

Report on Ottawa Lightpath Workshop

Michael Enrico
DANTE

What is a Lightpath?

- A point-to-point channel which a NIC sees (or experiences) as a dedicated line with a given Service Level Guarantee (deterministic behaviour)
- Using:
 - WDM?
 - TDM?
 - MPLS based techniques (L2-VPN or similar proprietary ones like CCC and ATOM)?
 - Premium IP?
 - any (technically possible) concatenation of the above?
- No real agreement on common definition so far...

Need for a Workshop

- **Worldwide R&E Networking community increasingly pre-occupied with “lightpath” provisioning:**
 - Light Exchanges (StarLight, NetherLight, CzechLight, etc...)
 - CA*Net 4
 - Other EU-NREN work
 - SURFnet6
 - Internet2 HOPI Project
 - GN2 JRA3 and SA3
- **Need for a workshop identified during CANARIE/Internet2/GEANT collaboration meeting in Dec 2003**
- **Workshop held in Ottawa, Canada, March 25-26**

Workshop Agenda

- Dissection of transatlantic lightpath experiment
- CA/I2/EU designs and wish lists + discussion
- SURFnet6 preview
- Lightpath definition discussion
- Control plane strategies + discussion
- UCLP software implementations
- Live Demo (Ireland-Taiwan – see Victor next)
- Performance measurements
- Control plane inter-op discussion

Trans-Atlantic Lightpath Experiment

- **Set up a basic 1G Lightpath as quickly as possible**
 - Following KIDS, not KISS – that is, keep it difficult stupid!
 - Using a variety of layer 1, 2, and 3 technologies
 - Crossing administrative domains using different layers
- **Goal - examine the problems, and how one might make this dynamic (in some way)!**
- **Control Plane**
 - 8 hours of conference calls
 - Approximately 300 pieces of e-mail

