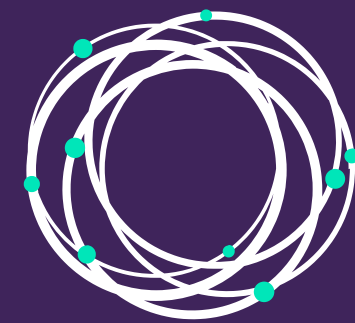




inter.link

# BGP Origin Type

James Bensley

**RIPE91**

Intro

**Person**

James

**Company**

Inter.link

**Context**

Well sell IP transit

Origin

# Origin

[RFC4271](#) - A well-known mandatory attribute.

The ORIGIN attribute is generated by the speaker that originates the associated routing information.

Origin

RFC4271

- IGP - [The NLRI] is interior to the originating AS

Origin

RFC4271

- IGP - [The NLRI] is interior to the originating AS
- EGP - [The NLRI] is learned via the EGP protocol

Origin

RFC4271

- IGP - [The NLRI] is interior to the originating AS
- EGP - [The NLRI] is learned via the EGP protocol
- INCOMPLETE - [The NLRI] is learned by some other means

Origin

RFC4271

- IGP - [The NLRI] is interior to the originating AS
- ~~EGP - [The NLRI] is learned via the EGP protocol~~
- INCOMPLETE - [The NLRI] is learned by some other means

Origin

DFZ @ 2025-09

Approx:

- > 90% IGP
- > 9% INCOMPLETE
- < 1% EGP

# Origin

- 293 ASNs originating 2,064 prefixes with origin EGP
- Seem to be legacy customer config  
(any other reasons, please let me know?)

TLDR

- IGP is more preferred than INCOMPLETE

# TLDR

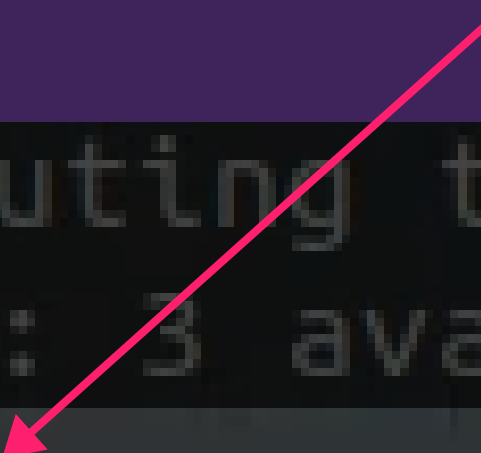
- IGP is more preferred than INCOMPLETE
- [RFC4271](#) - "... SHOULD NOT be changed by any other speaker"

## Example Prefix

```
BGP routing table entry for 217.195.157.0/24  
  Paths: 3 available  
    3209  
      94.103.180.66 from 94.103.180.66 (94.103.  
    Origin INCOMPLETE, metric 90, localpref
```

## Example Prefix

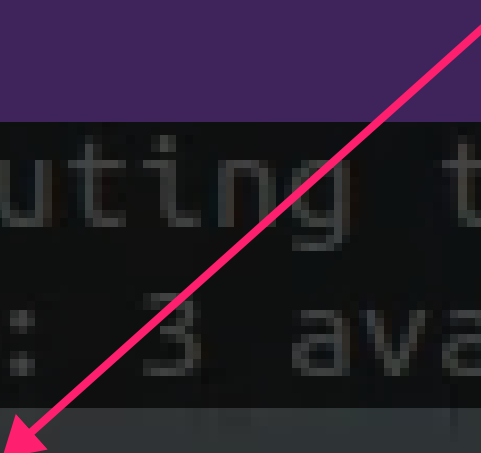
direct peering with origin



```
BGP routing table entry for 217.195.157.0/24  
Paths: 3 available  
3209  
94.103.180.66 from 94.103.180.66 (94.103.  
Origin INCOMPLETE, metric 90, localpref
```

## Example Prefix

direct peering with origin



```
BGP routing table entry for 217.195.157.0/24  
Paths: 3 available  
3209  
94.103.180.66 from 94.103.180.66 (94.103.  
Origin INCOMPLETE, metric 90, localpref
```

