

BGP條件式通告功能

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簡介

本檔案介紹邊界閘道通訊協定(BGP)條件通告功能，此功能提供額外的路由通告控制，這取決於BGP表中是否有其他字首。

必要條件

需求

思科建議您瞭解以下主題：

- 獨立於平台

採用元件

本文中的資訊係根據以下軟體和硬體版本：

- IOS
- IOS-XE
- ASR1000

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。

設定

配置R1、R2和R3。此處提供了配置。

網路圖表



組態

R1配置：

```
!  
hostname R1  
!  
ip cef  
!  
interface Loopback0  
ip address 1.1.1.1 255.255.255.255  
!  
interface Loopback1  
ip address 1.1.1.2 255.255.255.255  
!  
interface Loopback2  
ip address 1.1.1.3 255.255.255.255  
!  
interface Loopback3  
ip address 1.1.1.4 255.255.255.255  
!  
interface Loopback4  
ip address 1.1.1.5 255.255.255.255  
!  
interface Loopback100  
ip address 10.139.224.1 255.255.240.0  
!  
interface Ethernet0/0  
ip address 10.10.12.1 255.255.255.0  
!  
router bgp 1  
bgp log-neighbor-changes  
neighbor 10.10.12.2 remote-as 2  
!  
address-family ipv4  
network 0.0.0.0 route-map DEF  
network 1.1.1.1 mask 255.255.255.255 route-map RM1  
network 1.1.1.5 mask 255.255.255.255  
redistribute connected route-map CUST  
neighbor 10.10.12.2 activate  
neighbor 10.10.12.2 send-community  
neighbor 10.10.12.2 soft-reconfiguration inbound  
exit-address-family  
!  
ip forward-protocol nd  
!  
ip bgp-community new-format
```

```

ip route 0.0.0.0 0.0.0.0 Null0
!
ip prefix-list CUST seq 5 permit 10.139.224.0/20
!
ip prefix-list DEFAULT seq 5 permit 0.0.0.0/0
!
ip prefix-list PL1 seq 5 permit 1.1.1.1/32
!
route-map CUST permit 10
match ip address prefix-list CUST
set community 64671:501
!
route-map RM1 permit 10
match ip address prefix-list PL1
set community 64952:3008
!
route-map DEF permit 10
match ip address prefix-list DEFAULT
set community 64848:3011 65011:200 65013:200
!
end

```

R2配置：

```

!
hostname R2
!
ip cef
!
interface Loopback0
 ip address 2.2.2.2 255.255.255.255
!
interface Ethernet0/0
 ip address 10.10.12.2 255.255.255.0
!
interface Ethernet0/1
 ip address 10.10.23.2 255.255.255.0
!
router bgp 2
 bgp log-neighbor-changes
 neighbor 10.10.12.1 remote-as 1
 neighbor 10.10.23.3 remote-as 3
!
 address-family ipv4
  neighbor 10.10.12.1 activate
  neighbor 10.10.12.1 soft-reconfiguration inbound
  neighbor 10.10.23.3 activate
  neighbor 10.10.23.3 send-community
  neighbor 10.10.23.3 advertise-map ADV-MAP exist-map EXIST-MAP <<< This statement changes in
non-exist-map
  neighbor 10.10.23.3 soft-reconfiguration inbound
  exit-address-family
!
ip forward-protocol nd
!
ip bgp-community new-format
ip community-list standard DEFAULT-ROUTE permit 65013:200
ip community-list standard DC1-ROUTES permit 64952:3008
ip community-list standard DC2-ROUTES permit 64671:501
ip community-list standard DC3-ROUTES permit 64950:3009
ip community-list standard DEFAULT-ROUTE-DENY deny 65013:200
!
!

```

```

ip prefix-list DEFAULT seq 5 permit 1.1.1.5/32
ip prefix-list DEFAULT seq 10 permit 1.1.1.1/32
!
ip prefix-list EXIST seq 5 permit 10.10.10.10/32
!
ip prefix-list DEFAULT-ROUTE seq 5 permit 0.0.0.0/0
!
ip prefix-list DEFAULT-ROUTE-DENY seq 5 deny 0.0.0.0/0
!
ip prefix-list IP1 seq 5 permit 10.139.224.0/20
!
ip prefix-list T2 seq 5 permit 1.1.1.5/32
!
route-map ADV-MAP permit 10
  match ip address prefix-list IP1
!
route-map ADV-MAP permit 20
  match community DC1-ROUTES DC2-ROUTES DC3-ROUTES
!
route-map EXIST-MAP permit 10
  description Verify Default Route from MDC-SWG
  match ip address prefix-list DEFAULT-ROUTE IP1
  match community DEFAULT-ROUTE
!
!
end

