Introduction

This document describes how to redistribute Internal Border Gateway Protocol (BGP) routes into Open Shortest Path First (OSPF) process. Like in other Interior Gateway Protocol (IGP) to IGP redistribution, the behavior is different when internal BGP (IBGP) is redistributed into OSPF. IBGP learned routes are not forwarded to an IGP routing protocol through the redistribute command. Use command `bgp redistribute-internal` under the BGP process on the redistributing router.

Prerequisites

Requirements

Cisco recommends that you have knowledge of basic BGP configuration and understanding of routing protocols – BGP, OSPF Enhanced Interior Gateway Routing Protocol (EIGRP) and Routing Information Protocol (RIP).

For more information, refer to BGP Case Studies and Configuring BGP.

Components Used

The information in this document is based on Cisco IOS® Software Release 15.1(4)M5

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. If your network is live, make sure that you understand the potential impact of any command.
Configure

Network Diagram

![Network Diagram](image)

Configurations

OSPF

Configure OSPF between R2 & R3

In the scenario depicted here, router R1 and R2 are running IBGP and router R2/R3 running OSPF Area 0. R1 is advertising two routes (1.1.1.1 /32 and 10.10.10.10/32) through network command.

R2 is redistributing BGP into OSPF area 0. It is required to redistribute selected internal routes (10.10.10.10/32).

The task is achieved by making use of prefix-list and route-map.

R1

```conf
interface Loopback0
ip address 1.1.1.1 255.255.255.255
!
interface Loopback10
ip address 10.10.10.10 255.255.255.255
!
interface GigabitEthernet0/1
ip address 192.168.1.1 255.255.255.0
duplex auto
speed auto
!
router bgp 10
no synchronization
bgp router-id 1.1.1.1
bgp log-neighbor-changes
network 1.1.1.1 mask 255.255.255.255
network 10.10.10.10 mask 255.255.255.255
neighbor 192.168.1.2 remote-as 100
no auto-summaryR1#show ip bgp summary
BGP router identifier 10.10.10.10, local AS number 10
BGP table version is 3, main routing table version 3
2 network entries using 296 bytes of memory
2 path entries using 128 bytes of memory
1/1 BGP path/bestpath attribute entries using 136 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
```
R2

interface Loopback0
ip address 2.2.2.2 255.255.255.255
!
interface GigabitEthernet0/0
ip address 192.168.1.2 255.255.255.0
duplex auto
speed auto
!
interface GigabitEthernet0/1
ip address 10.1.1.1 255.255.255.0
duplex auto
speed auto
!
router ospf 1
router-id 2.2.2.2
log-adjacency-changes
redistribute bgp 100 metric 100 metric-type 1 subnets route-map BGP-To_OSPF
network 10.1.1.1.1 0.0.0.0 area 0
no synchronization
bgp router-id 2.2.2.2
bgp log-neighbor-changes
bgp redistribute-internal
neighbor 192.168.12.1 remote-as 10
no auto-summary
!
ip prefix-list BGP-to-ospf seq 5 permit 172.16.0.0/16
!
routemap BGP-To_OSPF permit 10
match ip address prefix-list BGP-to-ospf

R2#show ip bgp summary
BGP router identifier 192.168.1.2, local AS number 10
BGP table version is 3, main routing table version 3
2 network entries using 272 bytes of memory
2 path entries using 112 bytes of memory
1/1 BGP path/bestpath attribute entries using 128 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
BGP using 512 total bytes of memory
BGP activity 2/0 prefixes, 2/0 paths, scan interval 60 secs
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
192.168.1.2 4 10 6 7 3 0 0 00:03:10 0

R2#show ip bgp
BGP table version is 3, local router ID is 192.168.1.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, x best-external, f RT-Filter
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Weight Path
*>i1.1.1.1/32 192.168.1.1 0 100 0 i
*>i10.10.10.10/32 192.168.1.1 0 100 0 i
R2#show ip route 1.1.1.1
Routing entry for 1.1.1.1/32
Known via "bgp 10", distance 200, metric 0, type internal
Last update from 192.168.1.1 00:04:53 ago
Routing Descriptor Blocks:
  * 192.168.1.1, from 192.168.1.1, 00:04:53 ago
Route metric is 0, traffic share count is 1
AS Hops 0
MPLS label: none

R2#show ip route 10.10.10.10
Routing entry for 10.10.10.10/32
Known via "bgp 10", distance 200, metric 0, type internal
Last update from 192.168.1.1 00:04:56 ago
Routing Descriptor Blocks:
  * 192.168.1.1, from 192.168.1.1, 00:04:56 ago
Route metric is 0, traffic share count is 1
AS Hops 0
MPLS label: none

