StarLight GOLE Update

10th Annual Global LambdaGrid Workshop

Joe Mambretti, Linda Winkler, Alan Verlo

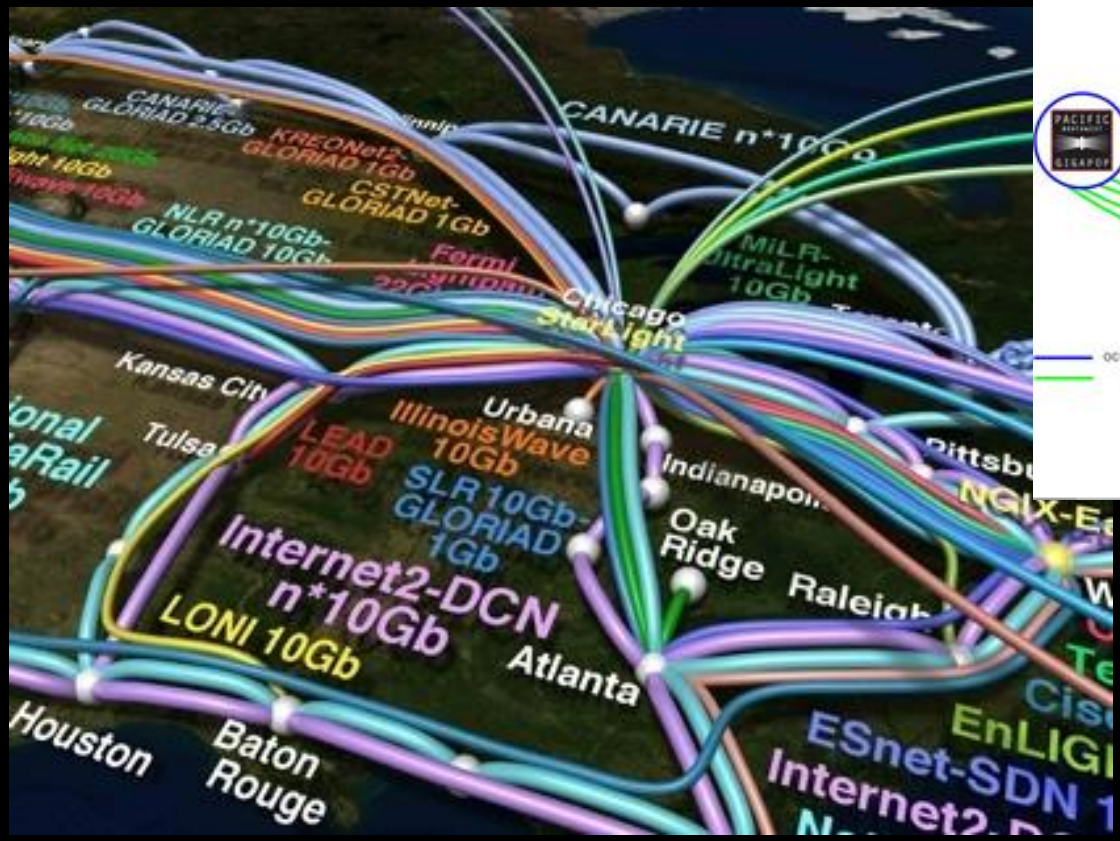
& the StarLight International Consortium

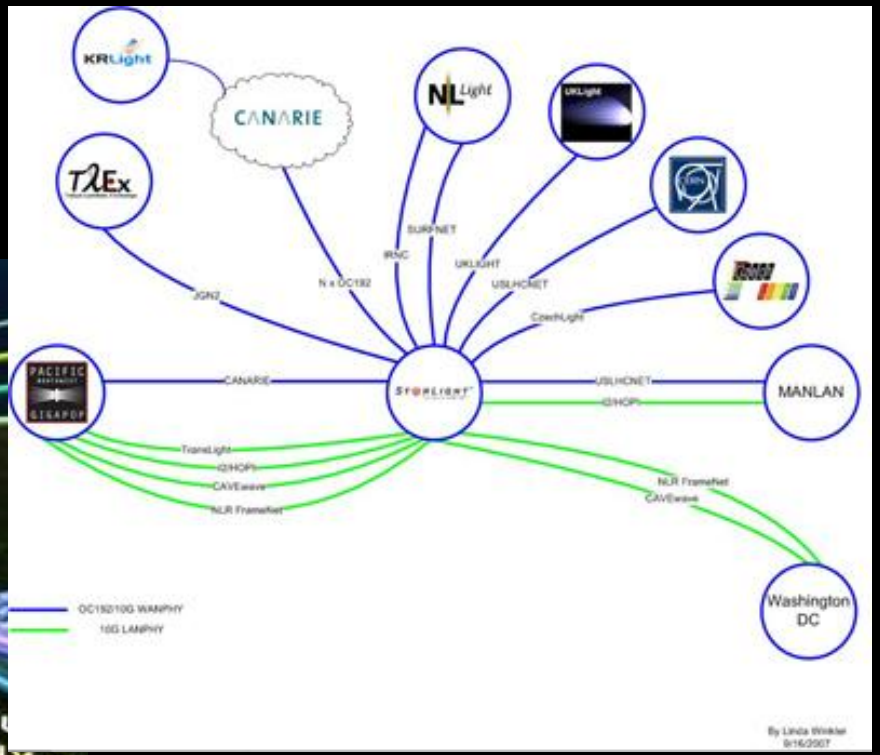
CERN, Switzerland

12-14 October 2010

Current StarLight Infrastructure

Ciena OME, Calient PXC (L1)
Force10 E1200 (L2/L3)
Many Lambdas & Collaborators





http://wiki.glif.is/index.php/StarLight

Measurement Servers:
bwctl, owamp, ndt/npad, perfSONAR

IRNC:ProNet: TransLight/StarLight

July 13, 2010

Tom DeFanti, Maxine Brown, Joe Mambretti, Tajana Rosing

Calit2, University of California, San Diego
Electronic Visualization Lab, University of Illinois at Chicago
International Center for Advanced Internet Research, Northwestern University

