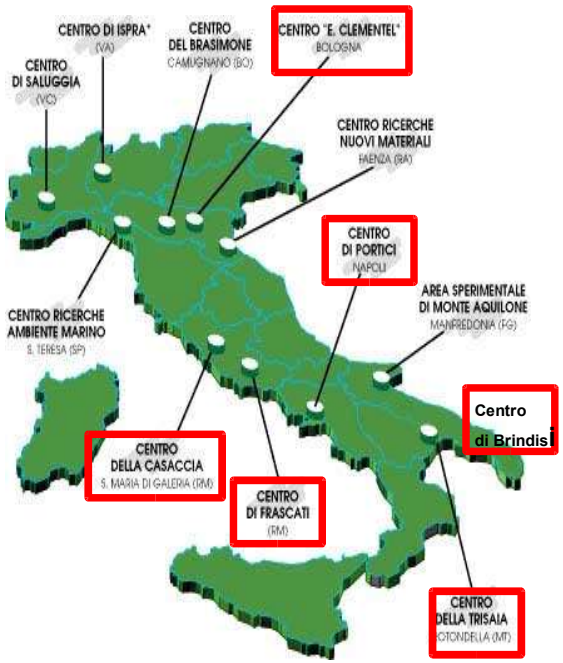
Integration of ENEA-GRID multi-platform resources in EGEE

G. Bracco, P. D'Angelo, S.Migliori, A.Quintiliani, F. Simoni
ENEA INFO, Frascati, Roma (Italy), bracco@frascati.enea.it
C.Sciò [Esse3Esse, Roma], A. Secco [Nice], M. Fontana, M. Leone [CRIAI, Portici]

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 were 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 **lsrun** 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.