Janet Update

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_2025

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Janet update

Jisc as your National Research and Education Network (NREN)

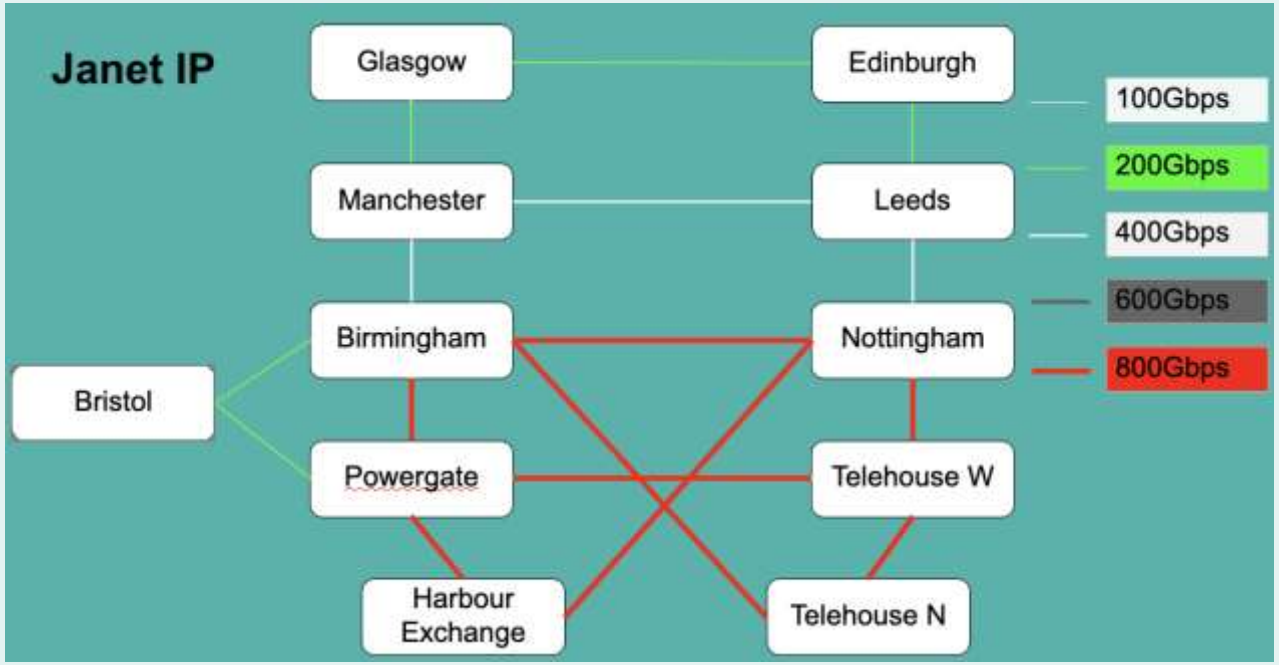
- The Janet network
- Our network performance tools
- Our Research Network Engineering community
- What might interest you for your research
- How you might help us make Janet better

- If you have any interest to work with us, or need something, just email me or Chris

The Janet network

Current status

- Core backbone running at up to 800G
  - Looking at 1.2T+
- New optical upgrades
  - 50GHz add/drop to ‘colourless’
- 400G R&E peering to GÉANT
- 5T aggregate to external networks
- Jumbo-frame ready (9000 MTU)
- Supports L2/L3 VPNs across/beyond Janet
  - Janet Netpath(+) - https://www.jisc.ac.uk/netpath
- Enabling RPKI



Network Performance tools

Capabilities we provide – all open and free to use

- Ad-hoc throughput testing to our reference servers using **iperf** or **ethr**
- Open perfSONAR servers, with archiving
  - Collect measurements of **network characteristics over time**
  - Allows historic comparisons and analysis
- **Ad hoc application disk-to-disk copying** to/from data transfer nodes (DTN)
- A RIPE Atlas anchor, for bespoke RIPE Atlas tests
- All on IPv4/IPv6, at 10G or 100G, with jumbo-enabled servers (9000 MTU)

