

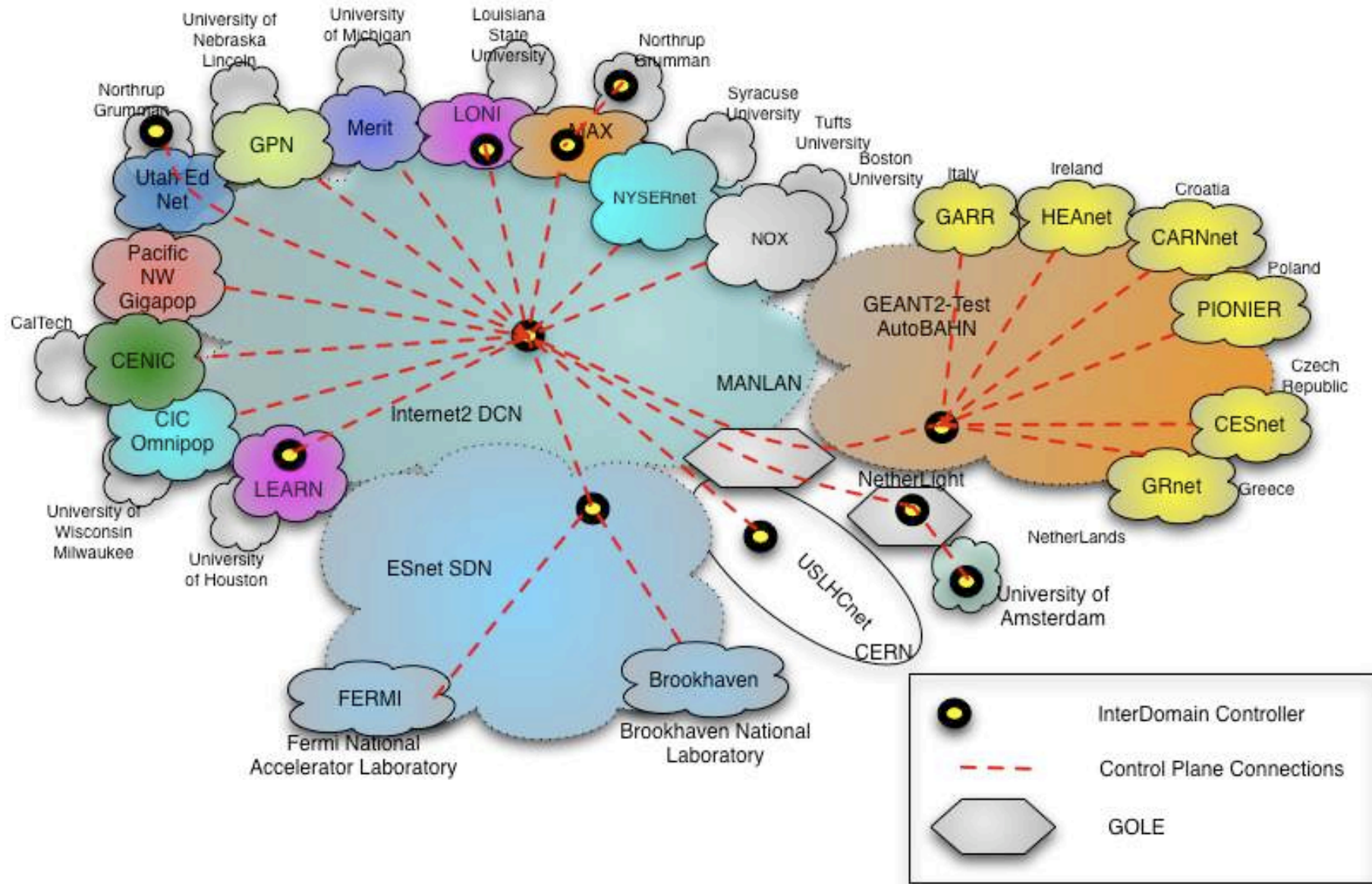
# **IDC Protocol and Infrastructure**

## **development and deployment**

GLIF Seattle  
October 1, 2008  
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# Global Dynamic Circuit Network



# Brief History of IDC Protocol from Internet2 Perspective

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- 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

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- 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

