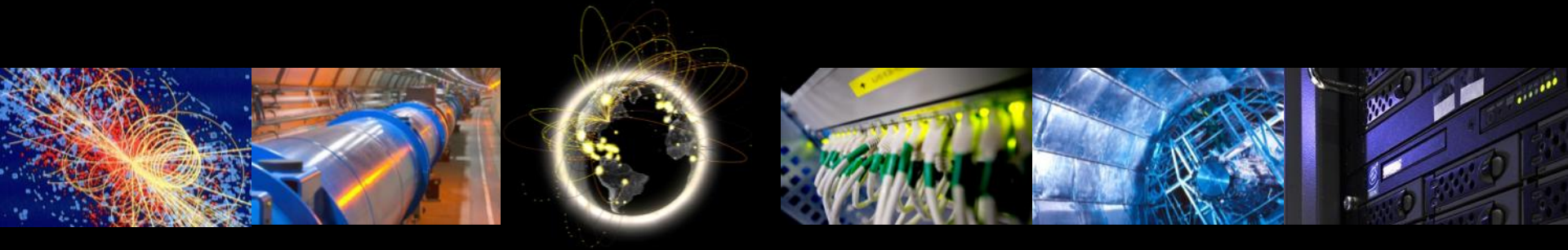


Network and Transfer WG Metrics Area Meeting

Shawn McKee, Marian Babik

Network and Transfer Metrics Kick-off Meeting
26^h November 2014



Outline

- Status and progress in perfSONAR
 - T2.1 Commissioning/Operations
 - T2.2 Storage
 - T2.3 Configuration
- Metrics area
 - T1.1: Gather requirements and use cases
 - T1.2: Review existing transfer and network metrics
 - T1.3: Determine current test coverage
 - T1.4: Topology mapping

Actions from last meeting

- ALL: Send comments and suggestions on the proposed list of topics/tasks and on the way WG will be organized
- ALL: Volunteer to lead tasks in the metrics area (T1s)
- Julia: Send a list of topics concerning xRootD tasks to the WG. To be discussed with WLCG OPS Coordination
 - Separate meeting held on the topic – agreed to follow up on status of GLED deployment and support
- Marian: Setup WG JIRA and report to WLCG OPS coordination every 2 weeks on the status of ongoing tasks.
 - JIRA at <https://its.cern.ch/jira/browse/METRICS>
 - WLCG OPS Reports at <https://twiki.cern.ch/twiki/bin/view/LCG/NetworkTransferMetrics#Reports>
- Marian, Shawn: Prepare abstract for CHEP2015 (done)



Network Monitoring Status perfSONAR

perfSONAR ops

- perfSONAR 3.4 released Oct 14th
- Restructuring support and operations
 - Introduced site-level support via GGUS
- Rewritten documentation
 - <https://twiki.opensciencegrid.org/bin/view/Documentation/DeployperfSONAR>
- Responded to ShellShock and Poodle
 - Sites advised to terminated their instances
 - Performed security audit and established security procedures
- Testing and validation of the new perfSONAR central configuration
- perfSONAR 3.4 update campaign
 - Includes migration to the new configuration system
 - Security considerations documented
 - Progressing well (111 sonars updated out of 214)
 - Deadline 8th January

perfSONAR config and store

- Deployed in OSG production
- Introduces central interface to reconfigure the entire network
 - All aspects – tests parameters, mesh participation
 - List of available sonars taken from GOCDDB and OIM
 - Supports hierarchical support model (per mesh admins)
 - Web interface
 - Connected to OSG crawler and perfSONAR infrastructure monitoring
- Site reconfiguration needed to adopt
 - Run as part of 3.4 campaign
- perfSONAR data store
 - Deployed in OSG ITB – several major issues fixed
 - Scale tests on-going this week
 - Operationally ready for production



perfSONAR metrics

Metrics and Their Use

- We gather a number of metrics:
 - Topology/path-information via traceroute
 - One-way delay via OWAMP
 - Packet-loss via OWAMP
 - Usable bandwidth via BWCTL
- WLCG perfSONAR coverage
 - http://grid-monitoring.cern.ch/perfsonar_coverage.txt
- ESnet has some nice pages on using perfSONAR to identify problems
 - <http://fasterdata.es.net/performance-testing/evaluating-network-performance/>
- Some examples from Jason Zurawski follow

