

**G- lambda**

# **Coordination of a Grid Scheduler and Lambda Path Service over GMPLS**

**- Toward Commercial Lambda Path Services -**

Grid Technology Research Center, AIST

KDDI R&D Laboratories

NTT Network Innovation Laboratories

NICT

- To make lambda path service available for everyone
  - Lambda path service should be provided by network operators.
    - Well defined standard interface between users and network operators is required
    - Isolate detailed network control from users

**GNS-WSI: Grid Network Service / Web Services Interface**

- To realize inter-carrier service
  - A standard lambda path control protocol should be used

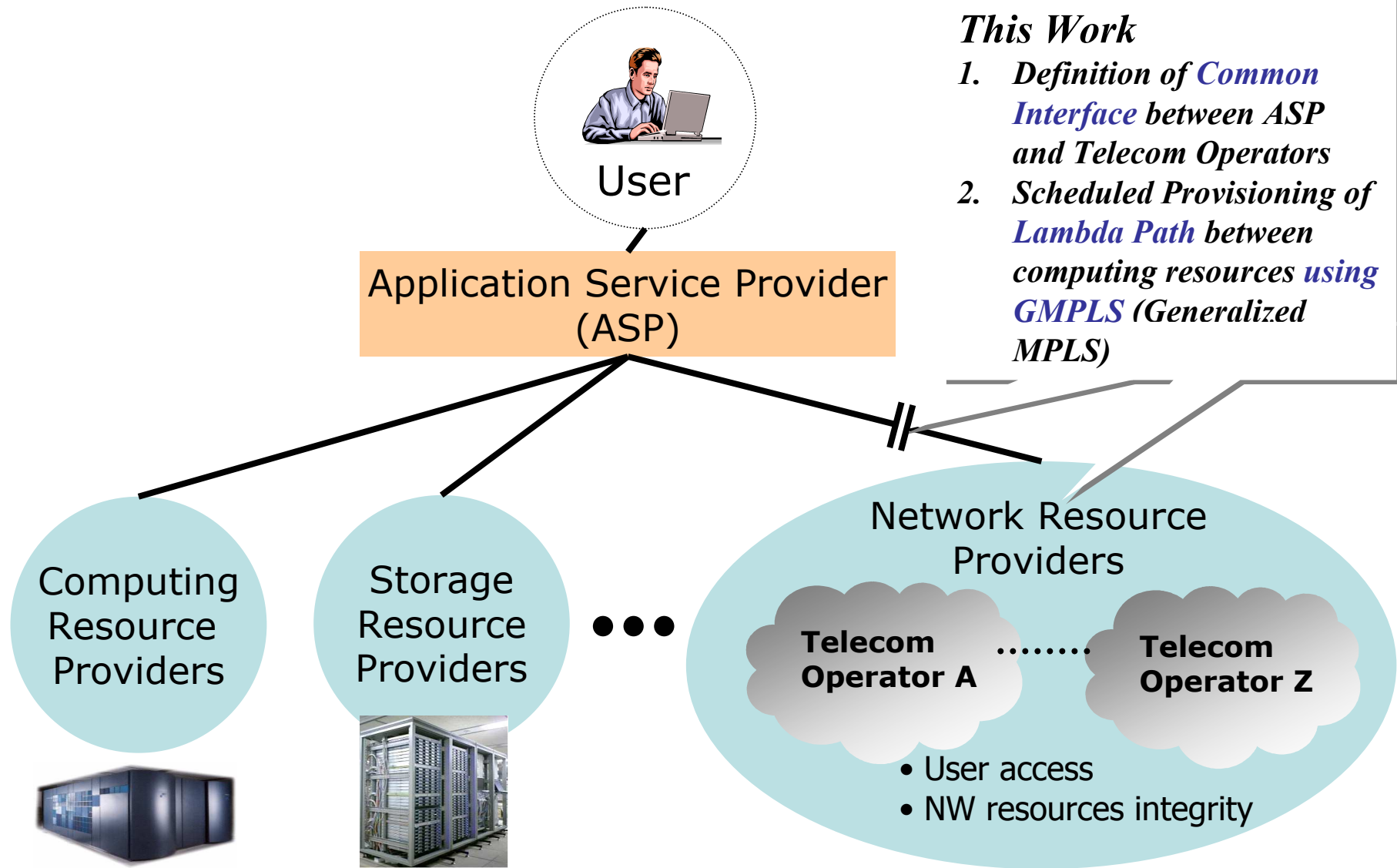
**GMPLS (Generalized Multi-Protocol Label Switching)**

