



Enabling Grids for
E-science in Europe

www.eu-egee.org

TF-NGN Meeting

University of Amsterdam

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JRA4 Overview

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- EGEE brief description
- Network Resource Provision (SA2)
- Network Services Development (JRA4)
 - Objectives & Architecture
 - Bandwidth Allocation and Reservation
 - Network Performance Monitoring
 - IPv6 uptake



EGEE Activity Areas

- **Services**
 - Deliver “**production level**” grid services (manageable, robust, resilient to failure)
- **Middleware**
 - Grid middleware re-engineering activity in support of the production services
- **Networking**
 - Proactively market Grid services to new research communities in academia and industry
 - Provide necessary education



- **EGEE includes 11 activities**
- **Services**
 - **SA1:** Grid Operations, Support and Management
 - **SA2:** Network Resource Provision
- **Middleware (Joint Research)**
 - **JRA1:** Middleware Engineering and Integration
 - **JRA2:** Quality Assurance
 - **JRA3:** Security
 - **JRA4:** Network Services Development
- **Networking**
 - **NA1:** Management
 - **NA2:** Dissemination and Outreach
 - **NA3:** User Training and Education
 - **NA4:** Application Identification and Support
 - **NA5:** Policy and International Cooperation

Equivalent EDG Work Packages / Groups

WP6

WP7

WP1-5 & 6

QAG

Security Group

WP7

WP12

WP11

WP11

WP8-10

?

Network Resource Provision (SA2)

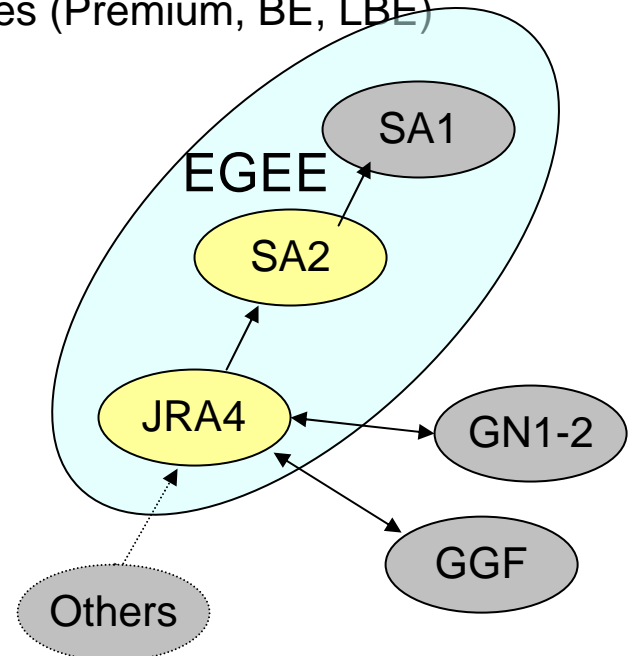
- Definition of network services through standard processes:
 - **Gather of Service Level Request (SLR)** from end users and applications
 - **Definition of Service Level Specifications (SLSs)** by SA2, to be implemented by GEANT and the NRENs, in conjunction with JRA4 activity
 - **Signature of Service Level Agreement (SLAs)** between applications, SA2 and GEANT/NRENs
- Study of Network Operation Centres (NOCs) procedures on GEANT and selected NRENS and incremental integration with EGEE Grid Operations Centers (GOCs).
- Outside the EGEE scope to provide connections for any user or resource site
 - Sites must have adequate bandwidth & performance to join the production grid facility
- Go beyond existing best effort IP service to meet the needs of a production level grid network

Network Service Development (JRA4) Tasks and Context

- **Main sub-activities:**
 - Bandwidth Allocation and Reservation
 - Network Performance Monitoring and Diagnostic tools
 - IPv6 uptake
- **DANTE already deploying basic infrastructure in GEANT (current GN1 and the coming GN2 projects):**
 - Introduction of Layer 3 differentiated services (Premium, BE, LBE)
 - Instrumentation for network measurement

