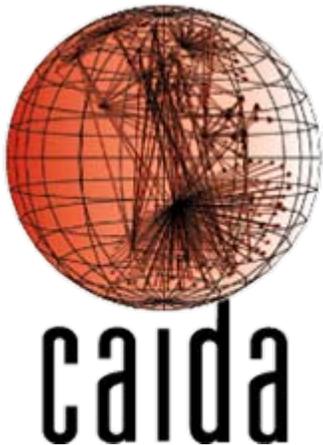# *DNS load visualization*

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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.

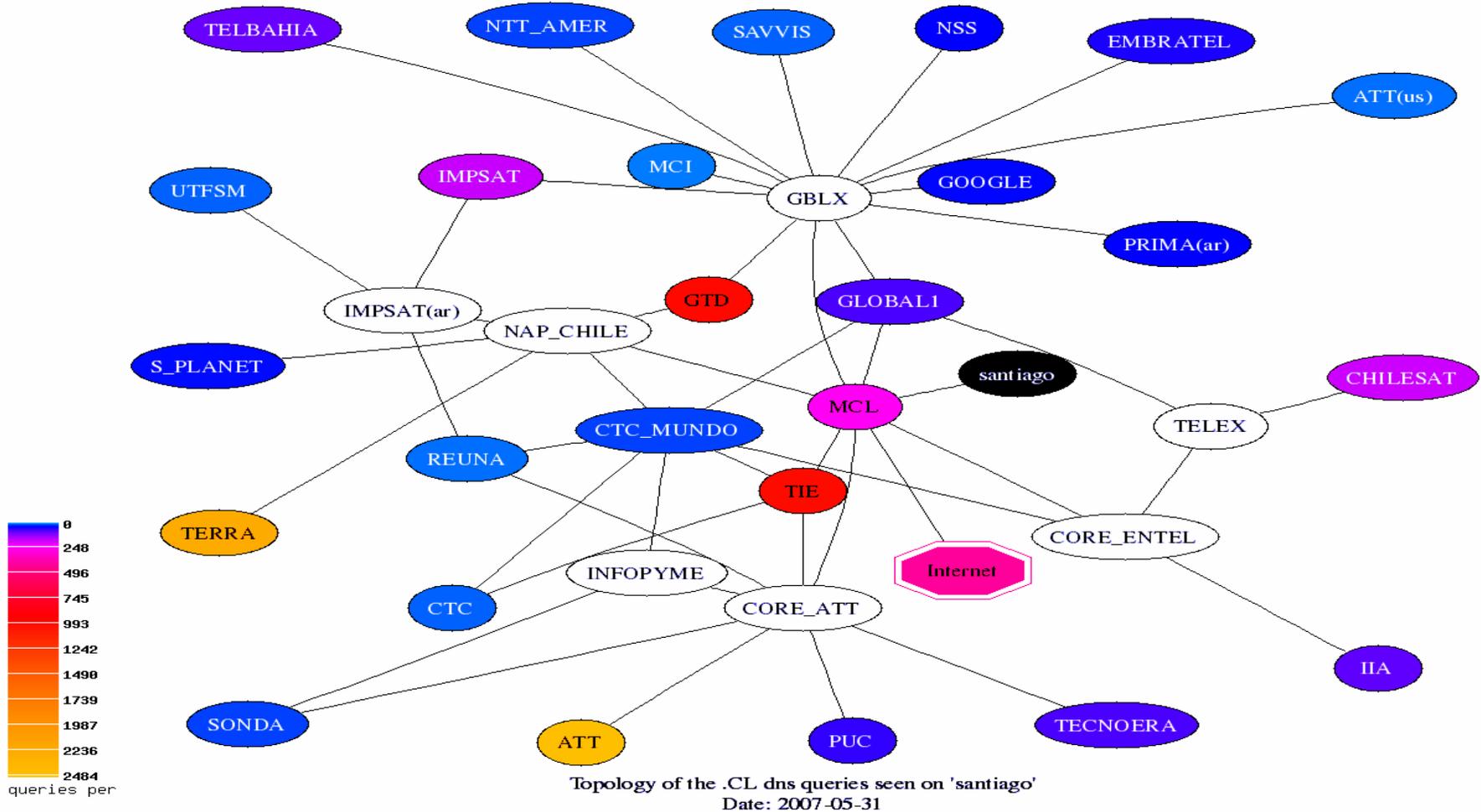- The following visualization is intended to help to answer that question.

