Esempio di implementazione BGP con configurazione del numero AS a 32 bit

Sommario

Introduzione

In questo documento viene descritto come configurare Border Gateway Protocol (BGP) con un numero AS a 32 bit. In BGP, ogni dominio di routing è un singolo dominio amministrativo a cui è assegnato un numero AS univoco e viene gestito all'interno di un set uniforme di policy di routing. Gestisce anche il routing tra domini.

In questo documento, il peer BGP è configurato tra router BGP a 16 bit e a 32 bit. La nuova modalità AS a 32 bit è compatibile con la modalità AS a 16 bit. I peer BGP in grado di funzionare in modalità 32 bit rispondono positivamente alla nuova funzionalità e la sessione funziona in una nuova modalità. D'altra parte, i peer BGP a 32 bit quando comunicano con gli altoparlanti BGP a 16 bit, i router parlanti a 16 bit ignorano questa nuova funzionalità e gestiscono la sessione BGP in modalità a 16 bit.

Prerequisiti

Requisiti

Cisco raccomanda la conoscenza base di BGP.

Versioni hardware e software

Le configurazioni di questo documento si basano sul router Cisco serie 7200 con software Cisco IOS® versione 15.0(1).

Convenzioni

Per ulteriori informazioni sulle convenzioni usate, consultare il documento Cisco sulle convenzioni nei suggerimenti tecnici.

