

# Multi-Layer GOLEs: Polling for interest

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GLIF NG Architecture WG

GLIF Tech meeting

TNC 2013



## Original Vision (from About GLIF)

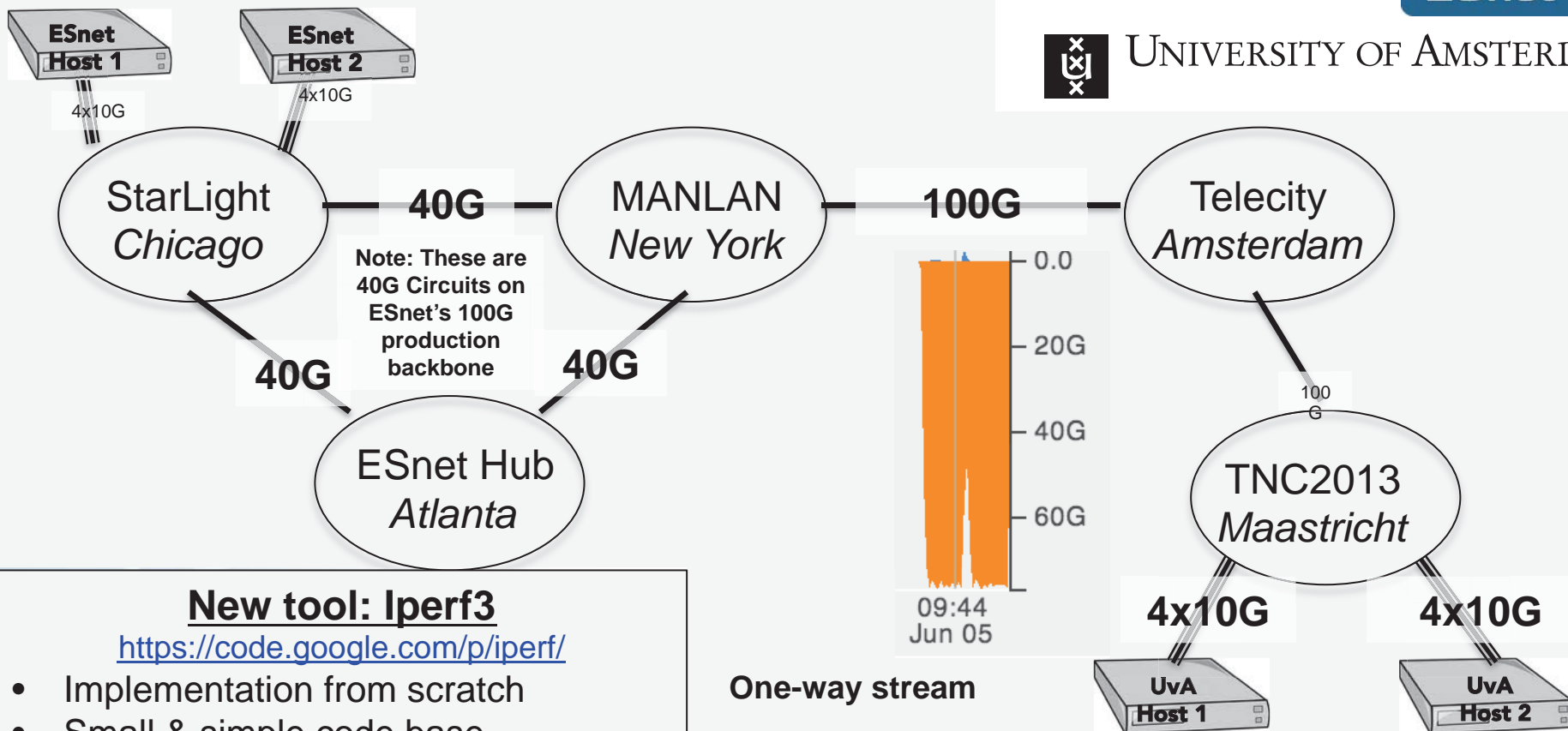


A **LambdaGrid** requires the **interconnectivity of optical links**, each carrying one or more **lambdas, or wavelengths**, of data, to form on-demand, **end-to-end 'light paths'**, in order to meet the needs of **very demanding e-science applications.**

