Regional AS Structures

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motivation

- existing AS structure analysis
  - with only global view
- but a view from Asia might be different from a view from US

The goal of this project is to investigate regional differences in AS structures to better understand the relationship of the Internet structure and geographical regions.

disclaimer

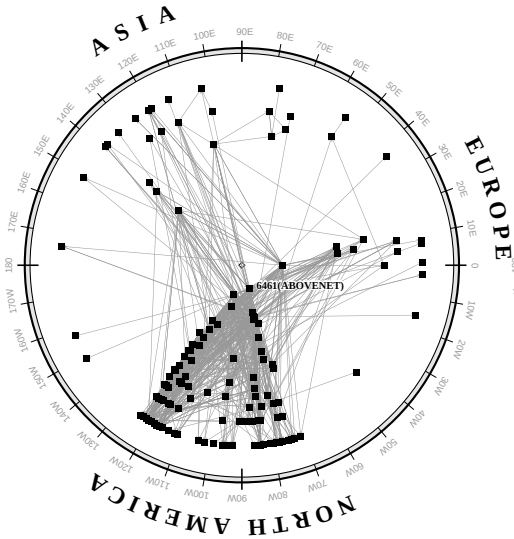
this is an ongoing project.
the results are preliminary with many limitations and flaws...

methods

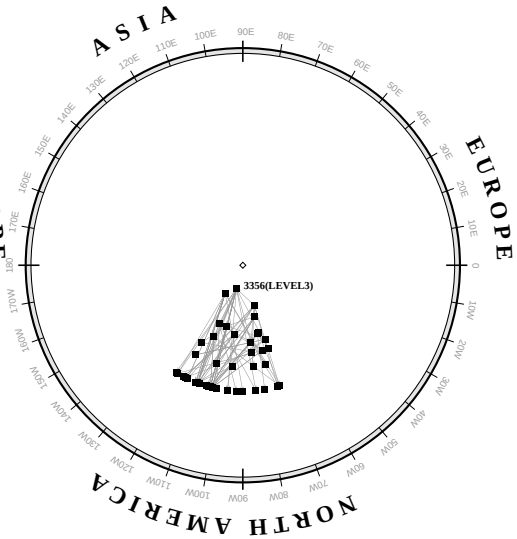
- main idea
  - extract ASes with presence in a region
  - use AS Core Map to see structural differences
    - which ISPs compose the core in the region
    - by showing ISPs' out-degrees in the region
- data set: skitter
- extracting ASes in a region by clustering AS boundary nodes
  - landmarks: IX prefixes, reverse DNS names (undns)
  - RTTs: assuming 2 nodes with small RTT (e.g, less than 20ms) are in the same region