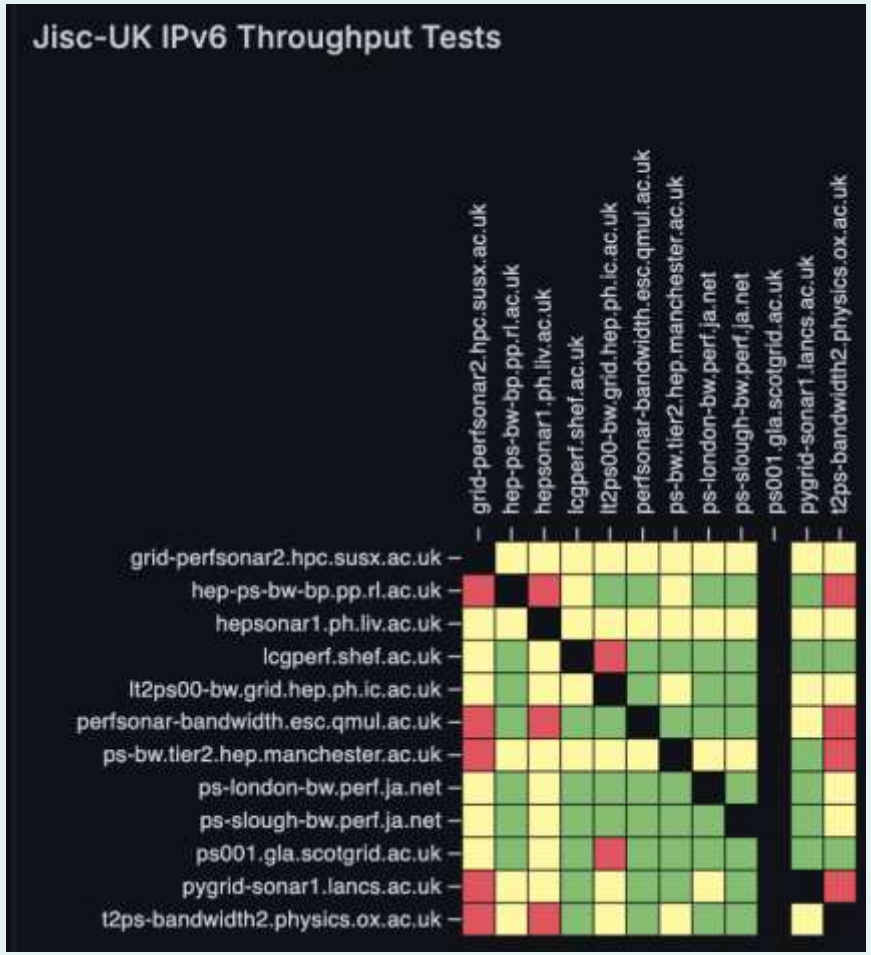
- Any questions or issues, email netperf@jisc.ac.uk
- See https://www.jisc.ac.uk/guides/using-the-janet-network-performance-test-facilities

