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The ENEA-EGEE site: Access to non-standard platforms

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Outline

- ENEA-GRID
- Implementation of ENEA-INFO EGEE site:
 - Access to AIX resources
 - Middleware integration: gssklog and lcms
- Status and Discussion
- Documentation
- Work in progress...

ENEA

[Italian National Agency for New Technologies, Energy and Environment]

12 Research sites and a **Central Computer and Network Service** (ENEA-INFO) with **6 computer centres** managing multi-platform resources for serial & parallel computation and graphical post processing.



ENEA GRID

ENEA GRID mission [started 1999]:

- provide a **unified user environment** and an homogeneous access method for all ENEA researchers, irrespective of their location.
- optimize the utilization of the available resources

GRID functionalities (unique authentication, authorization, resource access and resource discovery) are provided using “mature”, multi-platform components:

Distributed File System: **OpenAFS**

Resource Manager: **LSF Multicluster** [www.platform.com]

Unified user interface: **Java & Citrix Technologies**

These components constitute the ENEA-GRID Middleware.

ENEA EGEE site implementation (1)

ENEA has implemented an EGEE site as a funded partner in the project

Our implementation requirements:

- ◆ provide access to the main ENEA-GRID resources
- ◆ EGEE users => mapped to some standard ENEA-GRID AFS users
- ◆ Access to AIX platform => **NO Middleware on Worker Nodes**
- ◆ OpenAFS: minimize local installation
- ◆ LSF resources must be used whenever possible
 - **Batch submission**: bsub
 - **Information**: lshosts, bhosts, bqueues,...
 - **Prompt job execution**: lsruncmd
 - **Batch queues** dedicated to EGEE GRID users

ENEA EGEE site implementation (2)

Implementation architecture:

- ◆ UI & SE: Linux, Standard EGEE configuration
- ◆ CE: Linux, modifications to implement AFS pool-account
- ◆ A “Transmitter” linux element with WN packages installed
- ◆ WN: any platform/OS with support for AFS/LSF
 - share user homes with CE and Transmitter using AFS
 - delegate all grid commands concerning file transfer to/from GRID to the Transmitter by means of the LSF lsruncmd command.
 - AFS security and quota management guarantee reliability

ENEA EGEE site implementation (3)

How:

- ♦ Any WN middleware command concerning file transfer is wrapped with a lsrn script.
- ♦ The wrapped WN middleware is located in AFS.
- ♦ The relevant PATHs in the environment of the EGEE job on the WN are modified so that the wrapped middleware is used
 - LSF job-starter script for the EGEE dedicated queues

e.g. /afs/enea.it/grd_egge/system/eneaaddon/opt/globus/bin/globus-url-copy
globus-url-copy -> wrapper
wrapper: lsrn -m "transmitter" globus-url-copy \$*

- ♦ EGEE GRID users require an AFS token:
 - gssklogd modified to be compatible with EGEE middleware
 - EGEE middleware on the CE must properly call gssklog.