# Tier 1s Rewriting Origin to IGP

# Tier 1s Rewriting Origin to IGP

6 out of 16

|      |     |       |     |
|------|-----|-------|-----|
| 174  | Yes | 5511  | No  |
| 701  | No  | 6453  | Yes |
| 1299 | Yes | 6461  | No  |
| 2914 | Yes | 6762  | No  |
| 3257 | No  | 6830  | No  |
| 3320 | No  | 6939  | Yes |
| 3356 | Yes | 7018  | No  |
| 3491 | Yes | 12956 | No  |

## Tier 1s Rewriting Origin to IGP

*XXXX may normalize the ORIGIN attribute to IGP (0) when processing or aggregating routes. This is done to ensure consistency in route propagation and to align with our internal routing policies across ASXXXX...*

## Tier 1s Rewriting Origin to IGP

*...While RFC 4271 Section 5.1.1 states that the ORIGIN attribute "SHOULD NOT" be modified, the use of "SHOULD NOT" (as defined in RFC 2119) allows for exceptions when operationally justified. In our case, this normalization helps maintain route stability and predictability across our global backbone.*

AS5405

- We decided not to modify Origin (like LocalPref)

- We decided not to modify Origin (like LocalPref)
- Over time we've had more and more customers complain that they aren't sending their traffic via our network, but they want traffic to go via our network, because of origin

AS5405

- We will start to rewrite the origin to IGP on all eBGP advertisements, because our customers are negatively affected by a zero sum game

- We will start to rewrite the origin to IGP on all eBGP advertisements, because our customers are negatively affected by a zero sum game
- We will provide an opt-out feature for any customer or peer that doesn't want this (just email [support@inter.link](mailto:support@inter.link))

AS5405

- We are the first major transit provider to announce we will do this publicly, why we are doing it, and provide an out-opt feature

- We are the first major transit provider to announce we will do this publicly, why we are doing it, and provide an out-opt feature
- Strategic Convergence - If everyone does this we implicitly deprecate the attribute

# Bonus

## 1299 Looking Glass

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

```
1273 3209
```

```
2.255.249.46 (metric 2004) from 2.255.253.106 (2.255.249.46)
```

```
Origin IGP, metric 0, localpref 150, valid, internal
```

## Bonus

### 1299 Looking Glass

```
Path #1: Received by speaker 0  
1273 3209  
  2.255.249.46 (metric 2004) from 2.255.253.106 (2.255.249.46)  
    Origin IGP, metric 0, localpref 150, valid, internal
```

If the BGP best path process goes down to the router ID for a tie breaker, 1299 use addresses in 2/8 for their router IDs

(lowest ID wins!)

# Bonus

Tls announcing space in 2/8:

- 174
- 1299
- 3257
- 3320
- 6762
- 12956

## Bonus

Tls announcing space in 2/8:

- 174
- 1299
- 3257
- 3320
- 6762
- 12956

If you have space for sale  
in 1/8, find me later :D

# Questions / Comments?

Find me here at RIPE91

Email: [james@inter.link](mailto:james@inter.link)

Looking glass  
captures of each  
Tier 1 network

# AS1273

Each Vodafone geography aggregates through AS1273.  
Some TIs are peering with AS3209, some are peered with AS1273.

```
217.195.157.0/24    *[BGP/170] 4d 20:15:20, localpref 100  
                  AS path: 3209 ?, validation-state:  
>   to 195.2.15.34 via ae46.100
```

INCOMPLETE

# AS174

direct peering with origin

Path #1: Received by speaker 0

1273 3209

38.28.8.43 (metric 103030) from 38.28.8.21 (38.28.8.43)

Origin incomplete, metric 4294967294, localpref 100, valid, internal, best, group-best, import-candidate

Received Path ID 0, Local Path ID 1, version 2918216116

Community: 174:12001 174:20666 174:21200 174:22038

Originator: 38.28.8.43, Cluster list: 38.28.8.21

AS174 rewriting inbound

<https://cogentco.com/en/looking-glass>

# AS701

direct peering with origin

```
217.195.157.0/24 (2 entries, 1 announced)
  *BGP   Preference: 170/-101
        Age: 6d 19:52:03      Metric: 10      Metric2: 190052
        Announcement bits (5): 0-KRT 3-RT 8-BGP_Multi_Path 9-Res
        AS path: (65200) 1273 3209 ?
        Communities:
        Localpref: 100
```

701 not rewriting inbound

701 does peer with RIPE RIS, RoueViews, or PCH collectors. 6461 doesn't rewrite and path learned via 701 has origin unmodified.

