

RIPE

Monitoring your BGP routing at a glance

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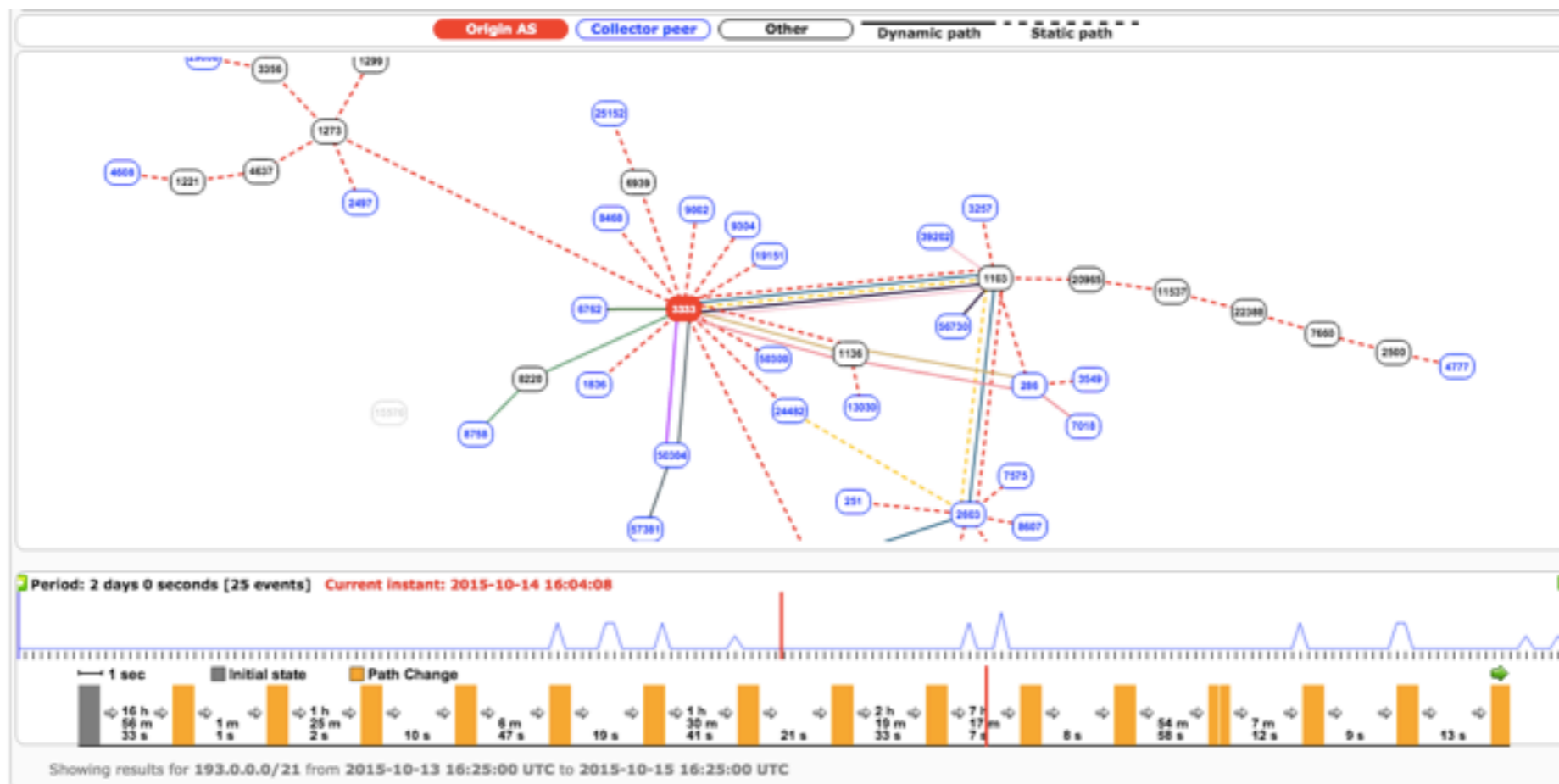
Day-to-day questions about BGP

1. How to trace interdomain **availability** over time?
2. Are my **resources visible** around the world over the internet?
3. **How** are they currently visible?
4. Do we have **stable routing**?
5. Is possible to **squeeze detailed information** for the whole process?



