Unified Network Information Services

Things we are doing that perfSONAR can use

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UNIS is an information services plane

- Project UNIS – Unified Network Information Services
- Distributed software architectures use the Information Services plane to discover “meta” information within the network.
- This information services plane facilitates discovery of network topology, location, and capabilities of network services.
Some UNIS projects

• UNIS proposes solutions for information services necessities.
  – UNIS topology schema. Used in:
    • Performance measurement infrastructures (perfSONAR);
    • Dynamic circuit networks (ESnet SDN, Internet2 DCN, ION, GÉANT AutoBAHN, Phoebus);
    • Experimental infrastructures (GENI).
  – Periscope: graphical control panel tool, caching service, domain-specific topology schema normalization.
  – New heuristic for IP summarization for perfSONAR Lookup Service.
Lookup Service conveys a distributed directory for services

- The Lookup Service (LS) is a distributed directory, composed of levels.
  - Local directories (hLS): point to local services (measurement tools, archives).
  - Global directories (gLS) of local directories (all gLSs are synchronized).
New heuristic for IPv4 summarization

- Our heuristic summarizes a list of IP addresses by employing *IP subnet addresses* to represent the actual host IP addresses controlled by an hLS.
How does it do it

• The heuristic constructs a special data structure – a PATRICIA tree – within which the *inner nodes* are the *subnet addresses*, and the *leaves*, the actual *host IP addresses*.

• Uses three metrics to decide which inner nodes to pick:
  – **Distance**: notion of how many IPs a subnet claims, but do not actually exist in the network;
  – **Density**: number of actual IP addresses over total number of possible IPs in a subnet;
  – **Minimum Subnet Mask**: avoids too large subnets.

• User-controllable by two parameters.
How it integrates with perfSONAR LS

- Two parameters to control the summarization algorithm (implemented through the file `daemon.conf`):
  - `summarization_granularity`: Controls the granularity or coarseness of the summarization. Accepts values from 0 to 3:
    - 0 → finer summarizations; more summarizing nodes.
    - 3 → coarser summarizations; fewer summarizing nodes.
    - Default = 1.
  - `summarization_minMask`: Controls the minimum mask that a summarizing node must have. Accepts values from 0 to 32 (IPv4).
    - Default = 8.
New LS version is currently in perfSONAR-PS test branch

• Volunteers to deploy and test?

• This presentation and UNIS poster are available at:

• More about the new IP summarization heuristic at perfSONAR wiki:

• More about UNIS at Information Services Working Group:

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