20 Years of perfSONAR… and the Road Ahead

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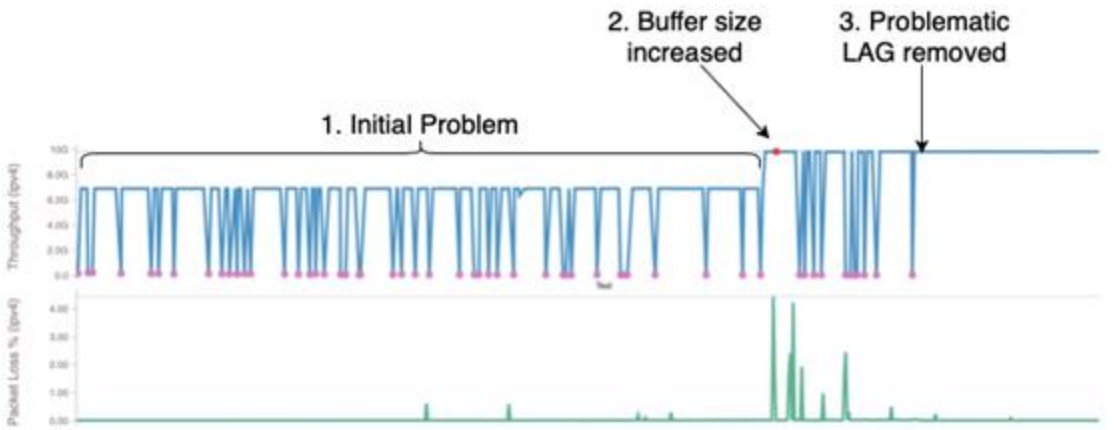
perfSONAR is developed by a partnership of

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 public deployments** around the world across hundreds of institutions

Map of perfSONAR deployments around the globe

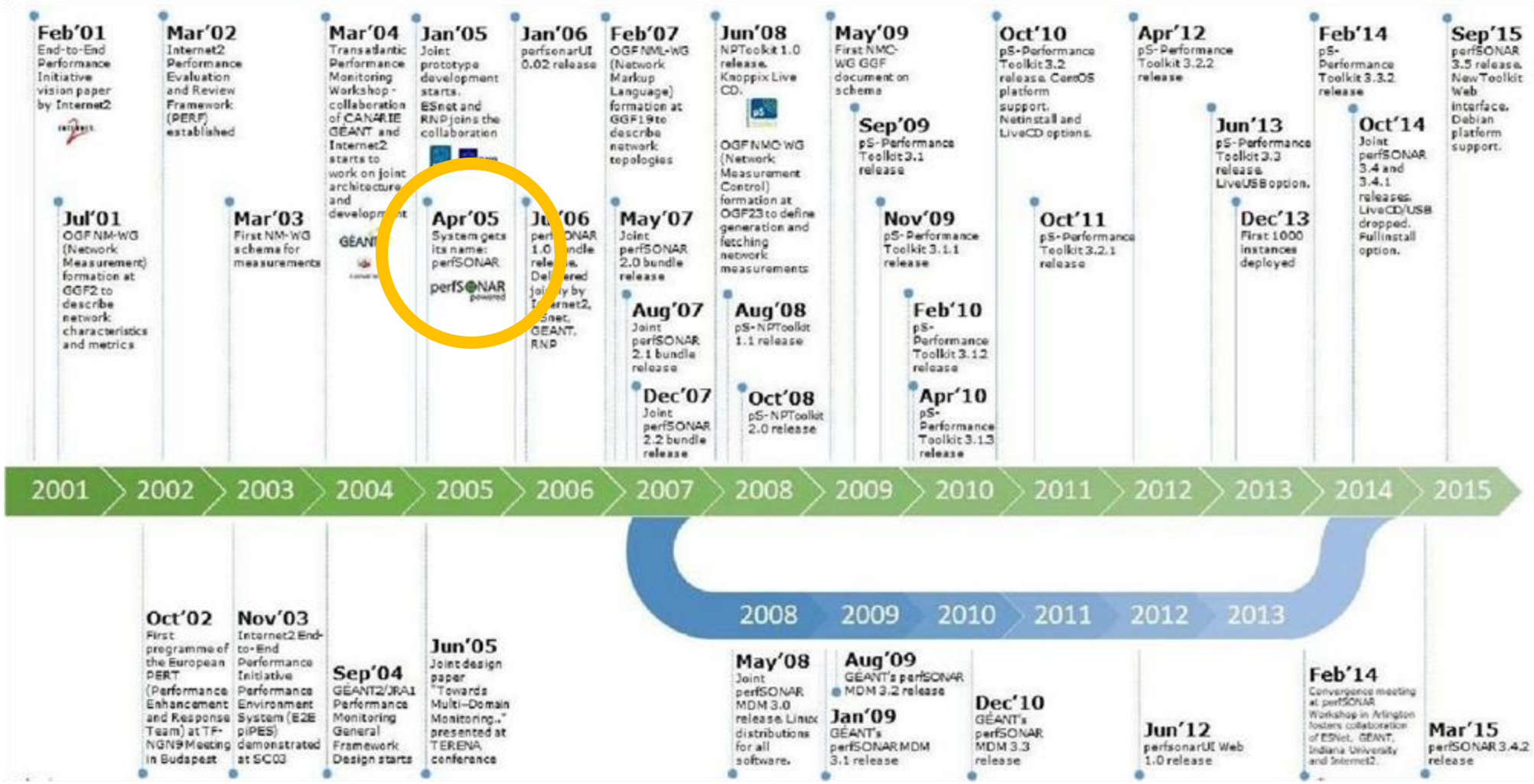


Graph of low throughput from Pan-STARRS Hawaii to Queen's University Belfast

Example perfSONAR use cases:

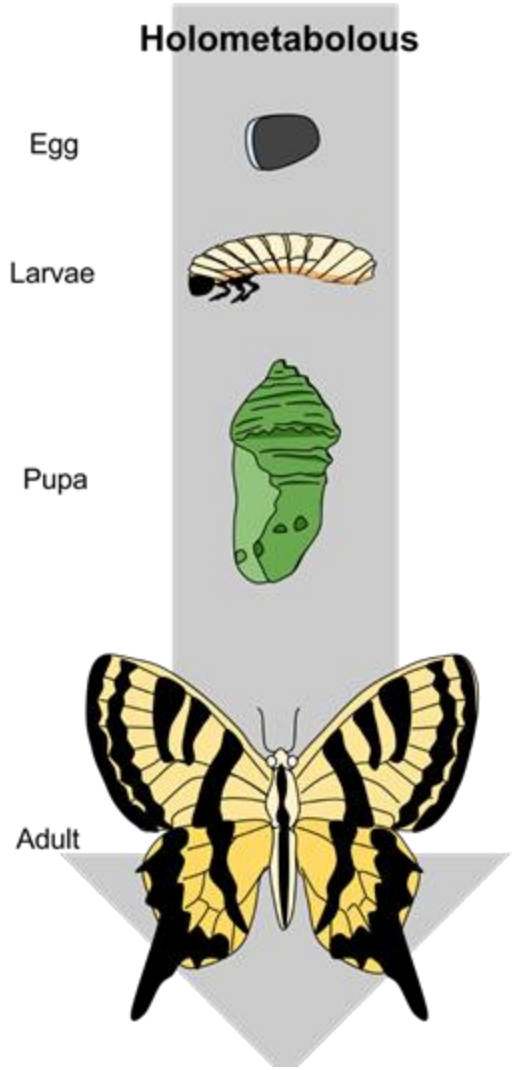
- Solving global network performance issues for for researchers transmitting data from **Pan-STARRS Hawaii** to **Queen's University Belfast** *(see above graph)*
- Identifying packet loss issues at **UT Arlington**
- Identifying performance bottlenecks as **Large Hadron Collider (LHC)** prepares for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

