Jisc and Janet network update

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Coseners MSN - the 33rd Multi-Service Networks workshop

1st July 2021, online

Agenda

- Overview
- Janet network
- Network development projects: JAP and OSS/BSS
- GÉANT GN4-3 project
- Our challenges
- Network research support
- Janet security policy – consultation on new principles

Overview

Context…

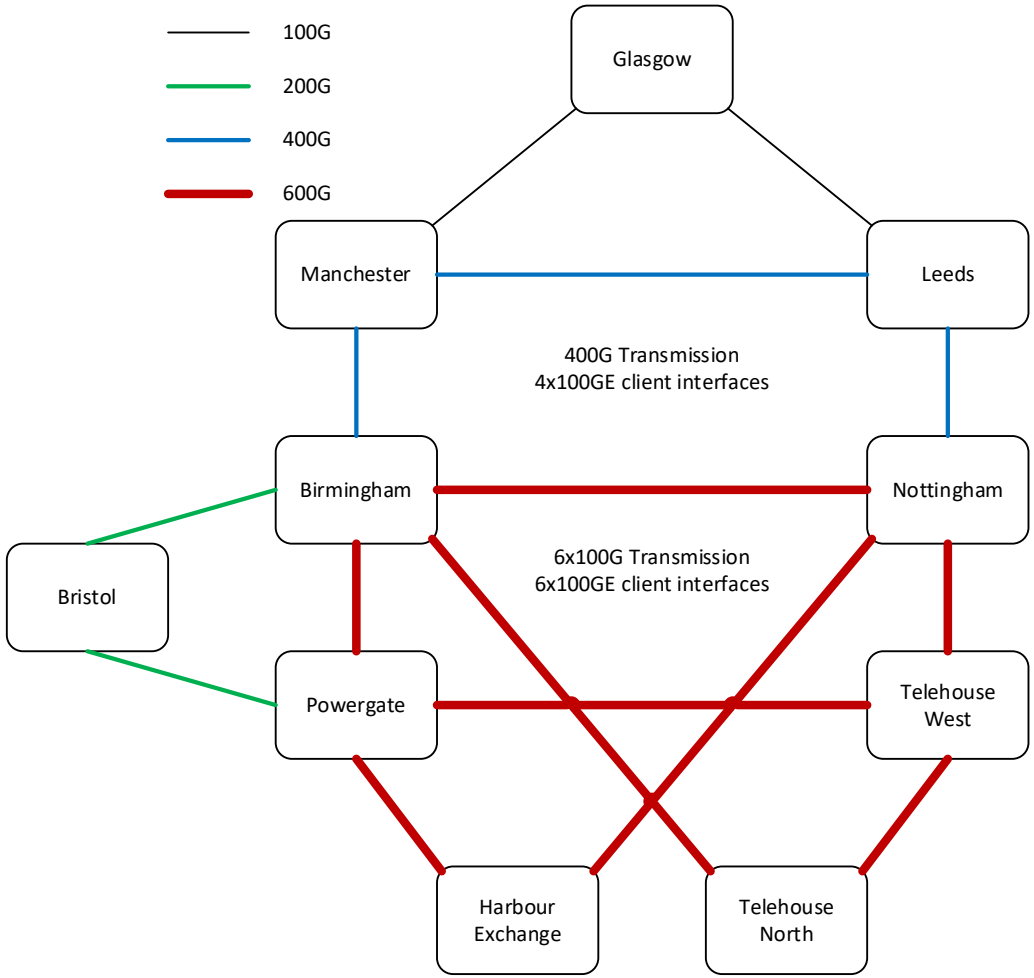
- Janet is your national research and education network (NREN)
- You can watch our annual Janet network update from Networkshop:
  - See https://www.youtube.com/watch?v=Sf1cRTIymGE (15 mins)

This year we said farewell to David Salmon, a long-standing UKERNA/Janet(UK)/Jisc contributor to the Coseners NGN community, who has now retired.
We are currently recruiting a replacement.

