perfSONAR Update and Roadmap

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Overview

• 3.3.2 Release Overview
• Current Focus Areas
• Possible Future Focus Areas
perfSONAR collaboration has been re-invigorated

ESnet, Internet2, and Indiana University all committing 1.5 FTE effort to the project

perfSONAR-MDM (EU effort) will be folded into perfSONAR-PS

NSF-sponsored perfSONAR workshop in DC in February
Toolkit Deployment: over 1100 nodes as of Feb 2014
(Note: There is now enough critical mass to be *really* useful)
# Global perfSONAR Deployment*

<table>
<thead>
<tr>
<th>Organization</th>
<th>Number of Domains</th>
<th>Number of perfSONAR hosts</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESnet</td>
<td>1</td>
<td>96</td>
</tr>
<tr>
<td>Internet2</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td>US Regional networks</td>
<td>27</td>
<td>63</td>
</tr>
<tr>
<td>US Universities</td>
<td>69</td>
<td>152</td>
</tr>
<tr>
<td>US Govt/DOE Labs</td>
<td>11</td>
<td>30</td>
</tr>
<tr>
<td>Canada</td>
<td>11</td>
<td>40</td>
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<tr>
<td>South America</td>
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<td>4</td>
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<tr>
<td>Europe</td>
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<td>81</td>
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<td>Asia/Pacific</td>
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</tr>
<tr>
<td>Africa</td>
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<tr>
<td>Commercial</td>
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<td>27</td>
</tr>
<tr>
<td>Unclassified**</td>
<td>-</td>
<td>243***</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>197</strong></td>
<td><strong>802</strong></td>
</tr>
</tbody>
</table>

*Captured from Lookup Service – Sept 6th 2013

***Private Address Space, Lack of DNS records, etc.
perfSONAR Update

perfSONAR-PS 3.3.2 released late February
about 50% of all perfSONAR hosts now running 3.3.2
Includes a few bug fixes, and some security enhancements

iptables now on by default
fail2ban host IDS
updated versions of bwctl, iperf3, and nuttcp
http://psps.perfsonar.net/toolkit/releasenotes/pspt-3_3_2.html
New bwctl features

Bwctl now lets you run any of the following between any 2 perfSONAR nodes:

- iperf3, nuttcp, ping, owping, traceroute, and tracepath

Sample Commands:

bwctl -c psmsu02.aglt2.org -s elpa-pt1.es.net -T iperf3
bwping -s atla-pt1.es.net -c ga-pt1.es.net
bwping -E -c www.google.com
bwtraceroute -T tracepath -c lbl-pt1.es.net -l 8192 -s atla-pt1.es.net
bwping -T owamp -s atla-pt1.es.net -c ga-pt1.es.net -N 1000 -i .01
Iperf3: https://code.google.com/p/iperf/

iperf3 is a new implementation from scratch, with the goal of a smaller, simpler code base, and a library version of the functionality that can be used in other programs.

Some new features in iperf3 include:

• reports the number of TCP packets that were retransmitted and CWND
• reports the average CPU utilization of the client and server (-V flag)
• support for zero copy TCP (-Z flag)
• JSON output format (-J flag)
• “omit” flag: ignore the first N seconds in the results

Sample iperf3 output

iperf3 -c 10.28.0.43
Connecting to host 10.28.0.43, port 5201
[  4] local 10.28.0.11 port 53389 connected to 10.28.0.43 port 5201
[ ID] Interval           Transfer     Bandwidth       Retr   Cwnd
[  4]   0.00-1.09   sec  2.50 MBytes  19.2 Mbits/sec  0    446 KBytes
[  4]   1.09-2.09   sec  18.8 MBytes  157 Mbits/sec  0    3.46 MBytes
[  4]   2.09-3.09   sec  325 MBytes  2.73 Gbits/sec  154  74.9 MBytes
[  4]   3.09-4.09   sec  430 MBytes  3.60 Gbits/sec  1356 39.1 MBytes
[  4]   4.09-5.09   sec  419 MBytes  3.52 Gbits/sec  0    40.6 MBytes
[  4]   5.09-6.09   sec  434 MBytes  3.64 Gbits/sec  0    41.9 MBytes
[  4]   6.09-7.09   sec  454 MBytes  3.80 Gbits/sec  0    42.9 MBytes
[  4]   7.09-8.09   sec  444 MBytes  3.73 Gbits/sec  0    43.8 MBytes
[  4]   8.09-9.09   sec  477 MBytes  4.00 Gbits/sec  0    44.5 MBytes
[  4]   9.09-10.09  sec  468 MBytes  3.93 Gbits/sec  0    45.0 MBytes

