



**RIPE NCC**  
RIPE NETWORK COORDINATION CENTRE

# Zombie Routes

BGP routes getting stuck

# Zombie Routes?



- aka. “stuck route”
- Origin withdrew prefix but route still visible
  - Even after path hunting
- The good: This doesn't happen too often
  - or does it?
- The bad: It does happen
- The ugly: hard to debug

# Even BGP-Nyanocat was affected!



- <https://labs.ripe.net/Members/cteusche/bgp-meets-cat>

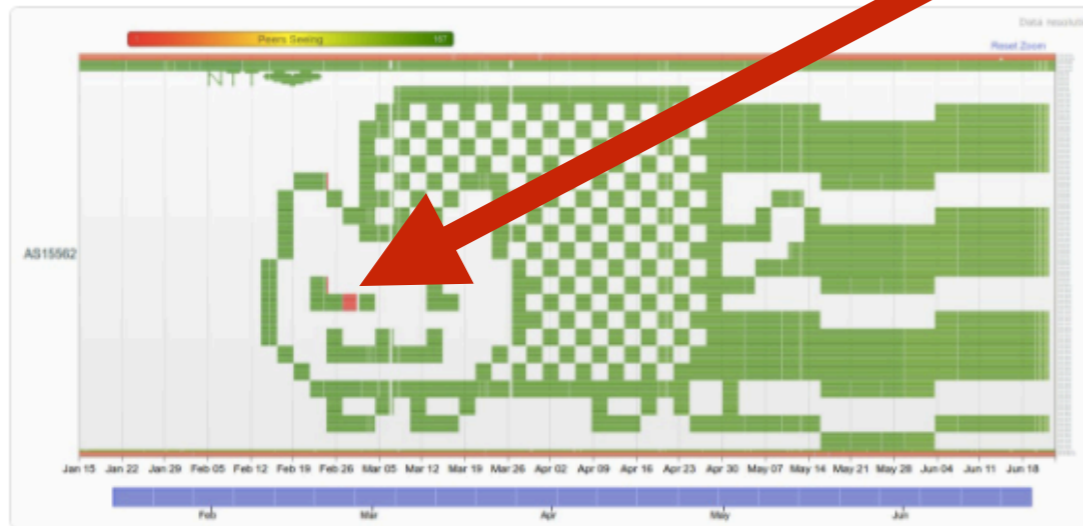


**Bert Hubert/PowerDNS**

@PowerDNS\_Bert

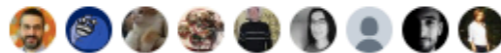
Follow

After 3072 hours of manipulating BGP, @JobSnijders has succeeded in drawing a Nyanocat on the RIPE statmon interface. [tinyurl.com/nyancatbgp](https://tinyurl.com/nyancatbgp)



