# Introduction to the OMII-Europe session

Sergio Andreozzi, INFN-CNAF, Bologna (Italy)

**EGEE JRA1 All-Hands Meeting**

**21 Feb 2008, Amsterdam, The Netherlands**

# OMII-Europe

- **OMII-Europe:**
  - Open Middleware Infrastructure Institute for Europe
- **EU-funded project**
- **Duration of 2 years**
  - **May 2006 -> April 2008**
- **Contribution of 8M €**
- **Involves 16 partners**
  - 8 EU
  - 4 USA
  - 4 China

# OMII-Europe: Vision and Mission

- **Vision:**
  - e-Science having easy access and use of Grid resources in heterogeneous e-infrastructures crossing national, pan-European and global boundaries

- **Mission:**
  - Enabling of e-infrastructure interoperability by providing standards-based middleware components leveraging existing work and activities

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# OMII-Europe Main Contributions To Standard Adoption

- **OGSA-BES**
  - Functional interface for executing activites
  - CREAM-BES, UNICORE-BES and GLOBUS-BES

- **GLUE**
  - Common definition/representation of Grid entities
  - Definition as OGF standard, reference implementations

- **VOMS-SAML**
  - Functional interface for retrieving user privilege attributes
  - Enabling UNICORE to access VOMS privilege attributes

- **Accounting/RUS**
  - Functional interface for exchanging accounting information
  - Exchanging accounting information across gLite, UNICORE and Globus

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# Today Presenting the Following Outcomes

- **S. Andreozzi**
  - GLUE 2.0

- **Valerio Venturi**
  - VOMS-SAML

- **Paolo Andreeto**
  - CREAM-BES

# GLUE 2.0 – The Specification

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# GLUE 2.0: What

- **An Information Model of Grid entities**
  - Abstract description to be used for
    - **Resource Awareness**
    - **Resource Selection**
    - **Resource Requirements Expression**
    - **High-Level Monitoring**
- **Reference implementations for different concrete data models:**
  - XML Schema, LDAP, SQL
  - more to come upon expression of interest
- **An upcoming OGF proposed recommendation**

# GLUE 2.0: Why

- **GLUE 1.x is adopted mainly by EGEE and OSG**
  - Other approaches exist (see NorduGrid, TeraGrid)
- **The design is based on 5 years old ideas refined through different backwards-compatile updates**
  - Now we have
    - **a valuable expertise**
    - **experience in production environment**
  - Grid middleware evolved
- **Need for a community standard which unifies all the relevant modeling efforts**
  - OGF as the context where to define

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# GLUE 2.0: Where

- **New OGF Working Group approved at OGF 19 (Jan 2007)**

- **Focus:**
  - facilitate interoperability between Grid infrastructures via common information models and reference implementation for describing Grid resources in response to use cases

- **Goal:**
  - define a use case document collecting use cases from different Grid projects/infrastructures
  - define a conceptual model defining the abstract schema GLUE 2.0 satisfying the collected use cases.
  - develop reference implementations
    - **Starting with XML Schema, LDAP, SQL DDL**

- **Unify modeling approaches and experience in production systems**

**http://forge.ogf.org/sf/sfmain/do/viewProject/projects.glue-wg**

# GLUE 2.0: Who

- **Co-chaired by**
  - Sergio Andreozzi (OMII-Europe)
  - Laurence Field (EGEE)
  - Balazs Konya (NorduGrid)
- **Active Participants from**
  - OMII-Europe
  - EGEE
  - ARC
  - TeraGrid
  - UNICORE
  - D-Grid
  - AustralianGrid

# GLUE 2.0: When

- **Mature Draft will be released by the end of this week to be presented and discussed at OGF22**

- **Reference Implementation prototypes available for early evaluation**
  - XML Schema, SQL, LDAP