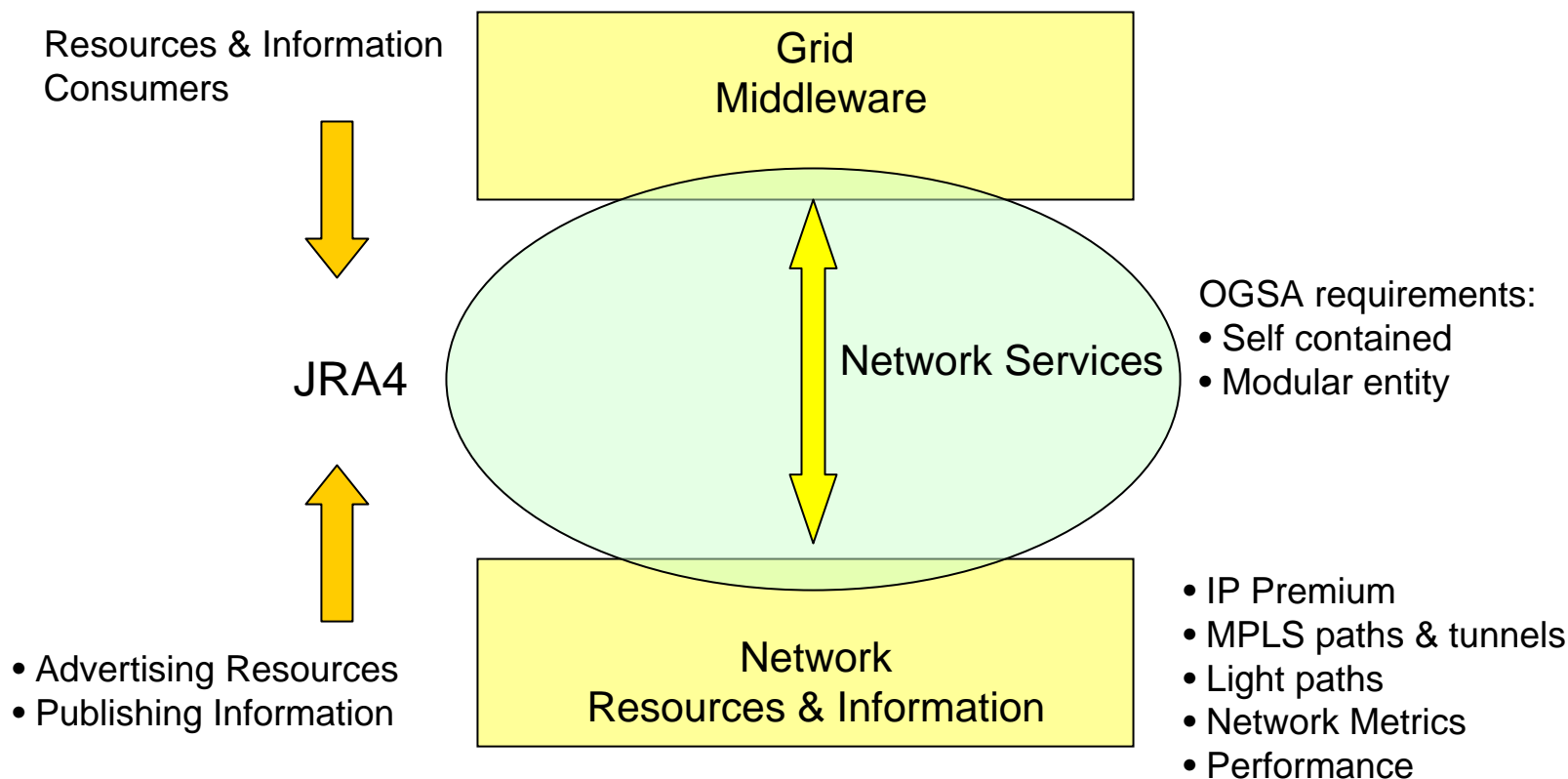
- **JRA4 Partners**

- UCL
- CNRS / UREC
- DANTE
- DFN
- GARR

