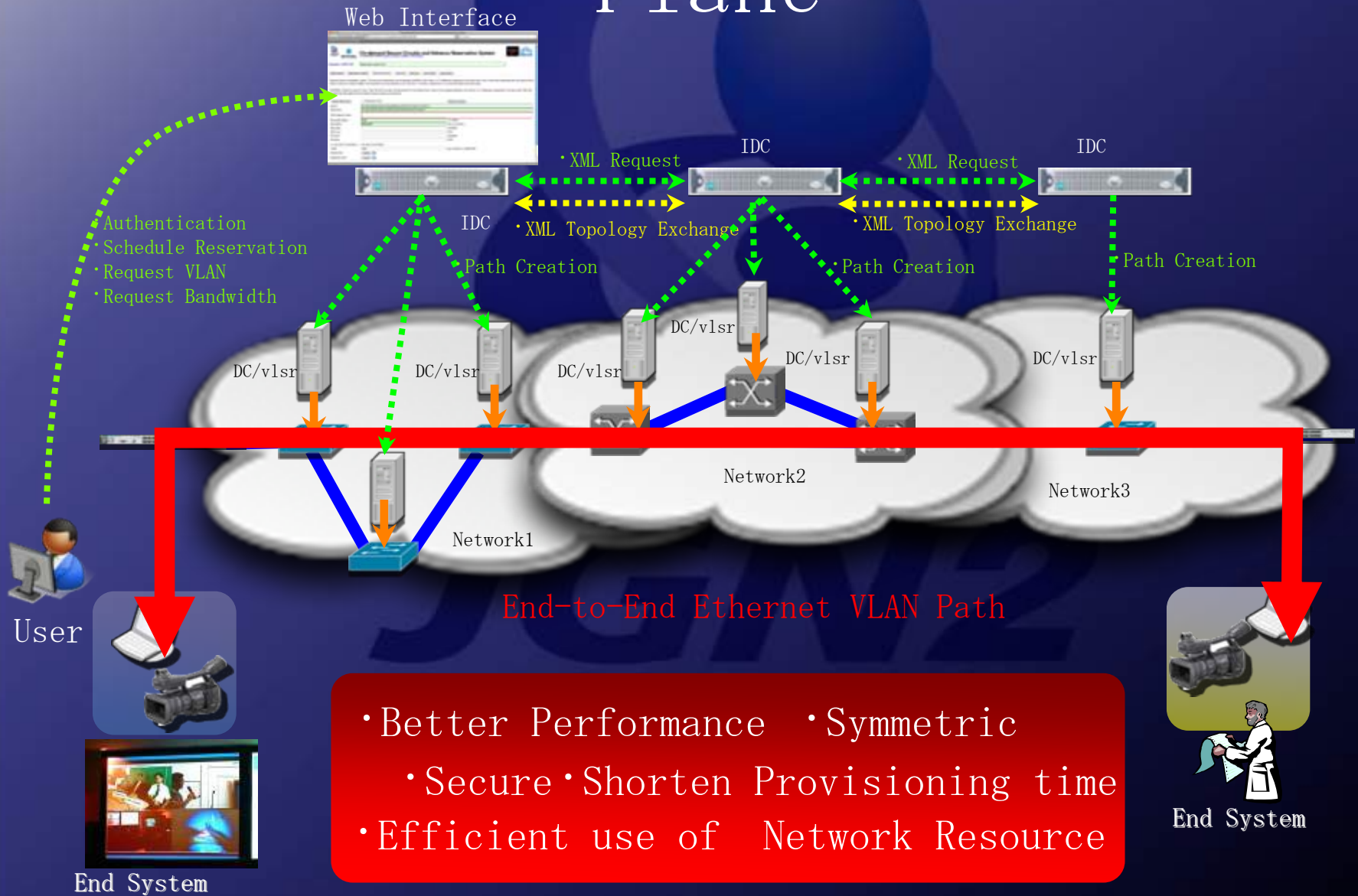# Multi-domain Network Provisioning using GLIF/fenius interface