20 years of experience



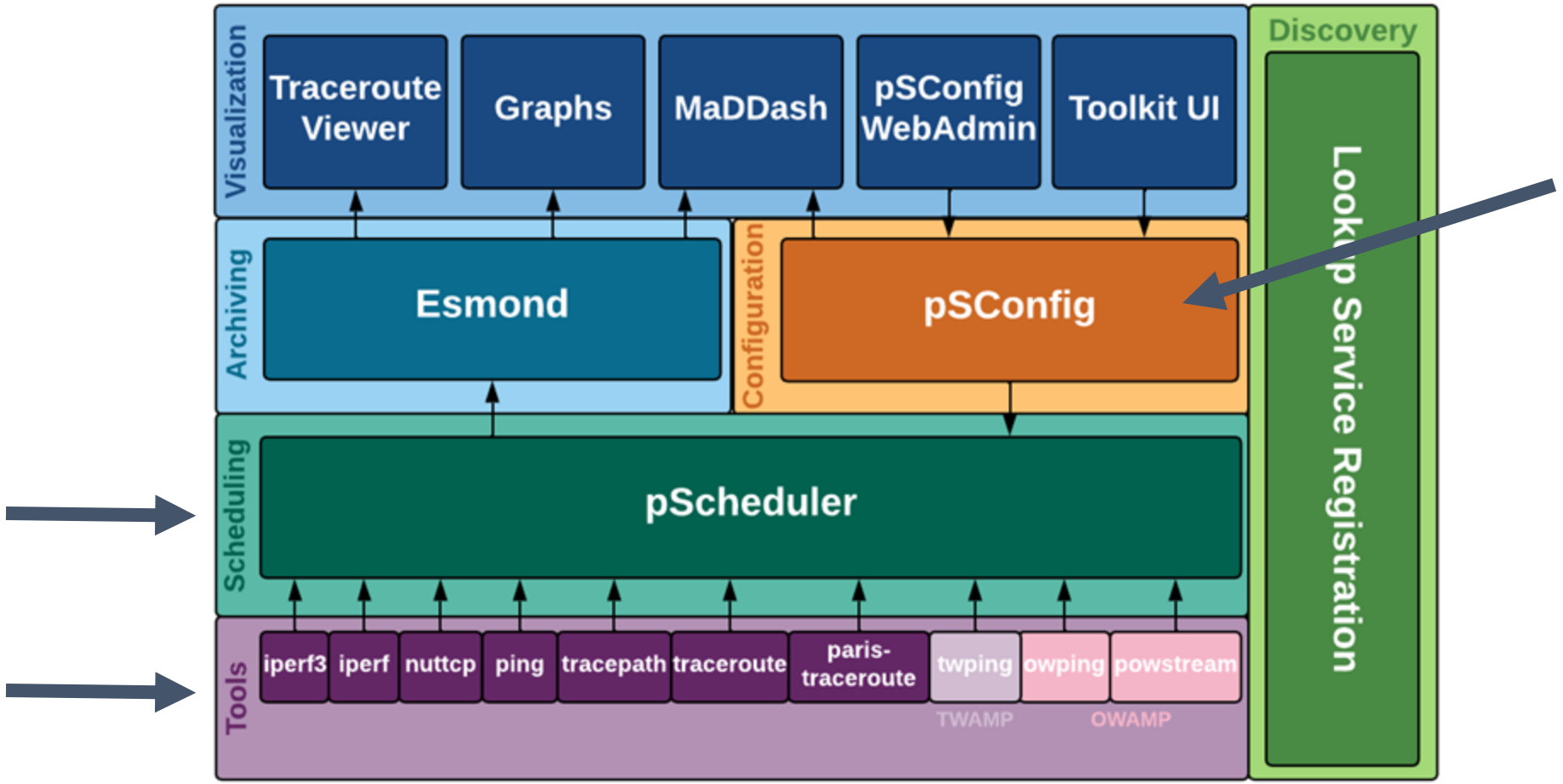
perfSONAR's Metamorphosis

- As perfSONAR reaches 20 years old, it also approaches an important point in its history
- 5.0 kicked off a stage of metamorphosis that will largely wrap-up by the time we hit 5.3.0 later this year
- Let's take a step back and look at these changes…

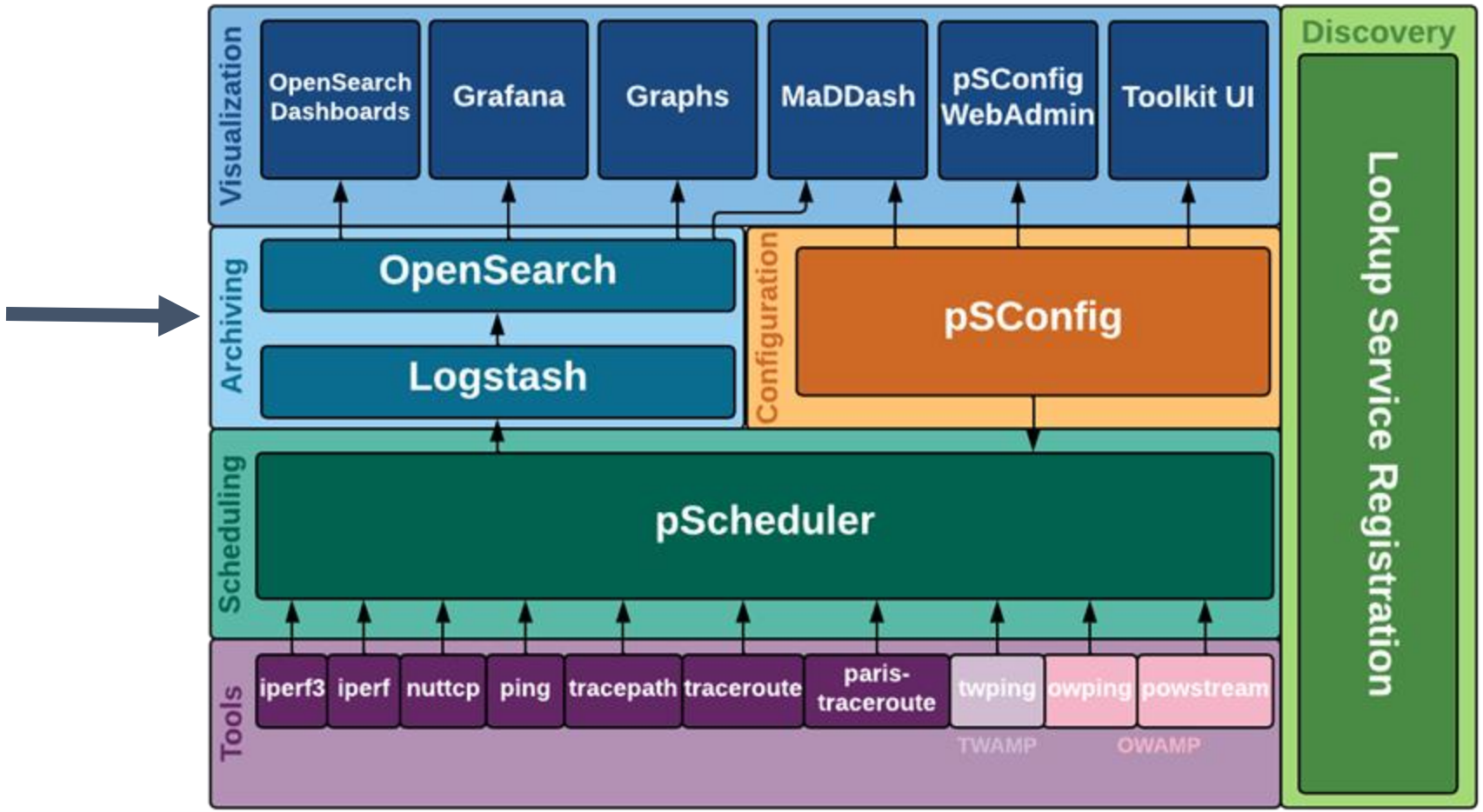


What's been happening the past few years?

