

使用VRF的EIGRP故障切換配置示例

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簡介

本文說明如何使用虛擬路由和轉發(VRF)配置使用增強型內部網關路由協定(EIGRP)的故障切換。VRF是IP路由的擴展，可提供多個路由例項。Internet服務提供商(ISP)利用此VRF為客戶建立單獨的虛擬專用網路(VPN)，因為它允許路由器中存在路由表的多個例項。

必要條件

- EIGRP基礎知識
- VRF基礎知識

硬體和軟體版本

本檔案中的組態是根據Cisco IOS[®]軟體版本12.4(15)T 13上的Cisco 3700系列路由器。

慣例

如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

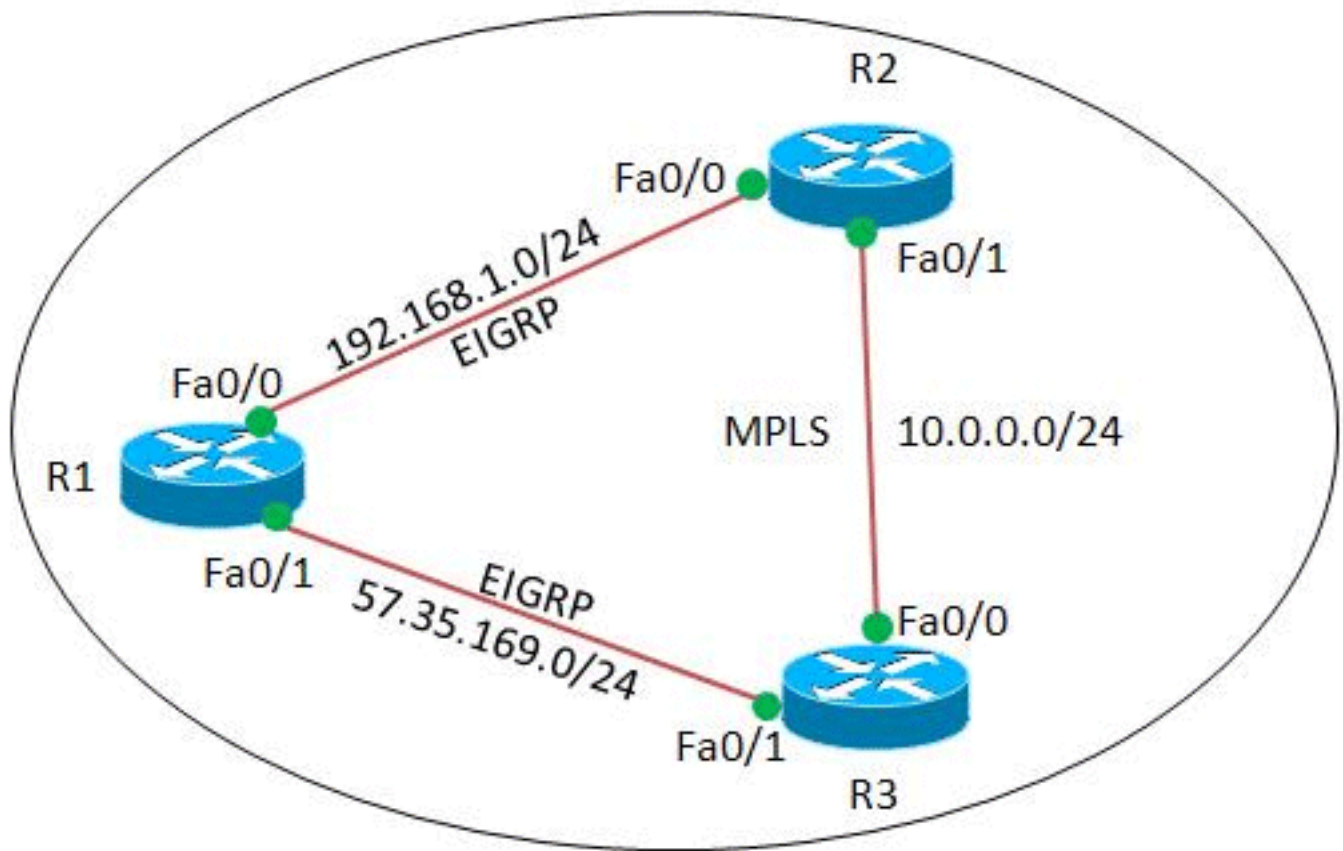
設定

在本示例中，路由器R1被視為PE路由器。路由器R2和R3被視為CE路由器。路由器使用EIGRP相互通訊。如果R2失去與R1的連線（即在故障轉移的情況下），路由可以通過R3到達R1。路由器R2和R3之間具有MPLS連線。

註：使用[Command Lookup Tool](#)(僅限[註冊](#)客戶)查詢有關本文檔中使用的命令的更多資訊。

網路圖表

本檔案會使用以下網路設定：



組態

本檔案會使用以下設定：

- [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
```

驗證

使用本節內容，確認您的組態是否正常運作。

[輸出直譯器工具](#)(僅供已註冊客戶使用)(OIT)支援某些show命令。使用OIT檢視show命令輸出的分析

o

顯示命令

要檢驗EIGRP是否配置正確，請使用[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失去與R1的連線，來自R2的路由將通過R3到達路由器R1。

發生故障切換時

當R2失去與R1的連線時，嘗試在R2的Fa0/0上發出shut down命令。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的同一例項上，故障切換鏈路被啟用。

```

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

```

為了檢驗路由器R2是否仍然可以到達R1，請發出ping vrf 命令，以便從路由器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.
```

相關資訊

- [VRF感知服務](#)
- [EIGRP支援頁](#)
- [技術支援與文件 - Cisco Systems](#)