GNS-WSI2
Grid Network Service / Web Services Interface, version 2

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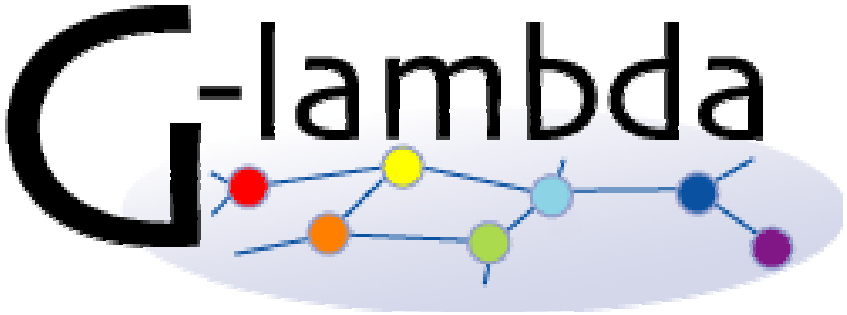

G- lambda project overview

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

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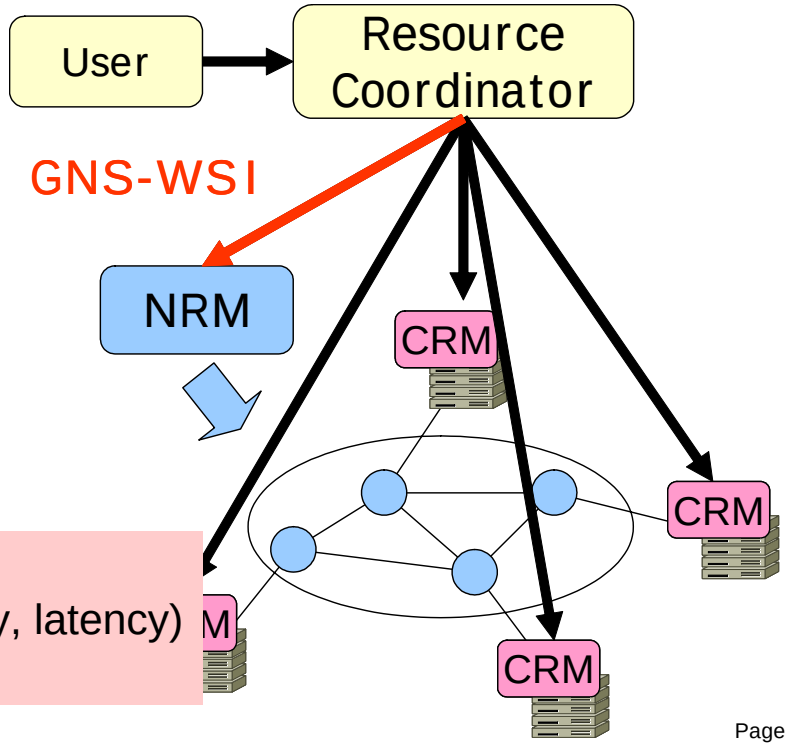
G-lambda

GNS-WSI

- Grid Network Service / Web Services Interface
- Interface to enable advance reservation of bandwidth from Grid applications and middleware
- Based on the Web Services interface technology
- Can be used for inter-domain coordination
- Polling-based non-blocking operations
  - Advance reservation of a path between end points
  - Modification of reservation (i.e. reservation time or duration)
  - Query of reservation status



Booking request (netResourceReservation)
Site IDs, Reservation Time, Bandwidth(, availability, latency)
(Example: **Site A-B, 15:00-18:00, 1Gbps)**

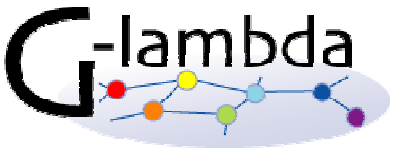
GNS-WSI2 (GNS-WSI ver. 2)

- GNS-WSI ver. 1 in 2005
  - Provides simple Web services based interface
    - Reservation requests are identified by the "path reservation ID" operation parameter
  - 1-phase commit
- GNS-WSI2 (GNS-WSI ver. 2) in 2006
  - Based on **WSRF** (Web Services Resource Framework)
    - Standard WS interface for "stateful" services
    - Reservation requests are identified by Endpoint Reference (EPR)
  - Support **2-phase commit** protocol
    - Distributed transaction processing by GRC is available

