

inter.link

The End of Prefix Filtering

James Bensley

RIPE 93

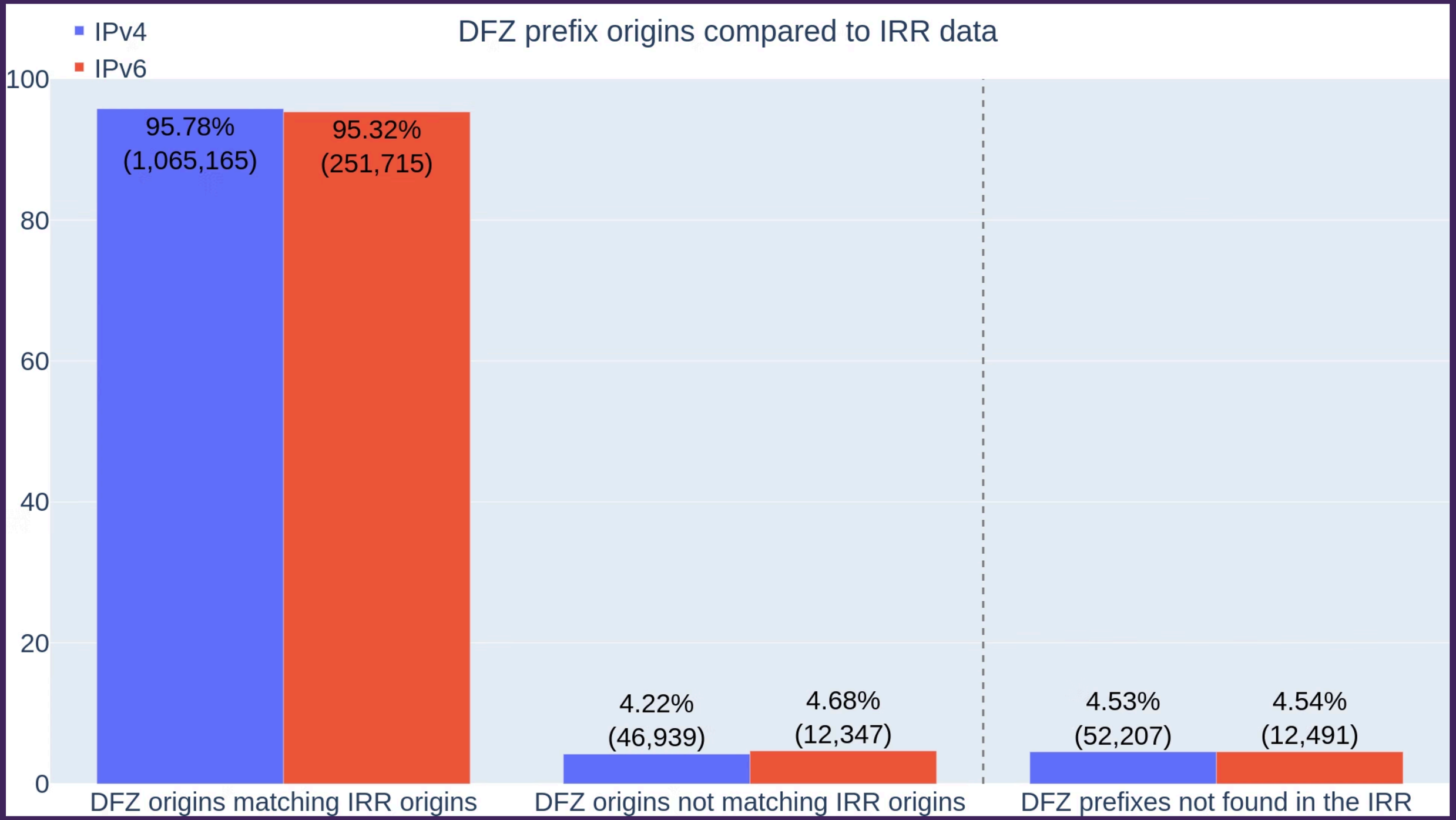
Q: Can we remove ingress prefix filters from our edge BGP policy?

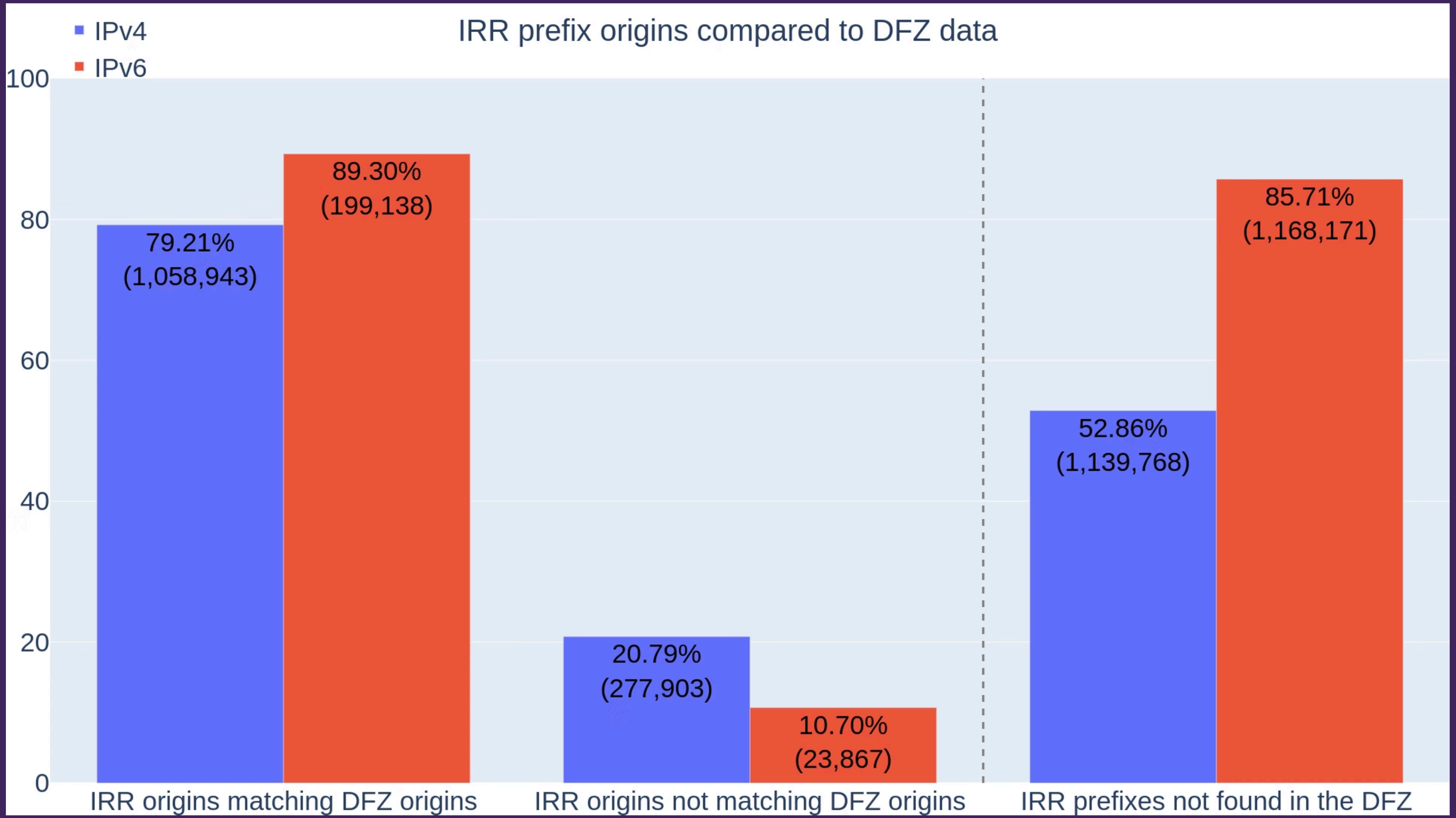
- ROI on operational overhead?
- Degradation in routing security?