|                 |                                                                              |
|-----------------|------------------------------------------------------------------------------|
| Neighbor        | 2001:504:40:108::1:13 (AS6461) <small>Learned from: route-views.flix</small> |
| Prefix          | 2600:1002:a018::/45                                                          |
| AS Path         | 6461 701 22394 6167                                                          |
| Origin          | INCOMPLETE                                                                   |
| RPKI validation | VALID <small>At least one VRP Matches the Route Prefix</small>               |
| Communities     | 6461:5997                                                                    |
| Last Updated    | 10.9.2025, 08:23:49 (3w01d00h)                                               |

# AS1299

Path #2: Received by speaker 0

1273 3209

2.255.249.46 (metric 2004) from 2.255.253.107 (2.255.249.46)

Origin IGP, metric 0, localpref 150, valid, internal

Communities:

1299:431 (RPKI state Unknown)

1299:4000 1299:20000 1299:20700

Originator: 2.255.249.46 (ffm-b11), Cluster list: 2.255.253.107

Path #3: Received by speaker 0

1273 3209

62.115.174.155 from 62.115.174.155 (195.2.1.88)

Origin IGP, metric 0, localpref 150, valid, external, best, group

Communities:

1299:431 (RPKI state Unknown)

1299:4000 1299:20000 1299:20700

Path #4: Received by speaker 0

1273 3209, (received-only)

62.115.174.155 from 62.115.174.155 (195.2.1.88)

Origin incomplete, metric 0, localpref 100, valid, external

Communities: 1273:12276 1273:43003

direct peering with origin

AS1299 rewriting outbound

direct peering with origin

AS1273 IP

INCOMPLETE on inbound

<https://lg.twelve99.net/?type=bgp&router=ffm-b5&address=217.195.157.0/24>

# AS2914

direct peering with origin

```
Path #7: Received by speaker 0
Not advertised to any peer
1273 3209
129.250.66.42 (metric 5501) from 129.250.1.58 (129.250.0.75)
Origin incomplete, metric 4294967294, localpref 100, valid
Received Path ID 1, Local Path ID 0, version 0
Community: 1273:12276 1273:43003 2914:395 2914:1203 2914:2
Originator: 129.250.0.75, Cluster list: 129.250.1.58
```

2914 not rewriting inbound

RIPE RIS peering with 2914,  
2914 rewriting outbound

|                 |                                                              |
|-----------------|--------------------------------------------------------------|
| Neighbor        | 80.81.192.46 (AS2914) Learned from: rrc12.ripe.net           |
| Prefix          | 217.195.157.0/24                                             |
| AS Path         | 2914 1273 3209                                               |
| Origin          | IGP                                                          |
| RPKI validation | UNKNOWN No VRP Covers the Route Prefix                       |
| MED             | 2001                                                         |
| Communities     | 1273:12276 1273:43003 2914:420 2914:1201 2914:2202 2914:3200 |
| Last Updated    | 24.9.2025, 18:27:10 (0w06d19h)                               |

# AS3257

Looking glass is broken.  
Looking at 70183257 via RIPE RIS, they are rewriting



|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Neighbor        | 80.81.196.110 (AS3257) <small>Learned from: rrc12.ripe.net</small> |
| Prefix          | 217.195.157.0/24                                                   |
| AS Path         | 3257 1273 3209                                                     |
| Origin          | INCOMPLETE                                                         |
| RPKI validation | UNKNOWN <small>No VRP Covers the Route Prefix</small>              |
| MED             | 0                                                                  |
| Communities     | 3257:8059 3257:8927 3257:30244 3257:50001                          |
| Last Updated    | 24.9.2025, 18:27:08 (0w06d19h)                                     |

No looking glass for GTT

<https://bgp.he.net/lg/3257#217.195.157.0/24?tob=none&els=exact>

# AS3320

direct peering with origin

|                   |                                                                                    |
|-------------------|------------------------------------------------------------------------------------|
| BGP as_path       | 3209                                                                               |
| BGP cluster_list  | 194.25.5.167 194.25.7.112                                                          |
| BGP community     | (3320,1276) (3320,2010) (3320,9020) (64512,200) (64900,31201) (64901,10000)        |
| BGP local_pref    | 100                                                                                |
| BGP next_hop      | 194.25.5.160                                                                       |
| BGP origin        | Incomplete                                                                         |
| BGP originator_id | 194.25.5.160                                                                       |
| Summary           | 217.195.157.0/24 [bgp1 2025-09-24 16:27:08 from 100.127.200.129] * (100) [AS3209?] |
| Type              | BGP univ                                                                           |
| VantagePoint      | Frankfurt, Germany                                                                 |

