与EIGRP的故障切换使用VRF配置示例

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简介

使用虚拟路由和转发(VRF)，本文描述如何配置与增强的内部网关路由选择协议(EIGRP)的故障切换。VRF是提供多个路由实例IP路由的分机。网络服务提供商(ISP)利用此VRF为了创建客户的分开的虚拟专用网络，当在路由器允许路由表的多个实例存在。

先决条件

- EIGRP 的基础知识
- VRF基础知识

硬件与软件版本

在本文的配置根据在Cisco IOS软件版本12.4(15)T 13的Cisco 3700系列路由器。

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

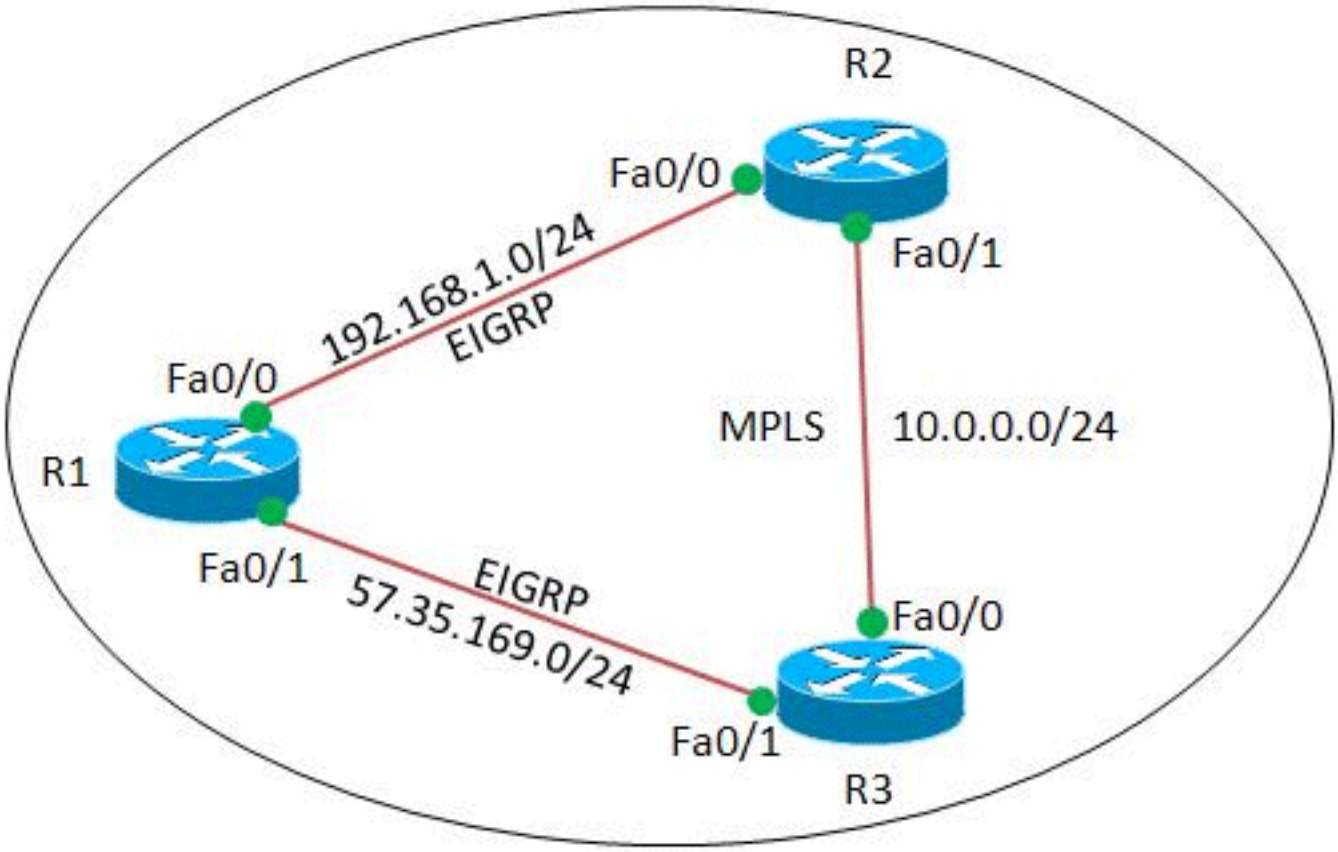
配置

在本例中，路由器R1认为PE路由器。路由器R2和R3认为CE路由器。路由器使用EIGRP彼此连通。如果R2丢失与R1的连接(即在故障切换的情况下)，路由能通过R3到达R1。路由器R2和R3有他们之间的一MPLS连接。