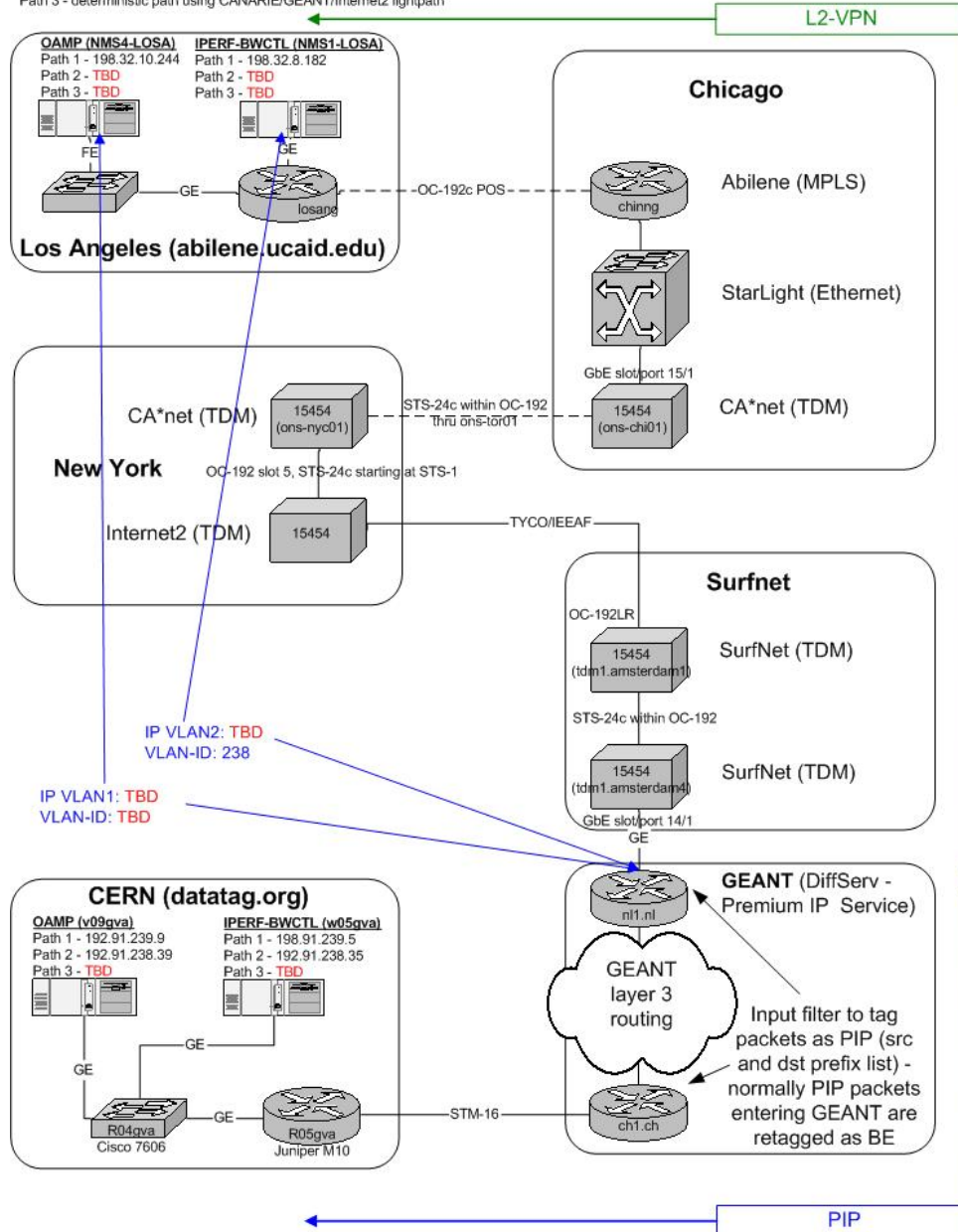
Joint Demo L2 Final Solution

Path legend

Path 1 - routed path using Chicago-CERN direct connection (default)

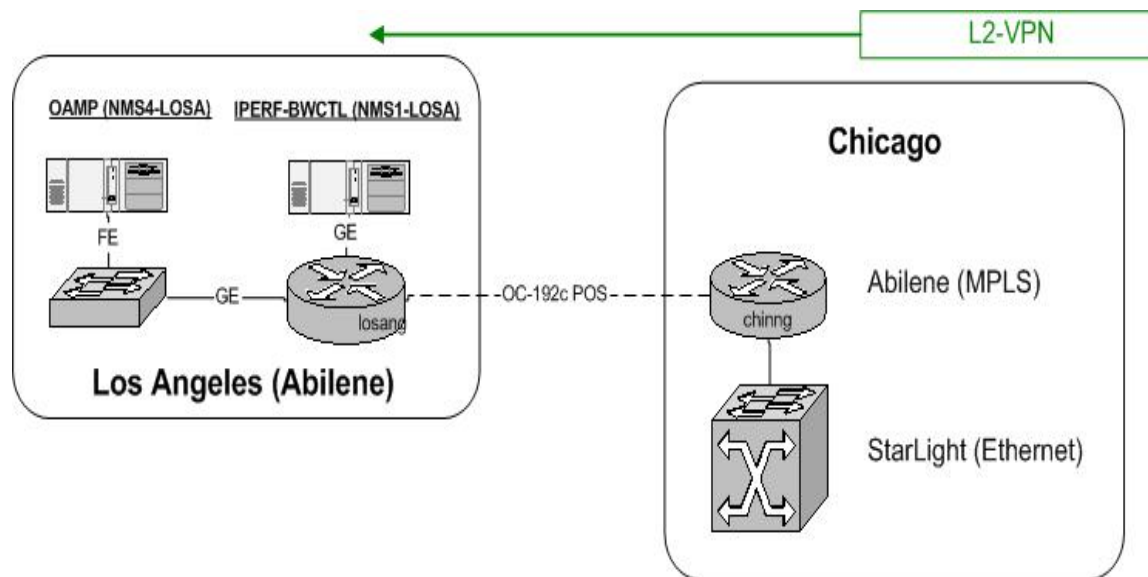
Path 2 - routed using GEANT-Internet2 MAN-LAN connection

Path 3 - deterministic path using CANARIE/GEANT/Internet2 lightpath



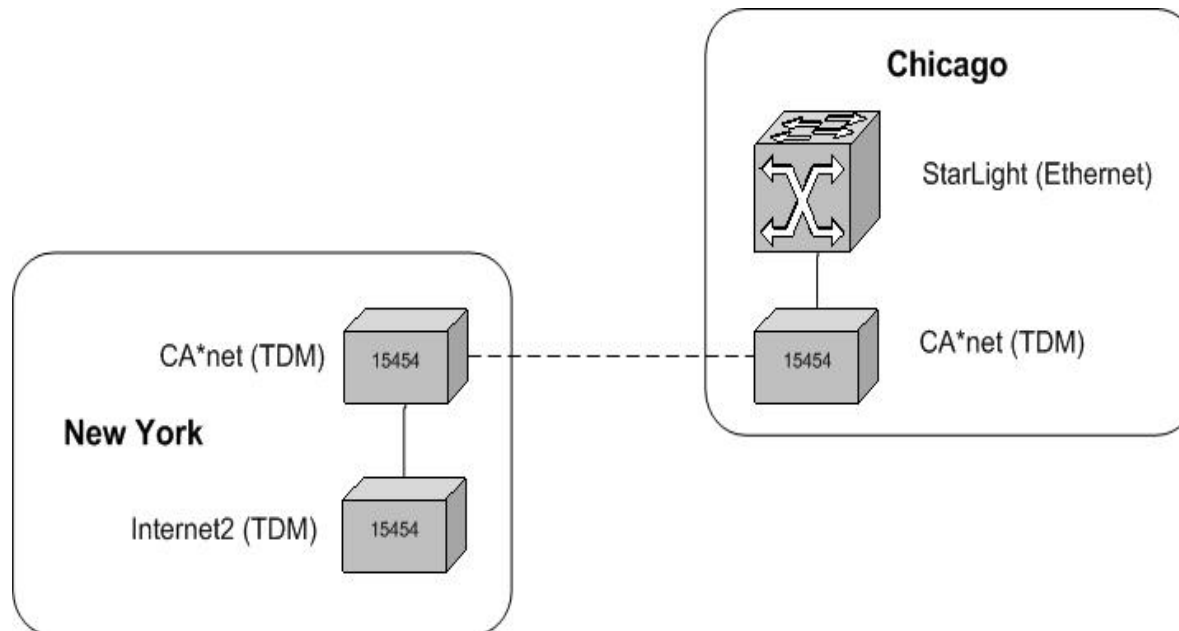
LA to Chicago

- **MPLS L2VPN across Abilene with preference through the lightpath**
 - Setup of VLANs, MTUs, IP addressing
 - Testing of MPLS QoS in the lab



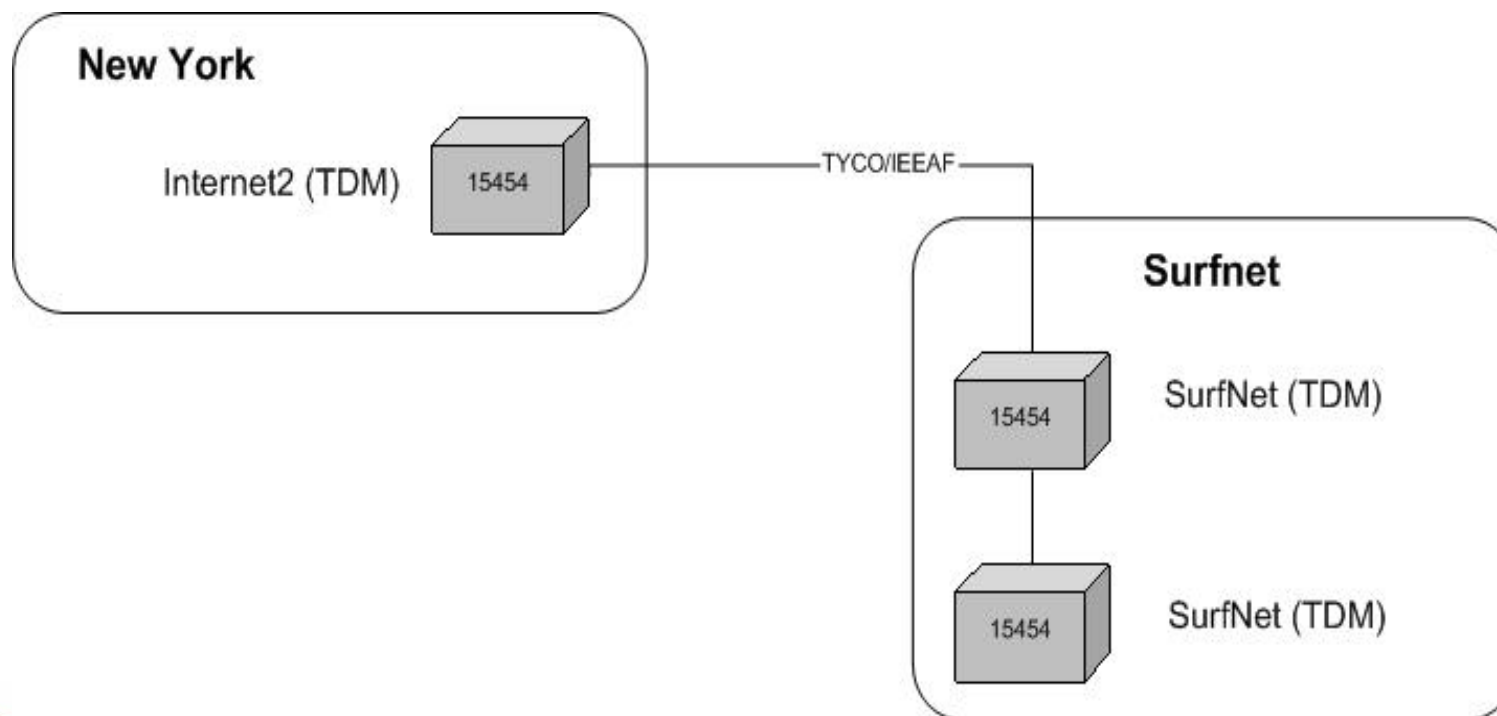
Chicago to NY

- Layer-1 TDM path across CA*Net 4
 - No layer-2, layer-3 configuration needed



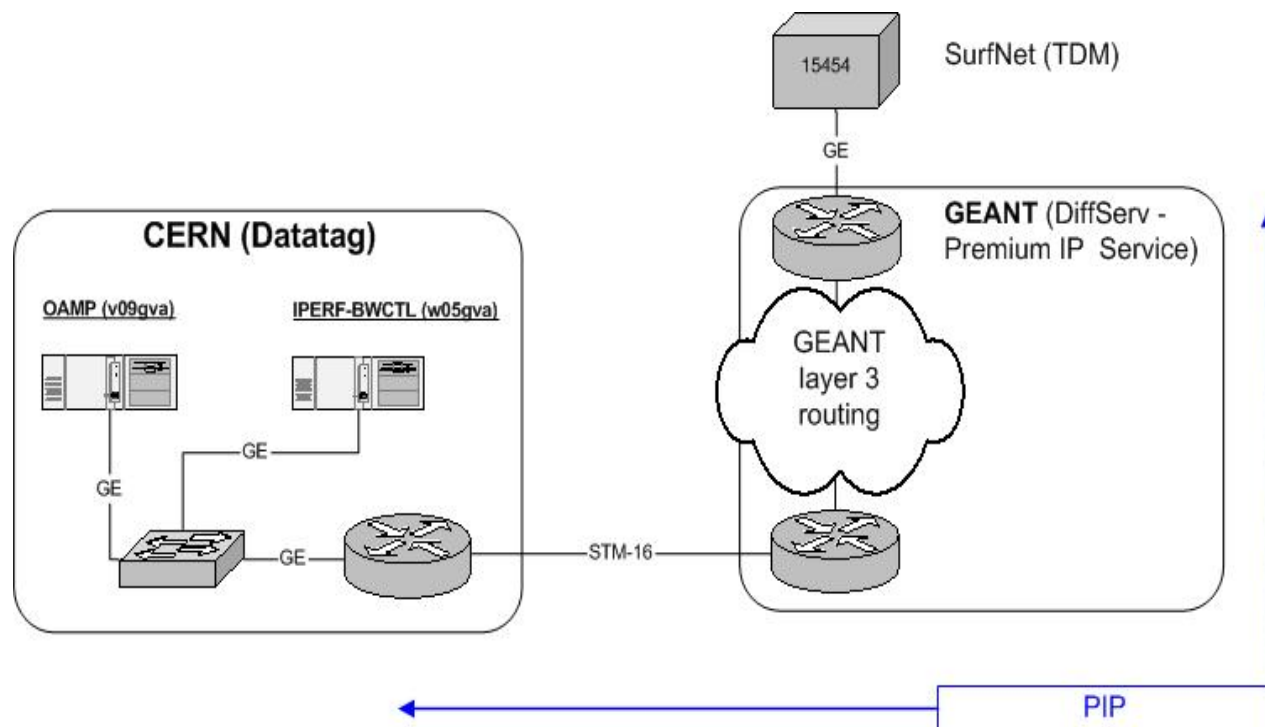
NY to Amsterdam

- Layer-1 TDM path across CANARIE, Internet2, and SURFnet
 - Layer-1 configuration problems encountered on TYCO/IEEAF circuit

