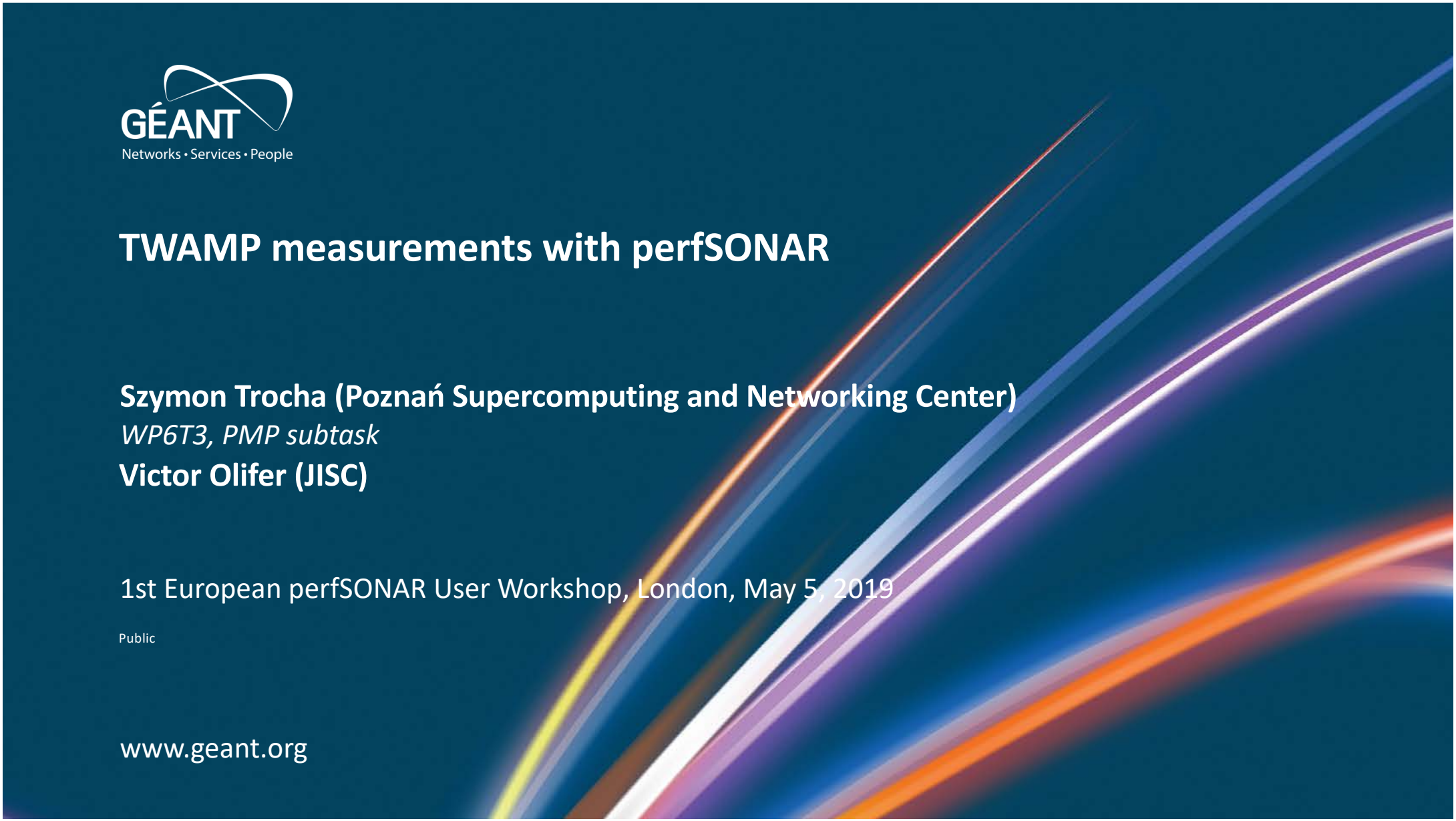

TWAMP measurements with perfSONAR

Szymon Trocha (Poznań Supercomputing and Networking Center)
WP6T3, PMP subtask
Victor Olifer (JISC)