a view from US

US-PST

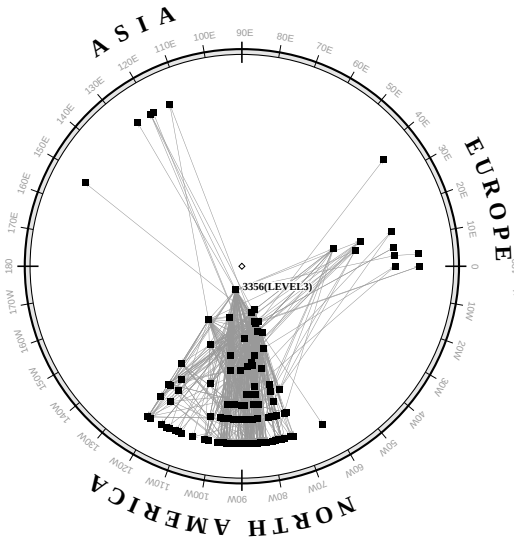


US-MST



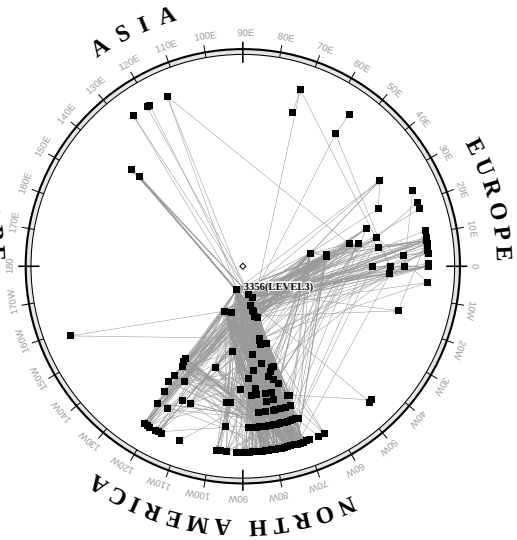
Number of ASes: 327

US-CST



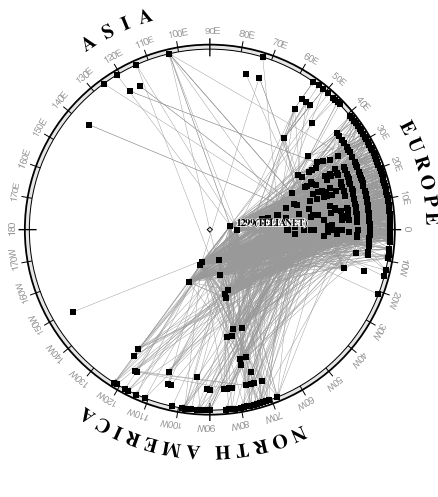
