



# perfSONAR

Delivering flexible and high-speed performance measurements

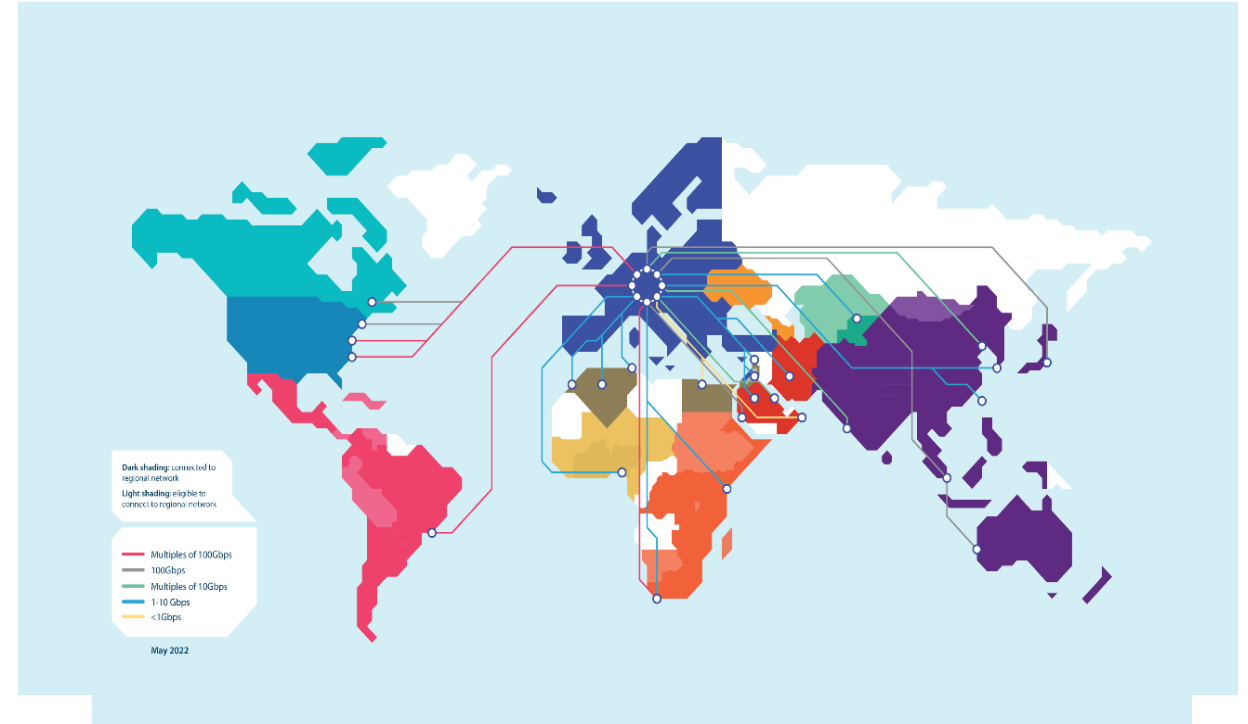
Szymon Trocha, PSNC  
PMP service manager

