

DNS load visualization

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Introduction

- Any DNS operator, specially those running an anycast infrastructure, need to know if the load is well balanced between the nodes and which would be a right place to put a new node.
- The first question could be answered comparing simple query load graphs, but the second requires some work.
- The following visualization is intended to help to answer that question.

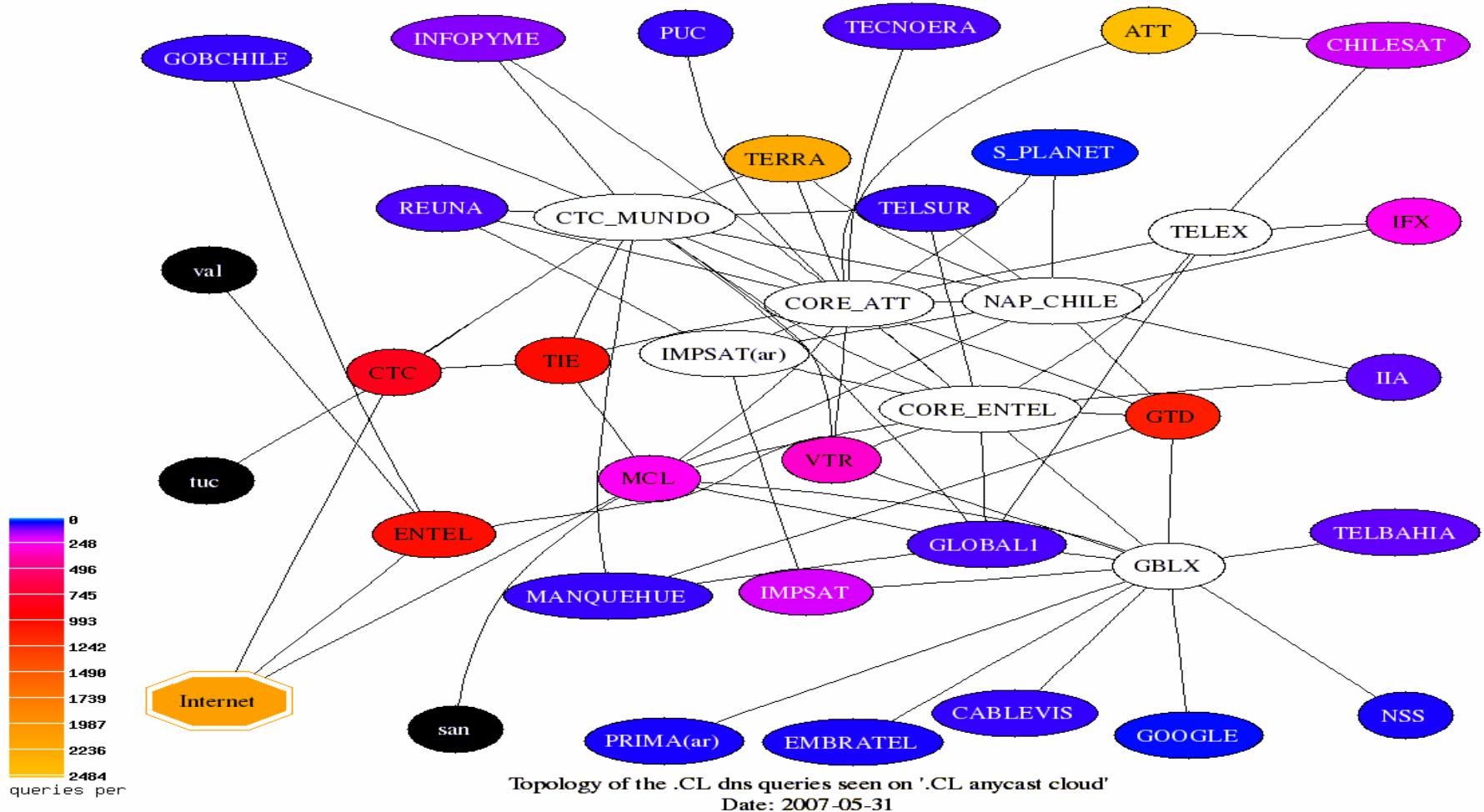
Query load per topological origin

- Anycast is based on routing protocols (mainly BGP).
- The selection of the placement for a new node should be ruled by the origin of the queries received, either by country or by AS.
- There is no strict correlation between geography and AS topology
 - One AS could span over several countries.

