# InterDomain Dynamic Circuit Network

## GLIF - Hawaii January 2008

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# Interdomain Dynamic Circuit Network

Global network that allows dynamic ckts to be created across multiple circuit networks

Internet2, ESnet and Dante have worked in the DICE control plane working group

Developed and continue to develop IDC protocol

Deployed and continue to deploy Interdomain dynamic circuit infrastructure

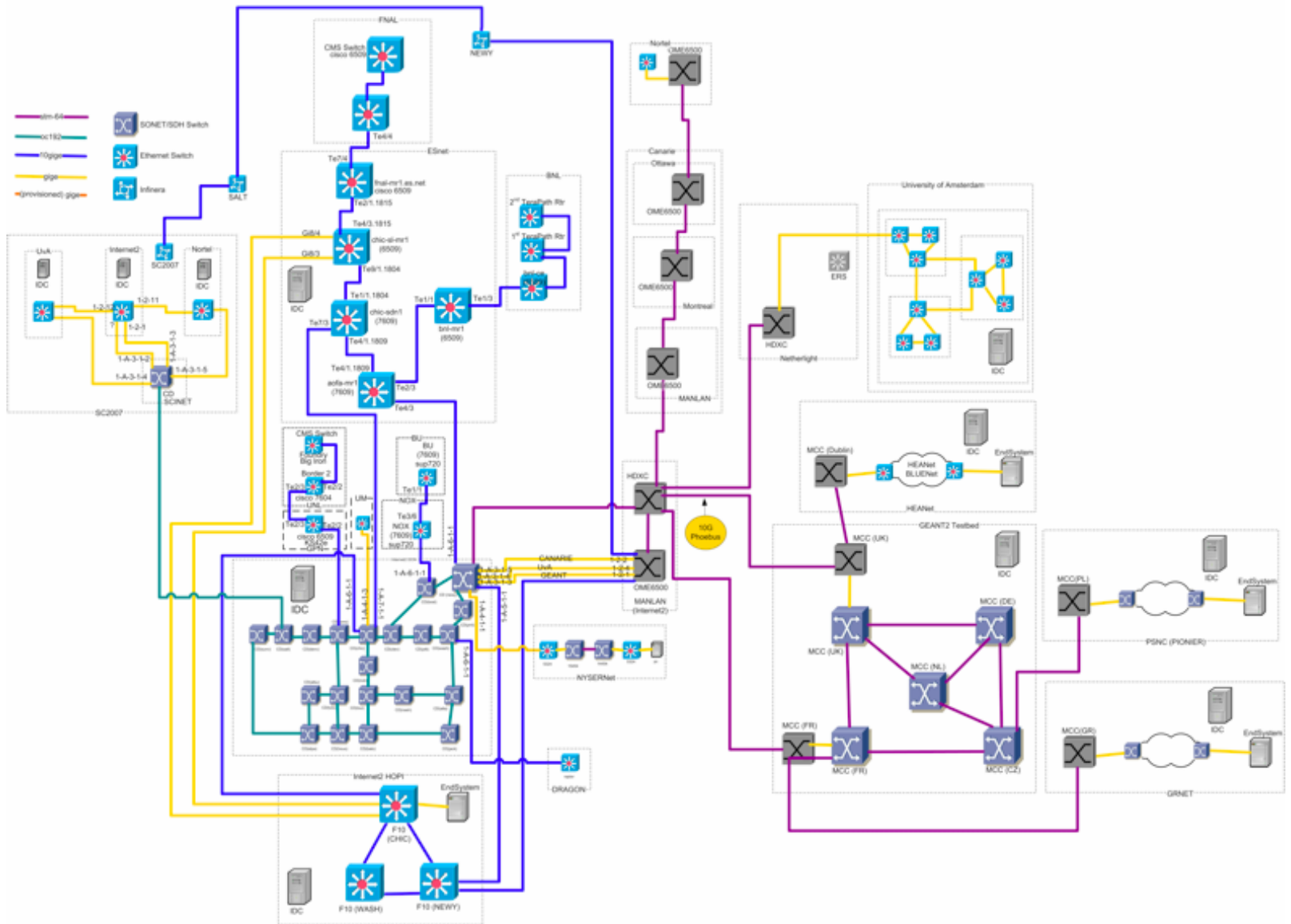Additional Collaboration with Nortel and University of Amsterdam