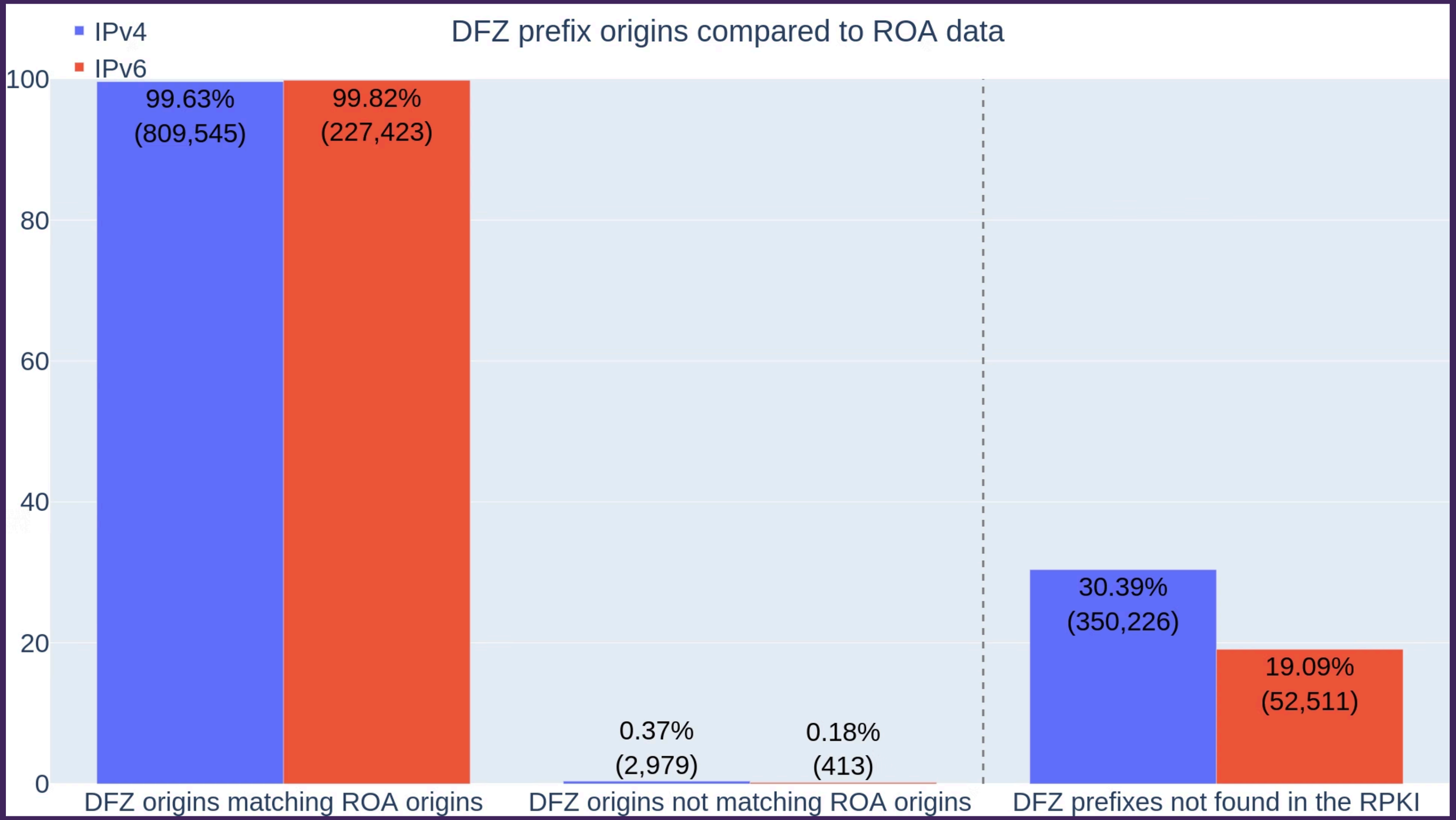
* This is for the standard case, not RTBH, private ASNs, Flowspec, etc.

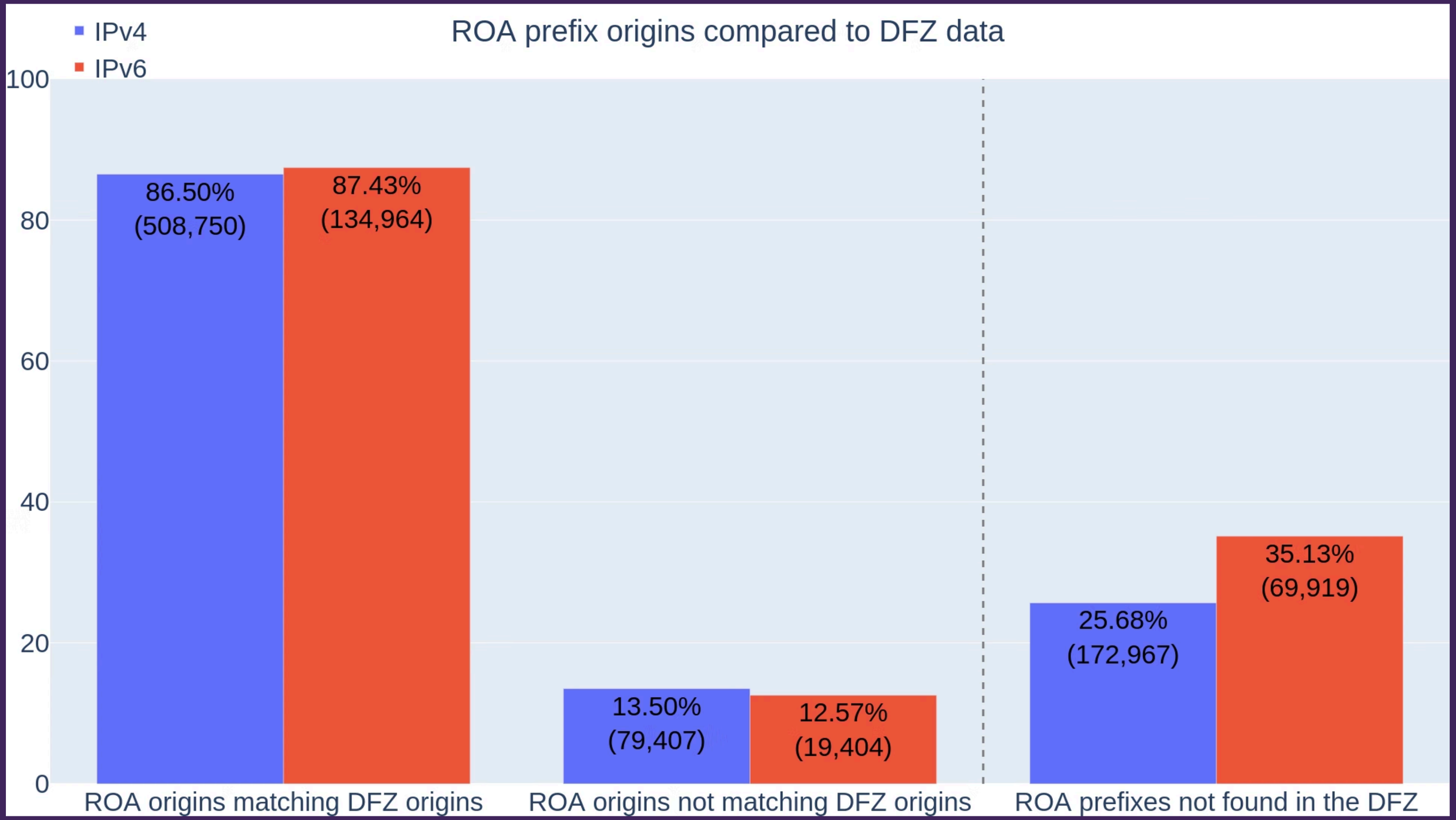
Caveat emptor:

- A 3-way comparison of DFZ <> IRR <> ROA
- A snapshop of a single day


DFZ prefix origins compared to IRR data
IPv4
IPv6
100
80
60
40
20
0
95.78%
(1,065,165)
95.32%
(251,715)
4.22%
(46,939)
4.68%
(12,347)
4.53%
(52,207)
4.54%
(12,491)
DFZ origins matching IRR origins
DFZ origins not matching IRR origins
DFZ prefixes not found in the IRR

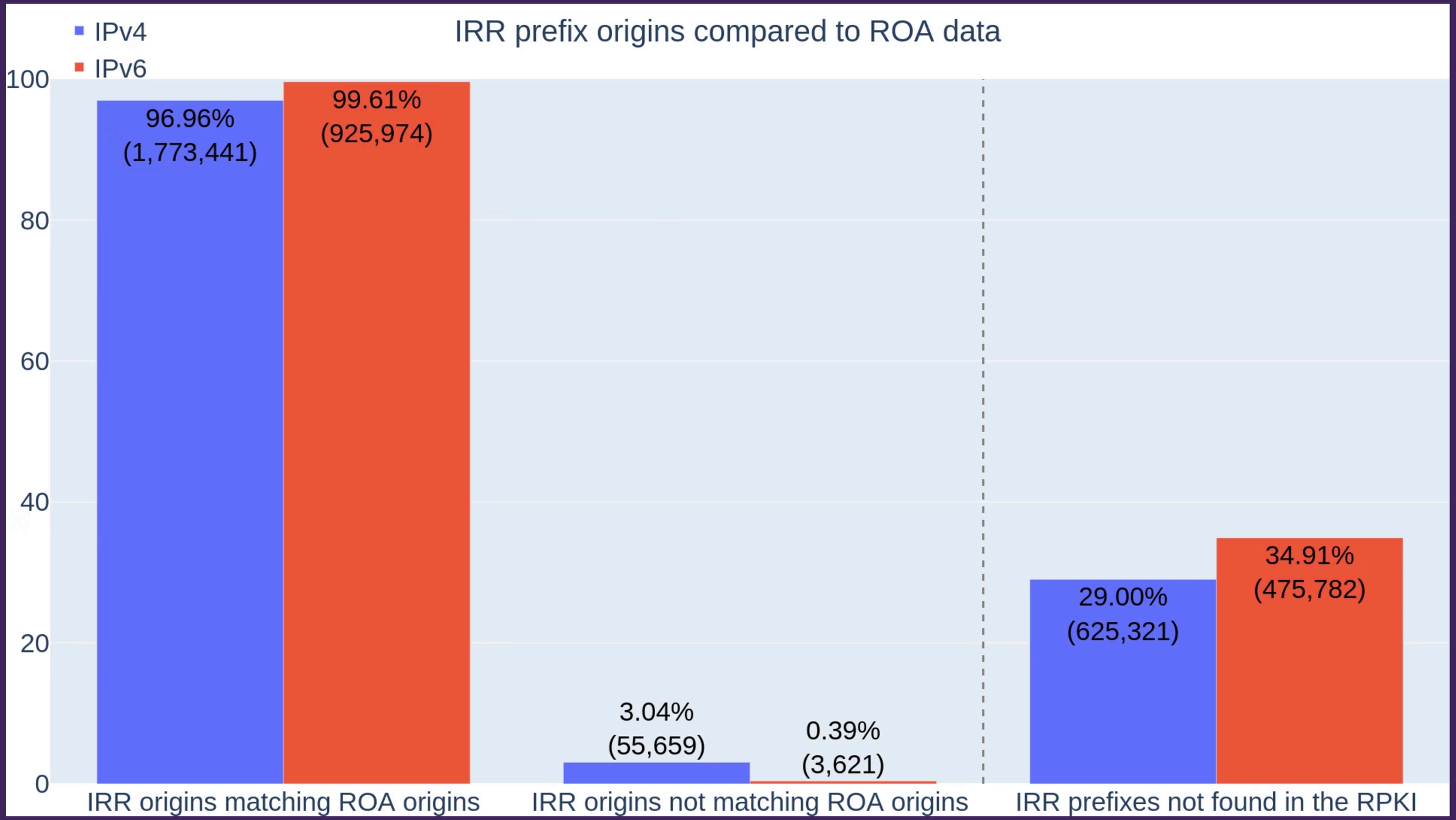

IRR prefix origins compared to DFZ data
IPv4
IPv6
100
80
60
40
20
0
79.21%
(1,058,943)
89.30%
(199,138)
20.79%
(277,903)
10.70%
(23,867)
52.86%
(1,139,768)
85.71%
(1,168,171)
IRR origins matching DFZ origins
IRR origins not matching DFZ origins
IRR prefixes not found in the DFZ