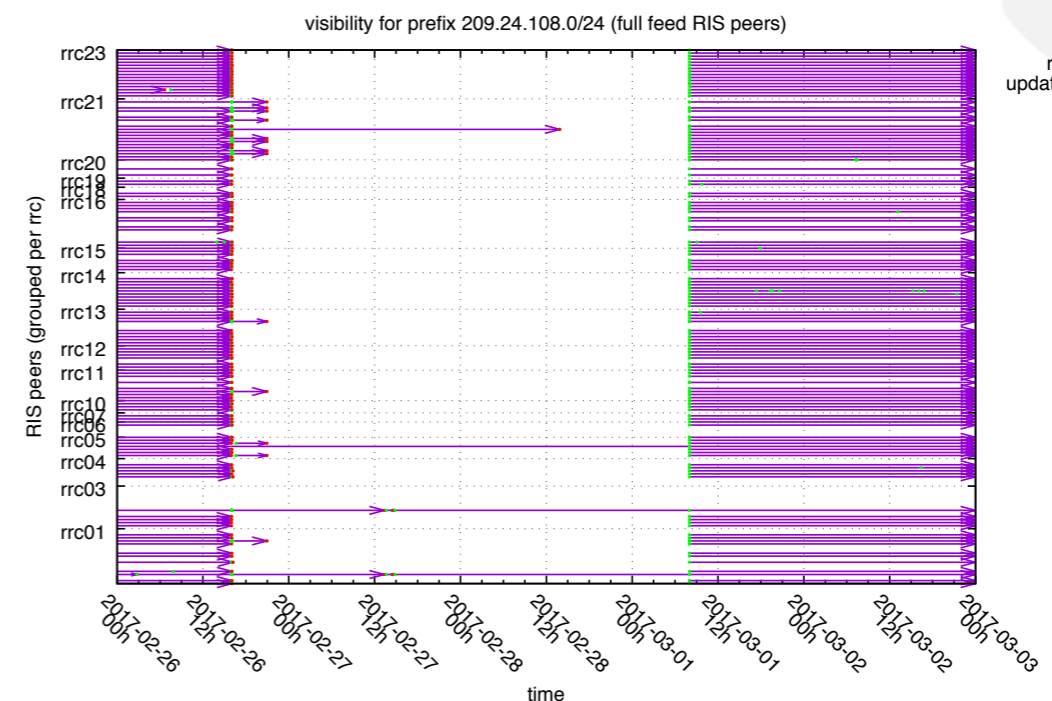
Retweets  
**1,420**

Likes  
**1,663**

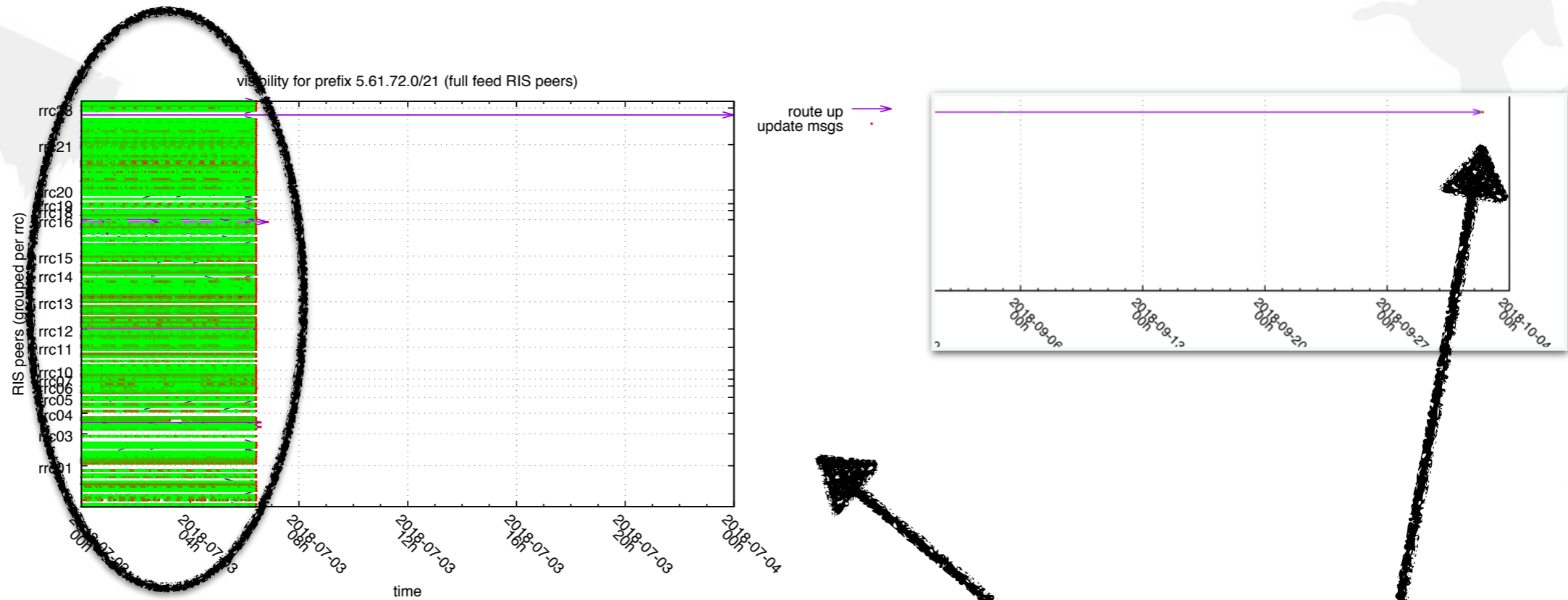


9:39 AM - 23 Jun 2017

20 1.4K 1.7K



# Example: Long Lived Zombie



Tons of BGP updates

3 Months!

Route totally withdrawn only after manual intervention

Confusing if you want to know: Is this routed publicly?

