



PMP service update

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PMP SERVICE MANAGER / SA2T3

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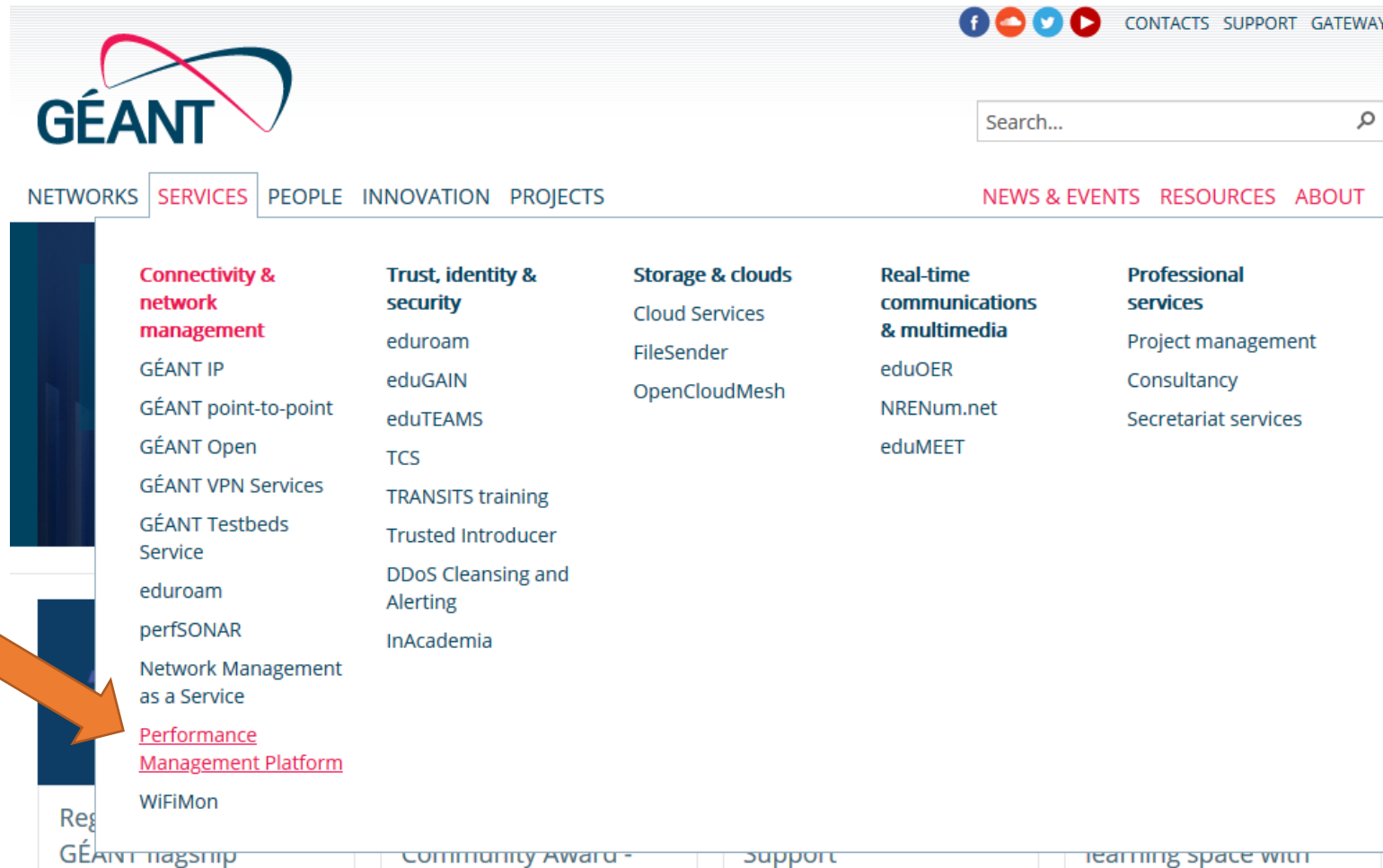
SA2T3

2nd European perfSONAR User Workshop, On-line, 14-15 Apr 2021

Public

www.geant.org

A GÉANT's service



The screenshot shows the GÉANT website's navigation menu. The 'SERVICES' tab is active, displaying a list of service categories and their associated projects. An orange arrow points to the 'Performance Management Platform' link under the 'Performance' category.

Connectivity & network management	Trust, identity & security	Storage & clouds	Real-time communications & multimedia	Professional services
GÉANT IP	eduroam	Cloud Services	eduOER	Project management
GÉANT point-to-point	eduGAIN	FileSender	NRENum.net	Consultancy
GÉANT Open	eduTEAMS	OpenCloudMesh	eduMEET	Secretariat services
GÉANT VPN Services	TCS			
GÉANT Testbeds Service	TRANSITS training			
eduroam	Trusted Introducer			
perfSONAR	DDoS Cleansing and Alerting			
Network Management as a Service	InAcademia			
Performance Management Platform				
WiFiMon				

Performance Measurement Platform (PMP)



Consists of set of low-cost hardware nodes with preinstalled perfSONAR software

- Natural evolution of successful Small Nodes project (2016)
- The central components that manage the platform elements, gather, store and represent the performance data