Number of ASes: 75

US-EST



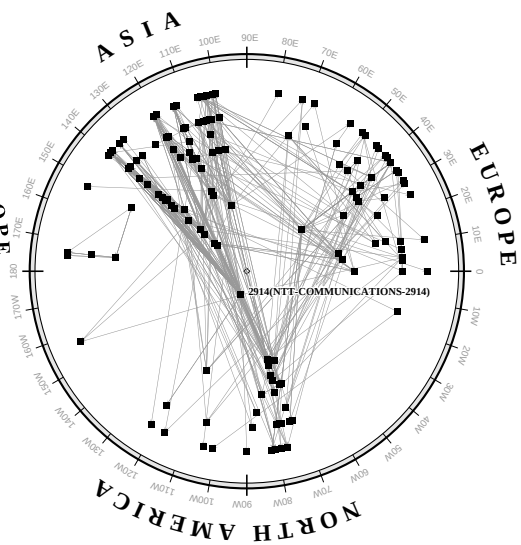
a view from other regions

Europe



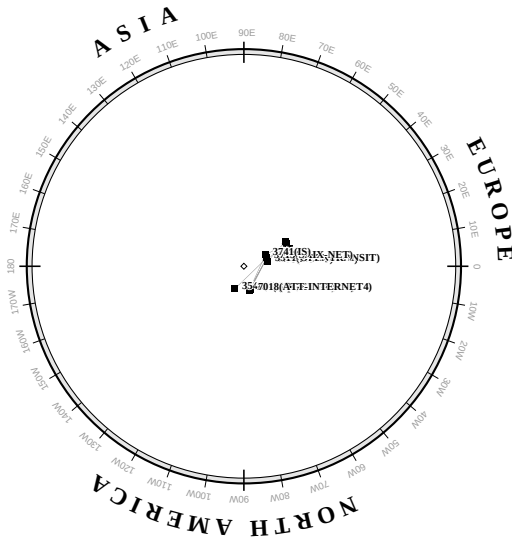
Number of ASes: 1244

Asia

