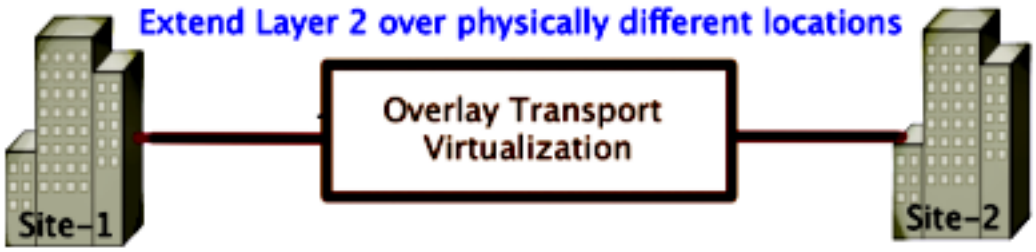
ASR 1000 OTV组播配置示例

目录

简介

本文档介绍如何在思科聚合服务路由器(ASR)1000平台上配置重叠传输虚拟化(OTV)组播模式。OTV将第2层(L2)拓扑扩展到物理上不同的站点，这允许设备在第2层通过第3层(L3)提供商通信。站点1中的设备认为它们与站点2中的设备位于同一广播域。



先决条件

要求

Cisco 建议您了解以下主题：

- 以太网虚拟连接(EVC)配置
- ASR平台上的基本L2和L3配置
- 基本互联网组管理协议(IGMP)第3版和协议无关组播(PIM)配置知识

使用的组件

本文档中的信息基于ASR1002和Cisco IOS®版本asr1000rp1-adventerprise.03.09.00.S.153-2.S.bin。

要在ASR 1000上实施OTV功能，系统必须具备以下要求：

- Cisco IOS-XE版本3.5S或更高版本
- 最大传输单位(MTU)为1542或更高

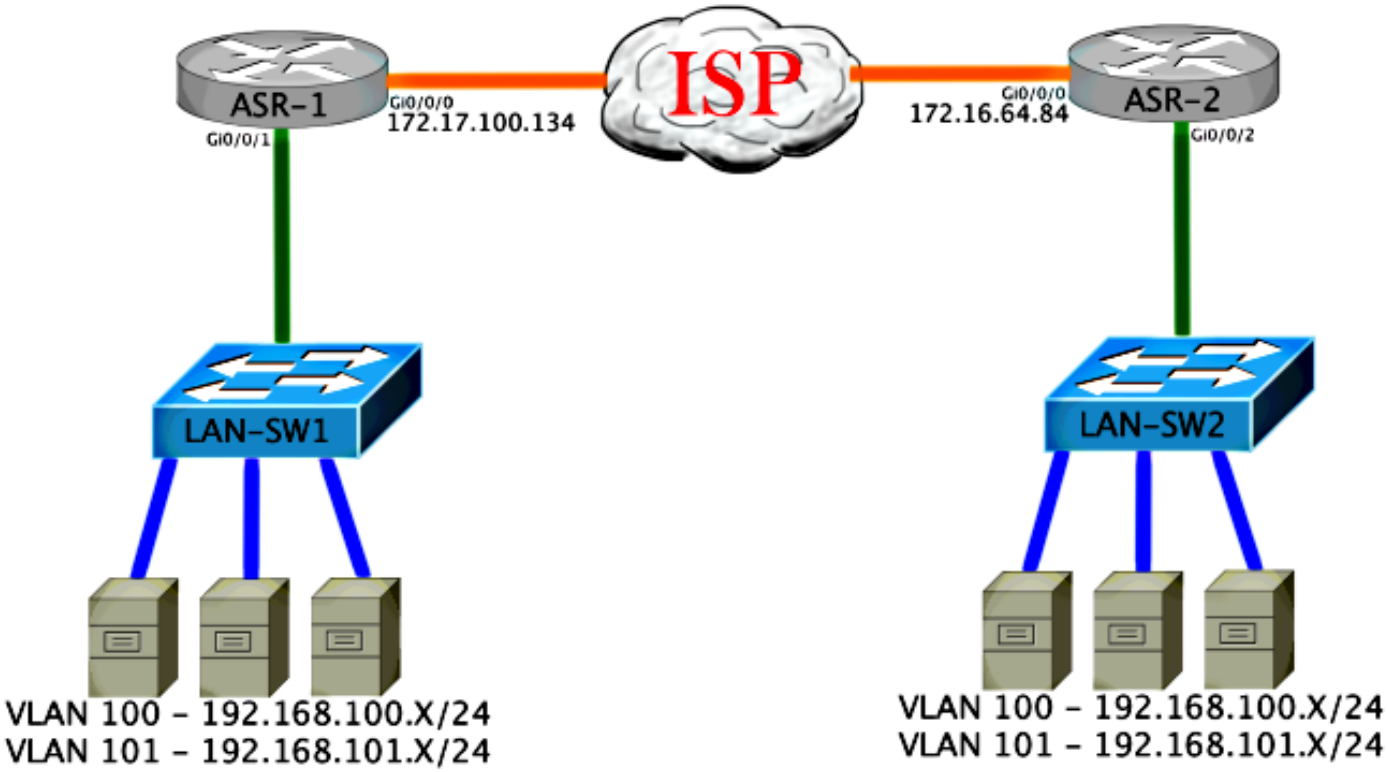
  注意：OTV向所有封装的数据包添加一个42字节报头，其中包含“不分段”位（DF位）。要通过重叠传输1500字节的数据包，传输网络必须支持最大传输单位(MTU)1542或更高。要允许在OTV上进行分段，必须启用**otv fragmentation join-interface** <interface>。
- 站点之间的单播和组播可达性

