在Nexus 9000上配置BGP聯盟

目錄

簡介

本檔案介紹在Nexus 9000系列上設定邊界閘道通訊協定(BGP)聯盟的程式。

必要條件

需求

思科建議您瞭解以下主題：

- Nexus交換機
- BGP

採用元件

本文中的資訊是根據特定實驗室環境內的裝置所建立。文中使用到的所有裝置皆從已清除（預設）的組態來啟動。如果您的網路運作中，請確保您瞭解任何指令可能造成的影響。

背景資訊

BGP用來避免路由迴圈的機制是將其自己的自治系統編號(ASN)新增到AS PATH屬性中。對於IBGP拓撲，更新不會修改AS-PATH屬性，因為它們屬於同一個ASN，這可能會導致路由環路。

BGP使用其水準分割規則，該規則宣告BGP裝置通過IBGP對等體接收字首，並且無法將字首通告給另一個IBGP鄰居。 此規則強制您使用全網狀拓撲與每個IBGP鄰居交換字首。 對於大型網路而言，採用全網狀方案是不可擴展的，因為它會使用過多的資源來建立對等。

iBGP的全網狀拓撲的替代方案有：

- 路由反射
- 聯盟

本文檔僅重點介紹BGP聯合體的用法。

BGP聯盟通過將一個ASN劃分為多個子自治系統並將它們分組到一個聯盟中，消除了全網狀拓撲的需要。

配置示例

要檢查BGP聯盟配置指南，請參閱[高級BGP配置指南Nexus 9000](#)。

網路圖表

註：在拓撲中，Nexus 1、Nexus 2、Nexus 3和Nexus 4屬於同一個聯盟ASN 64513，將聯盟劃分為2個較小的ASN(64512和64514)

註:Nexus 1和Nexus 3建立iBGP鄰居關係。

注意:Nexus 2和Nexus 4建立iBGP鄰居關係。

注意:Nexus 1和Nexus 2建立了eBGP鄰居關係。

組態

注意：聯盟配置導致重置每個已建立的bgp對等體。此配置必須在維護視窗下完成。

Nexus 1

```
Nexus1# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Thu Jul 20 21:13:08 2023
!Time: Thu Jul 20 23:28:41 2023

version 10.2(5) Bios:version 05.47
feature bgp

router bgp 64512                               --> Local ASN
  confederation identifier 64513               --> BGP Confederation identifier
  confederation peers 64514                      --> ASN that belong to the Confederation
  log-neighbor-changes
  neighbor 10.0.5.2
    remote-as 64515
    address-family ipv4 unicast
  neighbor 172.16.255.2
    remote-as 64514
    update-source loopback0
    address-family ipv4 unicast
  neighbor 172.16.255.3
    remote-as 64512
    log-neighbor-changes
    update-source loopback0
    address-family ipv4 unicast
```

Nexus 2

```
Nexus2# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Thu Jul 20 21:12:54 2023
!Time: Thu Jul 20 23:31:04 2023

version 10.2(5) Bios:version 05.47
feature bgp

router bgp 64514                               --> Local ASN
  confederation identifier 64513               --> BGP Confederation identifier
  confederation peers 64512                      --> ASN that belong to the Confederation
  log-neighbor-changes
  neighbor 172.16.255.1
    remote-as 64512
    update-source loopback0
    address-family ipv4 unicast
  neighbor 172.16.255.4
    remote-as 64514
```

```
    update-source loopback0
    address-family ipv4 unicast
```

Nexus 3

```
Nexus3# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Thu Jul 20 21:14:54 2023
!Time: Thu Jul 20 23:31:45 2023

version 10.2(5) Bios:version 05.47
feature bgp

router bgp 64512                            --> Local ASN
  confederation identifier 64513            --> BGP Confederation identifier
  log-neighbor-changes
  neighbor 172.16.255.1
    remote-as 64512
    log-neighbor-changes
    update-source loopback0
    address-family ipv4 unicast
```

Nexus 4

```
Nexus4# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Thu Jul 20 15:11:15 2023
!Time: Thu Jul 20 17:32:58 2023

version 10.2(5) Bios:version 05.47
feature bgp

router bgp 64514                            --> Local ASN
  confederation identifier 64513            --> BGP Confederation identifier
  log-neighbor-changes
  address-family ipv4 unicast
    network 172.30.1.0/24
    network 172.30.2.0/24
    network 172.30.3.0/24
    network 172.30.4.0/24
    network 172.30.5.0/24
    network 172.30.6.0/24
    network 172.30.7.0/24
    network 172.30.8.0/24
  neighbor 172.16.255.2
    remote-as 64514
    update-source loopback0
    address-family ipv4 unicast
```

