IDC Protocol and Infrastructure

development and deployment

GLIF Seattle

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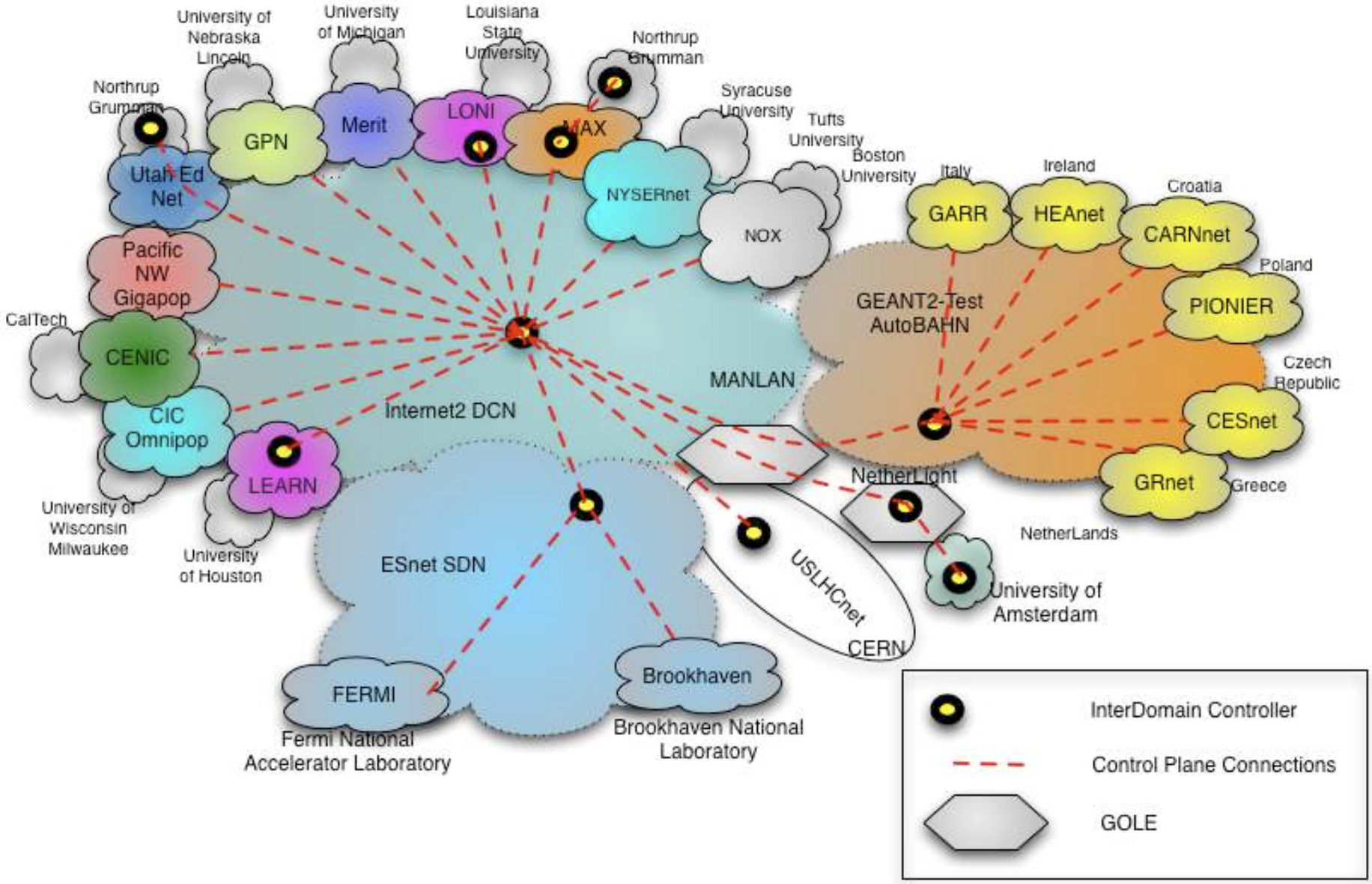
INTERNET2®