- One of the most viable protocols for lambda path control and management

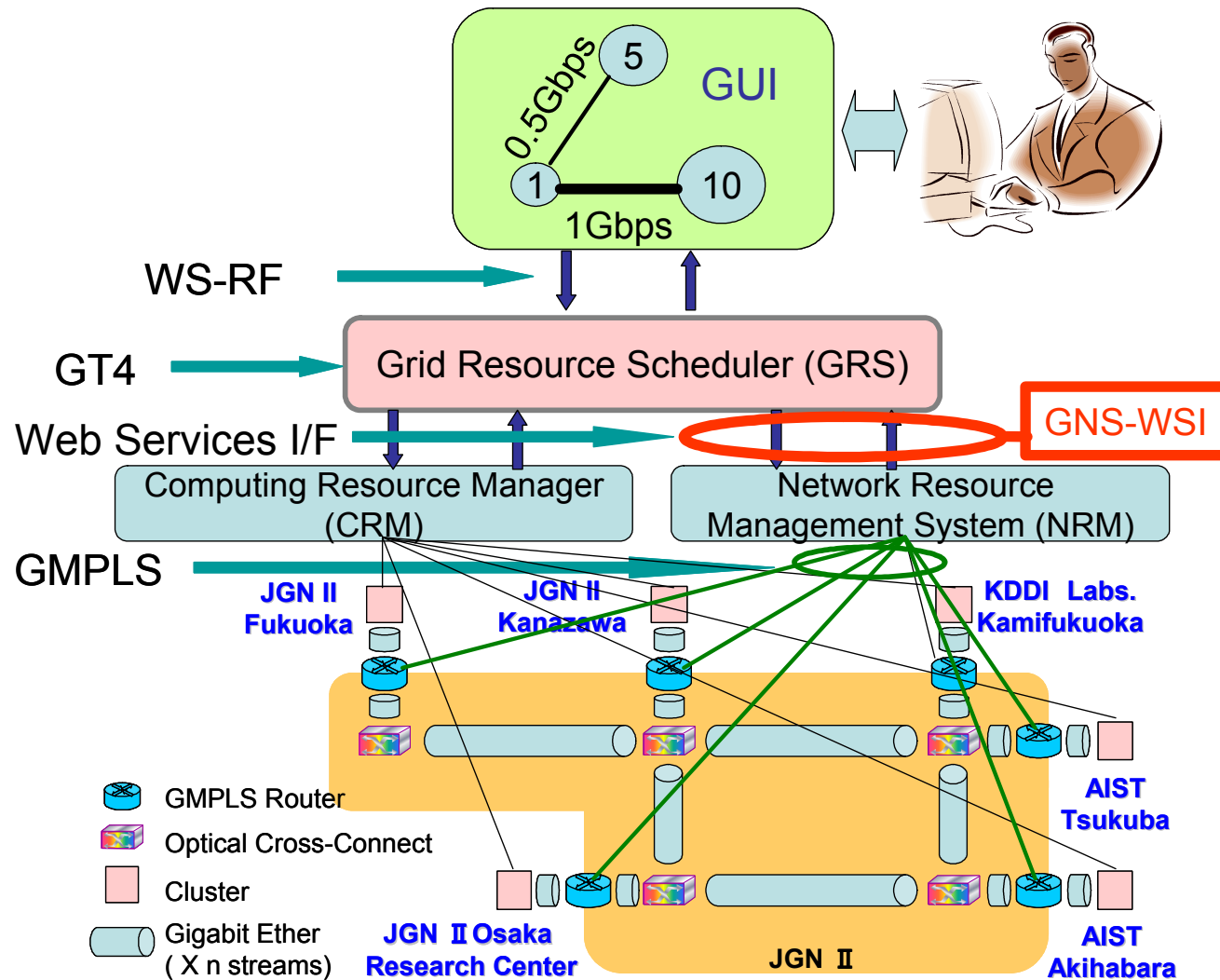
- To realize stable and high quality service on Grid at low cost
  - Dynamic provisioning of stable wide-BW network

