

هتحص نم ققحتلاو BGP راسم دي دحت نيوكت في IOS-XR

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عمدق مالا

ةرابع لبا لوكوتوربل راسم ةسايس في راسم مالا دي دحت ةومجم نايب دنن تسم لبا اذه فصبي
Cisco IOS®-XR لخالعا (BGP) ةي دودح لبا

ةيساسا تامولعم

ةدحاو ةئدابل ةددعت م تاراسم نع نلعتو BGP دحت نا لبا تاميم صتلا نم دي دعالا فدهت

اذه نع نالعالا متي و، راسم لصف اكل طوقف دحاو BGP راسم دي دحت متي، يضا رتفا لكشبو
يلي ام BGP راسم دي دحت ةيمزراوخ دحت. طوقف لصف ال راسم لبا

[لصف ال راسم دي دحت ةيمزراوخ](#)

نكمي. يطايتحالالخصنلل راسمك ناث راسم لضفأ رايتخ| نكمي، راسم لضفأ بناج يلاو لقتسم براق) PIC BGP ةقاطب تاذ تاميمصتلا يف اذه يطايتحالالخصنلل راسم مادختسا (ةئدابلاب).

كلذ نوكي نأ نكمي. لالمحالالانزاوم قيقحتل ةددعتم تاراسم تيبتب BGP موقوي نأ نكمي Equal Cost Multipath Balancing (ECMP) Load Balancing أو Unequal Cost Cost Multipath (UCMP). لودج وأ تانايبلا يوتسمو (RIB) هيچوتل لودج يف ةددعتم تاراسم لاهه تيبتب متي و CEF لودج باضيأ FIB لودج فرعي. لالمحالالانزاوم قيقحتل (FIB) هيچوتل اداع| ليثم ةدعاق (Cisco نم عيرسلا هيچوتل اداع).

نئفده يلع ةلاقم لاهه زكرت:

- اها تيبتب متيل ةددعتم تاراسم رايتخي BGP لعجن فيك؟
- ةددعتم تاراسم نع نلعي BGP لعجن فيك؟

(ةيفاضال تاراسم لاهه) ةيفاضال تاراسم لاهه و BGP لبق نم ةمدختسم رخأ ةزيم كانه ةدحاو BGP ةسلج ربع راسم نم رثكأ نع نالعال BGP ل ةزيم لاهه هذحيتت.

صخلم

- ام أطخ كانهف، كلذك رمال نكي مل ن| BGP ةطساوب امئاد لضفأ ل راسم لاهه اقننا متي. تاهويرانيسلا هذه يطفغ ال ةلاقم لاهه.
- BGP لالم لليبس يلع) ةدحم لاهه نيم ل نيوكت مت اذا يطايتحالالخصن راسم رايتخ| نكمي (PIC).
- يتل تاراسم لاهه ديحتل BGP ل ةدحم نيوانع ةومجم نمض راسم لاهه سايس نيوكت نكمي. اهنع نالعال وأ/واها تيبتب متيس.
- راسم لاهه ن في طقف دحاو راسم ديحت نايب لمعد كانه، Cisco IOS®-XR 7.3.1 لبق. ةنعم ةئدابلا تاراسم ديحتل.
- هه ن في ةومجم لاهه ةددعتم لاهه راسم لاهه ديحت لمجل معد كانه، Cisco IOS®-XR 7.3.1 عم ادبلل. ةنعم ةئدابلا تاراسم ديحتل راسم لاهه.
- راسم لاهه سايس مادختسا نكمي شيح ةزيم ةفاضل تم، Cisco IOS®-XR 7.3.1 نم ادب. BGP ةراج يلا BGP ةئدابلا ةدحم تاراسم نع نالعال.

اهم. تاراسم لاهه مالتسال بيترتلاب BGP ةطساوب تاراسم لاهه ةددعتم لاهه تاراسم لاهه ديحت متي. ميجمعم بيترت يف رمم BGP لاهه رما يدي بgpp ضرعلا.

BGP تاراسم ةيؤرل - Cisco IOS®-XR 7.3.1 يف هميدقت مت- ديچ رما مادختسا نكمي هه اهلابقتسا مت يذلا بيترتلاب:

```
show bgp <afi> rd <rd> <path_details>
```

لحي هن| اهحالصوا اهئاظأ فاشكتساو ةددعتم لاهه تاراسم لاهه نم ققحتل يف اذه دعاسي رخأ سيلي و تاراسم لاهه ددعتم راسمك راسم رايتخ| متي اذا مل نع يساسال لاهه لاهه.

يحمي هنكلو تاراسم لاهه ددعتم سيلي يطايتحالالخصن راسم وه تاراسم لاهه ةددعتم ةيامل راسم لاهه. رخأ لاهه ةددعتم لاهه تاراسم لاهه لاهه.

Multipath-protect-Advertising ةديجال ةيساسال ةمكل لاهه هه كانه، Cisco IOS®-XR 7.3.1 نم ادب

بناج تاراسملا ةددعت م ةيماحل راسم نع نالعالل اهمادختسا نكمي . راسملا نييغت نايل اهمادختسا متيس يتلا ةلماكل رماوالا . ةددعتملا تاراسملا بناج واطاي تحاللا خسنلا راسم هي route-policy في:

```
set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
set path-selection multipath advertise multipath-protect multipath-protect-advertise
```

هبة صاخلا ةيساسالا تاملكلا تاومجم عيجم عم **set path-selection** رمالا يل عمام ةرطن هذه يلاتلا مسقلا يف ةلثم او اليصفت رثكأ حرش دجوي.

يلع) اطخ كانهف ، كلذك نكت مل اذا . لصفالا راسملا تيبتت متي ، هاندأ تالاحل عيجم يف **set path-selection** رمالا بقلعتي ال اذه نكلو ، (ةحيحص ريغ ةيلاتلا ةوطخلا ، لاثملا ليلبس

راسم ديحتب حمست BGP لوكوتوربل ةزيم نيكم مت بجي ، طاي تحاللا خسنلا راسم ديحتل BGP PIC لاثملا ليلبس يلع : طاي تحاللا BGP خسن

maximum-paths: ناوعلال ةلائع رمالا لال خ نم BGP يف ةددعتملا تاراسملا نيكم مت متي

```
maximum-paths {ebgp | eibgp | ibgp} <2-32> (unequal-cost)
```

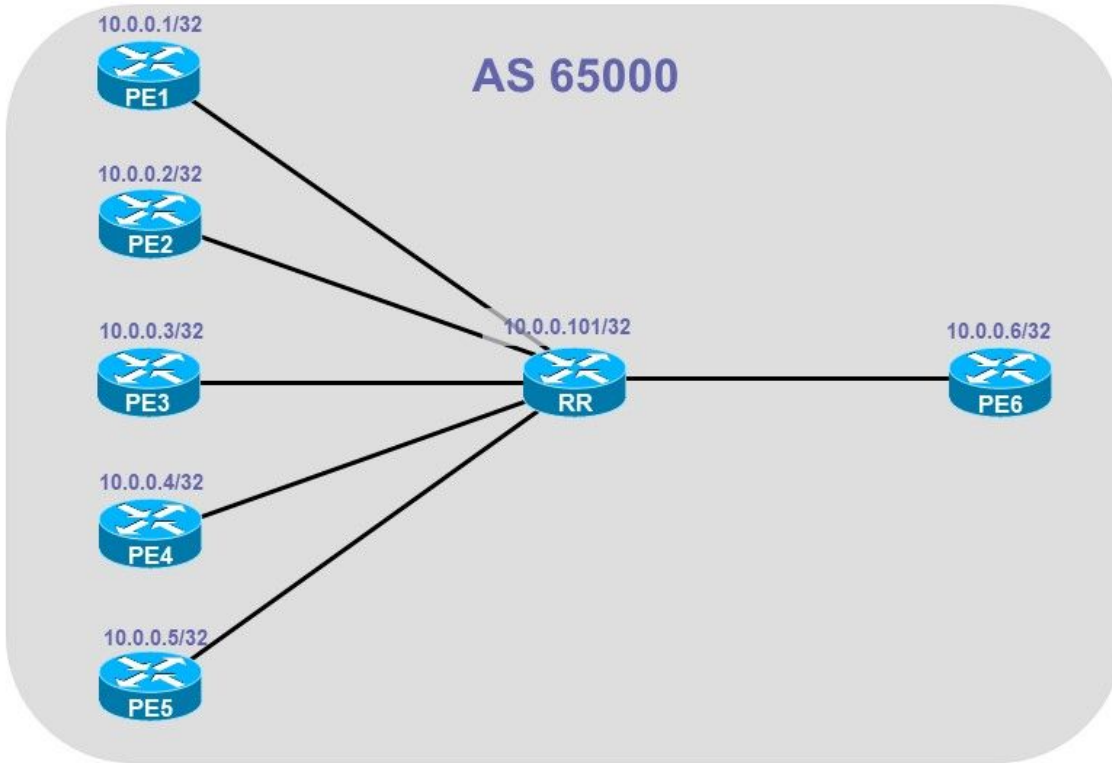
ديحولا راسملا وه راسم لصفأ . تاراسملا ددعت م راسم وه راسم لصفأ ، فيرعتلا بسح نكمي . BGP لوكوتوربل تاراسملا ددعت م نيكم مت متي مل اذا هيوتلا لودج يف تبتملا **maximum-paths** رمالا مادختساب هيوتلا لودج يف ةتبتملا BGP تاراسم ددع يف مكحتلا (ةيواسم ريغ ةفلكت) **{ebgp | eibgp | ibgp} <2-32>**.

نم ديزمل **set path-selection** رمالا مادختساب تارايلال لك يلع عمام ةرطن لودجال اذه رفوي انه ةمدقم ةلاح لكل يلاتلا مسقلا يلع عرا ، ةلثمالا او ليلصافتلا

فرط	تيبتت	نالعا
1	خسن راسملا تيبتت مت دحاو طاي تحاللا .	راسملا نع نالعالا متي . طقف لصفالا .
2	طاي تحاللا خسنلا راسملا . تبتم ريغ .	راسملا نع نالعالا متي . طاي تحاللا خسنلا .
3	خسنلا راسملا تيبتت مت طاي تحاللا .	راسملا نع نالعالا متي . طاي تحاللا خسنلا .
4	طاي تحاللا خسنلا راسملا . تبتم ريغ . ةتبتم تاراسملا ةددعت م .	راسملا نع نالعالا متي . لصفأ) تاراسملا ، طاي تحاللا خسن راسمو ، راسملا ددعت م راسمو ، راسملا ددعت م ريغو .
5	ةددعت م تاراسملا . ةتبتم تاراسملا .	راسملا نع نالعالا متي . طقف لصفالا .
6	ةددعت م تاراسملا . ةتبتم تاراسملا .	راسملا نع نالعالا متي . تاراسملا ةددعت م .

7	دي دجت-راسم ني يع 1 ة يطاي تحال ة خسن لل -تاراسم لل ددع تم تي ب ث ت ة ا م ح	ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل ر خ آ راسم تي ب ث ت م تي يطاي تحال خسن راسم ك خسن لل' راسم) ة ا م ح) يطاي تحال ا ذ ا ' (ة ددع تم تاراسم لل ك انه ل ا ز ت ال ت ن ا ك تاراسم لل ر ا و ج ب تاراسم ة ددع تم لل	م لل ن ع ن ال ع ا ل ا م تي ط ق ف ل ض ف ا ل ا .
8	دي دجت تان ال ع ا د ا ع ا خسن لل راسم لل تي ب ث ت 1 يطاي تحال ة ا م ح لل تاراسم لل ددع تم	ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل ر خ آ راسم تي ب ث ت م تي يطاي تحال خسن راسم ك خسن لل' راسم) ة ا م ح) يطاي تحال ا ذ ا ' (ة ددع تم تاراسم لل ك انه ل ا ز ت ال ت ن ا ك تاراسم لل ر ا و ج ب تاراسم ة ددع تم لل	م لل ن ع ن ال ع ا ل ا م تي ن لل راسم و ل ض ف ا ل ا يطاي تحال م ن ع ن ال ع ا ل ا م تي م () يطاي تحال خسن لل (ة ددع تم تاراسم لل
9	ل ض ف ا ل تان ال ع ا ني يع راسم دي دجت ة و م ح م	ل ض ف ا ل ة و م ح م دي دجت AS ل كل راسم ل ض ف ا و ة ل ا ت ة و ط خ ل كل ل ذ ك و ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل	ي م ح ن ع ن ال ع ا ل ا م تي م لل تاراسم ل ض ف ا
10	set path-selection backup Multipath- protect Advertising Multipath-protect-adverads	ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل ر خ آ راسم تي ب ث ت م تي يطاي تحال خسن راسم ك خسن لل' راسم) ة ا م ح) يطاي تحال ا ذ ا ' (ة ددع تم تاراسم لل ك انه ل ا ز ت ال ت ن ا ك تاراسم لل ر ا و ج ب تاراسم ة ددع تم لل	م لل ن ع ن ال ع ا ل ا م تي ن لل راسم و ل ض ف ا ل ا ل ا راسم و يطاي تحال ة ا م ح) يطاي تحال (ة ددع تم تاراسم لل
11	راسم دي دجت ني يع ن ال ع ا تاراسم لل ددع تم ة ا م ح لل تاراسم لل ددع تم	ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل	م لل ن ع ن ال ع ا ل ا م تي تاراسم لل ة ددع تم م ن ع ن ال ع ا ل ا م تي م () يطاي تحال خسن لل (ة ددع تم تاراسم لل
12	دي دجت تان ال ع ا ني يع تاراسم لل ددع تم راسم تاراسم لل ددع تم ة ا م ح ل ن ال ع ا ل - تاراسم لل ددع تم	ة ددع تم تاراسم لل ة ت ب ث م تاراسم لل ر خ آ راسم تي ب ث ت م تي يطاي تحال خسن راسم ك خسن لل' راسم) ة ا م ح) يطاي تحال ا ذ ا ' (ة ددع تم تاراسم لل ك انه ل ا ز ت ال ت ن ا ك تاراسم لل ر ا و ج ب تاراسم ة ددع تم لل	م لل ن ع ن ال ع ا ل ا م تي تاراسم لل ة ددع تم م ن ع ن ال ع ا ل ا م تي () يطاي تحال خسن لل (ة ددع تم تاراسم لل

لمالك لاب دنتسمل اذه يف ةمدختسمل ايجولوبطال ايه هذو.



