Configuración de la Función IPv6 BGP Local Preference

Contenido

Introducción

Este documento explica la característica Preferencia Local del Border Gateway Protocol (BGP) de IPv6. La preferencia local es una indicación para el AS sobre qué trayectoria tiene preferencia para salir del AS a fin de alcanzar una red determinada. Se prefiere un trayecto con preferencia local más alta. El valor predeterminado de preferencia es 100.

Prerequisites

Requirements

Asegúrese de cumplir estos requisitos antes de intentar esta configuración:

- Comprensión del protocolo de ruteo BGP y su funcionamiento
- Introducción al esquema de direccionamiento IPv6

Componentes Utilizados

La información de este documento se prueba en estas versiones de software y hardware

- Software Cisco IOS versión 12.4, conjunto de funciones de servicios IP avanzados
- •Routers de acceso multiservicio Cisco de la serie 3700

Convenciones

Consulte Convenciones de Consejos TécnicosCisco para obtener más información sobre las convenciones del documento.

Antecedentes

En el ejemplo, el Router R1, R2 y R3 forman parte del Sistema Autónomo BGP número 123. R4 forma parte del Sistema Autónomo 101 y R5 del Sistema Autónomo 100.

Los tres routers (R1, R2 y R3) se configuran con OSPFv3 para la conectividad IGP. Prefijo IPv6 de la interfaz de bucle invertido Lo 0 (1111:111:111:A::/64 eui-64, 222:222:222:A::/64 eui-64 Y 333:333:333 R:/64 eui-64) de los tres routers se anuncia en el Área 0 del protocolo de ruteo OSPFv3.

El peering IBGP se forma entre los routers R1, R2 y R3 a través de los prefijos loopback aprendidos. Los routers R1 y R4 están conectados a través de un enlace WAN (conexión serial) y forman pares EBGP. Del mismo modo, los routers R3 y R5 están formando peering EBGP sobre el link WAN.

Los routers R4 y R5 inyectan los mismos prefijos IPv6:

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

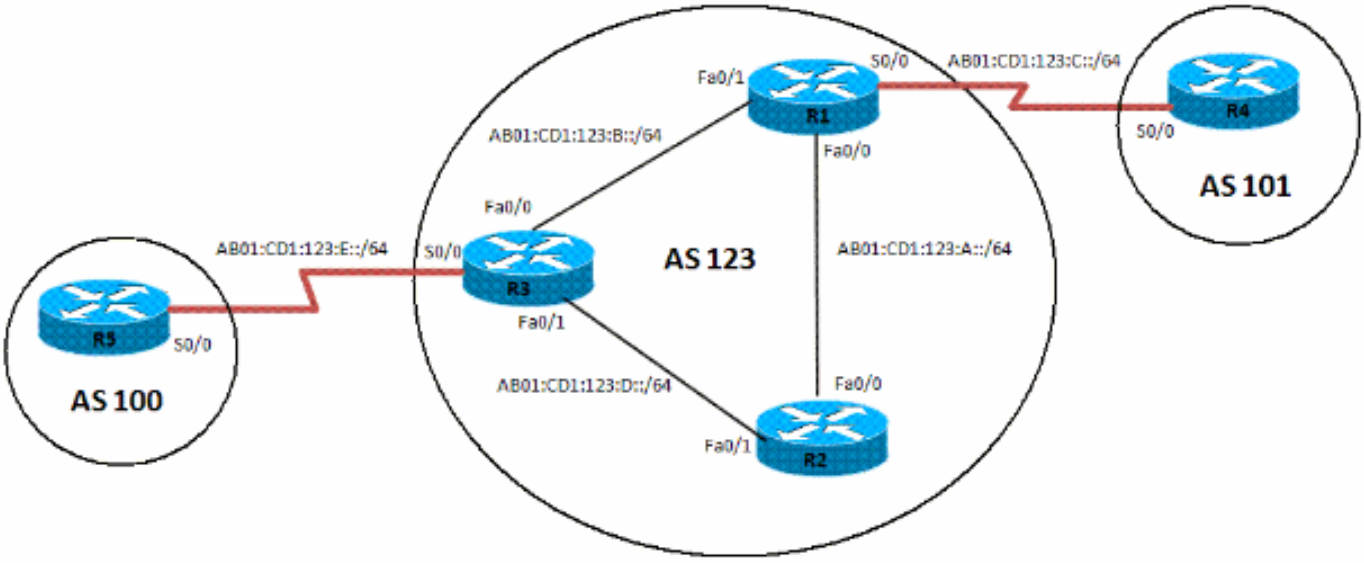
A medida que los dos Routers R4 y R5 inyectan los mismos prefijos IPv6, la selección de trayectoria se basa en atributos conocidos de BGP. En este ejemplo, se elige Preferencia local. El valor de Preferencia Local BGP de 500 se configura para el prefijo BC01:BC1:10:A::/64 en el router R3 a través del route-map. Esto da como resultado R3 como punto de salida para este prefijo y R1 como punto de salida para los dos prefijos restantes.

