

使用VRF的EIGRP故障切换配置示例

目录

[简介](#)

[先决条件](#)

[硬件与软件版本](#)

[规则](#)

[配置](#)

[网络图](#)

[配置](#)

[验证](#)

[显示命令](#)

[相关信息](#)

简介

本文档介绍如何使用虚拟路由和转发(VRF)使用增强型内部网关路由协议(EIGRP)配置故障切换。VRF是IP路由的扩展，提供多个路由实例。Internet服务提供商(ISP)利用此VRF为客户创建单独的虚拟专用网络(VPN)，因为它允许路由表中存在多个实例。

先决条件

- EIGRP 的基础知识
- VRF的基本知识

硬件与软件版本

本文档中的配置基于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](#)。

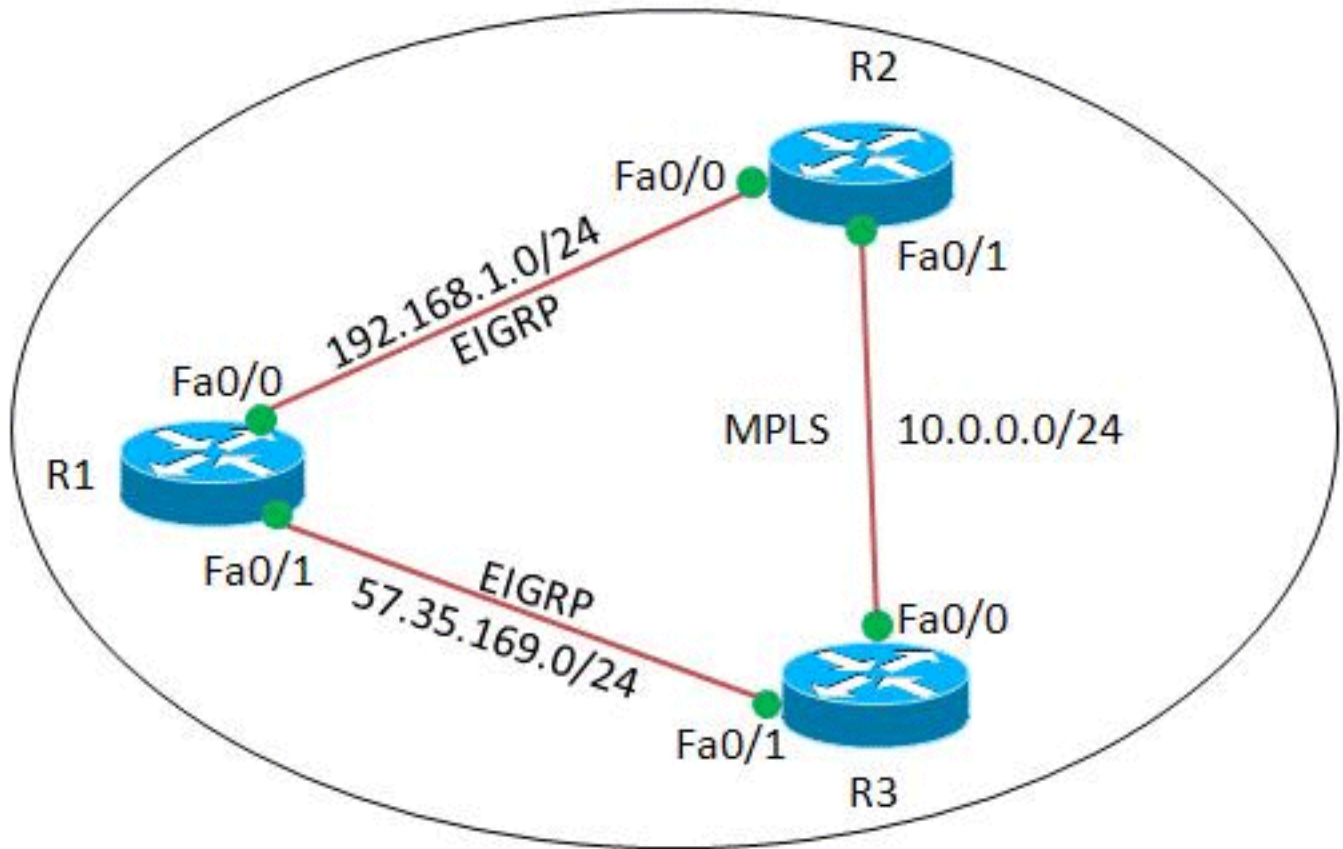
配置

在本例中，路由器R1被视为PE路由器。路由器R2和R3被视为CE路由器。路由器使用EIGRP相互通信。如果R2与R1失去连接（即，在故障转移情况下），路由可以通过R3到达R1。路由器R2和R3之间有MPLS连接。

注意：使用[命令查找工具](#)(仅限注册客户)可查找有关本文档中使用的命令的详细信息。

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

要检验EIGRP是否配置正确，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与R1失去连接，则从R2到路由器R1的路由将通过R3到达。

在故障切换时

当R2失去与R1的连接时，尝试在R2的Fa0/0上关闭。在路由器R2

```

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的同一实例中，故障切换链路激活。

```

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

```

要检验路由器R2是否仍能到达R1，请发出ping vrf命令，以便从路由器R2 ping 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](#)