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NHS-HE Forum

Frances Neilson

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Janet 6
Jisc Update

Summary to date

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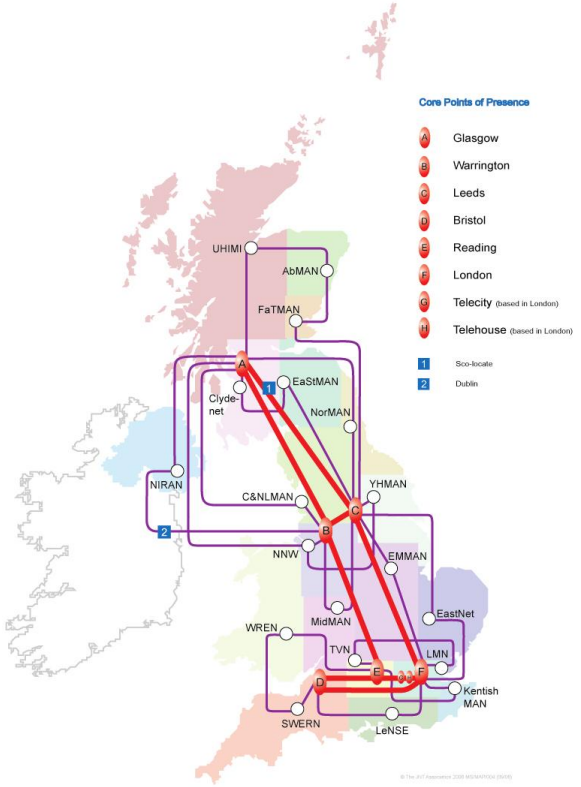
SuperJanet5: 2006 to 2013



- **Janet6:** Project to replace the UK wide Janet backbone, SuperJanet5

Requirements gathering & analysis 	2011
Procurement • Fibre infrastructure • Optical transmission equipment	Oct 2011 to Sept 2012
Rollout	Sept 2012 to April 2013
Transition SJ5 to J6	May 2013 to July 2013
SJ5 'turned-off'	Oct 2013

Janet6 status – Procurement phase complete

- Fibre infrastructure contract signed: 31st July 2012

- Scottish & Southern Energy Telecoms (SSET)
- 10 year contract
- £30M

- Optical transmission contract signed: 6th September 2012

- Ciena Inc.
- Supply and 5 years support agreement
- £12.8M

Meeting your requirements

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- ***To deliver a highly reliable and secure network***
  - Careful design choices
  - Carrier class network equipment & infrastructure
  - Strict SLA's
  - Management by Janet NOC
- ***To provide a network that is flexible in meeting future demand***
  - Design enable capacity scaling at controllable cost
- ***To provide a network that is more agile in dealing with change***
  - Management by Janet NOC
  - Close working relationship with industry partners

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Infrastructure Design: Fibre