```

R3配置：

```

!
hostname R3
!
ip cef
!
interface Loopback0
  ip address 3.3.3.3 255.255.255.255
!
interface Ethernet0/1
  ip address 10.10.23.3 255.255.255.0
  shutdown
!
router bgp 3
  bgp log-neighbor-changes
  neighbor 10.10.23.2 remote-as 2
  !
  address-family ipv4
    neighbor 10.10.23.2 activate
    neighbor 10.10.23.2 send-community
    neighbor 10.10.23.2 soft-reconfiguration inbound
  exit-address-family
!
ip forward-protocol nd
!
ip bgp-community new-format
!
end

```

驗證

條件1:

如果BGP RIB中沒有預設路由，則R2不應通告某些路由。

如果BGP RIB中存在預設路由，R2應通告所有路由。

使用存在對映

條件2:

如果BGP RIB中沒有預設路由，R2應通告所有路由。

如果BGP RIB中存在預設路由，則R2不應通告某些路由。

使用不存在的對映

```
R1#show ip bgp
BGP table version is 7, local router ID is 10.139.224.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	0.0.0.0	0.0.0.0	0		32768	i
*>	1.1.1.1/32	0.0.0.0	0		32768	i
*>	1.1.1.5/32	0.0.0.0	0		32768	i
*>	10.139.224.0/20	0.0.0.0	0		32768	?

```
R2#show ip bgp
BGP table version is 11, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	0.0.0.0	10.10.12.1	0		0 1	i
*>	1.1.1.1/32	10.10.12.1	0		0 1	i
*>	1.1.1.5/32	10.10.12.1	0		0 1	i
*>	10.139.224.0/20	10.10.12.1	0		0 1	?

R2#show ip bgp 0.0.0.0

```
BGP routing table entry for 0.0.0.0/0, version 9
Paths: (1 available, best #1, table default)
  Advertised to update-groups:
    1
  Refresh Epoch 1
  1, (received & used)
    10.10.12.1 from 10.10.12.1 (10.139.224.1)
      Origin IGP, metric 0, localpref 100, valid, external, best
      Community: 64848:3011 65011:200 65013:200
      rx pathid: 0, tx pathid: 0x0
```

```
R2#show ip bgp neighbors 10.10.23.3 advertised-routes
BGP table version is 11, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0	10.10.12.1	0		0	1 i
*> 1.1.1.1/32	10.10.12.1	0		0	1 i
*> 1.1.1.5/32	10.10.12.1	0		0	1 i
*> 10.139.224.0/20	10.10.12.1	0		0	1 ?

Total number of prefixes 4

Condition1 Verification:

=====

If default route is not present in BGP RIB, R2 should not advertise certain routes.

If default route is present in BGP RIB, R2 should advertise all the routes. Use exist-map

R2's BGP Configuration:

=====

```
R2#show running-config | sec bgp
router bgp 2
  bgp log-neighbor-changes
  neighbor 10.10.12.1 remote-as 1
  neighbor 10.10.23.3 remote-as 3
  !
  address-family ipv4
    neighbor 10.10.12.1 activate
    neighbor 10.10.12.1 soft-reconfiguration inbound
    neighbor 10.10.23.3 activate
    neighbor 10.10.23.3 send-community
  neighbor 10.10.23.3 advertise-map ADV-MAP exist-map EXIST-MAP
  neighbor 10.10.23.3 soft-reconfiguration inbound
  exit-address-family
  ip bgp-community new-format
```

When Default route is removed from R2's BGP RIB:

=====

```
*Mar 6 09:07:08.833: BGP(0): 10.10.12.1 rcv UPDATE about 0.0.0.0/0 -- withdrawn
*Mar 6 09:07:08.833: BGP(0): no valid path for 0.0.0.0/0
*Mar 6 09:07:08.833: BGP: topo global:IPv4 Unicast:base Remove_fwdroute for 0.0.0.0/0
*Mar 6 09:07:08.833: BGP(0): (base) 10.10.23.3 send unreachable (format) 0.0.0.0/0
*Mar 6 09:07:21.280: BPG(0): Condition EXIST-MAP changes to Withdraw
*Mar 6 09:07:21.353: BGP(0): net 1.1.1.1/32 matches ADV MAP ADV-MAP: bump version to 13
*Mar 6 09:07:21.353: BGP(0): net 10.139.224.0/20 matches ADV MAP ADV-MAP: bump version to 14
*Mar 6 09:07:21.362: BGP(0): Revise route installing 1 of 1 routes for 1.1.1.1/32 ->
10.10.12.1(global) to main IP table
*Mar 6 09:07:21.362: BGP(0): Revise route installing 1 of 1 routes for 10.139.224.0/20 ->
10.10.12.1(global) to main IP table
*Mar 6 09:07:38.933: BGP(0): (base) 10.10.23.3 send unreachable (format) 1.1.1.1/32
*Mar 6 09:07:38.933: BGP(0): (base) 10.10.23.3 send unreachable (format) 10.139.224.0/20
```