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。如果您使用的是真实网络，请确保您已经了解所有命令的潜在影响。

配置

本节介绍如何配置OTV组播模式。

具有基本L2/L3连接的网络图



基本L2/L3连接

从基本配置开始。ASR上的内部接口配置为dot1q流量的服务实例。OTV加入接口是外部WAN L3接口。

```
ASR-1
interface GigabitEthernet0/0/0
 description OTV-WAN-Connection
 mtu 9216
 ip address 172.17.100.134 255.255.255.0
 negotiation auto
 cdp enable

ASR-2
interface GigabitEthernet0/0/0
 description OTV-WAN-Connection
 mtu 9216
 ip address 172.16.64.84 255.255.255.0
 negotiation auto
 cdp enable
```

由于OTV添加了42字节报头，因此您必须验证Internet服务提供商(ISP)是否从站点到站点传递了最小MTU大小。要完成此验证，请发送数据包大小为1542且设置了DF位。这为ISP提供了模拟OTV数据**包所需**的负载加上数据包上的“不分段”标记。如果没有DF位就无法ping通，则会出现路由问题。如果可以不执行ping操作，但无法通过DF位集执行ping操作，则表明存在MTU问题。成功后，您就可以将OTV单播模式添加到站点ASR。

```
ASR-1#ping 172.17.100.134 size 1542 df-bit
Type escape sequence to abort.
Sending 5, 1514-byte ICMP Echos to 172.17.100.134, timeout is 2 seconds:
Packet sent with the DF bit set
 !!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/1/2 ms
```

内部接口是L2端口，配置了L2 dot1q标记数据包的服务实例。它还构建内部站点网桥域。在本例中，它是无标记VLAN1。内部站点网桥域用于同一站点上多个OTV设备的通信。这允许他们通信并确定哪台设备是哪个网桥域的授权边缘设备(AED)。

必须将服务实例配置到使用重叠的网桥域中。

```
ASR-1
interface GigabitEthernet0/0/1
 no ip address
 negotiation auto
 cdp enable
  service instance 1 ethernet
   encapsulation untagged
   bridge-domain 1
 !
 service instance 50 ethernet
  encapsulation dot1q 100
  bridge-domain 200
 !
 service instance 51 ethernet
  encapsulation dot1q 101
  bridge-domain 201


ASR-2
interface GigabitEthernet0/0/2
 no ip address
 negotiation auto
 cdp enable
  service instance 1 ethernet
   encapsulation untagged
   bridge-domain 1
 !
 service instance 50 ethernet
  encapsulation dot1q 100
  bridge-domain 200
 !
 service instance 51 ethernet
  encapsulation dot1q 101
  bridge-domain 201
```

OTV组播最低配置

这是一种基本配置，只需几个命令即可设置OTV和加入/内部接口。

配置本地站点网桥域。在本例中，它是LAN上的VLAN1。站点标识符特定于每个物理位置。在本例中，有两个远程位置彼此物理上独立。站点1和站点2已进行相应配置。组播也必须根据OTV的要求进行配置。

```
ASR-1

Config t
otv site bridge-domain 1
otv site-identifier 0000.0000.0001
ip multicast-routing distributed
ip pim ssm default
interface GigabitEthernet0/0/0
  ip pim passive
```

```
  ip igmp version 3
```

```
ASR-2

Config t
otv site bridge-domain 1
otv site-identifier 0000.0000.0002
ip multicast-routing distributed
ip pim ssm default
interface GigabitEthernet0/0/0
  ip pim passive
  ip igmp version 3
```