Backbone Fibre

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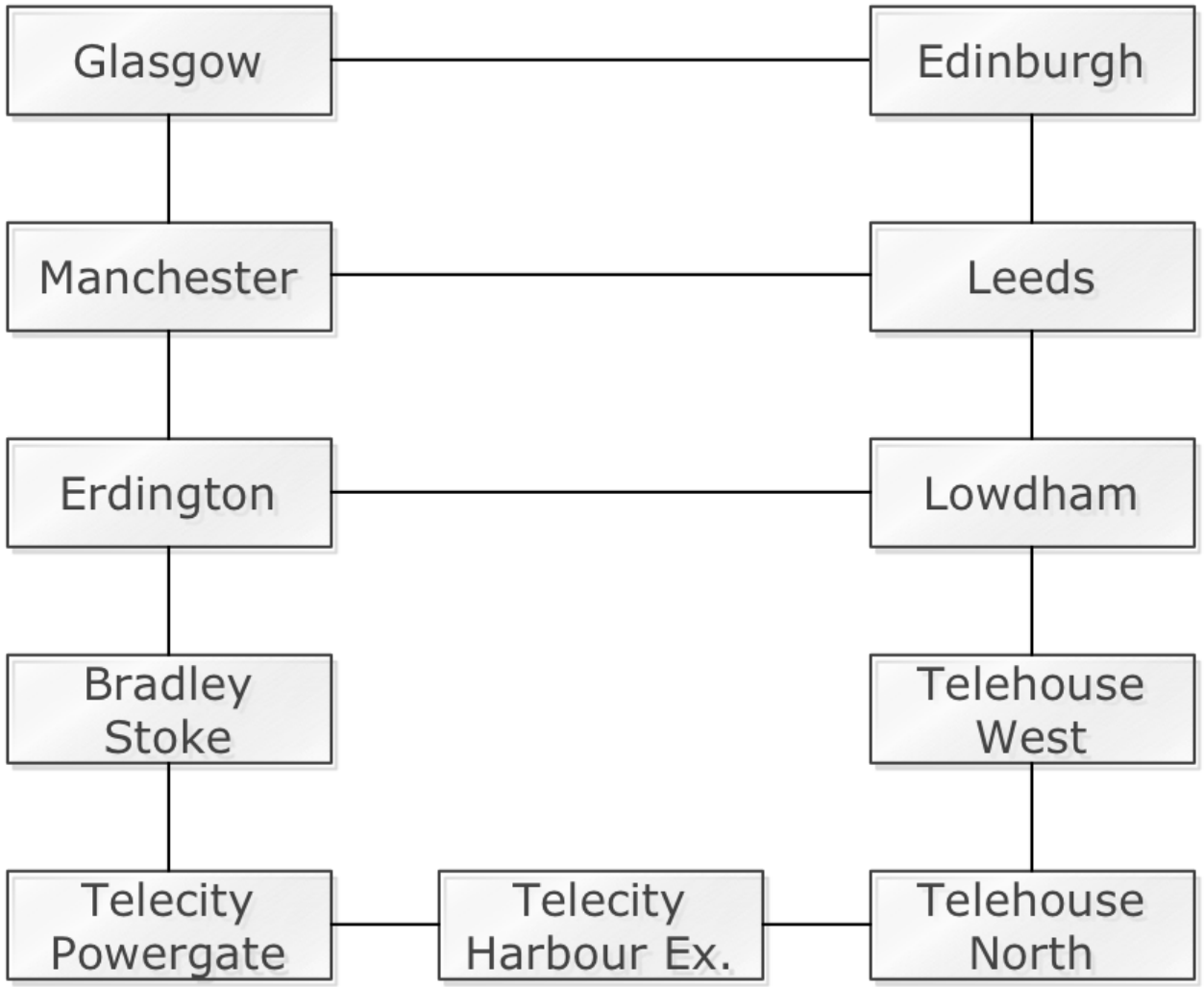

Backbone Fibre

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- New East-West link between Erdington (Birmingham) and Lowdham (Leicester)
  - More resilience
  - Shorter reroutes in case of failure
- Different topology in the south
  - Single loop of fibre through London and Bristol