```
R2#show ip bgp neighbors 10.10.23.3 advertised-routes
BGP table version is 14, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 1.1.1.5/32	10.10.12.1	0		0	1 i

Total number of prefixes 1

When Default route is added back into R2's BGP RIB:

```
=====
*Mar 6 09:15:22.883: BGP(0): 10.10.12.1 rcvd UPDATE w/ attr: nexthop 10.10.12.1, origin i,
metric 0, merged path 1, AS_PATH , community 64848:3011 65011:200 65013:200
*Mar 6 09:15:22.883: BGP(0): 10.10.12.1 rcvd 0.0.0.0/0
*Mar 6 09:15:22.883: BGP(0): Revise route installing 1 of 1 routes for 0.0.0.0/0 ->
10.10.12.1(global) to main IP table
*Mar 6 09:15:22.883: BGP(0): (base) 10.10.23.3 send UPDATE (format) 0.0.0.0/0, next 10.10.23.2,
metric 0, path 1
*Mar 6 09:16:21.759: BGP(0): Condition EXIST-MAP changes to Advertise
*Mar 6 09:16:21.759: BGP(0): net 1.1.1.1/32 matches ADV MAP ADV-MAP: bump version to 16
*Mar 6 09:16:21.759: BGP(0): net 10.139.224.0/20 matches ADV MAP ADV-MAP: bump version to 17
*Mar 6 09:16:21.768: BGP(0): Revise route installing 1 of 1 routes for 1.1.1.1/32 ->
10.10.12.1(global) to main IP table
*Mar 6 09:16:21.769: BGP(0): Revise route installing 1 of 1 routes for 10.139.224.0/20 ->
10.10.12.1(global) to main IP table
*Mar 6 09:16:21.769: BGP(0): (base) 10.10.23.3 send UPDATE (format) 1.1.1.1/32, next
10.10.23.2, metric 0, path 1
*Mar 6 09:16:21.769: BGP(0): (base) 10.10.23.3 send UPDATE (format) 10.139.224.0/20, next
10.10.23.2, metric 0, path 1
```

```
R2#show ip bgp neighbors 10.10.23.3 advertised-routes
BGP table version is 17, local router ID is 2.2.2.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
               x best-external, a additional-path, c RIB-compressed,
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

Network	Next Hop	Metric	LocPrf	Weight	Path
*> 0.0.0.0	10.10.12.1	0		0	1 i
*> 1.1.1.1/32	10.10.12.1	0		0	1 i
*> 1.1.1.5/32	10.10.12.1	0		0	1 i
*> 10.139.224.0/20	10.10.12.1	0		0	1 ?

Total number of prefixes 4

Condition2 Verification:

```
=====
If default route is not present in BGP RIB, R2 should advertise all the routes.
If default route is present in BGP RIB, R2 should not advertise certain routes. Use non-exist-
map
```

R2's BGP Configuration:

```
=====
R2#show running-config | sec bgp
router bgp 2
  bgp log-neighbor-changes
  neighbor 10.10.12.1 remote-as 1
  neighbor 10.10.23.3 remote-as 3
  !
  address-family ipv4
  neighbor 10.10.12.1 activate
  neighbor 10.10.12.1 soft-reconfiguration inbound
  neighbor 10.10.23.3 activate
  neighbor 10.10.23.3 send-community
  neighbor 10.10.23.3 advertise-map ADV-MAP non-exist-map EXIST-MAP
  neighbor 10.10.23.3 soft-reconfiguration inbound
  exit-address-family
  ip bgp-community new-format
```

When Default route is removed from R2's BGP RIB:

=====

