



RIPE NCC
RIPE NETWORK COORDINATION CENTRE

AS-Hegemony

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AS Interdependency

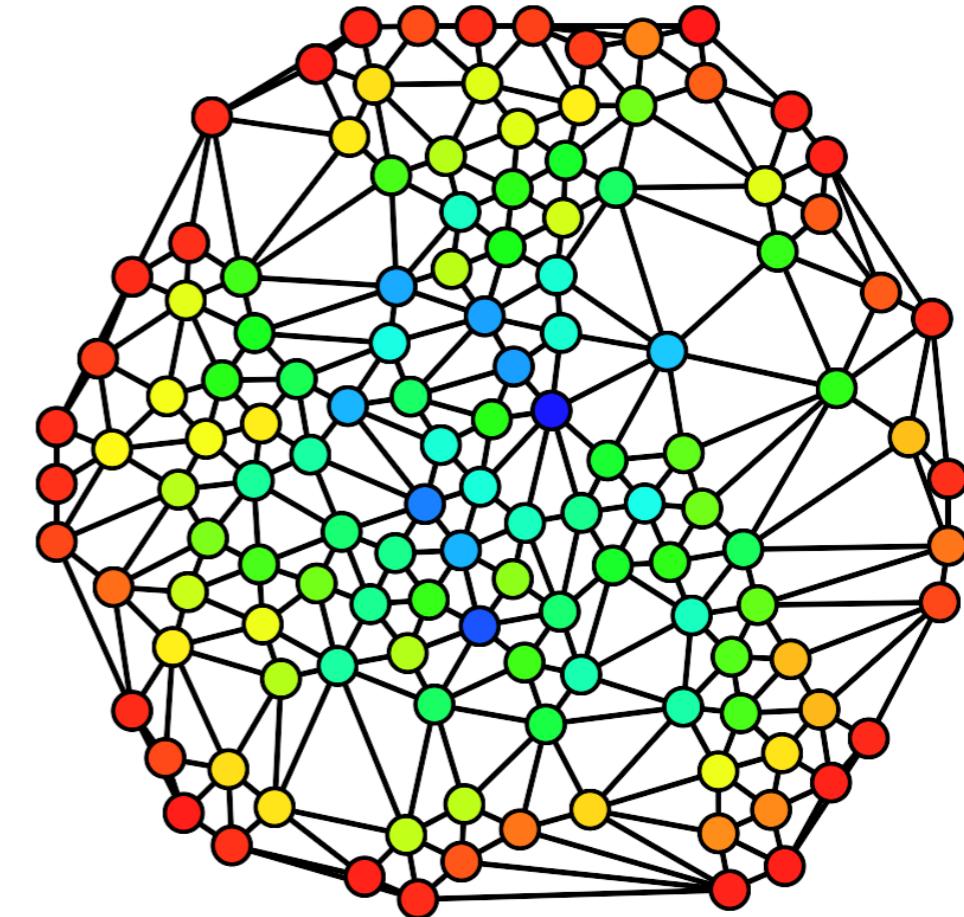


- How does a network depend on other networks?
 - Directly: upstreams
 - Indirectly: upstream from that
- Data we have:
 - RIPE RIS
 - Oregon Routeviews
- Problem: BIAS!

Key concepts: Graph Betweenness



- Betweenness Centrality
 - How central is a node (ASN)?
- Global vs. local
 - Global: what's between all the things
 - Local: what's between a node (ASN) and the rest of the things



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Key concepts: Truncated Mean



- Truncated mean to solve bias
- Solves averaging in the face of outliers



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https://pam2018.inet.berlin/wp-content/uploads/2018/04/pam2018_fontugne.pdf