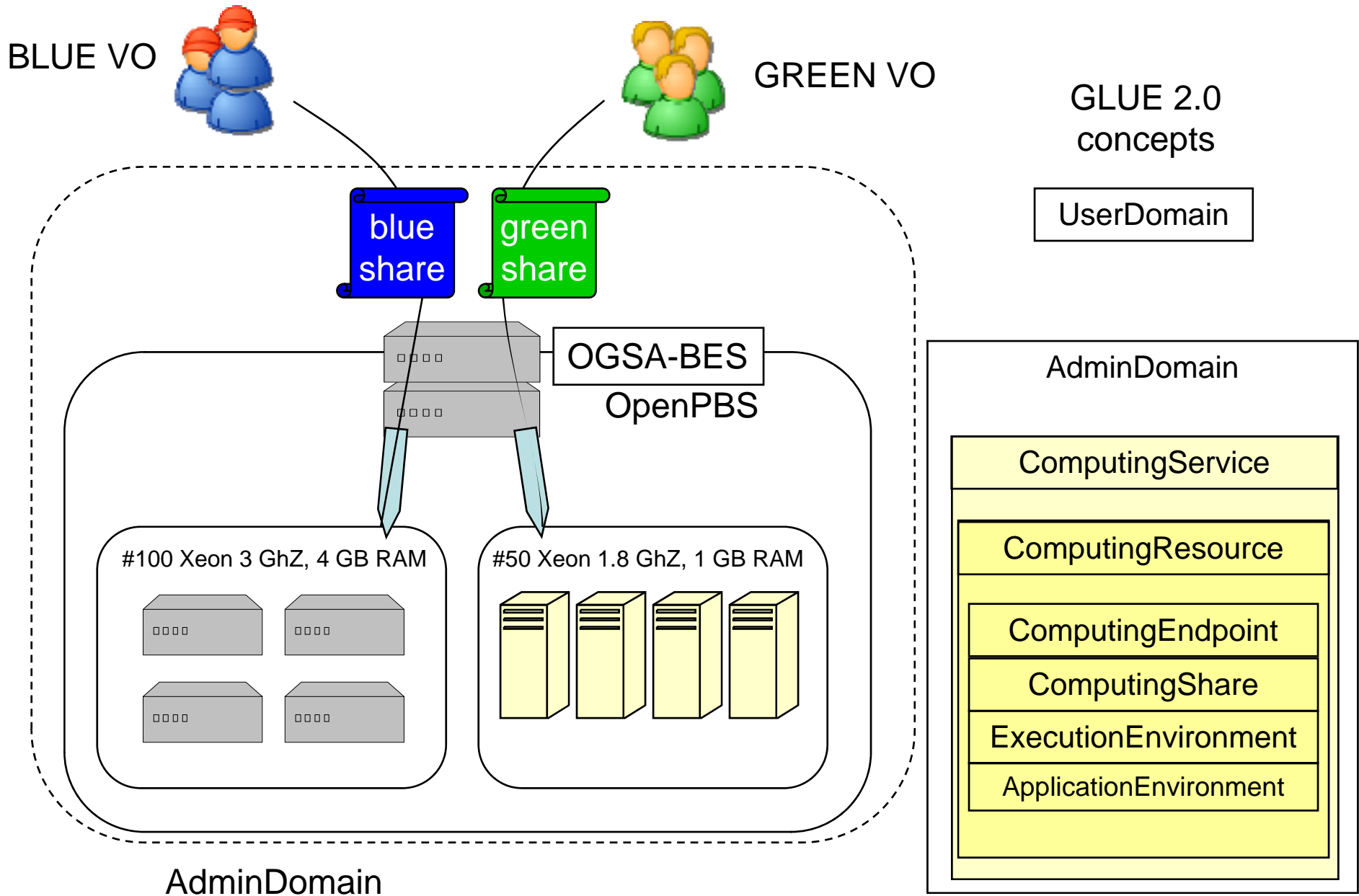- **Plan to go public comment by in following weeks after OGF22**

