

在非广播链路上配置OSPF的初始配置

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简介

本文档介绍在非广播链路上的开放最短路径优先(OSPF)的初始配置。

背景信息

在非广播介质 (例如, 帧中继、X.25、ATM 和交换式多兆位数据服务 (SMDS)) 上, OSPF 可以在两种模式下运行:

- 非广播多路访问(NBMA): 通过选举指定路由器(DR)和备用指定路由器(BDR)来模拟广播模型。在NBMA网络上模拟广播模型的方法有两种: 使用`ip ospf network broadcast interface`子命令将网络类型定义为广播, 或使用`router ospf`命令配置`neighbor`语句。
- 点对多点: 通过配置[ip ospf network point-to-multipoint](#)命令将非广播网络视为点对点链路的集合。

必须定义非广播网络上的网络类型, 以避免配置`neighbor`语句。本文档提供非广播链路上OSPF的示例配置。使用`show ip ospf interface`命令检查运行OSPF的接口的网络类型, 并使用`show ip ospf neighbor`命令了解邻居路由器的状态。

先决条件

要求

Cisco建议您了解OSPF路由协议的[基本配置](#)。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- Cisco 2500 路由器
- 在路由器上运行的Cisco IOS®软件版本12.2(24a)

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

网络图

这是本文档的配置示例中使用的网络图。



NBMA配置（使用网络类型广播）

Router1

```
interface Loopback0
  ip address 192.0.2.3 255.255.255.255
  !
  !
interface Serial2
  ip address 192.0.2.1 255.255.255.0
  encapsulation frame-relay
  ip ospf network broadcast
  no keepalive
  frame-relay map ip 192.0.2.1 16 broadcast
  !
  !
router ospf 1
  network 192.0.2.0 0.0.0.255 area 0
```

Router2

```
interface Loopback0
  ip address 192.0.2.2 255.255.255.255
  !
interface Serial1/0
  ip address 192.0.2.1 255.255.255.0
  encapsulation frame-relay
  ip ospf network broadcast
  no keepalive
  clockrate 2000000
  frame-relay map ip 192.0.2.1 16 broadcast
  !
router ospf 1
  network 192.0.2.0 0.0.0.255 area 0
  !
```

验证提示

这是Router1的show命令输出。

```
Router1# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.2	1	FULL/BDR	00:00:37	192.0.2.1	Serial2

```
Router1# show ip ospf interface s2
```

```
Serial2 is up, line protocol is up
Internet Address 192.0.2.1/24, Area 0
Process ID 1, Router ID 192.0.2.3, Network Type BROADCAST, Cost: 64
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.0.2.3, Interface address 192.0.2.1
Backup Designated router (ID) 192.0.2.2, Interface address 192.0.2.1
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:00
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 2
Last flood scan time is 0 msec, maximum is 4 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 192.0.2.2 (Backup Designated Router)
Suppress hello for 0 neighbor(s)
```

Router2 的输出如下所示。

```
Router2# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.3	1	FULL/DR	00:00:38	192.0.2.1	Serial1/0

```
Router2# show ip ospf interface s1/0
```

```
Serial1/0 is up, line protocol is up
Internet Address 192.0.2.1/24, Area 0
Process ID 1, Router ID 192.0.2.2, Network Type BROADCAST, Cost: 64
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 192.0.2.3, Interface address 192.0.2.1
Backup Designated router (ID) 192.0.2.2, Interface address 192.0.2.1
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:03
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 2
Last flood scan time is 0 msec, maximum is 4 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 192.0.2.3 (Designated Router)
Suppress hello for 0 neighbor(s)
```

NBMA配置 (使用邻居语句)

Router1

```
interface Loopback0
 ip address 192.0.2.3 255.255.255.255
!
interface Serial2
 ip address 192.0.2.1 255.255.255.0
 encapsulation frame-relay
```

```

ip ospf priority 2
no keepalive
frame-relay map ip 192.0.2.1 16
!
router ospf 1
network 192.0.2.0 0.0.0.255 area 0
neighbor 192.0.2.1
!

```

Router2

```

interface Loopback0
ip address 192.0.2.2 255.255.255.255
!
interface Serial1/0
ip address 192.0.2.1 255.255.255.0
encapsulation frame-relay
no keepalive
clockrate 2000000
frame-relay map ip 192.0.2.1 16
!
router ospf 1
network 192.0.2.0 0.0.0.255 area 0
neighbor 192.0.2.1
!