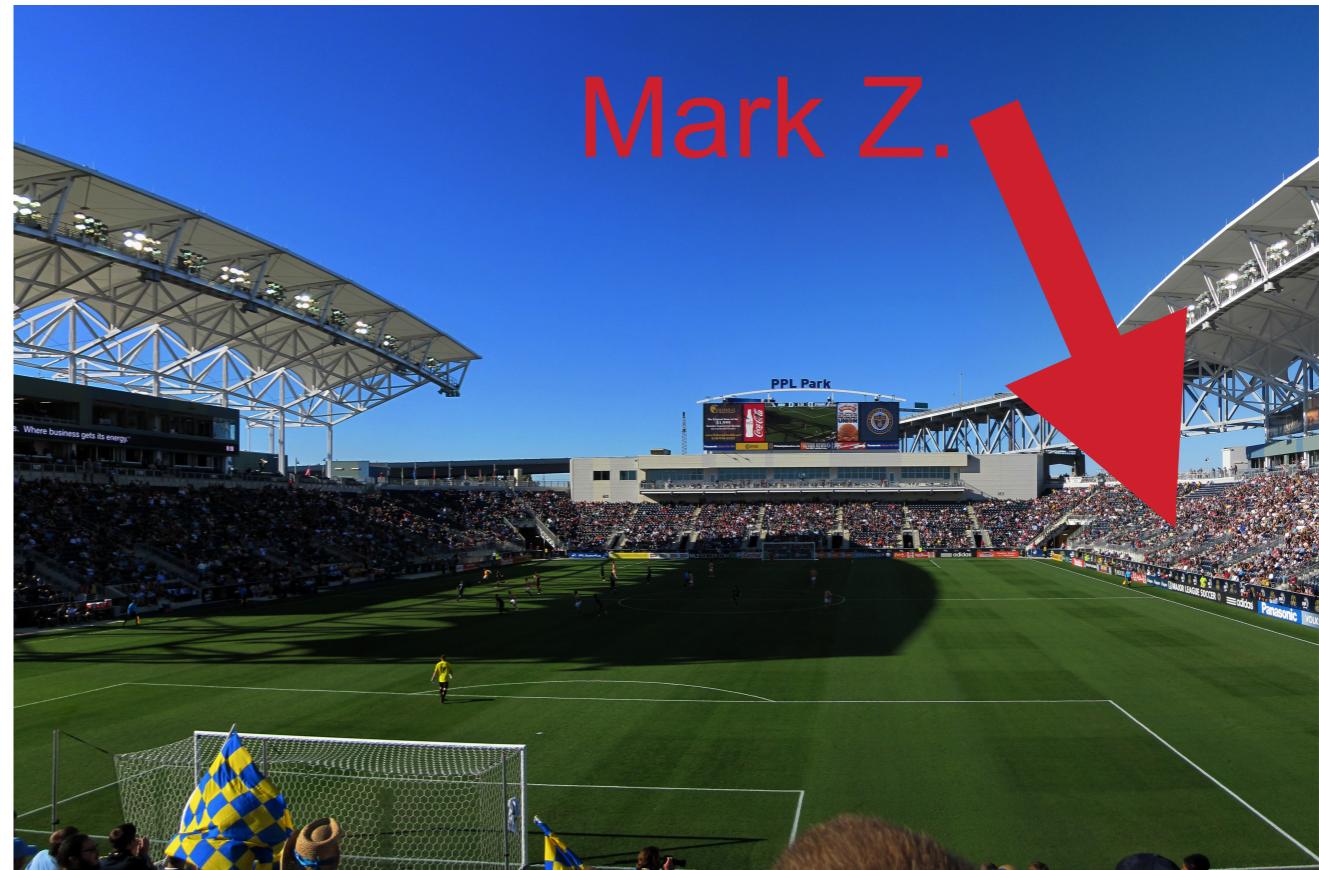
<https://arxiv.org/pdf/1711.02805.pdf>

<https://github.com/romain-fontugne/ashash>

