



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

Three Easy Ways to Look at BGP Events

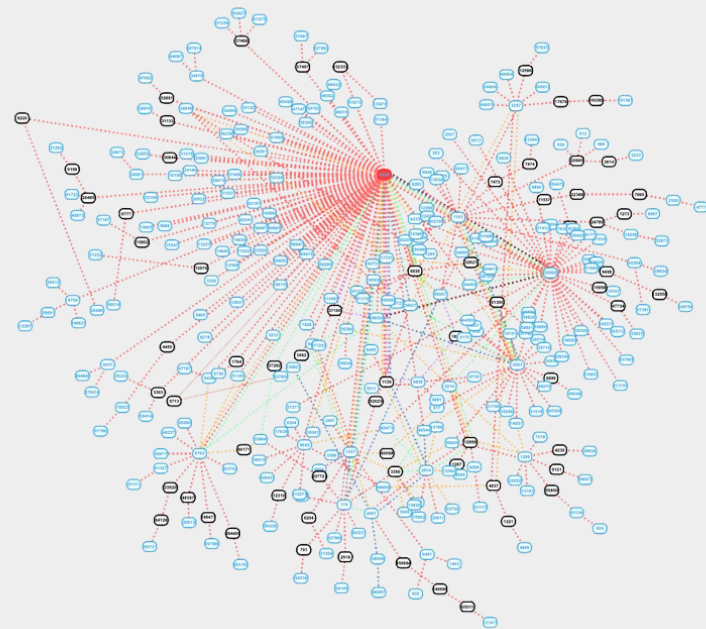
And Two Tough Ones

What is RIPEstat?



Information service for Internet-related data and analytics

- **RIPEstat offers:**
 - Information on IP address space and Autonomous System Numbers (ASNs)
 - Statistics on specific hostnames and countries
 - Visualisations of Internet routing
- **All in a centralised place**





RIPEstat pulls data from a variety of sources, including:

- The RIPE Database (for ownership and contact information)
- Routing registries (e.g., RIPE IRR)
- DNS and reverse DNS systems
- Live and historical BGP data (RIPE RIS)
- Regional Internet Registries and IANA

More details at:

stat.ripe.net/data-sources



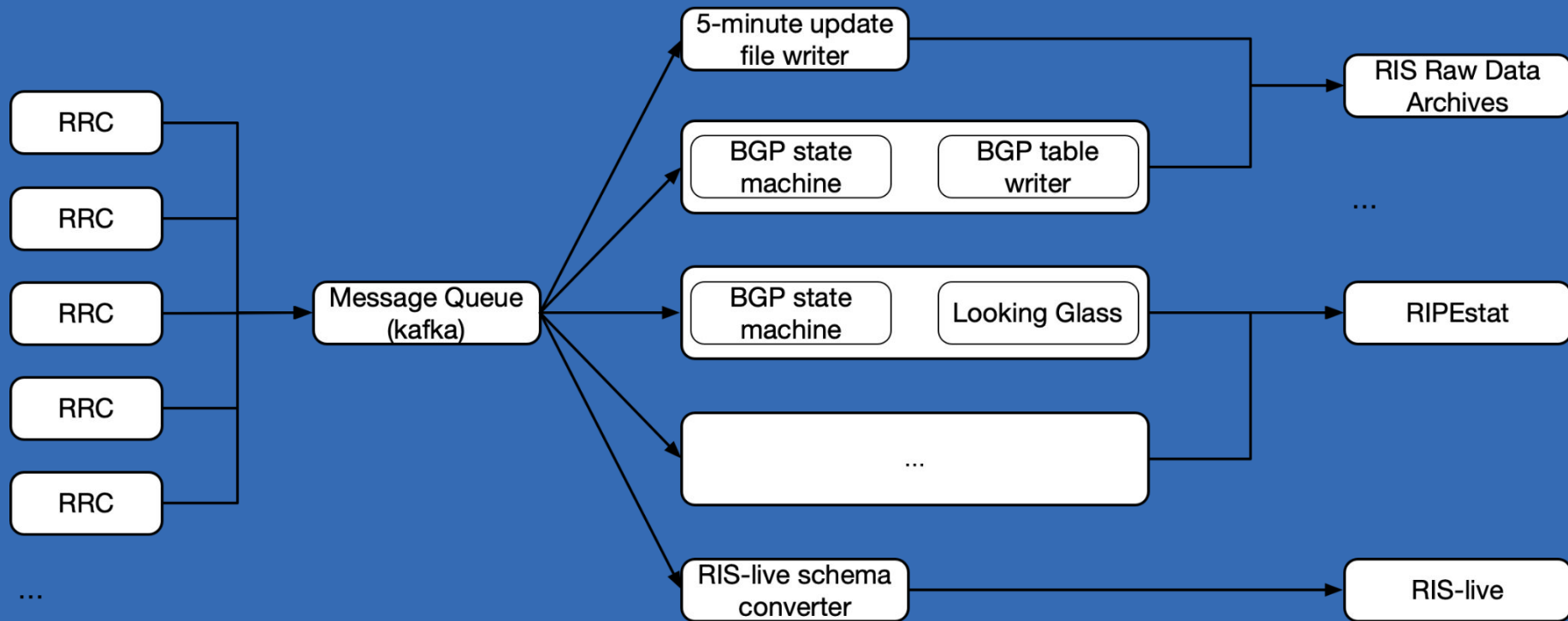
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RIS Architecture



