



The EU DataGrid Testbed

**The European
DataGrid Project Team**

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

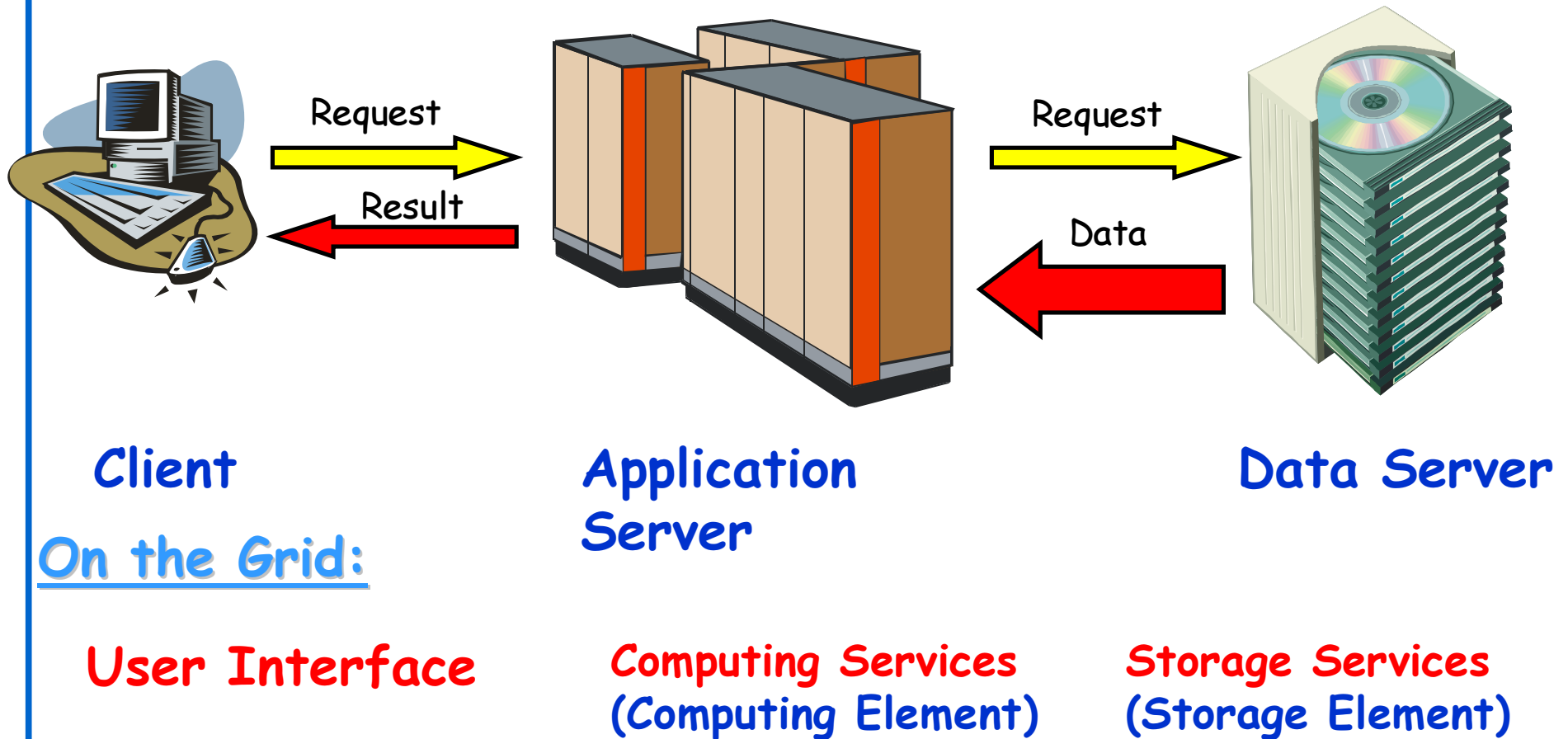




Contents

- ◆ Grid Services
- ◆ Hardware Components of an EDG Testbed
- ◆ Code distribution policy