PE6 و (راسمل اسكاع) RR نبي Add-Path نبيكم متي، تالاحل ايجي يف

VPN4 يداحأل ثبل ايجوت لثم ةئدابلا سفن نع PE1 و PE2 و PE3 و PE4 و PE5 و PE6 نلعي و RR.

RR نم ةئدابلا هذو لبق تسبي يذلاو، PE لخدملا وه PE6.

دحل نبيوكت متي و BGP ةسلج لك ىلع Add-PATH نبيكم متي، كلذ فالخ ركذي مل ام VPN4 ناو ناعلا ةلئاعل يداحأل ثبل RR ىلع 3 IBGP تاراسملل ىصقألا.

نم رثكأ CEF و RIB يلودج يف ىصقأ دحك تبتثم دحاو يطايتحإ خسن راسم دجوي: **ةظحال** RIB لودج و BGP لودج يف ةيطايتحإ ةخسنك راسملا زييتم متي. موعدم/نكمم ريغ دحاو CEF لودج.

نكمي. ةلاقملا هذو يف BGP لوكوتورب ةطساوب امئاد يطايتحإلا خسنلا راسم رايتخإ متي BGP نوكي ام امئاد انه نكلو، ىرخأ ةزييم ةطساوب يطايتحإلا خسنلا راسم رايتخإ

تاراسملا ةددعتم تاراسم تيبثت متي دق، BGP لوكوتوربل ةددعتم تاراسم نبيوكت مت اذإ خسنلا راسم. **ةددعتملا تاراسملا** اهلل ةمالع عضو متي BGP لودج يف (ECMP أو UCMP) ناك اذإ تاراسملا ةددعتم تاراسملا دحا نوكي نا بجي كلذل، راسم لضفأ يثا وه يطايتحإلا (ةددعتملا تاراسملا ةيامح) ةيطايتحإ ةخسنك انه نوكي نا نكمي هنأ ينعي اذهو. اهنم يا كانه **تاراسملا ةيامح** ةساسالا ةملكلا) ةزيملا هذو نبيوكت مت اذإ BGP ةطساوب اهرايتخإ مت خسنلا راسم نإ، لالحا وه اذه ناك اذإ. (ةساس-راسم ديحت-راسم نبييغت نايب يف ةددعتملا نإ CEF و RIB لودج يف يطايتحإلا خسنلا راسم وه اذه (ةددعتملا تاراسملا ةيامح) يطايتحإلا نم لكشلا اذو هيلع ةمالع عضو مت و BGP لبق نم هرايتخإ مت يذلا يطايتحإلا خسنلا راسم تاراسملا ددعتم راسم درجم وه لب، يطايتحإلا خسن راسم ذئنيح سيل BGP لبق

ناك اذإ ريبك لكشب ايقطنم (RR) يطايتحإلا لوجم لوجم ىلع يطايتحإلا راسملا نوكي ال وي دارلا ددرت هبعلي يذلا رودلا طقف اذه وي دارلا ددرت

خسن راسم دي دحتب مق ،ةلجال هذه في PE هجوم اضيأ وه RR نأ ضررت في ،ةلاقملا هذه في BGP ةقابطل يطايتجالا خسنلا راسم مادختسا نكمي .يقطنم لكشب هتيتبثتو يطايتجالا PIC.

ةدحمل ةئدابلل دي دحت دنع RIB في يطايتجالا خسنلاب يطايتجالا خسنلا راسم زييمت متي ةئدابلل دي دحت متي مل اذا "!" مادختساب وأ

```
RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32
Routing entry for 10.1.1.1/32
  Known via "bgp 65000", distance 200, metric 0
  Number of pic paths 1 , type internal
  Installed Sep 17 13:25:25.064 for 00:03:27
  Routing Descriptor Blocks
    10.0.0.1, from 10.0.0.1, BGP multi path
      Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
      Route metric is 0
    10.0.0.2, from 10.0.0.2, BGP backup path
      Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
      Route metric is 0
    10.0.0.3, from 10.0.0.3, BGP multi path
      Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
      Route metric is 0
    10.0.0.4, from 10.0.0.4, BGP multi path
      Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
      Route metric is 0
  No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show route vrf one
```

```
Codes: C - connected, S - static, R - RIP, B - BGP, (>) - Diversion path
       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, E - EGP
       i - ISIS, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, su - IS-IS summary null, * - candidate default
       U - per-user static route, o - ODR, L - local, G - DAGR, l - LISP
       A - access/subscriber, a - Application route
       M - mobile route, r - RPL, t - Traffic Engineering, (!) - FRR Backup path
```

```
Gateway of last resort is not set
```

```
B    10.1.1.1/32 [200/0] via 10.0.0.1 (nexthop in vrf default), 00:02:16
      [200/0] via 10.0.0.2 (nexthop in vrf default), 00:02:16 (!)
      [200/0] via 10.0.0.3 (nexthop in vrf default), 00:02:16
      [200/0] via 10.0.0.4 (nexthop in vrf default), 00:02:16
```

راسملا تاسايس في راسملا دي دحت رماو نيينت

ةلئاعل راسملا ةسايس في ةمدختسملا راسملا نيينت تارابع عيجم مسقلا اذه يطغي هجوملل BGP لوكوتورب نمض ةدحمل نيوانعلا

اذه pre-أو post-Cisco IOS®-XR 7.3.1 وه Cisco IOS®-XR رادصا نع رظنلا ضغب اذه

نيناوكتلا:

```
router bgp 65000
  address-family ipv4 unicast
```

```
!  
address-family vpnv4 unicast  
additional-paths receive  
additional-paths send  
additional-paths selection route-policy BGP-Path-Selection  
!  
neighbor 10.0.0.1  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client  
!  
!  
neighbor 10.0.0.2  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client  
!  
!  
neighbor 10.0.0.3  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client  
!  
!  
neighbor 10.0.0.4  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client  
!  
!  
neighbor 10.0.0.5  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client  
!  
!  
neighbor 10.0.0.6  
remote-as 65000  
update-source Loopback0  
address-family ipv4 unicast  
  route-reflector-client  
!  
address-family vpnv4 unicast  
  route-reflector-client
```

```

!
!
vrf one
rd 1:1
address-family ipv4 unicast
  maximum-paths ibgp 3
  additional-paths selection route-policy BGP-Path-Selection
  redistribute connected
!
!
!

```

ةلئاعل يداحألأ شبلأ تحت ةعوومجملأ راسملا ديدحت تارابع عم راسملا ةسايس قيبطت متي وناونعلال vpv4.

مزلي ناك اذا بولطم اذهو. VRF لىل راسملا نبيعت تارابع عم راسملا جهن قيبطت متي امك ربع هنع نالعالأ و) VRF لوكوتوربب صاخلا RIB/CEF لودج يفي طايحتإ خسن راسم تيبتت (PE-CE طابتراربع BGP لمع ةسلج).

تحت ةفلتخم تاسايس قيبطت نكمي نكلو، اهسفن يه راسملا تاسايس نم الك، انه VRF تحت لباقم وناونعلال ةلئاع.

لصي ام دوجو ةيناكلما ديدحت عم، VRF One نمض *iBGP 3* راسملا صقألا دحلا مادختسا متي لىل RIB/CEF لودج يفي ECMP تاراسم ةثالث لىل.

راسملا ديدحت نبيعت عم راسملا جهن تايناكلما عيمج تالاحل هذه رهظت.

1 راسملا ديدحت نم ةيطايتحالأ ةخسنللأ تيبتت نبيعت

```

route-policy BGP-Path-Selection
  set path-selection backup 1 install
end-policy
!

```

```
RP/0/RP0/CPU0:RR#show bgp vpv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	5	5

Last Modified: Sep 17 13:14:35.907 for 00:04:41

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

0.2 0.3

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.2 0.3

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, **group-best**, **multipath**,

import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VpV4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)


```
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
Received Path ID 0, Local Path ID 2, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 0, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 0, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
    Received Label 24014
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
    Received Path ID 1, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:
```

```
RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32
```

```
Routing entry for 10.1.1.1/32
```

```
Known via "bgp 65000", distance 200, metric 0
```

```
Number of pic paths 1 , type internal
```

```
Installed Sep 17 13:25:25.064 for 00:03:27
```

```
Routing Descriptor Blocks
```

```
  10.0.0.1, from 10.0.0.1, BGP multi path
```

```
    Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
    Route metric is 0
```

```
  10.0.0.2, from 10.0.0.2, BGP backup path
```

```
    Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
    Route metric is 0
```

```
  10.0.0.3, from 10.0.0.3, BGP multi path
```

```
    Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
    Route metric is 0
```

```
  10.0.0.4, from 10.0.0.4, BGP multi path
```

```
    Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
    Route metric is 0
```

```
No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32
```

```
10.1.1.1/32, version 119, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf4e10a8)
```

```
Updated Sep 17 13:25:25.068
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
```

```
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2730
```

```
recursion-via-/32
```

```

next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.1/32 via 24003/0/21
  next hop 10.1.101.1/32 Gi0/0/0/0   labels imposed {ImplNull 24012}
via 10.0.0.2/32, 2 dependencies, recursive, backup [flags 0x6100]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0]
  recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.2/32 via 24001/0/21
  next hop 10.2.101.2/32 Gi0/0/0/4   labels imposed {ImplNull 24012}
via 10.0.0.3/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2060 0x0], Internal 0xd6a2550
  recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.3/32 via 24007/0/21
  next hop 10.3.101.3/32 Gi0/0/0/6   labels imposed {ImplNull 24012}
via 10.0.0.4/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 3 NHID 0x0 [0xdab2c98 0x0], Internal 0xd6a2190
  recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.4/32 via 24000/0/21
  next hop 10.4.101.4/32 Gi0/0/0/7   labels imposed {ImplNull 24013}

```

اهن ع نل عمل تاراسم ل ن م ق قحت

```

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          87        87
Last Modified: Sep 17 13:50:32.649 for 00:00:42
Paths: (1 available, best #1)
  Not advertised to any peer
  Path #1: Received by speaker 0
  Not advertised to any peer
Local
  10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-
candidate, imported
    Received Path ID 1, Local Path ID 1, version 87
    Extended community: RT:65000:1
    Originator: 10.0.0.1, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

راسم ل ن ع نال ع ل م تي. VRF في RR ل ع ت ب ث م د ح او ي ط اي ت ح ل خ س ن راس م د ج و ي : ة م ت ا خ ل ا ط ق ف ل ض ف ا ل ا

2. راسم ل دي د ح ت ل 1 ي ط اي ت ح ل ا خ س ن ل ا ت ا ن ا ل ع ل ن ي ع ت

```

route-policy BGP-Path-Selection
  set path-selection backup 1 advertise
end-policy
!
```

```

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          5         5
Last Modified: Sep 17 13:38:03.907 for 00:02:04
Paths: (5 available, best #1)

```

```

Advertised to update-groups (with more than one peer):
 0.2 0.3
Path #1: Received by speaker 0
Advertised to update-groups (with more than one peer):
 0.2 0.3
Local, (Received from a RR-client)
 10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
   Received Label 24012
   Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
   Received Path ID 0, Local Path ID 1, version 5
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #2: Received by speaker 0
Advertised to update-groups (with more than one peer):
 0.3
Local, (Received from a RR-client)
 10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
   Received Label 24012
   Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
   Received Path ID 0, Local Path ID 2, version 5
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
 10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
   Received Label 24012
   Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
   Received Path ID 0, Local Path ID 0, version 0
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
 10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
   Received Label 24013
   Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
   Received Path ID 0, Local Path ID 0, version 0
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
 10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
   Received Label 24014
   Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
   Received Path ID 1, Local Path ID 0, version 0
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0, type internal

Installed Sep 17 13:38:04.233 for 00:04:26

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

```
Route metric is 0
10.0.0.4, from 10.0.0.4, BGP multi path
NextHop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
Route metric is 0
No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32
```

```
10.1.1.1/32, version 135, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf696158)
```

```
Updated Sep 17 13:38:04.236
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
```

```
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
path-idx 0 NHID 0x0 [0xdab2bc0 0x0]
```

```
recursion-via-/32
```

```
next hop VRF - 'default', table - 0xe0000000
```

```
next hop 10.0.0.1/32 via 24003/0/21
```

```
next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
```

```
via 10.0.0.2/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
path-idx 1 NHID 0x0 [0xdab2e48 0x0]
```

```
recursion-via-/32
```

```
next hop VRF - 'default', table - 0xe0000000
```

```
next hop 10.0.0.2/32 via 24001/0/21
```

```
next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
```

```
via 10.0.0.4/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
path-idx 2 NHID 0x0 [0xdab2c98 0x0]
```

```
recursion-via-/32
```

```
next hop VRF - 'default', table - 0xe0000000
```

```
next hop 10.0.0.4/32 via 24000/0/21
```

```
next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}
```

اهن نل عمل تاراسملا نم ققحت

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
Process          bRIB/RIB  SendTblVer
```

```
Speaker          73        73
```

```
Last Modified: Sep 17 13:38:05.649 for 00:02:47
```

```
Paths: (2 available, best #1)
```

```
Not advertised to any peer
```

```
Path #1: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local
```

```
10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported
```

```
Received Path ID 1, Local Path ID 1, version 73
```

```
Extended community: RT:65000:1
```

```
Originator: 10.0.0.1, Cluster list: 10.0.0.101
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #2: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local
```

```
10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
Received Path ID 2, Local Path ID 0, version 0
```

```
Extended community: RT:65000:1
```

```
Originator: 10.0.0.2, Cluster list: 10.0.0.101
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

يطايتحال خسنللا راسم نع نالعالإ م تي . يطايتحال خسنللا راسم تي بثت م تي مل :ةمخال

تانالعالإ تي بثت ةأدا 1 راسملا ديحتل يطايتحال خسنللا ةأدا ني عت 3.