Global Dynamic Circuit Network



Brief History of IDC Protocol from Internet2 Perspective

- OSCARS – initiated by ESnet to setup MPLS tunnels
- OSCARS-BRUW - Collaboration between Internet2 and ESnet
  - BRUW created experimental tunnels on Internet2 IP net
- Internet2 develops interface from OSCARS to DRAGON enabled GMPLS switches
- IDC developed by DICE control plane WG (GEANT, Internet2, ESnet)
  - Based on enhanced OSCARS-BRUW
- DCN Software Suite combines DRAGON and OSCARS for Inter and Intra Domain control
- GEANT/AutoBAHN implements IDC interface to Internet2
- Nortel, University of Amsterdam, NetherLight implement demos
- Applications (LambdaStation, TeraPaths and Phoebus) use IDC interface
- IDC/DICE participates in OGF GNI-API wg
- IDC /DICE helps organize OGF/NSI working group

IDC infrastructure

- Internet2 DCN and ESnet SDN deployed at sites across the United States and interconnect at Chicago and NY
- AutoBAHN interfaces to Internet2 IDC in NY
- NYSernet, Dragon/Mid Atlantic Crossroads, LONI, LEARN (Regional US networks) - adopt DCN SS and connect to Internet2
- AutoBAHN connects to Internet2
  - NRENs connect to AutoBAHN
- University of Amsterdam connects to Internet2 through NetherLight

DCN Software Status

- DCN Software Suite developed by Internet2, ESnet, ISI-East, Mid Atlantic Crossroads
- Includes DRAGON and OSCARS programs in combination tested to work together
- Currently DCN SS-Suite at version 0.3.1, testing 0.4
- Collaborating with others to add features
  - University of Amsterdam, Nortel
  - Encourage additional collaboration- open source
- Version 0.3.1 supports GMPLS for Domain Control, IDC protocol for Interdomain
- Version 0.4 supports VLAN translation at edge of network (if hardware supports it), improves internal state handling, includes notification broker to interface between IDCs and with other service,

DCN Software Suite Futures

- **New Features being developed**
  - Additional AA and Trust Infrastructure
  - SONET to Ethernet Adaptation between domains
    - Ethernet at endpoints/ SONET cross domains
  - Increase Lookup Service infrastructure use between domains - to simplify finding host's network connection
  - Modify topology description from NM-WG to NML when NML is complete
  - Policy Scheduling for advance reservations
  - Advanced multiple domain Authorization Policy
  - Standardize Pathfinding among domains
- **Use common Information infrastructure with perfSONAR [Lookup Service, Topology, AA/Trust, Notification]**
- **Infrastructure deployment and capabilities to be defined with IDC group and GLIF**
- **Standardize protocols at OGF with other developers**

Dynamic GOLE Planning

- Exchange Points may participate in Dynamic Circuit creation – becomes a “Dynamic GOLE”
- GUSI – GLIF Generic User Interface – being developed by GLIF GNI-API wg could be used to support this
- GUSI – supports circuit requests from a number of different control planes
- NetherLight and MANLAN are considering creating Dynamic GOLE using GUSI or IDC
- Dynamic GOLES seem a good goal for GLIF ☺