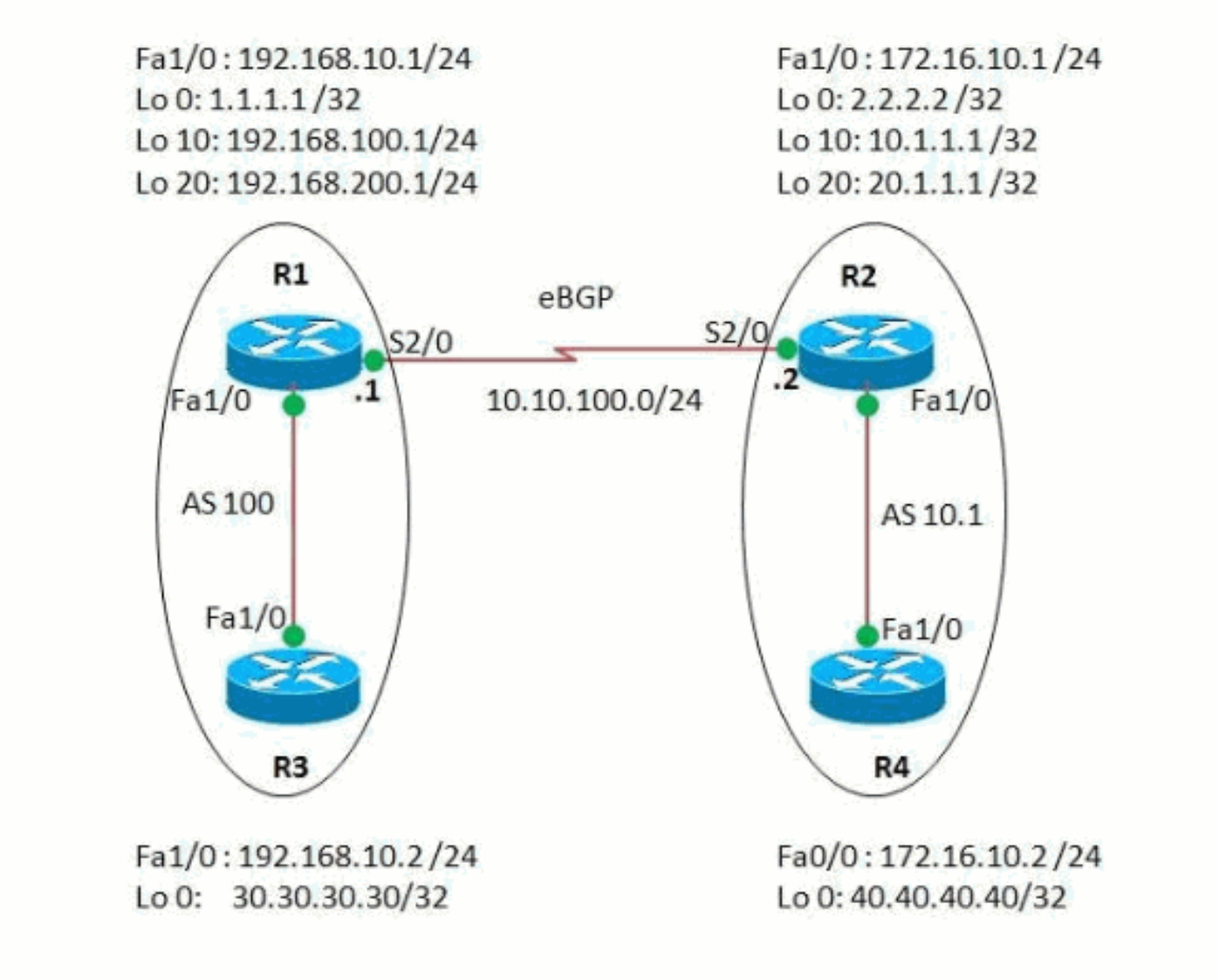
Configurazione

Nell'esempio, i router R1 e R3 sono configurati per essere in relazione iBGP AS 100 che forma la modalità AS 16-bit. I router R2 e R4 sono configurati in AS 10.1 e formano il peering iBGP usando la modalità AS a 32 bit. I router R1 e R2 eseguono e eseguono il protocollo IGP, in questo esempio OSPF tra di loro e forma anche eBGP adiacente tra di loro.

Nota: per ulteriori informazioni sui comandi menzionati in questo documento, usare lo strumento di ricerca dei comandi (solo utenti registrati).

Esempio di rete

Nel documento viene usata questa impostazione di rete:



Configurazioni

Nel documento vengono usate queste configurazioni:

- Router R1
- Router R2
- Router R3
- Router R4

Router R1

```
R1#show run
Building configuration...
!
version 15.0
!
hostname R1
!
ip cef
!
interface Loopback0
ip address 1.1.1.1 255.255.255.255
!
interface Loopback10
ip address 192.168.100.1 255.255.255.0
!
interface Loopback20
ip address 192.168.200.1 255.255.255.0
!
interface FastEthernet1/0
ip address 192.168.10.1 255.255.255.0
duplex auto
 speed auto
!
interface Serial2/0
 ip address 10.10.100.1 255.255.255.0
 serial restart-delay 0
!
router ospf 1
 log-adjacency-changes
 network 1.1.1.1 0.0.0.0 area 0
 network 10.10.100.0 0.0.0.255 area 0
!
router bgp 100
!--- BGP is configured using 16-bit AS number no
synchronization bgp router-id 10.10.10.10 bgp asnotation
dot
!--- This command change the default asplain notation to
dot notation. !--- Note that without this command the AS
number will treated as asplain notation i.e. 10.1 will
be displayed as 655361

 bgp log-neighbor-changes
 network 192.168.100.0
 network 192.168.200.0
 neighbor 2.2.2.2 remote-as 10.1
!--- The AS number of the eBGP peer in 32-bit neighbor
2.2.2.2 ebgp-multihop 255 neighbor 2.2.2.2 update-source
Loopback0 neighbor 192.168.10.2 remote-as 100 neighbor
192.168.10.2 next-hop-self no auto-summary ! end
```

Router R2

```
R2#show run
!
version 15.0
!
hostname R2
!
ip cef
!
interface Loopback0
ip address 2.2.2.2 255.255.255.0
!
interface Loopback10
ip address 10.1.1.1 255.255.255.255
!
interface Loopback20
ip address 20.1.1.1 255.255.255.255
!
interface FastEthernet1/0
ip address 172.16.10.1 255.255.255.0
duplex auto
speed auto
!
interface Serial2/0
ip address 10.10.100.2 255.255.255.0
serial restart-delay 0
!
!
router ospf 1
 log-adjacency-changes
 network 2.2.2.2 0.0.0.0 area 0
 network 10.10.100.0 0.0.0.255 area 0
!
router bgp 10.1
!--- BGP is configured using 32-bit AS number no
synchronization bgp router-id 20.20.20.20 bgp asnotation
dot bgp log-neighbor-changes network 10.1.1.1 mask
255.255.255.255 network 20.1.1.1 mask 255.255.255.255
neighbor 1.1.1.1 remote-as 100 neighbor 1.1.1.1 ebgp-
multihop 255 neighbor 1.1.1.1 update-source Loopback0
neighbor 172.16.10.2 remote-as 10.1 neighbor 172.16.10.2
next-hop-self no auto-summary ! end
```

Router R3

```
R3#show run
Building configuration...
!
version 15.0
ip cef
!
interface Loopback0
 ip address 30.30.30.30 255.255.255.255
!
interface FastEthernet1/0
 ip address 192.168.10.2 255.255.255.0
 duplex auto
 speed auto
!
router bgp 100
 no synchronization
```

```
 bgp router-id 3.3.3.3
 bgp log-neighbor-changes
 network 30.30.30.30 mask 255.255.255.255
 neighbor 192.168.10.1 remote-as 100
 neighbor 192.168.10.1 next-hop-self
 no auto-summary
!--- iBGP peering is formed between routers R1 and R3
using 16-bit AS number. ! end
```

Router R4

```
R4#show run
Building configuration...
!
version 15.0
ip cef
!
interface Loopback0
 ip address 40.40.40.40 255.255.255.255
!
interface FastEthernet1/0
 ip address 172.16.10.2 255.255.255.0
 duplex auto
 speed auto
!
router bgp 10.1
 no synchronization
 bgp router-id 4.4.4.4
 bgp asnotation dot
 bgp log-neighbor-changes
 network 40.40.40.40 mask 255.255.255.255
 neighbor 172.16.10.1 remote-as 10.1
 no auto-summary
!
end
!--- iBGP peering is formed between routers R2 and R4
using 32-bit AS number.
```

Verifica

Fare riferimento a questa sezione per verificare che la configurazione funzioni correttamente.

