Jisc

Research & Education Networking in the UK: challenges & opportunities

Jeremy Sharp, Janet Chief Technology Officer

Jisc is the UK digital body dedicated to the education and research communities.

Working in partnership with our Members, together we develop creative solutions

Who are Jisc?

We are the UK's digital agency for lifelong learning and research.
We are a social enterprise of 750 people dedicated to:

Our Vision

For the UK to be the best place in the world to use technology to learn, teach and research.

Our Aim

Powering UK's Higher and Further education's teaching, learning and research, inspiring its digital transformation, and building solutions that make it happen

Jisc

Who are Jisc?

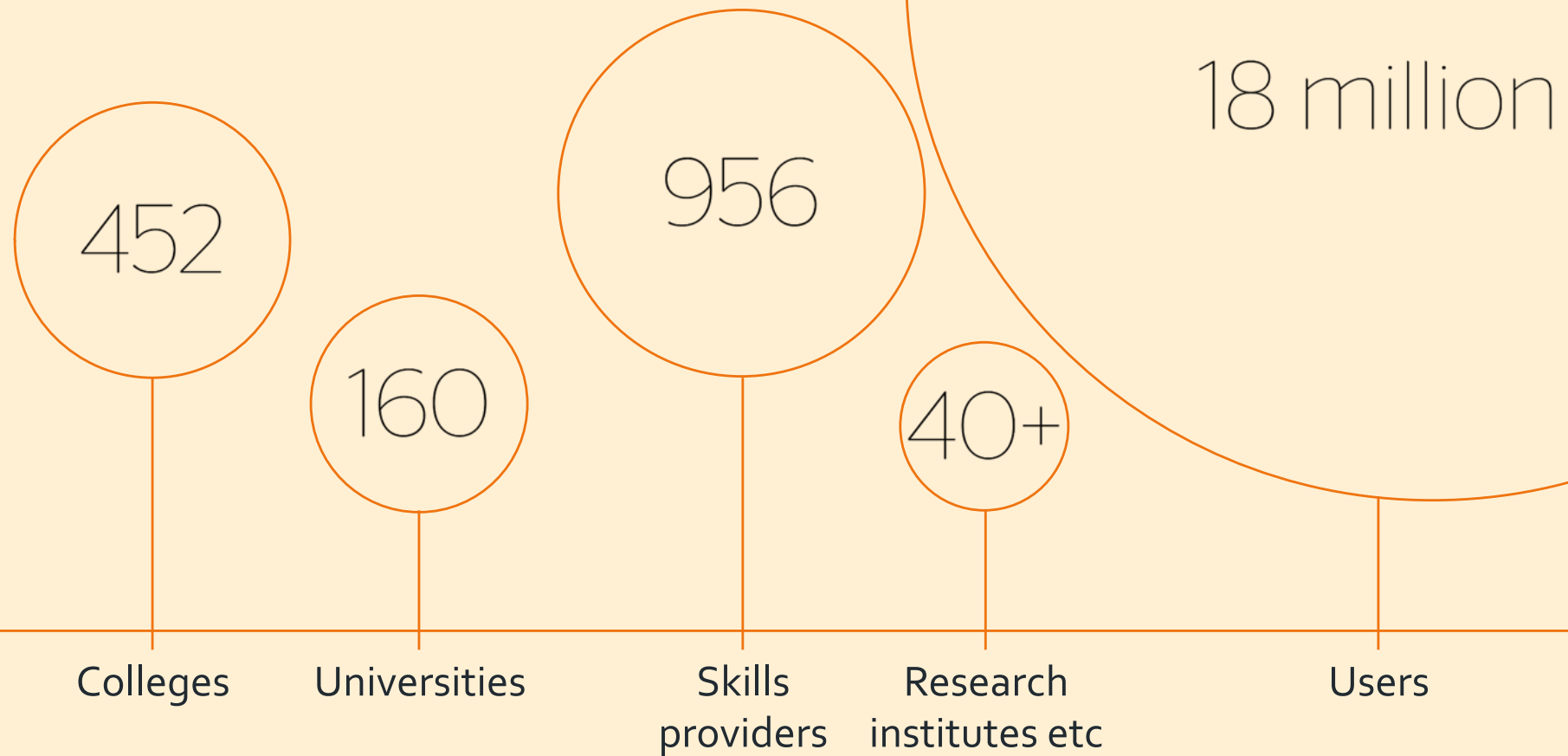## We serve the whole UK:

- All state funded universities
- Vast majority of colleges
- Many schools
- All research institutes
- Many other national institutions
- Work very closely with key national institutions like British Library, National Archives, BBC

