Jisc

Networkshop_50

Using RARE/FreeRtr for the Janet network performance test facility

Tim Chown

Network development manager, Jisc

Agenda for this session

P4 / programmable networking in campuses

We have two talks

- I'll give a brief overview of Jisc's work towards launching a **100Gbps network performance test facility** which we are hosting behind a white box running RARE/FreeRtr with P4

- Prof Nick Race will give some general information about P4 and then talk about **research work at Lancaster University** in applying programmable networking
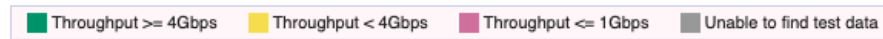
Jisc

Supporting network performance testing

Jisc has 10G-capable test systems you can use today

• Hosted at our Slough shared DC

• Juniper EX4600 in front of physical servers running Linux

• This provides you with three capabilities:

  • **iperf** - *iperf-slough-10g.ja.net*

  • perfSONAR - *ps-slough-10g.ja.net* and *ps-slough-1g.ja.net*

  • DTN application tests, including Globus endpoint

• Email netperf@jisc.ac.uk for further info on these

  • Or to suggest we add other tools that would help you
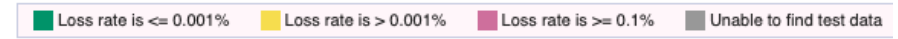
Jisc

Example: perfSONAR mesh for UK GridPP community

See https://psmad.opensciencegrid.org/maddash-webui/index.cgi?dashboard=UK%20Mesh%20Config

Using RARE/FreeRtr for the Janet network performance test facility

Jisc
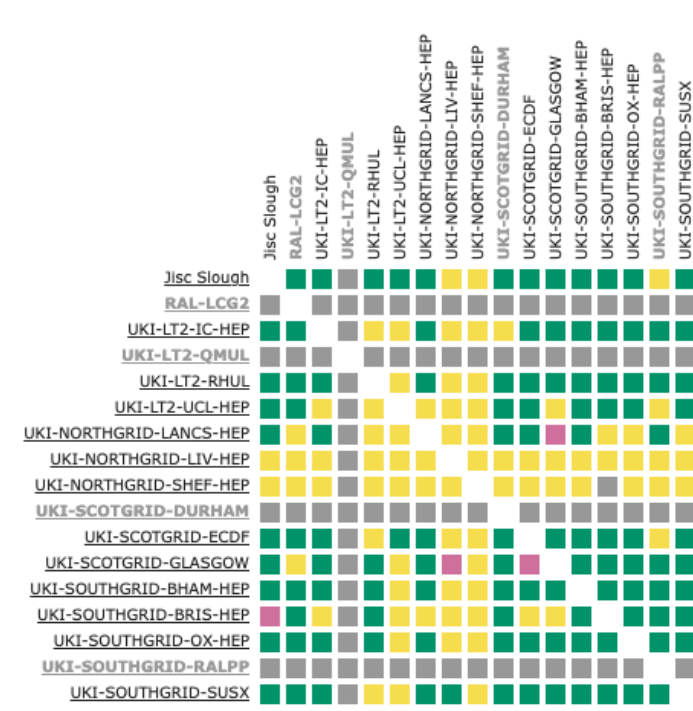
Drilling down to specific measurements over time

