GridPP networking: Jisc/Janet perspective

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Agenda

- The Janet network
  - Wider connectivity and the Janet access network refresh
  - Upgrading sites, and connecting at 100G
- Netsight and BRIAN
- Janet network performance test facilities
- Other brief topics
  - WLCG packet marking and NetSage
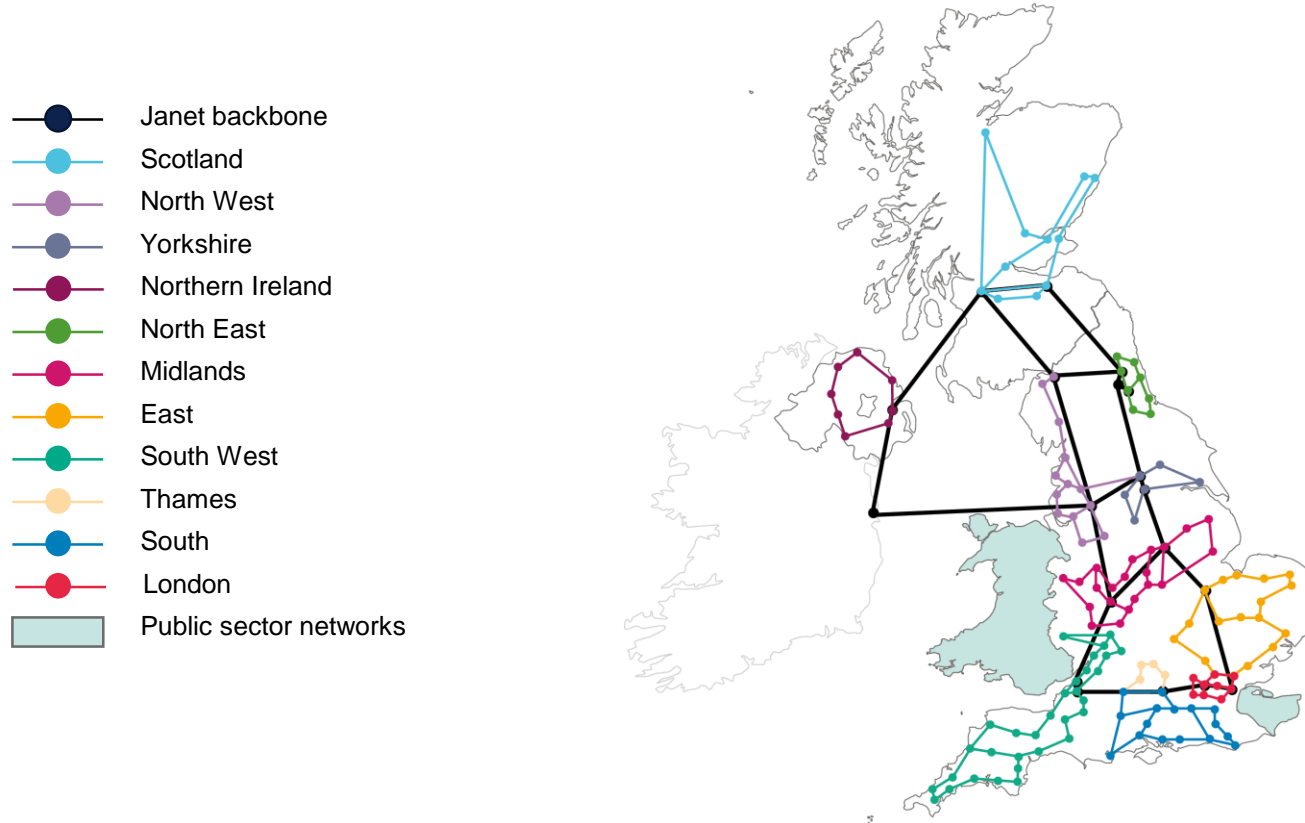 - Research Networking Infrastructure Engineer community

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The Janet network

Jisc as your ISP

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The Janet network

Providing your Internet connectivity

- Jisc provides and operates the **Janet network**

- Connects universities, FE colleges, research organisations

- Provides wider connectivity to the Internet, content providers, etc.