Jisc

Our members and users

452 — Colleges

160 — Universities

956 — Skills providers

40+ — Research institutes etc

18 million — Users
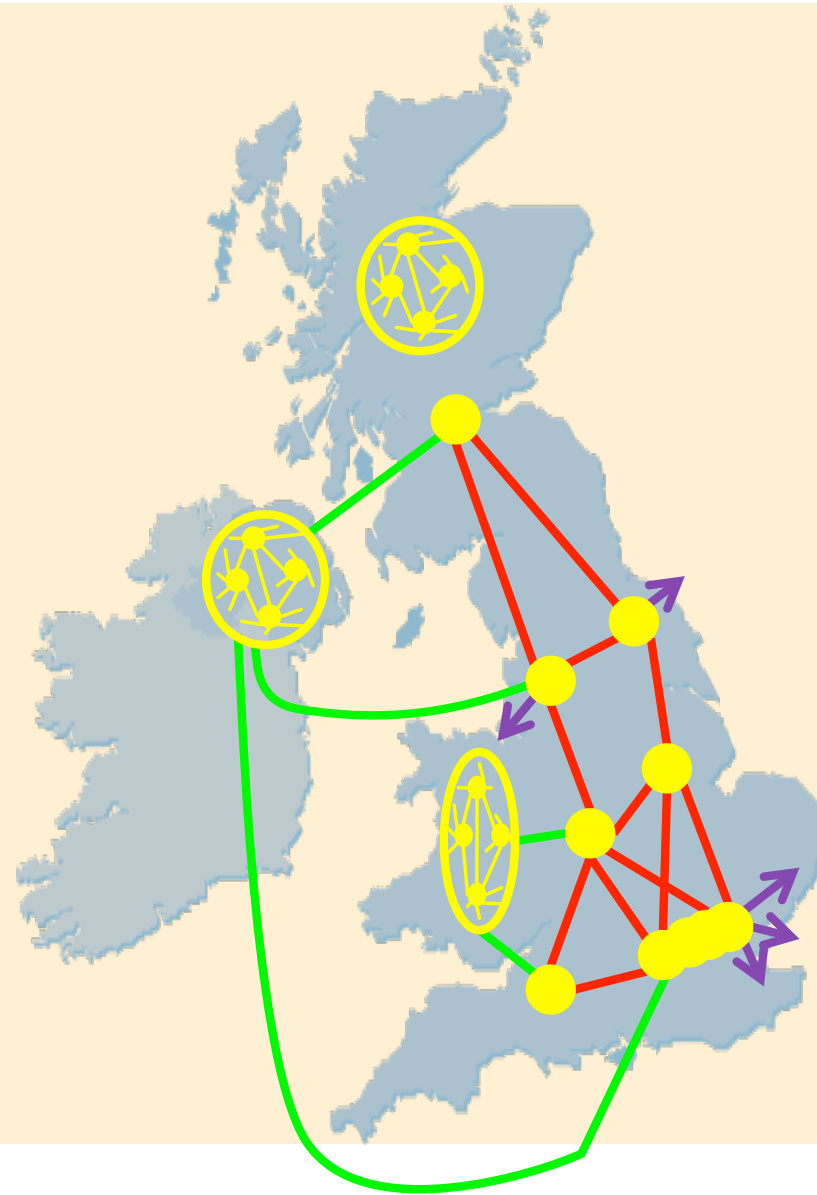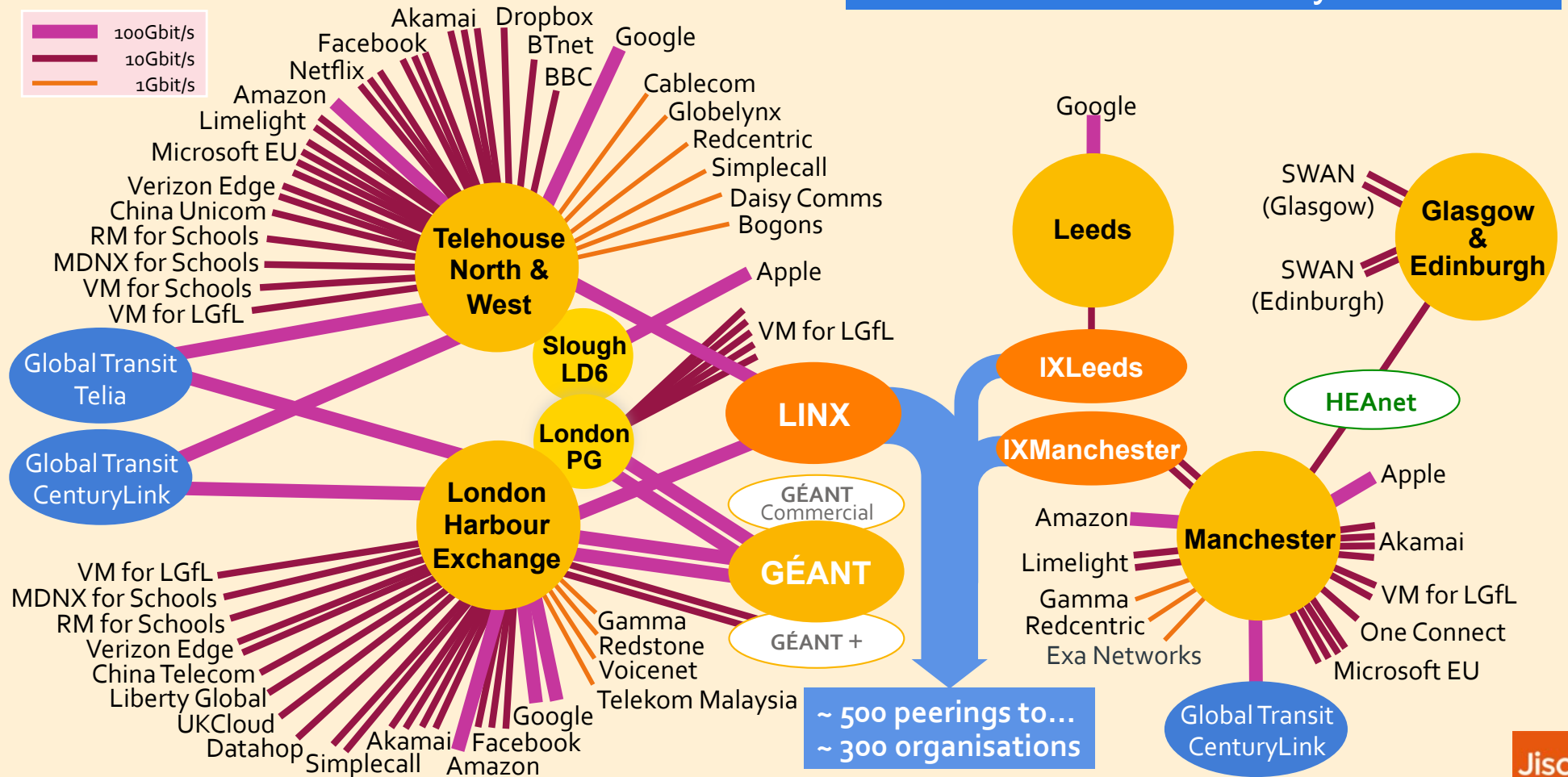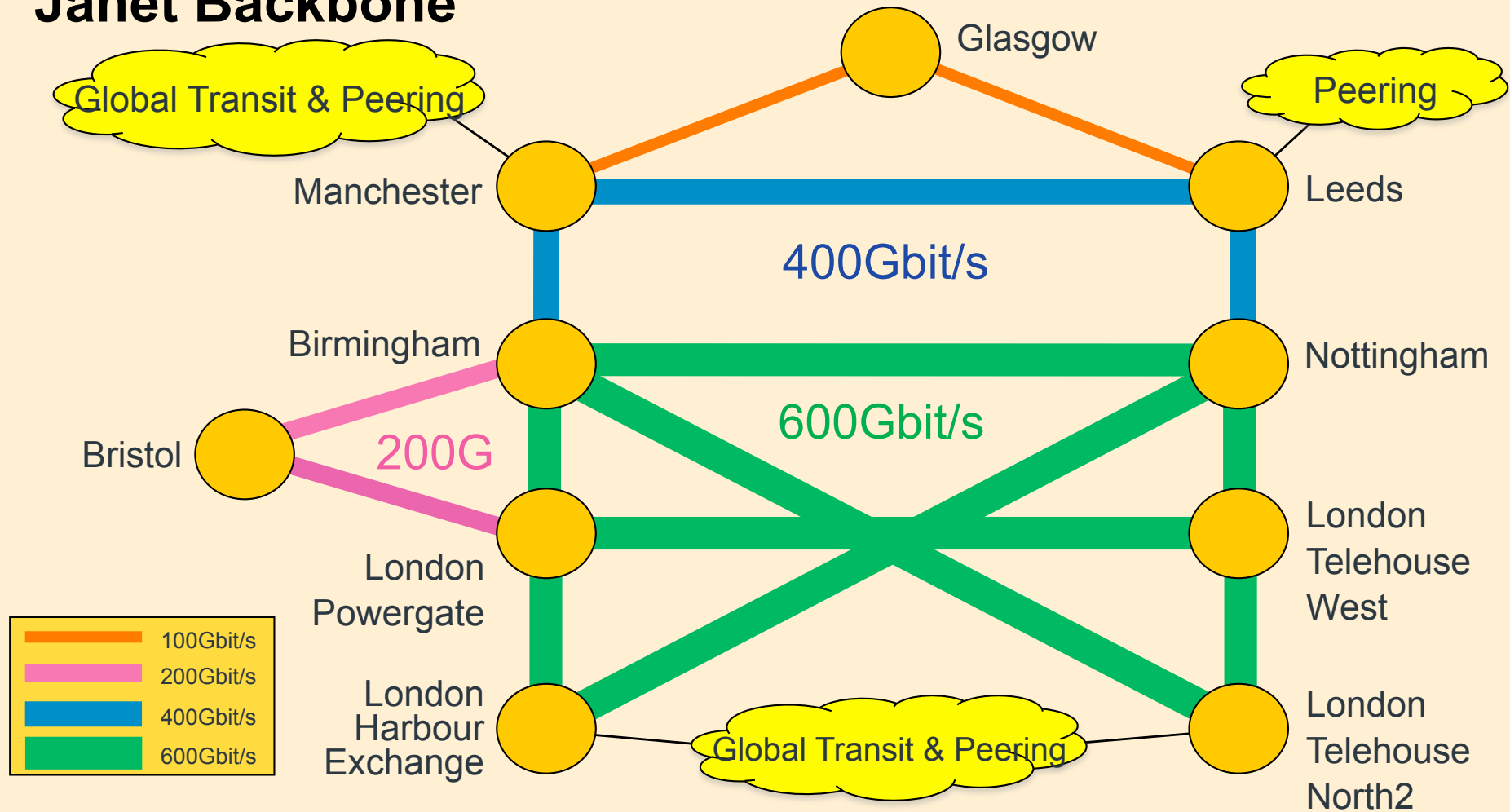
Jisc