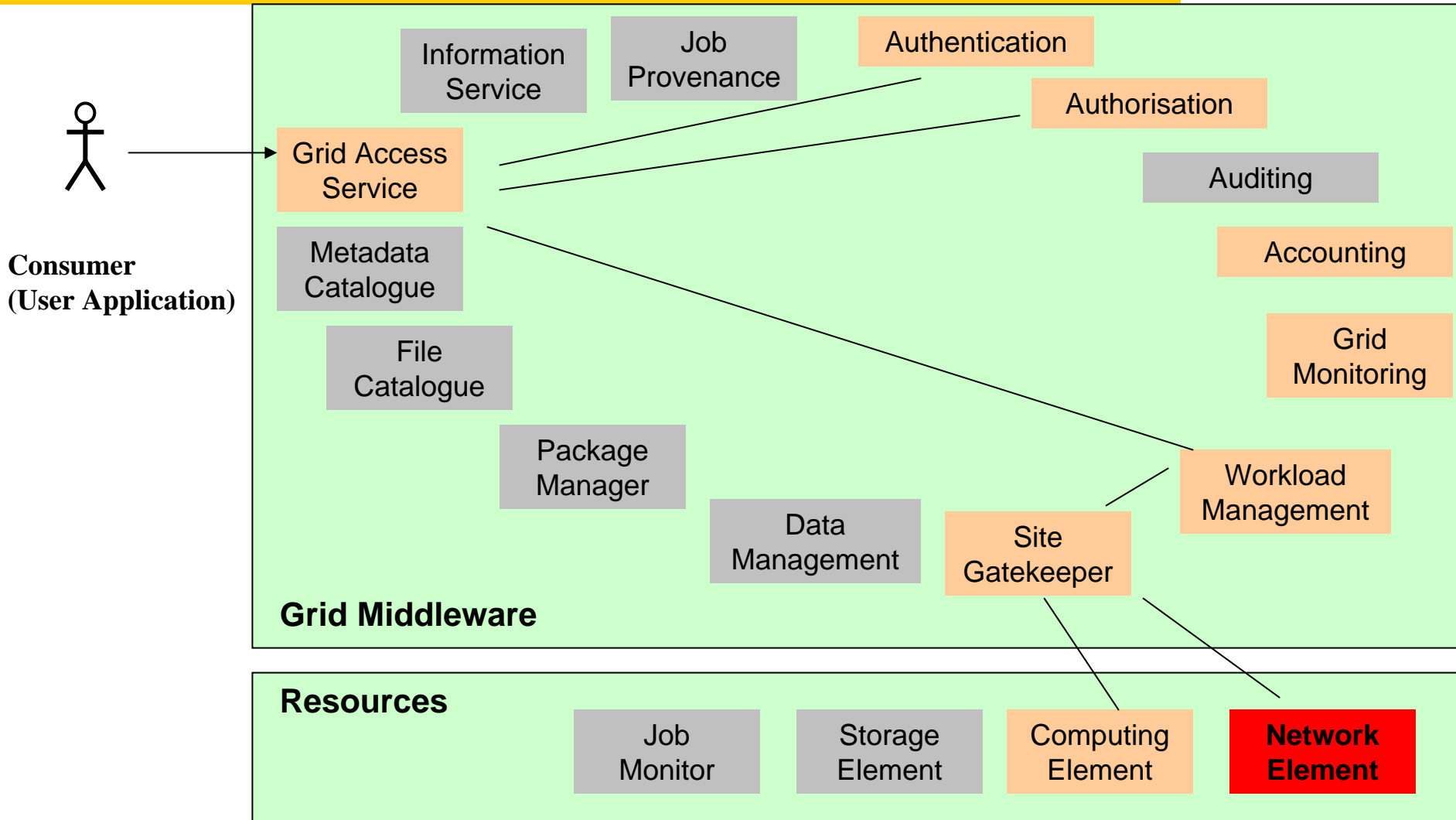


JRA4 Objectives

JRA4 will provide common interfaces between Grid middleware and Network Resources