20 years of NSF-Funded High-Performance International Networking for Advanced Applications

(1995-2014)

IRNC TL/SL 3-Year Deliverables

- Continue enabling multi-national application and middleware experiments on international networks
  - High-Performance Digital Media Network (HPDMnet)
  - iGENI: the GENI-funded international GENI project*
  - SAGE: connecting people and their data at high-res*
  - CineGrid: it's all about visual communications
  - GreenLight International: less watts/terabyte*
  - Science Cloud Communication Services Network (SCCSnet)*: the impending disruption
- Build cooperative partnerships (e.g. MSC-CIEC*)
- Serve GLIF, NLR, and I2 as senior leaders, reviewers
- New services, including many with industrial partners
- Create opportunities for all the REUs we can get*

*Currently also funded by various NSF awards to UCSD/UIC/NU

TransLight/StarLight Collaborates with All IRNC/GLIF Initiatives

Connect to TransLight/PacificWave in Seattle via TransLight (Cisco Research Wave deployed on NLR)

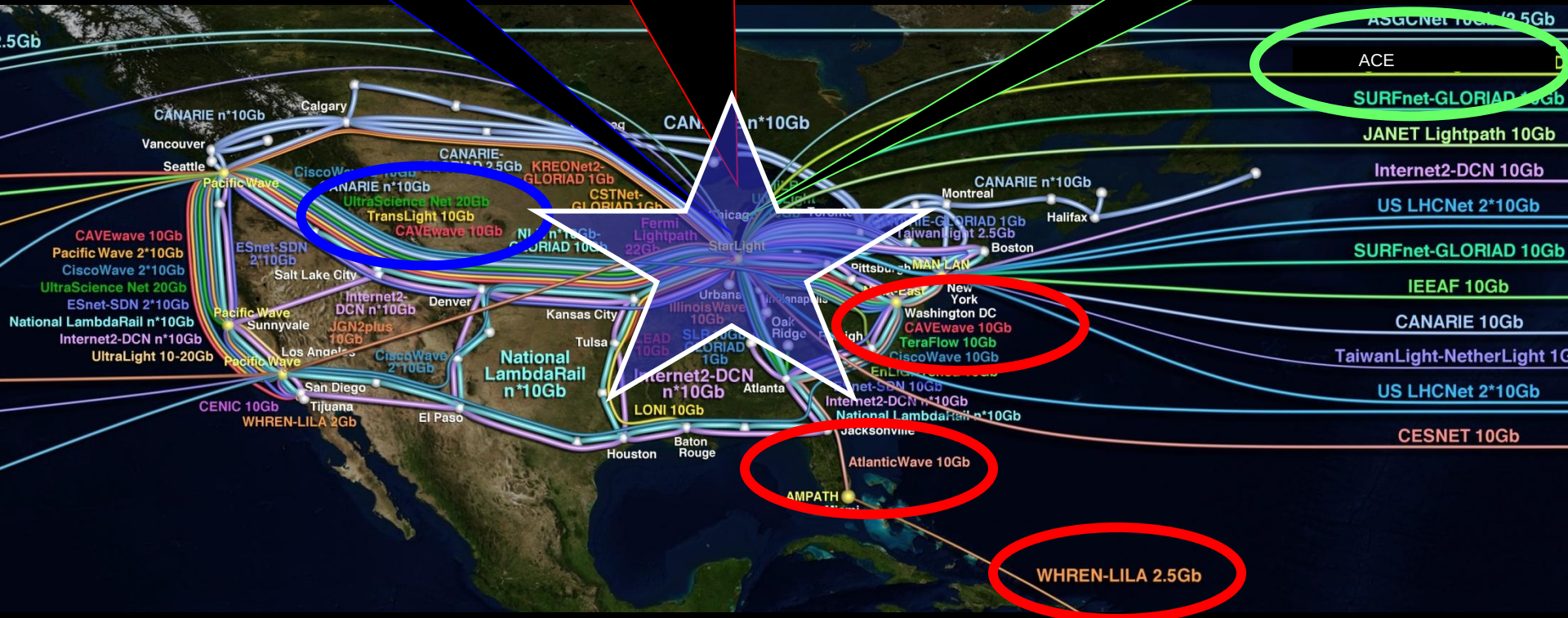
PACIFIC WAVE TRANS LIGHT

With US HEP/LHC researchers, do trials to move multi-gigabit traffic between CERN and Brazil (Geneva to Amsterdam; via LHCnet to Chicago; via CAVEwave to DC; via AtlanticWave to Miami; via AmLight-East to Brazil

WHREN

Provide GLORIAD via StarLight with services to support multi-gigabit US traffic to partners in Russia, Netherlands, Nordic countries, Asia

GLORIAD



iGENI: International Global Environment for Network Innovations

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International Center for Advanced Internet Research (www.icair.org)
Northwestern University
Director, Metropolitan Research and Education Network (www.mren.org)
Partner, StarLight/STAR TAP, PI-OMNINet (www.icair.org/omninet)

