



EuroHPC monitoring solution and deployment

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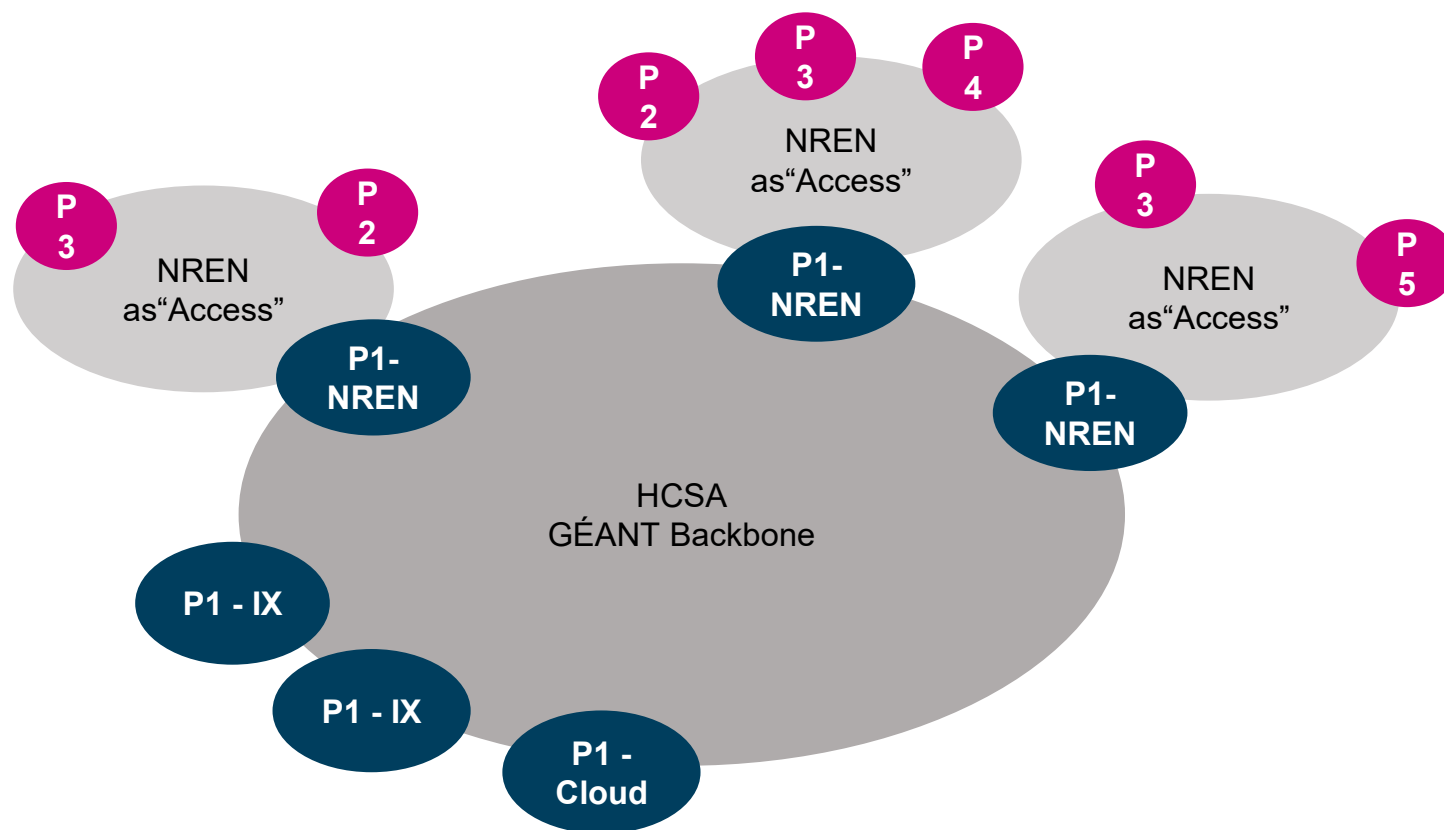
Public

