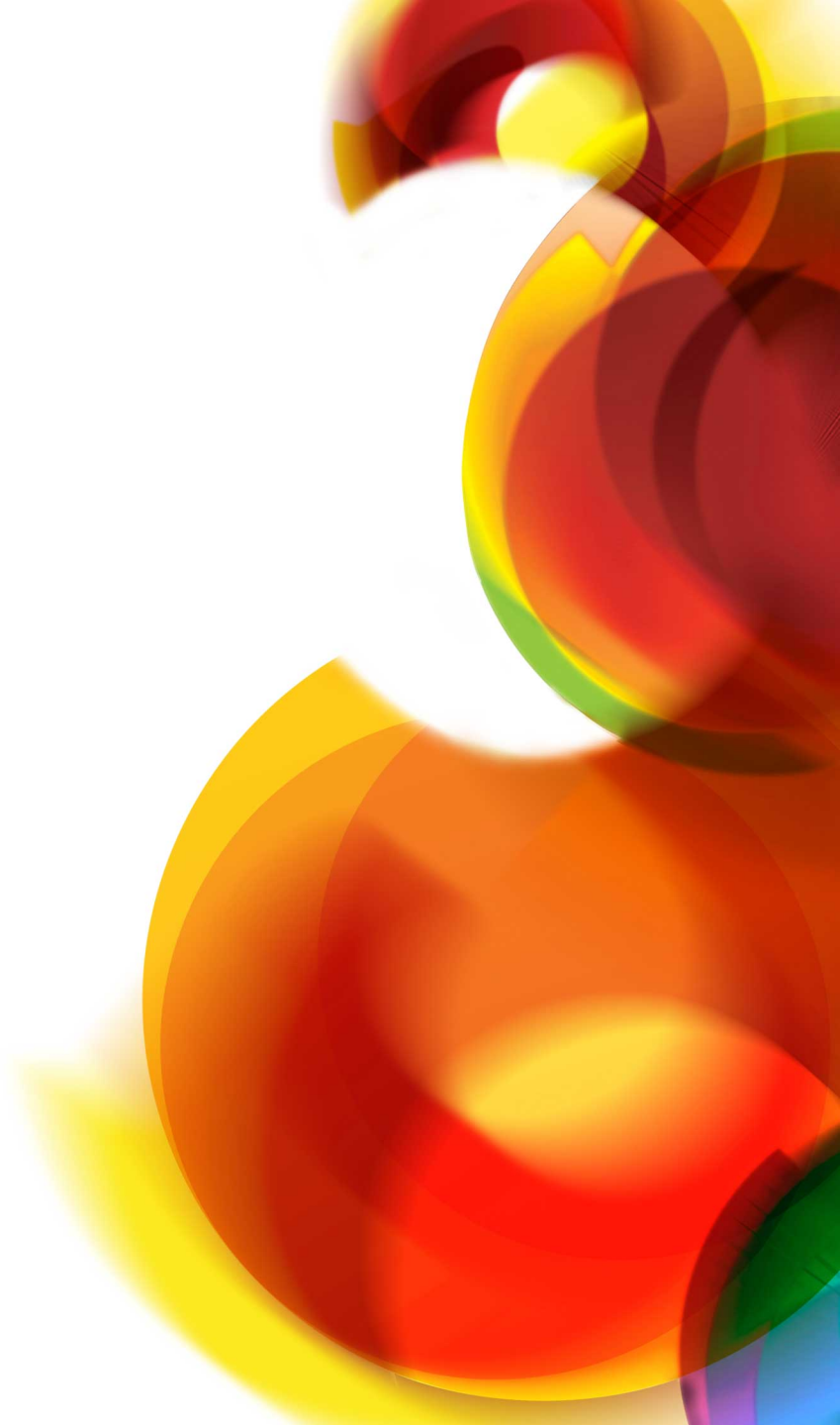# janet

Janet6: What it is, and what it isn't.