Using RARE/FreeRtr for the Janet network performance test facility
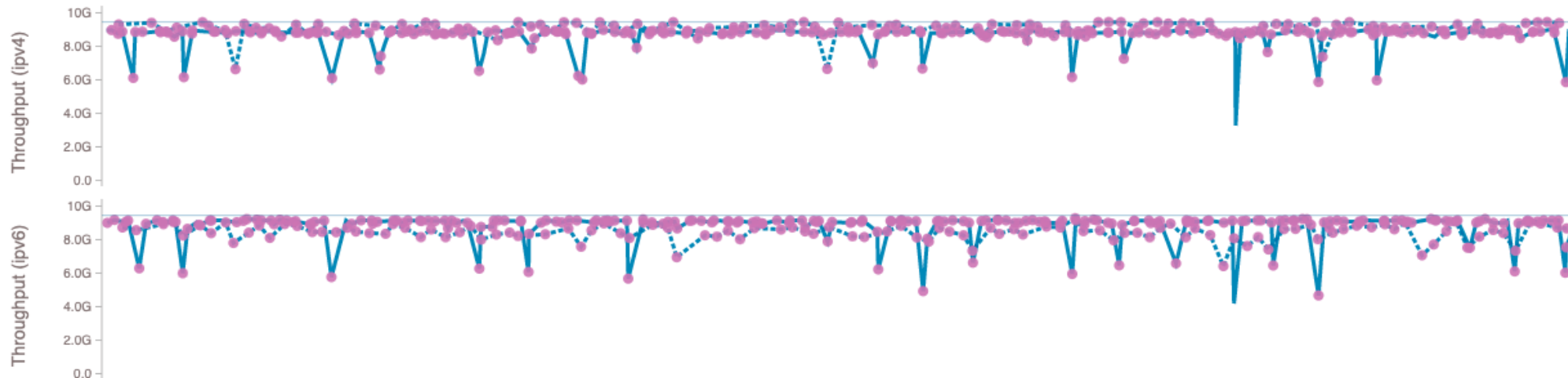
Extending the test capability

Going beyond 10G

- Need to be able to test at the capacity of our member sites
  - Several now connected at 100G, one at 2x100G
  - And certainly to test at > 10G
- Want to be cost-efficient
  - Traditional vendor 100G interfaces are not cheap
- Interested in exploring new alternatives in production
  - The test facility is important, but not mission critical to Janet
- **Would be nice to run a flexible platform where we can more easily add or test features the community want**

Jisc

Enter RARE/FreeRtr

An open source routing platform supporting P4

- Combines FreeRtr control plane with P4 (or other) data plane

- **Feature rich, supports very high performance on low-cost white box hardware**

- Built in GÉANT GN4-3 project, validated on GÉANT P4 Lab

- RARE docs: https://wiki.geant.org/display/RARE/Home

- RARE/FreeRtr docs: http://docs.freertr.org/
  - Includes install for Wedge 100BF-32X (which Jisc is using)
  - ONIE image, CI/CD deployment, Nix package manager

- Mail list: https://lists.geant.org/sympa/info/rare-users

Why RARE/FreeRtr?

Much to like

- Runs on relatively cheap but performant 100G hardware
  - Edgecore Wedge 100BF-32X, 6.4Tbit/s capacity, cost £6,500+VAT
  - Variant of the switch used by Facebook in their DCs

- Demonstrated performant in [2021 Data Mover Challenge](#)
  - Achieved >85Gbps from Amsterdam to Singapore and Australia

- Open platform, with **flexibility to add new features**
  - e.g., [PolKA](#), policy routing, AMT and bier, WLCG packet marking

- Built by members of the NREN community

Jisc

Are there downsides to this approach?

There are potential issues

- It's not a Juniper/Cisco/<insert vendor here> box
  - So there's a new environment to learn
  - There is no 'commercial' support for RARE/FreeRtr

- The Wedge hardware is fast, but limited in some ways
  - In particular the buffers are only 16MB
  - The impact of this may depend on what we try to run
  - If necessary, we will consider a higher spec white box or revert to more traditional hardware

Jisc

When will the 100G facility be available?

Status

- New rack has been set up in London
  - Hardware is being installed
  - Many thanks to David Richardson in our ops team ☺

- We will need to do some internal testing
  - Then will look for community testers

- If all goes well, expect a fuller launch in July/August

- Any questions, please email me or netperf@jisc.ac.uk

Summary

And what next?

- Important that Jisc can provide test facilities to our members

- We see value in getting experience with low cost white box hardware with P4 support
  - Deploying at the edge in a non-critical use case initially

- RARE/FreeRtr is an excellent platform for doing that

- Also keen to explore other new approaches in the facility
  - Streaming telemetry is one example
  - Please feel free to suggest other tools we might provide

Jisc

Thank you

Tim Chown

Network development manager

tim.chown@jisc.ac.uk

_____

T 01235 822106

help@jisc.ac.uk

jisc.ac.uk

Networkshop_50