EuroHPC Background

- EuroHPC is a joint undertaking by the EU, member countries and partners
- Aims to create a world class Supercomputing Ecosystem
- GÉANT worked with NRENs to win the contract for the connectivity



Simple overview of EuroHPC Network : The HCSA – Core Network, Access



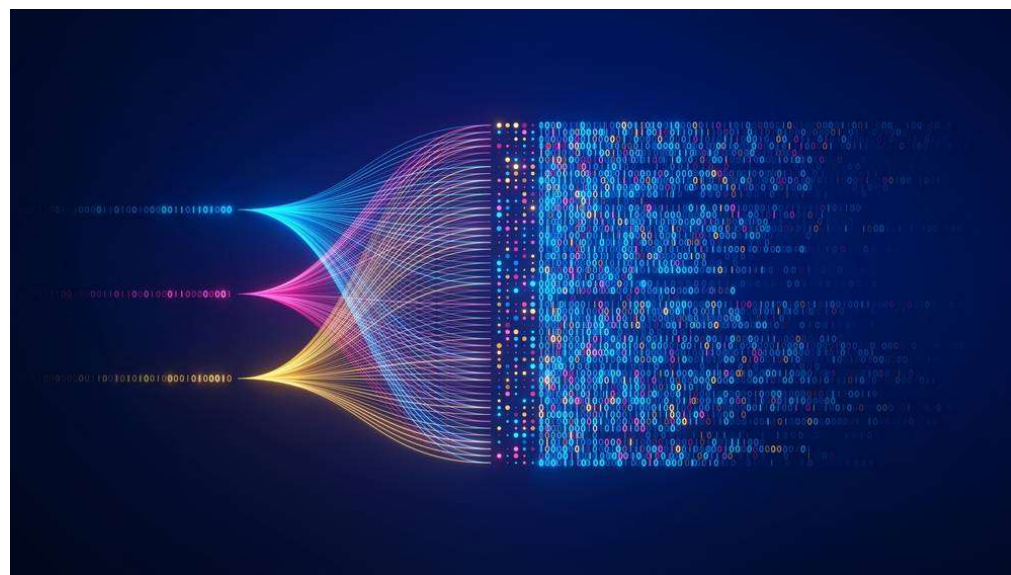
Requirements for Connectivity

- EuroHPC JU set the mandatory requirements:
 - Number of nodes
 - Locations
 - Throughput requirement @ 80% line rate
 - *Which triggered research and design*
 - *... the community has never needed this operational solution before*
 - *... typically seen with dedicated Ethernet testers at link commissioning only*
 - *... and in research efforts with DTNs, and community publicity challenges, etc.*



