# RIS Beacons Revisited

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# Why This Presentation?

- TL:DR;
    - We are planning to revamp RIS beacons, tentative plan Q3
    - We want your input

# What Are RIS Beacons?

- https://ris.ripe.net/docs/30_routing_beacons.html#current-beaconing-setup

- 2 Flavours:

  - Per RRC anchor/beacon

  - Specials:

    - RPKI valid/invalid/notfound

    - Anycast failover (2 RRCs)

    - Fast beacon (20 mins)

| IPv4 prefix | IPv6 prefix | type | origin RRC (IXP/multihop) | peer location(s) |
|---|---|---|---|---|
| 84.205.64.0/24 | 2001:7FB:FE00::/48 | beacon | RRC00 (multihop) | global |
| 84.205.80.0/24 | 2001:7FB:FF00::/48 | anchor | " | " |
| 84.205.65.0/24 | 2001:7FB:FE01::/48 | beacon | RRC01 (LINX/LONAP) | GB |
| 84.205.81.0/24 | 2001:7FB:FF01::/48 | anchor | " | " |
| 84.205.67.0/24 | 2001:7FB:FE03::/48 | beacon | RRC03 (AMS-IX, NL-IX) | NL,DK |
| 84.205.83.0/24 | 2001:7FB:FF03::/48 | anchor | " | " |
| 84.205.68.0/24 | 2001:7FB:FE04::/48 | beacon | RRC04 (CIXP) | CH,FR |
| 84.205.84.0/24 | 2001:7FB:FF04::/48 | anchor | " | " |