Jin Tanaka NICT/KDDI
Takahiro Miyamoto KDDIlabs
Evangelos Chaniotakis Esnet

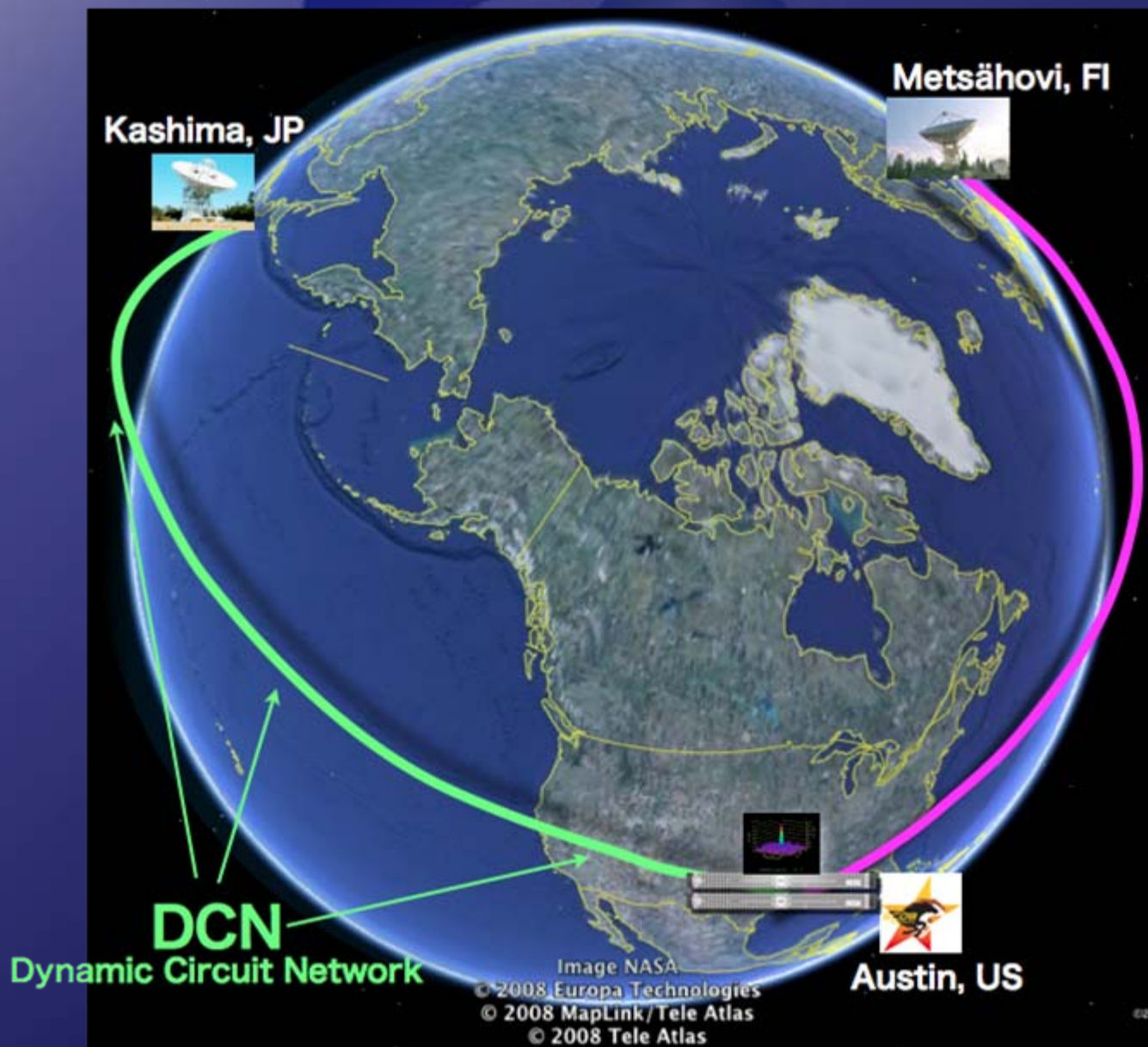SC09

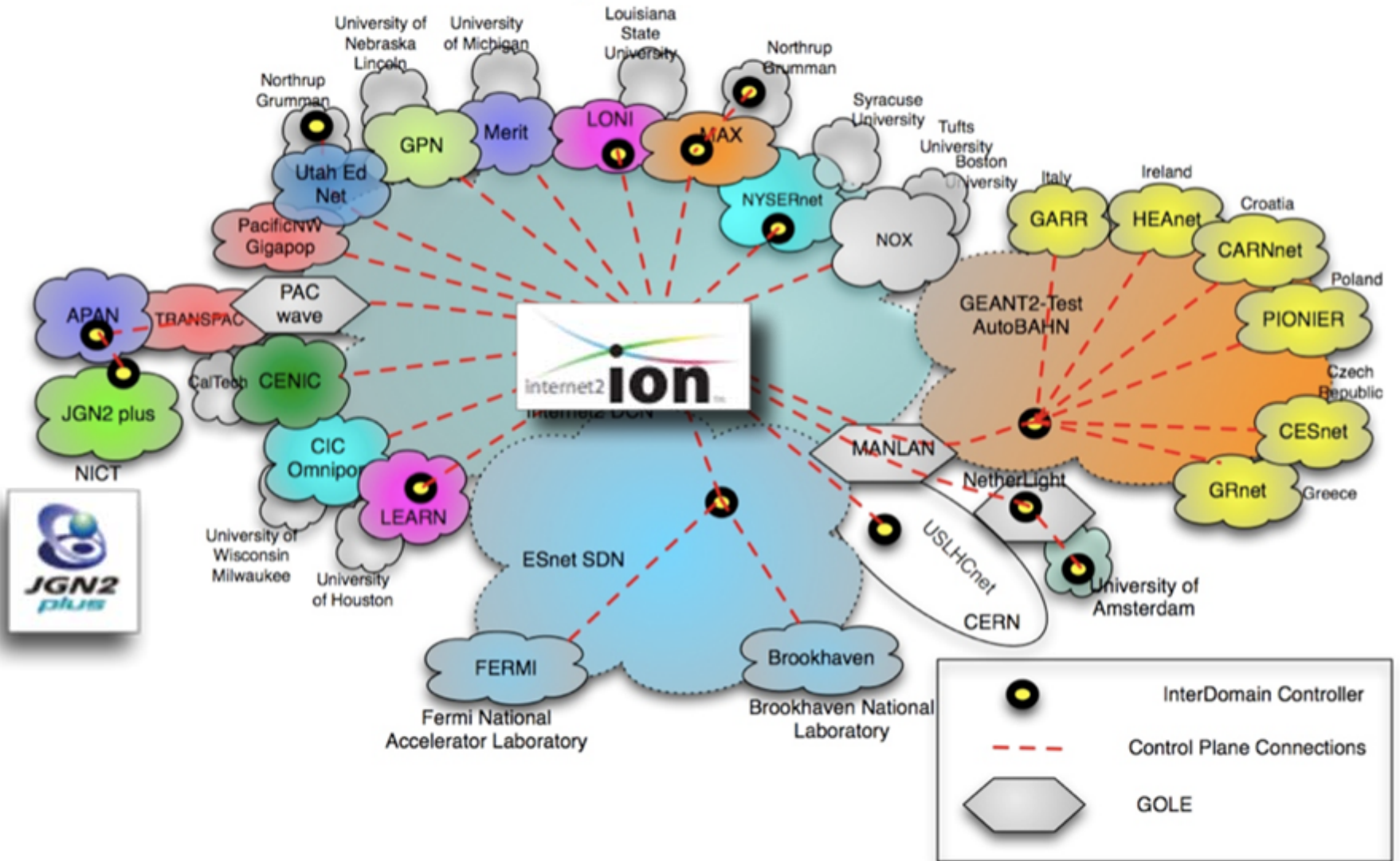18th November 2009

DCN Multi-domain Control Plane

Web Interface

·XML Request

IDC

·XML Request

IDC

·Authentication
·Schedule Reservation
·Request VLAN
·Request Bandwidth

IDC

·XML Topology Exchange

·XML Topology Exchange

Path Creation

Path Creation

Path Creation

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

Network2

Network3

Network1

User

End-to-End Ethernet VLAN Path

End System

·Better Performance ·Symmetric
·Secure ·Shorten Provisioning time
·Efficient use of Network Resource