注意： 有关本文档所用命令的详细信息，请使用命令查找工具（仅限注册用户）。

网络图

本文档使用以下网络设置：



配置

本文档使用以下配置：

- 路由器 R1
- 路由器 R2
- 路由器 R3

路由器 R1

```
!
version 12.4
!
hostname R1
!
ip cef
!
!
interface Loopback0
 ip address 2.2.2.2 255.255.255.255
!
interface FastEthernet0/0
 ip address 192.168.1.2 255.255.255.0
 duplex auto
```

```
 speed auto
!
interface FastEthernet0/1
 ip address 57.35.169.2 255.255.255.0
 duplex auto
 speed auto
!
router eigrp 220 network 2.2.2.2 0.0.0.0 network
57.35.169.2 0.0.0.0 network 192.168.1.0 no auto-summary
!--- Configured EIGRP and advertised the networks. ! end
```

路由器 R2

```
!
version 12.4
!
hostname R2
!
ip cef
!
ip vrf A !--- Configures VRF routing table! rd
1.1.1.1:111 !---Configuring a route distinguisher RD
creates routing and forwarding table for a VRF. The RD
can be used in either of these formats: - 16-bit AS
number: Your 32-bit number (for example, 1:100) - 32-bit
IP address: Your 16-bit number (In our case,
1.1.1.1:111) route-target export 1.1.1.1:111 route-
target import 1.1.1.1:111 !--- Creates a list of import
and/or export route target communities for the specified
VRF. ! ip vrf B rd 2.2.2.2:222 import ipv4 unicast map
vrfA-to-vrfB !--- Associates the specified route map
with the VRF. route-target export 2.2.2.2:222 route-
target import 2.2.2.2:222 ! mpls label protocol ldp !
interface Loopback1 ip vrf forwarding B !--- Associates
a VRF instance with an interface. ip address 172.16.2.1
255.255.255.255 ! interface FastEthernet0/0 ip vrf
forwarding A ip address 192.168.1.1 255.255.255.0 duplex
auto speed auto ! interface FastEthernet0/1 ip vrf
forwarding A ip address 10.0.0.1 255.255.255.0 duplex
auto speed auto mpls ip ! interface FastEthernet1/0 ip
vrf forwarding B ip address 203.197.194.1 255.255.255.0
duplex auto speed auto ! router eigrp 1 no auto-summary
! address-family ipv4 vrf B !--- Enter address family
configuration mode for configuring EIGRP routing
sessions. network 172.16.2.0 0.0.0.255 network
203.197.194.0 no auto-summary autonomous-system 330 !---
Defines the autonomous system number for this specific
instance of EIGRP. exit-address-family ! address-family
ipv4 vrf A network 10.0.0.1 0.0.0.0 network 192.168.1.0
no auto-summary autonomous-system 220 exit-address-
family ! access-list 99 permit 172.16.1.0 0.0.0.255
access-list 99 permit 192.168.1.0 0.0.0.255 access-list
101 permit udp host 192.168.1.1 eq bootps host 1.1.1.1
eq bootps !--- Create access list in order to permit the
host addresses. ! route-map vrfA-to-vrfB permit 10 match
ip address 99 !--- Created a route map and distributed
the routes permitted by access list 99. ! end
```

路由器 R3

```
!
version 12.4
!
hostname R3
!
ip cef
```

```
!
!
!
!
ip vrf A
 rd 1.1.1.1:111
!
mpls label protocol ldp
!
interface Loopback1
 ip address 1.1.1.1 255.255.255.255
!
interface FastEthernet0/0
 ip vrf forwarding A
 ip address 10.0.0.2 255.255.255.0
 duplex auto
 speed auto
 mpls ip
!
interface FastEthernet0/1
 ip vrf forwarding A
 ip address 57.35.169.1 255.255.255.0
 duplex auto
 speed auto
!
interface FastEthernet1/0
 ip address 203.197.194.2 255.255.255.0
 duplex auto
 speed auto
!
router eigrp 330
 network 1.1.1.1 0.0.0.0
 network 10.0.0.2 0.0.0.0
 network 57.35.169.1 0.0.0.0
 network 203.197.194.0
 no auto-summary
 !
 address-family ipv4 vrf A
  network 10.0.0.2 0.0.0.0
  network 57.35.169.1 0.0.0.0
  no auto-summary
 autonomous-system 220
 exit-address-family
!
end
```