# How many modern servers can fill a 100Gps Trans-Atlantic circuit?



UNIVERSITY OF AMSTERDAM



## New tool: Iperf3

<https://code.google.com/p/iperf/>

- Implementation from scratch
- Small & simple code base
- New features
  - Reports retransmissions
  - Reports CPU utilization
  - JSON output format

One-way stream

## Contributors

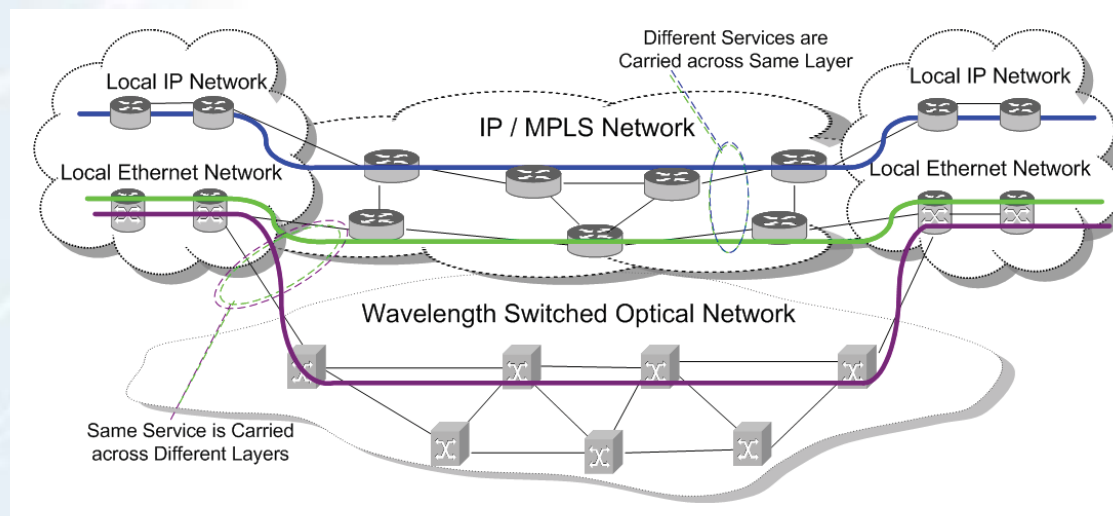
ESnet: Brian Tierney, Inder Monga, Chin Guok

UvA: Ralph Koning, Cees DeLaat

# What's the requirement?

Optical Bypass for 'very demanding e-science applications'

- It doesn't take much to fill a 100G pipe across continents
- RDMA like traffic (Ethernet only)
- **Define: [Dynamic] Optical Bypass**
  - Separation of large flows, from L2/MPLS circuits to L1 circuits
  - Traditionally has been very complicated, vendor dependent and not-interoperable



ARCHSTONE  
project DOE

# Emerging need for “optical bypass”, multi-domain



NOT NEW: In the world of SONET, we used to do that!

Many R&E networks have control over both Optical and packet layers in their infrastructure

