

Route Filtering at the Edge

AS15169

EPF 2019

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Background

- Pretty much self explanatory why routing security matters, but if you ask me to say ...
- Sending/receiving route hijacks, leaks, mitms, etc hurts

The problems



So in 2019

AS15169 will start to apply stricter filters to BGP announcements on all peering sessions

Route Data Sources

IRR, RPKI, <internal TE>

- IRR data for what peers think they will be sending
- RPKI data where available to validate IRR data
- Internal TE sources to limit further if required

The Plan

1. Notify peers (howdy!) that this is going to start happening
2. Collect data regularly (daily?)
3. Parse and place into internal data service
4. Create per-ASN filter content
5. Apply changes to network device(s)
6. Mark today, drop tomorrow

Notification

- <https://isp.google.com>
- Plans to enhance portal feature to display current data set for your ASN
- Implement ability to request 'update my filter because I updated my data' by peer(s)
- Feedback once this is working will be important!

How would we collect data?

- IRR data is relatively easy to find:
 - <ftp://ftp.radb.net/>
 - But there are others too ...
- Decide on which IRR databases to collect and parse
 - We will use RADB, RIPE, APNIC, AFRINIC, ARIN, CenturyLink, NTT and some more. Check the ISP Portal for details
- If you need another one please let us know

Parse IRR data

- IRR data is generally formatted
 - Follow the AS -> Maintainer -> AS-SET trees...
 - 'Everyone' keeps theirs updated, right?
 - (these aren't really IRR problems as such)
- What tooling exists for this today?
 - Irrtoolset - no
 - Bgpq3 - not usable (internal problems)
 - Run a local IRRd... doesn't actually solve the problem of making the data available to the other tooling used
 - ISOC/MANRS is coordinating some data:
 - [github.com/manrs-tools/...](https://github.com/manrs-tools/)

Applying and updating the filters

Apply Changes as Required

- When changes arrive, apply them in the normal fashion
- Follow existing device configuration processes
- New processes are bad/hard/problems

When

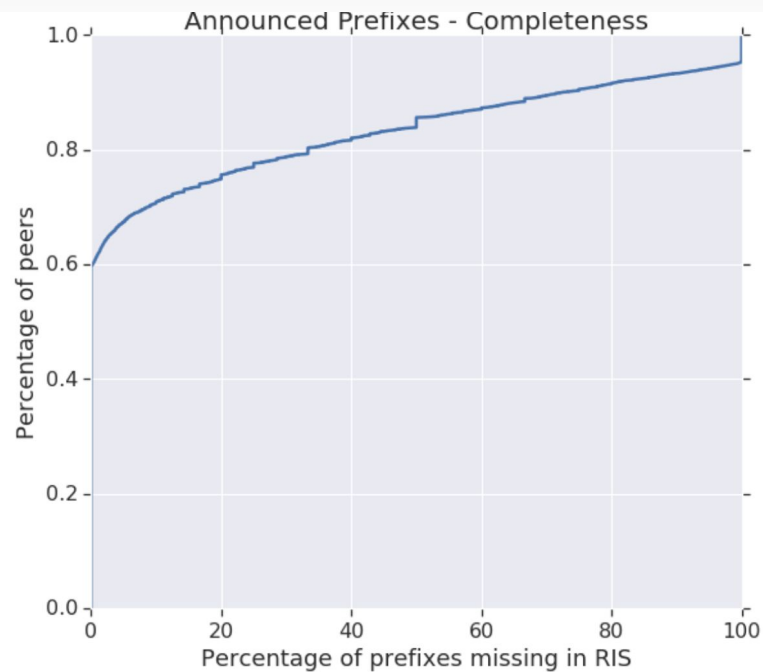
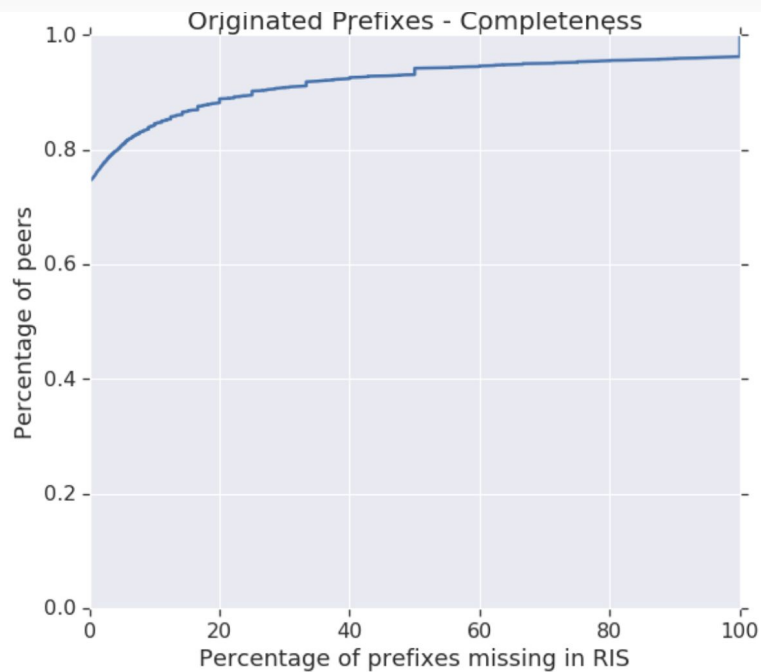
Goal is to start marking routes based on filter inclusion / exclusion by September 2019.