1st European perfSONAR User Workshop, London, May 5, 2019

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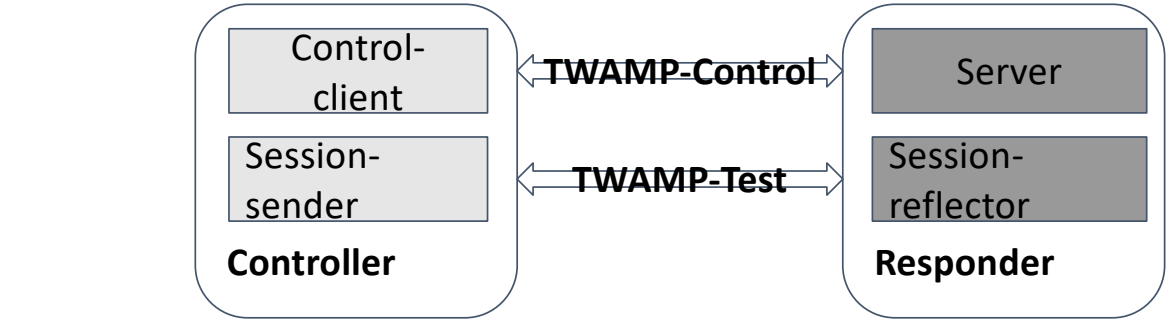
- Introduction to TWAMP
- perfSONAR architecture
- TWAMP implementation in perfSONAR
- Application scenarios for TWAMP
- TWAMP graphs
- Practical testing
- Resources

What is TWAMP?

- **T**wo **W**ay **A**ctive **M**easurement **P**rotocol
  - Based on RFC 5357

- OWAMP-based
- Active measurement to measure two-way measurements
- Typically doesn’t require hosts clock synchronisation
- Implemented by some major network devices vendors
- Used to measure performance over IP routed networks
  - SLA verification

