

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

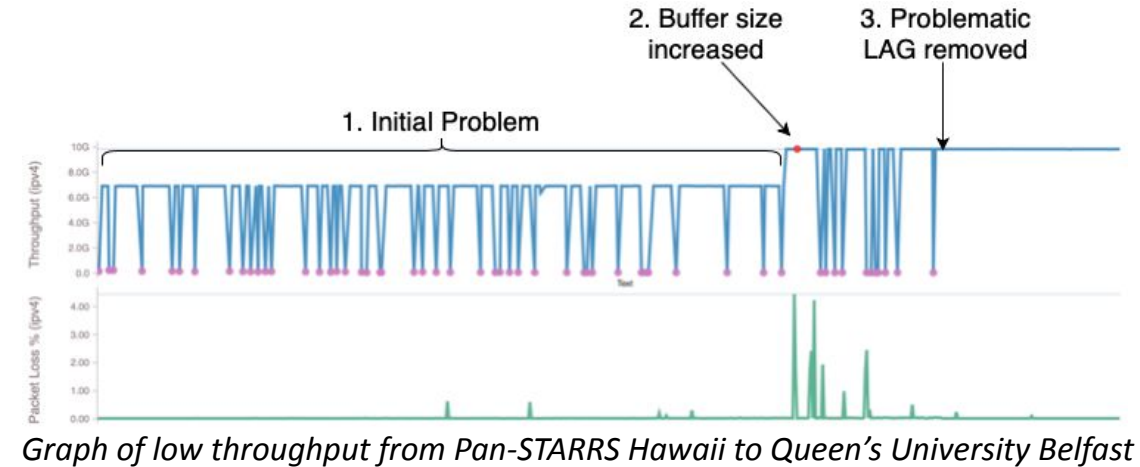


perfSONAR

- 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



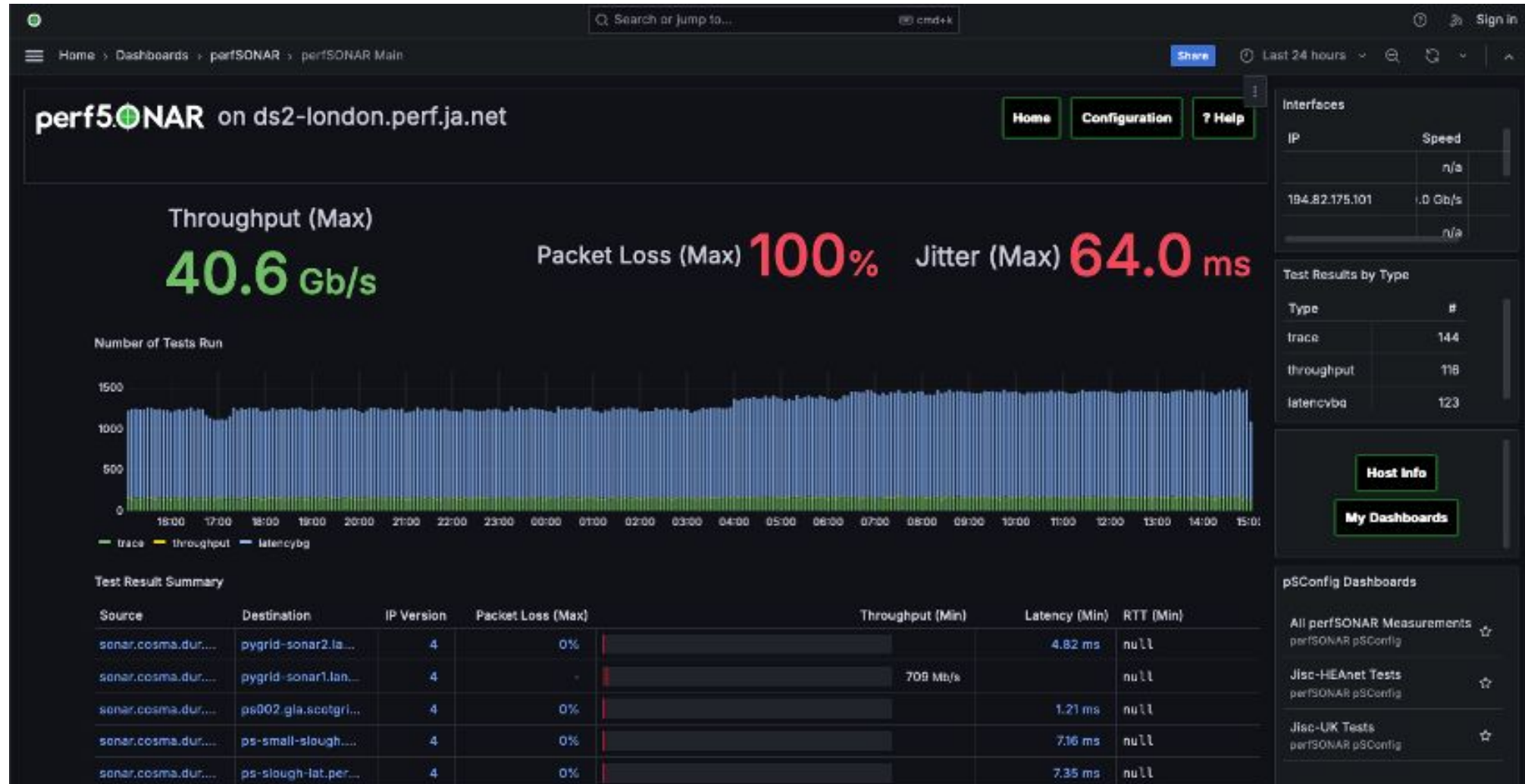
Example perfSONAR use cases:

- Solving global network performance issues 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



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



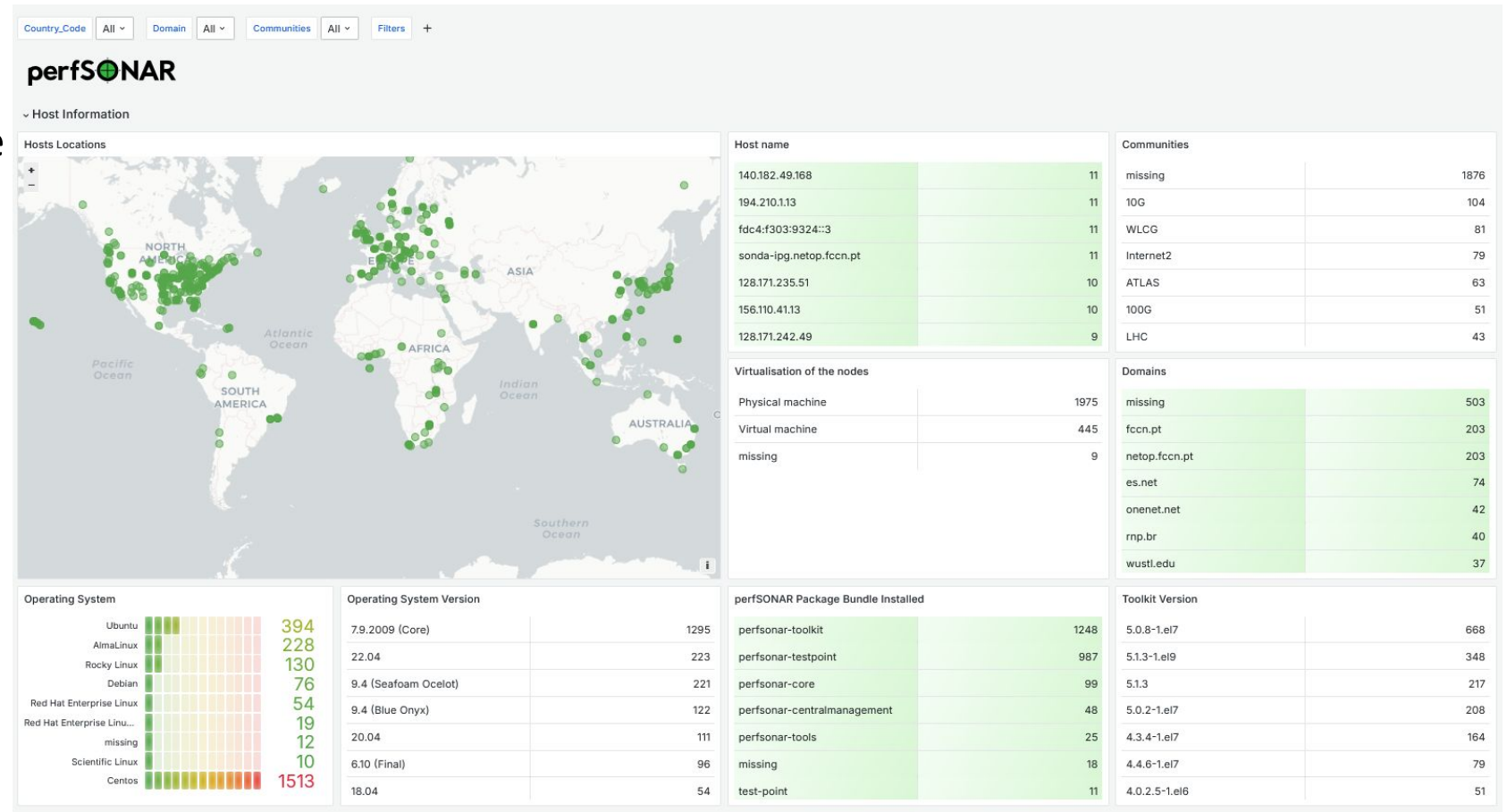
keep measuring... (divide & conquer)