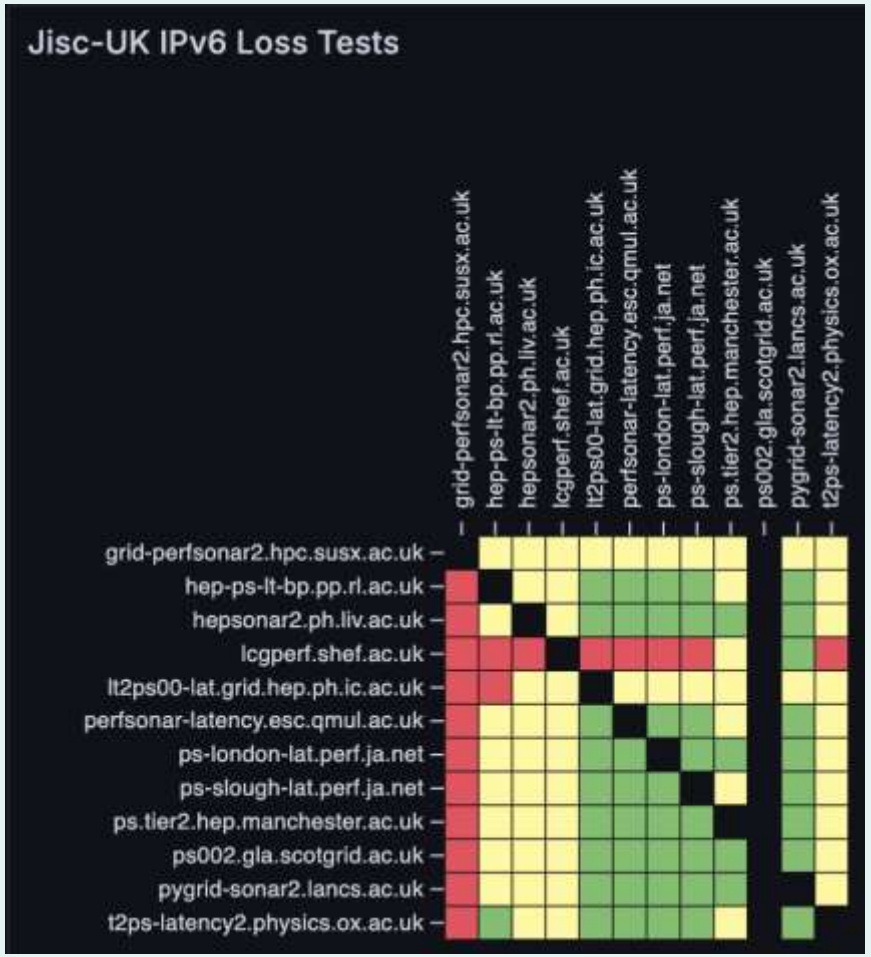
perfSONAR

For persistent network characteristic monitoring

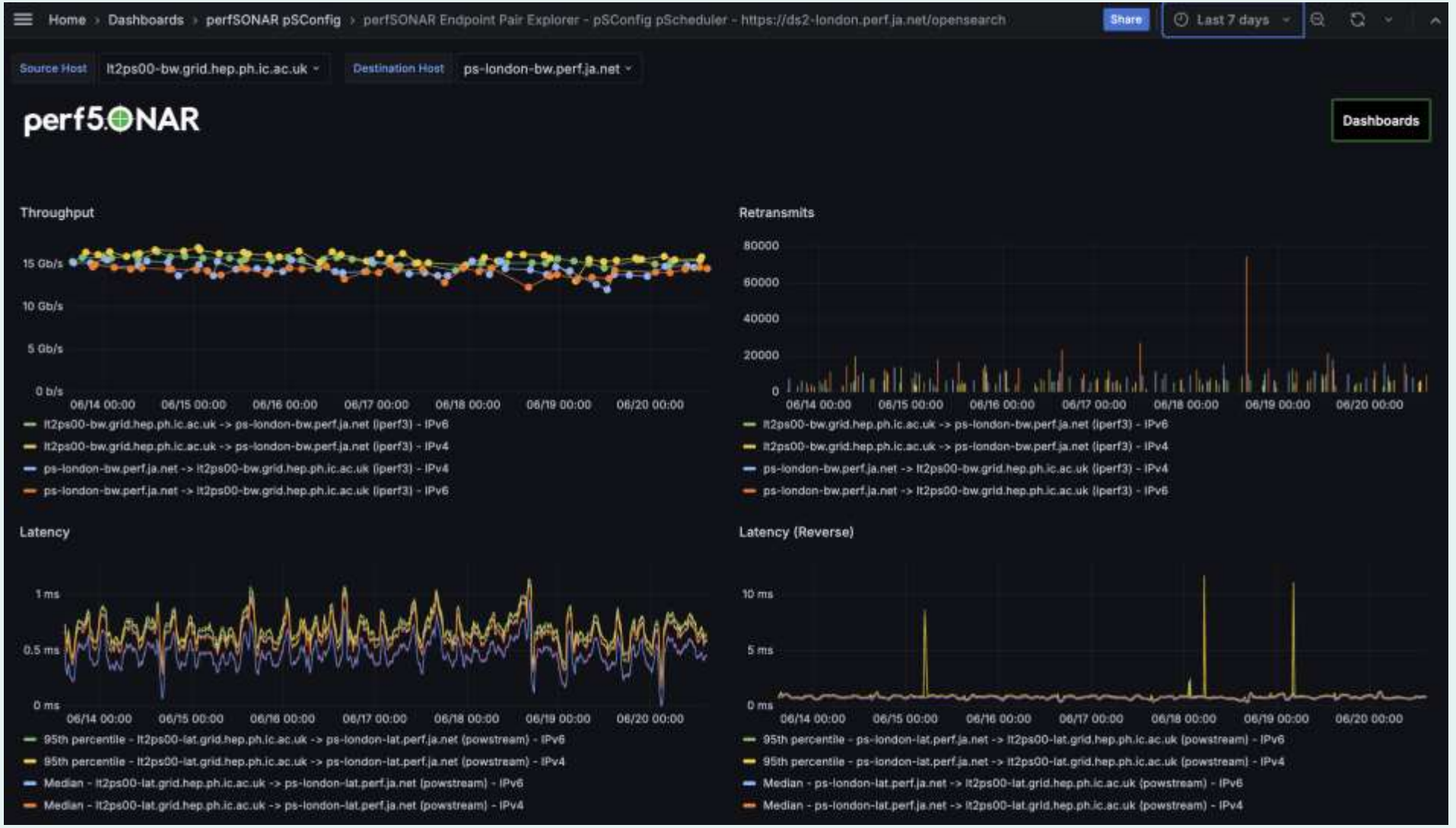
- Open source, with R&E developers, see https://www.perfsonar.net
- Continuously tests latency, loss, path and runs periodic throughput tests (default 6 hourly)
- Over 1,000 servers in R&E networks, used heavily by WLCG (CERN experiments)
- Jisc offers two servers:
  - Slough DC (10G) - **ps-slough-bw.perf.ja.net** and **ps-slough-lat.perf.ja.net**
  - London TN2 PoP (100G) - **ps-london-bw.perf.ja.net** and **ps-london-lat.perf.ja.net**
- We also offer mesh and archive hosting, and Grafana GUIs
  - See examples at https://ps-mesh.perf.ja.net/grafana/dashboards/f/ddl3qr8ufgagwe/
  - Includes a UK test mesh of (currently) 14 servers, mainly GridPP (CERN experiments)