The Janet Network

- Ten core points of presence across the UK.
- A fibre core across the UK.
- 19 regional distribution areas.
- Multiple connections for resilience.
- ~900 organisations connected.
- Point to point "Netpath" connections for research.
- ~2.3Tbit/s external connectivity.

Jisc

Total external connectivity ≈ 2.3 Tbit/s

Legend
- 100Gbit/s
- 10Gbit/s
- 1Gbit/s

Telehouse North & West
- Akamai
- Dropbox
- BTnet
- BBC
- Google
- Facebook
- Netflix
- Amazon
- Limelight
- Microsoft EU
- Verizon Edge
- China Unicom
- RM for Schools
- MDNX for Schools
- VM for Schools
- VM for LGfL
- Cablecom
- Globelynx
- Redcentric
- Simplecall
- Daisy Comms
- Bogons
- Apple
- VM for LGfL

Slough LD6

London PG

London Harbour Exchange
- VM for LGfL
- MDNX for Schools
- RM for Schools
- Verizon Edge
- China Telecom
- Liberty Global
- UKCloud
- Datahop
- Simplecall
- Akamai
- Google
- Facebook
- Amazon

Global Transit Telia

Global Transit CenturyLink

LINX

GÉANT Commercial

GÉANT

GÉANT +
- Gamma
- Redstone
- Voicenet
- Telekom Malaysia

~ 500 peerings to…
~ 300 organisations

Leeds
- Google

IXLeeds

IXManchester

Manchester
- Amazon
- Limelight
- Gamma
- Redcentric
- Exa Networks
- Apple
- Akamai
- VM for LGfL
- One Connect
- Microsoft EU

Global Transit CenturyLink

HEAnet

Glasgow & Edinburgh
- SWAN (Glasgow)
- SWAN (Edinburgh)

Jisc

Janet Backbone

Glasgow

Global Transit & Peering

Peering

Manchester

Leeds

400Gbit/s

Birmingham

Nottingham

Bristol

600Gbit/s

200G

London Powergate

London Telehouse West

London Harbour Exchange

Global Transit & Peering

London Telehouse North2

Legend:
- 100Gbit/s
- 200Gbit/s
- 400Gbit/s
- 600Gbit/s

Jisc

A changing landscape

• Reducing central government funding

• Demand for new services

• Increasing complex threat landscape

How we're responding:

• Widening the customer base

• Introducing a wider set of managed services

• **Strengthening our security services**

• Embracing new technology (SDN, NFV)

• **Rearchitecting the regional networks**

• Reorganising how we deliver Janet – Design; Build; Operate approach

Protecting the Janet network and our members

BS 31111 audit and assessment   Cyber security assessment   Cyber security financial X-ray   DDoS mitigation   Email advice and testing   CSIRT   Penetration testing

Security blacklists and whitelists   Simulated phishing and associated training   Splunk   Vulnerability assessment and information service   Web filtering and monitoring

Cyber security

To help you get the most from your Jisc membership, we work to protect the Janet Network and connect organisations

EVENT Book your place - Jisc security conference 2019

We protect the network

We run the world-class Janet Network on behalf of research and education in the UK.

Because of this, it's vital we protect it – detecting and resolving issues that might affect availability, in an effort to ensure seamless access for users.

Security operations centre
Safeguarding the Janet Network

Janet Network CSIRT
Monitoring and resolving any security incidents that occur on the Janet Network

We protect the network

We run the world-class Janet Network on behalf of research and education in the UK.

Because of this, it's vital we protect it – detecting and resolving issues that might affect availability, in an effort to ensure seamless access for users.

Security operations centre
Safeguarding the Janet Network

Janet Network CSIRT
Monitoring and resolving any security incidents that occur on the Janet Network

We protect your organisation

As well as protecting the Janet Network, we also protect your own IT estate. We can respond to cyber security incidents and work to mitigate them, to help protect your reputation and safeguard users.

DDoS mitigation
A range of services to help reduce the risk of losing your connection

Security operations centre
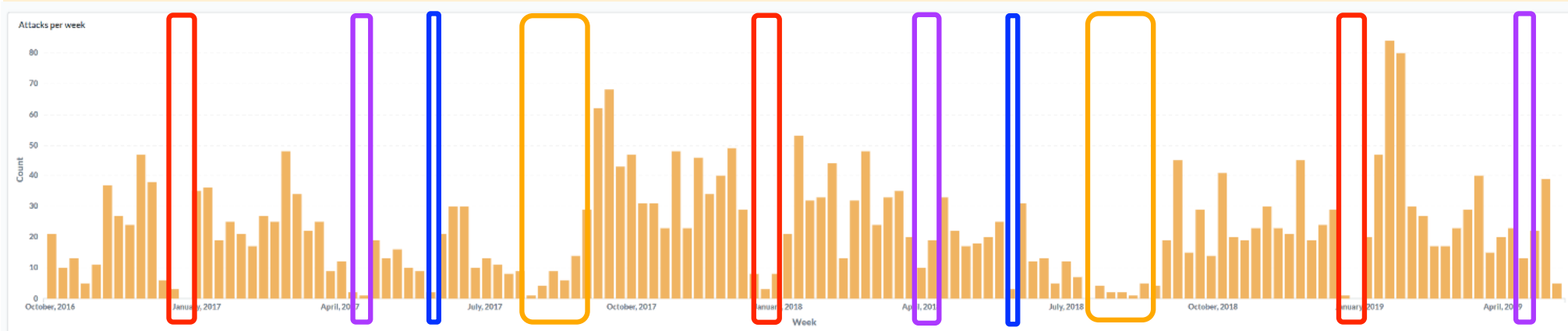Sharing intelligence and advice to help keep your own networks safe

Email advice and testing
Testing your mail servers and reporting unauthorised relays

Security blacklists and whitelists
Access our copies of several leading DNS blacklists and whitelists to protect your users from email abuse

