IPv6 BGP首碼型傳出路由過濾配置示例

目錄

簡介

本文檔提供使用IPv6的示例配置，幫助您配置BGP基於字首的出站路由過濾。此功能使用BGP出站路由過濾器(ORF)傳送和接收功能，這些功能可將對等路由器之間傳送的BGP更新數量降至最低。此功能配置有助於在源位置過濾掉不需要的路由更新。

必要條件

需求

嘗試此組態之前，請確保符合以下要求：

- 瞭解BGP路由協定及其操作
- 瞭解IPv6編址方案

採用元件

本文件所述內容不限於特定軟體和硬體版本。

本文檔中的配置基於採用Cisco IOS®軟體版本15.0(1)的Cisco 7200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

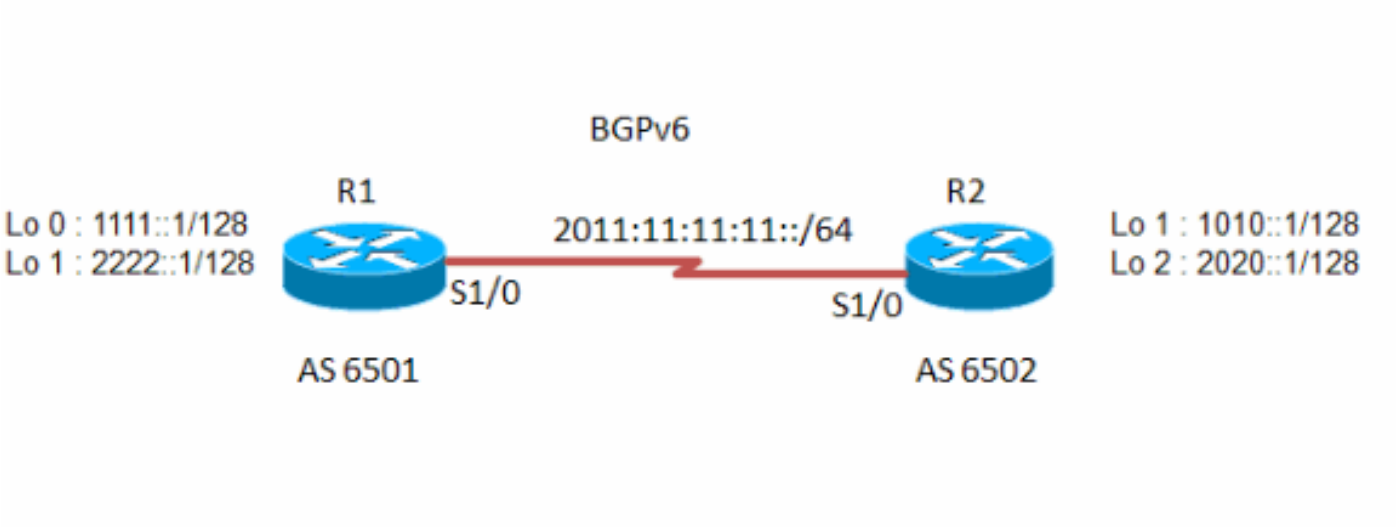
在本例中，路由器R1配置為向路由器R2通告基於字首的ORF傳送功能。在另一端路由器R2配置為向路由器R1通告基於字首的ORF接收功能。在啟用BGP基於字首的出站路由過濾功能以傳送或接收基於字首的ORF通告之前，必須在每台參與路由器上啟動並運行BGP對等會話，並且必須在路由器之前啟用BGP ORF功能。

本檔案使用neighbor orf prefix-filter命令在路由器上啟用ORF字首清單功能。此命令是在Cisco IOS軟體版本12.0(11)ST中匯入。

註：使用 Command Lookup Tool(僅限註冊客戶)可以查詢有關本文檔中使用的命令的詳細資訊。

網路圖表

本檔案會使用以下網路設定：



配置示例

本檔案會使用以下設定：

- 路由器R1
- 路由器R2

路由器R1

```
!
hostname R1
!
ipv6 unicast-routing
ipv6 cef
!
!
interface Loopback1
 no ip address
 ipv6 address 1111::1/128
!
```

```
!
interface Loopback2
 no ip address
 ipv6 address 2222::1/128
!
!
interface Serial1/0
 no ip address
 ipv6 address 2011:11:11:11::1/64
 serial restart-delay 0
!
!
router bgp 6501
 no synchronization
 no bgp default ipv4-unicast
 bgp router-id 1.1.1.1
 bgp log-neighbor-changes
 neighbor 2011:11:11:11::2 remote-as 6502
 neighbor 2011:11:11:11::2 ebgp-multihop 255
 no auto-summary
 !
 address-family ipv6
  neighbor 2011:11:11:11::2 activate
  neighbor 2011:11:11:11::2 capability orf prefix-list
send
  neighbor 2011:11:11:11::2 prefix-list FILTER_IPv6 in
 exit-address-family
!
!
ipv6 prefix-list FILTER_IPv6 seq 10 permit 1111::1/128
ipv6 prefix-list FILTER_IPv6 seq 20 permit 2222::1/128
!
!
end
```

