Using a network simulator for stress, collapse and best configuration analysis in .CL's authoritative servers

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NicLabs

- New Research Laboratory Held by NIC Chile (TLD of the .CL zone)
- Created on 2008
- Doing applied research in:
  - Convergence of networks
  - Next Generation Networks
- Wants to become a national reference about Internet Technologies.

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The NIC Chile's network

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The setup within Chile

The NIC Chile's network in 2007:

- 3 servers in a anycast cloud (a.nic.cl)
  - Santiago
  - Tucapel
  - Valparaiso
- One unicast server (ns.nic.cl)
- Each one connected to a different provider

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The problem

We may have questions like:

- If a server crash:
  - How the queries are re-distributed ?
  - How long it takes to stabilise? How many packet lost we have?
- Once recovered, how the network is re-setup ?
- which combination of anycast cloud and Round-Robin is the best

However

- We cannot answer using the production infrastructure

We propose to use a simulator

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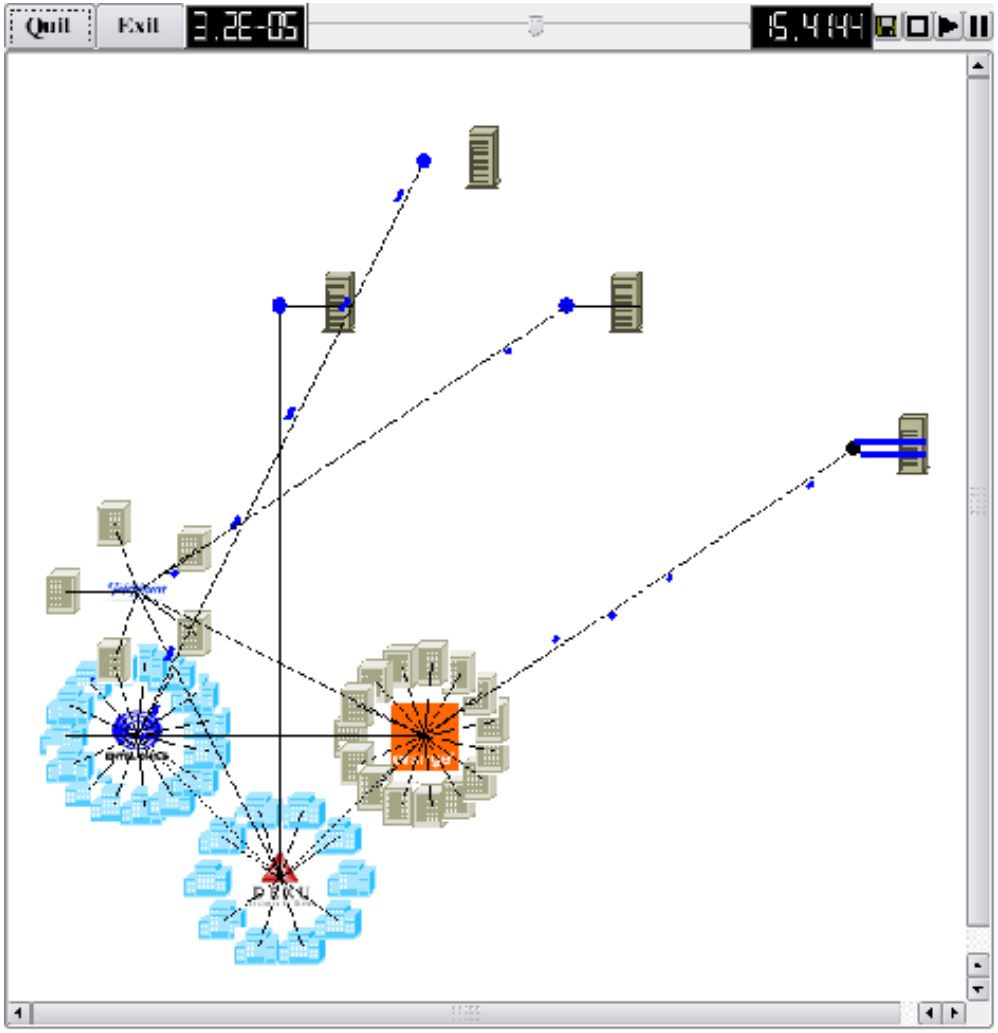
NIC Chile's network simulation



- Simulator GTNetS
  - NS2 + Zebra
- 4 AS
- DNS resolvers using Round-Robin and best RTT

