perfSONAR Small Nodes in GÉANT

Antoine Delvaux (antoine.delvaux@man.poznan.pl)

GÉANT SIG PMV Meeting 2016

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Agenda

- What is perfSONAR
- Why Small Nodes?
- Limitations
- Small Nodes in GÉANT
- Performance troubleshooting
- Project future

What is perfSONAR?

- Network measurements toolkit
  - active: latency (owd + rtt), throughput, loss, traceroute
  - measurements on links or on full paths
  - runs on linux (CentOS and Debian)
  - CLI tools and web interface
- Single domain or across domains measurements
- Open Source Project: http://github.com/perfsonar

Small Nodes?

- Many different experimentations
  - cheap deployments and small form factor
  - more deployments, more useful perfSONAR is
- Early trials
  - Very cheap HW: Cubox, Beaglebone, Raspberry Pi, …
  - ARM based challenging (no CentOS support)
- Survey amongst users

Small Nodes!

- Inexpensive but with known capabilities:
  - 1 Gbps with enough RAM and disk space
- perfSONAR project official support from 3.5 onwards
  - Debian support (easier for ARM devices)
  - Improved central management
- Cost target: € 200
  - Many different hardware choices

Examples

- Intel NUC kit
- ASUS Chromeux
- Liva I/X/X2
- Gigabyte BRIX
- Zotac BOX
- Servers Direct/Supermicro

Limitations

- Single NIC:
  - Other traffic perturbing measurements
  - No wire speed measurements
- CPU, RAM, disk space:
  - Limited throughput
  - Low number of measurements
  - Limited storage space
- NTP stability

Limitations: what to look at

- CPU power, RAM (8 GB preferred), Multiple NIC
- Disk space (or use central server)
- Form factor (rack mount, durability, …)
- You get what you pay for…
- But newer, better, always coming soon!

So this replaces large server?

- No, not really.
- Still need to have larger boxes with more memory, higher speed, warranties, stability
- Useful for custom and numerous deployments or as starters' boxes

Small Node in GÉANT

- Enable people to have first hand experience with perfSONAR
  - Help with easy and useful setup
- 6 months project with
  - provided hardware
  - central server and support
- Launched at TNC2016

Measurements

- Upstream connectivity
  - to 5 GÉANT Measurement Points (MP)
    - throughput and latency
    - IPv4 and IPv6
  - Between small nodes if interest and agreement
- Central server (storage and dashboard) run by GÉANT
- Can add own measurements, experiment themselves

Automatic Setup

- Deployed in the core of the network
- Node comes preconfigured
  - Give IP address
  - Define responsible contact and organisation
  - Ready to run!
- Automatically participates to a mesh of measurements around Europe

Requirements to participate

- Belonging to the R & E community
- Being part of a networking team, service or research group
- Identified responsible person to sign agreement
- Priority given to GÉANT Service Area organisations
- Node remains property of GÉANT
- Launched at TNC2016
  - perfSONAR on Low Cost Hardware BoF