Backbone and Regional Networks

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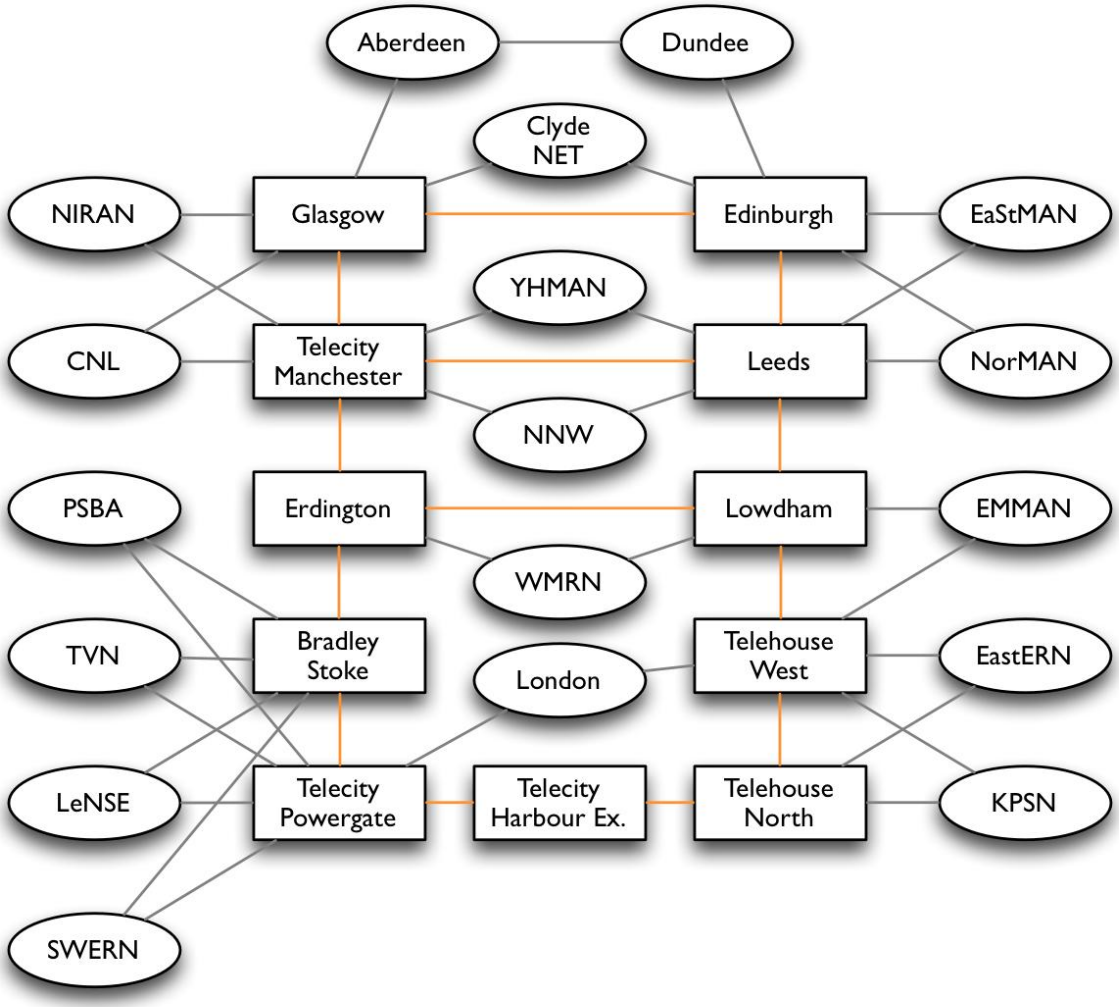

Backbone and Regional Fibre

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- Same principle of two diverse fibre pairs to each region.
- Fewer collector arcs picking up multiple regions
- All fibre is G.652
  - Older specification than G.655, but works better with modern transmission systems

I could go into more detail…

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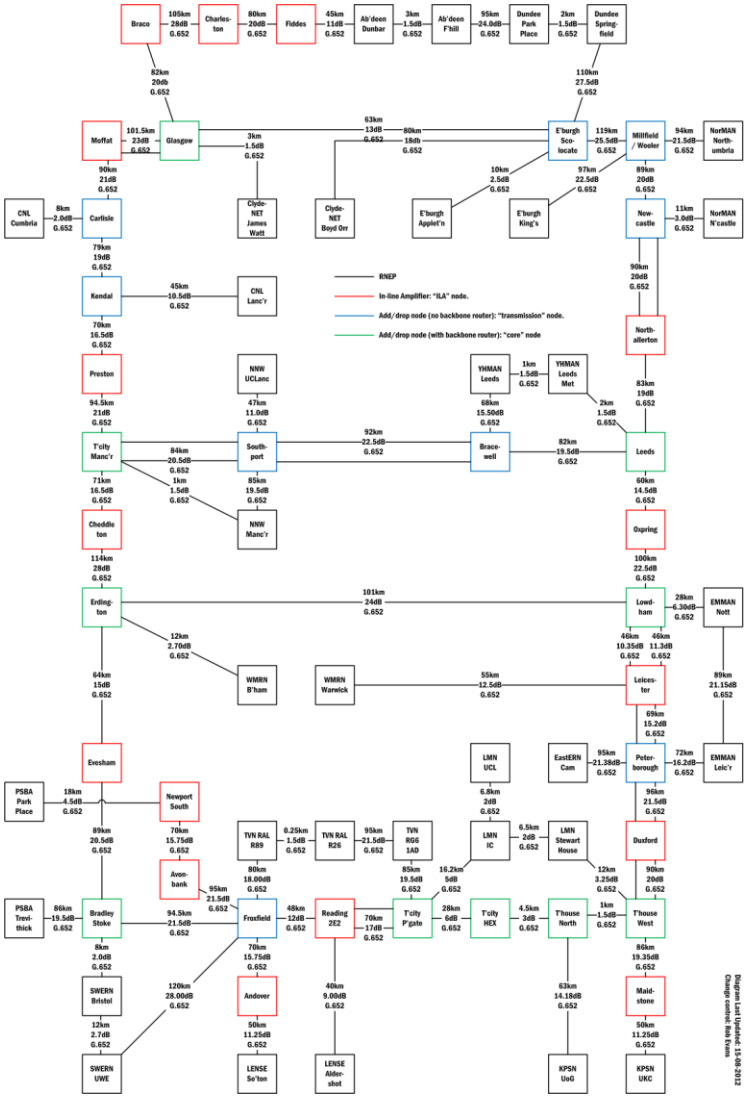