A 3 Tier Business Architecture



Situation on a Grid



Information Services

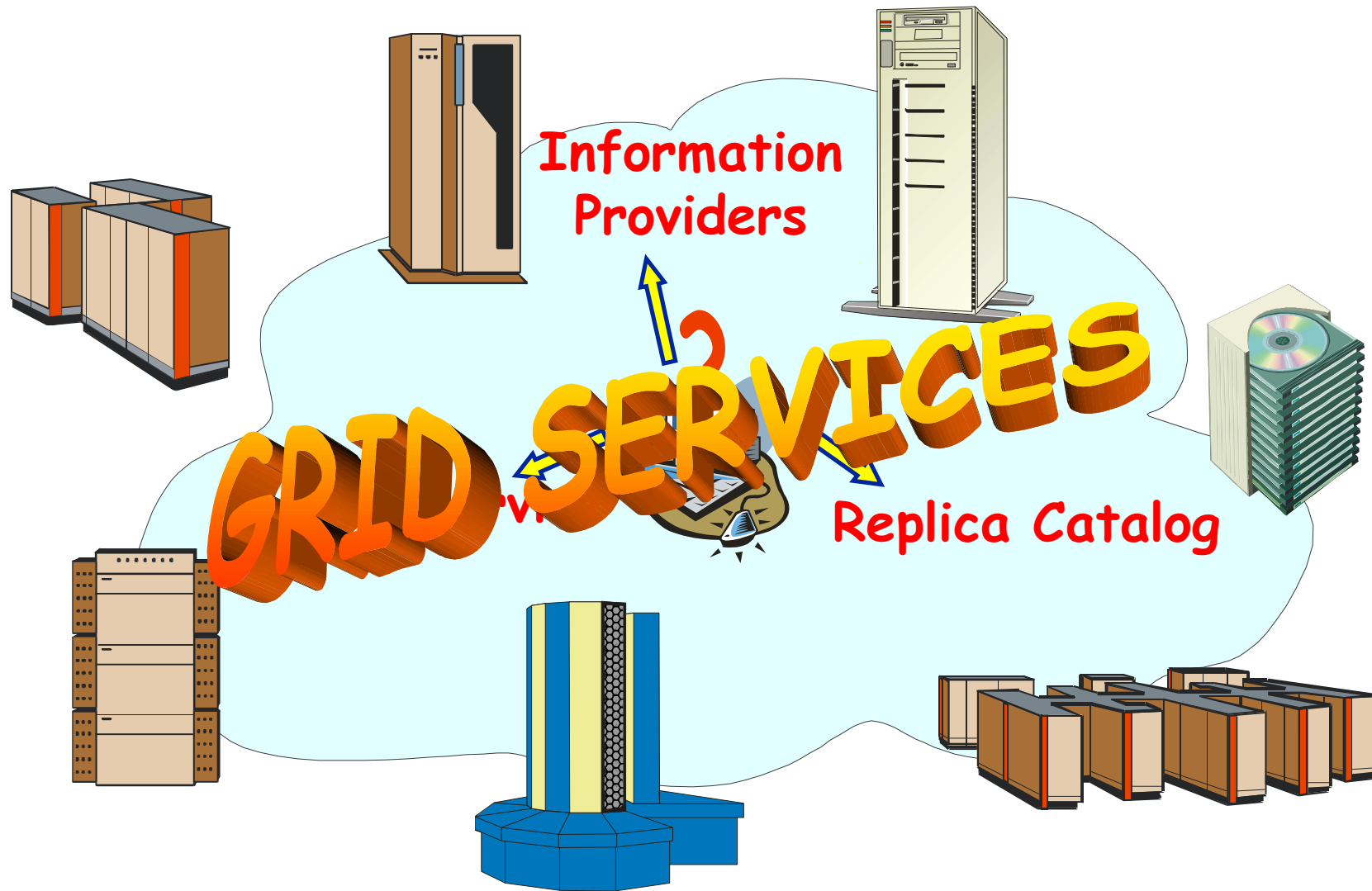


- ◆ Hardware:
 - EDG Information Service
 - Information Providers
- ◆ Data:
 - Replica Catalog
 - LDAP (release 1.4)
 - RLS (release 2.0)
- ◆ Software & Services:
 - EDG Grid Services:
 - Information Service
 - MDS (release 1.4)
 - R-GMA (release 2.0)
 - Application Services:
 - Currently only EDG applications directly supported

Machine Types:

- ◆ Information Service (IS)
 - Top level MDS
 - R-GMA registry
- ◆ Replica Catalog (RC, RLS)