34th STF, Dublin, Ireland

25-26 February 2025

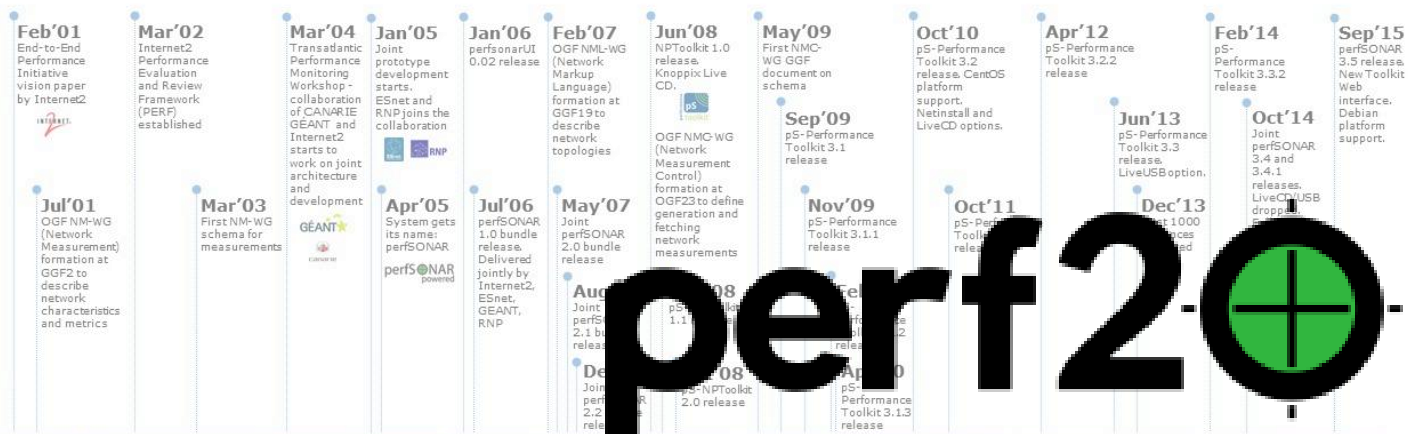
## Multi [-domain | -NREN ] environment

- Efficient and reliable data exchange is crucial
- Network users and operators must have efficient way to troubleshoot network performance problems
- perfSONAR automatically tests and monitors networks



# Happy Birthday!

## perfSONAR HISTORY TIMELINE 2001 - 2015



## perfsONAR HISTORY TIMELINE 2016 - present

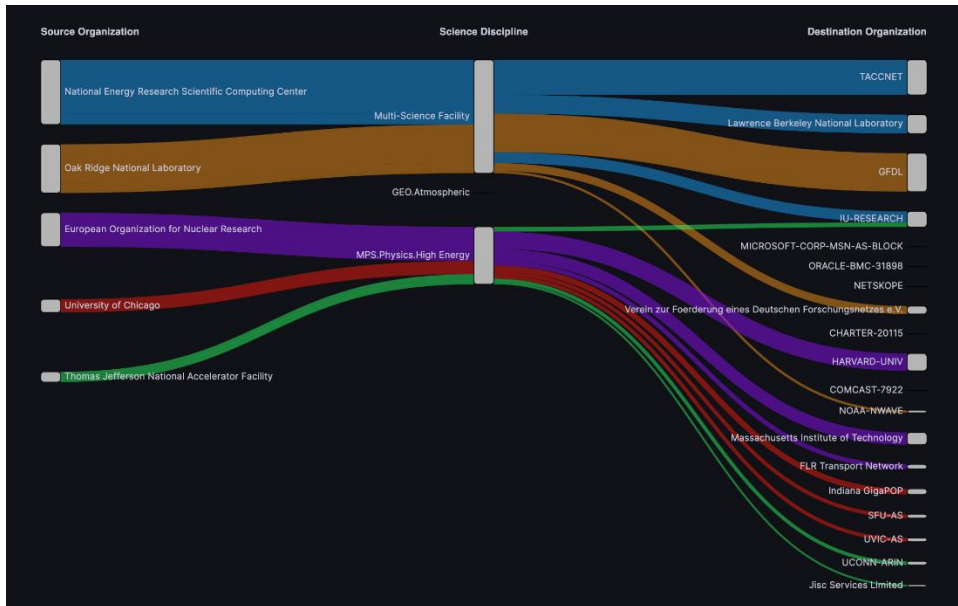
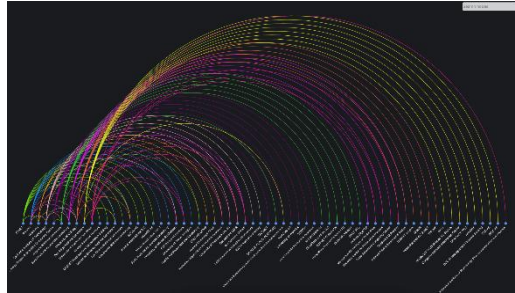
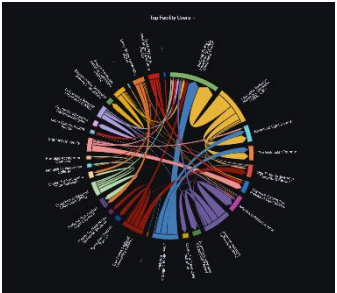


# perfsONAR 20 years

## Better troubleshooting through new perfSONAR features

- Threaded iperf3 support
  - Ability to test at 100Gbps+
- Test plugins to support wide range of tests
  - WiFi BSSID (returns a list of BSSIDs for the given SSID)
  - 802.1X authentication (tests authentication to a WiFi network with 802.1X)
  - HTTP, DNS, DHCP response time
- Troubleshooting tools for easy system maintenance
  - pscheduler troubleshoot
  - psarchive troubleshoot