Hardware: Gigabyte BRIX

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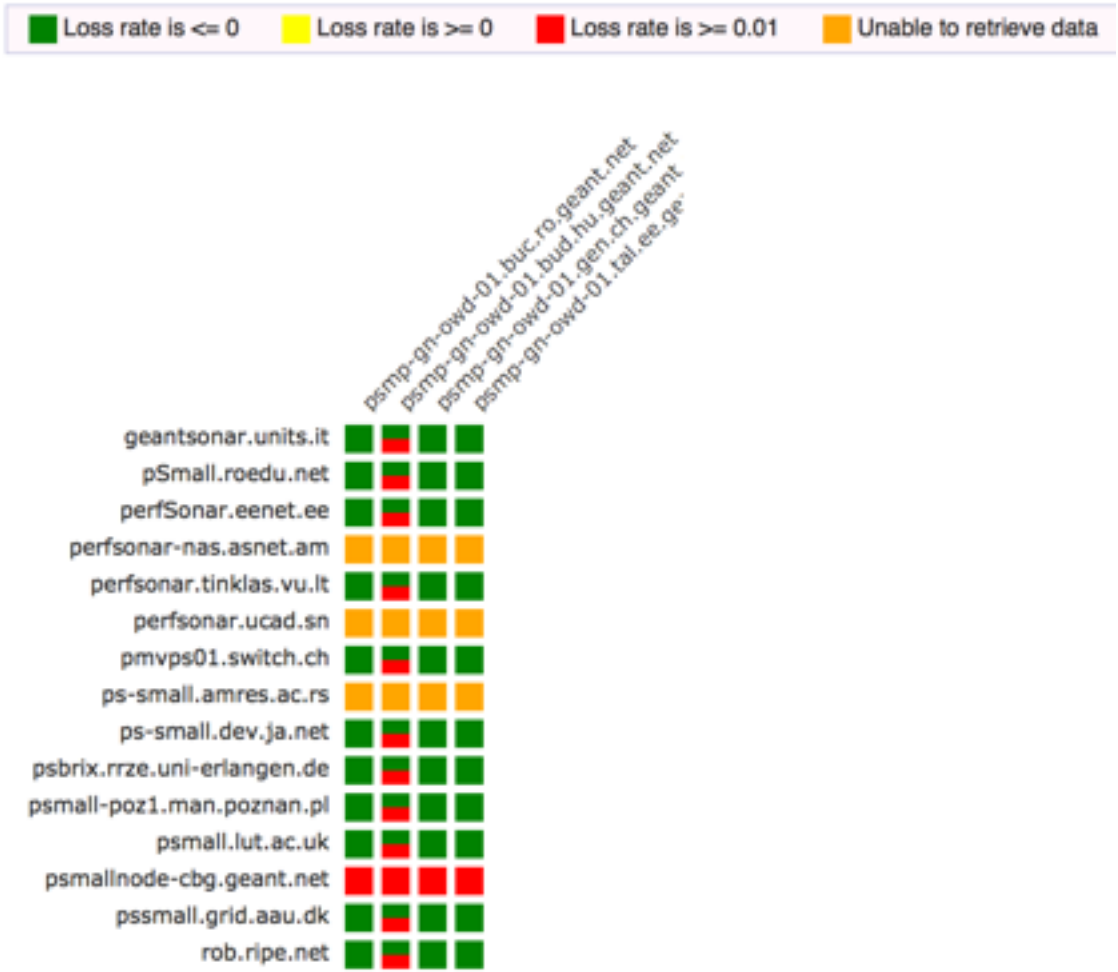
Performance troubleshooting

Performance troubleshooting

- Some difficulties
  - Node location
  - IPv6