Rob Evans

Chief Network Architect, Janet

Janet background

- Backbone
  - IP service managed by the Janet Network Operations Centre
    - More on the transmission management later
- Regional networks
  - Most managed autonomously by the regions themselves
  - Some "public service networks"
    - Accredited to carry other public sector traffic
    - Mainly MPLS to segregate Janet traffic and Internet from private networks
  - Connect to the backbone in two different places
- Most sites connect to regional networks
  - Two management boundaries between Janet and the site
    - Janet – Regional Network
    - Regional Network – Site

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- SuperJANET5
  - Contract signed October 23rd, 2006.
  - Transmission system dedicated to us, but managed by Verizon Business
    - Ciena CoreStream and 4200
    - Latterly Nortel/Ciena 6500 for 40G SDH and 100GE on high-PMD fibres
  - Juniper routers managed in-house
    - Two routing platforms
      - T series for IP
        » No MPLS!
      - MX for EoMPLS, used for lightpaths
  - End of contract October 23rd, 2013.

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- Light the dark fibre ourselves
  - Reduce complexity of asking Verizon Business to do something, then Verizon having to ask Ciena to do it
    - Lots of contractual negotiations for anything 'new'
  - Scale under our control
- Lots of high-speed circuits
  - Currently peaking at about 160Gbit/s of IP traffic from GEANT, peering and transit
    - Still growing exponentially
- Ability to offer consistent set of services
 - Bring management of regional networks in-house

- 6,500km of dark fibre
- Ciena 6500 transmission system
  - 28 x 100GE circuits
  - 160(ish) 10G circuits
  - All coherent
    - 10G carried over 40G muxponders
    - No dispersion compensation
- 100GE uses SR10 optics
  - Cheaper optics, but more expensive cabling
  - Only use within a data centre
  - Saved ~£1M (~€1.2M) across network
- Janet manages most regional networks
  - Not all
  - Regional network infrastructure not refreshed as part of this, but ongoing project

A picture is worth 1,000 words

Core PoP (Point of Presence) — Regional network — Transmission site
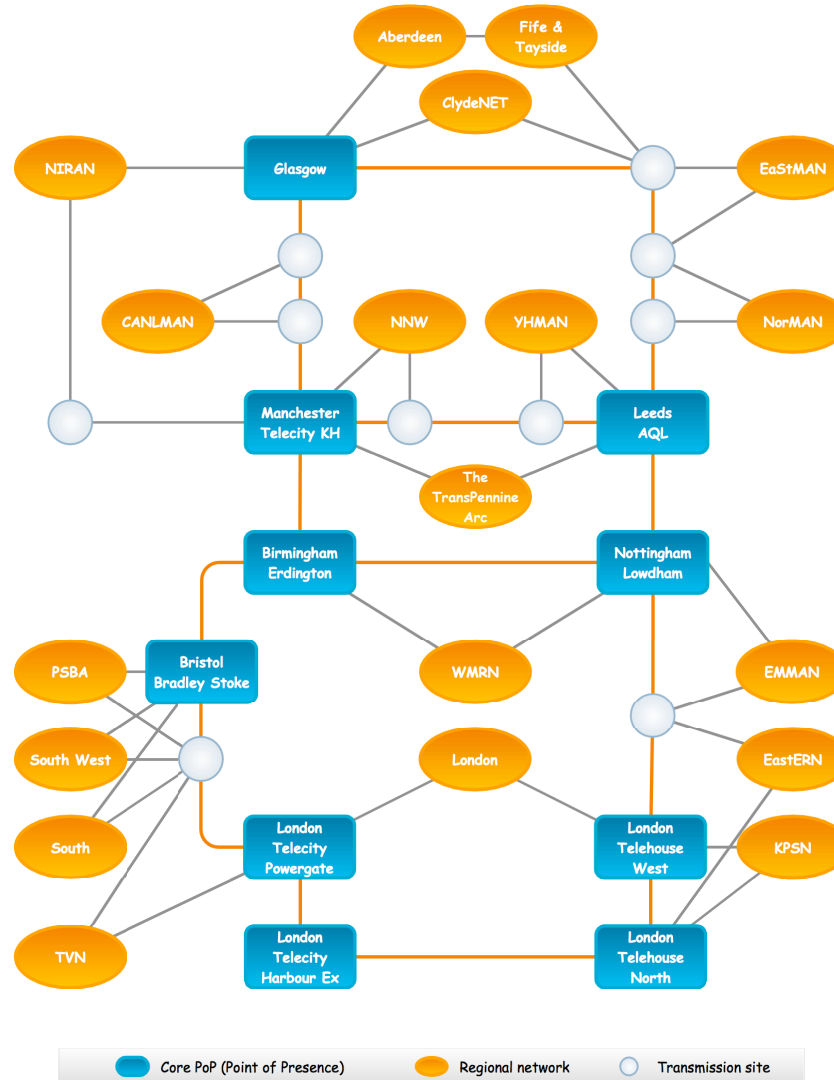
What we got

