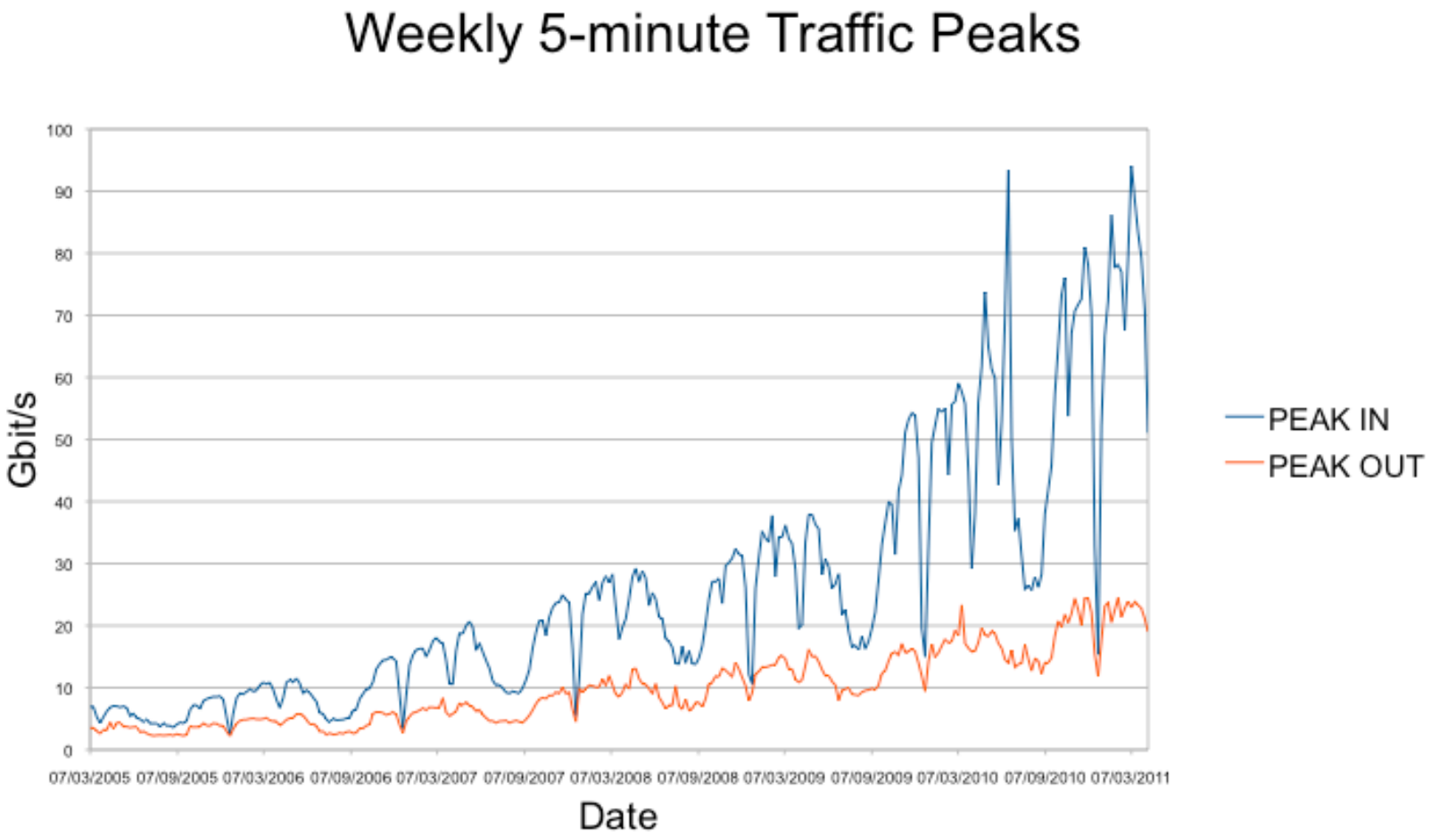
Deploying 100GE

Rob Evans, JANET(UK)
UKNOF 19
April 20th, Leeds

You may remember me from…

- UKNOF 12, Bristol
  - Deploying STM-256 (40Gbit/s SDH)
  - POLMUX-QPSK
- UKNOF 13, Sheffield
  - 100Gbit/s Transmission Trials
    - NOT 100GE
  - Presentation is on the website, but you won't remember it, I stood aside so we could learn about monetizing our excess intellectual capacity.

At the risk of becoming a one-trick pony



Need capacity to last until 2013

- Expected lifetime of the current JANET backbone
- ~200Gbit/s of external traffic
- Reduce reliance on Docklands
  - (Large) PoP in Telecity Manchester
  - IXLeeds when we get some circuits
- Still need more capacity

Moar Internets, plz.

- Bundle up STM-256.
  - Sad to say, SDH is dead. OTN isn't quite there on the router side.
- Discard STM-256, bundle 10GE.
  - Writing off a hefty investment
- Hybrid
  - Migrate existing STM-256 to bundles
  - Deploy n x 10GE or something else elsewhere

Up until now…

- Only one option
  - Lots of 10GE in parallel
- We'd already done some groundwork
  - Transmission Tests with Ciena and ~~Nortel~~Ciena.
  - Tried to test Juniper interface
    - Required beta software on a production router
    - Ops didn't fall for it