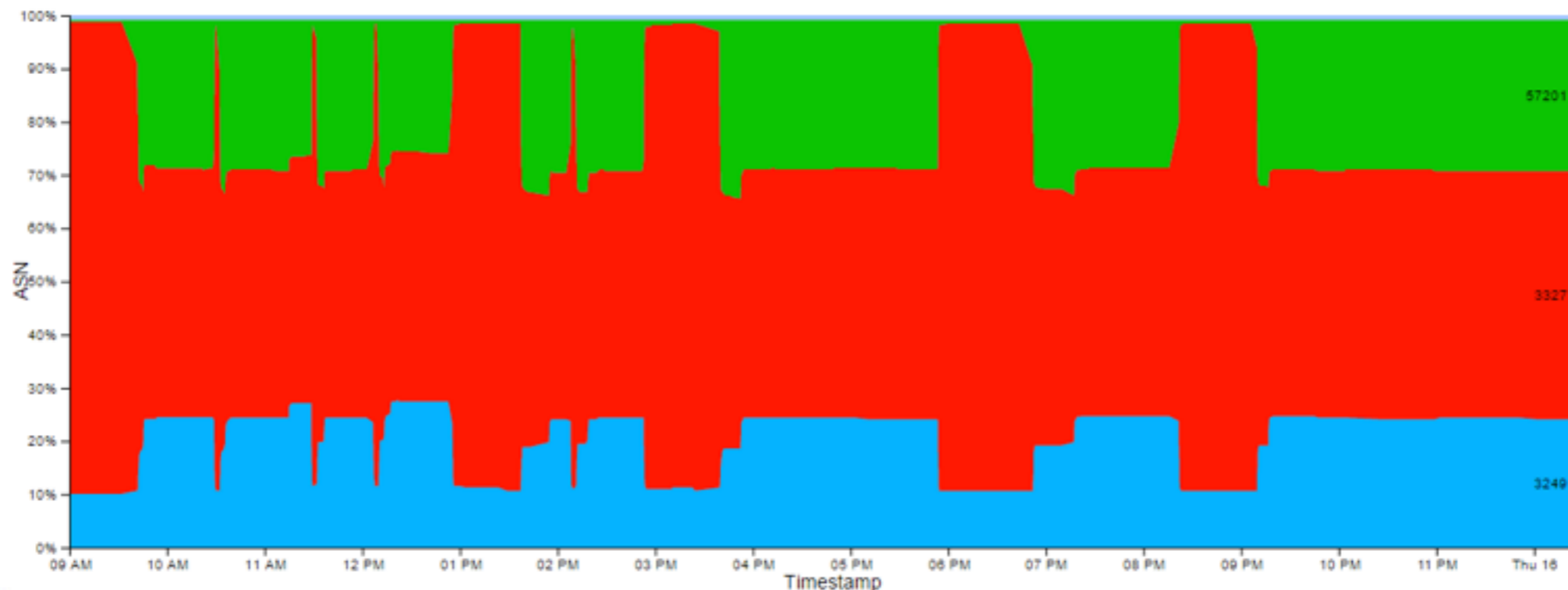
State of the art: BGPlay

- Shows BGP routing evolution in time by means of a graph
- Nodes represent ASes, paths represent reachability state
- Available in RIPEstat (stat.ripe.net/)