Maxine Brown, Associate Director (maxine@uic.edu)
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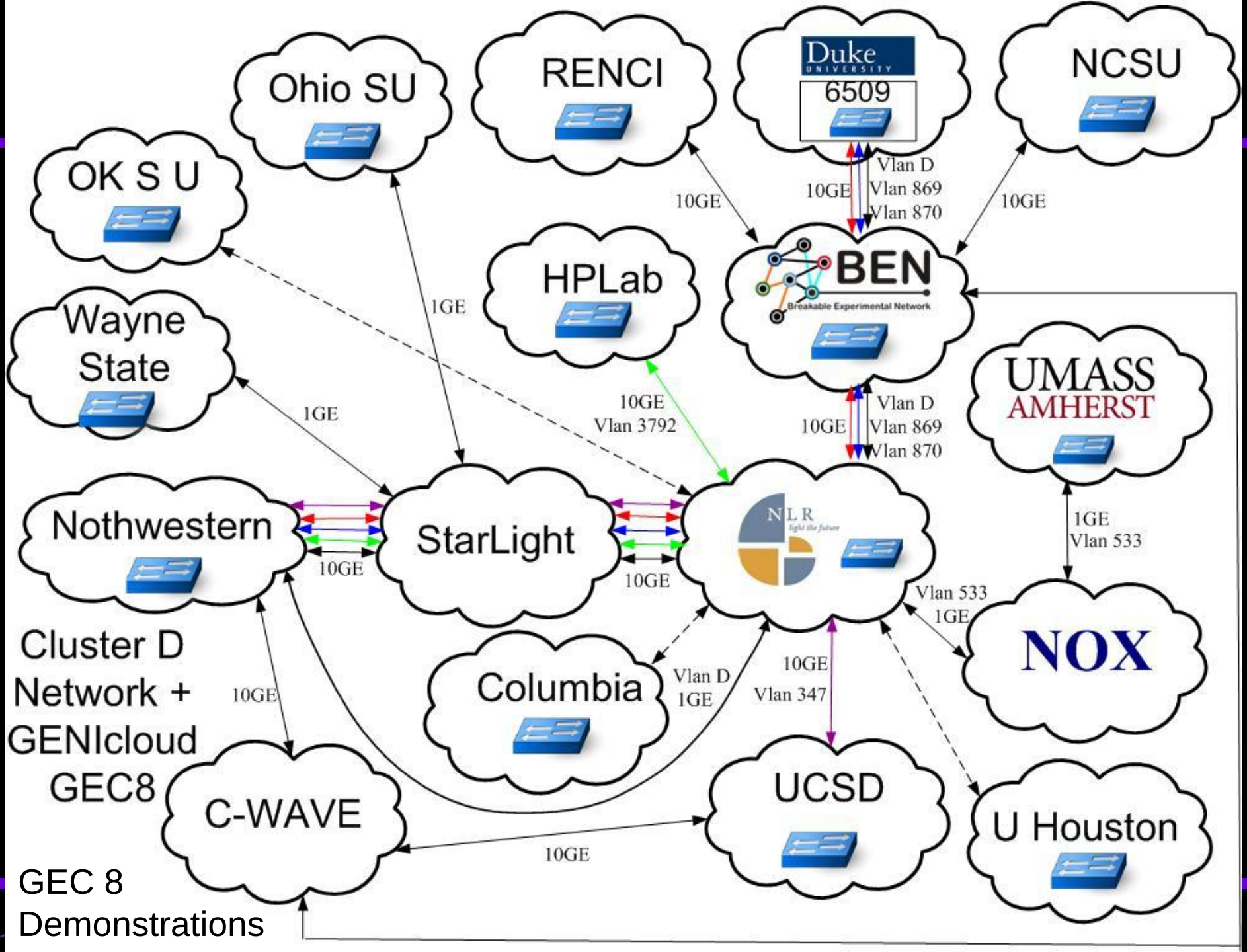
University of Illinois at Chicago

Tom DeFanti, Research Scientist (tdefanti@ucsd.edu)
California Institute for Telecommunications and Information Technology (www.calit2.net),
University of California, San Diego