...until the problem reappears

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)





Network Infrastructure Topology | May 2024

This map represents all 50 states and five major territories of the U.S. The Internet2 network infrastructure extends across the contiguous U.S. and, through a global fabric of research and education networks and exchange points, interconnects with locations in Alaska, Hawaii, Guam, Puerto Rico, and 100+ countries worldwide.

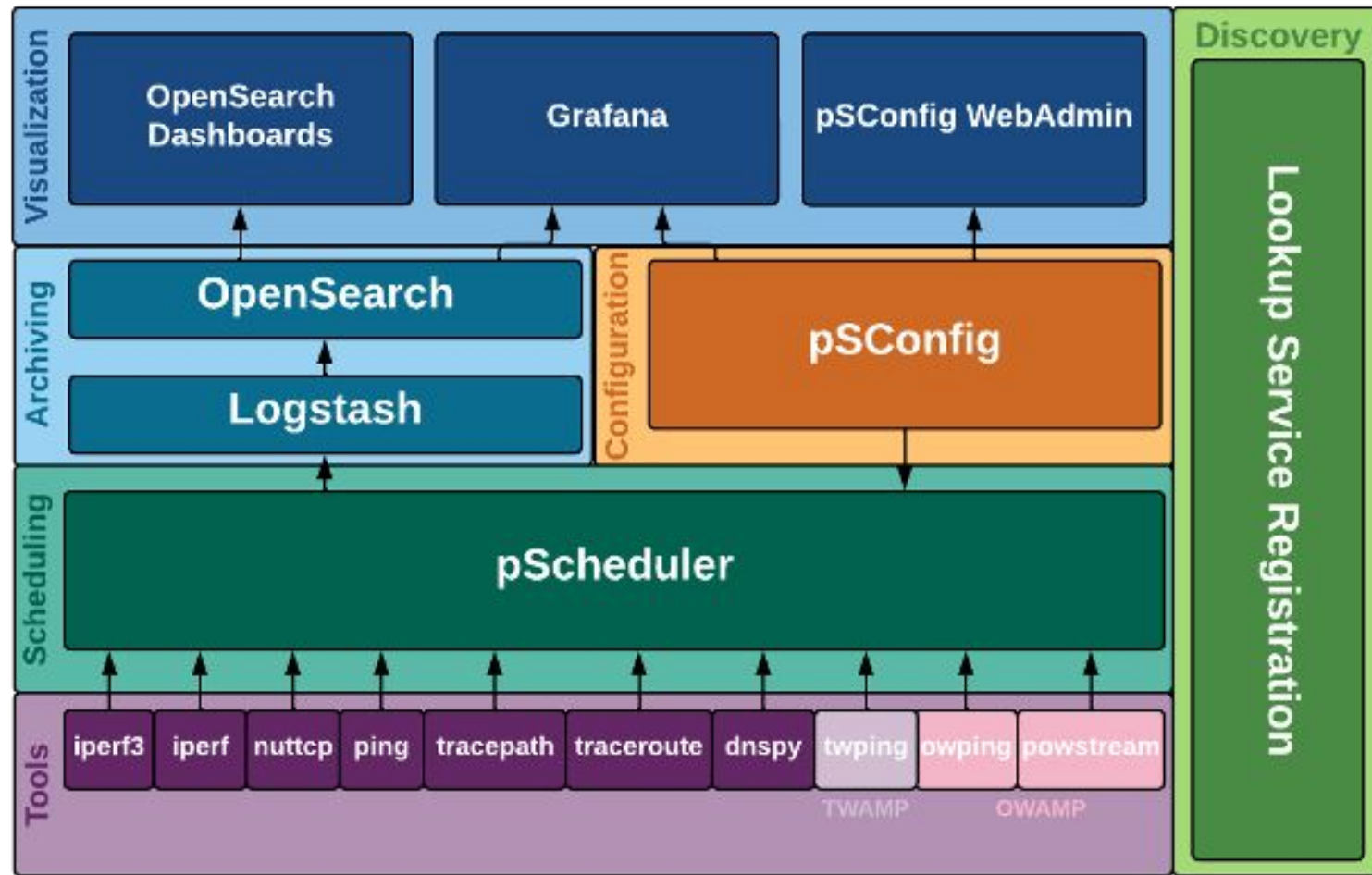
Internet2 has perfSONAR nodes at every packet and peering site - 100G interfaces



