

# BGP条件付きアドバタイズメント機能

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## 概要

このドキュメントでは、BGPテーブル内の他のプレフィックスの存在に応じて、ルートアドバタイズメントの追加制御を提供するポードーゲートウェイプロトコル(BGP)条件付きアドバタイズメント機能について説明します。

## 前提条件

### 要件

次の項目に関する専門知識があることが推奨されます。

- プラットフォームに依存しません。

### 使用するコンポーネント

このドキュメントの情報は、次のソフトウェアとハードウェアのバージョンに基づいています。

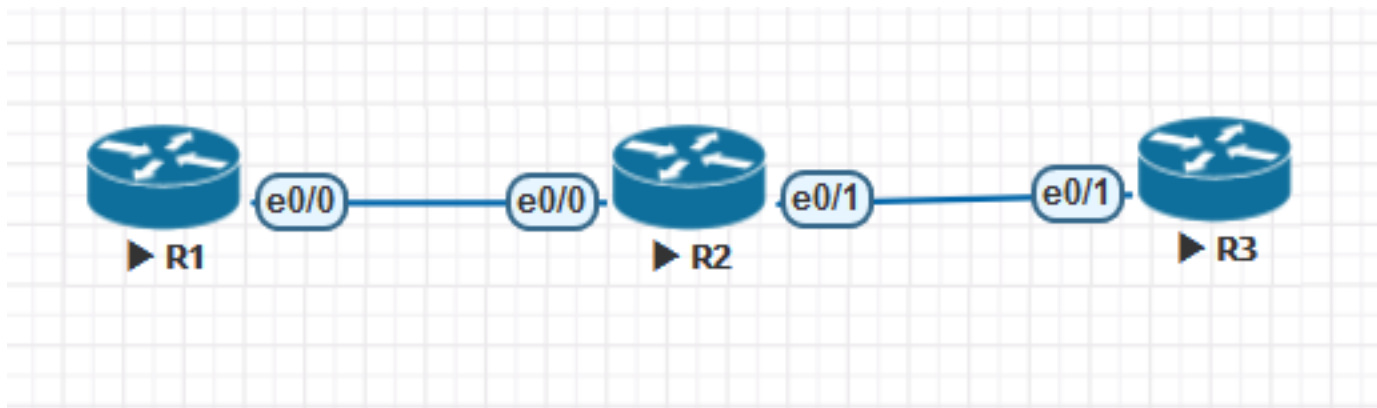
- IOS
- IOS-XE
- ASR1000

このドキュメントの情報は、特定のラボ環境にあるデバイスに基づいて作成されました。このドキュメントで使用するすべてのデバイスは、初期（デフォルト）設定の状態から起動しています。本稼働中のネットワークでは、各コマンドによって起こる可能性がある影響を十分確認してください。

## 設定

R1、R2、およびR3を設定します。設定は次のとおりです。

### ネットワーク図



## 設定

R1の設定 :

```
!  
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の設定 :

```

!
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の設定 :

```

!
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

```

## 確認

条件 1:

デフォルトルートがBGP RIBに存在しない場合、R2は特定のルートをアドバタイズしません。  
デフォルトルートがBGP RIBに存在する場合、R2はすべてのルートをアドバタイズする必要があります。

## exist-mapを使用

条件 2:

デフォルトルートがBGP RIBに存在しない場合、R2はすべてのルートをアドバタイズする必要があります。

デフォルトルートがBGP RIBに存在する場合、R2は特定のルートをアドバタイズしません。

## non-exist-mapを使用

```
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: BGP(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: BGP(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
*> 1.1.1.1/32       10.10.12.1          0          0 1 i
```

Total number of prefixes 2

	<b>Exist-mapステータス</b>	<b>Advertise-map Status</b>
デフォルトルートが存在する場合。	条件が一致しました	ADVERTISE
デフォルトルートがない場合。	条件が一致しません	取り消されました
	<b>Non-exist-map Status</b>	<b>Advertise-map Status</b>
デフォルトルートが存在する場合。	条件が一致しました	撤回
デフォルトルートがない場合。	条件が一致しません	ADVERTISE

## トラブルシューティング

重要なコマンドは**debug ip bgp updates**で、BGP条件付きマップに関連付けられたルートマップのバックエンドの移動が可能です。大規模ネットワークでは、ACLを使用して条件付きデバッグを実行します。

注：BGPスキャンプロセスは60秒ごとに実行されるため、exist-map/non-exist-mapのアップデートを取得するとすぐに、Advertise-mapがトリガーされるまで60秒かかります。