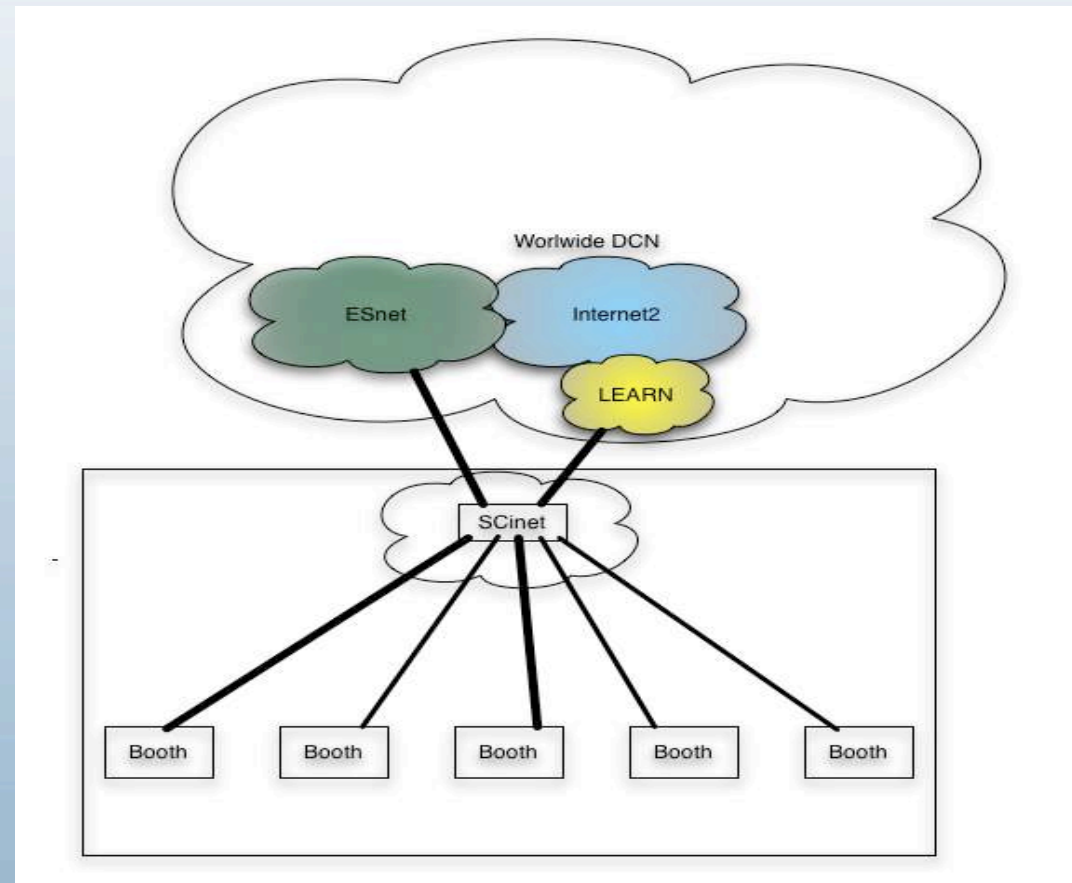
- Exchange Points may participate in Dynamic Circuit creation - becomes a “Dynamic GOLE”
- GUSI - GLIF Generic User Interface - being developed by GLIF GNI-API wg could be used to support this
- GUSI - supports circuit requests from a number of different control planes
- NetherLight and MANLAN are considering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