**Simultaneous advance reservation of both computing and lambda path resources**

# An Example Service Model of Commercial GRID



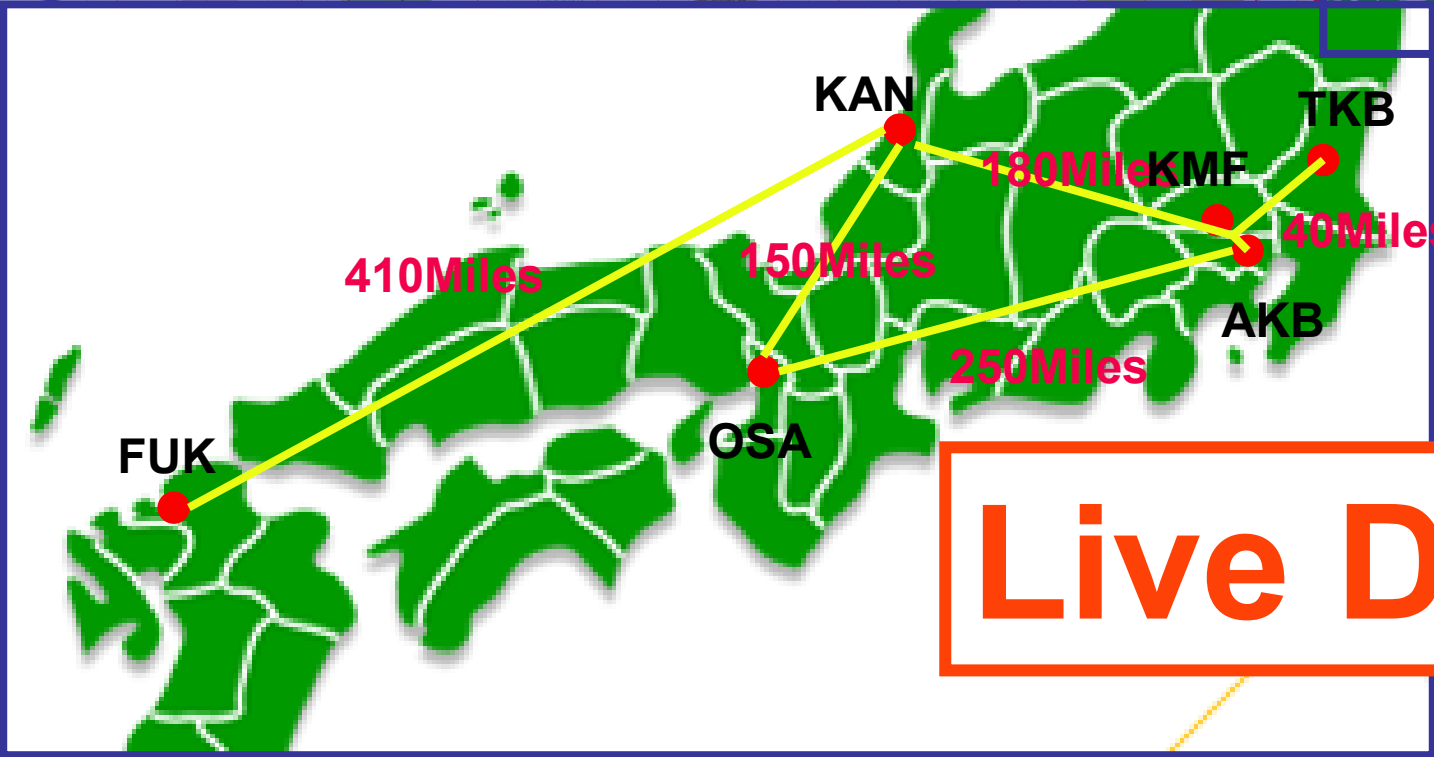
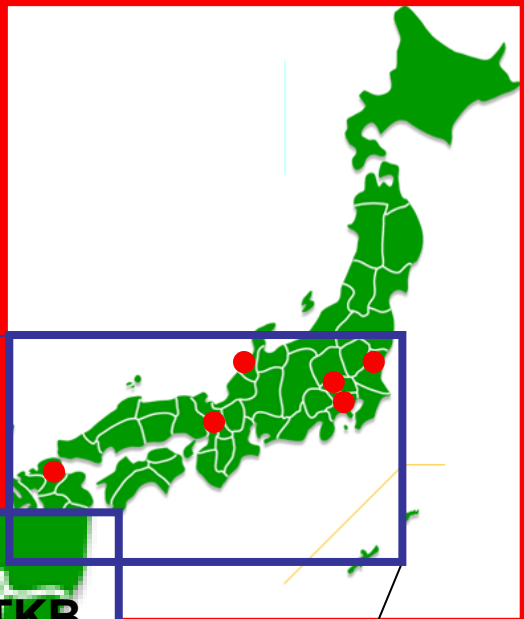
# Demonstration Overview



① User requests service via GUI, specifying the required number of computers and the network bandwidth needed

