Allowas–in Feature in BGP Configuration Example

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Introduction

This document describes a scenario where two branch routers are connected via an ISP and running Border Gateway Protocol (BGP) between them. The two branch routers (R1 and R2), though at different locations, share the same AS number. Once the routes arrive from a branch (R1 in this case) to the Service Provider (SP) network, they will be tagged with the customer AS. Once the SP passes it to the other branch router (R2), by default, the routes will be dropped if the other branch was also running BGP with the SP using the same AS number. In this scenario, the neighbor allowas–in command is issued in order to allow BGP at the other side to inject updates. This document provides a sample configuration that helps you to understand the Allowas–in feature in BGP.

Note: This feature can only be used for true eBGP peers. You cannot use this feature for two peers that are members of different confederation sub–ASs.

Prerequisites

Requirements

There are no specific requirements for this document.

Components Used

This document is not restricted to specific software and hardware versions.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

Configure

This section presents you with the information to configure the features that this document describes.
**Note:** Use the Command Lookup Tool (registered customers only) to find more information on the commands used in this document.

## Network Diagram

This document uses this network setup:

![Network Diagram](image)

## Configurations

This document uses these configurations:

- **Router_A**
- **Router R1**
- **Router R2**

### Configuration on Router_A

```
Router_A#interface Loopback1
   ip address 1.1.1.1 255.255.255.255
!
interface Loopback2
   ip address 2.2.2.2 255.255.255.255
!
interface Loopback3
   ip address 3.3.3.3 255.255.255.255
!
interface GigabitEthernet0/1
   no switchport
   ip address 192.1.12.2 255.255.255.0
!
router eigrp 100
   network 1.1.1.1 0.0.0.0
   network 2.2.2.2 0.0.0.0
   network 3.3.3.3 0.0.0.0
   network 192.1.12.0
   auto-summary
!
```

### Configuration on Router R1

```
R1#interface Loopback22
   ip address 22.22.22.22 255.255.255.255
!
interface FastEthernet0/0
   ip address 192.1.12.1 255.255.255.0
duplex auto
   speed auto
!
interface Serial1/0
   ip address 172.16.12.1 255.255.255.0
!
```
router eigrp 100
  network 192.1.12.0
  no auto-summary
!
router bgp 121
  no synchronization
  bgp router-id 22.22.22.22
  bgp log-neighbor-changes
  network 22.22.22.22 mask 255.255.255.255

!--- This is the advertising loopback address.

redistribute eigrp 100

!--- This shows the redistributing internal routes in BGP.

neighbor 172.16.12.2 remote-as 500

!--- This shows the EBGP connection with ISP.

neighbor 172.16.12.2 ebgp-multihop 5
  no auto-summary
!

This example shows that the EIGRP runs between Router_A and R1:

```
rl#show ip eigrp neighbors
IP-EIGRP neighbors for process 100
  H   Address                 Interface       Hold Uptime   SRTT   RTO  Q  Seq
    (sec)         (ms)       Cnt Num
  0   192.1.12.2              Fa0/0             14 01:17:12  828  4968  0  7
```

This example shows how Router R1 learns routes from Router_A through EIGRP:

```
rl#show ip route eigrp 100
D    1.0.0.0/8 [90/156160] via 192.1.12.2, 00:02:24, FastEthernet0/0
D    2.0.0.0/8 [90/156160] via 192.1.12.2, 00:02:24, FastEthernet0/0
D    3.0.0.0/8 [90/156160] via 192.1.12.2, 00:02:24, FastEthernet0/0
```

This example shows how Router R1 establishes a BGP connection with an ISP running BGP AS500:

```
rl#show ip bgp summary
BGP router identifier 22.22.22.22, local AS number 121
BGP table version is 19, main routing table version 19
  7 network entries using 924 bytes of memory
  7 path entries using 364 bytes of memory
  5/4 BGP path/bestpath attribute entries using 840 bytes of memory
  1 BGP AS-PATH entries using 24 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 2184 total bytes of memory
BGP activity 40/33 prefixes, 42/35 paths, scan interval 60 secs
  Neighbor  V  AS  MsgRcvd  MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
  172.16.12.2  4  500  86  76  19  0  0 00:25:13  2
```

