

配置IPv6 BGP本地首選項功能

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簡介

本檔案將說明IPv6邊界閘道通訊協定(BGP)Local-Preference功能。本地優先順序是指AS哪條路徑優先退出AS以到達特定網路。具有更高本地優先順序的路徑更優先。優先順序的預設值為100。

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

本檔案中的資訊已使用以下軟體和硬體版本進行測試

- Cisco IOS軟體版本12.4，高級IP服務功能集
- Cisco 3700系列多重服務存取路由器

慣例

如需文件慣例的詳細資訊，請參閱[思科技術提示慣例](#)。

背景資訊

在本例中，路由器R1、R2和R3屬於BGP自治系統編號123。R4屬於自治系統101,R5屬於自治系統100。

三台路由器 (R1、R2和R3) 配置了OSPFv3以實現IGP連線。所有三台路由器的環回介面Lo 0 (1111:111:A::/64 eui-64、222:222:222:A::/64 eui-64和333:333:333:A::/64 eui-64) 的IPv6字首在OSPFv3路由協定的區域0中通告。

路由器R1、R2和R3之間通過獲知的環回字首形成IBGP對等。路由器R1和R4通過WAN鏈路 (串列連線) 連線，形成EBGP對等。同樣，路由器R3和R5正在通過WAN鏈路形成EBGP對等。

路由器R4和R5插入相同的IPv6字首：

1. 網路BC01:BC1:10:A::/64
2. 網路BC02:BC1:11:A::/64
3. 網路BC03:BC1:12:A::/64

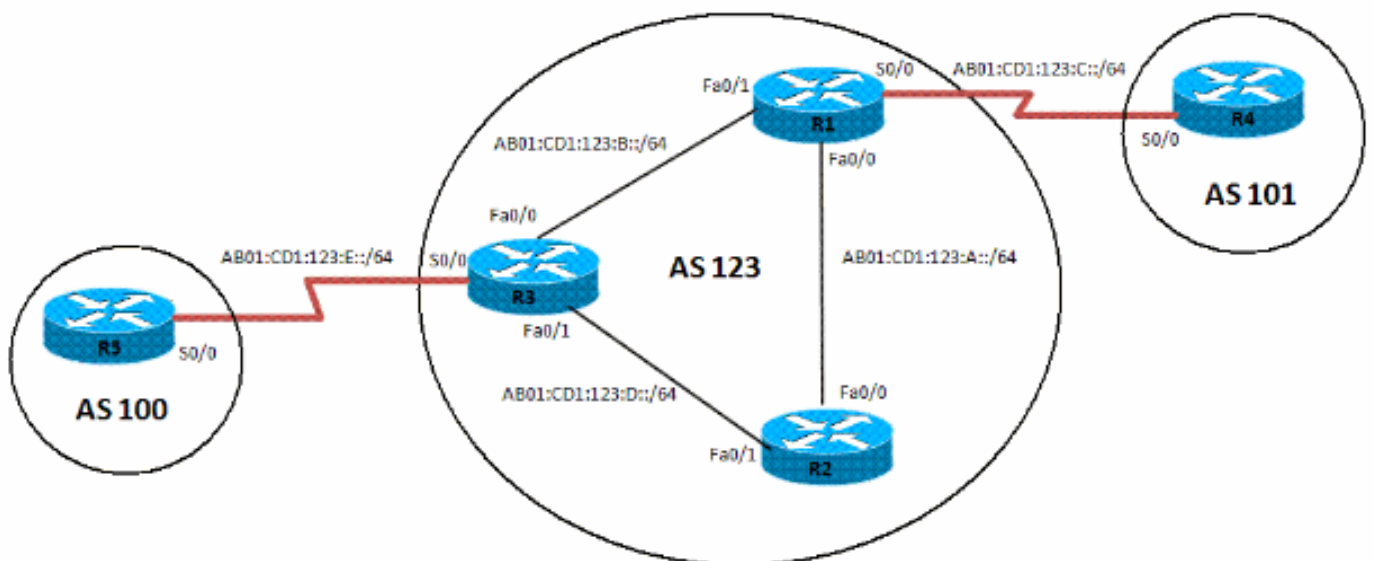
由於兩台路由器R4和R5插入了相同的IPv6字首，因此路徑選擇基於BGP已知屬性。在本示例中，選擇了Local Preference。BGP本地優先順序值500通過路由對映為路由器R3上的字首BC01:BC1:10:A::/64設定。這會導致R3成為此字首的退出點，而R1成為其餘兩個字首的退出點。