AS3320 not rewriting outbound

AS3320 not rewriting inbound

|                                                    |                                                      |
|----------------------------------------------------|------------------------------------------------------|
| Super Looking Glass Terminal                       |                                                      |
| 217.195.157.0/24                                   |                                                      |
| Processing....                                     |                                                      |
| Exact Match Shorter Longer Brief Text Exclude 3320 |                                                      |
| 6 Paths observed                                   |                                                      |
| Neighbor                                           | 80.249.209.211 (AS3320) Learned from: rrc03.ripe.net |
| Prefix                                             | 217.195.157.0/24                                     |
| AS Path                                            | 3320 3209                                            |
| Origin                                             | INCOMPLETE                                           |
| RPKI validation                                    | UNKNOWN No VRP Covers the Route Prefix               |
| Communities                                        | 3320:1276 3320:2010 3320:9020                        |
| Last Updated                                       | 7.10.2025, 06:18:11 (2w02d01h)                       |

<https://lookingglass.telekom.com/?queryTerm=217.195.157.0%2F24&selectedVantagePoints=%5B%22Frankfurt%2C%20Germany%22%5D&vantagePoint=030-f-ed13>

<https://bgp.he.net/super-lg/#217.195.157.0/24?tob=none&mt=include&ma=3320&els=exact>

# AS3356

direct peering with origin

Age: 4d 21:56:54 Metric: 100000 Metric2: 20020

Validation State: unverified

Task: BGP\_3356.171.75.50.11

**AS path: 3209 1 (Originator)**

Cluster list: 0.0.7.9

**Originator ID: 171.75.52.141**

**Communities: 3356:2 3356:22 3356:86 3356:501 3356:502**

Accepted

**Localpref: 86**

Router ID: 171.75.50.11

Addpath Path ID: 1

Thread: junos-main

Route Record: Recorded nexthop 0x18533fc5c

as-index: 435727 (Recorded) com-index 12222 (Not-Recorded)

AS3356 rewriting inbound

<https://lookingglass.centurylink.com/>

# AS3491

consoleconnect

Source

Abidjan Cote D'Ivoire Ivory Coast

Destination

Bethlehem Pennsylvania USA

OffNet

Routing Protocol

IPv4

Query Type

Ping

Network Query

Abort-Remove

 Standard Routing   br01.abj01 to var01.abe01

Mon Sep 29 15:39:56.014 GMT

Sending 5, 100-byte ICMP Echos to 63.223.146.7, timeout is 2 seconds:

.....

Success rate is 0 percent (0/5)

RP/0/RSP0/CPU0:br01.abj01

Query Complete

Looking glass doesn't show routes.  
Looking at the 3491 routes via RIPE RIS,  
they are rewriting.

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Neighbor        | 27.111.228.43 (AS3491) <small>Learned from: route-views.sg</small> |
| Prefix          | 217.195.157.0/24                                                   |
| AS Path         | 3491 1273 3209                                                     |
| Origin          | IGP                                                                |
| RPKI validation | UNKNOWN <small>No VRP Covers the Route Prefix</small>              |
| Communities     | 1273:12276 1273:43003 3491:4000 3491:4012 3491:9002                |
| Last Updated    | 24.9.2025, 18:27:27 (0w06d19h)                                     |

<https://lookingglass.consoleconnect.com/>

<https://bgp.he.net/lg/3491#217.195.157.0/24?tob=none&els=exact>

# AS5511

direct peering with origin

```
1273 3209
 193.251.143.90 from 193.251.245.45 (172.25.4.96)
  Origin incomplete, metric 100, localpref 85, valid, interr
  Community: 5511:514 5511:666 5511:710 5511:30428 5511:3048
```

AS5511 not rewriting inbound

AS5405 direct peering with 5511

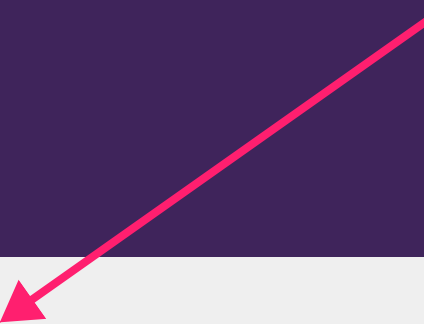
```
5511 1273 3209
 193.251.255.53 from 193.251.255.53 (172.25.4.213)
  Origin INCOMPLETE, metric 2, localpref -, IGP metric 0, weight
```