Reject/Drop by sometime in Q4-2019

FAQ

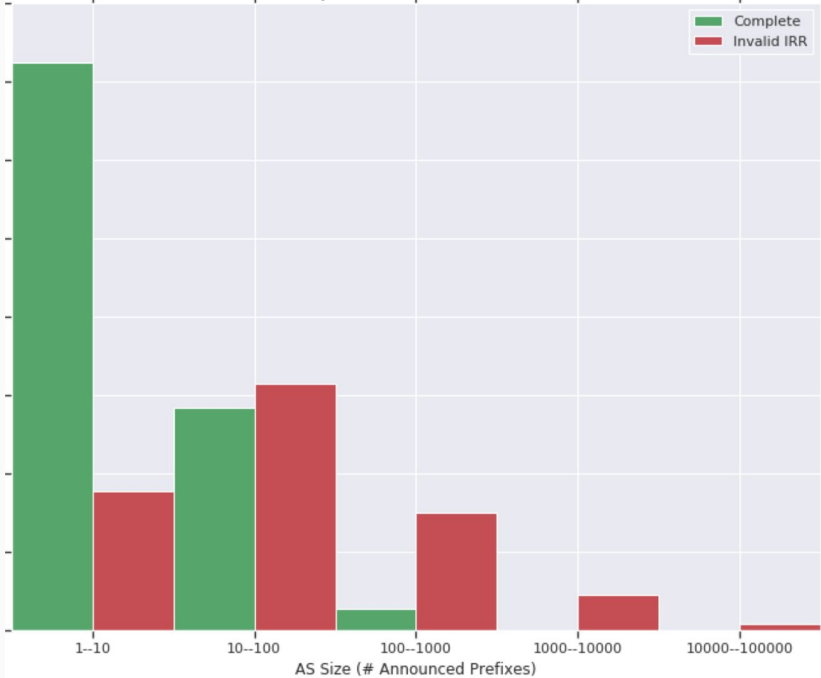
- I do not have any IRR object. Would AS15169 accept my prefixes?
 - No. If you do not have any IRR object AS15169 won't accept any routing data from the BGP session(s) with your ASN.
- I modified some IRR objects. How long would take Google to process it?
 - We automatically process new data every day, so allow a period of 48hrs for our systems to update. If you encounter any problem or you have an emergency please contact the NOC.
- Where can I find more information and updates?
 - <https://peering.google.com> for general information
 - <https://isp.google.com> for specific information about your network