# GLUE 2.0: Main Ideas

- **Three Main Sub-Models:**
  - Main Entities:
    - **a model of Grid core entities from which service-specific models can be derived**
  - Computing Entities:
    - **a model for Computing Entities**
      - "the old Computing Element"
  - Storage Entitites:
    - **a model for Storage Entitites**
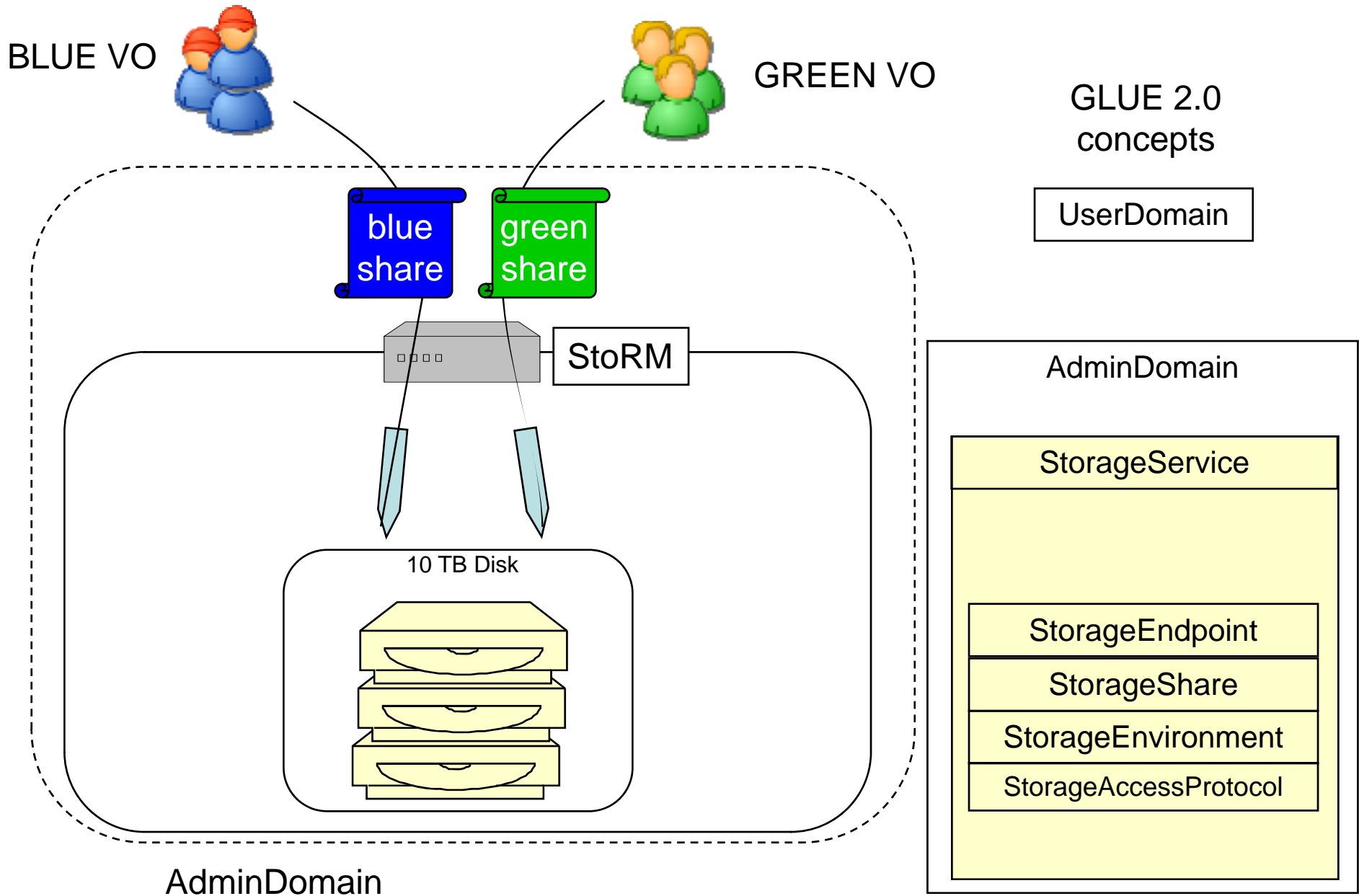      - "the old Storage Element"