Query load per topological origin

- Methodology
 - Using packet traces from every node in the .CL anycast cloud and the BGP tables available on those nodes, we counted the number of queries from each origin AS.
 - Also prepared a topology map
 - The map shows AS relations, number of queries originated from those AS and their relation with the AS holding the anycast node.
 - In some cases, there are too many origin AS to fit into the plot. In those cases, only the set of AS representing >70% of the total query load are plotted.

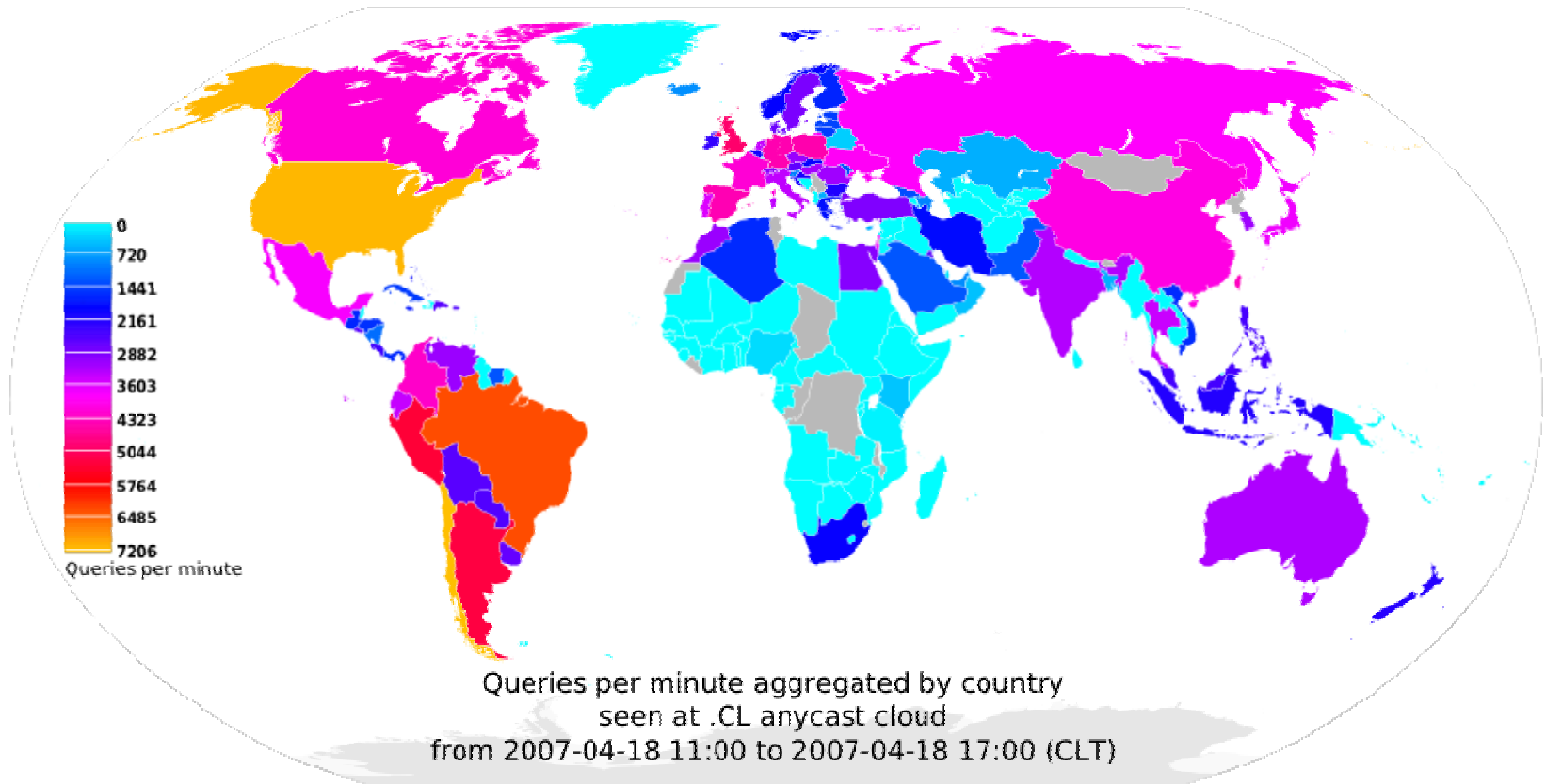
Query load per topological origin



Geographic map

- There are several tools to represent the query load aggregated by “geography”
 - Like “root servers influence map” by Bradley Huffaker from CAIDA
- This visualization provides a different angle.
 - Each country is colored by the number of queries originated from there.
 - It is a vector-based format (not raster). Does not lose resolution when zoomed-in.