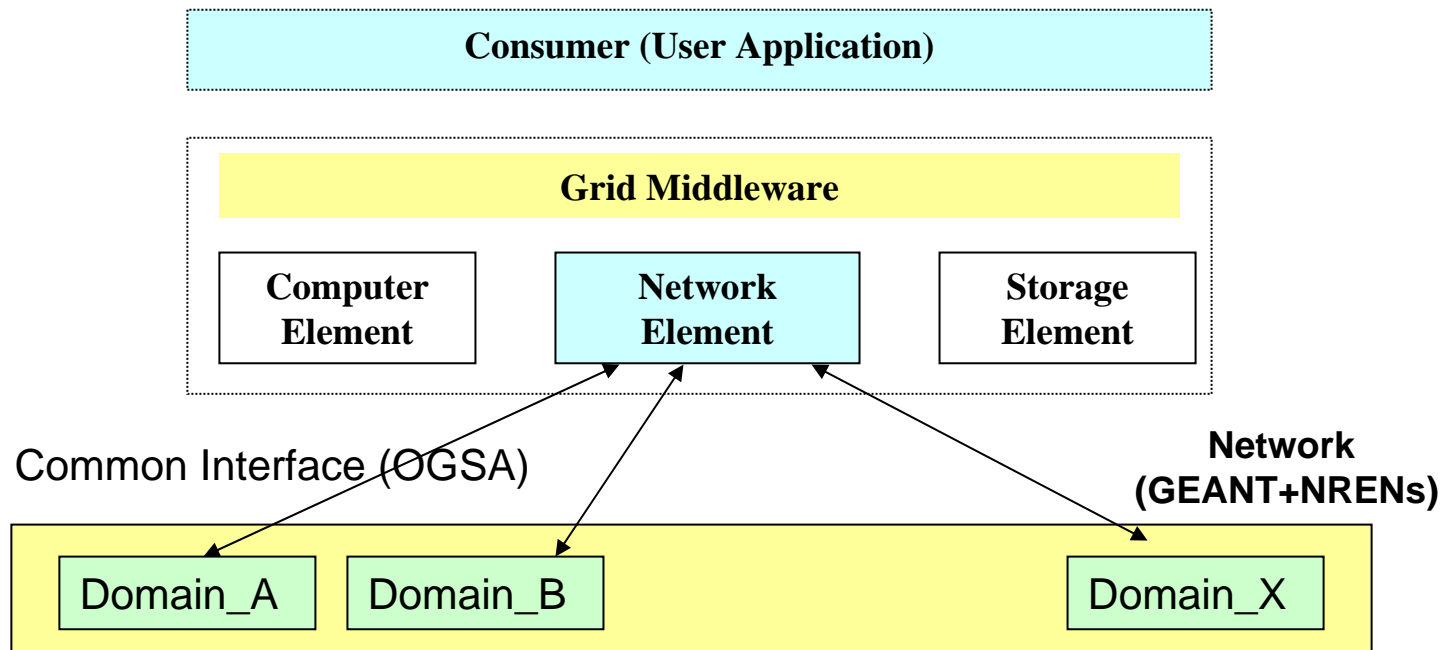
Middleware Architecture



- Network Resources:
 - Layer 3 - diffserv based traffic: IP Premium, Scavenger, ...
 - Layer 2 : VLAN, MPLS
 - Layer 1 : lightpaths
- Allocating network resources :
 - immediate
 - advance
- Features:
 - Multiple domains
 - Users as part of Virtual Organizations
 - Authentication, Authorization and Accounting of end users
 - Policy derived from SLA (input from SA2 – Geant, NRENs)

Bandwidth Allocation & Reservation

- It needs to be integrated in the Generic Middleware architecture.
- The Network Element needs to be spread across different administrative domains