路由器R2

```
!
hostname R2
!
!
no ip domain lookup
ipv6 unicast-routing
ipv6 cef
!
interface Loopback1
 no ip address
 ipv6 address 1010::1/128
 !
!
interface Loopback2
 no ip address
 ipv6 address 2020::1/128
!
interface Serial1/0
 no ip address
 ipv6 address 2011:11:11:11::2/64
 serial restart-delay 0
!
!
router bgp 6502
 no synchronization
 bgp router-id 2.2.2.2
```

```
 bgp log-neighbor-changes
 neighbor 2011:11:11:11::1 remote-as 6501
 neighbor 2011:11:11:11::1 ebgp-multihop 255
 no auto-summary
 !
 address-family ipv6

  network 1010::1/128
  network 2020::1/128
  neighbor 2011:11:11:11::1 activate
  neighbor 2011:11:11:11::1 capability orf prefix-list
receive
  neighbor 2011:11:11:11::1 prefix-list R2_list in
 exit-address-family
!
ipv6 prefix-list R2_list seq 10 permit 1010::1/128
ipv6 prefix-list R2_list seq 20 permit 2020::1/128
!
end
```

案例 1:根據帶有表達式的字首清單過濾路由

在此案例中，在R1的介面loopback 0下配置了環回地址**1000::1/45**。建立字首清單以允許大於字首長度：/64的任何路由。

註：路由器R2的配置與前面給出的配置相同，R1的配置也有所更改，如下所示。這些路由器上的IP地址保持不變。

路由器R1

```
!--- Output omitted. ! interface Loopback0 no ip address
ipv6 address 1000::1/45 ! !--- Output omitted. router
bgp 6501 no synchronization bgp router-id 1.1.1.1 bgp
log-neighbor-changes neighbor 2011:11:11:11::2 remote-as
6502 neighbor 2011:11:11:11::2 ebgp-multihop 255 no
auto-summary ! address-family ipv6 network 1000::1/45
  network 1111::1/128
  network 2222::1/128
  neighbor 2011:11:11:11::2 activate
  neighbor 2011:11:11:11::2 prefix-list IPV6-LONG in
!--- Applies the prefix-list and filters !--- the
incoming updates from the neighbor 2011:11:11:11::2.
exit-address-family ! ipv6 prefix-list IPV6-LONG
description Match any prefix longer than /64
ipv6 prefix-list IPV6-LONG seq 1 permit ::/0 ge 64
!--- seq 1 permit ::/0 ge 64 permits anything !--- that
is ge /64 subnet mask. ! 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。

以下**show**命令用於驗證設定：

- show running-config | beg bgp
- show bgp ipv6 unicast neighbors

驗證在傳送模式下配置的IPv6 BGP字首型出站路由過濾

在路由器R1中：

show running-config | beg bgp

```
router bgp 6501
 no synchronization
 bgp router-id 1.1.1.1
 bgp log-neighbor-changes
 neighbor 2011:11:11:11::2 remote-as 6502
 neighbor 2011:11:11:11::2 ebgp-multihop 255
 no auto-summary
 !
 address-family ipv6
  neighbor 2011:11:11:11::2 activate
  neighbor 2011:11:11:11::2 capability orf prefix-list
send
!--- Indicates that the neighbor 2011:11:11:11::2 !---
is configured with the prefix-based !--- ORF feature in
send mode.
```

show bgp ipv6 unicast neighbors

```
R1#show bgp ipv6 unicast neighbors 2011:11:11:11::2
BGP neighbor is 2011:11:11:11::2,  remote AS 6502,
external link
  BGP version 4, remote router ID 2.2.2.2
  Session state = Established, up for 01:30:36
  Last read 00:00:44, last write 00:00:42, hold time is
180, keepalive interval is 60 seconds
 BGP multisession with 2 sessions (2 established), first
up for 01:31:26
  Neighbor sessions:
    2 active, is multisession capable
  Neighbor capabilities:
    Route refresh: advertised and received(new) on
session 1, 2
    Four-octets ASN Capability: advertised and received
on session 1, 2
    Address family IPv4 Unicast: advertised and received
    Address family IPv6 Unicast: advertised and received
!--- Output omitted. For address family: IPv6 Unicast
Session: 2011:11:11:11::2 session 2 BGP table version 1,
neighbor version 1/0 Output queue size : 0 Index 2
session 2 member 2 update-group member AF-dependant
capabilities: Outbound Route Filter (ORF) type (128)
Prefix-list:
!--- Shows that the neighbor 2011:11:11:11::2 !--- is
configured with the prefix-based !--- ORF feature in
send mode. Send-mode: advertised Receive-mode: received
Outbound Route Filter (ORF): sent; Incoming update
prefix filter list is FILTER_IPv6 Sent Rcvd Prefix
activity: ---- ---- Prefixes Current: 2 4 Prefixes
Total: 0 0 Implicit Withdraw: 1 0 Explicit Withdraw: 1 0
Used as bestpath: n/a 0 Used as multipath: n/a 0
```

