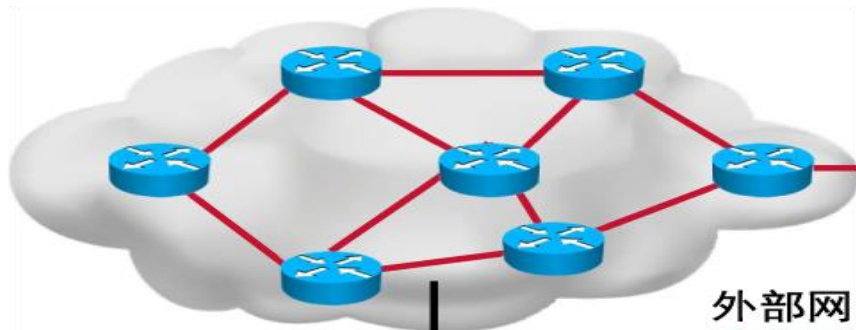
# 了解 IPv6（已从 ICDN2 更新和重新定位）

## IPv6 简介

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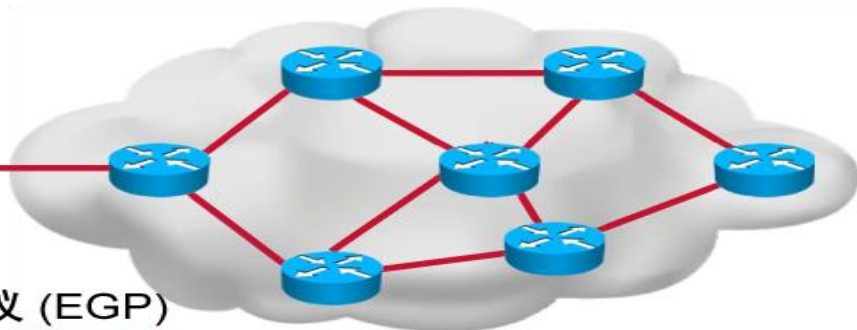
# IPv6 路由

自治系统 65100



内部网关协议 (IGP)  
(RIPng、IPv6 的 EIGRP、OSPFv3)

自治系统 65200



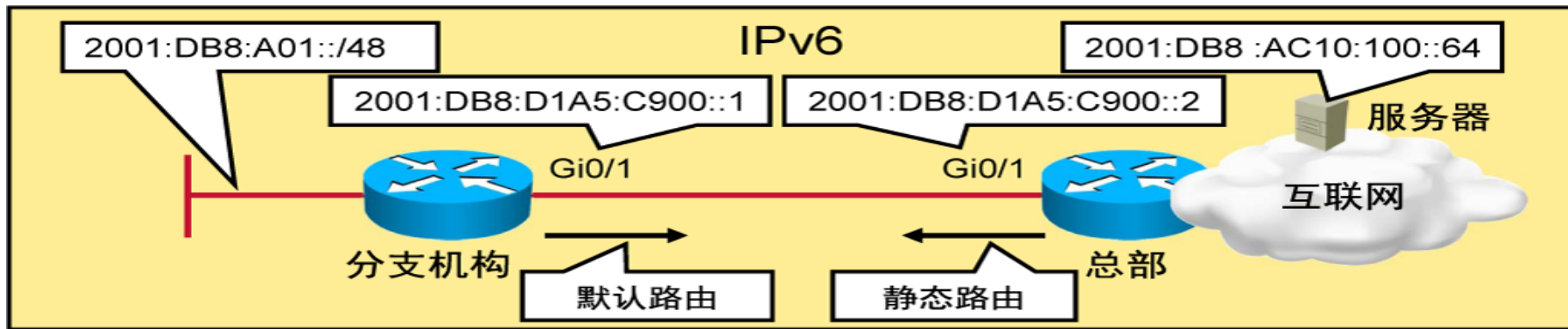
外部网关协议 (EGP)  
(MP-BGP4)

# IPv6 路由（续）

## IPv6 路由类型：

- 静态
- RIPng (RFC 2080)
- 用于 IPv6 的 EIGRP
- OSPFv3 (RFC 2740)
- MP-BGP4 (RFC 2545/2858)

# 静态路由



静态 IPv6 路由可在 HQ 路由器上配置:

```
HQ(config)#ipv6 route 2001:DB8:A01::/48 Gi0/1 2001:DB8:D1A5:C900::1
```

可以在 Branch 路由器上配置默认 IPv6 路由:

```
Branch(config)#ipv6 route ::/0 Gi0/1 2001:DB8:D1A5:C900::2
```

# 静态路由（续）

验证 HQ 路由器上的静态 IPv6 路由：

```
HQ#show ipv6 route static
IPv6 Routing Table - default - 4 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
        B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2
        IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP
external
        ND - Neighbor Discovery, l - LISP
        O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
S    2001:DB8:A01::/48 [1/0]
     via 2001:DB8:D1A5:C900::1, GigabitEthernet0/1
```

# 静态路由（续）

验证 Branch 路由器上的默认 IPv6 路由：

```
Branch#show ipv6 route static
IPv6 Routing Table - default - 4 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
        B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2
        IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP
external
        ND - Neighbor Discovery, l - LISP
        O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
        ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
S   ::/0 [1/0]
    via 2001:DB8:D1A5:C900::2, GigabitEthernet0/1
```