設定

路由器R1、R2和R3的快速乙太網介面 (F0/0和F0/1) 啟用了IPv6,IPv6地址格式為eui-64。

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：

- [R1配置](#)
- [R2配置](#)
- [R3配置](#)
- [R4配置](#)
- [R5配置](#)

注意：使用[ipv6 unicast-routing](#)命令，所有路由器都啟用了IPv6[資料包轉發](#)功能。

R1

```
interface Loopback0
  no ip address
  ipv6 address 1111:111:111:A::/64 eui-64
  ipv6 enable
  ipv6 ospf 10 area 0
  !--- Enables OSPFv3 on the interface and associates !---
  the interface loopback0 to area 0. ! interface
FastEthernet0/0 description CONNECTED TO Rtr2 no ip
address duplex auto speed auto ipv6 address
AB01:CD1:123:A::/64 eui-64 ipv6 enable ipv6 ospf 10 area
0 ! interface Serial0/0 no ip address ipv6 address
AB01:CD1:123:C::/64 eui-64 ipv6 enable clock rate
2000000 ! interface FastEthernet0/1 no ip address duplex
auto speed auto ipv6 address AB01:CD1:123:B::/64 eui-64
ipv6 enable ipv6 ospf 10 area 0 ! ipv6 router ospf 10
router-id 1.1.1.1 log-adjacency-changes redistribute
connected route-map CONNECTED ! route-map CONNECTED
permit 10 match interface Serial0/0 ! router bgp 123 bgp
router-id 1.1.1.1 no bgp default ipv4-unicast bgp log-
neighbor-changes neighbor 2222:222:222:A:C602:3FF:FEF0:0
remote-as 123 neighbor 2222:222:222:A:C602:3FF:FEF0:0
update-source Loopback0 neighbor
3333:333:333:A:C603:3FF:FEF0:0 remote-as 123 neighbor
3333:333:333:A:C603:3FF:FEF0:0 update-source Loopback0
neighbor AB01:CD1:123:C:C604:16FF:FE98:0 remote-as 101
neighbor AB01:CD1:123:C:C604:16FF:FE98:0 ebgp-multihop 5
! address-family ipv6 neighbor
2222:222:222:A:C602:3FF:FEF0:0 activate neighbor
2222:222:222:A:C602:3FF:FEF0:0 next-hop-self neighbor
3333:333:333:A:C603:3FF:FEF0:0 activate neighbor
3333:333:333:A:C603:3FF:FEF0:0 next-hop-self neighbor
AB01:CD1:123:C:C604:16FF:FE98:0 activate exit-address-
family
```

R2

```
interface Loopback0
  no ip address
  ipv6 address 2222:222:222:A::/64 eui-64
  ipv6 enable
  ipv6 ospf 10 area 0
!
interface FastEthernet0/0
  no ip address
  duplex auto
  speed auto
  ipv6 address AB01:CD1:123:A::/64 eui-64
  ipv6 ospf 10 area 0
!
interface FastEthernet0/1
  no ip address
```

```
duplex auto
speed auto
ipv6 address AB01:CD1:123:D::/64 eui-64
ipv6 enable
ipv6 ospf 10 area 0
!
ipv6 router ospf 10
router-id 2.2.2.2
log-adjacency-changes
!
router bgp 123
no synchronization
bgp router-id 2.2.2.2
bgp log-neighbor-changes
neighbor 1111:111:111:A:C601:3FF:FEF0:0 remote-as 123
neighbor 1111:111:111:A:C601:3FF:FEF0:0 update-source
Loopback0
neighbor 3333:333:333:A:C603:3FF:FEF0:0 remote-as 123
neighbor 3333:333:333:A:C603:3FF:FEF0:0 update-source
Loopback0
no auto-summary
!
address-family ipv6
neighbor 1111:111:111:A:C601:3FF:FEF0:0 activate
neighbor 3333:333:333:A:C603:3FF:FEF0:0 activate
exit-address-family
```