Janet network

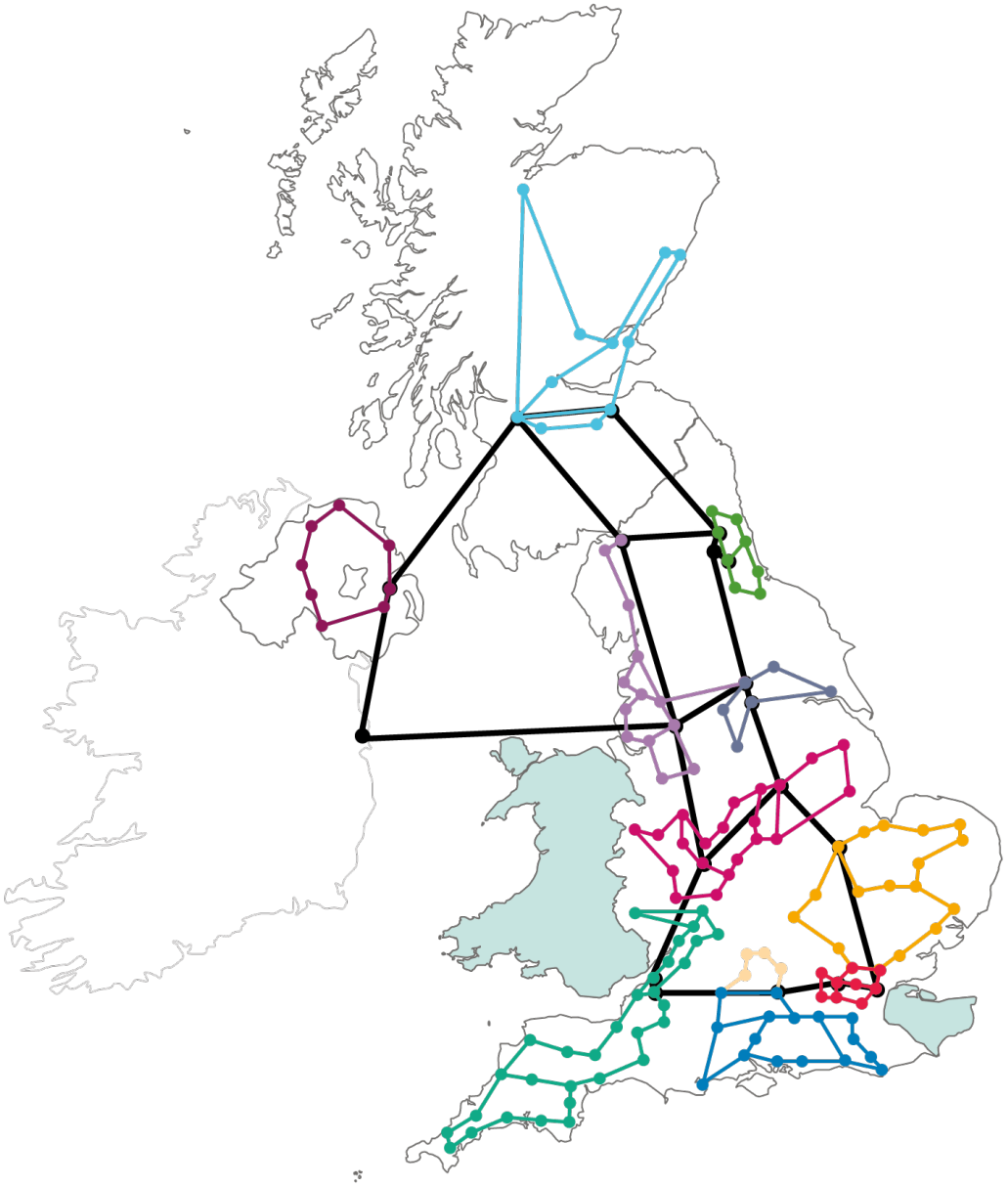
High-level view

- Backbone + regional aggregation
- Dark fibre network backbone
  - Entered service in 2013
  - Ciena transmission, managed in-house
  - (Mainly) Juniper routing equipment
- 6x100Gbps trunks in parts of the network
  - Increasing to 8x100Gbps this year
  - Some 400G transmission
- Fibre contract runs to 2028