- Backbone capacity ranges from 200G to 800G

- **Regional access infrastructure currently being refreshed**

- Site connectivity typically nx10G for HE, 1G for FE

- Some sites now connecting at 100G, RAL has 2x100G, resilient

- A site's capacity is determined by need and budget

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The Janet network (AS786) – core and access networks

Legend:
- Janet backbone
- Scotland
- North West
- Yorkshire
- Northern Ireland
- North East
- Midlands
- East
- South West
- Thames
- South
- London
- Public sector networks

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European R&E networking - GÉANT

Connecting to the world

- Janet connects to other European NRENs via **GÉANT**, e.g., RENATER in France
  - Currently 2 x 100G
  - Rising to 3 x 100G in a few weeks
- Includes routes to other international academic networks, including **ESnet**
  - See the GÉANT Connectivity Map
  - Peering info can be seen at peeringdb
- Ongoing GN4-3N project shown to right
  - Fibre (IRUs) and shared spectrum

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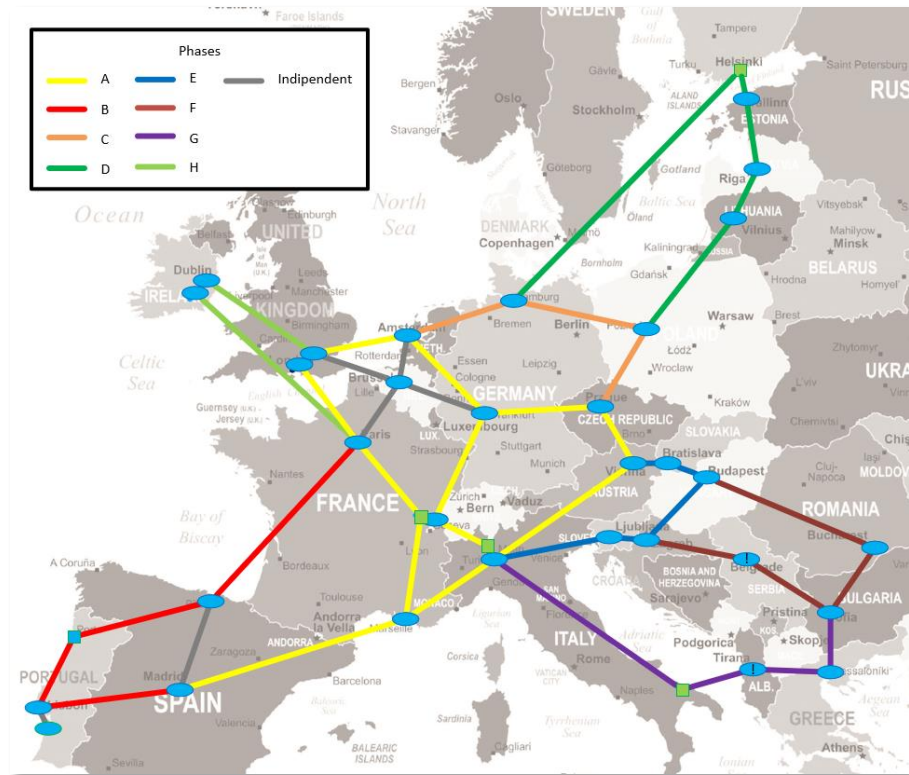
ESnet topology/weathermap – https://my.es.net
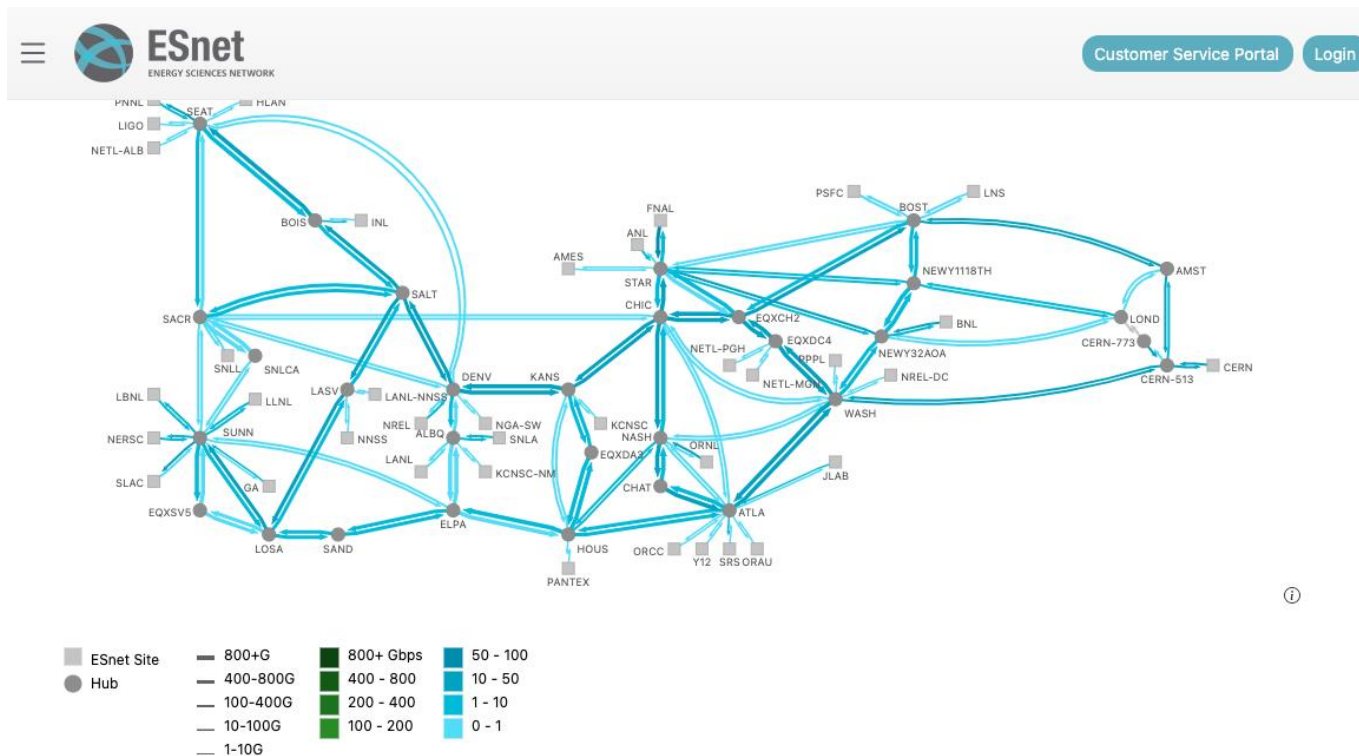
Wider connectivity – over 3Tbit/s
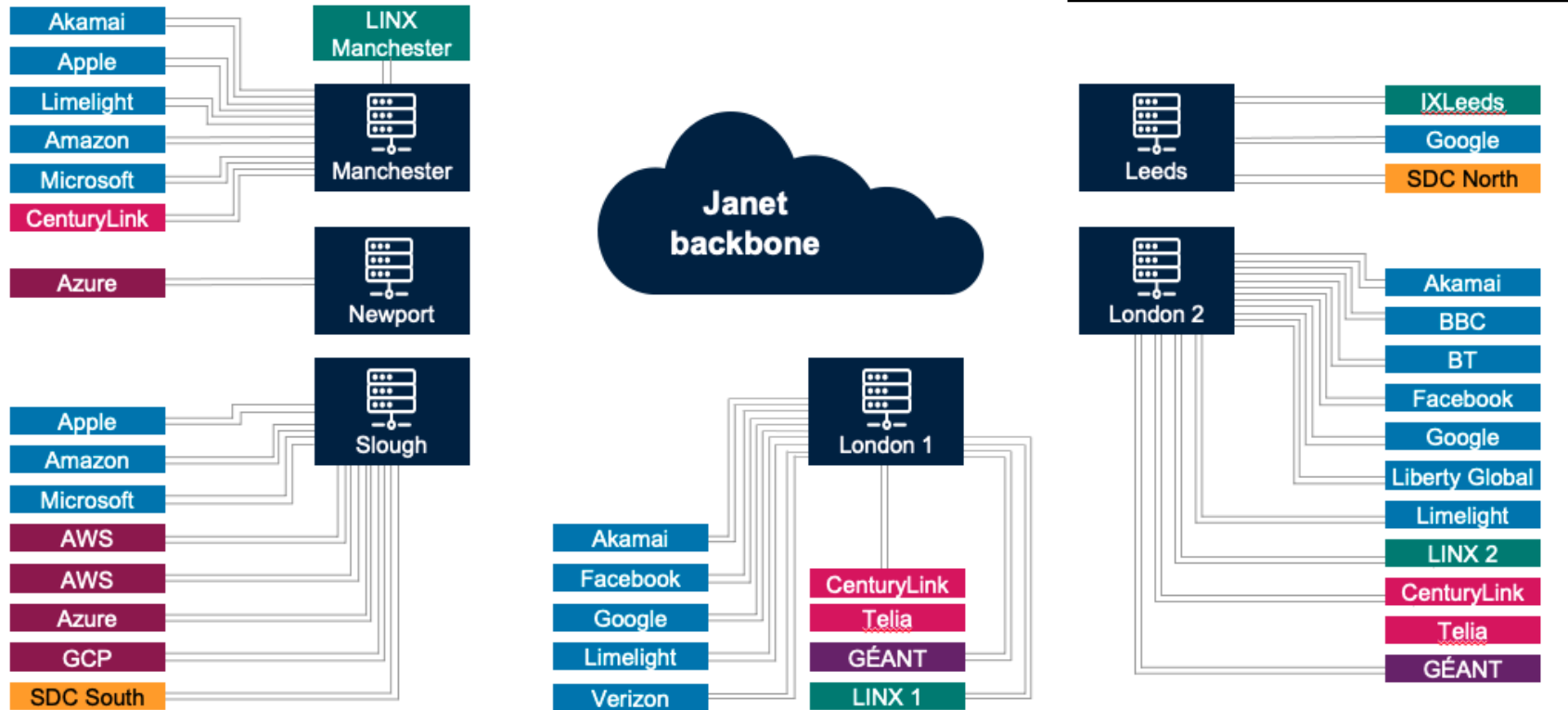
Janet network access refresh

