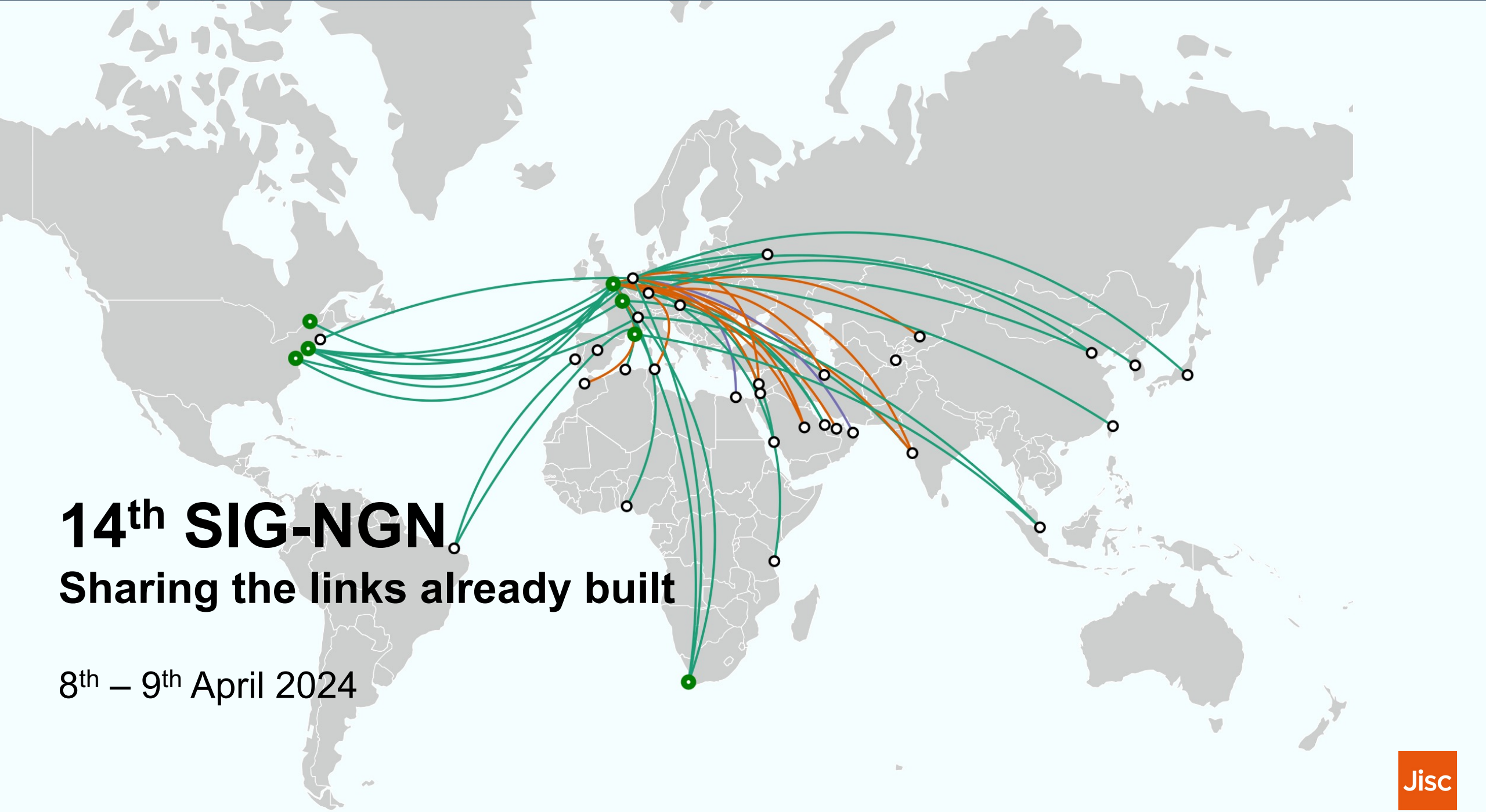

14th SIG-NGN

Sharing the links already built

8th – 9th April 2024

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Agenda

Day 2: Sharing the links already built

1. Welcome. Yatish Kumar, ESnet (5 minutes)
2. Layer 2 and layer 3 overlays. Lions and tigers and bears, oh my! Rob Evans, Jisc (10 mins)
3. Evolution of LHC networking, future perspectives. Edoardo Martelli, CERN. (15 mins)
4. Spectrum sharing in the nordic NRENs. Rasmus Lund, NORDUnet. (15 mins)
5. Time & Frequency in the Netherlands. Sander Klemann, SURF. (10 mins)
6. CERN-CNAF DCI. Paolo Bolletta, GARR. (20 mins)
7. Coffee. (20 mins)
8. Infrastructure Sharing. Christian Todorov, Internet2 (20 minutes)
9. Support multiple “private” networks over WAN. Eli Dart, ESnet (30 mins).
10. Panel Discussion chaired by Lars Fischer, NORDUnet (20 mins).

Need to finish promptly to enable lunch before LHC meeting starts.

How did we get here?

- “Bell-heads” and “Net-heads”
- Pejorative descriptions of those with a telco-mentality and an Internet-mentality
  - Circuit-switched v Packet-switched
- Just got out of the days of ATM (and X.25 before that).
- IP everywhere, let statistical multiplexing take care of the bursts in demand.

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But…

- When we moved from ATM to IP/MPLS, there was a demand for committed bandwidth circuits to replicate what we'd offered before.
  - ~20 years ago some NRENs were reluctant to offer them, either due to preference or hardware limitations.
  - "I don't want my transfers to be restricted by whatever else is happening on the network, I want 1 [G/M/T]bps."
- As we've seen from yesterday's presentations, bandwidth is rarely the limiting factor today, so what do the overlays provide?
- If you commit bandwidth to an underutilised circuit, you're wasting bandwidth.
  - Why lose the benefits of statistical multiplexing and appropriately configured underlying capacity.
  - Many of our early demands for point-to-point circuits were woefully underutilised.
- Overlay networks are be limiting compared to any-to-any IP
  - Reachability, bandwidth…

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So why do we build overlays?

Overlay requirements: Bandwidth

- Raw bandwidth requirements
  - “It’s easier/cheaper to switch than route.”
- Highly dependent on the underlying infrastructure, but if unit of point-to-point demand is about the same as the unit of provision on the underlying transmission (optical) infrastructure, could save on costs.
- We see a number of requests for “an optical circuit” of 10G, whereas in reality most 10G circuits are provisioned on the packet layer.

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Overlay requirements: Latency

- Minimise latency between two points
- With direct optical provisioning, true.
- With IP/MPLS style services, largely used for < 100G services, what is the saving?
- Is the reduction in latency as large as the perceived request?

Overlay requirements: Addressing separation

- Experiment is using RFC1918 addressing
  - Do we need to engineer networks around those that can’t use IPv6?

Overlay requirements: Traffic Separation

- If you need to separate somewhere, you need to separate everywhere.
  - VLAN tag
  - MPLS label
  - MPLS RT/RD
- Why do we need to differentiate
  - Different funding requirements – some science domains might be funding their own links.
    - Billing?
  - Offload campus uplinks
- What other options are there?

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Overlay requirements: Visibility

- Easier to visualise traffic levels if they are separated out
- Poll traffic within an LSP or on sub-interfaces corresponding to VLANs
- Does scitags remove this requirement?

Overlay requirements: Security

- Extending a DMZ
- What is being secured against?
- Do you really want to trust the remote network(s) outside of your administrative control?

On with the real content…