

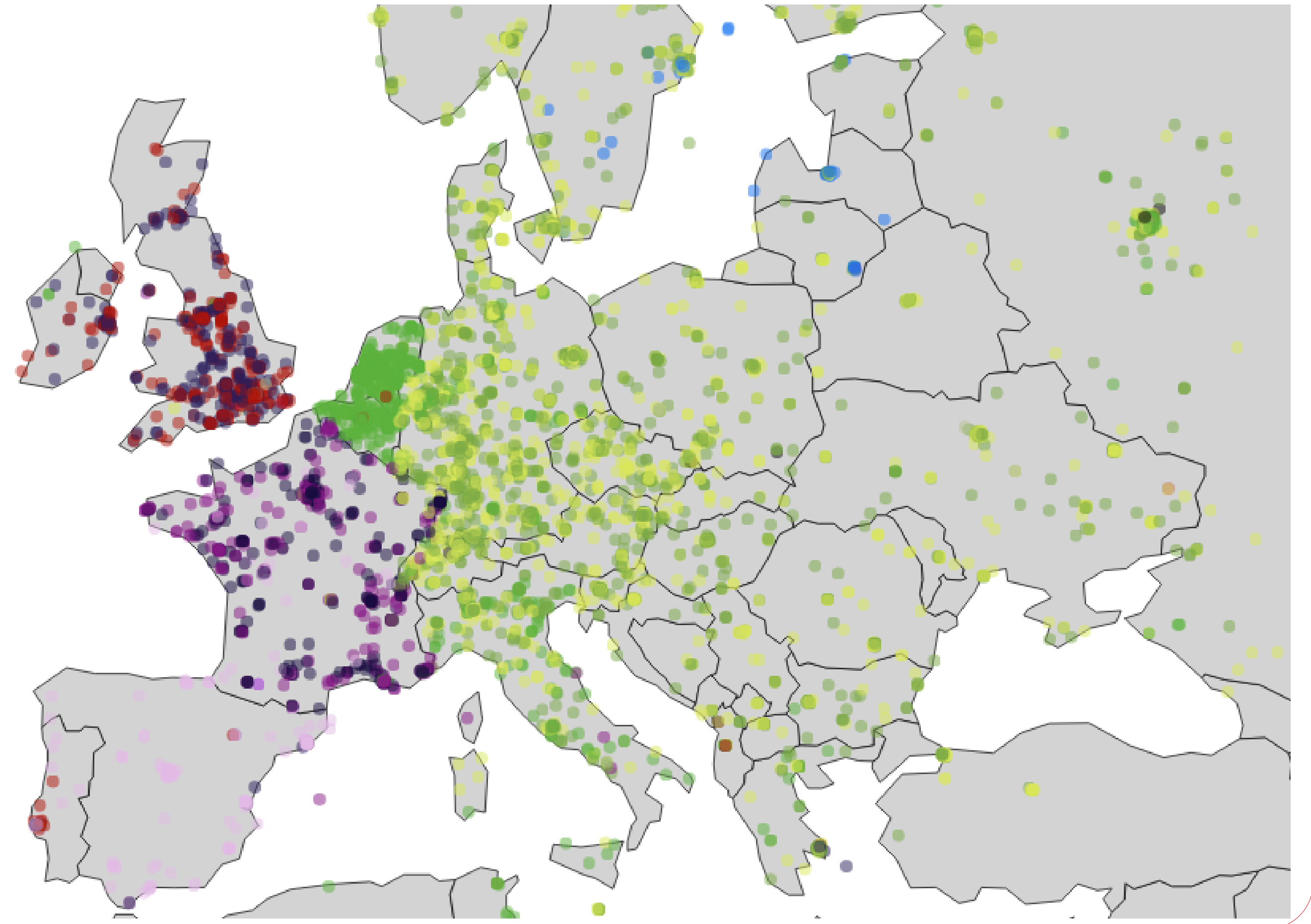
INTRODUCTION

Anycast CDNs announce the same IP address blocks from different points-of-presence (PoPs), relying upon BGP routing to map clients to these PoPs. This defines *catchments*[2]: the set of clients served by a given PoP. In this poster, we outline a methodology for mapping anycast catchments, and evaluating changes in anycast announcements at a large CDN. Understanding and optimising these catchments is important, given their impact client performance and PoP load.