Improving network access across the UK

- Janet sites connect via a number of former regional networks

- A rolling programme is refreshing the access network
  - For information and status see
    https://www.jisc.ac.uk/rd/projects/shaping-the-future-of-janet

- Many benefits for you and Jisc
  - Harmonising network technology – a unified architecture
  - Reduced delivery time for new connections
  - Agile deployment of new services
  - Improved resilience, more scalable

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What can I expect from my available capacity?

In ideal conditions, with the network there for just you…

	1 Min	5 Mins	20 Mins	1 Hour	8 Hours	1 Day	7 Day	30 Days
10 PB	1,333Tbps	266.7Tbps	66.7Tbps	22.2Tbps	2.78Tbps	926Gbps	132Gbps	30.9Gbps
1 PB	133.3Tbps	26.7Tbps	6.67Tbps	2.2Tbps	278Gbps	**92.6Gbps**	13.2Gbps	3.09Gbps
100 TB	13.3Tbps	2.67Tbps	667Gbps	222Gbps	27.8Gbps	**9.26Gbps**	1.32Gbps	309Mbps
10 TB	1.33Tbps	266.7Gbps	66.7Gbps	22.2Gbps	2.78Gbps	926Mbps	132Mbps	30.9Mbps
1 TB	133.3Gbps	26.67Gbps	6.67Gbps	**2.22Gbps**	278Mbps	92.6Mbps	13.2Mbps	3.09Mbps
100 GB	13.3Gbps	2.67Gbps	667Mbps	222Mbps	27.8Mbps	9.26Mbps	1.32Mbps	309Kbps
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1 GB	133.3Mbps	26.7Mbps	6.67Mbps	2.22Mbps	278Kbps	92.6Kbps	13.2Kbps	3.09Kbps
100 MB	13.3Mbps	2.67Mbps	667Kbps	222Kbps	27.8Kbps	9.26Kbps	1.32Kbps	0.31Kbps

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Connecting to Janet at 100G?

Many use cases, not just in GridPP

- The GridPP position has been be covered by Duncan
  - The community's network forward look is really useful!
  - I recently blogged about the [100G of GridPP traffic to Imperial](#)
- SKA will place demands on the participating sites
- Scientific equipment is getting more precise, e.g. cryoEM
- RAL is at 200G resilient, plus 100G dedicated link to CERN (LHCOPN)
- 100G delivered (at least from the Jisc side):
  - Edinburgh ACF, Manchester, STFC Daresbury, QMUL, Imperial, EBI/EMBL, ECMWF, Oxford, UKAEA

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Upgrading a site's Janet connectivity

How do I get more capacity?

- Jisc uses its network utilisation data to determine when a site is likely to need an upgrade
  - The same data you can see in Netsight (more in a moment)
  - Predictions are based on organic growth, not step change
- If you believe you need a capacity upgrade
  - Talk to your Jisc relationship manager
  - Feel free to chat to Chris Walker
  - The upgrade is then processed based on the need and budget
  - Backup links should be considered

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Netsight and BRIAN

Views on traffic levels

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What is the capacity / traffic for my site?

Available via Netsight

- The Netsight3 tool shows capacity and traffic usage (in/out)
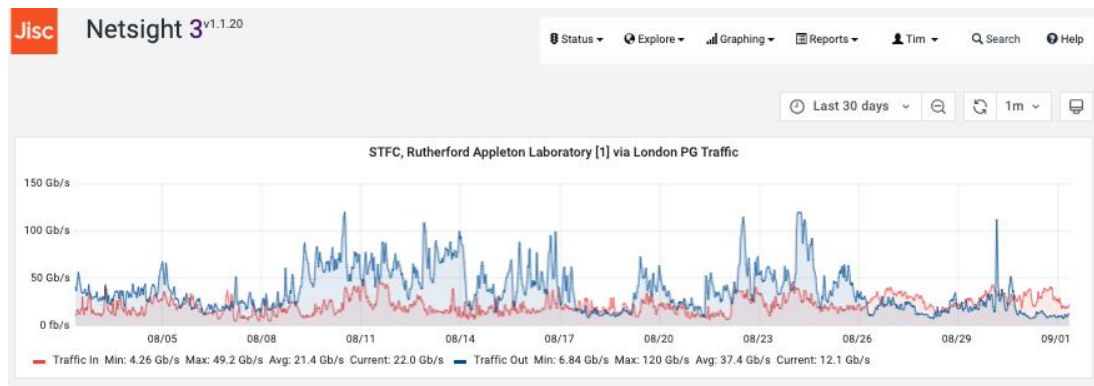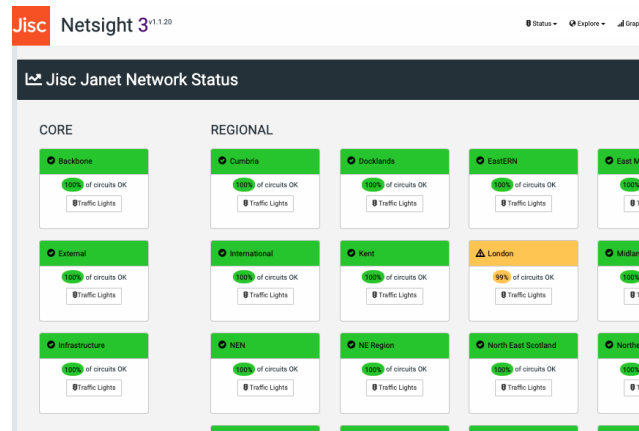 - https://netsight3.ja.net/view
- Some entries are a campus, **some** show specific GridPP facilities
- RAL example to right
  - But that's all of RAL