End System

End System

Example of DCN Utility
NICT e-VLBI Correlation over DCN at SC08
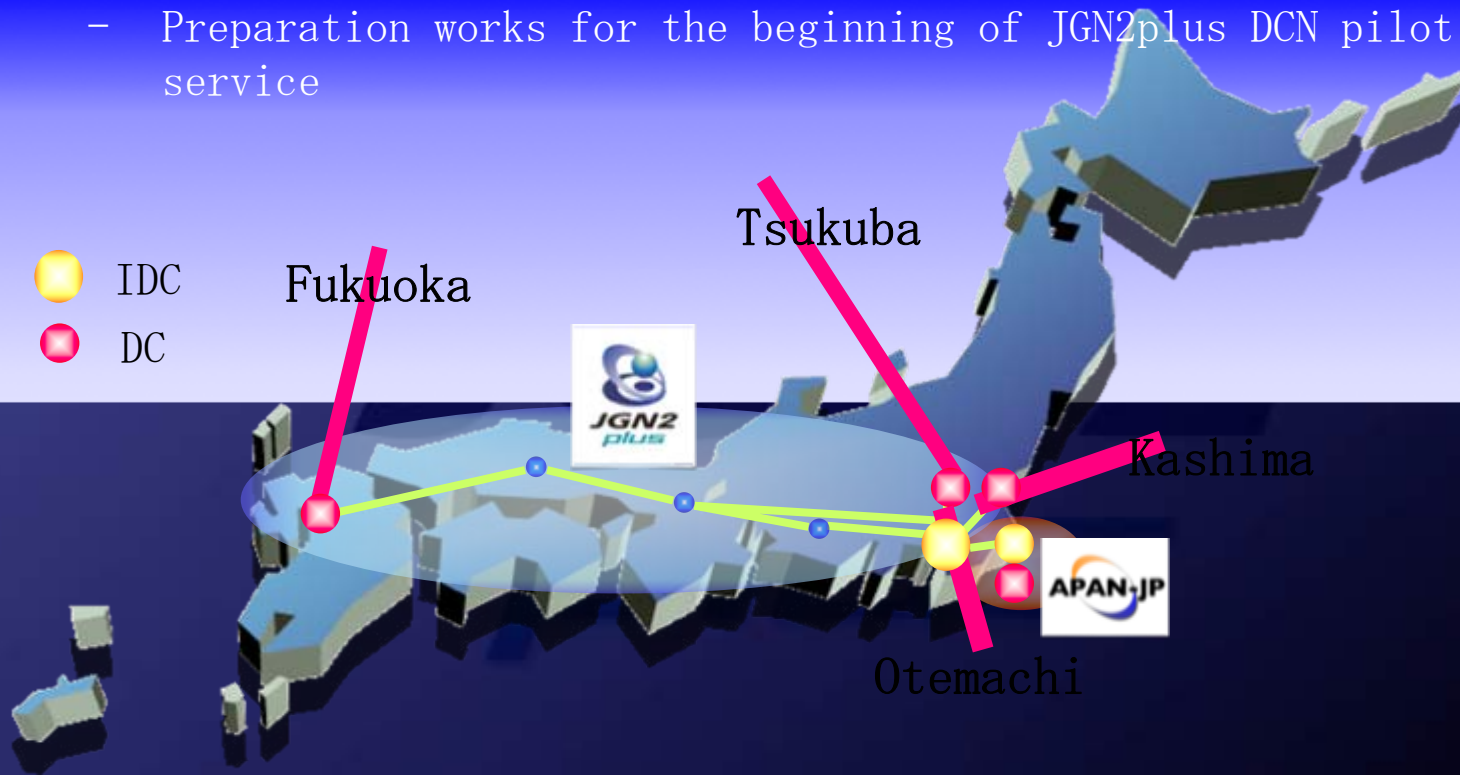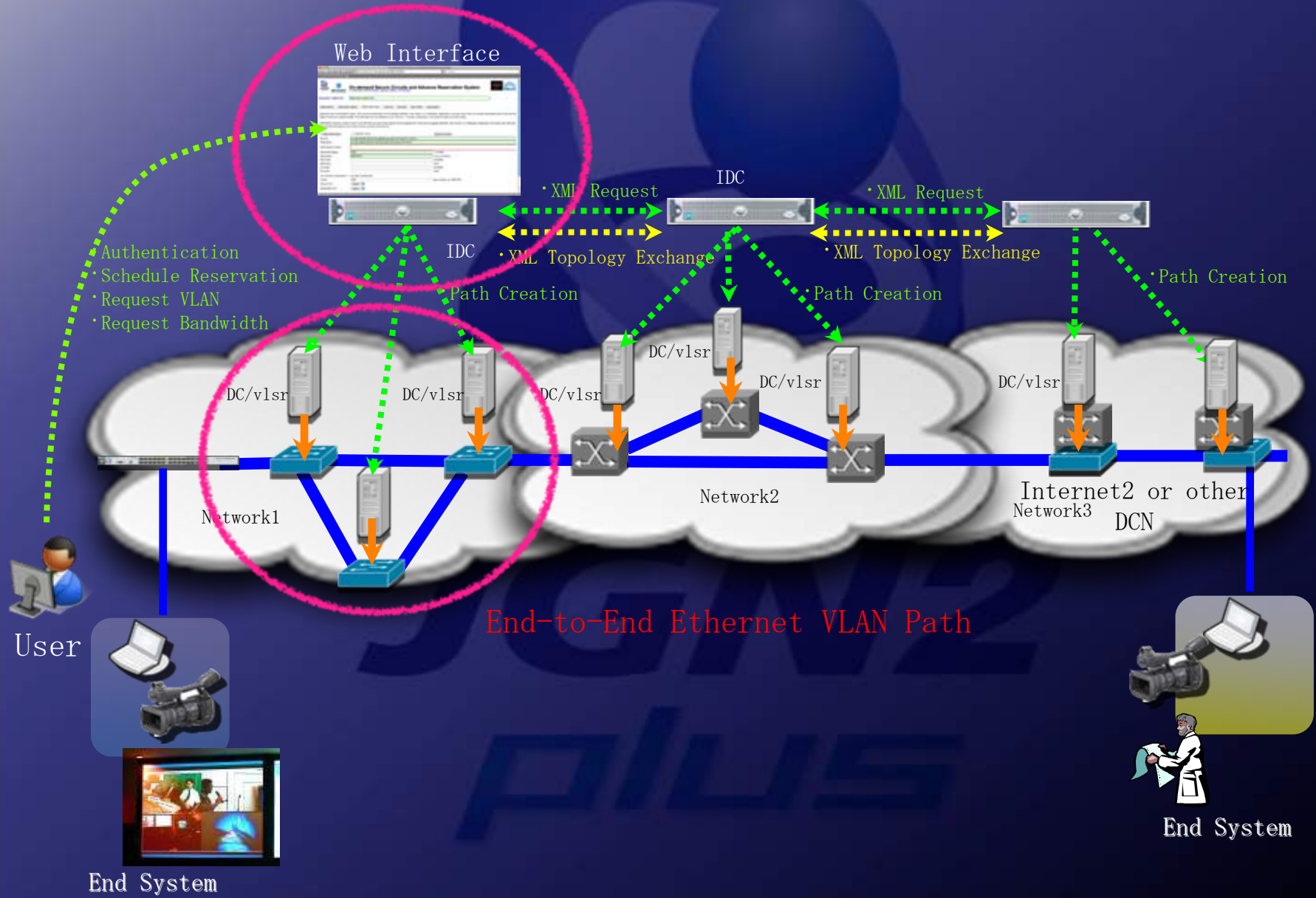
Deployment Status in Japan