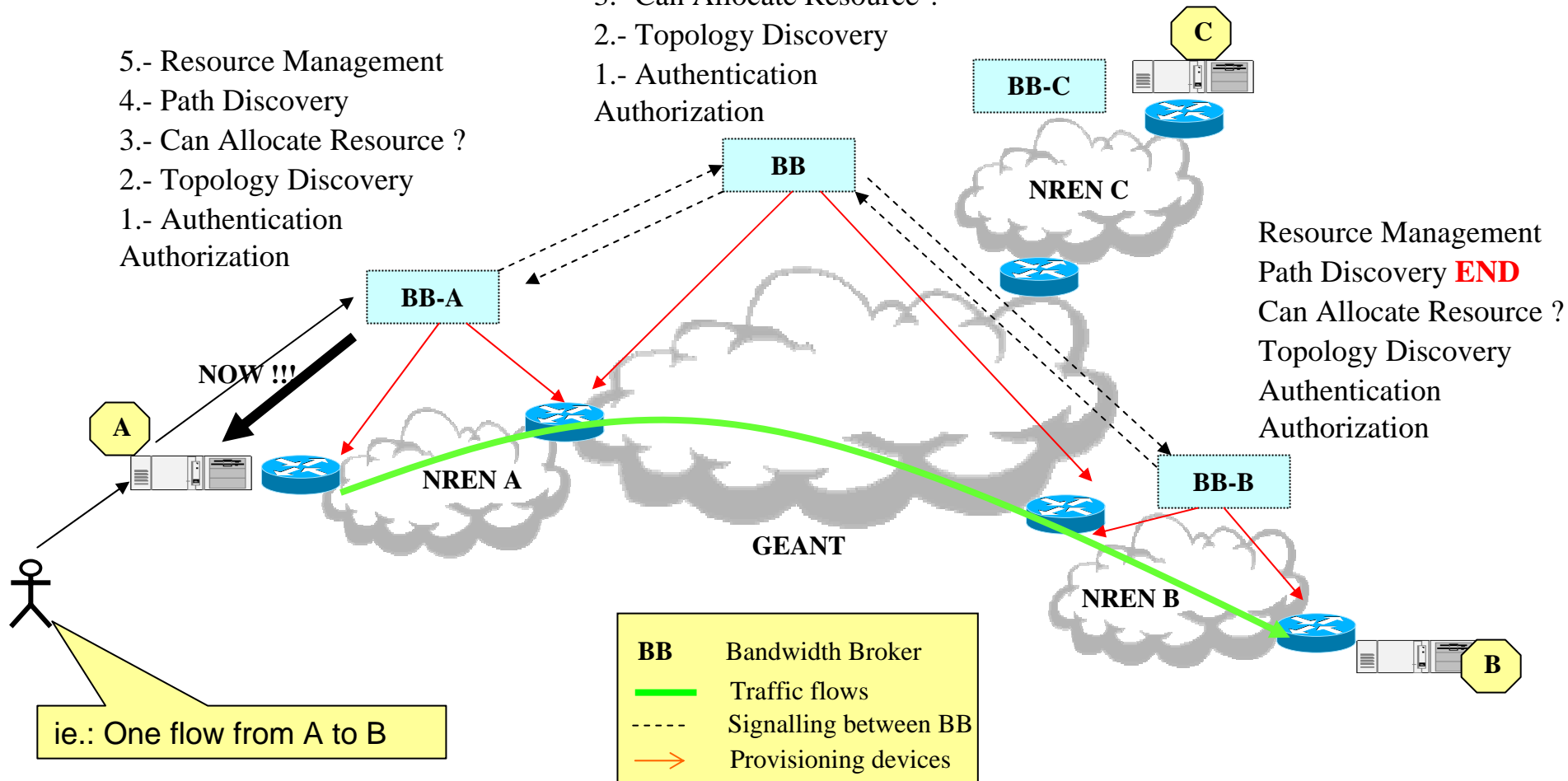


Bandwidth Allocation & Reservation

- 5.- Resource Management
- 4.- Path Discovery
- 3.- Can Allocate Resource ?
- 2.- Topology Discovery
- 1.- Authentication
Authorization

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- Resource Management
- Path Discovery **END**
- Can Allocate Resource ?
- Topology Discovery
- Authentication
- Authorization

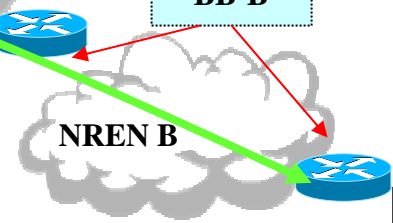
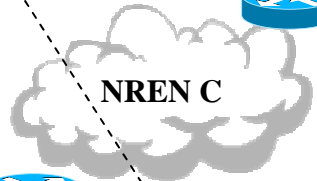
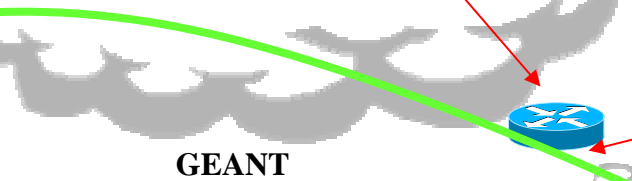
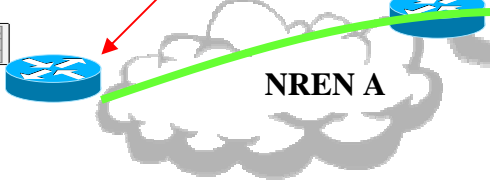
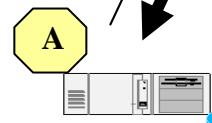
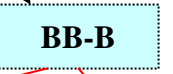
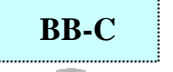
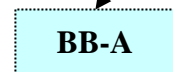


Bandwidth Allocation & Reservation

2.- Path Discovery
1.- Authentication
Authorization

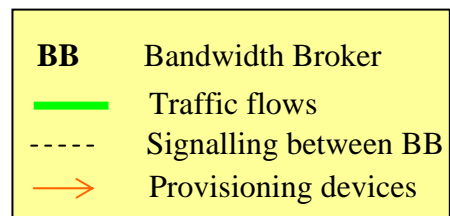


NOW !!!



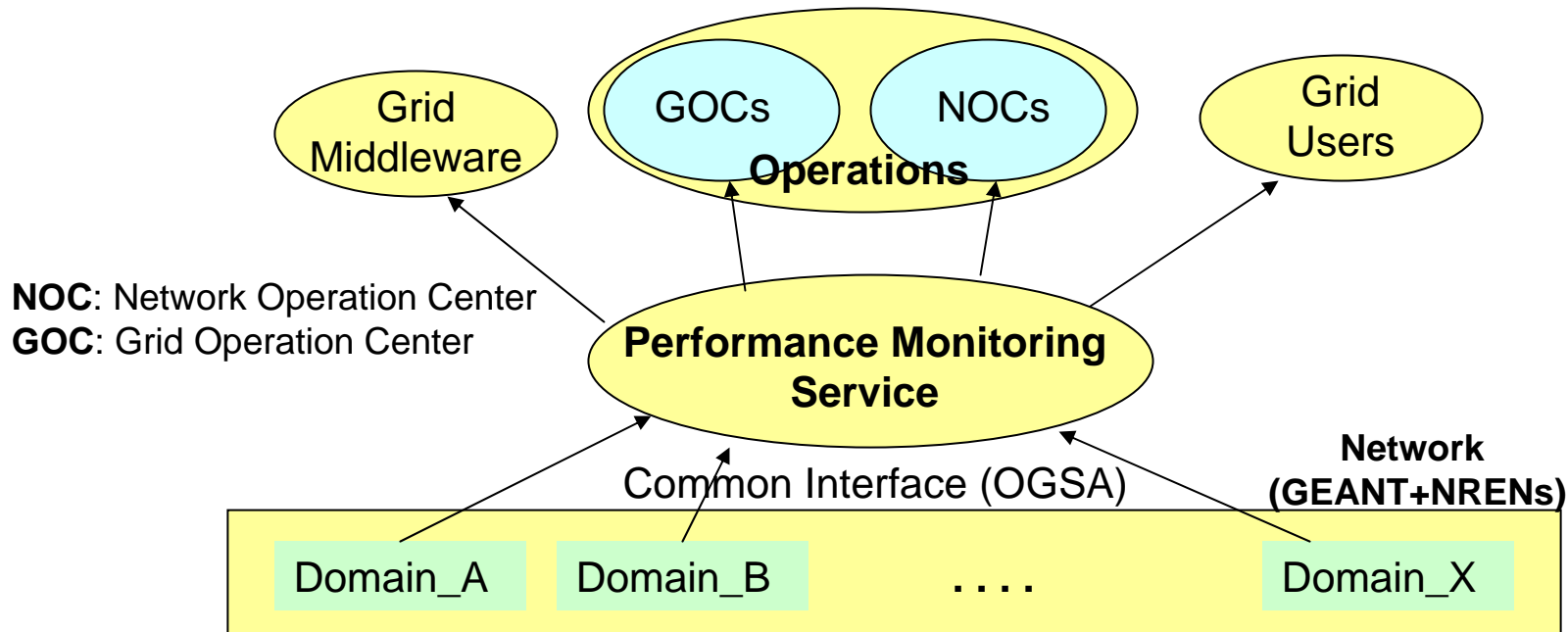
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3.- Can Allocate Resource ?
2.- Topology Discovery
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ie.: One flow from A to B