```
route-policy BGP-Path-Selection
  set path-selection backup 1 advertise install
end-policy
!
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
Process          bRIB/RIB  SendTblVer
```

```
Speaker          5         5
```

```
Last Modified: Sep 17 14:20:36.907 for 00:01:55
```

```
Paths: (5 available, best #1)
```

```
Advertised to update-groups (with more than one peer):
```

```
0.2 0.3
```

```
Path #1: Received by speaker 0
```

```
Advertised to update-groups (with more than one peer):
```

```
0.2 0.3
```

```
Local, (Received from a RR-client)
```

```
10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
```

```
import-candidate, imported
```

```
Received Path ID 0, Local Path ID 1, version 5
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #2: Received by speaker 0
```

```
Advertised to update-groups (with more than one peer):
```

```
0.3
```

```
Local, (Received from a RR-client)
```

```
10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
```

```
import-candidate, imported
```

```
Received Path ID 0, Local Path ID 2, version 5
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #3: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local, (Received from a RR-client)
```

```
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
Received Path ID 0, Local Path ID 0, version 0
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #4: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local, (Received from a RR-client)
```

```
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
```

```
Received Label 24013
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
Received Path ID 0, Local Path ID 0, version 0
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #5: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local, (Received from a RR-client)
 10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
   Received Label 24014
   Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
   Received Path ID 1, Local Path ID 0, version 0
   Extended community: RT:65000:1
   Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32
```

```
Routing entry for 10.1.1.1/32
Known via "bgp 65000", distance 200, metric 0
Number of pic paths 1 , type internal
Installed Sep 17 14:23:42.997 for 00:00:59
Routing Descriptor Blocks
 10.0.0.1, from 10.0.0.1, BGP multi path
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
 10.0.0.2, from 10.0.0.2, BGP backup path
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
 10.0.0.3, from 10.0.0.3, BGP multi path
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
 10.0.0.5, from 10.0.0.5, BGP multi path
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32
```

```
10.1.1.1/32, version 185, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08
(0xf4e10a8)
Updated Sep 17 14:23:42.999
Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2730
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.1/32 via 24003/0/21
    next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
via 10.0.0.2/32, 2 dependencies, recursive, backup [flags 0x6100]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.2/32 via 24001/0/21
    next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
via 10.0.0.3/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2060 0x0], Internal 0xd6a2550
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.3/32 via 24007/0/21
    next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}
via 10.0.0.5/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 3 NHID 0x0 [0xdab2368 0x0], Internal 0xd6a2190
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.5/32 via 24005/0/21
    next hop 10.5.101.5/32 Gi0/0/0/1 labels imposed {ImplNull 24014}
```

اهن نل عمل تاراسم الم ققحت

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

```
Process          bRIB/RIB  SendTblVer
Speaker          105      105
```

Last Modified: Sep 17 14:23:43.649 for 00:02:16

Paths: (2 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 105

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

إذ. يطايتحال خسنللا راسم نع نالعالا متي. يطايتحال خسنللا راسم تيتبثت مت: ةمخاللا
هذه 1 و 2.

4. تانالعالا لكل راسملا دي دحت تانالعالا ني عت

```
route-policy BGP-Path-Selection
  set path-selection all advertise
end-policy
!
```

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

```
Process          bRIB/RIB  SendTblVer
Speaker          5         5
```

Last Modified: Sep 17 14:28:58.907 for 00:04:04

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

0.2 0.3

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.2 0.3

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, **multipath**, import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Advertised to update-groups (with more than one peer):

```

0.2
Local, (Received from a RR-client)
  10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
    Received Path ID 0, Local Path ID 4, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Advertised to update-groups (with more than one peer):
  0.2
Local, (Received from a RR-client)
  10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, add-path, import-candidate,
imported
    Received Path ID 0, Local Path ID 2, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Advertised to update-groups (with more than one peer):
  0.2
Local, (Received from a RR-client)
  10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, add-path, import-candidate,
imported
    Received Path ID 0, Local Path ID 3, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Advertised to update-groups (with more than one peer):
  0.2
Local, (Received from a RR-client)
  10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
    Received Label 24014
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
    Received Path ID 1, Local Path ID 5, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0, type internal

Installed Sep 17 14:28:59.169 for 00:04:52

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.5, from 10.0.0.5, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

No advertising protos.

RP/0/RP0/CPU0:RR#**show cef vrf one 10.1.1.1/32**

10.1.1.1/32, version 201, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf696158)

Updated Sep 17 14:28:59.175


```

Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.1/32 via 24003/0/21
    next hop 10.1.101.1/32 Gi0/0/0/0    labels imposed {ImplNull 24012}
via 10.0.0.2/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.2/32 via 24001/0/21
    next hop 10.2.101.2/32 Gi0/0/0/4    labels imposed {ImplNull 24012}
via 10.0.0.5/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2368 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.5/32 via 24005/0/21
    next hop 10.5.101.5/32 Gi0/0/0/1    labels imposed {ImplNull 24014}

```

اهن نل عمل تاراسم لا نم ققحت

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	BRIB/RIB	SendTblVer
Speaker	125	125

Last Modified: Sep 17 14:29:00.649 for 00:02:21

Paths: (5 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 125

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.3 (metric 3) from 10.0.0.101 (10.0.0.3)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.3, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local

10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 3, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.4, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 4, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Not advertised to any peer

Local

10.0.0.5 (metric 3) from 10.0.0.101 (10.0.0.5)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 5, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.5, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

(5) تاراسم لاي مج نعالع ال ا م تي . ي ط ا ي تح ال ا خ س ن ال ا ر ا س م ت ي ب ث ت م ت ي م ل : ة م ت ا خ ال

5. راسم لاي دحت ل راسم لاض ف ا ني ع ت

```
route-policy BGP-Path-Selection
```

```
  set path-selection best-path
```

```
end-policy
```

```
!
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions: Process          bRIB/RIB  SendTblVer
```

```
  Speaker              5          5
```

```
Last Modified: Sep 17 15:34:15.907 for 00:00:09
```

```
Paths: (5 available, best #1)
```

```
  Advertised to update-groups (with more than one peer):
```

```
    0.2 0.3
```

```
  Path #1: Received by speaker 0
```

```
  Advertised to update-groups (with more than one peer):
```

```
    0.2 0.3
```

```
Local, (Received from a RR-client)
```

```
  10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
```

```
    Received Label 24012
```

```
    Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,  
import-candidate, imported
```

```
    Received Path ID 0, Local Path ID 1, version 5
```

```
    Extended community: RT:65000:1
```

```
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
  Path #2: Received by speaker 0
```

```
  Not advertised to any peer
```

```
Local, (Received from a RR-client)
```

```
  10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
```

```
    Received Label 24012
```

```
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,  
imported
```

```
    Received Path ID 0, Local Path ID 0, version 0
```

```
    Extended community: RT:65000:1
```

```
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
  Path #3: Received by speaker 0
```

```
  Not advertised to any peer
```

```
Local, (Received from a RR-client)
```

```
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
  Received Path ID 0, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
  Received Label 24013
  Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
  Received Path ID 0, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
  Received Label 24014
  Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
  Received Path ID 1, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32
```

```
Routing entry for 10.1.1.1/32
```

```
Known via "bgp 65000", distance 200, metric 0, type internal
```

```
Installed Sep 17 15:34:16.311 for 00:00:28
```

```
Routing Descriptor Blocks
```

```
10.0.0.1, from 10.0.0.1, BGP multi path
```

```
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
  Route metric is 0
```

```
10.0.0.2, from 10.0.0.2, BGP multi path
```

```
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
  Route metric is 0
```

```
10.0.0.3, from 10.0.0.3, BGP multi path
```

```
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
```

```
  Route metric is 0
```

```
No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32
```

```
10.1.1.1/32, version 215, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf696100)
```

```
Updated Sep 17 15:34:16.313
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
```

```
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0]
```

```
  recursion-via-/32
```

```
  next hop VRF - 'default', table - 0xe0000000
```

```
  next hop 10.0.0.1/32 via 24003/0/21
```

```
    next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
```

```
via 10.0.0.2/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
  path-idx 1 NHID 0x0 [0xdab2e48 0x0]
```

```
  recursion-via-/32
```

```
  next hop VRF - 'default', table - 0xe0000000
```

```
  next hop 10.0.0.2/32 via 24001/0/21
```

```
    next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
```

```
via 10.0.0.3/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
```

```
  path-idx 2 NHID 0x0 [0xdab2060 0x0]
```

```
  recursion-via-/32
```

```
  next hop VRF - 'default', table - 0xe0000000
```

```
next hop 10.0.0.3/32 via 24007/0/21
```

```
next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}
```

نع نالعالإم تي .طقف تاراسملا ددعتم تاراسملا وراسم لصفأ تي بثت م تي :ةمخالل
هنع نالعم وأ تبثم وأ دحم يطايتحإخسن راسم دجوي ال .طقف لصفأال راسملا

6. راسملا دي دحتل تاراسملا ددعتم نالعالإ ني عت

ةبولطم ةيساسأ ةملك وه نالعالإ

```
route-policy BGP-Path-Selection
  set path-selection multipath advertise
end-policy
```

نيوانعلا ةلئاعل BGP ل تاراسملا ددعتم ني كمت كانه نو كي نأ بجي ،كلذ لمعي يكلو
ةددملا

دحاو VRF يف IPv4 unicast ل رمم ددعتملا تنكم ،انه

```
router bgp 65000
  vrf one
  rd 1:1
  address-family ipv4 unicast
    maximum-paths ibgp 3
  additional-paths selection route-policy BGP-Path-Selection
  redistribute connected
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

```
Process          bRIB/RIB  SendTblVer
Speaker          5         5
```

Last Modified: Sep 17 15:40:15.907 for 00:00:28

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

```
0.2 0.3
```

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

```
0.2 0.3
```

Local, (Received from a RR-client)

```
10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
```

import-candidate, imported

```
Received Path ID 0, Local Path ID 1, version 5
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

Path #2: Received by speaker 0

Advertised to update-groups (with more than one peer):

```
0.3
```

Local, (Received from a RR-client)

```
10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
```

candidate, imported

```
Received Path ID 0, Local Path ID 3, version 5
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

Path #3: Received by speaker 0

Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 0, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.3

Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, add-path, import-candidate, imported
Received Path ID 0, Local Path ID 2, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 1, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0, type internal

Installed Sep 17 15:40:16.152 for 00:01:11

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.4, from 10.0.0.4, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

No advertising protos.

RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32

10.1.1.1/32, version 229, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf6961b0)

Updated Sep 17 15:40:16.156

Prefix Len 32, traffic index 0, precedence n/a, priority 3

via 10.0.0.1/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 0 NHID 0x0 [0xdab2bc0 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.1/32 via 24003/0/21

next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}

via 10.0.0.2/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 1 NHID 0x0 [0xdab2e48 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.2/32 via 24001/0/21

next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}

via 10.0.0.4/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

```

path-idx 2 NHID 0x0 [0xdab2c98 0x0]
recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.4/32 via 24000/0/21
  next hop 10.4.101.4/32 Gi0/0/0/7   labels imposed {ImplNull 24013}

```

اهن نل عم ل تاراسم ل نم ق قحت:

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

```

Process          bRIB/RIB  SendTblVer
Speaker          153      153

```

Last Modified: Sep 17 15:40:17.649 for 00:02:08

Paths: (3 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 153

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.4, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 3, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

- ةددم تاراسم مادختساب VPNv4 تاراسم مي لعت متي.
- RIB في ةتبت ةثال ل ةددم تاراسم ل.
- ةثال ل ةددم تاراسم ل ن نال ع ل متي.
- ي طايحت ح ل خسن راسم دجوي ال.

خسن دجوي ال. اهن نال ع ل او RIB في تاراسم ل ةددم تاراسم ل تي بت متي: ةم تال ح ل ن نل عم و ا بتبت و ا دحم ي طايحت ح ل.

7. ةي امح-تاراسم ل ددم تي بت 1 ةي طايحت ح ل خسن ل دي دحت-راسم ني عت.