```

注意：在刚才显示的配置中，Router1上的ip ospf priority 2命令设置比默认优先级值1更高的接口优先级，使其成为NBMA网络的DR，而Router2成为BDR。如果需要，可以将优先级值设置为0，以将路由器配置为永不成为DR/BDR。这在星型网络中是必需的，在该网络中，必须将中心配置为成为DR，其中as分支既不能是DR也不可以是BDR。尽管在一端配置neighbor语句足以形成邻接关系，但最好在两端都配置该语句，如下所示。并且，因为OSPF数据包是使用neighbor语句进行单播的，所以frame-relay map命令不需要包含broadcast参数。

验证提示

这是Router1的show命令输出。

```
Router1# show ip ospf neighbors
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.2	1	FULL/BDR	00:01:39	192.0.2.1	Serial2

```
Router1# show ip ospf interface s2
```

```

Serial2 is up, line protocol is up
Internet Address 192.0.2.1/24, Area 0
Process ID 1, Router ID 192.0.2.3, Network Type NON_BROADCAST, Cost: 64
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.0.2.3, Interface address 192.0.2.1
Backup Designated router (ID) 192.0.2.2, Interface address 192.0.2.1
Timer intervals configured, Hello 30, Dead 120, Wait 120, Retransmit 5
Hello due in 00:00:19
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 2, maximum is 2
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 192.0.2.2 (Backup Designated Router)
Suppress hello for 0 neighbor(s)

```

Router2 的输出如下所示。

```
Router2# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.3	1	FULL/DR	00:01:49	192.0.2.1	Serial1/0

```
Router2# show ip ospf interface s1/0
```

```
Serial1/0 is up, line protocol is up
  Internet Address 192.0.2.1/24, Area 0
  Process ID 1, Router ID 192.0.2.2, Network Type NON_BROADCAST, Cost: 64
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 192.0.2.3, Interface address 192.0.2.1
  Backup Designated router (ID) 192.0.2.2, Interface address 192.0.2.1
  Timer intervals configured, Hello 30, Dead 120, Wait 120, Retransmit 5
    Hello due in 00:00:01
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 2
  Last flood scan time is 0 msec, maximum is 0 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
    Adjacent with neighbor 192.0.2.3 (Designated Router)
  Suppress hello for 0 neighbor(s)
```

点对多点的配置

Router1

```
interface Loopback0
  ip address 192.0.2.3 255.255.255.255
!
interface Serial2
  ip address 192.0.2.1 255.255.255.0
  encapsulation frame-relay
  ip ospf network point-to-multipoint
  no keepalive
  frame-relay map ip 192.0.2.1 16 broadcast
!
router ospf 1
  network 192.0.2.0 0.0.0.255 area 0
!
```

Router2

```
interface Loopback0
  ip address 192.0.2.2 255.255.255.255
!
interface Serial1/0
  ip address 192.0.2.1 255.255.255.0
  encapsulation frame-relay
  ip ospf network point-to-multipoint
  no keepalive
  clockrate 2000000
  frame-relay map ip 192.0.2.1 16 broadcast
!
router ospf 1
  network 192.0.2.0 0.0.0.255 area 0
```

验证提示

这是Router1的show命令输出。

```
Router1# show ip ospf neighbors
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.2	1	FULL/ -	00:01:53	192.0.2.1	Serial2

```
Router1# show ip ospf interface s2
```

```
Serial2 is up, line protocol is up
Internet Address 192.0.2.1/24, Area 0
Process ID 1, Router ID 192.0.2.3, Network Type POINT_TO_MULTIPOINT, Cost: 64
Transmit Delay is 1 sec, State POINT_TO_MULTIPOINT,
Timer intervals configured, Hello 30, Dead 120, Wait 120, Retransmit 5
Hello due in 00:00:18
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 192.0.2.2
Suppress hello for 0 neighbor(s)
```

Router2 的输出如下所示。

```
Router2# show ip ospf neighbor
```

Neighbor ID	Pri	State	Dead Time	Address	Interface
192.0.2.3	1	FULL/ -	00:01:58	192.0.2.1	Serial1/0

```
Router2# show ip ospf interface s1/0
```

```
Serial1/0 is up, line protocol is up
Internet Address 192.0.2.1/24, Area 0
Process ID 1, Router ID 192.0.2.2, Network Type POINT_TO_MULTIPOINT, Cost: 64
Transmit Delay is 1 sec, State POINT_TO_MULTIPOINT,
Timer intervals configured, Hello 30, Dead 120, Wait 120, Retransmit 5
Hello due in 00:00:18
Index 1/1, flood queue length 0
Next 0x0(0)/0x0(0)
Last flood scan length is 1, maximum is 1
Last flood scan time is 0 msec, maximum is 0 msec
Neighbor Count is 1, Adjacent neighbor count is 1
Adjacent with neighbor 192.0.2.3
Suppress hello for 0 neighbor(s)
```

注:当NBMA网络配置为点对多点时(如输出所示),没有选举DR和BDR,因为它被视为点对点链路的集合。

有关详细信息,请参阅[配置OSPF](#)。

相关信息

- [OSPF 支持页](#)
- [IP路由协议支持页](#)
- [技术支持和文档 - Cisco Systems](#)

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