## Better visibility through new perfSONAR features



- New analysis and integration capabilities through **OpenSearch** - the backend measurement storage database
- Better presentation and integration with other data through **Grafana** dashboards
- Customizable visualization and **custom plugins** (by NetSage and Esnet)



## PMP service approach to perfSONAR deployment



Multidomain



Selection of organizations and critical points in the network



Comprises of different equipment



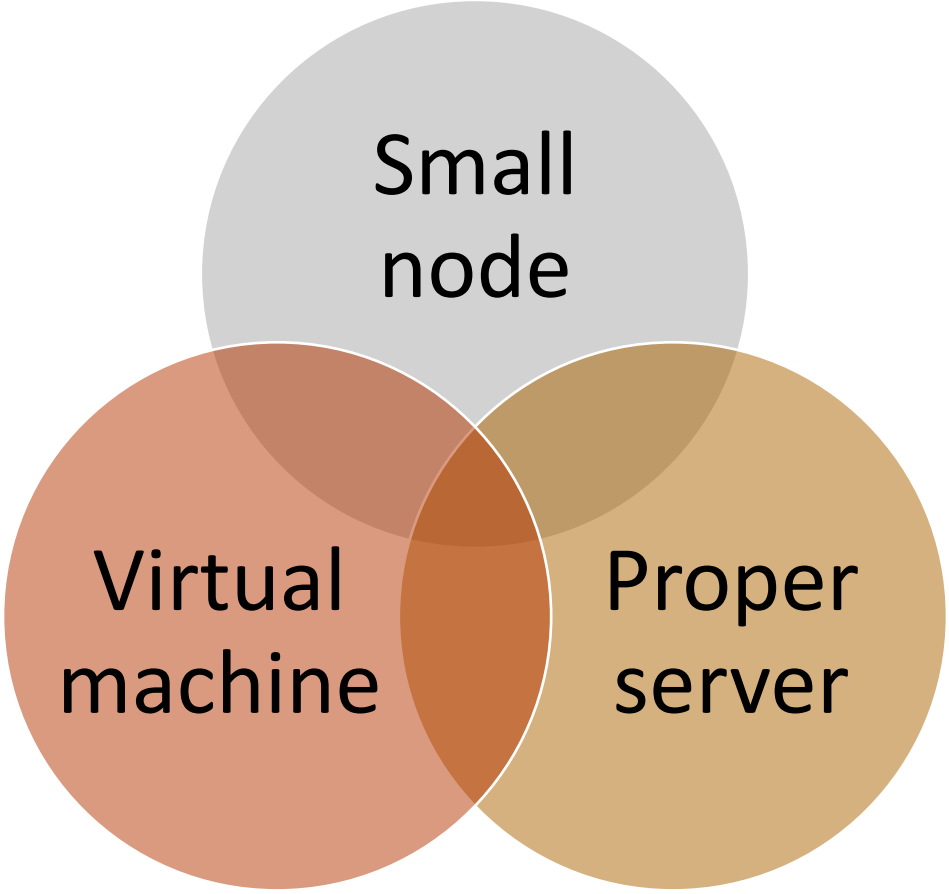
Hosts managed by local party and different people



Central parts

**NOTE: Your host may be part of **multiple meshes****

# PMP deployment models



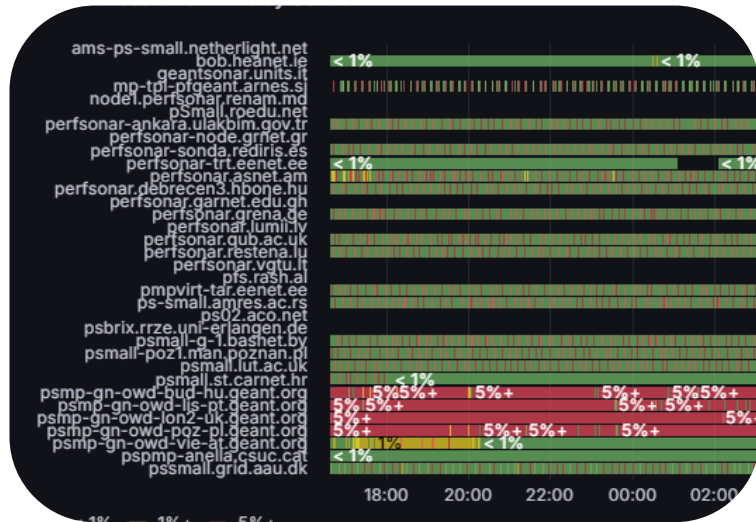
## Evolution of PMP service

- New central instance
- Opensearch replaces old Esmond MA
- Grafana replaces old Maddash
- Migration to the new server
- Ansible scripts migration

