Comprendre le dépannage BGP de base

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Introduction

Ce document décrit la procédure pour effectuer le dépannage du protocole BGP (Border Gateway Protocol) et la compréhension des sorties de base sur un Nexus.

Conditions préalables

Exigences

Cisco vous recommande de prendre connaissance des rubriques suivantes :

- Commutateurs Nexus
- BGP

Composants utilisés

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. Si votre réseau est en ligne, assurez-vous de bien comprendre l'incidence possible des commandes.

Informations générales

Le protocole BGP est un protocole de passerelle externe utilisé dans les réseaux à grande échelle pour permettre l'échange d'informations de routage et d'accessibilité entre des systèmes autonomes (AS). Il s'agit du protocole de routage principal qui alimente le système de routage global d'Internet.

Identifier la configuration implémentée pour les homologues BGP

Vérifiez que la fonctionnalité BGP est activée sur Nexus 9300.

Identifiez et comprenez la configuration du processus BGP.

```
switch# show running-config bgp

!Command: show running-config bgp
!Running configuration last done at: Tue Jul 18 19:45:05 2023
!Time: Tue Jul 18 19:45:44 2023

version 10.2(4) Bios:version 05.47
feature bgp

router bgp 64512                                  -> The AS number of the local BGP speaker.
  router-id 172.17.255.255                        -> BGP speaker identifier.
  address-family ipv4 unicast                     -> Global address family configuration.
    network 10.100.1.0/24                          -> Specifies a network as local to this autonomous system
    redistribute direct route-map permit_all      -> Routes redistribution from other routing protocols (OSI
    neighbor 10.1.1.1                              -> IP address of the remote BGP peer.
    remote-as 64512                               -> The AS number of the remote BGP peer.*
    address-family ipv4 unicast                   -> Local address family configuration.
      prefix-list allow_in in                     -> Prefix-list applied at the inbound of the BGP peer. **
      prefix-list allow_out out                   -> Prefix-list applied at the outbound of the BGP peer. *
      soft-reconfiguration inbound always         -> Store the inbound BGP route updates.
  neighbor 172.18.255.255
    remote-as 65535
    update-source loopback10                      -> Interface used to source BGP updates.
    ebgp-multihop 3                               -> Maximum hops to reach peer IP address, it modifies the
    address-family ipv4 unicast
      route-map block_route in                    -> Route-map applied at the inbound of the BGP peer. **
      route-map no_local out                      -> Route-map applied at the outbound of the BGP peer. **
      soft-reconfiguration inbound always
```

✎ Remarque : le même ASN configuré en local et à distance identifie une session iBGP, un autre ASN configuré identifie une session eBGP.

La carte de routage a une valeur de hiérarchie supérieure à une liste de préfixes appliquée au même homologue.

Comment comprendre les sorties BGP de base

État homologue BGP

```
switch# show ip bgp summary
BGP summary information for VRF default, address family IPv4 Unicast
BGP router identifier 172.17.255.255, local AS number 64512                          -> Local BGP ID
BGP table version is 67, IPv4 Unicast config peers 2, capable peers 2
20 network entries and 19 paths using 5424 bytes of memory
BGP attribute entries [6/2112], BGP AS path entries [2/20]
```

```
BGP community entries [0/0], BGP clusterlist entries [0/0]
13 received paths for inbound soft reconfiguration
12 identical, 0 modified, 1 filtered received paths using 96 bytes

Neighbor        V    AS    MsgRcvd   MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.1.1.1        4 64512      346       334       67     0    0 05:25:12 8              -> BGP peer IP a
172.18.255.255  4 65535      334       327       67     0    0 05:18:00 8
```

✎ Remarque : la section Up/Down affiche l'heure à laquelle la session homologue BGP a été
up ou down.

La section State/PfxRcd affiche l'état BGP dans lequel la session est actuellement. Il
indique le nombre de préfixes appris de son homologue lorsque l'état est établi.

ÉTATS BGP	
Inactif	Il s'agit du premier état où BGP attend un « événement de démarrage ». L'événement start se produit quand quelqu'un configure un nouveau voisin BGP ou quand nous réinitialisons un homologue BGP établi.
Connecter	BGP attend la fin de la connexion TCP en trois étapes. Lorsqu'il réussit, il passe à l'état OpenSent. En cas d'échec, nous passons à l'état Actif.
Actif	BGP tente une autre connexion TCP en trois étapes pour établir une connexion avec le voisin BGP distant. S'il réussit, passe à l'état OpenSent. Si le minuteur ConnectRetry expire, nous revenons à l'état Connect.
OpenSent	Dans cet état, BGP attend un message Open du voisin BGP distant.
OuvrirConfirmer	BGP attend un message de test d'activité du voisin BGP distant.
Établi	La contiguïté de voisinage BGP est terminée et les routeurs BGP envoient des paquets de mise à jour pour échanger des informations de routage.

