

Overview of G-lambda and requirements for network description

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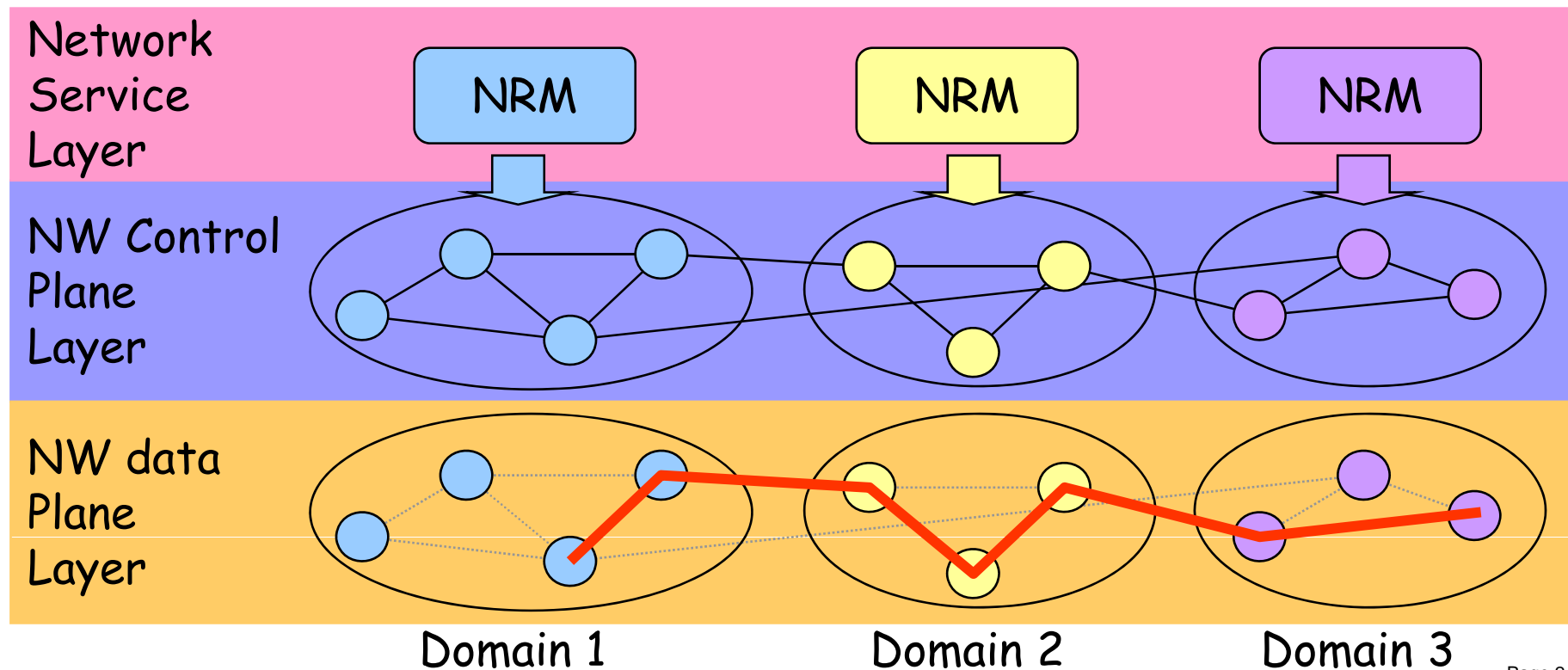
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Note: This talk includes
information which is under
discussion and not final

Network service

- Network service provides **bandwidth provisioning (reservation) service**, using web services technology
- Network service layer is above the “traditional” control plane (i.e. GMPLS, ASON) layer