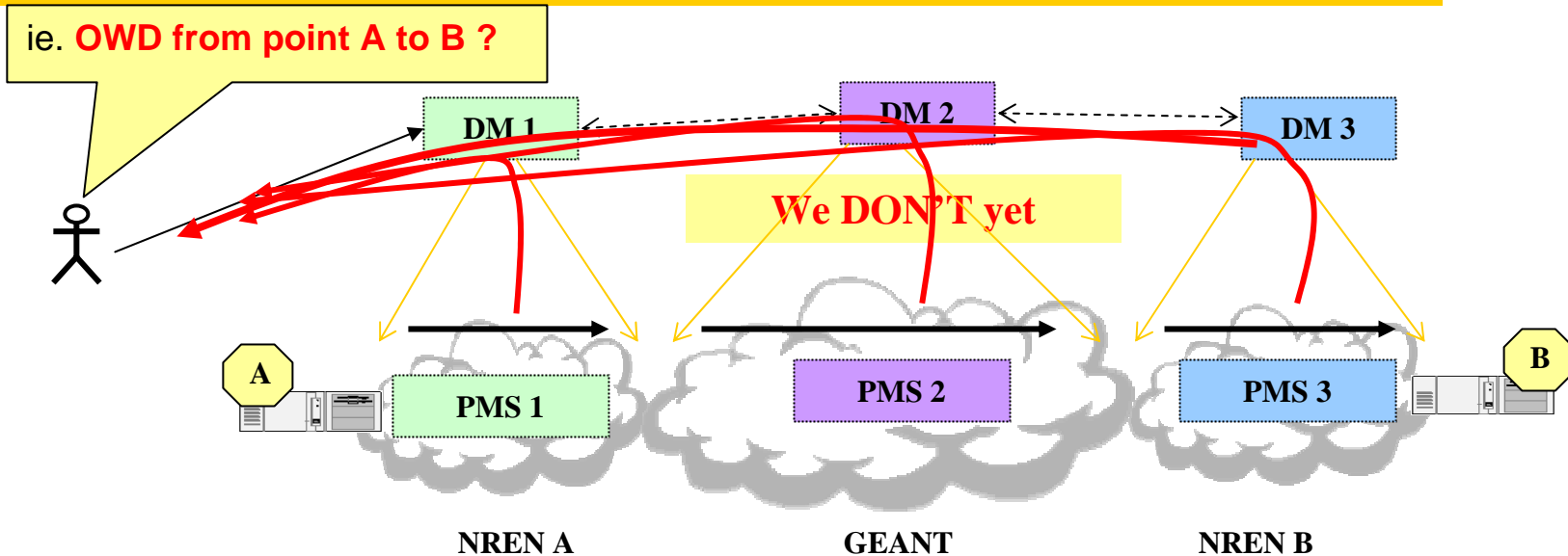


Network Performance Monitoring

- **Grid Performance** closely linked to **Network Performance**
- **Network Performance?, what for? :**
 - Problem diagnostic and rectification
 - Facilitate resources allocation
 - Performance monitoring and SLA adherence



Net. Perf. Monitoring: Use case example

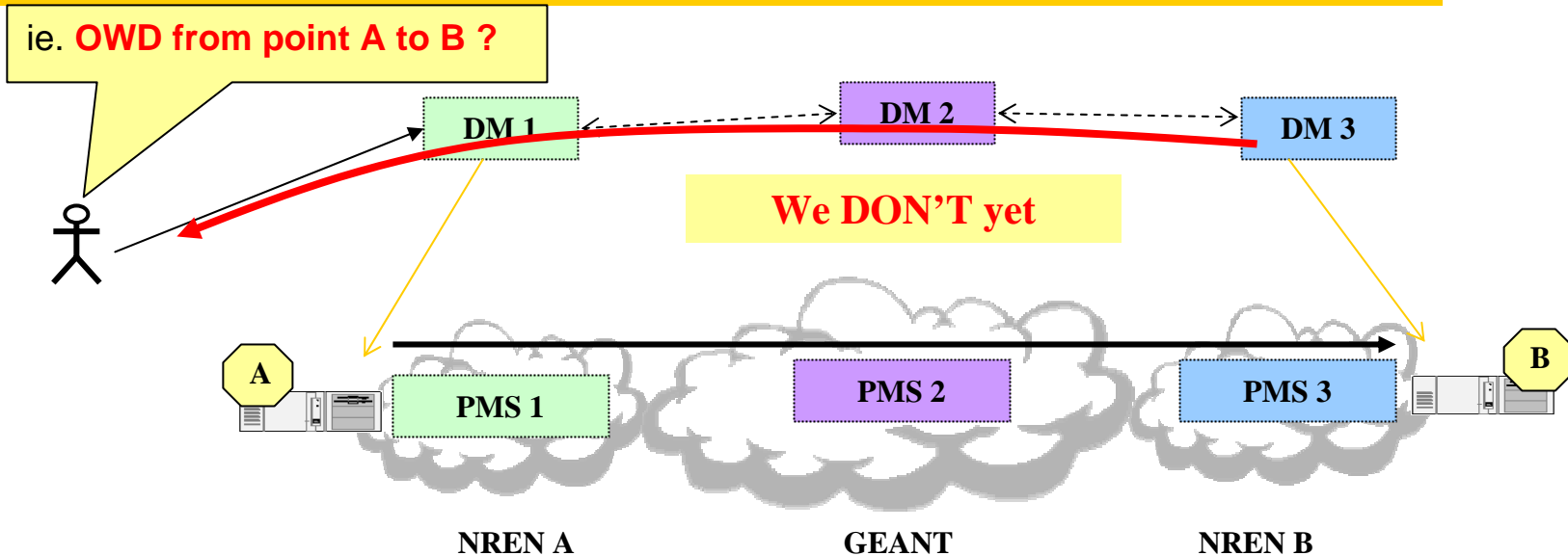


$$\text{OWD} = \text{OWD1} + \text{OWD2} + \text{OWD3}$$

- PMSx and DMx
 - Are independent implementation for the measurements
- Features
 - Multiple domains, AAA, OGSA/OGSI

