# Report on GLUE activities and demos

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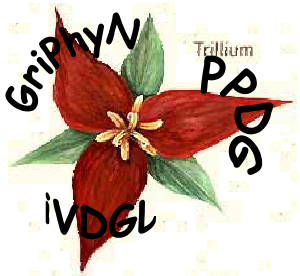
**DataGRID Project Technical Board**
**2 October 2002**



# Summary

- Update on GLUE activities: schema, authorization, packaging
- Deliverable 4.1 Document
- Update on IST2002 and SC2002 joint EU-US demos

**Interoperability : between Grid domains for core grid services, coexistence of optimization/collective services**

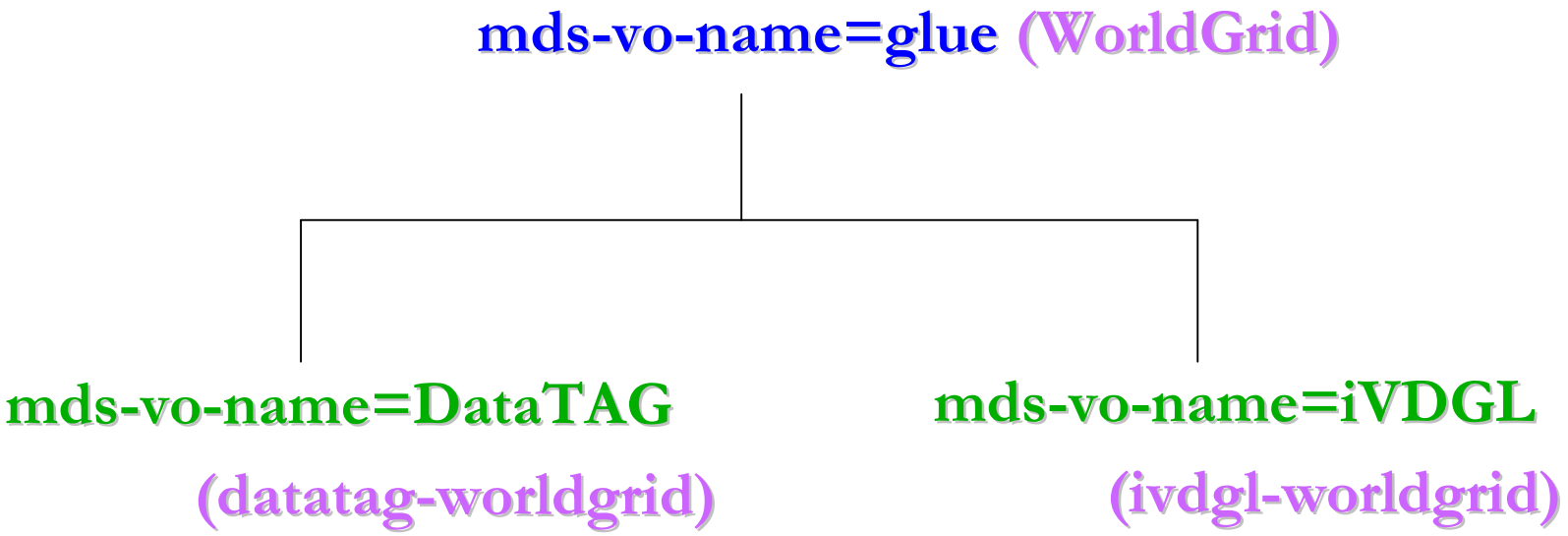
# Resource Discovery and GLUE schema

## Schema implementation status

- CE logical structure **is stable**
- **Minimal SE definition to be approved next Thursday (10/10)**
- **CESE (with static associations) agreed for the first GLUE schema version**
- **Added file system info and schema versioning system**
- **LDAP implementation defined, agreed and released!**
- **Glue Schema is included in Globus MDS 2.2 (delivered on September 23rd 2002)**
- **Globus Info Providers fill the host level info**
- **EDG WP4 Info providers filling Sub-Cluster and CE are working properly. Work in progress.**
- **EDG info providers will be included in VDT.**
- **This implementation can be tested with MDS 2.1**