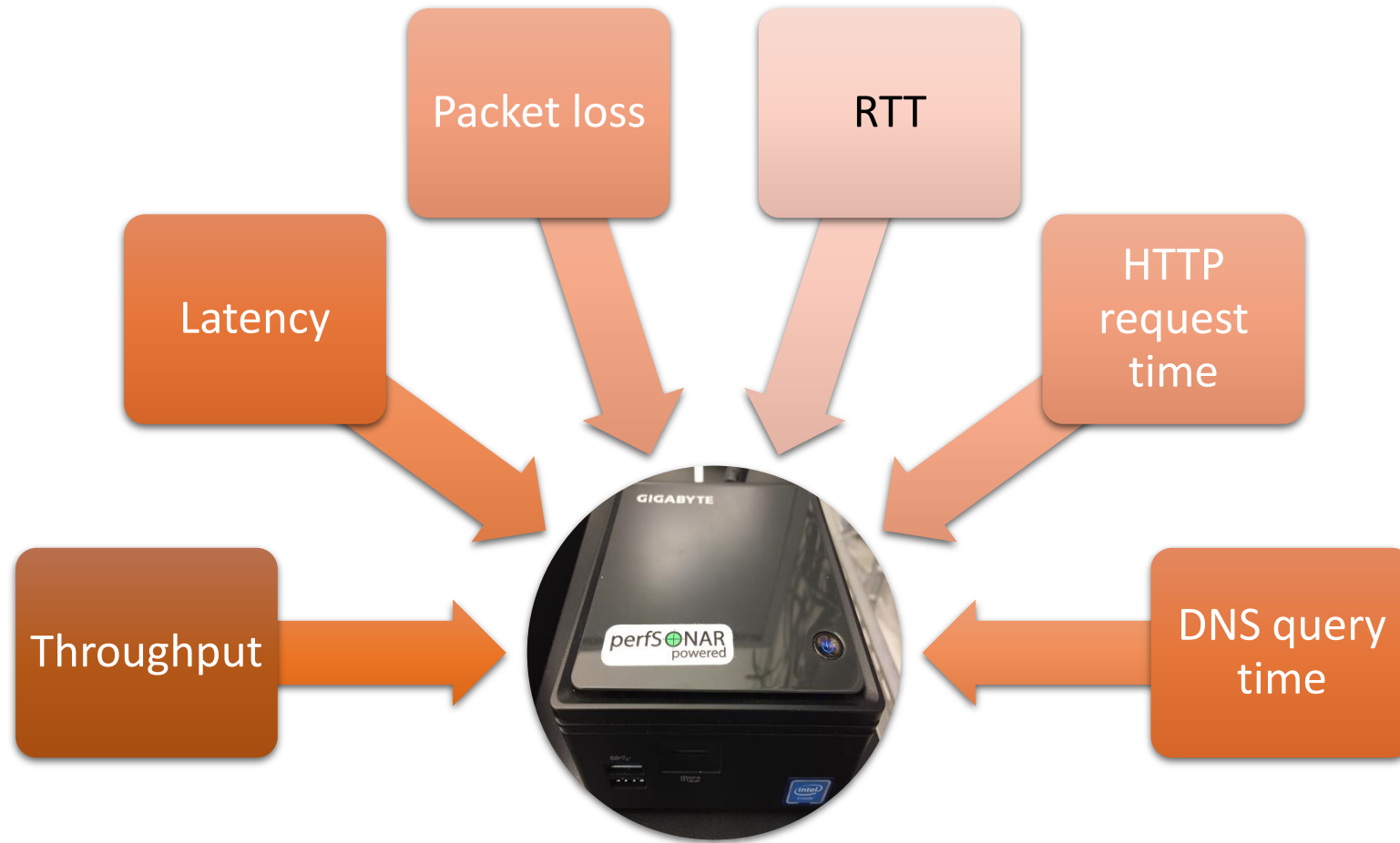


Operated and maintained by the GÉANT project

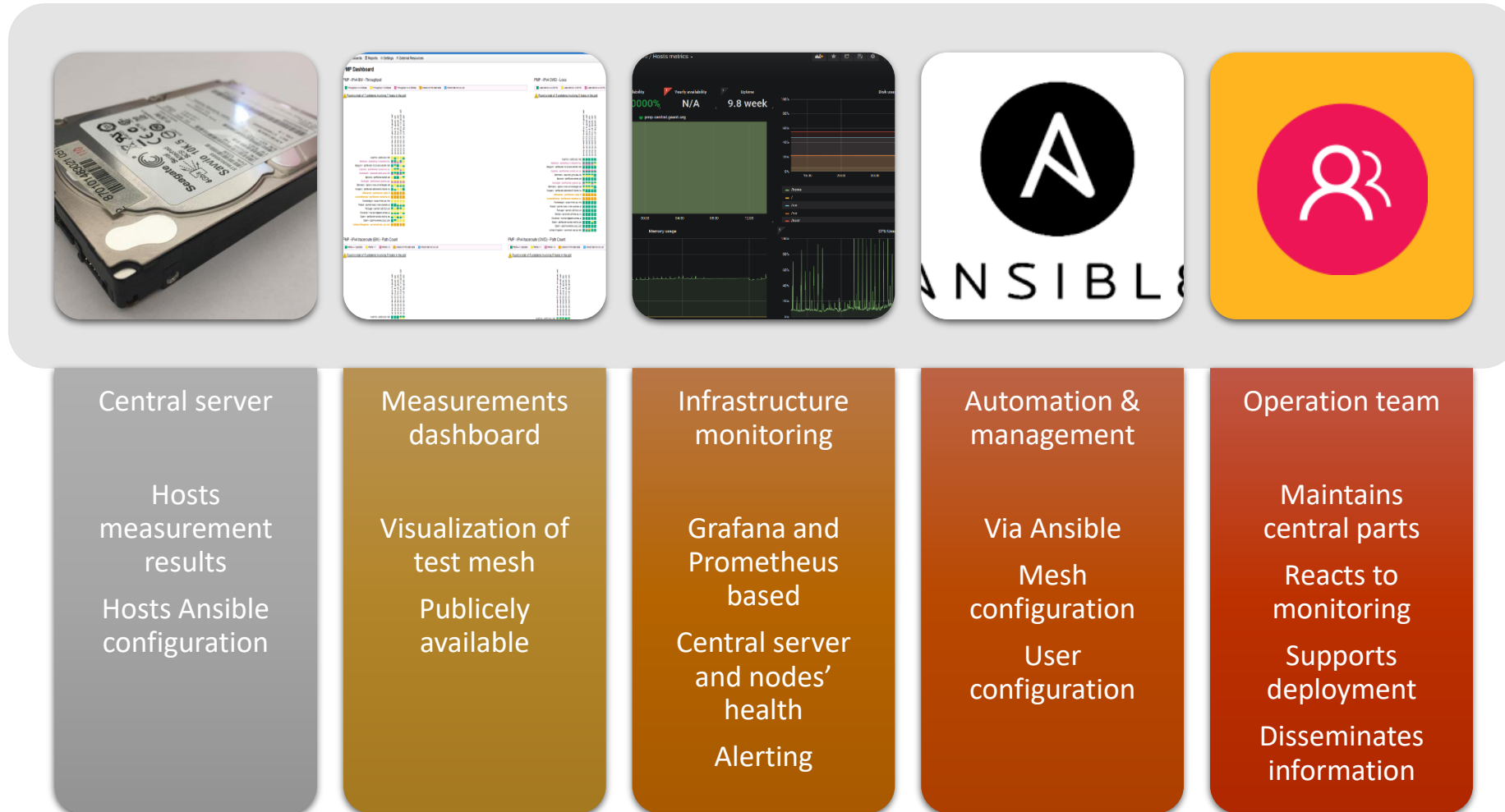


Coupled with GÉANT MPs to create a partial mesh for NRENs

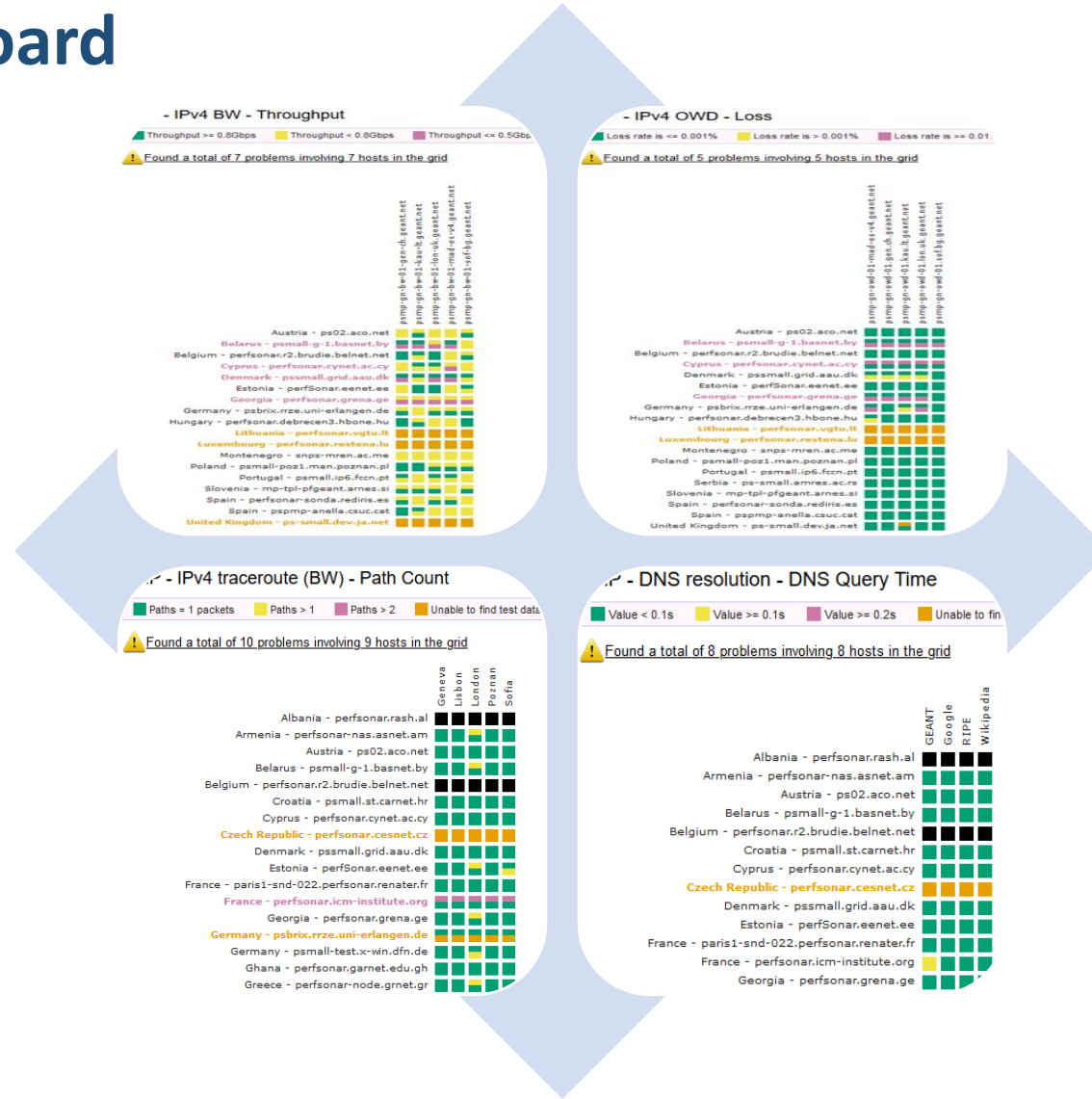
Regular testing



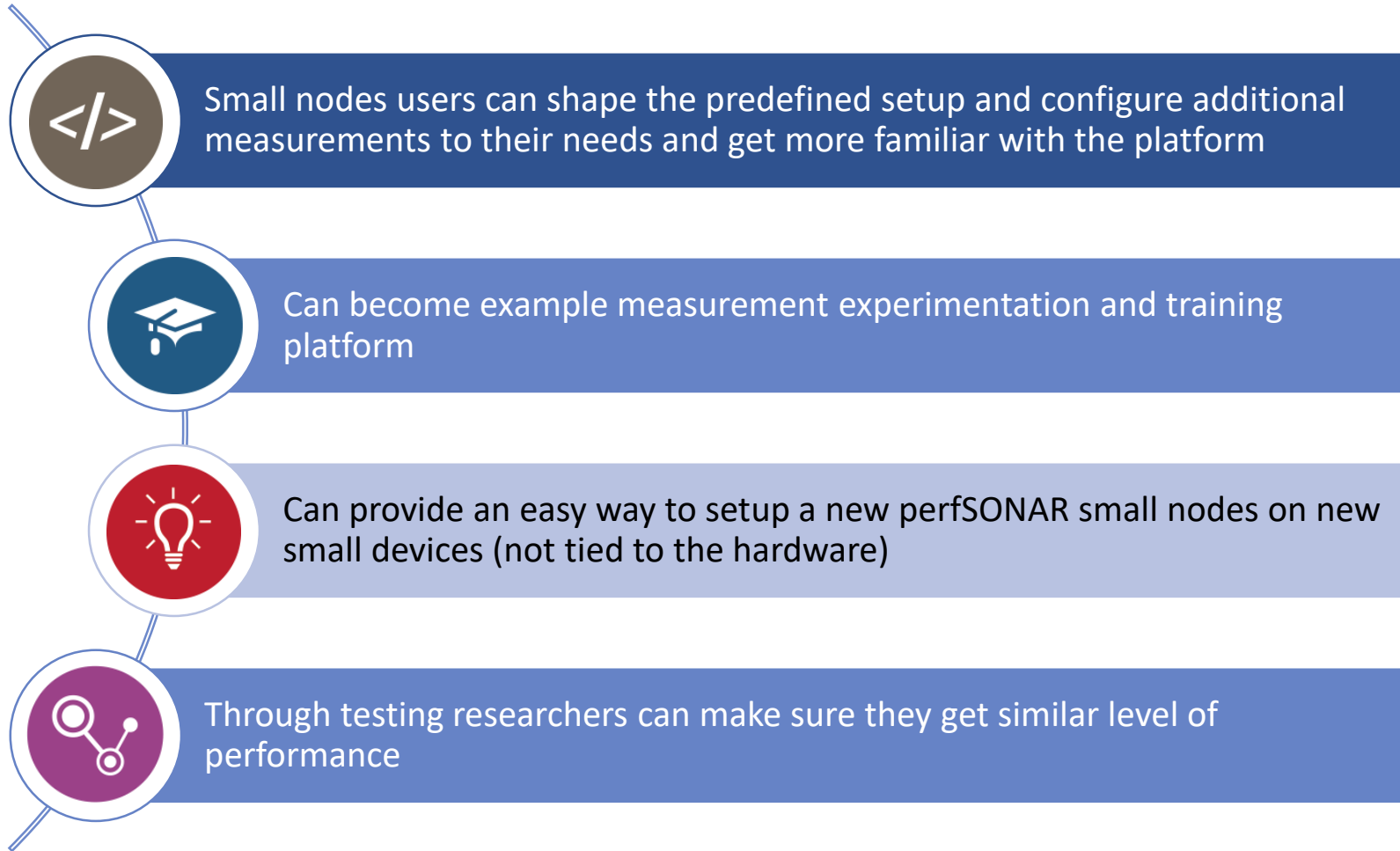