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[ ID] Interval           Transfer     Bandwidth       Retr
[  4]   0.00-10.09  sec  3.39 GBytes  2.89 Gbits/sec  1510    sender
[  4]   0.00-10.09  sec  3.32 GBytes  2.83 Gbits/sec    receiver

4/8/14
2 models for perfSONAR deployments

Toolkit Model

Each perfSONAR Toolkit is a testing island

• The Configuration GUIs are focused on configuring the tests that this host should perform

• The Graphing GUIs only display results for tests that this host is performing

(Virtual) Organization Model

Each perfSONAR Toolkit is a part of a group, or multiple groups, of hosts

• Needs to look at the performance of the system as a whole

• Needs to ensure the individual instances are performing appropriate tests
perfSONAR Mesh Configuration

Central description of the “Mesh”
• Contains descriptions of the organizations, sites and hosts involved
• Contains the set of tests to be performed by each host

Each Toolkit is configured to download the central description, and perform the tests that the host has been told to perform
• Regularly, regrab the Mesh description, and update the set of tests to be performed

Benefits
• Allows for centralized configuration
• Enables GUIs that better understand the mesh
• Gives users, and administrators insight into what the mesh should be doing
Current Focus Areas
perfSONAR Roadmap

https://code.google.com/p/perfsonar-ps/wiki/RoadMap

High-level Goals for the perfSONAR 3.4 release (rc1 targeted for June, 2014)

- perfSONAR node Cost Reduction:
  - Support both latency testing and throughput testing on the same host, on separate NICs

- Extensibility and Ease of Use:
  - REST APIs for all components: this will make it much easier for others to extend perfSONAR, and write their own analysis tools
  - New MA for owamp that supports data summarization and queries for historical trends

- Documentation overhaul
  - New CMS-based web site

- Additional Troubleshooting Capabilities:
  - e.g.: ability to collect, store, and plot TCP retransmit/cwnd information.
  - New GUIs for owamp data (overlaid with iperf3 data)

- Enhanced NOC support:
  - ability to do define and manage email alerts.
Possible Future Focus Areas
Under Consideration: Let us know what you think we should focus on

Increase perfSONAR team efficiency:

Enhanced Release Management: utilize automated build/test systems such as OSG uses
automated way to deal with web100/web10G patching

Self-configuring perfSONAR:

when a perfSONAR node is installed, option to auto-join or auto-configure a test mesh
particularly useful for $100 owamp micro-nodes
Under Consideration: Let us know what you think we should focus on

Increased value for network research community

new REST APIs will help, but need better client APIs, documentation, and process to integrate researcher code

Firewall Friendly

reduce the number of perfSONAR ports required

Support for Users that don’t have admin rights to their machines

is there a way to install the tools as a regular user?

Ability to add additional tests to bwctl

  e.g.: GridFTP
Under Consideration: Let us know what you think we should focus on

perfSONAR for layer 2/OpenFlow networks
- lots of open questions on how to best to this

What else? Open discussion
perfSONAR Community

The perfSONAR collaboration is working to build a strong user community to support the use and development of the software.

perfSONAR Mailing Lists

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

• Users List:
  – https://mail.internet2.edu/wws/subrequest/perfsonar-users
perfSONAR Update

Questions/Comments?

http://www.perfsonar.net