DATA SOURCES

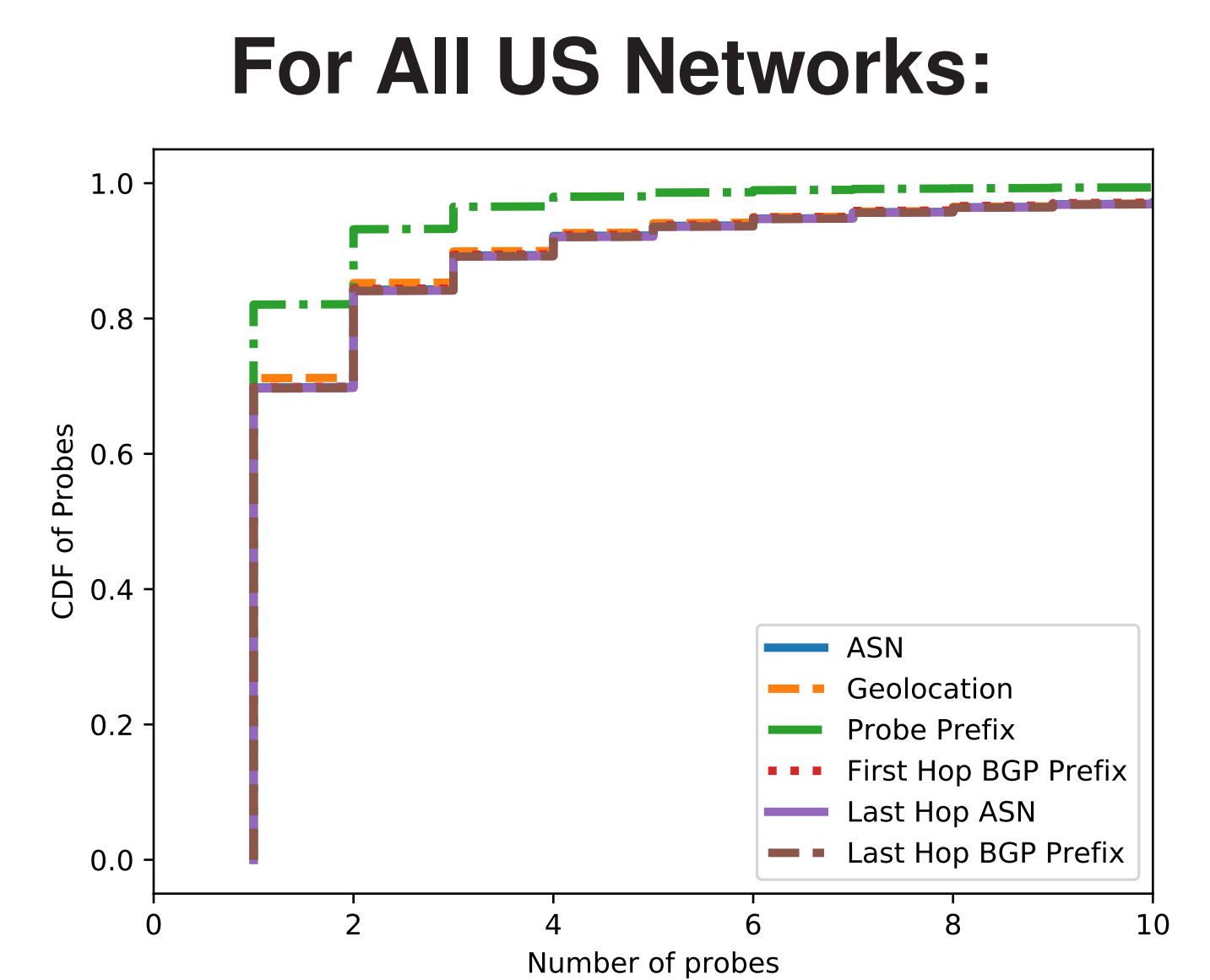
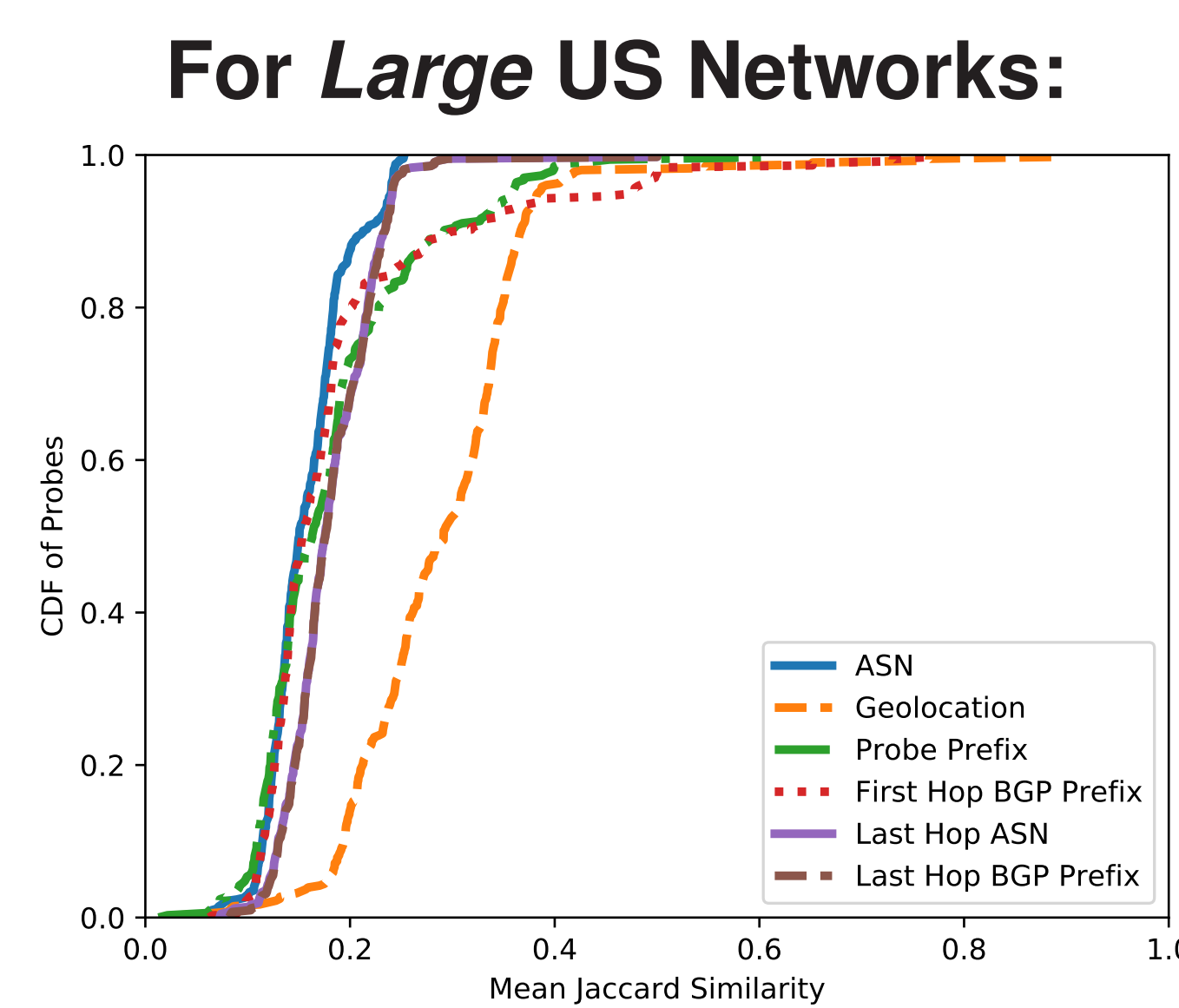
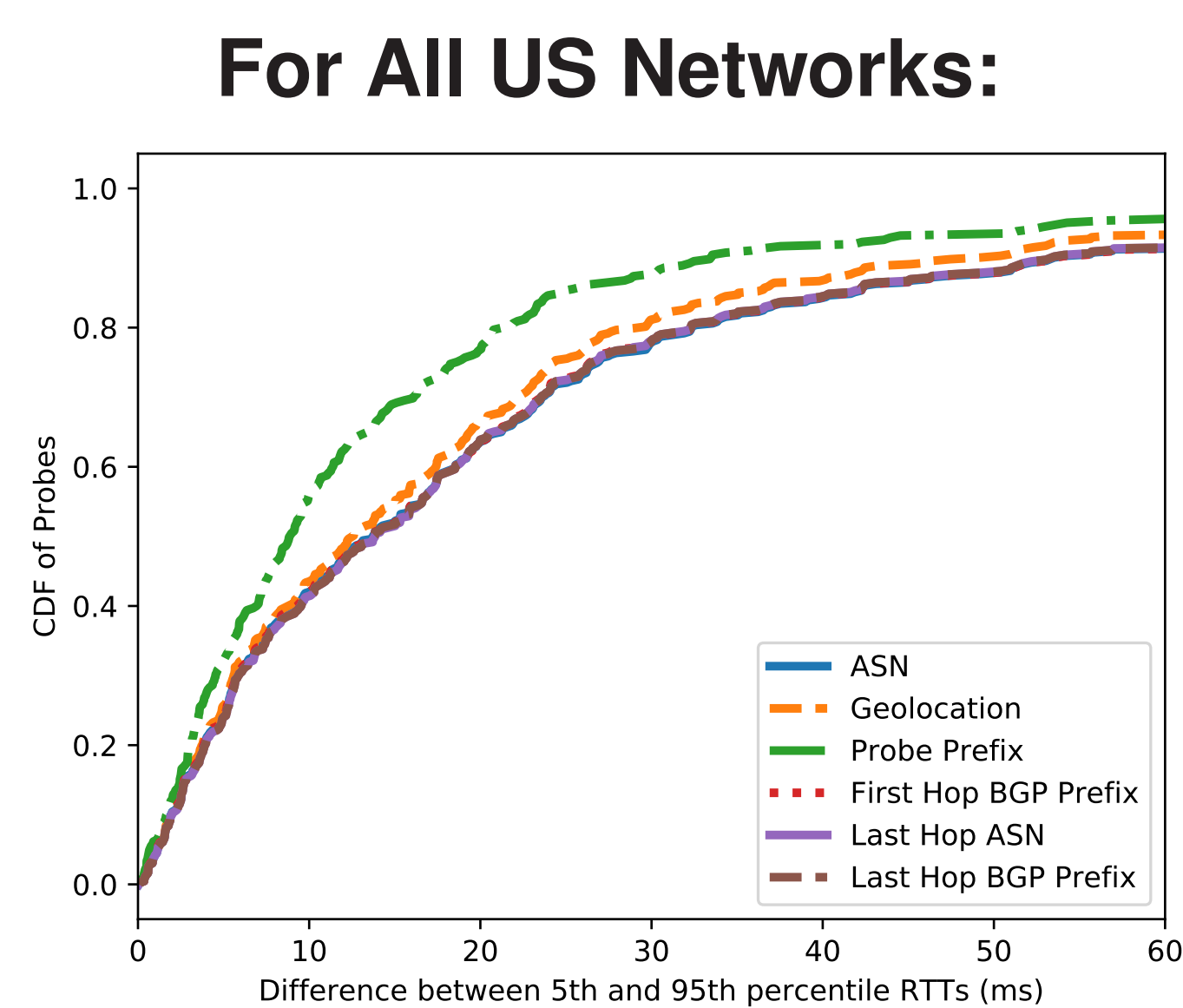
- Traceroute data from RIPE Atlas probes[1].
- Probe-PoP mappings: Use traceroutes and BGP session information from each PoP.
- Test IP blocks: a control block (consistent with current announcements), and an experimental block (with proposed configuration).