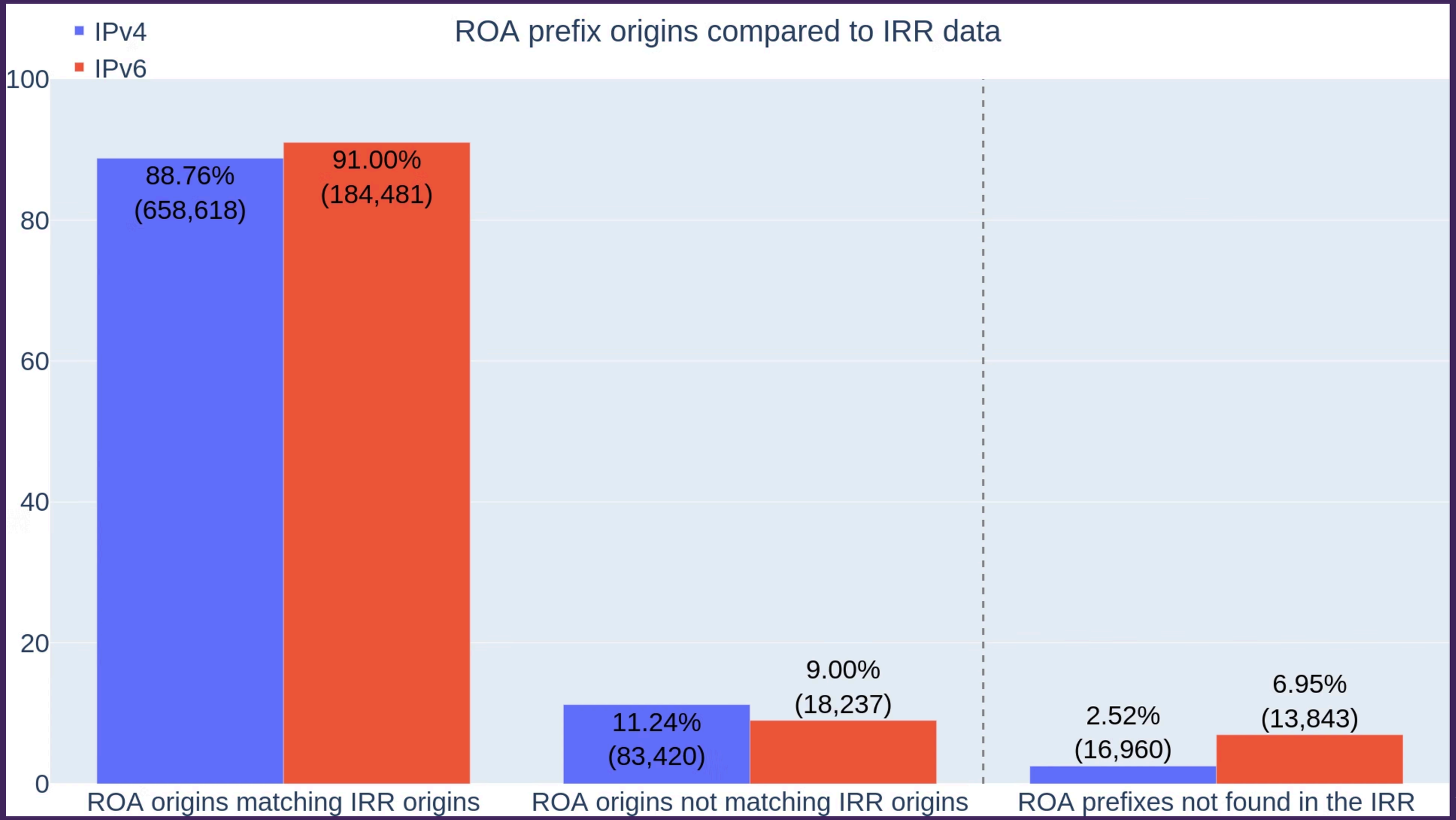

DFZ prefix origins compared to ROA data
IPv4
IPv6
100
80
60
40
20
0
99.63%
(809,545)
99.82%
(227,423)
0.37%
(2,979)
0.18%
(413)
30.39%
(350,226)
19.09%
(52,511)
DFZ origins matching ROA origins
DFZ origins not matching ROA origins
DFZ prefixes not found in the RPKI

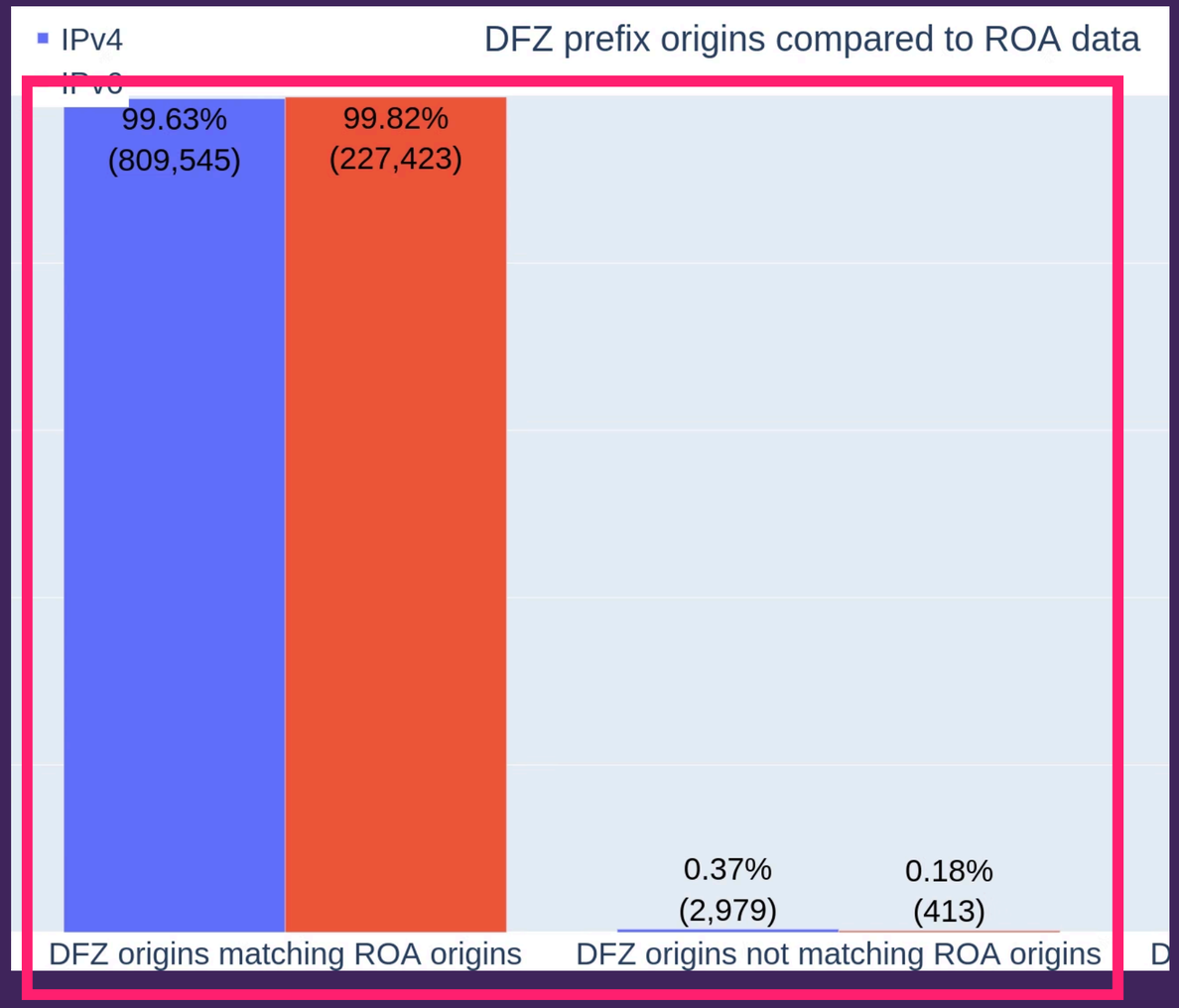

ROA prefix origins compared to DFZ data
IPv4
IPv6
100
80
60
40
20
0
86.50%
(508,750)
87.43%
(134,964)
13.50%
(79,407)
12.57%
(19,404)
25.68%
(172,967)
35.13%
(69,919)
ROA origins matching DFZ origins
ROA origins not matching DFZ origins
ROA prefixes not found in the DFZ

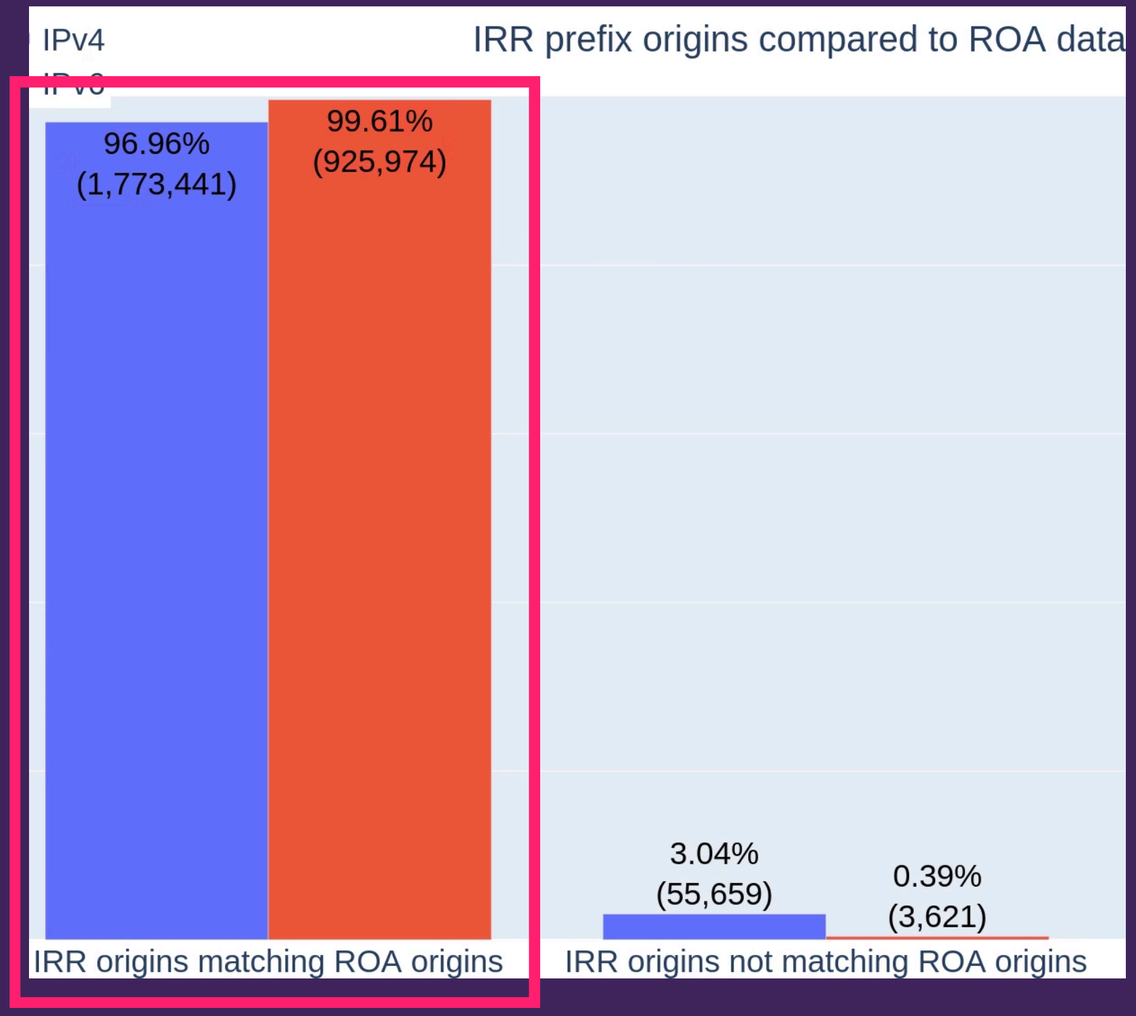
So far:

- DFZ data closely matches IRR data
- IRR data contains a lot of redundant data
- DFZ data more closely matches ROA data (but ROA coverage is lower)
- Seeing redundant ROA data begin to build up

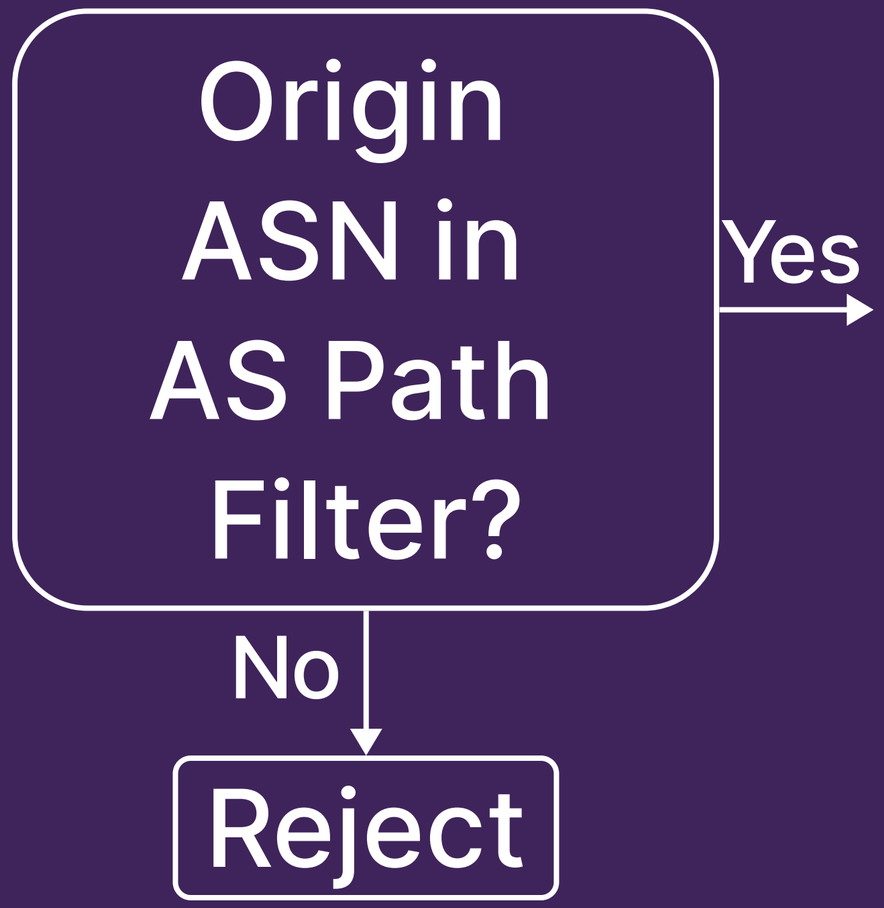

IRR prefix origins compared to ROA data
IPv4
IPv6
100
80
60
40
20
0
96.96%
(1,773,441)
99.61%
(925,974)
3.04%
(55,659)
0.39%
(3,621)
29.00%
(625,321)
34.91%
(475,782)
IRR origins matching ROA origins
IRR origins not matching ROA origins
IRR prefixes not found in the RPKI

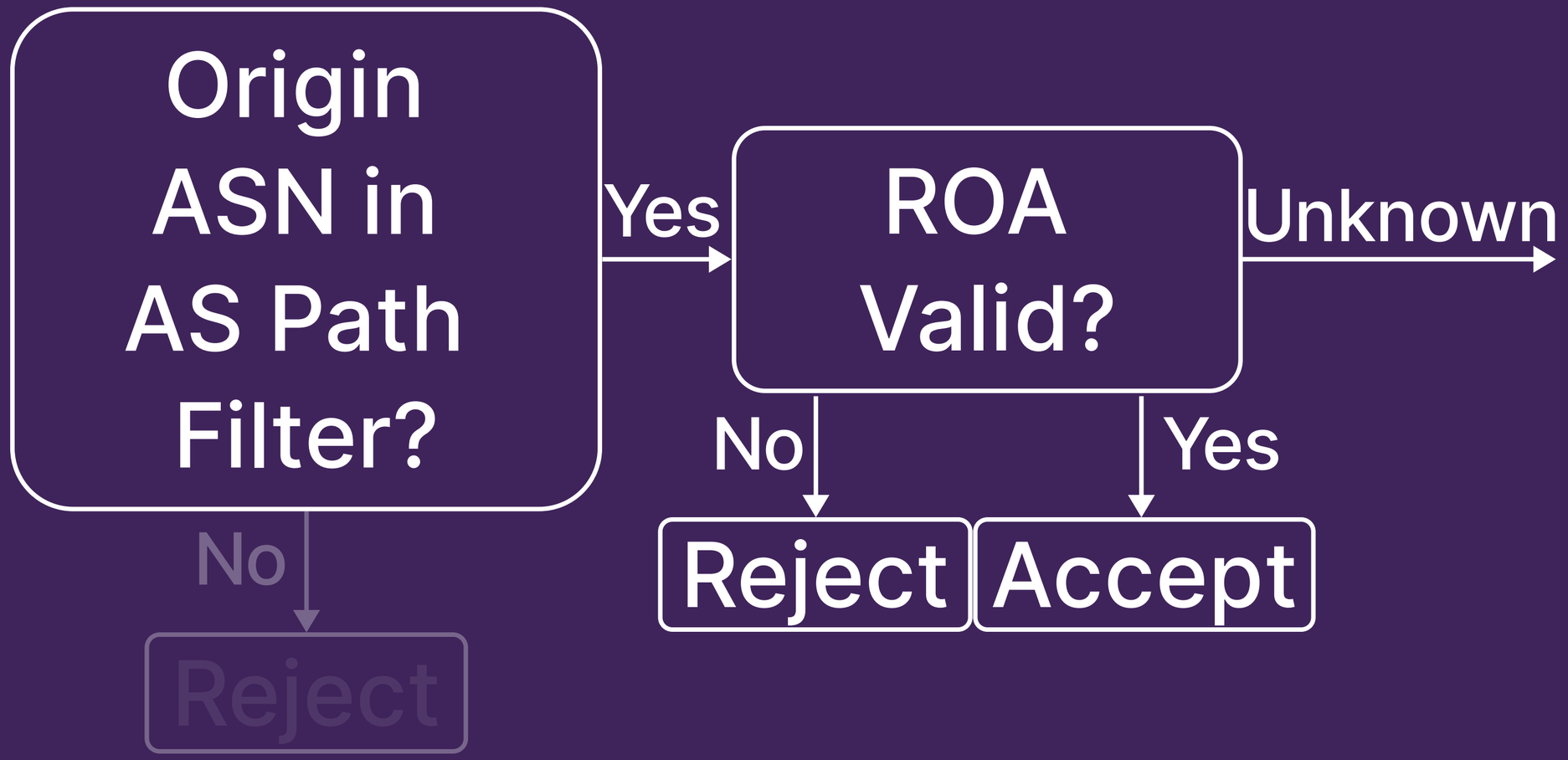

ROA prefix origins compared to IRR data
IPv4
IPv6
100
80
60
40
20
0
88.76%
(658,618)
91.00%
(184,481)
11.24%
(83,420)
9.00%
(18,237)
2.52%
(16,960)
6.95%
(13,843)
ROA origins matching IRR origins
ROA origins not matching IRR origins
ROA prefixes not found in the IRR