Jisc

DDoS mitigation enhancement

Attacks per week
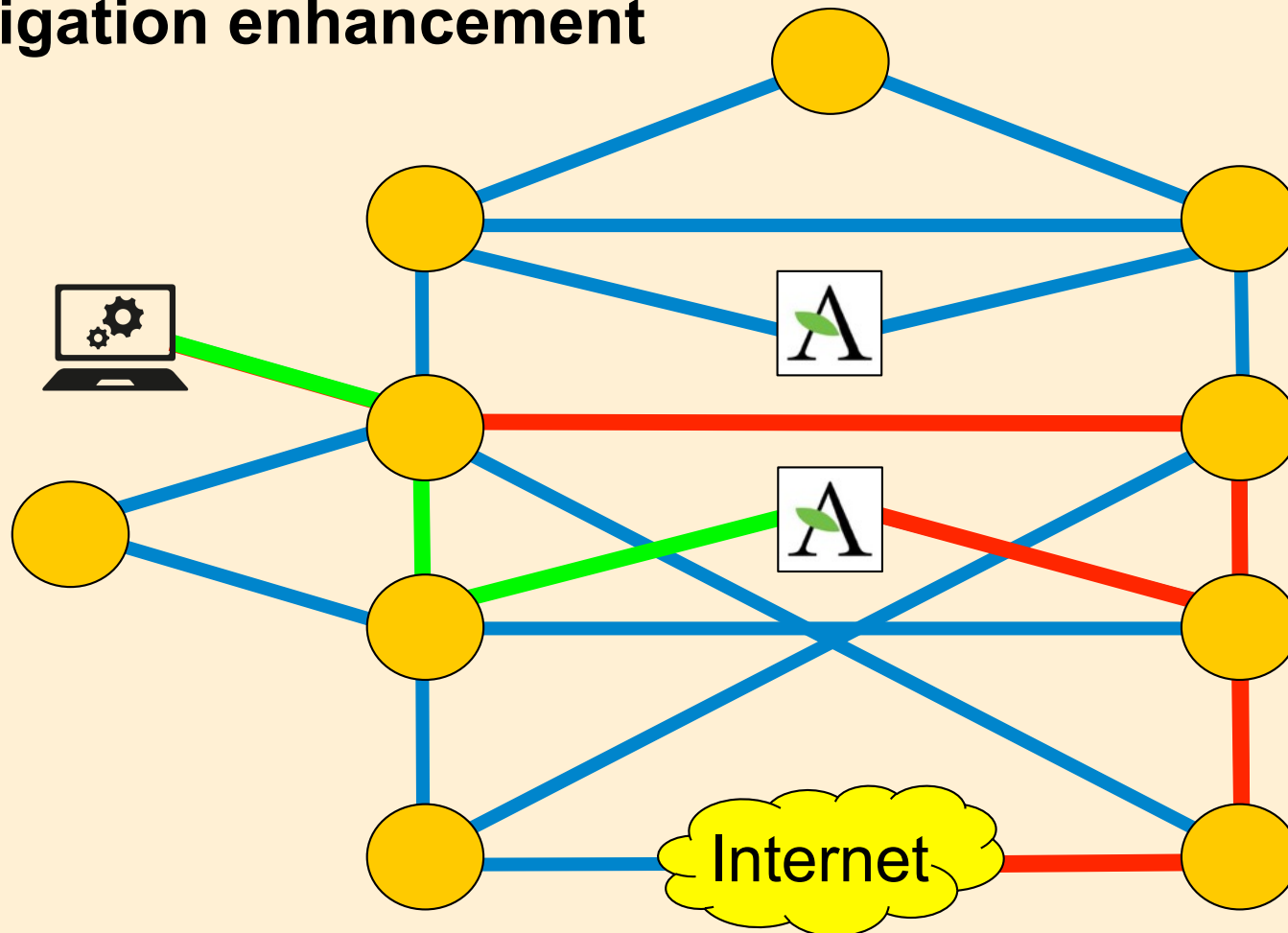
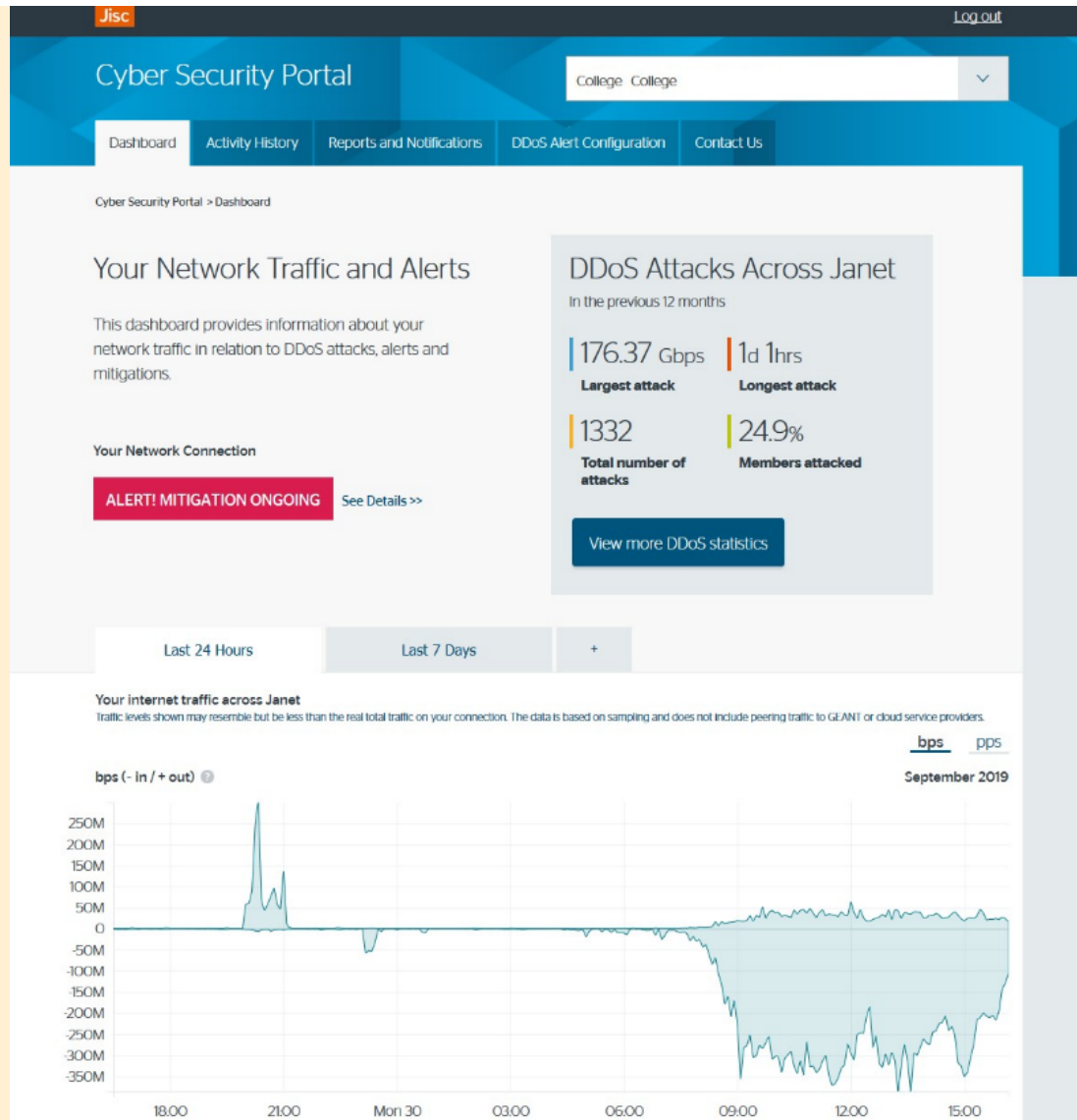Christmas Easter Summer Holidays Christmas Easter Summer Holidays Christmas Easter