# Resource Discovery and GLUE schema

## GIIS structure proposal for the GLUE and Worldgrid testbed




- The US side set up the top-level GIIS

# Resource Discovery and GLUE schema

## GLUE Schema testbed on-going activity

- DataTAG machines upgraded to EDG 1.2.2 with MDS 2.1 and Glue Schema v1.0
- Glue Schema v1.0 on US machines. In US MDS 2.2
- GLUE modified RB setup on edt003.cnaf.infn.it
- EDG/WP4 Information Provider installed on DataTAG
- RB Tests in progress. First simple successful submission with one node
- Install SE EDG 1.2.2 and Glue Schema SE v1.0
- EDG Info Providers in VDT

# Resource Discovery and GLUE schema

## People and HW resources

### PEOPLE:

- DataTAG/WP4.2 people : INFN (1.5 fte)


| | | |
|---|---|---|
| Coordinator: | Cristina Vistoli (40%) | - Cristina.Vistoli@cnaf.infn.it |
| INFN CNAF: | Sergio Andreozzi (100%) | - Sergio.Andreozzi@cnaf.infn.it |
| | Vicenzo Ciaschini (20%) | - Vicenzo.Ciaschini@cnaf.infn.it |


### Hardware Resources:

- Local HW at CNAF/Padova
- Local HW at ISI

### iVDGL Contacts:

- B. Tierney, J. Schopf, E. Deelman, C. Kesselman, A. Shoshani

### EDG Contacts:

- M. Sgaravatto, P. Kunstz, J. Gordon, O. Barring

# Authorization services from VO LDAP to VOMS

- **EDG Tools proposed for use to iVDGL collaborators**
  - **VO LDAP server**
  - **VO GroupMAN**
  - **edg-mkgridmap**

  **These tools are now part of the official VDT distribution.**

- **VOMS under study by iVDGL collaborators.**
  - ***VOMS architecture defined***
  - ***agreement on the database structure (MYSQL)***
  - ***agreement on the ACLs for the database administrators***
  - ***data returned contain user's certificate subject plus user' attributes(user's role...) and membership (VO, group, subgroup..) information.***
  - ***the user's attributes and membership are added to the proxy certificate during the proxy creation.***
  - ***software ready and first VOMS server implementation by the end of next week.***

- FNAL – Working on KCA/X509
- Becoming aware of LCAS/LCMAPS

# Authorization services

## People and HW resources

## PEOPLE:

- DataTAG/WP4.2 people : INFN (2.5 fte)

| | | |
|---|---|---|
| Coordinator: | Roberto Cecchini (30%) | - Roberto.Cecchini@fi.infn.it |
| INFN CNAF: | Luca Dell'Agnello (30%) | - Luca.DellAgnello@cnaf.infn.it |
| | Fabio Spataro (100%) | - Fabio.Spataro@cnaf.infn.it |
| | Vicenzo Ciaschini (80%) | - Vicenzo.Ciaschini@cnaf.infn.it |