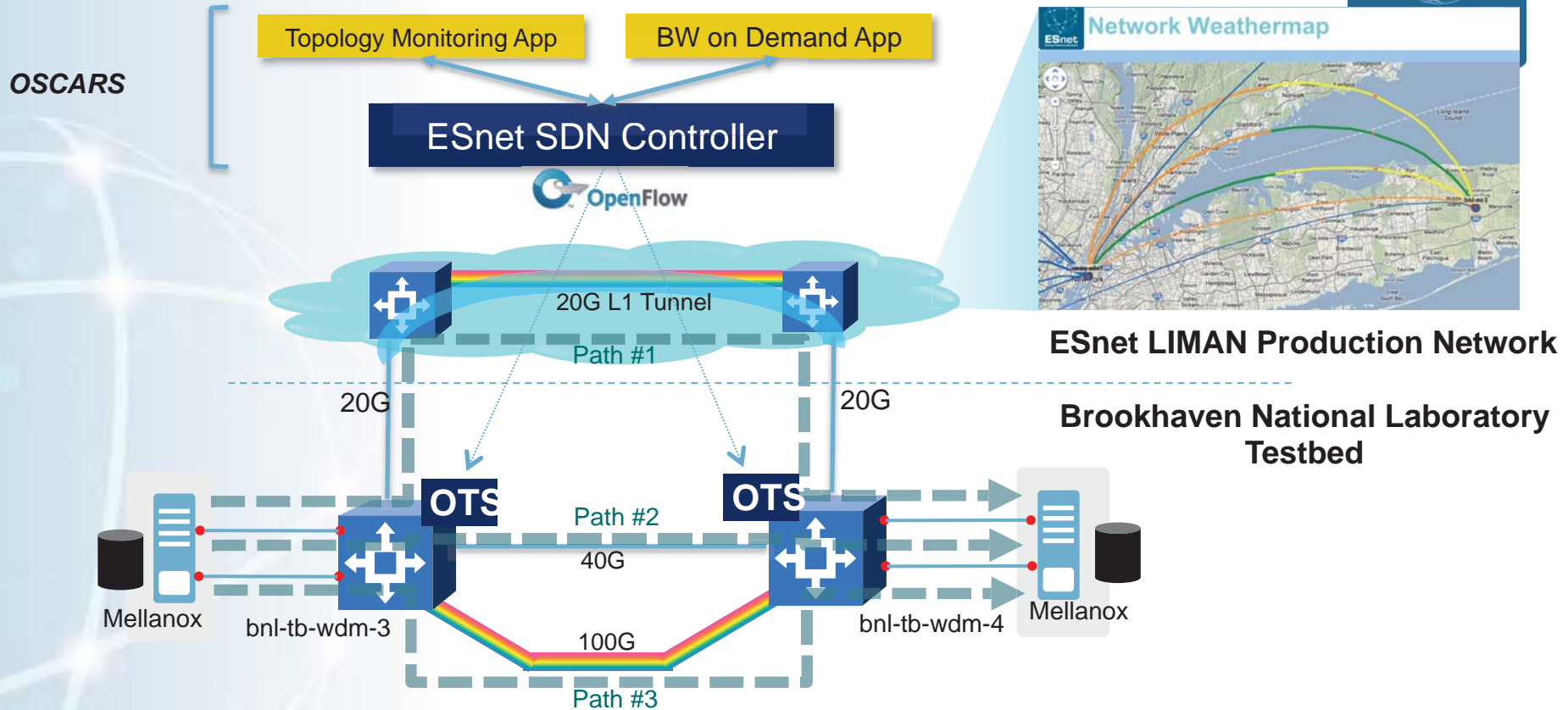
Multi-domain wavelength service?

What's the bottom line?