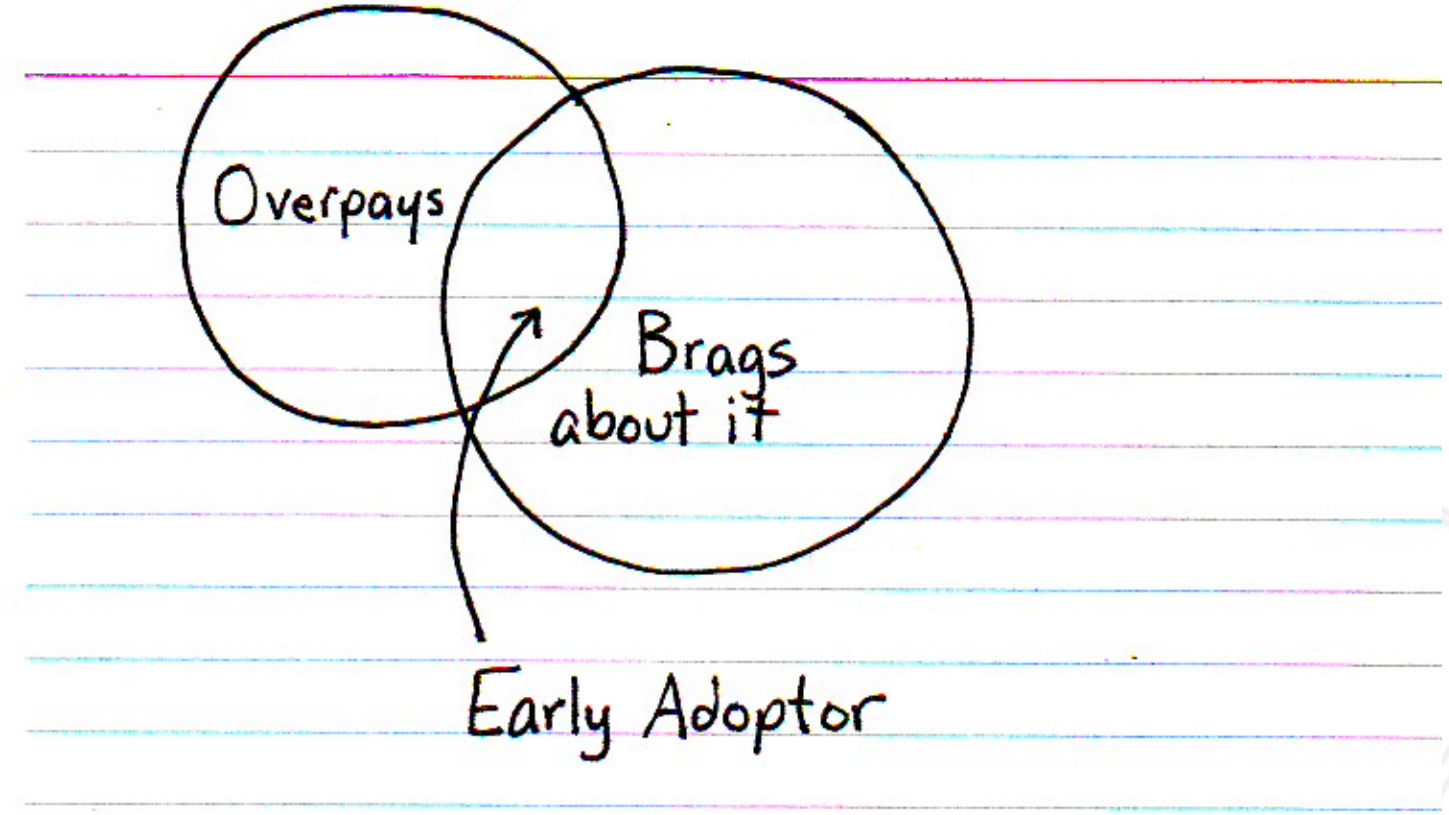
Why 100GE?

- Try and avoid the big bundles
- If you're doing a bundle for capacity, you might have to take it down if just one interface fails.
  - On a 10x10 bundle, that is 20 single points of failure
- If you're not going to take it down, complex traffic engineering to shift LSPs around
- I dont like complex
  - I can understand simple

Why not 100GE

- Large quantum of bandwidth and chassis space
- Add another link into your 10GE bundle?
  - 1/64th of your chassis capacity gone
- Bundle up a second 100GE?
  - 1/8th of your chassis capacity gone
- Cost
- Risk

You are here.



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Except…

- We got a good deal.
  - Especially if the alternative was scaling STM-256s
- I'm trying to share, rather than brag
  - (But it is kinda cool)

Engineering

- Ciena CoreStreams for the transport layer
  - Stuck with those
- Run Ciena AF6500 on top, easy
  - Except it isn't really Ciena, it is ex-Nortel
  - Different optical characteristics
  - CoreStream launches low and pre-amps on input
  - 6500 launches high
  - No automatic gain control, need to tune receive optical levels

Engineering

- Increase SNR
  - RAMAN Amplifier Install line-side between Reading and Harbour Exchange
    - Splice rather than patch
    - Replace SC/PC, etc., with E2000/APC on path

Engineering – IP

Engineering – IP

- Juniper Interface is a special beast
  - 2 x 50Gbit/s PFEs (Packet Forwarding Engines)
  - Need some way to spray received packets over the two PFEs
    - Juniper – Juniper: “multicast” bit in MAC address
    - (Other) – Juniper: VLAN steering
  - Appears as an “ae” (aggregated ethernet) address
- 100GBASE-LR4 CFP
  - About the size of a couple of XENPAKs
  - 4 x 25Gbit/s channels, but invisible (as it were) to user

It works!

- First two links into service April 12th (last Tuesday)
- Second two April 19th (yesterday morning)
- Minor irritations
  - Router ignores ISO MTU setting (used for IS-IS)
    - Fixed by upgrade from 10.4R2 to 10.4R3
- 1st Generation Tech
  - Juniper will get 2 x 100G per slot with T-4000
  - Improvements on the transmission side too

Questions, comments…