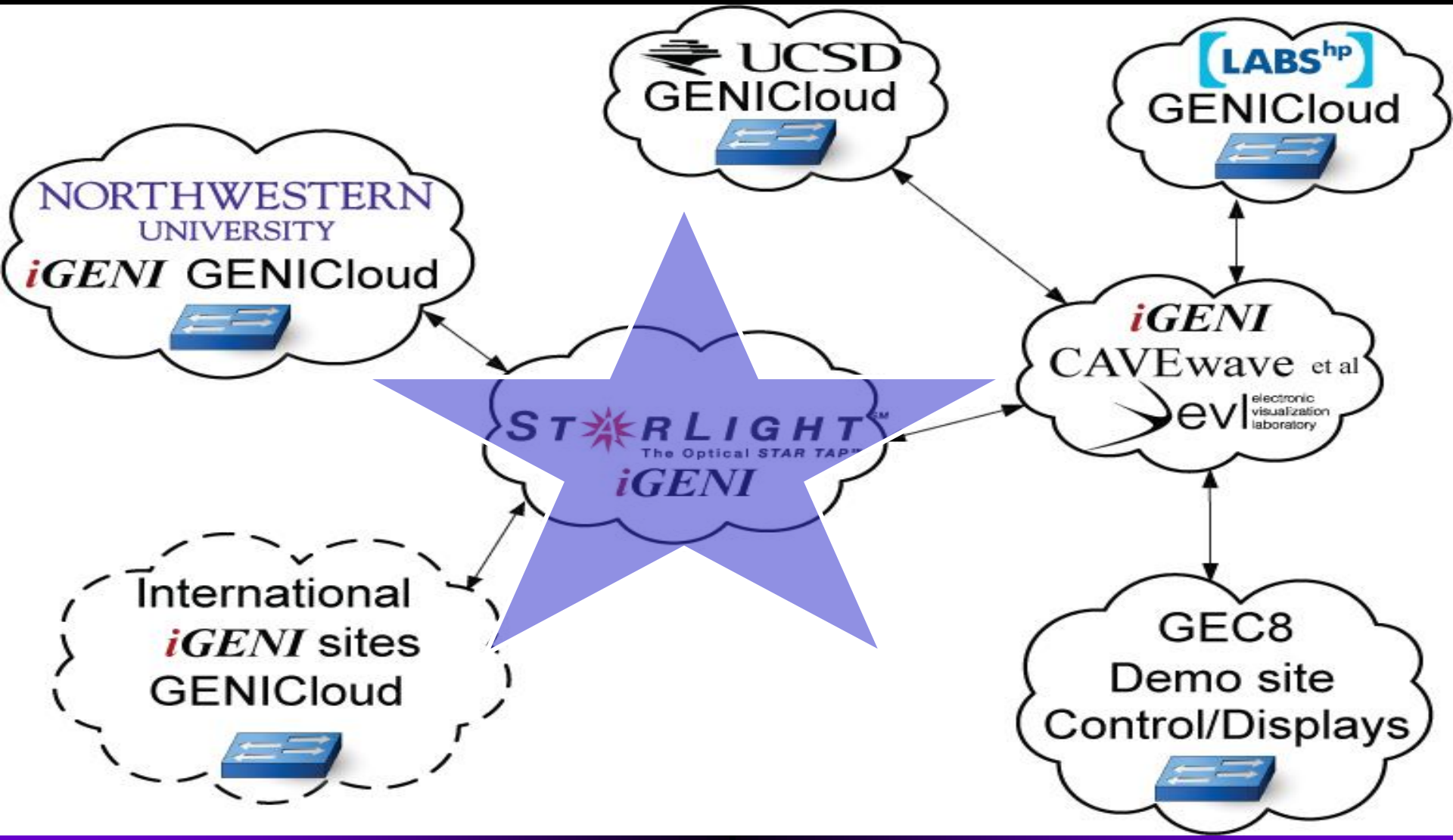
iGENI: The International GENI

- The iGENI Initiative Is Designing, Developing, Implementing, and Operating a Major New National and International Distributed Infrastructure.
- iGENI Is Placing the “G” in GENI Making GENI Truly Global.
- iGENI Is Creating a Unique Distributed Infrastructure To Support GLOBAL Research and Development for Next-Generation Network Communication Services and Technologies.
- This Infrastructure Is Being Integrated With Current and Planned GENI Resources.
- iGENI Infrastructure Is Interconnecting Its Resources With Current GENI National Backbone Transport Resources, With Current and Planned GENI Regional Transport Resources, and With International Research Networks and Projects
- iGENI Is Highly Leveraging Existing International Advanced Networking Facilities



GEC 8 Demonstrations

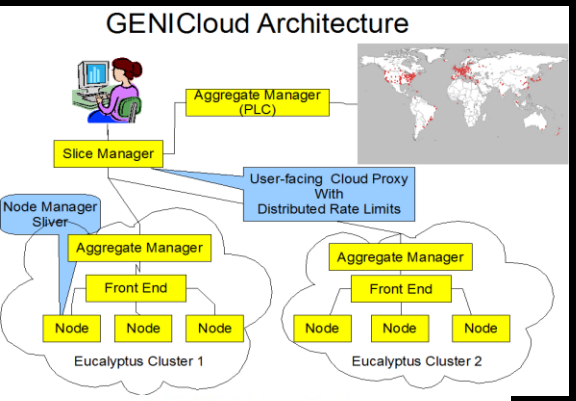
iGENI Demonstration Next Week at GENI



NU/EVL/UCSD is leading this trial

GENICloud

Andy Bavier, Jessica Blaine, Daniel Catrein, Jim Chen, Yvonne Coady, James Kempf, Christian Lottermann, Joe Mambretti, Rick McGeer, Alex Snoeren, Johannes Willig, Marco Yuen, Alvin AuYoung



Status and Accomplishments

- Integrated Eucalyptus and GENI
  - Eucalyptus release supporting the SFA
- Unified API interface to Eucalyptus and SFA
  - GENI tools now work on (our) Clouds
- RSpec for Eucalyptus
- Resource Discovery
  - Kernel/Disk images
  - Instance Types
- Jobs instantiated on multiple Clouds
- Distributed Rate Limiting over multiple Clouds

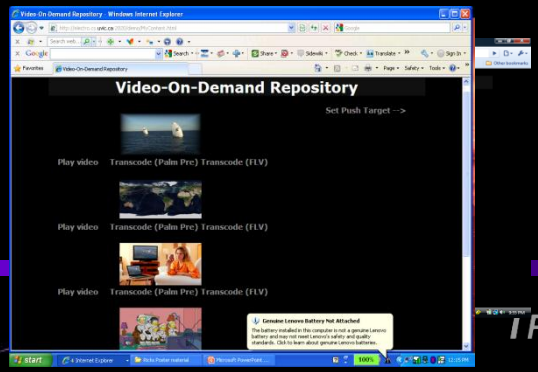
Roadmap

- Full integration of PlanetLab and Eucalyptus
- Complete "Slice Manager" – user-facing multiple-SFA facility controller
- Integrate DRL into cross-facility slices
- New GUI for PlanetLab, Eucalyptus, cross-SFA Facilities