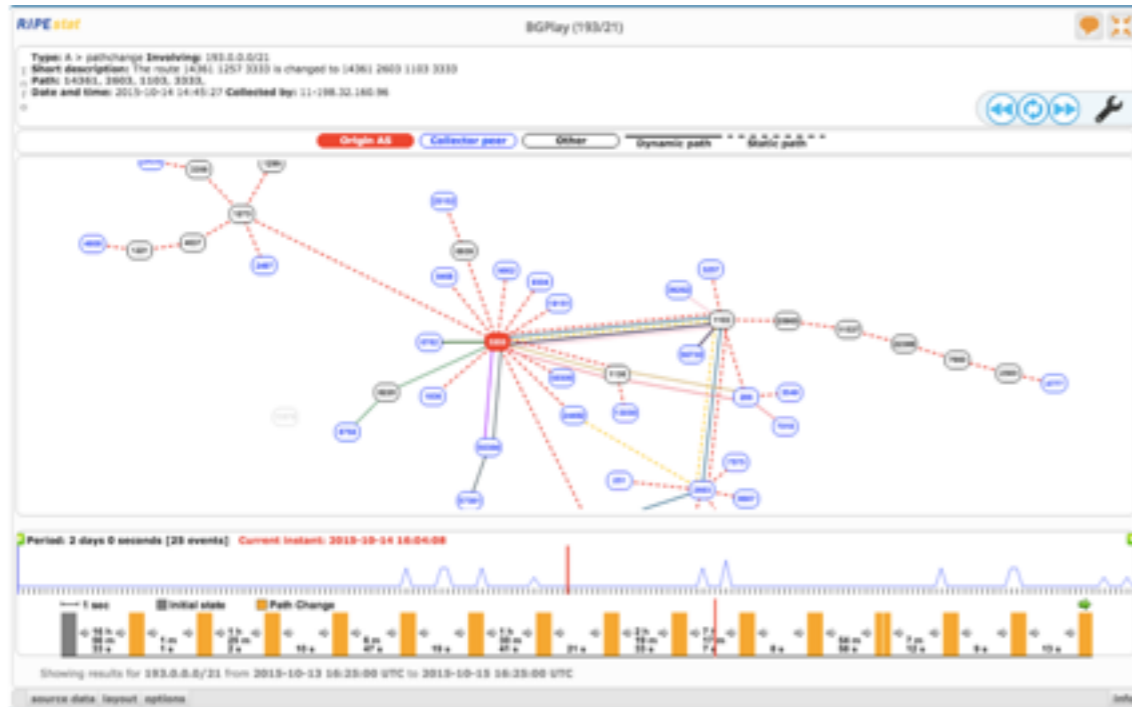
What's new: BGP Streamgraph

- Show a summary of the visibility status
- Colored areas represent a percentage of visibility through an upstream for a specified target
- Try it at massimo.ripe.net/bgpstreamgraph/widget/
- Fork us on github.com/LucaMarzialetti/BGP_streamgraph