This example shows how R1 announces the BGP learned routes:

```
rl#show ip bgp
BGP table version is 19, local router ID is 22.22.22.22
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
Router R2 does not learn any routes from router R1.

This is natural behavior because the BGP tries to avoid routing loops. For example, the readvertisement of all prefixes that contain duplicate Autonomous System Numbers (ASNs) is disabled by default.

Redistributed EIGRP routes (1.0.0.0, 2.0.0.0, 3.0.0.0) and the BGP internal route 22.22.22.22 from R1 are not received by R2 as they are originating from the same ASN across the Internet. Since R2 see its own AS number (121) in the AS−PATH, R2 does not take those routes.

r2#show ip bgp
BGP table version is 20, local router ID is 33.33.33.33
Status codes: s suppressed, d damped, h history, * valid, > best, i − internal, r RIB−failure, S Stale
Origin codes: i − IGP, e − EGP, ? − incomplete

<table>
<thead>
<tr>
<th>Network</th>
<th>Next Hop</th>
<th>Metric LocPrf</th>
<th>Weight Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>r&gt; 10.10.12.0/24</td>
<td>10.10.12.2</td>
<td>0</td>
<td>0 500 i</td>
</tr>
<tr>
<td>r&gt; 33.33.33.33/32</td>
<td>0.0.0.0</td>
<td>0</td>
<td>32768 i</td>
</tr>
<tr>
<td>*r&gt; 172.16.12.0/24</td>
<td>10.10.12.2</td>
<td>0</td>
<td>0 500 i</td>
</tr>
</tbody>
</table>
In order to allow the readvertisement of all prefixes that contain duplicate ASNs, use the `neighbor allowas-in` command in router configuration mode in Router R2.

```
r2(config-router)#neighbor 10.10.12.2 allowas-in
r2#clear ip bgp*
r2#show ip bgp
BGP table version is 10, local router ID is 33.33.33.33
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal, r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

<table>
<thead>
<tr>
<th>Network</th>
<th>Next Hop</th>
<th>Metric</th>
<th>LocPrf</th>
<th>Weight</th>
<th>Path</th>
</tr>
</thead>
<tbody>
<tr>
<td>*&gt; 1.0.0.0</td>
<td>10.10.12.2</td>
<td>0</td>
<td>500</td>
<td>121</td>
<td>?</td>
</tr>
<tr>
<td>*&gt; 2.0.0.0</td>
<td>10.10.12.2</td>
<td>0</td>
<td>500</td>
<td>121</td>
<td>?</td>
</tr>
<tr>
<td>*&gt; 3.0.0.0</td>
<td>10.10.12.2</td>
<td>0</td>
<td>500</td>
<td>121</td>
<td>?</td>
</tr>
<tr>
<td>r&gt; 10.10.12.0/24</td>
<td>10.10.12.2</td>
<td>0</td>
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<td>121</td>
<td>i</td>
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<td>*&gt; 22.22.22.22/32</td>
<td>10.10.12.2</td>
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<td>*&gt; 33.33.33.33/32</td>
<td>10.10.12.2</td>
<td>0</td>
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<td>121</td>
<td>i</td>
</tr>
<tr>
<td>*&gt; 0.0.0.0</td>
<td>10.10.12.2</td>
<td>0</td>
<td>32768</td>
<td>i</td>
<td></td>
</tr>
<tr>
<td>*&gt; 172.16.12.0/24</td>
<td>10.10.12.2</td>
<td>0</td>
<td>500</td>
<td>i</td>
<td></td>
</tr>
<tr>
<td>*&gt; 192.1.12.0</td>
<td>10.10.12.2</td>
<td>0</td>
<td>500</td>
<td>121</td>
<td>?</td>
</tr>
</tbody>
</table>
```

Now try to ping from R1 to R2:

```
r2#ping 22.22.22.22
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 22.22.22.22, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 56/57/60 ms
```

**Verify**

There is currently no verification procedure available for this configuration.

**Troubleshoot**

**Error Message**

The Message: %BGP% Neighbor A.B.C.D recv bogus route : AS loop error message is received.

This notification means that the BGP route received by the CE router has its own AS number in the AS path and is considered a router loop for the CE router. As a workaround, configure the CE router with the allowas−in feature as illustrated in the previous example.

**Related Information**

- Border Gateway Protocol (BGP)
- Technical Support & Documentation – Cisco Systems