

知 某局点V7MSR5660替换V5MSR5040对接思科起ospf邻居不能正常建立的经 验案例

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组网及说明

现场本来是V5的MSR5040直连思科设备，并于思科设备正常建立OSPF邻居。客户目前设备有更新需求，计划将V5的MSR设备替换更新为V7的MSR5660设备。

问题描述

客户现场将原本的MSR5040替换成MSR5660并完成网络互通及ospf相关配置之后，发现MSR5660无法与对端思科设备正常建立OSPF邻居，其OSPF邻居状态一直卡在exchange状态。

[MSR5660]dis ospf peer

OSPF Process 65091 with Router ID 1.1.1.1

Neighbor Brief Information

Area: 0.0.0.0

Router ID	Address	Pri	Dead-Time	State	Interface
2.2.2.2	10.0.0.2	1	40	Exchange/	GE2/0/0

过程分析

对于OSPF邻居关系停滞于Exstart或Exchange状态，一般可能有以下原因：

- 1、两端的MTU值不匹配；
- 2、中间有传输，传输MTU值限制太小，两端MTU比较大，导致大包过不去。

但是在这个问题当中，现场MSR设备和对端的思科设备是直连的，且经过现场确认，现场我们设备以及对端思科设备的互联接口的MTU均为默认的1500，所以不存在MTU的这个问题。现场的配置基本如下，可以看到现场两端设备的Hello定时器、邻居失效时间等配置均是一致的：

MSR5660主要相关配置：

```
#
router id 1.1.1.1
#
ospf 65091 router-id 1.1.1.1
area 0.0.0.0
network 1.1.1.1 0.0.0.0
network 10.0.0.1 0.0.0.0
#
#
interface GigabitEthernet2/0/0
port link-mode route
combo enable copper
ip address 10.0.0.1 255.255.255.252
ospf network-type p2p
#
```

对端思科设备相关信息：

```
CISCO# sh ip ospf nei
OSPF Process ID 65091 VRF default
Total number of neighbors: 8
Neighbor ID Pri State Up Time Address Interface
1.1.1.1 1 EXSTART/- 00:15:05 10.0.0.1 Eth9/30
CISCO#
CISCO#
CISCO# sh ip ospf inter
interface internal
CISCO# sh ip ospf interface et9/30
Ethernet9/30 is up, line protocol is up
IP address 10.0.0.2/30, Process ID 65091 VRF default, area 0.0.0.0
Enabled by interface configuration
State P2P, Network type P2P, cost 10
Index 9, Transmit delay 1 sec
1 Neighbors, flooding to 0, adjacent with 0
Timer intervals: Hello 10, Dead 40, Wait 40, Retransmit 5
Hello timer due in 00:00:05
No authentication
Number of opaque link LSAs: 0, checksum sum 0
```

接下来我们提供debug信息来确认，建议现场收集OSPF邻居建立过程的debugging ospf event和debugging ospf packet的信息。

通过对比MSR5040正常情况下的debug以及MSR5660异常情况下的debug信息，我们看到：

对于MSR5040：

```
*Oct 24 00:24:22:747 2021MSR5040 RM/6/RMDEBUG: OSPF 65091: SEND Packet.
*Oct 24 00:24:22:847 2021MSR5040 RM/6/RMDEBUG: Source Address: 10.0.0.1
*Oct 24 00:24:22:947 2021MSR5040 RM/6/RMDEBUG: Destination Address: 224.0.0.5
*Oct 24 00:24:23:047 2021MSR5040 RM/6/RMDEBUG: Ver# 2, Type: 2, Length: 32.
*Oct 24 00:24:23:147 2021MSR5040 RM/6/RMDEBUG: Router: 1.1.1.1, Area: 0.0.0.0, Checksum: 65
9.
*Oct 24 00:24:23:247 2021MSR5040 RM/6/RMDEBUG: AuType: 00, Key(ascii): 0 0 0 0 0 0 0 0.
```

```
*Oct 24 00:24:23:347 2021MSR5040 RM/6/RMDEBUG: MTU: 0, Option: _E_, R_I_M_MS Bit: _I_M_MS_
```

```
*Oct 24 00:24:23:497 2021MSR5040 RM/6/RMDEBUG: DD SeqNumber: bf80e05
```

```
OSPF 65091: Nbr 10.0.0.2 Rcv 2WayReceived State Init -> ExStart.
```