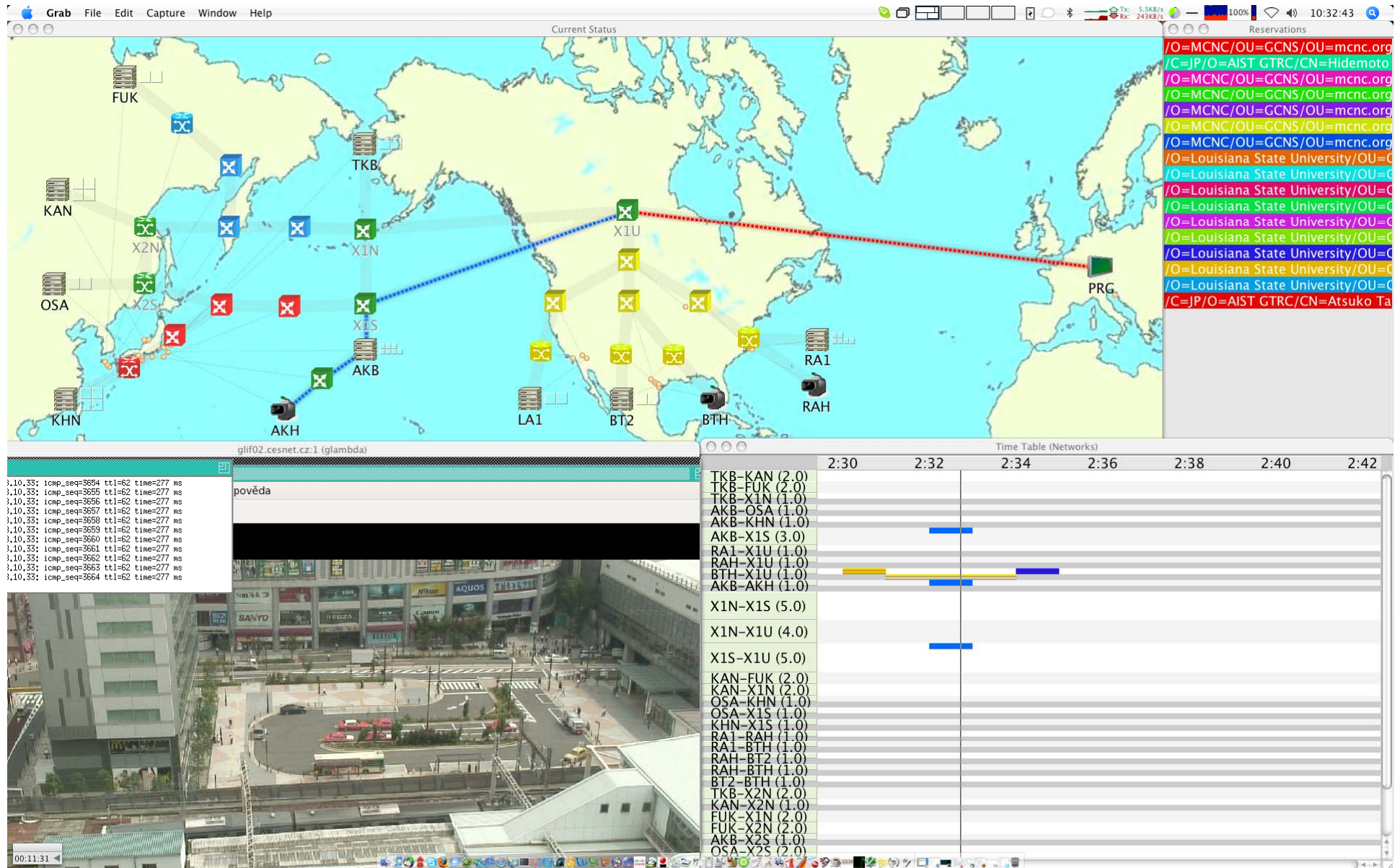


G- **lambda** project and GNS-WSI

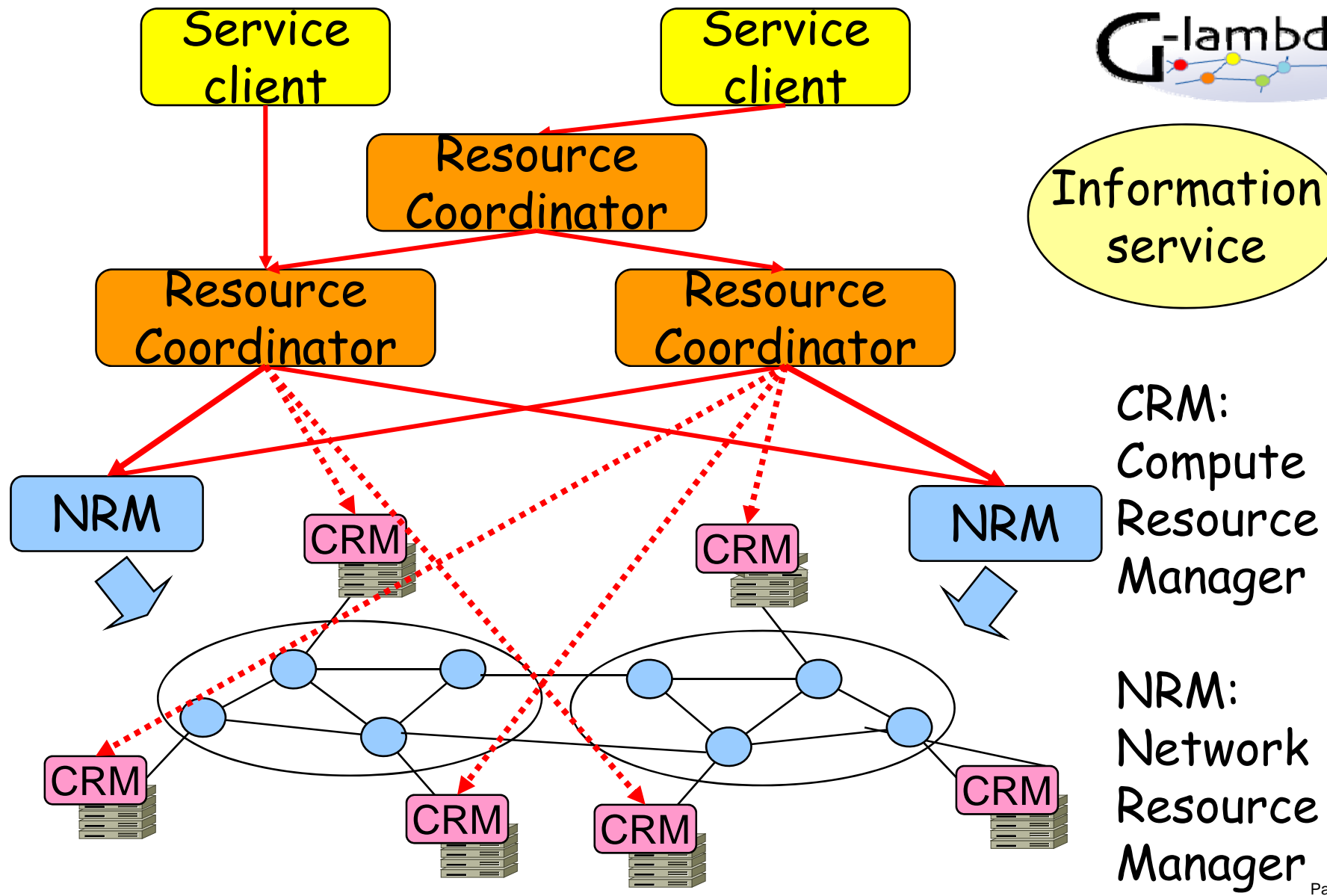


- G-lambda project
 - Joint project of KDDI R&D labs., NTT, NICT and AIST.
 - Started in December 2004.
 - Objective is to define and promote an interface called GNS-WS
- GNS-WSI
 - Grid Network Service / Web Services Interface
 - An interface to **reserve bandwidth between end points**
 - Unified interface for other resources such as computers
 - A **standard web services interface** between resource coordinators and network resource managers
 - Assume network services **provided by network operators.**
 - Used in the GLIF2006/GLIF2007 demo with EnLIGHTened computing project