Key elements of TWAMP

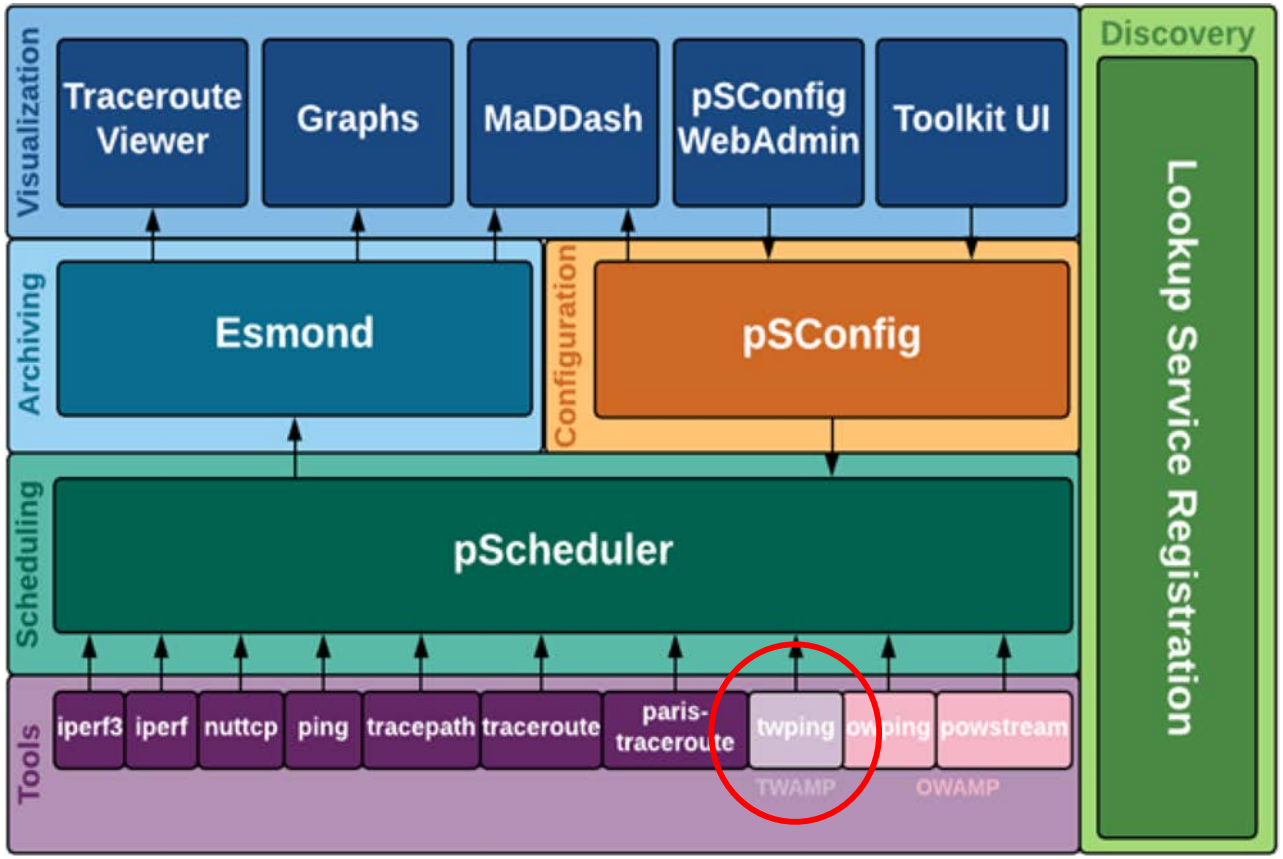


TWAMP-Control:
- Connection setup

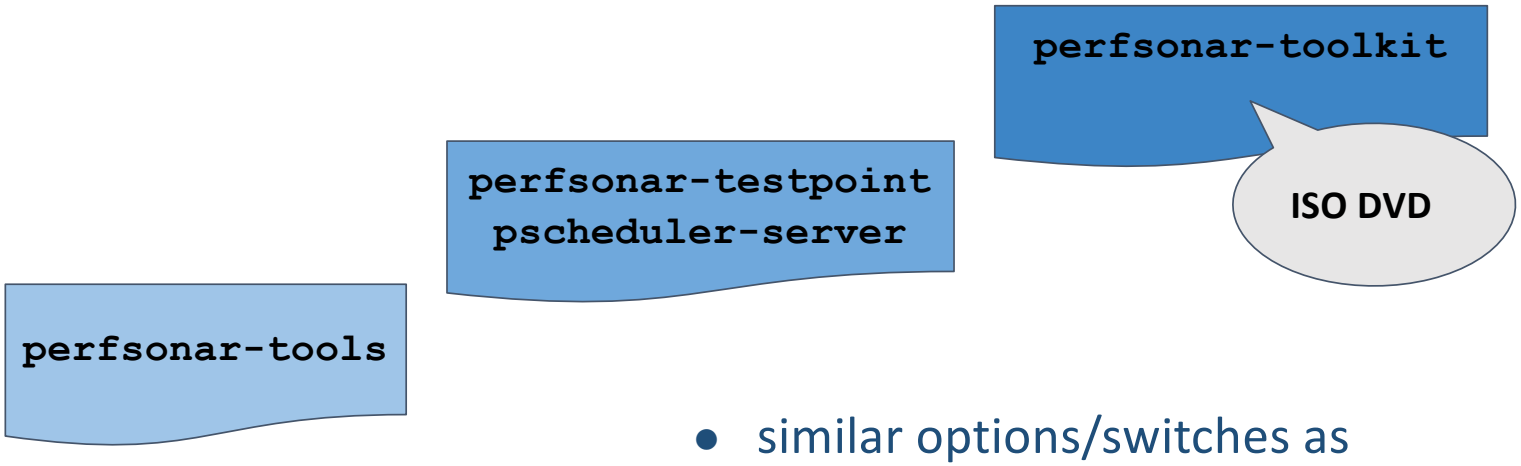
TWAMP-Test:
- Session-sender: sends/receives test packets
- Session-reflector: sends back a measurement packet when received