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
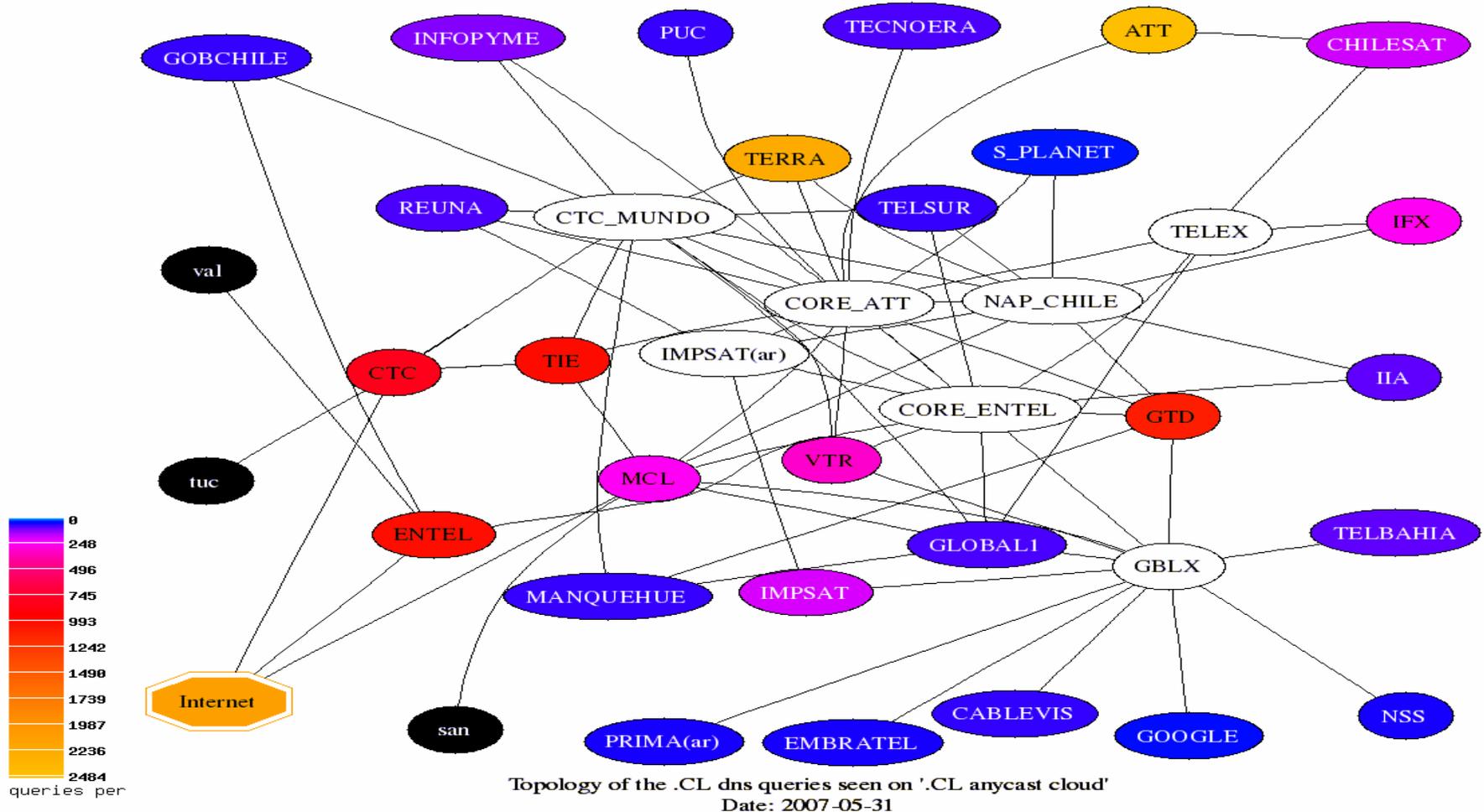 - One AS could span over several countries.