CATCHMENTS



GROUPING PROBES

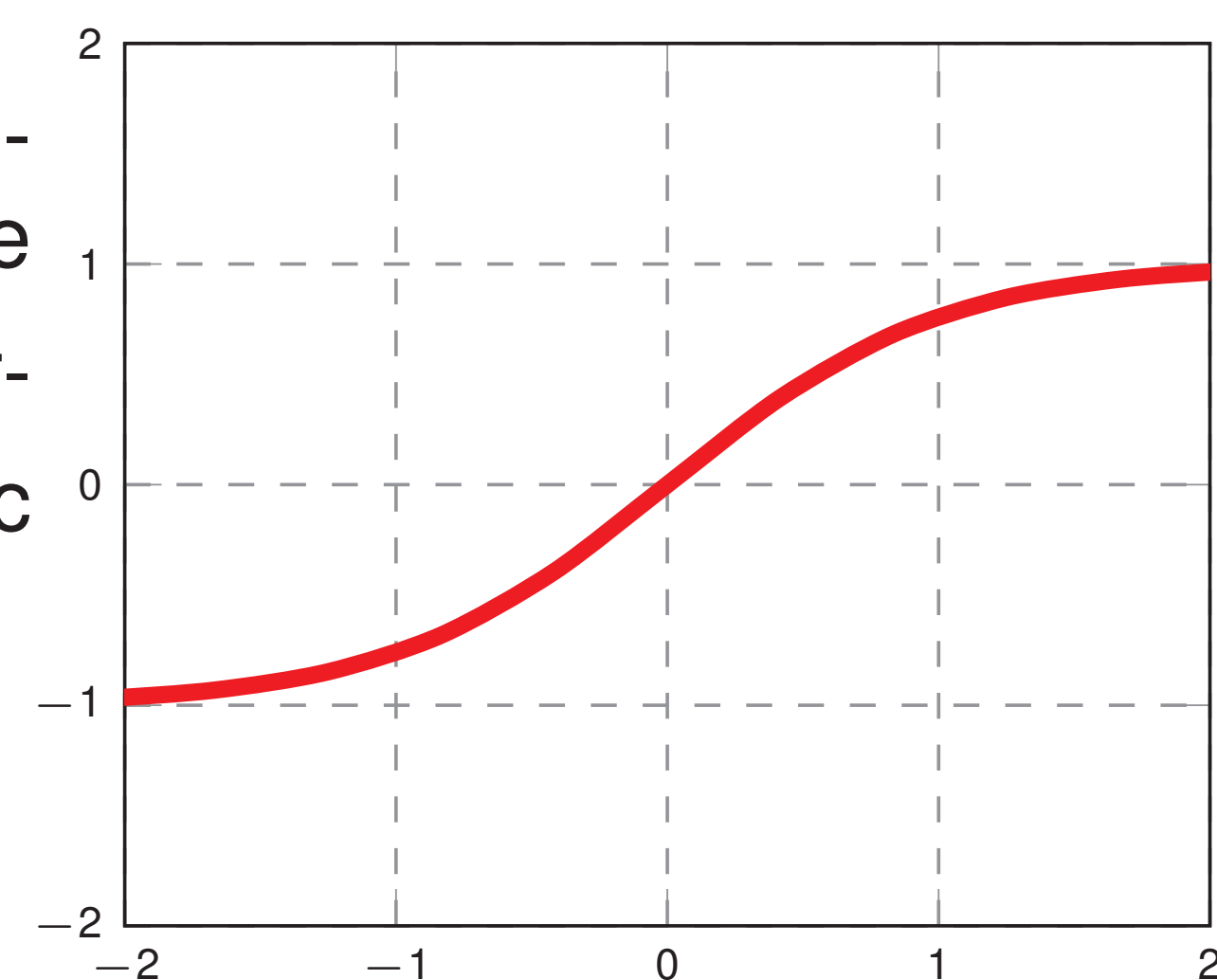
- Group probes together for consistent measurement
- Ideally, groups would exhibit uniform path[3] and RTT behaviour
- Find that ASN combined with state (country outside of US) provides best trade off



