The Grid Testbed

The INFNGrid Project Team

http://www.infn.it/grid

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Grid: System which allows distributed, disparate computing resources to appear as single, coherent computing platform on which to efficiently process user-defined tasks.

Grid Participants

- ## Users
  - People with computing-intensive task who want to use grid resources to accomplish it.

- ## Virtual Organization (VO)
  - Group of people with common interests and who control access to certain resources.

- ## Site Administrators
  - People who manage computing resources and who are ultimately responsible for usage of those resources.

- ## Outside Authorities
  - People or organizations with a financial, legal, etc. interest in grid's resources or operation. (e.g. Police, funding agencies, …)

Grid Services

- Workload Management
  - Reliable **Job Submission**
  - Matchmaking
  - **Logging** & Bookkeeping
- Data Management
  - **Replica Management**
  - Metadata Management
- Resources
  - **Gatekeeper** (batch interface)
  - Storage (disk, tape, etc.)
  - Database (SQL, …)
  - Network

the globus project™
www.globus.org

- Information System
  - **Service Discovery**
  - **Service State Information**
- Security
  - **Authentication**
  - **Authorization**

Globus Architecture

VDT Client

Information System

INFN GRID TUTORIALS

query

LDAP Based

query

VDT Server

Replica Location Service

getting credential

submit

publish state

retrieve

Site X

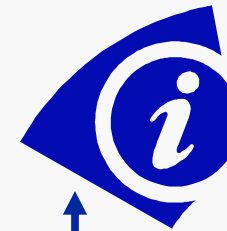Computing Resources
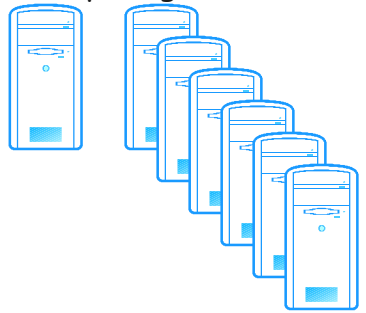
Storage Resources
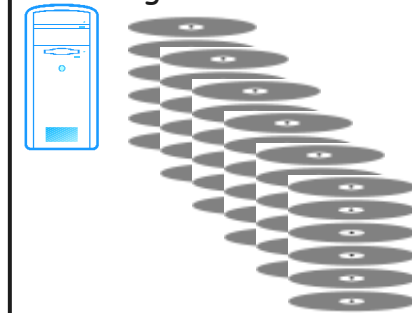
CAS

EDG Architecture

User Interface

submit

retrieve

update
credential

Resource Broker

Information System

query

R-GMA

query

submit

retrieve

publish
state

Replica Location
Service

Site X

Computing Element

Storage Element

VOMS

Machine Types

- User Interface (UI) & Worker Nodes (WN)
  - Deployment: User/Site, many
  - Contain client software to access EDG services
  - Lightweight and easy to install on existing systems
  - Neither is really part of the grid, but provide access to it

- Gatekeeper (CE)
  - Deployment: Site, one per batch system
  - Grid interface to LRMS (PBS, LSF, Condor)

- Storage Element (SE)
  - Deployment: Site, one per MSS type
  - Grid interface to storage (disk, tape, etc.)

VDT Client

VDT Server

Machine Types (cont'd)

- ## Monitoring Node (MON)
  - Deployment: Site, one per site
  - Site R-GMA server; site's interface to information system
  - Fabric monitoring server
  - Replica optimization server

- ## Information Catalog (IC)
  - Deployment: Sites?, one per grid
  - Registry of all information producers & consumers on grid.

- ## Replica Location Service (RLS)
  - Deployment: VO, one per VO
  - LRC and RMC servers

VDT Server

Machine Types (cont'd)

- Virtual Organization Membership Service (VOMS)
  - Deployment: VO, one per VO
  - Contains VO's membership and authorization information

- Resource Broker (RB)
  - Deployment: VO?, few per grid
  - Contains matchmaking service
  - Reliable job submission service (CondorG)
  - Logging & Bookkeeping for job state information
  - Cache for job input and output "sandboxes"