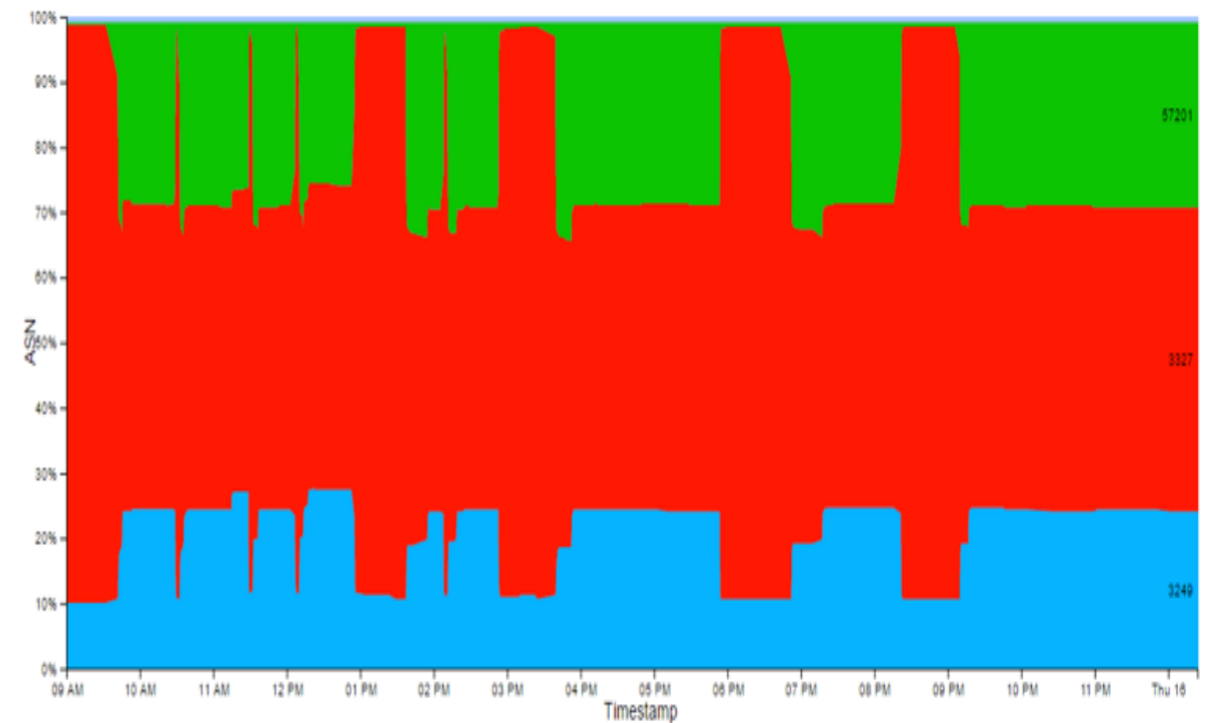
Two different purposes

BGPlay



Shows *What* and *How*
Single events
High interactivity
Realtime

BGP Streamgraph



Shows *If* and *When*
Aggregated events
Low interactivity
Realtime

BGPlay + BGP Streamgraph

- BGP Instability case
 - from the instability report potaroo.com (by Geoff Huston)
- **AS57201** (EDF-AS) is the **target, only 2 upstreams**
 - **AS3327** (LINXTELECOM) on the **left**
 - **AS3249** (ESTPAK) on the **right**



BGPlay + BGP Streamgraph



BGP Streamgraph metaphor

Using ***streamgraphs*** representation for

- Tracking the routing variations in time
- Tracking the changing of reachability for the target
- It's a **quantitative** model

Using ***heatmaps*** representation for

- Detailed reachability for all routing collectors involved
- It's a **qualitative** model

Ordering problem

- The quality of the draw lay in the areas/rows ordering



Metrics, Heuristics, Data structures

Metrics

- Levenshtein distance
- Standard Deviation of boundary curves



Heuristics

- Curves order optimization for best view
- Greedy approach
- Random walking + simulated annealing
- Compensation based with pruning



Data Structures

- PQ-trees (Implemented in JavaScript)