# Topics

- SC07 presentation overview
- Infrastructure at time of SC07
- Weather Map of DCN today
- Quick overview of applications on weathermap
- GOLEs in DCN
-  IDC architecture
- IDC and meta scheduler
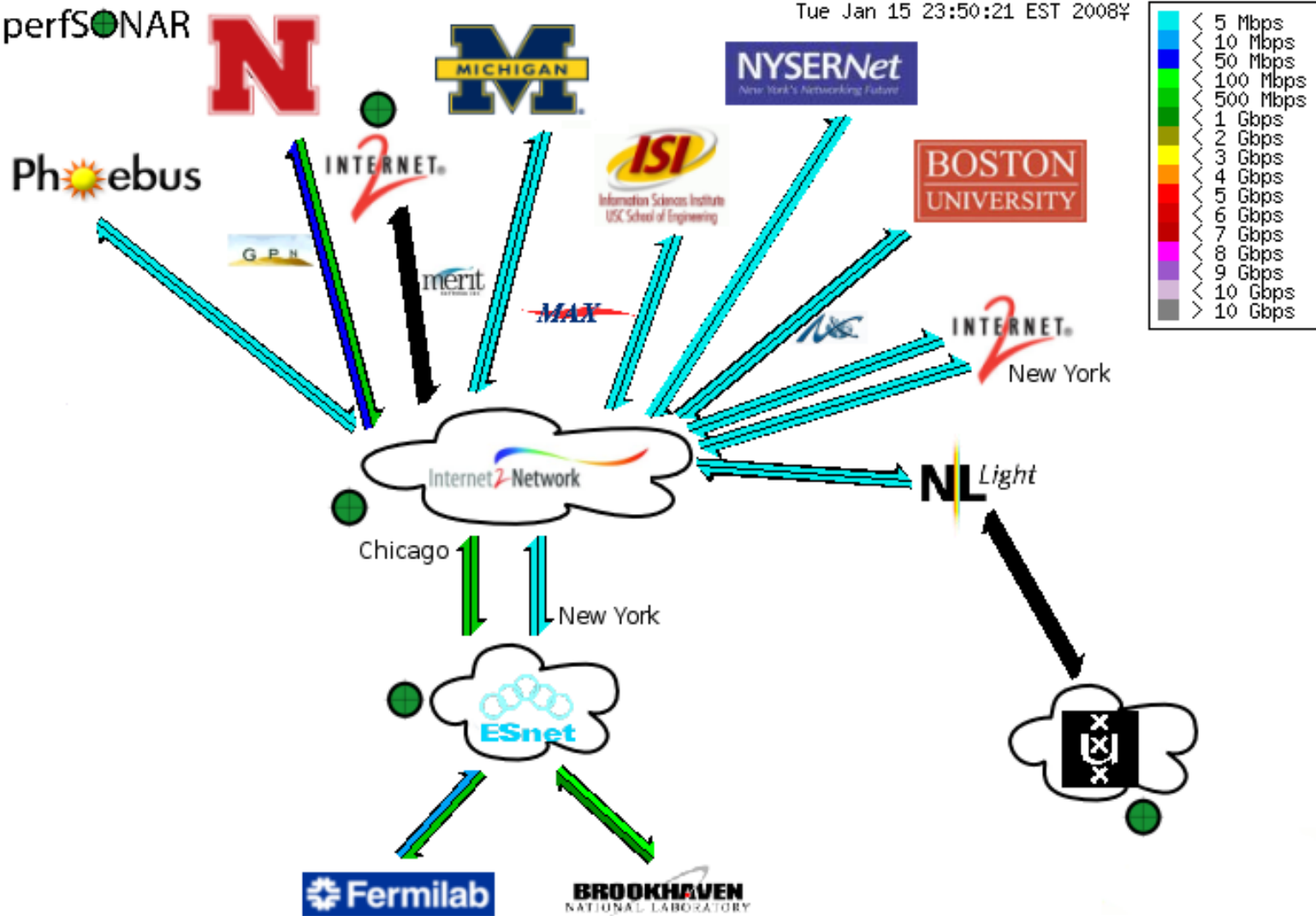- Future with GLIF