Central components



Central dashboard

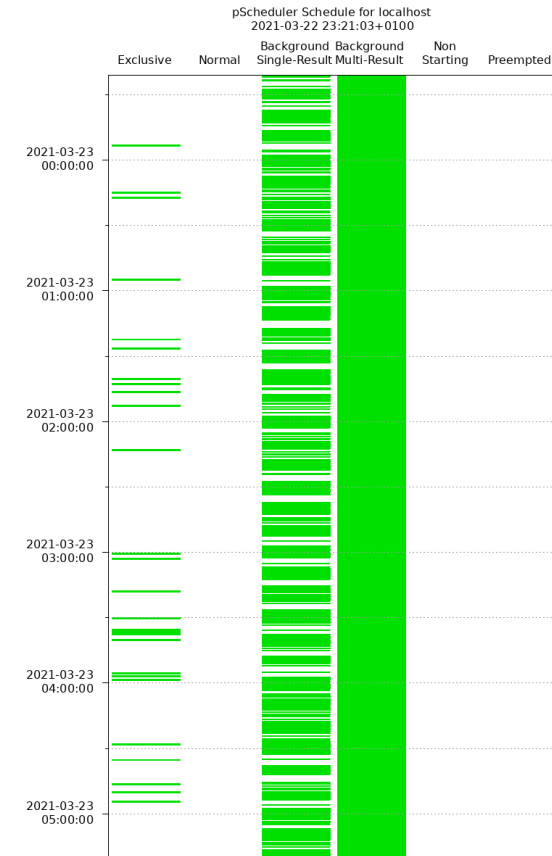


Flexible service

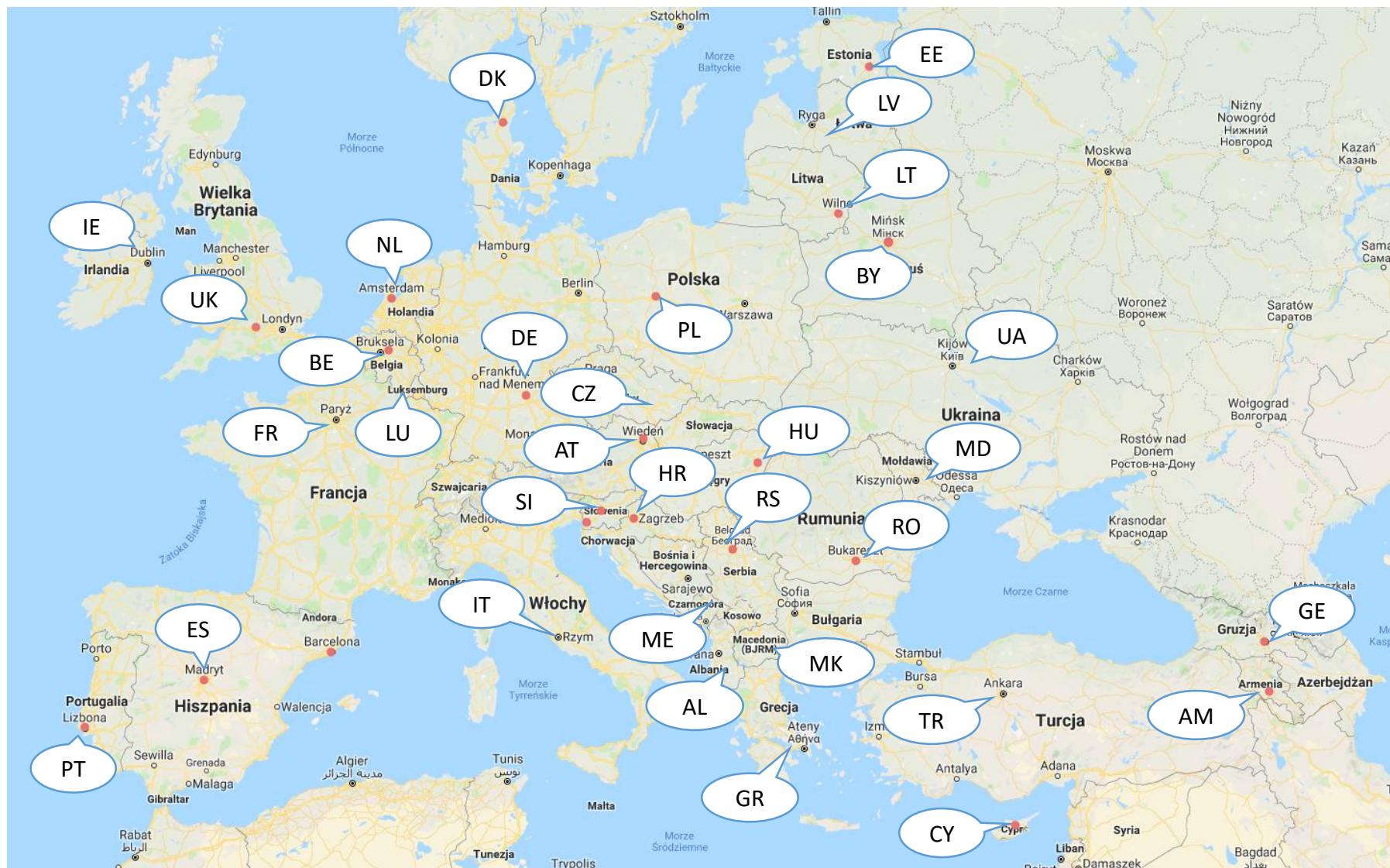


Lessons learnt

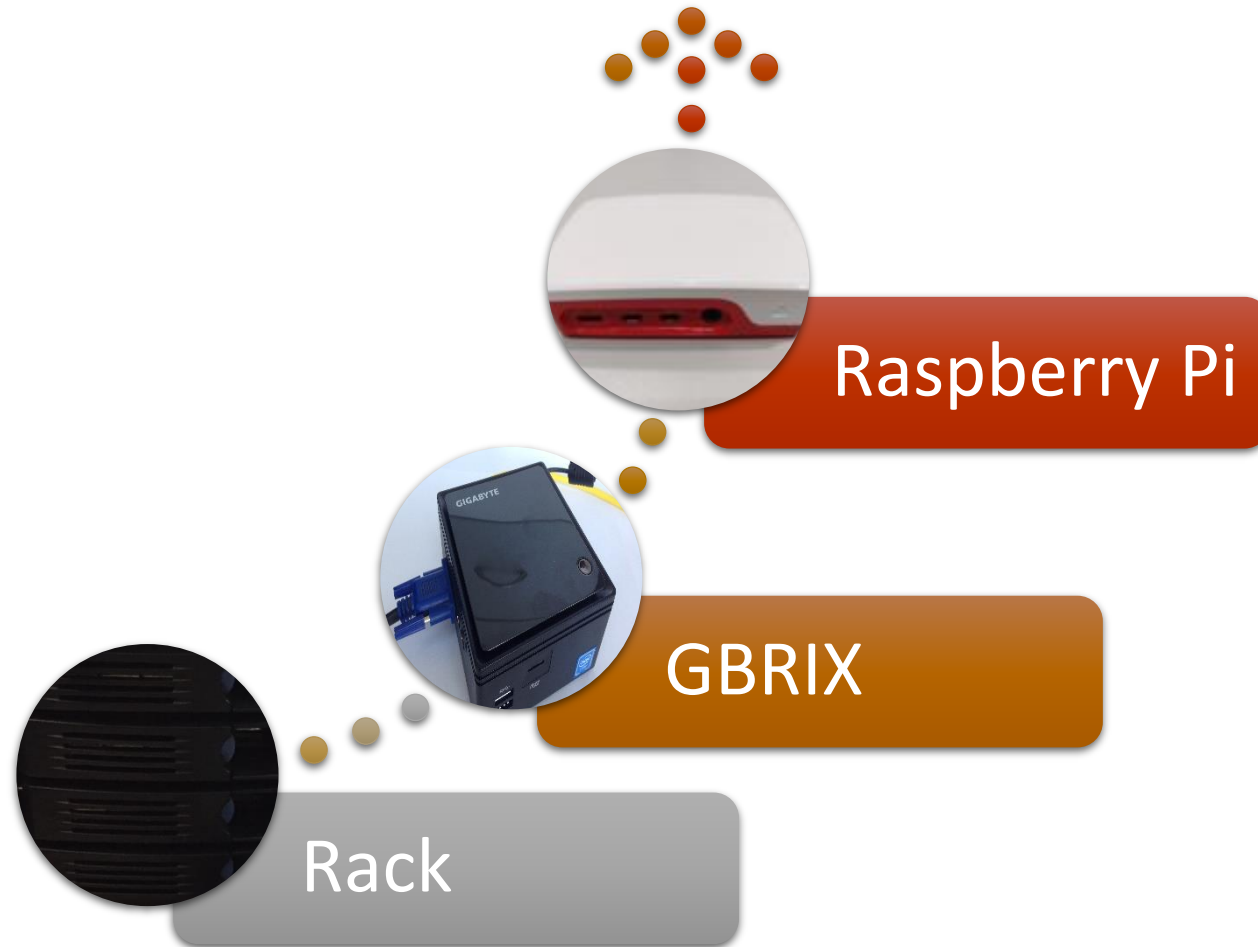
- ✓ Easy to move and ship
- ✓ Performs well (busy devices)
- ✓ Automate your operational tasks
- ✓ Monitor environment
- ✓ Where possible pay attention to SSD disks durability
- ✓ Consider remote storage only



Current coverage



TESTING a new size and platform



New challenges

Raspberry Pi 4 Model B

- 4GB RAM
- 32GB NOOBS with Raspberry Pi OS microSD card
- 1 GE
- Broadcom BCM2711, Quad core Cortex-A72 (ARM v8) 64-bit SoC @ 1.5GHz

Even easier to place

Small communities

Ad-hoc networks

RJ45 1G

Remote storage preferred

Creating testing environment @ home, during COVID-19



Test setup



Poznań,
Poland

PMP node (GIGABYTE BRIX GB-BACE-3160)