Janet backbone and regional access infrastructure

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



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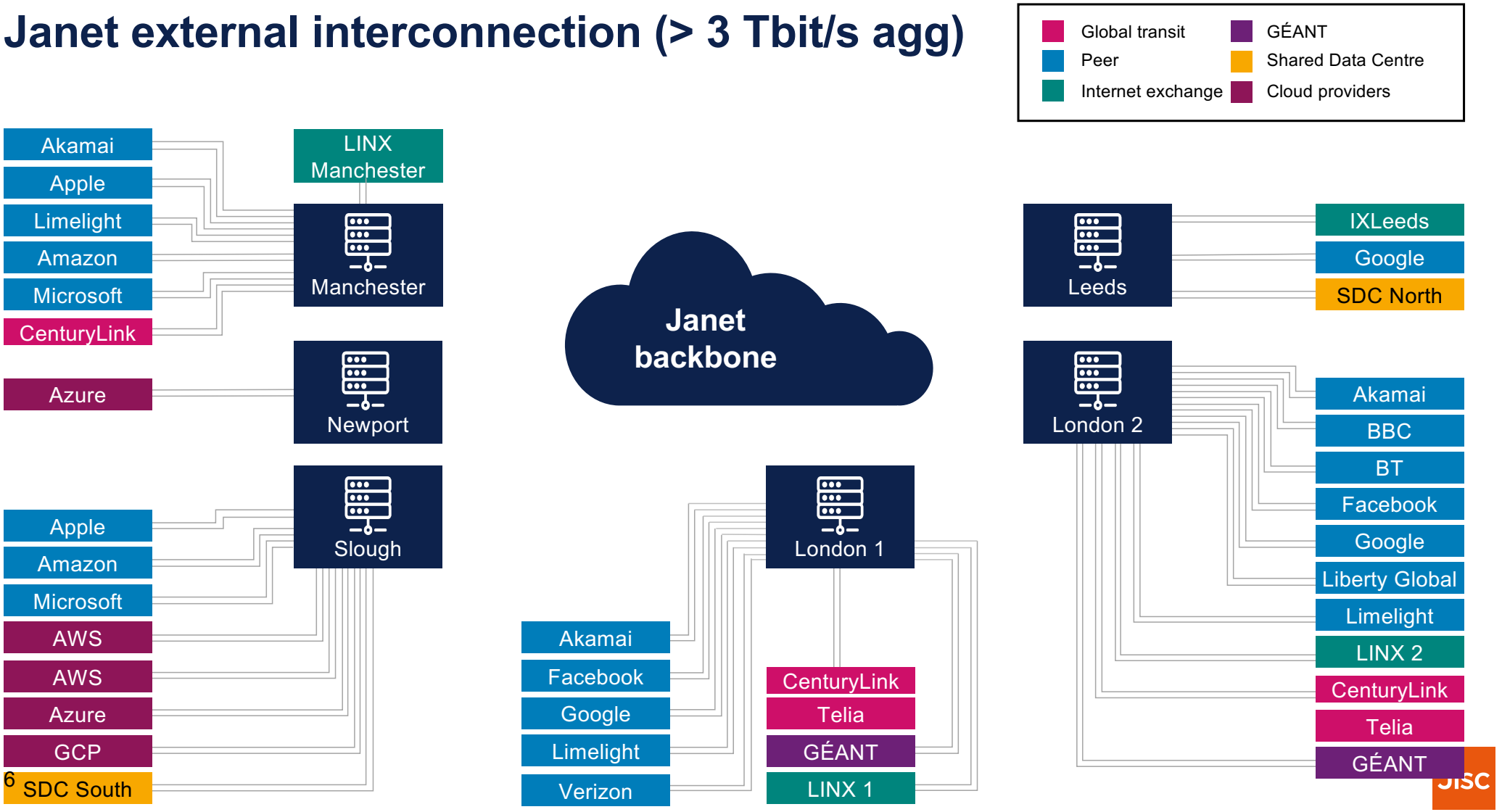
Janet external interconnection (> 3 Tbit/s agg)



Network development projects (1)

Janet Access Programme (JAP)

- Major investment to re-engineer Janet regional networks that connect into the Janet UK-wide backbone, providing:
  - Greater coverage, increased resilience, lower cost and faster provisioning

- Using a common architecture / design pattern
  - Dark fibre, or “dim” services from telco
    - Ciena layer 2 equipment
    - Juniper routing equipment
      - Moving from multiple routers per region to ~2 per region

