

在GRE隧道的多播

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Introduction

本文为通过通用路由封装 (GRE) 隧道进行组播提供配置示例。

在许多网络方案中您要配置您的网络使用GRE封装隧道发送独立于协议的组播(PIM)和组播数据流在路由器之间。一般，这发生，当组播源和接受器由没有为IP组播路由被配置的IP网云时分离。在这样网络方案中，配置在IP网云间的一条隧道用PIM启用了传输组播信息包往接受器。本文描述配置、验证和相关问题关于在GRE封装隧道的组播。

Prerequisites

Requirements

尝试进行此配置之前，请确保满足以下要求：

- 组播和PIM基本的了解是有用的。请参见[组播快速配置指南](#)关于组播和PIM的更多信息。

Components Used

This document is not restricted to specific software and hardware versions.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

[Conventions](#)

Refer to [Cisco Technical Tips Conventions](#) for more information on document conventions.

Configure

本部分提供有关如何配置本文档所述功能的信息。

当网络图显示，组播源(10.1.1.1)被连接到R102和为组播组239.1.1.20被配置。组播接收器(10.2.2.3)被连接到R104和被配置对组的239.1.1.20接收组播信息包。分离R102和R104是IP网云，没有为组播路由被配置。

隧道被配置在对来源的R104的R102之间用他们的环回接口。ip pim sparse-dense mode命令在隧道接口被配置，并且组播路由在R102和R104被启用。在隧道接口的sparse-dense模式配置准许sparse-mode或在隧道将转发的密集模式信息包根据组的聚合点(RP)配置。

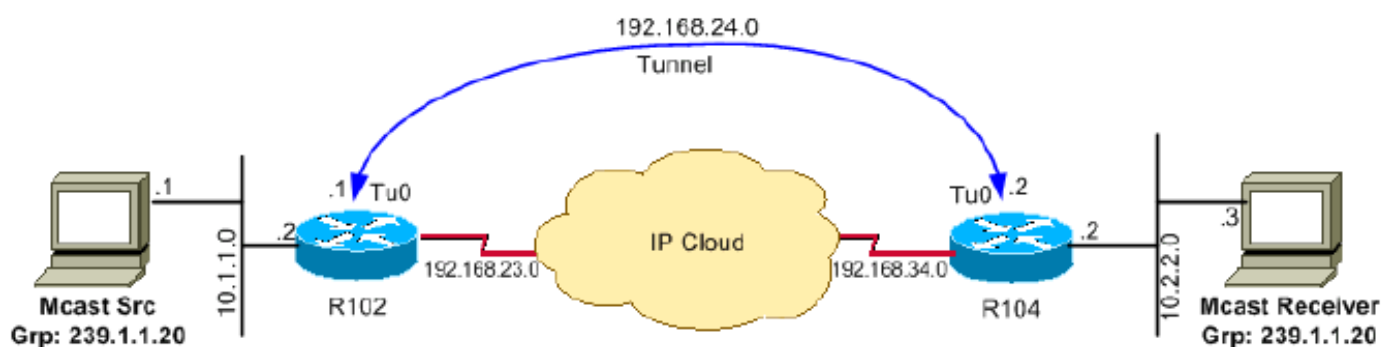
Note: 密集模式-当PIM密集模式被配置在隧道，ip mroute 10.1.1.0 255.255.255.0隧道0命令在R104被配置保证组播源地址的10.1.1.1成功的RPF。在隧道0 (Tu0)的流入(10.1.1.1, 239.1.1.20)组播信息包被检查反向路径转发(RPF)使用此mroute语句。在成功的检查，组播信息包转发到流出的接口列表(油)后接口。

Note: 稀疏模式-当PIM稀疏模式被配置在隧道，请保证这些点寻址：

- 组播数据流的一个成功的RPF验证在共享结构树的(*, G)从RP，ip mroute RP寻址nexthop命令需要为RP地址被配置，该指向隧道接口。假设R102在这种情况下是RP (RP地址2.2.2.2)，然后mroute是ip mroute 2.2.2.2 255.255.255.255隧道0命令，保证数据流的成功的RPF检查漫过共享结构树。
- 组播的一个成功的RPF验证(S, G)在最短路径结构树(SPT)的数据流，ip mroute source-address nexthop命令需要为组播源被配置，指向隧道接口。在这种情况下，当SPT数据流漫过隧道接口时ip mroute 10.1.1.0 255.255.255.0隧道0命令在R104被配置保证流入(10.1.1.1, 239.1.1.20)组播信息包的一个成功的RPF验证在Tu0接口。

Network Diagram

本文档使用以下网络设置：



配置

本文档使用以下配置：

- [R102](#)
- [R104](#)