Situation on a Grid Cont'd



Main EDG Grid Services

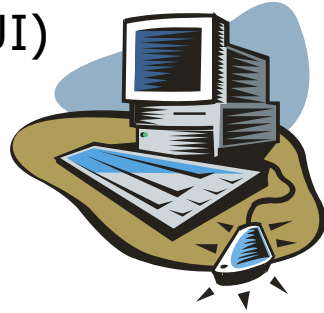


- ◆ Authentication & Authorization
- ◆ Job submission service
 - Resource Broker
- ◆ Replica Management
 - EDG-Replica-Manager
 - Mass storage system support
- ◆ Logging & Bookkeeping

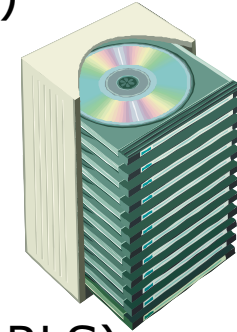
EDG Main Logical Machine Types



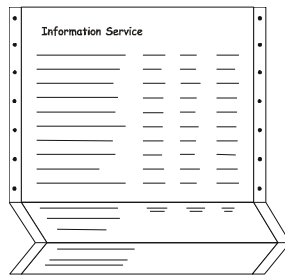
◆ User Interface (UI)



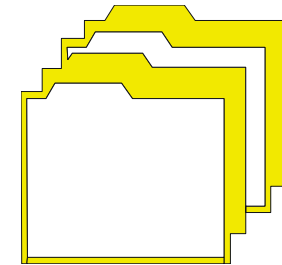
◆ Storage Element (SE)



◆ Information Service (IS)

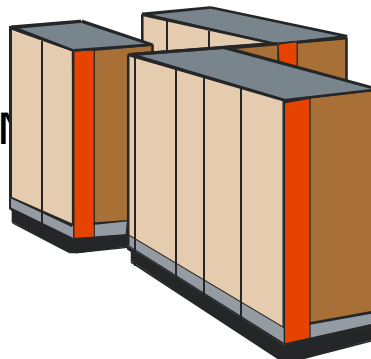


◆ Replica Catalog (RC, RLS)



◆ Computing Element (CE)

- Frontend Node
- Worker Nodes (WN)



◆ Resource Broker (RB)



Main Services per Machine Type (release 1.4)



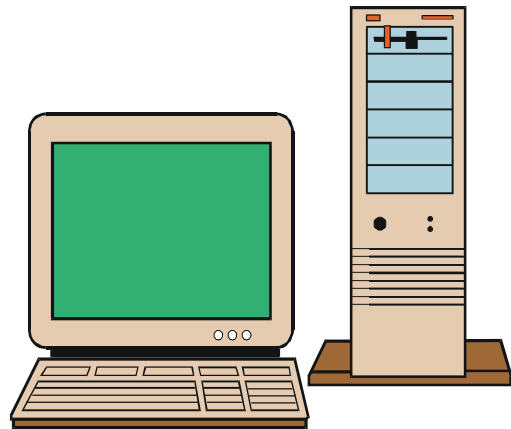
Daemon	UI	IS	CE (frontend)	WN	SE	RC	RB
Globus Gatekeeper	-	-	✓	-	-	-	-
Replica Catalog	-	-	-	-	-	✓	-
GridFTP	-	-	✓	-	✓	-	✓
Globus MDS	-	✓	✓	-	✓	-	-
Info-MDS	-	✓	✓	-	✓	-	-
Broker	-	-	-	-	-	-	✓
Job submission	-	-	-	-	-	-	✓
Information Index	-	-	-	-	-	-	✓
Logging & Bookkeeping	-	-	-	-	-	-	✓
Local Logger	-	-	✓	-	✓	-	✓
CRL Update	-	-	✓	-	✓	-	✓
Grid mapfile Update	-	-	✓	-	✓	-	✓
RFIO	-	-	-	-	✓	-	-
GDMP	-	-	-	-	✓	-	-

Main Services per Machine Type (release 2.0)