Traceroute

- Traceroute is fundamental to any of the other metrics. Without it we don't know what path was being measured. In the toolkit:

psTracerouteViewer v2

performance
ps
toolkit

perSONAR Services

- Local Services
- Global Services

View Test Results

- Throughput / Latency Graphs
- Traceroute Graphs

External Tools

- Reverse Ping
- Reverse Traceroute
- Reverse Tracepath
- Traceroute Visualization

Toolkit Administration

- Configure Tests

Scheduled Tests Configuration

Save Reset

Scheduled Tests

- GOC Latency Tests
- Traceroute Test Between WLCG Latency
- USATLAS Latency Mesh Test
- USATLAS Traceroute Test
- USATLAS/WLCG Intercloud Latency M
- perSONAR Toolkit Default Tracerout

Add New Throughput Test Add New

Save Reset

Measurement Archive:

Start Time:

End Time:

Timezone:

Select endpoints available on <http://localhost/esmond/perfsonar/archive/>

Do not de-duplicate results

Topology beginning at Sun Nov 23 09:26:08 2014 (UTC -5)

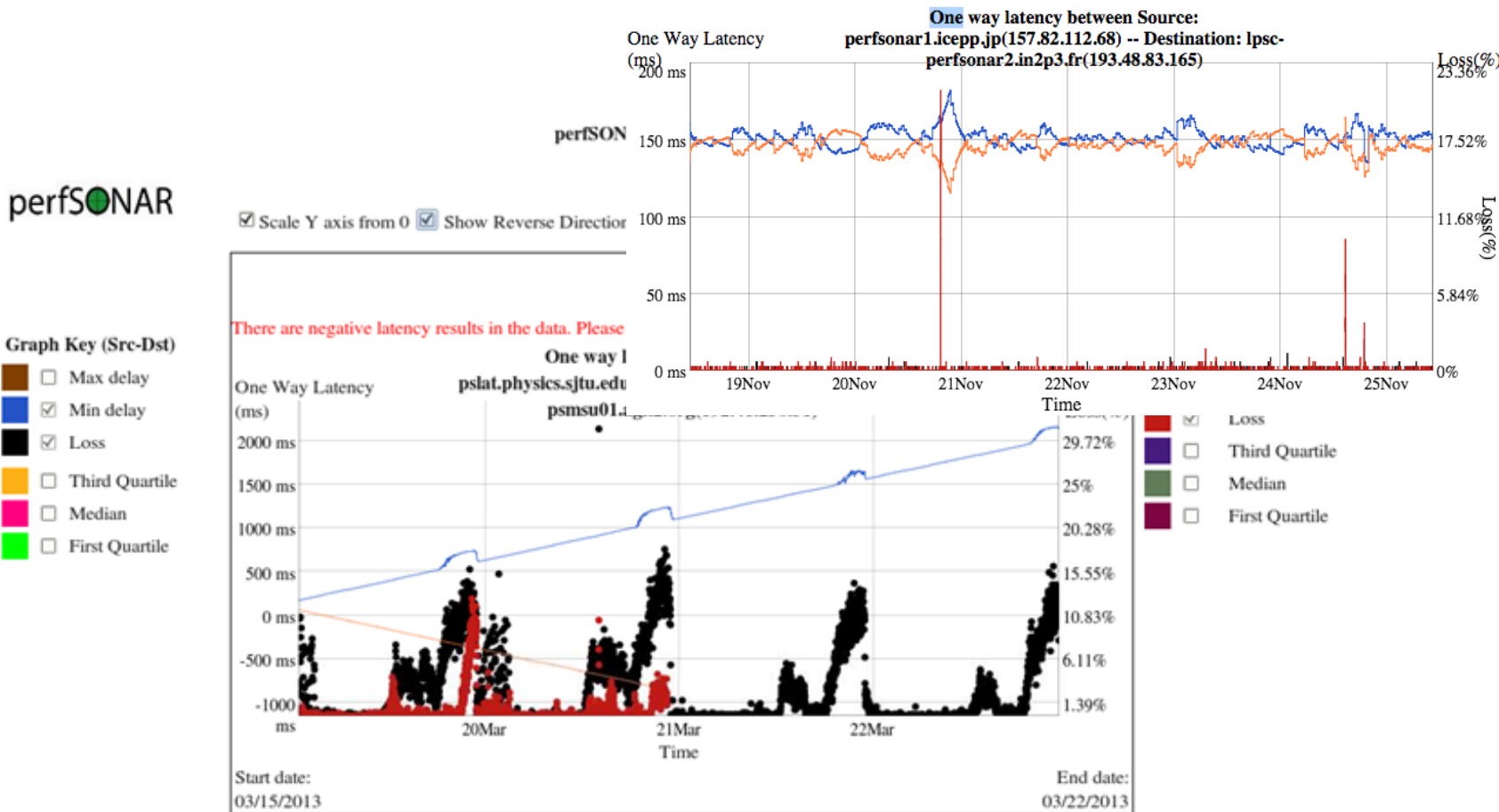
Hop	Router	IP	Delay	MTU
1	gw35.roma1.infn.it	141.108.35.254	1.877ms	
2	172.25.25.1	172.25.25.1	11.753ms	
3	ru-infn-rm1-t2-lhccone-rx1-rm2.rm2.garr.net	193.206.131.17	1.364ms	
4	rx1-rm2-rx1-bo1.bo1.garr.net	90.147.80.45	10.778ms	
5	garr-lhccone-gw.gen.ch.geant.net	62.40.126.202	9.977ms	
6	geant-lhccone-gw.mx1.gen.ch.geant.net	62.40.126.201	17.251ms	
7	xe-0-3-3.2020.rtr.chic.net.internet2.edu	64.57.30.134	128.425ms	
8	64.57.30.154	64.57.30.154	132.95ms	
9	psum01.aglt2.org	192.41.230.59	133.034ms	

