The new perfSONAR Scheduler in 4.0

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What is perfSONAR?

- perfSONAR is a tool to:
  - Set (hopefully raise) network performance expectations
  - Find network problems (“soft failures”)
  - Help fix these problems

- All in multi-domain environments
  - 2032 public hosts (as of 2/17, up from 1700 last year) on many different networks
  - [http://stats.es.net/ServicesDirectory/](http://stats.es.net/ServicesDirectory/) [takes a long time to load...]

- These problems are all harder when multiple networks are involved
  - Focus on Research and Education (R&E) Networking, 1Gbps links or higher

- perfSONAR provides a standard way to publish active and passive monitoring data
  - This data is interesting to network researchers as well as network operators

- See Brian Tierney’s talk from AIMS 2016!
Current perfSONAR 3.5 components

- **Measurement tools**
  - iperf3, bwctl, owamp, traceroute, paris-traceroute, etc.
- **Measurement archive**
- **Central test mesh management tools**
- **Host management tools**
  - Configure tests, configure NTP, etc.
- **Data analysis tools**
  - Plot data from the archive
  - Dashboard tools
- **Lookup Service**
perfSONAR 3.5
New in perfSONAR 4.0

• New MeshConfig (G)UI – set up mesh of tests
• MaDDash 2.0 – displaying mesh of results
• Graphs – switched underlying graphing system
  – Dynamically see more information
• CentOS 7 support
• ...and pScheduler
What is pScheduler?

• Software for scheduling, supervising and archiving measurements

• Complete replacement for the Bandwidth Test Controller (BWCTL) as a component of perfSONAR, and how owamp was used
perfSONAR 4.0

Visualization
- Graphs
- MaDDash

Archiving
- Esmond

Scheduling
- pScheduler
  - iperf3
  - iperf
  - ping
  - tracepath
  -traceroute
  - owping
  - powstream
  - OWAMP

Discovery
- Lookup Service Registration

Picture from Andy Lake

Highlighted Improvements

• Visibility into prior, current and future activities
• Measurement diagnostics provided with results
• Full-featured, repeating testing for all measurement types baked into the core of the system
• More-powerful system for imposing policy-based limits on users
• Reliable archiving (with multiple archivers, including RabbitMQ)
Major Improvement: Extensibility

• Plug-in system allows integration of new...
  – Tests  
  – Tools  
  – Archivers
  Things to measure
  Things to do the measurements
  Ways to dispose of results

• Well-documented API
• Brings new applications into the perfSONAR fold
• Core development team doesn’t need to be involved other than in an advisory role
• Opportunity for researchers
Technical Improvements

• Considerably-simplified code base designed for reliability and maintainability.

• REST API to make software-based interfacing to perfSONAR easier (request, cancel, view...)

• Standardized, documented data formats based on JavaScript Object Notation (JSON)
Progress

• Implementation began November, 2015.

• RC3 imminent.

• General availability about one month after.
perfSONAR for Network Researchers

- New ability to add tests to platform; new ways to get data from platform
- Active measurement interesting for network researchers
  - Traceroute data automatically collected along with throughput/latency results
  - TCP retransmits as measured by iperf3
- Data easy to download for analysis [again, with 4.0 Esmond is not the only archiver, but today...]
  - esmond-ps-get-bulk
    - Output CSV or JSON
    - See: https://pypi.python.org/pypi/esmond_client
- Additional Information at: [will be updated after 4.0 GA]
  - http://docs.perfsonar.net/client_apis.html
Closing Thoughts

- pScheduler represents a significant change.
  - Documentation in state of flux before general release
  - We expect there will be some teething pain.
  - We believe the long-term benefits will be worth it.

- The development team welcomes your ideas and feedback.
Mailing Lists...

• Announcement Lists:
  – https://mail.internet2.edu/wws/subrequest/perfsonar-announce

• Users List (developers also monitor):
  – https://mail.internet2.edu/wws/subrequest/perfsonar-users
More Descriptive Information

• perfSonar 4.0 feature tour talk by Andy Lake:
  – http://meetings.internet2.edu/2016-technology-exchange/detail/10004491/ (includes video)

• Introducing pScheduler talk by Mark Feit:
  – http://meetings.internet2.edu/2016-technology-exchange/detail/10004321/ (also includes video)
Useful URLs

- [https://github.com/perfsonar/pscheduler](https://github.com/perfsonar/pscheduler)  
  - [https://github.com/perfsonar/pscheduler/wiki](https://github.com/perfsonar/pscheduler/wiki)
- [http://docs.perfsonar.net/](http://docs.perfsonar.net/) [3.5 as of 3/1/2017; 4.0 at GA]
- [http://www.perfsonar.net/](http://www.perfsonar.net/)
- [http://fasterdata.es.net/](http://fasterdata.es.net/)  
- [https://github.com/perfsonar](https://github.com/perfsonar)  
  - [https://github.com/perfsonar/project/wiki](https://github.com/perfsonar/project/wiki)