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简介

开放最短路径优先(OSPF)协议存储其林克状态广告(LSA)在OSPF数据库。本文描述Cisco IOS软件如何处理OSPF交迭的外部(Type-5) LSA。

您应该熟悉OSPF LSA，他们在Cisco路由器的Cisco IOS软件内使用。IP寻址基础知识也是有用。

> **注意**：命令输出解释程序工具（仅限注册用户）支持某些 **show** 命令。请使用Output Interpreter Tool为了查看show命令输出分析。

外部LSA输出

OSPF外部LSA包含信息导入到从其他路由进程的OSPF。这是OSPF外部LSA的输出示例:。

```
R1#sh ip ospf database external 192.168.1.0

            OSPF Router with ID (10.0.12.1) (Process ID 1)

        Type-5 AS External Link States

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 924
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
Link State ID: 192.168.1.0 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000003
Checksum: 0x29D4
Length: 36
Network Mask: /24
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0
```

在本例中， OSPF使用同外部网络号一样)的林克状态ID (为了区分另外外部LSA。

示例 1：两个不同的路由用同样外部网络号

是可能的有用不同的掩码的同样网络号导入到从不同的路由协议的OSPF。即两个不同的路由能有同一网络号，但是不同的掩码。

```
R1#sh ip route ospf
Codes: L - local, C - connected, S - static, 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       + - replicated route, % - next hop override
The gateway of last resort is not set.

     10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
O         10.1.23.0/24 [110/20] via 10.1.12.2, 00:24:06, Ethernet0/0
     192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
O E2      192.168.1.0/24 [110/1] via 10.1.12.2, 00:20:57, Ethernet0/0
O E2      192.168.1.0/25 [110/1] via 10.1.12.2, 00:00:11, Ethernet0/0
```

在本例中，OSPF必须安装在其数据库的两个LSA。为了达到此，OSPF安装下个已接收LSA作为其广播编号而不是其网络号。

```
R1#sh ip ospf database external

            OSPF Router with ID (10.0.12.1) (Process ID 1)

        Type-5 AS External Link States

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 53
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.0 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000003
Checksum: 0x29D4
Length: 36
 Network Mask: /24
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 428
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.127 (External Network Number )  <----Broadcast Number
of 192.168.1.0/25
Advertising Router: 10.1.23.2
LS Seq Number: 80000001
Checksum: 0x35CA
Length: 36
 Network Mask: /25
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
```

```
 External Route Tag: 0
```

示例 2： 被提取的LSA

在本例中，提取LSA 192.168.1.0/24。一旦此LSA丢失，另一个LSA (192.168.1.0/25)没有用其网络号安装，然而用广播编号安装。

```
R1#sh ip ospf database external

            OSPF Router with ID (10.0.12.1) (Process ID 1)

        Type-5 AS External Link States

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 1066
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.127 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000001
Checksum: 0x35CA
Length: 36
 Network Mask: /25
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0
```

示例 3： 接收的新的LSA

在本例中，新的LSA (192.168.1.0/26)接收。

```
R1#sh ip ospf database external

            OSPF Router with ID (10.0.12.1) (Process ID 1)

        Type-5 AS External Link States

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 51
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.0 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000001
Checksum: 0x2DD2
Length: 36
 Network Mask: /24
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 7
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
```

```
 Link State ID: 192.168.1.63 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000001
Checksum: 0x39C6
Length: 36
 Network Mask: /26
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 1198
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.127 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000001
Checksum: 0x35CA
Length: 36
 Network Mask: /25
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0
```

示例 4： LSA被提取的和接收的新建的LSA

在本例中，提取LSA 192.168.1.0/24，并且新的LSA (192.168.1.0/26)接收。新的LSA替换撤回的LSA，并且OSPF能安装新的LSA用其网络号。

```
R1#sh ip ospf database external

            OSPF Router with ID (10.0.12.1) (Process ID 1)

        Type-5 AS External Link States

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 2
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.0 (External Network Number )
Advertising Router: 10.1.23.2
LS Seq Number: 80000003
Checksum: 0xAD8F
Length: 36
 Network Mask: /26
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0

Routing Bit Set on this LSA in topology Base with MTID 0
LS age: 1362
Options: (No TOS-capability, DC, Upward)
LS Type: AS External Link
 Link State ID: 192.168.1.127 (External Network Number )
Advertising Router: 10.1.23.2
```

```
LS Seq Number: 80000001
Checksum: 0x35CA
Length: 36
 Network Mask: /25
 Metric Type: 2 (Larger than any link state path)
 MTID: 0
 Metric: 1
 Forward Address: 10.1.23.3
 External Route Tag: 0
```

Cisco IOS软件设法安装LSA作为其网络号。如果，例如，网络号已经安装与一不同的掩码，可能无法如此执行。在那种情况下， Cisco IOS软件安装最近接收的LSA作为其广播编号而不是其网络号。