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Network development projects (2)

OSS / BSS refresh project

- A significant refresh of our systems
- We have built a software team (7 people / unicorns)
- Some early automation examples
  - See David Richardson's Networkshop talk this year (MRS / JAP)
  - Building single source(s) of truth – e.g., NetBox
- Moving towards orchestration and applying business logic

- Tech 2 Tech online events to discuss topics with members
  - https://www.jisc.ac.uk/get-involved/tech-2-tech-your-role-in-shaping-janet

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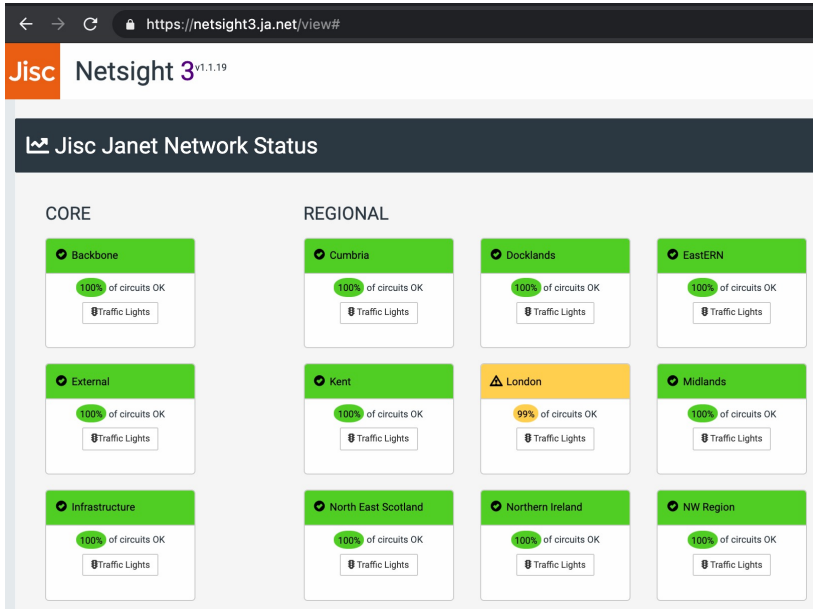
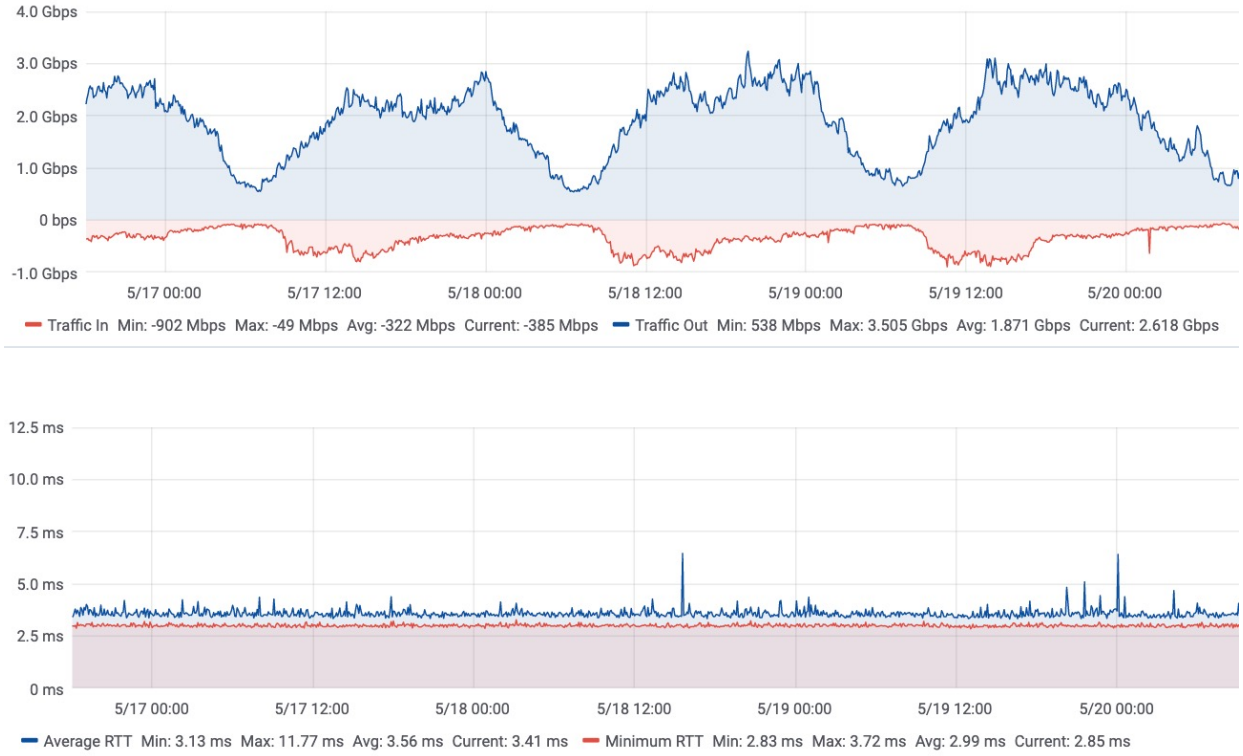
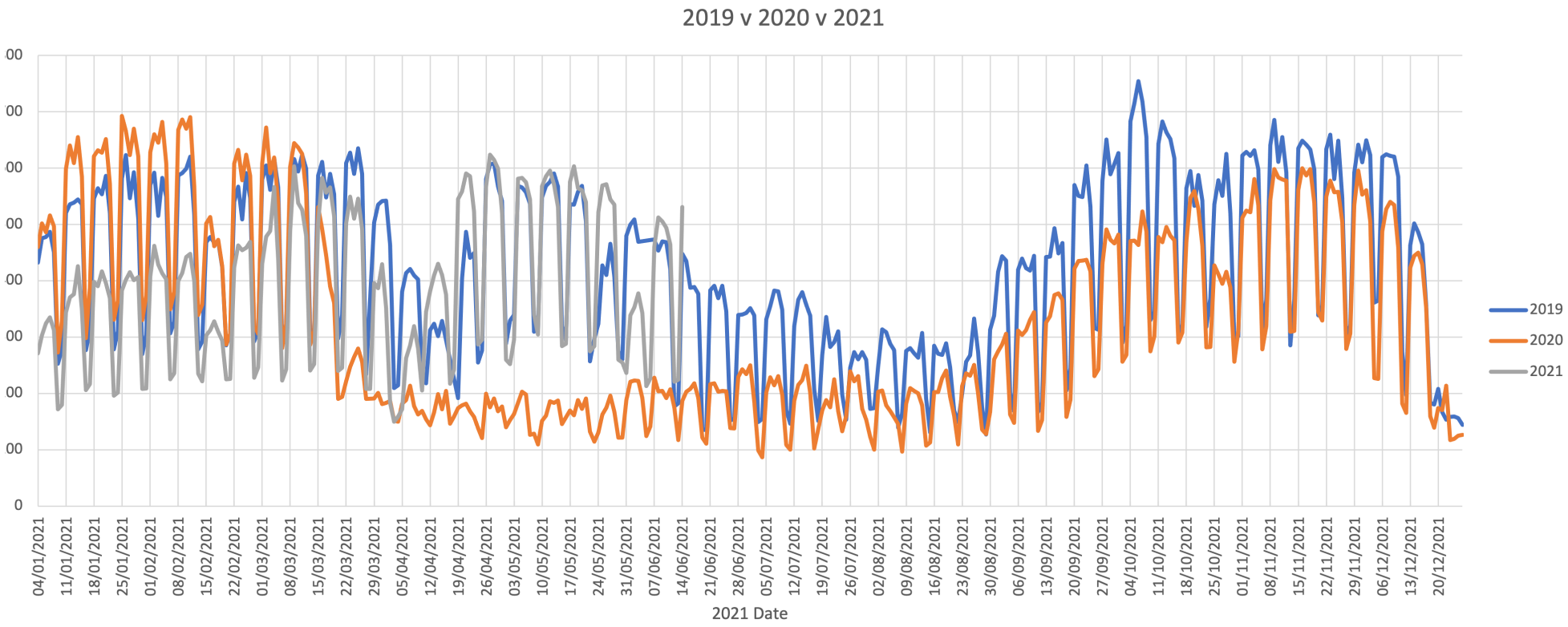
Aside: Netsight3 - https://netsight3.ja.net/