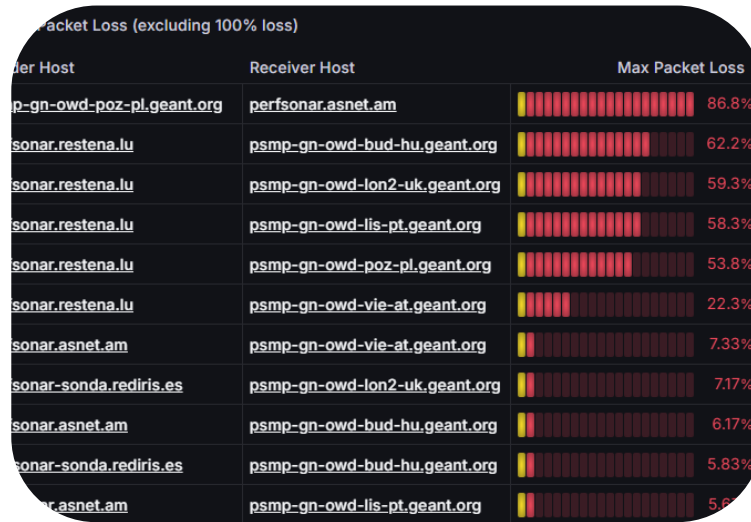
<https://pmp-archive.geant.org/>



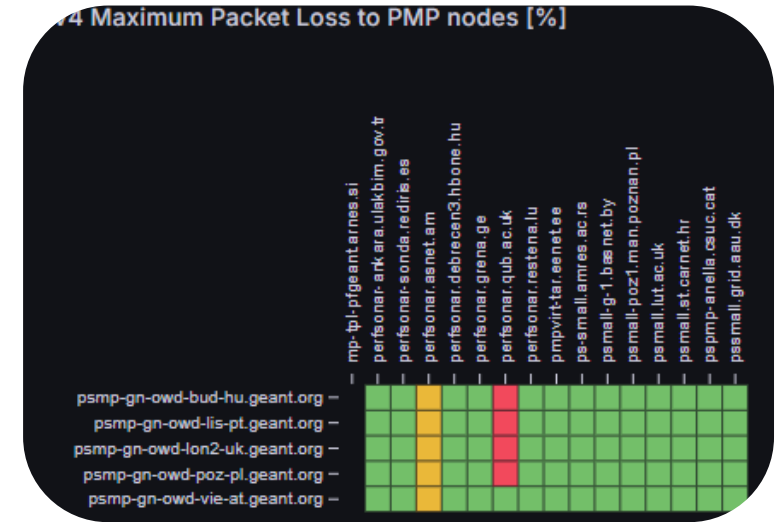
# The power of new visualization (test results)