GNS-WSI2 Services

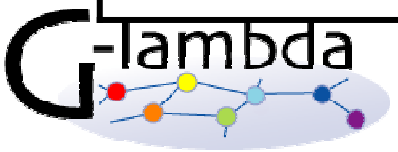
- ReservationFactoryService
  - Creates ReservationResource instance in ReservationService
  - Provides network resource information
- ReservationService
  - Provides general reservation operations
    - reservation, modification, release
  - Creates ReservationCommandResource instance in ReservationCommandService
- ReservationCommandService
  - Enables 2 phase commit and non-blocking operation

(xxxResource is a service instance for each user request)



GNS-WSI2 Operations

Service	Operations	Remarks
Reservation Factory Service	createReservationResource	creates reservation resource
	netResourceQuery	discovery of resources between designated sites
	netAvailableResourceQuery	discovery of available resources
Reservation Service	netResourceReservation	advance reservation request
	netResourceModification	modification request
	netResourceRelease	release request
	getResourceProperty(QName)	returns specified ReservationResource property
Reservation Command Service	getResourceProperty	returns CommandStatus
	commit	commit the request
	abort	abort the request

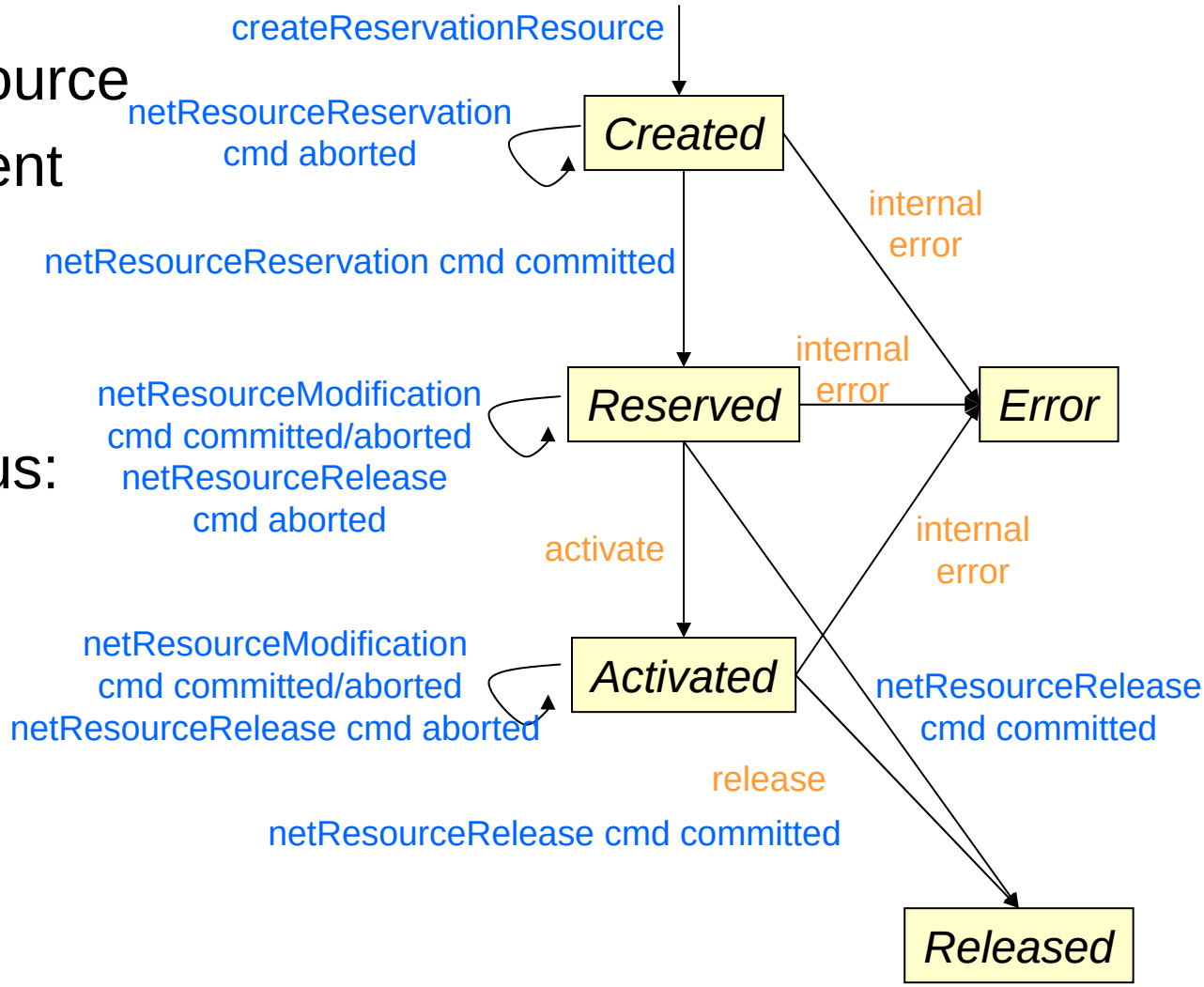


Service Parameters
(Most of them are defined by GNS-WSI ver. 1)