EGEE Standard site layout

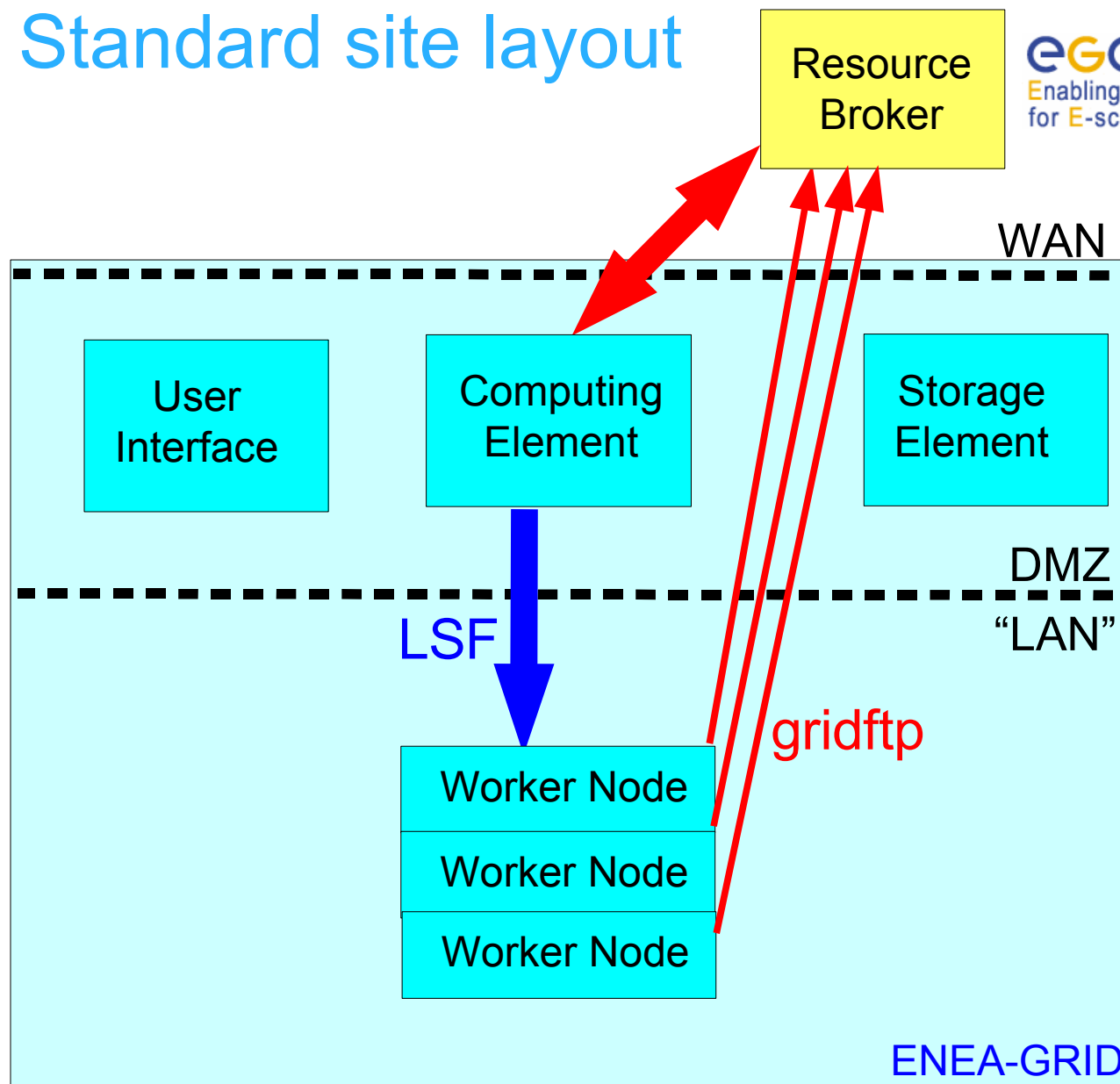
EGEE
Enabling Grids
for E-science

User Interface

Storage Element

Computing Element: accepts jobs sent by the RB and submits them to the local batch system (LSF)

Worker Nodes: they perform the computation and the WN middleware sends back job results to RB