May Half Term   May Half Term

14

We help you protect your organisation

As well as offering direct protection, we enable access to a range of additional cyber security services – helping you add layers of defence to your security capability.

Jisc is a CREST-accredited provider of penetration testing.

Penetration testing
Evaluate and improve the security of your system or network by simulating real-world attacks

Vulnerability assessment and information service
Detect and manage internal and external vulnerabilities within your IT estate

Simulated phishing and associated training
Reduce the risks from phishing and related attacks by giving users the skills and awareness to spot threats

Splunk
Save money on a Splunk Enterprise licence and get real-time insights into your infrastructure and services

Web filtering and monitoring framework
A range of web filtering and monitoring solutions enabling you to apply your web use policies

Cyber security financial X-ray
A transparent overview of cyber security costs to help you assess levels of protection and identify vulnerabilities

Cyber security assessment
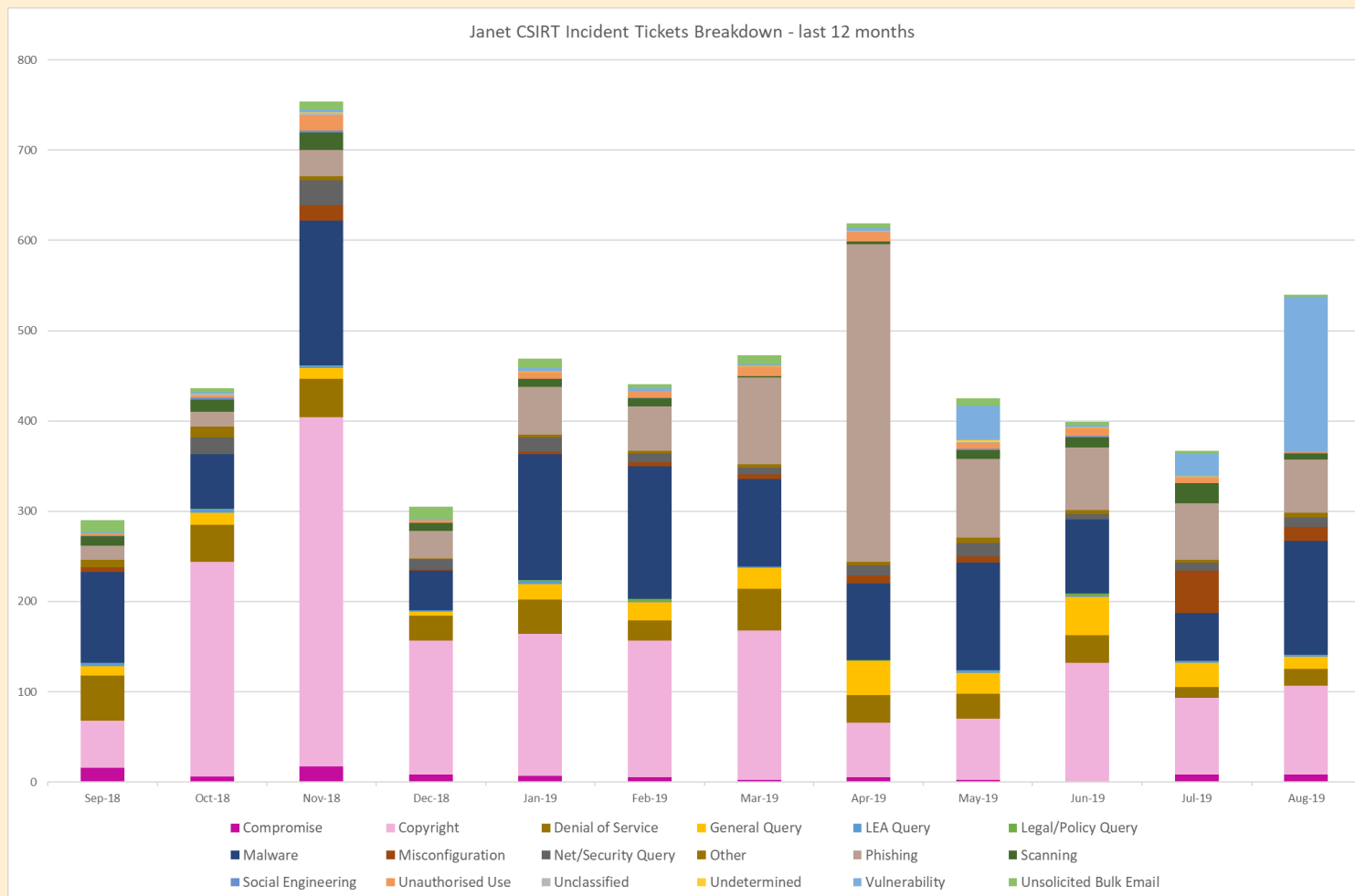Evaluate, analyse and improve your cyber security – to meet audit and compliance needs