…but how good is your eyesight?

- >5,700km fibre
- 78 PoPs with optical equipment
- 232km unamplified subsea span
- 119km unamplified land span
- 28 100GE circuits
- 130 10GE circuits

Backbone Points of Presence

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- Vacating the Verizon Business PoPs
  - Except for small presence in Glasgow and Reading due to Scottish Schools' network and TVN
- Existing Provider-Neutral PoPs
  - Telehouse North
  - Telecity Harbour Exchange
  - Telecity Manchester
    - Moves onto the backbone
  - Scolocate
    - Moves onto the fibre backbone (more later)
- New Provider-Neutral PoPs
  - Telecity Powergate (West London)
  - Telehouse West
  - Leeds (AQL, Salem Church)

Other Points of Presence

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- Transmission PoPs
  - Couple of racks, multiplex wavelengths from regional fibres onto the backbone
  - Provided by SSET
- In-Line Amplifier PoPs
  - Single rack, small amplifier shelf
  - Provided by SSET

PoP Issues

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- Power – we need lots of it
  - Routers have two Power Entry Modules (PEMs)
  - Each PEM requires six -48V DC feeds with 60A breakers
  - 2-4kW more for the transmission equipment
  - Lightpath routers, management routers and switches
  - Electrical guys don't seem to like aggregating capacity as easily as router guys

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Infrastructure Design: Transmission

Ciena 6500

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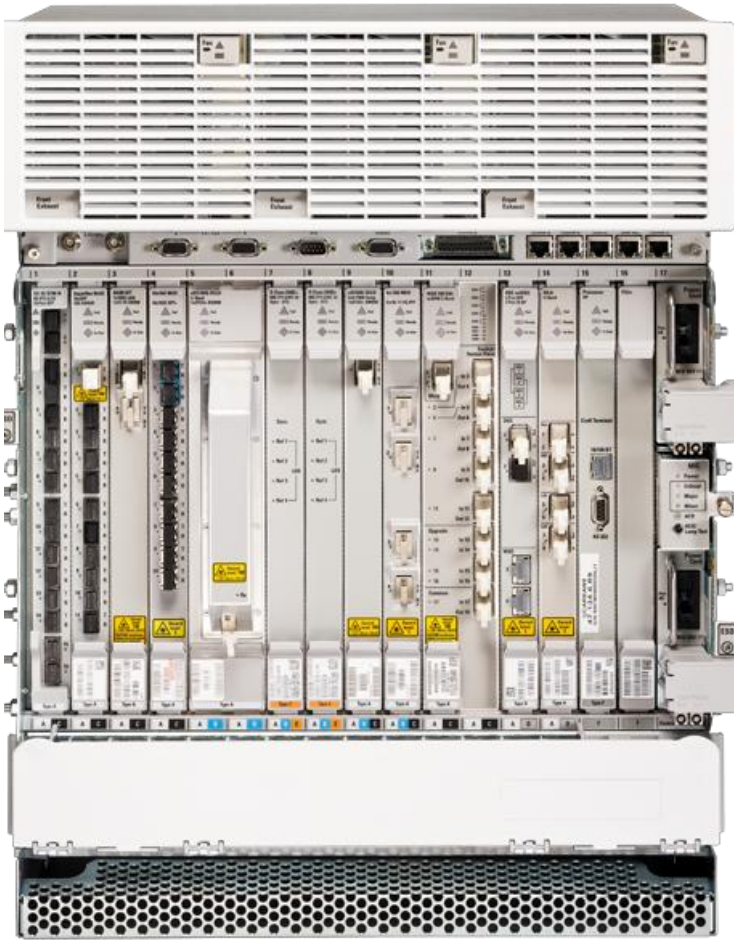
- ROADM
  - Reconfigurable Optical Add/Drop Multiplexer
- Wavelength Selective Switch
  - Microelectromechanical System (MEMS)
    - Diffraction grating
    - Lens
    - Servo-actuated mirrors
  - 2:1 or 9:1 modules allow incoming DWDM channels to be split over 2 or 9 outgoing fibres