So, What About BGP Data?



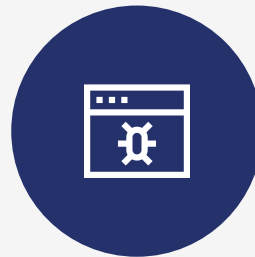
Looking Glass

Current visibility of a resource



Routing History

Historic routing of a resource



Upstream Visibility

Investigate AS path changes over time



BGPlay

Zoom into a BGP event at the message level

Use Case: Real-Time Data



A Looking Glass

- Near Real-Time Looking Glass from all RIS peers
- Also available as API

Example: K-root in Kazakhstan

The screenshot shows the RIPEstat Looking Glass web application. The browser address bar displays 'stat.ripe.net/g/193.0.14.129'. A notification at the top states: 'IP address (193.0.14.129) has been converted to its encompassing routed prefix (193.0.14.0/24)'. The main heading is 'Looking Glass' with a 'Share' link. A search bar contains '193.0.14.129'. Below the search bar, there are filters for 'AS Path' with 'Include' and 'Exclude' options, each with an '+ Add' button. The results section shows '474 peers announcing 193.0.14.0/24 originated by 25152 and seen by 23 RRCs'. Two tables are displayed, each with columns for AS Path, Communities, Large Communities, Extended Communities, Origin, Next Hop, Peer, and Last Updated.

AS Path	Communities	Large Communities	Extended Communities	Origin	Next Hop	Peer	Last Updated
25152	25152:1363	25152:1363:65553	-	IGP	103.142.153.17	103.142.152.16 at RRC00	2025-08-28T22:24:48Z

AS Path	Communities	Large Communities	Extended Communities	Origin	Next Hop	Peer	Last Updated
25152	6777:6777 6777:6501 6777:6502 25152:1	25152:16777	-	IGP	80.249.208.240	80.249.208.255 at RRC03	2025-08-28T09:17:25Z

Use Case: Real-Time Data



Looking Glass

- Near Real-Time Looking Glass from all RIS peers
- Also available as API

Example: K-root in Kazakhstan

The screenshot shows the RIPEstat Looking Glass web interface. The browser address bar displays `stat.ripe.net/g/193.0.14.129#included=9198`. A blue notification banner at the top states: "IP address (193.0.14.129) has been converted to its encompassing routed prefix (193.0.14.0/24)".

The main heading is "Looking Glass" with a "Share" link. A search bar contains the IP `193.0.14.129`. Below the search bar, there are filters for the AS Path, with "9198" included. A message indicates "5 filtered peers (of 474) announcing 193.0.14.0/24 originated by 25152 and seen by 5 RRCs".