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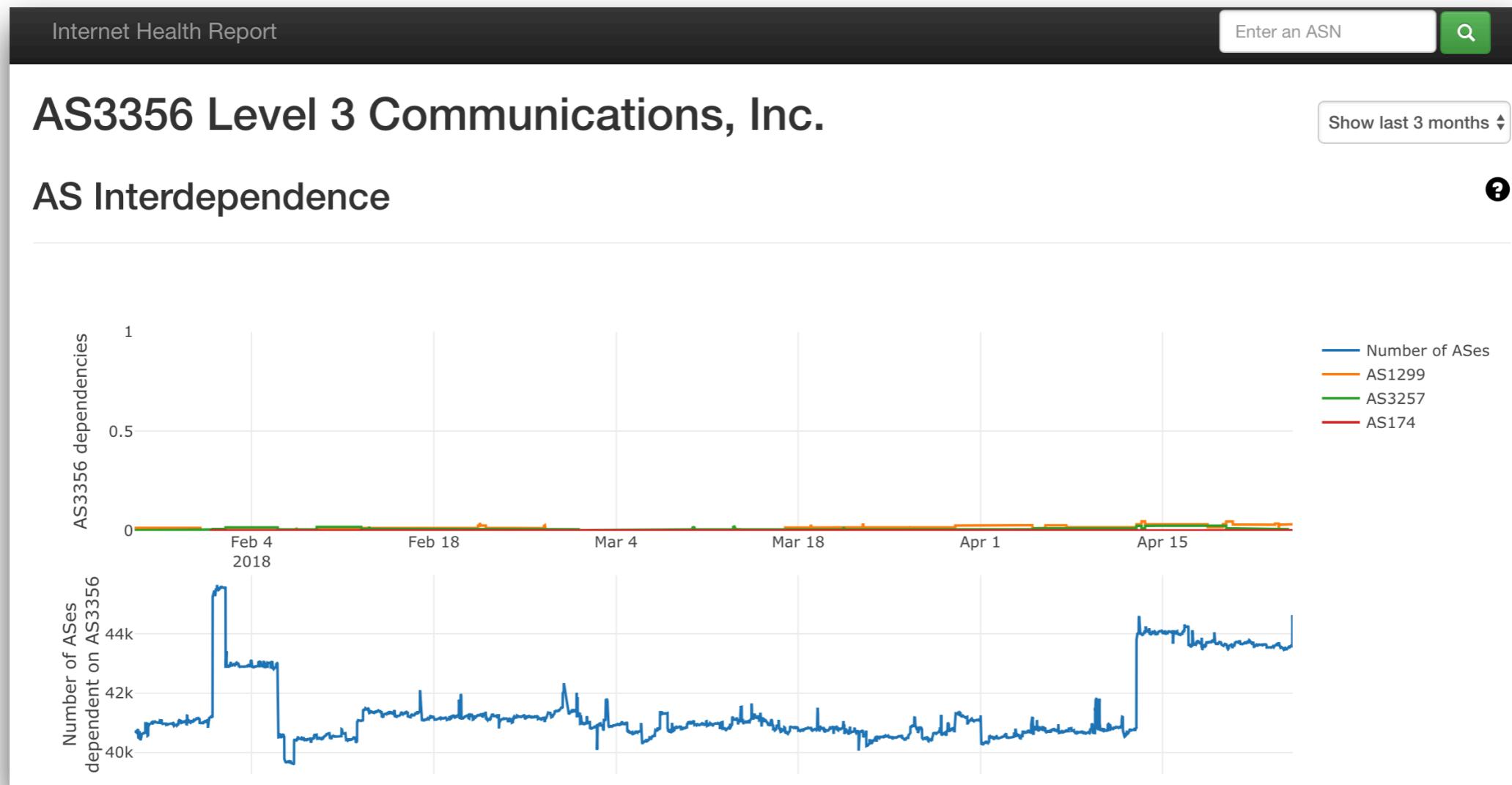
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Try This Yourself!