## Hardware Resources:

- Local HW at CNAF

## iVDGL Contacts:

- Doug Olson

## EDG Contacts:

- Roberto Cecchini

# Common software deployment procedures

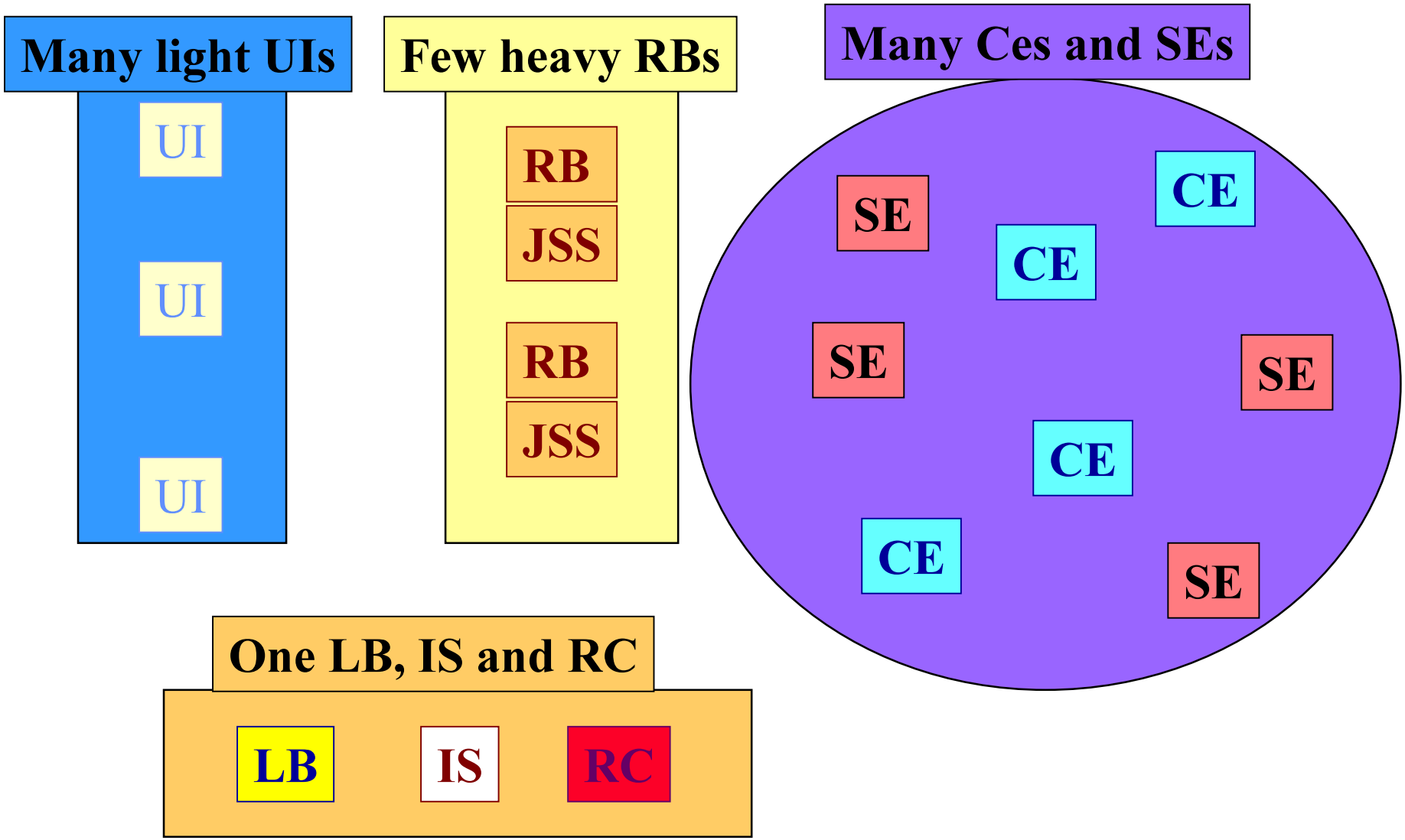
## Goals:

- Contribute to a distribution that:
  - Is EDG and VDT compliant (can be included in VDT/EDG)
  - Includes main EDG and VDT components
  - Allows for interoperation of testbeds
  - Enforces common flexible configuration rules