## History

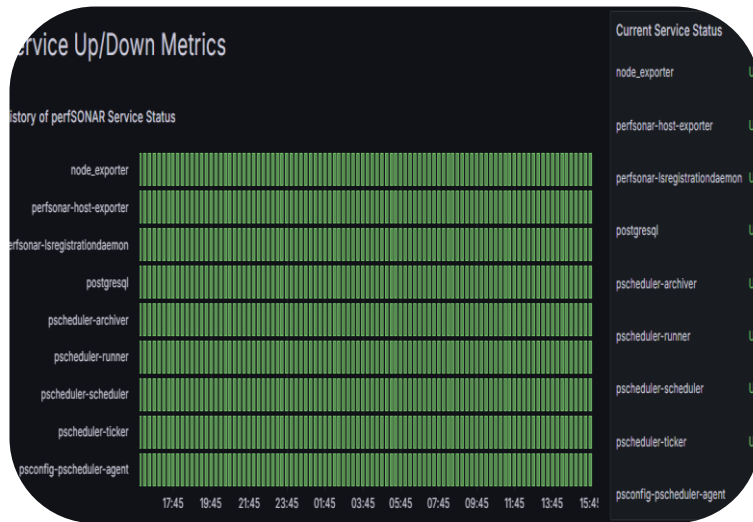


## Top N



## Matrix

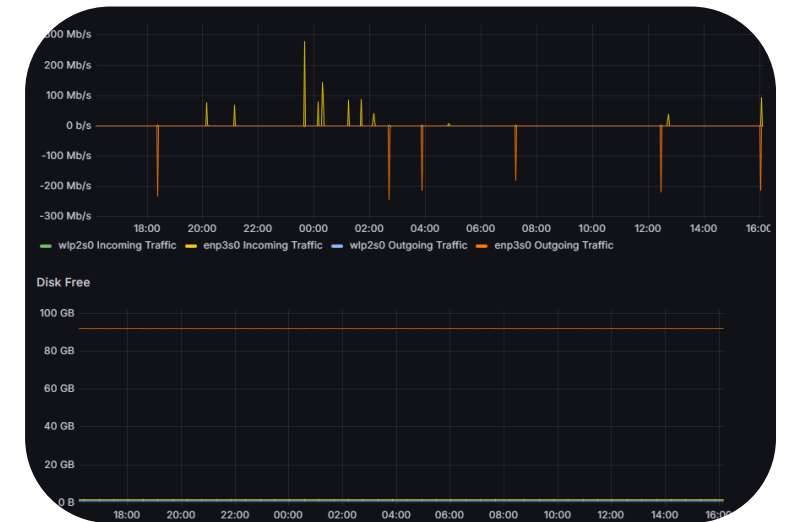
## The power of new visualization (host metrics)