Parameter	Usage	Value	Remarks
Site ID (APoint, ZPoint)	ID to specify A and Z points	String	Name or ID of sites
bandwidth	Bandwidth of the resource	Positive integer (kbit/s)	
latency	Latency between end points	Positive integer (msec)	
availability	Network protection of network resource	Integer (-2^{32} ～ $2^{32}-1$)	0 = Un-protected 1 = Protected
Reservation time (startTime, endTime)	Start time and end time of the reservation	xsd:dateTime	YYYY-MM-DDTHH:MM:SSZ
localUsername	user name of certificate	String	GT4 GSI
reservationStatus	status of reservation	String	Created/Reserved/Activated/Released/Error
commandStatus	status of each command	String	Initial/Prepared/Committed/Aborted
resourceStatus	status of network resource	String	*Available* / *NotAvailable*

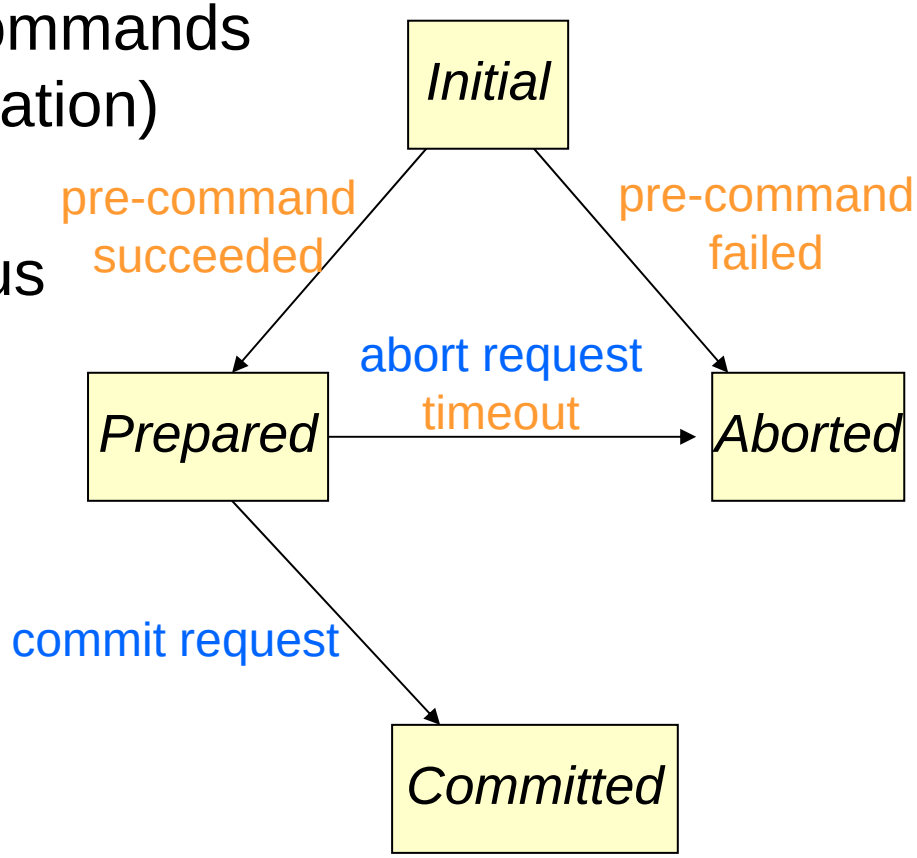
ReservationStatus Transition Process (Reservation)

- A property of ReservationResource
- Represents current "Reservation" status for each requested path
- ReservationStatus:
  - ***Created***
  - ***Reserved***
  - ***Activated***
  - ***Released***
  - ***Error***