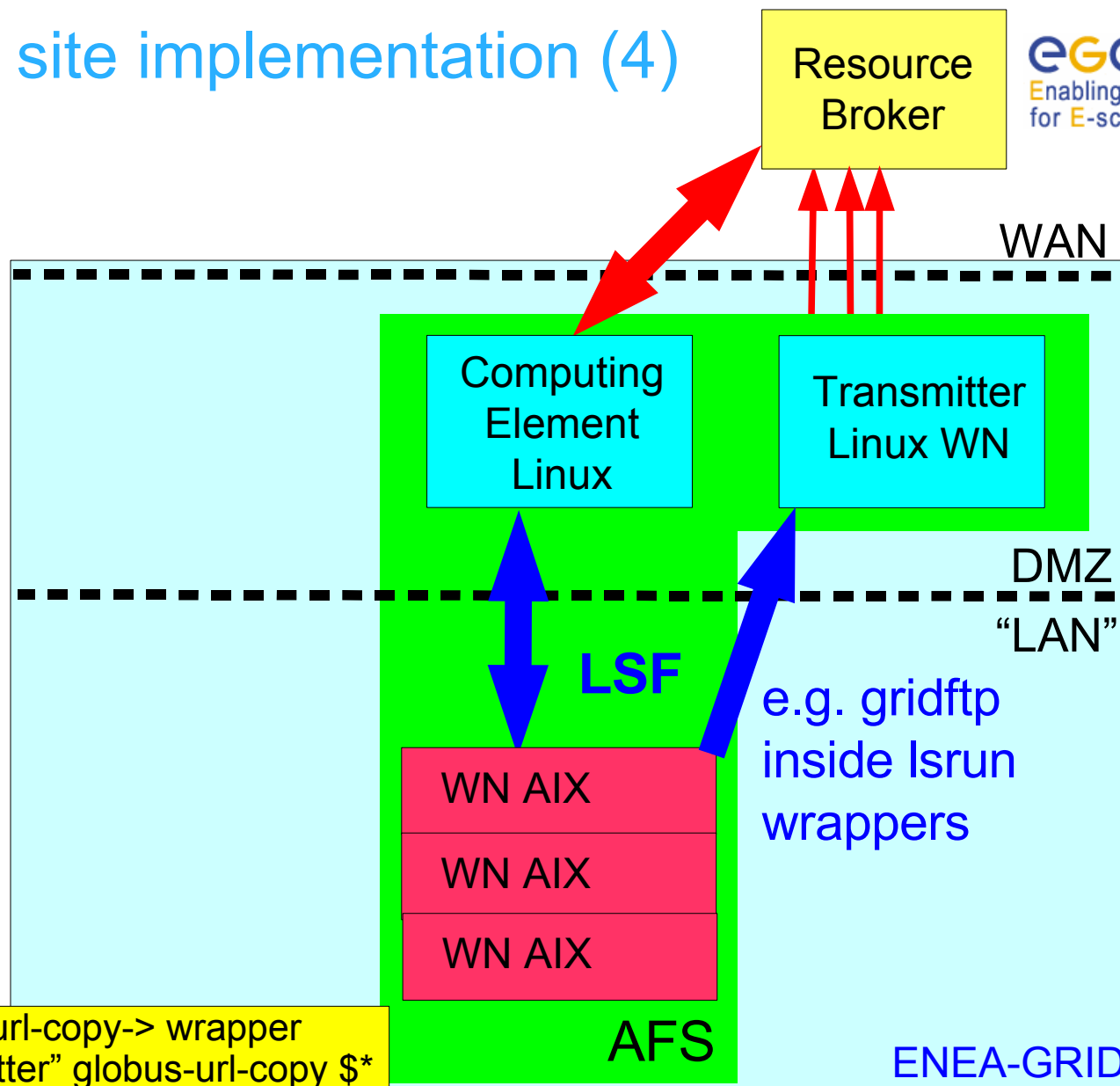
EGEE ENEA site implementation (4)

The “Transmitter”
Linux WN has two
functions:

1) A complete linux
WN where
wrapped
commands are
executed.