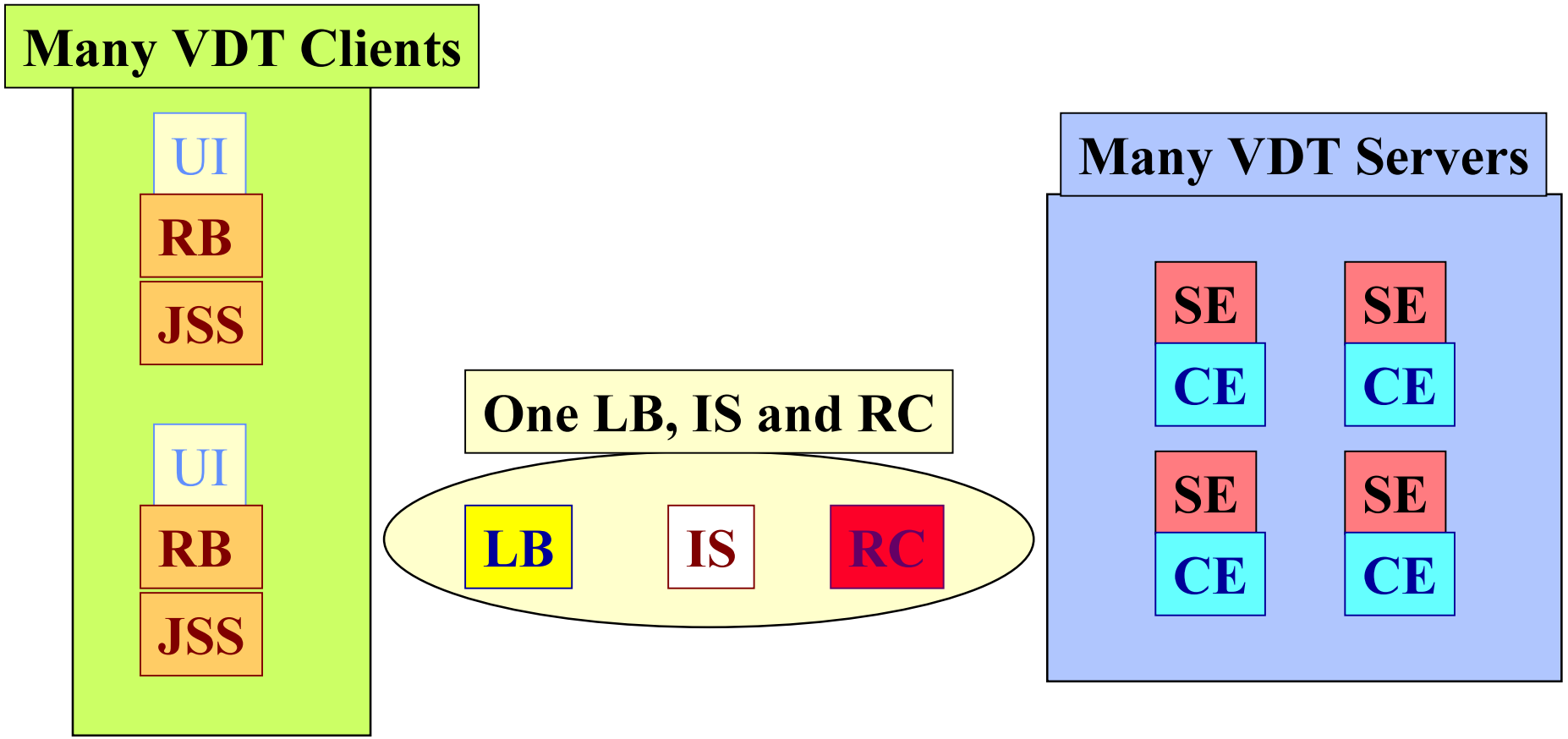
## Intermediate plan:

- Setup a reference software repository for interoperability software.
- This repository should contain the main source tar file from where rpm and pacman files are created.
- The WorldGrid cache contains a fairly stable distribution that can be absorbed by VDT and EDG.
- Other specific repositories: Demos, DataTAG, iVDGL, CMS, ATLAS,…
- Propose a configuration strategy to both VDT and EDG
- Work on a common EDG-VDT versioning strategy
- Try to converge on a “common” distribution tool

# EDG Structure



# VDT Structure



# Common software deployment procedures

## People and HW resources

### PEOPLE:

- DataTAG/WP4.3 people : INFN (1.5 fte)

| | | |
|---|---|---|
| Coordinator: | Flavia Donno (20%) | - Flavia.Donno@pi.infn.it |
| INFN Milano: | David Rebatto (30%) | - David.Rebatto@mi.infn.it |
| | Luca Vaccarossa (50%) | - Luca.Vaccarossa@mi.infn.it |
| INFN Padova: | Sergio Fantinel (50%) | - Sergio.Fantinel@lnl.infn.it |