TWAMP-Control:
- Terminate connection

perfSONAR architecture



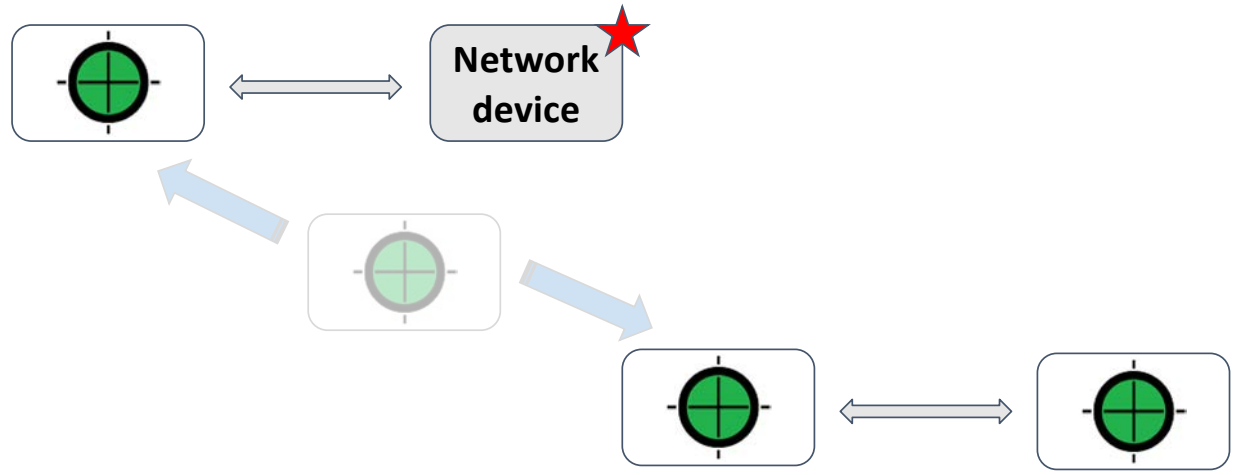
Implementation in perfSONAR



- twampd
  - server process
- twping
  - client
- owstats
  - analyse measurement session

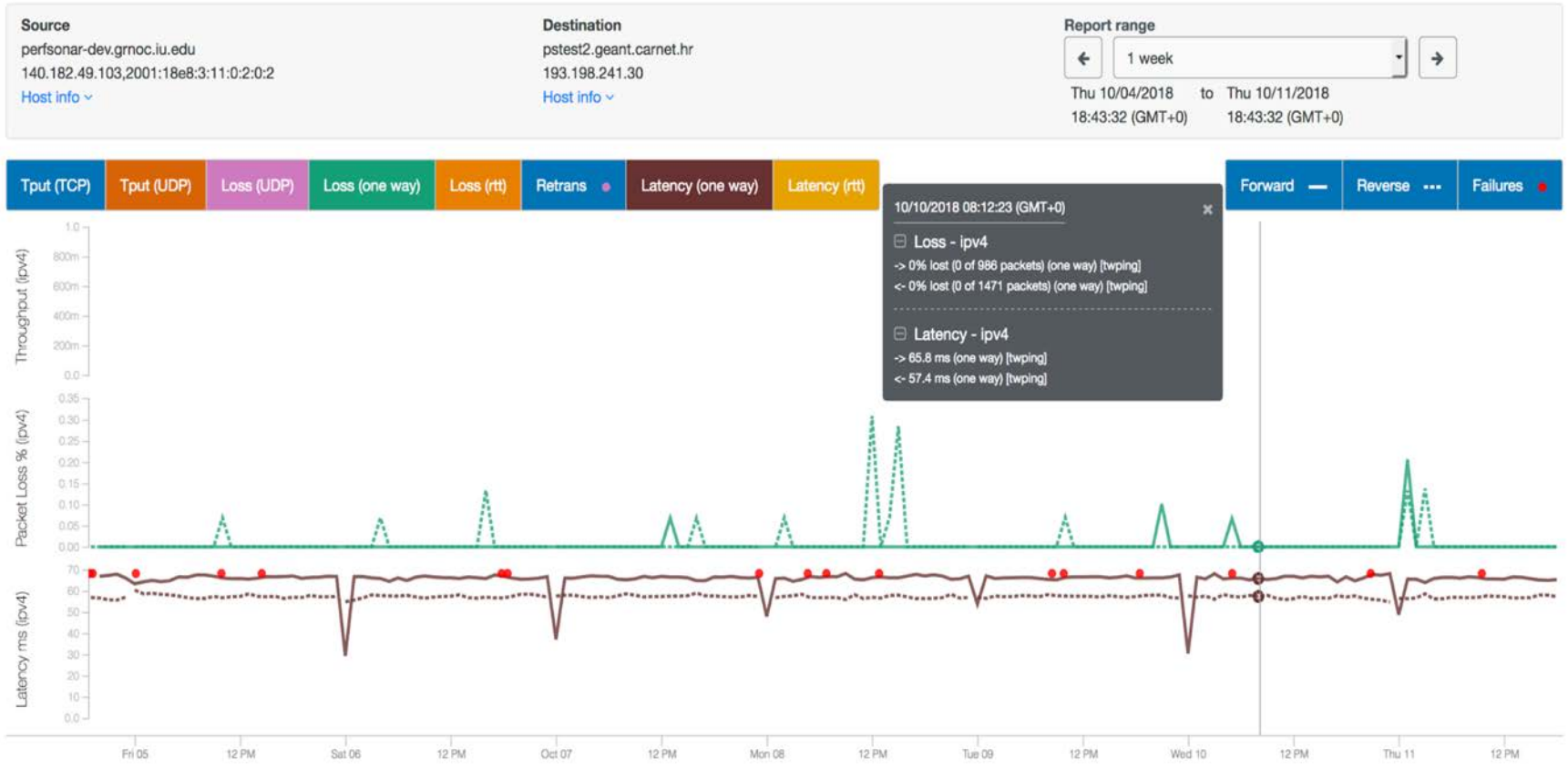
- similar options/switches as OWAMP binaries
  - Single source code base
  - same version number
- man pages
- integration with pscheduler
- integration with psconfig