UK test mesh examples





Clicking to dive into results over time



Using perfSONAR

Some tips

- How do I find servers to use?
  - Use the perfSONAR directory dashboard at https://stats.perfsonar.net/
  - GÉANT servers are listed at https://network.geant.org/perfsonar/

- Running tests between remote servers on demand with pscheduler:
  - **pscheduler task throughput --source HOST1 --dest HOST2**
- You can also **use pscheduler to change MTU (MSS), CCA, buffer sizes, parallel streams,** …
  - And can potentially add new test types as plugins

- If you run a minimal ‘testpoint’ installation, Jisc can archive your data and offer a Grafana GUI

Janet RIPE Atlas anchor

A global infrastructure – used heavily by researchers

- See https://atlas.ripe.net/
- Supports measurements from RIPE Atlas nodes
  - Hardware (available from RIPE) or software probes
- The RIPE Atlas ecosystem is mature
  - Well over 10,000 probes around the world
- Our anchor node is deployed at Slough
  - See https://atlas.ripe.net/probes/6695/
  - Useful for loss and latency, but can do more bespoke tests

- We can give you ‘credits’ to run tests, we have billions of them!

IETF responsiveness (RPM) test

An interesting new user-oriented test – can measure 'lagginess'

- Being defined in the IETF
  - https://datatracker.ietf.org/doc/draft-ietf-ippm-responsiveness/
  - Involvement from Apple and others
  - Emerged from various 'bufferbloat' discussions
  - The test reports responses per second under load – higher numbers are better

- Implementations?
  - Our iperf2 server supports it (as do clients as of iperf 2.1.9)
  - You can test with the –bounceback option, for example:
    - iperf -c iperf-slough-10g.perf.ja.net -i 1 --bounceback