# Global DCN Infrastructure at SC07 timeframe
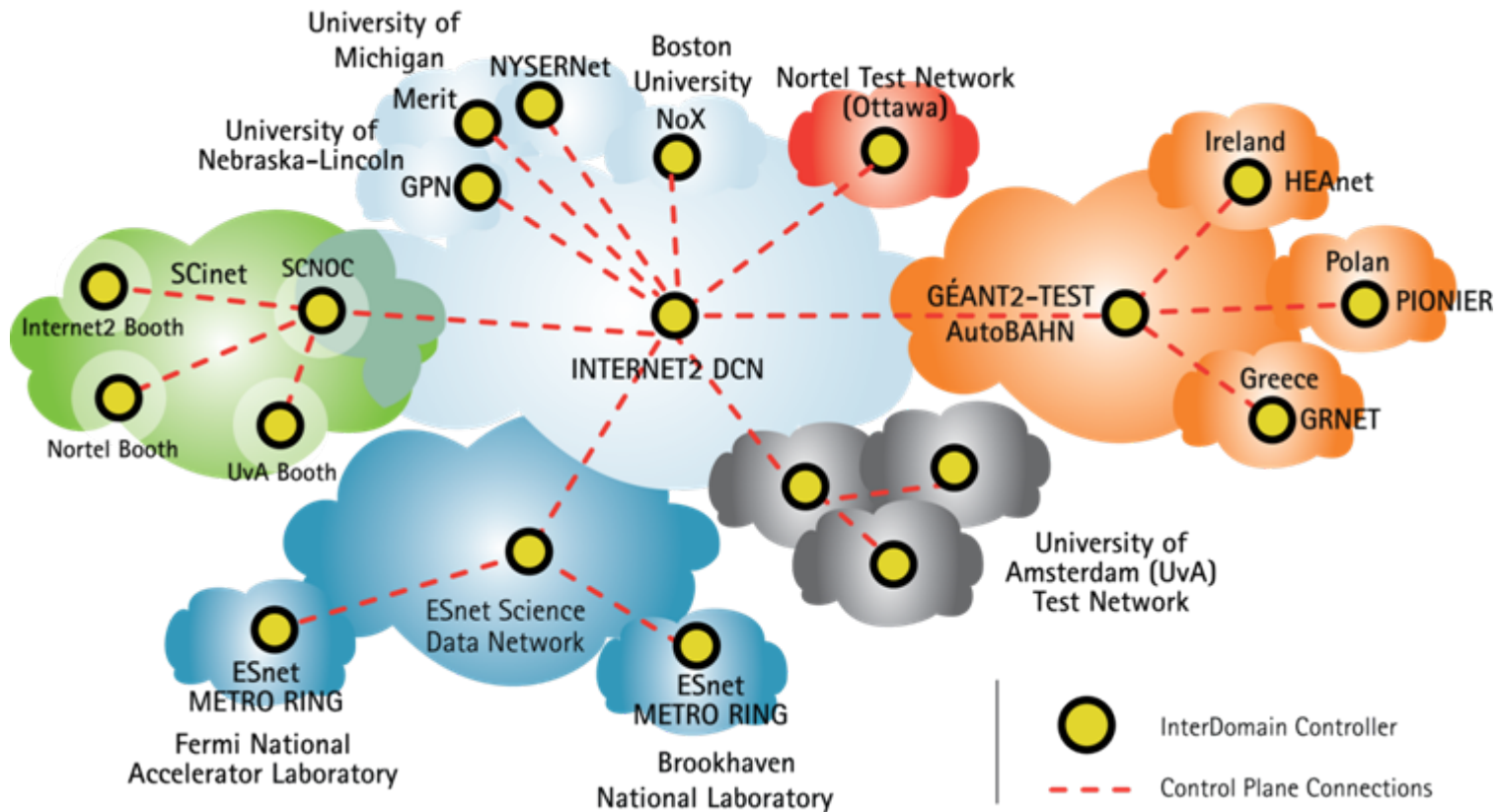