Network

Meeting

OWAMP: Overloaded Link

Example of a campus with an overloaded uplink to the WAN. You can see daily overloads as campus gets busy each day



<< 4 hours

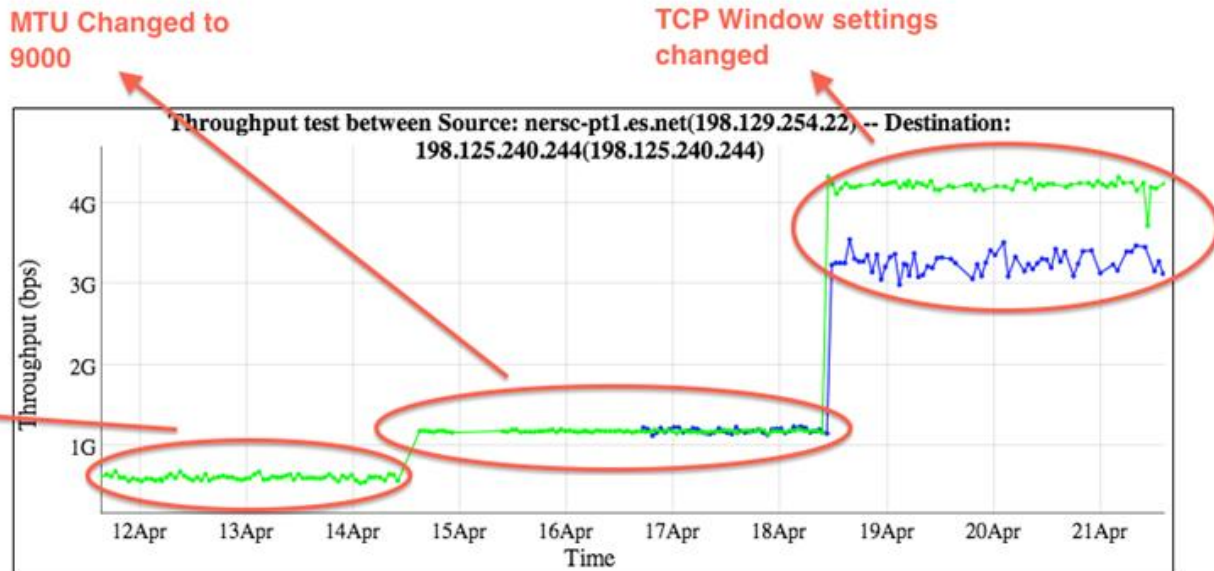
Bandwidth (iperf)

perfSONAR measures usable bandwidth

Bandwidth changes as MTU and window setting adjusted

perfSONAR

perfSONAR BWCTL Graph



<- 1 month

10s BWCTL TCP Testing

1 month ->

Timezone: GMT-0400 (EDT)