# First Step: BGP Beacons



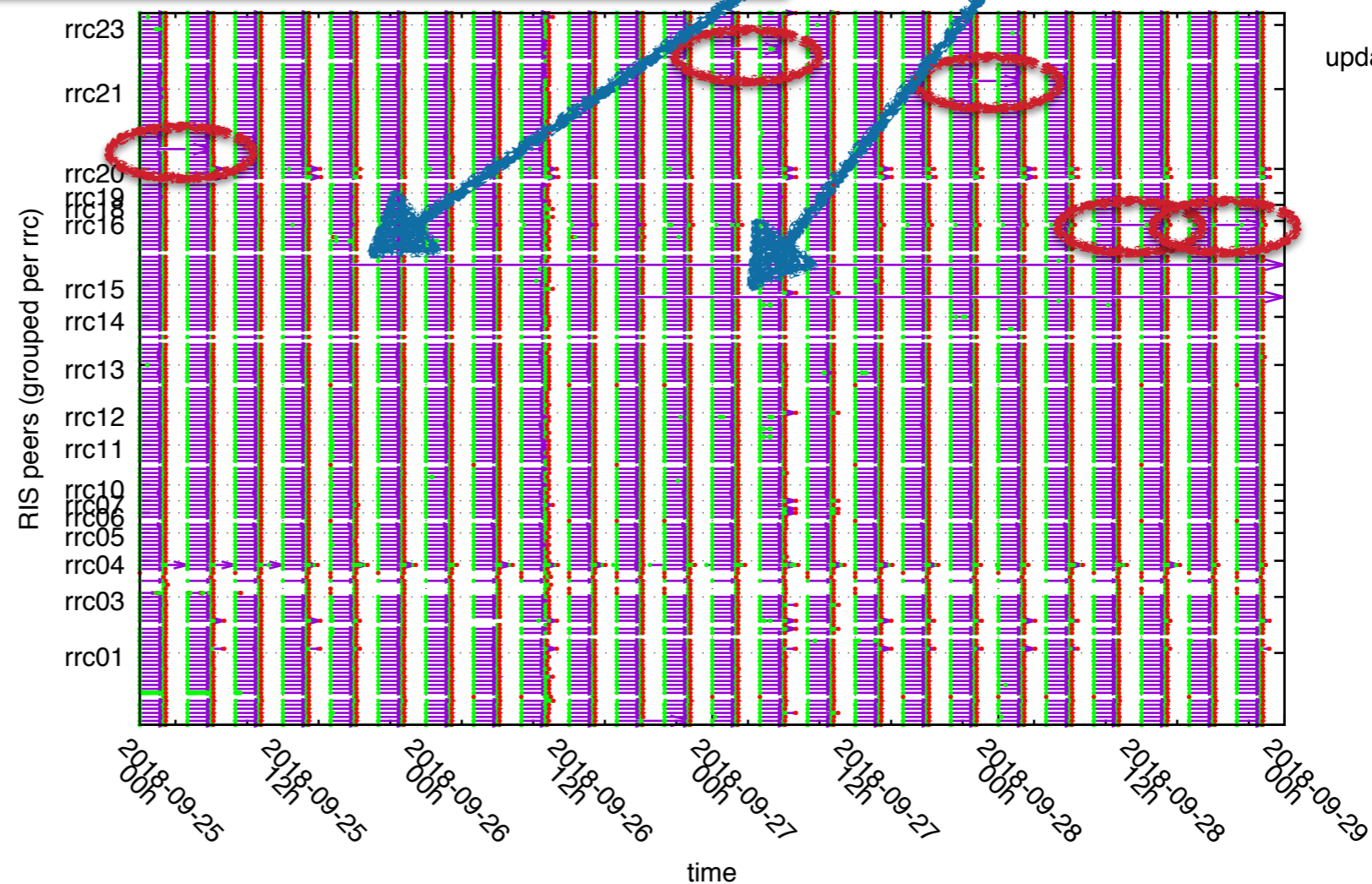
## Current RIS Routing Beacons

**Note:** IPv6 beacons and anchors are now being announced from the RRCs. See below for details.

All RRCs:

- Announcements at 00:00, 04:00, 08:00, 12:00, 16:00, 20:00 (UTC)