为每侧构建重叠。配置重叠，应用加入接口，并将控制和数据组添加到每一端。

添加要扩展的两个网桥域。请注意，您不扩展站点网桥域，只需要两个VLAN。您为重叠接口构建单独的服务实例以调用网桥域200和201。分别应用dot1q标记100和101。

```
ASR-1

Config t
 interface Overlay1
  no ip address
  otv join-interface GigabitEthernet0/0/0
otv control-group 225.0.0.1 otv data-group 232.10.10.0/24
   service instance 10 ethernet
    encapsulation dot1q 100
    bridge-domain 200
   service instance 11 ethernet
    encapsulation dot1q 101
    bridge-domain 201
```

```
ASR-2

Config t
 interface Overlay1
  no ip address
  otv join-interface GigabitEthernet0/0/0
otv control-group 225.0.0.1 otv data-group 232.10.10.0/24
 service instance 10 ethernet
    encapsulation dot1q 100
    bridge-domain 200
   service instance 11 ethernet
    encapsulation dot1q 101
    bridge-domain 201
```

> **注意**：请勿在重叠接口上扩展站点VLAN。这会导致两个ASR发生冲突，因为它们认为每个远程端位于同一站点。

在此阶段，ASR到ASR OTV组播邻接关系已完成且正常运行。找到邻居，ASR应支持AED，以用于需要扩展的VLAN。

```
ASR-1#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : Yes
```

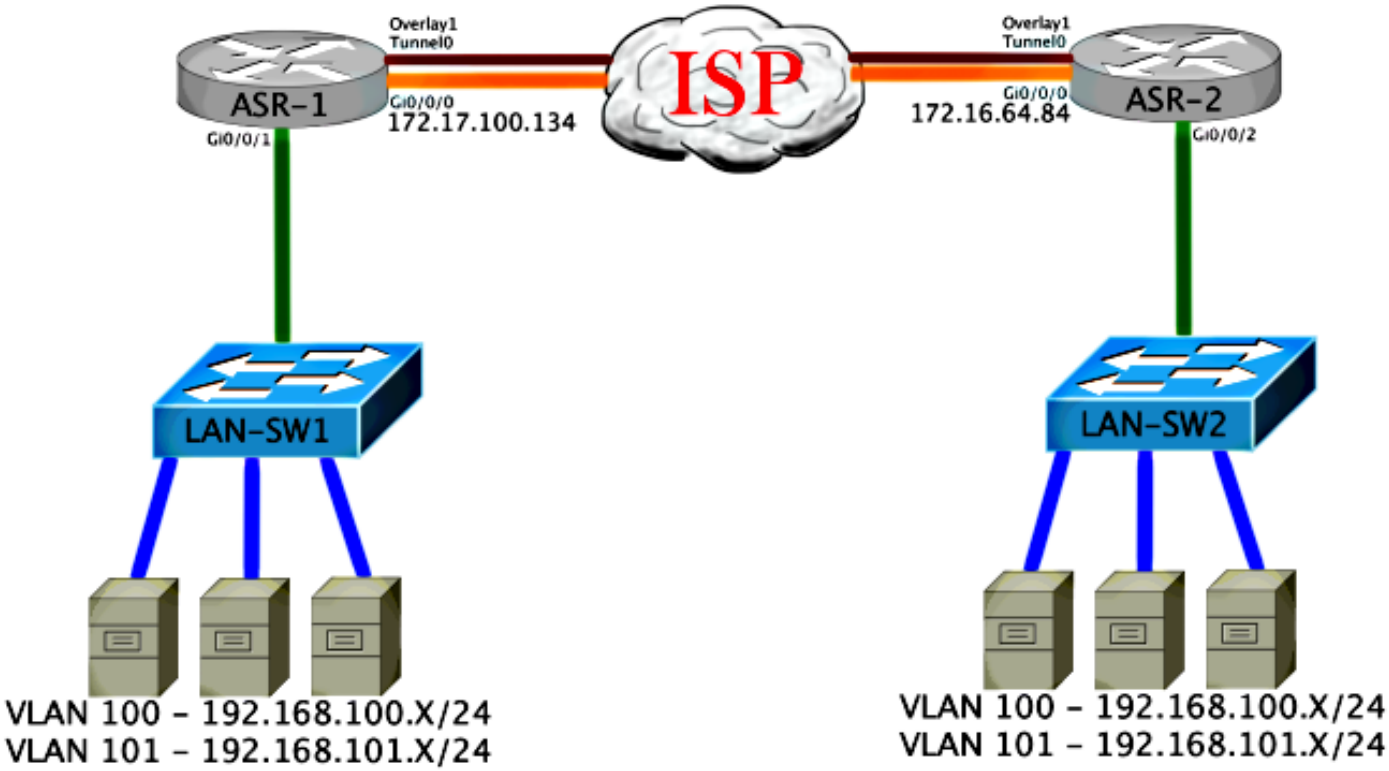
```
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.10.10.0/24
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.17.100.134
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None


ASR-2#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : Yes
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.10.10.0/24
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.16.64.84
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None
```