MTU = 1500 on
10G Host

MTU Changed to
9000

TCP Window settings
changed

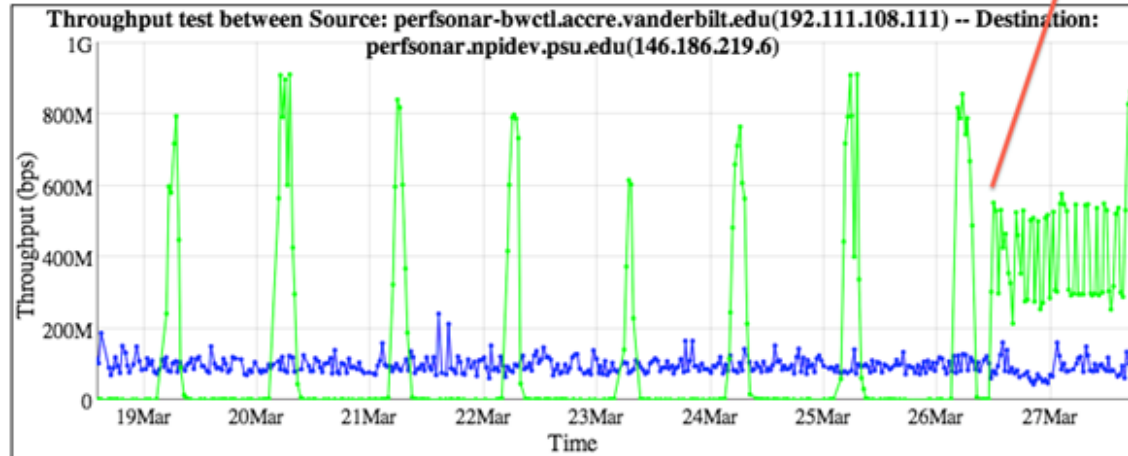
Bandwidth: Bad vs Good Routing

perfSONAR

perfSONAR BWCTL Graph

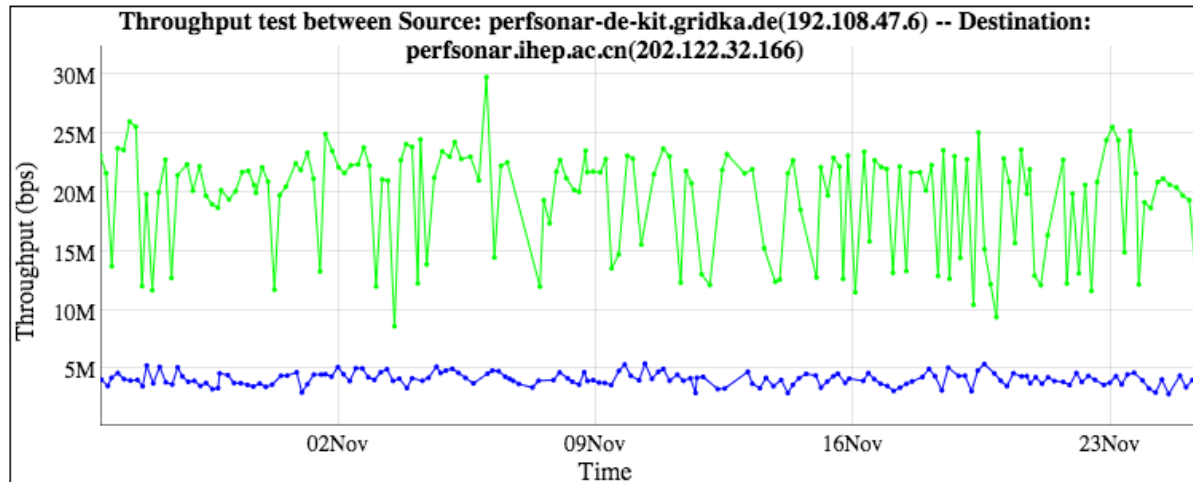
← Shortest path between the two went over commodity →