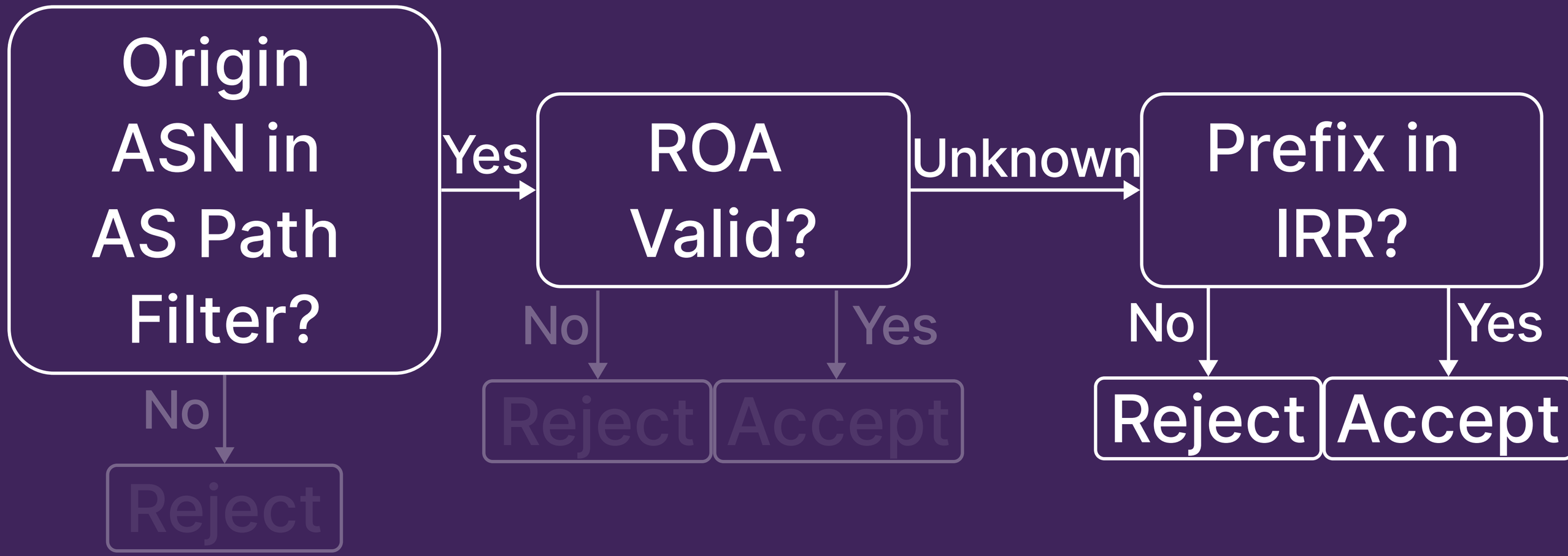

IPv4
DFZ prefix origins compared to ROA data
99.63%
(809,545)
99.82%
(227,423)
0.37%
(2,979)
0.18%
(413)
DFZ origins matching ROA origins
DFZ origins not matching ROA origins

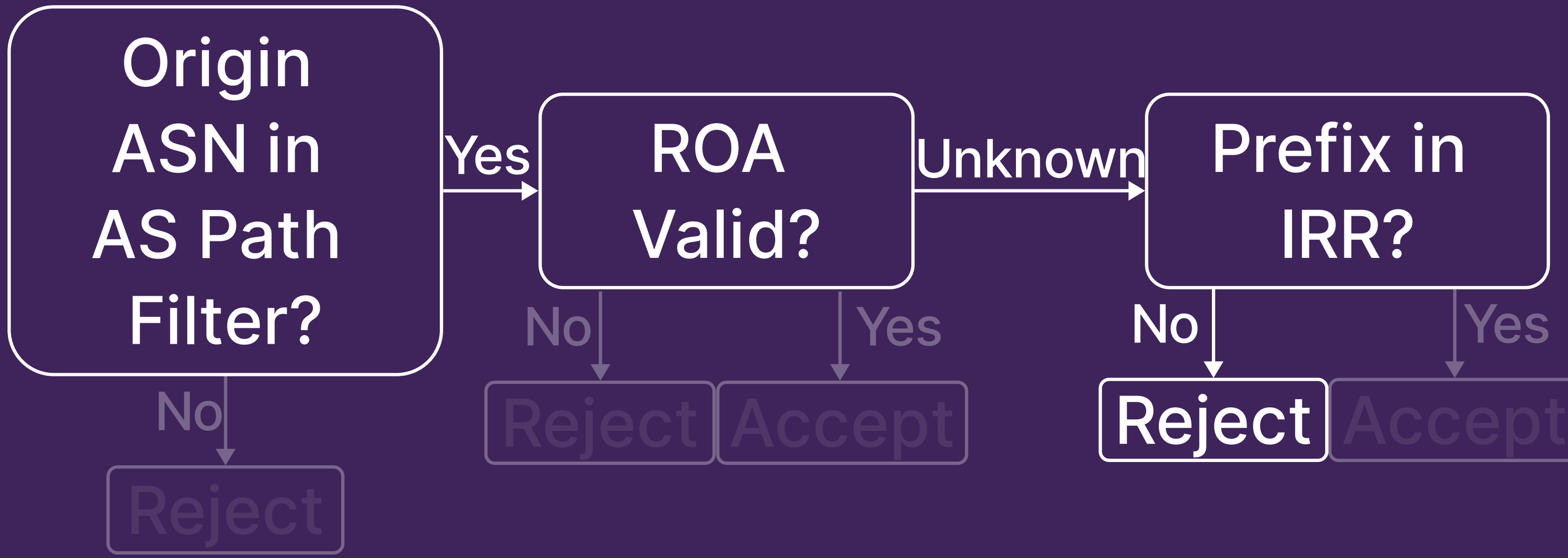

IPv4
IRR prefix origins compared to ROA data
96.96%
(1,773,441)
99.61%
(925,974)
3.04%
(55,659)
0.39%
(3,621)
IRR origins matching ROA origins
IRR origins not matching ROA origins

Is ROA coverage high enough “for me”?