```
route-policy BGP-Path-Selection
```

```
  set path-selection backup 1 install multipath-protect
```

end-policy

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	5	5

Last Modified: Sep 17 15:46:17.907 for 00:04:59

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):
0.2 0.3

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):
0.2 0.3

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, **multipath**,
import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, **backup**, add-path,
import-candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **backup(protect multipath)**,
add-path, import-candidate, imported

Received Path ID 0, Local Path ID 3, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, import-candidate,
imported

Received Path ID 0, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0

Number of pic paths 1 , type internal

Installed Sep 17 15:46:17.904 for 00:05:14

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.3, from 10.0.0.3, **BGP backup path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.4, from 10.0.0.4, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

No advertising protos.

RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32

10.1.1.1/32, version 249, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf4e10a8)

Updated Sep 17 15:46:17.907

Prefix Len 32, traffic index 0, precedence n/a, priority 3

via 10.0.0.1/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.1/32 via 24003/0/21

next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}

via 10.0.0.2/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 1 NHID 0x0 [0xdab2e48 0x0], Internal 0xd6a2550

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.2/32 via 24001/0/21

next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}

via 10.0.0.3/32, 2 dependencies, recursive, **backup** [flags 0x6100]

path-idx 2 NHID 0x0 [0xdab2060 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.3/32 via 24007/0/21

next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}

via 10.0.0.4/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 3 NHID 0x0 [0xdab2c98 0x0], Internal 0xd6a2730

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.4/32 via 24000/0/21

next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}

اهن نل عمل تاراسم نم ققحت

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process bRIB/RIB SendTblVer

Speaker 163 163

Last Modified: Sep 17 15:46:18.649 for 00:07:36

Paths: (1 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 163

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

ناك اذا، لاثم لاي بس يلع. (تاراسم لاددعتم ةيامح) يطاي تح | خسن راسم كانه نوكي ال دق
كانه نوكي سف، طقف ني راسم مالتس | متو هنيوكت مت 2 BGP راسم لى صق أل دحل كانه
(تاراسم لاددعتم ةيامح) يطاي تح | خسن راسم دجوي الو تاراسم لاددعتم ني راسم

يطاي تح | خسن راسم ك رخآ راسم تي بثت مت. RIB يفة تبثم ةددعتم ل تاراسم ل لك: ةم تاخ ل
طقف لصف أل راسم ل نعالع ال متي. (تاراسم لاددعتم ةيامح) يطاي تح | خسن راسم

8. تاراسم لاددعتم تي بثت 1 يطاي تح | خسن ل راسم لاددعتم تانال ع | ني عت ةيامح ل

```
route-policy BGP-Path-Selection
```

```
set path-selection backup 1 install multipath-protect advertise
```

```
end-policy
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	5	5

Last Modified: Sep 17 16:03:00.907 for 00:01:19

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

0.2 0.3

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.2 0.3

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, **multipath**, import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.3

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, **backup**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)

```

Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
Received Path ID 0, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
Received Path ID 0, Local Path ID 3, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 1, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

```

Routing entry for 10.1.1.1/32
Known via "bgp 65000", distance 200, metric 0
Number of pic paths 1 , type internal
Installed Sep 17 16:03:01.199 for 00:05:13
Routing Descriptor Blocks
10.0.0.1, from 10.0.0.1, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.2, from 10.0.0.2, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.3, from 10.0.0.3, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.4, from 10.0.0.4, BGP backup path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
No advertising protos.

```

RP/0/RP0/CPU0:RR#**show cef vrf one 10.1.1.1/32**

```

10.1.1.1/32, version 281, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08
(0xf4e1108)
Updated Sep 17 16:03:01.206
Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.1/32 via 24003/0/21
    next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
via 10.0.0.2/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0], Internal 0xd6a2550
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.2/32 via 24001/0/21
    next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}

```

```

via 10.0.0.3/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2060 0x0], Internal 0xd6a2910
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.3/32 via 24007/0/21
    next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}
via 10.0.0.4/32, 2 dependencies, recursive, backup [flags 0x6100]
  path-idx 3 NHID 0x0 [0xdab2c98 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.4/32 via 24000/0/21
    next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}

```

اهن ع نل عمل تاراسم ل ن م ق قحت:

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	181	181

Last Modified: Sep 17 16:03:02.649 for 00:07:39

Paths: (2 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 181

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

- تاراسم ل ةدعتم تاراسم ةثالث كانه
- يطاي تحال خسن ل راسم وه اذه . دحاو "تاراسم ل ددعتم ةيامح) يطاي تحا خسن" راسم كانه ل و دج يف تبت م ل RIB/CEF.
- ددحم ريغ سم اخل ل راسم ل
- يطاي تحال خسن ل راسم و ل ضف ال راسم ل ن ع ن ال عال م تي .

ن انك اذا ، ل اثم ل ل ي بس ي ل ع . (تاراسم ل ددعتم ةيامح) يطاي تحا خسن راسم كانه نو كي ال دق كانه نو كي سف ، طقف ني راسم م ال تس ا م تو ه ني وكت م ت BGP 2 راسم ل ي صق ال ا دحا ل كانه (تاراسم ل ددعتم ةيامح) يطاي تحا خسن راسم دجوي الو تاراسم ل ي ددعتم ني راسم

يطاي تحال خسن ل) تاراسم ل ددعتم تاراسم ل دحا وه اذه هن ع نل عمل يطاي تحال خسن ل راسم ل (BGP ل و دج يف زي م ل

ibgp 1: تاراسم ل ل ي صق ال ا دحا ل عم اذه

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	5	5

Last Modified: Sep 17 16:15:48.907 for 00:00:44

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

0.2 0.3

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.2 0.3

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.2

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **backup**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 0, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 0, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32

Routing entry for 10.1.1.1/32

```
Known via "bgp 65000", distance 200, metric 0
Number of pic paths 1 , type internal
Installed Sep 17 16:15:48.900 for 00:01:28
Routing Descriptor Blocks
 10.0.0.1, from 10.0.0.1
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
 10.0.0.2, from 10.0.0.2, BGP backup path
   Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
   Route metric is 0
No advertising protos.
```

RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32

```
10.1.1.1/32, version 297, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08
(0xf6960a8)
```

Updated Sep 17 16:15:48.903

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive [flags 0x6000]
 path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190
 recursion-via-/32
 next hop VRF - 'default', table - 0xe0000000
 next hop 10.0.0.1/32 via 24003/0/21
   next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
via 10.0.0.2/32, 2 dependencies, recursive, backup [flags 0x6100]
 path-idx 1 NHID 0x0 [0xdab2e48 0x0]
 recursion-via-/32
 next hop VRF - 'default', table - 0xe0000000
 next hop 10.0.0.2/32 via 24001/0/21
   next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
```

اهن نل عمل تاراسملا نم ققحت

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	189	189

Last Modified: Sep 17 16:15:50.649 for 00:02:10

Paths: (2 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 189

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

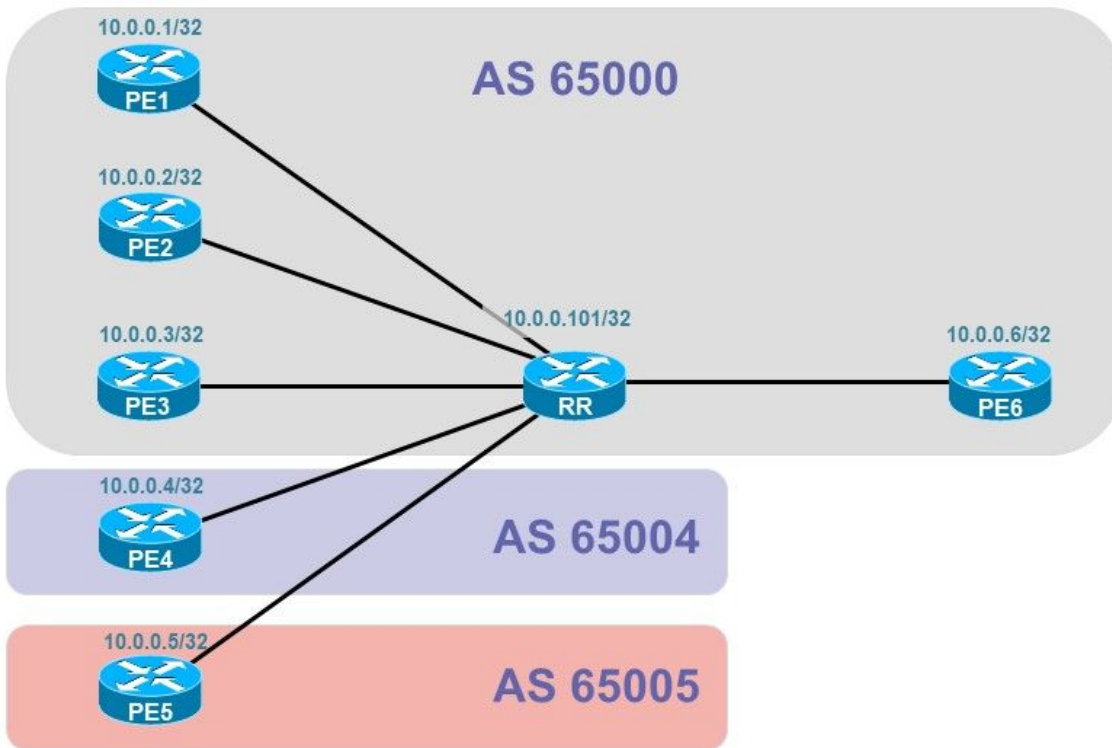
- RR ىل ع ECMP لوكوتورپ دچوي ال
- RIB/CEF لودج ي ف هتېبثت مت .يطايتحالال خسنللا راسم وه راسم لضفأ ي ناث
- .يطايتحالال خسنللا راسمو لضفأال راسملا نع نالعالا متي
- .(تاراسملا ددعتم ةيماح) يطايتحالال خسن راسم دچوي ال

يطايتحالال خسن راسمك رخآ راسم تېبثت مت .RIB ي ف ةتېبثم ةددعتملا تاراسملا لك :ةمتاخلا .يطايتحالال خسنللا راسمو لضفأال راسملا نع نالعالا متي

9. راسم دي دحت ةعومجم لضفأال تانالعالا نيي عت

- نالعالال عم طقف ةعومجم لضفأال مادختسا نكمي
- ةوطخ لكل لكدكو (يتاذلا ماظنلا) AS لكل راسم لضفأال وه لضفأال ةعومجملا دي دحت ةيلال
- ةفلتخم ةلق تسم ةمظنا نم ةئدابلا أشنت

PE4 نكلو، 1 ةروصلال ي ف اهسفن تاهجوملا دچوت .ةلالال هذهل فلتخم طاطخم مادختسا متي AS 65000 ي ف رخآال تاهجوملا عيمج لازت ال .AS 65005 ي ف PE5 و AS 65004 ي ف نالال



2 ةروصلال

PE5 و RR نيپو PE4 و RR نيپو eBGP لمع ةسلج نالال دچوت هنا ينعني اذهو

```
route-policy BGP-Path-Selection
  set path-selection group-best advertise
end-policy
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
Process          bRIB/RIB  SendTblVer
Speaker          5         5
Local Label: 24010
```

Last Modified: Sep 21 06:06:29.117 for 00:02:18

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):

0.3 0.4

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.3 0.4

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, **group-best**, **multipath**,
import-candidate, imported

Received Path ID 1, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, import-candidate,
imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, import-candidate,
imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.4

65004

10.4.101.4 from 10.4.101.4 (10.0.0.4)

Received Label 24015

Origin incomplete, metric 0, localpref 100, valid, external, **group-best**, add-path, import-
candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Advertised to update-groups (with more than one peer):

0.4

65005

10.5.101.5 from 10.5.101.5 (10.0.0.5)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, external, **group-best**, add-path, import-
candidate, imported

Received Path ID 0, Local Path ID 3, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RP/0/RP0/CPU0:RR#show route vrf one 10.1.1.1/32

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0, type internal

Installed Sep 20 19:59:07.762 for 10:00:40

Routing Descriptor Blocks

```

10.0.0.1, from 10.0.0.1, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.2, from 10.0.0.2, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.3, from 10.0.0.3, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
No advertising protos.

```

RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32

10.1.1.1/32, version 114, internal 0x1000001 0x30 (ptr 0xd96a338) [1], 0x0 (0xe366530), 0xa08 (0xf69e0a8)

Updated Sep 20 19:59:07.765

Prefix Len 32, traffic index 0, precedence n/a, priority 3

via 10.0.0.1/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 0 NHID 0x0 [0xdab1b98 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.1/32 via 24008/0/21

local label 24010

next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24014}

via 10.0.0.2/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 1 NHID 0x0 [0xdab30d0 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.2/32 via 24000/0/21

local label 24010

next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24014}

via 10.0.0.3/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 2 NHID 0x0 [0xdab2918 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.3/32 via 24002/0/21

local label 24010

next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24014}

ال CEF و RIB لودج يف ةتبثم ECMP تاراسم ةثالث ىلع يوتحي RR لازي ال

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	47	47

Last Modified: Sep 20 19:59:07.588 for 09:59:44

Paths: (3 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.3 (metric 5) from 10.0.0.101 (10.0.0.3)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 47

Extended community: RT:65000:1

Originator: 10.0.0.3, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

65004


```

10.4.101.4 (metric 3) from 10.0.0.101 (10.0.0.101)
  Received Label 24010
  Origin incomplete, metric 0, localpref 100, valid, internal, group-best, import-candidate,
imported
  Received Path ID 2, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
65005
10.5.101.5 (metric 2) from 10.0.0.101 (10.0.0.101)
  Received Label 24010
  Origin incomplete, metric 0, localpref 100, valid, internal, group-best, import-candidate,
imported
  Received Path ID 3, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

AS نم اهل ابلقت سا متي يتل اة ثلاث لاراس مل نم ة وومج مل راسم لصفأ نع RR نلعي
اهل ابلقت سا متي يتل اة ثلاث لاراس مل راسم لصفأ نع ااضي RR نلعي، راسم ل اذ بن ايل او 65000.
راسم و AS 65004 و AS 65005.

نع نالعال متي ك فل تخم راج اهل اة ثلاث لاراس مل نأل ة وومج لصفأ تاراسم ة ثلاث كانه
تاراسم ل اذ بن ايل او 65000. تاراسم ل اذ بن ايل او 65000.

تاع وومج مل راسم لصفأ نع نالعال متي: ةم تاخا

10. ددعتم نالعال تي بثت 1 راسم ل اذ بن ايل او 65000 ةم تاخا

Cisco IOS®-XR 7.3.1 نم اءب طقف رايخا اذ رفوتي

Multipath Protect-Advertising ةديج ةساساً ةم لك كانه، Cisco IOS®-XR 7.3.1 عم ءب ل

ل ب ق. يطايتح اال خسن ل راسم بن ايل او 65000 ةم تاخا راسم نالعال ابل حمسي اذ هو
ه نالعال متي مل نكل و تاراسم ل اذ بن ايل او 65000 ةم تاخا راسم تي بثت مت، Cisco IOS®-XR 7.3.1.
(8. ةل اال رظنا)

```

route-policy BGP-Path-Selection
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
end-policy
!
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB   SendTblVer
  Speaker          5          5
Last Modified: Sep 17 16:43:05.907 for 00:01:14
Paths: (5 available, best #1)
  Advertised to update-groups (with more than one peer):
    0.2 0.3
  Path #1: Received by speaker 0
  Advertised to update-groups (with more than one peer):
    0.2 0.3
  Local, (Received from a RR-client)
    10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

```