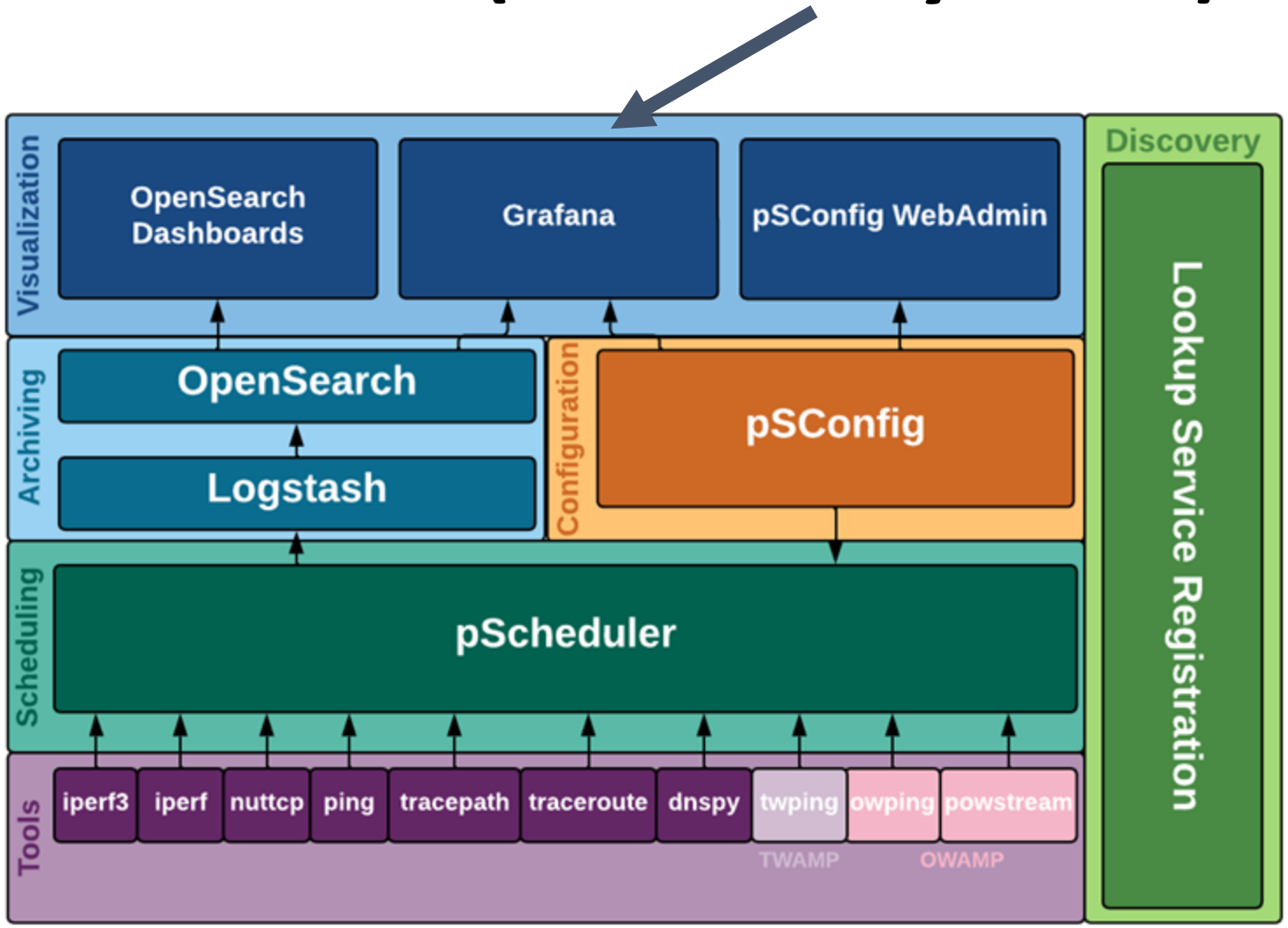
perfSONAR in 2020 (4.X)



perfSONAR 5.0 (2023)

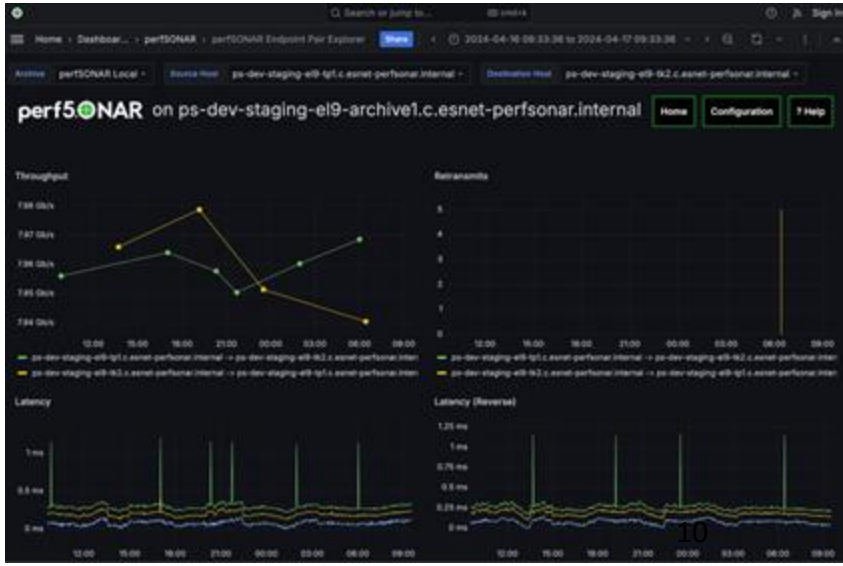


perfSONAR 5.1-5.2 (2024-Early 2025)



perfSONAR 5.1.0-.4

- **New Grafana Interface**
  - Customizable visualization, better integration with other data
- **Threaded iperf3 Support**
  - Ability to test at 100Gbps+
- **Python pSConfig**
  - Better maintainability of more modern codebase
- **Better Instrumentation and Troubleshooting Tools**
  - Makes it easier to identify issues when perfSONAR misbehaves
- **OS Support**
  - Debian 11, Debian 12 and Ubuntu 22 support. <u>No CentOS 7 support.</u>



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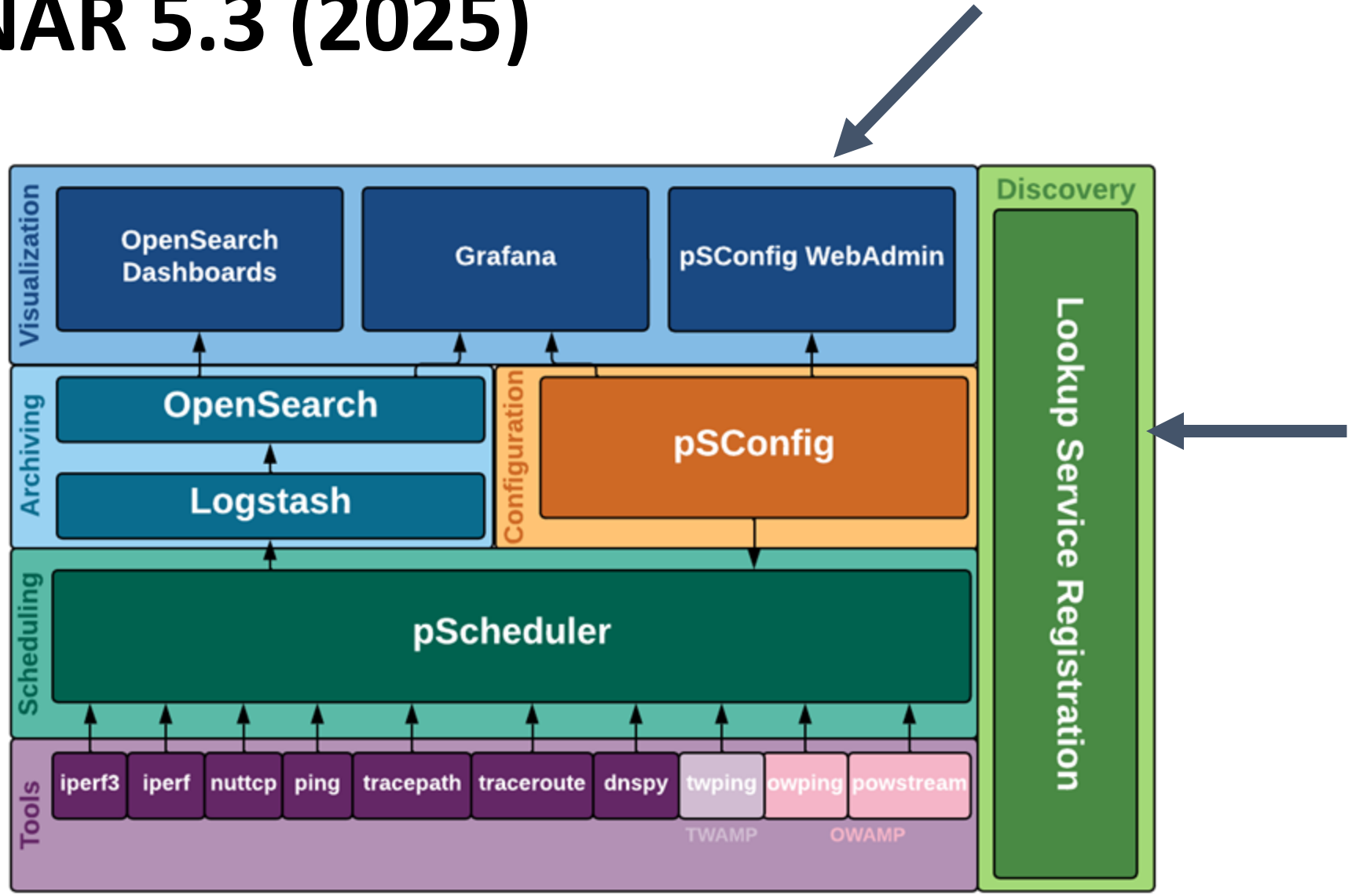
perfSONAR 5.2.0-beta