BGP local Pref changed to prefer Internet2 over Cogent

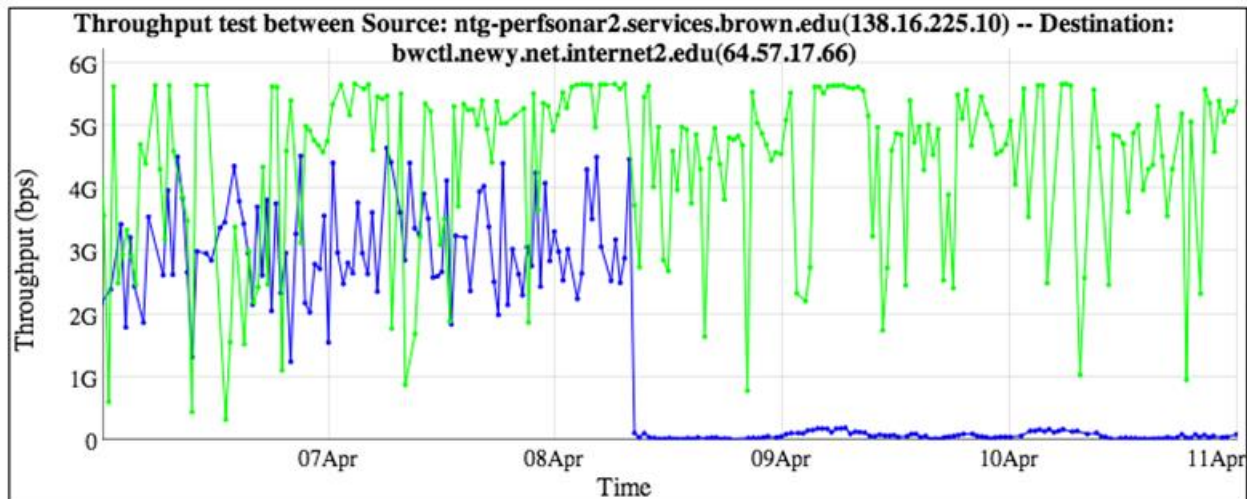


<- 1 month

1 month ->



Drastic BW Change



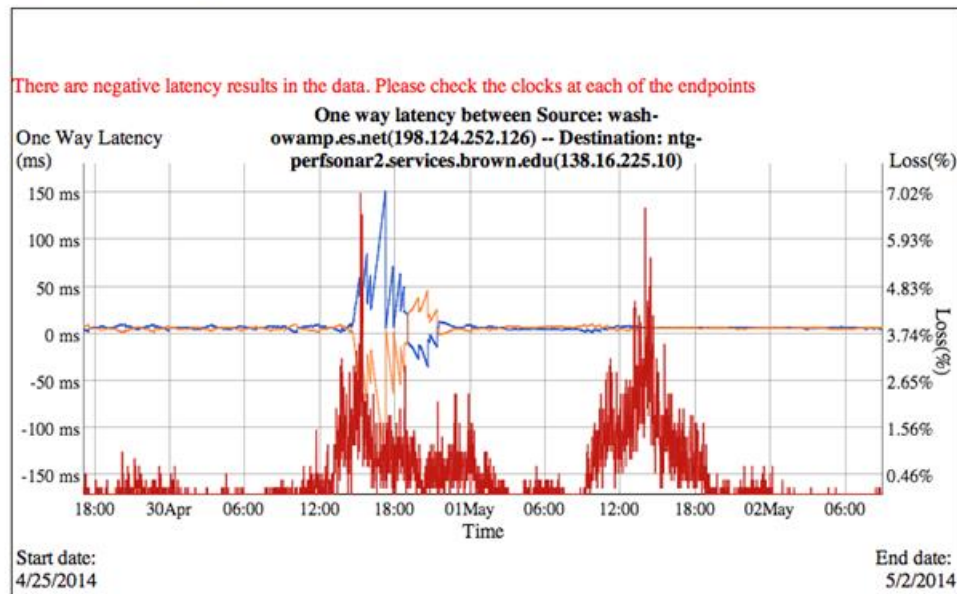
Graph Key

- Src-Dst throughput
- Dst-Src throughput

Scale Y axis from 0 Show Reverse Direction Data

[<- 1 month](#)