```

Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
Received Path ID 0, Local Path ID 1, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #2: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.3
Local, (Received from a RR-client)
10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
Received Path ID 0, Local Path ID 2, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, import-candidate,
imported
Received Path ID 0, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.3
Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
Received Path ID 0, Local Path ID 3, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 1, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1**

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0

Number of pic paths 1 , type internal

Installed Sep 17 16:43:05.562 for 00:01:45

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.3, from 10.0.0.3, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

```
10.0.0.4, from 10.0.0.4, BGP backup path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
No advertising protos.
```

```
RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1
```

```
10.1.1.1/32, version 323, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf4e1168)
```

```
Updated Sep 17 16:43:05.567
```

```
Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.1/32 via 24003/0/21
    next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
via 10.0.0.2/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0], Internal 0xd6a2730
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.2/32 via 24001/0/21
    next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
via 10.0.0.3/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2060 0x0], Internal 0xd6a2910
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.3/32 via 24007/0/21
    next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}
via 10.0.0.4/32, 2 dependencies, recursive, backup [flags 0x6100]
  path-idx 3 NHID 0x0 [0xdab2c98 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.4/32 via 24000/0/21
    next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}
```

اهن نل عمل تاراسملا نم ققحت:

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
Process          bRIB/RIB  SendTblVer
Speaker          207      207
```

```
Last Modified: Sep 17 16:43:06.649 for 00:02:31
```

```
Paths: (3 available, best #1)
```

```
Not advertised to any peer
```

```
Path #1: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local
```

```
10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported
```

```
Received Path ID 1, Local Path ID 1, version 207
```

```
Extended community: RT:65000:1
```

```
Originator: 10.0.0.1, Cluster list: 10.0.0.101
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #2: Received by speaker 0
```

```
Not advertised to any peer
```

```
Local
```

```
10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
Received Path ID 2, Local Path ID 0, version 0
Extended community: RT:65000:1
Originator: 10.0.0.2, Cluster list: 10.0.0.101
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 3, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.4, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

راسم ةيماح) يطاي تحال خسنال - رخآ راسم. RIB في ةتبت م ةددعت مل تاراسم لك : ةم تاخال
لض فال راسم ل ن نال عال م تي. يطاي تحا خسن راسم ك هت يبت م ت - (تاراسم ل ددعت م
(تاراسم ل ةددعت م ةيماح ل) يطاي تحال خسنال راسم و يطاي تحال خسنال راسم و

11. تاراسم ل ددعت م نال عال راسم ل دي دحت ل تاراسم ل ددعت م ناو ن ع ني عت 11. ةيماح ل ل

Cisco IOS®-XR 7.3.1. ن م ادب طقف را يخال اذ ه رفوتي

```
route-policy BGP-Path-Selection
  set path-selection multipath advertise multipath-protect
end-policy
!
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          5         5
Last Modified: Sep 18 06:12:25.907 for 00:00:12
Paths: (5 available, best #1)
  Advertised to update-groups (with more than one peer):
    0.2 0.3
  Path #1: Received by speaker 0
  Advertised to update-groups (with more than one peer):
    0.2 0.3
  Local, (Received from a RR-client)
    10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
      Received Label 24012
      Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 5
      Extended community: RT:65000:1
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
  Path #2: Received by speaker 0
  Advertised to update-groups (with more than one peer):
    0.3
  Local, (Received from a RR-client)
    10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
      Received Label 24012
      Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
      Received Path ID 0, Local Path ID 3, version 5
      Extended community: RT:65000:1
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

Path #3: Received by speaker 0
 Not advertised to any peer
 Local, (Received from a RR-client)
 10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
 Received Label 24012
 Origin incomplete, metric 0, localpref 100, valid, internal, **backup(protect multipath)**,
 add-path, import-candidate, imported
 Received Path ID 0, Local Path ID 4, version 5
 Extended community: RT:65000:1
 Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0
 Advertised to update-groups (with more than one peer):
 0.3
 Local, (Received from a RR-client)
 10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
 Received Label 24013
 Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, add-path, import-
 candidate, imported
 Received Path ID 0, Local Path ID 2, version 5
 Extended community: RT:65000:1
 Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0
 Not advertised to any peer
 Local, (Received from a RR-client)
 10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
 Received Label 24014
 Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
 Received Path ID 1, Local Path ID 0, version 0
 Extended community: RT:65000:1
 Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

Routing entry for 10.1.1.1/32
 Known via "bgp 65000", distance 200, metric 0
 Number of pic paths 1 , type internal
 Installed Sep 18 06:12:26.137 for 00:05:23
 Routing Descriptor Blocks
 10.0.0.1, from 10.0.0.1, **BGP multi path**
 Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
 Route metric is 0
 10.0.0.2, from 10.0.0.2, **BGP multi path**
 Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
 Route metric is 0
 10.0.0.3, from 10.0.0.3, **BGP backup path**
 Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
 Route metric is 0
 10.0.0.4, from 10.0.0.4, **BGP multi path**
 Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
 Route metric is 0
 No advertising protos.

RP/0/RP0/CPU0:RR#**show cef vrf one 10.1.1.1/32**

10.1.1.1/32, version 345, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08
 (0xf4e1108)
 Updated Sep 18 06:12:26.140
 Prefix Len 32, traffic index 0, precedence n/a, priority 3
 via 10.0.0.1/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]
 path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190
 recursion-via-/32
 next hop VRF - 'default', table - 0xe0000000
 next hop 10.0.0.1/32 via 24003/0/21
 next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
 via 10.0.0.2/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

```

path-idx 1 NHID 0x0 [0xdab2e48 0x0], Internal 0xd6a2730
recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.2/32 via 24001/0/21
  next hop 10.2.101.2/32 Gi0/0/0/4    labels imposed {ImplNull 24012}
via 10.0.0.3/32, 2 dependencies, recursive, backup [flags 0x6100]
path-idx 2 NHID 0x0 [0xdab2060 0x0]
recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.3/32 via 24007/0/21
  next hop 10.3.101.3/32 Gi0/0/0/6    labels imposed {ImplNull 24012}
via 10.0.0.4/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
path-idx 3 NHID 0x0 [0xdab2c98 0x0], Internal 0xd6a2550
recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.4/32 via 24000/0/21
  next hop 10.4.101.4/32 Gi0/0/0/7    labels imposed {ImplNull 24013}

```

اهن ع نل عمل ا تاراسم ل ن م ق قحت

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	BRIB/RIB	SendTblVer
Speaker	221	221

Last Modified: Sep 18 06:12:27.649 for 00:01:38

Paths: (3 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 221

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.4, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 3, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

- ةيامح) يطايتح |خسنك هميلعت متي. يطايتحال |خسن ل راسم وه ثلث ل راسم ل
RIB ي يطايتح |خسن راسمك هتبتت و BGP ي (ةدعت ل تاراسم ل

- تاراسم لة ددعت م تاراسم ل او راسم ل ض ف ا ن ع ن ال ع ل ا م ت ي .
- (ة ددعت م ل تاراسم ل ا ة ي ام ح) ي ط ا ي ت ح ال ا خ س ن ل ا " راسم ل ن ع ن ال ع ل ا م ت ي م ل ."

12. ة ي ام ح ل تاراسم ل ا ددعت م راسم ل ا دي د ح ت ل تاراسم ل ا ددعت م ن ال ع | ن ي ي ع ت . ن ال ع | - تاراسم ل ا ددعت م

تاراسم ل ا ب ن ا ج ب ن ع ن ال ع ل ا و تاراسم ل ا ددعت م ي م ح م ل ا راسم ل ا ت ي ب ت ب ح م س ي ا ذ و ة ددعت م ل ا .

```
route-policy BGP-Path-Selection
```

```
  set path-selection multipath advertise multipath-protect multipath-protect-advertise
end-policy
```

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
  Process          bRIB/RIB  SendTblVer
  Speaker          5         5
```

```
Last Modified: Sep 18 06:22:22.907 for 00:03:12
```

```
Paths: (5 available, best #1)
```

```
  Advertised to update-groups (with more than one peer):
    0.2 0.3
```

```
  Path #1: Received by speaker 0
```

```
  Advertised to update-groups (with more than one peer):
    0.2 0.3
```

```
  Local, (Received from a RR-client)
```

```
    10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
```

```
      Received Label 24012
```

```
      Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
```

```
      Received Path ID 0, Local Path ID 1, version 5
```

```
      Extended community: RT:65000:1
```

```
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
  Path #2: Received by speaker 0
```

```
  Advertised to update-groups (with more than one peer):
    0.2
```

```
  Local, (Received from a RR-client)
```

```
    10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
```

```
      Received Label 24012
```

```
      Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
```

```
      Received Path ID 0, Local Path ID 4, version 5
```

```
      Extended community: RT:65000:1
```

```
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
  Path #3: Received by speaker 0
```

```
  Not advertised to any peer
```

```
  Local, (Received from a RR-client)
```

```
    10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
```

```
      Received Label 24012
```

```
      Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
      Received Path ID 0, Local Path ID 0, version 0
```

```
      Extended community: RT:65000:1
```

```
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
  Path #4: Received by speaker 0
```

```
  Advertised to update-groups (with more than one peer):
    0.2
```

```
  Local, (Received from a RR-client)
```

```
    10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
```

```
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
Received Path ID 0, Local Path ID 2, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.2
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
Received Path ID 1, Local Path ID 3, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

```
Routing entry for 10.1.1.1/32
Known via "bgp 65000", distance 200, metric 0
Number of pic paths 1 , type internal
Installed Sep 18 06:22:23.059 for 00:03:34
Routing Descriptor Blocks
10.0.0.1, from 10.0.0.1, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.2, from 10.0.0.2, BGP backup path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.4, from 10.0.0.4, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
10.0.0.5, from 10.0.0.5, BGP multi path
  Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000
  Route metric is 0
No advertising protos.
```

RP/0/RP0/CPU0:RR#**show cef vrf one 10.1.1.1/32**

```
10.1.1.1/32, version 367, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08
(0xf4e11c8)
Updated Sep 18 06:22:23.062
Prefix Len 32, traffic index 0, precedence n/a, priority 3
via 10.0.0.1/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.1/32 via 24003/0/21
    next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}
via 10.0.0.2/32, 2 dependencies, recursive, backup [flags 0x6100]
  path-idx 1 NHID 0x0 [0xdab2e48 0x0]
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.2/32 via 24001/0/21
    next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}
via 10.0.0.4/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 2 NHID 0x0 [0xdab2c98 0x0], Internal 0xd6a2550
  recursion-via-/32
  next hop VRF - 'default', table - 0xe0000000
  next hop 10.0.0.4/32 via 24000/0/21
    next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}
via 10.0.0.5/32, 3 dependencies, recursive, bgp-multipath [flags 0x6080]
  path-idx 3 NHID 0x0 [0xdab2368 0x0], Internal 0xd6a2910
```



```
recursion-via-/32
next hop VRF - 'default', table - 0xe0000000
next hop 10.0.0.5/32 via 24005/0/21
  next hop 10.5.101.5/32 Gi0/0/0/1    labels imposed {ImplNull 24014}
```

اهن نل عمل تاراسم ل ن م ق قحت:

```
RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

```
Process          bRIB/RIB  SendTblVer
Speaker          235      235
Last Modified: Sep 18 06:22:24.649 for 00:03:59
Paths: (4 available, best #1)
Not advertised to any peer
Path #1: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-
candidate, imported
    Received Path ID 1, Local Path ID 1, version 235
    Extended community: RT:65000:1
    Originator: 10.0.0.1, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #2: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 2, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.4, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.5 (metric 3) from 10.0.0.101 (10.0.0.5)
    Received Label 24014
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 3, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.5, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 4, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.2, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

زارق ل:

- BGP لو كوت ورب ي ف ة ثالث ل تاراسم ل ة فاك ي ل ع تاراسم ل دد ع ت م ة م ال ع ع ض و م تي .
- RIB/CEF ل و د ج ي ف ECMP تاراسم م 3 تي ب ث ت م ت .
- ة ي ط ا ي ت ح ل ة خ س ن " ة م ال ع ع ض و م ت . ي ط ا ي ت ح ل ا ل خ س ن ل راسم و ه ي ن ا ث ل راسم ل .

يُطابق حاليًا خسن راسمك اهتبيثتو (BGP) دودحلا ةباوب لوكوتورب يف (ةددعتملا تاراسملا ريب/CEF لودج يف

- يطابق حاليًا خسنل "تاراسمو تاراسملا ةددعتم تاراسملاو راسم لصفأ نع نالعال متي (ةددعتملا تاراسملا ةيامح)".

Cisco IOS®-XR 7.3.1 عم لالحا وه امك ديديج راسم ديديجت كولس

اذه ريغتمت، Cisco IOS®-XR 7.3.1 نم ارباعت:

- طقف نيوانع ةومجم لكل اذه ناك، Cisco IOS®-XR 7.3.1 لبق. نكمم راج لك راسم ديديجت.
- دحاو راسم جهن يف ةومجملا ةددعتم راسم ديديجت لمجب حامسلا متي.
- هب اهلابقتسا متي يذلا بيترتلاب BGP تاراسم ضرع نكمي.

نكمم راج لك راسم ديديجت

راسملا جهن يف حاتملا راسملا ديديجت وه اذه:

```
RP/0/RP0/CPU0:RR(config-rpl)#set path-selection ?
all          BGP all paths
backup       BGP backup path
best-path    BGP best path
group-best   BGP group best path
multipath    BGP multipath
```

يضا رتفالا وه راسم لصفأ.

نيوانعلا ةلئاع يوتسم يلع موعدم اذهو.

نيوكتلال لاثم:

```
router bgp 65000
address-family ipv4 unicast
!
address-family vpnv4 unicast
additional-paths receive
additional-paths send
  additional-paths selection route-policy BGP-Path-Selection
!
neighbor 10.0.0.1
remote-as 65000
update-source Loopback0
address-family ipv4 unicast
  route-reflector-client
!
address-family vpnv4 unicast
  route-reflector-client
!
!
vrf one
rd 1:1
address-family ipv4 unicast
  maximum-paths ibgp 2
  additional-paths selection route-policy BGP-Path-Selection
  redistribute connected
!
```

!
!

راسملا ةسايس يف راسملا ديدحت تاراخي ضعب معد متي، Cisco IOS®-XR 7.3.1 عم ادبلل يتلا تاراسملا بقلعتي اميف ةقد رثكأ مكحت ىلإ يدؤي اذهو. رواجملا ىوتسملا ىلع اضيأ لصفأ نع BGP توص ربكم نلعي دق، لاثملا لىبس ىلع BGP ناريجل اهنع نالعالا متي يمحيو ةددعتملا تاراسملا نع نلعي هنكلو، دحاو BGP راج ىلإ دحاو يطايتحإ خسن راسم وراسم رخأ راج ىلإ تاراسملا ددعتملا راسملا

كانه، رواجلا ىوتسم ىلعو

```
RP/0/RP0/CPU0:RR(config-rpl)#if destination ?
in                               Member of a set
  is-all                          Check for additional paths selected by all path-selection
  is-backup-path                  Checks for backup path
is-best-external                 Checks for best external route
  is-best-path                    Checks for best path
  is-multi-path                   Checks for multiple paths
  is-multipath-protect            Checks for multipath-protect path
longer-than                      Prefix-length greater than the route's prefix length
or-longer                        Prefix-length equal to or greater than the route's prefix length
```

كلذ عمو BGP maximum-path رمأ نيوكت مت اذا تاراسملا ددعتم وه راسم لصفأ: ريذحت، متي ف، تاراسملا ددعتم وه راسملا جهن يف هنيوكت مت يذلا ديجولا طرشل ناك اذا ىلع دمتعي! لصفأ راسملا دعت ال يتلا طقف تاراسملا ةددعتم تاراسملا نع نالعالا، ةددعتملا تاراسملا نع نالعالا يغبني ناك اذا ه نأ لمتحملا نم نكلو، BGP ميمصت اضيأ لصفأ راسملا نع نالعالا بجيف

Cisco IOS®-XR 7.3.1 عم اثيديح is-all و is-multipath-protect ل اخدا متي

دحاو راسم جهن يف ةعومجملا ةددعتم راسم ديدحت تارابعب حامسلا متي

يف ددعتملا راسملا ديدحت تارابع ىلع لوصحلا كنكمي، Cisco IOS®-XR 7.3.1 نم ارابتعا هب احومسم اذه نكي مل، Cisco IOS®-XR 7.3.1 لبق. ةدحاو ةئدابب ةقلعتم ةدحاو راسم ةسايس عقتوم ريغ BGP راسم كولس ىلإ يدؤي نأ ه نأش نمو.

ةئداب ل ك يف ال وأ دحاو راسم نم رثكأ ديدحت ىلإ رظنلا متي

ي: لي ام معد متي ال، Cisco IOS®-XR 7.3.1 لبق، لاثملا لىبس ىلع

```
route-policy add-path-to-ibgp
set weight 65000
  set path-selection backup 1 install
set metric-type type-1
set extcommunity rt RT BUSINESS additive
  set path-selection all advertise
set rib-metric 100
end-policy
```

ت. ةئدابلا سفن ىلع اهقيبطت متي ةدحاو راسم ةسايس يف راسم ديدحت ناتلمج كيدل

راسملا ديدحت تارابع نأ وه بلسلا Cisco IOS®-XR 7.3.1 لبق لي ام معد متي، كلذ عمو (...، عم تجم، ةهجو) ديدحت تاذ تارابع مادختسا مت اذا هنأل، ةفلتخملا تائدابلل يه ةفلتخملا

1: لاثم

```

route-policy ADDPATH
  if destination in TRAFFIC_1 then
    set path-selection backup 1 install
  endif
  if destination in TRAFFIC_2 then
    set path-selection multipath advertise
  endif
end-policy

```

نيت لمج في نوكت) ة فل تخم ل ائ د اب ل اب ق ل ع ت ت ة و م ج م ل ا ر ا س م د ي د ح ت ا ر ا ب ع ن ا ل د ي ج ا ذ ه و (ل م ج ت ن ا ك ا ذ ا ن ي ت ف ل ت خ م

2: ل ا ث م

```

route-policy ADDPATH-2
  if community matches-any COMM_ADD-PATH then
    set path-selection backup 1 install multipath-protect advertise
  else
    set path-selection best-path
  endif
end-policy

```

ي في هو) ة فل تخم ل ائ د اب ل اب ق ل ع ت ت ة و م ج م ل ا ر ا س م د ي د ح ت ا ر ا ب ع ن ا ل ا ر ط ن د ي ج ا ذ ه و (i f ة ر ا ب ع ن م ن ي ف ل ت خ م ن ي ا ن ج

ا ذ ه م ع د م ت ي ، Cisco IOS®-XR 7.3.1 ن م اء د ب

ة د ح ا و ر ا س م د ي د ح ت ة ر ا ب ع ن م ر ث ك ا ي ل ع ي و ت ح ي ر ا س م ل ا ج ه ن ي ل ع ل ا ث م ا ذ ه

```

route-policy BGP-Path-Selection
  set path-selection multipath advertise
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
end-policy
!

```

ر ا س م ي ا ر ا ي ت خ ا ن ك م ي . ر و ا ج م ل ا ا ذ ه ل ا ه ن ع ن ا ل ع ا ل ا م ت ي ي ت ل ا ت ا ر a س م ل ا ر ا ج ل ل ك ل ر a س م ل ا ج ه ن د د ح ي ن . ن ي و ا ن ع ل ا ة ل ا ع ا ع ي و ت س م ي ل ع ل ع ف ل ا ب ا ه ي ل ع ة م a ل ع ع و م ت ي ت ل a ت a ر a س م ل a ن م ط ق ف

ر a س م ل a د ي د ح ت ك ي د ل ، ن ي و a ن ع ل a ة ل ا ع a ي و ت س م ي ل ع

```

RP/0/RP0/CPU0:RR(config-rpl)#set path-selection ?
all          BGP all paths
backup       BGP backup path
best-path    BGP best path
group-best   BGP group best path
multipath    BGP multipath

```

ك ا ن ه ، ر a و ا ج ل a ي و ت س م ي ل ع و

```

RP/0/RP0/CPU0:RR(config-rpl)#if destination ?
in           Member of a set
is-all       Check for additional paths selected by all path-selection
is-backup-path Checks for backup path
is-best-external Checks for best external route
is-best-path Checks for best path
is-multi-path Checks for multiple paths
is-multipath-protect Checks for multipath-protect path

```

longer-than
or-longer

Prefix-length greater than the route's prefix length
Prefix-length equal to or greater than the route's prefix length

كذلك، **BGP maximum-path** رقمًا نيوكوت مت إذا تاراسملا ددعتم وه راسم لضفأ: ريذحت،
م تي ف، تاراسملا ددعتم وه راسملا جهن يف هنيوكوت مت يذلا ديحول طرشل ناك إذا
يلع دمتعي! لضفأ راسملا دعت ال يتل طقف تاراسملا ددعتم تاراسملا نع نالعال
، ددعتم تاراسملا نع نالعال يغبني ناك إذا هنا لم تجملا نم نكلو، BGP مي م صت
اضيا لضفأ راسملا نع نالعال بجي ف.

Cisco IOS®-XR 7.3.1 عم اتي دح **is-all** و **is-multipath-protect** ل اخدا متي

راسملا دي دحت عاضوا نم اچي زم راسملا دي دحت **ةمالع** نوكت نأ نكمي، ةقيرطال هذه مادختساب
ةددعتم ةي امحلا، تاراسملا ددعتم، يطايت حالال خسنلا، لك، لاثملا ل بس يلع) كي يدل يتل
ال (اذك هو، تاراسملا).

راسملا دي دحت ةمالع ل ا ادانتسا **نالعال** يف رواجملا جهنلا مكحتي

اعم ددعتم راسملا او يطايت حالال خسنلا نيوكوت نكمي، لاثملا ل بس يلع: تامالال عزج
يني وانالال ةلئاع يوتسم يلع راسملا جهن يف

```
route-policy BGP-Path-Selection
  set path-selection multipath advertise (1)
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
(2)
end-policy
!
```

Cisco IOS®-XR 7.3.1 نم اءب اتي دح همعد متي ام امه هالع ني ت دراوال راسملا دي دحت اتعومجم
م يللي ام كي يدل، لاثملا ل ي ف انوكم لازي ام **Maximum-Path IBGP 3** دوجو م

- ةددعتم تاراسملا عي مچو راسم لضفأ نع نالعال حيتي
 - (ةددعتم تاراسملا ةي امح) يطايت حالال خسنلا راسم و راسم لضفأ نع نالعال اب حامسلا
- اونوكي نأ ام (2) وأ (1) نأ ينعني اذهو. Cisco IOS®-XR 7.3.1 ل بق ةنكمم ةعومجملا هذه نكت مل
ذي فننتل زيح يف

ةجيتنلاليه هذهو:

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
Process          bRIB/RIB  SendTblVer
Speaker          5         5
```

```
Last Modified: Sep 18 06:59:27.907 for 00:00:28
```

```
Paths: (5 available, best #1)
```

```
Advertised to update-groups (with more than one peer):
```

```
0.2 0.3
```

```
Path #1: Received by speaker 0
```

```
Advertised to update-groups (with more than one peer):
```

```
0.2 0.3
```

```
Local, (Received from a RR-client)
```

```
10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
```

```
import-candidate, imported
```

```
Received Path ID 0, Local Path ID 1, version 5
```

```

Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #2: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.2
Local, (Received from a RR-client)
10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
Received Path ID 0, Local Path ID 2, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.2
Local, (Received from a RR-client)
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
Received Path ID 0, Local Path ID 3, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Advertised to update-groups (with more than one peer):
0.2
Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
Received Path ID 0, Local Path ID 4, version 5
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 1, Local Path ID 0, version 0
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

RP/0/RP0/CPU0:RR#**show route vrf one 10.1.1.1/32**

Routing entry for 10.1.1.1/32

Known via "bgp 65000", distance 200, metric 0

Number of pic paths 1 , type internal

Installed Sep 18 06:59:27.833 for 00:01:59

Routing Descriptor Blocks

10.0.0.1, from 10.0.0.1, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.2, from 10.0.0.2, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.3, from 10.0.0.3, **BGP backup path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

10.0.0.4, from 10.0.0.4, **BGP multi path**

Nexthop in Vrf: "default", Table: "default", IPv4 Unicast, Table Id: 0xe0000000

Route metric is 0

No advertising protos.

RP/0/RP0/CPU0:RR#show cef vrf one 10.1.1.1/32

10.1.1.1/32, version 409, internal 0x5000001 0x30 (ptr 0xd96a770) [1], 0x0 (0xe3662a8), 0xa08 (0xf4e1168)

Updated Sep 18 06:59:27.836

Prefix Len 32, traffic index 0, precedence n/a, priority 3

via 10.0.0.1/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 0 NHID 0x0 [0xdab2bc0 0x0], Internal 0xd6a2190

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.1/32 via 24003/0/21

next hop 10.1.101.1/32 Gi0/0/0/0 labels imposed {ImplNull 24012}

via 10.0.0.2/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 1 NHID 0x0 [0xdab2e48 0x0], Internal 0xd6a2550

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.2/32 via 24001/0/21

next hop 10.2.101.2/32 Gi0/0/0/4 labels imposed {ImplNull 24012}

via 10.0.0.3/32, 2 dependencies, recursive, **backup** [flags 0x6100]

path-idx 2 NHID 0x0 [0xdab2060 0x0]

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.3/32 via 24007/0/21

next hop 10.3.101.3/32 Gi0/0/0/6 labels imposed {ImplNull 24012}

via 10.0.0.4/32, 3 dependencies, recursive, **bgp-multipath** [flags 0x6080]

path-idx 3 NHID 0x0 [0xdab2c98 0x0], Internal 0xd6a2370

recursion-via-/32

next hop VRF - 'default', table - 0xe0000000

next hop 10.0.0.4/32 via 24000/0/21

next hop 10.4.101.4/32 Gi0/0/0/7 labels imposed {ImplNull 24013}

اهن نل عمل تاراسملا نم ققحت:

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process bRIB/RIB SendTblVer

Speaker 271 271

Last Modified: Sep 18 06:59:28.649 for 00:01:53

Paths: (4 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 271

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

```

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.3 (metric 3) from 10.0.0.101 (10.0.0.3)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 3, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.3, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Not advertised to any peer
Local
  10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 4, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Originator: 10.0.0.4, Cluster list: 10.0.0.101
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

(راسم لصفأ) ةيساسأل اي طاي تحال خسنل تاراسم نع ناريجل دحل نالعال نأل نكم يو
 .ي طاي تحال خسنل راسم وأ راسم لصفأ ل اذانتسا

IS-Multi-path. مادختساب يرخال ةرواجم ل ةزهأل دحل ةددعتم ل تاراسم ل نع نالعال نكم يو

(ةلئال-ناونعال يوتسم يلع راسم ل جهن عم مدختسي) رواجم ل راسم ل جهن يلع لاثم

```

route-policy BGP-neighbor-1
  if community matches-any COMM-LIST-1 then
    if destination is-best-path or destination is-backup-path then
      pass
    else
      drop
    endif
  elseif community matches-any COMM-LIST-2 then
    if destination is-multi-path or destination is-multipath-protect then
      pass
    else
      drop
    endif
  else
    drop
  endif
end-policy
!

```

ةللال BGP تاراسم ل RR ل ناك اذ:

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          5         5
Last Modified: Sep 18 07:14:32.907 for 00:06:53
Paths: (5 available, best #1)
  Advertised to update-groups (with more than one peer):
    0.3
  Advertised to peers (in unique update groups):

```



```

10.0.0.6      10.0.0.5
Path #1: Received by speaker 0
Advertised to update-groups (with more than one peer):
  0.3
Advertised to peers (in unique update groups):
  10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
  10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
    Received Path ID 0, Local Path ID 1, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #2: Received by speaker 0
Advertised to peers (in unique update groups):
  10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
  10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
    Received Path ID 0, Local Path ID 2, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Advertised to peers (in unique update groups):
  10.0.0.5
Local, (Received from a RR-client)
  10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
    Received Path ID 0, Local Path ID 4, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Advertised to peers (in unique update groups):
  10.0.0.5
Local, (Received from a RR-client)
  10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
    Received Label 24013
    Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
    Received Path ID 0, Local Path ID 3, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
  10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
    Received Label 24014
    Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
    Received Path ID 1, Local Path ID 0, version 0
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

وهو، راسملا ةسايس - رواجملا راسملا لولال لولال راسملا مث

```

if destination is-best-path or destination is-backup-path then
  pass

```

تاراسملا هذه رواجملا PE6 ىقلتى

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	283	283

Last Modified: Sep 18 07:14:33.649 for 00:07:21

Paths: (2 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.1 (metric 3) from 10.0.0.101 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 1, Local Path ID 1, version 283

Extended community: RT:65000:1

Originator: 10.0.0.1, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 2, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

RR. ىلع يطايت حال خسنلا راسم و راسم لصفاً امه ناراسملا ناده

يئاتلا كيهو، رواجملا راسملا ةسايس نم يئاتلا عزجلل ةبسنلاب

```
if destination is-multi-path or destination is-multipath-protect
then
pass
```

تاراسملا هذه رواجملا PE6 ىقلت ي

RP/0/RP0/CPU0:PE6#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	299	299

Last Modified: Sep 18 07:31:09.649 for 00:02:29

Paths: (3 available, best #1)

Not advertised to any peer

Path #1: Received by speaker 0

Not advertised to any peer

Local

10.0.0.2 (metric 3) from 10.0.0.101 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, import-candidate, imported

Received Path ID 2, Local Path ID 1, version 299

Extended community: RT:65000:1

Originator: 10.0.0.2, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Not advertised to any peer

Local

10.0.0.4 (metric 3) from 10.0.0.101 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 3, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.4, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Not advertised to any peer

Local

10.0.0.3 (metric 3) from 10.0.0.101 (10.0.0.3)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 4, Local Path ID 0, version 0

Extended community: RT:65000:1

Originator: 10.0.0.3, Cluster list: 10.0.0.101

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

خسنلا راسم و (!راسم لضفأ نمضتت ال نكلو) تاراسملا ددعتم تاراسملا يه تاراسملا هذه (ددعتملا تاراسملا ةيامح) يطايتحال

هب اهلابقتسا متي يذلا بيترتلاب BGP تاراسم راهظا

يجمععمل بيترتلاب BGP تاراسم رهظت

BGP تاراسم ةيؤرل - Cisco IOS®-XR 7.3.1 ي هم يدقت مت- ديدج رمأ مادختسا نكمي هب اهلابقتسا مت يذلا بيترتلاب

```
show bgp <afi> rd <rd> <path_details> <age-order>
```

ددعتم ةمالع عضو متي . تاراسملا ددعتم تاملع تاراسملا تناك امل يري نأ ديفم رمأ اذه يوصق تاراسمك RIB ي اهتيبثت متي واقباس اهيقلت مت يتلا تاراسملا يلع تاراسملا يلع ةتبثملا تاراسملا BGP Multipath ةيساسالا ةملكلا **show route** رمألا ضرعي . راسملا وحنلا اذه

ديدل رمألا مادختسا نكمي ، هيلع تاراسملا ددعتم ةمالع عضو مت يذلا راسملا نم ققحتلل يلعأ ي ف نوكت ثحال تاراسملا . تاراسملا عيمجالتسا هب مت يذلا بيترتلا نم ققحتلل تاجرخل

ي:لاتلا نيوكتلا مادختساب ، لاثملا ليلبس يلع

```
route-policy BGP-Path-Selection
  set path-selection multipath advertise
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
end-policy
!
```

صئاصخ يأ يلع تاراسملا يوتحت الو ، لضفألا راسملا ريرقت ةيلمع ي ف تاريغيغت دجوت ال راسم لضفأ ي ف رارقلا ذاختا ةيلمع يلع رثوت (يلحمل ليلضفتلا لثم)

اذه BGP راسم ديدحت يلع RR لم تشي

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

```
Process          bRIB/RIB  SendTblVer
Speaker          5         5
```

Last Modified: Sep 18 08:46:11.907 for 00:03:43

Paths: (5 available, best #1)

Advertised to update-groups (with more than one peer):
0.3

Advertised to peers (in unique update groups):
10.0.0.5

Path #1: Received by speaker 0

Advertised to update-groups (with more than one peer):
0.3

Advertised to peers (in unique update groups):
10.0.0.5

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, **multipath**,

import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Advertised to peers (in unique update groups):
10.0.0.5

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, **backup**, add-path,

import-candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Advertised to peers (in unique update groups):
10.0.0.5 10.0.0.6

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 3, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Advertised to peers (in unique update groups):
10.0.0.5 10.0.0.6

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, **backup(protect multipath)**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 4, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

خسننلا راسم وه 10.0.0.2 نم راسملا اذامل؟ راسم لضفأ وه 10.0.0.1 نم راسملا اذامل
خسننلا وه 10.0.0.4 نم راسملا اذامل؟ تاراسملا ددعتم 10.0.0.3 نم راسملا اذامل؟ يطاي تحالال
لضفأ راسملا سيل 10.0.0.5 نم راسملا اذامل؟ (ددعتم تاراسملا ةيامح) يطاي تحالال
(ددعتم تاراسملا ةيامح) يطاي تحالال خسننلا راسم الو ددعتم راسملا سيلو

نوكت ثدحالال تاراسملا. ةياهنلا يف رمعلا بيترت عم هسفن رمألا مادختساب اذه ةيؤركنكمي
تاجخملال لعأ يف

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 age-order
```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process bRIB/RIB SendTblVer

Speaker 5 5

Flags: 0x240692b2+0x00010000; multipath; backup available;

Last Modified: Sep 18 07:31:07.907 for 00:23:23

Paths: (5 available, best #3)

Advertised to update-groups (with more than one peer):

0.3

Advertised to peers (in unique update groups):

10.0.0.5

Path #1: Received by speaker 0

Flags: 0x2000000084060205, import: 0x96

Advertised to peers (in unique update groups):

10.0.0.6 10.0.0.5

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, **backup(protect multipath)**,

add-path, import-candidate, imported

Received Path ID 0, Local Path ID 3, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Flags: 0x2000000084020205, import: 0x96

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5), if-handle 0x00000000

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Flags: 0x2000000085070205, import: 0x9f

Advertised to update-groups (with more than one peer):

0.3

Advertised to peers (in unique update groups):

10.0.0.5

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, multipath,

import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Flags: 0x2000000084070205, import: 0x96

Advertised to peers (in unique update groups):

```

10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
  10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
    Received Path ID 0, Local Path ID 4, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Flags: 0x2000000084070205, import: 0x96
Advertised to peers (in unique update groups):
  10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
  10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
    Received Path ID 0, Local Path ID 2, version 5
    Extended community: RT:65000:1
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

إذا لم نم ققحت لل **bestpath-compare** في أساس الة لكل ال عم **show bgp** رم أو ما دخت س إ كن كم ي
(راسم لكل ب ب س ل ا ض رع م تي) راسم ل ض ف أ وه راسم ل س ي ل

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 bestpath-compare
```

```

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          5         5
    Flags: 0x240692b2+0x00010000; multipath; backup available;
Last Modified: Sep 18 07:31:07.907 for 00:44:59
Paths: (5 available, best #1)
  Advertised to update-groups (with more than one peer):
    0.3
  Advertised to peers (in unique update groups):
    10.0.0.5
  Path #1: Received by speaker 0
  Flags: 0x2000000085070205, import: 0x9f
  Advertised to update-groups (with more than one peer):
    0.3
  Advertised to peers (in unique update groups):
    10.0.0.5
Local, (Received from a RR-client)
  10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
    Received Path ID 0, Local Path ID 1, version 5
    Extended community: RT:65000:1
      best of local AS, Overall best
    Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
  Path #2: Received by speaker 0
  Flags: 0x2000000084070205, import: 0x96
  Advertised to peers (in unique update groups):
    10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
  10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000
    Received Label 24012
    Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
    Received Path ID 0, Local Path ID 2, version 5

```

```

Extended community: RT:65000:1
iBGP multi-path
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Flags: 0x2000000084070205, import: 0x96
Advertised to peers (in unique update groups):
10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000
Received Label 24012
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
Received Path ID 0, Local Path ID 4, version 5
Extended community: RT:65000:1
iBGP multi-path
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Flags: 0x2000000084060205, import: 0x96
Advertised to peers (in unique update groups):
10.0.0.6      10.0.0.5
Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000
Received Label 24013
Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
Received Path ID 0, Local Path ID 3, version 5
Extended community: RT:65000:1
Higher router ID than best path (path #1)
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Flags: 0x2000000084020205, import: 0x96
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5), if-handle 0x00000000
Received Label 24014
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
Received Path ID 1, Local Path ID 0, version 0
Extended community: RT:65000:1
Higher router ID than best path (path #1)
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

لضفا رأي تخارارق نإف، تاراسم ال نيب ةي واستم BGP تاراسم يف تامس ال مظعم نأ امب
 BGP 10.0.0.1 توص ربكم يلي امي ف. BGP توص ربكم نم هجوم فرعم لقا يلى لقتنا راسم
 ربكم نم هجوم فرعم لقا يثا يلاتلابو، راسم لضفا يثا وه يطايتحال خسن ال راسم
 BGP 10.0.0.2 انه توص

دعب اهتبيثت مت اهنا ل تاراسم ال ةددعتم تاراسم تسيل 10.0.0.5 و 10.0.0.4 نم تاراسم ال
 10.0.0.3 و 10.0.0.2 و 10.0.0.1 نم تاراسم ال

(ةددعتم ال تاراسم ال ةي امح) يطايتحال خسن ال لباقم يطايتحال خسن ال راسم

```

route-policy BGP-Path-Selection
  set path-selection multipath advertise
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
end-policy
!
```

Maximum-path ibgp 3. نيوكت مت

راسم لبق ةددعتم ال تاراسم ال مالتسإ مت، انه. راسم لضفا يثا وه يطايتحال خسن ال
 يطايتحال خسن راسم وه رخاؤ تاراسم ال ةددعتم تاراسم ةثالث كانه، اذا. ةي طاييتحال خسن ال

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 age-order

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
Speaker	5	5

Flags: 0x240692b2+0x00010000; multipath; backup available;

Last Modified: Sep 18 08:51:17.907 for 00:07:11

Paths: (5 available, best #3)

Advertised to update-groups (with more than one peer):

0.3

Advertised to peers (in unique update groups):

10.0.0.5

Path #1: Received by speaker 0

Flags: 0x2000000084020205, import: 0x96

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 0, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Flags: 0x2000000084060205, import: 0x96

Advertised to peers (in unique update groups):

10.0.0.5

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **backup**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 2, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Flags: 0x2000000085070205, import: 0x9f

Advertised to update-groups (with more than one peer):

0.3

Advertised to peers (in unique update groups):

10.0.0.5

Local, (Received from a RR-client)

10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **best**, group-best, multipath, import-candidate, imported

Received Path ID 0, Local Path ID 1, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #4: Received by speaker 0

Flags: 0x2000000084070205, import: 0x96

Advertised to peers (in unique update groups):

10.0.0.6

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5), if-handle 0x00000000

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, add-path, import-candidate, imported

Received Path ID 1, Local Path ID 3, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #5: Received by speaker 0


```
Flags: 0x2000000084070205, import: 0x96
Advertised to peers (in unique update groups):
 10.0.0.5      10.0.0.6
Local, (Received from a RR-client)
 10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
  Received Path ID 0, Local Path ID 4, version 5
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

كيدل نآلا 10.0.0.5 راجلا قلغأ:

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 age-order
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```
Process          bRIB/RIB  SendTblVer
Speaker          7         7
```

```
Flags: 0x2406b2b2+0x00010000; multipath; backup available;
```

```
Last Modified: Sep 18 09:05:07.907 for 00:00:23
```

```
Paths: (4 available, best #3)
```

```
Advertised to update-groups (with more than one peer):
```

```
0.3
```

```
Path #1: Received by speaker 0
```

```
Flags: 0x2000000084060205, import: 0x96
```

```
Advertised to peers (in unique update groups):
```

```
10.0.0.6
```

```
Local, (Received from a RR-client)
```

```
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000
```

```
Received Label 24013
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
```

```
Received Path ID 0, Local Path ID 5, version 7
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #2: Received by speaker 0
```

```
Flags: 0x2000000084070205, import: 0x96
```

```
Advertised to peers (in unique update groups):
```

```
10.0.0.6
```

```
Local, (Received from a RR-client)
```

```
10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
```

```
Received Path ID 0, Local Path ID 2, version 7
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #3: Received by speaker 0
```

```
Flags: 0x2000000085070205, import: 0x9f
```

```
Advertised to update-groups (with more than one peer):
```

```
0.3
```

```
Local, (Received from a RR-client)
```

```
10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
```

```
Received Path ID 0, Local Path ID 1, version 5
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #4: Received by speaker 0
```

```
Flags: 0x2000000084070205, import: 0x96
```

Advertised to peers (in unique update groups):

10.0.0.6

Local, (Received from a RR-client)