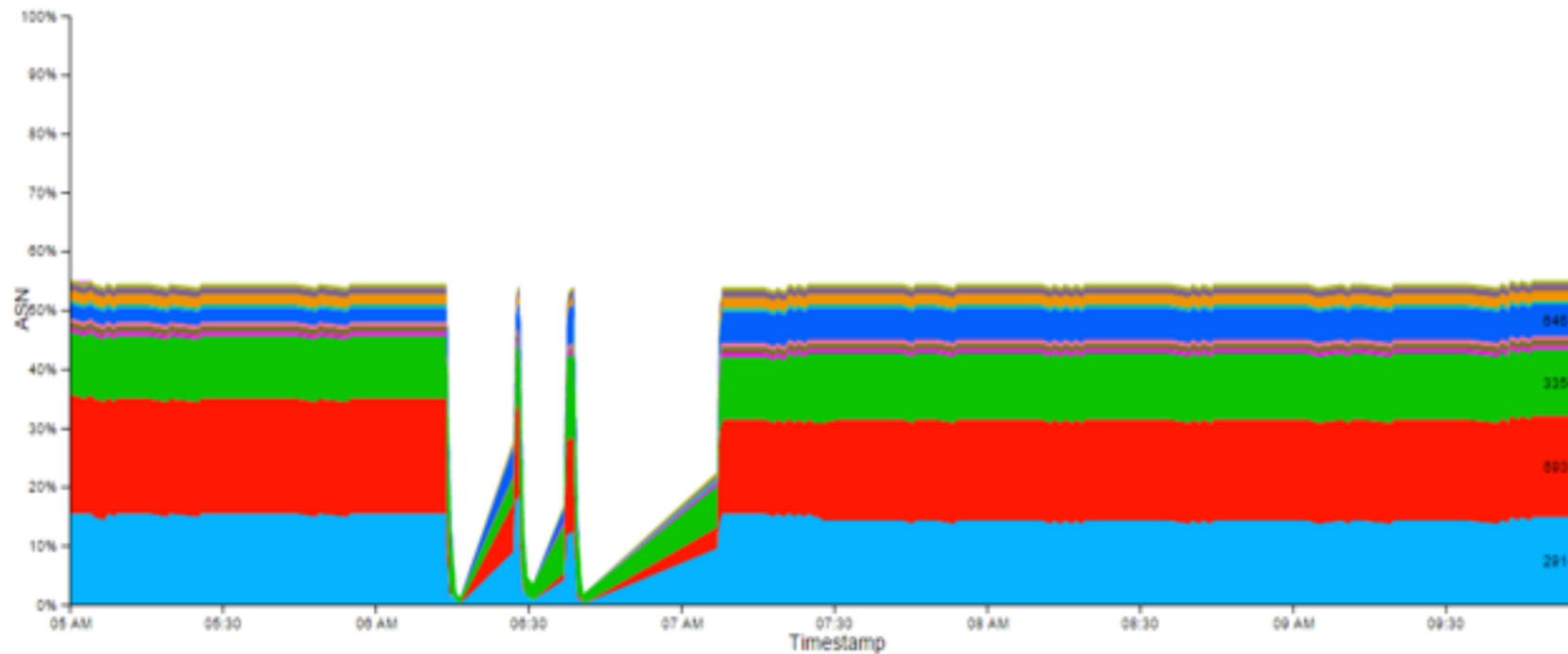
Try it yourself

massimo.ripe.net/bgpstreamgraph/widget/



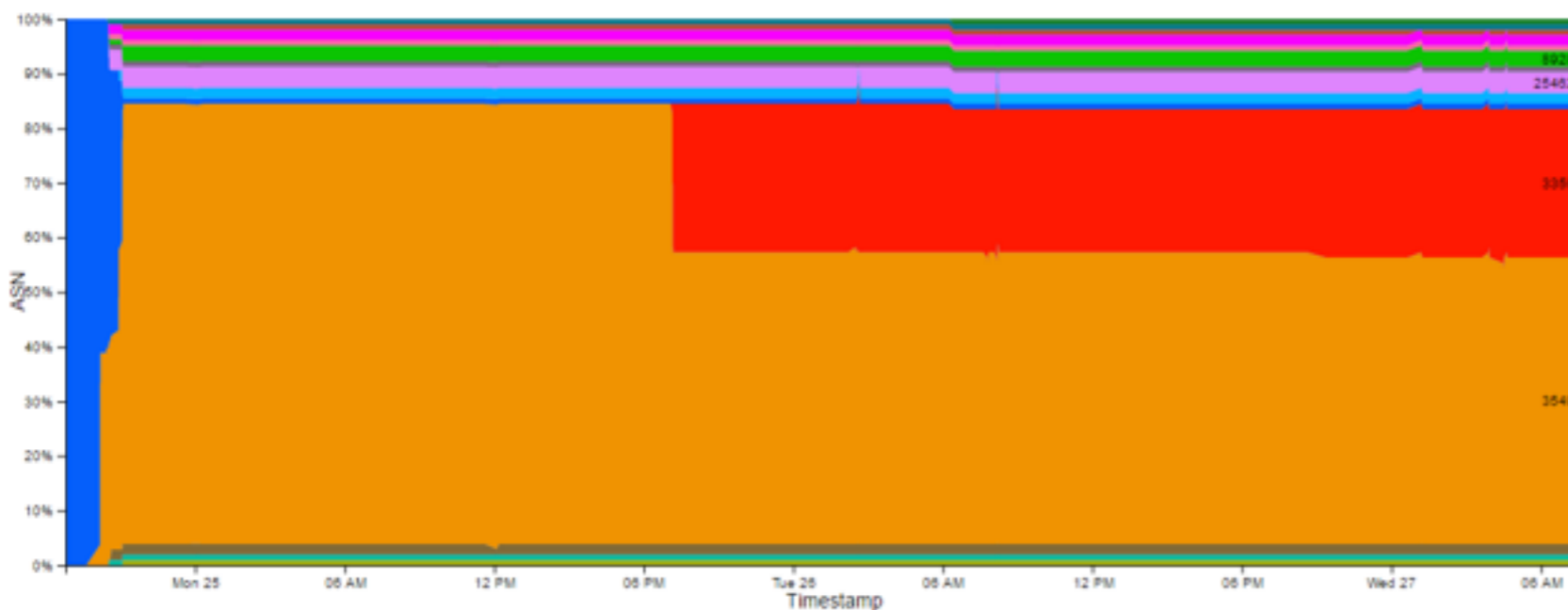
Real case: outages 1/2

27/01/2015 “Facebook down” 2a03:2880:f000::48



AS6461 = MFN, Zayo
AS3356 = Level 3
AS6939 = Hurricane E.
AS2914 = NTT America