Two tables of network data are displayed:

AS Path	28910 9198 25152
Communities	-
Large Communities	-
Extended Communities	-
Origin	IGP
Next Hop	195.69.189.4
Peer	195.69.189.4 at RRC25
Last Updated	2025-09-04T09:19:34Z

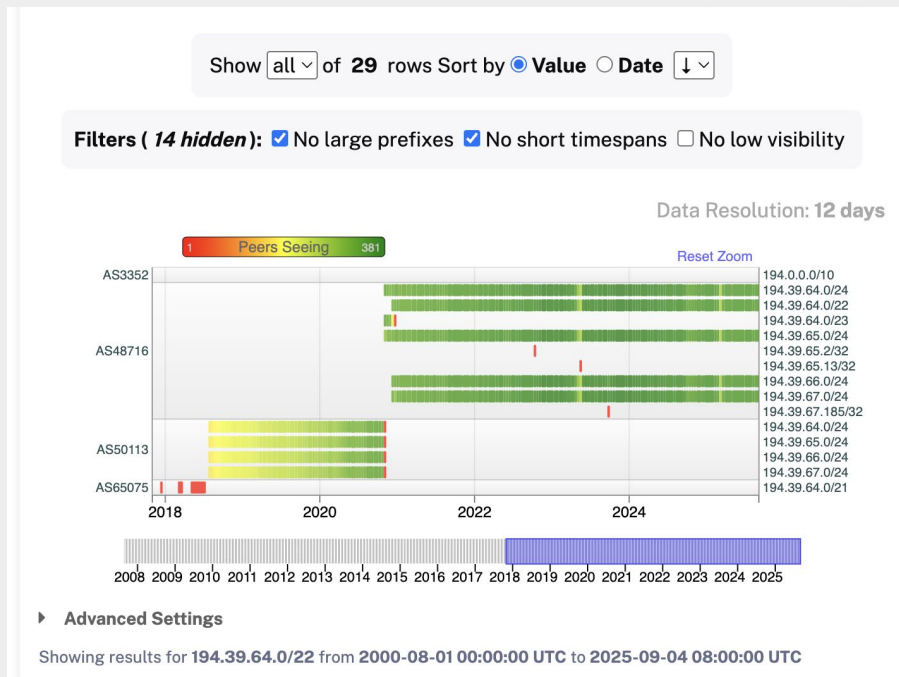
AS Path	9198 9198 25152
Communities	9198:5842 9198:5849 9198:5990 25152:1223
Large Communities	-
Extended Communities	-
Origin	IGP
Next Hop	194.68.123.35
Peer	194.68.123.35 at RRC07
Last Updated	2025-09-28T09:20:50Z

Use Case: Long term history



Routing History

- Long-term routing history
- Look back (far) in time
- See if behaviour is consistent



Use Case: Distribution over Time



Upstream Visibility

- Show the distribution over upstreams ASNs.
- *Very useful* when visibility changed.
- Example: prefix became RPKI invalid (AS 0 ROA)



