perfSONAR Status and Updates

with network research in mind
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Includes slides pilfered from Mark Feit, Andy Lake and Szymon Trocha

perfSONAR is developed by a partnership of

perfSONAR

- perfSONAR is an **open source software suite** that runs, stores and displays **active measurements** such as **throughput, packet loss, latency and traceroute**
- Primarily maintained by consortium of **ESnet, GEANT, Indiana University, Internet2, RNP** and the **University of Michigan**
- **Over 2000 registered deployments** around the world across hundreds of institutions

Map of perfSONAR deployments around the globe
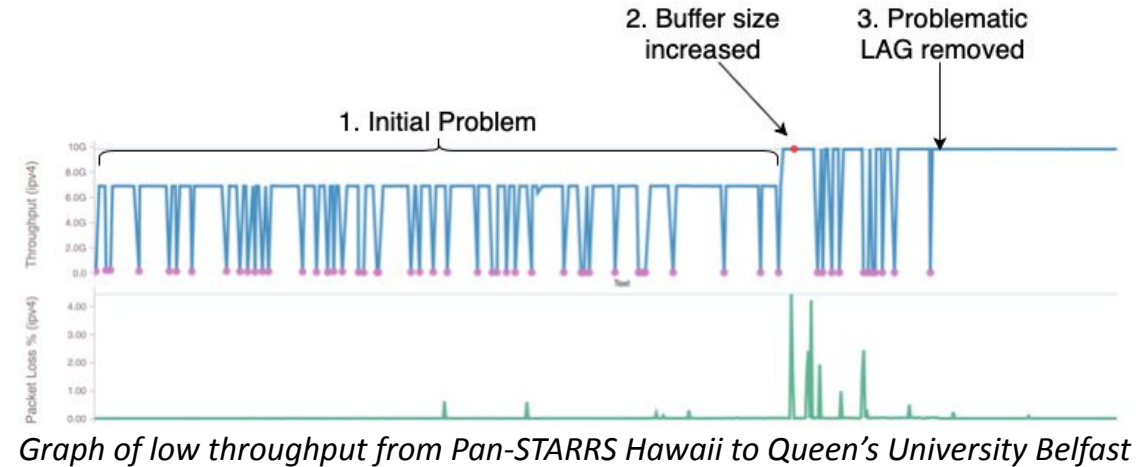
*Graph of low throughput from Pan-STARRS Hawaii to Queen's University Belfast*

Example perfSONAR use cases:
- Solving global network performance issues for for researchers transmitting data from **Pan-STARRS Hawaii** to **Queen's University Belfast** *(see above graph)*
- Identifying packet loss issues at **UT Arlington**
- Identifying performance bottlenecks as **Large Hadron Collider (LHC)** prepares for the "high luminosity" era

Typical perfSONAR deployment

- Standard toolset for measuring network performance
  - Any two points with perfSONAR nodes can interoperate
  - Cooperative scheduling of measurements where required
- 24x7 unattended operation – No humans required!
  - Nodes can be tasked remotely for ad hoc measurements
  - Regular, scheduled testing individually or as part of a mesh
- Placed near DMZs or important project compute or data
  - And in national (Internet2, ESnet, GEANT) and regional networks
- Set expectations, perform quality assurance, find "soft" failures