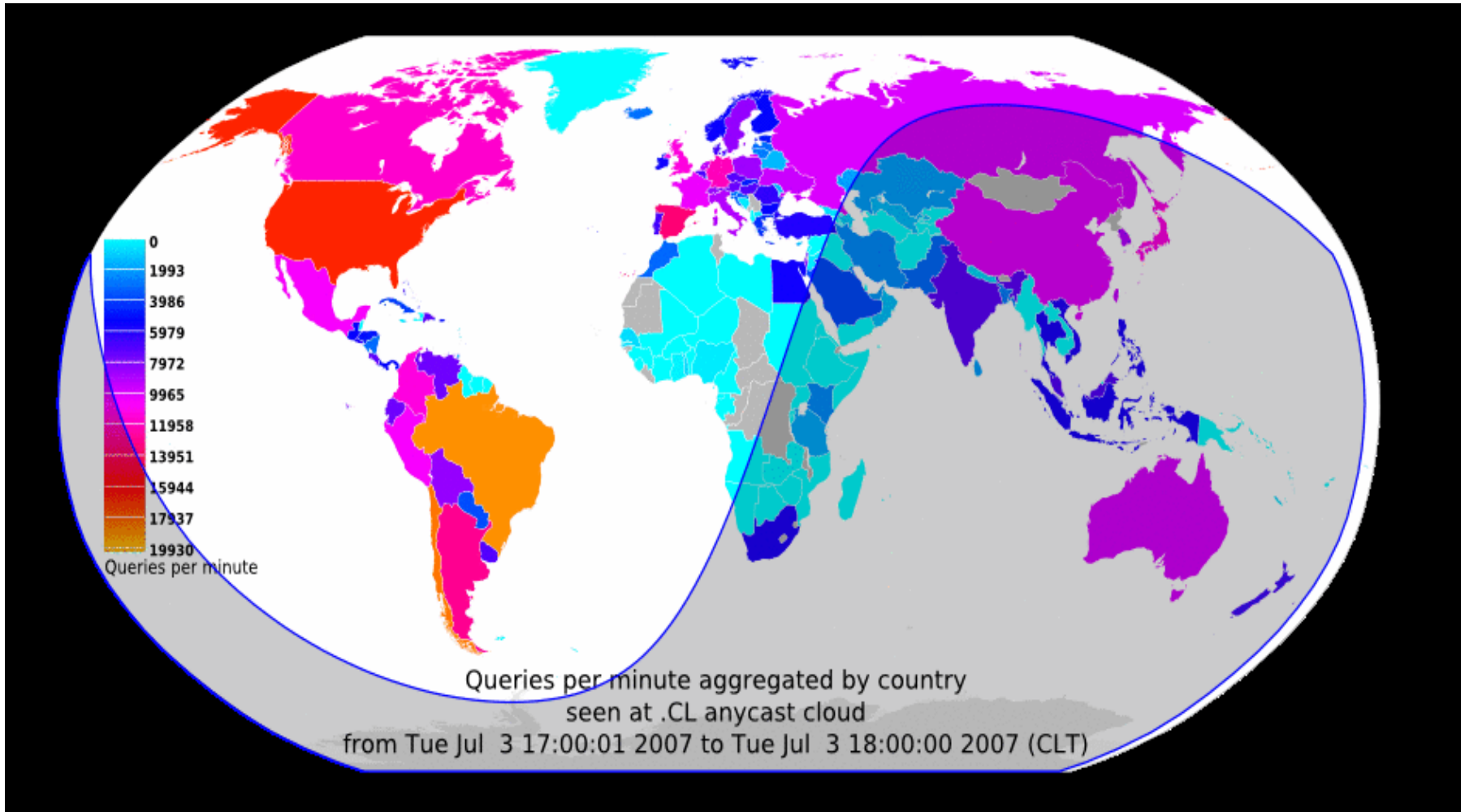
Geographic map



Geographic animated map

- The next step was prepare an animation showing the evolution of the traffic along the day.
 - Idea inspired by cuttlefish tool from CAIDA
- Methodology
 - One hour traces using dnscap
 - Generate aggregated traffic by source address using CoralReef
 - Map address to geography using NetAcuity
 - Aggregate the query load by country
 - Plot the aggregated data using the home-grown tool.

Geographic animated map



- Snapshot of the animated map

Geographic animated map

- Future work
 - Pack the tool
 - Improve documentation
 - Release it to the public