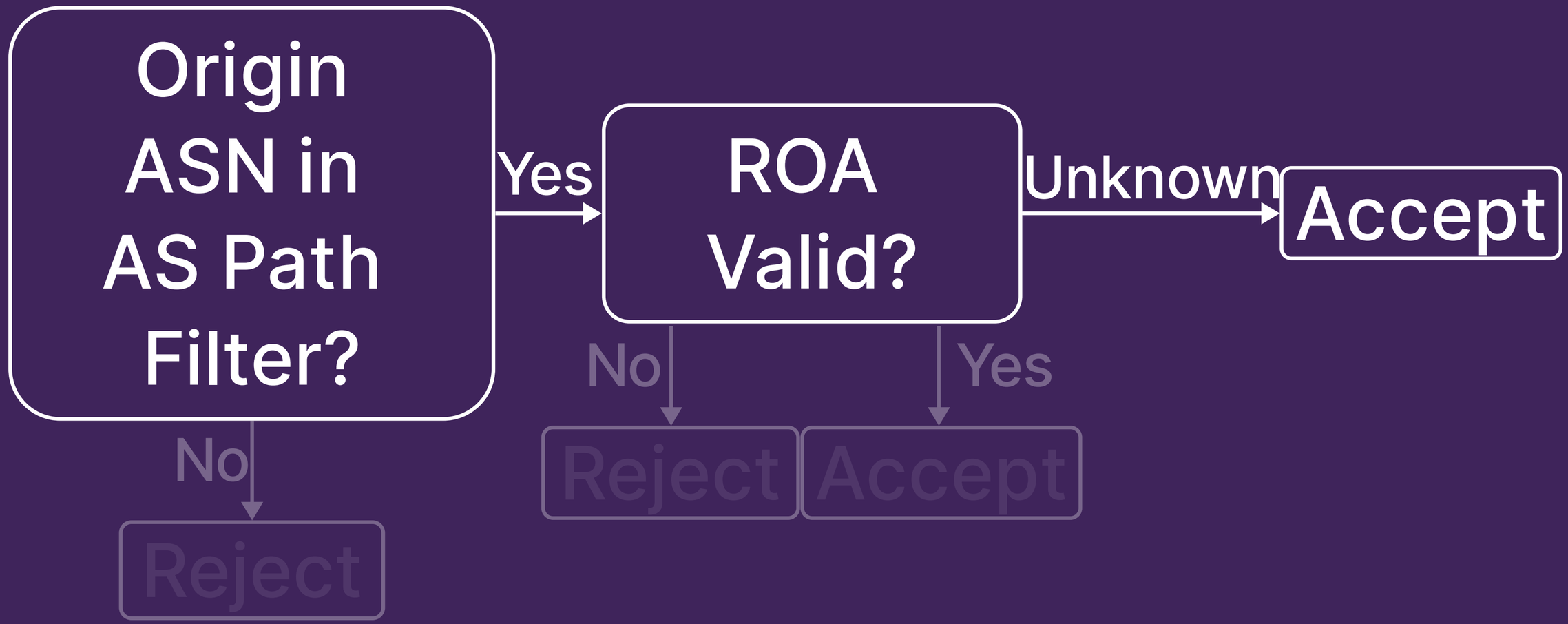

Origin ASN in AS Path Filter?
Yes
No
Reject

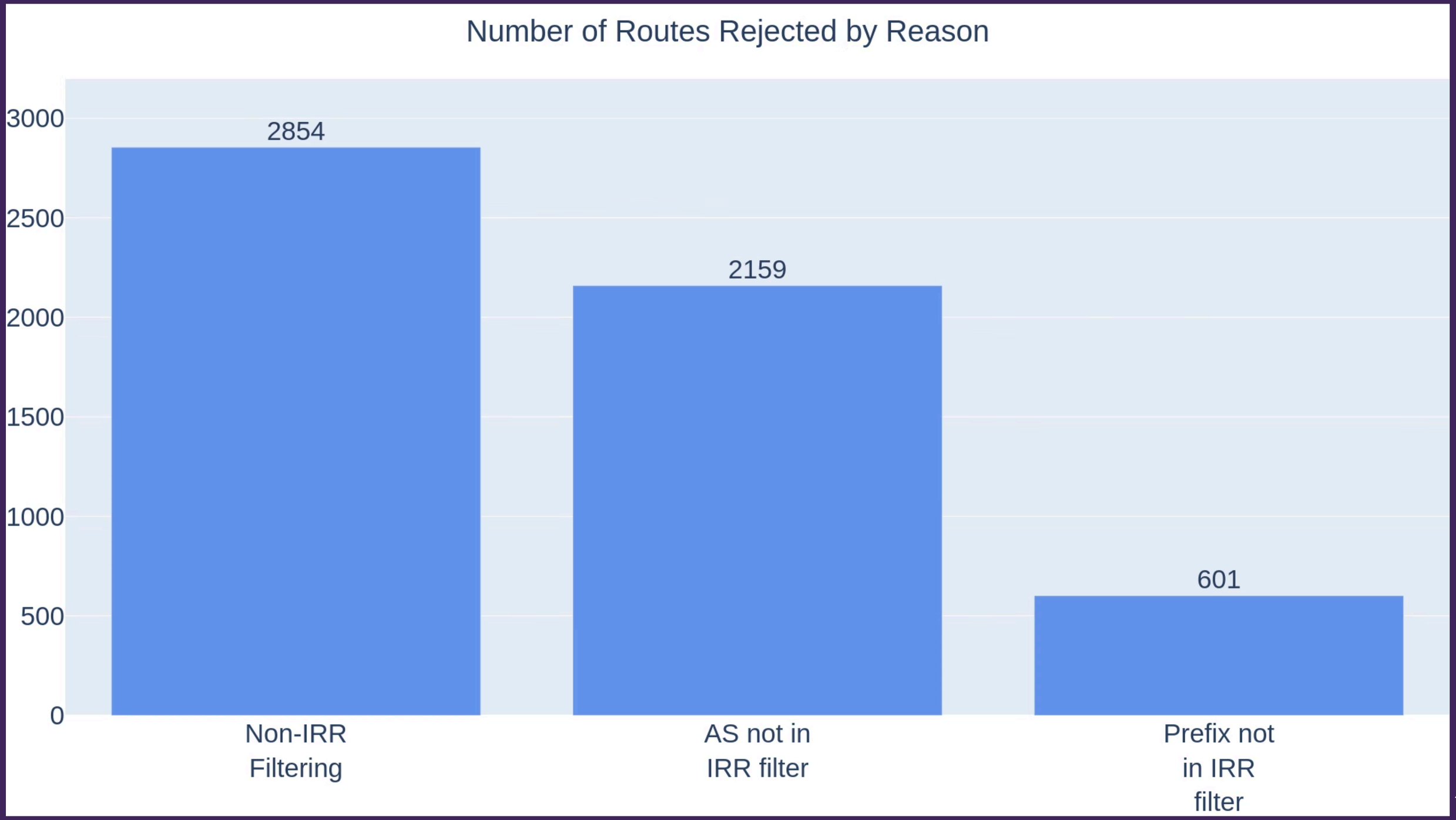

Origin ASN in AS Path Filter?
Yes
ROA Valid?
Unknown
No
Yes
Reject
Accept
No
Reject