R3

interface FastEthernet1/0
  ip address 10.1.1.2 255.255.255.0
duplex auto
  speed autorouter ospf 1
log-adjacency-changes
  network 10.1.1.2 0.0.0.0 area
R3#show ip ospf neighbor
Neighbor ID Pri State Dead Time Address Interface
  192.168.1.2 1 FULL/DR 00:00:36 10.1.1.1 GigabitEthernet0/1

Routing table in R3 before bgp redistribute-internal is added on R2 under router bgp 10:

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
L1 - IS-IS level-1, L2 - IS-IS level-2
I - IS-IS inter area, * - candidate default, U - per-user static route
O - ODR, P - periodic downloaded static route, H - NHRP, L - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
  C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
  C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
  L 10.1.1.2/32 is directly connected, GigabitEthernet0/1

R2

router bgp 10
bgp redistribute-internal
Verify

R3
Routing table for R3 after bgp redistribute-internal is added on R2 under router bgp 10:

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
L 10.1.1.2/32 is directly connected, GigabitEthernet0/1
O E1 10.10.10.10/32 [110/11] via 10.1.1.1, 00:00:06, GigabitEthernet0/1

EIGRP

Configure EIGRP between R2 & R3

In the scenario depicted here, router R1 and R2 are running IBGP and router R2/R3 running EIGRP Autonomous System 1. R1 is advertising two routes (1.1.1.1 /32 and 10.10.10.10/32) through network command. R2 is redistributing BGP into EIGRP AS 1. It is required to redistribute selected internal routes (10.10.10.32). The task is achieved by making use of prefix-list and route-map.

R2

router eigrp 1
network 10.0.0.0
redistribute bgp 10 metric 1544 10 255 1 1500 route-map BGP_To_EIGRP
eigrp router-id 2.2.2.2 route-map BGP_To_EIGRP, permit, sequence 10
Match clauses:
   ip address prefix-lists: BGP-to-eigrp
Set clauses:
   Policy routing matches: 0 packets, 0 bytes

ip prefix-list BGP-to-eigrp: 1 entries
seq 1 permit 10.10.10.10/32

R3

router eigrp 1
network 10.0.0.0
eigrp router-id 3.3.3.3

Output of show ip route on R3 before bgp redistribute-internal is added on R2 under router bgp 10:

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
L 10.1.1.2/32 is directly connected, GigabitEthernet0/1

R2

router bgp 10
bgp redistribute-internal

Verify

Output of show ip route on R3 after bgp redistribute-internal is added on R2 under router bgp 10:

```
R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
L 10.1.1.2/32 is directly connected, GigabitEthernet0/1
D EX 10.10.10.10/32 [170/1660672] via 10.1.1.1, 00:00:04, GigabitEthernet0/1
```

RIP

Configure RIP between R2 & R3

In the scenario depicted here, router R1 and R2 are running IBGP and router R2/R3 running RIPv2.

R1 is advertising two routes (1.1.1.1 /32 and 10.10.10.10/32) through network command.
R2 is redistributing BGP into RIPv2. It is required to redistribute selected internal routes (10.10.10.10/32).
The task is achieved by making use of prefix-list and route-map.

R2

router rip
version 2
redistribute bgp 10 metric 1 route-map BGP_To_RIP
network 10.0.0.0
no auto-summary
route-map BGP_To_RIP, permit, sequence 10
Match clauses:
ip address prefix-lists: BGP-to-rip
Set clauses:
Policy routing matches: 0 packets, 0 bytes

ip prefix-list BGP-to-rip: 1 entries
seq 1 permit 10.10.10.10/32

R3

router rip
version 2
network 10.0.0.0
no auto-summary

Output on R3 before you enable bgp redistribute-internal on R2 under router bgp 10:

R3#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
L 10.1.1.2/32 is directly connected, GigabitEthernet0/1

R2

router bgp 10
bgp redistribute-internal

Verify

Output on R3 after you enable bgp redistribute-internal on R2 under router bgp 10:

R3#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP, l - LISP
+ - replicated route, % - next hop override
Gateway of last resort is not set
3.0.0.0/32 is subnetted, 1 subnets
C 3.3.3.3 is directly connected, Loopback0
10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.1.1.0/24 is directly connected, GigabitEthernet0/1
L 10.1.1.2/32 is directly connected, GigabitEthernet0/1
R 10.10.10.10/32 [120/1] via 10.1.1.1, 00:00:09, GigabitEthernet0/1

Troubleshoot
There is currently no specific troubleshooting information available for this configuration.