View of a deployment

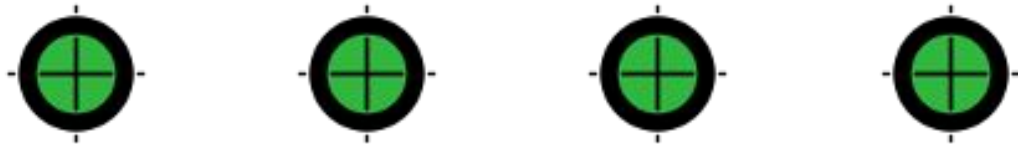4
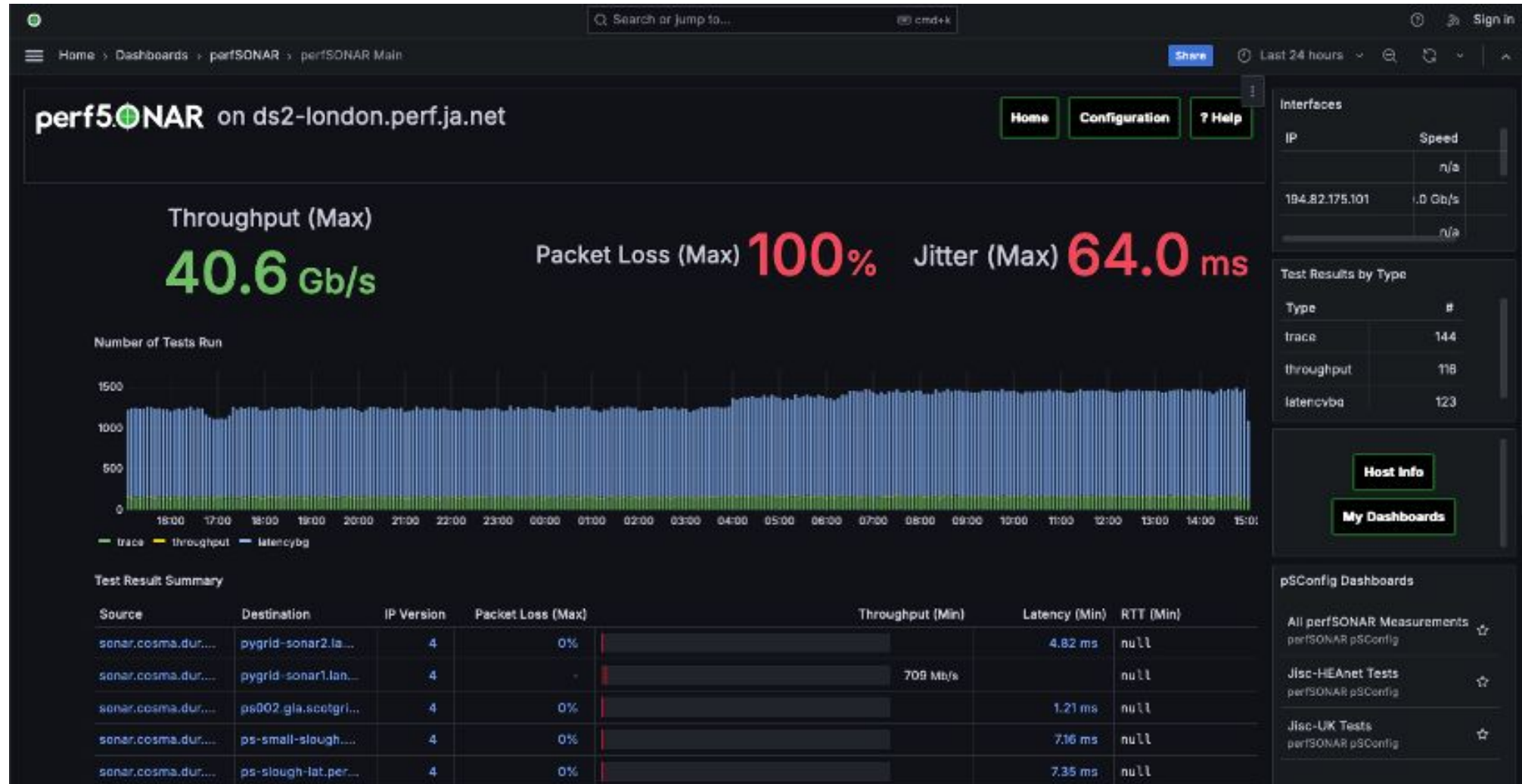
Mesh view - status of long-running tests

View of a set of tests between two points

Solving Inter-domain Problems

Observe poor performance

Identify perfSONAR nodes along path between endpoints

Measure to points across the network

keep measuring… (divide & conquer)

…until the problem reappears

Start looking for problems between these test points.

