**Objectives**

- Implement improved GNRS independent of IP based on the previous DMap algorithm.
- To create a new HashID mapper which replaces previous IPv4+udp format with a 20-digit HashID.
- Hierarchical 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 maps GUID to the GNRS hash space and chooses k nearest HashID.

**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.