根据此运行配置文件配置路由器102：

R102

```
version 12.2
!hostname r102
!
!ip subnet-zero
no ip domain-lookup
!--- It stops IP domain lookup, which improves
!--- the show command response time. ! ip multicast-routing !--- Enables IP multicast routing. ! interf
Loopback0 ip address 2.2.2.2 255.255.255.255 !--- Tunnel Source interface. ! interface Tunnel0 !--- Tun
interface configured for PIM and carrying
!--- multicast packets to R104. ip address 192.168.24.1 255.255.255.252 ip pim sparse-dense-mode tunnel
source Loopback0 tunnel destination 4.4.4.4 ! interface Ethernet0/0 !--- Interface connected to Source.
address 10.1.1.2 255.255.255.0 ip pim sparse-dense-mode ! ! interface Serial8/0 ip address 192.168.23.1
255.255.255.252 !--- Note IP PIM sparse-dense mode is
!--- not configured on Serial interface. !router ospf 1 log-adjacency-changes network 2.2.2.2 0.0.0.0 a
network 10.1.1.0 0.0.0.255 area 0 network 192.168.23.0 0.0.0.255 area 0 ! ip classless ip pim bidir-ena
line con 0 line aux 0 line vty 0 4 login ! end
```

根据此运行配置文件配置路由器104：

R104

```
r104#
version 12.2
!
hostname r104
!
!
ip subnet-zero
no ip domain-lookup
!--- It stops IP domain lookup, which improves
!--- the show command response time. ! ip multicast-routing !--- Enables IP multicast routing. ! interf
Loopback0 ip address 4.4.4.4 255.255.255.255 !--- Tunnel Source interface. ! interface Tunnel0 ip adre
192.168.24.2 255.255.255.252 !--- Tunnel interface configured for PIM
!--- and carrying multicast packets. ip pim sparse-dense-mode tunnel source Loopback0 tunnel destinatio
2.2.2.2 ! interface Ethernet0/0 ip address 10.2.2.2 255.255.255.0 ip pim sparse-dense-mode ! interface
Serial9/0 ip address 192.168.34.1 255.255.255.252 !--- Note IP PIM sparse-dense mode is not
!--- configured on Serial interface. ! ! router ospf 1 log-adjacency-changes network 4.4.4.4 0.0.0.0 ar
network 10.2.2.0 0.0.0.255 area 0 network 192.168.34.0 0.0.0.255 area 0 ! ip classless no ip http serve
pim bidir-enable ip mroute 10.1.1.0 255.255.255.0 Tunnel0 !--- This mroute ensures a successful RPF che
!--- for packets flowing from the source.
!--- 10.1.1.1 over Shared tree in case of Dense
!--- more and SPT in case of Sparse mode. ! ip mroute 2.2.2.2 255.255.255.255 tunnel 0 !--- This mroute
required for RPF check when
!--- Sparse mode multicast traffic is
!--- flowing from RP (assuming R102 with 2.2.2.2 as RP)
!--- towards receiver via tunnel
!--- before the SPT switchover. line con 0 line aux 0 line vty 0 4 login ! end
```

Verify

Use this section to confirm that your configuration works properly.

确定Cisco CLI分析器(仅限注册用户)技术支持显示命令。请使用Cisco CLI分析器查看show命令输出分析。

- **显示ip igmp组-验证接受器发送了其IGMP加入会员要求组239.1.1.20对R104。**

```
r104#show ip igmp groups
IGMP Connected Group Membership
Group Address      Interface          Uptime    Expires    Last Reporter
239.1.1.20        Ethernet0/0       00:00:04  00:02:55  10.2.2.3
```

- **组地址的show ip mroute -验证，当来源10.1.1.1开始组的239.1.1.20组播信息包，R102在R102 mroute表里安装(*,239.1.1.20)和(10.1.1.1, 239.1.1.20)条目。Note: 在(10.1.1.1, 239.1.1.20)条目，油是隧道0。**

```
r102#show ip mroute 239.1.1.20
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,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report
Outgoing interface flags: H - Hardware switched
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode

(*, 239.1.1.20), 00:00:09/00:02:59, RP 0.0.0.0, flags: D
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    Tunnel0, Forward/Sparse-Dense, 00:00:09/00:00:00
    Ethernet0/0, Forward/Sparse-Dense, 00:00:09/00:00:00
```

```
(10.1.1.1, 239.1.1.20), 00:00:09/00:02:58, flags: T
  Incoming interface: Ethernet0/0, RPF nbr 0.0.0.0
  Outgoing interface list:
    Tunnel0, Forward/Sparse-Dense, 00:00:09/00:00:00
```