Upstream Visibility



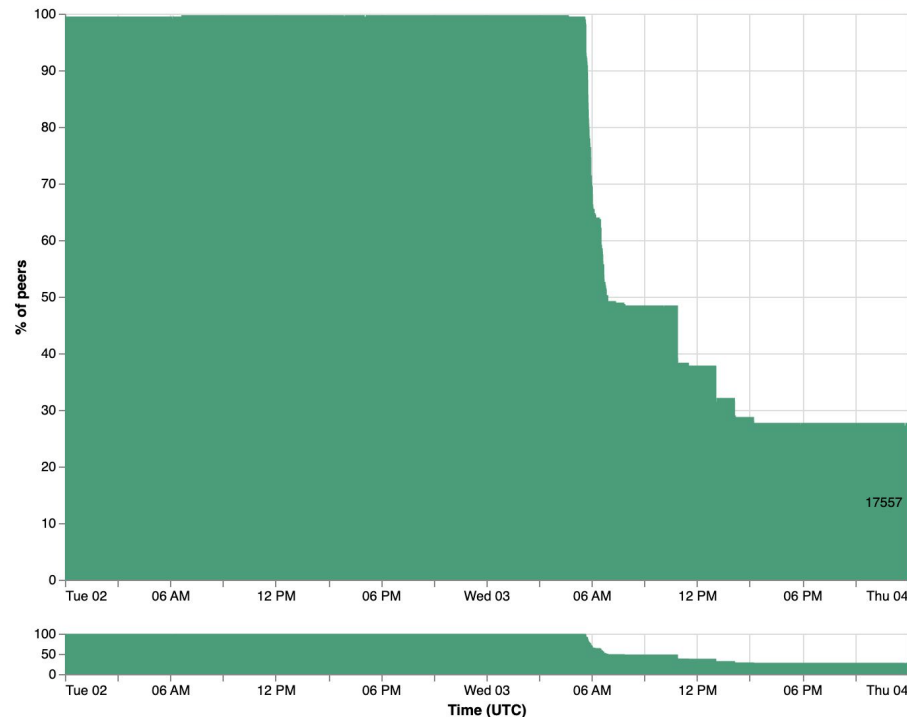
Distance from origin

1



✓ By ASN

By CP



Showing results for 115.186.103.0/24 from 2025-09-02 00:00:00 to 2025-09-04 00:00:59

Use Case: Distribution over Time



Upstream Visibility

- Show the distribution over upstreams ASNs.
- *Very useful* when visibility changed.
- Example: prefix became RPKI invalid (AS 0 ROA)
 - Most upstreams of 17557 filtered, some stayed.