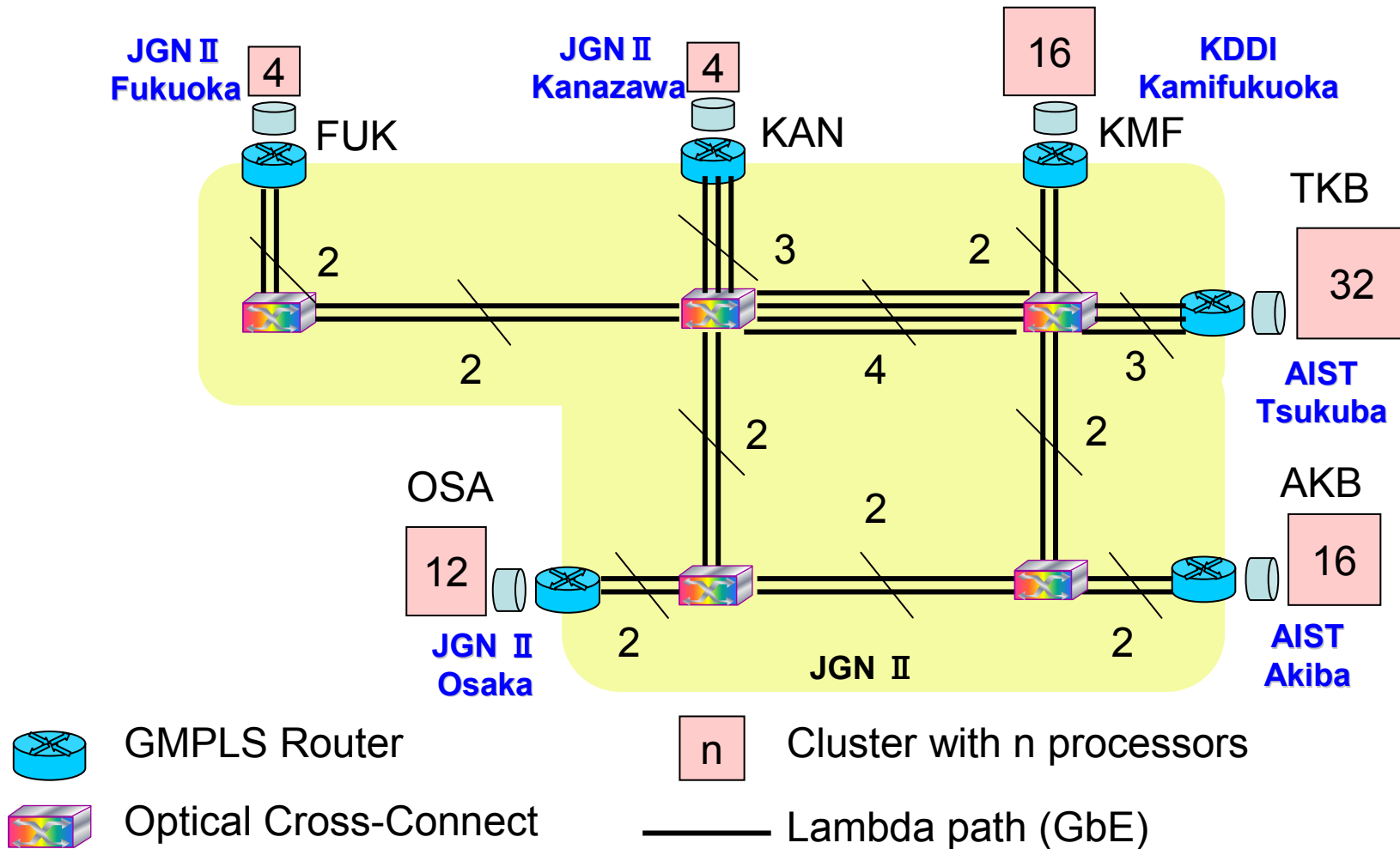
② The computing resources and GMPLS network resources are reserved as the result of interworking between the GRS and NRM using GNS-WSI (Grid Network Service / Web Services Interface)

③ A molecular dynamics simulation is executed using the reserved computers and lambda paths. Ninf-G2 and Globus Toolkit 2 (GT2) are used at each cluster.



