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WINLAB | Wireless Information Network Laboratory

Improved Global Name Resolution Service Implementation and Emulation

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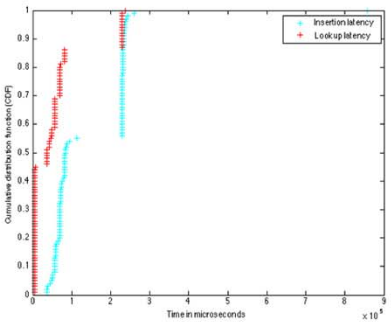
Objectives

- Implement improved GNRS independent of IP based on the previous DMap algorithm.
- To create a new HashID mapper which replace preivous Ipv4+udp format with a 20-digit HashID.
- Hierachical GNRS: divide the network into three layers: local, regional and global and apply design extended GNRS.

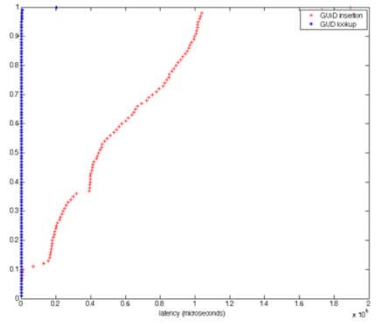
Approach

- Client Side
  - Generate messages based on client trancefile.
  - Send GUID insertion and lookup message to the local server.
- Server Side
  - Generate new HashID and as-binding input files for server topology
  - Each AS generates multiple HashID based on the capacity of AS
  - For each insertion/lookup, the local server map GUID to the GNRS hash space and choose k nearest HashID

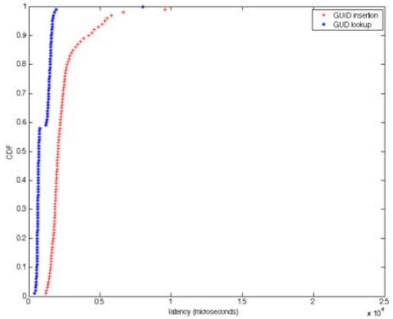
Emulation Results



Existing DMap latency CDF (ms)
Message delay: 250 ms



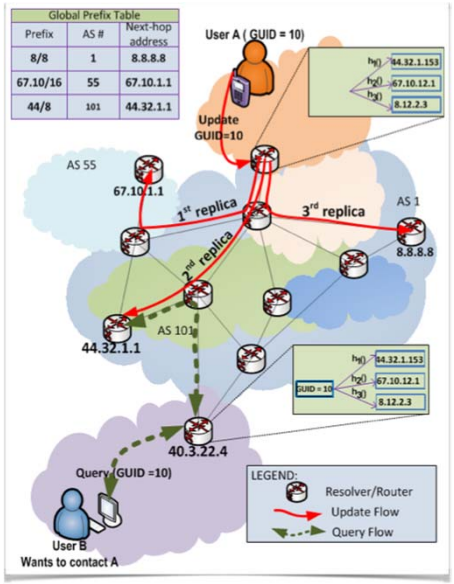
Improved GNRS latency CDF (ms)
Message delay: 250 ms



Improved GNRS latency CDF (ms)
Message delay: 2500 ms

Experiment on ORBIT Grid using 4 nodes. Emulate 12 Autonomous Systems (servers) and 1 trace client. 10000 insertion and 10000 lookup messages in total.

GNRS (DMap) Flow



Issues

- Latency is dominated by queuing delay for 250ms message delay.
- Latency is unexpected, may due to packet lost.

Future Plan

- Fix the problem on multiple servers case. Find out the reason of unexpected data.
- Optimize the code. Compare the server processing rate with DMap.
- Organize & clean up the code and write a documentation.
- Hierarchical GNRS design

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