Comprendre les informations d'homologue BGP.

```
switch# show ip bgp neighbors 10.1.1.1
BGP neighbor is 10.1.1.1, remote AS 64512, ibgp link, Peer index 3            -> Peer IP address, remot
  BGP version 4, remote router ID 172.16.255.255                              -> BGP version, Peer Rou
  Neighbor previous state = OpenConfirm                                       -> Previous BGP state
  BGP state = Established, up for 00:05:29                                     -> Current BGP state and
  Neighbor vrf: default                                                       -> VRF used for the peer
  Peer is directly attached, interface Ethernet1/49                           -> Interface used to sou
  Last read 00:00:28, hold time = 180, keepalive interval is 60 seconds       -> Amount of time from l
  Last written 00:00:28, keepalive timer expiry due 00:00:31                  -> Amount of time from l
  Received 363 messages, 0 notifications, 0 bytes in queue
  Sent 354 messages, 1 notifications, 0(0) bytes in queue
  Enhanced error processing: On
    0 discarded attributes
  Connections established 2, dropped 1                                        -> Counters informing th
  Last update recd 00:05:28, Last update sent  = 00:05:28                     -> Timer of the last maj
  Last reset by us 00:06:21, due to holdtimer expired error                   -> Last reset timer and
```

```
Last error length sent: 0
Reset error value sent: 0
Reset error sent major: 4 minor: 0
Notification data sent:
Last reset by peer never, due to No error
Last error length received: 0
Reset error value received 0
Reset error received major: 0 minor: 0
Notification data received:

Neighbor capabilities:
Dynamic capability: advertised (mp, refresh, gr) received (mp, refresh, gr)
Dynamic capability (old): advertised received
Route refresh capability (new): advertised received
Route refresh capability (old): advertised received
4-Byte AS capability: advertised received
Address family IPv4 Unicast: advertised received
Graceful Restart capability: advertised received

Graceful Restart Parameters:
Address families advertised to peer:
  IPv4 Unicast
Address families received from peer:
  IPv4 Unicast
Forwarding state preserved by peer for:
Restart time advertised to peer: 120 seconds
Stale time for routes advertised by peer: 300 seconds
Restart time advertised by peer: 120 seconds
Extended Next Hop Encoding Capability: advertised received
Receive IPv6 next hop encoding Capability for AF:
  IPv4 Unicast  VPNv4 Unicast

Message statistics:
                          Sent              Rcvd
Opens:                       2                 2
Notifications:               1                 0
Updates:                    22                20
Keepalives:                340               339
Route Refresh:               1                 0
Capability:                  2                 2
Total:                     354               363
Total bytes:              7949              7524
Bytes in queue:              0                 0

For address family: IPv4 Unicast
BGP table version 88, neighbor version 88
8 accepted prefixes (8 paths), consuming 2176 bytes of memory
0 received prefixes treated as withdrawn
11 sent prefixes (11 paths)                                        -> Amount of prefixes ad
Inbound soft reconfiguration allowed(always)
Third-party Nexthop will not be computed.
Inbound ip prefix-list configured is allow_in, handle obtained
Outbound ip prefix-list configured is allow_out, handle obtained
Last End-of-RIB received 00:00:01 after session start
Last End-of-RIB sent 00:00:01 after session start
First convergence 00:00:01 after session start with 11 routes sent

Local host: 10.1.1.2, Local port: 28262
Foreign host: 10.1.1.1, Foreign port: 179
fd = 73
```

Comprendre la table BGP

Ce résultat affiche l'état, le saut suivant, la métrique, la préférence locale, le poids et le chemin AS de tous les préfixes appris dans la table BGP.

```
switch# show ip bgp
BGP routing table information for VRF default, address family IPv4 Unicast
BGP table version is 88, Local Router ID is 172.17.255.255
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
*>r10.1.1.0/30         0.0.0.0                0        100      32768 ?
*>i10.100.1.0/24       10.1.1.1                        100          0 i
*>i10.100.2.0/24       10.1.1.1                        100          0 i
*>i10.100.3.0/24       10.1.1.1                        150          0 i
*>i10.100.4.0/24       10.1.1.1               0        100          0 ?
*>i10.100.5.0/24       10.1.1.1               0        100          0 ?
*>i10.100.6.0/24       10.1.1.1               0        100          0 ?
*>i10.100.7.0/24       10.1.1.1               0        100          0 ?
*>i10.100.8.0/24       10.1.1.1               0        100          0 ?
*>r172.17.255.255/32   0.0.0.0               0        100      32768 ?
*>e172.30.1.0/24       172.18.255.255        0                     0 65535 ?
*>e172.30.2.0/24       172.18.255.255        0                     0 65535 ?
*>e172.30.3.0/24       172.18.255.255        0                     0 65535 ?
*>e172.30.4.0/24       172.18.255.255        0                     0 65535 ?
*>e172.30.5.0/24       172.18.255.255        0                     0 65535 65534 65533 ?
*>e172.30.6.0/24       172.18.255.255        0                     0 65535 65534 65533 ?
*>e172.30.7.0/24       172.18.255.255        0                     0 65535 65534 65533 ?
*>e172.30.8.0/24       172.18.255.255        0                     0 65535 65534 65533 ?
*>r192.168.1.0/30      0.0.0.0               0        100      32768 ?
```

