GLIF Control Plane and Grid Middleware Integration

Mission: **To agree on the interfaces and protocols to automate and use the control planes of the contributed Lambda resources to help users on a global scale access optical resources on-demand or pre scheduled.**

several key areas we need to focus on:

- Define and understand real operational scenarios
- Defining a set of basic services and definitions:
  - Precise definitions
  - Developing semantics the whole community agrees to for machine to machine communications
- Define a Resource Control Plane Architecture
- Introduce other Resources to the Architecture
- Interdomain exchange of information for both control planes and management planes
  - Determine what information needs to be monitored
  - How to abstract monitored information to share
- Determine what existing standards are useful vs. where Grid requirements are unique and new services and concepts are required
  - How do we standardize mechanisms and protocols that are unique to the Grid community
- Work closely with E-science applications to provide vertical integration

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Issues and Challenges

- Interoperation of existing control software - no need to change current implementations -UCLP, GMPLS, etc.
  - Both control and Management planes and Grid middleware
- Coordination of network resources and other Grid resources
- Two phase commit for all involved resources - KISS
- Topology Abstractions - including end points - or services
- Monitoring - MonALISA, PerfSONAR….
- Advertising resources globally - agree on what and how to represent resources… NDL etc.
- Policy
- Different implementations of each component (no need to standardize on how things are done)
- Agree on Functional components
- Focus on a couple of KEY interfaces (low set of options - use lowest common denominator) Prioritize - GNI …
- Next will incorporate GCI

Control Plane Agenda

Control Plane Working Group Meeting - Draft Agenda

Provisional and subject to change

20 January 2008 (08.30-17.30)

* **Actions from last meeting**
* **Updates from last meeting: what was agreed - Gigi Karmous-Edwards, MCNC**

  Inder Monger - skype demo - IDC

* **DICE IDE - John Vollbrecht, Internet2 & Tom Lehman, USC/ISI)**
* **Insights on the IDC API - Evangelos Chaniotakis, ESNet**
* **VLAN config for CineGrid - Alan Verlo**
* **GNS-WSI - Tomohiro Kudoh, AIST**
* **Next steps**

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KISS

Keep it Simple and Smart!