Upstream Visibility

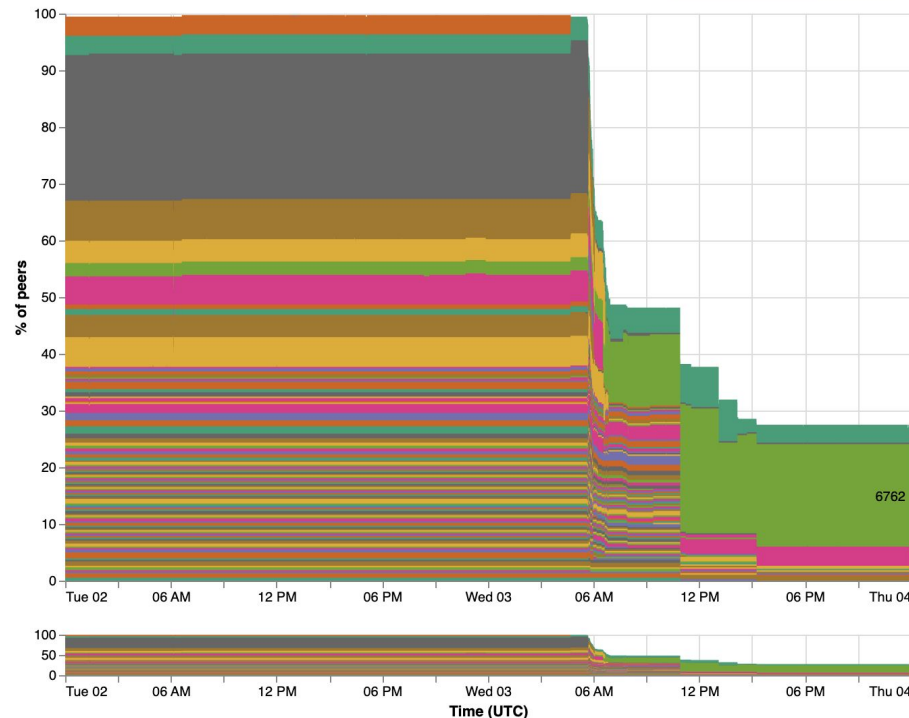


Distance from origin 2



✓ By ASN

By CP



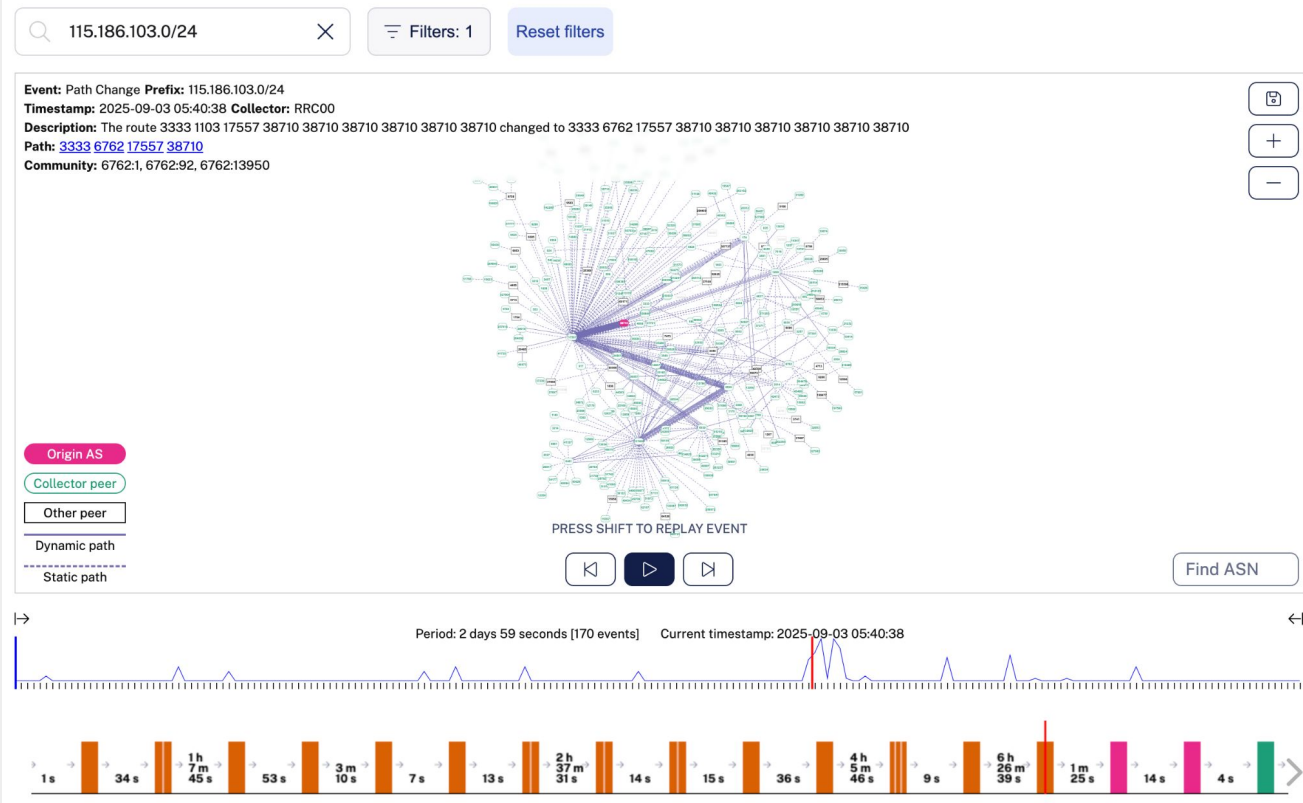
Showing results for 115.186.103.0/24 from 2025-09-02 00:00:00 to 2025-09-04 00:00:59

Use Case: In Depth - BGPlay



BGPlay

- Look at BGP messages in detail
- See how routes adjust over time
- This shows all events received.





The raw data is available

- The BGP archives are available at <https://ris.ripe.net/docs/mrt/>
- Can be parsed with CLI tools (monocle from bgpkit, bgpreader from bgpstream/caida)
- Custom tools
 - Scripts
 - Custom programmes
 - ...
- Can even put it in a database:
 - Used by analysts (e.g. [Anurag Bhatia's blog](#))
 - Short clickhouse tutorial (QR code). On RIPE labs soon.





You - and LLMs - understand SQL:

```
SELECT
  prefix,
  splitByChar(' ', as_path)[-2] AS first_upstream,
  count(*) AS cnt
FROM rib
WHERE prefix = '193.0.14.0/24'
GROUP BY ALL
ORDER BY cnt DESC
LIMIT 5
```

Query id: 02917ea2-4239-45cb-b21a-df41a04f9410

	prefix	first_upstream	cnt
1.	193.0.14.0/24	6939	70
2.	193.0.14.0/24	513	20
3.	193.0.14.0/24	20612	20
4.	193.0.14.0/24	28186	15
5.	193.0.14.0/24	1103	13

5 rows in set. Elapsed: 0.019 sec. Processed 4.64 million rows, 157.65 MB (250.59 million rows/s., 8.52 GB/s.)
Peak memory usage: 249.23 KiB.



You can use this BGP data

I hope I showed:

- Three ways to look at BGP using RIPEstat that are easy
- One method – BGPlay – that allows you to look in detail
- And, finally, that the data can be versatile (SQL)



Questions & Comments



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