Grid Testbeds and Services

- **_GriDis Dissemination Testbed (tutorials and demonstrations)_**
  - – Software: Certified release (LCG1-1.1.3)
  - – State: Open to all; small testbed with limited resources.
- **_LCG/EGEE Service (Production Grid for HEP Experiments)_**
  - – Software: "Stable", certified release (LCG2-2.0.0)
  - – State: Open to HEP; supported 24 hours/day every day.
- **_Grid.It Service (Production Grid for HEP and other applications)_**
  - – Software: "Stable", certified release (LCG1-1.1.3)
  - – State: Open to HEP and others; not always compatible with LCG.
- **_Middleware Testbeds (testing, development of middleware)_**
  - – Software: Bleeding-edge, unreleased middleware.
  - – State: Developers only; varies, controlled by MW work packages.
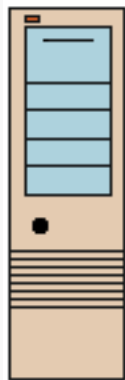
Typical Testbed Site

Mass Storage System (0+)

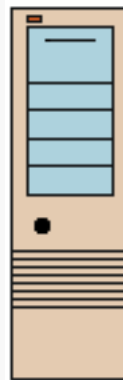"Close"
Posix File Access
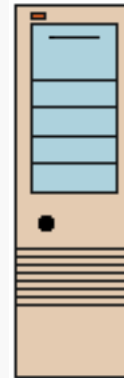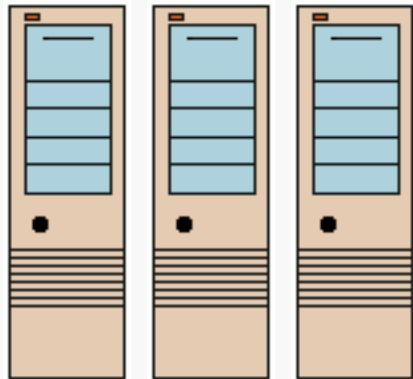
Gatekeeper (1+)
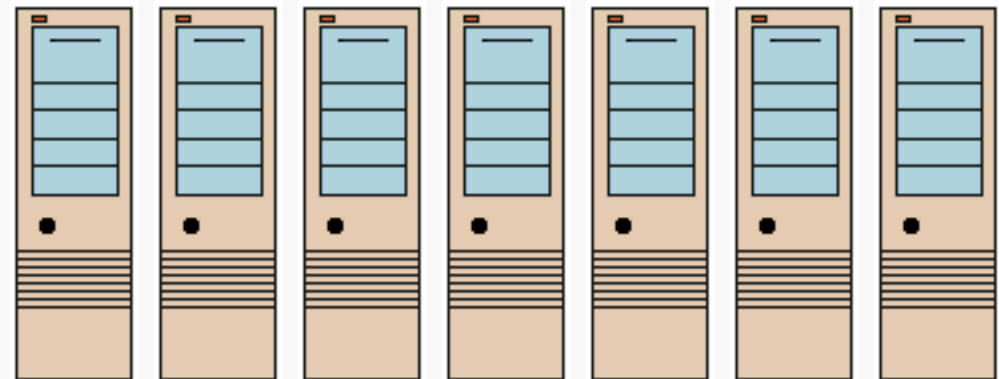
Storage Element (1+)

LRMS (PBS, LSF, Condor)

LCFGng (1)   "MON" (1)

Worker Nodes (0+)

Obtaining Software

- Software covered by EDG License (allows for commercial use) or Globus Licence
- Sources and binary distributions are available from Globus web site or EDG/LCG repositories
  - EDG is only supported for RedHat 7.3
  - EDG/LCG used VDT 1.1.8-* (Globus 2.2) but already VDT 1.1.13 (Globus 2.4) available
  - LCG distribution with more enhancements (Storage)
- Configuration is complicated but manual and automatic (via LCFGng) procedures are described

Summary

- Overview of Grid services

- Deployment of services

- The various testbed

- Obtaining and installing the software

Further Information

- Users' Guide
  - Introduction to EDG services and simple examples using major grid services.
  - http://marianne.in2p3.fr/datagrid/documentation/
- Installation Guide
  - Instructions on installing and configuring all of the EDG/LCG and supporting services.   Mainly via LCFG, but manual installation for UI.
  - http://marianne.in2p3.fr/datagrid/documentation/
  - http://grid-it.cnaf.infn.it/
- LCFGng Server Installation
  - http://grid-it.cnaf.infn.it/index.php?lcfgnginstall&type=1
  - http://datagrid.in2p3.fr/distribution/datagrid/wp4/edg-lcfg/documentation