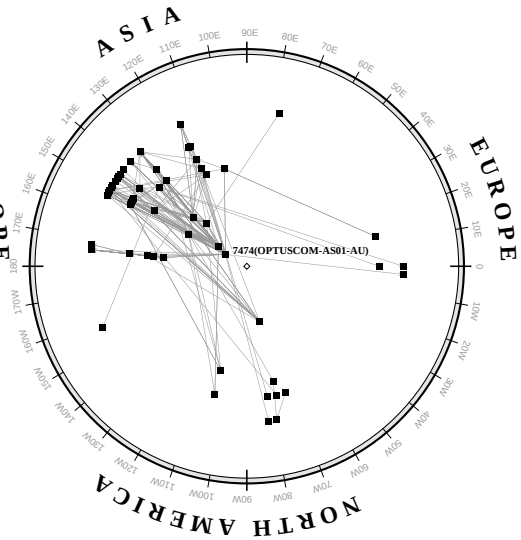


Number of ASes: 379

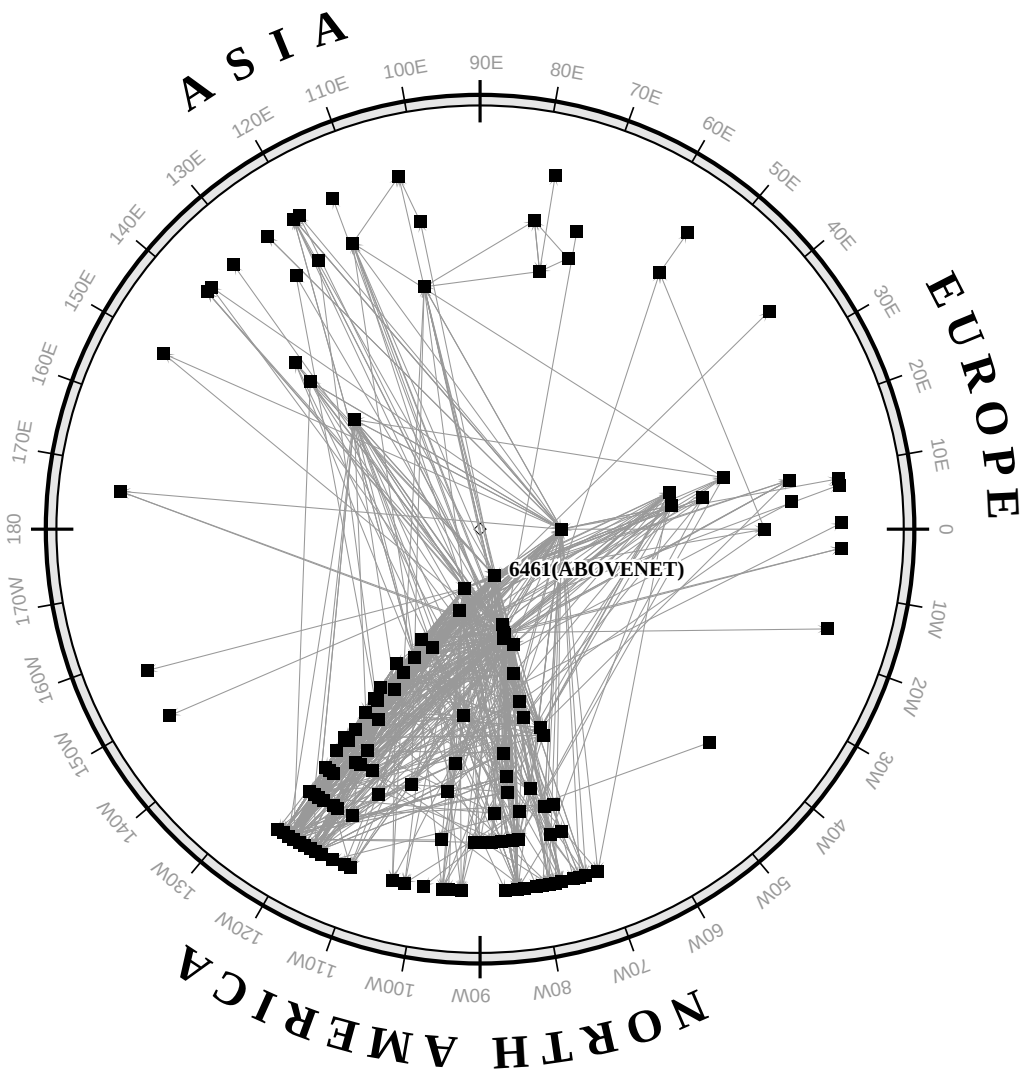
Africa



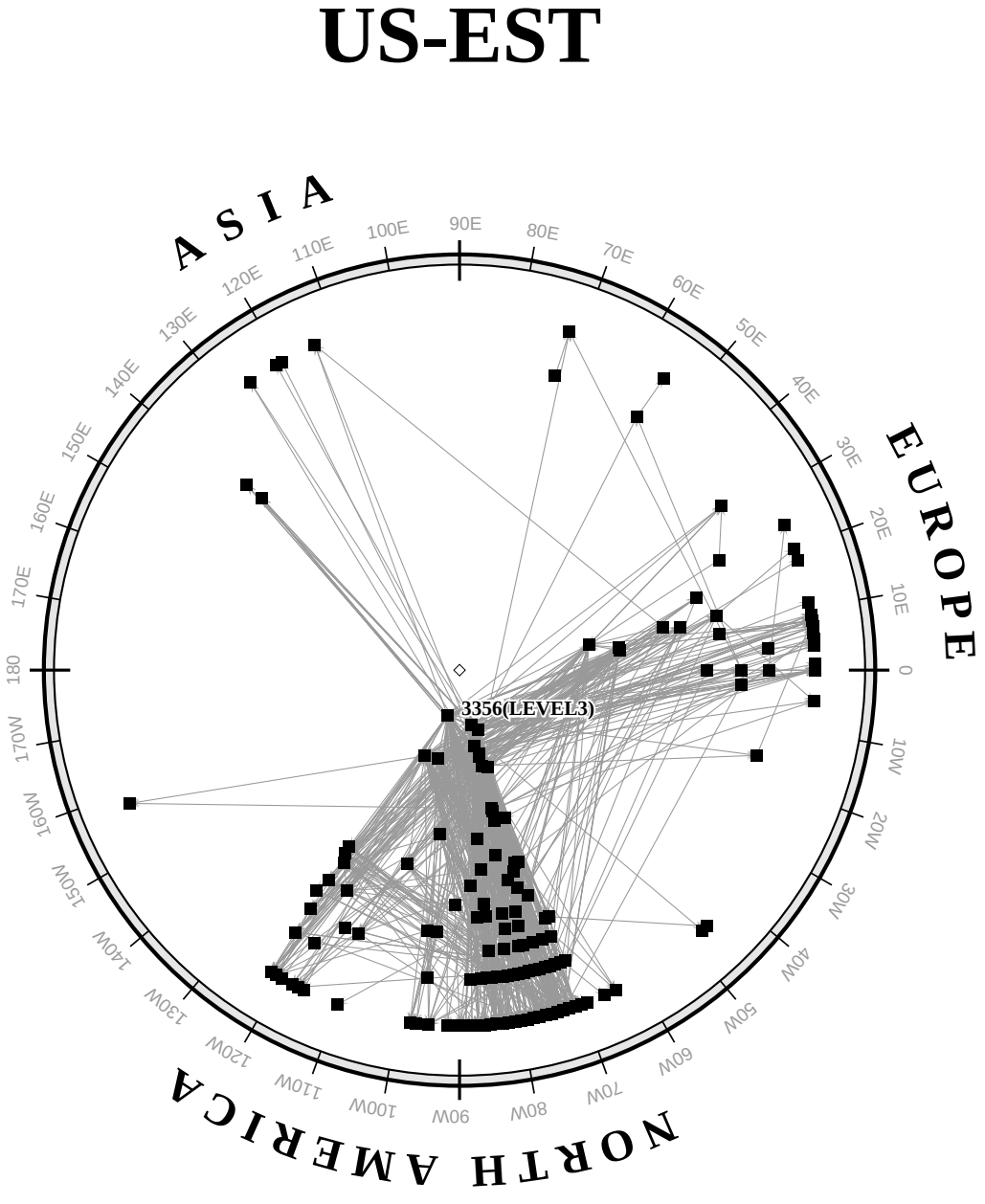
Australia



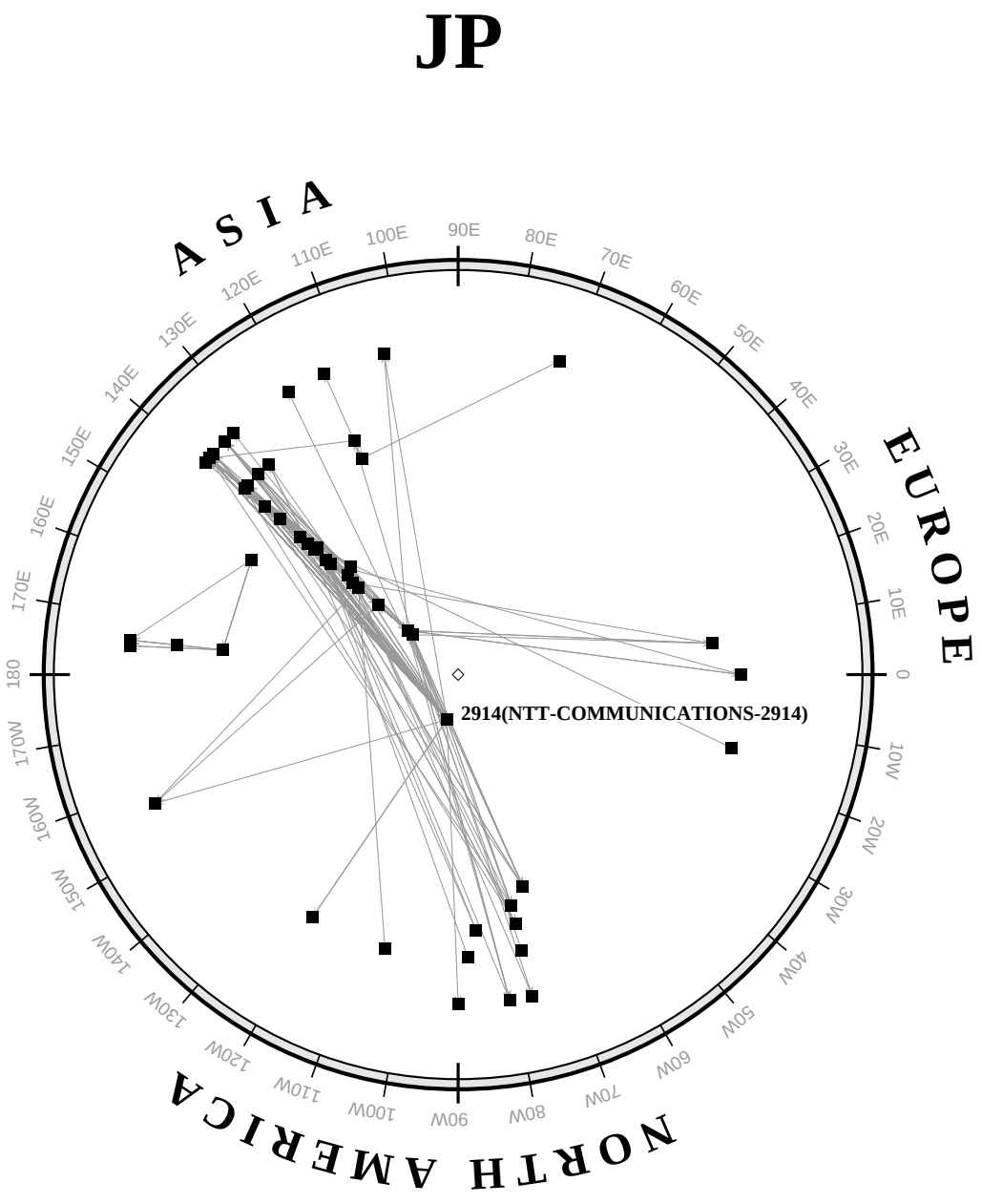