Lo strumento Output Interpreter (solo utenti registrati) (OIT) supporta alcuni comandi **show**. Usare l'OIT per visualizzare un'analisi dell'output del comando **show**.

Comandi show

Per verificare che BGP sia in grado di supportare ASN a 32 bit, utilizzare il comando show ip bgp neighbors.

show ip bgp neighbors

Nel router R1

```
R1#show ip bgp neighbor 2.2.2.2
BGP neighbor is 2.2.2.2,  remote AS 10.1, external link
  BGP version 4, remote router ID 20.20.20.20
  BGP state = Established, up for 03:28:22
  Last read 00:00:41, last write 00:00:29, hold time is
```

```
180, keepalive interval is 60 seconds
  Neighbor sessions:
    1 active, is multisession capable
  Neighbor capabilities:
    Route refresh: advertised and received(new)
    Four-octets ASN Capability: advertised and received
    Address family IPv4 Unicast: advertised and received
    Multisession Capability: advertised and received
  Message statistics, state Established:
    InQ depth is 0
    OutQ depth is 0

                         Sent       Rcvd
    Opens:                  1          1
    Notifications:          0          0
    Updates:                3          3
    Keepalives:           229        230
    Route Refresh:          0          0
    Total:                233        234

!--- Output omitted---!
```

Per visualizzare le voci nella tabella di routing BGP, usare il comando [show ip bgp](#).

show ip bgp

Nel router R1

```
R1#sh ip bgp
BGP table version is 13, local router ID is 10.10.10.10
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
*> 10.1.1.1/32      2.2.2.2                  0
0 10.1 I
*> 20.1.1.1/32      2.2.2.2                  0
0 10.1 I
*>i30.30.30.30/32   192.168.10.2             0    100
0 I
*> 40.40.40.40/32   2.2.2.2
0 10.1 I
*> 192.168.100.0    0.0.0.0                  0
32768 I
*> 192.168.200.0    0.0.0.0                  0
32768 I

 !--- Note that the routes highlighted are received from
the eBGP peer router R2 which is in 32-bit AS 10.1. In
router R3



R3#sh ip bgp
BGP table version is 11, local router ID is 3.3.3.3
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
*>i10.1.1.1/32      192.168.10.1             0    100
0 655361 I
*>i20.1.1.1/32      192.168.10.1             0    100
0 655361 I
*> 30.30.30.30/32   0.0.0.0                  0
32768 I
*>i40.40.40.40/32   192.168.10.1             0    100
0 655361 I
*>i192.168.100.0    192.168.10.1             0    100
0 I
*>i192.168.200.0    192.168.10.1             0    100
0 I

 !--- The router R3 does not have bgp asnotation dot
configured in it. Therefore, the route received from the
router in 32-bit AS AS 10.1 is displayed as 655361.


In router R4



R4#sh ip bgp
BGP table version is 7, local router ID is 4.4.4.4
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
*>i10.1.1.1/32      172.16.10.1              0    100
0 I
*>i20.1.1.1/32      172.16.10.1              0    100
0 I
*>i30.30.30.30/32   172.16.10.1              0    100
0 100 I
*> 40.40.40.40/32   0.0.0.0                  0
32768 I
*>i192.168.100.0    172.16.10.1              0    100
0 100 I
*>i192.168.200.0    172.16.10.1              0    100
0 100 I

 !--- The above output shows the entries in BGP routing
table of router R4.
```

Per verificare la raggiungibilità tra i router, usare il comando **ping**.

ping

Dal router R3

```
R3#ping 40.40.40.40

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 40.40.40.40, timeout
is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip
min/avg/max = 68/101/148 ms
```

Dal router R4

```
R4#ping 30.30.30.30

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 30.30.30.30, timeout
is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip
min/avg/max = 56/89/112 ms
!--- The above output shows that End to End connectivity
is established between R3 and R4, where R3 is AS 100(16-
bit AS) and router R4 is in AS 10.1(32-bit AS).
```

Informazioni correlate

- Supporto ASN Cisco IOS BGP a 4 byte
- Pagina di supporto BGP
- Case study del protocollo BGP
- Numeri di sistema autonomi
- Documentazione e supporto tecnico – Cisco Systems