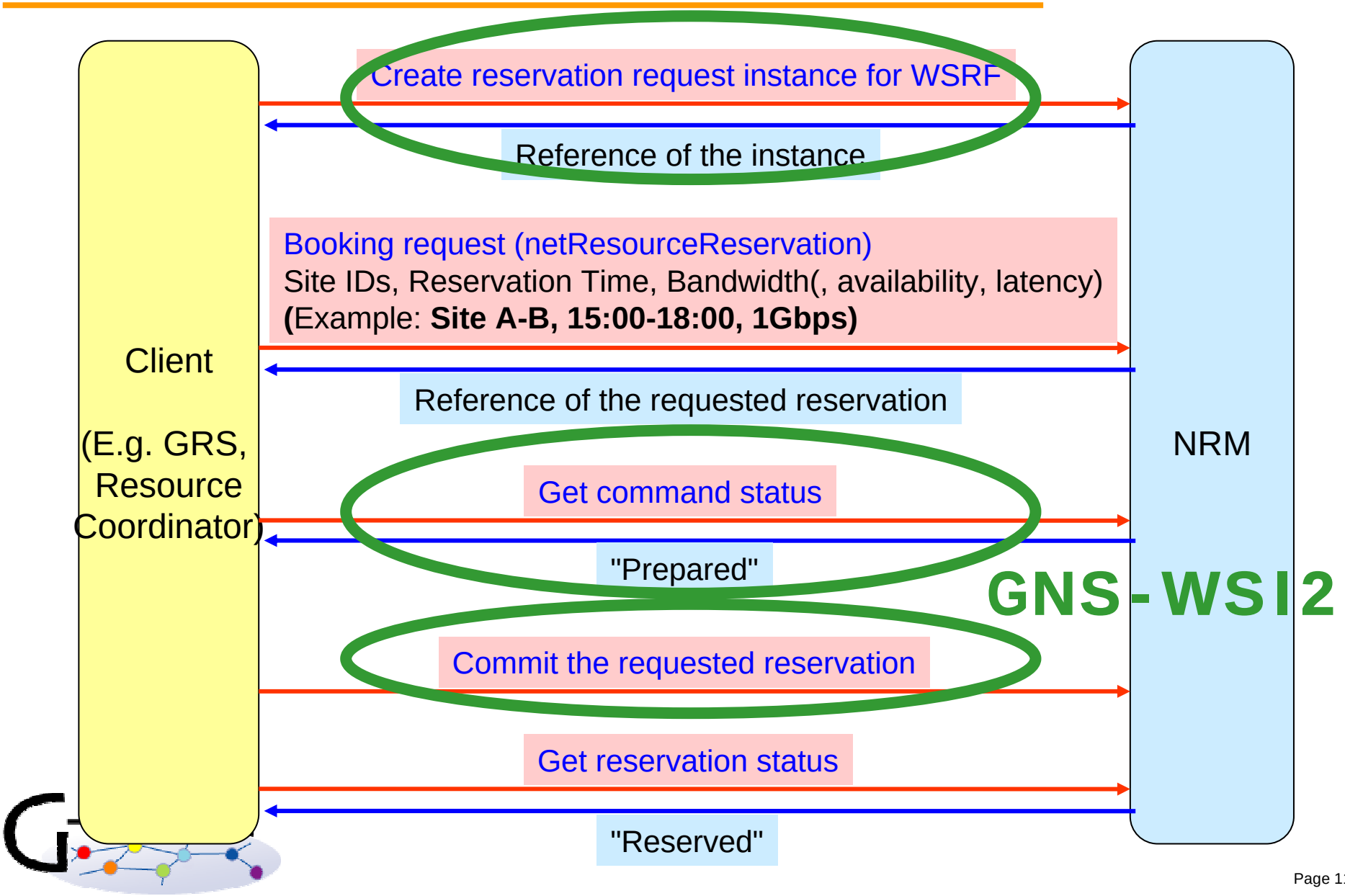


CommandStatus Transition Process (ReservationCommand)

- A property of ReservationCommandResource created by reservation commands (e.g. netResourceReservation)
- Represents current requested operation status
- CommandStatus:
  - ***Initial***
  - ***Prepared***
  - ***Committed***
  - ***Aborted***