- Withdrawals at 02:00, 06:00, 10:00, 14:00, 18:00, 22:00 (UTC)

visibility for prefix 84.205.67.0/24 (full feed RIS peers)



# Beacon Zombies



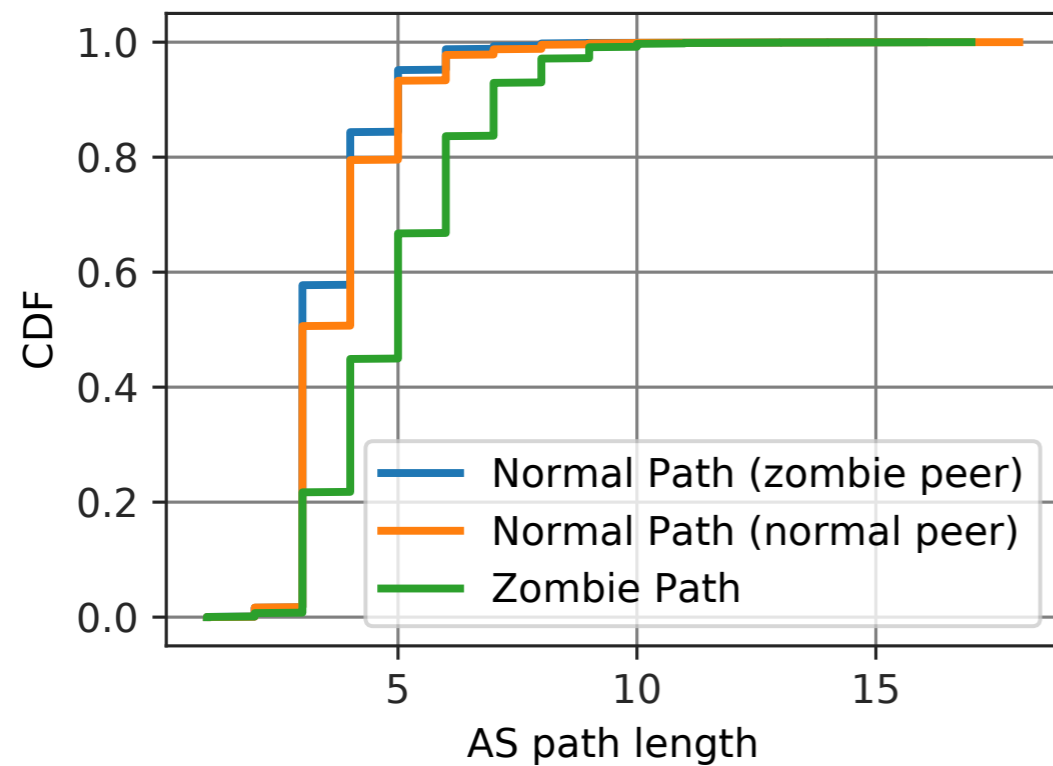
- Likelihood for a RIS peer to see a beacon zombie route?