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Finding perfSONAR nodes

- https://stats.perfsonar.net/
- Many (but not all) nodes register with lookup service
- This displays location, available services, and machine type
- Over 2000 nodes, mainly at R&E sites (but not exclusively)
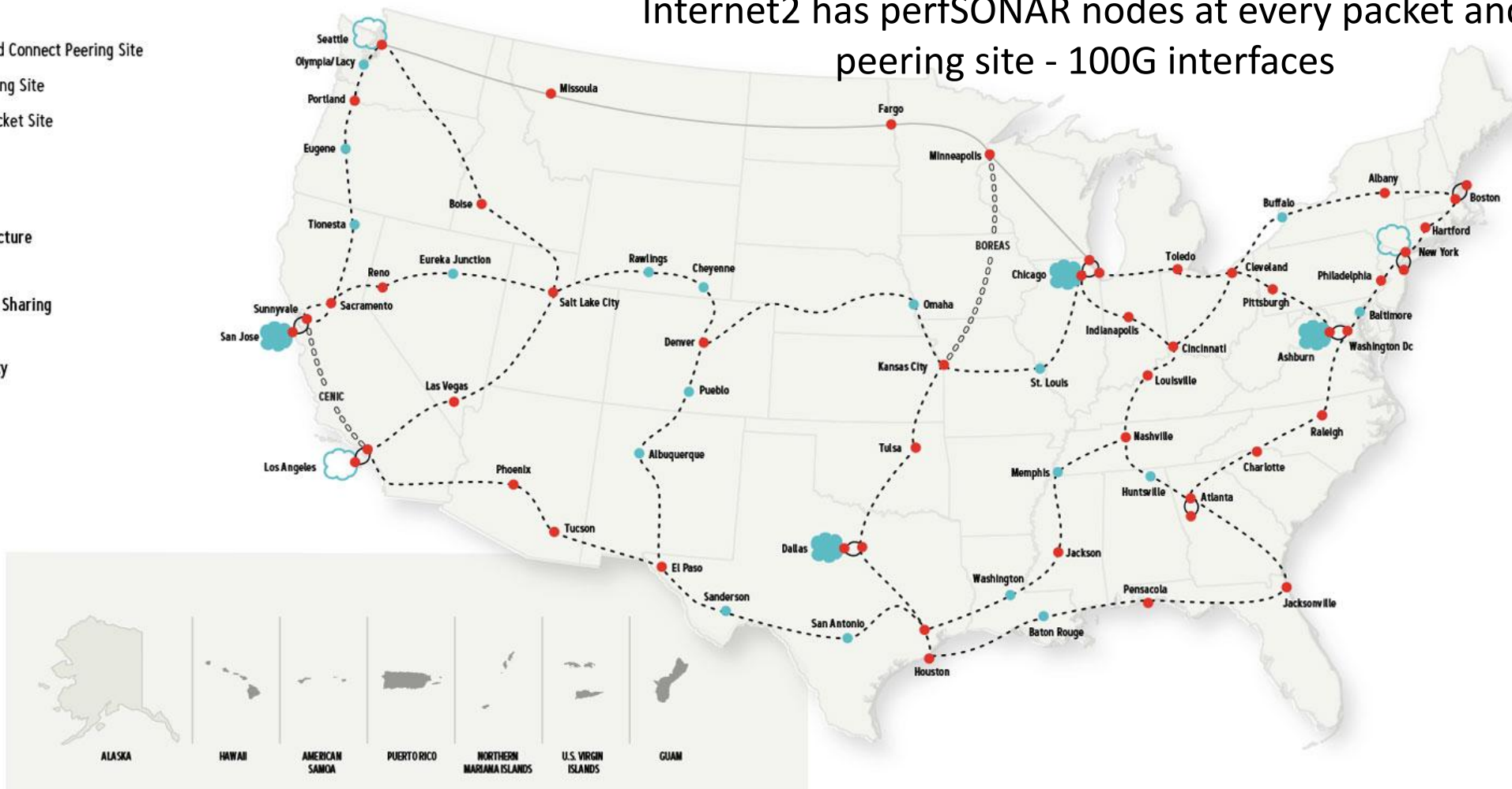- Large high-energy physics deployments (WLCG, Atlas)
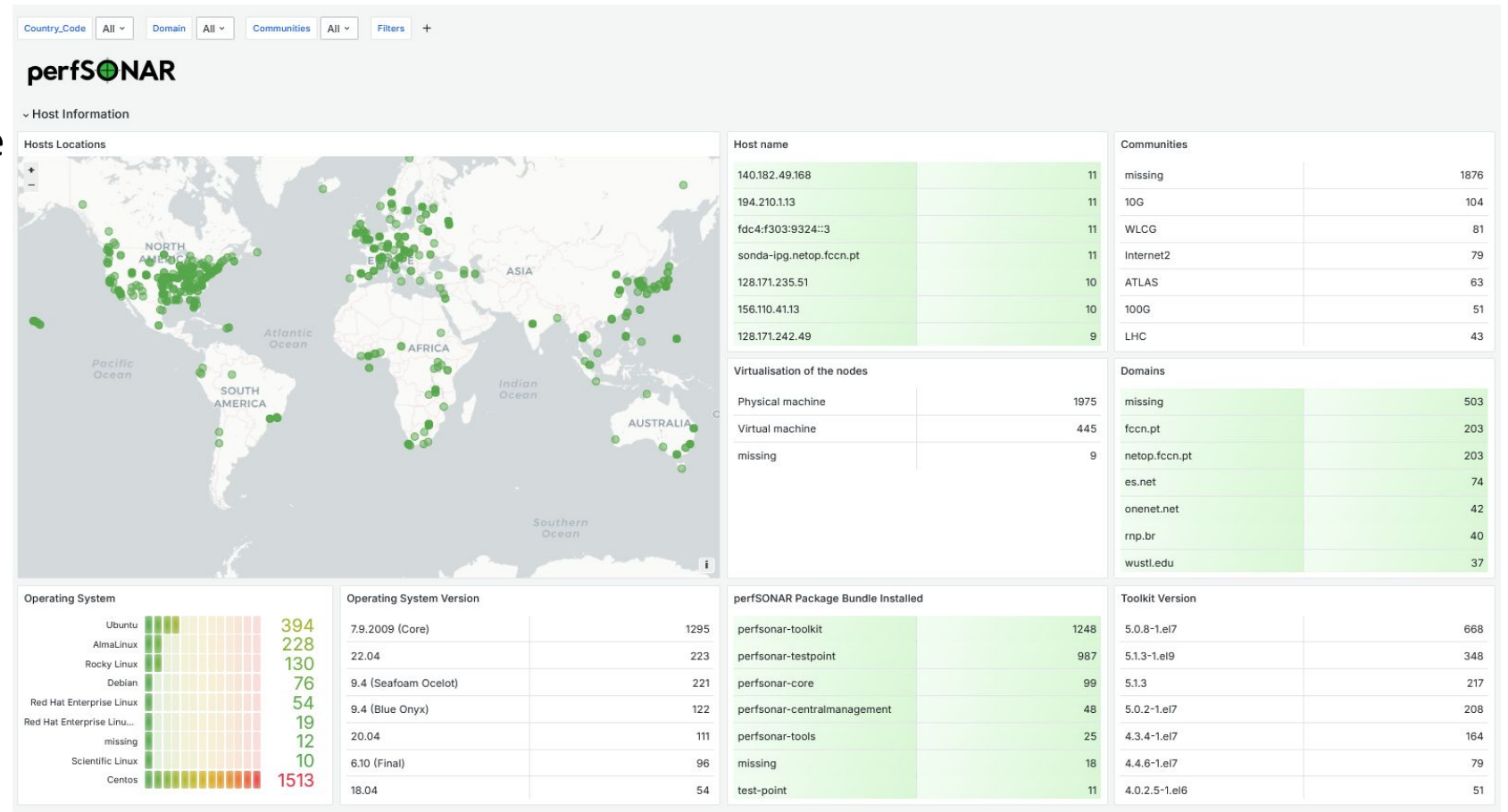
Internet2 has perfSONAR nodes at every packet and peering site - 100G interfaces

