

Thesis
B.Sc.

Thesis
M.Sc.

IDP

Analyzing BGP as a Graph

Motivation

The Border Gateway Protocol (BGP) is the foundation of the Internet and inter-AS communication. Different route collector services, e.g., Routeviews [1] and Ripe RIS [2] peer with different ASes that offer to share their routing table (so called BGP feeders). Data from these services is publicly available and can be used to analyze the current AS graph and inter AS routing. While many different feeds are available, not all of these are complete but some ASes only share parts of their routing tables. Furthermore, routing decisions are often based on individual, unknown policies.

With the increasing popularity of graph based machine learning, e.g., Graph Neural Networks (GNN) new possibilities arise to analyze the BGP and inter-AS routing ecosystem. To successfully apply algorithms, a graph has to be extracted from collector views and features have to be identified. An example can be seen in the work from Sanchez et al. [3].

Goal of this thesis is to transform BGP data into a graph, merge the viewpoint of different BGP feeders and identify full feeders. Furthermore, different features should be identified based on the graph but also additional data sources, that can help machine learning algorithms in the future.

Your Task

- Transform BGP data into graphs
- Merge different viewpoints and scale the approach
- Identify import features and enrich the graph
- Analyze the graph in respect to different dimensions, e.g., resource consumption

Requirements

- Basic programming knowledge in Python or Go
- Familiarity with GIYF-Based work approaches

Bibliography

- [1] <http://www.routeviews.org/routeviews/>
[2] <https://www.ripe.net/analyse/internet-measurements/routing-information-service-ris>
[3] Sanchez, Odnan Ref, et al. "Comparing machine learning algorithms for BGP anomaly detection using graph features". 2019.

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