**Live Demo**

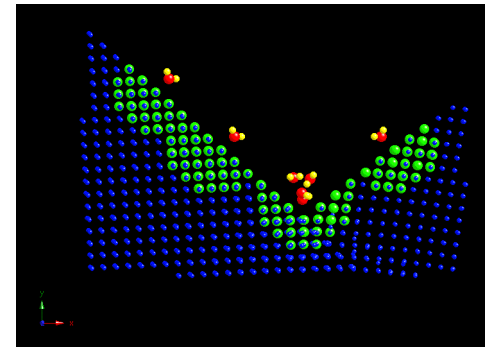
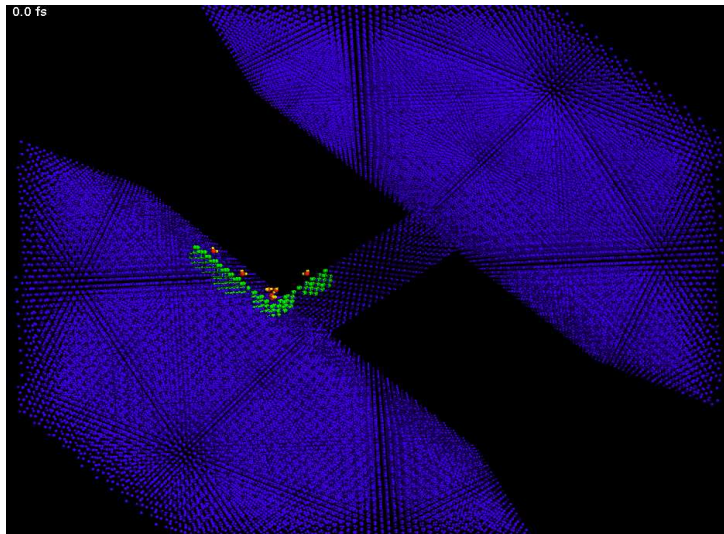
# Demo Environment



Clusters distributed over six locations in Japan are connected over JGN II GMPLS network test-bed

# Overview of the Demo Application

- A molecular dynamics simulation implemented with a Grid Middleware called Ninf-G2, that is developed by AIST, Japan
  - Ninf-G2 conforms the GridRPC API, a Global Grid Forum standard programming API for Grid
  - Uses Globus Toolkit 2 for job invocation and communication
- Simulation Scenario
  - [Silicon and water reaction under stress](#)



Global Grid Forum:

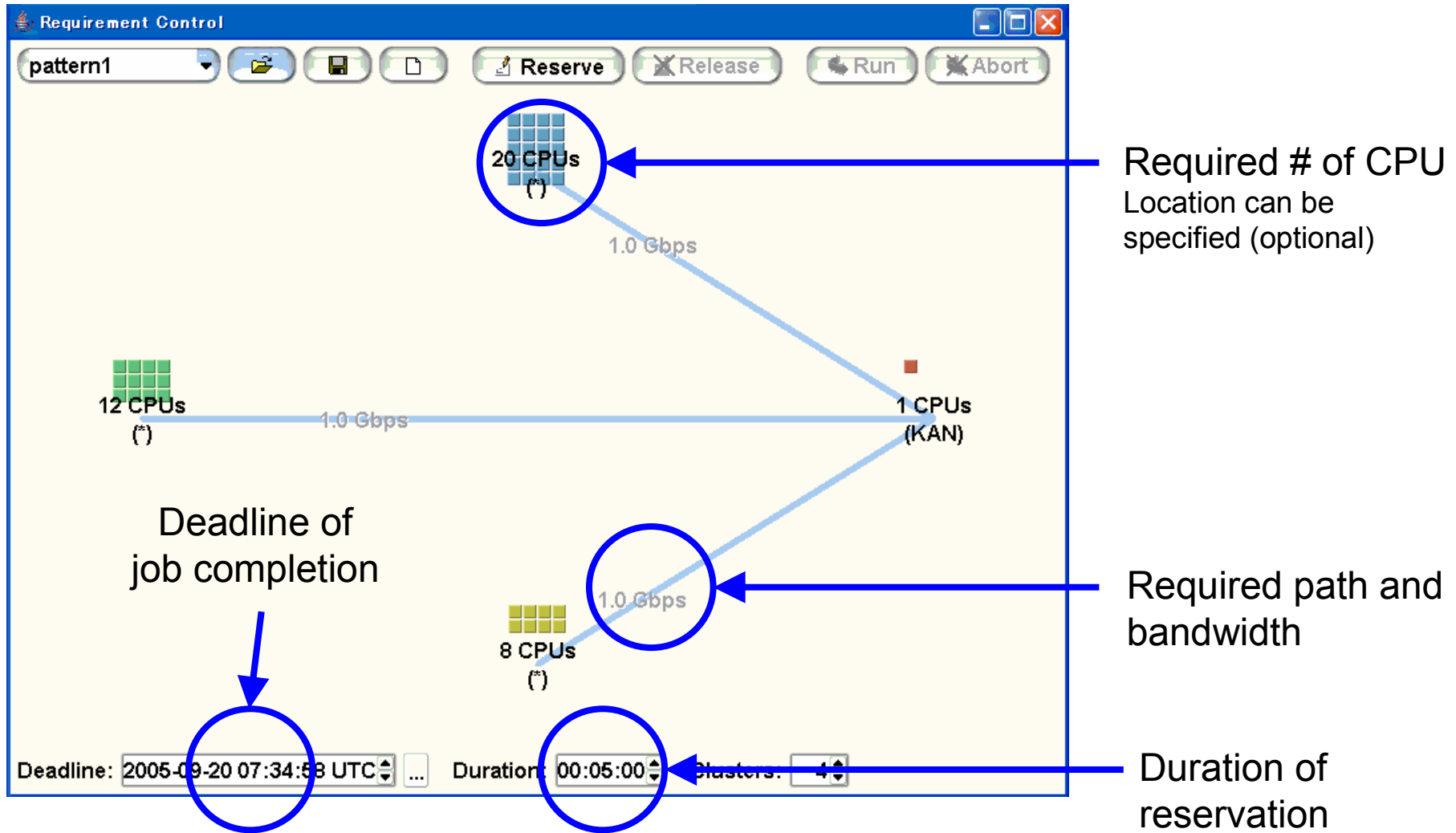
A standardization body for grid related technologies