OTV验证

使用本部分可确认配置能否正常运行。

带OTV的网络图



验证命令和预期输出

此输出显示VLAN 100和101已扩展。ASR是AED，映射VLAN的内部接口和服务实例显示在输出中。

```
ASR-1#show otv vlan
Key:  SI - Service Instance

Overlay 1 VLAN Configuration Information
 Inst VLAN  Bridge-Domain  Auth  Site Interface(s)
 0    100   200            yes   Gi0/0/1:SI50
 0    101   201            yes   Gi0/0/1:SI51
 Total VLAN(s): 2
 Total Authoritative VLAN(s): 2
```

```
ASR-2#show otv vlan
Key:  SI - Service Instance

Overlay 1 VLAN Configuration Information
 Inst VLAN  Bridge-Domain  Auth  Site Interface(s)
 0    100   200            yes   Gi0/0/2:SI50
 0    101   201            yes   Gi0/0/2:SI51
 Total VLAN(s): 2
 Total Authoritative VLAN(s): 2
```

为了验证，请扩展VLAN并执行站点到站点ping。主机192.168.100.2位于站点1，主机192.168.100.3位于站点2。当您在本地和跨OTV到另一端构建地址解析协议(ARP)时，前几个ping操作预期会失败。

```
LAN-SW1#ping 192.168.100.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.100.3, timeout is 2 seconds:
...!!
```

```
Success rate is 40 percent (2/5), round-trip min/avg/max = 1/5/10 ms


LAN-SW1#ping 192.168.100.3
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.100.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/10 ms


LAN-SW1#ping 192.168.100.3 size 1500 df-bit
Type escape sequence to abort.
Sending 5, 1500-byte ICMP Echos to 192.168.100.3, timeout is 2 seconds:
Packet sent with the DF bit set
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/4/10 ms
```

为了确保MAC表和OTV路由表与本地设备正确建立，请使用show otv route命令获取远程设备的MAC地址。

```
LAN-SW1#show int vlan 100
Vlan100 is up, line protocol is up
  Hardware is Ethernet SVI, address is 0c27.24cf.abd1 (bia 0c27.24cf.abd1)
  Internet address is 192.168.100.2/24


LAN-SW2#show int vlan 100
Vlan100 is up, line protocol is up
  Hardware is Ethernet SVI, address is b4e9.b0d3.6a51 (bia b4e9.b0d3.6a51)
  Internet address is 192.168.100.3/24


ASR-1#show otv route vlan 100

Codes: BD - Bridge-Domain, AD - Admin-Distance,
       SI - Service Instance, * - Backup Route

OTV Unicast MAC Routing Table for Overlay1

 Inst VLAN BD     MAC Address    AD    Owner  Next Hops(s)
-----------------------------------------------------------
 0    100  200    0c27.24cf.abaf 40    BD Eng Gi0/0/1:SI50
 0    100  200    0c27.24cf.abd1 40    BD Eng Gi0/0/1:SI50 <--- Local mac is
pointing to the physical interface
 0    100  200    b4e9.b0d3.6a04 50    ISIS   ASR-2
 0    100  200    b4e9.b0d3.6a51 50    ISIS   ASR-2        <--- Remote mac is
pointing across OTV to ASR-2

4 unicast routes displayed in Overlay1

-----------------------------------------------------------
4 Total Unicast Routes Displayed


ASR-2#show otv route vlan 100

Codes: BD - Bridge-Domain, AD - Admin-Distance,
       SI - Service Instance, * - Backup Route

OTV Unicast MAC Routing Table for Overlay1

 Inst VLAN BD     MAC Address    AD    Owner  Next Hops(s)
-----------------------------------------------------------
```

```
 0    100  200    0c27.24cf.abaf 50    ISIS   ASR-1
 0    100  200    0c27.24cf.abd1 50    ISIS   ASR-1          <--- Remote mac is
pointing across OTV to ASR-1
 0    100  200    b4e9.b0d3.6a04 40    BD Eng Gi0/0/2:SI50
 0    100  200    b4e9.b0d3.6a51 40    BD Eng Gi0/0/2:SI50    <--- Local mac is
pointing to the physical interface

4 unicast routes displayed in Overlay1

------------------------------------------------------------
4 Total Unicast Routes Displayed
```

