Multi-domain Network Provisioning using GLIF/fenius interface

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DCN Multi-domain Control Plane

Web Interface

- Authentication
- Schedule Reservation
- Request VLAN
- Request Bandwidth

User

DC/ vlsr

Network1

IDC

Network2

DC/vlsr

IDC

Network3

DC/vlser

End-to-End Ethernet VLAN Path

- Better Performance
- Symmetric
- Secure
- Shorten Provisioning time
- Efficient use of Network Resource
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
Installation of Control Plane Software

- Installation of Control Plane Software
- Web Interface
- End-to-End Ethernet VLAN Path
- User
- End System
- Network1
- Network2
- Network3
- Internet2 or other DCN
- IDC
- DC/vlr
- XML Request
- XML Topology Exchange
- Path Creation
- Authentication
- Schedule Reservation
- Request VLAN
- Request Bandwidth
- XML Request
- XML Topology Exchange
- Path Creation
Control Plane Software (1)

Domain Controller

- **DRAGON** *(Dynamic Resource Allocation via GMPLS Optical Network)*
  - 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

• 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 Requirements 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

KDDI Otemachi, Tokyo

Fenius API

APAN-JP

TransPAC2

PacificWAVE LA

Los Angeles, US

ESnet

Internet2 ION

AIST

NICT G-kappa

JGN2plus G-lambda

NICT Space Weather Forecast Home Site

NICT Koganei in Tokyo

NICT Booth at SC09 in Portland, US

Visualization

To monitor and model space environment
G- \texttt{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.
An Example Service Model of Commercial GRID

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

Diagram:
- User
- Application Service Provider (ASP)
- Computing Resource Providers
- Storage Resource Providers
- Network Resource Providers
  - Telecom Operator A
  - Telecom Operator Z
  - User access
  - NW resources integrity
Demonstration @ GLIF2006
G-lambda/Enlightened middleware coordination diagram

- Japan Application
- GL Grid Resource Scheduler
- EL App. Launcher
- EL Grid Resource Coordinator
- HARC Acceptor
- EL→GL wrapper
- GL→EL wrapper

Clusters:
- JAPAN
- US

NRM Connections:
- CRM
- Cluster
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