October 5th, 2005
GGF 15 Boston

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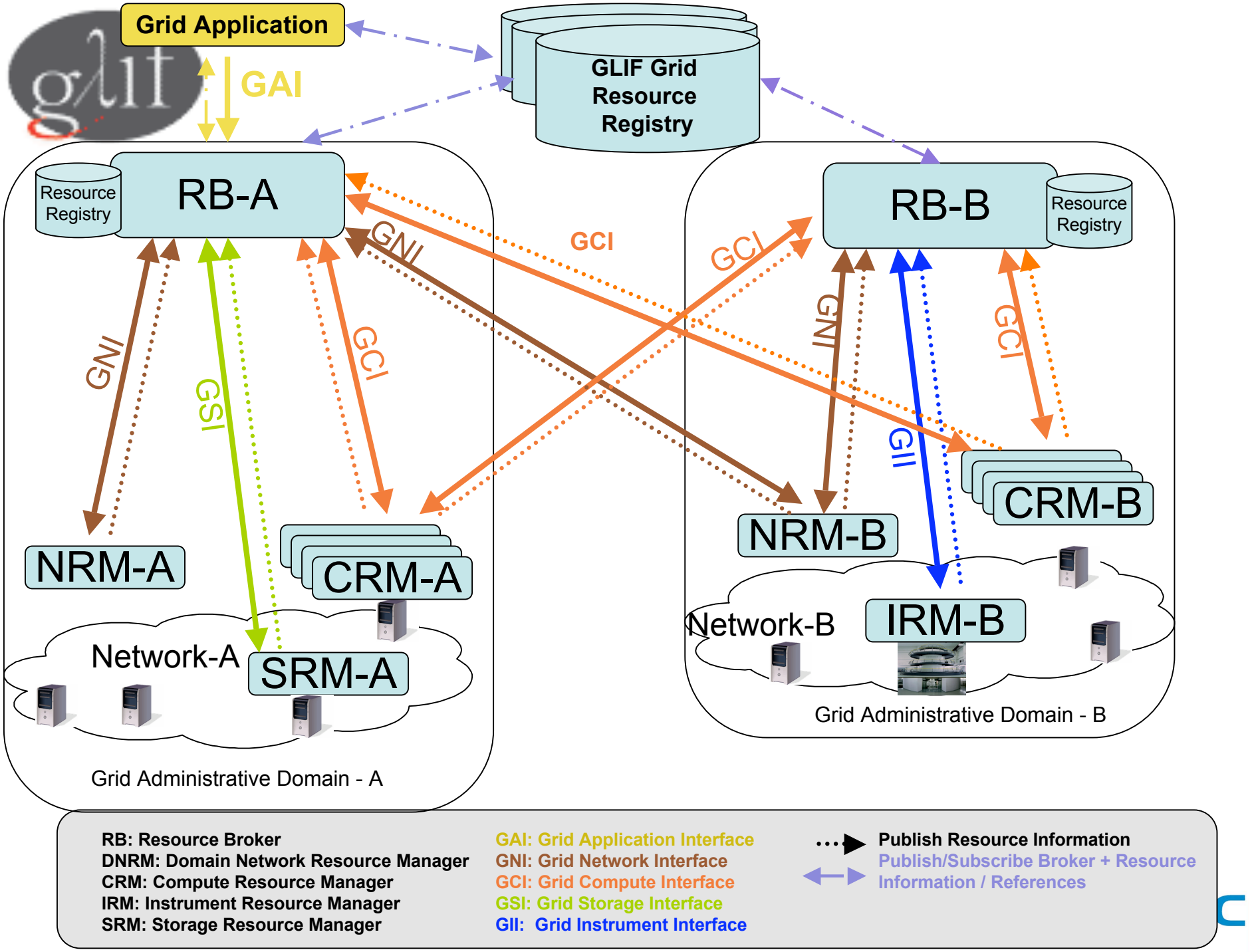
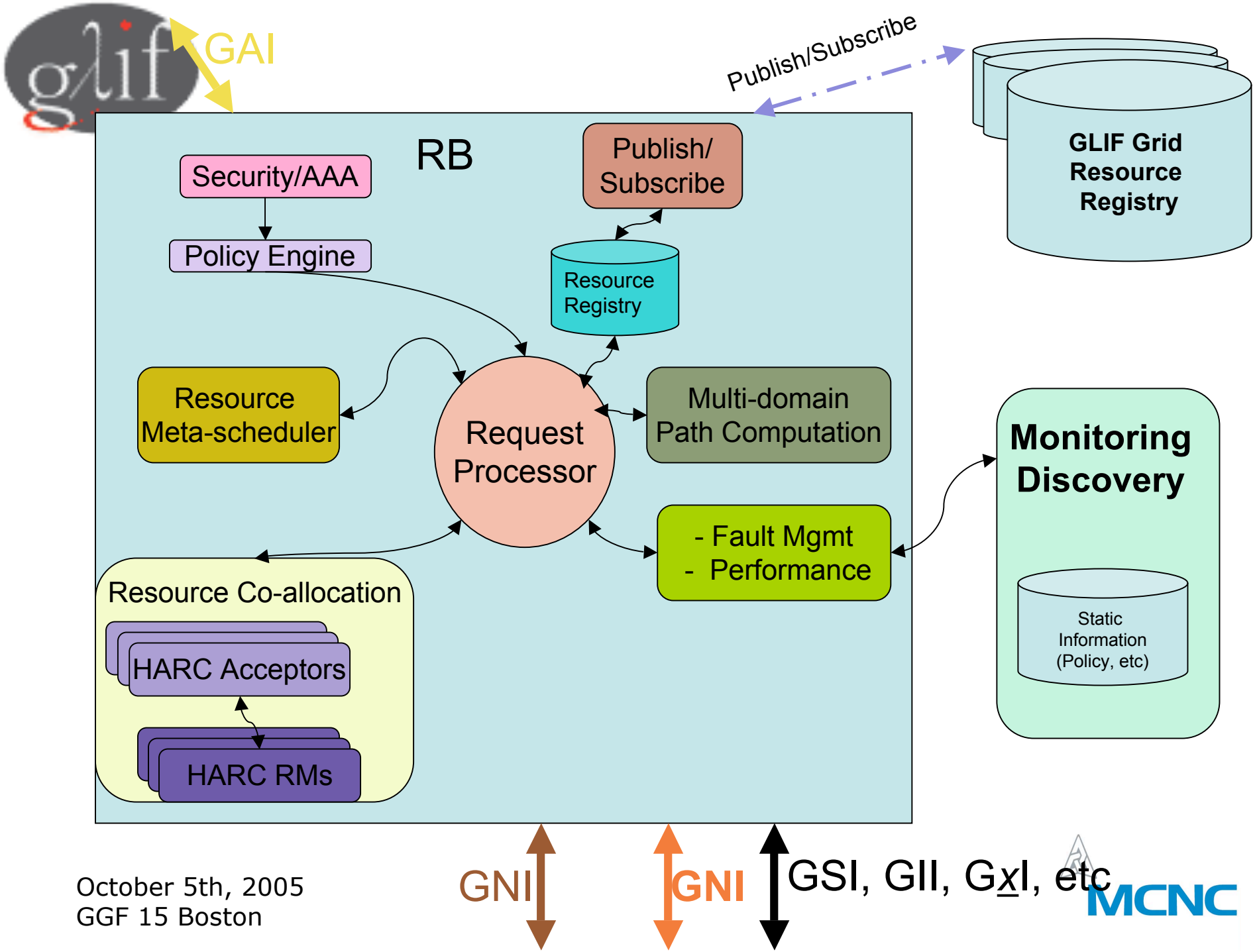