5511 not rewriting outbound

# AS6453

| A | V | Destination      | Next hop | AS path         |
|---|---|------------------|----------|-----------------|
| * | ? | 217.195.157.0/24 | 0        | 1273 3209 I     |
|   |   | unverified       |          | >195.219.50.133 |

direct peering with origin



AS6453 rewriting inbound



# AS6461

Router: Frankfurt, DE

Command: show route protocol bgp table inet.0 212.8.7.0/24 terse exact

This is Zayo's IP Looking Glass. Zayo offers [IP Transit](#), [Dedicated Internet Access](#), and [IP-VPN](#) on its Tier-1 IP network backbone, which delivers bandwidth to 7 countries on the world's 2nd most-peered network.

Commands are logged for later analysis

<https://lg.as6453.net/bin/lg.cgi>

Looking glass doesn't show routes.  
Looking at 6461 routes via RIPE RIS, they are not rewriting.

|                 |                                                                    |
|-----------------|--------------------------------------------------------------------|
| Neighbor        | 37.49.237.180 (AS6461) <small>Learned from: rrc21.ripe.net</small> |
| Prefix          | 217.195.157.0/24                                                   |
| AS Path         | 6461 3209                                                          |
| Origin          | INCOMPLETE                                                         |
| RPKI validation | UNKNOWN <small>No VRRP Covers the Route Prefix</small>             |
| MED             | 1075                                                               |
| Communities     | 6461:5997                                                          |
| Last Updated    | 24.9.2025, 19:03:18 (0w06d18h)                                     |

<https://bgp.he.net/lg/6461#217.195.157.0/24?tob=none&els=exact>

# AS6762

6762 have direct peering with origin

```
217.195.157.0/24 *[BGP/170] 1d 19:18:40, MED 1234, localpref 90
AS path: 1273 3209 *, validation-state: unknown
> to 195.2.6.25 via ae20.0
to 195.2.17.25 via ae21.0
```

AS6762 not rewriting inbound

<https://www.tisparkle.com/looking-glass>

Looking glass shows no rewrite on inbound.  
Looking at 6762 routes via RIPE RIS, they are not rewriting.

| Neighbor        | 80.81.192.194 (AS6762) <small>Learned from: rrc12.ripe.net</small> |
|-----------------|--------------------------------------------------------------------|
| Prefix          | 217.195.157.0/24                                                   |
| AS Path         | 6762 1273 3209                                                     |
| Origin          | INCOMPLETE                                                         |
| RPKI validation | UNKNOWN <small>No VRP Covers the Route Prefix</small>              |
| MED             | 100                                                                |
| Communities     | 6762:30 6762:14900                                                 |
| Last Updated    | 24.9.2025, 21:44:23 (0w06d16h)                                     |

<https://bgp.he.net/lg/6762#217.195.157.0/24?tob=none&els=exact>

# AS6830

direct peering with origin

```
Task: BGP_6830.62.179.128.90
Announcement bits(6): 0-KRT 5-Aggregate 7-BG
AS path: 1273 3209 ? (Originator)
Cluster list: 62.179.128.90
Originator ID: 84.116.128.248
Communities: 1273:12276 1273:43003 6830:17000
```

AS6830 not rewriting inbound

Looking glass shows no rewrite on inbound.  
Looking at 6830 routes via RouteViews, they are not rewriting.

|                 |                                                                     |
|-----------------|---------------------------------------------------------------------|
| Neighbor        | 80.249.208.106 (AS6830) <small>Learned from: rrc03.ripe.net</small> |
| Prefix          | 217.195.157.0/24                                                    |
| AS Path         | 6830 1273 3209                                                      |
| Origin          | INCOMPLETE                                                          |
| RPKI validation | UNKNOWN <small>No VRP Covers the Route Prefix</small>               |
| Communities     | 1273:12276 1273:43003 6830:17000 6830:17473                         |
| Last Updated    | 24.9.2025, 18:27:14 (0w06d19h)                                      |