常见问题

输出中的OTV Does Not Form错误消息显示ASR不支持AED。这意味着ASR不会通过OTV转发VLAN。造成这种情况的原因有几种，但最常见的是ASR在站点之间没有连接。检查L3连接和可能的阻塞组播流量。此情况的另一个可能原因是未配置内部站点网桥域。这会造成ASR无法成为AED的情况，因为它是否是站点上唯一的ASR尚不确定。

```
ASR-1#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : No, overlay DIS not elected       <--- Not Forwarding
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.0.0.0/8
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.17.100.134
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None
```

```
ASR-2#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : No, overlay DIS not elected       <--- Not Forwarding
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.0.0.0/8
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.16.64.84
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None
```

故障排除

本部分提供了可用于对配置进行故障排除的信息。

在加入接口上创建数据包捕获以查看OTV Hello

您可以在ASR上使用板载数据包捕获设备来帮助排除可能的问题。

创建访问控制列表(ACL)，以尽量减少影响和过饱和捕获。设置此配置是为了仅捕获两个站点之间的组播hello。调整IP地址以匹配邻居的加入接口。

```
ip access-list extended CAPTURE
 permit ip host 172.16.64.84 host 225.0.0.1
 permit ip host 172.17.100.134 host 225.0.0.1
```

设置捕获，以便在两个ASR上双向嗅探连接接口：

```
monitor capture 1 buffer circular access-list CAPTURE interface g0/0/0 both
```

要开始捕获，请输入：

```
monitor capture 1 start

*Nov 14 15:21:37.746: %BUFCAP-6-ENABLE: Capture Point 1 enabled.

<wait a few min>

monitor capture 1 stop

*Nov 14 15:22:03.213: %BUFCAP-6-DISABLE: Capture Point 1 disabled.

show mon cap 1 buffer brief
```

