

Integration of ENEA-GRID multi-platform resources in EGEE

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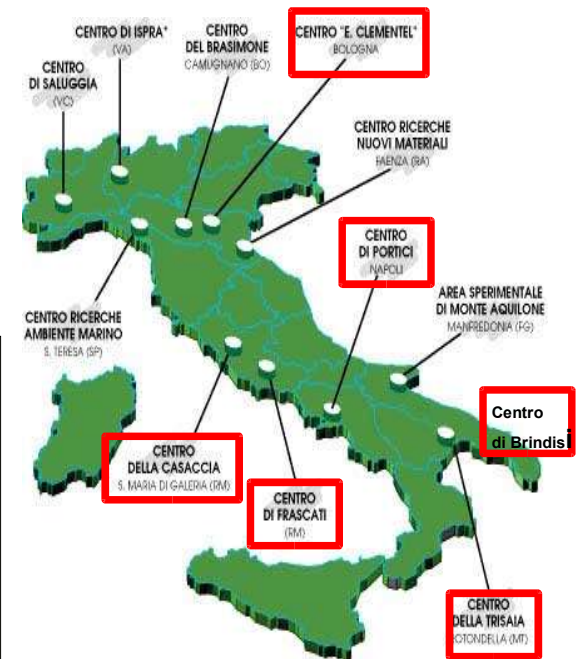
ENEA: Italian National Agency for New Technologies, Energy and Environment

ENEA-GRID: the infrastructure providing an **unified user environment** and an **homogeneous access method** to ENEA computational resources distributed in 6 Italian sites, connected over WAN.

ENEA-GRID computational resources:

~300 cpu: IBM SP; SGI Altix & Onyx; Linux clusters 32/64; Apple MacOSX cluster; Windows servers. **Most relevant resource: IBM SP4 128 nodes ~1Tflops, located at Frascati site.**

~600 registered users; installed storage ~15 TB



ENEA-GRID Architecture

GRID functionalities (unique authentication, authorization, resource access and resource discovery) are provided using “**mature**”, **multi-platform components** that constitute ENEA-GRID middle-ware:

- Distributed File System: **AFS/OpenAFS** (native authentication & authorization)
- Resource Manager: **LSF Multicluster** (Job Forwarding Model)
- Unified user interface: **Java & Citrix Technologies** (including Web access)

ENEA participation in EGEE/SA1

The focus of the participation of ENEA in other GRID projects is **interoperability**: sharing resources with other GRIDs must be compatible with ENEA GRID architecture -> **gateway implementation**. Moreover gateways are a **simple approach to Multi-platform resources**.

ENEA EGEE site [**ENEA-INFO**] is located in Frascati and consists of:

- **Standard EGEE Linux nodes**: YAM/YUM/YAIM repository LCG 2.6, SE, UI
- **EGEE/ENEA Linux Cluster**: CE egce.frascati.enea.it , 16 WNs
- **EGEE/ENEA Gateway to AIX**: Linux CE egceaix.frascati.enea.it

EGEE/ENEA Linux Cluster

LCG 2.6 Middle-ware has been patched for compatibility with ENEA-GRID architecture, AFS and LSF:

- **Pool account users** are pre-defined as standard AFS user of ENEA GRID with AFS homes: e.g. for dteam VO \$HOME=/afs/enea.it/grd_egee/user/dteam001...
- **lcmaps** has been modified to acquire an AFS token using gssklog.
- gssklogd daemon has been modified for compatibility with VO security.
- **lsf** job manager is used and **JobManager.pm** and **lsf.pm** have been modified for compatibility with AFS file system and ENEA LSF configuration.

In this approach **CE and WN share the same file system** via AFS.

Jobs can be submitted by edg-job-submit using INFN certification RB and setting explicitly CE: egce.frascati.enea.it.

Implementing the gateway: one of the Linux WNs was modified and tested

- 1) /etc/grid-security and /opt/ directories was completely removed.
- 2) a new /opt/globus has been created with 2 subdirectories: bin and etc.
- 3) **/opt/globus/etc/globus-user-env.sh** is a link to the usual file in an AFS location
- 4) **/opt/globus/bin/globus-url-copy** & **grid-proxy-info** are links to wrappers in AFS
e.g.: **globus-url-copy** -> wrapper
wrapper: **lsrun -m egce.frascati.enea.it globus-url-copy \$***

where **lrun** is the LSF command for immediate execution on a remote host. As a result **all data transfer between WN and RB are effectively done by the CE** which shares \$HOME with WN (AFS).

EGEE/ENEA gateway to AIX

With the described approach, a similar **/opt/globus** has been created on IBM SP hosts and the CE `egceaix.frascati.enea.it` differs from the Linux CE only for the name of the resource where LSF submits are performed.

Successful tests have been performed with the same approach also with submissions to **SGI/Irix 6.5** , to **Apple/MacOSX** and **SGI/Altix IA64** : hosts located at **3 different sites** **Frascati** , **Trisaia (Southern Italy)**, **Casaccia**

Advantage of this approach: easy WN firewall configuration!

Limitations: on WN monitoring and accounting middle-ware is not yet available

ENEA-INFO site status: site certification in progress

Conclusion: successful job submission and result retrieval to AIX, MacOSX, IRIX and Altix IA64 Worker Nodes has been demonstrated using a Linux gateway between EGEE LCG 2.6 and ENEA-GRID.