Grid Application
GAI
GLIF Grid Resource Registry
RB-A
Resource Registry
RB-B
Resource Registry
GNI
GCI
GSI
GII
NRM-A
CRM-A
SRM-A
Network-A
Grid Administrative Domain - A
NRM-B
CRM-B
IRM-B
Network-B
Grid Administrative Domain - B
RB: Resource Broker
DNRM: Domain Network Resource Manager
CRM: Compute Resource Manager
IRM: Instrument Resource Manager
SRM: Storage Resource Manager
GAI: Grid Application Interface
GNI: Grid Network Interface
GCI: Grid Compute Interface
GSI: Grid Storage Interface
GII: Grid Instrument Interface
Publish Resource Information
Publish/Subscribe Broker + Resource Information / References



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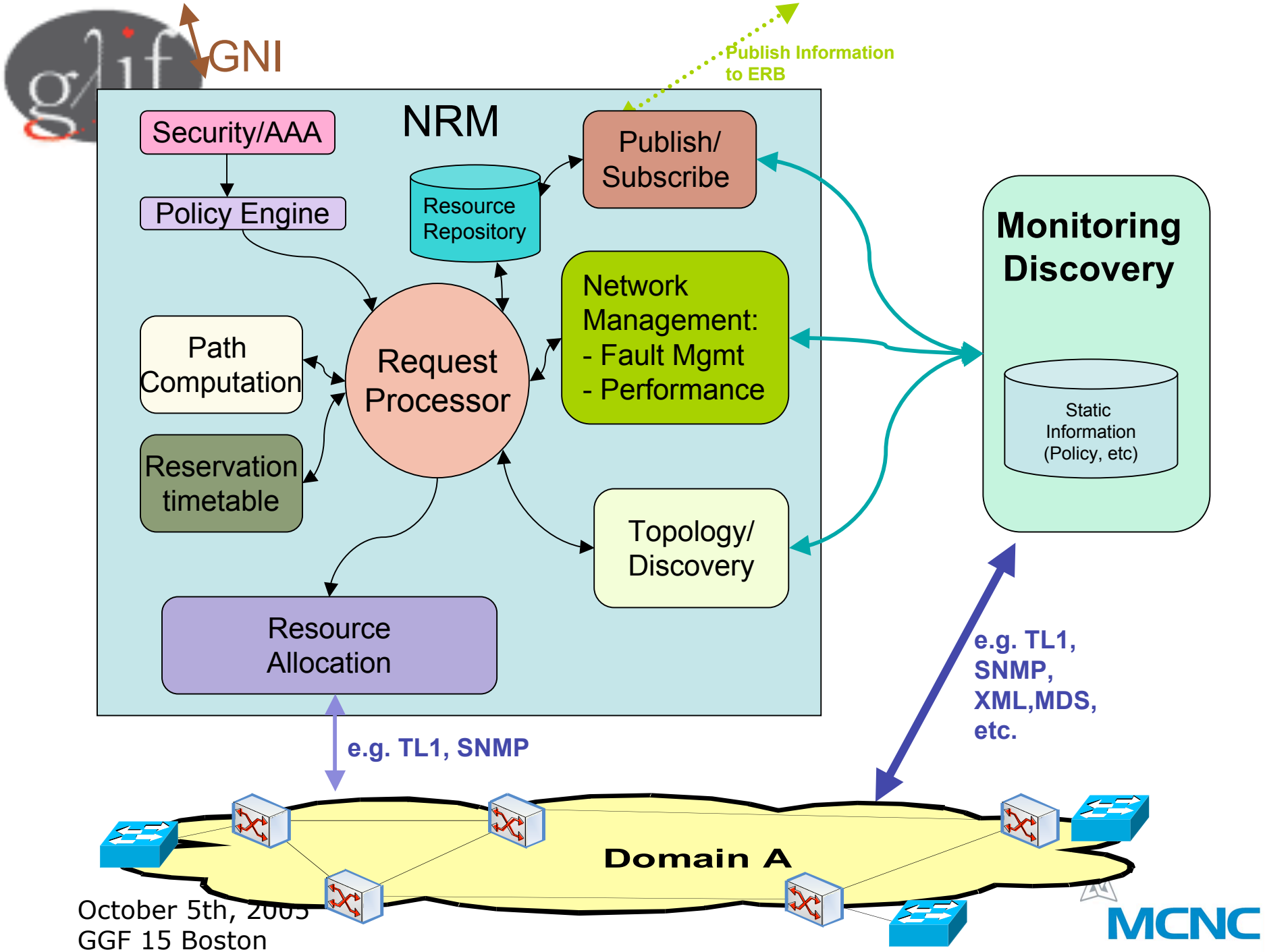
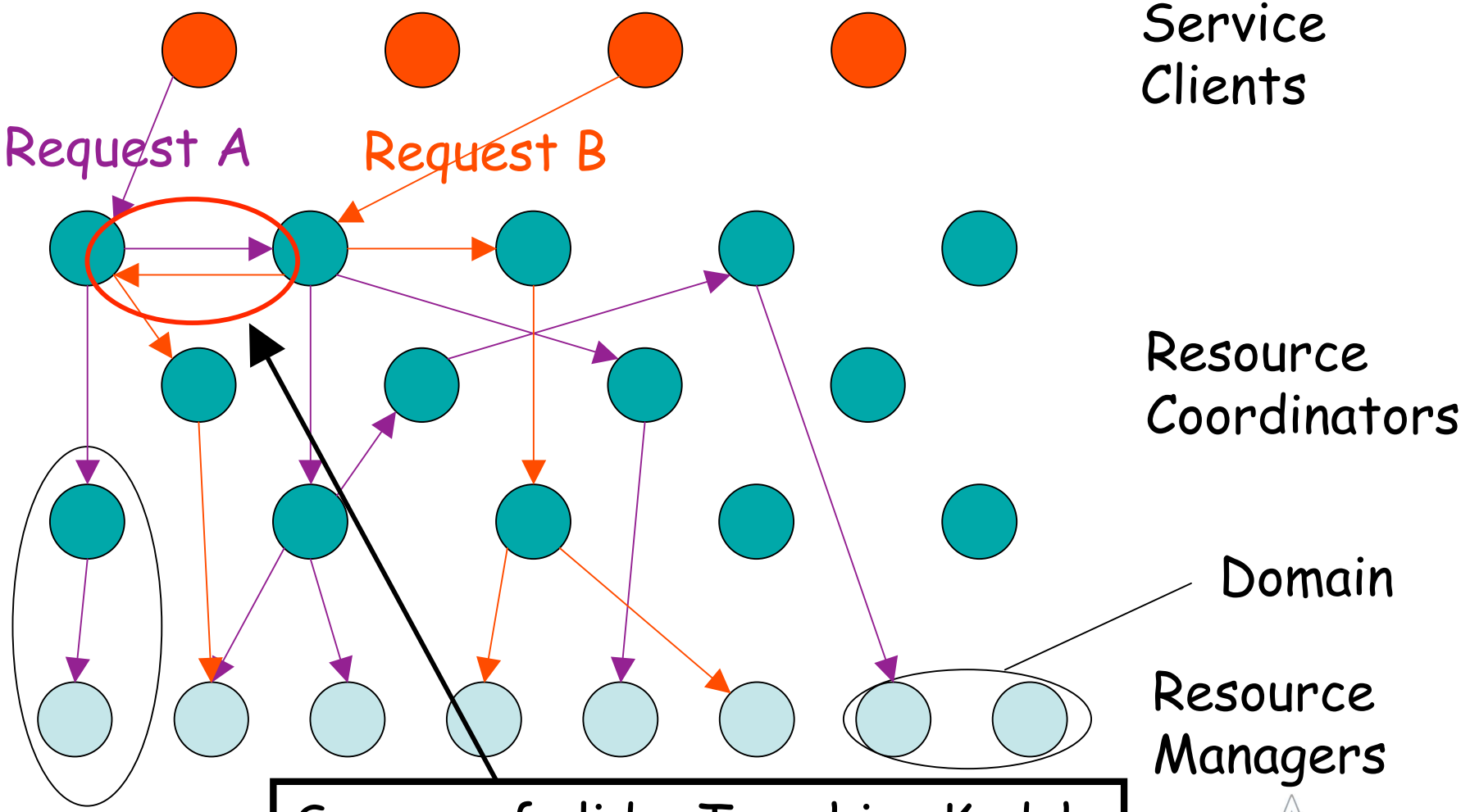
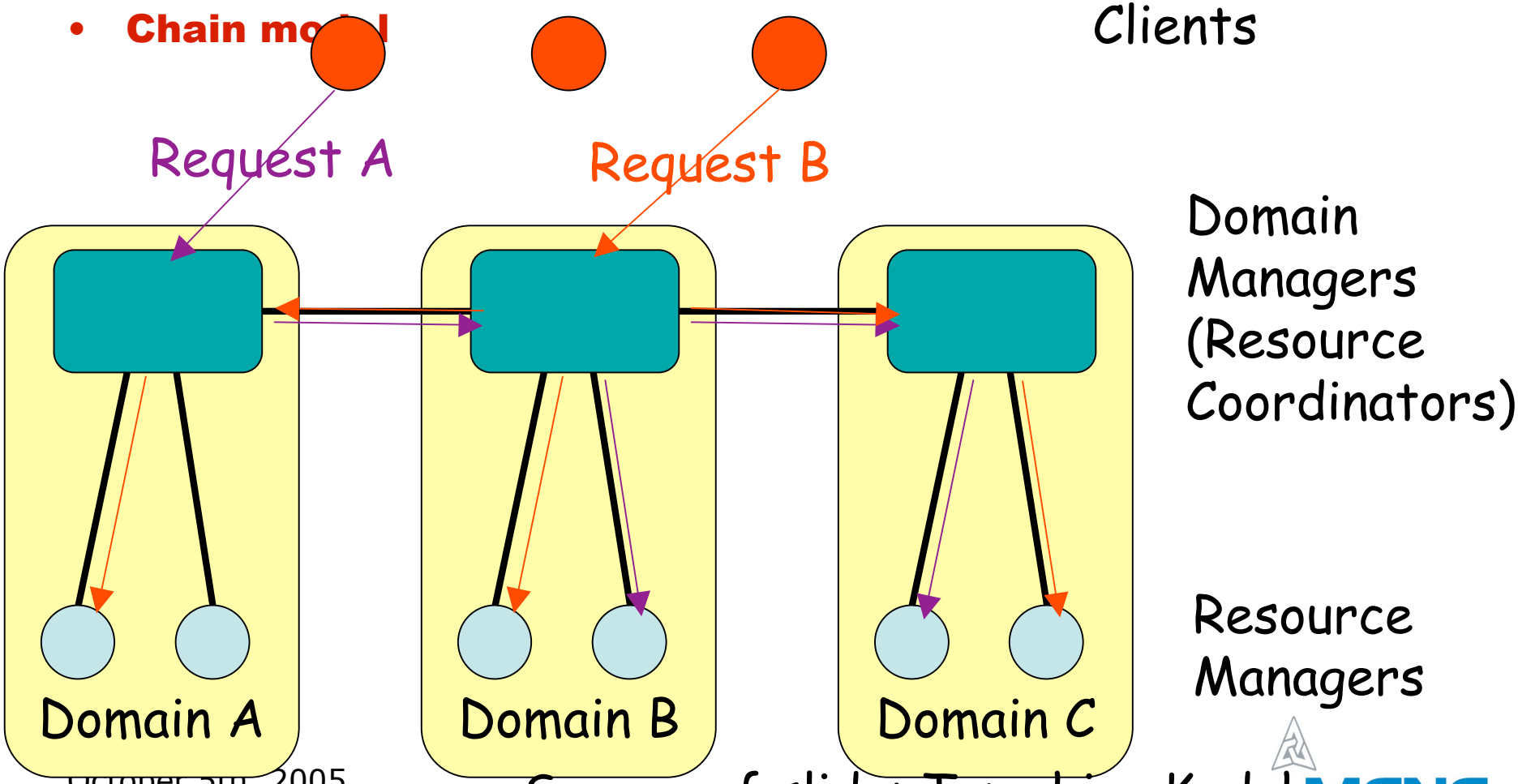