| 84.205.69.0/24 | 2001:7FB:FE05::/48 | beacon | RRC05 (VIX) | AT |
| 84.205.85.0/24 | 2001:7FB:FF05::/48 | anchor | " | " |
| 84.205.70.0/24 | 2001:7FB:FE06::/48 | beacon | RRC06 (DIX-IE) | JP |
| 84.205.86.0/24 | 2001:7FB:FF06::/48 | anchor | " | " |
| 84.205.71.0/24 | 2001:7FB:FE07::/48 | beacon | RRC07 (NETNOD) | SE |
| 84.205.87.0/24 | 2001:7FB:FF07::/48 | anchor | " | " |
| 84.205.74.0/24 | 2001:7FB:FE0A::/48 | beacon | RRC10 (MIX) | IT |
| 84.205.90.0/24 | 2001:7FB:FF0A::/48 | anchor | " | " |
| 84.205.75.0/24 | 2001:7FB:FE0B::/48 | beacon | RRC11 (NYIIX) | US |
| 84.205.91.0/24 | 2001:7FB:FF0B::/48 | anchor | " | " |
| 84.205.76.0/24 | 2001:7FB:FE0C::/48 | beacon | RRC12 (DE-CIX) | DE |
| 84.205.92.0/24 | 2001:7FB:FF0C::/48 | anchor | " | " |
| 84.205.77.0/24 | 2001:7FB:FE0D::/48 | beacon | RRC13 (MSK-IX) | RU |
| 84.205.93.0/24 | 2001:7FB:FF0D::/48 | anchor | " | " |
| 84.205.78.0/24 | 2001:7FB:FE0E::/48 | beacon | RRC14 (PAIX) | US |
| 84.205.94.0/24 | 2001:7FB:FF0E::/48 | anchor | " | " |
| 84.205.79.0/24 | 2001:7FB:FE0F::/48 | beacon | RRC15 (PTTMetro-SP) | BR |
| 84.205.95.0/24 | 2001:7FB:FF0F::/48 | anchor | " | " |