Host status

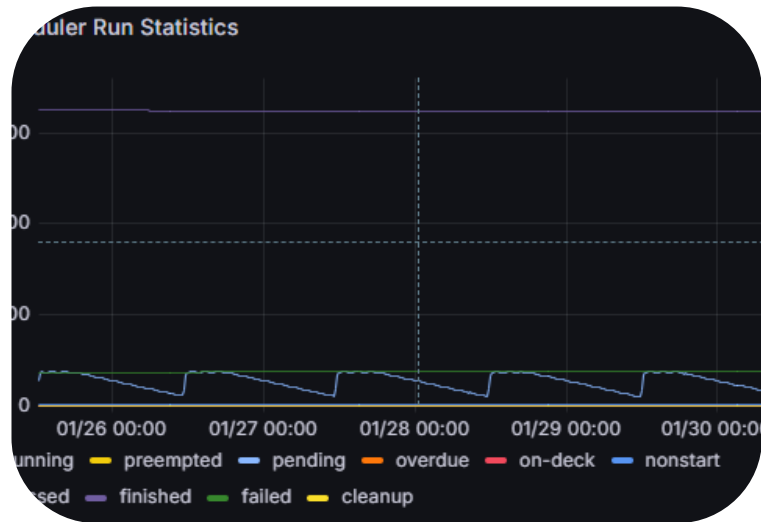


Memory, CPU

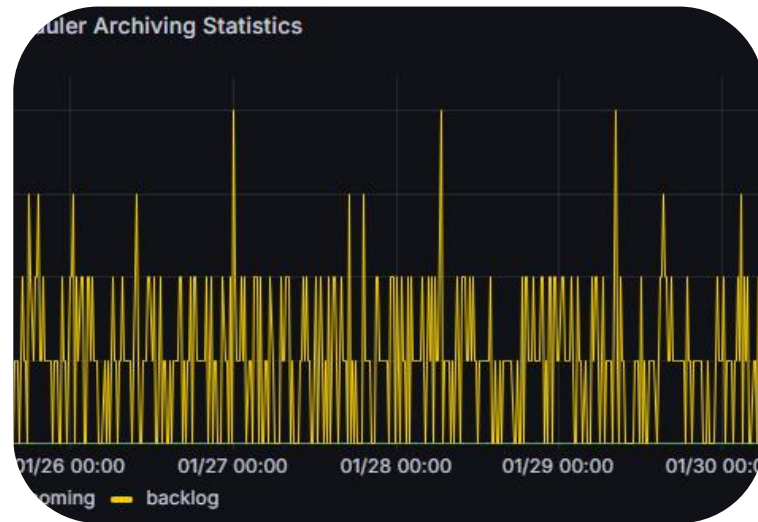


Disk space,  
traffic

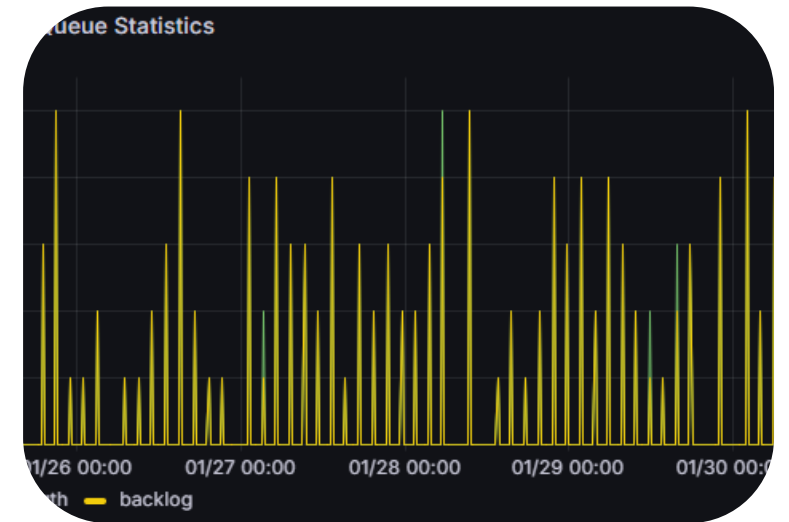
## The power of new visualization (pscheduler metrics)



Run



Archiving



HTTP queue

# PMP current coverage



● Requires attention

## Towards high speed testing with perfSONAR

- High-speed (100Gb/s+) networking ecosystems
  - LHCOPN
  - EuroHPC
  - others to come...
- perfSONAR supports test at 100Gpbs+
  - Updated tools
  - pscheduler support
  - + host tuning



[Photo](#) by Richard Patterson / [CC BY](#)

# perfSONAR EuroHPC compliance matrix

PMP model

## WP6T3 team experience

### Metrics

- Throughput
- Packet loss
- RTT
- Jitter

### Archiving / GUI

- Opensearch (default)
- Grafana

### Data exchange

- HTTP / RabbitMQ archivers
- Host metrics API

### On demand

- CLI

International collaboration development and experience



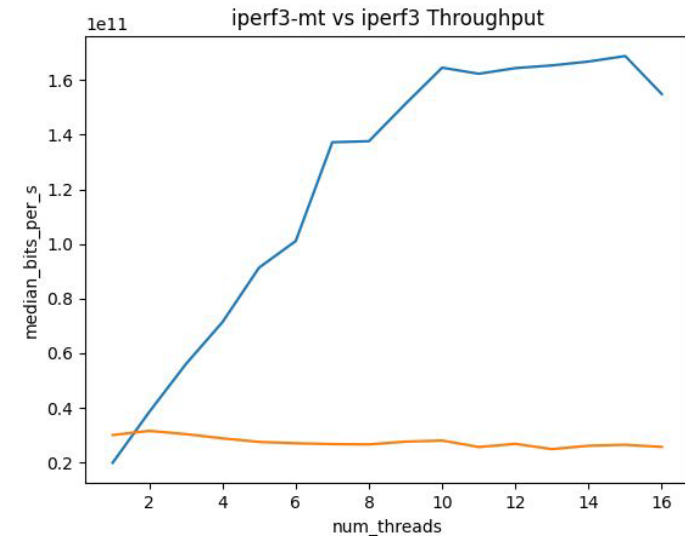
# Faster– Higher – Stronger

iperf3  
v 3.16  
(Dec'23)