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.
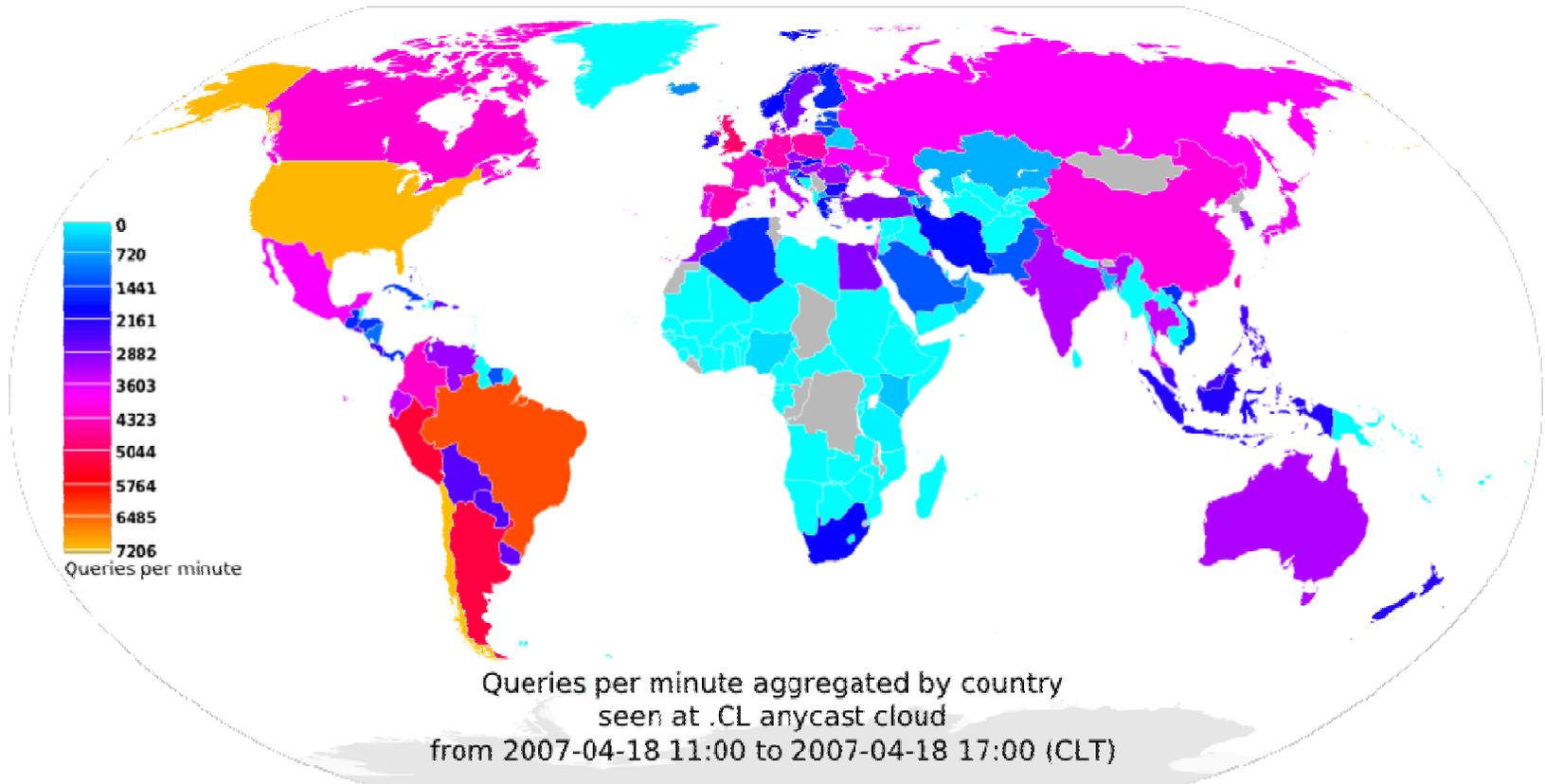
Query load per topological origin