GENICloud Demo

- Transcoding on Eucalyptus Clouds at UCSD, HP Labs, iCAIR (Northwestern)
- Transcoding app thanks to Ericsson Research
- For GEC-9:
  - Integration with NLR (CAVEWave)
  - Integrated Distributed Rate Limiting

Transcoding videos at three clouds:
- HP OpenCirrus
- Northwestern Univ. OpenCloud
- UCSD



Demo: Transcoding in the Cloud
http://electro.cs.uvic.ca:2020/demo/MyContent.html

VirtuLab Tile Display:
Directly Connected To National 10 Gbps Testbed
With Core at the StarLight Facility

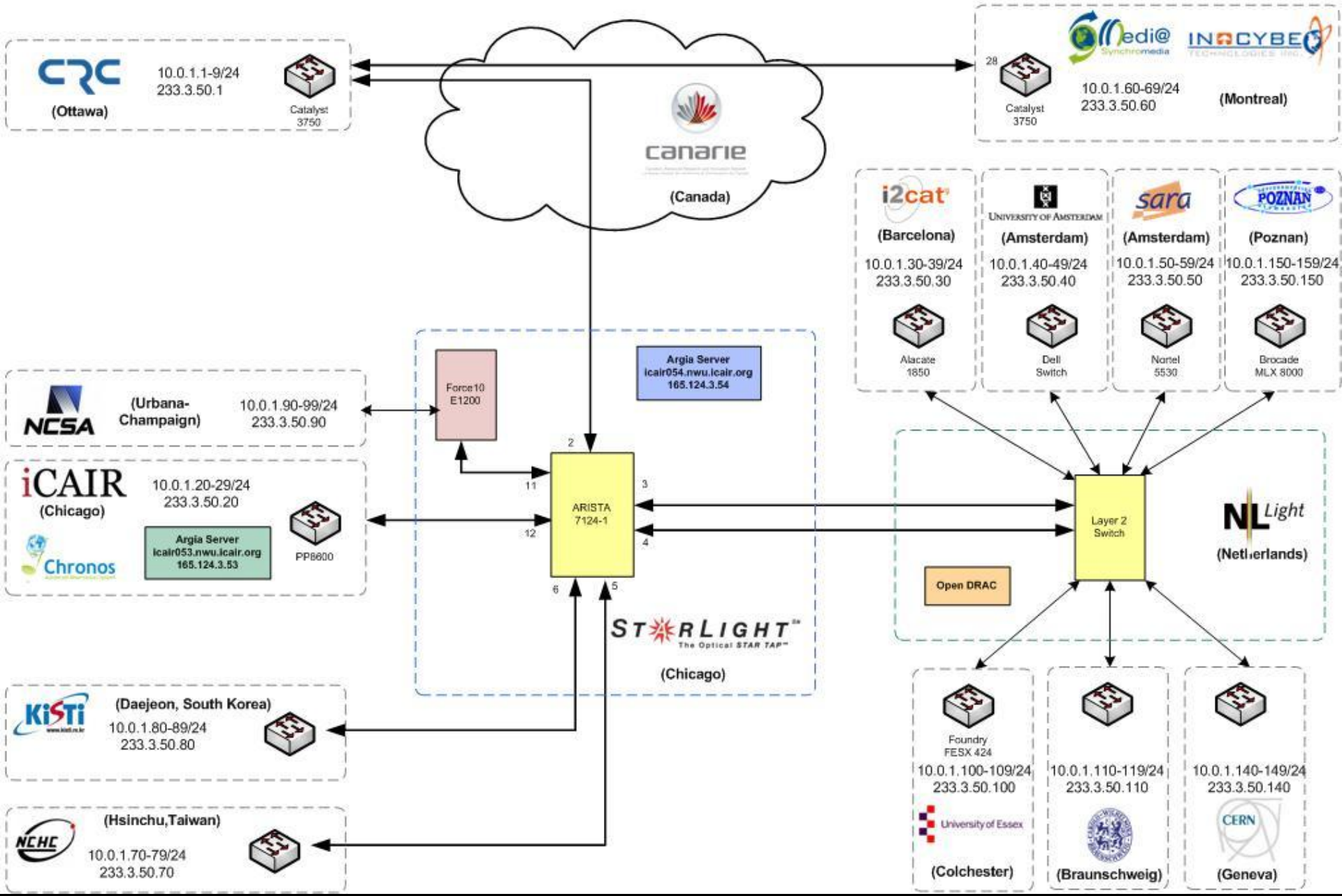
Multiple Network Research Testbeds

- Multiple Large Scale Network Research Testbeds
  - International
  - National
  - Regional
  - State-Wide
  - Metro
  - Local