- Spikes of packet loss, almost always during business hours
- Function of the load on the line/time of day
- This was traced to **regional network**



S

Timezone: GMT-0400 (EDT)

Key Messages about Metrics

- The monitoring infrastructure is sensitive for a reason – so that it finds the problems in all layers of the OSI stack.
- End-to-end data transmission (or just about any other use case) suffers because of a problems that may be unseen or not understood.
- Understanding comes from learning to use the tools, learning to trust them, and having universal availability.
- Comprehensive solutions will save time in the end



Metrics Area

Questionnaire

- Available as Google document
 - <https://docs.google.com/document/d/1ceiNITUJCwSuOuvbEHZnZp0XkWkwkPQTQic0VbH1mc/edit?usp=sharing>
- Asking for your input
 - FTS, FAX, PhEDEx, Rucio, PanDA by Dec 5
 - Experiments by Dec 12
- Next year
 - Strawman – important to receive initial input on coverage, test characteristics, etc.
 - Regular meetings next year
 - 28 Jan, 18 Feb, 18 March, 8 Apr (all at 4pm CEST)

AOB

- Shawn at CERN next week
 - perfSONAR office on Thursday (4th Dec)



Backup

iperf INFN PIC

Source: **perfonar-ps.cnaf.infn.it** - 131.154.254.11
Capacity: Unknown MTU: Unknown

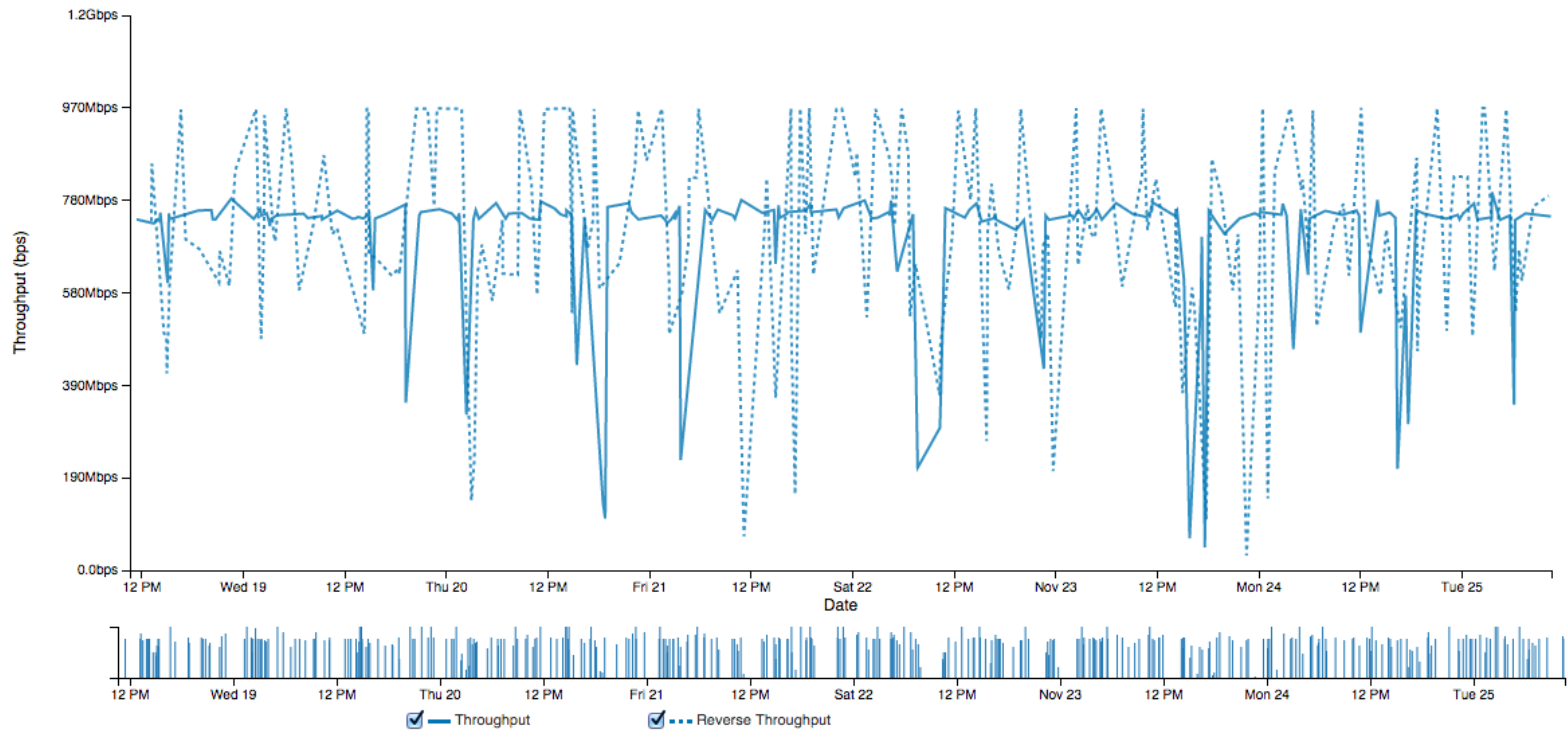
Destination: **psb01.pic.es** - 193.109.172.187
Capacity: Unknown MTU: Unknown