1 GE



1 GE



1 GE



NRENs,
GEANT

1 GE



Tartu,
Estonia

PMP node (GIGABYTE BRIX GB-BACE-3160)

Poznań,
Poland

Raspberry Pi 4

Software

- Pre-installed Raspberry Pi OS

- Version

```
pi@raspberrypi:~ $ cat /etc/os-release
PRETTY_NAME="Raspbian GNU/Linux 10 (buster)"
NAME="Raspbian GNU/Linux"
VERSION_ID="10"
VERSION="10 (buster)"
```

```
pi@raspberrypi:~ $ uname -a
Linux raspberrypi 5.4.72-v7l+ #1356 SMP Thu
Oct 22 13:57:51 BST 2020 armv7l GNU/Linux
```

Partial support for
perfsnar-testpoint

Software variants



perfsonar-toolkit
4.3.4



perfsonar-testpoint
4.3.4



Raspberry Pi <-> Raspberry Pi (via switch)

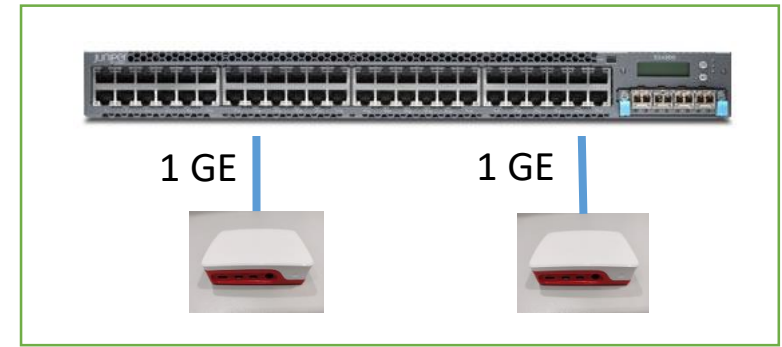
```
geantadmin@raspberrypi:~$ pscheduler task throughput --dest 150.254.x.y
Submitting task...
Task URL:
https://localhost/pscheduler/tasks/eb026a56-2872-4de9-a541-5291e5e637ab
Running with tool 'iperf3'
Fetching first run...
```

```
Next scheduled run:
https://localhost/pscheduler/tasks/eb026a56-2872-4de9-a541-5291e5e637ab/runs/dba6ef29-c35e-4a46-8334-8b1a21a02680
Starts 2021-04-12T16:03:46+02 (~3 seconds)
Ends 2021-04-12T16:04:05+02 (~18 seconds)
Waiting for result...
```

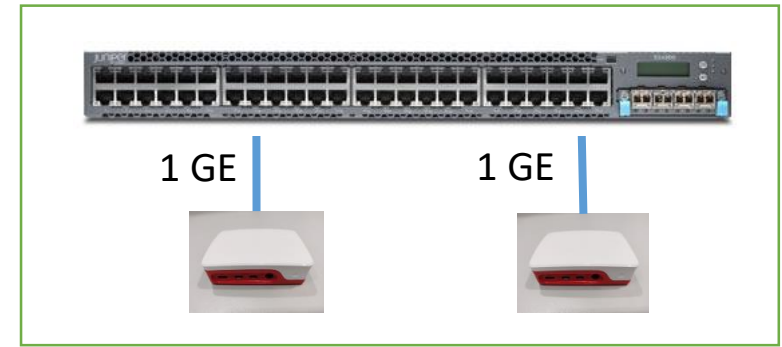
```
* Stream ID 5
Interval      Throughput      Retransmits      Current Window
0.0 - 1.0    945.82 Mbps     0                 389.51 KBytes
1.0 - 2.0    941.29 Mbps     0                 389.51 KBytes
2.0 - 3.0    934.27 Mbps     0                 389.51 KBytes
3.0 - 4.0    942.48 Mbps     0                 408.34 KBytes
4.0 - 5.0    939.35 Mbps     0                 408.34 KBytes
5.0 - 6.0    941.98 Mbps     0                 445.98 KBytes
6.0 - 7.0    938.27 Mbps     0                 445.98 KBytes
7.0 - 8.0    938.31 Mbps     0                 445.98 KBytes
8.0 - 9.0    942.47 Mbps     0                 445.98 KBytes
9.0 - 10.0   938.81 Mbps     0                 486.53 KBytes
```

Summary

Interval	Throughput	Retransmits	Receiver Throughput
0.0 - 10.0	940.30 Mbps	0	937.04 Mbps



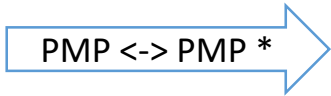
Stress latency tests (owping)



	1s	10s	20s
10 pps (-i 0.1)	-	100 packets 0 %	200 packets 0 %
100 pps (-i 0.01)	-	1 000 packets 0 %	2 000 packets 0 %
1000 pps (-i 0.001)	1 000 packets 0 %	10 000 packets 0 %	20 000 packets 0 %
10000 pps (-i 0.0001)	10 000 packets 0 %	100 000 packets ~0.5 %	200 000 packets ~0.5 %
20000 pps (-i 0.00005)	20 000 packets ~1 - 5 %	200 000 packets ~1 - 5 %	400 000 packets ~1 - 7 %

```
$ pscheduler task latency -c 10000 -i 0.001 --dest foo.bar
```

Raspberry Pi <-> GBRIX



SOURCE	DESTINATION	THROUGHPUT	LATENCY (MS)
perfSonar.eenet.ee 193.40.132.142	psmall-poz1.man.poznan.pl 150.254.163.77	→ 846 Mbps ← 824 Mbps	→ 16.1 ← 15.1

