perfSONAR Update:
TechEx 2018 Edition

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What is perfSONAR?

• perfSONAR is a *collection* of software to:
  – Set (hopefully raise) network performance expectations
  – Find network problems (“soft failures”)
  – Assist in identifying causes of these problems
• All in multi-domain environments
  – These problems are all harder when multiple networks are involved
• perfSONAR provides:
  – A set of measurement tools useful for network performance analysis (e.g. iperf3, OWAMP)
  – A framework for running, collecting and storing measurement results
  – Tools for visualizing and analyzing network results
  – Tools for collaborating with other perfSONAR users
Single Host Deployments

Local Network

Remote Networks

1. Tests manually defined through web interface to selected remote destinations
2. Test results displayed on locally hosted graphs
Multi-Host Deployments

1. Local deployments read central file that defines tests to run
2. Dashboard generated from central file to display test results

Local Network

Remote Networks

Test

Test

Test

Test
Cross-Institution Collaboration

1. Local deployments read local central file AND remotely hosted file from collaboration.

2. Remote networks read the same central file that defines tests to run.

3. Dashboard generated from collaboration's central file to display test results.
perfSONAR Components
Building the perfSONAR Pipeline

Tool

Configure

Schedule

Store

Analyze/Display
Why do we care about adding new capabilities?

- **Evolving network environments**
  - Cloud, containerization and virtualization
  - Embedded network devices

- **New Types of Measurements**
  - Research platforms really interested in things like disk-to-disk transfer

- **Data Analytics**
  - We want perfSONAR data to be used in new and interesting ways
  - This includes integration of data in projects looking at more than just perfSONAR results

- **Meshes Continue to Grow**
  - Can we build smarter meshes than we do today to avoid over-testing as collaboration get larger
Development
Taking a Breather

• Users: “We’re still trying to digest everything new in 4.x”

• Expect the pace of change to core perfSONAR components to slow a bit as the users catch up and give us feedback

• Improvements to our development processes and tools
Pedaling the Release Cycle

• Expect more-frequent, smaller releases
  • No longer tied to the conference schedule
  • Features will be released as they are ready
  • Gets things out to the field

• Version numbers shortened to be closer to Semantic Versioning
  • 4.0.0 Major architectural shift
  • 4.1.0 Feature addition or enhancement
  • 4.1.1 Bug fixes
Near-term Feature Releases

• perfSONAR 4.2.0 (Est. Q1 2019)
  • **GridFTP plug-in** - Significant interest from research community and others.
  • **Measurement preemption** - Easier for *ad hoc* tests to get a slot on busy hosts
  • **Additional pSConfig utilities** - Continuing to make meshes easier to build and manage through command-line and graphical interfaces
  • **Lookup Service improvements** - Bulk renewals and record signing

• perfSONAR 4.3.0 (Est. Q3 2019)
  • **User Interface and Visualization Strategy** - Seek to improve user experience and operational efficiency within development team by consolidating code
  • **pScheduler Resource Pooling** - Better management of resources like ports, potential gains in environments like containers or ACL’d networks where ports are constrained
  • **Esmond Updates** - Option to run using 100% PostgreSQL instead of Cassandra
Disk-to-Disk Testing

- Long-awaited plugins from the University of Michigan (a.k.a. “The Plugin Factory”)

- Measures disk-to-disk performance
  - Globus / GridFTP
  - FTP
perfSONAR as a Building Block

- pScheduler’s REST API makes every perfSONAR node easy to integrate with your own programs.
  - We measure, you use the results
  - No measurement archive required, no polling and trolling for results
  - Archivers can be used to asynchronously report results

- Developers are already taking advantage of it.
IU GlobalNOC Test Scheduler

• Custom schedule from topology, likely paths and route metrics
  • Limits test traffic on any link to 10 Gb/s
  • Prevents loss/retransmits caused by multiple concurrent tests
  • Shorter testing cycle to detect problems between directly-adjacent sites
  • Less-frequent full-mesh testing
  • Leaves time open for *ad hoc* testing by humans or other systems
• Test traffic can be more-reliably subtracted from link utilization
• In production on Internet2’s internal PAS network
• pSConfig is not being used
pShooter

• Prototype system that automates parts of the troubleshooting process.
• Tests on demand and results through a REST API
• Leverages the pScheduler API to do the measurements
• Intended for integration with other systems (e.g., visual trace)

• Tech talk and demo in the Internet2 Next Generation Infrastructure room Wednesday at 9:50 and Thursday at 11:00.
In Closing

• Lots of change in the last 18 months brings lots of opportunities

• Many sessions in the Advanced Networking track highlight things being done with perfSONAR
In Closing

Many of the best things we’ve done recently have come from our engagement with you and your engagement with us.

Please keep the ideas coming!

Thanks!