Completeness of ASNs

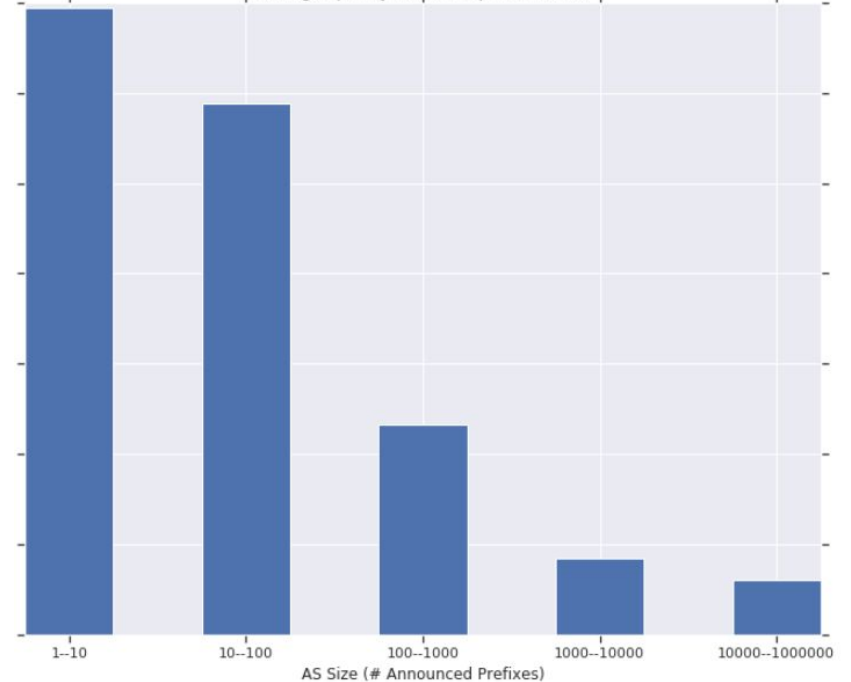


Completeness by ASN size

IRR Completeness for different sized ASes

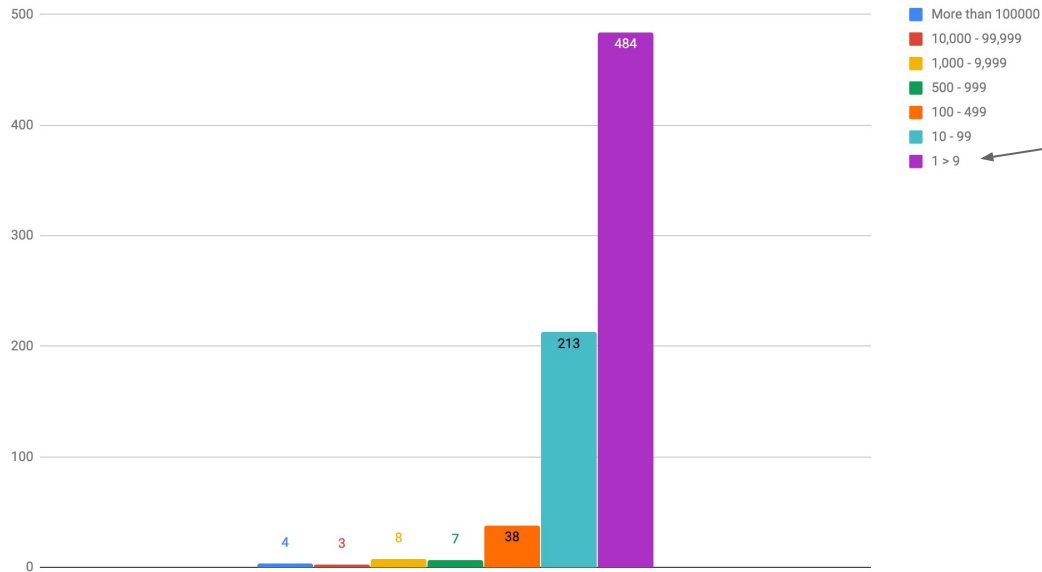


ASNs grouped by number of prefixes in RIS



Number of invalids

Number of Peers by Number of Invalids (Europe)



A few peers have a *lot* of invalids

Many peers have a few invalids

Tools to check your prefix validity

- Google ISP Portal (coming soon!)
 - <https://isp.google.com/bgp/>
- IRR Explorer NLNOG
 - <http://irrexplorer.nlnog.net/>
- RIPE RIS Routing Consistency
 - <https://stat.ripe.net/widget/as-routing-consistency>

BGP View at Google ISP Portal

Monitoring > Routing > BGP

Search networks and assets

BGP Prefixes

Last updated: Tue Sep 10 2019 09:04:45 (Local) [CLICK FOR DETAILS](#)

Filter by prefix

Filter by asset or previous hop

Filter by problem Show only problems

Prefix ↑	Problems	Reachable assets	Previous hops
4.0/22	▲ Invalid IRR Details	Peering	
52.0/23	▲ Invalid IRR Details	Peering	
0.0/13	▲ Invalid IRR Details	Peering	
0.0/21	▲ Invalid IRR Details	Peering	
36.0/21	▲ Invalid IRR Details	Peering	
36.0/24	▲ Invalid IRR Details	Peering	
24.0/21	▲ Invalid IRR Details	Peering	
120.0/21	▲ Invalid IRR Details	Peering	
42.0/24	▲ Invalid IRR Details	Peering	
48.0/21	▲ Invalid IRR Details	Peering	
216.0/21	▲ Invalid IRR Details	Peering	
3.42.0/23	▲ Invalid IRR Details	Peering	
5.16.0/20	▲ Invalid IRR Details	Peering	
8.0/22	▲ Invalid IRR Details	Peering	
160.0/20	▲ Invalid IRR Details	Peering	
3.192.0/24	▲ Invalid IRR Details	Peering	
2.112.0/21	▲ Invalid IRR Details	Peering	
4.0/24	▲ Invalid IRR Details	Peering	
36.0/22	▲ Invalid IRR Details	Peering	
36.0/24	▲ Invalid IRR Details	Peering	

CSV

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What else are we working on?

- Preventing ourselves from being the leaker (making progress!)
- Signing ROAs and studying data
- Implementing this into our peering policy
- MANRS

How do I peer with AS15169?

- Check your PeeringDB record is up to date. Add AS-SET record there if you use one
- Check your IRR objects
- Make the request using a company valid email address
- Check our peering locations at <https://www.peeringdb.com/asn/15169>
- And then, only then go to <https://peering.google.com/iwantpeering>

Thanks!

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