GNI
Publish Information to ERB
NRM
Security/AAA
Policy Engine
Resource Repository
Publish/ Subscribe
Path Computation
Request Processor
Network Management:
- Fault Mgmt
- Performance
Reservation timetable
Topology/ Discovery
Resource Allocation
Monitoring Discovery
Static Information (Policy, etc)
e.g. TL1, SNMP
e.g. TL1, SNMP, XML,MDS, etc.
Domain A

Per-request hierarchical (tree) architecture



Per-request hierarchical model can support Chain-model

- **Chain model**



Source of slide: Tomohiro Kudoh

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Advanced Reservation Challenges

- Control plane vs. Middleware for path computation - no preemption
- Optimization when scheduling resources
- Optimization of future reservations - after reservation is confirmed - continuously updated resources to be allocated?
- Optimization after failure - if link fails - which reservations will it effect? - how far in advance?

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Fault Management and Monitoring in a Grid Environment

- All resources have to be monitored as a system
- A fault on one type of resource has an impact on another - i.e. - if one of the compute resources goes down another network path will have to be computed to the alternate compute resource, etc.
- The system has to behave adaptively as a whole

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Monitoring Issues and Challenges

- **Information Collection**
- **Representation Format**
- **Update Frequency**
- **Non-Intrusiveness**
- **Monitoring Strategies**
  - Active vs Passive Monitoring
  - Standard protocols
  - Link vs Path Monitoring
- **Distribution of Monitoring Data**
- **Security**
- **Fault Tolerance**

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What we agreed to

- **We will collectively work on a GNI that is a inter-domain interface**
  - Existing WSDL will be sent to the list this week
  - Requests from clients to domain for a path or partial path
  - User interface will be a subset of the larger interface
- **Small task groups to write the specification GNI**
  - Use existing interfaces to capture the minimum set of calls and parameters
  - Security and Authorization -
  - Service request calls John V, Evangelos , kudoh san, Tom L.
  - Topology exchange calls - what is shared? To who? Policy? Evangelos,
- **GOLES IDC - John V. , Braam,**
- **We will work closely with OGF's GHPN and NMLwg for standardization**
- **We will communicate to a couple of area directors from IETF about our work and if it fits**
- **We will ask Industry research leaders to come talk to our group about existing possible solutions - Gigi**
- **Failure modes task group (issues) - Mathuieu, Braam**

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