a view from US-PST



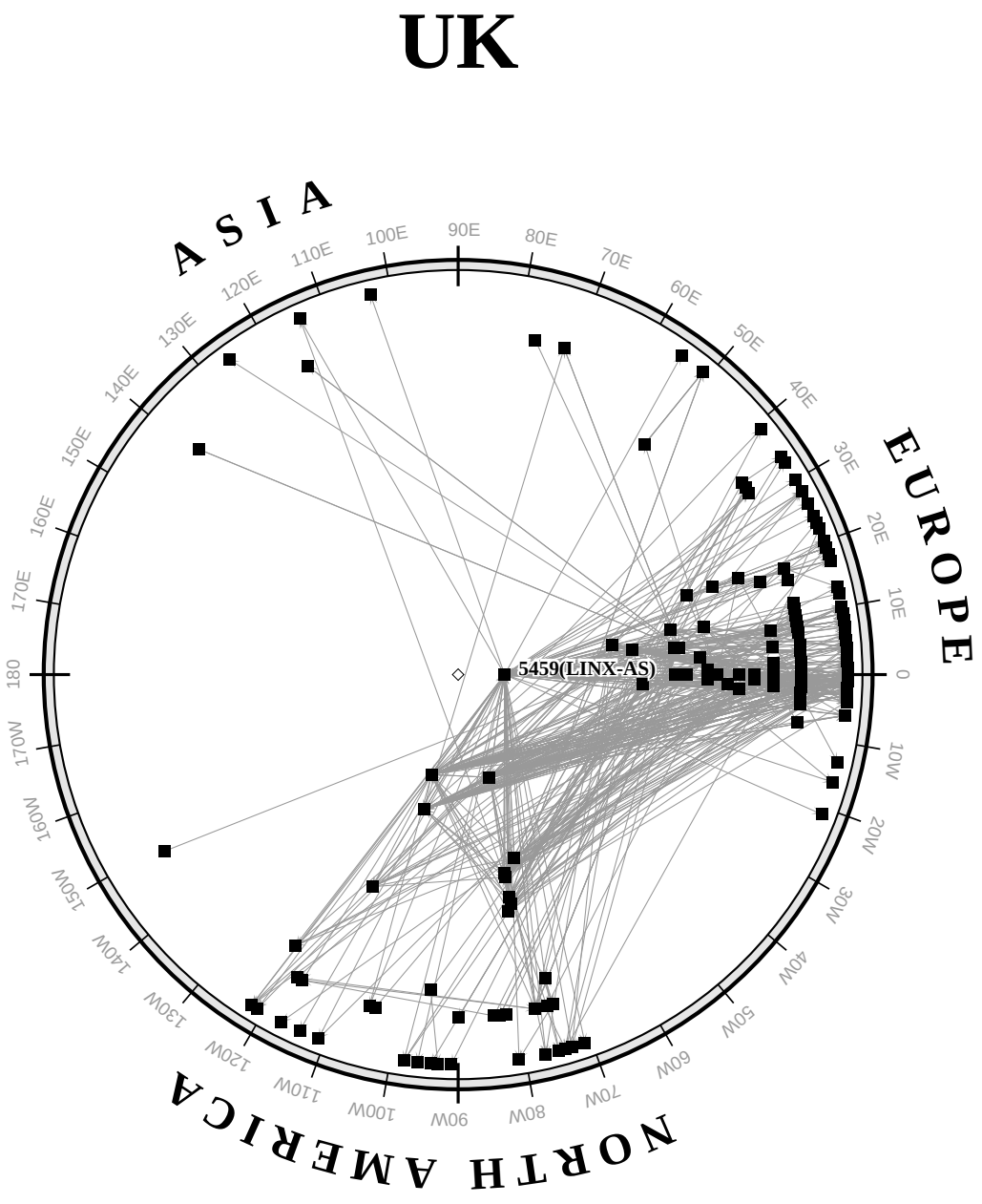
a view from US-EST



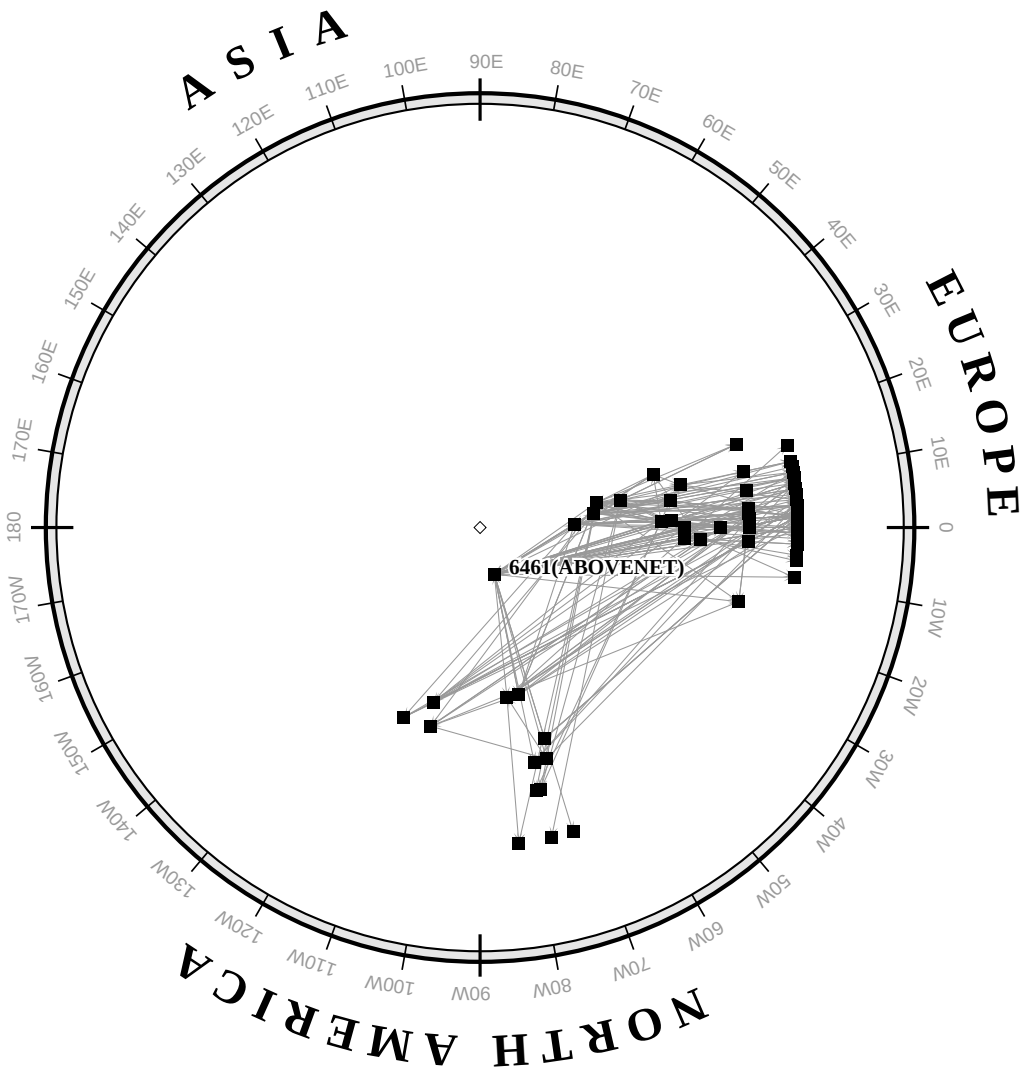
a view from JP



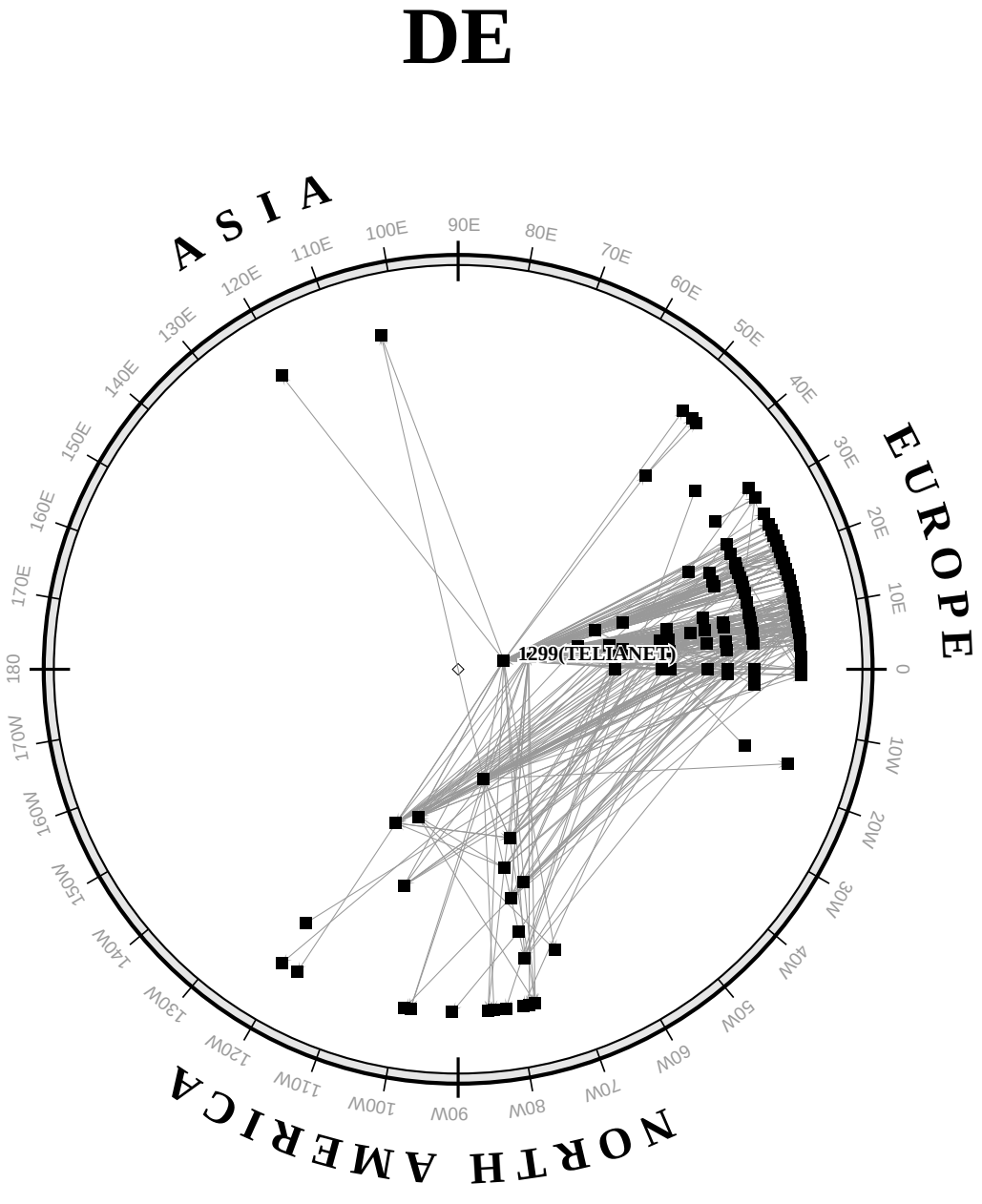