DM	Domain Manager
PMS	Performance Monitoring System
-----	Signalling between DM
→	Request of Measurement

Net. Perf. Monitoring: Use case example



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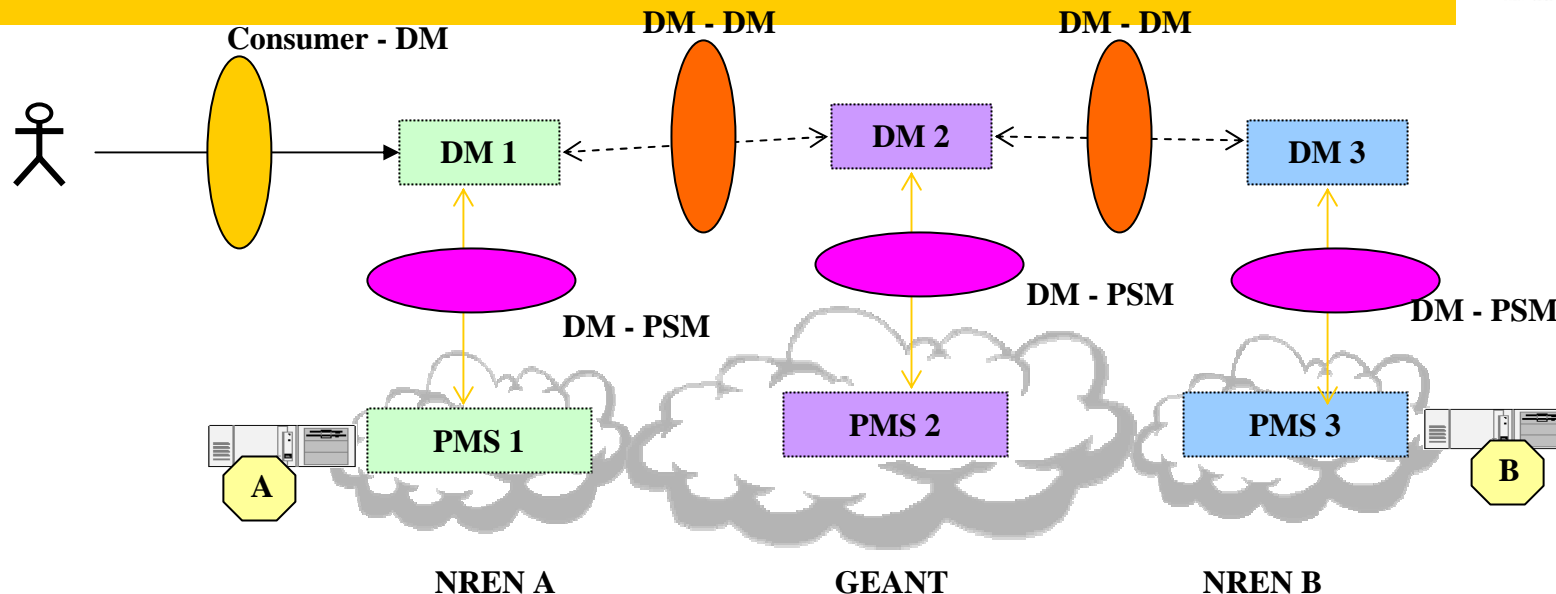
$$\text{OWD} = \text{OWD}_{A-B}$$

- PMSx and DMx
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DM Domain Manager
PMS Performance Monitoring System

----- Signalling between DM
→ Request of Measurement

EGEE: Focus on the Interfaces



- Consumer - DM
 - Consumers such as end-user, operations, middleware
- DM - DM
 - Supporting the multi domain signalling and other services like topology discovery
- DM - PSM
 - Control of the end monitoring resources

DM Domain Manager
PMS Performance Monitoring System

Study of the advantages of using IPv6 in Grid context:

- DANTE deploying IPv6 (already started)
- IPv6 is effective if deployed in all domains

The report will cover:

- Study of features of IPv6, highlighting the ones of interest for Grids
- Availability of IPv6 in NRENs and access networks
- EGEE internal awareness of IPv6

Also:

- Collaboration with 6NET
- Possibility of building a testbed, needs to be agreed

Thank you

<http://www.eu-egee.org>

<http://egee-jra4.web.cern.ch/EGEE-JRA4>