对于OSPF的DD报文，V5设备是组播发送，V7是单播发送。需要在思科侧修改访问控制列表配置，使得V7单播DD报文可以正常通过，之后OSPF邻居可以正常建立。

```
*Oct 24 00:24:27:636 2021MSR5040 RM/6/RMDEBUG: OSPF 65091: RECV Packet.
```

```
*Oct 24 00:24:27:636 2021MSR5040 RM/6/RMDEBUG: Source Address: 10.0.0.2
```

```
*Oct 24 00:24:27:636 2021MSR5040 RM/6/RMDEBUG: Destination Address: 10.0.0.1
```

```
*Oct 24 00:24:27:637 2021MSR5040 RM/6/RMDEBUG: Ver# 2, Type: 2, Length: 32.
```

```
*Oct 24 00:24:27:637 2021MSR5040 RM/6/RMDEBUG: Router: 2.2.2.2, Area: 0.0.0.0, Checksum: 24065.
```

```
*Oct 24 00:24:27:637 2021MSR5040 RM/6/RMDEBUG: AuType: 00, Key(ascii): 0 0 0 0 0 0 0 0.
```

```
*Oct 24 00:24:27:637 2021MSR5040 RM/6/RMDEBUG: MTU: 1500, Option: _E_, R_I_M_MS Bit: _I_M_MS_
```

```
*Oct 24 00:24:27:637 2021MSR5040 RM/6/RMDEBUG: DD SeqNumber: 3dd0bb30.
```

```
OSPF 65091: Nbr 10.0.0.2 Rcv NegotiationDone State ExStart -> Exchange.
```

而对于MSR5660：

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: OSPF 65091: Receiving packets.
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: Source address:
```

```
10.0.0.2
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: Destination address:
```

```
10.0.0.1
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: Version 2, Type: 2, Length:
```

```
32.
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: Router: 2.2.2.2, Area: 0.0.0.0, Checksum: 39419.
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: Authentication type: 00, Key(ASCII): 0 0 0 0 0 0 0 0.
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: MTU: 1500, Option: _O_E_, R_I_M_MS Bit: _I_M_MS_
```

```
*Oct 24 08:17:40:098 2021MSR5660 OSPF/7/DEBUG: DD Sequence number: 71484bbe.
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: OSPF 65091: Sending packets.
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: Source address: 10.0.0.1
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: Destination address:
```

```
10.0.0.2
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: Version 2, Type: 2, Length:
```

```
52.
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: Router: 1.1.1.1, Area: 0.0.0.0, Checksum: 3531.
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: Authentication type: 00, Key(ASCII): 0 0 0 0 0 0 0 0.
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: MTU: 0, Option: _O_E_, R_I_M_MS Bit: _M_
```

```
*Oct 24 08:17:40:099 2021MSR5660 OSPF/7/DEBUG: DD Sequence number: 71484bbe.
```

```
MSR5040
```

通过对比可以看出，V5的MSR5040发出和接收到的OSPF DD报文option字段都是不带O位的，而V7的MSR5660发出和接收到的DD报文的option字段是带O位的。这里的O位，是用来表明始发路由器支持Opaque LSA。

经过确认，V5的MSR5040缺省情况下，未使能OSPF的Opaque LSA能力，对于V7的MSR5660设备，OSPF的Opaque LSA发布接收能力处于开启状态。但是在debug信息里也看到，无论我们发出的DD报文是否带O位，对端总能回应对应的DD报文，也就是说在是否支持Opaque LSA这一点上，对端思科设备是可以自适应并正常与我们本端设备进行协商的，所以不涉及是否支持Opaque LSA这个问题。

接下来我们又对debug进行了分析，发现如下：

```
*Oct 24 08:17:18:107 2021MSR5660 OSPF/7/DEBUG: OSPF 65091: Receiving packets.
```

```
*Oct 24 08:17:18:107 2021MSR5660 OSPF/7/DEBUG: Source address:
```

```
10.0.0.2
```

*Oct 24 08:17:18:107 2021MSR5660 OSPF/7/DEBUG: Destination address:
10.0.0.1

*Oct 24 08:17:18:107 2021MSR5660 OSPF/7/DEBUG: Version 2, Type: 2, Length: