BGP ORIGIN en la práctica

Inconsistencias observadas en prefijos
LACNIC

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Recordatorio técnico breve: ORIGIN

Atributo BGP Origin

Indica cómo se introdujo originalmente una ruta en la tabla BGP.

IGP → originado dentro del AS

EGP → aprendida via EGP (obsoleto)

INCOMPLETE → aprendida indirectamente (redistribución)

Orden de decisión:

IGP > EGP > INCOMPLETE

Valor más bajo = más preferido

Valor	Nombre	Símbolo
0	IGP	i
1	EGP	e
2	INCOMPLETE	?

Cómo escoge BGP una ruta?

Orden de decisión BGP

1. Highest LOCAL_PREF
2. Shortest AS_PATH
3. **Lowest ORIGIN type**
.
.
.....

Cada implementación puede tener variaciones en el orden de decisión, aunque estos primeros criterios suelen ser compartidos entre vendors.

pit.scl> show bgp ipv6 2001:13c7:7002:4000::10

Ruta 1:

32590 6939 22548 28001
2801:14:9000::6939:1
Origin EGP, valid, external, **best (AS Path)**, rpki validation-state: valid

Ruta 2:

64112 22850 16735 22548 28001
2801:14:9000::6:4112:1
Origin IGP, valid, external, rpki validation-state: valid

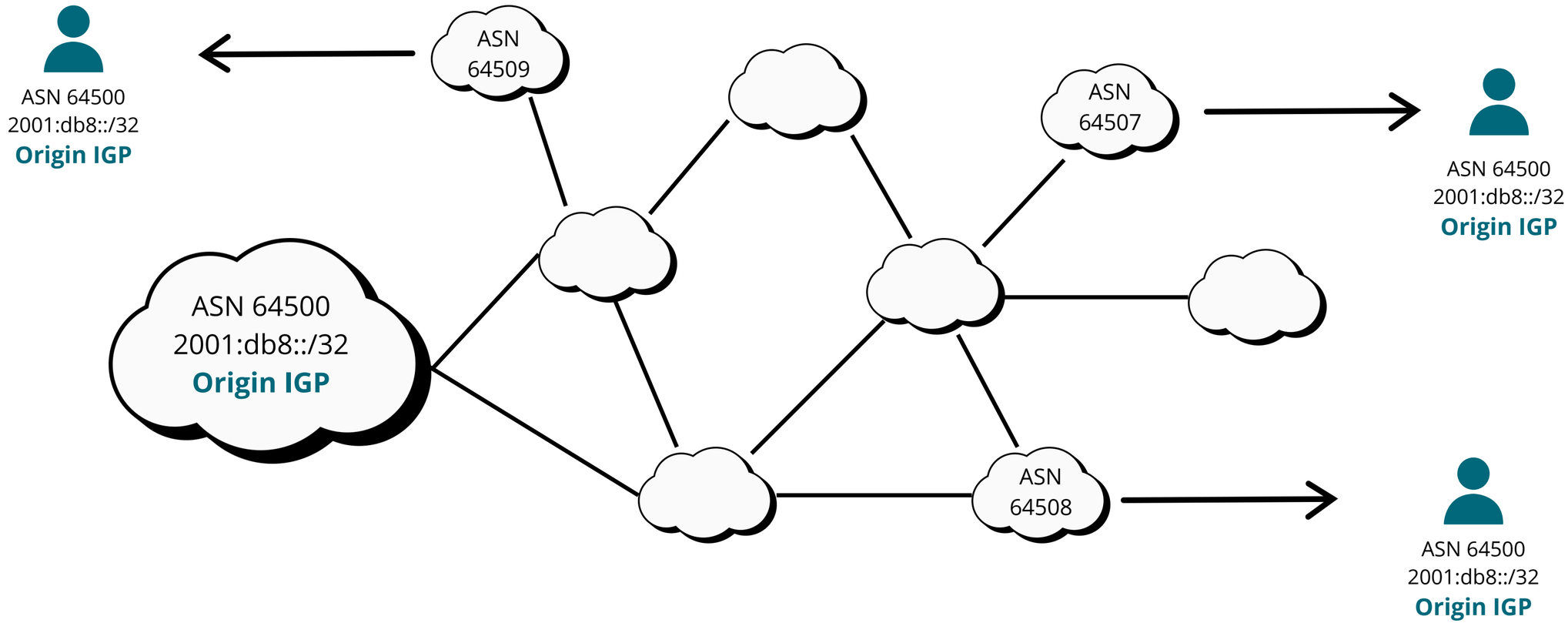
RFC 4271 - BGP

5.1.1. ORIGIN

ORIGIN is a well-known mandatory attribute. The ORIGIN attribute is generated by the speaker that originates the associated routing information. Its value SHOULD NOT be changed by any other speaker.

https://www.rfc-editor.org/rfc/rfc4271.html#section-5.1.1

BGP - ORIGIN


ASN 64500
2001:db8::/32
Origin IGP
ASN
64509
ASN
64507
ASN 64500
2001:db8::/32
Origin IGP
ASN 64500
2001:db8::/32
Origin IGP
ASN
64508
ASN 64500
2001:db8::/32
Origin IGP

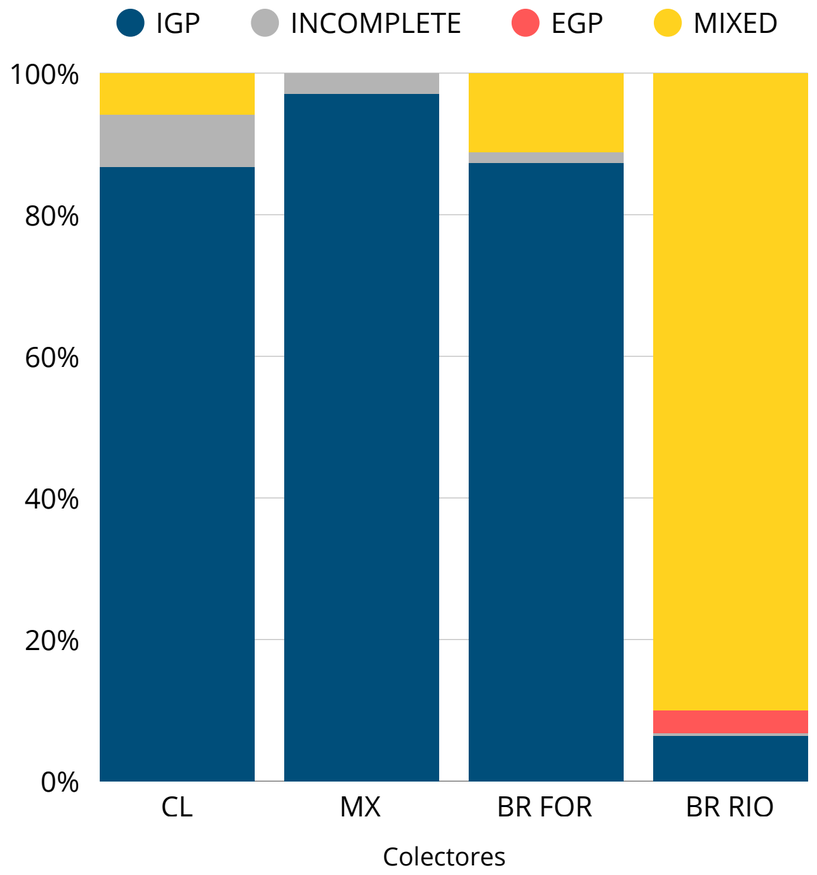
Debería ser consistente en internet

...

pero no lo es

Distribución de ORIGIN por colector (IPv4)

Aproximaciones Esperadas
- ≈ 90% IGP
- ≈ 9% INCOMPLETE
- ≈ 1% EGP



Datos y metodología de análisis

BGP
4 colectores RouteViews
IPv4 + IPv6
2025 (12 meses)

LACNIC
delegated-lacnic mensual
filtro de prefijos LACNIC

01
1 RIB/mes por colector

02
Convertir RIB a texto

03
1 delegated lacnic/mes

04
Filtrar prefijos LACNIC

05
Agrupación por prefijo único
Clasificación por ORIGIN

Unidad analítica: prefijos únicos

Datos y metodología de análisis

Prefijo	CC	Origin Type	ASN Origen	AS_PATH
5.183.80.0/22	DO	INCOMPLETE	52471	27986 6762 23520 52471
24.152.7.0/24	BR	IGP	270494	27986 6762 4230 270494
45.180.20.0/24	PA	INCOMPLETE	273045	27986 6762 262287 273045
45.180.20.0/24	PA	IGP	273045	27678 6429 27978 2914 174 262287 273045
128.201.236.0/24	AR	EGP	265749	27986 6762 7303 28048 28048 265749

RIB Prefijos LACNIC

¿Qué significa MIXED en este estudio?

+ mismo prefijo

+ mismo AS de origen

+ ORIGIN diferente según el peer dentro del colector

→ múltiples versiones de la misma ruta

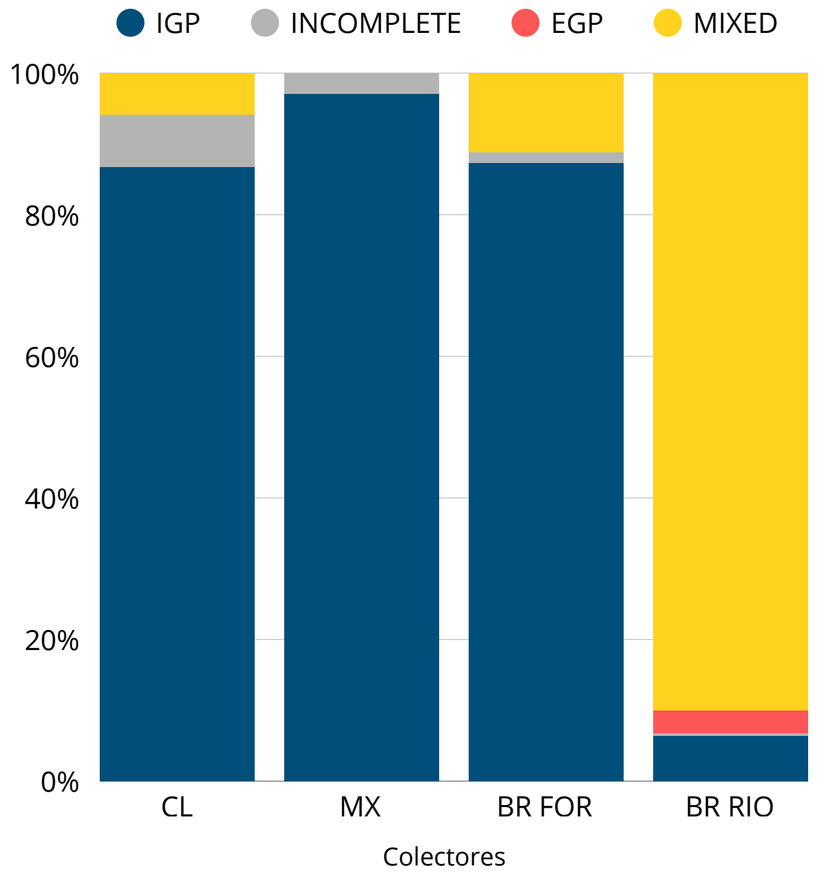
Prefijo 2001:db8::/32
ASN Origen: 64500

Peer 1 → IGP
Peer 2 → EGP
Peer 3 → INCOMPLETE
Peer 4 → IGP

Resultado → MIXED

Distribución de ORIGIN por colector (IPv4)

Aproximaciones Esperadas
- 90% IGP
  - 9% INCOMPLETE
  - 1% EGP

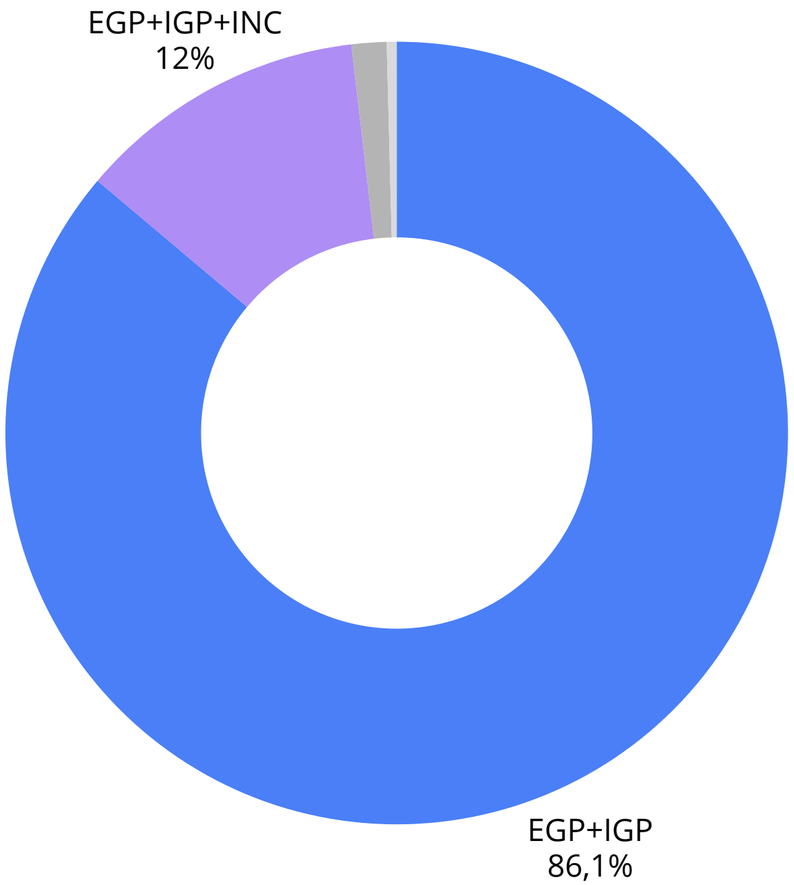


7% INCOMPLETE CL

97% IGP MX

90% Mixed BR_RIO

BR_RIO: 90% MIXED



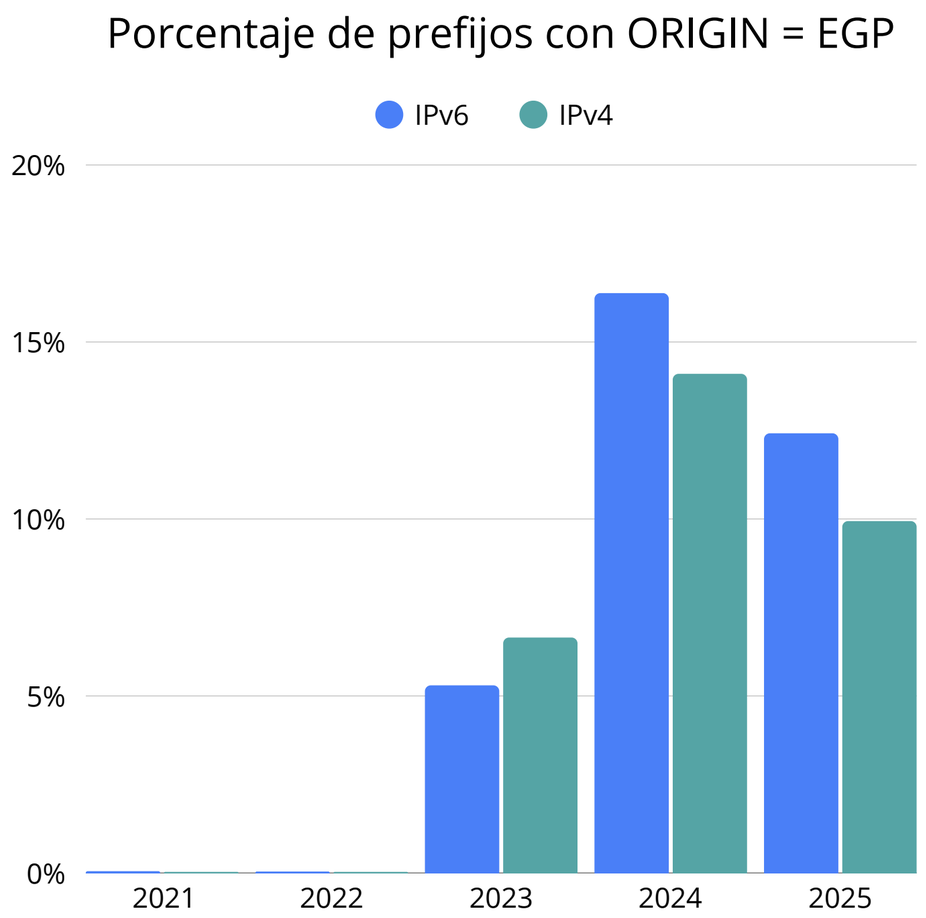
86% EGP+IGP: el mismo prefijo visto como EGP por unos peers e IGP por otros, dentro del mismo colector.

12% EGP+IGP+INC: triple inconsistencia dentro de un único colector

BR_FOR (mismo país, cantidad de peers similar):
~11% MIXED
→ mismo país, comportamiento completamente distinto

EGP: una señal inesperada

Aumento abrupto de ORIGIN = EGP en BR_FOR desde agosto de 2023



¿Por qué seguimos viendo EGP?

La respuesta del operador

Caso de estudio — validación operacional

“...tenemos routers distribuidos entre varios países y una de las métricas principales para los prefijos aprendidos por los ASBR es la distancia al next-hop.

El atributo Origin se analiza antes que la distancia al next-hop. Lo que hicimos fue remarcar el Origin para las rutas aprendidas por otros peers con Origin EGP, para que no gane la ruta de un router más lejano...”

Entonces...

ORIGIN no describe la ruta

describe una decisión del operador

Y solo sucede en nuestra región...?

Este comportamiento no es exclusivo de LACNIC

Rewriting BGP Origin
Speaker: James Bensley
RIPE91

https://ripe91.ripe.net/programme/meeting-plan/sessions/30/GJ8PFJ/

La “inconsistencia” en ORIGIN no es aleatoria:
es estructura, políticas y decisiones reales.

ORIGIN sigue siendo usado.
Pero ya no significa lo mismo.

¿Lo cambiamos..
o cambiamos cómo lo interpretamos?