  - Firewall setup

pSmall-GEANT - IPv4 loss

perfSONAR



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  - Link speed

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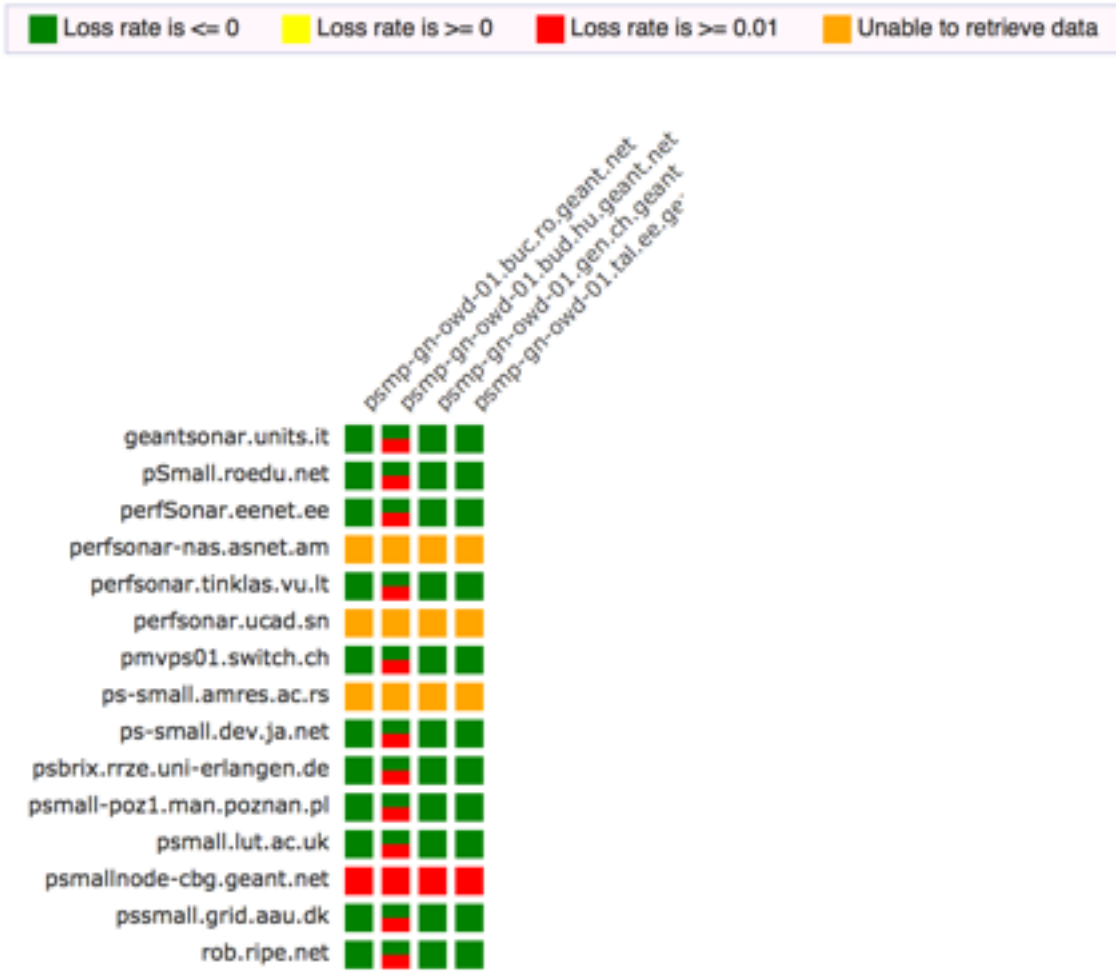