- Keeping two routing platforms
- Juniper T4000 for IP service
  - Upgrade from T1600
    - Sorta
  - 100GE cost on T4000 is fraction of cost on T1600
  - Introducing point-to-point circuits with uncommitted bandwidth
- Juniper MX for guaranteed bandwidth circuits
  - Upgrade interconnects from 10GE to 100GE
 - Can provision 10GE point to point circuits rapidly

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- OTN Switching
  - Had considered it for some parts of the network
    - Bandwidth drop at each point didn't need to be high
    - Wasn't available on many smaller chassis
    - Added cost
  - We use the routing platform for building point-to-point circuits
    - More flexible and dynamic

- Transponder-less DWDM system
 - Router optics not there for long-haul 100G

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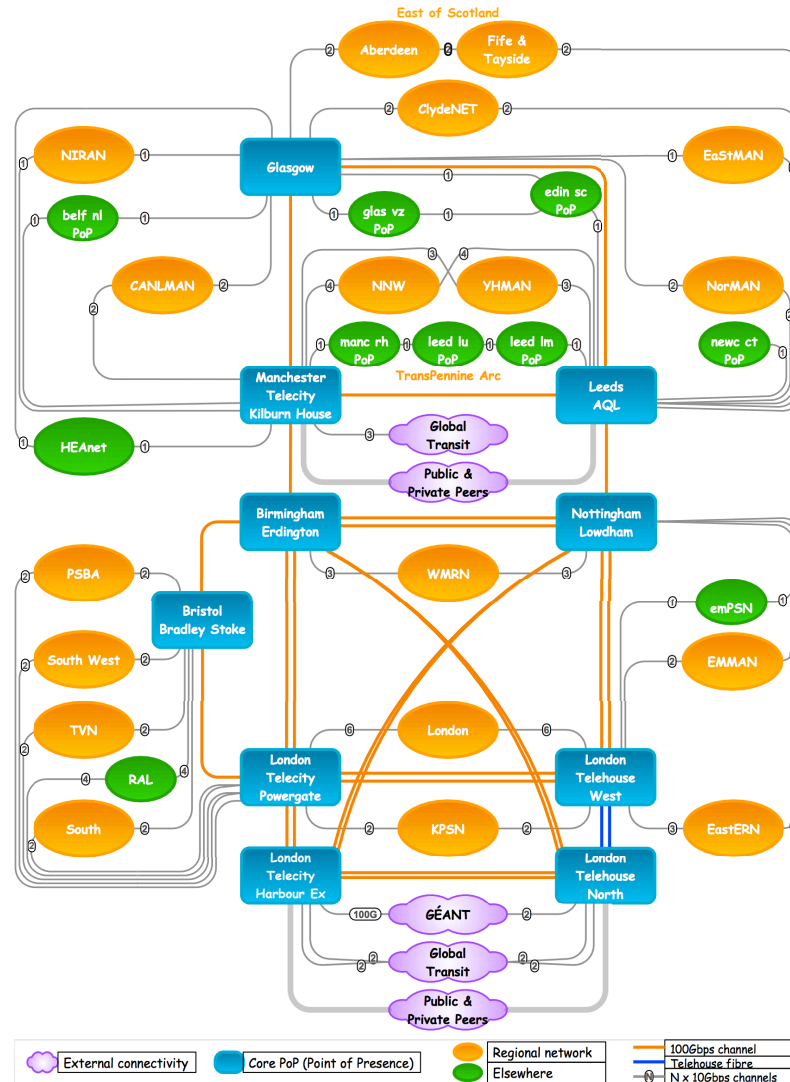
- Router power and cooling
- Wavelogic 3 Cards, shelf software and management software (OneControl under Linux) from Ciena were all new
  - Do release dates ever slip?
- Odd timing problem on 100Gbit/s OCLD (line-side) cards
  - Manifested as flapping links
  - Required a firmware fix
- Underwater links to Ireland require lots of amplification
  - 235km unamplified
  - Co- and counter-pump Raman amplifiers
  - Odd blip
    - Pump amplifiers up to maximum
    - Clean fibres
      - No, I mean **REALLY** clean the fibres
      - Never, ever, ever unplug this fibre again