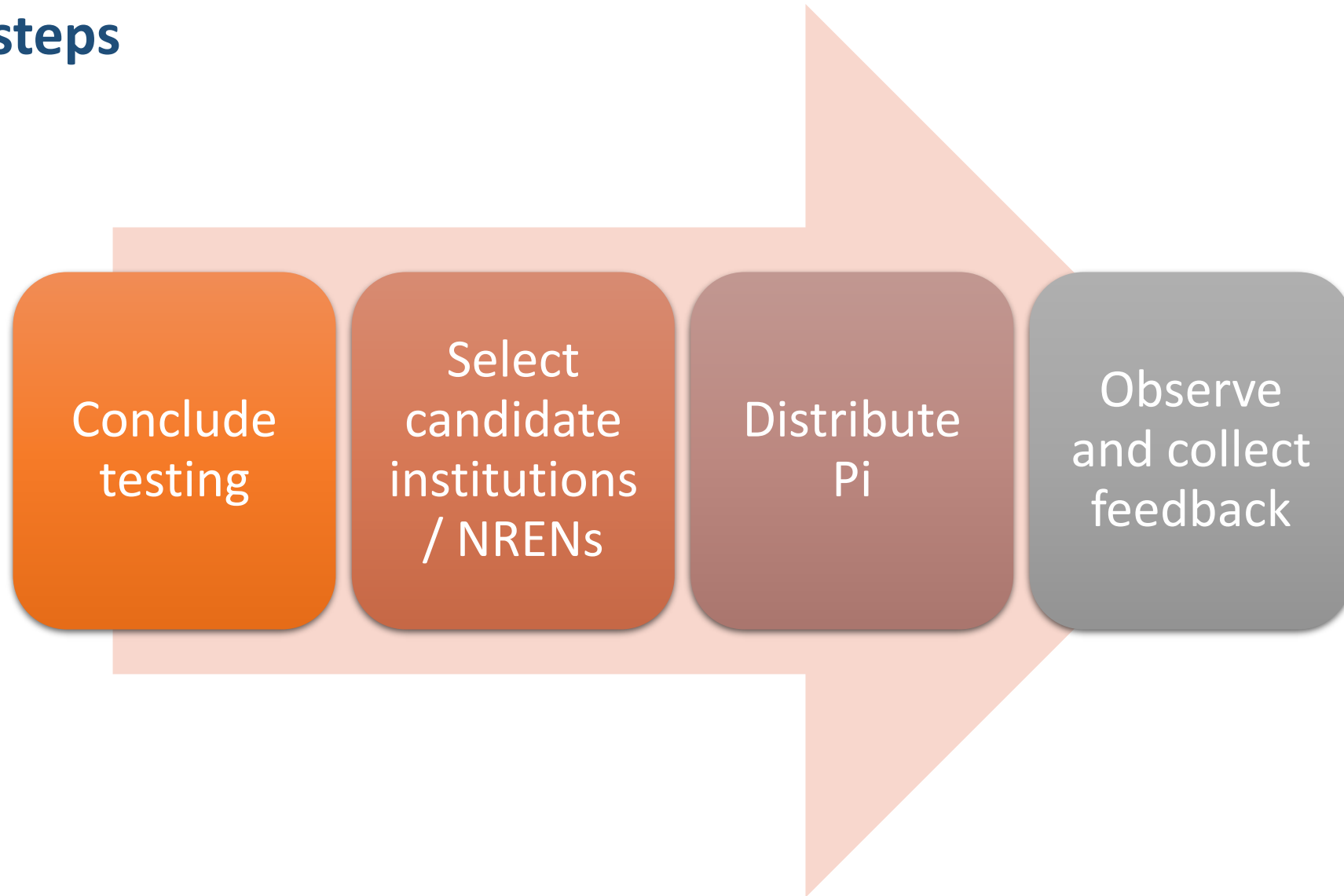
* But not precisely in the same place as RPi

SOURCE	DESTINATION	THROUGHPUT	LATENCY (MS)
perfSonar.eenet.ee 193.40.132.142	150.254.160.19	→ 711 Mbps ← 571 Mbps	→ 25.9 ← 15.0



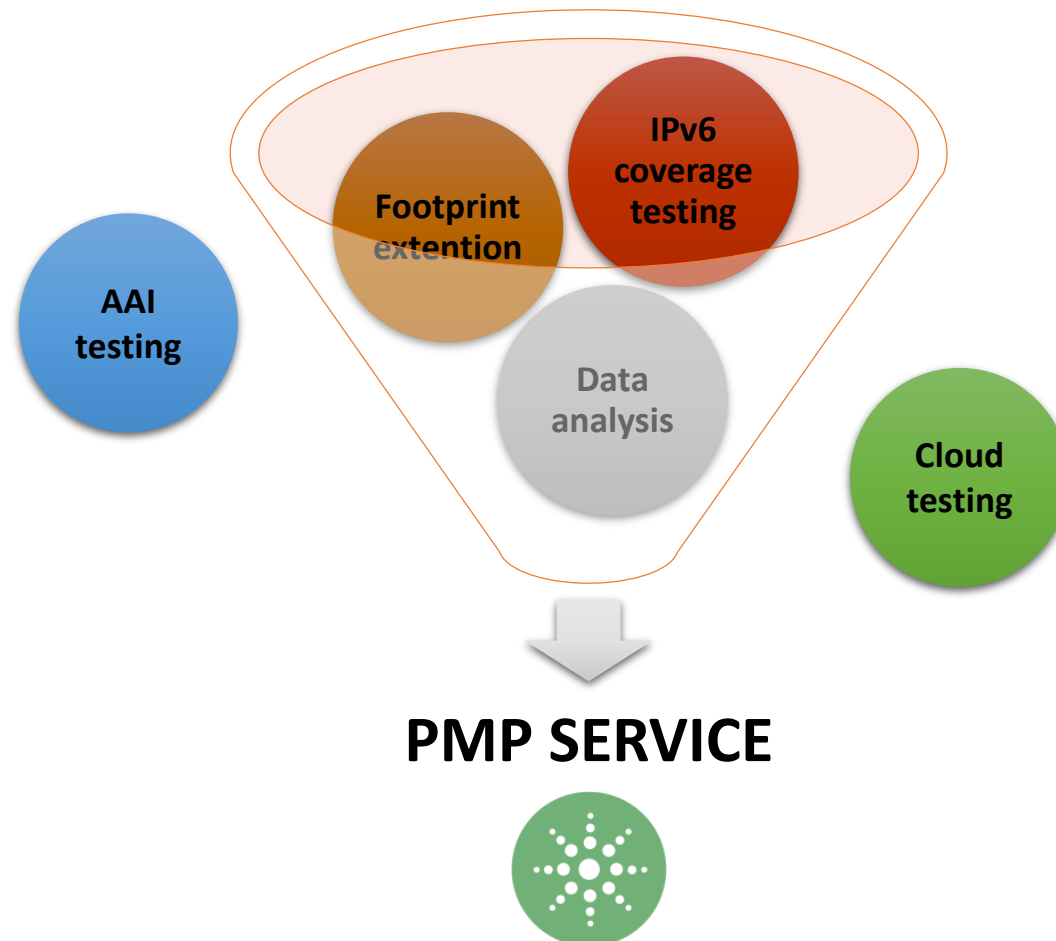
Max
-> 780 Mb/s
← 630 Mb/s

Next steps



How will the service look in future?