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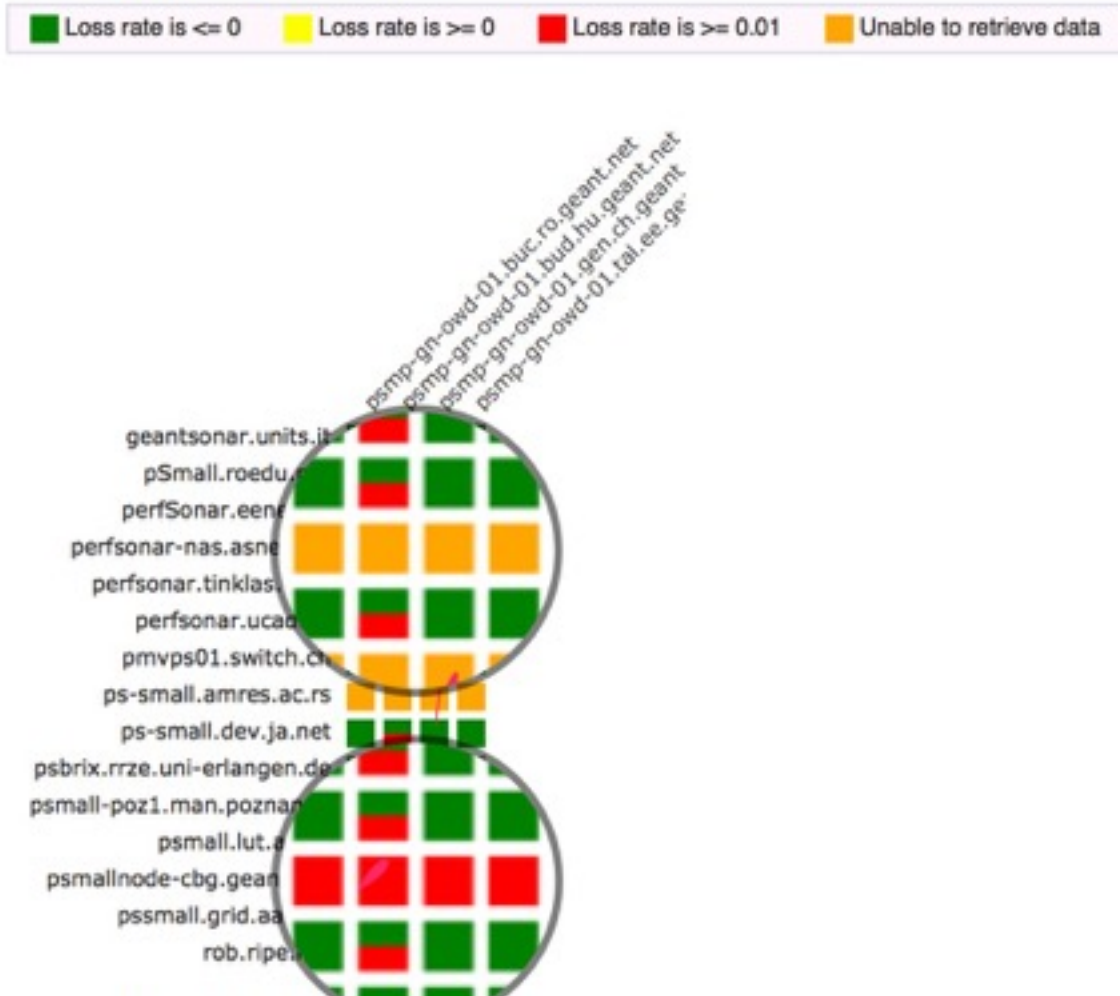
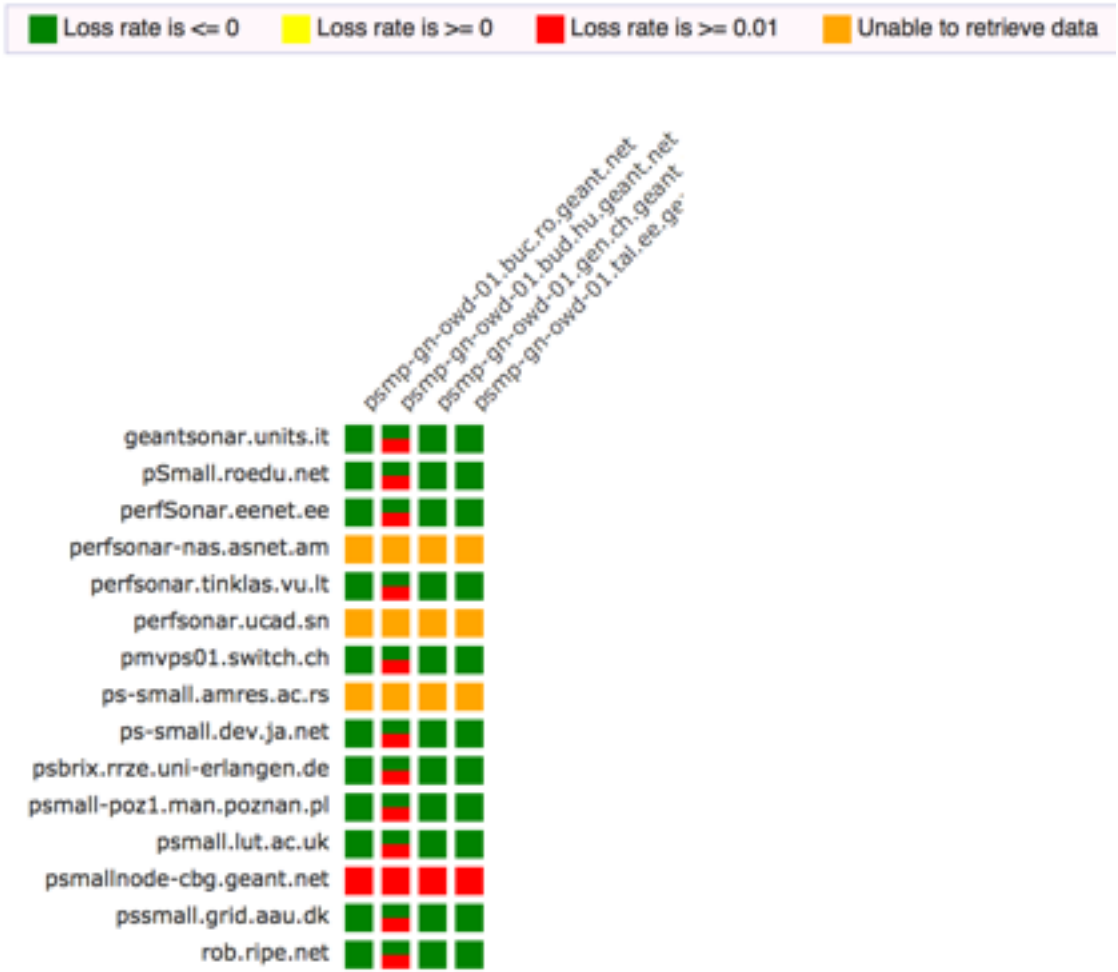