**Build a [Dynamic] Multi-Layer AutoGOLE Architecture**

**How do you manage and control such an AutoGOLE (the NS interface)**

# ESnet Transport SDN Demo



SDN Controller communicating with OTS via OpenFlow extensions

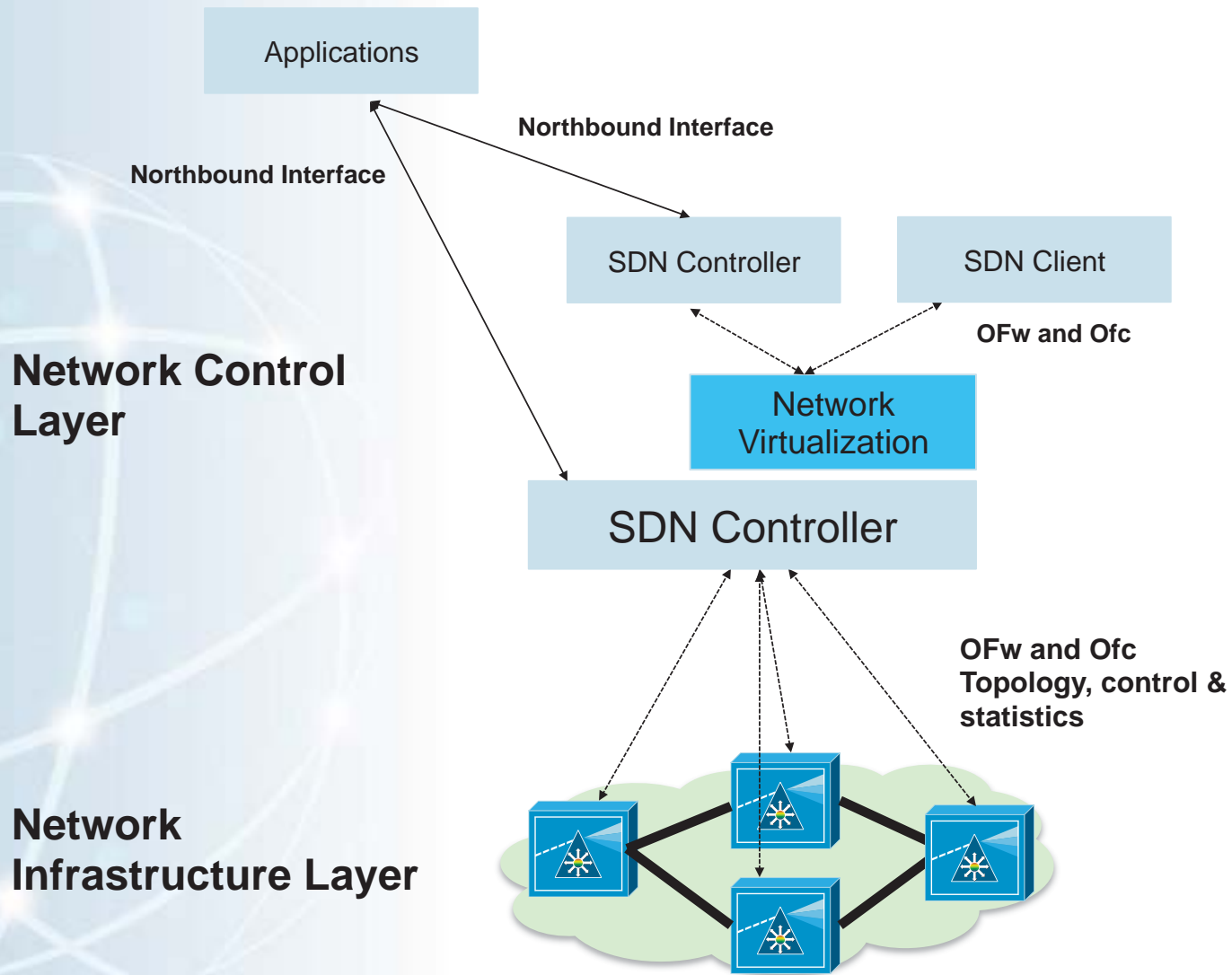
Bandwidth on Demand application for Big Data RDMA transport

3 physical transport path options (with varying latencies)

Implicit & explicit provisioning of 10GbE/40GbE services demonstrated



# Transport SDN Block Architecture



# What's the ask?



Is there community interest in architecting and implementing a network design for a multi-layer GOLE that can offer switching service at various layers?

- If so, we can target a mini-workshop at GLIF in Singapore
- Invite SDN-Transport vendors, researchers, and potential “pre-production” implementations with R&E networks

Is there interest in investigating common SDN-Transport control architecture for managing a dynamic, multi-layer GOLE?

- SDN-Transport architecture being defined in ONF
- OpenFlow extended to setup dynamic cross-connects on the optical equipment, both direct and as a virtual infrastructure
- Experiment with early implementation of extensions (collaborate with optical vendors)