Future looks

- Where now?
- Transmission capacity to scale for some time
- Router density is a concern
- Space and power for multiple chassis is difficult
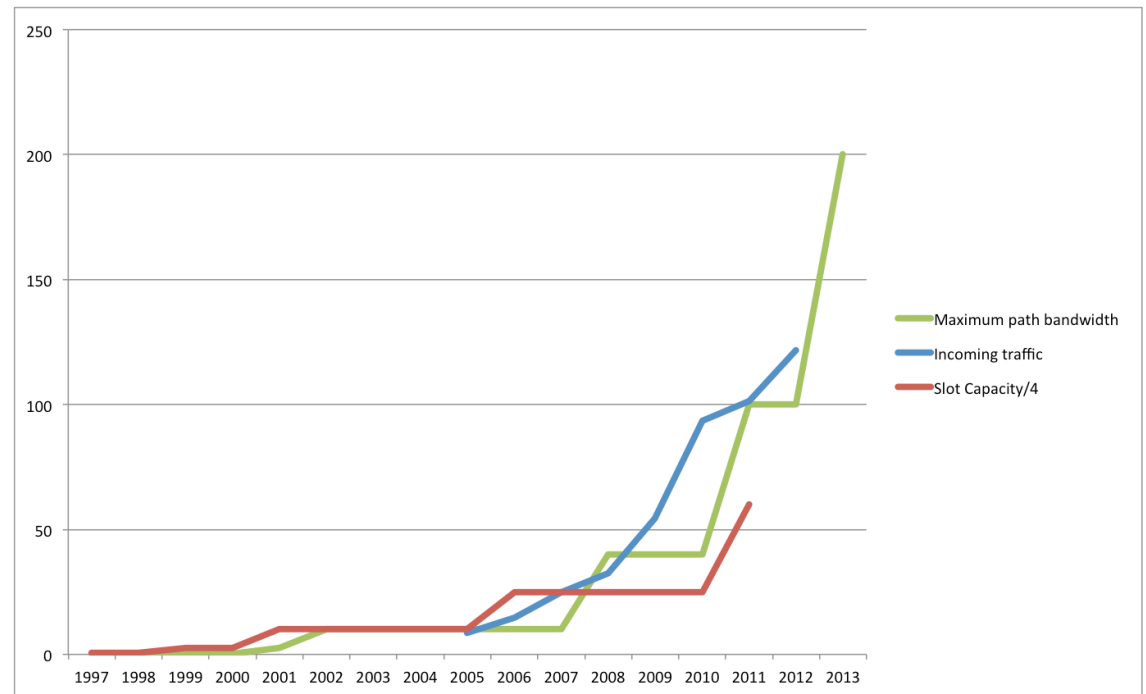
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Comments? Questions?

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