Gracias!



Evidencia operacional en colectores BGP

Prefix 24.152.57.0/24

```
route-views.fortaleza> show ip bgp 24.152.57.0/24
BGP routing table entry for 24.152.57.0/24, version 848678120
Paths: (10 available, best #1, table default)
  Not advertised to any peer
  262462 12956 22927 52361 269970
    45.68.74.7 from 45.68.74.7 (177.54.235.6)
      Origin IGP, valid, external, best (AS Path), rpki validation-state: valid
      Last update: Sun May  3 15:17:43 2026
  52320 12956 22927 52361 269970
    45.68.72.128 from 45.68.72.128 (200.16.68.11)
      Origin IGP, metric 120, valid, external, rpki validation-state: valid
      Community: 52320:12917
      Last update: Wed May  6 04:54:47 2026
  61573 37468 12956 22927 52361 269970
    45.68.72.242 from 45.68.72.242 (0.0.0.1)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 61573:1000
      Last update: Sun May  3 15:18:05 2026
  264479 2914 12956 22927 52361 269970
    45.68.73.15 from 45.68.73.15 (10.99.99.2)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Tue May  5 23:52:33 2026
```

Colector Fortaleza

route-views.fortaleza.routeviews.org

Prefix 24.152.57.0/24

```
route-views.rio> show ip bgp 24.152.57.0/24
BGP routing table entry for 24.152.57.0/24, version 567477955
Paths: (10 available, best #1, table default)
  Not advertised to any peer
  52320 12956 22927 52361 269970
    45.68.80.193 from 45.68.80.193 (200.16.68.4)
      Origin IGP, metric 0, valid, external, best (AS Path), rpki validation-state: valid
      Community: 52320:12917
      Last update: Tue May  5 19:45:00 2026
  6057 12956 22927 52361 269970
    45.68.82.203 from 45.68.82.203 (200.40.65.7)
      Origin EGP, valid, external, rpki validation-state: valid
      Community: 6057:1001 6057:32403 6057:40321
      Extended Community: RT:6057:6057
      Last update: Sun May  3 15:18:10 2026
  999 10429 12956 22927 52361 269970
    45.68.82.199 from 45.68.82.199 (10.31.0.203)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 999:800 10429:301
      Last update: Sun May  3 15:17:45 2026
  264479 2914 12956 22927 52361 269970
    45.68.81.167 from 45.68.81.167 (10.99.99.2)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Tue May  5 23:52:33 2026
```

Colector Rio

route-views.rio.routeviews.org

Prefix 24.152.57.0/24

```
pit.scl> show ip bgp 24.152.57.0/24
BGP routing table entry for 24.152.57.0/24, version 218628402
Paths: (2 available, best #1, table default)
  Not advertised to any peer
  32590 12956 22927 52361 269970
    45.68.16.190 from 45.68.16.190 (155.133.249.219)
      Origin EGP, valid, external, best (AS Path), rpki validation-state: valid
      Community: 12956:123 12956:4002 12956:4022 12956:4220 17152:0
      Last update: Sun May  3 15:17:49 2026
  64112 22850 174 12956 22927 52361 269970
    45.68.16.3 from 45.68.16.3 (170.247.92.1)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 22850:65151
      Last update: Sun May  3 15:18:05 2026
```