The high-level view and more specific data when logged in

Aside: Traffic levels during the pandemic



Aside: Janet-hosted network performance tools

- What we provide, currently at 10G:
  - **Ad hoc throughput testing** with *iperf3* or *ethr: iperf-slough-10g.ja.net*
  - Collecting measurements of **network characteristics over time** with perfSONAR; allows historic comparisons and analysis
    - https://ps-slough-10g.ja.net/ (and ps-slough-1g-ja.net for latency)
  - **Ad hoc disk to disk copying** from a data transfer node (DTN)
    - e.g., *globus-url-copy …*
  - A **RIPE Atlas** anchor, for bespoke RIPE Atlas tests
    - https://atlas.ripe.net/probes/6695/
  - For questions or suggestions for other tools, email netperf@jisc.ac.uk

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GÉANT GN4-3 project

Interesting areas from GN4-3 WP6, which we co-lead

- Data plane programmability / in-band network telemetry
- Deploying non-IP services: QKD, optical T&F
- RARE: open source platform combining FreeRtr control plane and P4/DPDK data plane, e.g. on Edgecore Wedge 32x100G
  - See https://wiki.geant.org/display/RARE/Home
  - Includes distributed P4 Lab – connections welcomed
- Network monitoring: perfSONAR (with friendly plug-in support)

- Full list of activities: https://wiki.geant.org/display/NETDEV

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Our challenges

How you might be able to help us

- Specifically, might your research areas help us provide a better, more efficient, or improved R&E networking infrastructure?
- Moving towards increased use of orchestration and automation (OSS/BSS)
- Applying AI/ML – fault prediction, trend analysis, security alerts, …
- Measuring residential network QoE with staff and students working from home
- Identifying new network services we could / should offer to members
- Informing us on the impact of new network protocols, or the results of network research that are directly applicable to Janet, e.g., QUIC, BBR, MTU, …

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Network research support

How we might help you

- Letters of support for proposals
- Presence on advisory boards, e.g., EPSRC 'TOWS' project (6G LiFi)
- Project infrastructure support, e.g., for TOUCAN and INITIATE, and (via subcontract) for the UK National Dark Fibre Facility (NDFF)
- Potential participation in projects, as a partner
- Provision or hosting of network test / measurement capabilities
- Providing access to network data (given appropriate controls)
- Exploring new services, e.g., talking with NPL on timing service over Janet

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Janet security policy – a consultation

Consulting on three new principles (for details see extra slide)

- Updating current policy to reflect new threat landscape
- New principles:
  - Geographic IP location blocking **by default** for certain high-risk protocols against traffic inbound to Janet, e.g. for RDP
  - Requirement for annual self-assessed security posture review by members
  - Proactive scanning, in response to critical alerts or actionable intelligence
- Also: New cyber threat sharing group being formed (using MISP)
  - If interested in piloting with Jisc please email cti.analysts@jisc.ac.uk
- Events: Security T2T (31 Aug), annual Jisc security conference (9-11 Nov)

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Thank you

- We’re very keen to discuss any of the topics presented today
- Please feel free to get in touch!

- Email: tim.chown@jisc.ac.uk

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Extra slide

Janet Security Policy – consultation on new principles

- Current policy: https://community.jisc.ac.uk/library/janet-policies/security-policy needs updating to reflect current threat landscape. Goals remain the same, but consulting on three new principles to protect members:
  - Geographic IP location blocking **by default** for certain high-risk protocols against traffic inbound to Janet.
    - e.g. blocking to prevent non-UK access **inbound** to RDP on TCP port 3389.
    - Janet Connected Orgs will be able to opt-out of individual protocols / port blocks at any time and will be able to opt back in as required. A minimum 2 weeks notice period will be given of new blocks unless in response to a clear and present danger.
  - Annual security posture review
    - Janet connected organisations required to complete an annual internal self-assessment review of security posture. There is no requirement to publish or inform Jisc of the outcomes of these reviews, only to complete these annual posture reviews. We are proposing a maturity model that can be used to help inform this self-assessment exercise.
  - Proactive scanning
    - Moving from scanning on an exceptional basis to undertaking regular active scans in response to critical vulnerability alerts or actionable threat intelligence.