Performance troubleshooting

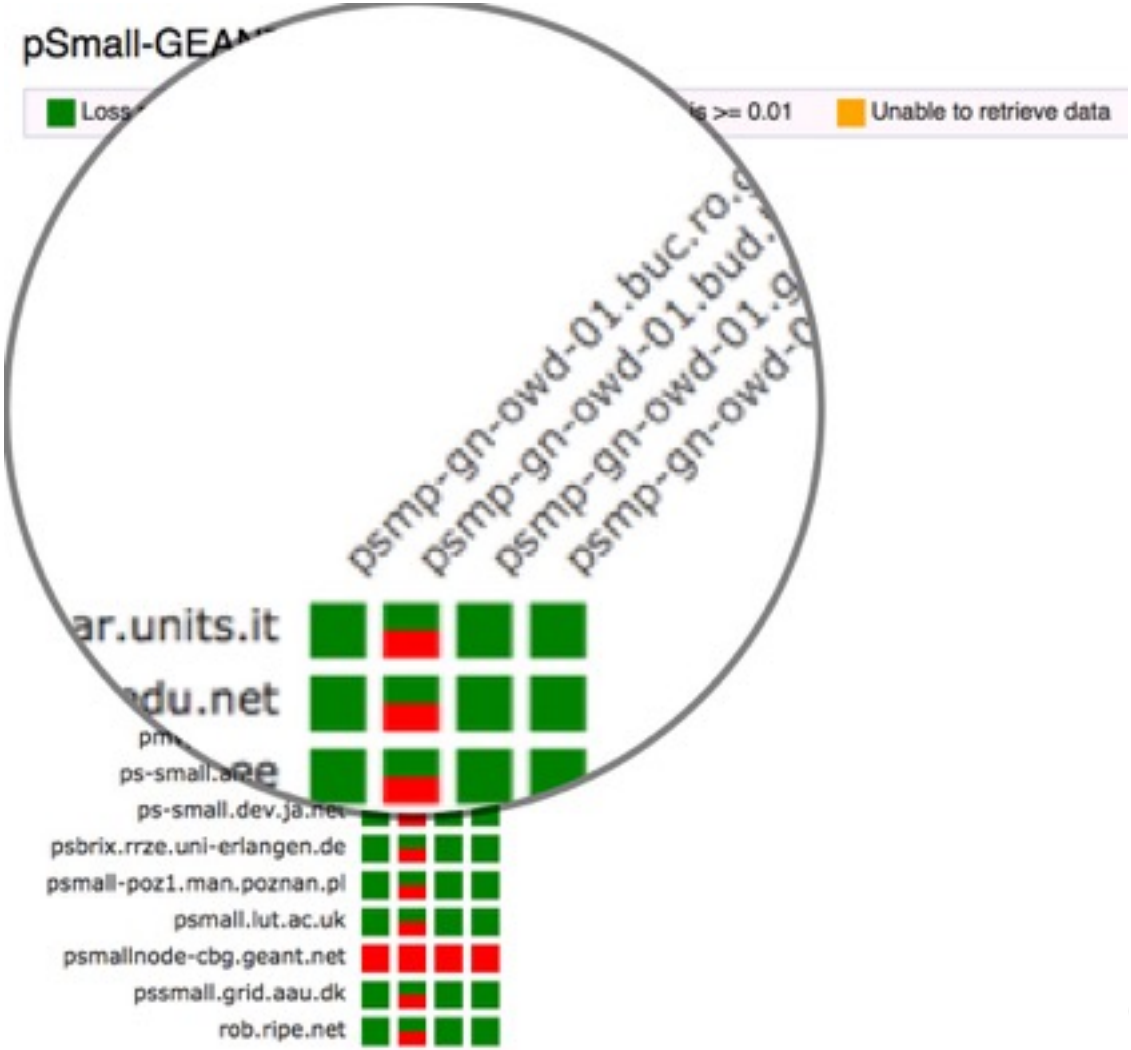
- Some difficulties
  - Node location
  - IPv6
  - Firewall setup
- Local misconfigurations
  - Firewall
  - Link speed
- Local performance issues
  - Upstream link packet losses

pSmall-GEANT - IPv4 loss

perfSONAR



perfSONAR


pSmall-GEA
Loss
>= 0.01
Unable to retrieve data
psmp-gn-owd-01.buc.ro.
psmp-gn-owd-01.bud.
psmp-gn-owd-01.g
psmp-gn-owd-0
ar.units.it
du.net
ps-small.ac.ee
ps-small.dev.ja.net
psbrix.rrze.uni-erlangen.de
psmall-poz1.man.poznan.pl
psmall.lut.ac.uk
psmallnode-cbg.geant.net
pssmall.grid.aau.dk
rob.ripe.net