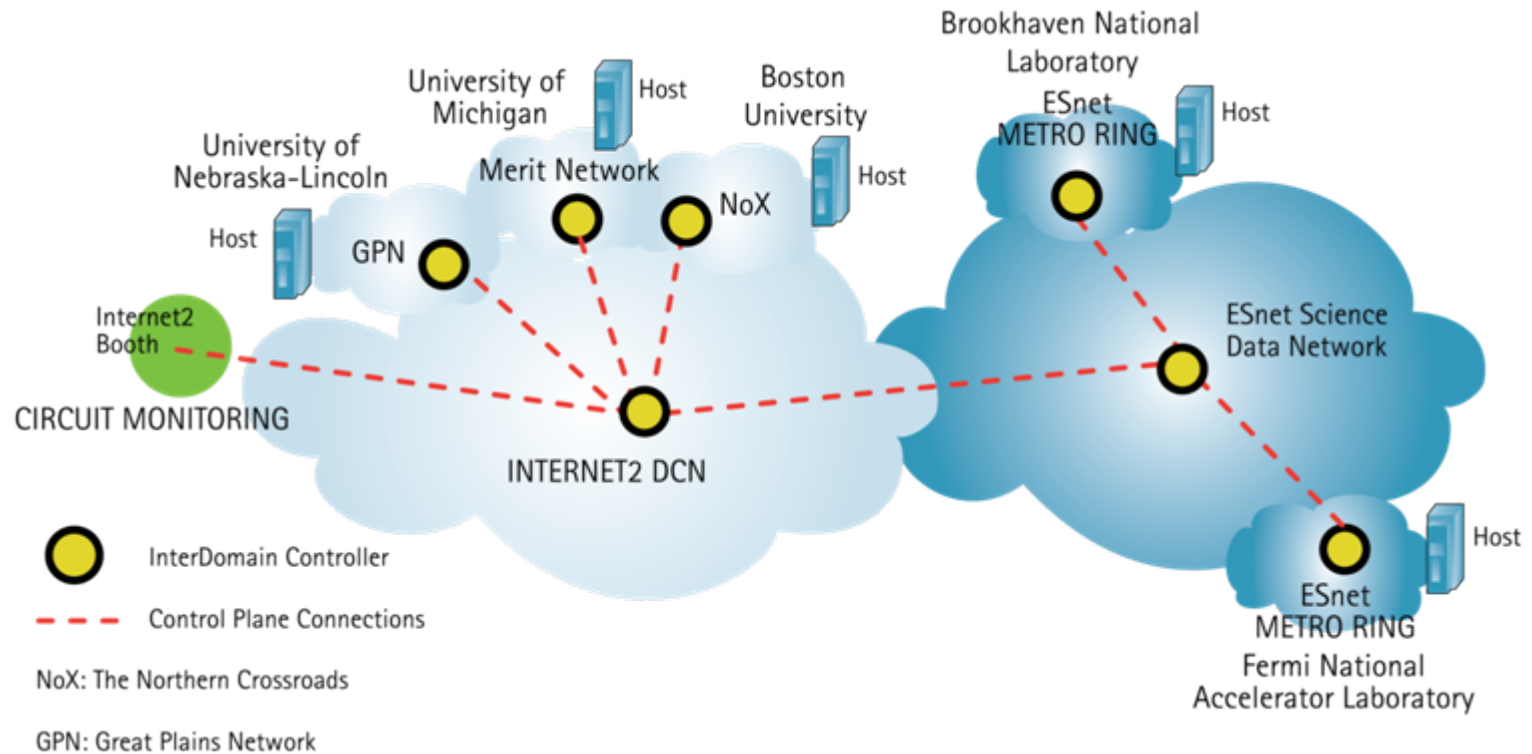
# Physical Infrastructure at SC time