R3

```
interface Loopback0
no ip address
ipv6 address 3333:333:333:A::/64 eui-64
ipv6 enable
ipv6 ospf 10 area 0
!
interface FastEthernet0/0
no ip address
duplex auto
speed auto
ipv6 address AB01:CD1:123:B::/64 eui-64
ipv6 enable
ipv6 ospf 10 area 0
!
interface Serial0/0
no ip address
ipv6 address AB01:CD1:123:E::/64 eui-64
ipv6 enable
clock rate 2000000
!
interface FastEthernet0/1
no ip address
duplex auto
speed auto
ipv6 address AB01:CD1:123:D::/64 eui-64
ipv6 ospf 10 area 0
!
ipv6 router ospf 10
router-id 3.3.3.3
log-adjacency-changes
redistribute connected route-map CONNECTED
!
router bgp 123
no synchronization
```

```

bgp router-id 3.3.3.3
bgp log-neighbor-changes
neighbor 1111:111:111:A:C601:3FF:FEF0:0 remote-as 123
neighbor 1111:111:111:A:C601:3FF:FEF0:0 update-source
Loopback0
neighbor 2222:222:222:A:C602:3FF:FEF0:0 remote-as 123
neighbor 2222:222:222:A:C602:3FF:FEF0:0 update-source
Loopback0
neighbor AB01:CD1:123:E:C605:16FF:FE98:0 remote-as 202
neighbor AB01:CD1:123:E:C605:16FF:FE98:0 ebgp-multihop
5
no auto-summary
!
address-family ipv6
neighbor 1111:111:111:A:C601:3FF:FEF0:0 activate
neighbor 1111:111:111:A:C601:3FF:FEF0:0 next-hop-self
neighbor 1111:111:111:A:C601:3FF:FEF0:0 route-map
LOCAL_PREF out
neighbor 2222:222:222:A:C602:3FF:FEF0:0 activate
neighbor 2222:222:222:A:C602:3FF:FEF0:0 next-hop-self
neighbor 2222:222:222:A:C602:3FF:FEF0:0 route-map
LOCAL_PREF out
neighbor AB01:CD1:123:E:C605:16FF:FE98:0 activate
exit-address-family

!
ipv6 prefix-list 10 seq 5 permit BC01:BC1:10:A::/64
!
route-map LOCAL_PREF permit 10
match ipv6 address prefix-list 10
set local-preference 500
!
route-map LOCAL_PREF permit 20
!
route-map CONNECTED permit 10
match interface Serial0/0

```

R4

```

interface Serial0/0
no ip address
ipv6 address AB01:CD1:123:C::/64 eui-64
ipv6 enable
clock rate 2000000
!
interface Loopback10
no ip address
ipv6 address BC01:BC1:10:A::/64 eui-64
ipv6 enable
!
interface Loopback11
no ip address
ipv6 address BC02:BC1:11:A::/64 eui-64
ipv6 enable
!
interface Loopback12
no ip address
ipv6 address BC03:BC1:12:A::/64 eui-64
ipv6 enable

router bgp 101
bgp router-id 4.4.4.4
no bgp default ipv4-unicast