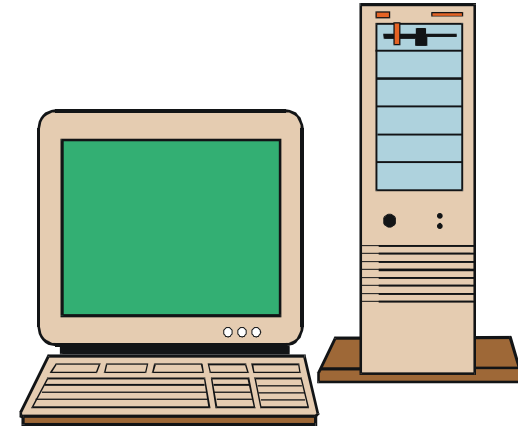


Daemon	UI	IS	CE (frontend)	WN	SE	RLS	RB
Globus Gatekeeper	-	-	✓	-	-	-	-
RLS-LRC	-	-	-	-	-	✓	-
RLS-RMC	-	-	-	-	-	✓	-
GridFTP	-	-	✓	-	✓	-	✓
R-GMA	-	✓	-	-	-	-	-
R-GMA GOUT	-	-	-	-	-	-	✓
R-GMA GIN	-	-	✓	-	✓	-	-
Broker (Network server, job control)	-	-	-	-	-	-	✓
CondorG Job submission	-	-	-	-	-	-	✓
Logging & Bookkeeping	-	-	-	-	-	-	✓
Local Logger	-	-	✓	-	-	-	✓
CRL Update	-	-	✓	-	✓	-	✓
Grid mapfile Update	-	-	✓	-	✓	-	✓
RFIO	-	-	-	-	✓	-	-
EDG-SE	-	-	-	-	✓	-	-

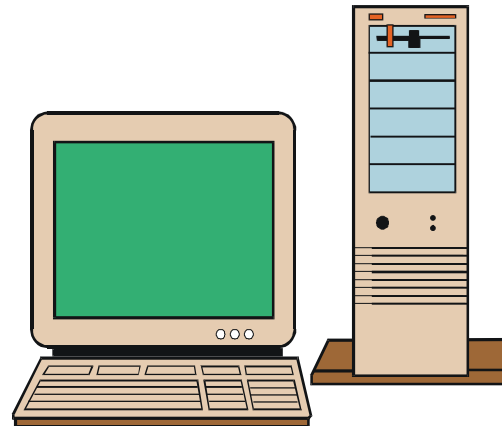
A Simple Testbed Configuration



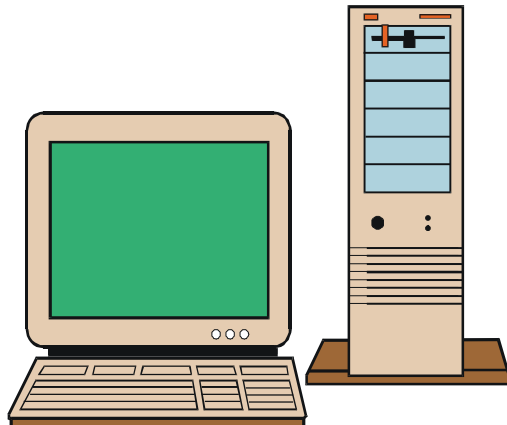
Storage Element 1



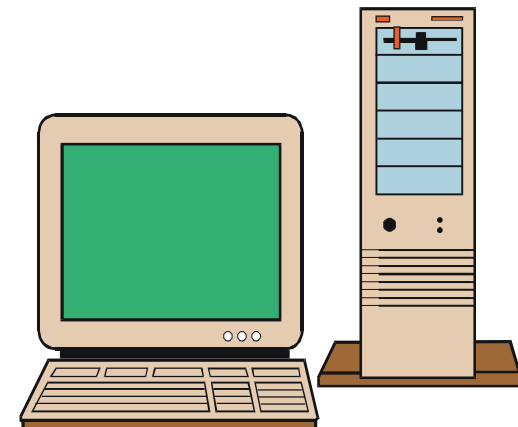
Computing Element 1



User Interface
Resource Broker
Replica Catalog
Information Service



Storage Element 2



Computing Element 2

Testbeds



GriDis dissemination testbed

- Small tutorial and demo testbed
- has access to application testbed
- CrossGrid sites take part

Application Testbed: End-user Applications

- Software: Stable, certified release (EDG 1.4.x)

Certification Testbed: Extended, Detailed Testing

- Software: Tagged release
- State: Starting...; Collaboration with Testing Group/LCG.

Development Testbed: Integration & Evaluation of SW

- Software: Current tagged release + new pkg. → New tagged release.
- State: Active use; 5 sites involved.