- Part of Janet IP Connection
- Account-based access
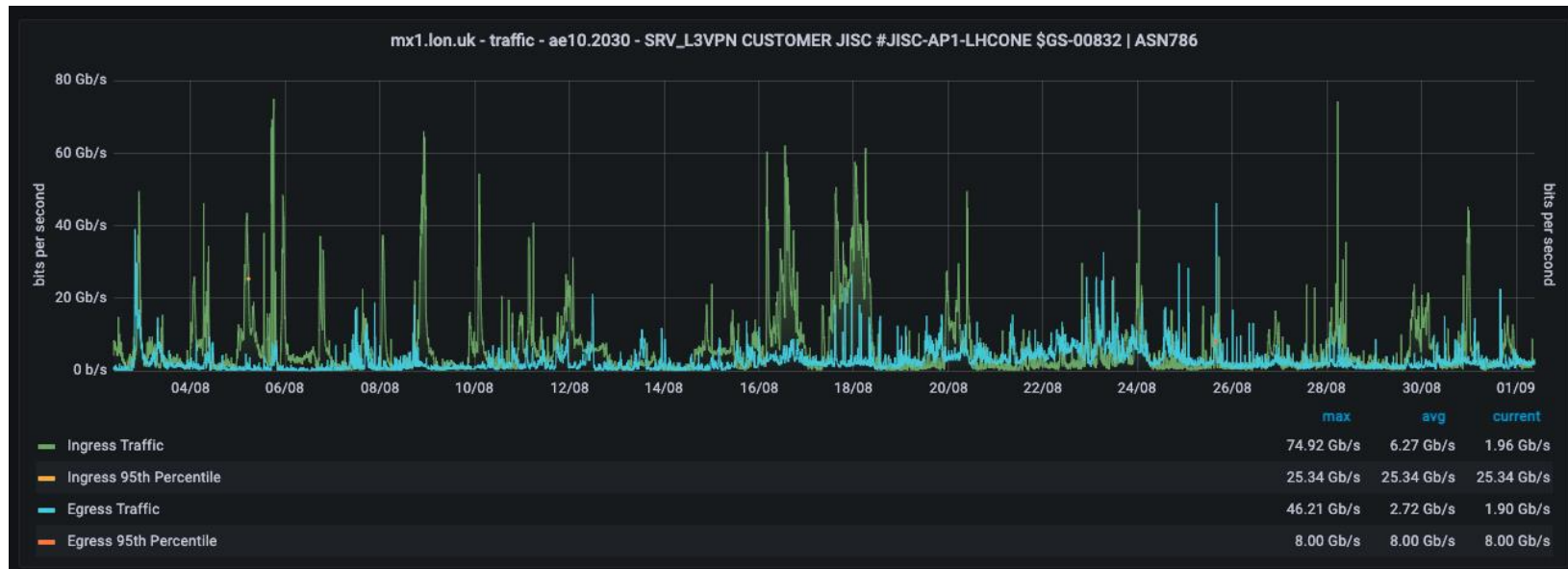
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How much traffic is going to/from GÉANT?