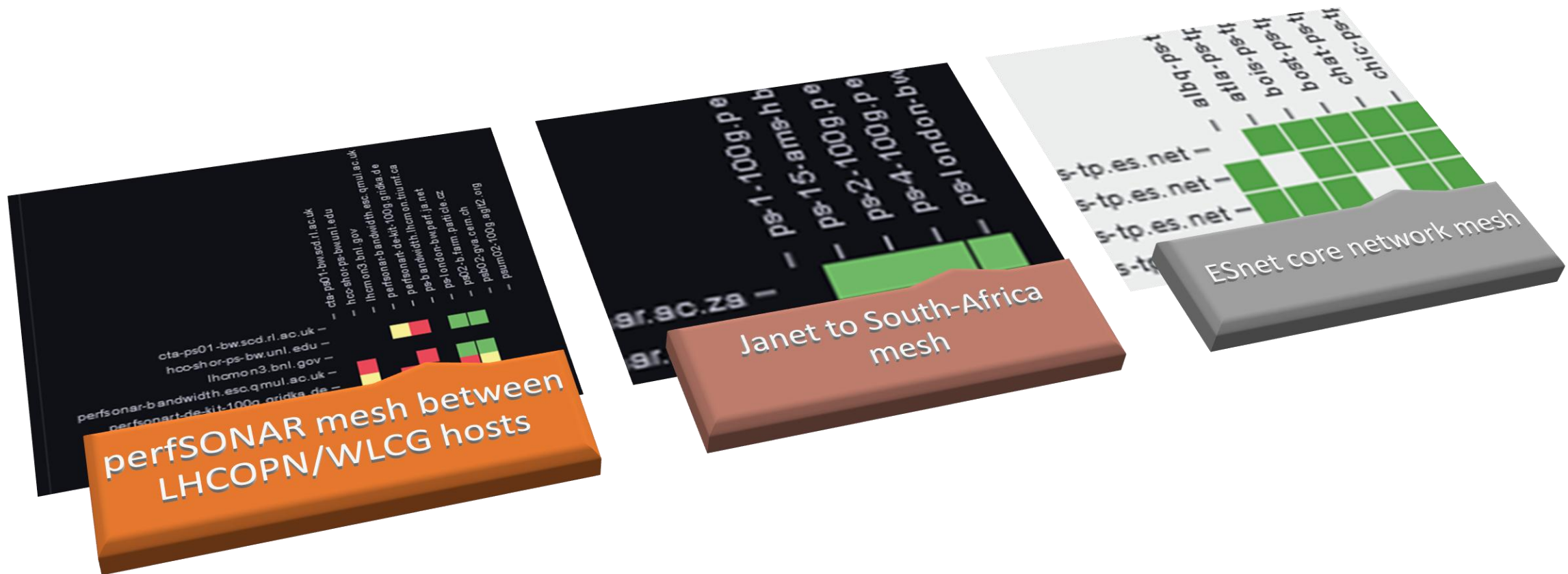
- iperf3 IS now multi-threaded
- multiple parallel test streams are now serviced by different threads
- this allows iperf3 to take advantage of multiple CPU cores

old  
iperf3

- iperf3 process WAS single-threaded
- all the parallel streams for one test used the same CPU core
- adding parallel iperf3 processes was not possible with pscheduler to manage iperf3 tests



# Practical experience in high-speed testing in GÉANT and perfSONAR community



## Practical experience - resources

- Bulding advanced high-speed testing environments
  - perfSONAR mesh between LHCOPN/WLCG hosts
    - Dashboard: <https://maddash.aglt2.org/d/f194e37c-c6b6-52d9-99ed-e94d97aba8c6/100g>
  - Janet to South-Africa mesh
    - <https://ps-mesh.perf.ja.net/grafana/d/56773ba1-88bc-5880-846e-2e776ebe9bea/uk-za-tests>
  - ESnet core network mesh
    - Dashboard: <http://ps-dashboard.es.net/d/313236af-1271-5d87-8098-c73f080e5d4d/203a-esnet-to-esnet-throughput-testing>
  - Internet2 100Gbps core network mesh expansion talk
    - <https://internet2.edu/internet2s-mike-simpson-expanding-perfsonar-to-support-the-new-network/>
- Community tests
  - 100 Gbps tests on the BELLA link (Europe to South America)
    - [https://resources.geant.org/wp-content/uploads/2023/02/GN4-3\\_White-Paper\\_Network-Performance-Tests-Over-100G-BELLA-Link.pdf](https://resources.geant.org/wp-content/uploads/2023/02/GN4-3_White-Paper_Network-Performance-Tests-Over-100G-BELLA-Link.pdf)
  - Tuning
    - <https://fasterdata.es.net/host-tuning/linux/100g-tuning/>



~97  
Gb/s

# Network Performance and Monitoring Workshop

**Starts: 1 Apr 2025, 09:00**

**Ends: 2 Apr 2025, 13:00**

(co-located with the 22nd SIG-NOC meeting)



Prague, Czech Republic

*Hands-on experience in network performance measurement, evaluation and results interpretation. The workshop will provide practical examples and guidance to make the most out of a PMP node or perfSONAR deployment.*

REGISTER NOW

<https://events.geant.org/event/1846/>





# Thank You

[www.geant.org](http://www.geant.org)



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