BS 31111 audit and assessment
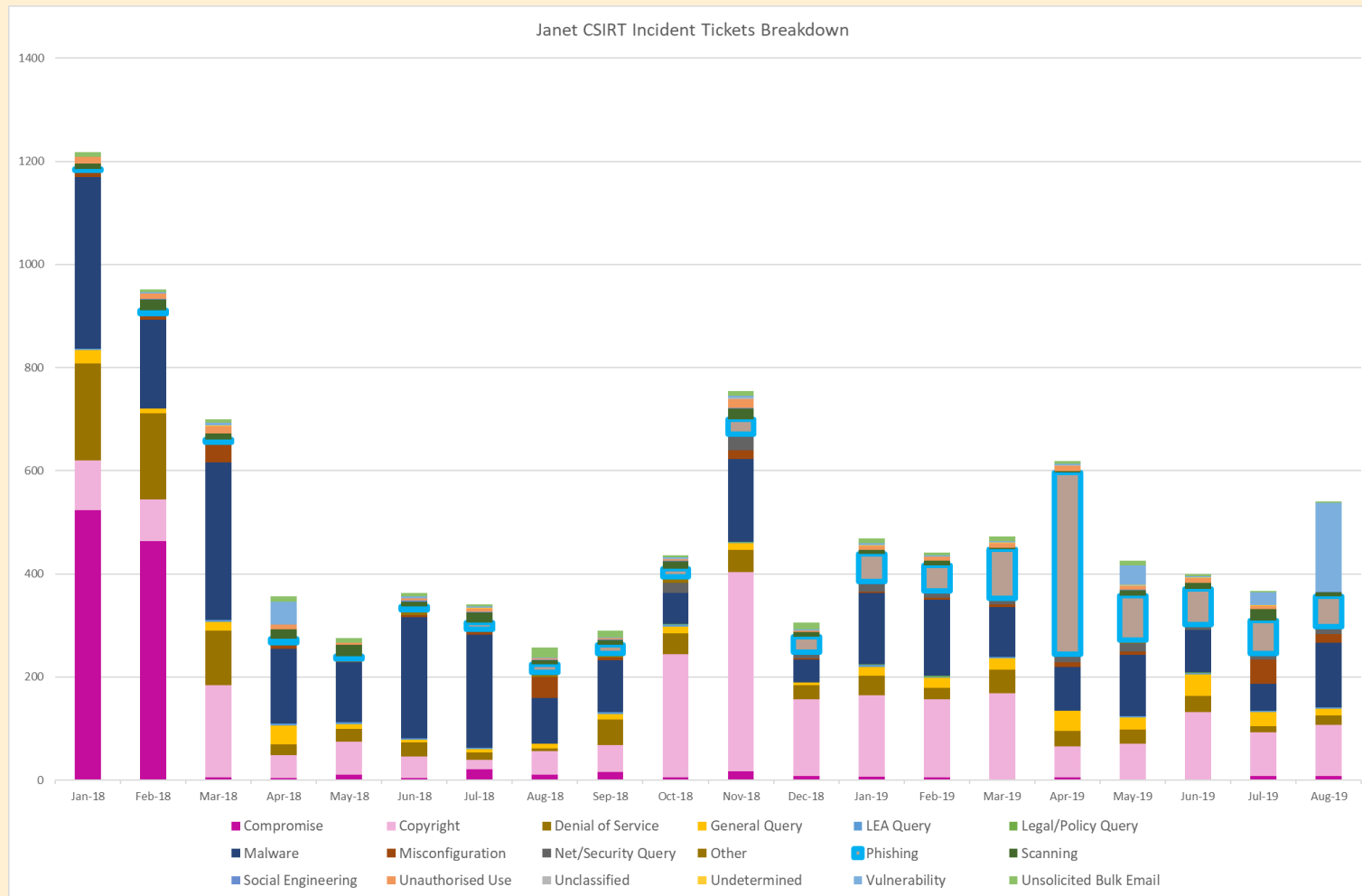A top-down approach to managing cyber risk, using the BS 31111:2018 standard.

Janet Network resolver
Advanced protection, with the performance and capacity to meet the needs of all Janet Network connected organisations

Incident breakdown by category

Janet CSIRT Incident Tickets Breakdown - last 12 months

Phishing

Janet CSIRT Incident Tickets Breakdown

Transforming the Janet regional networks

Janet Access Programme

A four-year programme to upgrade and rearchitect access in the 18 Janet regions across the UK.