缓冲区输出显示捕获中的hello会传出捕获的接口。它显示发往组播地址225.0.0.1的hello。这是已配置的控制组。请参阅捕获中的前13个数据包，并注意如何只有单向输出。仅显示来自172.17.100.134的Hello。解决核心中的组播问题后，邻居Hello出现在数据包编号14。

```
ASR-1#show mon cap 1 buff bri
 ----------------------------------------------------------
 #   size   timestamp     source             destination   protocol
 ----------------------------------------------------------
  0 1456    0.000000   172.17.100.134   ->  225.0.0.1        GRE
  1 1456    8.707016   172.17.100.134   ->  225.0.0.1        GRE
  2 1456   16.880011   172.17.100.134   ->  225.0.0.1        GRE
  3 1456   25.873008   172.17.100.134   ->  225.0.0.1        GRE
  4 1456   34.645023   172.17.100.134   ->  225.0.0.1        GRE
  5 1456   44.528024   172.17.100.134   ->  225.0.0.1        GRE
  6 1456   52.137002   172.17.100.134   ->  225.0.0.1        GRE
  7 1456   59.819010   172.17.100.134   ->  225.0.0.1        GRE
  8 1456   68.641025   172.17.100.134   ->  225.0.0.1        GRE
  9 1456   78.168998   172.17.100.134   ->  225.0.0.1        GRE
 10 1456   85.966005   172.17.100.134   ->  225.0.0.1        GRE
 11 1456   94.629032   172.17.100.134   ->  225.0.0.1        GRE
 12 1456  102.370043   172.17.100.134   ->  225.0.0.1        GRE
 13 1456  110.042005   172.17.100.134   ->  225.0.0.1        GRE
  14 1456  111.492031   172.16.64.84     ->  225.0.0.1        GRE <---Mcast core
fixed and now see neighbor hellos
 15 1456  111.493038   172.17.100.134   ->  225.0.0.1        GRE
```

```
 16 1456  112.491039   172.16.64.84     ->  225.0.0.1        GRE
 17 1456  112.501033   172.17.100.134   ->  225.0.0.1        GRE
 18  116  112.519037   172.17.100.134   ->  225.0.0.1        GRE
 19  114  112.615026   172.16.64.84     ->  225.0.0.1        GRE
 20  114  112.618031   172.17.100.134   ->  225.0.0.1        GRE
 21 1456  113.491039   172.16.64.84     ->  225.0.0.1        GRE
 22 1456  115.236047   172.17.100.134   ->  225.0.0.1        GRE
 23  142  116.886008   172.17.100.134   ->  225.0.0.1        GRE
 24  102  117.290045   172.17.100.134   ->  225.0.0.1        GRE
 25 1456  118.124002   172.17.100.134   ->  225.0.0.1        GRE
 26 1456  121.192043   172.17.100.134   ->  225.0.0.1        GRE
 27 1456  122.443037   172.16.64.84     ->  225.0.0.1        GRE
 28 1456  124.497035   172.17.100.134   ->  225.0.0.1        GRE
 29  102  126.178052   172.17.100.134   ->  225.0.0.1        GRE
 30  142  126.629032   172.17.100.134   ->  225.0.0.1        GRE
 31 1456  127.312047   172.17.100.134   ->  225.0.0.1        GRE
 32 1456  130.029997   172.17.100.134   ->  225.0.0.1        GRE
 33 1456  131.165000   172.16.64.84     ->  225.0.0.1        GRE
 34 1456  132.591025   172.17.100.134   ->  225.0.0.1        GRE
 35  102  134.832010   172.17.100.134   ->  225.0.0.1        GRE
 36 1456  135.856010   172.17.100.134   ->  225.0.0.1        GRE
 37  142  136.174054   172.17.100.134   ->  225.0.0.1        GRE
 38 1456  138.442030   172.17.100.134   ->  225.0.0.1        GRE
 39 1456  140.769025   172.16.64.84     ->  225.0.0.1        GRE
 40 1456  141.767010   172.17.100.134   ->  225.0.0.1        GRE
 41  102  144.277046   172.17.100.134   ->  225.0.0.1        GRE
 42 1456  144.996003   172.17.100.134   ->  225.0.0.1        GRE

ASR-1#
2#show mon cap 1 buff bri
```

验证OTV ASR上的Mroute状态

在OTV邻居之间构建组播路由状态时，必须具有正确的PIM状态。使用以下命令验证ASR上的预期PIM状态：

```
ASR-1#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : No, overlay DIS not elected
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.0.0.0/8
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.17.100.134
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None
```

注意与之前相同的错误：支持AED =否，未选择重叠DIS。这意味着ASR无法成为AED转发器，因为它没有足够的有关其对等体的信息。内部接口可能未打开，站点网桥域可能未关闭/未创建，或者两个站点在ISP之间无法看到对方。

查看ASR-1以确定问题。它显示未看到PIM邻居。即使在工作时，这也是意料之中的。这是因为PIM在加入接口上运行被动。PIM被动是OTV加入接口上唯一支持的PIM模式。

```
ASR-1#show ip pim neigh
PIM Neighbor Table
Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
     P - Proxy Capable, S - State Refresh Capable, G - GenID Capable
Neighbor          Interface                Uptime/Expires    Ver   DR
Address                                                            Prio/Mode
```

要验证ASR-1上是否配置了PIM接口，请输入：

```
ASR-1#show ip pim int

Address          Interface                Ver/   Nbr    Query  DR     DR
                                          Mode   Count  Intvl  Prior
172.17.100.134   GigabitEthernet0/0/0     v2/P   0      30     1      172.17.100.134
172.17.100.134   Tunnel0                  v2/P   0      30     1      172.17.100.134
0.0.0.0          Overlay1                 v2/P   0      30     1      0.0.0.0
```