- Installation of DCN systems in JGN2plus and APAN-JP
  - Linux based IDC and DCs / DCN Software Suite version 0.5.2
    - Establish control plane(dcn.jgn2plus.jp) and data plane on a nationwide
    - Connection test on multiple VLSRs in JGN2plus intra-domain
    - Connection test over inter-domain between JGN2plus and APAN-JP
    - Preparation works for the beginning of JGN2plus DCN pilot service

Tsukuba

IDC

Fukuoka

DC

JGN2 plus

Kashima

APAN-JP

Otemachi

Installation of Control Plane Software

Web Interface

·XML Request

IDC

·XML Topology Exchange

·XML Request

·XML Topology Exchange

IDC

·Authentication
·Schedule Reservation
·Request VLAN
·Request Bandwidth

·Path Creation

·Path Creation

·Path Creation

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

DC/vlsr

Network1

Network2

Internet2 or other
Network3   DCN

End-to-End Ethernet VLAN Path

User

End System

End System

End System

Control Plane Software (1)
Domain Controller

DC(Domain Controller)

VLSR

JGN2plus and APAN-JP hardware
- HP ProLiant DL360 G5
- Intel Xeon X5260 3.33GHz DualCore
- DDR2-667 2GB * 2
- SAS146GB*2 (RAID1)
- 10/100/1000 base-T * 2

- DRAGON (**D**ynamic **R**esource **A**llocation via **G**mpls **O**ptiacl **N**etwork)
  - Open source implementation of GMPLS maintained by MAX, USC ISI EAST, and George Mason University
  - VLSR (Virtual Label Switched Router)
    - Zebra PC based control plane software
    - Provides GMPLS protocol support for devices which do not support GMPLS
    - OSPF-TE, RSVP-TE
    - Provision the Ethernet Switch and SONET/SDH Switch
    - Switch setting method: SNMP, CLI, TL1, other script
    - Provisioning request via CLI, XML
  - System Requirements for Installation
    - DRAGON System
      - Linux BOX
      - RedHat Enterprise Base (Kernel version 2.4.2 or later)
      - Software Requirements
    - DRAGON Software package (VLSR, NARB, RCE, ASTB)
    - Dependence-package (SSH, GNU Compiles, Net-SNMP, libxml2, zlib-1.2.3)

Control Plane Software (2)
Inter-Domain Controller

IDC(Inter-domain Controller)

JGN2plus and APAN-JP hardware
- HP ProLiant DL360 G5
- Intel Xeon X5260 3.33GHz DualCore
- DDR2-667 2GB * 2
- SAS146GB*2 (RAID1)
- 10/100/1000 base-T * 2

- OSCARS
  - Open source project maintained by Internet2 and ESnet
  - Accept circuit requests from users
  - Use IDC protocol which consist of web services as a messaging among Inter-domain
  - Web User Interface function for users
  - Book-ahead and manage the scheduling of circuits
    System Requirement for Installation
    - OSCARS System
      - Linux BOX
      - RedHat Enterprise (Kernel version 2.4.2 or later)
    - OSCARS Package Software
      - Third-Party Library and Package Requirements
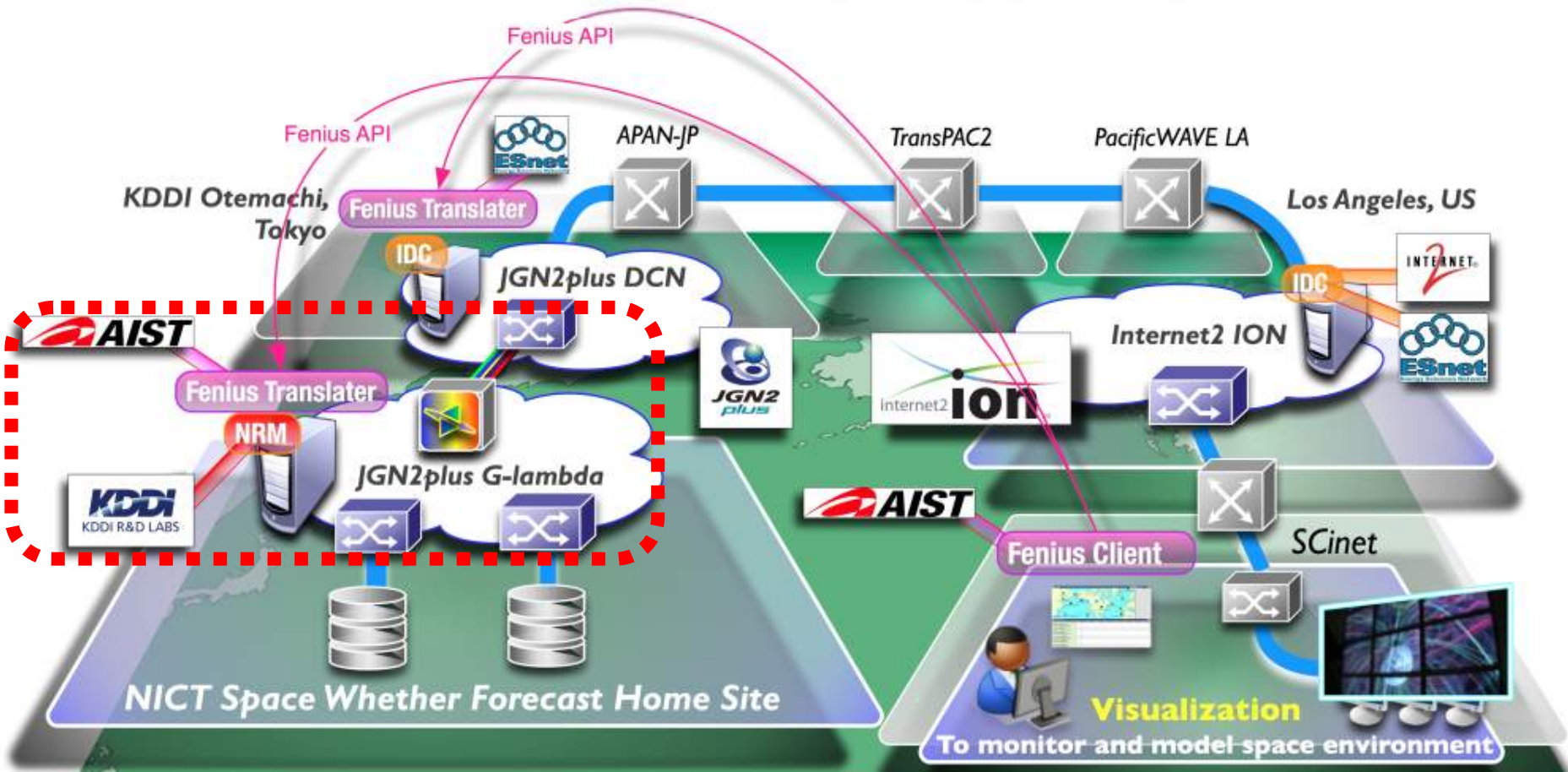   - OSCARS Package Software
      - MySQL5.0 / JDK5.0 / Tomcat 5.5 / Axis2 1.4.1/ Rampart 1.4.1/ Ant 1.7
    - SMTP(sendmail) for e-mail notification of circuit activity
    - NTP source