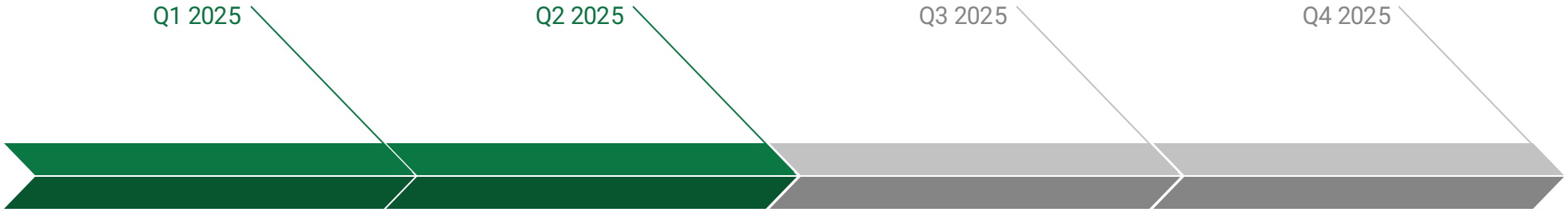
- **Beta just released**
  - 20th anniversary release
- **No major new features**
  - Inside components updates (Grafana, OpenSearch)
- **New OS Support: Ubuntu 24**
  - Debian 11 & 12 and Ubuntu 20, 22 a 24
  - Alma Linux 9 or Rocky Linux 9
- **Docker image for ARM64**
- **Test it for yourself**
  - And report bugs to GitHub perfSONAR project

What does 2025 look like?

perfSONAR 5.3 (2025)



Release Plan for 2025



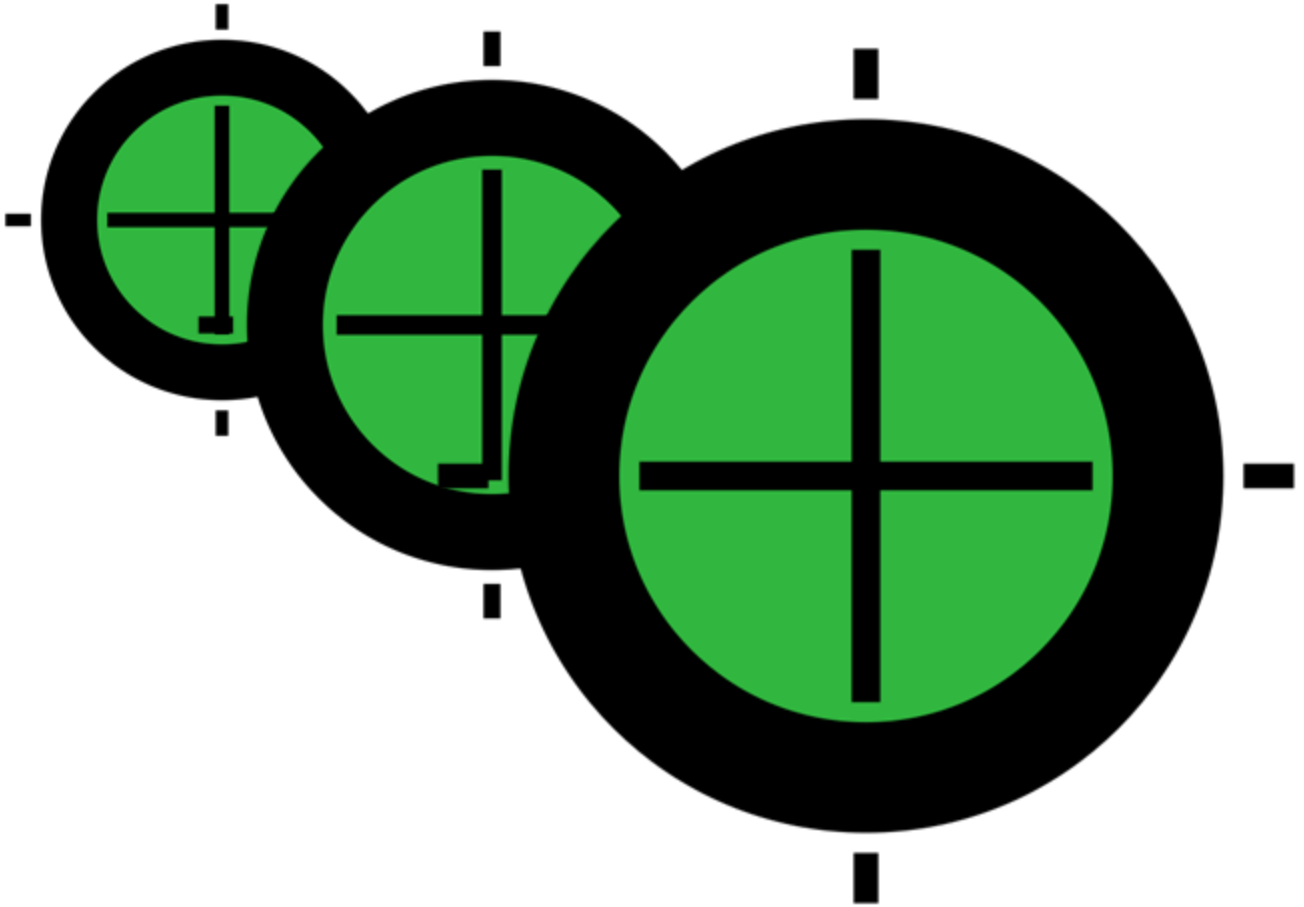
perfSONAR 5.2.0

- Not a huge feature release, but multiple changes too big for a bugfix release
- Ubuntu 24 support
- Grafana and OpenSearch updates
- Lots of fixes and quality of life improvements

perfSONAR 5.3.0

- Improving test configuration experience
- Lookup service enhancements
- Timekeeping improvements
- Micro-dependency analysis interface
- psGUI on-demand measurement UI

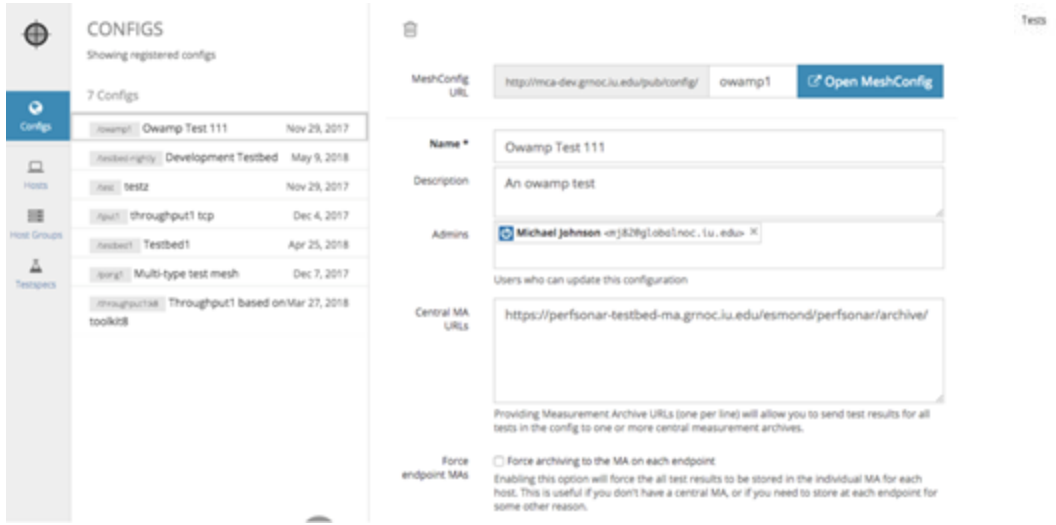
Let’s zoom in on a few specific features….