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How it's done

C++ file linked to GTNetS

```
Linkp2p lkvalparaiso(Rate("4000kb"), Time("9ms"));
...
BGP* ValpoBGP= new BGP(0);
....
Node *Valpo = new Node();
Valpo->SetIPAddr(IPAddr("192.100.0.3"));
ValpoBGP->AttachNode(Valpo);
ValpoBGP->config_file("./nic3.conf");
...
Node *Telefonica1 = new Node();
...
Valpo->AddDuplexLink(Telefonica1,lkvalparaiso);
```

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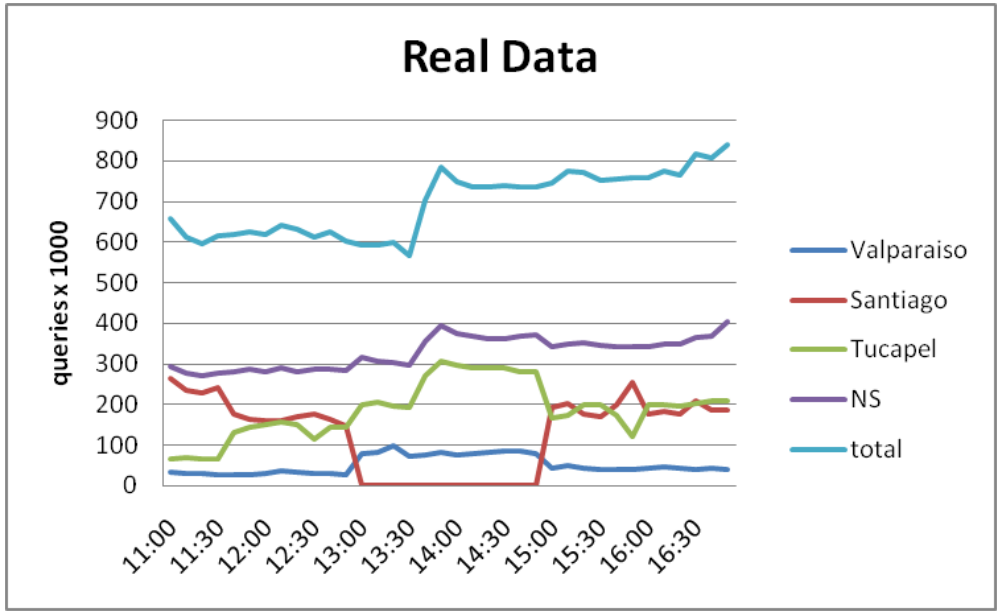
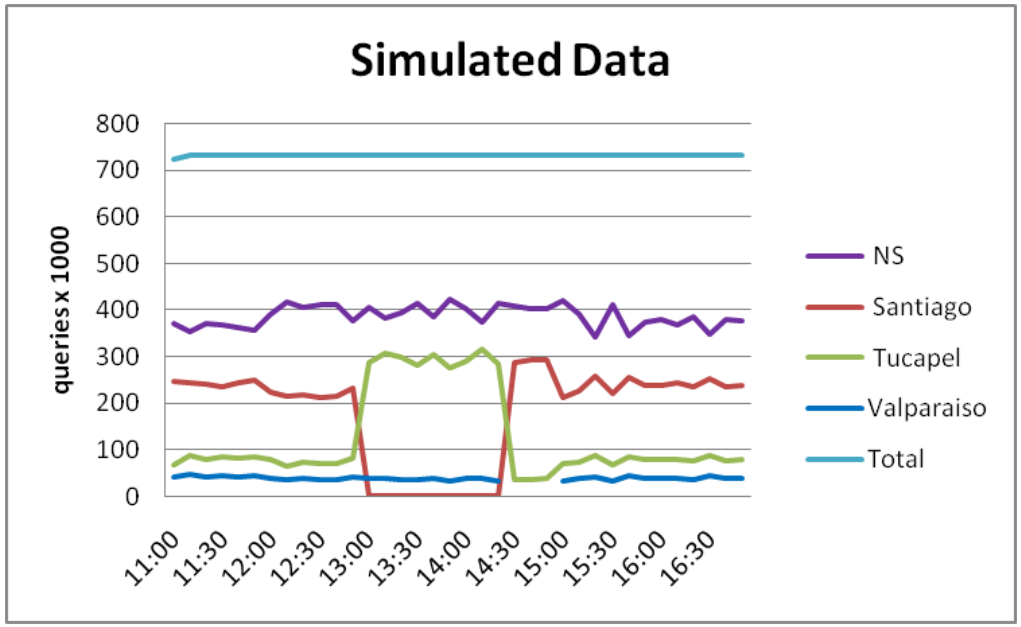
Validating the model