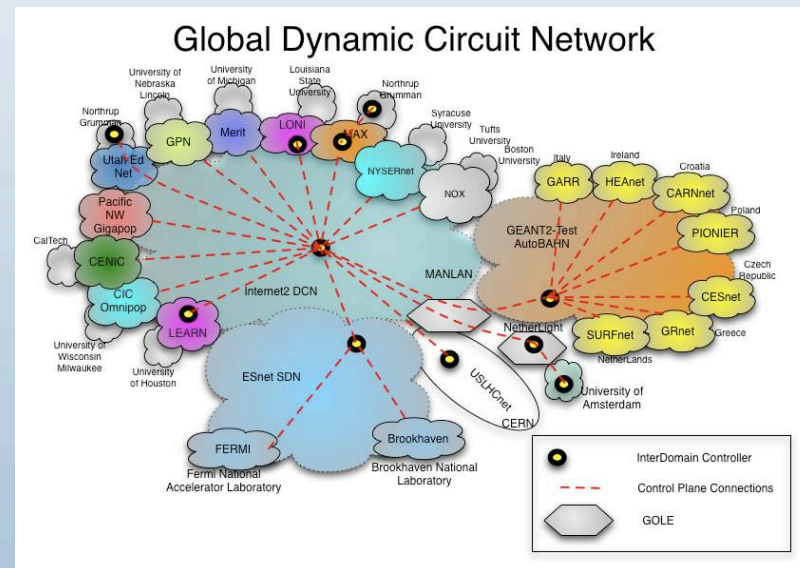
## GLIF and OGF

### Where is this work done?

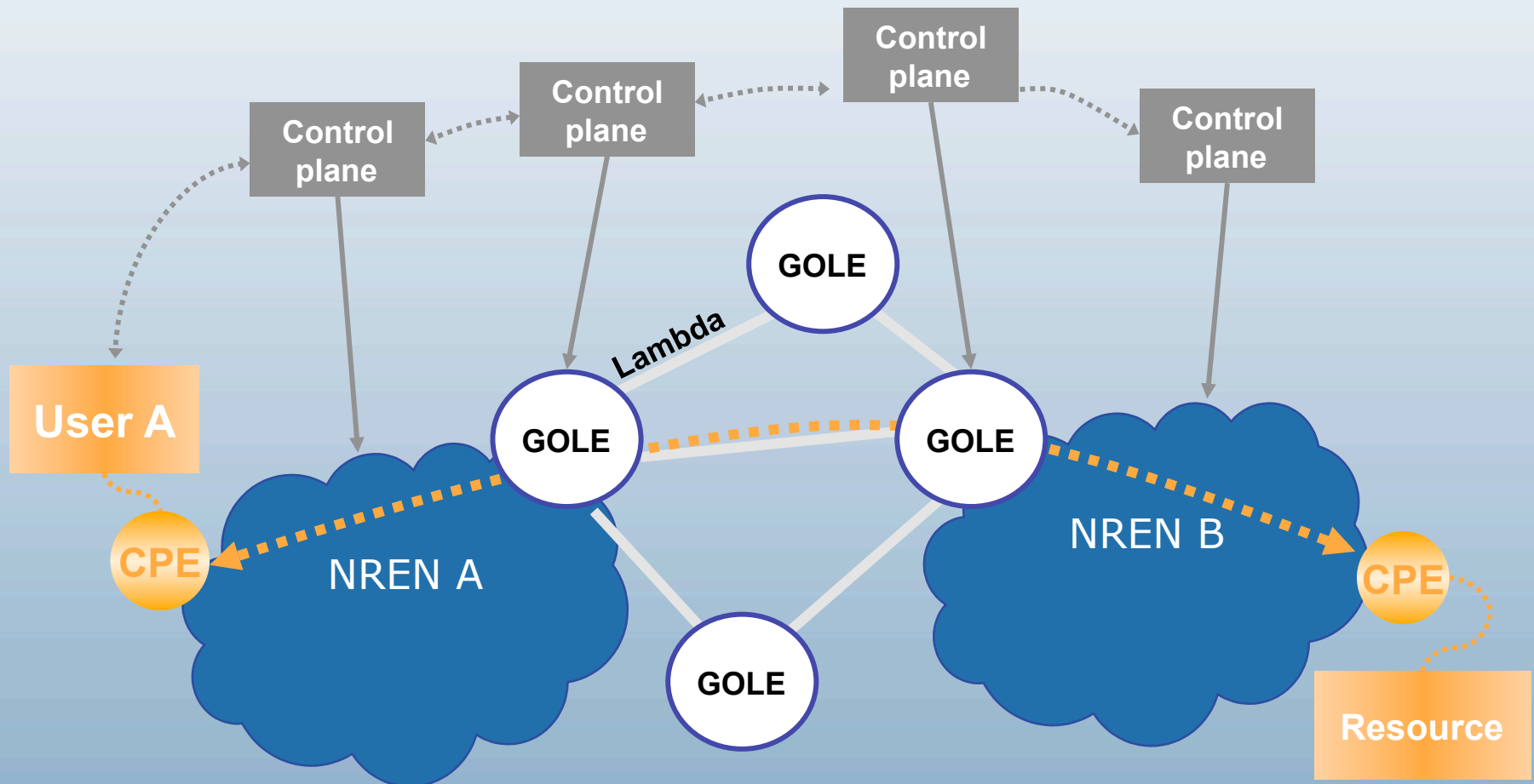
- Circuit scheduling and instantiation
  - OGF NSI wg, GLIF requirements
- Topology description
  - OGF NML wg, GLIF input?
- AA and Trust
  - OGF Security ++, GLIF requirements and use cases
- Pathfinding
  - OGF, IETF, -- GLIF requirements
- Scheduling
  - OGF/ Grid Scheduling, GLIF requirements and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



# Questions?