ASR的mroute状态提供大量有关链路组播状态的信息。在此输出中，您不会在本地ASRmroute表上将邻居视为S，G条目。当您查看控制组的mroute计数时，您也只将本地加入接口视为源。请注意，计数与接收的数据包和转发的总数相对应。这表示您在本地端启动并转发到组播域。

```
ASR-1#show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector
Outgoing interface flags: H - Hardware switched, A - Assert winner
 Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode

(*, 225.0.0.1), 00:20:29/stopped, RP 0.0.0.0, flags: DC
 Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list:
   Tunnel0, Forward/Sparse-Dense, 00:20:29/00:02:55
   GigabitEthernet0/0/0, Forward/Sparse-Dense, 00:20:29/Proxy

(172.17.100.134, 225.0.0.1), 00:16:25/00:02:19, flags: T
 Incoming interface: GigabitEthernet0/0/0, RPF nbr 0.0.0.0
 Outgoing interface list:
   GigabitEthernet0/0/0, Forward/Sparse-Dense, 00:16:25/Proxy
   Tunnel0, Forward/Sparse-Dense, 00:16:25/00:02:55

(*, 224.0.1.40), 00:20:09/00:02:53, RP 0.0.0.0, flags: DPC
 Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list: Null

ASR-1#show ip mroute count
Use "show ip mfib count" to get better response time for a large number of mroutes.

IP Multicast Statistics
3 routes using 1828 bytes of memory
2 groups, 0.50 average sources per group
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kilobits per second
Other counts: Total/RPF failed/Other drops(OIF-null, rate-limit etc)
```

```
Group: 225.0.0.1, Source count: 1, Packets forwarded: 116, Packets received: 117
  Source: 172.17.100.134/32, Forwarding: 116/0/1418/1, Other: 117/1/0

Group: 224.0.1.40, Source count: 0, Packets forwarded: 0, Packets received: 0
```

当核心组播问题解决后，您将看到ASR的预期输出。

```
ASR-1#show otv
Overlay Interface Overlay1
 VPN name                 : None
 VPN ID                   : 2
 State                    : UP
 AED Capable              : Yes
 IPv4 control group       : 225.0.0.1
 Mcast data group range(s): 232.0.0.0/8
 Join interface(s)        : GigabitEthernet0/0/0
 Join IPv4 address        : 172.17.100.134
 Tunnel interface(s)      : Tunnel0
 Encapsulation format     : GRE/IPv4
 Site Bridge-Domain       : 1
 Capability               : Multicast-reachable
 Is Adjacency Server      : No
 Adj Server Configured    : No
 Prim/Sec Adj Svr(s)      : None
```

仍然没有PIM邻居，物理接口、重叠接口和隧道接口是本地PIM接口。

```
ASR-1#show ip pim neigh
PIM Neighbor Table
Mode: B - Bidir Capable, DR - Designated Router, N - Default DR Priority,
     P - Proxy Capable, S - State Refresh Capable, G - GenID Capable
Neighbor          Interface                Uptime/Expires    Ver   DR
Address                                                            Prio/Mode
ASR-1#show ip pim int

Address          Interface                Ver/   Nbr    Query  DR     DR
                                          Mode   Count  Intvl  Prior
172.17.100.134   GigabitEthernet0/0/0     v2/P   0      30     1      172.17.100.134
172.17.100.134   Tunnel0                  v2/P   0      30     1      172.17.100.134
0.0.0.0          Overlay1                 v2/P   0      30     1      0.0.0.
```

mroute表和计数器提供有关组播状态的信息。输出将加入接口以及控制组中的OTV邻居显示为源。确保在远程站点反向路径转发(RPF)邻居(NBR)字段中也看到交汇点(RP)。您还可以转发和接收匹配的计数器。两个来源应合计组收到的总数。

```
ASR-1#show ip mroute
IP Multicast Routing Table
Flags: D - Dense, S - Sparse, B - Bidir Group, s - SSM Group, C - Connected,
       L - Local, P - Pruned, R - RP-bit set, F - Register flag,
       T - SPT-bit set, J - Join SPT, M - MSDP created entry, E - Extranet,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report,
       Z - Multicast Tunnel, z - MDT-data group sender,
       Y - Joined MDT-data group, y - Sending to MDT-data group,
       G - Received BGP C-Mroute, g - Sent BGP C-Mroute,
       Q - Received BGP S-A Route, q - Sent BGP S-A Route,
       V - RD & Vector, v - Vector
Outgoing interface flags: H - Hardware switched, A - Assert winner
 Timers: Uptime/Expires
 Interface state: Interface, Next-Hop or VCD, State/Mode
```

```
(*, 225.0.0.1), 00:25:16/stopped, RP 0.0.0.0, flags: DC
 Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list:
   Tunnel0, Forward/Sparse-Dense, 00:25:16/00:02:06
   GigabitEthernet0/0/0, Forward/Sparse-Dense, 00:25:16/Proxy

(172.16.64.84, 225.0.0.1), 00:04:09/00:02:50, flags: T
 Incoming interface: GigabitEthernet0/0/0, RPF nbr 172.17.100.1
 Outgoing interface list:
   Tunnel0, Forward/Sparse-Dense, 00:04:09/00:02:06

(172.17.100.134, 225.0.0.1), 00:21:12/00:01:32, flags: T
 Incoming interface: GigabitEthernet0/0/0, RPF nbr 0.0.0.0
 Outgoing interface list:
   GigabitEthernet0/0/0, Forward/Sparse-Dense, 00:21:12/Proxy
   Tunnel0, Forward/Sparse-Dense, 00:21:12/00:02:06

(*, 224.0.1.40), 00:24:56/00:02:03, RP 0.0.0.0, flags: DPC
 Incoming interface: Null, RPF nbr 0.0.0.0
 Outgoing interface list: Null

ASR-1#show ip mroute count
Use "show ip mfib count" to get better response time for a large number of mroutes.

IP Multicast Statistics
4 routes using 2276 bytes of memory
2 groups, 1.00 average sources per group
Forwarding Counts: Pkt Count/Pkts per second/Avg Pkt Size/Kilobits per second
Other counts: Total/RPF failed/Other drops(OIF-null, rate-limit etc)

Group: 225.0.0.1, Source count: 2, Packets forwarded: 295, Packets received:
297<----- 32 + 263 = 295
  Source: 172.16.64.84/32, Forwarding: 32/0/1372/1, Other: 32/0/0
  Source: 172.17.100.134/32, Forwarding: 263/0/1137/3, Other: 264/1/0

Group: 224.0.1.40, Source count: 0, Packets forwarded: 0, Packets received: 0
```