NICT Space Weather Forecast & GLIF/Fenius Joint Demonstration at SC09

Data transfer over Global Dynamic Circuit Network

Fenius API

Fenius API

KDDI Otemachi, Tokyo

APAN-JP

TransPAC2

PacificWAVE LA

Los Angeles, US

Fenius Translater

ESnet

IDC

JGN2plus DCN

AIST

Fenius Translater

Internet2 ION

INTERNET2

IDC

ESnet

NRM

JGN2plus G-lambda

JGN2 plus

Internet2 ion

KDDI R&D LABS

AIST

Fenius Client

SCinet

NICT Space Whether Forecast Home Site

Visualization

To monitor and model space environment

NICT Koganei in Tokyo

NICT Booth at SC09 in Portland, US

G- lambda project overview

- Joint project of NICT, AIST, KDDI R&D labs. and NTT.
- G-lambda project has been started in December 2004.
- The goal of this project is to define a standard web services interface (GNS-WSI) between Grid resource manager and network resource manager provided by network operators.

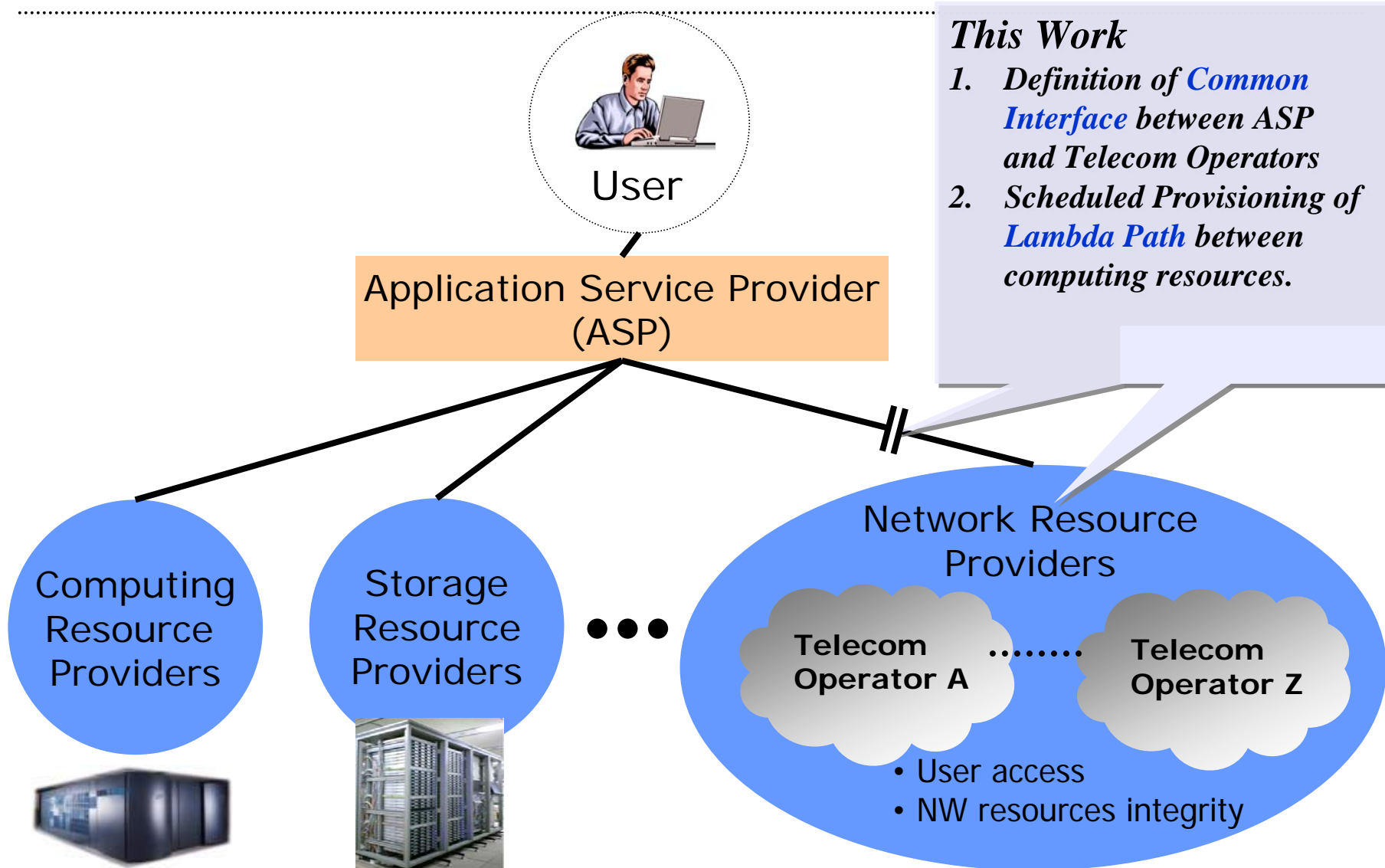National Institute of
Advanced Industrial Science
and Technology
AIST