# GLUE 2.0: Main Entities

- **UserDomain:**
  - VO or Groups
- **AdminDomain:**
  - People managing resources
  - how to contact, where they are
- **Service: abstract Grid functionality**
  - Endpoint: how to access the functionality
  - Share: utilization target
  - Resource: the underlying entity providing the functionality
- **Policy:**
  - Rule describing the expected behaviour of entitites
  - Type of policies so far:
    - **AccessPolicy, MappingPolicy**
      - Coarse-grained AuthZ related info to be used for pre-selection
      - Needed for Grid systems with no global AuthZ service
    - **SharePolicy**
      - Defines the utilization target

# GLUE 2.0: Computing Entities by Example

BLUE VO

GREEN VO

GLUE 2.0 concepts

blue share

green share

UserDomain

OGSA-BES

OpenPBS

#100 Xeon 3 GhZ, 4 GB RAM

#50 Xeon 1.8 GhZ, 1 GB RAM

AdminDomain

AdminDomain

ComputingService

ComputingResource

ComputingEndpoint

ComputingShare

ExecutionEnvironment

ApplicationEnvironment

# GLUE 2.0: Storage Entities by Example

BLUE VO

GREEN VO

GLUE 2.0 concepts

blue share

green share

StoRM

UserDomain

AdminDomain

10 TB Disk

StorageService

StorageEndpoint

StorageShare

StorageEnvironment

StorageAccessProtocol

AdminDomain

# GLUEMan: A WBEM-based Implementation of GLUE 2.0

Sergio Andreozzi, Michele Carpenè, Marco Canaparo, INFN-CNAF, Bologna (Italy)
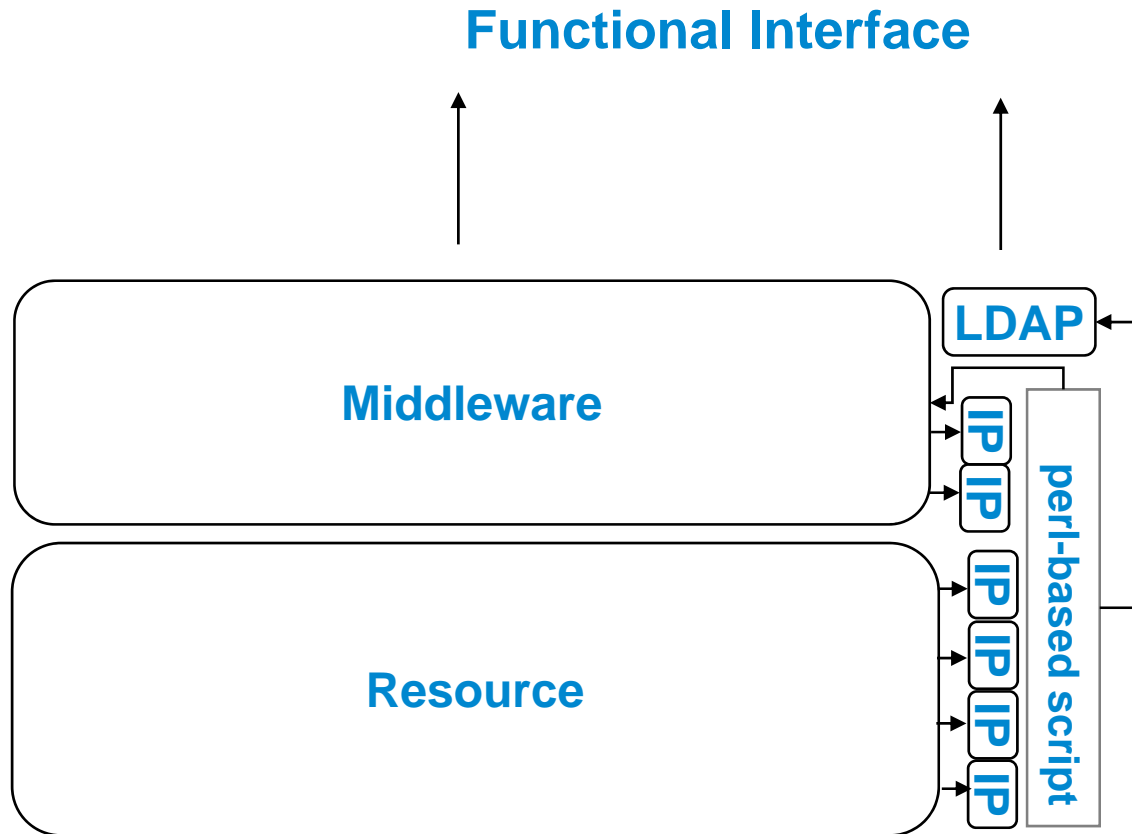
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# What is The Problem