在加入接口上创建数据包捕获以查看OTV数据包

由于OTV是封装流量，因此它被视为通用路由封装(GRE)流量，其中连接接口的源到远程连接接口的目的地。您无法执行太多操作来明确查看流量。验证流量是否通过OTV传输的一种方法是设置数据包捕获，特别是使用与当前流量模式无关的数据包大小。在本示例中，您可以指定大小为700的Internet控制消息协议(ICMP)数据包，并确定可以从捕获中过滤哪些内容。这可用于验证数据包是否通过OTV云传输。

要在两个连接接口之间设置访问列表过滤器，请输入：

```
ip access-list extended CAPTURE
 permit ip host 172.17.100.134 host 172.16.64.84
```

要设置监控会话以过滤指定大小756，请输入：

```
monitor capture 1 buffer size 1 access-list CAPTURE limit packet-len 756
interface g0/0/0 out
```

要开始捕获，请输入：

```
ASR-1#mon cap 1 start
*Nov 18 12:45:50.162: %BUFCAP-6-ENABLE: Capture Point 1 enabled.
```

发送具有指定大小的特定ping。由于OTV会添加42字节报头和8字节ICMP（带20字节IP报头），因此您可以发送大小为700的ping，并期望看到数据包大小为756的数据到达OTV云。

```
LAN-Sw2#ping 192.168.100.2 size 700 repeat 100
Type escape sequence to abort.
Sending 100, 700-byte ICMP Echos to 192.168.100.2, timeout is 2 seconds:
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (100/100), round-trip min/avg/max = 10/19/30 ms
```

要停止捕获，请输入：

```
ASR-1#mon cap 1 stop
*Nov 18 12:46:02.084: %BUFCAP-6-DISABLE: Capture Point 1 disabled.
```

在捕获缓冲区中，您会看到所有100个数据包都到达本地端的捕获。您应该看到所有100个数据包都到达远程端。否则，OTV云中需要进一步调查数据包丢失。

```
ASR-1#show mon cap 1 buff bri
 ----------------------------------------------------------------
 #   size   timestamp     source             destination   protocol
 ----------------------------------------------------------------
  0  756    0.000000   172.17.100.134   ->  172.16.64.84     GRE
  1  756    0.020995   172.17.100.134   ->  172.16.64.84     GRE
  2  756    0.042005   172.17.100.134   ->  172.16.64.84     GRE
  3  756    0.052991   172.17.100.134   ->  172.16.64.84     GRE
<Output Omitted>
 97  756    1.886999   172.17.100.134   ->  172.16.64.84     GRE
 98  756    1.908009   172.17.100.134   ->  172.16.64.84     GRE
 99  756    1.931003   172.17.100.134   ->  172.16.64.84     GRE
```

注意：此测试不是100%可靠，因为捕获了任何与长度756匹配的流量，因此请谨慎使用。此测试用于仅帮助收集可能的OTV核心问题的数据点。

相关信息

- 配置重叠传输虚拟化
- 了解以太网虚电路(EVC)
- 技术支持和文档 - Cisco Systems