Configurar

Las interfaces Fast Ethernet (F0/0 Y F0/1) de los routers R1, R2 Y R3 son compatibles con IPv6 con dirección IPv6 de formato eui-64.

Diagrama de la red

En este documento, se utiliza esta configuración de red:



Configuraciones

En este documento, se utilizan estas configuraciones:

- Configuración R1
- Configuración R2
- Configuración R3
- Configuración R4
- Configuración R5

Nota: Todos los routers están habilitados con el reenvío de paquetes IPv6 mediante el comando ipv6 unicast-routing .

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
```

Verificación

Esta sección proporciona información que puede utilizar para confirmar que su configuración funciona correctamente.

En el router R1

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
```

En el router R2

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 **Nota:** Cuando no se configura la preferencia local, el router R2 (Rtr2) tiene el router R1 (Rtr1) como salto siguiente para todas las direcciones IPv6 aprendidas.

```
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:FEF0:0
                                         0    100      0 202 i
*>i                 1111:111:111:A:C601:3FF:FEF0:0
                                         0    100      0 101 i
* iBC02:BC1:11:A::/64
                    3333:333:333:A:C603:3FF:FEF0:0
                                         0    100      0 202 i
*>i                 1111:111:111:A:C601:3FF:FEF0:0
                                         0    100      0 101 i
* iBC03:BC1:12:A::/64
                    3333:333:333:A:C603:3FF:FEF0:0
                                         0    100      0 202 i
*>i                 1111:111:111:A:C601:3FF:FEF0:0
                                         0    100      0 101 i
```

3. show bgp ipv6 unicast **Después de configurar la preferencia local 500 para el prefijo BC01:BC1:10:A::/64, R2 tiene una salida diferente sólo para este prefijo.**

```
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:FEF0:0
                                             0    500      0 202 i
*>iBC02:BC1:11:A::/64
                    1111:111:111:A:C601:3FF:FEF0:0
                                             0    100      0 101 i
* i                 3333:333:333:A:C603:3FF:FEF0:0
                                             0    100      0 202 i
*>iBC03:BC1:12:A::/64
                    1111:111:111:A:C601:3FF:FEF0:0
                                             0    100      0 101 i
* i                 3333:333:333:A:C603:3FF:FEF0:0
                                             0    100      0 202 i
```

Nota: El prefijo BC01:BC1:10:A::/64 toma una trayectoria de salida del Router R3 ya que la Preferencia Local se establece en lo más alto.

En el router R3

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
```

Troubleshoot

Utilice estos comandos para la resolución de problemas

1. debug bgp ipv6 updates
2. clear bgp ipv6 {unicast | multicast}

Información Relacionada

- Página de Soporte de BGP
- BGP: Preguntas Frecuentes
- Algoritmo de selección del mejor trayecto BGP
- Casos Prácticos de BGP
- Página de soporte de IP versión 6
- Implementación de BGP Multiprotocolo para IPv6
- Soporte Técnico y Documentación - Cisco Systems