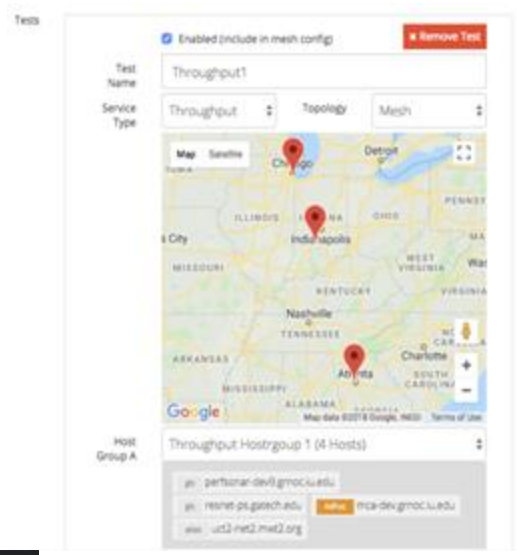


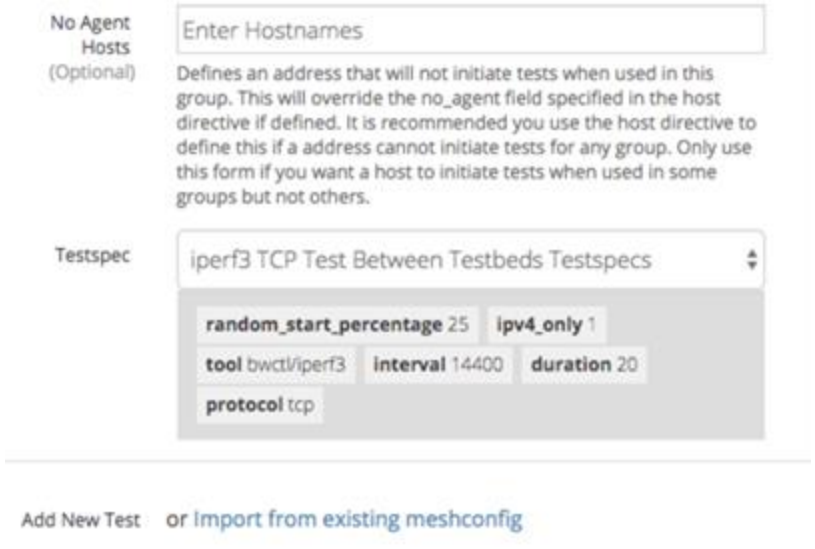
pSCompose

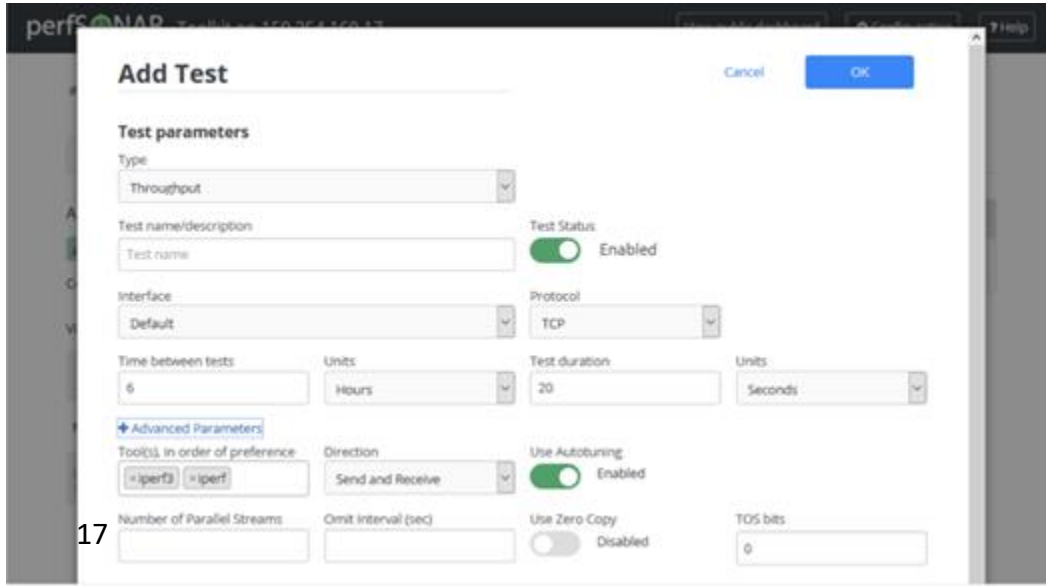
Next generation UI for test configuration

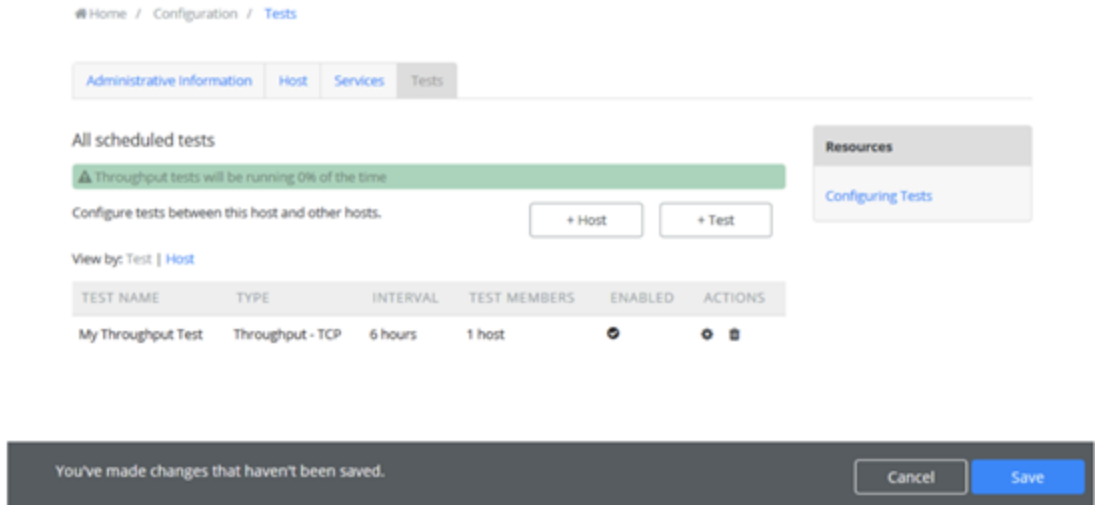
Test Configuration Today











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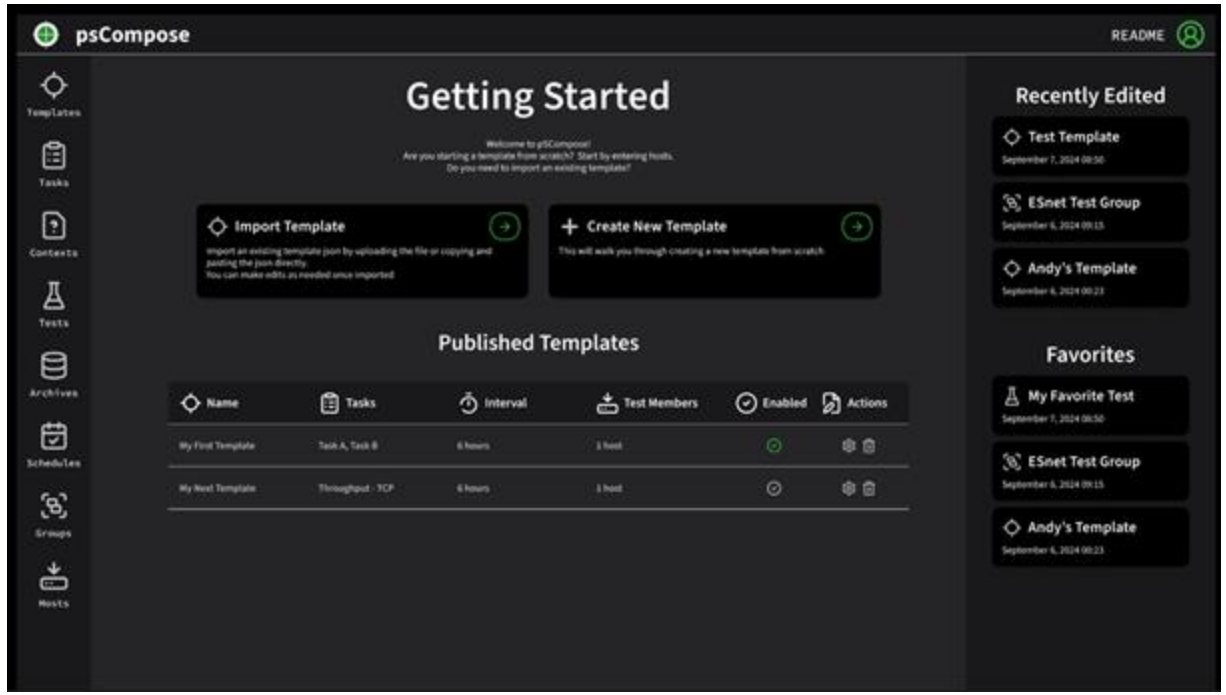
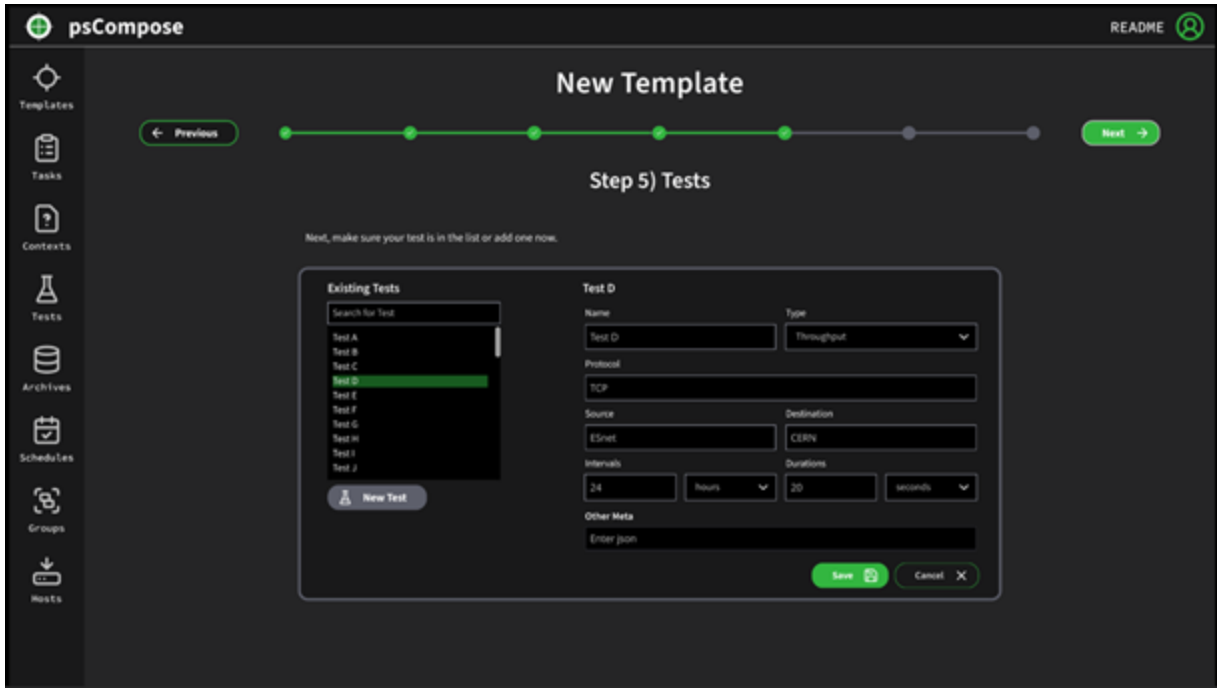
pSConfig Test Configuration