All mirrors and no smoke (unless it breaks)

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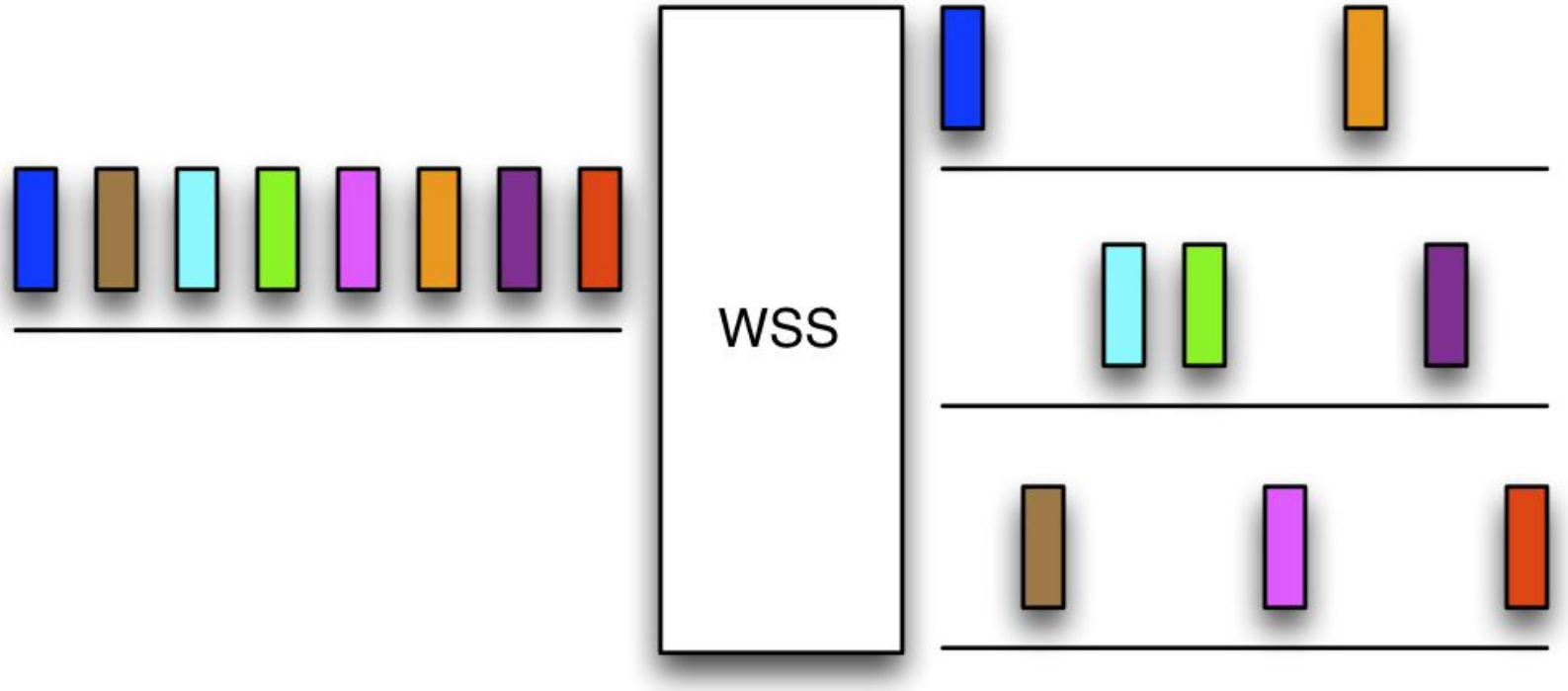

Other components…

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- Transponder
  - Takes 100GE from router and converts it to DWDM 100Gbit/s signal
- Muxponder
  - Carries, e.g., multiple 10GE circuits on 40 or 100Gbit/s signal
- Line-side card
  - Dual polarisation quadrature phase shift keying
  - >100Gbit/s (including framing) within 50GHz of optical spectrum