Piloting streaming telemetry

Fine-grained monitoring

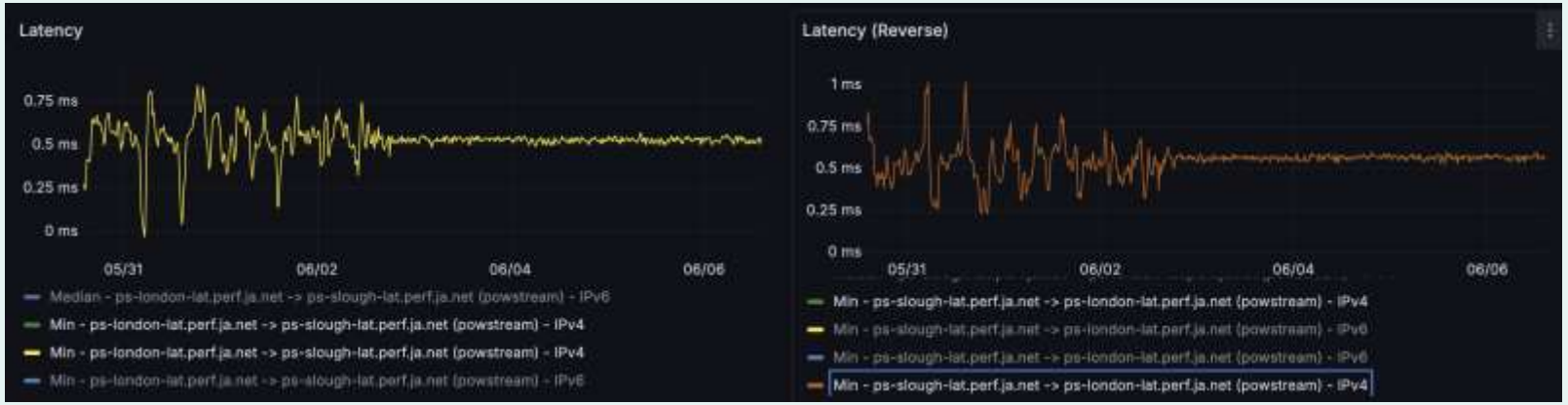
- Most traffic volume monitoring is done using SNMP, typically 5-minute polling
  - Good for indicative traffic levels, traffic forecasting, capacity planning
  - Bad for seeing detailed traffic, e.g., the impact of a 30-second iperf test

- An alternative is streaming telemetry
  - Subscription-based data – device streams requested data to a collector
  - Can effectively give real-time information via a Grafana GUI to the resulting database
  - Jisc piloting on own infrastructure – EX4600 at Slough DC
  - Potential to enable on at least some of our MRS devices for members (maybe on demand)
  - Promising for detailed traffic and related data and performance investigations

Time synchronisation

Time to improve time!

- Jisc provides NTP servers for Janet - https://www.jisc.ac.uk/network-time
- Recently taken a PTP feed from NPL to improve resilience and accuracy
- Exploring how to extend PTP across Janet – is this of interest to your research?
- Also looking at improving stability with NTP – e.g., tweaking Chrony configuration
- Feel free to get involved – perhaps join our timesync perfSONAR mesh



chrony.conf:
server ntp5.ja.net minpoll 5
maxpoll 5 iburst
lock_all
sysconfig:
vm_swappiness=1

Research Network Engineering Community

For discussion of campus network engineering to support science/research

- Membership largely those with an interest in supporting science
  - Largely large-scale data transfers, but recently also low latency (networked music)
- Monthly online calls on a specific topic, with discussion
  - Running since December 2022
  - Scope to have network research-oriented sessions if you have a topic?
- Past examples include:
  - SKA project, Globus, WLCG (Rucio/FTS), ESnet data movement, Scitags, Jumbo frames, TCP-BBR, streaming telemetry, JASMIN archive, CERN networking, Imperial College, …
- See https://www.jisc.ac.uk/get-involved/research-network-engineering-rne-community-group
  - Includes link to Teams registration and next meeting

How might you help us improve Janet?

What topics are of interest to us?

- Network management and monitoring
  - Performance – monitoring, tuning, … replacing Netsight3, …
  - Helping us understand issues we might see, and to improve them
- Approaches to automation
- How we can make use of AI/ML
  - Seen some very cool examples of network troubleshooting by Internet2
- Security - detection and mitigation
- We've partnered with KENET, the Kenyan NREN - might be opportunities there
- …

If you’d like to do research on Janet

How to approach us

- Bottom line is **speak to Chris or myself**, we’re very keen to try to support your requests
- We do have to be confident that
  - The research will not potentially be detrimental Janet operations
  - That any GDPR/sensitivity requirements are met
- Where necessary, we have NDA ‘paperwork’
  - Nice and simple thanks to Andrew Cormack, who we miss terribly
- Examples:
  - Hosting an IPv6 test server in our Slough DC, various EH/other measurements (Aberdeen)
  - Supporting a project proposal by Royal Academy of Music (RAM)
  - Working with Oxford on energy-aware routing, which also became a GÉANT FTP talk at TNC

Questions?

- Thanks!
- Again, please do feel free to **catch me or Chris** over the two days here
- And especially, let us know what Jisc can do to help you ☺

Resources

- Janet info - https://www.jisc.ac.uk/janet
- NetPerf test tools - https://www.jisc.ac.uk/guides/using-the-janet-network-performance-test-facilities
- Jisc Research Network Engineering (RNE) community - https://www.jisc.ac.uk/get-involved/research-network-engineering-rne-community-group

Thank you

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