```

```
bgp log-neighbor-changes
neighbor AB01:CD1:123:C:C601:3FF:FEF0:0 remote-as 123
neighbor AB01:CD1:123:C:C601:3FF:FEF0:0 ebgp-multihop 5
!
address-family ipv6
  neighbor AB01:CD1:123:C:C601:3FF:FEF0:0 activate
  network BC01:BC1:10:A::/64
  network BC02:BC1:11:A::/64
  network BC03:BC1:12:A::/64
exit-address-family
```

R5

```
interface Serial0/0
  no ip address
  ipv6 address AB01:CD1:123:E::/64 eui-64
  ipv6 enable
  clock rate 2000000
!
interface Loopback10
  no ip address
  ipv6 address BC01:BC1:10:A::/64 eui-64
  ipv6 enable
!
interface Loopback11
  no ip address
  ipv6 address BC02:BC1:11:A::/64 eui-64
  ipv6 enable
!
interface Loopback12
  no ip address
  ipv6 address BC03:BC1:12:A::/64 eui-64
  ipv6 enable
!
router bgp 202
  bgp router-id 5.5.5.5
  no bgp default ipv4-unicast
  bgp log-neighbor-changes
  neighbor AB01:CD1:123:E:C603:3FF:FEF0:0 remote-as 123
  neighbor AB01:CD1:123:E:C603:3FF:FEF0:0 ebgp-multihop 5
!
address-family ipv6
  neighbor AB01:CD1:123:E:C603:3FF:FEF0:0 activate
  network BC01:BC1:10:A::/64
  network BC02:BC1:11:A::/64
  network BC03:BC1:12:A::/64
exit-address-family
```

驗證

本節提供的資訊可用於確認您的組態是否正常運作。

在路由器R1上

1. [show ipv6 interface brief](#)

```

Rtr1#show ipv6 interface brief
FastEthernet0/0          [up/up]
    FE80::C601:3FF:FEF0:0
    AB01:CD1:123:A:C601:3FF:FEF0:0
Serial0/0                [up/up]
    FE80::C601:3FF:FEF0:0
    AB01:CD1:123:C:C601:3FF:FEF0:0
FastEthernet0/1         [up/up]
    FE80::C601:3FF:FEF0:1
    AB01:CD1:123:B:C601:3FF:FEF0:1
Serial0/1                [administratively down/down]
Loopback0               [up/up]
    FE80::C601:3FF:FEF0:0
    1111:111:111:A:C601:3FF:FEF0:0

```

2. [show bgp ipv6 unicast summary](#)

```

Rtr1#show bgp ipv6 unicast summary
BGP router identifier 1.1.1.1, local AS number 123
BGP table version is 9, main routing table version 9
3 network entries using 456 bytes of memory
6 path entries using 456 bytes of memory
4/2 BGP path/bestpath attribute entries using 496 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 2 (at peak 2) using 64 bytes of memory
BGP using 1520 total bytes of memory
BGP activity 3/0 prefixes, 8/2 paths, scan interval 60 secs

Neighbor          V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
2222:222:222:A:C602:3FF:FEF0:0
                   4    123     45     50      9    0   0 00:41:30      0
3333:333:333:A:C603:3FF:FEF0:0
                   4    123     59     55      9    0   0 00:45:09      3
AB01:CD1:123:C:C604:16FF:FE98:0
                   4    101     56     56      9    0   0 00:50:14      3

```

在路由器R2上

1. [show ipv6 interface brief](#)

```

Rtr2#show ipv6 interface brief
FastEthernet0/0          [up/up]
    FE80::C602:3FF:FEF0:0
    AB01:CD1:123:A:C602:3FF:FEF0:0
FastEthernet0/1         [up/up]
    FE80::C602:3FF:FEF0:1
    AB01:CD1:123:D:C602:3FF:FEF0:1
FastEthernet1/0         [administratively down/down]
Loopback0               [up/up]
    FE80::C602:3FF:FEF0:0
    2222:222:222:A:C602:3FF:FEF0:0