### Hardware Resources:

- Local HW in Milan
- Local HW in Padova
- HW in US

### iVDGL Contacts:

- Alain Roy, Saul Youseff, Jerry Gieraltowski

### EDG Contacts:

- Enrico Ferro

# Objectives of D4.1

- **The goal of this document is complex:**
  - **Describe the framework of the WP4 activity and the relationships established with projects developing grid middleware such as DataGRID in EU, Griphyn/PPDG and iVDGL (International Virtual-Data Grid Laboratory) in US.**
  - **Introduce the interoperability approach, the requirements and the resulting grid environment design.**
  - **Report on the state of the art of each underlying technology behind the different pillars.**

# FRAMEWORK AND RELATIONSHIPS

- US partner: iVDGL
- Grid middleware:
  - DataGRID Release 1
  - GriPhyN/PPDG → VDT v1
- Programme: GLUE

- Applications:
  - LHC experiments: Alice, Atlas, CMS
  - Virgo (Ligo)
  - CDF, D0, BaBar
- Plan for each experiment

# Interoperability approach

- **Grid services scenario and basic interoperability requirements**
  - Common VO scenario for the experiments in EU and US
  - Set of application-independent mechanisms to ensure basic grid functionality:
    - accessing storage or computing resources in a grid environment requires resource discovery and security mechanisms, requires logic for moving data reliably from place to place, scheduling sets of computational and data movement operations, monitoring the entire system for faults and responding to those faults.
- **Specific Data Grid functionality are built on top of a general basic grid infrastructure.**
- **These basic protocols/services are the basis for interoperability between different grid domains. One implementation of them, representing the de-facto standard for Grid system, is the Globus toolkit, that has been adopted by DataGRID and GriPhyN/PPDG (GRAM,GRIS, GSI).**
- **This situation has certainly facilitated the interoperability approach definition.**

# Grid resources in DataGRID, GriPhyN/PPDG

- The Grid Information Service (GIS) plays a fundamental role in the Data Grid environment, since resource discovery and decision making is based upon the information service infrastructure.
  - An important element of GIS is the schema, representing what makes resource data valuable to Grid tools and applications.
- DataGRID defined its own CE, SE and NE schemas
- Globus (GriPhyN) defined only CE differently
- These schemas (of Globus and DataGRID) are being modified by WP4 and iVDGL as one of the most important parts of the GLUE programme. The future common schemas will describe computing resources in a homogeneous way and will allow easier application development between EU and US grids.

# VO organization and AA management

- VO services are needed to specify user's identifiers for Authentication and Authorization mechanisms, grid access policies, data and metadata file catalogues etc.
- DataGRID is developing a Virtual Organization Membership Service (VOMS) focused on user authorization based on a VO-based management
- whereas the Community Authorization Service, that Globus is developing, is based on the idea of enabling a resource owner to delegate authorization decision to a community representative.
- It has been decided that the VO-based AA management must be based on a minimum set of common services and also this work is part of the GLUE programme agreed with iVDGL.

# User requirements

- **On top of the core services several flavours of grid scheduling, job submission, resource matching and data handling services can be developed. They *must interoperate with the core services* and their *coexistence within the same grid domain*. These services together with sophisticated metadata catalogues, virtual data system etc., are of particular interest for the HEP experiment applications.**

# Grid optimization or collective services

- **State of the art in DataGRID and GriPhyN/PPDG**
  - ***how to schedule***
  - ***how to access  distributed and replicated data***
- **EU-DataGRID and US-GriPhyn/PPDG projects provide different solutions to the above issues as detailed in the document.**

# LHC experiments

- The activity of WP4 has to *focus on what is already deployed and used* by the LHC experiments and their current needs.
- A coordinated plan must be settled to integrate and further develop the current tools (both from GRID Projects and from specific Experiments software) into common solutions.
- *Individual plans were discussed* with each of the experiments and a common strategy developed. High-level requirements and areas of intervention have been identified through many discussions and meetings with all of the LHC Experiments.
- One of the first results is the *dedicated test layouts* to experiment integration of specific components. The goals of each test layout and the results expected have been preliminarily defined and some of the goals have already been achieved.
- There are test layouts for CMS and ATLAS. ALICE has also defined its goals and is rapidly ramping-up.