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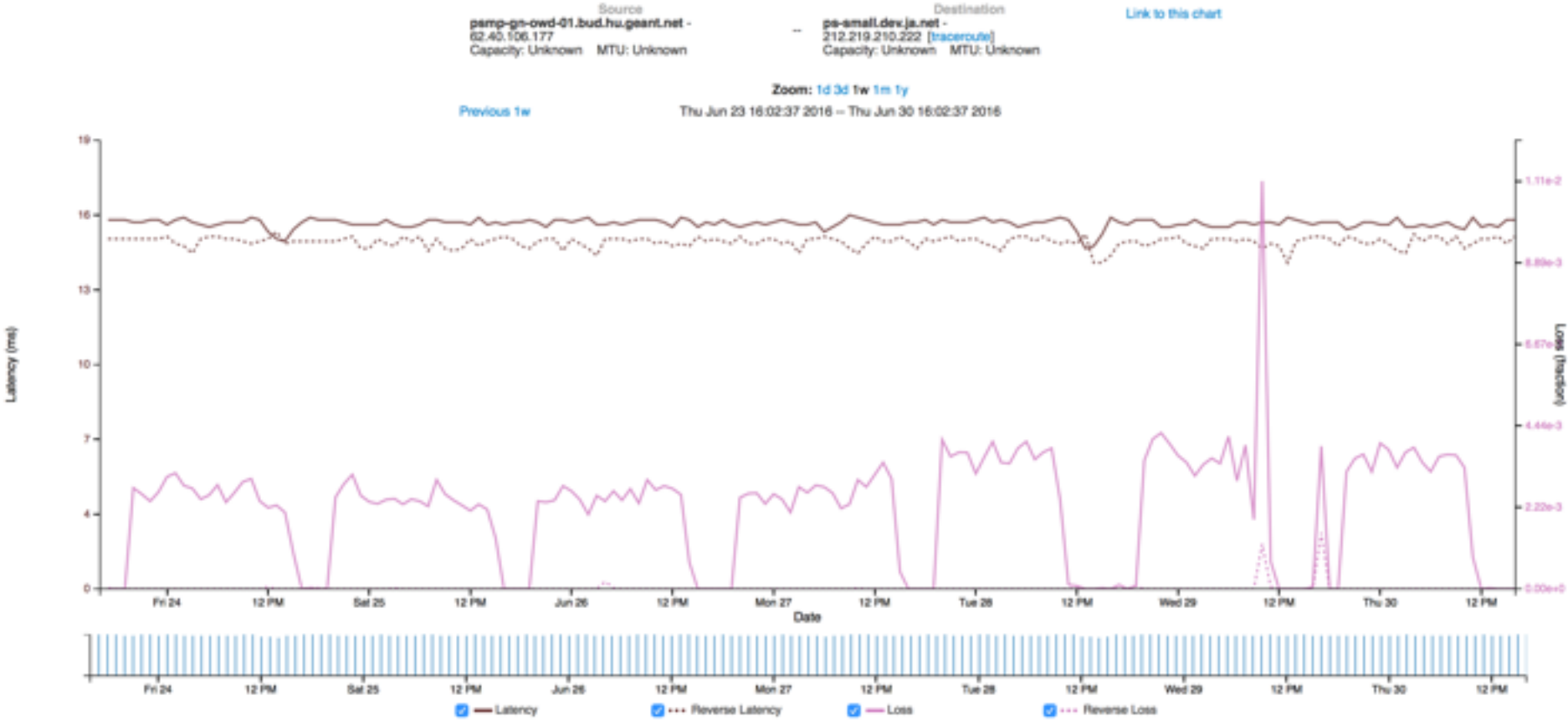
Budapest MP losses