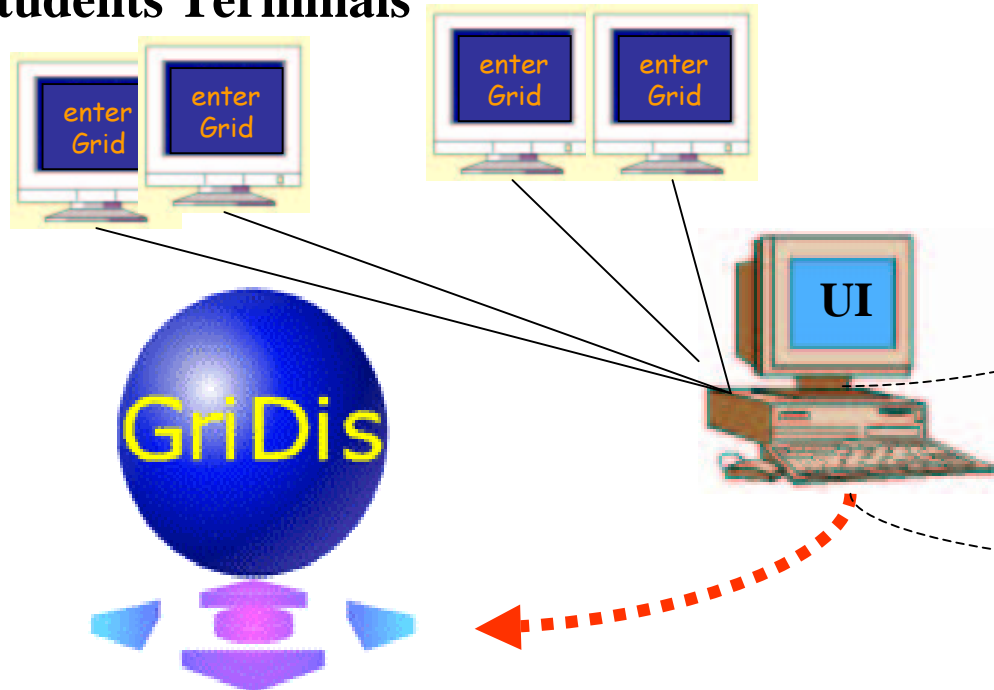
Development Machines: Testing of Middleware in Isolation

- Software: Bleeding edge versions.
- State: Varied; under control of middleware work packages.

Testbed Overview



Students Terminals



crossgrid

Application Testbed



Resource Broker
Computing Elements
Storage Elements
Information Index

Resource Broker
Computing Elements
Storage Elements
Information Index
<http://marianne.in2p3.fr>

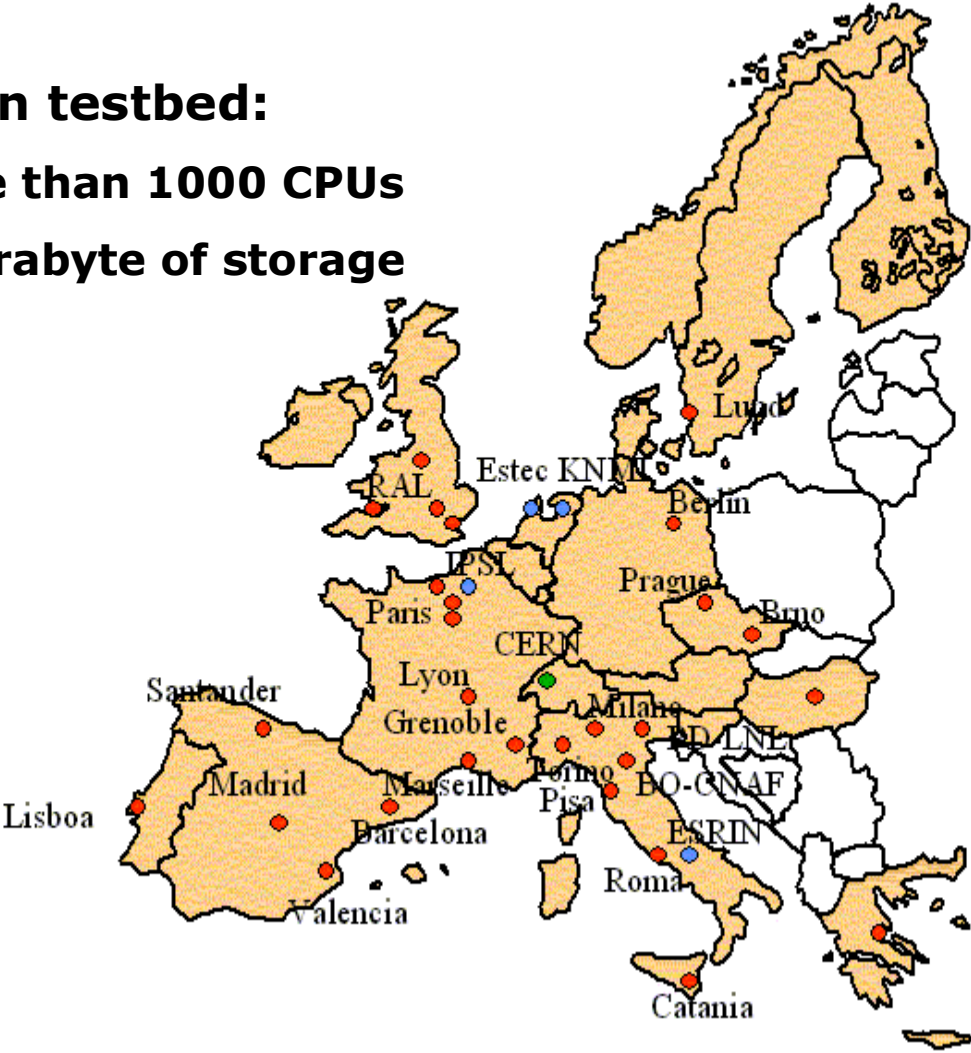
<http://web.datagrid.cnr.it/GriDis/GriDisWP1.html>