- **Simplified and Consolidate UIs**
  - We want one UI to serve Toolkit UI and PWA role
  - Leverage Lookup Service for host completion
  - Make it easy and clear to set common fields needed for Grafana, etc
- **Align Tech Stack**
  - An update call not strictly required, need to determine what is easiest for clients (delete+add vs update)
- **Leverage Flexibility of pScheduler and pSConfig**
  - We don’t want to issue a code update everytime a new test type implemented or new options added

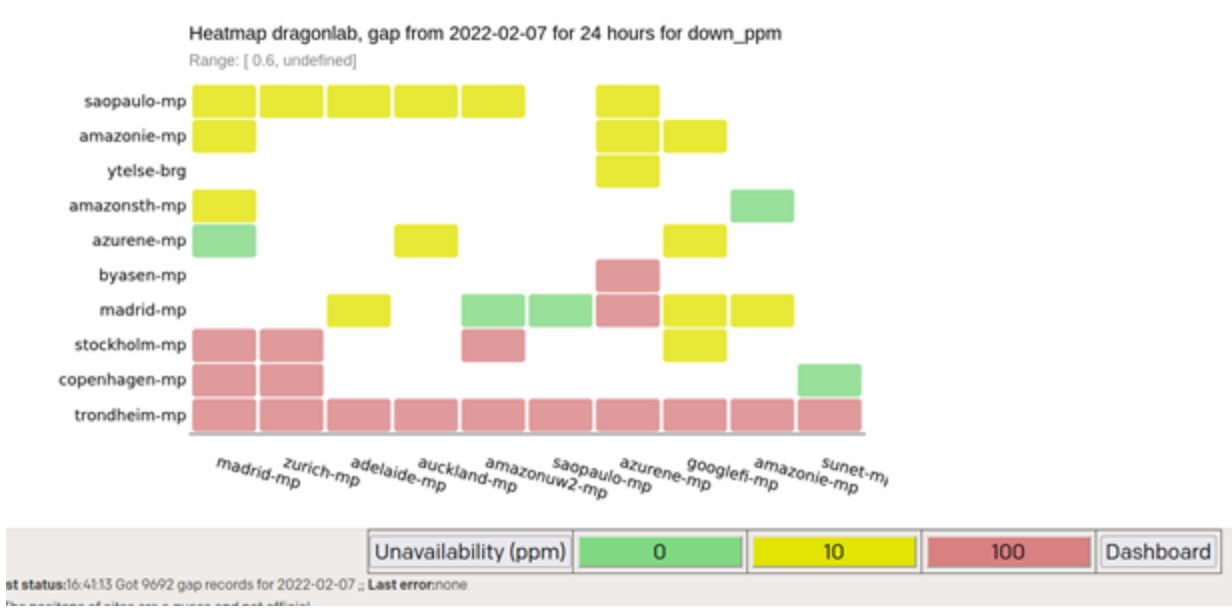
Development Underway…

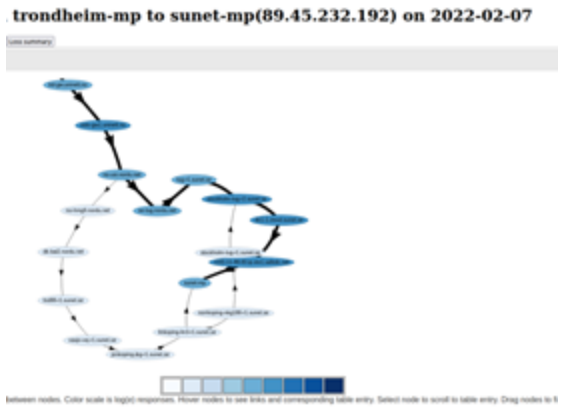


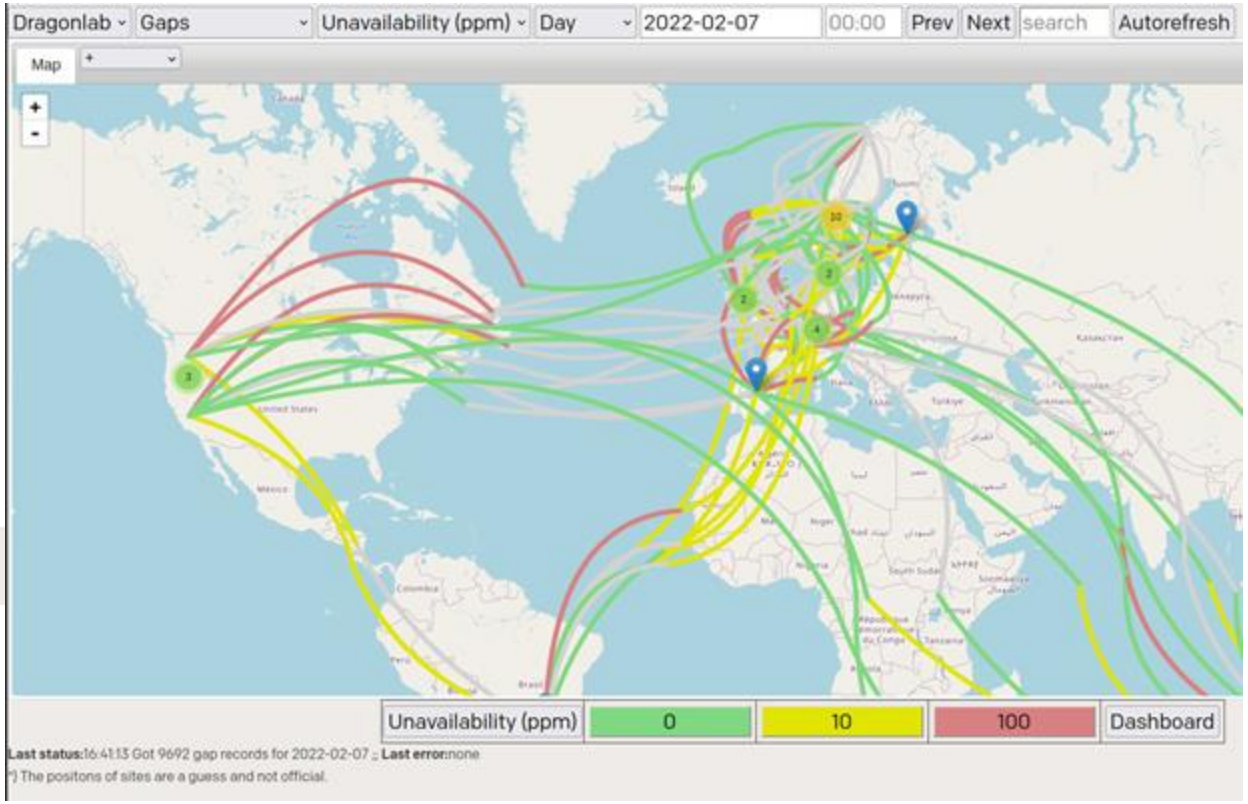


Micro-dependency

Microdep: spot micro outages

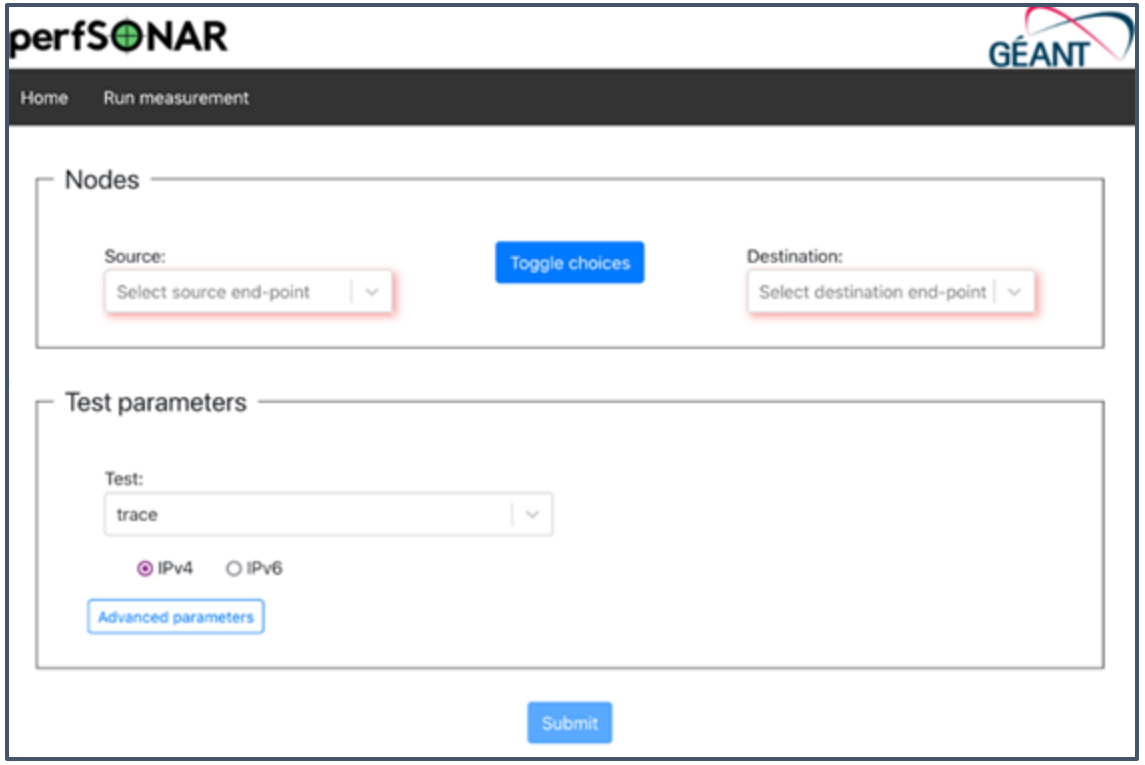


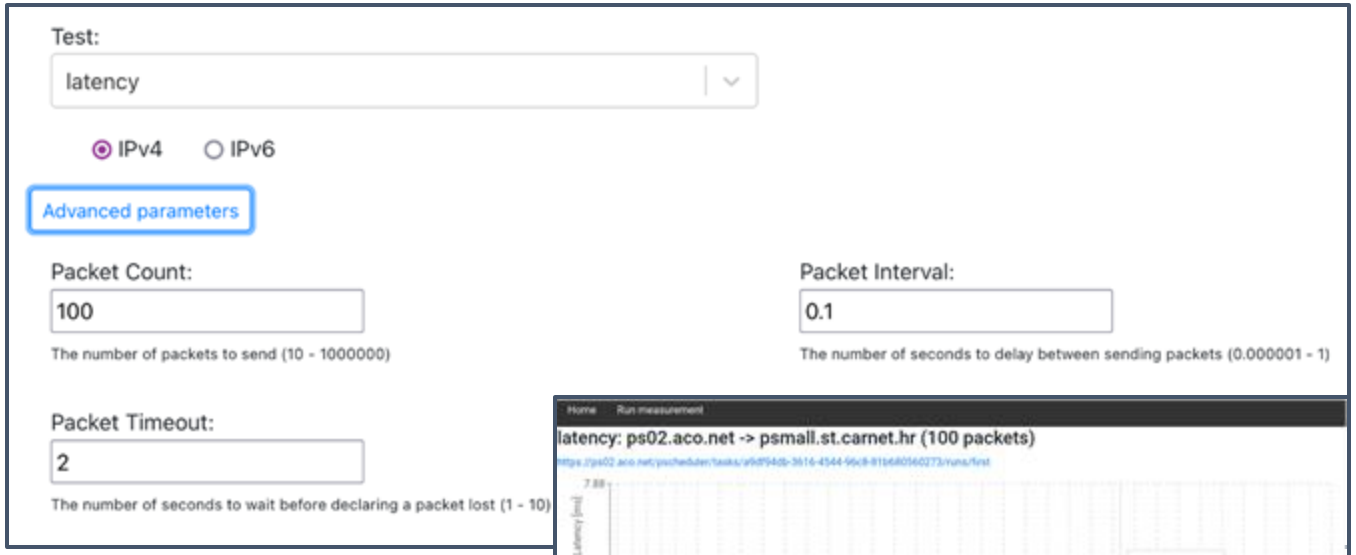


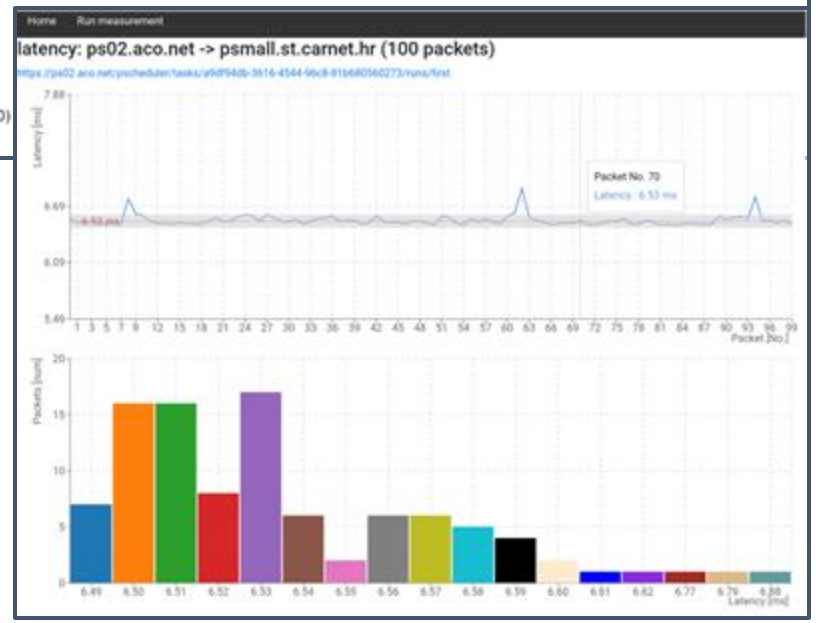


psGUI

A pScheduler on-demand UI





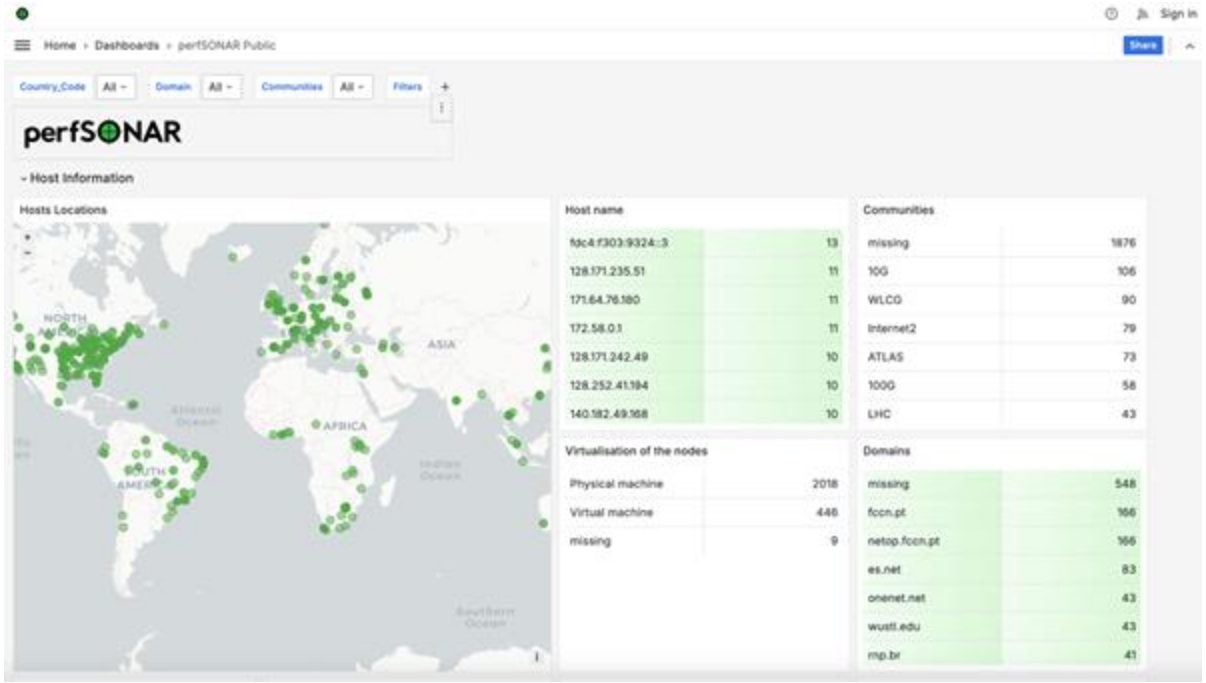


Latency, throughput, trace

Lookup Service Updates

Lookup Service - What is it?