Why useful to network research?

- Deployed to many locations
- Targets for tests (as long as tests and tools performing the tests relevant)
- Can pull older results from archive (now OpenSearch+Logstash)
  - Grafana now used for dashboards, so visualizing multiple sources straightforward
  - Internet2 currently doesn't have a central archive
  - Studies have been done on longitudinal data
- Central scheduler on nodes for performing tests (pScheduler) uses plugins for tests and tools and archives; straightforward to add new ones (but currently requires interacting with the development team); archives could be logstash but could also be RabbitMQ, a web target, or something you design

The architecture

Useful mailing lists
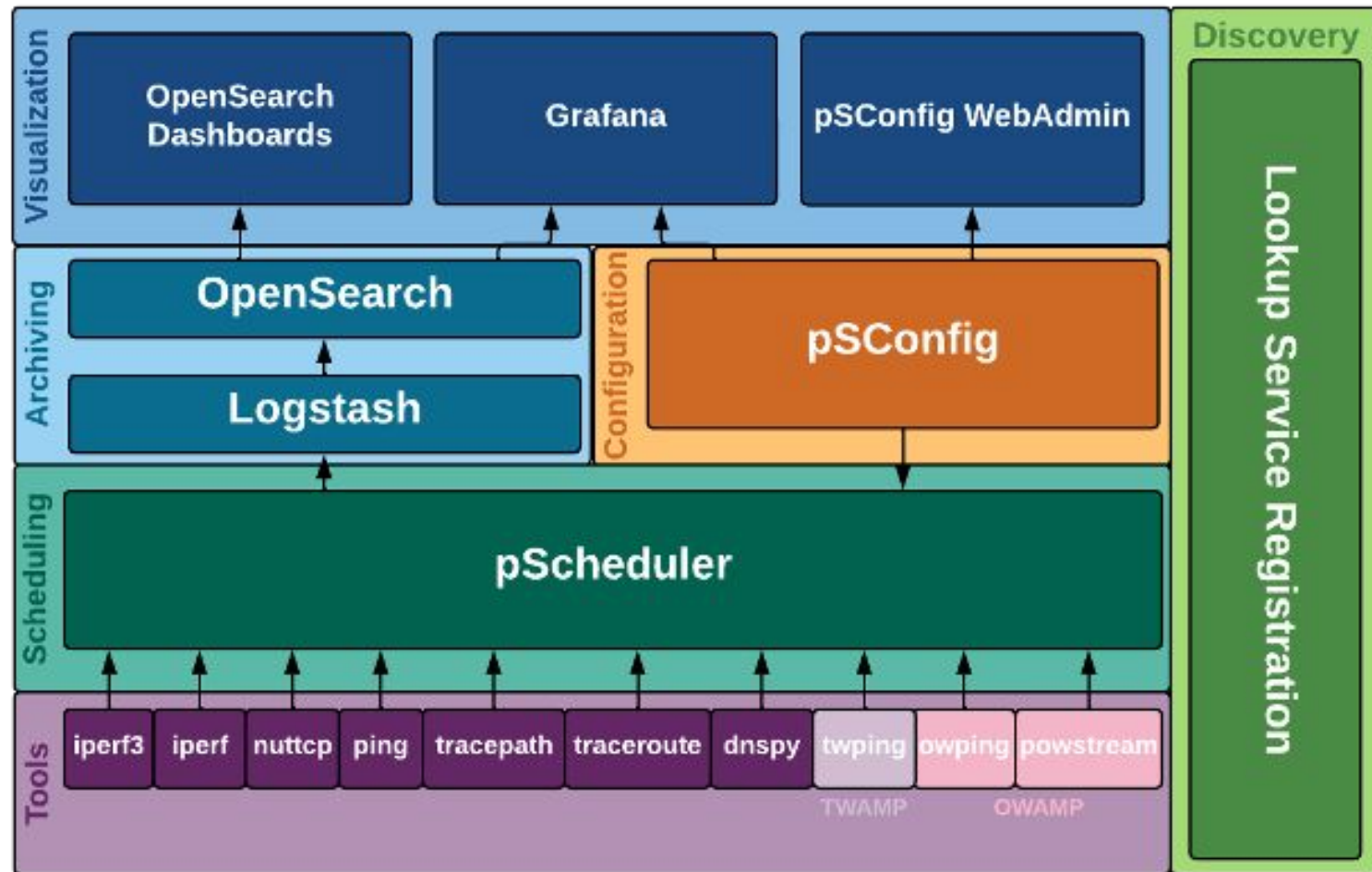
- https://lists.internet2.edu/sympa/info/perfsonar-user
General discussion, lots of help here, developers do read