DataGrid testbeds



Application testbed:
More than 1000 CPUs
5 Terabyte of storage

**EDG sw installed
at more than 40
sites**

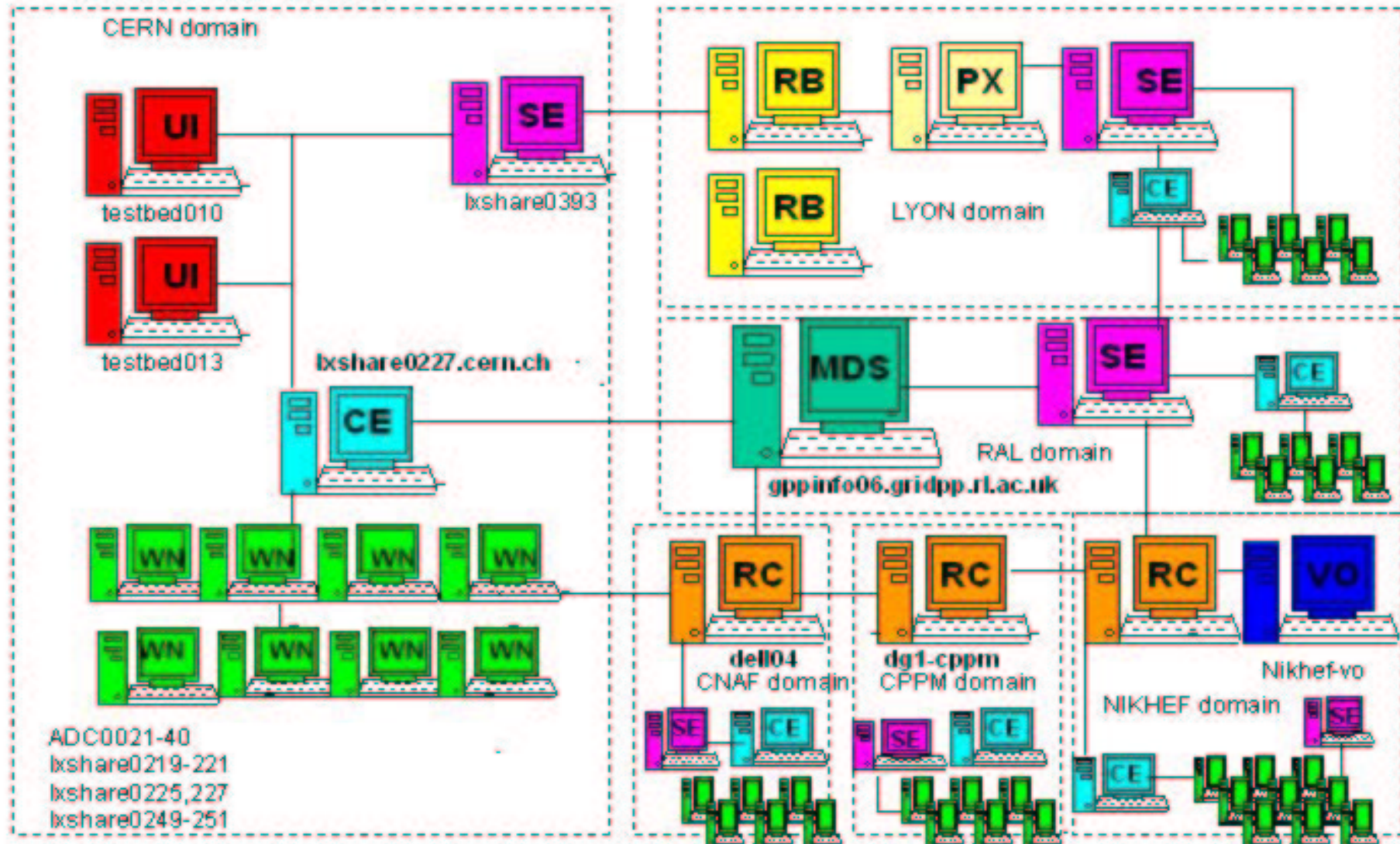


- Dubna
- Moscow
- HEP sites
- ESA sites

EDG production testbed EDG Release EDG 1.4.7

CERN Computing Element site and corresponding spread

GRID services





Example IS Content

Site: NIKHEF

CE tbn09.nikhef.nl:2119/jobmanager-pbs-qlong:

- PBS queue "qlong" with 96 hours time limit
- Software installed: CMS-1.0.2 ATLAS-1.3.0 ALICE-3.07.01 LHCb-1.1.1 IDL-5.4 NIKHEF D0MCC-0.1-1
- There are 0 jobs running and 0 waiting, with 16 CPUs free

Close SE tbn03.nikhef.nl with mount point /flatfiles

CE tbn09.nikhef.nl:2119/jobmanager-pbs-qshort:

- PBS queue "qshort" with 240 minutes time limit
- Software installed: CMS-1.0.2 ATLAS-1.3.0 ALICE-3.07.01 LHCb-1.1.1 IDL-5.4 NIKHEF D0MCC-0.1-1
- There are 0 jobs running and 0 waiting, with 16 CPUs free

Close SE tbn03.nikhef.nl with mount point /flatfiles

SE tbn03.nikhef.nl close to 2 CEs:

- tbn09.nikhef.nl:2119/jobmanager-pbs-qshort
- tbn09.nikhef.nl:2119/jobmanager-pbs-qlong
- VOs supported: alice atlas biomedical cms earthob lhcb iteam
- gridftp on port 2811
- rfio on port 3147
- file
- 31744 Mb of free space



EDG Software Distribution

- ◆ All software available as source & binary RPMs
- ◆ Binaries for RedHat 6.2 and RedHat 7.3
- ◆ > 600 packages including
 - Complete globus distribution
 - EDG packages (~50 packages)
 - Support tools (perl, ant, jdk, ...)