GLIF2007 G-lambda/EnLIGHTened demo screenshot



G-lambda architecture



Design choices of network services: G-lambda

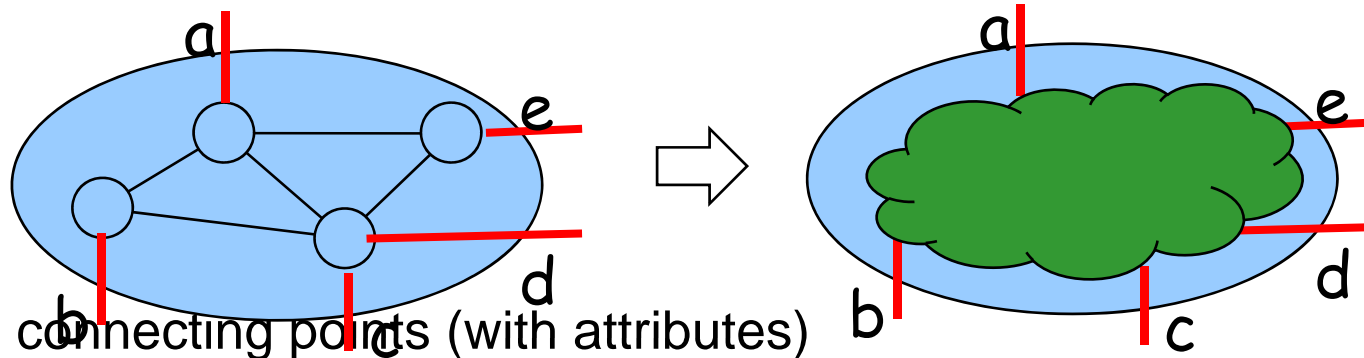
- Supported resources: Network only service / Unified service for all resources (computers, storages)
- Domain model: Chain / Hierarchical
- Initiator of a request: End node / Upper layer software component
- Path activation of reserved BW: Explicit (CP or WS) / Automatic
- Topology information: Exchange among domains / Information services
- Policy: No policy / Policy-based
- Monitoring: Independent / Integrated to IS
- Grid derived technologies: No (SSL, plain-WS) / Yes (GSI, WSRF)

Requirements for network description

- “path” is a guaranteed bandwidth between end-points
 - Implementation of a path can be:
 - L1,L2,L3, VLAN, MPLS / lambda (true-lambda, TDM...), QoS based sub-lambda etc.
- NML usage
 - path discovery
 - monitoring

Requirements for network description (cont.)