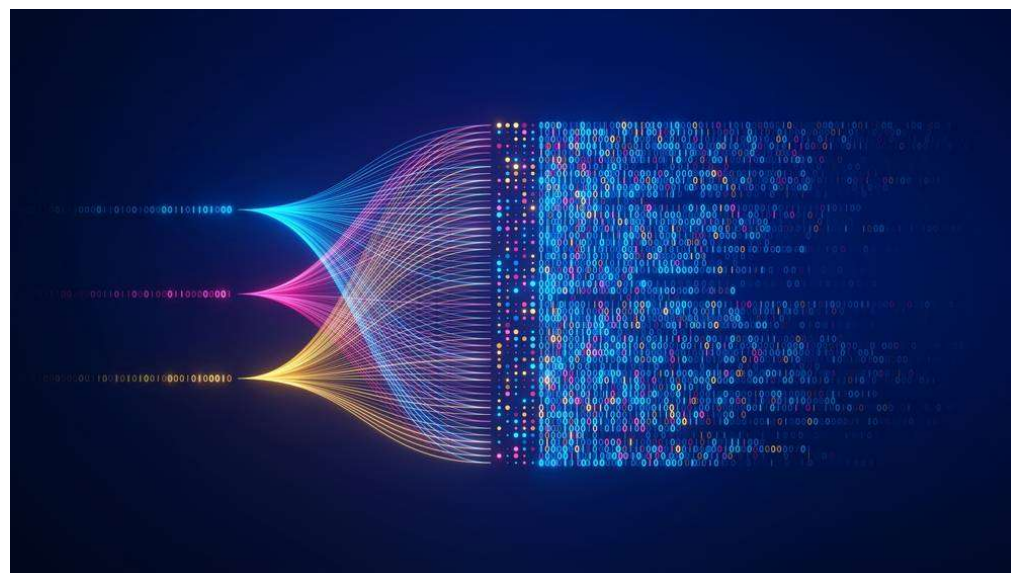
What needs to be tested

- All the Priority 2 sites to get a performance monitoring probe
- Need to test to 80%
- P2 Connectivity
 - Most are at 400G
 - Two are 800G
 - One is 1.2T
- Higher throughput



What needs to be tested

- P3 Sites
 - 10% of sites
- P4 Sites
 - 5% of sites



Testing the Solution

- perfSONAR was the preferred option
 - Known and Liked
 - Easier to work with
 - Could it be done?
 - Needed proof

Lab BOM



Item	Quantity	Description
Dell PowerEdge R770	2	Dual CPU - Xeon 6 6714P 4.0 Ghz, 8C/16T
Mellanox Connect-X 7	1	400G NIC
Mellanox Connect-X 7	1	400G NIC

• Two of:

- Dell PowerEdge R770
 - Dual CPU - Xeon 6 6714P 4.0 Ghz, 8C/16T
 - Mellanox Connect-X 7 1 x 400G NIC
 - Mellanox Connect-X 7 1 x 400G NIC



Design target:
320G per port
640G total

• Two of:

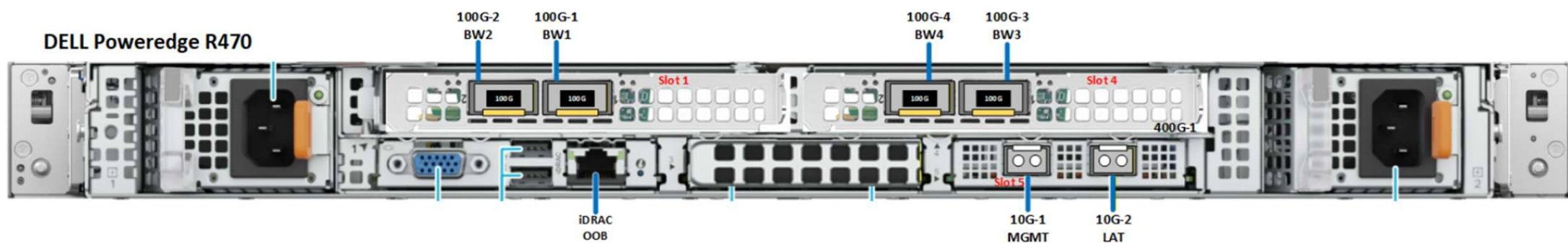
- Dell PowerEdge R470
 - Single CPU – Xeon 6 6507P 3.5 Ghz, 8C/16T
 - Mellanox Connect-X 6 2 x 100G NIC
 - Mellanox Connect-X 6 2 x 100G NIC



Design target:
320G per node

Equipment

- What will be used?
 - Dell server; NVIDIA ConnectX6 NIC(s); $n \times 100\text{G}$ ports; upto 400G per 1RU
 - perfSONAR running iperf3 – BAU
 - ib_write_bw – onboarding and as needed
 - Interfaces - OOB, MGMT, LAT; then depending on requirement, $n \times 100\text{G}$ BW interfaces

