

配置IPv6 BGP本地首选项功能

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简介

本文档介绍IPv6边界网关协议(BGP)本地首选项功能。本地优先级指示 AS 以哪条路径作为首选来退出 AS，到达特定网络。本地优先级较高的路径优先。首选项的默认值为100。

先决条件

要求

尝试进行此配置之前，请确保满足以下要求：

- 了解BGP路由协议及其运行
- 了解IPv6编址方案

使用的组件

本文档中的信息将在这些软件和硬件版本上进行测试

- Cisco IOS 软件版本 12.4，高级 IP 服务功能集
- Cisco 3700 系列多业务接入路由器

规则

有关文档规则的详细信息，请参阅 [Cisco 技术提示规则](#)。

背景信息

在本例中，路由器R1、R2和R3是BGP自治系统编号123的一部分。R4是自治系统101的一部分，R5是自治系统100的一部分。

三台路由器（R1、R2和R3）配置了OSPFv3以实现IGP连接。所有三台路由器的环回接口Lo0(1111:111:111:A::/64 eui-64、2222:222:222:A::/64 eui-64和3333:333:333:A::/64 eui-64)的IPv6前缀在OSPFv3路由协议区域0中通告。

路由器R1、R2和R3之间通过学习的环回前缀形成IBGP对等。路由器R1和R4通过WAN链路（串行连接）连接，并形成EBGP对等。同样，路由器R3和R5正在WAN链路上形成EBGP对等。

路由器R4和R5插入相同的IPv6前缀：

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

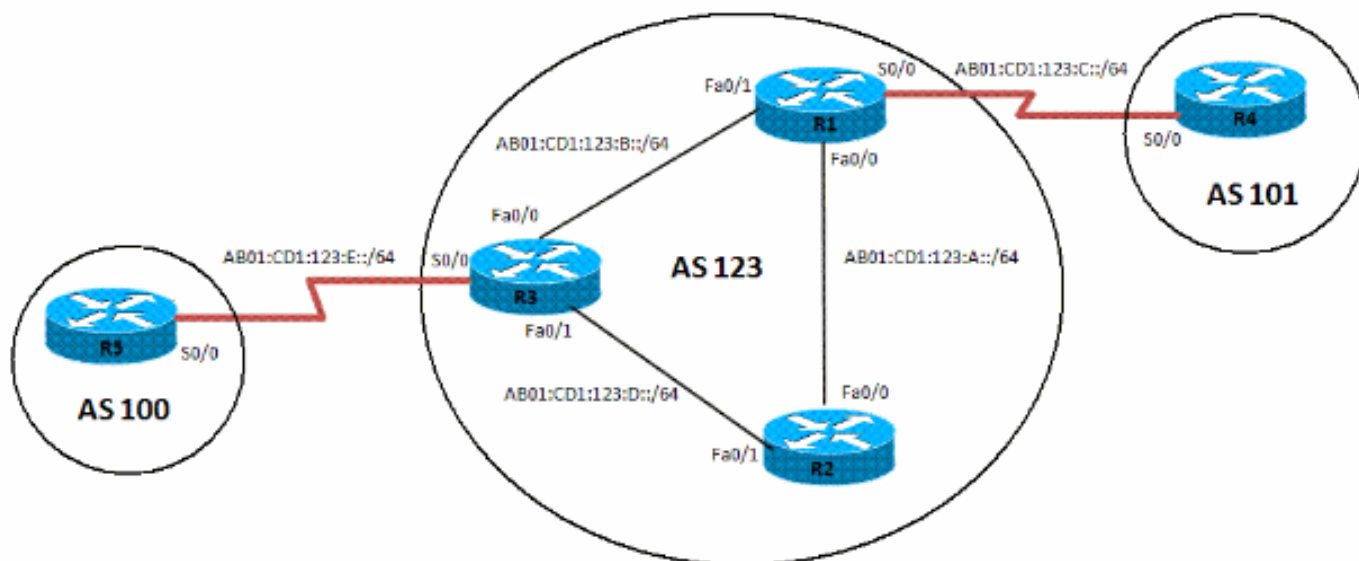
由于两台路由器R4和R5插入相同的IPv6前缀，因此路径选择基于BGP公认属性。在本例中，选择Local Preference。通过路由映射为路由器R3上的前缀BC01:BC1:10:A::/64设置BGP本地优先级值500。这会导致R3成为此前缀的出口点，而R1成为其余两个前缀的出口点。

配置

路由器R1、R2和R3的快速以太网接口（F0/0和F0/1）支持IPv6,IPv6地址格式为eui-64。

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：

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

注意：所有路由器都通过使用ipv6 unicast-routing命令转发IPv6数据包来启用。

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
```

验证

本部分提供的信息可用于确认您的配置是否工作正常。

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：当未配置本地首选项时，路由器R2(Rtr2)将路由器R1(Rtr1)作为其下一跳，用于所有学习的IPv6地址。

```

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](#) 在为前缀BC01:BC1:10:A::/64配置本地首选项500后，R2仅对此前缀有不同的退出。

```

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：前缀BC01:BC1:10:A::/64采用路由器R3的退出路径，因为本地首选项设置得更高。
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

```

[故障排除](#)

使用这些命令进行故障排除

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

[相关信息](#)

- [BGP 支持页](#)
- [调试输出中显示“BGP:常见问题”](#)
- [BGP 最佳路径选择算法](#)
- [BGP 案例分析](#)
- [IP 版本 6 支持页面](#)

- [实现 IPv6 的多协议 BGP](#)
- [技术支持和文档 - Cisco Systems](#)