<https://lg.aorta.net/app>

<https://bgp.he.net/lg/6830#217.195.157.0/24?tob=none&els=exact>

# AS6939

direct peering with origin

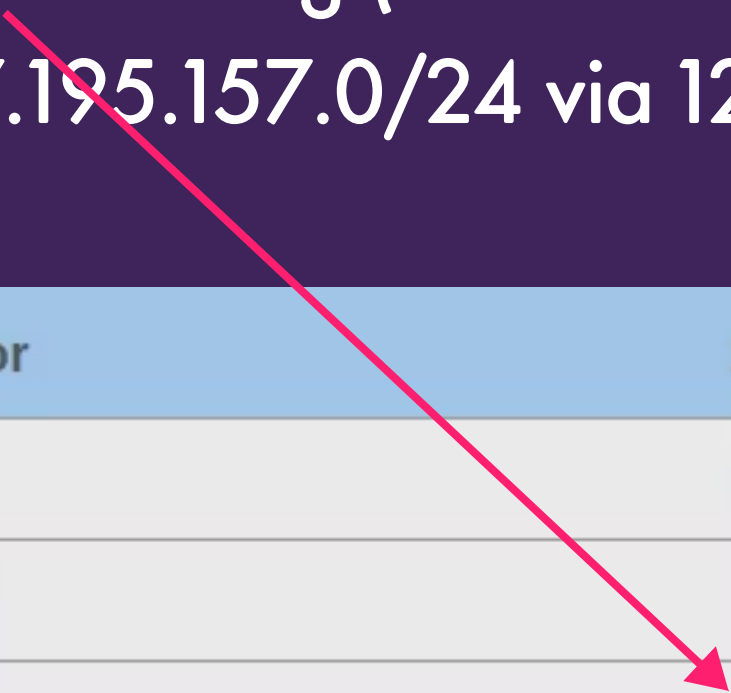
| Status | Network          | Next Hop        | Learned               | Metric | LocPr | MEB | Weight | Path | Origin | ROA |
|--------|------------------|-----------------|-----------------------|--------|-------|-----|--------|------|--------|-----|
| BI     | 217.195.157.0/24 | 216.218.253.103 | 216.218.253.18 (6939) | 20     | 100   | 0   | 0      | 3209 | IGP    | ?   |
| I      | 217.195.157.0/24 | 216.218.252.79  | 216.218.252.79 (6939) | 45     | 100   | 0   | 0      | 3209 | IGP    | ?   |

AS6939 rewriting inbound

# AS7018

Looking glass is broken.

Looking at 7018 via RouteViews, they are not rewriting (had to use a different prefix with non-IGP origin, 66.159.192.0/19, 7018 learns 217.195.157.0/24 via 1299 which rewrites to IGP).



| Neighbor        | 12.0.1.63 (AS7018) <small>Learned from: rrc00.ripe.net</small>              |
|-----------------|-----------------------------------------------------------------------------|
| Prefix          | 66.159.192.0/19                                                             |
| AS Path         | 7018 15169 394089                                                           |
| Origin          | EGP                                                                         |
| RPKI validation | <span>VALID</span> <small>At least one VRP Matches the Route Prefix</small> |
| Communities     | 7018:2500 7018:37232                                                        |
| Last Updated    | 29.9.2025, 23:58:33 (0w01d13h)                                              |

<http://route-server.ip.att.net/>

<https://bgp.he.net/lg/7018#66.159.192.0/19?tob=none&els=exact>

# AS12956

direct peering with origin

```
[BGP/170] 4d 22:36:03, MED 0, localpref 85
  AS path: 1273 3209 ?, validation-state:
> to 94.142.119.253 via ae20.0
  to 176.52.248.27 via ae32.0
```

AS12956 not rewriting inbound

Looking glass shows no rewrite on inbound.  
Looking at 12956 routes via RIPE RIS, they are not rewriting.

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Neighbor        | 80.249.208.208 (AS12956) <small>Learned from: rrc03.ripe.net</small> |
| Prefix          | 217.195.157.0/24                                                     |
| AS Path         | 12956 1273 3209                                                      |
| Origin          | INCOMPLETE                                                           |
| RPKI validation | UNKNOWN <small>No VRP Covers the Route Prefix</small>                |
| Communities     | 12956:4001 12956:4012                                                |
| Last Updated    | 24.9.2025, 18:27:36 (0w06d19h)                                       |