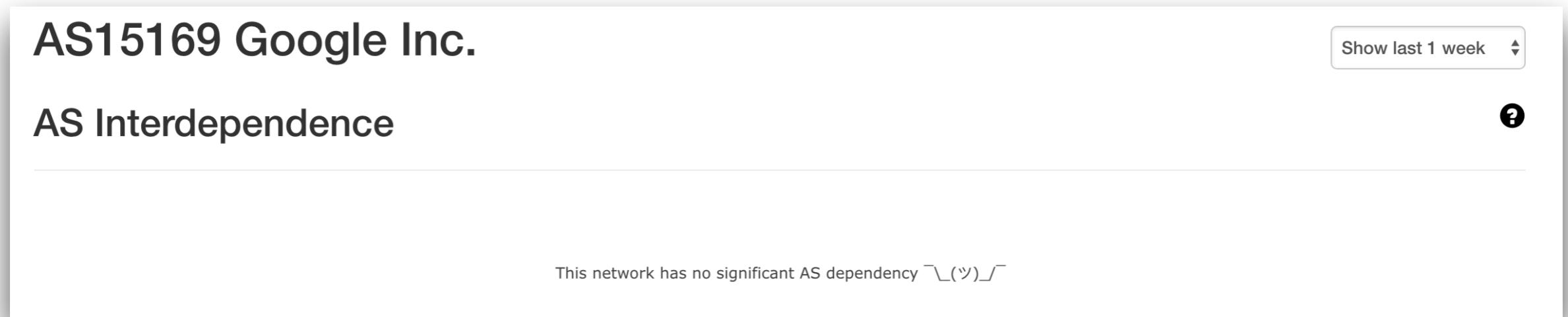
- [http://ihr.ijilab.net/ihr/3356/asn/?
date=2018-04-24&last=90](http://ihr.ijilab.net/ihr/3356/asn/?date=2018-04-24&last=90)



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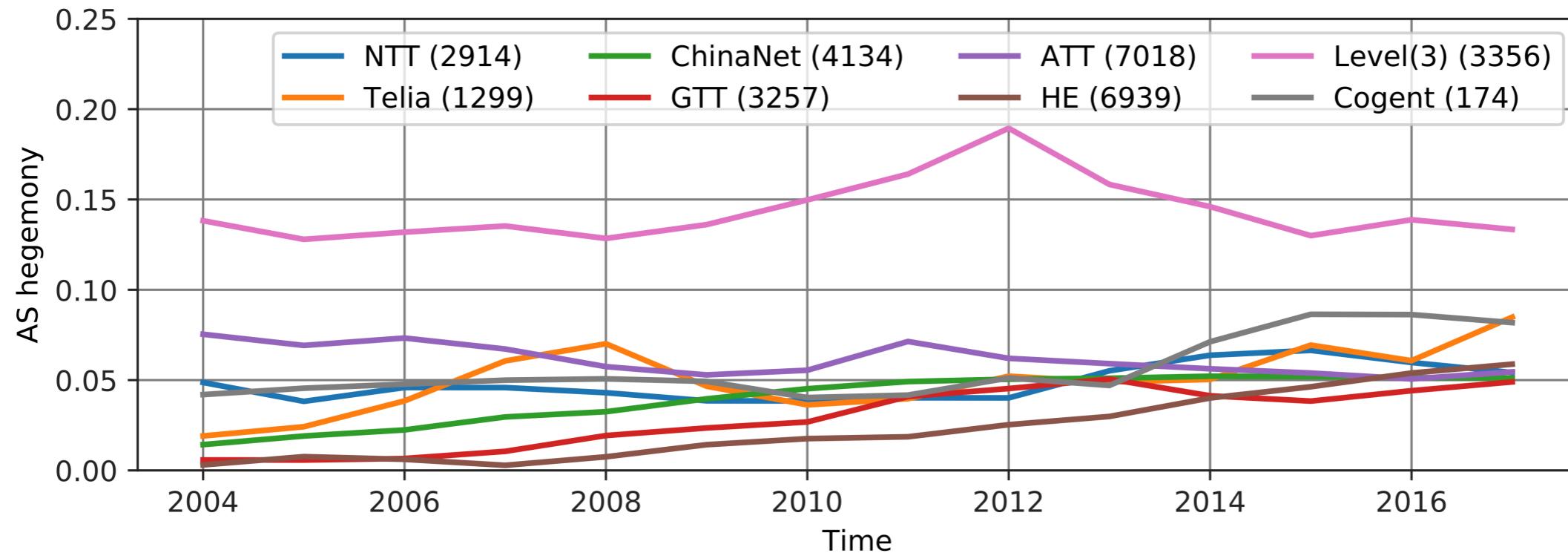
- <http://ihr.ijl.net/ihr/15169/asn/>



No significant dependencies!