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

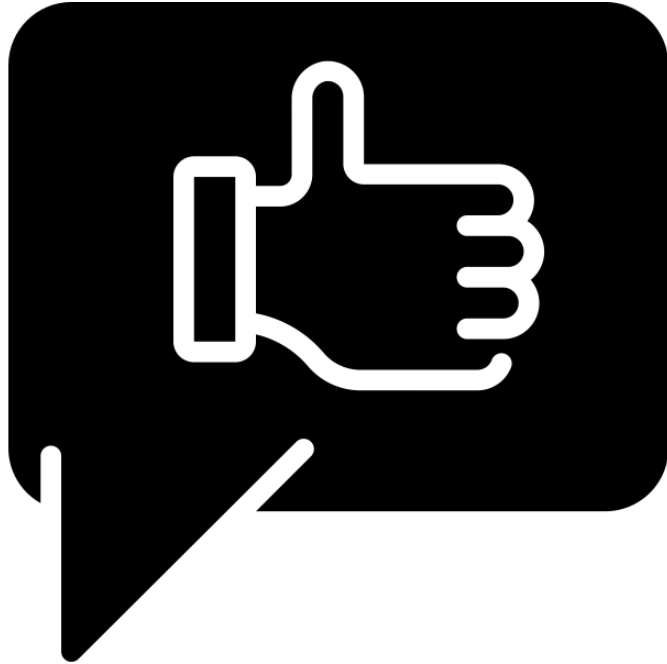
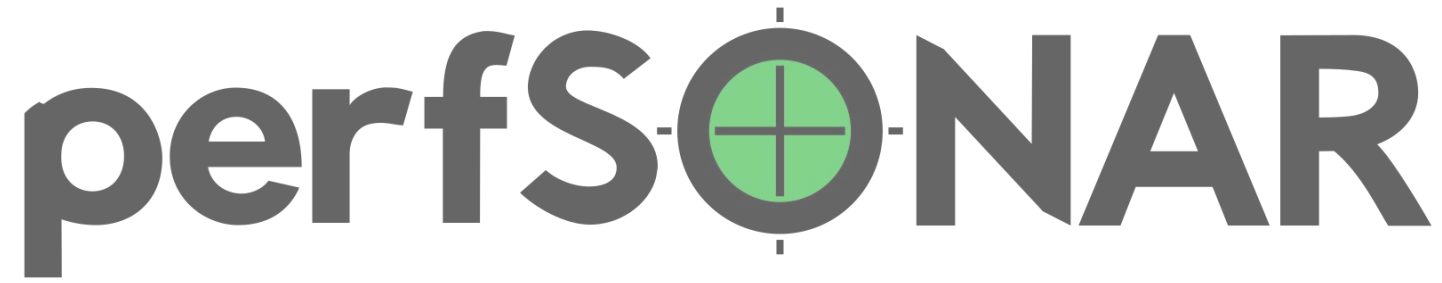


Useful mailing lists

- <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.)



Thanks icon by priyanka from The Noun Project

Thanks!

For more information,
please visit our web site:
<https://www.perfsonar.net>

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