Identifying Interesting Outages
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Introduction

Motivation: The Trinocular outage detection system collects a large amount of IPv4 /24 block outage data on a constant basis. 36M data points were collected in Q1 2019 alone, and there are nearly 660M points collected to date; however, we know little about this data. It is difficult to find important and interesting outages without a proper analytical tool.

Past Work: We previously developed an interactive map which displays geolocated outages. However, the average user may find the map difficult to navigate due to its minimal user interface.

Approach: We propose two approaches: first, create a web-based tool that fetches outages based on selected parameters and provides links to outages on the interactive map; second, use the reporting tool in a proof-of-concept analysis with the goal of answering research questions. (E.g., what makes an outage interesting?)

Outages: What is Interesting?

• We want to find and define interesting outages
• Large, severe, and dynamic outages are more interesting than small, minor, and gradually changing outages
• Dynamic outages are more likely to be an actual event than a static outage
• A large outage of any severity is more interesting than a small outage with high severity, so we give size a larger weight
• We define interest as follows:
  \[ I = \Delta \text{(size} \cdot \text{severity}^2) \]
• Outage data is highly skewed, with many small events

Outage Reports

• Backend program fetches list of outages from database
• Website displays outages based on search parameters:
  • Report type (size, severity, interest metric, historical)
  • Start date
  • Search duration
  • Region
• The report links to pre-existing outage map
  • The size of the circle corresponds to outage size
  • The color of the circle corresponds to outage severity

Analyzing Outages We Find

• We completed analysis to test the tool’s usefulness
• Goal: find large, dynamic outages
• Looked at data from 2019-03-03 to 2019-03-09
• Are there large outages?
• Brazil on 2019-03-05 (3074 blocks), not dynamic
• Venezuela on 2019-03-08 (1954 blocks), dynamic

Studying the Venezuelan Outage on 2019-03-08

• Are outages in a specific ISP?
  • Yes: CANTV, a Venezuelan state-run ISP
• Can we determine root causes?
  • Yes: we found documentation of power outages

Conclusions

• Website makes outage information more accessible to the general public
• The tool helps streaming finding interesting outages
• The tool is being used to analyze outage causes

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