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IP topology

IP topology

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- Remember that change in PoPs?
  - Moving routers from PoP to PoP whilst still maintaining a service would have been … challenging.
  - One-night migration for all of Janet?
- Need to upgrade from Juniper T-1600 to T-4000
  - Higher port density
    - 2x100GE per slot
    - 24x10GE per slot
  - Significantly lower per-port 100GE price
- New chassis and hand old ones back after migration
  - Except 'fixed' PoPs (Telecities, Telehouses)
- IP, IPv6, Unicast, Multicast
- Looking at L2VPNs

IP topology

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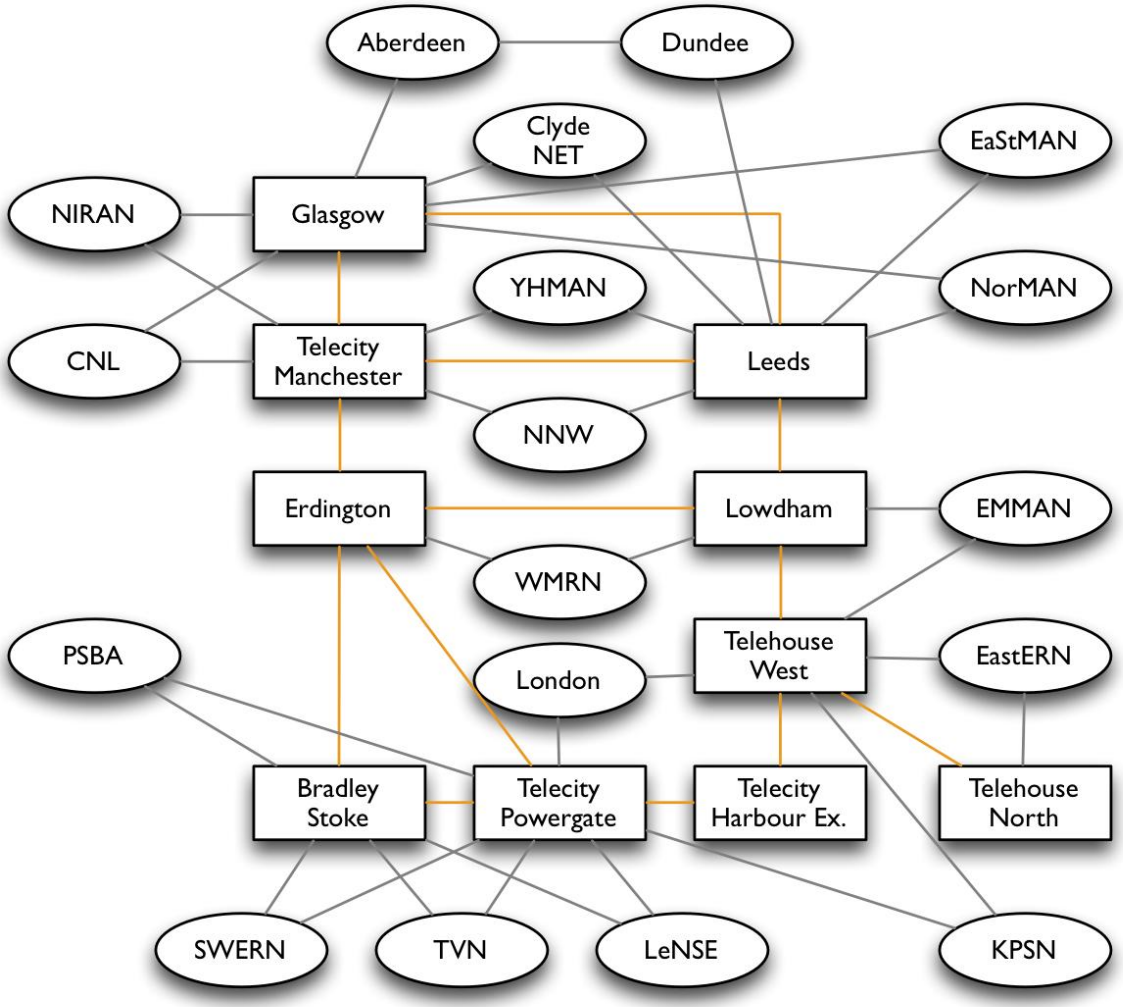