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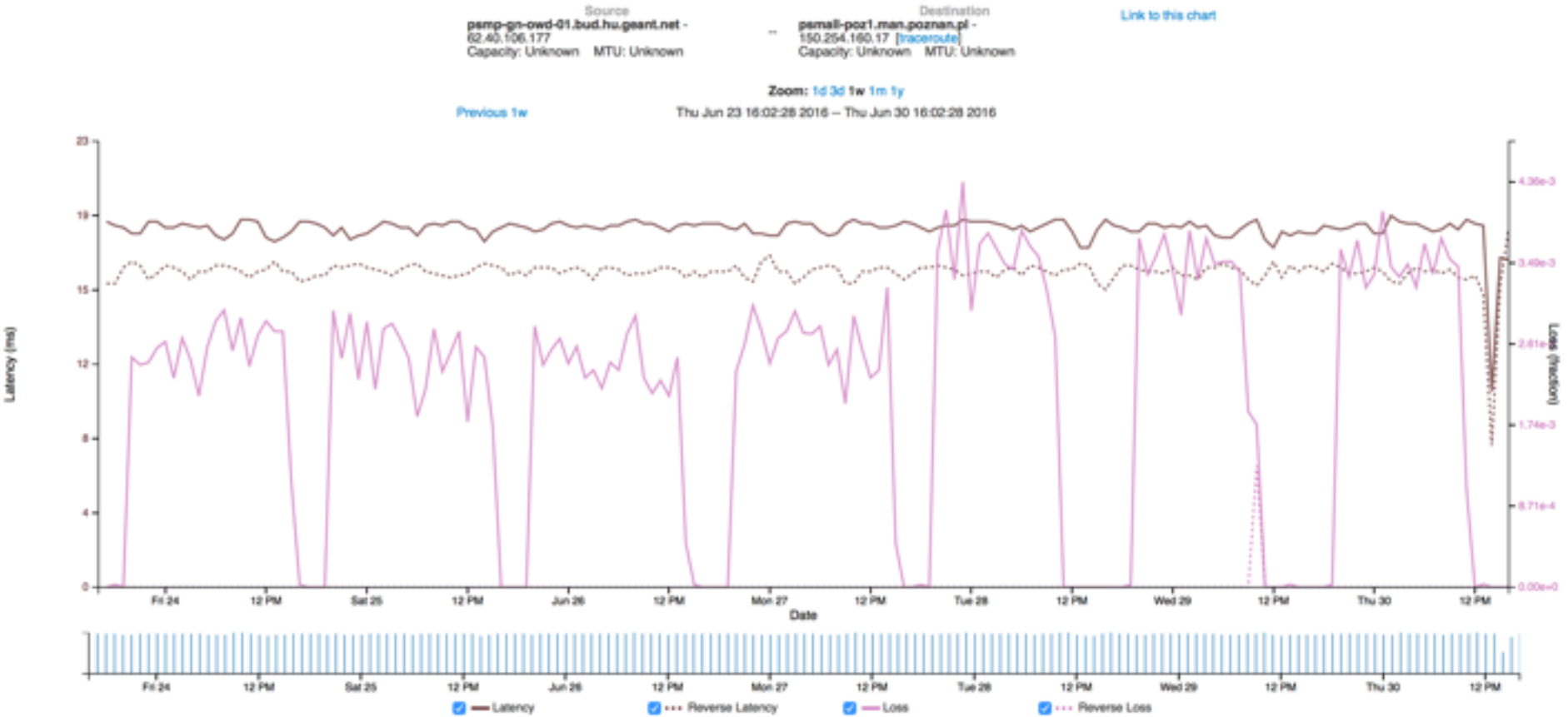

Interesting case: Budapest GÉANT MP

- Periodic losses daily
  - Small amount: ~0.3 % packets loss
  - But at very regular intervals

perfSONAR

Budapest MP throughput

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  - But at very regular intervals
- Throughput drop: 1Gbps to less than 100 Mbps
- Investigated with GÉANT Ops
  - Backup or large file transfer occurring
  - Switch buffers too small

eduPERT workshop

- Tomorrow
- Workshop will cover:
  - the mesh definition
  - the MP configuration
  - the central server configuration
  - and more if time permit
- Join us!

Project future

- Participants survey: 9 answers out of 20
- Trends
  - mainly running mesh only measurements
  - big interest to have more GÉANT managed small nodes (8/9)
  - Interest to run small nodes themselves (7/9)
  - Small interest in fully fledge pS server (5/9)
  - Interest in running their own mesh (5/9)
  - Would you recommend the pSmall project to others? **Yes!** (9/9)

Questions? Comments? Suggestions?

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