- **We have the GLUE 2.0 Specification and the reference implementations**

- **Grid components MUST be instrumented to**
  - expose GLUE 2.0-based description which is
    - **Conformant with the spec**
    - **Conformant with the renderings**

- **We want to reduce the impact on developers**
  - Reduce concepts and technologies to learn
  - Improve quality of data

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# How Does it Work Today in gLite

**Functional Interface**

**Middleware**

**LDAP**

IP IP

IP IP

**perl-based script**

**Resource**

IP IP IP IP IP IP

- **Pre-WS and WS Interfaces**
- **"out-of-band" information**
  - Information about services and resources is provided by an external publisher (based on OpenLDAP)
- **Situation:**
  - GLUE Schema 1.3
  - IP: Info Provider which output LDIF

# GLUEMan: What

- **A framework to manage information providers for GLUE 2.0**
- **Leverage WBEM technologies:**
  - **a suite of standards for the managing distributed IT resources defined by the DMTF**
- **Based on Open Pegasus**
  - open-source implementation of the DMTF CIM and WBEM standards in C++
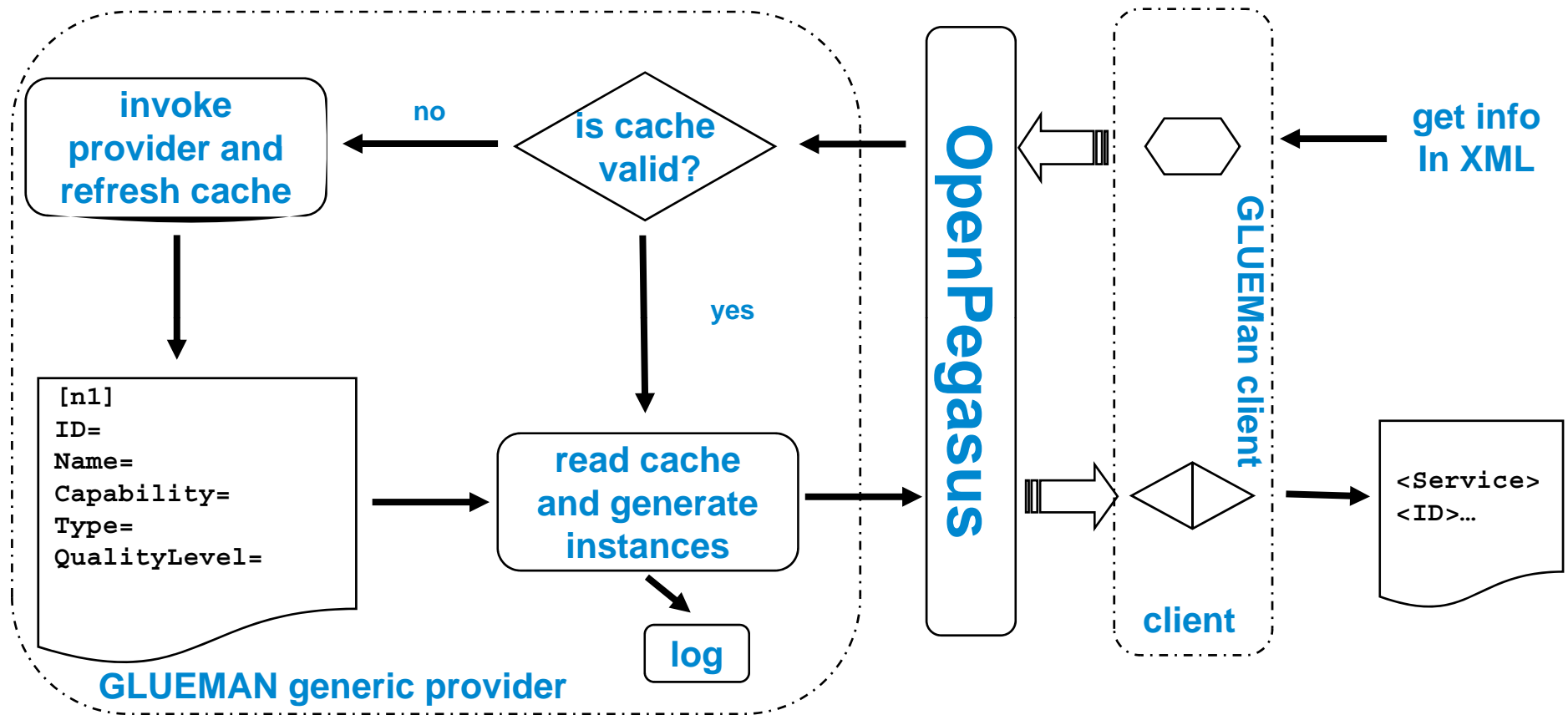  - Industry-supported
  - light-weight