23/2/2008 “Youtube knockout Pakistan Telecom” 208.65.153.0/24

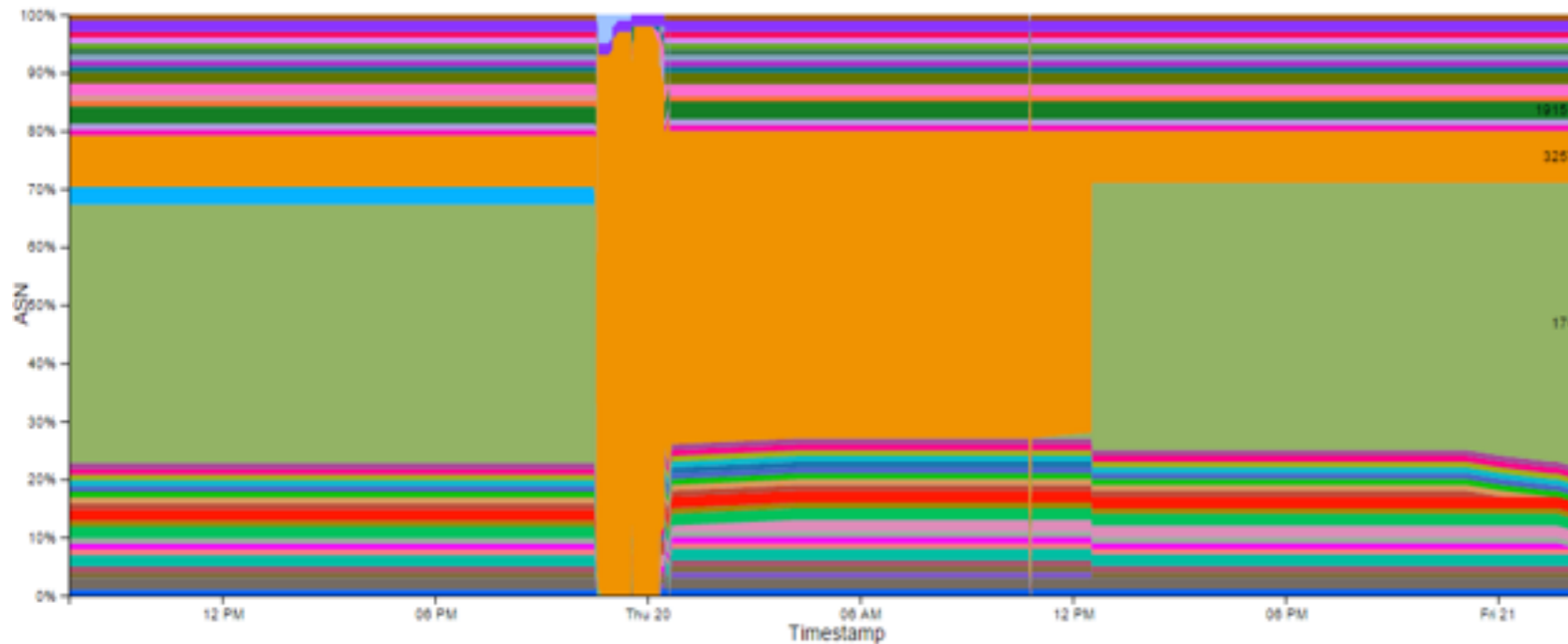


AS3491 = PCCWG-AS
AS3356 = Level 3
AS3549 = Level 3



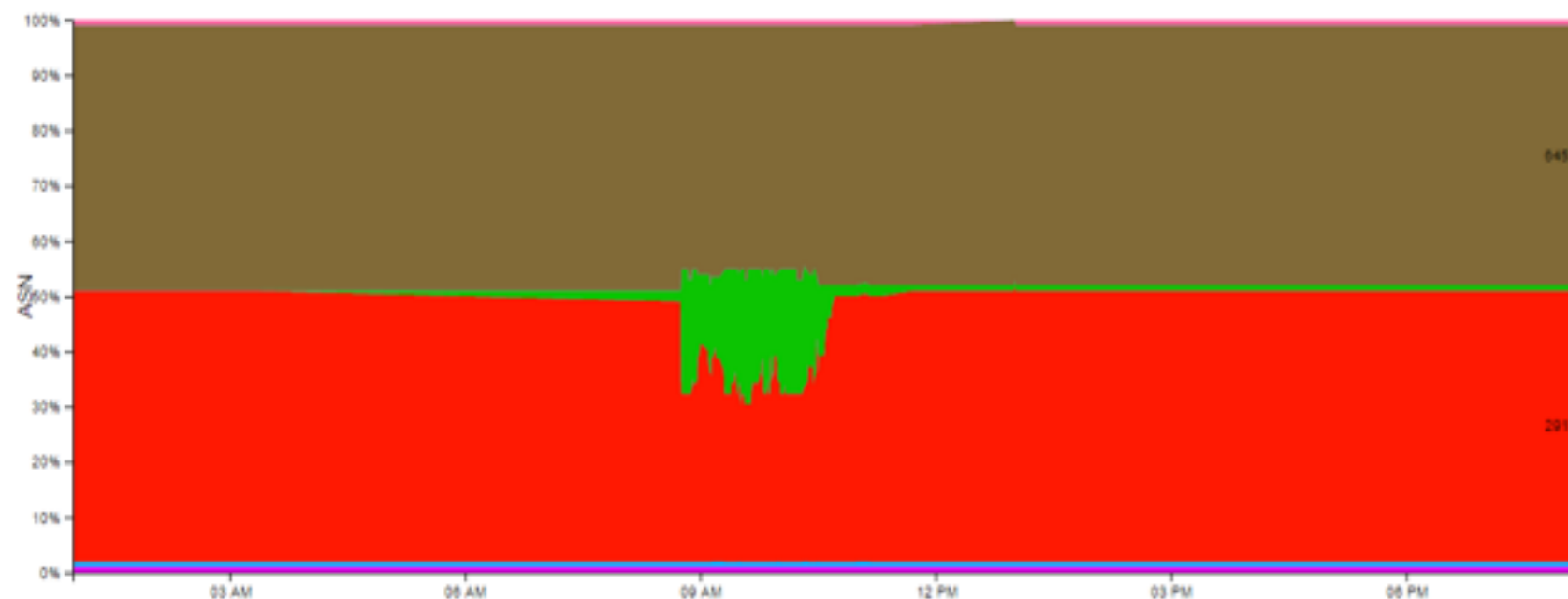
Real case: outages 2/2

20/11/2014 “Submarine cable cut in Ireland.” 212.17.32.0/19



AS34245 = Magnet-AS
AS174 = Cogent Comms

12/06/2015 “@DynResearch attack” 54.255.128.0/17



AS2914 = NTT America
AS4788 = TM NET
AS6453 = Globeinternet



Questions?

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Give us a feedback! :)

github.com/LucaMarzialetti/BGP_streamgraph