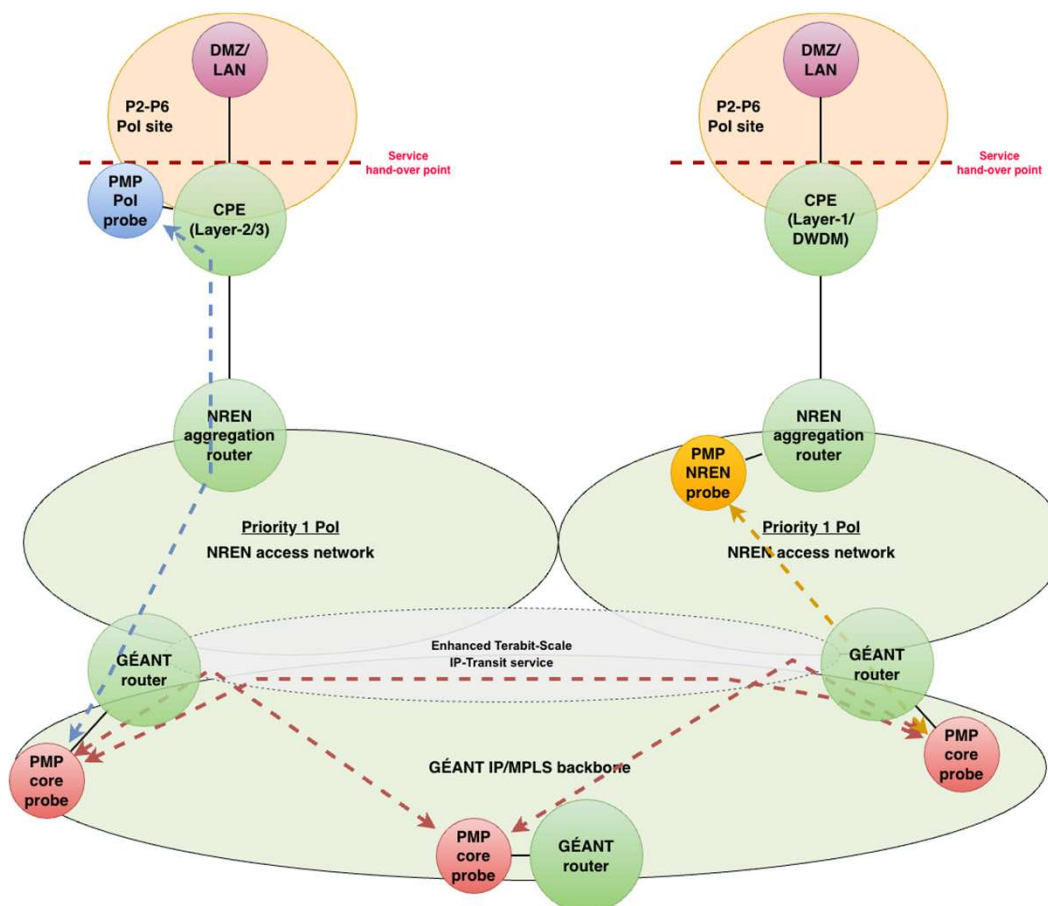


Deployment Overview

- Where:

Goal: QA the IP transit service
(not HPC's LAN switches or firewall)

- Left - Campus edge
 - NREN CPE router
- Right - NREN edge
 - POP nearest to HPC site