# Current Infrastructure of DCN



http://packrat.internet2.edu/~zurawski/TIP2008

# LHC applications on DCN

# Phoebus and DCN

- Phoebus breaks tcp connections into pieces to improve performance http://e2epi.internet2.edu/phoebus.html

- Phoebus has the ability to create and use DCN a piece of the connection

- Phoebus gateways are in place in Salt Lake and Syracuse NY now, being used

- Other Phoebus gateway have been used in Ireland, Greece, and Poland, and more are being deployed in US now.

# DCN GOLEs
## Exchange Points for Dynamic Circuits
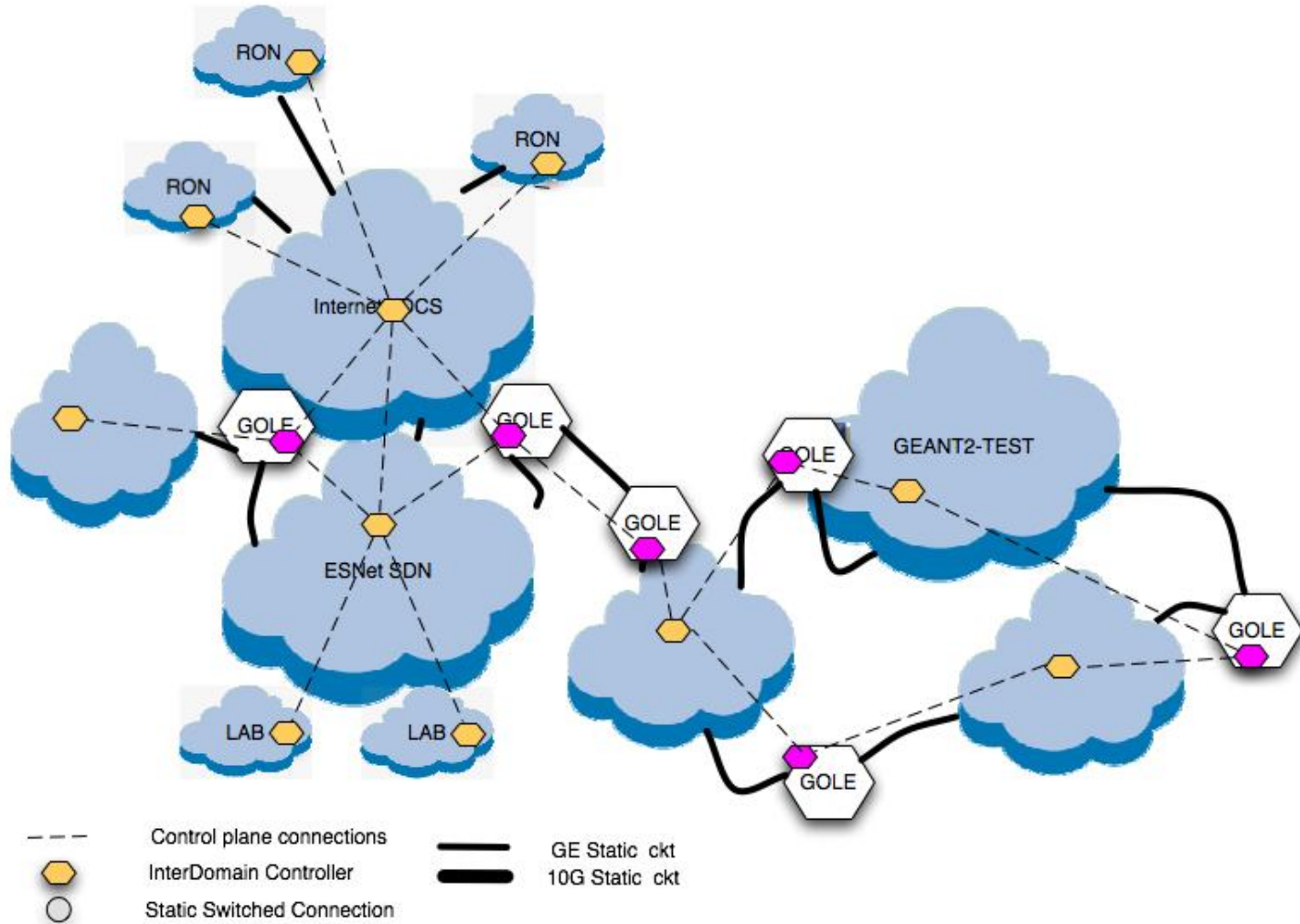
# GOLE policy issues

- Individual DCN GOLE is policy free
  - GOLE is non blocking
  - If both links agree path between them is made
  - This is initial demo being done at here and at JT
- When GOLEs connect to each other
  - Link between GOLEs is limited resource
  - Now have to have policy that determines what is allowed on inter GOLE link
- GOLE role :) may be
  - "superdomain" aggregating info on other domains
  - Part of GOLE domain that consists of only GOLES, administered by some standards body
- GLIF role in defining DCN GOLE?