Local “flattening of the Internet”

Top8 “Tier1” AS Hegemony Scores



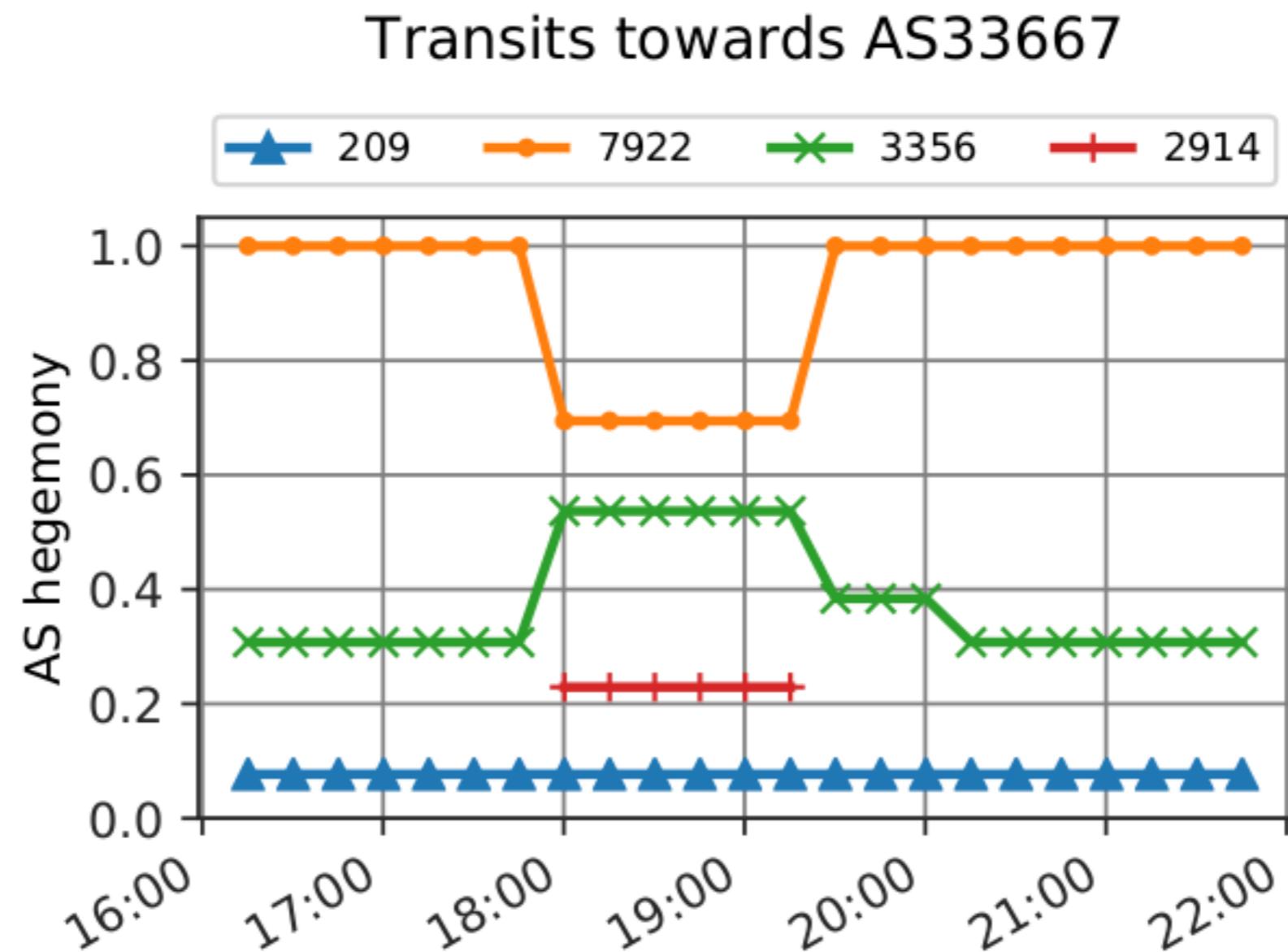
- Truncated mean of betweenness in route collector paths (RIS+Routeviews)

Globally: Non-flattening!?

What happens during Events



- Level3 leaked AS33667 (Comcast)



Actions



- Validation:
 - Do you see weird things in this that didn't match your expectation
 - Unexpected dependencies (esp. if not immediate upstream)
- Where to take this?
 - Alerts: LIR Portal?
 - RIS peer selection?
 - <<your idea here>>



Questions

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