SCORING

In order to quantify the value of a configuration change, for each group g_i we consider $\Delta_{g_i} = \frac{rtt_{ctl}^{g_i} - rtt_{exp}^{g_i}}{rtt_{ctl}^{g_i}}$. To normalize these values, we apply a logistic function:

$$s(\Delta_{g_i}) = \frac{2}{1 + e^{-2\Delta_{g_i}}} - 1 \in [-1, 1].$$



METHODOLOGY

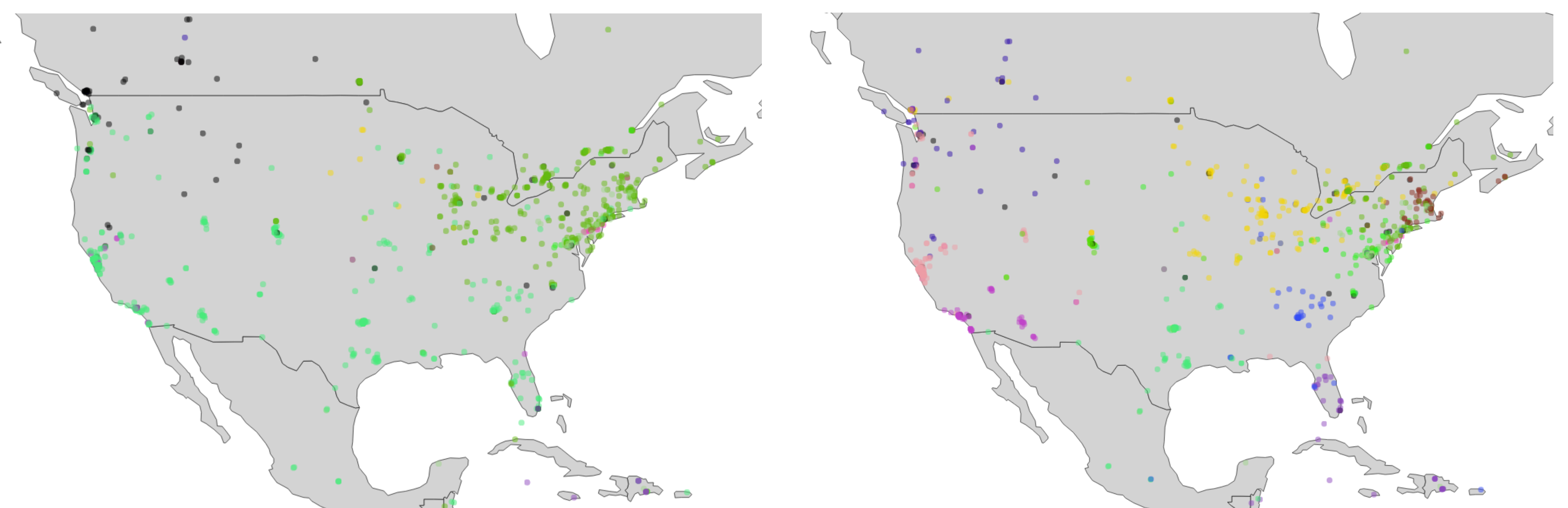
- 1 Perform traceroute from each probe to control and test blocks
- 2 Group probes together, based on AS number and geolocation
- 3 Score the change within each group, based on CDN client popularity of ASN.
- 4 Rank groups: positive scores indicate that performance has improved; negative scores show that it has degraded

CASE STUDY

The best and worst performers with a tested configuration. Larger, more important networks are weighted higher.

Group	# Probes	rtt_{ctl}	rtt_{exp}	Score
A	83	50.37	13.27	.039
B	13	55.62	16.92	.026
C	12	19.70	20.77	-.002
D	4	13.32	15.01	-.003

Several large networks saw improvements, reflected in higher scores and richer catchments.



REFERENCES

- [1] RIPE Atlas - RIPE Network Coordination Centre, 2017. <https://atlas.ripe.net/>.
- [2] W. B. de Vries, R. d. O. Schmidt, W. Hardaker, J. Heidemann, P.-T. de Boer, and A. Pras. Verploeter: Broad and load-aware anycast mapping. Technical Report ISI-TR-719, USC/Information Sciences Institute, 2017.
- [3] T. Holterbach, E. Aben, C. Pelsser, R. Bush, and L. Vanbever. Measurement Vantage Point Selection Using A Similarity Metric. In *Proceedings of the 2017 Applied Networking Research Workshop*. ACM, 2017.