Colector Chile

pit.scl.routeviews.org

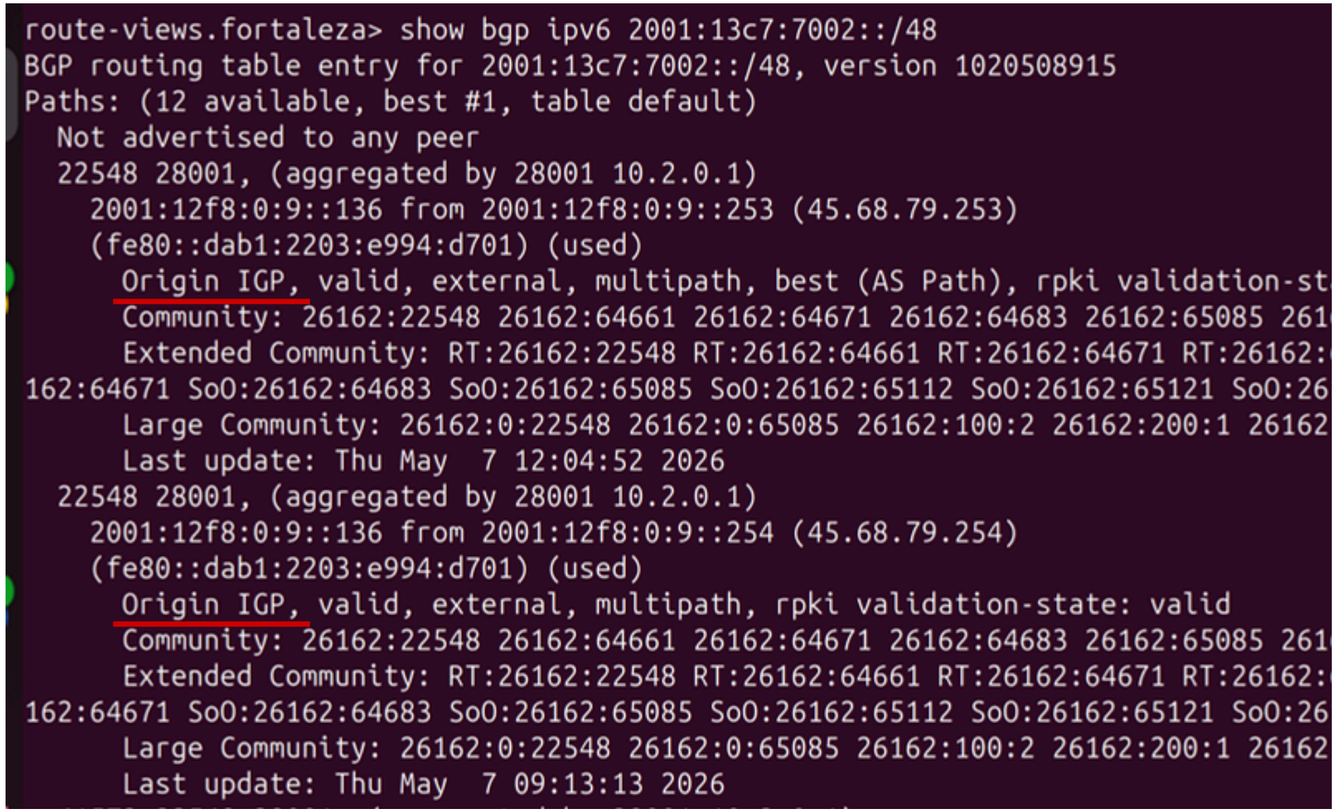
Prefix 24.152.57.0/24

```
pitmx.qro> show ip bgp 24.152.57.0/24
BGP routing table entry for 24.152.57.0/24, version 174966228
Paths: (3 available, best #1, table default)
  Not advertised to any peer
  28398 12956 22927 52361 269970
    200.23.206.59 from 200.23.206.59 (38.7.20.236)
      Origin IGP, metric 100, valid, external, best (AS Path), rpki validation-state: valid
      Last update: Sun May  3 15:17:54 2026
  272403 1299 12956 22927 52361 269970
    200.23.206.69 from 200.23.206.69 (10.188.88.1)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Sun May  3 15:17:44 2026
  199524 1299 12956 22927 52361 269970
    200.23.206.218 from 200.23.206.218 (10.255.68.64)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Sun May  3 15:17:44 2026
```

Colector México

pitmx.qro.routeviews.org

Prefix 2001:13c7:7002::/48



Colector Fortaleza

route-views.fortaleza.routeviews.org

Prefix 2001:13c7:7002::/48

```
53062 22548 28001, (aggregated by 28001 10.2.0.1)
  2001:12f8:0:2::54:73 from 2001:12f8:0:2::54:73 (172.23.240.128)
  (fe80::ae78:d108:b5ec:fcb1) (used)
    Origin IGP, valid, external, rpki validation-state: valid
    Community: 53062:10037 53062:10043 53062:30091
    Last update: Thu May  7 17:57:22 2026
52320 22548 28001, (aggregated by 28001 10.2.0.1)
  2001:12f8:0:2::193 from 2001:12f8:0:2::193 (200.16.68.4)
  (fe80::5e5e:ab07:49b8:bfc3) (used)
    Origin IGP, metric 120, valid, external, rpki validation-state: valid
    Community: 52320:22318
    Last update: Wed May  6 20:43:59 2026
6057 22548 28001, (aggregated by 28001 10.2.0.1)
  2001:12f8:0:2::54:203 from 2001:12f8:0:2::54:203 (200.40.65.7)
  (fe80::e81:260f:ccf6:58a8) (used)
    Origin EGP, valid, external, rpki validation-state: valid
    Community: 6057:1002 6057:33527 6057:40760
    Extended Community: RT:6057:6057
    Last update: Tue May  5 14:10:41 2026
```