# Monitoring Dynamic Circuits
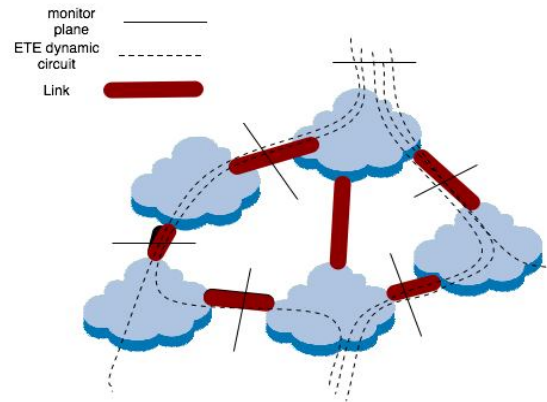


- Monitor plane - both sides can monitor and deploy
- Monitor links for infrastructure status and activity
- Monitor ETE circuits for user status, traffic and debugging
    - Ongoing development and standards activity in this area
    - perfSONAR is our choice of tool - will be enhanced to add additional support
    - Dynamic circuits make naming and syntax standards imperative

# IDC role in DCN
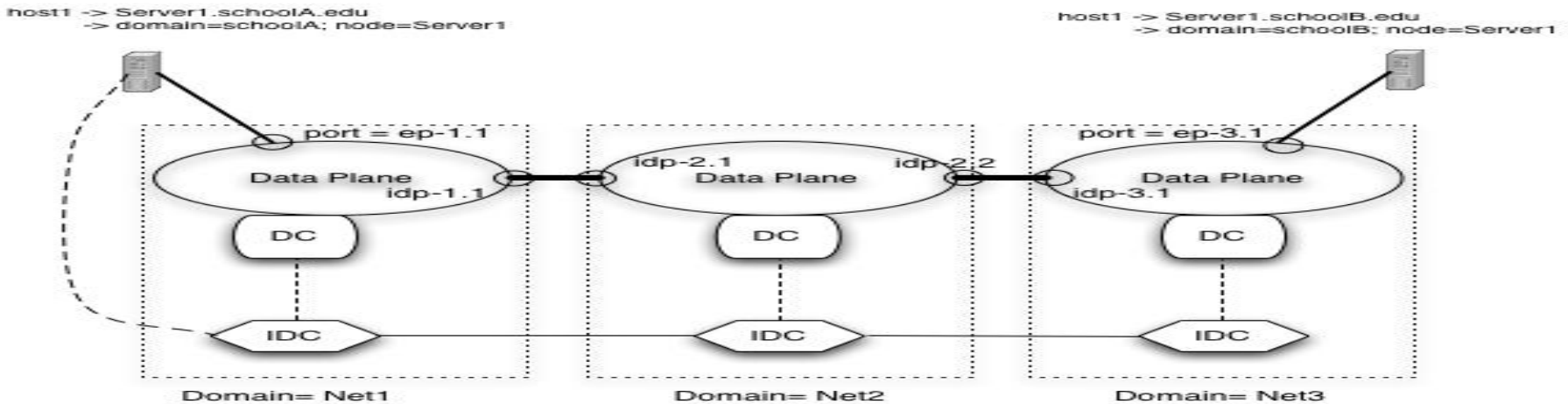


- IDC is what allows DCNs in different domains communicate
- IDC communicates with user and with other domains
- IDC requests services from its Domain Controller
  - Different implementations from
    Internet2, Esnet, GEANT, Nortel