# Joint EU-US grid demos

IST2002 4-6 November, Copenhagen
SC2002 16-22 November, Baltimore

**Goals:**

- Basic collaboration between European and US grid projects
- Interoperability between grid domains for applications submitted by users from different virtual organizations
- Controlled use of shared resources subject to agreed policy
- Integrated use of heterogeneous resources from iVDGL and EDG testbed domains

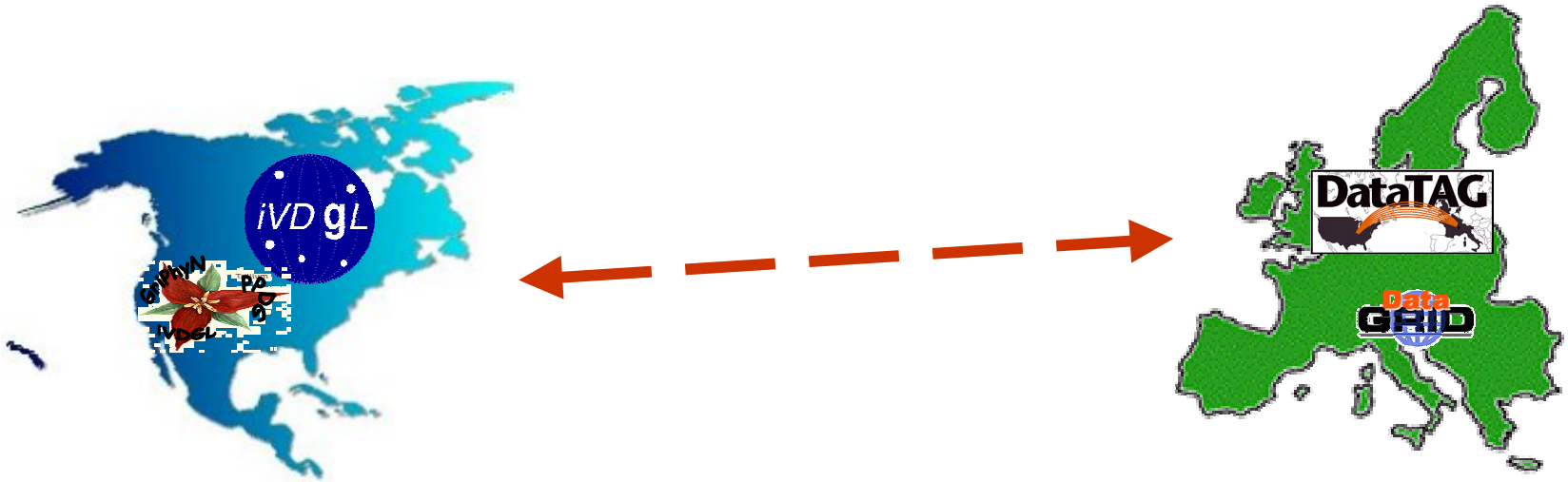
**Infrastructure:**

- WEB site: http://www.ivdgl.org/demo
  - Hypernews: http://atlassw1.phy.bnl.gov/HyperNews/get/intergrid.html
  - Mailing list: igdemo@datagrid.cnr.it
  - Archive: http://web.datagrid.cnr.it/hypermail/archivio/igdemo
- GLUE testbed with common schema
- VO (DataTAG and iVDGL) LDAP Servers in EU and US
- Central Repository with software distribution (DataTAG or iVDGL)
- Planning document outline