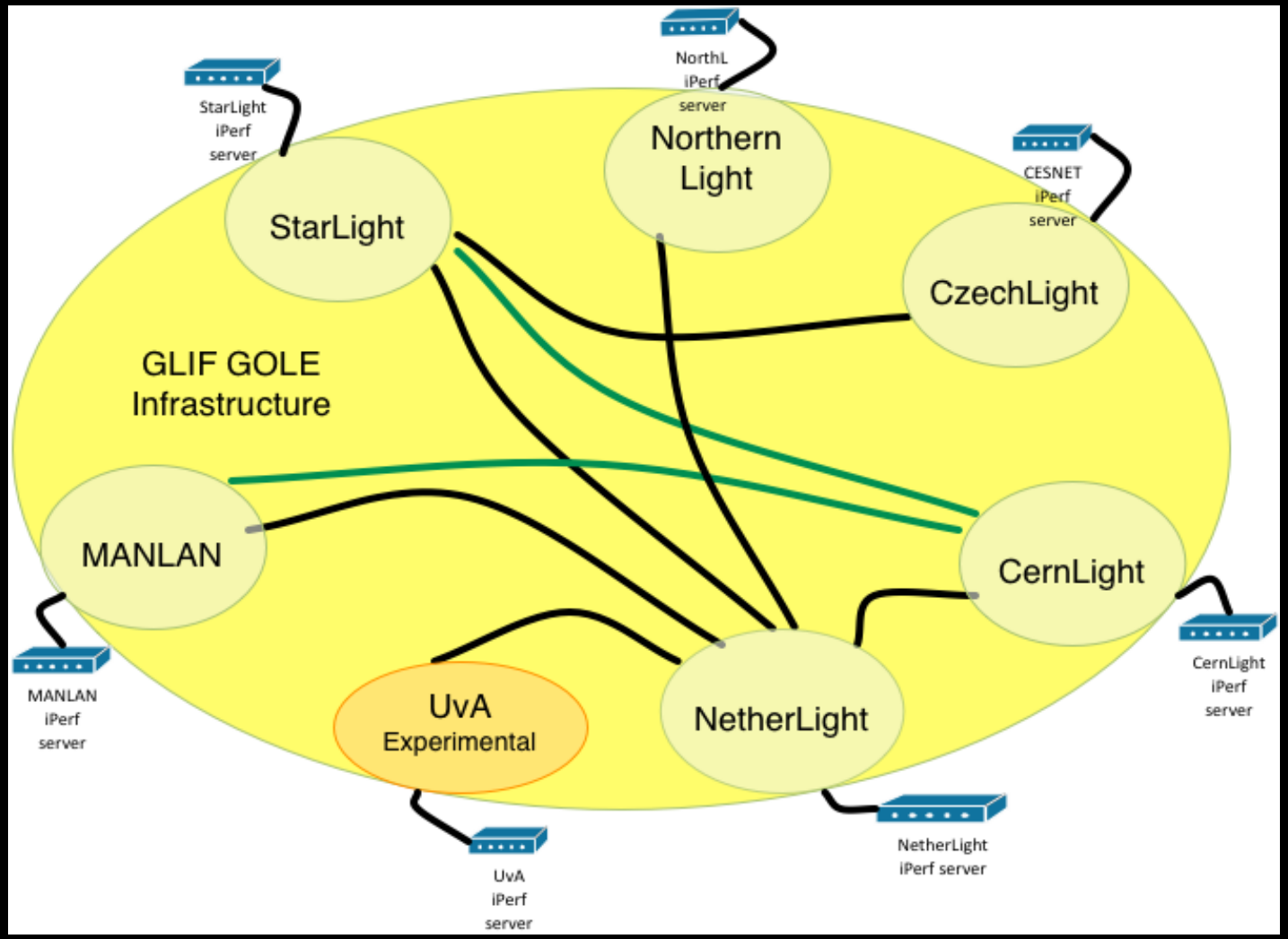
Last Updated: September 16, 2010

HPDMnet
High Performance Digital Media Network

Layer 2 Topology



Fenius/Automated GOLE Demonstration

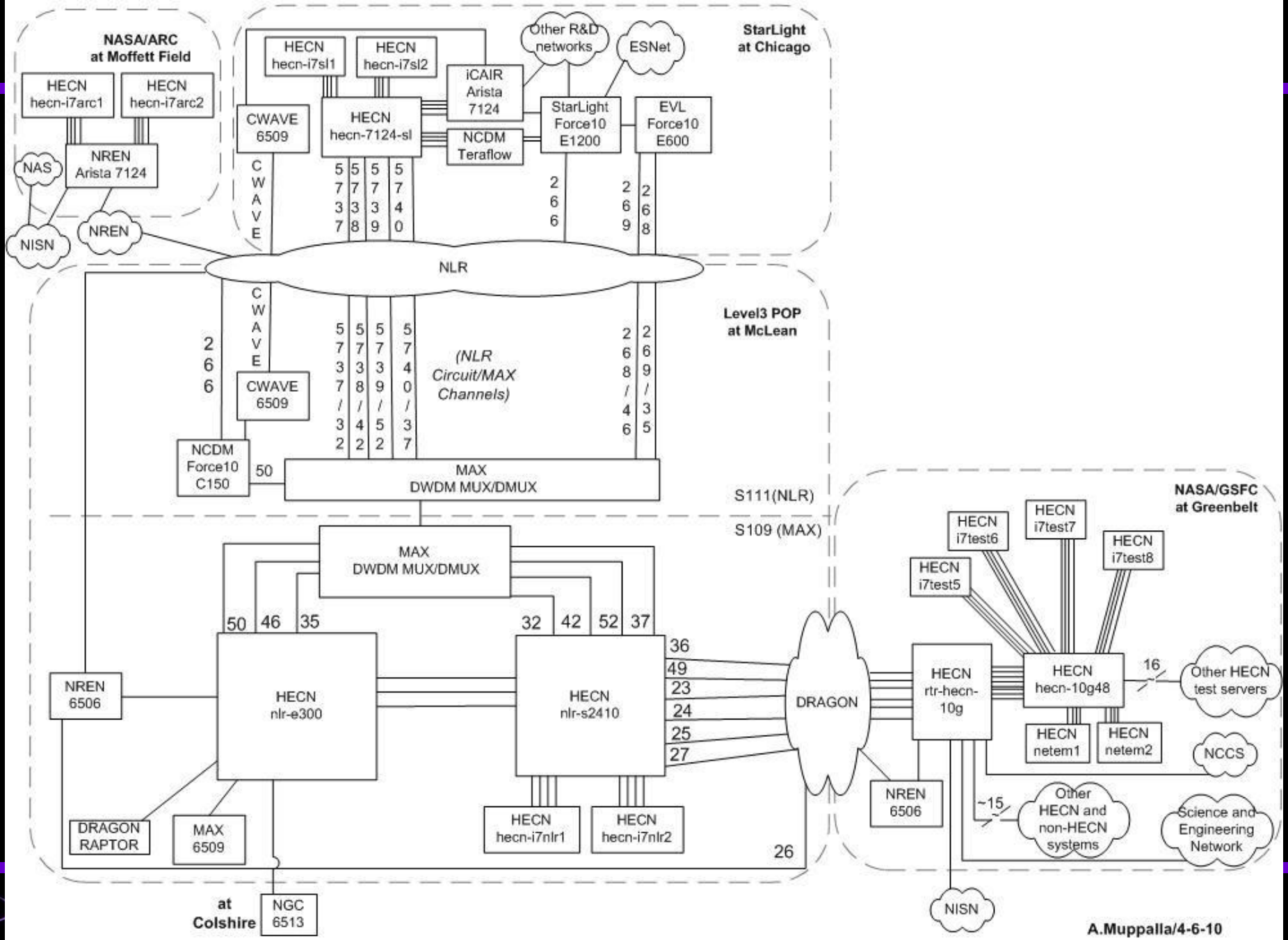


StarLight 100 Gbps/Tbps Initiatives

- StarLight Has Established Several Initiatives That Are Directed At Creating Networking Services, Architecture, Technology, and Networks Based on 100 Gbps and Higher Service, Including Tbps