# IDC Architecture
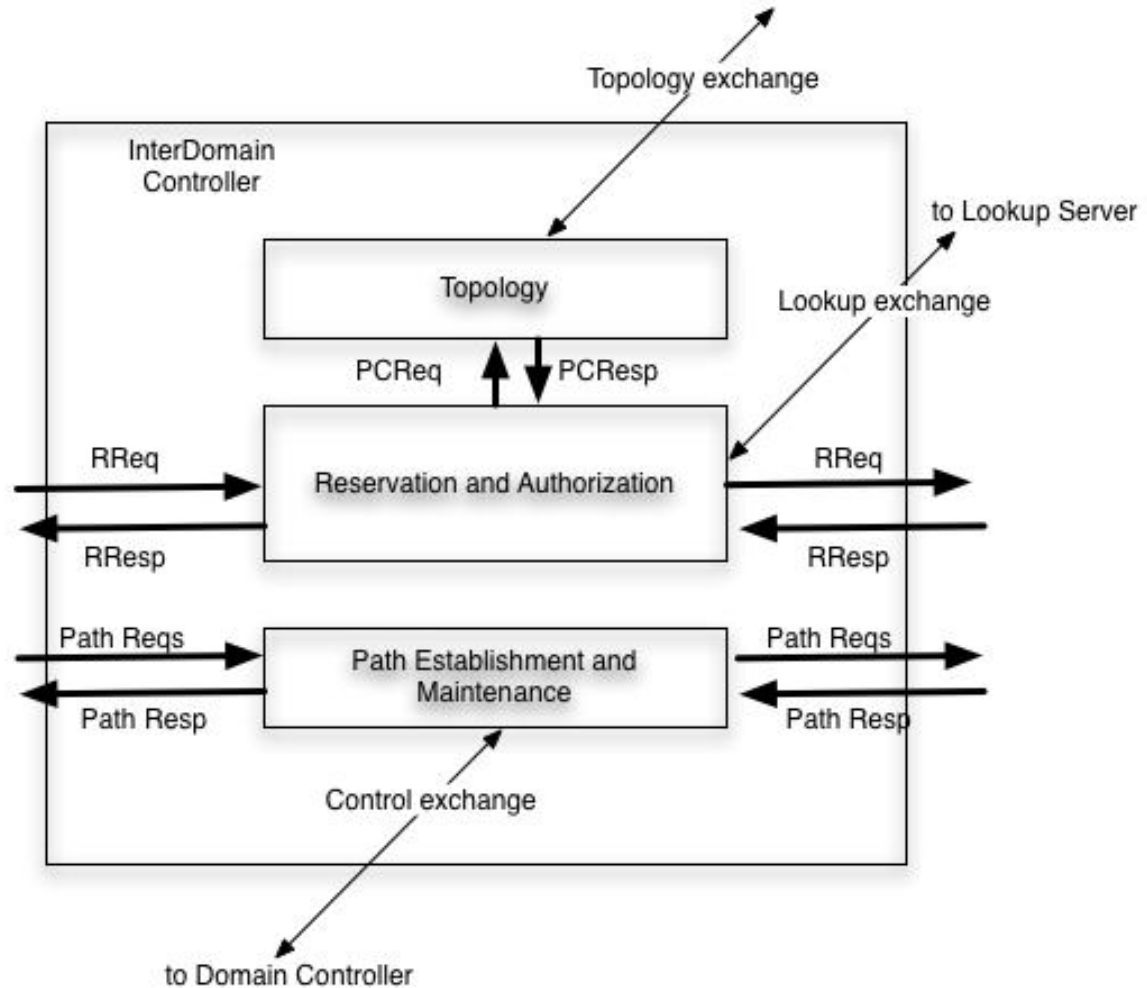
# IDC implementation status

- Path Reservation and authorization is implemented in several interoperating implementations
- Topology and Path computation is still done by configuring paths between endpoints
  - Plan to allow request for Interdomain path and have each domain complete its portion of the path
  - Three approaches to topology sharing
    - LS between domains shared between all domains
    - BGP like information shared between domains
    - Metascheduler controls selected networking resources
  - Modifying Reservation algorithm to allow any of these
- Circuit setup done by WS now by some, expect to also allow RSVP initiation

# Interoperation of IDC parts

- Topology and path computation provide the ability create a global path between two points.
  - Req Path, get modified path and next IDC
- Path Reservation and authorization
  - Req Reservation, get confirmed path
- Path setup
  - Req Path Setup, get path setup confirmation

# IDC future paths

- Plan being discussed is that current collaborators will proceed on two paths
    1. Continue to deploy infrastructure
        - Make some changes to simplify routing, correct bugs, add small features
        - Harden code base with real users
        - Add additional collaborators to build test infrastructure
    2. Approach standards body
        - With other implementers
        - Considering IETF as initial choice

    Looking for input on how best to proceed

    GLIF role?

# Summary

- DCN networks are in place now
- Development has been collaborative under auspices of DICE control plane
- Future plans to continue and expand existing DCN, both physically and functionally
- Investigating taking to standards body
- GOLE is being demo'd using Nortel implementation at Netherlight
- Interested in participating with GLIF
  - Expanding infrastructure
  - Developing new capabilities
  - Taking to standards bodies
  - Developing interoperation between other implementations of dynamic circuits