?

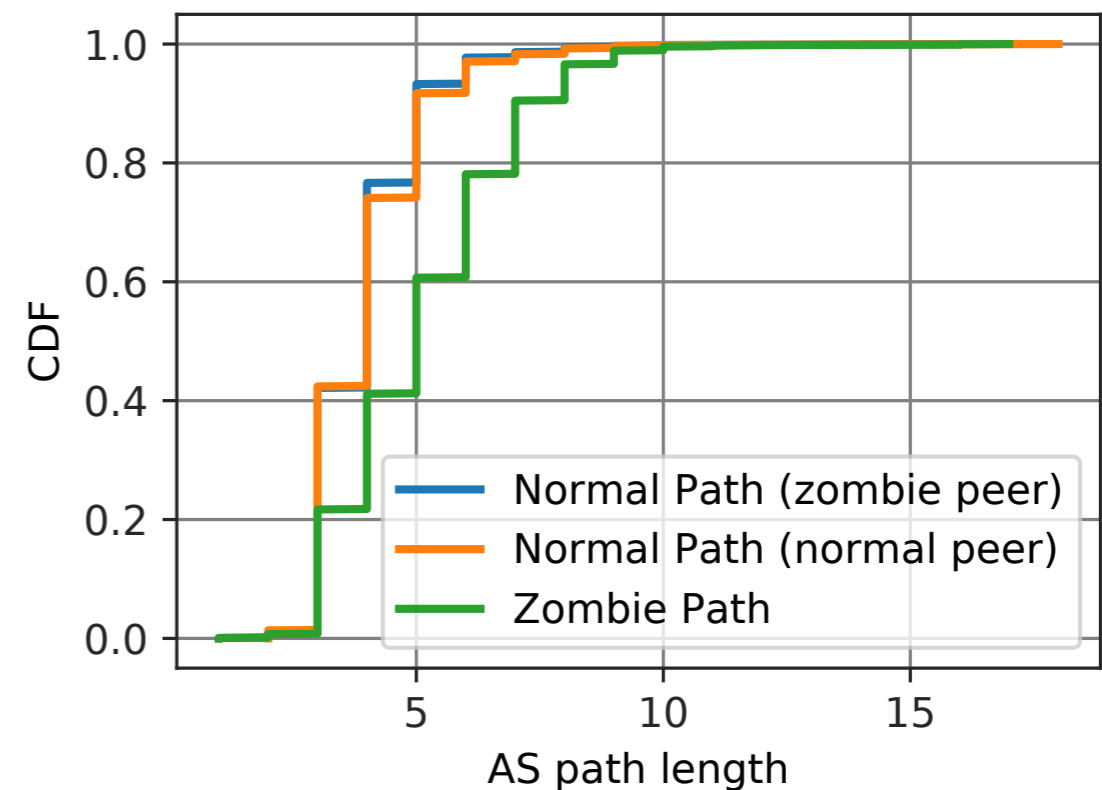
# Zombie paths are longer



## IPv6



## IPv4



- Zombie paths (green) are longer than best path
- Mitigate by reannounce/withdraw?

# Zombie Apocalypse?



- Is this a canary in the coal-mine?
- Sign of things getting worse?
  - didn't increase over time (until now) at least
- What if:
  - More prefixes?
  - More updates?





# What causes this?

- Software bugs
  - Routers
  - BGP optimisers?
  - Route reflector setups?
  - Route collector systems?
- Is this correlated to update rates?
  - another sign update rates are a problem?



# Next Steps



- **Zombie-aware BGPPlay?**
  - Needs us to be able to find zombies in the wild
- **Alerting?**
  - Do you want to know about these in your network
  - Does it increase your table size
- **Create awareness**
  - Researchers typically not aware this exist
- **Operator Feedback!**
  - Do you know how much trouble (tickets) this causes?



# Questions



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