| 84.205.73.0/24 | 2001:7FB:FE10::/48 | beacon | RRC16 (NOTA Miami) | US |
| 84.205.89.0/24 | 2001:7FB:FF10::/48 | anchor | " | " |
| | 2001:7FB:FE12::/48 | beacon | RRC18 (CATNIX) | ES |
| | 2001:7FB:FF12::/48 | anchor | " | " |
| 84.205.82.0/24 | 2001:7FB:FE13::/48 | beacon | RRC19 (NAP Africa JB) | ZA |
| 84.205.88.0/24 | 2001:7FB:FF13::/48 | anchor | " | " |
| | 2001:7FB:FE14::/48 | beacon | RRC20 (SwissIX) | CH |
| | 2001:7FB:FF14::/48 | anchor | " | " |
| 93.175.149.0/24 | 2001:7FB:FE15::/48 | beacon | RRC21 (FranceIX PAR/MAR) | FR |
| 93.175.148.0/24 | 2001:7FB:FF15::/48 | anchor | " | " |
| | 2001:7FB:FE16::/48 | beacon | RRC22 (InterLAN) | RO |
| | 2001:7FB:FF16::/48 | anchor | " | " |
| 93.175.151.0/24 | 2001:7FB:FE17::/48 | beacon | RRC23 (Equinix Singapore) | SG |
| 93.175.150.0/24 | 2001:7FB:FF17::/48 | anchor | " | " |
| 93.175.153.0/24 | 2001:7FB:FE18::/48 | beacon | RRC24 (multihop) | LACNIC region |
| 93.175.152.0/24 | 2001:7FB:FF18::/48 | anchor | " | " |
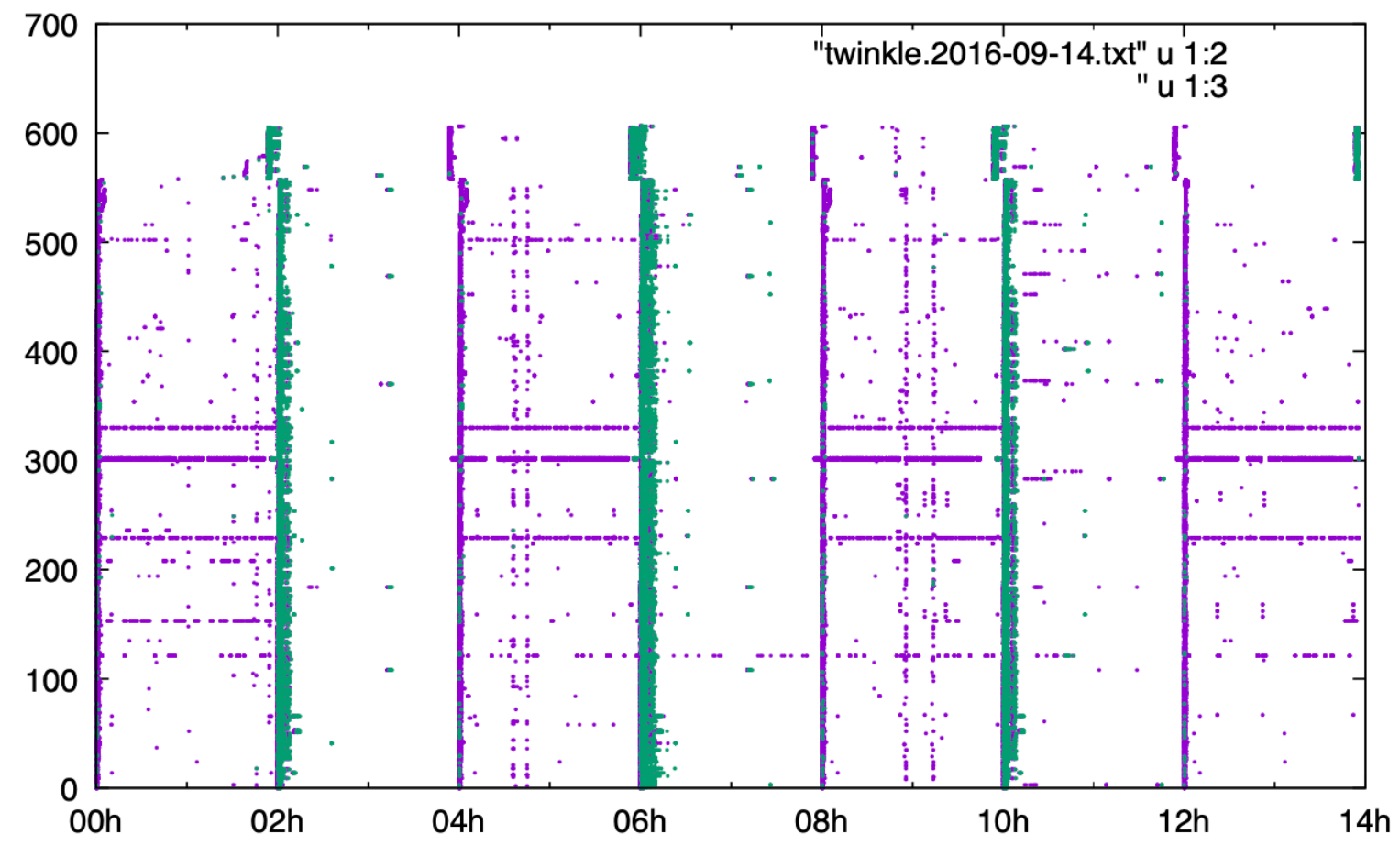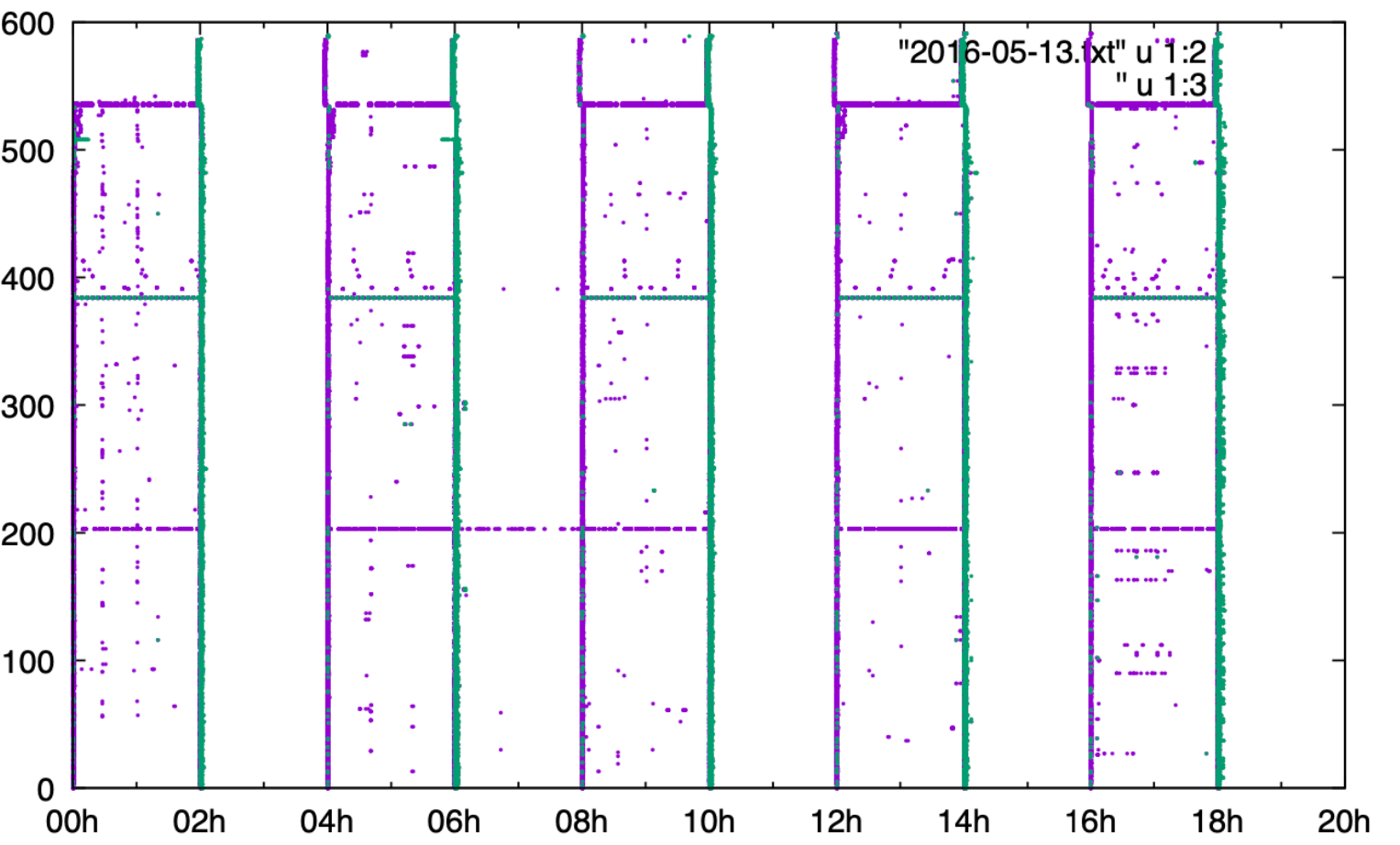
# Why revamp RIS beacons?