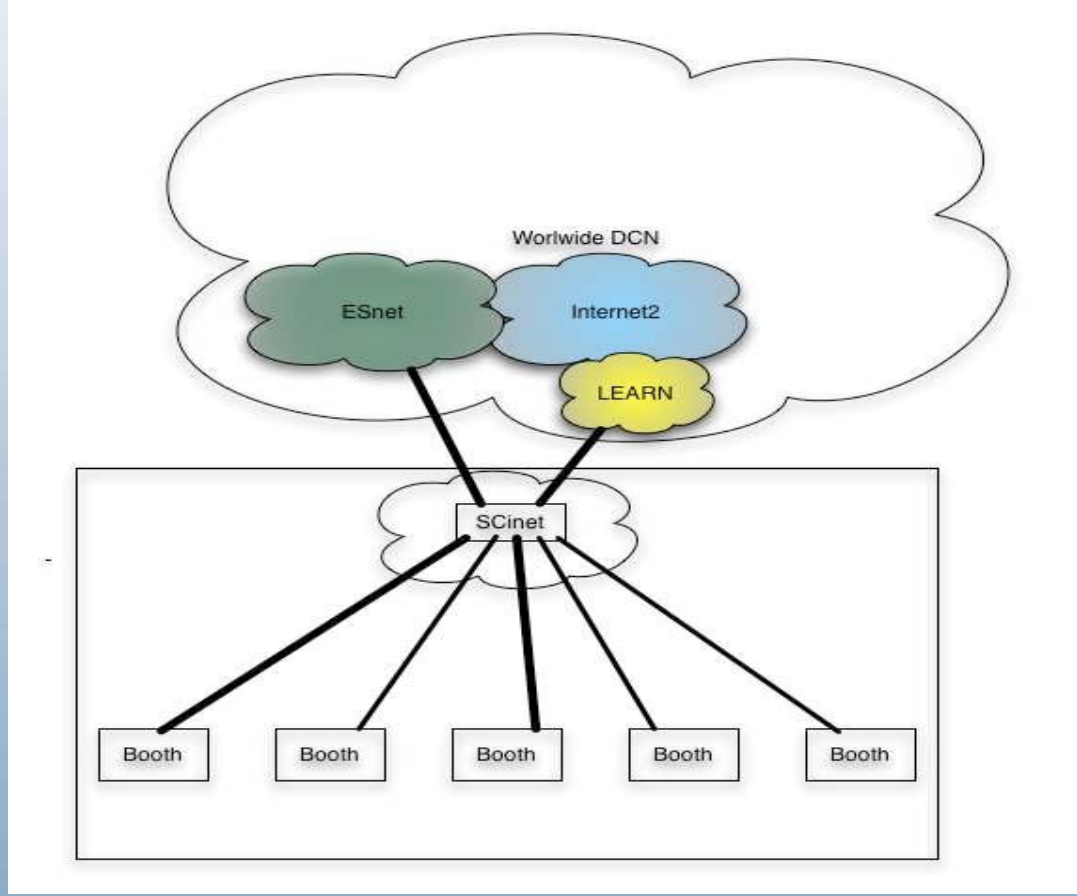
Plan for SC08

- SCinet DCN and IDC
- Internet2 and (possibly) ESnet connect to SCinet
- SCinet IDC will share bw between booths
- Booths connect to DCN

Anticipated applications

-LHC on showfloor to sites in US and Europe

- eVLBI to Amsterdam
- High definition Video
- Weather Simulation
- Phosphorous to IDC interoperation demo



Standardizing Software and Infrastructure

- Infrastructure – deployed by organizations to support users
- Software deployed by organizations to support network
- Standards needed for networks to interoperate
- Standards needed for users to interface to network
- Infrastructure needs standards and defines needed standards
- My view – GLIF infrastructure group that collaborates with OGF standards group

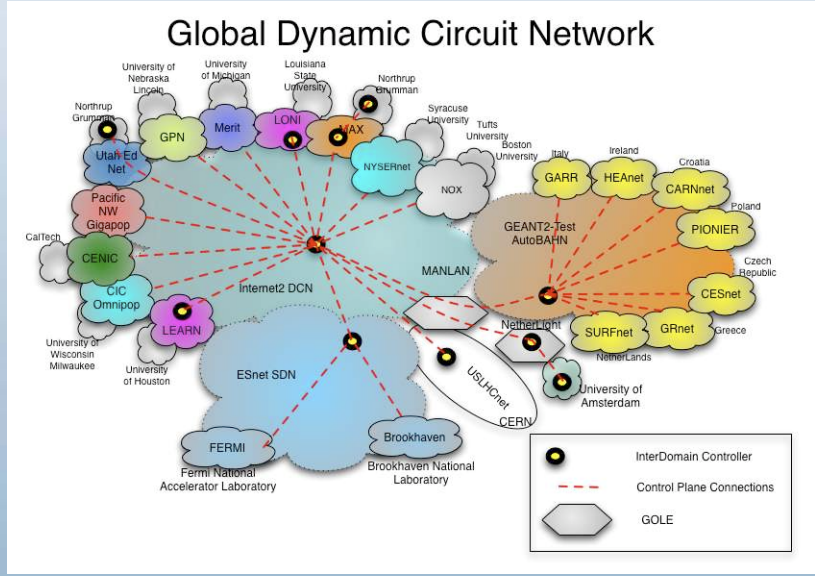
Interdomain Dynamic Circuits GLIF and OGF

Where is this work done?