# Joint EU-US grid demos

- **Demo testbed with Common GLUE and EDG schema and authorization/authentication tools.**
  - EDG 1.2.2 + extensions (MDS 2.2, GLUE and EDG Information Providers, VDT components), VDT 1.1.3 + extensions (MDS 2.2, GLUE and EDG Information Providers, EDG components)
  - "Old" authentication/authorization tools : VO LDAP servers, mkgridmap, etc
  - We do not rely on the availability of the new GLUE schema, RB and Information Providers
    ***BUT NEW SCHEMA will be used if working***
  - Glue testbed used for monitoring new schema, Demo testbed for real demo applications
- **Concentrate on visualization: CMS/GENIUS, ATLAS/GRAPPA, EDG/MAPCENTER (EDG/WP7), iVDGL/GANGLIA, DataTAG/NAGIOS**
  - Use WEB portals for job submission (CMS/Genius, ATLAS/Grappa)
  - Provide a World Map of the sites involved (EDG-WP7/MapCenter, DataTAG/Nagios)
  - Monitor job status and statistics from WP1 (DataTAG/Nagios, iVDGL/Ganglia).
    In Nagios implemented "top users", "top applications", "total resources", "averages over time", "per VO",…
  - Monitor farms (DataTAG/Nagios)
  - Developing plugins/sensors for WP1/L&B info (only on EDG part)
  - Services Monitoring (DataTAG/Nagios [using MDS info])
- **CMS and ATLAS demo**
  - ATLAS simulation jobs, GRAPPA modified to use both RB or explicit resources
  - Pythia & CMSIM simulation jobs submitted to intercontinental resources with IMPALA/BOSS interfaced to VDT/MOP, EDG/JDL, Genius portal.
  - Definition of the application demos in progress.

# Joint EU-US grid demos




**13 VDT servers**

- **FNAL**
- **University of Chicago**
- **ISI**
- **University of Florida**
- **Boston University**
- **Indiana University**
- **ANL**

**25 CE/SE/WN**

- **Padova**
- **Pisa (UI +RB+II)**
- **Milano**
- **CNAF (RC)**

**Imperial College and Ecole Politecnique are joining CERN ?**

# Joint EU-US grid demos

**Joint Task force in Chicago 23-30 September, 2002 for first DataTAG/iVDGL and ATLAS rehearsal.**

***What has been achieved:***

1. **Identified the software needed to allow for interoperability**
2. **Created common software repository (rpm and pacman) (http://hep.uchicago.edu/worldgrid, http://datatag-packaging.pi.infn.it/vdt_cache/rpms)**
3. **Imposed common tools for grid-mapfile creation/maintenance**
4. **From US and EDG GRAPPA portal submitted ATLAS job on EU/US UI with gatekeeper and executed on EDG production testbed**
5. **From US IMPALA/MOP executed a CMS job on EDT resources**
6. **From EDG UI IMPALA/BOSS executed a CMS job on iVDGL resources**
7. **Installed Globus and EDG Information providers on VDT server**
8. **Started tests with RB and MDS 2.2 Information Index**

# Joint EU-US grid demos

***Problems encountered/suggestions:***

•Heterogeneous environment: OS: FermiLinux 7.1.1, RH7.2, RH6.2, Globus 2.1/2.2

•EDG : Work on installation/configuration issues
- Relocatability (edg-system-util,edg-main-info, edg-mkgridmap, globus)
- Configuration environemnt (edg-info-main not modular)
- Service configuration and startup
- No problems with EDG WP1 and WP2 middleware

• Globus
- Found bug in MDS 2.1/2.2 (in a search if a substring at the end of the line matches, then the entry is returned)
- Not possible to populate database from multiple ldif files
- Changed format of variable in globus-gatekeeper.conf in VDT Server 1.1.3 (Globus 2.0). The EDG Information Providers need to be changed so that GRAMContactString is filled correctly.
- General problems in configure with Globus 2.2
- Interoperability of globus-job-run commands (command hungs if no outbound connectivity)

• Security:
- •Kerberos authentication disabled for both Globus and Monitoring

# Joint EU-US grid demos

***General feeling and impression:***

- Very productive meeting
- People know what to do and what needs to be done
- Good view of the architecture of the demo testbed
- Many tools in place for future work
- Coordination among people
- Working groups in place for testing and validate a site