Colector Rio

route-views.rio.routeviews.org

Prefix 2001:13c7:7002::/48

```
pit.scl> show bgp ipv6 2001:13c7:7002::/48
BGP routing table entry for 2001:13c7:7002::/48, version 203583326
Paths: (2 available, best #1, table default)
  Not advertised to any peer
  32590 6939 22548 28001, (aggregated by 28001 10.2.0.1)
    2801:14:9000::6939:1 from 2801:14:9000::3:2590:1 (155.133.249.219)
    (fe80::b6f9:5dff:fe3e:87a4) (used)
      Origin EGP, valid, external, best (AS Path), rpki validation-state: valid
      Community: 6939:7227 6939:8076 6939:9005 17152:0 32590:999
      Last update: Wed Apr 22 22:57:35 2026
  64112 22850 16735 22548 28001, (aggregated by 28001 10.2.0.1)
    2801:14:9000::6:4112:1 from 2801:14:9000::6:4112:1 (170.247.92.1)
    (fe80::20c:29ff:fefa:15c2) (used)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 22850:65101
      Last update: Fri May  1 19:35:02 2026
```

Colector Chile

pit.scl.routeviews.org

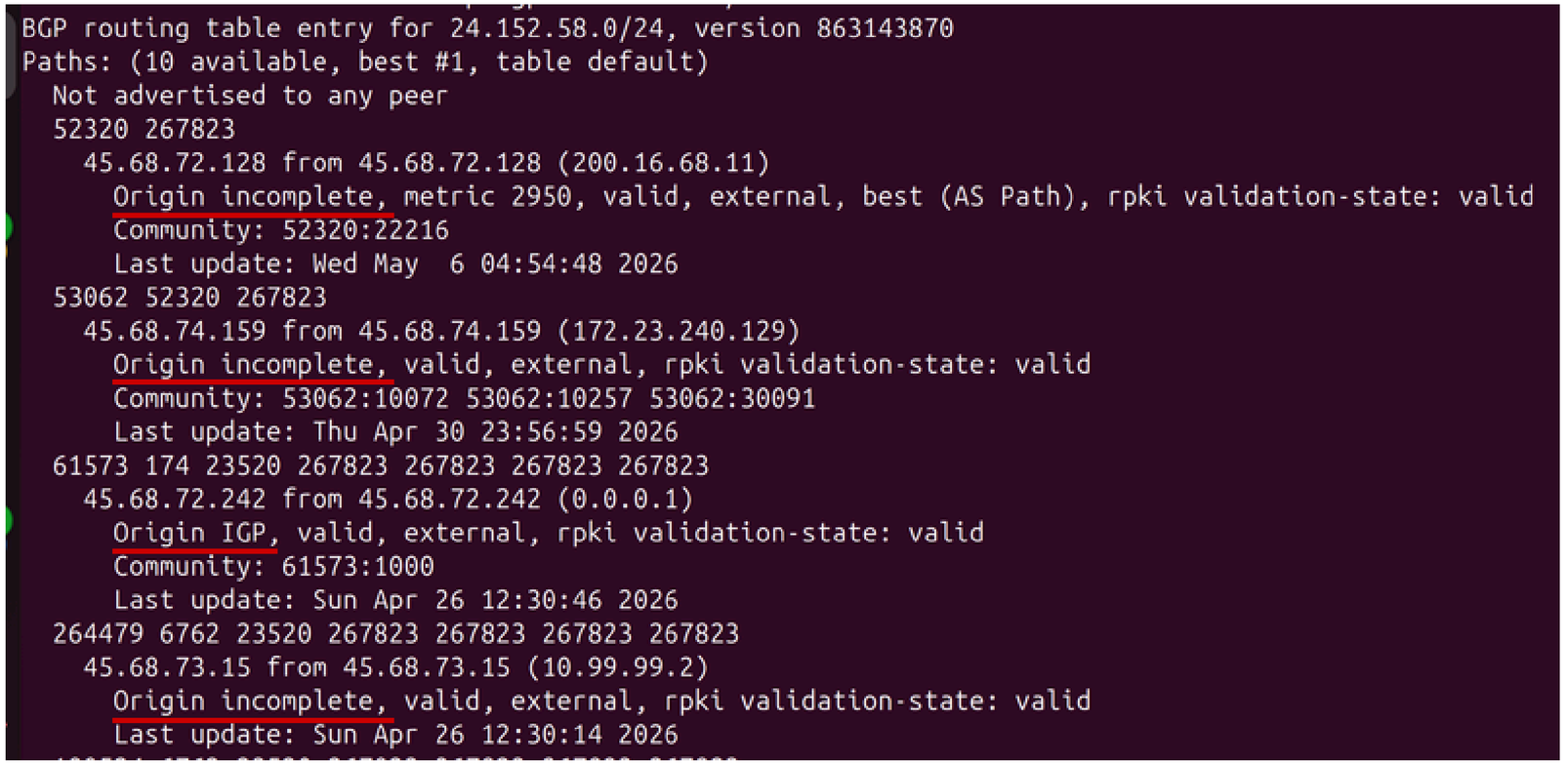
Prefix 2001:13c7:7002::/48

```
pitmx.qro> show bgp ipv6 2001:13c7:7002::/48
BGP routing table entry for 2001:13c7:7002::/48, version 80307476
Paths: (4 available, best #1, table default)
  Not advertised to any peer
  28398 12956 22548 28001, (aggregated by 28001 10.2.0.1)
    2803:3440:9025::2:8398:1 from 2803:3440:9025::2:8398:1 (38.7.20.236)
    (fe80::2c1:64ff:fe2f:d191) (used)
      Origin IGP, metric 100, valid, external, best (AS Path), rpki validation-state: valid
      Last update: Wed Apr 22 13:14:46 2026
  272403 1299 12956 22548 28001, (aggregated by 28001 10.2.0.1)
    2803:3440:9025::27:2403:1 from 2803:3440:9025::27:2403:1 (10.188.88.1)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Wed Apr 15 00:28:47 2026
  199524 1299 12956 22548 28001, (aggregated by 28001 10.2.0.1)
    2803:3440:9025::19:9524:1 from 2803:3440:9025::19:9524:1 (10.255.68.64)
      Origin IGP, valid, external, rpki validation-state: valid
      Last update: Thu Apr 30 04:07:22 2026
  64112 174 16735 22548 28001, (aggregated by 28001 10.2.0.1)
    2803:3440:9025::6:4112:1 from 2803:3440:9025::6:4112:1 (200.23.206.3)
    (fe80::20c:29ff:fe31:4228) (used)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 174:21001 174:22013
      Last update: Wed Apr  1 07:01:50 2026
```