- Hosts register records to the service
  - Information about toolkit nodes
    - Hosts
    - Interfaces
    - Services
    - metadata
- APIs to discover toolkit hosts and related information
- Records are ensured to be current by setting expiration date
  - Hosts to re-register before expiry



https://stats.perfsonar.net powered by lookup service

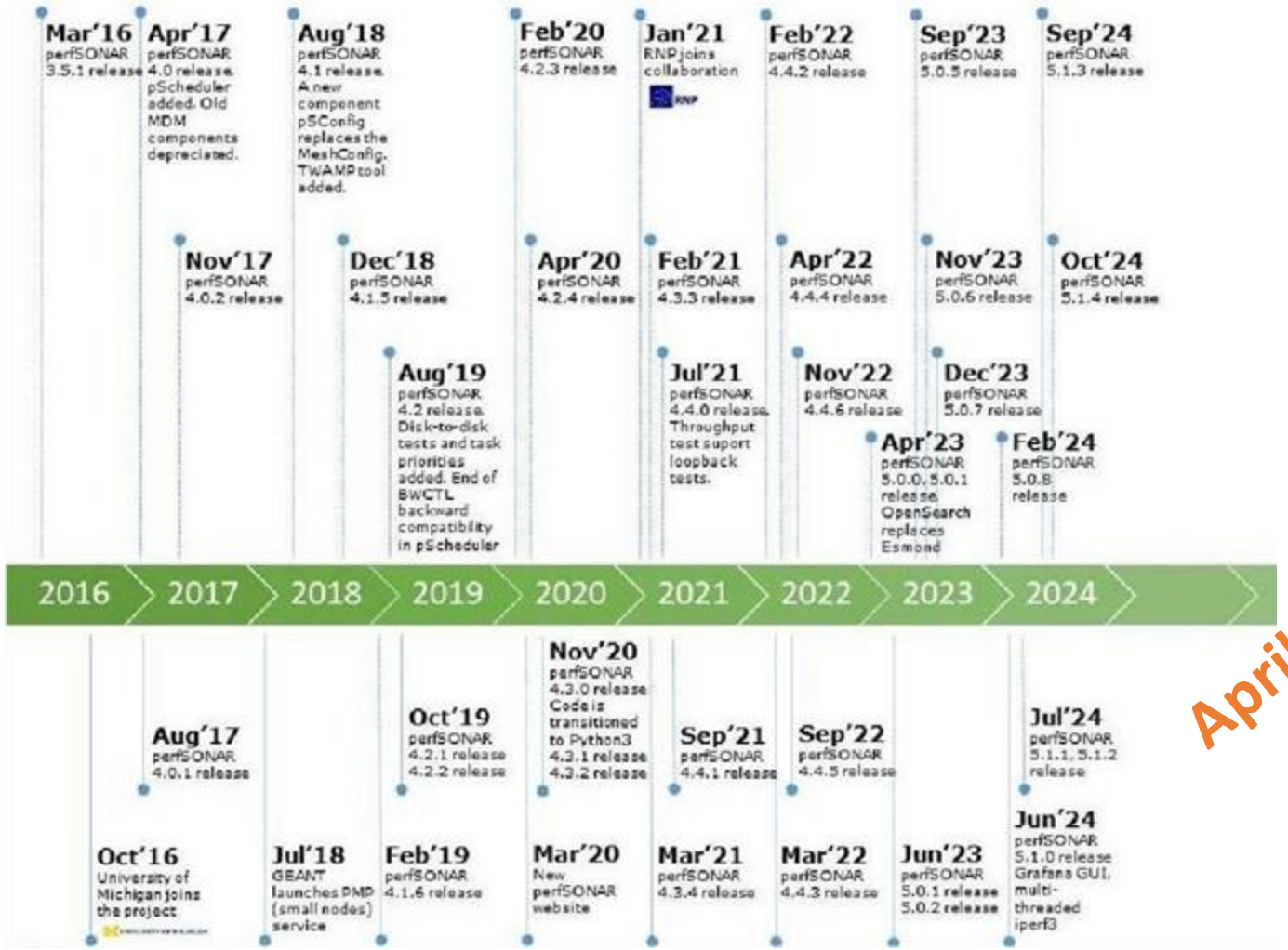
Why Redesign?

- Minimize the number of API calls for each host registration
- Provide a way for clients to check the authenticity of information in LS
- Validate the data sent for registration
- Provide richer API for querying
- Provide uniformity in fields across records for easier data analysis
- Provide a way to snapshot data for evaluating registration evolutions over time
- Continue supporting record updates

➥

- Simplify the registration process
- Provide better storage and query capabilities

But also, 20 years of experience …



April 2025

… means 20 years of collaboration

perf20NAR years

Put yourself (or your organization) on the map!
https://forms.gle/vsYmetjvyQRWwKUJ8

Will then show up at
https://stats.perfsonar.net

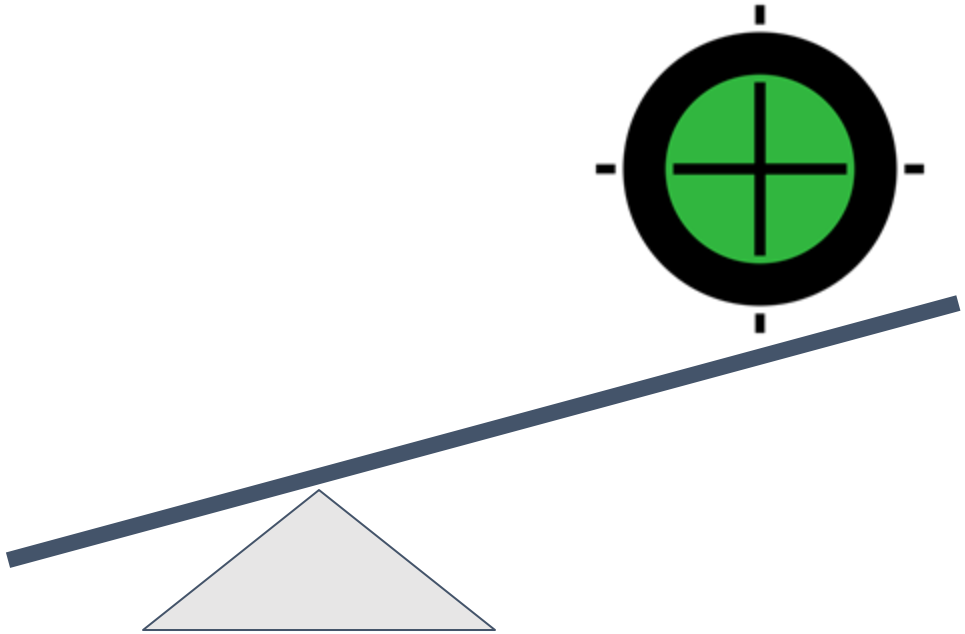
What happens after 5.3.0?

Make it easier

- We've introduced a lot of change, we want to focus on refining pain points
- Updated trainings that focus on the new pieces
- Continue to update documentation and add better guides
- Explore new ways to interact with documentation like training LLM on docs or similar

Leverage the changes of the last few years

- Our new platform opens up many new possibilities in
  - Alerting
  - Analysis
  - Visualization
  - Correlation with other data (e.g. Flow, SNMP/Streaming telemetry)
- Explore way to enable researchers to use the data



Guided by our Community

- Most important is your continued feedback to help shape the future
- Checkout quarterly office hours as part of https://www.es.net/science-engagement/ci-engineering-lunch-and-learn-series
- Join our mailing list perfsonar-user@perfsonar.net
- Watch for community surveys

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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