- IPv4 address space (46 /24s) we use for this is almost all used

- Is all we do useful enough?

- Are there new things we could be doing that are more useful?

  - Occasional request, mostly from researchers

  - Cool research papers with setups that get torn down

- Responsible stewardship:

  - How much BGP churn is acceptable?

> **A  ETHICS**
>
> When performing active BGP measurements one needs to avoid impacting real-world operations. As we are sending many BGP Updates, especially when high update burst rates are active, we need to make sure that our Beacons do not overwhelm other routers. In the first measurement period, we caused 0.48% of all IPv4 control plane traffic seen in RIPE RIS, RouteViews, and Isolario data, whereas in the second period our Beacon caused 0.54% of all IPv4 BGP updates. Interestingly, the prefixes oscillating every minute were still causing a lot fewer updates than other prefixes on the Internet. As an example, we picked March 1th and measured how many announcements belonged to each prefix. We found ≈ 50 prefixes causing 3 times as many updates as one of our Beacon prefixes and 4 prefixes caused 17 times more updates individually than one of our Beacon prefixes.

BGP Beacons, Network Tomography, and Bayesian Computation to Locate Route Flap Damping
Gray et. Al. , IMC2020
https://ilab-pub.imp.fu-berlin.de/papers/gmbpr-bbntb-20.pdf

# Current Beacons - Upstream Diversity

- How diverse are upstreams per RRC?

- Low diversity = Less useful?
  - Where to draw the line?

- Keep doing IPv6 for each one

| Beacon on: | IPv4 Upstreams | IPv6 Upstreams |
|---|---|---|
| RRC00 (MH) | 64 | 9 |
| RRC01/LON | 33 | 27 |
| RRC03/AMS | 30 | 29 |
| RRC04/GVA | 5 | 3 |
| RRC05/VIE | 13 | 10 |
| RRC06/TYO | 1 | 1 |
| RRC07/STO | 10 | 8 |
| RRC10/MIL | 12 | 10 |
| RRC11/NYC | 11 | 9 |
| RRC12/FRA | 35 | 33 |
| RRC13/MSK | 6 | 5 |
| RRC14/PAO | 5 | 5 |
| RRC15/SPO | 9 | 8 |
| RRC16/MIA | 0 | 0 |
| RRC18/BCE | - | 3 |
| RRC19/JNB | 6 | 5 |
| RRC20/ZHR | - | 15 |
| RRC21/PAR | 16 | 14 |
| RRC22/BUC | - | 14 |
| RRC23/SIN | 0 | 0 |
| RRC24/LAC (MH) | 3 | 3 |

# Some Ideas

- Longer than /24 prefixes in IPv4

  - Non-overlapping so we can ping them from Atlas?

- RPKI / ASPA

  - Valid/invalid/unknown exists already

  - Announce a prefix where the RPKI state changes, not the announcement  ( Fontugne et al. PAM '23 )

- Anycast

- Ghost/zombie routes characterisation

- Unknown BGP attributes (we did this in 2010, with <u>unintended consequences</u>)

- Fast beacon: Every 20 mins (nice for demo purposes?)

- Even faster: Route Flap Damping (RFD)

- *<blink>Insert your idea here</blink>*

# Questions

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