- Path discovery requirements
 - Support of abstracted representation



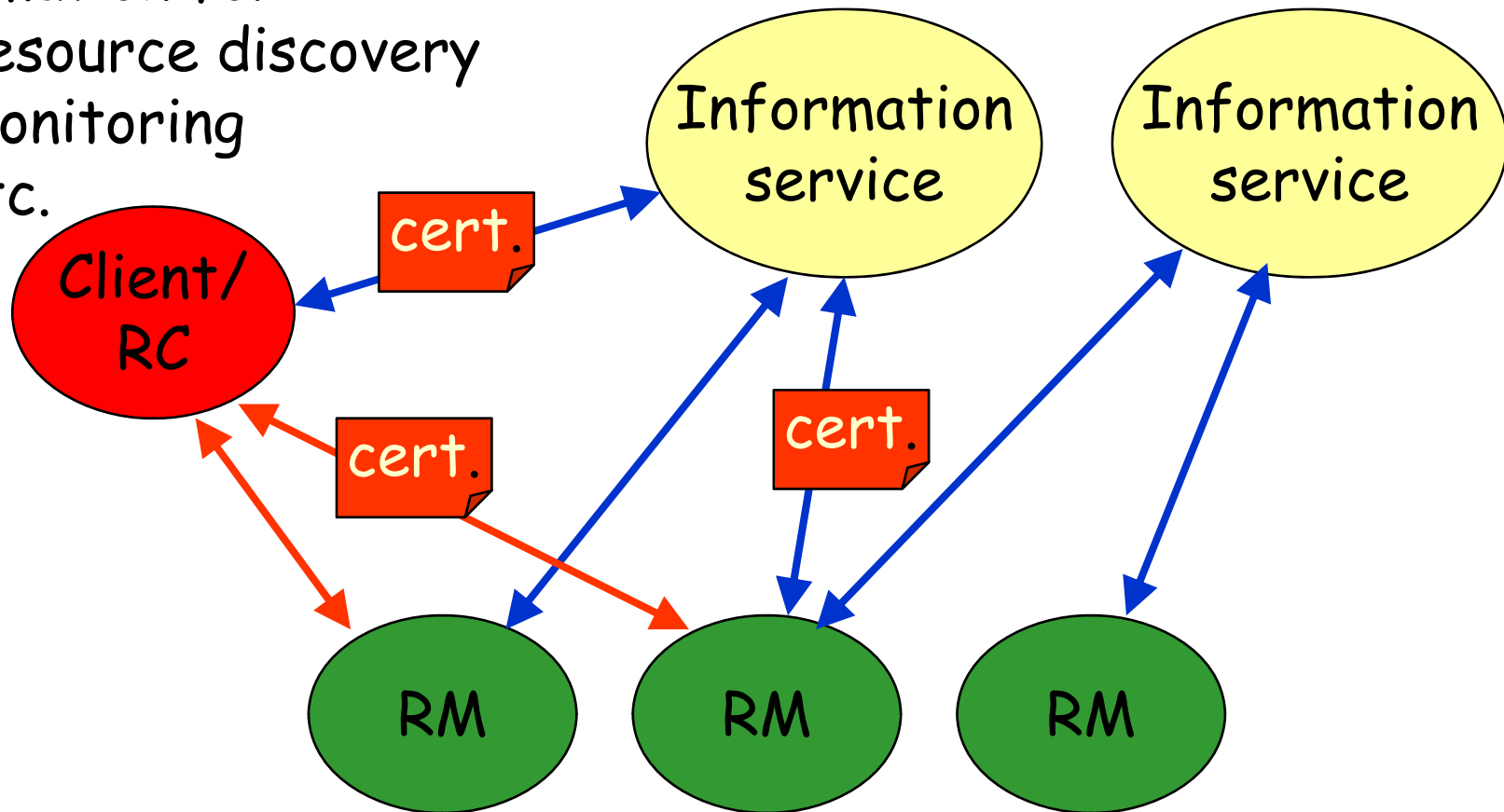
- possible bandwidth between connecting points (some of them may be exclusive)
- Policy based topology advertisement
 - The information provided to a particular client is decided based on policy (i.e. contract with that client)
- Information of supported ids: VLAN, IP addresses, (G)MPLS ...
 - Ids are resources: to be selected from the upper layer component
- monitoring requirements:
 - policy based monitoring