KDDI
KDDI R&D LABS

NiCT
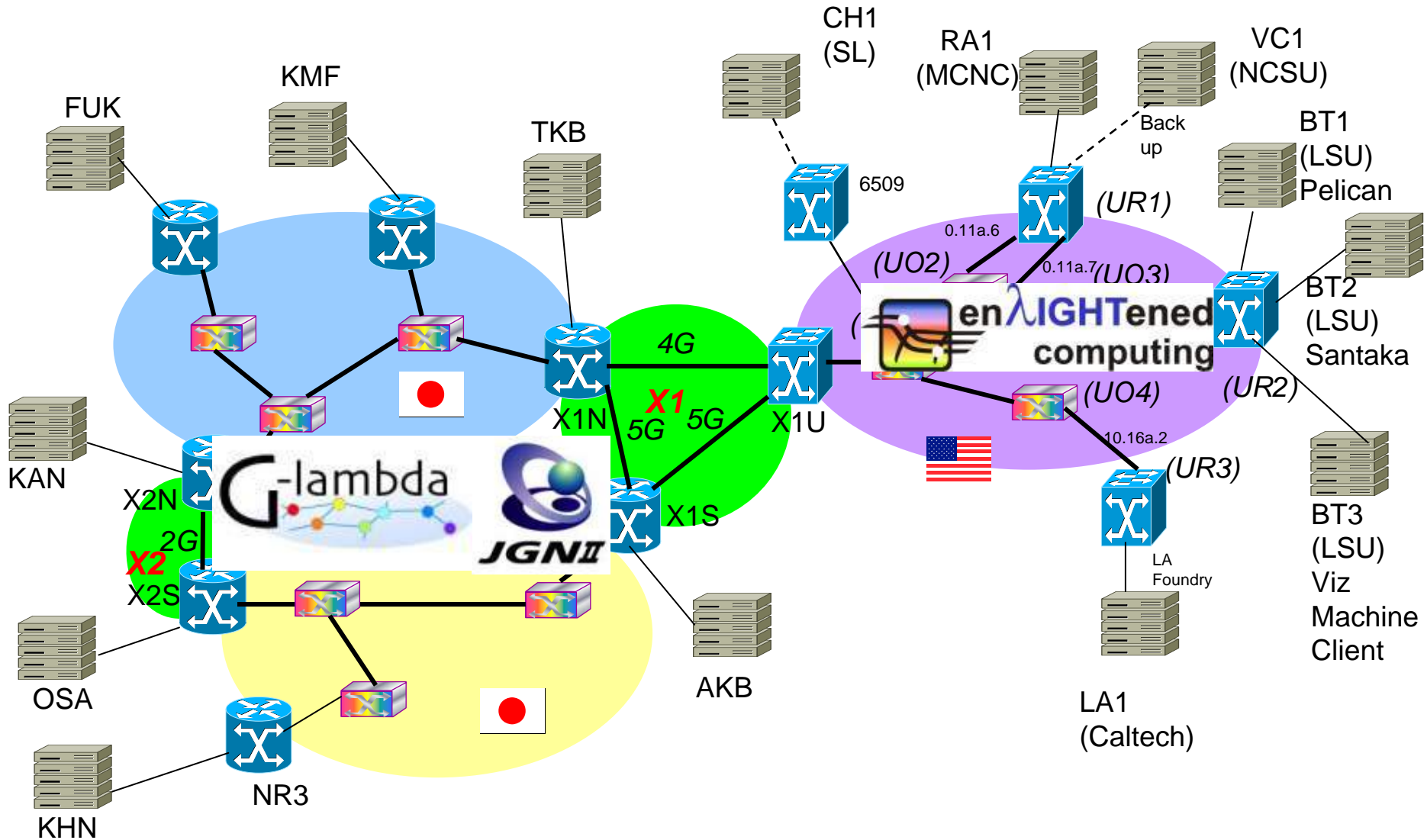National Institute of
Information and
Communications
Technology

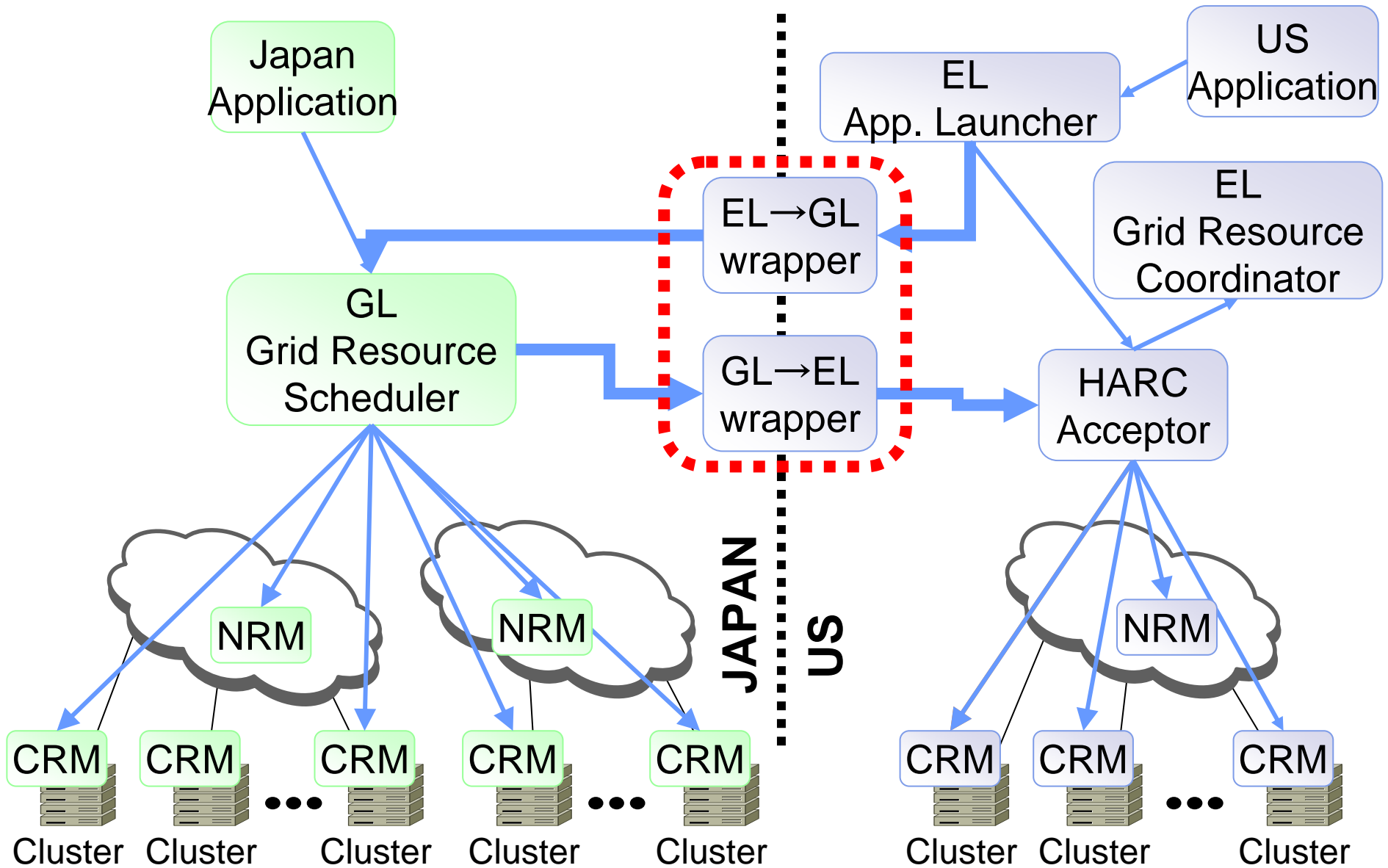JGN2
plus

NTT

An Example Service Model of Commercial GRID

User

Application Service Provider (ASP)