- https://lists.internet2.edu/sympa/info/perfsonar-announce
announcements if you want to follow along

- perfsonar-developer@internet2.edu
If you want to contact the developers directly

Useful URLs

- https://www.perfsonar.net/ - General information about perfSONAR

- https://docs.perfsonar.net/ - Detailed documentation about the current perfSONAR release.   Including installation (bare metal, container) and the plugins available in pScheduler

- https://stats.perfsonar.net/ - Lookup service registrations

- https://github.com/perfsonar/ - The Source. Important repositories:
  - project - general info about development, wiki is here
  - pscheduler - has pscheduler plugins, and some documentation (which I am told is really not up to date, hence please contact the developers.   They do have a skeleton plugin you can populate.)

perfSONAR

Thanks!

For more information,
please visit our web site:
https://www.perfsonar.net
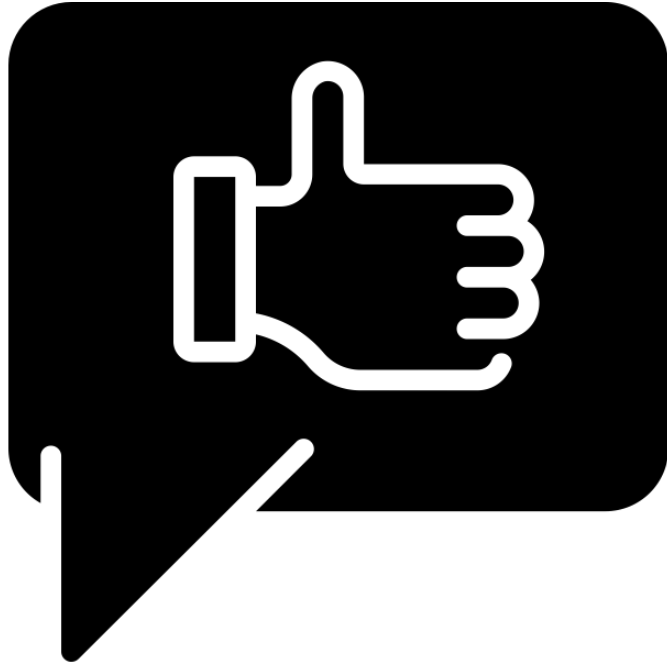
Thanks icon by priyanka from The Noun Project

perfSONAR is developed by a partnership of   ESnet ENERGY SCIENCES NETWORK   GÉANT   INDIANA UNIVERSITY   INTERNET2   RNP ORGANIZAÇÃO SOCIAL DO MCTI   UNIVERSITY OF MICHIGAN