# 静态路由（续）

验证从 Branch 路由器至 IPv6 地址 2001:db8:AC10:100::64: 的 IPv6 连接本主题介绍如何配置和验证 OSPFv3。

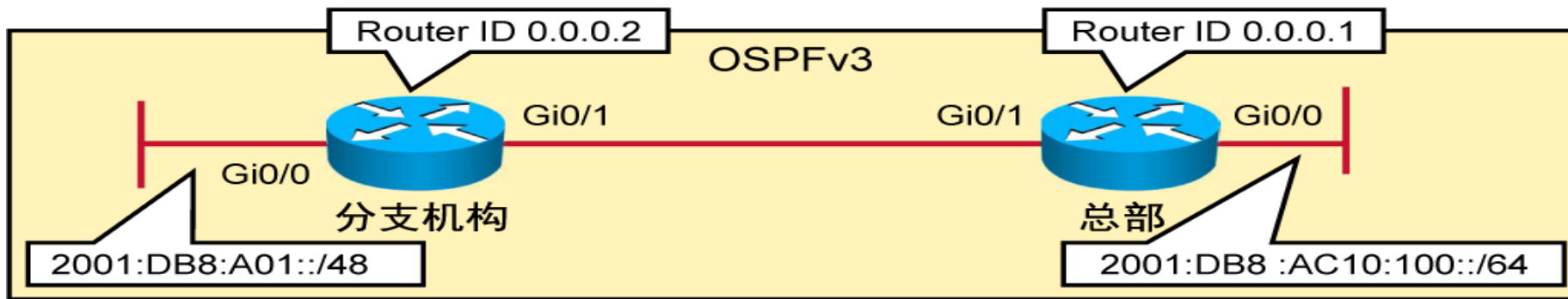
```
Branch#ping 2001:db8:AC10:100::64
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 2001:DB8:AC10:100::64, timeout is 2
seconds:
|||||
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/0/0 ms
```

# OSPFv3

- 路由器 ID 看起来像 IPv4 地址。
- 邻接和下一跳属性使用本地链路地址。
- IPv6 用于传输 LSA。
- 在每条链路而不是每个网络中启用 OSPFv3。



# OSPFv3 (续)



在 HQ 路由器上配置 OSPFv3:

```
HQ(config)# interface GigabitEthernet0/0
HQ(config-if)# ipv6 ospf 1 area 0
HQ(config-if)# exit
HQ(config)# interface GigabitEthernet0/1
HQ(config-if)# ipv6 ospf 1 area 0
HQ(config-if)# exit
HQ(config)# ipv6 router ospf 1
HQ(config-rtr)# router-id 0.0.0.1
```

# OSPFv3 (续)

在 Branch 路由器上配置 OSPFv3:

```
Branch(config)# interface GigabitEthernet0/0
Branch(config-if)# ipv6 ospf 1 area 0
Branch(config-if)# exit
Branch(config)# interface GigabitEthernet0/1
Branch(config-if)# ipv6 ospf 1 area 0
Branch(config-if)# exit
Branch(config)# ipv6 router ospf 1
Branch(config-rtr)# router-id 0.0.0.2
```

# OSPFv3 (续)

验证 Branch 路由器上的 OSPFv3 路由:

```
Branch# show ipv6 route ospf
IPv6 Routing Table - default - 6 entries
Codes: C - Connected, L - Local, S - Static, U - Per-user Static route
       B - BGP, R - RIP, I1 - ISIS L1, I2 - ISIS L2
       IA - ISIS interarea, IS - ISIS summary, D - EIGRP, EX - EIGRP
external
       ND - Neighbor Discovery, l - LISP
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext 1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
```

验证 Branch 路由器上的 OSPFv3 邻居:

```
Branch# show ipv6 ospf neighbor

Neighbor ID      Pri   State           Dead Time   Interface ID  Interface
0.0.0.1          1    FULL/BDR        00:00:38   4             GigabitEthernet0/1
```

# OSPFv3 (续)

验证 Branch 路由器上的 OSPFv3 设置:

```
Branch# show ipv6 ospf
Routing Process "ospfv3 1" with ID 0.0.0.2
Event-log enabled, Maximum number of events: 1000, Mode: cyclic
Initial SPF schedule delay 5000 msec
Minimum hold time between two consecutive SPF's 10000 msec
Maximum wait time between two consecutive SPF's 10000 msec
Minimum LSA interval 5 sec
Minimum LSA arrival 1000 msec
LSA group pacing timer 240 sec
Interface flood pacing timer 33 msec
Retransmission pacing timer 66 msec
Number of external LSA 0. Checksum Sum 0x000000
Number of areas in this router is 1. 1 normal 0 stub 0 nssa
Graceful restart helper support enabled
Reference bandwidth unit is 100 mbps
< output omitted >
```

# 总结

- 思科支持所有主要的 IPv6 路由协议：RIPng、OSPFv3 和 EIGRP。
- 使用 **ipv6 route** 命令，配置 IPv6 静态路由和默认路由。
- 在每条链路而不是每个网络中启用 OSPFv3。OSPFv3 邻接使用本地链路地址进行通信。

Thank you.