This Work
1. *Definition of **Common Interface** between ASP and Telecom Operators*
2. *Scheduled Provisioning of **Lambda Path** between computing resources.*

Computing Resource Providers

Storage Resource Providers

Network Resource Providers

Telecom Operator A .... **Telecom Operator Z**

• User access
• NW resources integrity

Demonstration @ GLIF2006

Resource Map

Simulation result

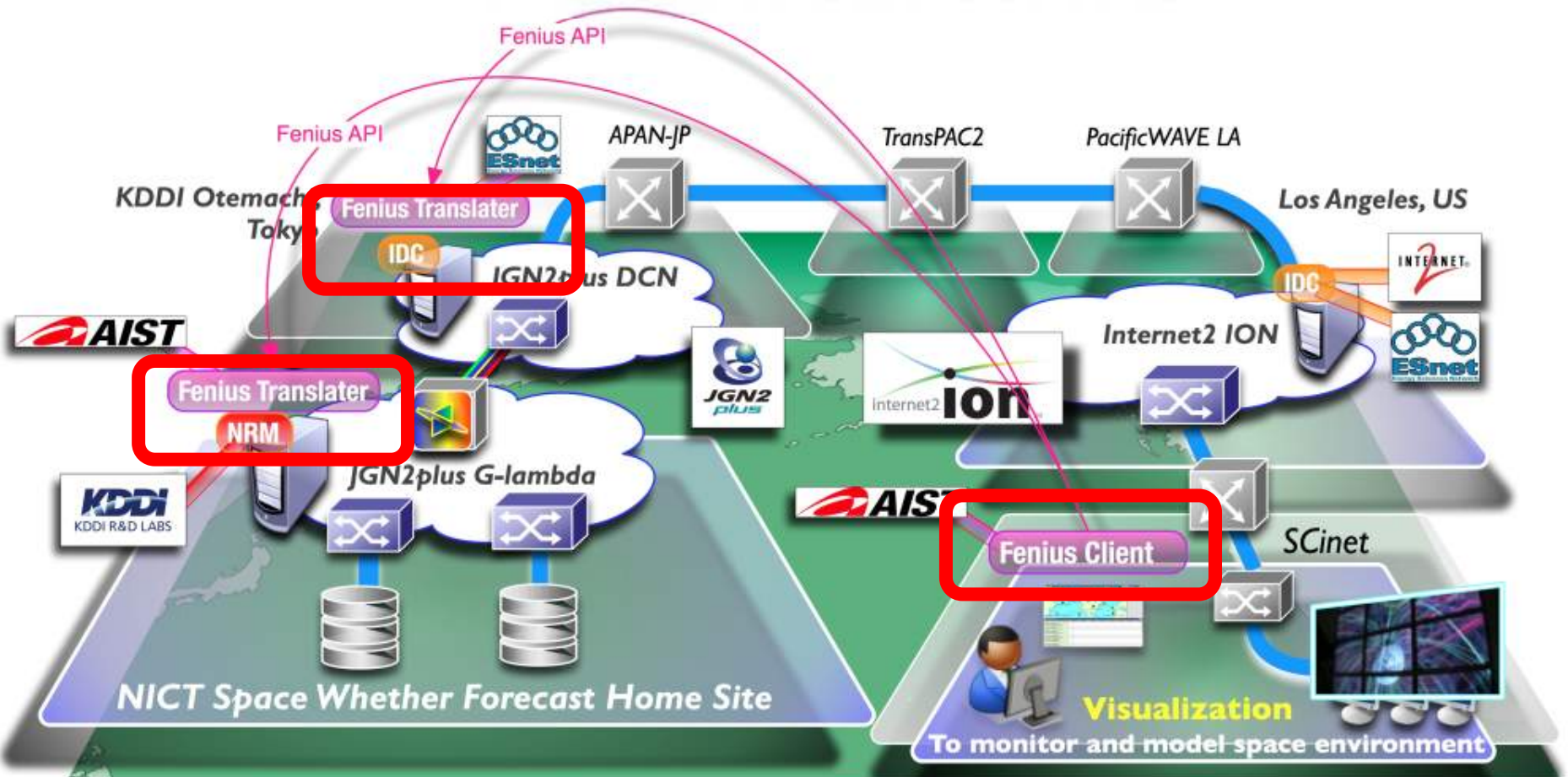Time table (clusters)

Time table (networks)