# Identified Requirements

- **General**
  - Isolate provider developers from WBEM-specific details
  - Read-only providers
  - Support any programming languages
  - Reduce intrusiveness
- **Provider**
  - Enforce strong data conformance checking
  - Help in detecting errors about the produced information
  - Easy the writing of configuration-based information
- **Client**
  - Support multiple output renderings
    - **at least XML, LDAP, SQL**
  - Easy the addition of new renderings
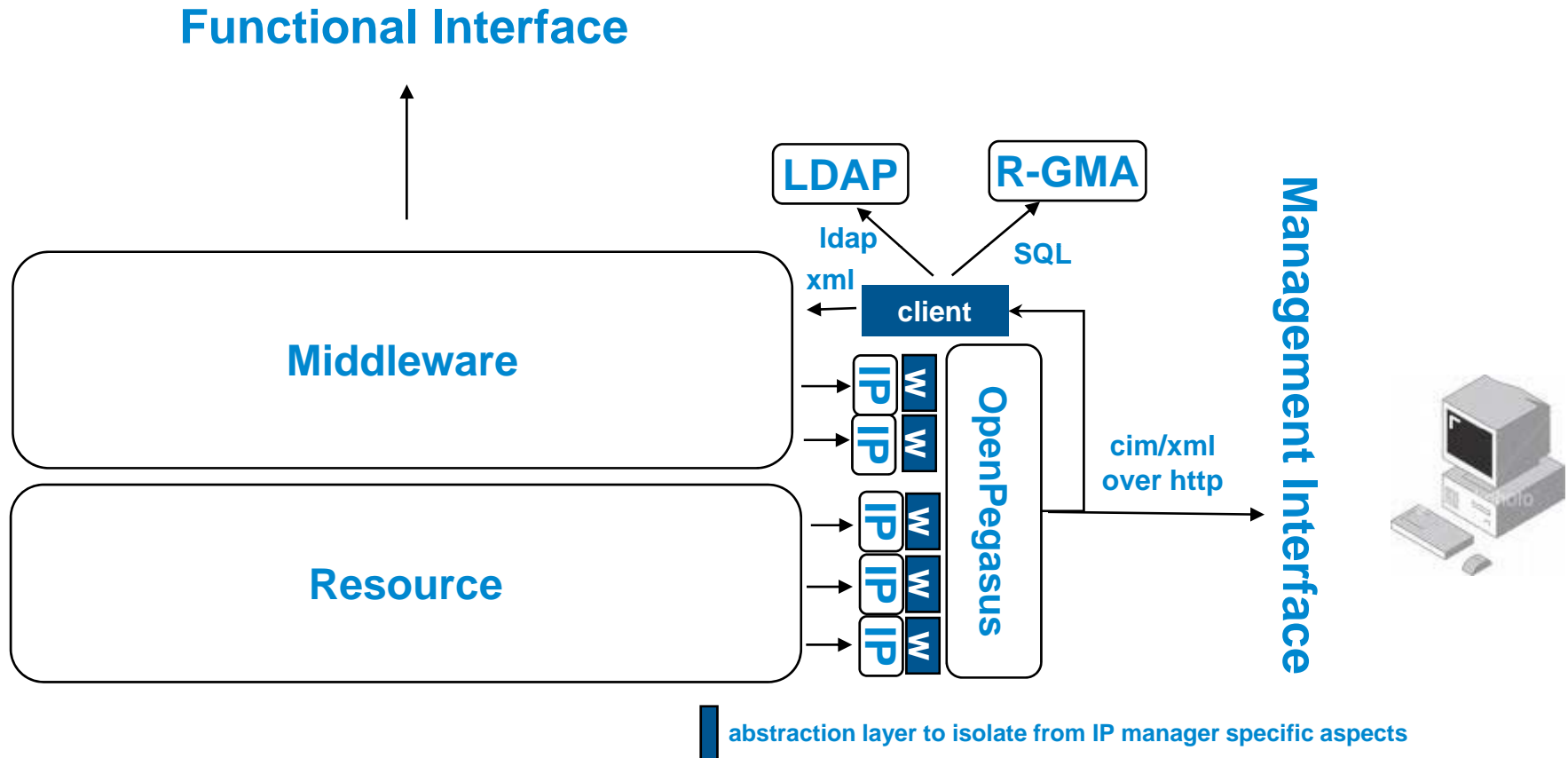
# What a Developer Should Do