验证

使用本部分可确认配置能否正常运行。

命令输出解释程序（仅限注册用户）(OIT) 支持某些 **show** 命令。使用 OIT 可查看对 show 命令输出的分析。

显示命令

为了验证EIGRP适当地配置，请使用show ip route vrf命令。

show ip route vrf

在路由器 R2 中R2#**show ip route vrf A** Routing Table: A
Codes: 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 Gateway of last resort is not set 2.0.0.0/32 is subnetted, 1 subnets D 2.2.2.2 [90/409600] via 192.168.1.2, 00:15:47, FastEthernet0/0 57.0.0.0/24 is subnetted, 1 subnets D 57.35.169.0 [90/307200] via 192.168.1.2, 00:15:47, FastEthernet0/0 [90/307200] via 10.0.0.2, 00:15:47, FastEthernet0/1 10.0.0.0/24 is subnetted, 1 subnets C 10.0.0.0 is directly connected, FastEthernet0/1 C 192.168.1.0/24 is directly connected, FastEthernet0/0 **在路由器 R3 中**R3#**show ip route vrf A** Routing Table: A
Codes: 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 Gateway of last resort is not set 2.0.0.0/32 is subnetted, 1 subnets D 2.2.2.2 [90/409600] via 57.35.169.2, 00:16:59, FastEthernet0/1 57.0.0.0/24 is subnetted, 1 subnets C 57.35.169.0 is directly connected, FastEthernet0/1 10.0.0.0/24 is subnetted, 1 subnets C 10.0.0.0 is directly connected, FastEthernet0/0 D 192.168.1.0/24 [90/307200] via 57.35.169.2, 00:17:02, FastEthernet0/1 [90/307200] via 10.0.0.1, 00:17:02, FastEthernet0/0 *!--- Displays the routing table associated with VRF instance A.*

如果R2丢失连接对R1，从R2的路由通过R3将到达路由器R1。

在故障切换的情况下

当R2丢失其连接对R1时，请尝试在R2's Fa0/0**关闭的**发出。**在路由器 R2 中**R2#**conf t** Enter configuration commands, one per line. End with CNTL/Z. R2(config)#**int fa0/0** R2(config-if)#**shut down** R2(config-if)# *Mar 1 00:01:01.539: %TDP-5-INFO: VRF A: TDP ID removed *Mar 1 00:01:01.675: %LDP-5-NBRCHG: LDP Neighbor (vrf A) 57.35.169.1:0 (1) is DOWN (LDP Router ID changed) *Mar 1 00:01:01.679: %DUAL-5-NBRCHANGE: IP-EIGRP(1) 220: Neighbor 192.168.1.2 (FastEthernet0/0) is down: interface down R2(config-if)# *Mar 1 00:01:03.519: %LINK-5-CHANGED: Interface FastEthernet0/0, changed state to administratively down *Mar 1 00:01:04.519: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to down 在路由器R3的同一实例，故障切换链路获得激活。 R3# *Mar 1 00:00:52.527: %LDP-5-NBRCHG: LDP Neighbor (vrf A) 192.168.1.1:0 (1) is
DOWN (TCP connection closed by peer)
R3#
***Mar 1 00:00:59.591: %LDP-5-NBRCHG: LDP Neighbor (vrf A) 10.0.0.1:0 (1) is UP**

为了验证路由器R2能仍然到达R1，请发出ping vrf命令为了ping从路由器R2的R1。

ping
在路由器 R2 中R2#**ping vrf A 192.168.1.2** Type escape sequence to abort. Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds: !!!!! Success rate is 100 percent (5/5), round-trip min/avg/max = 12/51/96 ms *!--- R2 can still reach R1 through R3.*

相关信息

- VRF感知服务
- EIGRP 支持页
- 技术支持和文档 - Cisco Systems