

BGP يطرش لال نالعالا ةزيم

تايوتحمل

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ةمدقملا

رفوت يتللا (BGP) ةيودحللا ةرابعللا لوكوتوربل طورشملا نالعالا ةزيم دننسملا اذه فصوي BGP لودج ي ف يرخأ تائاداب دوجو يلع دمتعت يتللاو، راسملا تانالعالا ي ف يفاضلالا مكحتلا

ةيساسألا تابلطتملا

تابلطتملا

عوضوم اذه نم ةفرعم تنأ يقلتني نأ ي صوي cisco:

- ربنملا نع لقتسم

ةمدختسملا تانوكملا

ةيلاللا ةيادامل تانوكملا او جماربل تارادصلإ يلا دننسملا اذه ي ف ةدراوللا تامولعمللا دننست:

- IOS
- IOS-XE
- ASR1000

ةصاخ ةيولمعم ةئيبي ي ف ةدوجوملا ةزهجالا نم دننسملا اذه ي ف ةدراوللا تامولعمللا ءاشنإ مت تناك اذإ. (يضا رتفا) حوسمم نيوكتب دننسملا اذه ي ف ةمدختسملا ةزهجالا عيمج تادب رما يال لمحتحمل ريثاتلل كمهف نم دكاتف، ليغشتلا ديقتكتك بش

نيوكتلا

انه نيوكتلا ريفوت متي R1 و R2 و R3 نيوكت

ةكبش لال يطيختلا مسرلا



تاني وكتال

R1 نيوكت

```

!
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: ني وكت

```

!
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

```

ر3 نڤوكت:

```

!
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

```

ةحصللا نم ققحتلا

1: طرشللا

ةنعم تاراسم نع R2 نلعي ال ا ب ج ف ، BGP RIB يف ادوجوم يضارتفالا راسملا نكي مل اذا
تاراسملا عيجم نع R2 نلعي نا ب ج ف ، BGP RIB يف ادوجوم يضارتفالا راسملا ناك اذا

ةدوجوم ةطيخ مادختسا

2: طرشل

تاراسملا عيجم نع R2 نلعي نا ب ج ف ، BGP RIB يف ادوجوم يضارتفالا راسملا نكي مل اذا
ةنعم تاراسم نع R2 نلعي ال ا ب ج ف ، BGP RIB يف ادوجوم يضارتفالا راسملا ناك اذا

ةدوجوم ريغ ةطيخ مادختسا

```
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

يضارتفالاراسملا ناك اذا ادوجوم	دوجولا ةطيخ ةلاح قباطملا طرشللا	تانالعالا ةطيخ ةلاح نالعا
راسملا نكي مل اذا ادوجوم يضارتفاللا	قباطم ريغ طرشللا	بوحسم
يضارتفالاراسملا ناك اذا ادوجوم	ةدوجوم ريغ ةطيخ ةلاح قباطملا طرشللا	تانالعالا ةطيخ ةلاح بحسنن
راسملا نكي مل اذا ادوجوم يضارتفاللا	قباطم ريغ طرشللا	نالعا

اهحالص او ااطخالا فاشكتسا

ةطبترملا راسملا تاططخمل ةيفلخ ةكرح كحنمت يتلا **BGP ip** تاتيحت وه مهملارمألا
ةريبكة لةك بشلا لةيغشتل يطرشللا ااطخالا حيحصت ي ف **BGP** ةيطرشللا ةطيخالاب
(ACL) لوصولا ي ف مكحتلا ةمئاق مادختساب

نأ درجمب يلاتلابو ،ةينات 60 لك يئوضلا **BGP** حسام ةيلمع لةيغشت متي :**ةطخالم**
Advertising- قرغتسي ،ةدوجوملا ريغ/ةدوجوملا ةطيخالاب ةصاخلا تاتيحتلا يلع لصحن
ه. لةيغشت متيل ةينات 60 **map**

ةمچرتل هذه لوج

ةللأل تاي نقتل نمة ومة مادختساب دن تسمل اذة Cisco تمةرت
ملاعلاء انء مء مء نمة دختسمل معد و تمة مء دقتل ةر شبل او
امك ةق قء نوك ت نل ةللأل ةمچرت لصف أن ةظحال مء ءرء. ةصاأل مء تءل ب
Cisco ةللخت. فرتمة مچرت مء دقء ةللأل ةل فارتحال ةمچرتل عم لاعل او
ىل إأمءءاد ءوچرلاب ةصوء و تامةرتل هذه ةقء نء اهءل وئس م Cisco
Systems (رفوتم طبارل) ةل صأل ةل ءل ءن إل دن تسمل