Nexus 5

```
Nexus5# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Thu Jul 20 21:13:32 2023
!Time: Thu Jul 20 23:33:34 2023

version 10.2(5) Bios:version 05.47
feature bgp

router bgp 64515                              --> Local ASN
  log-neighbor-changes
  address-family ipv4 unicast
    network 192.168.1.0/24
    network 192.168.2.0/24
    network 192.168.3.0/24
    network 192.168.4.0/24
    network 192.168.5.0/24
    network 192.168.6.0/24
    network 192.168.7.0/24
    network 192.168.8.0/24
  neighbor 10.0.5.1
    remote-as 64513
    address-family ipv4 unicast
```

驗證

Nexus 1

第1步：建立BGP鄰居並交換字首。

```
Nexus1# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.16.255.1, local AS number 64512
BGP table version is 28, IPv4 Unicast config peers 3, capable peers 3
16 network entries and 16 paths using 4416 bytes of memory
BGP attribute entries [2/704], BGP AS path entries [2/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS    MsgRcvd    MsgSent    TblVer  InQ OutQ Up/Down  State/PfxRcd
10.0.5.2        4 64515       328        321        28    0    0 05:00:34 8
172.16.255.2    4 64514       270        264        28    0    0 04:16:51 8
172.16.255.3    4 64512       318        318        28    0    0 05:12:28 0
```

第2步：通過檢視狀態c-confed標識聯盟對等體獲取的字首。

```
Nexus1# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
```

```
BGP table version is 28, Local Router ID is 172.16.255.1
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

   Network            Next Hop          Metric      LocPrf      Weight Path
*>c172.30.1.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.2.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.3.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.4.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.5.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.6.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.7.0/24      172.16.255.4                  100              0 (64514) i
*>c172.30.8.0/24      172.16.255.4                  100              0 (64514) i
*>e192.168.1.0/24     10.0.5.2                                       0 64515 i
*>e192.168.2.0/24     10.0.5.2                                       0 64515 i
*>e192.168.3.0/24     10.0.5.2                                       0 64515 i
*>e192.168.4.0/24     10.0.5.2                                       0 64515 i
*>e192.168.5.0/24     10.0.5.2                                       0 64515 i
*>e192.168.6.0/24     10.0.5.2                                       0 64515 i
*>e192.168.7.0/24     10.0.5.2                                       0 64515 i
*>e192.168.8.0/24     10.0.5.2                                       0 64515 i
```

Nexus 2

第1步：建立BGP鄰居並交換字首。

```
Nexus2# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.16.255.2, local AS number 64514
BGP table version is 27, IPv4 Unicast config peers 2, capable peers 2
16 network entries and 16 paths using 3904 bytes of memory
BGP attribute entries [2/344], BGP AS path entries [1/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS MsgRcvd MsgSent    TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.255.1    4 64512     274     265        27    0    0 04:20:26 8
172.16.255.4    4 64514     269     262        27    0    0 04:16:00 8
```

第2步：通過檢視狀態c-confed標識聯盟對等體獲取的字首。

```
Nexus2# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 27, Local Router ID is 172.16.255.2
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

   Network            Next Hop          Metric      LocPrf      Weight Path
*>i172.30.1.0/24      172.16.255.4                  100              0 i
*>i172.30.2.0/24      172.16.255.4                  100              0 i
*>i172.30.3.0/24      172.16.255.4                  100              0 i
```

```
*>i172.30.4.0/24      172.16.255.4                      100         0 i
*>i172.30.5.0/24      172.16.255.4                      100         0 i
*>i172.30.6.0/24      172.16.255.4                      100         0 i
*>i172.30.7.0/24      172.16.255.4                      100         0 i
*>i172.30.8.0/24      172.16.255.4                      100         0 i
*>c192.168.1.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.2.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.3.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.4.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.5.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.6.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.7.0/24     10.0.5.2                          100         0 (64512) 64515 i
*>c192.168.8.0/24     10.0.5.2                          100         0 (64512) 64515 i
```

Nexus 3

第1步：建立BGP鄰居並交換字首。

```
Nexus3# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.16.255.3, local AS number 64512
BGP table version is 34, IPv4 Unicast config peers 1, capable peers 1
16 network entries and 16 paths using 4416 bytes of memory
BGP attribute entries [2/704], BGP AS path entries [2/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS    MsgRcvd    MsgSent    TblVer  InQ OutQ Up/Down  State/
PfxRcd
172.16.255.1    4 64512       332        323        34    0    0 05:17:52 16
```