- **组地址的show ip mroute -验证R104有(*,239.1.1.20)和(10.1.1.1, 239.1.1.20)条目，当转发组的从10.1.1.1时来源的239.1.1.20组播信息包。Note: 在(10.1.1.1, 239.1.1.20)，流入的接口是隧道0，并且RPF相邻是192.168.24.1 -在R102的隧道头端。RPF验证根据在R104配置的mroute完成，并且组播信息包被推出对对在Ethernet0/0接口连接的接受器的油。**

```
r104#show ip mroute 239.1.1.20
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,
       X - Proxy Join Timer Running, A - Candidate for MSDP Advertisement,
       U - URD, I - Received Source Specific Host Report
Outgoing interface flags: H - Hardware switched
Timers: Uptime/Expires
Interface state: Interface, Next-Hop or VCD, State/Mode

(*, 239.1.1.20), 00:07:10/00:00:00, RP 0.0.0.0, flags: DCL
  Incoming interface: Null, RPF nbr 0.0.0.0
  Outgoing interface list:
    Tunnel0, Forward/Sparse-Dense, 00:07:10/00:00:00
    Ethernet0/0, Forward/Sparse-Dense, 00:07:10/00:00:00
```

```
(10.1.1.1, 239.1.1.20), 00:01:13/00:02:24, flags: CLT
  Incoming interface: Tunnel0, RPF nbr 192.168.24.1, Mroute
  Outgoing interface list:
    Ethernet0/0, Forward/Sparse-Dense, 00:01:13/00:00:00
```

- **show ip rpf IP地址-进行从10.1.1.1发出的信息包的一个RPF验证。以下示例确认10.1.1.1的**

RPF是通过隧道0，我们接受组播(S，G)信息包。

```
r104>show ip rpf 10.1.1.1
RPF information for ? (10.1.1.1)
  RPF interface: Tunnel0
  RPF neighbor: ? (192.168.24.1)
  RPF route/mask: 10.1.1.1/24
  RPF type: static
  RPF recursion count: 0
  Doing distance-preferred lookups across tables
```

Troubleshoot

使用本部分可排除配置故障。

确定[Cisco CLI分析器\(仅限注册用户\)](#)技术支持显示命令。请使用Cisco CLI分析器查看show命令输出分析。

Note: 使用 `debug` 命令之前，请参阅[有关 Debug 命令的重要信息](#)。

如果您的在GRE封装隧道的组播不工作，这些中的一个可以是原因：

- **不UP/UP的隧道**-隧道源及目的地在隧道的每个末端不配比。例如，如果R102的隧道目的地更改了到IP地址10.2.2.2而不是2.2.2.2，当在R104的配置依然是同样时，隧道不会过来。发出 `show interface tunnel 0`命令为了验证隧道的状态。
- **组播信息包被丢弃由于RPF故障**。发出`show ip mroute count`命令。此命令和其增长的计数器输出示例: RPF故障的在此输出中显示：

```
r104#show ip mroute count
IP Multicast Statistics
3 routes using 1642 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: 224.0.1.40, Source count: 0, Packets forwarded: 0, Packets received: 0

Group: 239.1.1.20, Source count: 1, Packets forwarded: 11, Packets received: 45
  Source: 10.1.1.1/32, Forwarding: 11/0/100/0, Other: 25/14/0
```

```
!--- After some time, the show ip mroute count command
!--- is issued again. You can see the RPF failed counter increasing: r104#show ip mroute
count
```

```
IP Multicast Statistics
3 routes using 1642 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: 224.0.1.40, Source count: 0, Packets forwarded: 0, Packets received: 0

Group: 239.1.1.20, Source count: 1, Packets forwarded: 11, Packets received: 50
  Source: 10.1.1.1/32, Forwarding: 11/0/100/0, Other: 30/19/0
r104#
```

您能也发出`show ip rpf source`命令。保证RPF接口是相同的象来源组播信息包收到的那-在本例中的隧道0。请参见[IP组播故障排除指南](#)关于RPF故障的更多信息。

- **PIM相邻-**，因为看不到PM相邻R104，路由器R102不在隧道0接口转发。发出以下命令：`show ip pim neighbor` -您能使用`show ip pim neighbor`命令在R102显示在隧道的相邻R104。显示ip

pim int -您能也使用**show ip pim int**命令表示，有相邻。**ip pim sparse-dense-mode** -验证 interface level **ip pim sparse-dense-mode**命令在隧道的两端被配置，并且Ip multicast-routing是启用的。

Related Information

- [组播快速配置指南](#)
- [IP组播故障排除指南](#)
- [基本组播故障排除工具](#)
- [TCP/IP 多播支持页](#)
- [Technical Support & Documentation - Cisco Systems](#)