Application scenarios

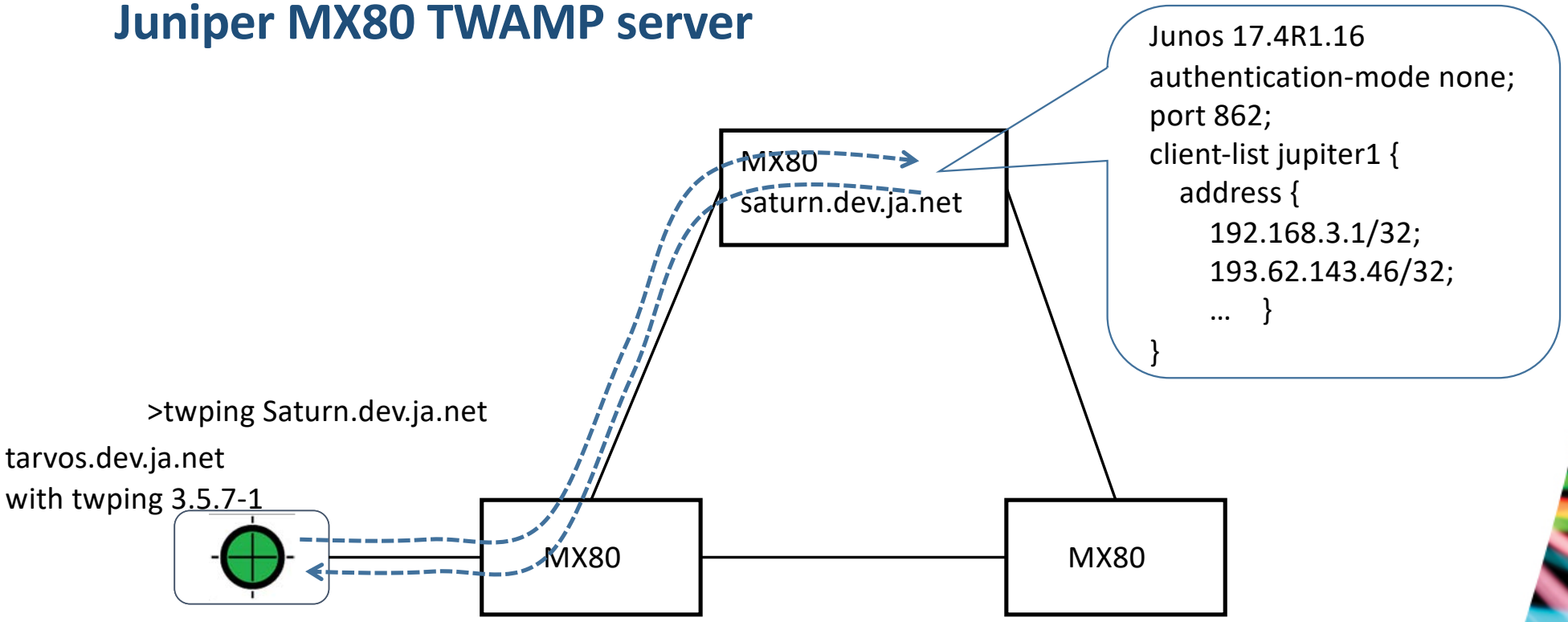


Some vendors support only the Reflector side of TWAMP (Server)

TWAMP visualization



Testing and Debugging perfSONAR TWAMP client against Juniper MX80 TWAMP server



Initial result was negative:

[st-admin@tarvos ~]$ twping saturn.dev.ja.net

> twping: FILE=capi.c, LINE=796, Server denied test: saturn.dev.ja.net

> twping: FILE=owping.c, LINE=228, Session Failed!