Globus Toolkit:

Infra-ware for the Grid



# Request computers and bandwidth

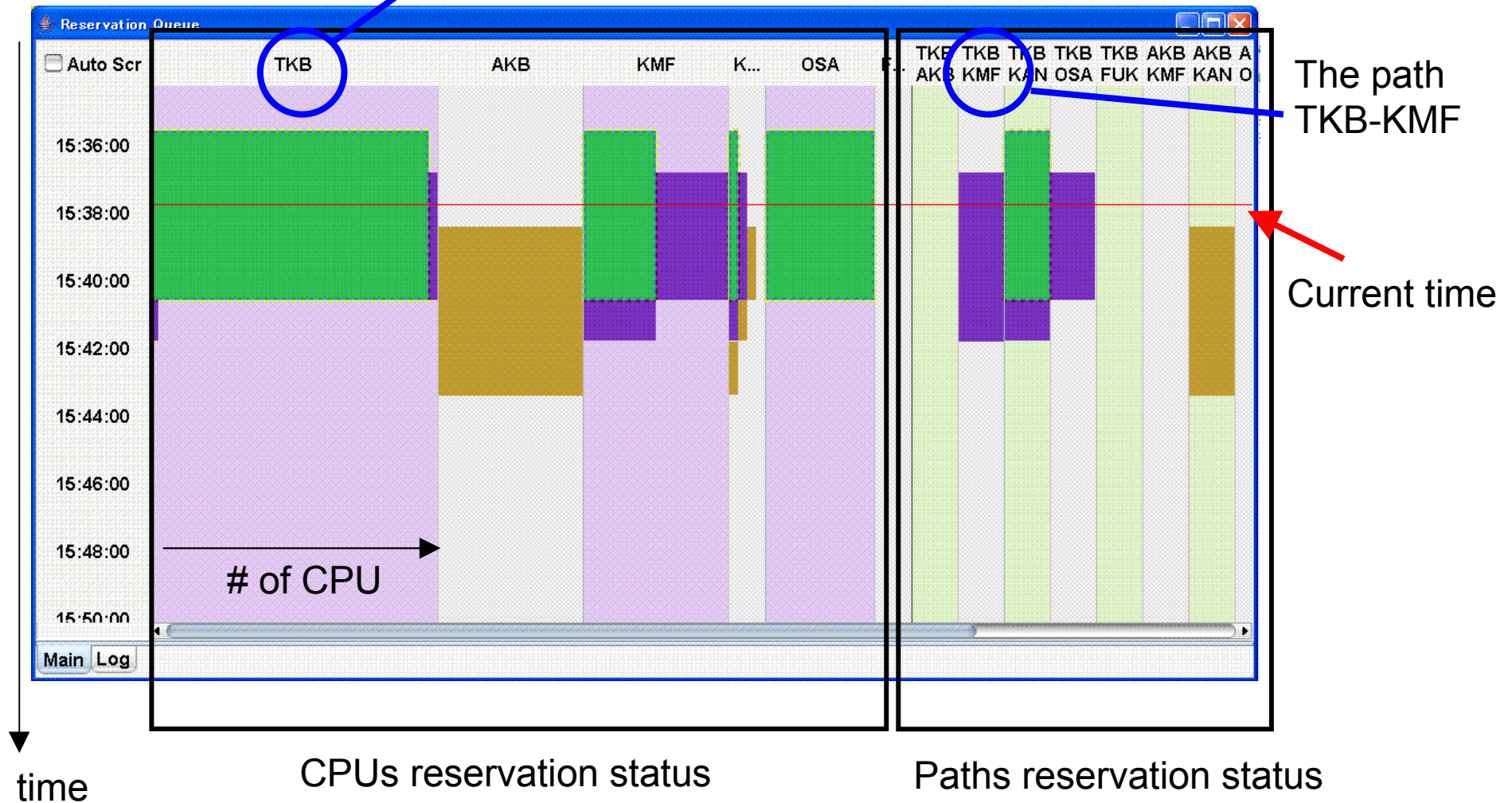


**A total of 37 CPUs at 4 locations and star