Monitoring is available through BRIAN

- GÉANT's new monitoring platform

- Janet <-> GÉANT:
  - https://public-brian.geant.org/d/S8qjUmwMz/jisc?orgId=5&from=now-30d&to=now (last 30 days)
  - Peak in: 144Gbps, peak out 168Gbps (from GÉANT perspective)

- Janet <-> LHCONE:
  - https://public-brian.geant.org/d/BSLnzJg4k/jisc?orgId=5
  - Peak in: 45Gbps, peak out 21Gbps, mainly IPv6 ☺

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Traffic between Janet and GÉANT

LHCONE traffic between Janet and GÉANT

mx1.lon.uk - traffic - ae10.2030 - SRV_L3VPN CUSTOMER JISC #JISC-AP1-LHCONE $GS-00832 | ASN786

	max	avg	current
Ingress Traffic	74.92 Gb/s	6.27 Gb/s	1.96 Gb/s
Ingress 95th Percentile	25.34 Gb/s	25.34 Gb/s	25.34 Gb/s
Egress Traffic	46.21 Gb/s	2.72 Gb/s	1.90 Gb/s
Egress 95th Percentile	8.00 Gb/s	8.00 Gb/s	8.00 Gb/s

Jisc-hosted performance test tools

Tools we make available on the Janet backbone

Jisc-hosted performance test tools

New 100G facility added in London

- **Slough DC**
- **iperf server (**10G**):**
  - *iperf-slough-10g.ja.net*
- **perfSONAR server** (10G)
  - *ps-slough-10g.ja.net*
  - *ps-slough-1g.ja.net*
- **Data transfer node (**10G DTN**)**
  - *dtn-slough-10g.ja.net*
  - Globus, or other tools on request

- **London PoP**
- **perfSONAR server** (100G)
  - *ps-london-bw.ja.net*
  - *ps-london-lat.ja.net*
  - In WLCG 100G mesh
- iperf and DTN to follow

- Email netperf@jisc.ac.uk for help with any of these

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Other brief topics…

A few closing things to highlight

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WLCG net-wg project: packet marking

Identifying experiment traffic and applications

- A [good deck given at LHCONE/OPN #48](#) in March
- Aim is to mark traffic by experiment and application
- Solution space includes:
  - IPv6 Flow Label (20 bits)
  - Firefly packets
- ESnet firefly pilot running for some time
- Brunel and Glasgow hoping to start UK pilot (using XrootD)
- Jisc can run a firefly collector
- More participants welcome!

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NetSage

Combining traffic monitoring sources

- NetSage is a long-running project that enables multiple traffic monitoring data sources to be combined, and analysed, with innovative visualisations – see https://www.netsage.global/

- We *could* feed GridPP site traffic-related data in:
  - Netsight traffic levels, netflow records, perfSONAR measurements

- The one snag is NetSage data is held in the US, at IU, who have a privacy statement, but participating sites would need to be comfortable with this
  - Traffic records could be anonymised to some level (last 8 bits of a v4 /24)

- If some sites were interested, we could start a pilot very soon

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Research Network Infrastructure Engineers

A potential community?

- There are many network and campus IT staff wrestling with supporting large scale data transfers, and the necessary infrastructure and best practices to make them work well

- At Networkshop Jisc held a post-event 'fringe' meeting to gauge interest in a community in this space
  - Main goal: Share experience, discuss common issues

- Not a GridPP activity – it would include other disciplines and projects (SKA, cryoEM, etc)

- Maybe a monthly call, Teams group or similar – if interested, please let us know.

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Thank you

- Questions?

- Please feel free to get in touch
  - General: help@jisc.ac.uk
  - Network performance: netperf@jisc.ac.uk
  - Me: tim.chown@jisc.ac.uk
- Or speak to your Jisc relationship manager
  - https://www.jisc.ac.uk/contact/your-account-manager

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