Two reasons of session rejection had been found:

1. Twping didn't clear bytes in IP address extension field reserved for IPv6 address when sends IPv4 address
   - We found out it with Valentin Vidic (CARnet) comparing the succesfull session perfSONAR twping <– >perfSONAR TWAMP server vs. failing perfSONAR twping – Junos twamp server
   - It was fixed by perfSONAR TWAMP developers but…

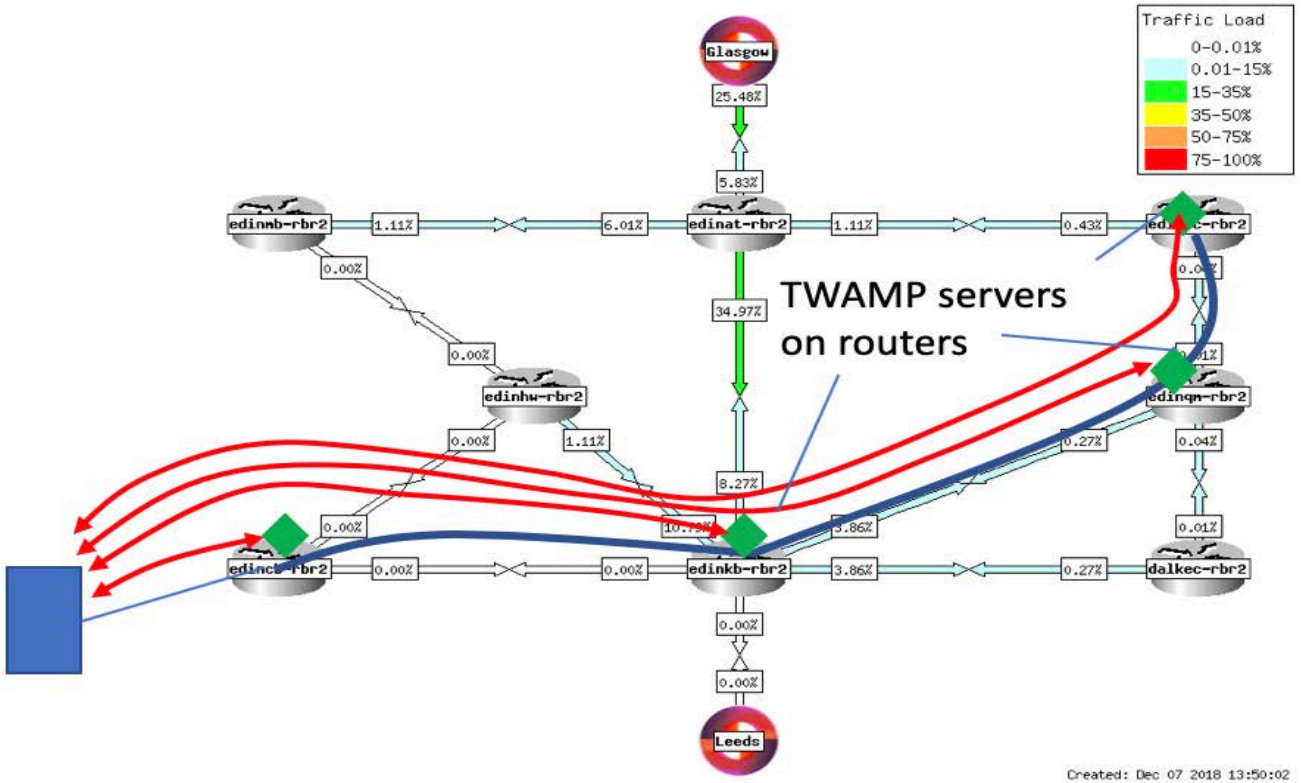
2. Junos doesn't support TWAMP server on management port fxp0 (no mention in Junos manuals)
   - Assigned the public IP address to data interface ge-0/0/1 – success!