- Foundation Research Is Based On Earlier Experience With Dynamic Lightpath Technologies
- 100 Gbps = More Than Capacity (e.g., Dynamic Control Over Channel Segments, Customization)
- StarWave: New NSF Award To Create a New 100 Gbps Exchange at the StarLight Facility for Data Intensive Science

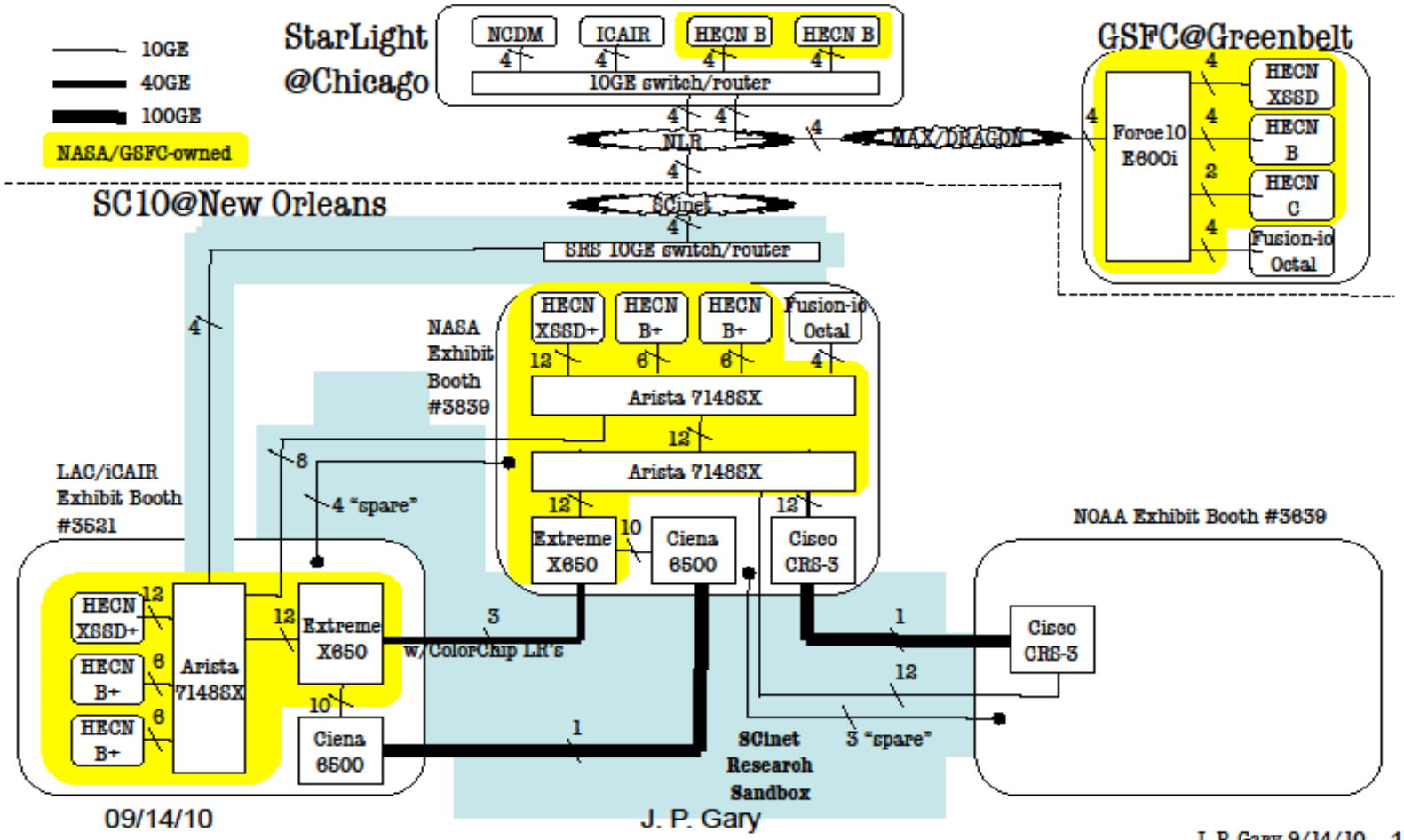
GSFC/High End Computer Network (HECN) and Partners 10GE and 10G Lambda Connections Through McLean