Shouting down Santiago, experiment done in 2007





- Total queries rate 720 q/s

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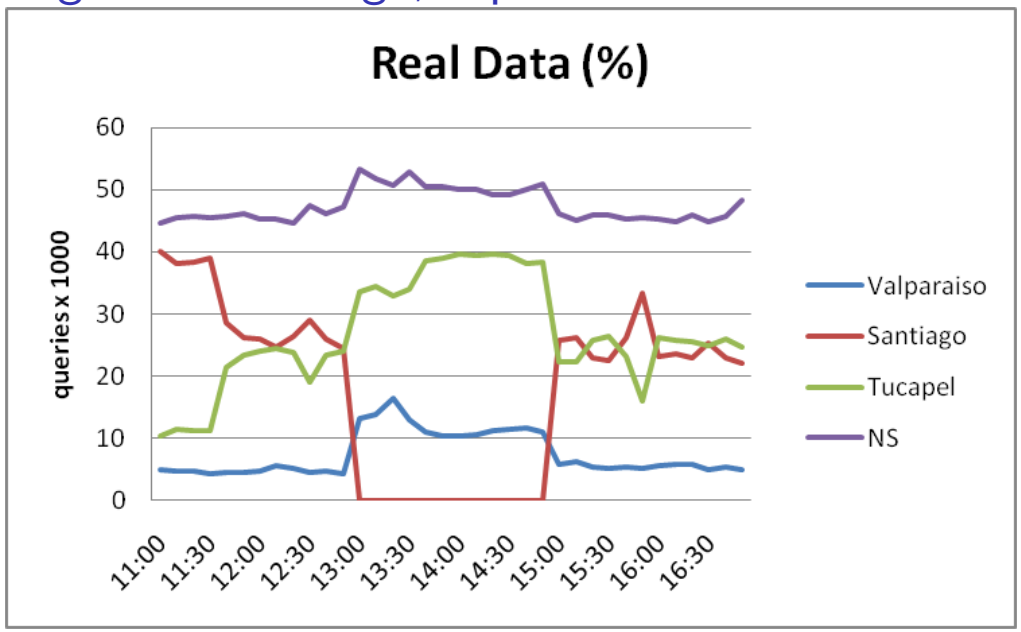