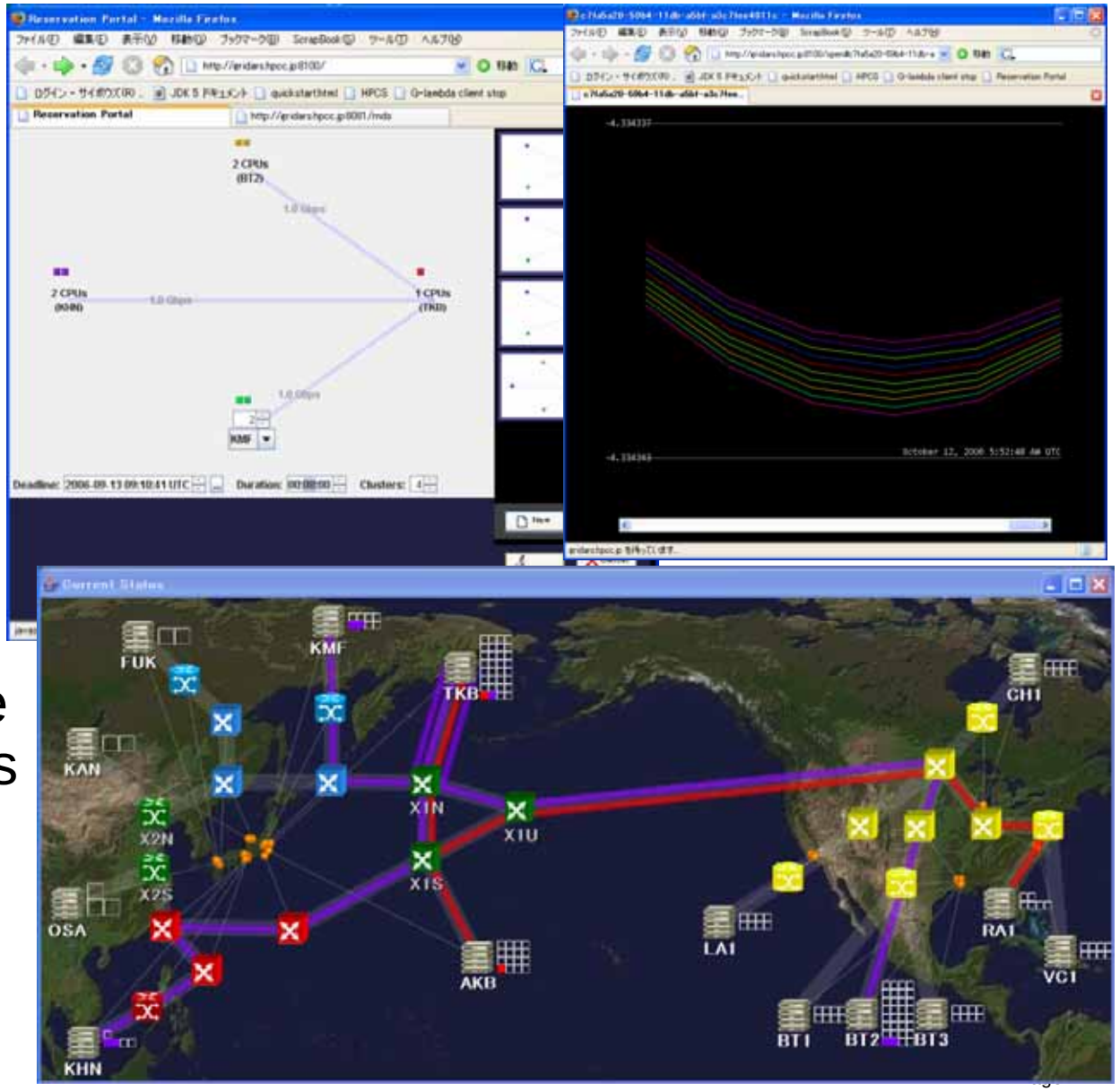


An example XML exchanged through GNS-WSI2



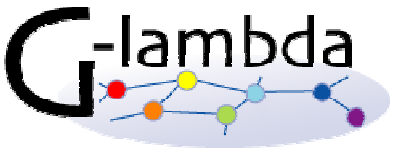
GNS-WSI2 Demonstration [GLIF2006, SC06]

- G-lambda & Enlightened collaboration
- Allocate trans-pacific resources with advance reservation
- Perform a parallel molecular dynamics simulation over the reserved resources



Reference Implementation of GNS-WSI2

- GridARS-WSRF is a reference implementation of the GNS-WSI2 NRM WSRF I/F module
  - GridARS: Grid Advance Reservation-based System framework for Grid Co-allocation developed by AIST
- Network resource providers do not need to write complicated WSRF services code
- Developed using Globus Toolkit 4, Java WS Core
  - Can support GSI
- Resource properties have been implemented persistently
- Used by GNS-WSI wrapper developed by the EnLIGHTened team and AIST-NRM at the demonstration
  - KDDI and NTT NRMs have different implementation



Conclusions

- GNS-WSI2 defined by G-lambda
- Based on **WSRF** (Web Services Resource Framework)
- Support **2-phase commit** protocol
  - Distributed transaction processing by GRC is available
- Reference implementation will be available from

http://www.g-lambda.net/