- **For each GLUE 2.0 class**
  1. Develop a provider in a language of your choice that writes on stdout instances of that class using the INI format
  2. Edit the class-related configuration file to associate the provider to the related class

- **GLUEMan will take care of**
  - Calling the provider upon request
    - **per-class caching**
  - Parse the INI file and create instances in OpenPegasus
  - From the client side
    - **Render the information in the requested format**
      - XML Schema, SQL, LDAP, ...
  - Log all errors to help the identification of problems

# Simplified Functional View



invoke provider and refresh cache

no

is cache valid?

yes

OpenPegasus

GLUEMan client

get info In XML

```
[n1]
ID=
Name=
Capability=
Type=
QualityLevel=
```

read cache and generate instances

log

GLUEMAN generic provider

client

```
<Service>
<ID>…
```

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GLUEMan    remote    local

EU project: RIO31844-OMII-EUROPE

# Possible Deployment Scenario in gLite

**Functional Interface**

**LDAP**     **R-GMA**

ldap          SQL

xml

client

**Middleware**

IP W
IP IP W

**Resource**

IP W
IP IP W
IP IP W

OpenPegasus

cim/xml over http

**Management Interface**

abstraction layer to isolate from IP manager specific aspects

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EU project: RIO31844-OMII-EUROPE

# GLUEMan Release Milestones

- **Feb2008: Alpha Release**
  - Generic provider written in C++
    - **Support for caching**
  - Client with XML and LDAP rendering aligned to latest GLUE 2.0 draft

- **Apr2008: Beta Release**
  - All foreseen functionalities implemented
  - Aligned with latest GLUE 2.0 Spec (possibly in public comment)
  - Tested integration with
    - **CREAM-BES/UNICORE-BES**
    - **OpenLDAP**
  - Basic suite of providers for PBS/LSF
  - Possibly add SQL rendering

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# Conclusion

- **GLUE 2.0 Spec will enable standard-based information interoperability among different Grid Middleware**
  - The coming weeks will be important for the final version
  - Your feedback is important to detect missing info

- **GLUEMan will simplify and help the development of providers**
  - In March/April, download and play with it,
  - Provide feedback for improving

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# References

- **OMII-Europe Project**
  - http://omii-europe.org
- **JRA2 Activity Wiki**
  - http://omii-europe.forge.cnaf.infn.it/jra2
- **OGF GLUE Working Group**
  - http://forge.ogf.org/sf/sfmain/do/viewProject/projects.glue-wg
- **GLUE 2.0 Specification (latest draft)**
  - http://forge.ogf.org/sf/go/doc14639

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Thank you!!!

Q&A