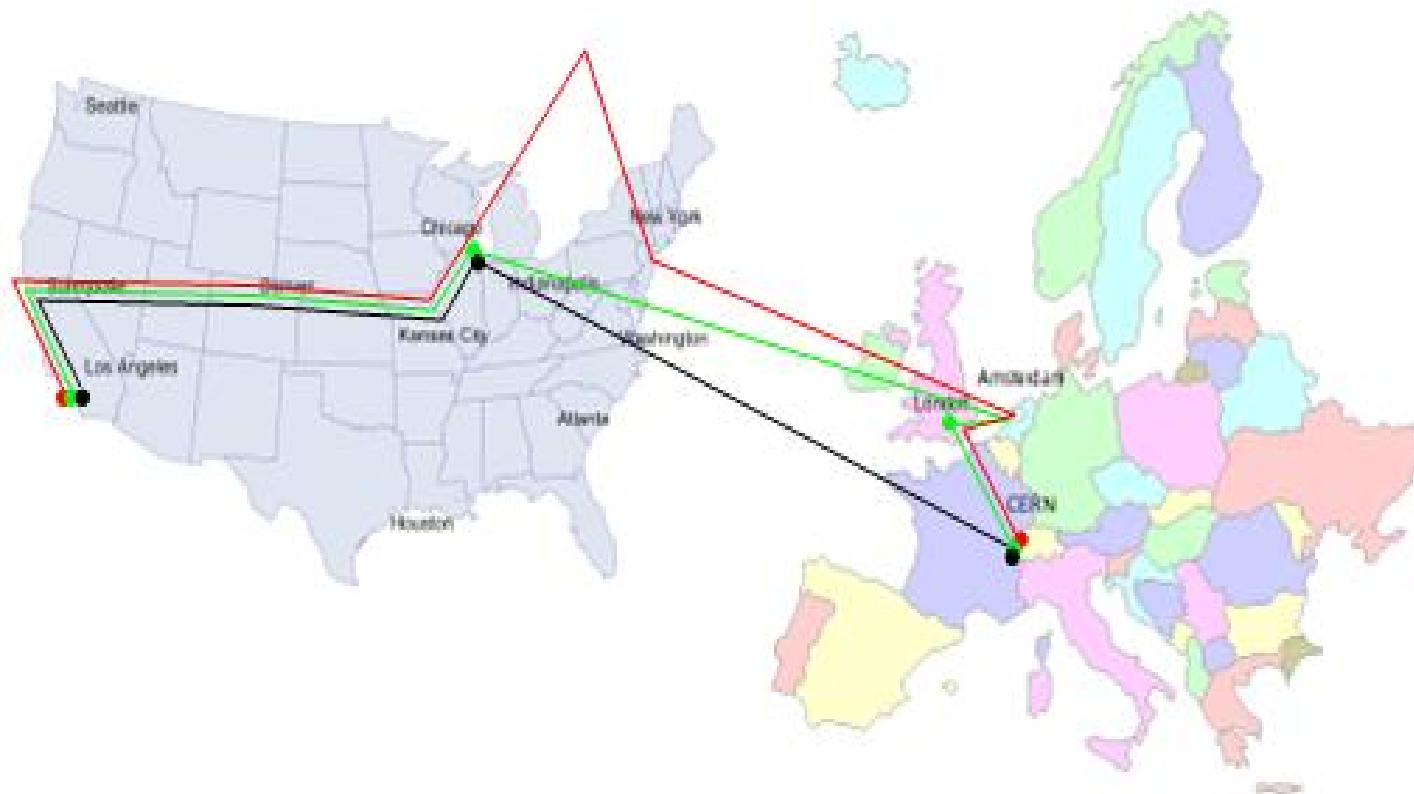


Amsterdam to CERN

- Layer3 Premium IP Service across GEANT
 - Setup of VLANs, IP addressing, DSCP marking, routing



Measurements



Path 1 — DataTag — Default Route

Path 2 — Eurolink — "Cooked" Alternate Route

Path 3 — Lightpath — "Cooked" Alternate Route

Circles Correspond to OWAMP / BWCTL Measurement Node Pair

Summary

- **Biggest hinderance was problems with TYCO circuit**
- **Performance measurements inconclusive**
- **Much more work to do on this particular lightpath experiment**
- **2nd workshop later this year**
- **Multi-domain, heterogeneous Lightpaths not yet available “on-demand” ...**

URL

[http://www.canarie.ca/canet4/library/
lightpath_workshop/agenda.html](http://www.canarie.ca/canet4/library/lightpath_workshop/agenda.html)

Questions?