a view from UK



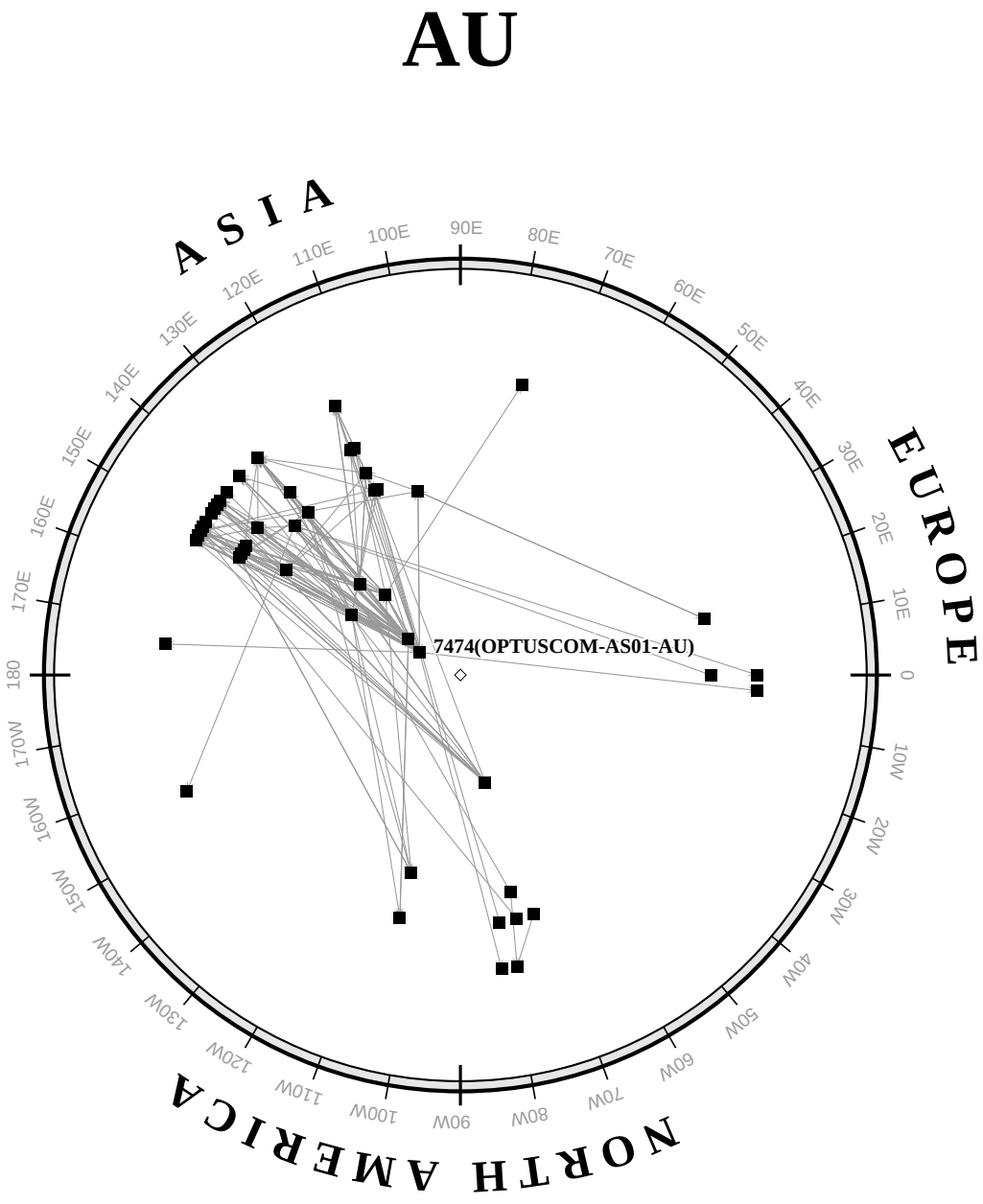
a view from FR



a view from DE



a view from AU



issues

- limited number of skitter probes
  - gulliver helps but will not be enough
  - traceroute data from DIMES?
- AS boundary clustering by regions
  - there's no reliable way
  - currently, we combine landmarks and RTT-based clustering

discussions

- is this interesting or useful?
- it it technically possible to obtain reasonable accuracy?
- what granularity (region, country)?
- prettier visualization by collaborating with caida?