[Link to this chart](#)

Zoom: 1d 3d 1w 1m 1y

Previous 1w

Tue Nov 18 10:34:45 2014 -- Tue Nov 25 10:34:45 2014



owamp+iperf INFN PIC



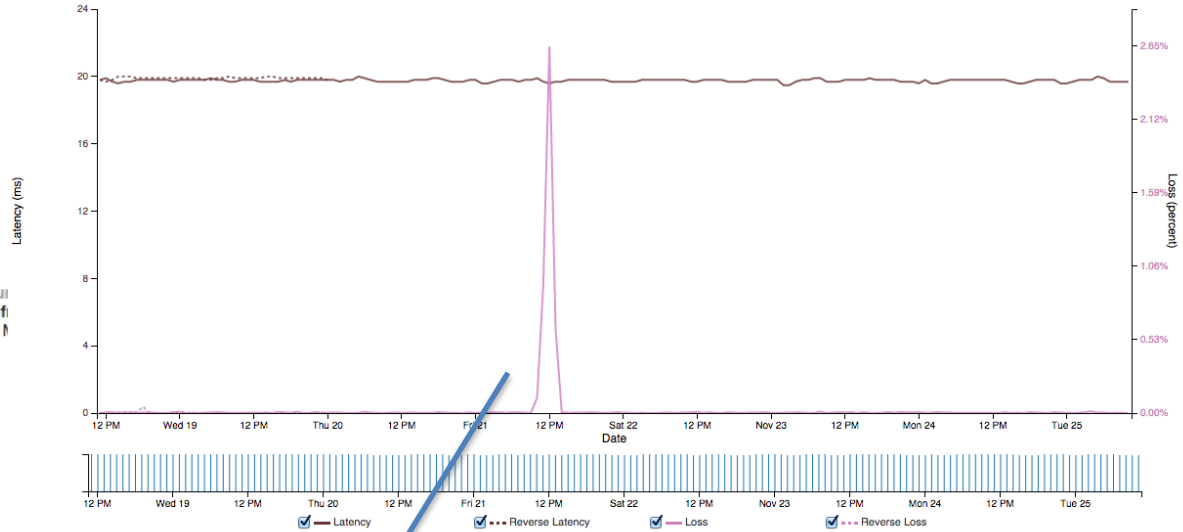
Source: **psi01.pic.es** - 193.109.172.188
Capacity: Unknown MTU: Unknown

Destination: **personar-ow.cnaf.infn.it** - 131.154.254.12
Capacity: Unknown MTU: Unknown

[Link to this chart](#)

Zoom: 1d 3d 1w 1m 1y

Previous 1w Tue Nov 18 10:31:21 2014 -- Tue Nov 25 10:31:21 2014



Source: **personar-ps.cnaf.infn.it**
Capacity: Unknown

Previous 1w