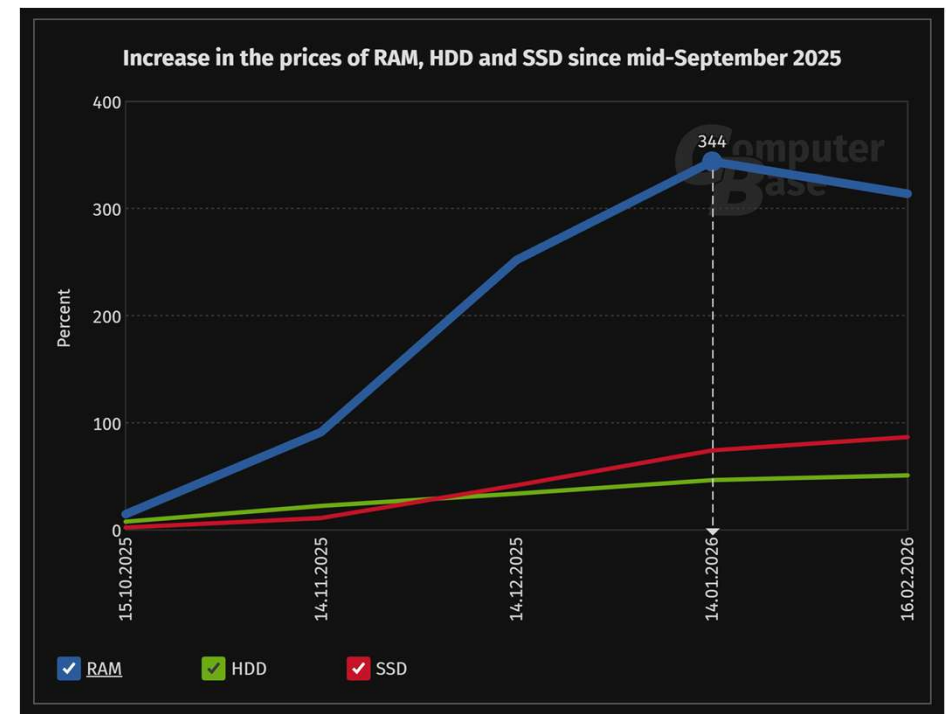
P2 Sites

- P2 sites have been identified
- Most sites connected at 400G or higher

Country	City	Pol	Priorit	Speed for 2025
Bulgaria	Sofia	HPC centre Sofia Tech Park (EuroHPC Discoverer)	2	100G
Czech Republic	Ostrava	National Supercomputing Centre IT4Innovation (EuroHPC Karolina)	2	400G
Czech Republic	Ostrava	National Supercomputing Centre IT4Innovation (EuroHPC LUMI-Q planned)	2	400G
Finland	Kajaani	CSC - IT Center for Science (EuroHPC LUMI)	2	400G
France	Bruyères-le-Châtel	CEA/TGCC Jules Verne (Très Grand Centre de Calcul) - Alice Recoque	2	400G
Germany	Jülich	Jülich Supercomputing Centre / Forschungszentrum Jülich GmbH (EuroHPC	2	400G
Germany	Jülich	Jülich Supercomputing Centre / Forschungszentrum Jülich GmbH (EuroHPC	2	400G
Germany	Garching bei	(EuroHPC Quantum System Germany - Planned)	2	400G
Greece	Lavrio	GRNET/EuroHPC DeaDalus	2	400G
Hungary	Budapest	KIFÜ (EuroHPC Levente)	2	200G
Ireland	Unknown	ICHEC (EuroHPC CASPIr)	2	200G
Italy	Bologna	CINECA/LEONARDO (EuroHPC site)	2	800G
Italy	Bologna	CINECA EuroHPC Quantum	2	400G
Luxembourg	Bissen	LuxProvide (EuroHPC MeluXina)	2	200G
Poland	Krakow	Cyfronet (EuroHPC EHPCPL)	2	200G
Poland	Poznan	PSNC Poznan, (EuroQCS-EuroHPC)	2	200G
Portugal	Guimaraes	University of Minho (EuroHPC Deucalion)	2	400G
Slovenia	Maribor	IZUM Maribor, HPC Vega (EuroHPC site)	2	1200G
Spain	Barcelona	EuroHPC/BSC MareNostrum 5 ACC (EuroHPC MN5 ACC)	2	400G
Spain	Barcelona	EuroHPC/BSC Quantum simulator (planned in MN4 chapel site)	2	20G
Sweden	Linköping	Linköping University (LIU) (EuroHPC Arrhenius)	2	800G

Challenges

- Working to a tight time frame
- Availability of Servers
- Lead times increasing
- Working with partners to expedite deliveries and deployments



Successes already

- Proven throughput of ~390Gbps
- 1RU Server sufficient for most testing
- Community tool is fit for purpose
- Network meets requirements





Thank You

Any questions?

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