shaped paths are requested**

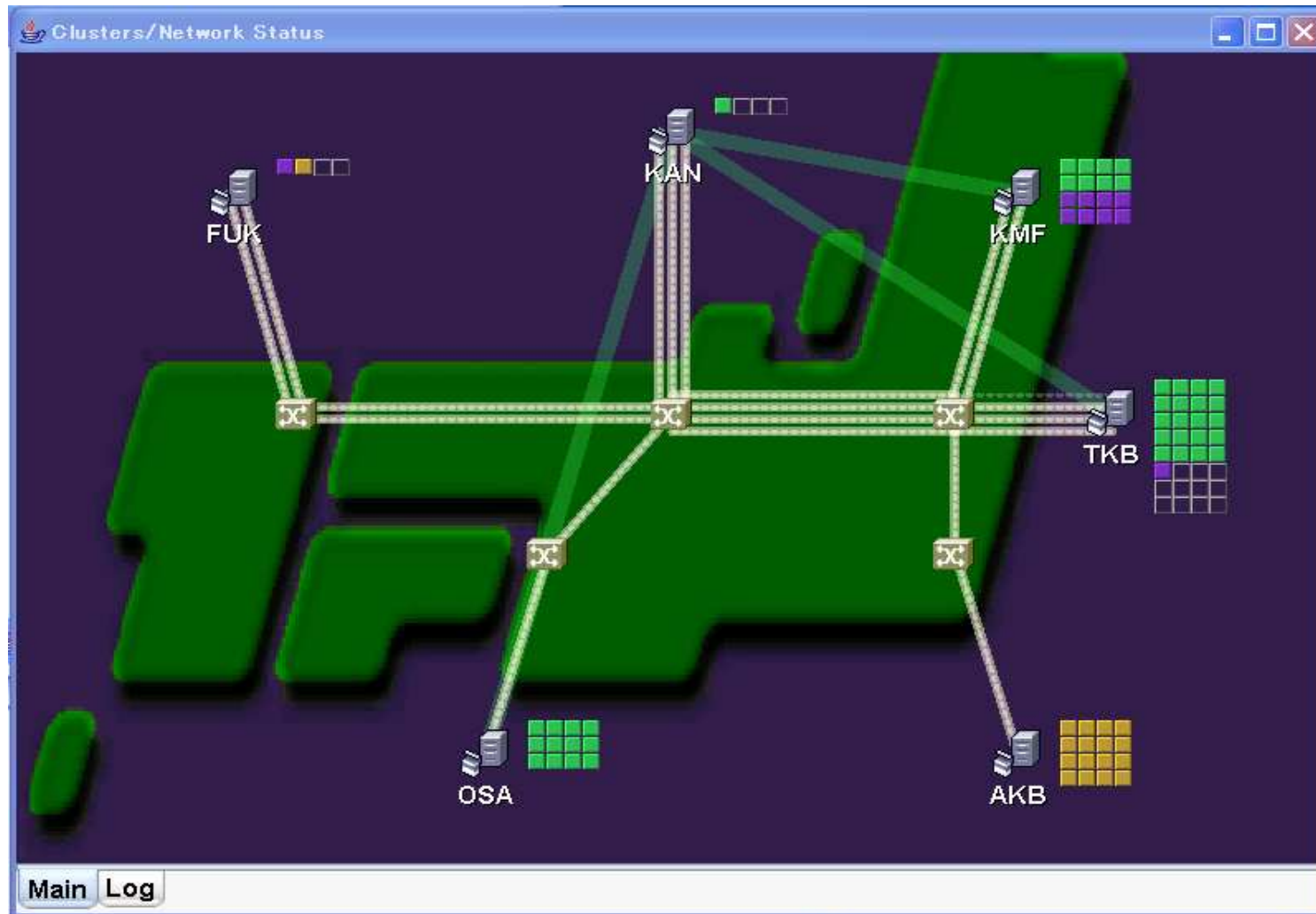


# Advance reservation status

Reservation status of  
TKB cluster

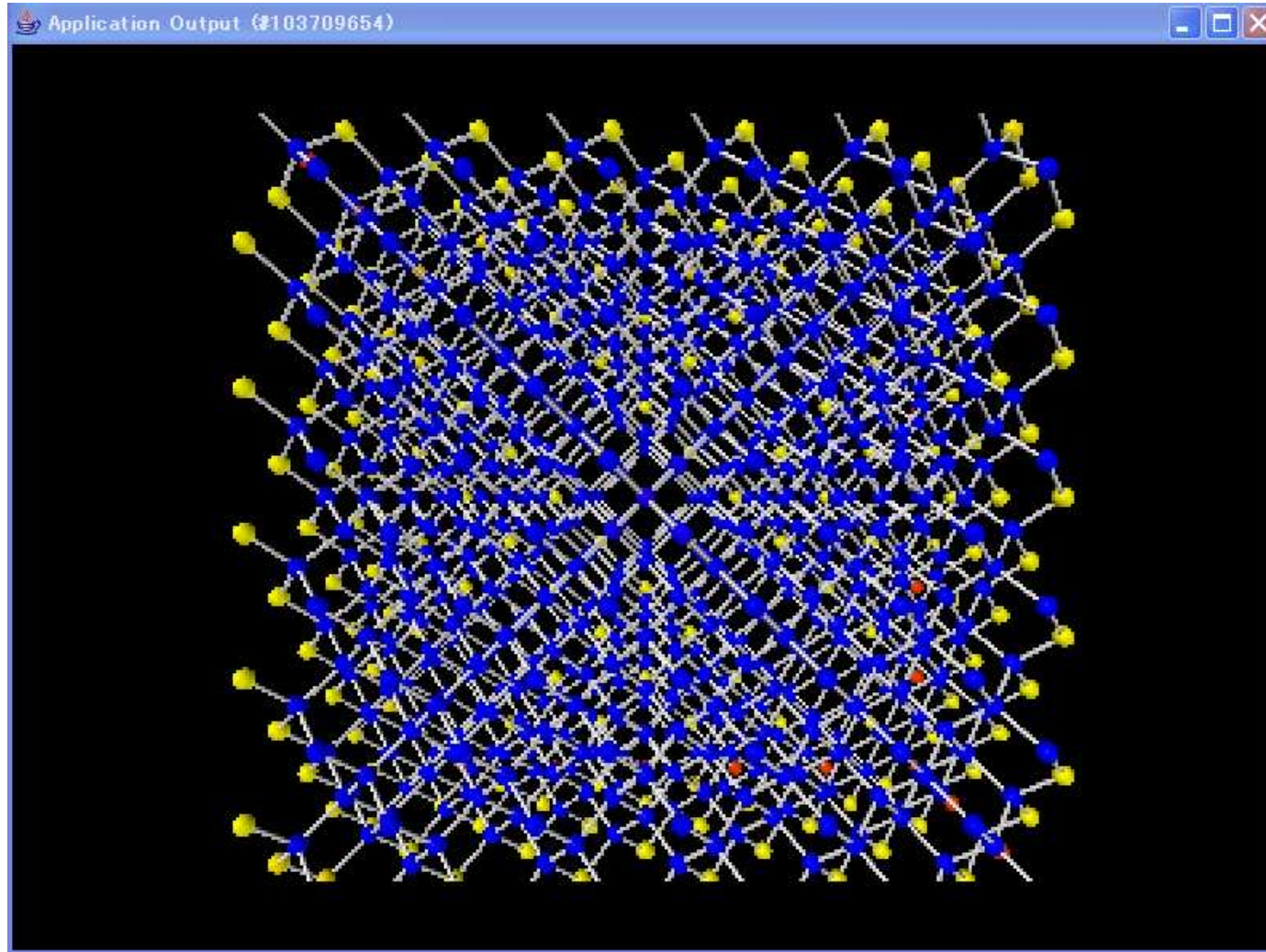


# Current CPU and paths



Paths are displayed based on the information from GMPLS routers

# Output of the simulation



Temperature of Molecules of Silicon