Les préfixes sont annoncés à un voisin BGP spécifique.

```
switch# show ip bgp neighbors 172.18.255.255 advertised-routes

Peer 172.18.255.255 routes for address family IPv4 Unicast:
BGP table version is 88, Local Router ID is 172.17.255.255
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
*>i10.100.1.0/24       10.1.1.1                        100          0 i
*>i10.100.2.0/24       10.1.1.1                        100          0 i
*>i10.100.3.0/24       10.1.1.1                        150          0 i
*>i10.100.4.0/24       10.1.1.1               0        100          0 ?
*>i10.100.5.0/24       10.1.1.1               0        100          0 ?
*>i10.100.6.0/24       10.1.1.1               0        100          0 ?
*>i10.100.7.0/24       10.1.1.1               0        100          0 ?
*>i10.100.8.0/24       10.1.1.1               0        100          0 ?
```

Préfixes reçus d'un homologue BGP avant tout filtre (liste de préfixes et/ou carte de routage)*

```
switch# show ip bgp neighbors 172.18.255.255 received-routes

Peer 172.18.255.255 routes for address family IPv4 Unicast:
BGP table version is 88, Local Router ID is 172.17.255.255
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
* e172.18.255.255/32  172.18.255.255        0                0 65535 ?
*>e172.30.1.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.2.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.3.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.4.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.5.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.6.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.7.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.8.0/24      172.18.255.255        0                0 65535 65534 65533 ?
```

✏️ Remarque La reconfiguration logicielle entrante doit être configurée sur le voisin

---

Préfixes reçus d'un homologue BGP après filtres (prefix-list et/ou route-map)

```
switch# show ip bgp neighbors 172.18.255.255 routes

Peer 172.18.255.255 routes for address family IPv4 Unicast:
BGP table version is 88, Local Router ID is 172.17.255.255
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
*>e172.30.1.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.2.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.3.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.4.0/24      172.18.255.255        0                0 65535 ?
*>e172.30.5.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.6.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.7.0/24      172.18.255.255        0                0 65535 65534 65533 ?
*>e172.30.8.0/24      172.18.255.255        0                0 65535 65534 65533 ?
```

Informations détaillées sur le chemin d'accès pour un préfixe spécifique

```
switch# show ip bgp 172.30.6.0
BGP routing table information for VRF default, address family IPv4 Unicast
BGP routing table entry for 172.30.6.0/24, version 28                                    -> Prefi
Paths: (3 available, best #3)                                                            -> Numbe
Flags: (0x8000001a) (high32 00000000) on xmit-list, is in urib, is best urib route, is in HW

  Path type: external, path is valid, not best reason: Router Id, no labeled nexthop
  AS-Path: 65535 65534 65533 , path sourced external to AS                               -> As Pa
    172.20.255.255 (metric 0) from 172.20.255.255 (172.20.255.255)                       -> Next
      Origin incomplete, MED 0, localpref 100, weight 0

  Path type: external, path is valid, not best reason: newer EBGP path, no labeled nexthop
  AS-Path: 65535 65534 65533 , path sourced external to AS
    172.19.255.255 (metric 0) from 172.19.255.255 (172.19.255.255)
      Origin incomplete, MED 0, localpref 100, weight 0

  Advertised path-id 1
  Path type: external, path is valid, is best path, no labeled nexthop, in rib          -> Path
  AS-Path: 65535 65534 65533 , path sourced external to AS
    172.18.255.255 (metric 0) from 172.18.255.255 (172.18.255.255)
      Origin incomplete, MED 0, localpref 100, weight 0

  Path-id 1 advertised to peers:                                                        -> BGP p
    10.1.1.2
```

✎ Remarque : *AS-Path représente l'ASN traversé pour atteindre l'emplacement d'où provient
le préfixe.

      **L'AS-Path se lit de droite à gauche.

Pour examiner le processus de sélection du meilleur chemin dans BGP, consultez Sélection du
meilleur chemin BGP

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