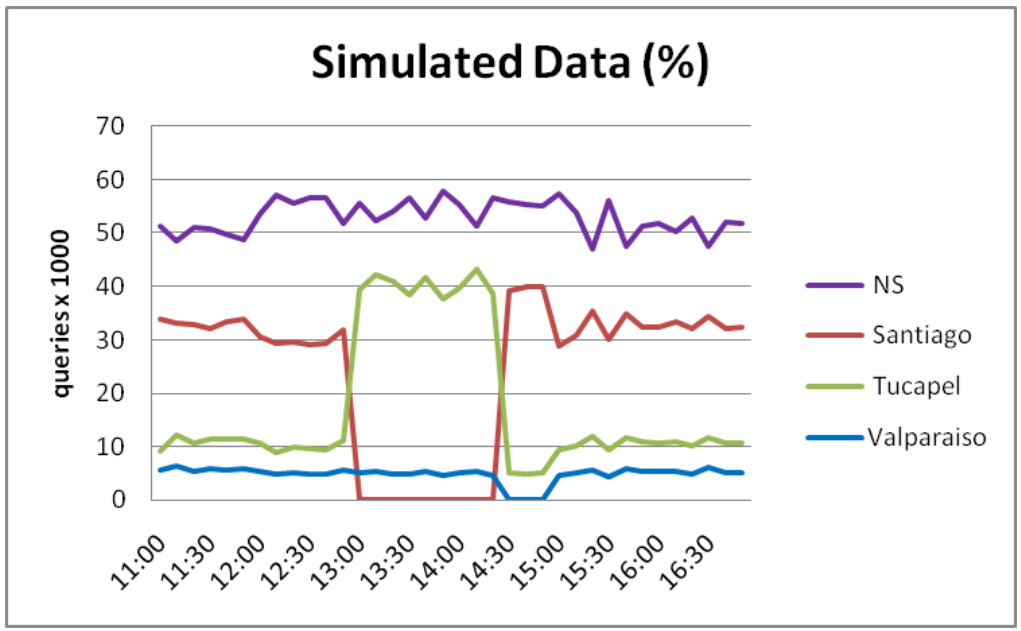

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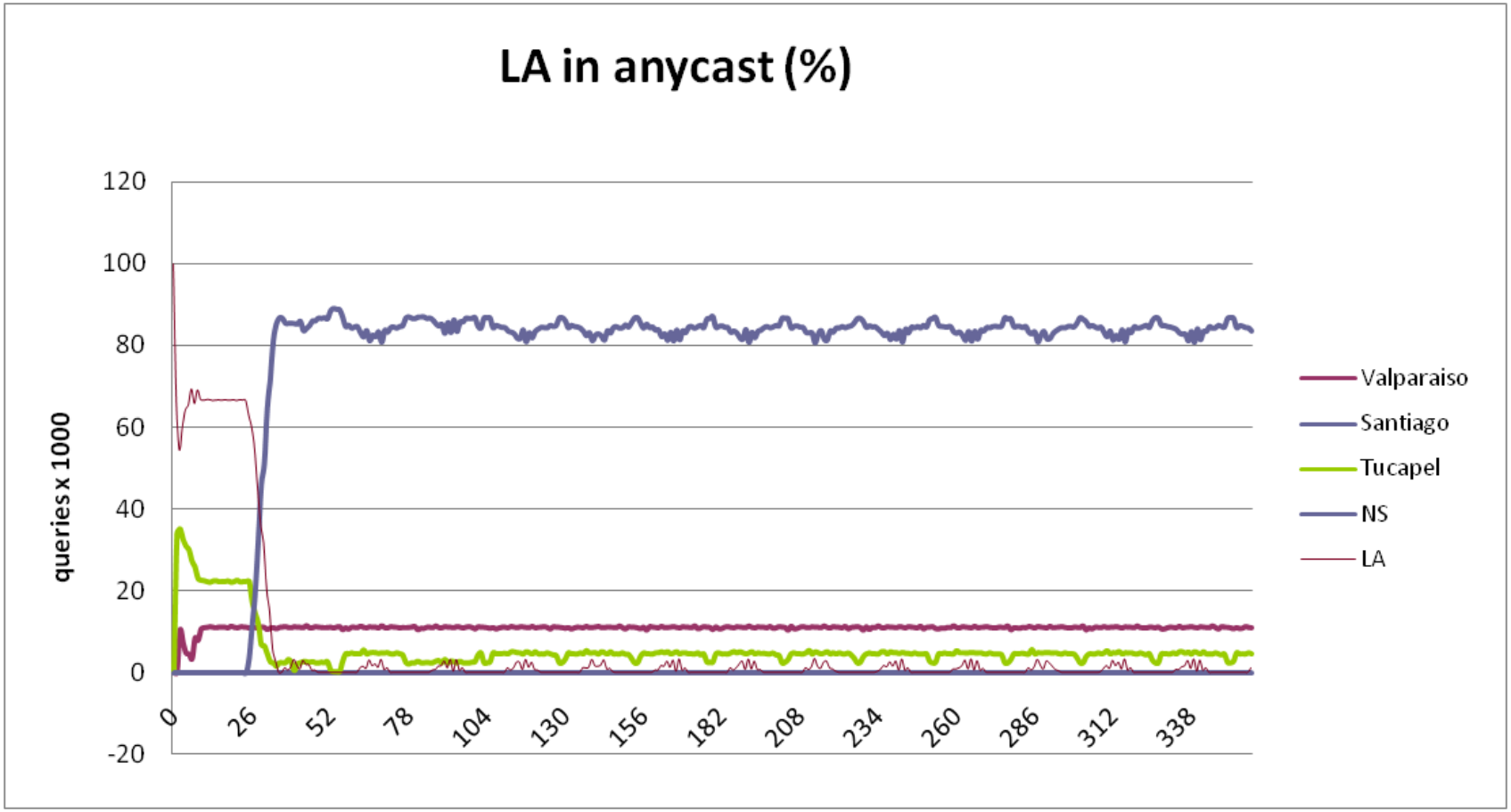
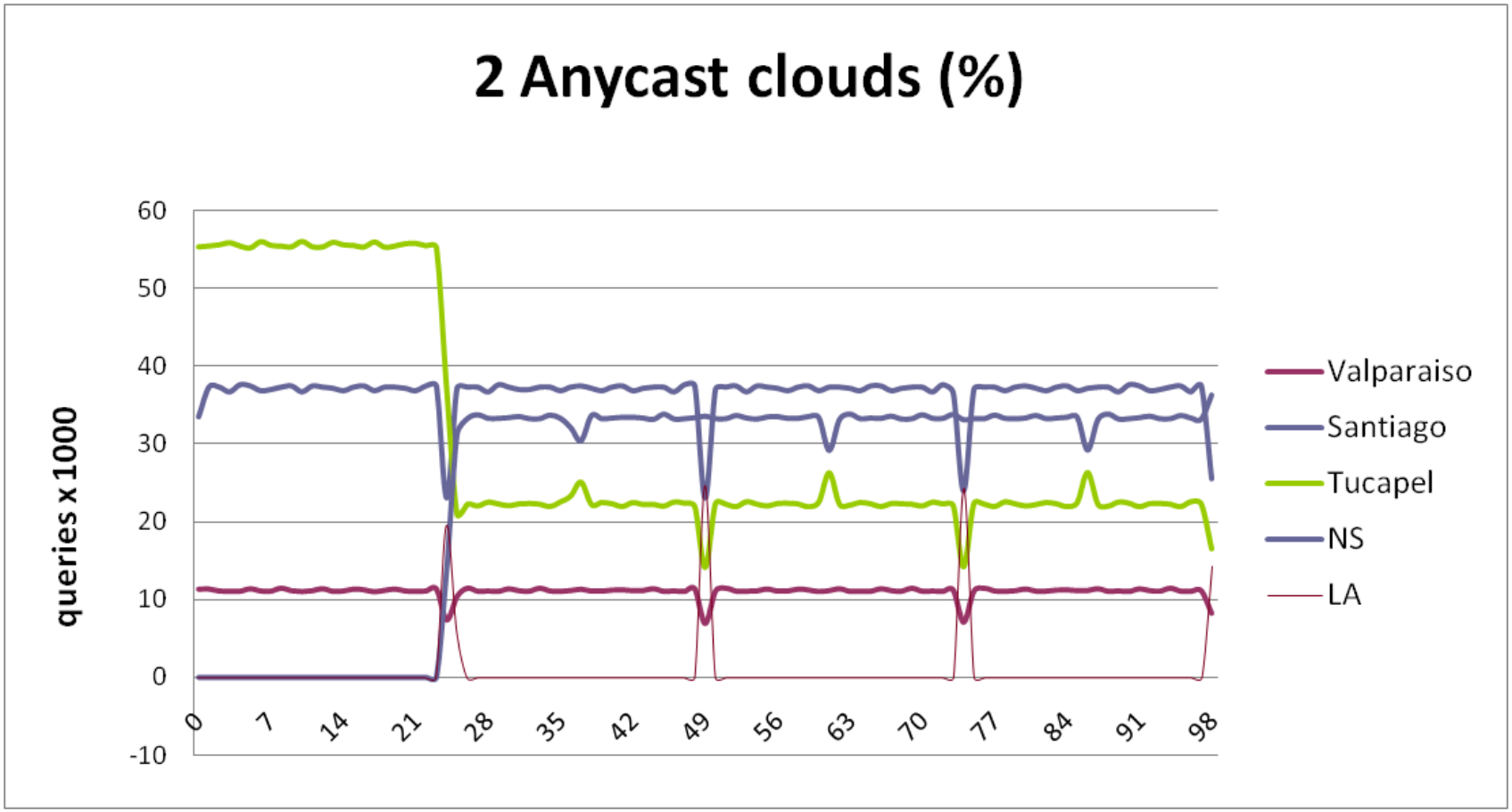
Adding a new node

New node in LA as part of the cloud



Adding a new node

New node in LA as part of a new cloud with NS



Conclusions

- First results are promising (7.2% of difference)
- It can become a valid tool for analysis of the real setup
- The methodology can be applied to analyse the impact of the network setup to other "layer 7" systems
- Eventually can be used to analyse new technologies (e.g. DNS over SCTP) or trends (full TCP DNS)
- Future work:
  - More testing and analysis
  - Make a friendly tool
  - Refine the simulation closer to reality
  - Dynamic update based on live traffic

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