Note: The non-GSFC/HECN systems shown typically have other connections that are not shown in this diagram, as the focus is primarily GSFC/HECN connections

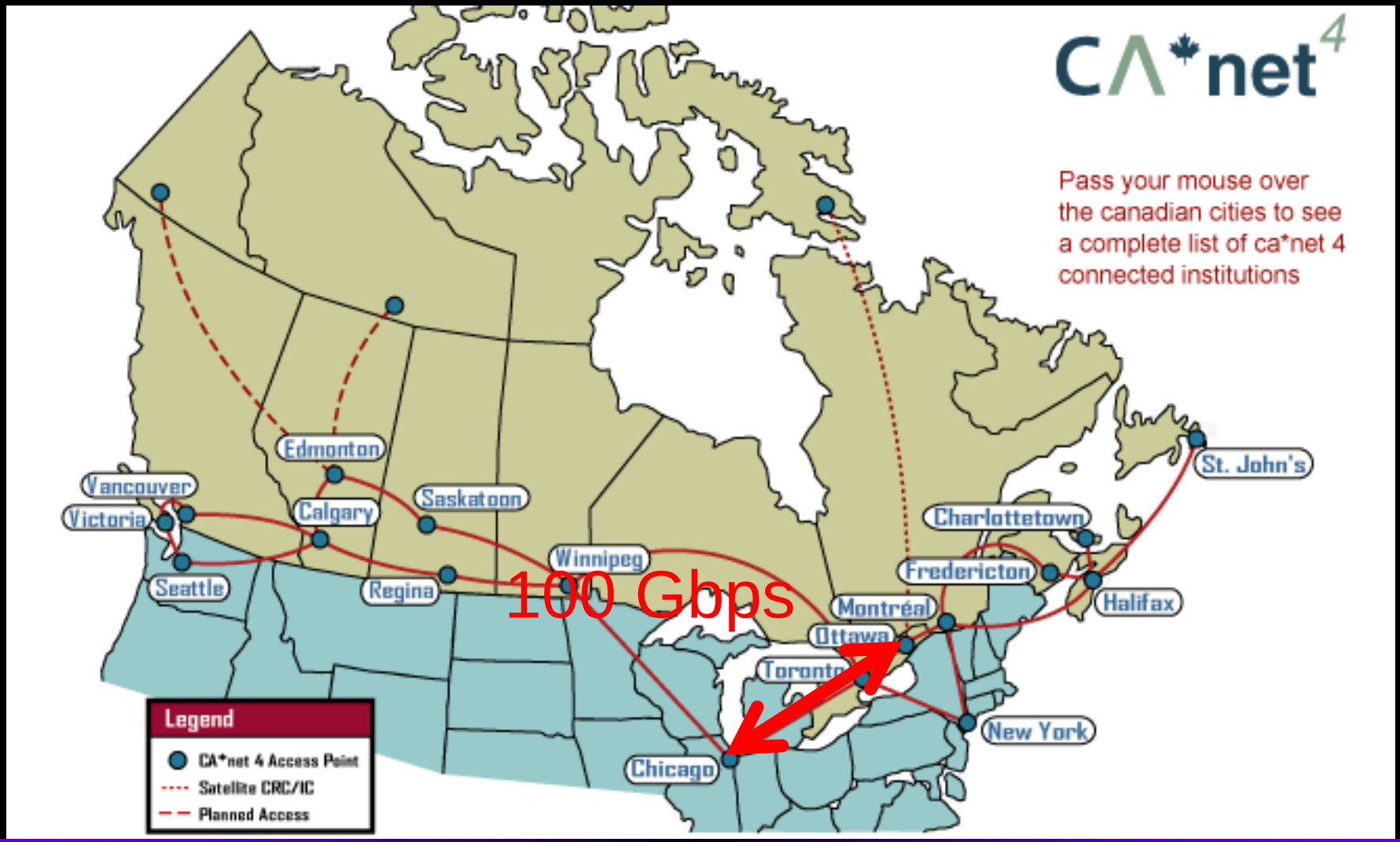


Using 100G Network Technology in Support of Petascale Science

A Collaborative Initiative Among NASA, NLR, NOAA, Northwestern/iCAIR, SCinet & UIC/LAC



CA*net/Ciena/StarLight/iCAIR 100 Gbps Testbed Implemented In Sept 2010



Source: CANARIE

Contact Us

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