10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 4, version 5

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

• 10.0.0.5 ن م راسم ال يفتخا

• اضيأ تاراسم ال ددعت م نآل ه نكلو، اي طاي تح | 10.0.0.2 ن م راسم ال لازي ال

• خسن راسم نآل كيدل، تاراسم ال ددعت م راسم اضيأ وه ي طاي تح ال خسن ال راسم نآل
10.0.0.4 ن م راسم ال وه اذه. (تاراسم ال ددعت م ةي امح) ي طاي تح |

10.0.0.5 رواجم ال قالغ اءاغ ل اب مق

RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 **age-order**

BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1

Versions:

Process	bRIB/RIB	SendTblVer
---------	----------	------------

Speaker	10	10
---------	----	----

Flags: 0x2406b2b2+0x00010000; multipath; backup available;

Last Modified: Sep 18 09:08:42.907 for 00:00:00

Paths: (5 available, best #4)

Advertised to update-groups (with more than one peer):

0.3

Advertised to peers (in unique update groups):

10.0.0.5

Path #1: Received by speaker 0

Flags: 0x2000000084020205, import: 0x96

Not advertised to any peer

Local, (Received from a RR-client)

10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5), if-handle 0x00000000

Received Label 24014

Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported

Received Path ID 1, Local Path ID 0, version 0

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #2: Received by speaker 0

Flags: 0x2000000084060205, import: 0x96

Advertised to peers (in unique update groups):

10.0.0.5 10.0.0.6

Local, (Received from a RR-client)

10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000

Received Label 24013

Origin incomplete, metric 0, localpref 100, valid, internal, **backup(protect multipath)**, add-path, import-candidate, imported

Received Path ID 0, Local Path ID 5, version 7

Extended community: RT:65000:1

Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

Path #3: Received by speaker 0

Flags: 0x2000000084070205, import: 0x96

Advertised to peers (in unique update groups):

10.0.0.5 10.0.0.6

Local, (Received from a RR-client)

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000

Received Label 24012

Origin incomplete, metric 0, localpref 100, valid, internal, **multipath, backup**, add-path, import-candidate, imported

```

Received Path ID 0, Local Path ID 2, version 10
Extended community: RT:65000:1
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Flags: 0x2000000085070205, import: 0x9f
Advertised to update-groups (with more than one peer):
  0.3
Advertised to peers (in unique update groups):
  10.0.0.5
Local, (Received from a RR-client)
  10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
  Received Path ID 0, Local Path ID 1, version 5
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Flags: 0x2000000084070205, import: 0x96
Advertised to peers (in unique update groups):
  10.0.0.5      10.0.0.6
Local, (Received from a RR-client)
  10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
  Received Path ID 0, Local Path ID 4, version 5
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

نم راسم الة فاضا تم . لبق نم اهت يثبت مت يتل الع بر الة تاراسم الة ايش ريغت ي مل نم عون ي ا و ا تاراسم الة ددع تم راسم سي ل ه ن ا . ث دح ا ه ن ال الة ف س ل ج ي ه ن ا . ط ق ف 10.0.0.5 ي ط ا ي ت ح ال ا خ س ن ال راسم

ريغت دع ب تاراسم الة ددع تم ريغ الة ا تاراسم الة ددع تم نم 10.0.0.5 نم راسم الة ريغت مت راسم الة ف الة ل

رارق الة :

- نوكت تاراسم الة ا دي دح ت ي ف ارود ه ب تاراسم الة ل ا ب ق ت س ا مت ي ي ذل ا ب ي ت ر ت ل ا ب ع ل ي . تاراسم الة ددع تم
- ي ط ا ي ت ح ا خ س ن راسم ك ا ن ه ن ا ك ا ذ ا ارود تاراسم الة م ا ل ت س ا ه ي ف م ت ي ي ذل ا ب ي ت ر ت ل ا ب ع ل ي . ال م ا (تاراسم الة ددع تم ا ي ا م ح)
- ل ض ف ا ك ه ر ا ي ت ح ا م ت ي راسم ي ا ي ف ارود ب ع ل ي ال تاراسم الة م ا ل ت س ا ه ب م ت ي ي ذل ا ب ي ت ر ت ل ا ب ع ل ي . ي ط ا ي ت ح ا خ س ن راسم و ا راسم

IGP سايق بسح بلطال

(IGP) الة ل خ ا د ل ا ا ر ا ب ع ال ل و ك و ت و ر ب سايق ل ل ا د د ع ت م الة تاراسم الة ب ي ت ر ت ل ر ا ي خ ك ا ن ه

```

RP/0/RP0/CPU0:RR#conf t
RP/0/RP0/CPU0:RR(config)#router bgp 65000
RP/0/RP0/CPU0:RR(config-bgp)#vrf one
RP/0/RP0/CPU0:RR(config-bgp-vrf)#address-family ipv4 unicast
RP/0/RP0/CPU0:RR(config-bgp-vrf-af)#maximum-paths ibgp 3 unequal-cost ?
deterministic Deterministic Multipath selection primarily on IGP metric order
selective Allow multipaths only from marked neighbors
<cr>

```

```
RP/0/RP0/CPU0:RR(config-bgp-vrf-af)#maximum-paths ibgp 3 unequal-cost deterministic ?
selective Allow multipaths only from marked neighbors
<cr>
RP/0/RP0/CPU0:RR(config-bgp-vrf-af)#maximum-paths ibgp 3 unequal-cost deterministic
RP/0/RP0/CPU0:RR(config-bgp-vrf-af)#commit
RP/0/RP0/CPU0:RR(config-bgp-vrf-af)#end
RP/0/RP0/CPU0:RR#
```

راسم و طقف لضفألا راسملا يلعل لصحت كنإف، إاوبولطم ةئف اكتمل ريغ ةفلكتل لإا جاتحت ةددعتملا تاراسملا نأل تاراسملا ددعتم راسم دجوي ال نكل و يطايتحال خسنل ةددعتم تاراسم اهرابتعا متي يتح ةيلخادلا ةرابعل لوكوتورب ةفلكت سفن

لوكوتورب ةفلكت نيوكت متي. ططخمل في PE تاهجوم لإ RR نم IGP ةفلكت ريغت متي يلي امك ةيلخادلا ةرابعل:

- RR لإ PE1 : 5
- RR لإ PE2 : 4
- RR لإ PE3 : 3
- RR لإ PE4 : 2
- RR لإ PE5 : 1

هذه كانه لازت ال

```
route-policy BGP-Path-Selection
  set path-selection multipath advertise
  set path-selection backup 1 install multipath-protect advertise multipath-protect-advertise
end-policy
!
```

(تاطابترال عيجم في اهسفن يه ةفلكتل) IGP سايق تاريغت لبق:

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
Versions:
  Process          bRIB/RIB  SendTblVer
  Speaker          10        10
Last Modified: Sep 18 09:08:42.907 for 05:26:53
Paths: (5 available, best #1)
  Advertised to update-groups (with more than one peer):
    0.3
  Advertised to peers (in unique update groups):
    10.0.0.5
  Path #1: Received by speaker 0
  Advertised to update-groups (with more than one peer):
    0.3
  Advertised to peers (in unique update groups):
    10.0.0.5
  Local, (Received from a RR-client)
    10.0.0.1 (metric 2) from 10.0.0.1 (10.0.0.1)
      Received Label 24012
      Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
      Received Path ID 0, Local Path ID 1, version 5
      Extended community: RT:65000:1
      Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
  Path #2: Received by speaker 0
  Advertised to peers (in unique update groups):
    10.0.0.5      10.0.0.6
  Local, (Received from a RR-client)
```

```

10.0.0.2 (metric 2) from 10.0.0.2 (10.0.0.2)
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
  Received Path ID 0, Local Path ID 2, version 10
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Advertised to peers (in unique update groups):
  10.0.0.5      10.0.0.6
Local, (Received from a RR-client)
10.0.0.3 (metric 2) from 10.0.0.3 (10.0.0.3)
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
  Received Path ID 0, Local Path ID 4, version 5
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Advertised to peers (in unique update groups):
  10.0.0.5      10.0.0.6
Local, (Received from a RR-client)
10.0.0.4 (metric 2) from 10.0.0.4 (10.0.0.4)
  Received Label 24013
  Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
  Received Path ID 0, Local Path ID 5, version 7
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Not advertised to any peer
Local, (Received from a RR-client)
10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5)
  Received Label 24014
  Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
  Received Path ID 1, Local Path ID 0, version 0
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

IGP سايقم رييغت دعب

```
RP/0/RP0/CPU0:RR#show bgp vpnv4 unicast rd 1:1 10.1.1.1/32 age-order
```

```
BGP routing table entry for 10.1.1.1/32, Route Distinguisher: 1:1
```

```
Versions:
```

```

Process          bRIB/RIB  SendTblVer
Speaker          14        14

```

```
Flags: 0x2486b2b2+0x00010000; multipath; backup available;
```

```
Last Modified: Sep 18 16:09:45.907 for 00:01:10
```

```
Paths: (5 available, best #2)
```

```
Advertised to update-groups (with more than one peer):
```

```
0.3
```

```
Path #1: Received by speaker 0
```

```
Flags: 0x2000000084020205, import: 0x94
```

```
Not advertised to any peer
```

```
Local, (Received from a RR-client)
```

```
10.0.0.1 (metric 6) from 10.0.0.1 (10.0.0.1), if-handle 0x00000000
```

```
Received Label 24012
```

```
Origin incomplete, metric 0, localpref 100, valid, internal, import-candidate, imported
```

```
Received Path ID 1, Local Path ID 0, version 0
```

```
Extended community: RT:65000:1
```

```
Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
```

```
Path #2: Received by speaker 0
```

```

Flags: 0x2000000085070205, import: 0x9f
Advertised to update-groups (with more than one peer):
  0.3
Local, (Received from a RR-client)
  10.0.0.5 (metric 2) from 10.0.0.5 (10.0.0.5), if-handle 0x00000000
  Received Label 24014
  Origin incomplete, metric 0, localpref 100, valid, internal, best, group-best, multipath,
import-candidate, imported
  Received Path ID 1, Local Path ID 1, version 11
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #3: Received by speaker 0
Flags: 0x2000000084060205, import: 0x94
Advertised to update-groups (with more than one peer):
  0.3
Advertised to peers (in unique update groups):
  10.0.0.6
Local, (Received from a RR-client)
  10.0.0.2 (metric 5) from 10.0.0.2 (10.0.0.2), if-handle 0x00000000
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, backup(protect multipath),
add-path, import-candidate, imported
  Received Path ID 1, Local Path ID 3, version 10
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #4: Received by speaker 0
Flags: 0x2000000084070205, import: 0xd4
Advertised to update-groups (with more than one peer):
  0.3
Advertised to peers (in unique update groups):
  10.0.0.6
Local, (Received from a RR-client)
  10.0.0.4 (metric 3) from 10.0.0.4 (10.0.0.4), if-handle 0x00000000
  Received Label 24013
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, backup, add-path,
import-candidate, imported
  Received Path ID 1, Local Path ID 5, version 14
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1
Path #5: Received by speaker 0
Flags: 0x2000000084070205, import: 0x94
Advertised to update-groups (with more than one peer):
  0.3
Advertised to peers (in unique update groups):
  10.0.0.6
Local, (Received from a RR-client)
  10.0.0.3 (metric 4) from 10.0.0.3 (10.0.0.3), if-handle 0x00000000
  Received Label 24012
  Origin incomplete, metric 0, localpref 100, valid, internal, multipath, add-path, import-
candidate, imported
  Received Path ID 1, Local Path ID 4, version 10
  Extended community: RT:65000:1
  Source AFI: VPNv4 Unicast, Source VRF: one, Source Route Distinguisher: 1:1

```

- (2 ڀرت م ل) IGP ساي قم ضافخنا ب بسب 10.0.0.5 نم راس م ل وه نآل راس م ل ض ف أ.
- وه و، IGP ساي ق ل ض ف أ ڀ ن ا ت ي ل ع ي و ت ح ي ي ذل راس م ل نآل وه ي ط ا ي ت ح ا ل خ س ن ل راس م
- (3 ڀرت م ل) 10.0.0.4 نم راس م ل
- د حا و راس م ي ق ب ي ك ل ذل ، ت ا راس م ل د د ع ت م ي ط ا ي ت ح ا ل خ س ن ل راس م و ل ض ف أ ل راس م ل ن آ م ك
- (4 ساي ق ل) 10.0.0.3 نم راس م ل وه ا ذه . ه ر ا ي ت خ ا م ت ي ل ت ا راس م ل د د ع ت م
- (5 ساي ق ل) 10.0.0.2 نم راس م ل وه (ة د د ع ت م ل ت ا راس م ل ة ي ا م ح) ي ط ا ي ت ح ا ل خ س ن ل راس م
- ي و ت ح ي ه ن آ ل ، ق ا ل ط ا ل ا ي ل ع (6 ڀرت م ل) 10.0.0.1 نم راس م ل ا ي ل ع ة م ا ل ع و م ت ي م ل ، ا ر ي خ ا و
- ساي قم ا و س ا ي ل ع

ةمچرتل هذه ل و ح

ةلأل تاي نقتل ن مة و مچم مادختساب دن تسملا اذ ه Cisco ت مچرت
ملاعلاء نأ عي مچي ف ني م دختسم ل م عدد ي و ت م م ي دقتل ل ي رش ب ل و
امك ة ق ي ق د ن و ك ت ن ل ة ل آل ة مچرت ل ض ف أن ة ظ حال م ي ج ر ي . ة ص ا خ ل م ه ت غ ل ب
Cisco ي ل خ ت . ف ر ت م م مچرت م ا ه م د ق ي ي ت ل ا ة ي ف ا ر ت ح ا ل ا ة مچرت ل ل ع م ل ا ح ل ا و ه
ي ل ا م ئ ا د ع و ج ر ل ا ب ي ص و ت و ت ا مچرت ل ل ه ذ ه ة ق د ن ع ا ه ت ي ل و ئ س م Cisco
Systems (ر ف و ت م ط ب ا ر ل ا) ي ل ص أ ل ا ي ز ي ل ج ن إ ل ا دن ت س م ل ا