```
Outbound Inbound Local Policy Denied Prefixes: --------
------- !--- Output omitted.
```

驗證在接收模式下配置的IPv6 BGP字首型出站路由過濾

在路由器R2中：

show running-config | beg bgp

```
router bgp 6502
 no synchronization
 bgp router-id 2.2.2.2
 bgp log-neighbor-changes
 neighbor 2011:11:11:11::1 remote-as 6501
 neighbor 2011:11:11:11::1 ebgp-multihop 255
 no auto-summary
 !
 address-family ipv6
  network 1010::1/128
  network 2020::1/128
  neighbor 2011:11:11:11::1 activate
  neighbor 2011:11:11:11::1 capability orf prefix-list
receive
!--- Indicates that the neighbor 2011:11:11:11::1 !---
is configured with the prefix-based !--- ORF feature in
receive mode.
```

show bgp ipv6 unicast neighbors

```
R2#show bgp ipv6 unicast nei 2011:11:11:11::1
BGP neighbor is 2011:11:11:11::1,  remote AS 6501,
external link
  BGP version 4, remote router ID 1.1.1.1
  Session state = Established, up for 01:47:11
  Last read 00:00:44, last write 00:00:32, hold time is
180, keepalive interval is 60 seconds
multisession with 2 sessions (2 established), first up
for 01:48:02
  Neighbor sessions:
    2 active, is multisession capable
  Neighbor capabilities:
    Route refresh: advertised and received(new) on
session 1, 2
    Four-octets ASN Capability: advertised and received
on session 1, 2
    Address family IPv4 Unicast: advertised and received
    Address family IPv6 Unicast: advertised and received
    Multisession Capability: advertised and received
 !--- Output omitted. For address family: IPv6 Unicast
Session: 2011:11:11:11::1 session 2 BGP table version 3,
neighbor version 3/0 Output queue size : 0 Index 3
session 2 member 3 update-group member AF-dependant
capabilities: Outbound Route Filter (ORF) type (128)
Prefix-list:
!--- Shows that the neighbor 2011:11:11:11::1 !--- is
configured with the prefix-based !--- ORF feature in
receive mode. Send-mode: received Receive-mode:
advertised Outbound Route Filter (ORF): received (2
entries) Incoming update prefix filter list is R2_list
Sent Rcvd Prefix activity: ---- ---- Prefixes Current: 2
```

```
5 Prefixes Total: 0 0 Implicit Withdraw: 0 0 Explicit
Withdraw: 2 0 !--- Output omitted.
```

驗證案例1:根據帶有表達式的字首清單過濾路由

在路由器R1中發出**show ipv6 route bgp**命令，以顯示IPv6 BGP路由表的當前內容。

show ipv6 route bgp

在路由器R1上：

```
R1#show ipv6 route bgp
IPv6 Routing Table - default - 9 entries
Codes: C - Connected, L - Local, S - Static, U - Per-
user Static route
       B - BGP, HA - Home Agent, MR - Mobile Router, R -
RIP
       I1 - ISIS L1, I2 - ISIS L2, IA - ISIS interarea,
IS - ISIS summary
       D - EIGRP, EX - EIGRP external, ND - Neighbor
Discovery
       O - OSPF Intra, OI - OSPF Inter, OE1 - OSPF ext
1, OE2 - OSPF ext 2
       ON1 - OSPF NSSA ext 1, ON2 - OSPF NSSA ext 2
B   1010::1/128 [20/0]
     via 2011:11:11:11::2
B   2020::1/128 [20/0]
     via 2011:11:11:11::2
!--- In this ouput, 1000::1/45 is not !--- displayed
because the network is lesser !--- than ::/64 prefix and
its filtered.
```

使用**show ipv6 prefix-list**命令以顯示有關IPv6字首清單或IPv6字首清單條目的資訊。

show ipv6 prefix-list

在路由器R1上：

```
R1#show ipv6 prefix-list detail

Prefix-list with the last deletion/insertion: IPV6-LONG
ipv6 prefix-list IPV6-LONG:
   Description: Match any prefix longer than /64
   count: 1, range entries: 1, sequences: 1 - 1,
refcount: 3
   seq 1 permit ::/0 ge 64 (hit count: 14, refcount: 1)

R1#show ipv6 prefix-list summary

Prefix-list with the last deletion/insertion: IPV6-LONG
ipv6 prefix-list IPV6-LONG:
   Description: Match any prefix longer than /64
   count: 1, range entries: 1, sequences: 1 - 1,
refcount: 3

R1#show ipv6 prefix-list IPV6-LONG

ipv6 prefix-list IPV6-LONG: 1 entries
   seq 1 permit ::/0 ge 64
```

相關資訊

- BGP 支援頁面
- IP第6版支援頁面
- BGP 個案研究
- 技術支援與文件 - Cisco Systems