第2步：從Nexus 3的角度來看，字首被學習為正常iBGP字首。從它的角度來看，它沒有任何聯盟鄰居，並且它唯一的對等體是iBGP對等體。

```
Nexus3# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 34, Local Router ID is 172.16.255.3
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - b
est2

   Network          Next Hop         Metric     LocPrf     Weight Path
*>i172.30.1.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.2.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.3.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.4.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.5.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.6.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.7.0/24    172.16.255.4                    100         0 (64514) i
*>i172.30.8.0/24    172.16.255.4                    100         0 (64514) i
*>i192.168.1.0/24   10.0.5.2                        100         0 64515 i
*>i192.168.2.0/24   10.0.5.2                        100         0 64515 i
```

```
*>i192.168.3.0/24      10.0.5.2                            100         0 64515 i
*>i192.168.4.0/24      10.0.5.2                            100         0 64515 i
*>i192.168.5.0/24      10.0.5.2                            100         0 64515 i
*>i192.168.6.0/24      10.0.5.2                            100         0 64515 i
*>i192.168.7.0/24      10.0.5.2                            100         0 64515 i
*>i192.168.8.0/24      10.0.5.2                            100         0 64515 i
```

Nexus 4

第1步：建立BGP鄰居並交換字首。

```
Nexus4# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.16.255.4, local AS number 64514
BGP table version is 18, IPv4 Unicast config peers 1, capable peers 1
16 network entries and 16 paths using 4416 bytes of memory
BGP attribute entries [2/704], BGP AS path entries [1/12]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS    MsgRcvd    MsgSent    TblVer  InQ OutQ Up/Down  State/PfxRcd
172.16.255.2    4 64514       268        267        18    0    0 04:21:40 8
```

第2步：從Nexus 4的角度來看，字首被學習為正常iBGP字首。從它的角度來看，它沒有任何聯盟鄰居，並且它唯一的對等體是iBGP對等體。

```
Nexus4# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 18, Local Router ID is 172.16.255.4
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-injected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - best2

   Network          Next Hop        Metric      LocPrf     Weight Path
*>l172.30.1.0/24    0.0.0.0                      100        32768 i
*>l172.30.2.0/24    0.0.0.0                      100        32768 i
*>l172.30.3.0/24    0.0.0.0                      100        32768 i
*>l172.30.4.0/24    0.0.0.0                      100        32768 i
*>l172.30.5.0/24    0.0.0.0                      100        32768 i
*>l172.30.6.0/24    0.0.0.0                      100        32768 i
*>l172.30.7.0/24    0.0.0.0                      100        32768 i
*>l172.30.8.0/24    0.0.0.0                      100        32768 i
*>i192.168.1.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.2.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.3.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.4.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.5.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.6.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.7.0/24   10.0.5.2                     100            0 (64512) 64515 i
*>i192.168.8.0/24   10.0.5.2                     100            0 (64512) 64515 i
```

Nexus 5

第1步：建立BGP鄰居並交換字首。在這種情況下，唯一的鄰居是Nexus 3，這是eBGP鄰居。

```
Nexus5# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.16.255.5, local AS number 64515
BGP table version is 18, IPv4 Unicast config peers 1, capable peers 1
16 network entries and 16 paths using 3904 bytes of memory
BGP attribute entries [2/344], BGP AS path entries [1/6]
BGP community entries [0/0], BGP clusterlist entries [0/0]

Neighbor        V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.0.5.1        4 64513     317     317       18    0    0 05:11:26 8
```

第2步：從Nexus 5的角度來看，從Nexus 3收到的字首是使用聯盟ASN的AS PATH接收的，但作為正常eBGP字首接收。

```
Nexus5# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 18, Local Router ID is 172.16.255.5
Status: s-suppressed, x-deleted, S-stale, d-dampened, h-history, *-valid, >-best
Path type: i-internal, e-external, c-confed, l-local, a-aggregate, r-redist, I-i
njected
Origin codes: i - IGP, e - EGP, ? - incomplete, | - multipath, & - backup, 2 - b
est2

   Network          Next Hop            Metric     LocPrf     Weight Path
*>e172.30.1.0/24    10.0.5.1                                       0 64513 i
*>e172.30.2.0/24    10.0.5.1                                       0 64513 i
*>e172.30.3.0/24    10.0.5.1                                       0 64513 i
*>e172.30.4.0/24    10.0.5.1                                       0 64513 i
*>e172.30.5.0/24    10.0.5.1                                       0 64513 i
*>e172.30.6.0/24    10.0.5.1                                       0 64513 i
*>e172.30.7.0/24    10.0.5.1                                       0 64513 i
*>e172.30.8.0/24    10.0.5.1                                       0 64513 i
*>l192.168.1.0/24   0.0.0.0                           100      32768 i
*>l192.168.2.0/24   0.0.0.0                           100      32768 i
*>l192.168.3.0/24   0.0.0.0                           100      32768 i
*>l192.168.4.0/24   0.0.0.0                           100      32768 i
*>l192.168.5.0/24   0.0.0.0                           100      32768 i
*>l192.168.6.0/24   0.0.0.0                           100      32768 i
*>l192.168.7.0/24   0.0.0.0                           100      32768 i
*>l192.168.8.0/24   0.0.0.0                           100      32768 i
```

註:Nexus 5不知道Nexus 1 - Nexus 4之間使用的聯盟。從它的角度來看，這些都是正常的eBGP字首。