Topology of the .CL dns queries seen on 'santiago'
Date: 2007-05-31

Query load per topological origin

Topology of the .CL dns queries seen on '.CL anycast cloud'
Date: 2007-05-31

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.
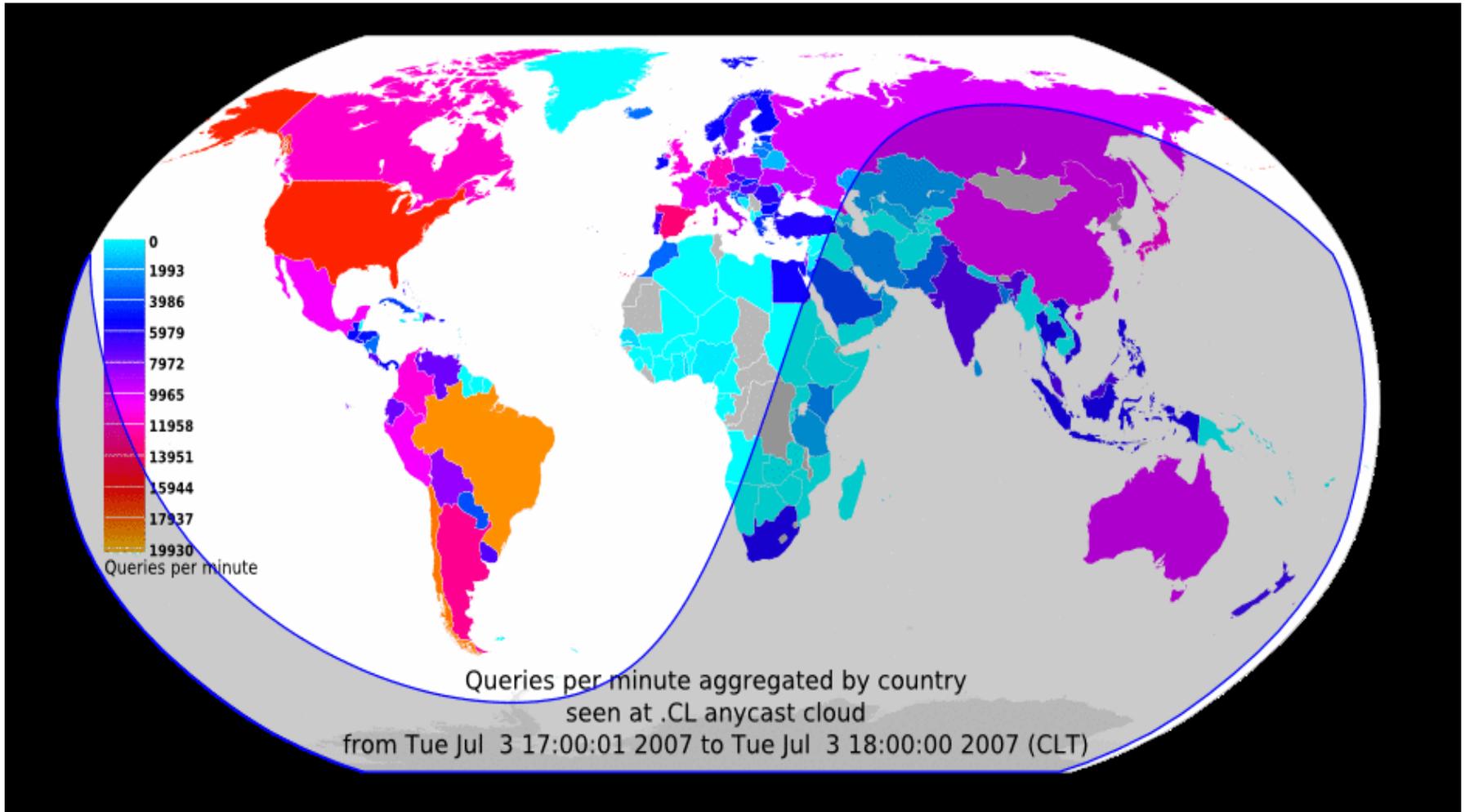 - It is a vector-based format (not raster). Does not loose resolution when zoomed-in.

Geographic map

Queries per minute aggregated by country
seen at .CL anycast cloud
from 2007-04-18 11:00 to 2007-04-18 17:00 (CLT)

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

Queries per minute aggregated by country
seen at .CL anycast cloud
from Tue Jul 3 17:00:01 2007 to Tue Jul 3 18:00:00 2007 (CLT)

- Snapshot of the animated map

Geographic animated map

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