Depends on you but we have some ideas



Seeking advice on service improvement

We're seeking
the users'
inputs

We're building
new features *

* we did not think of

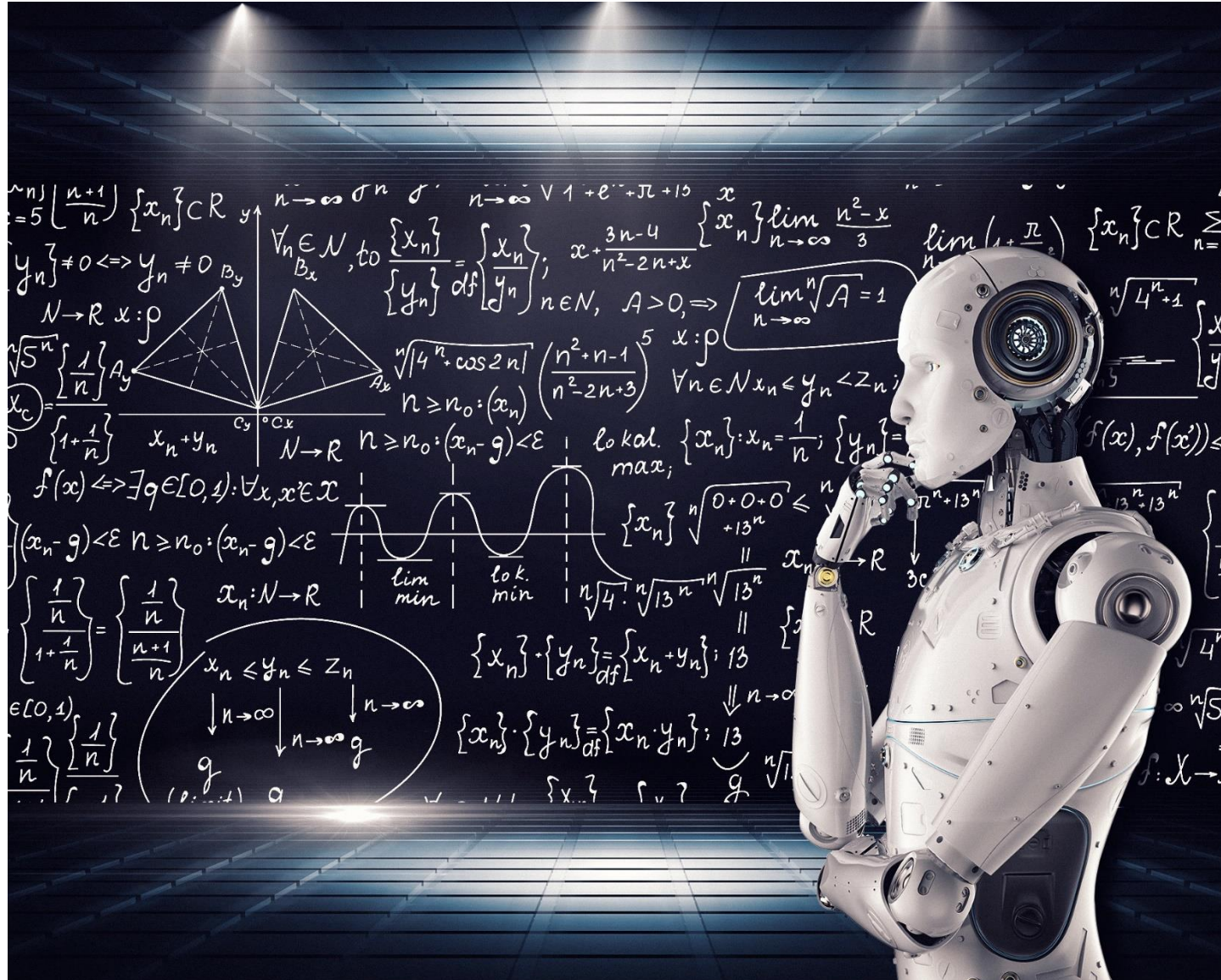
We identify
product
improvement
areas

We feed your
feedback into our
product roadmaps

We can enrich our
niche

You motivate us
and we deliver
better service

perfsonar@lists.geant.org



What kind of data we have?

- Latency, Jitter, RTT and Throughput data
- Approximately 600GB (last 7 months) of various measurement data available
- Measurement data stored in databases and made accessible using esmond
- Timeseries data stored using Cassandra database
- Measurement metadata (type, parameters, etc.) stored using postgresSQL
- Data accessible using esmond REST API

AI use cases as seen of interest for the PMP

Develop an AI model that can help detect anomalies in network monitoring data in order to:

- Pinpoint areas with ongoing issues
- Facilitate Network Planning
- Support sensitive and/or high data traffic
- ...

Current on-going work in PMP

- Data aggregation with intent to construct adequate datasets that will be used for model training
 - Extracting historical data via Esmond API
 - Importing the data into ELK Stack
 - Examining, transforming and cleaning the data
 - Exploratory data analysis
- Next step
 - Developing the AI model for Anomaly detection

————— **share your** —————

SUCCESS STORY

————— **to inspire** —————

Thank you

Any questions?

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The scientific work is published for the realization of the international project co-financed by Polish Ministry of Science and Higher Education in the years 2019 - 2022 from financial resources of the programme entitled "PMW"; Agreement No. 5023/H2020/2019/2



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