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Lightpath Topology

Lightpath topology

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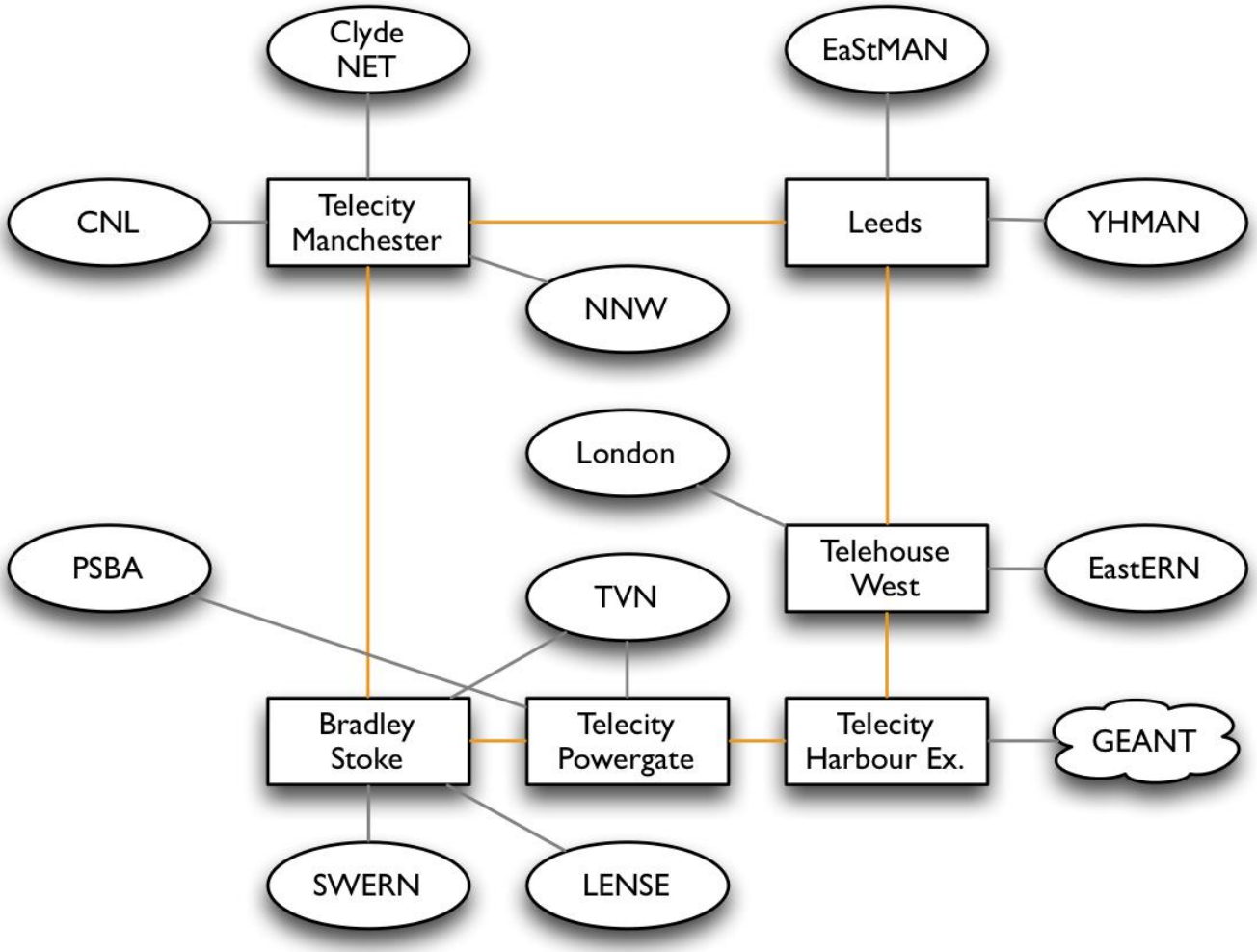

Lightpath changes

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- Increase the bandwidth between the backbone nodes to 100GE
  - If client optics are in place, allows us to carry 10GE lightpath circuits with only software configuration on the core.
- Topology reflects what is currently required
  - If there is a need for lightpaths elsewhere, talk to us!

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Jisc Update

The other ‘New Co’


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Jisc holding company
Jisc Collections and Janet Ltd

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Any Questions?

Frances.neilson@ja.net