```

2. [show bgp ipv6 unicast](#) 注意：未配置Local Preference時，路由器R2(Rtr2)將路由器R1(Rtr1)作為所有已學習IPv6地址的下一跳。

```

Rtr2#sh bgp ipv6 unicast
BGP table version is 4, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric LocPrf Weight Path
* iBC01:BC1:10:A::/64
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   100       0 202 i
*>i
                   1111:111:111:A:C601:3FF:FEFO:0
                                     0   100       0 101 i
* iBC02:BC1:11:A::/64
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   100       0 202 i
*>i
                   1111:111:111:A:C601:3FF:FEFO:0
                                     0   100       0 101 i
* iBC03:BC1:12:A::/64
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   100       0 202 i
*>i
                   1111:111:111:A:C601:3FF:FEFO:0
                                     0   100       0 101 i

```

3. [show bgp ipv6 unicast](#) 為字首BC01:BC1:10:A::/64配置本地首選項500後，R2隻有此字首有不同的出口。

```

Rtr2#show bgp ipv6 unicast
BGP table version is 12, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop          Metric LocPrf Weight Path
*>iBC01:BC1:10:A::/64
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   500       0 202 i
*>iBC02:BC1:11:A::/64
                   1111:111:111:A:C601:3FF:FEFO:0
                                     0   100       0 101 i
* i
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   100       0 202 i
*>iBC03:BC1:12:A::/64
                   1111:111:111:A:C601:3FF:FEFO:0
                                     0   100       0 101 i
* i
                   3333:333:333:A:C603:3FF:FEFO:0
                                     0   100       0 202 i

```

注意：字首BC01:BC1:10:A::/64採用路由器R3的退出路徑，因為「本地首選項」設定得更高。

在路由器R3上

1. [show ipv6 interface brief](#)


```

Rtr3#show ipv6 interface brief
FastEthernet0/0          [up/up]
    FE80::C603:3FF:FEF0:0
    AB01:CD1:123:B:C603:3FF:FEF0:0
Serial0/0                [up/up]
    FE80::C603:3FF:FEF0:0
    AB01:CD1:123:E:C603:3FF:FEF0:0
FastEthernet0/1         [up/up]
    FE80::C603:3FF:FEF0:1
    AB01:CD1:123:D:C603:3FF:FEF0:1
Serial0/1               [administratively down/down]
    unassigned
Loopback0               [up/up]
    FE80::C603:3FF:FEF0:0
    3333:333:333:A:C603:3FF:FEF0:0

```

2. [show bgp ipv6 unicast summary](#)

```

Rtr3#show bgp ipv6 unicast summary
BGP router identifier 3.3.3.3, local AS number 123
BGP table version is 4, main routing table version 4
3 network entries using 456 bytes of memory
5 path entries using 380 bytes of memory
3/1 BGP path/bestpath attribute entries using 372 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
Bitfield cache entries: current 1 (at peak 2) using 32 bytes of memory
BGP using 1288 total bytes of memory
BGP activity 3/0 prefixes, 8/3 paths, scan interval 60 secs

Neighbor          V      AS MsgRcvd MsgSent   TblVer  InQ  OutQ Up/Down  State/PfxRcd
1111:111:111:A:C601:3FF:FEF0:0
                   4      123     57     61       4    0    0 00:47:59      2
2222:222:222:A:C602:3FF:FEF0:0
                   4      123     51     63       4    0    0 00:44:59      0
AB01:CD1:123:E:C605:16FF:FE98:0
                   4     202     55     53       4    0    0 00:49:40      3

```

[疑難排解](#)

使用這些命令進行故障排除

1. [debug bgp ipv6 updates](#)
2. [clear bgp ipv6 {unicast |組播}](#)

[相關資訊](#)

- [BGP 支援頁面](#)
- [BGP:常見問題](#)
- [BGP 最佳路徑選取演算法](#)
- [BGP 個案研究](#)
- [IP第6版支援頁面](#)

- [為IPv6實施多協定BGP](#)
- [技術支援與文件 - Cisco Systems](#)