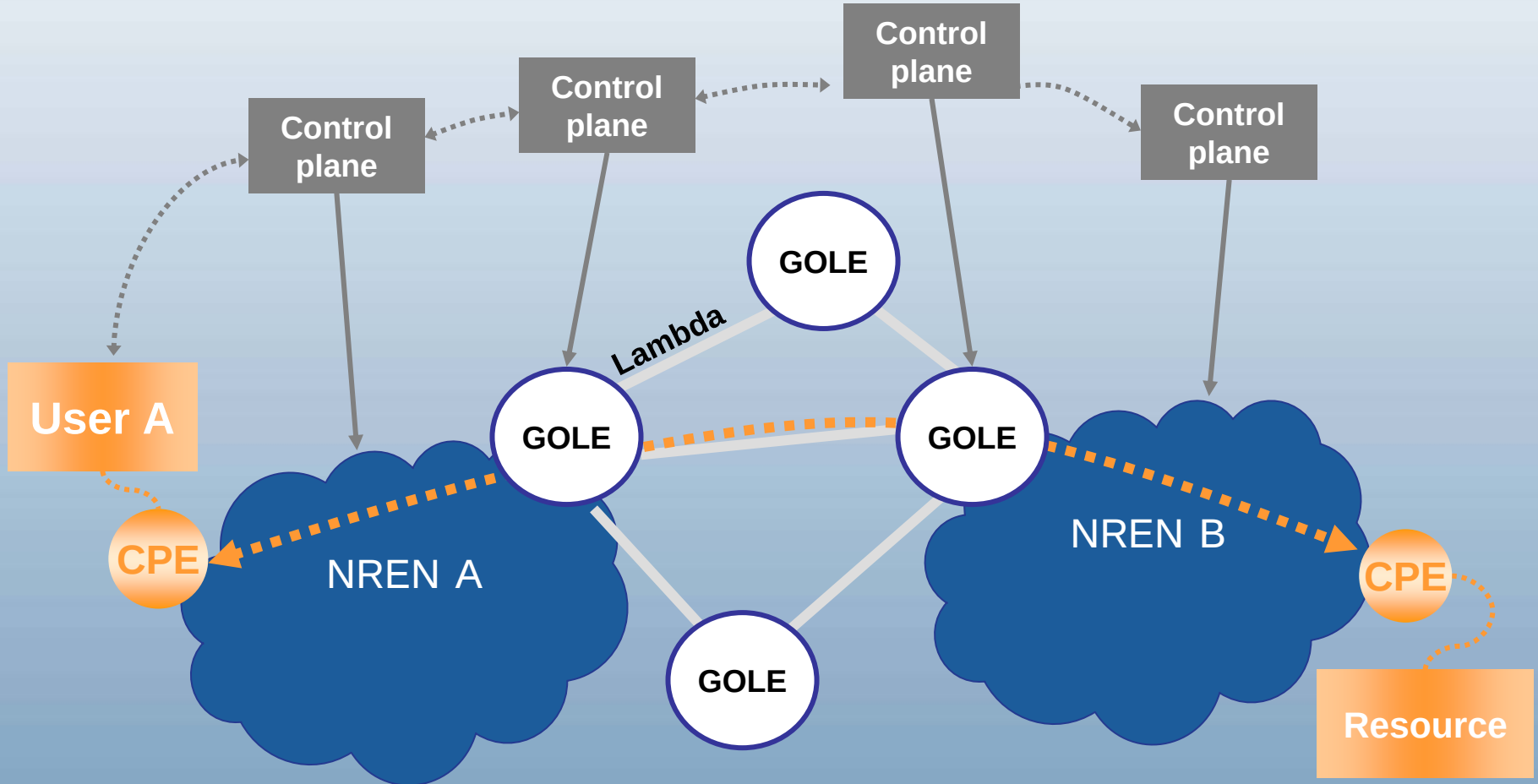
- **Circuit scheduling and instantiation**
  - **OGF NSI wg, GLIF requirements**
- **Topology description**
  - **OGF NML wg, GLIF input?**
- **AA and Trust**
  - **OGF Security ++, GLIF requirments and use cases**
- **Pathfinding**
  - **OGF, IETF, -- GLIF requirements**
- **Scheduling**
  - **OGF/ Grid Scheduling, GLIF requirements and use cases**
- **Lookup**
  - **GLIF use cases?**

Summary

- **IDC infrastructure developing, use is increasing**
- **Future depends on developing global interoperation standards**



The GLIF approach to lambda networking



8th Annual Global LambdaGrid Workshop
Seattle, 1-2 October

From Kees Neggers

Questions?