- ◆ Pre-packaged for different machine types



Issues when Adding new Sites to the Testbed

- ◆ EDG is currently setting-up procedures explaining how to add new sites
 - Variations already tested with Taiwan and Romania
 - Step-by-step instructions produced which we expect to become simpler over time
- ◆ Need to clarify the "*minimum requirements*" for a site to become a member of the testbed
 - A number of regular tasks have to be performed by the sites administrators
 - A maximum delay needs to be defined for responding to requests/problems if the testbed is to run efficiently
- ◆ Sites from new countries have to identify/create a **supporting CA**
 - Since CAs need mutual trust this could lead to an explosion of inspection activities
- ◆ Some tasks will fall on the people responsible for **managing the VOs**
 - HEP experiment secretariats already perform some level of authentication of their institutes and members. How an we get some leverage from this?



Summary

- ◆ Logical machine types of an EDG Testbed
- ◆ Mapping of services to logical machines
- ◆ Example and current EDG Testbed configuration
- ◆ Code distribution strategy



Further Information

- ◆ EDG Testbed homepage:

<http://marianne.in2p3.fr/>

- ◆ Fabric management:

<http://hep-proj-grid-fabric.web.cern.ch/hep-proj-grid-fabric/>

- ◆ LCFG on EDG Testbed information:

<http://www.lnl.infn.it/datagrid/wp4-install/>

<http://datagrid.in2p3.fr/distribution/datagrid/wp4/installation/doc/>