G-lambda information service model



Information for

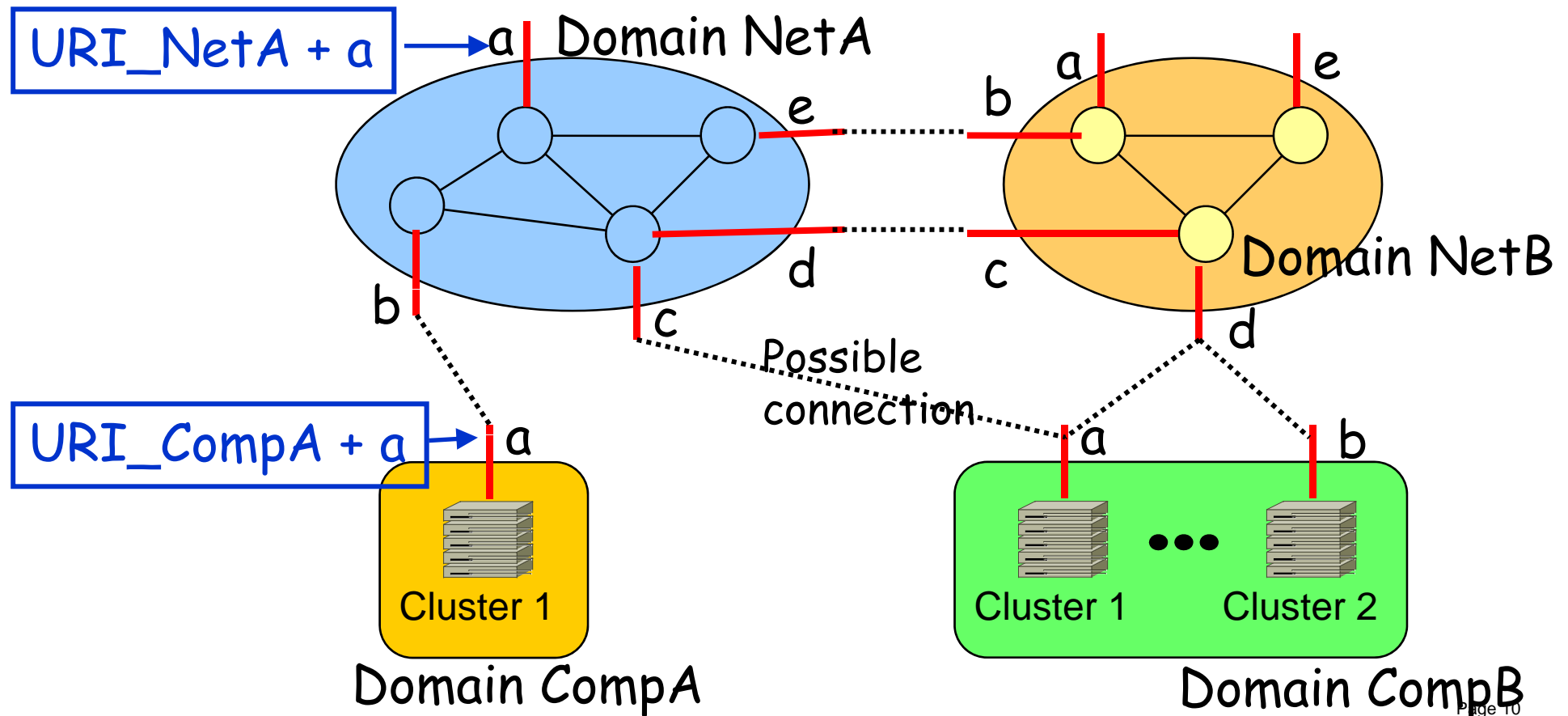
- Resource discovery
- Monitoring
- etc.



Resource managers provide their information directly to a client or via IS according to their own policy.

Naming scheme of end points

- Each domain has its own URI (Uniform Resource Identifier)
- End point id: domain URI + id (which is unique in the domain)



Finding a path

- Lookup domains which have required resources by accessing Information Service (directory)
- Query to CompA (directly or via IS):
 - End point name of available resource : $\text{URI_CompA} + a$
 - Attribute of $\text{URI_CompA} + a$: media type, bandwidth, possible pairing counterpart ($\text{URI_NetA} + b$)
- Query to CompB
 - End point name: $\text{URI_CompB} + b$
 - Attribute including counterpart ($\text{URI_NetB} + d$)
- Query to NetA and NetB
 - Possible pairs of endpoints to connect ($\text{URL_NetA} + b$) and ($\text{URL_NetB} + b$)