- Reduced delivery time for members

- Reduced running costs

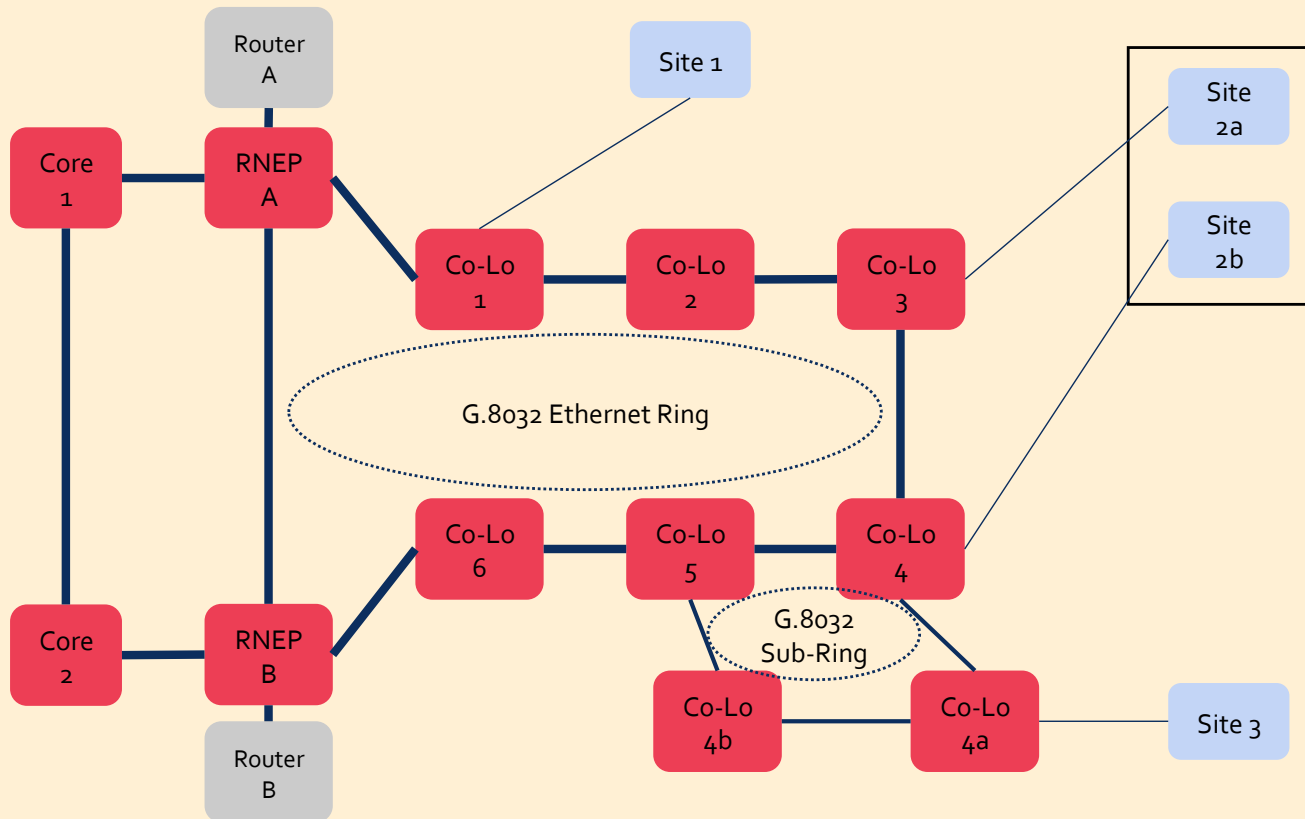- Deploying the latest technologies in a more agile way

In build:	**In design:**
South, South West, parts of North West	Midlands (east and west combined), London, Scotland, East Anglia.

Jisc

New access area - example topology

Move from layer 3 to 2

- Fewer expensive routers
- Ethernet ring protection
  - Current method of routing takes order of seconds to converge on fibre failure
  - Ethernet ring protection (G.8032) takes ~50ms. No impact on layer 3.
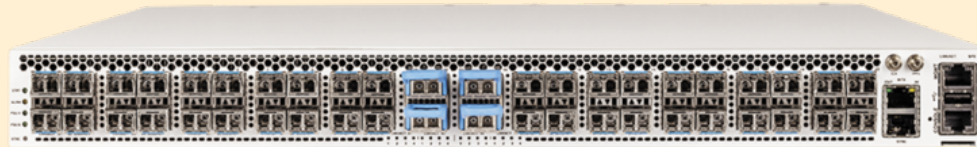
Janet South West example

Now
Future

- Better coverage
- More resilience
- Lower cost
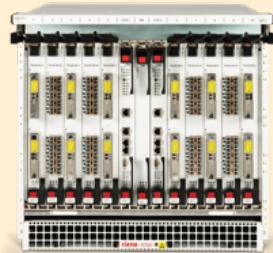- Faster provisioning

Building blocks:

- Openreach PoPs
- Fibre DPS
- Regulated Openreach products
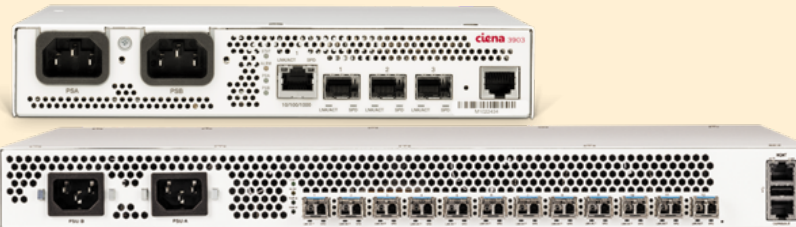
Jisc

Equipment options

Ciena 5170 / 5171

Ciena 8700

Ciena 3903 / 3926 / 3928

3926m

3926m – Customer CPE
- 6 x 1G / 10G SFP+ ports
- 2 x 100M / 1G ports
- NTE with option for embedded x86 processor
- Virtual machines for router, firewall, DPI, IDS, flow optimisation, site-to-site VPNs, …?
- Evaluating performance in the lab

Jisc

In summary

We're not short of challenges

With these challenges there are great opportunities

It's never been a more exciting time to be a provider of network services

Jisc

Thank-You

Jisc