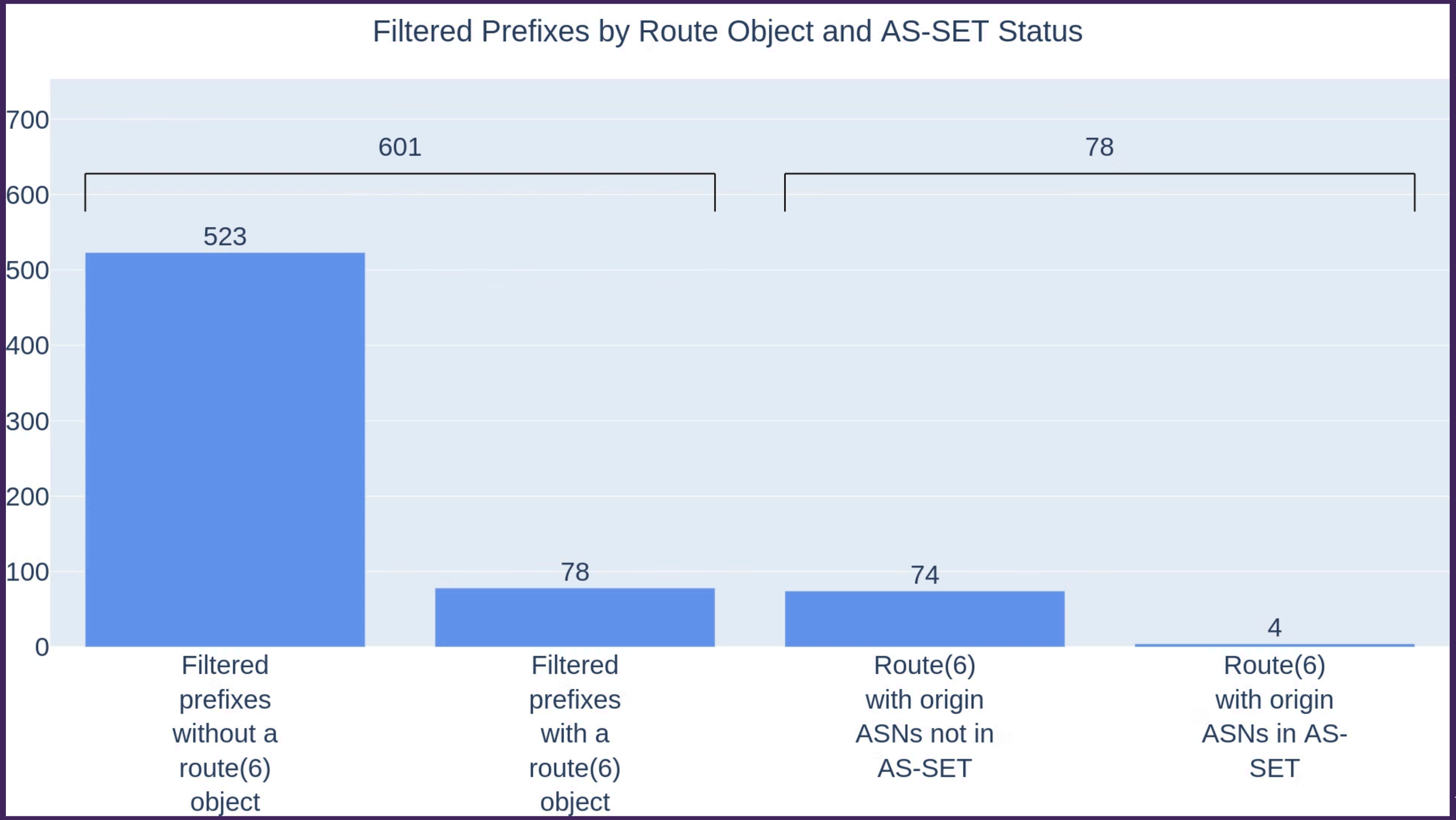

Origin ASN in AS Path Filter?
Yes
ROA Valid?
Unknown
Prefix in IRR?
No
Reject
No
Yes
Reject
Accept
No
Reject
Yes
Accept



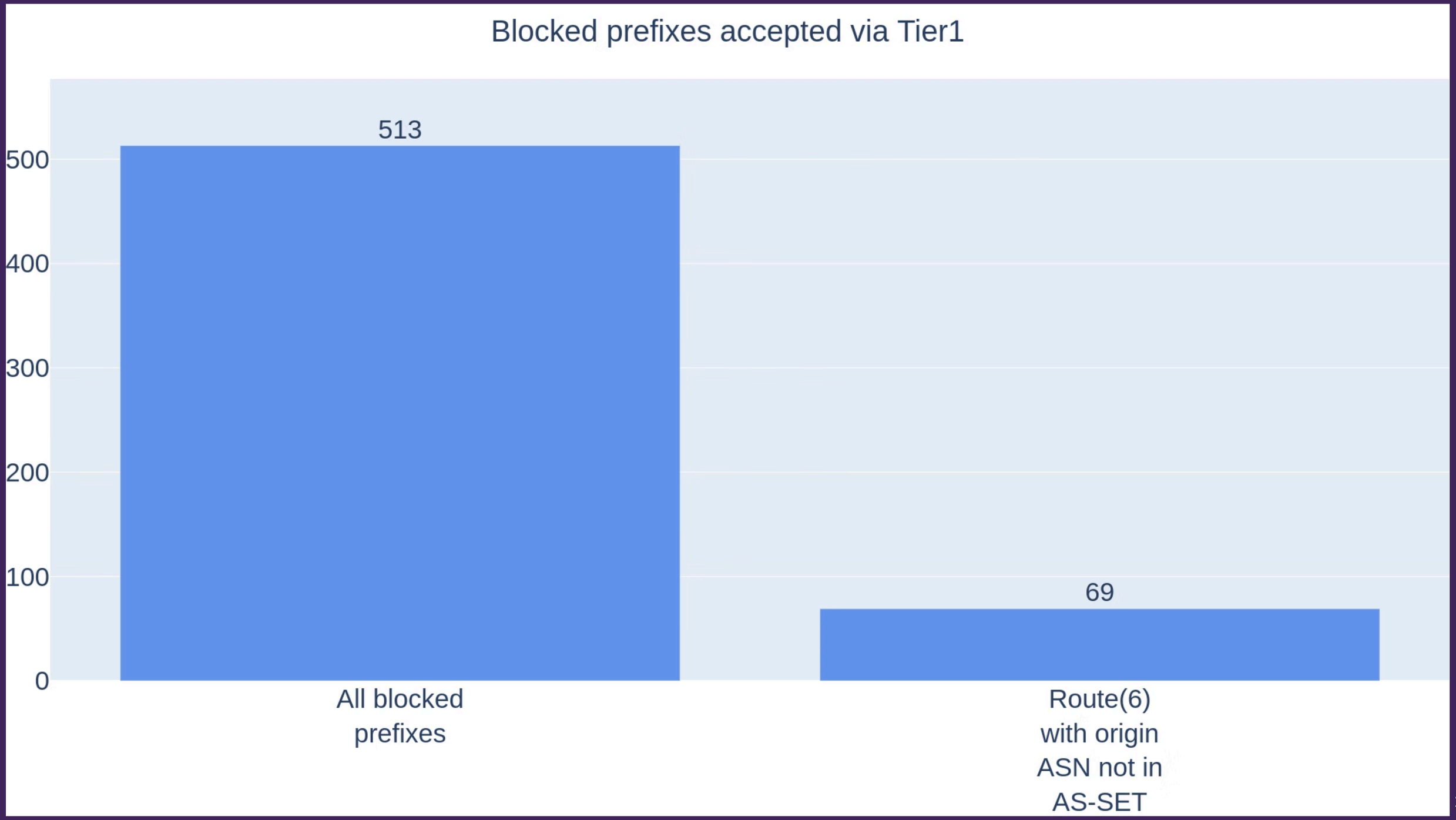
Are we rejecting anything, why?


Origin ASN in AS Path Filter?
Yes
ROA Valid?
Unknown
Accept
No
Reject
No
Reject
Yes
Accept


Number of Routes Rejected by Reason
3000
2500
2000
1500
1000
500
0
2854
2159
601
Non-IRR Filtering
AS not in IRR filter
Prefix not in IRR filter


Filtered Prefixes by Route Object and AS-SET Status
700
600
500
400
300
200
100
0
601
78
523
78
74
4
Filtered prefixes without a route(6) object
Filtered prefixes with a route(6) object
Route(6) with origin ASNs not in AS-SET
Route(6) with origin ASNs in AS-SET

- Tier1 transit feeds → accept a full table without prefix or AS path filters
- The prefixes we are currently blocking, do we receive them via Tier1s anyway?


Blocked prefixes accepted via Tier1
513
69
500
400
300
200
100
0
All blocked prefixes
Route(6) with origin ASN not in AS-SET

Are we there yet?

Thank You

james@inter.link