Colector México

pitmx.qro.routeviews.org

Prefix 24.152.58.0/24



```
BGP routing table entry for 24.152.58.0/24, version 863143870
Paths: (10 available, best #1, table default)
  Not advertised to any peer
  52320 267823
    45.68.72.128 from 45.68.72.128 (200.16.68.11)
      Origin incomplete, metric 2950, valid, external, best (AS Path), rpki validation-state: valid
      Community: 52320:22216
      Last update: Wed May  6 04:54:48 2026
  53062 52320 267823
    45.68.74.159 from 45.68.74.159 (172.23.240.129)
      Origin incomplete, valid, external, rpki validation-state: valid
      Community: 53062:10072 53062:10257 53062:30091
      Last update: Thu Apr 30 23:56:59 2026
  61573 174 23520 267823 267823 267823 267823
    45.68.72.242 from 45.68.72.242 (0.0.0.1)
      Origin IGP, valid, external, rpki validation-state: valid
      Community: 61573:1000
      Last update: Sun Apr 26 12:30:46 2026
  264479 6762 23520 267823 267823 267823 267823
    45.68.73.15 from 45.68.73.15 (10.99.99.2)
      Origin incomplete, valid, external, rpki validation-state: valid
      Last update: Sun Apr 26 12:30:14 2026
```

Colector Fortaleza

route-views.fortaleza.routeviews.org

Prefix 2803:2b00:110a::/48

```
route-views.rio> show bgp ipv6 2803:2b00:110a::/48
BGP routing table entry for 2803:2b00:110a::/48, version 427568534
Paths: (7 available, best #1, table default)
  Not advertised to any peer
  6057 52468
    2001:12f8:0:2::54:203 from 2001:12f8:0:2::54:203 (200.40.65.7)
    (fe80::e81:260f:ccf6:58a8) (used)
      Origin EGP, valid, external, best (AS Path), rpki validation-state: valid
      Community: 6057:1002 6057:33323 6057:48400 6057:48401
      Extended Community: RT:6057:6057
      Last update: Tue Apr 14 02:20:43 2026
  52320 52468
    2001:12f8:0:2::193 from 2001:12f8:0:2::193 (200.16.68.4)
    (fe80::5e5e:ab07:49b8:bfc3) (used)
      Origin incomplete, metric 1560, valid, external, rpki validation-state: valid
      Community: 52320:21912
      Last update: Thu May  7 12:47:09 2026
  267613 16735 52468
    2001:12f8:0:2::62 from 2001:12f8:0:2::62 (10.255.255.20)
    (fe80::4e96:1406:3b54:f9c0) (used)
      Origin incomplete, metric 0, valid, external, rpki validation-state: valid
      Community: 5469:2200 5469:10111 5469:11100
      Last update: Tue May  5 15:12:21 2026
```

Colector Rio

route-views.rio.routeviews.org