```
*Mar 6 09:21:24.445: BGP(0): 10.10.12.1 rcv UPDATE about 0.0.0.0/0 -- withdrawn
*Mar 6 09:21:24.445: BGP(0): no valid path for 0.0.0.0/0
*Mar 6 09:21:24.445: BGP: topo global:IPv4 Unicast:base Remove_fwdroute for 0.0.0.0/0
*Mar 6 09:21:24.445: BGP(0): (base) 10.10.23.3 send unreachable (format) 0.0.0.0/0
*Mar 6 09:22:22.050: BPG(0): Condition EXIST-MAP changes to Advertise
*Mar 6 09:22:22.050: BGP(0): net 1.1.1.1/32 matches ADV MAP ADV-MAP: bump version to 21
*Mar 6 09:22:22.050: BGP(0): net 10.139.224.0/20 matches ADV MAP ADV-MAP: bump version to 22
*Mar 6 09:22:22.060: BGP(0): Revise route installing 1 of 1 routes for 1.1.1.1/32 ->
10.10.12.1(global) to main IP table
*Mar 6 09:22:22.060: BGP(0): Revise route installing 1 of 1 routes for 10.139.224.0/20 ->
10.10.12.1(global) to main IP table
*Mar 6 09:22:22.060: BGP(0): (base) 10.10.23.3 send UPDATE (format) 1.1.1.1/32, next
10.10.23.2, metric 0, path 1
*Mar 6 09:22:22.060: BGP(0): (base) 10.10.23.3 send UPDATE (format) 10.139.224.0/20, next
10.10.23.2, metric 0, path 1
```

R2#show ip bgp neighbors 10.10.23.3 advertised-routes

BGP table version is 22, local router ID is 2.2.2.2

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	1.1.1.1/32	10.10.12.1	0		0	1 i
*>	1.1.1.5/32	10.10.12.1	0		0	1 i
*>	10.139.224.0/20	10.10.12.1	0		0	1 ?

Total number of prefixes 3

When Default route is added back into R2's BGP RIB:

=====

```
*Mar 6 09:23:04.461: BGP(0): 10.10.12.1 rcvd UPDATE w/ attr: nexthop 10.10.12.1, origin i,
metric 0, merged path 1, AS_PATH , community 64848:3011 65011:200 65013:200
*Mar 6 09:23:04.461: BGP(0): 10.10.12.1 rcvd 0.0.0.0/0
*Mar 6 09:23:04.461: BGP(0): Revise route installing 1 of 1 routes for 0.0.0.0/0 ->
10.10.12.1(global) to main IP table
*Mar 6 09:23:04.461: BGP(0): (base) 10.10.23.3 send UPDATE (format) 0.0.0.0/0, next 10.10.23.2,
metric 0, path 1
*Mar 6 09:23:22.090: BPG(0): Condition EXIST-MAP changes to Withdraw
*Mar 6 09:23:22.090: BGP(0): net 1.1.1.1/32 matches ADV MAP ADV-MAP: bump version to 24
*Mar 6 09:23:22.090: BGP(0): net 10.139.224.0/20 matches ADV MAP ADV-MAP: bump version to 25
*Mar 6 09:23:22.103: BGP(0): Revise route installing 1 of 1 routes for 1.1.1.1/32 ->
10.10.12.1(global) to main IP table
*Mar 6 09:23:22.103: BGP(0): Revise route installing 1 of 1 routes for 10.139.224.0/20 ->
10.10.12.1(global) to main IP table
*Mar 6 09:23:35.248: BGP(0): (base) 10.10.23.3 send unreachable (format) 1.1.1.1/32
*Mar 6 09:23:35.248: BGP(0): (base) 10.10.23.3 send unreachable (format) 10.139.224.0/20
```

R2#show ip bgp neighbors 10.10.23.3 advertised-routes

BGP table version is 25, local router ID is 2.2.2.2

Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
r RIB-failure, S Stale, m multipath, b backup-path, f RT-Filter,
x best-external, a additional-path, c RIB-compressed,

Origin codes: i - IGP, e - EGP, ? - incomplete

RPKI validation codes: V valid, I invalid, N Not found

	Network	Next Hop	Metric	LocPrf	Weight	Path
*>	0.0.0.0	10.10.12.1	0		0	1 i
*>	1.1.1.5/32	10.10.12.1	0		0	1 i

如果存在預設路由。	Exist-map狀態	Advertise-map狀態
如果不存在預設路由。	條件匹配	廣告
	條件不匹配	已撤銷
	不存在對映狀態	Advertise-map狀態
如果存在預設路由。	條件匹配	撤銷
如果不存在預設路由。	條件不匹配	廣告

疑難排解

重要命令是`debug ip bgp updates`，它提供與BGP條件對映關聯的路由對映的後端移動。在大型網路中，使用ACL運行條件調試。

附註：BGP掃描程式進程每60秒運行一次，因此，一旦我們獲取了exist-map/non-exist-map的更新，Advertise-map需要60秒才能被觸發。