Successful test from Poznan perfSONAR twping to Janet TWAMP server

```
geantadmin@psmall-poz2:)~$ twping 193.63.63.42 -v
    >    Approximately 12.1 seconds until results available
    >
    >    --- twping statistics from [193.63.63.42]:9621 to [psmall-poz2.man.poznan.pl]:9621 ---
    >    SID:       c13f3f2adf674acb804ee7c413c167d0
    >    seq_no=0          fwd_delay=17.7 ms bck_delay=16.2 ms delay=33.9 ms proc_delay=0.0401 ms   (err=1.14 ms)
    >    seq_no=99         fwd_delay=17.9 ms bck_delay=15.9 ms delay=33.9 ms proc_delay=0.073 ms    (err=1.14 ms)
    >
    >    --- twping statistics from [193.63.63.42]:9621 to [psmall-poz2.man.poznan.pl]:9621 ---
    >    first:     2018-10-09T17:42:04.604
    >    last:      2018-10-09T17:42:14.191
    >    100 sent, 0 lost (0.000%), 0 send duplicates, 0 reflect duplicates
    >    round-trip time min/median/max = 33.7/33.9/34.1 ms, (err=1.14 ms)
    >    send time min/median/max = 17.5/17.7/18.8 ms, (err=0.568 ms)
    >    reflect time min/median/max = 14.9/16.2/16.5 ms, (err=0.568 ms)
    >    reflector processing time min/max = 0.03/5.72 ms
    >    two-way jitter = 0.1 ms (P95-P50)
    >    send jitter = 1 ms (P95-P50)
    >    reflect jitter = 0.2 ms (P95-P50)
    >    send hops = 12 (consistently)
    >    reflect hops = 12 (consistently)
```

WP6 T3 plan to investigate use of perfSONAR twping <-> TWAMP server on Junos & Cisco for fault localization

TWAMP client on host – fault localization



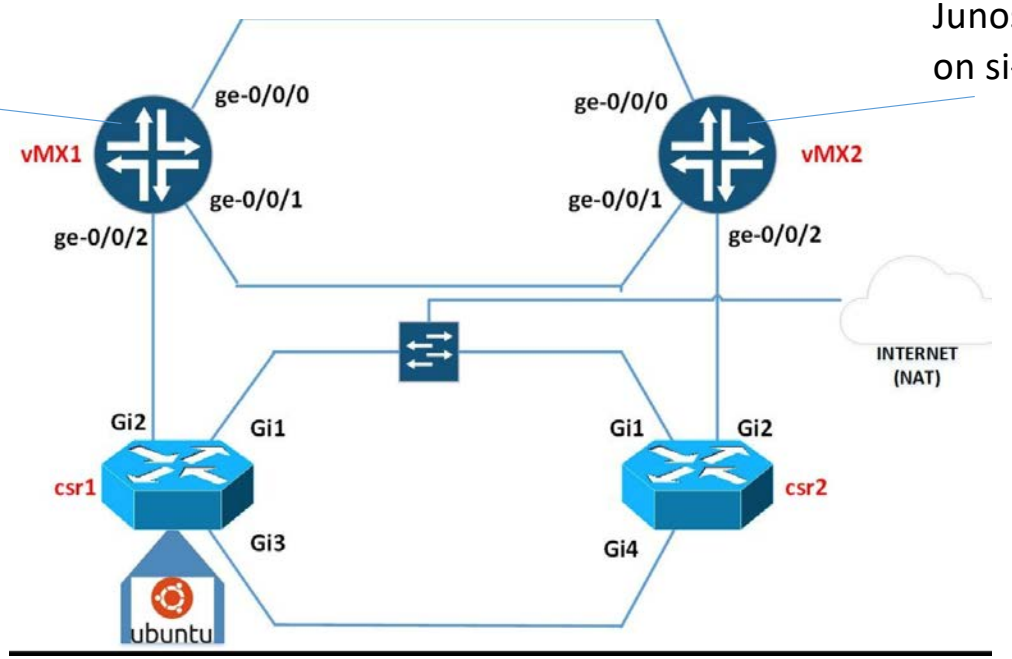
pShooter – similar idea but localization limited to nearest perfSONAR host

Embedded TWAMP agents work on Juniper vMX too

(WP6 T3 set up on GEANT GTS, tested by Nemanja Nincovic)