13

G-lambda/Enlightened middleware coordination diagram

NICT Space Weather Forecast & GLIF/Fenius Joint Demonstration at SC09
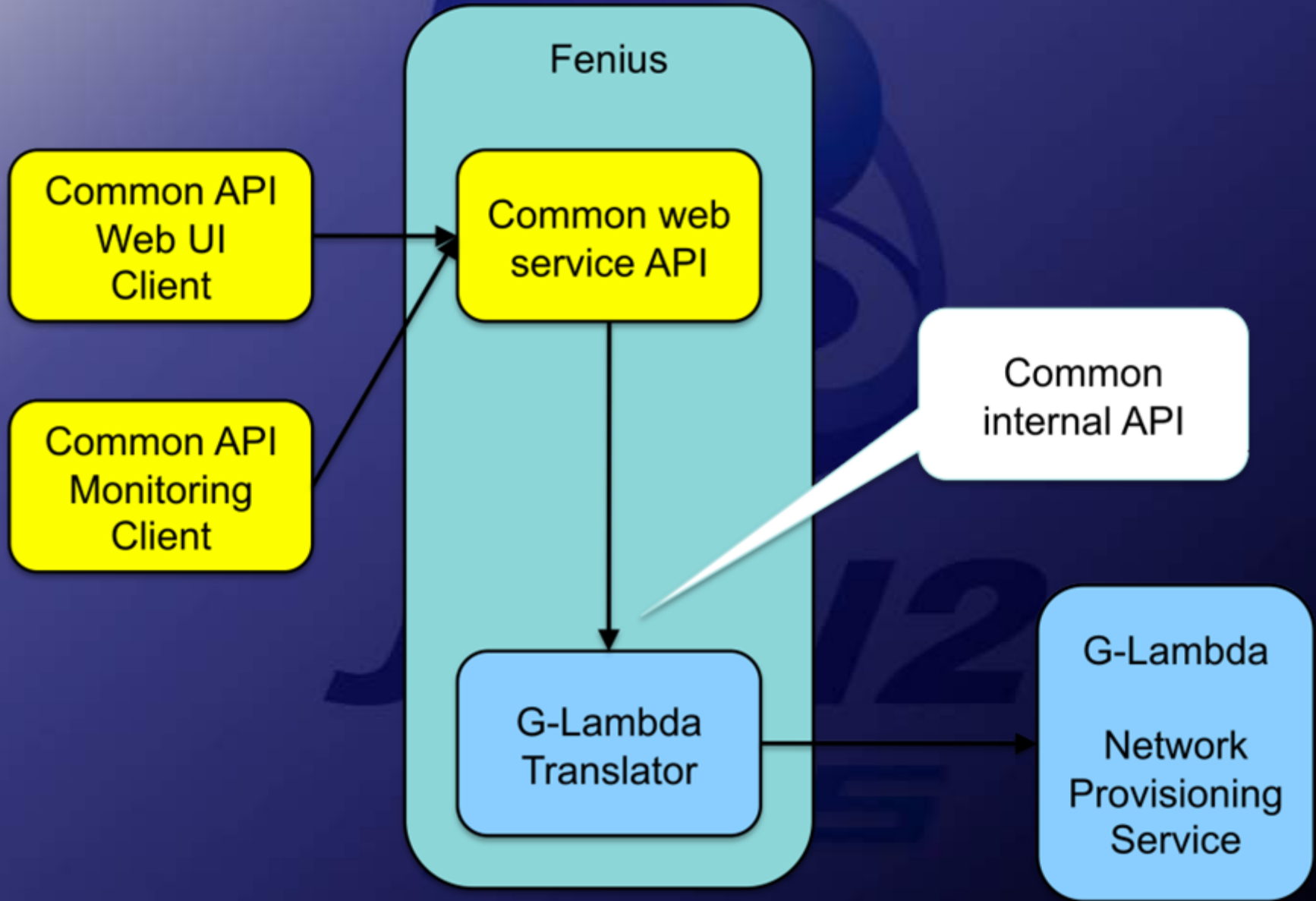
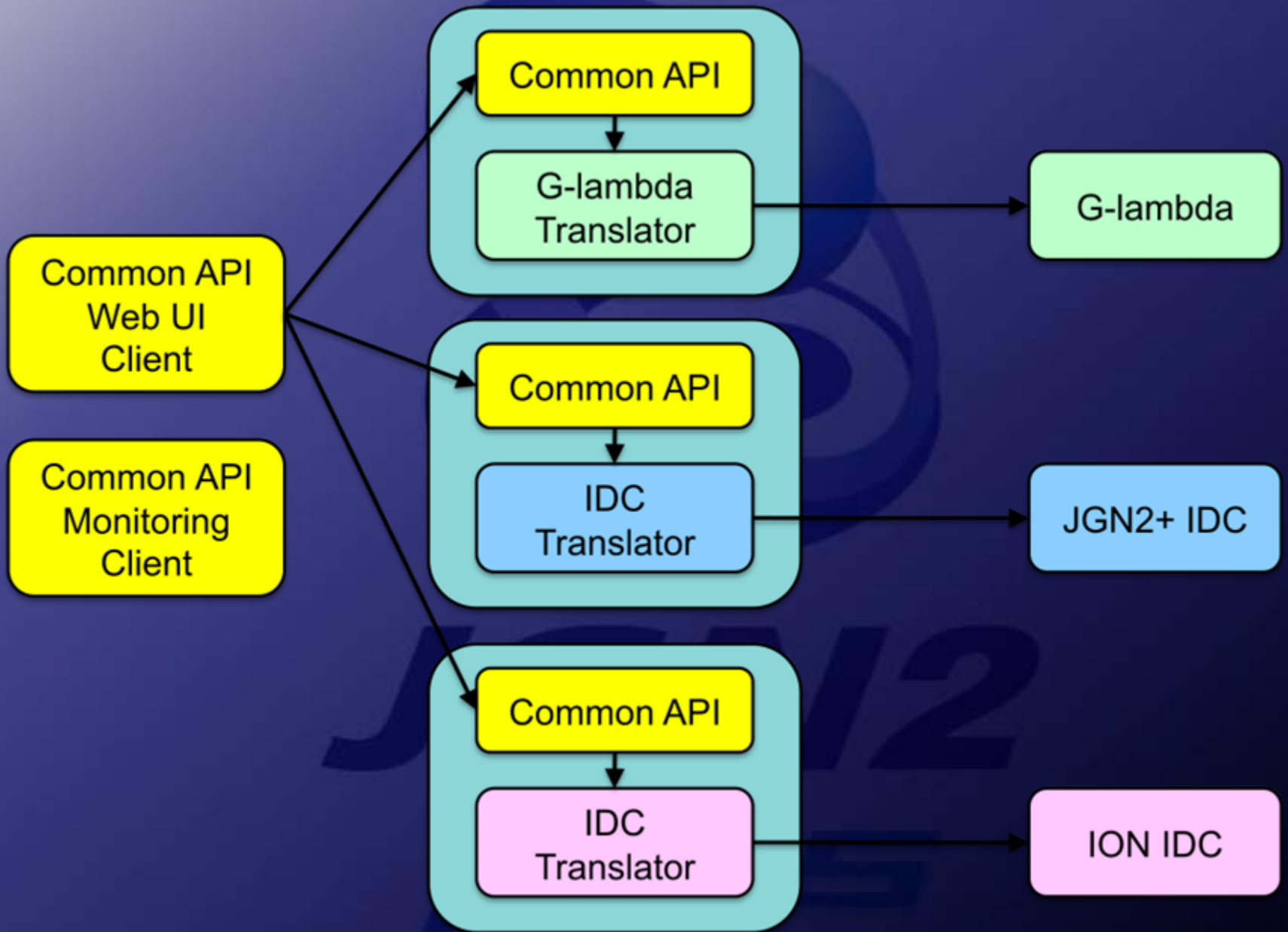Data transfer over Global Dynamic Circuit Network

NICT Koganei in Tokyo

NICT Booth at SC09 in Portland, US

Global Dynamic Circuit Network