Junos tw client:
on si-0/0/0

Junos tw server:
on si-0/0/0



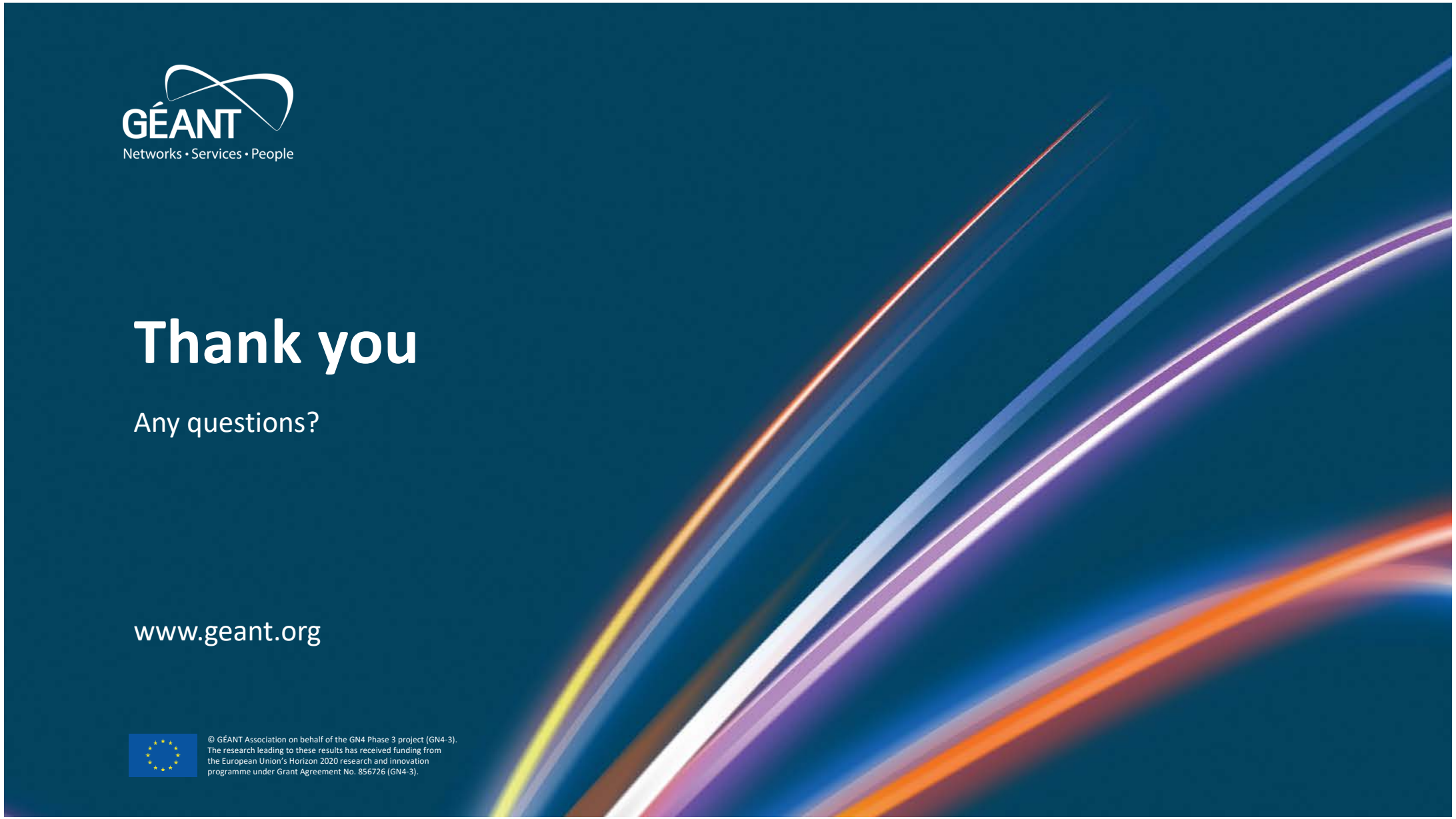

```
root@vmx2# run show services rpm twamp server
Connection  Client           Client  Server           Server   Session  Auth
ID          address          port    address          port     count    mode
         7  60.60.60.1        53129  70.70.70.1          862         1  Unauthenticated
```

Additional resources

```
man twping
```

- http://docs.perfsonar.net/
- http://www.perfsonar.net/about/getting-help/

- YoutTube channel
  - https://www.youtube.com/perfSONARProject/



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