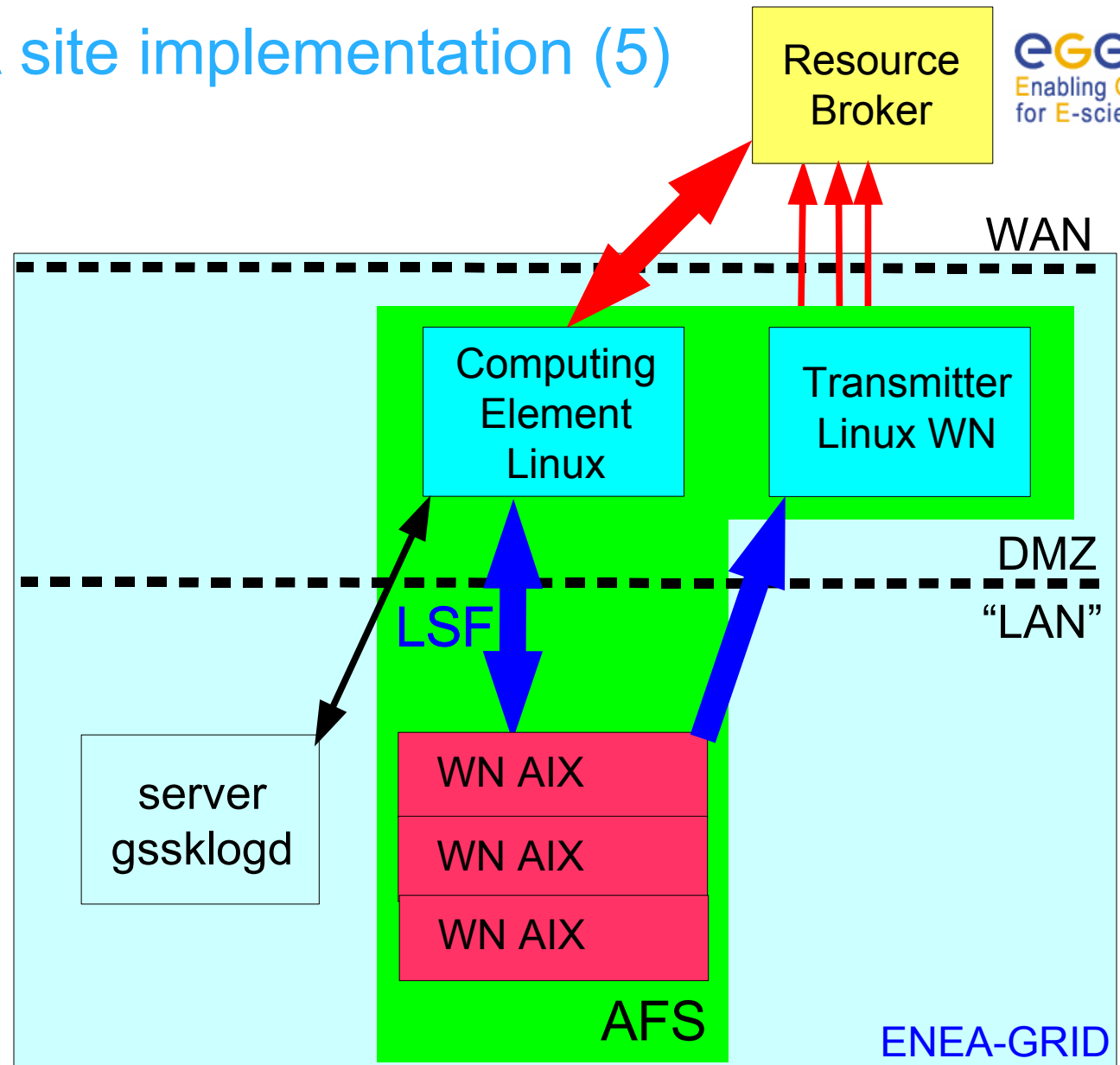
2) A proxy system to
sends back job
results to RB.

e.g. `/afs/enea.it/.../globus-url-copy-> wrapper`
wrapper: `lrun -m “transmitter” globus-url-copy $*`



EGEE ENEA site implementation (5)

GRID users are AFS users so a **modified gssklogd server is required** to obtain an AFS token from the X509 certificate.



gssklogd/gssklog

Gssklog package has been developed by Doug Engert (ANL) to obtain an AFS token using a GSS [Generic Security Service] implementation.

It has been used together with Globus Toolkit GSSAPI to obtain an AFS token from a X509 certificate.[ftp://achilles.ctd.anl.gov/pub/DEE](http://achilles.ctd.anl.gov/pub/DEE)

The package include a daemon: [gssklogd] and a client [gssklog].

gssklogd has been modified to provide tokens for pool account users on the basis of the content of the VO information contained in the user certificate. The daemon requires now also the VO certificate.

The afsguid-mapfile syntax has been extended, e.g. for ENEA VO:

"/VO=enea" .enea/020/

The client gssklog provides always the principal name:

gssklog -server *server_address* -principal enea004

lcmaps_afs

LCAS [Local Centre Authorization Service] and **LCMAPS** [Local Credential Mapping Service] are the **EGEE services** that make the connection between GRID users certificates and local UNIX userids on the local site.

LCMAPS [Local Credential Mapping Service] is a modular service.

A **lcmaps_afs** module exists with the purpose to obtain an AFS tokens for the local mapped user using gssklog but **the standard module is not compatible with VOMS** “pool account”

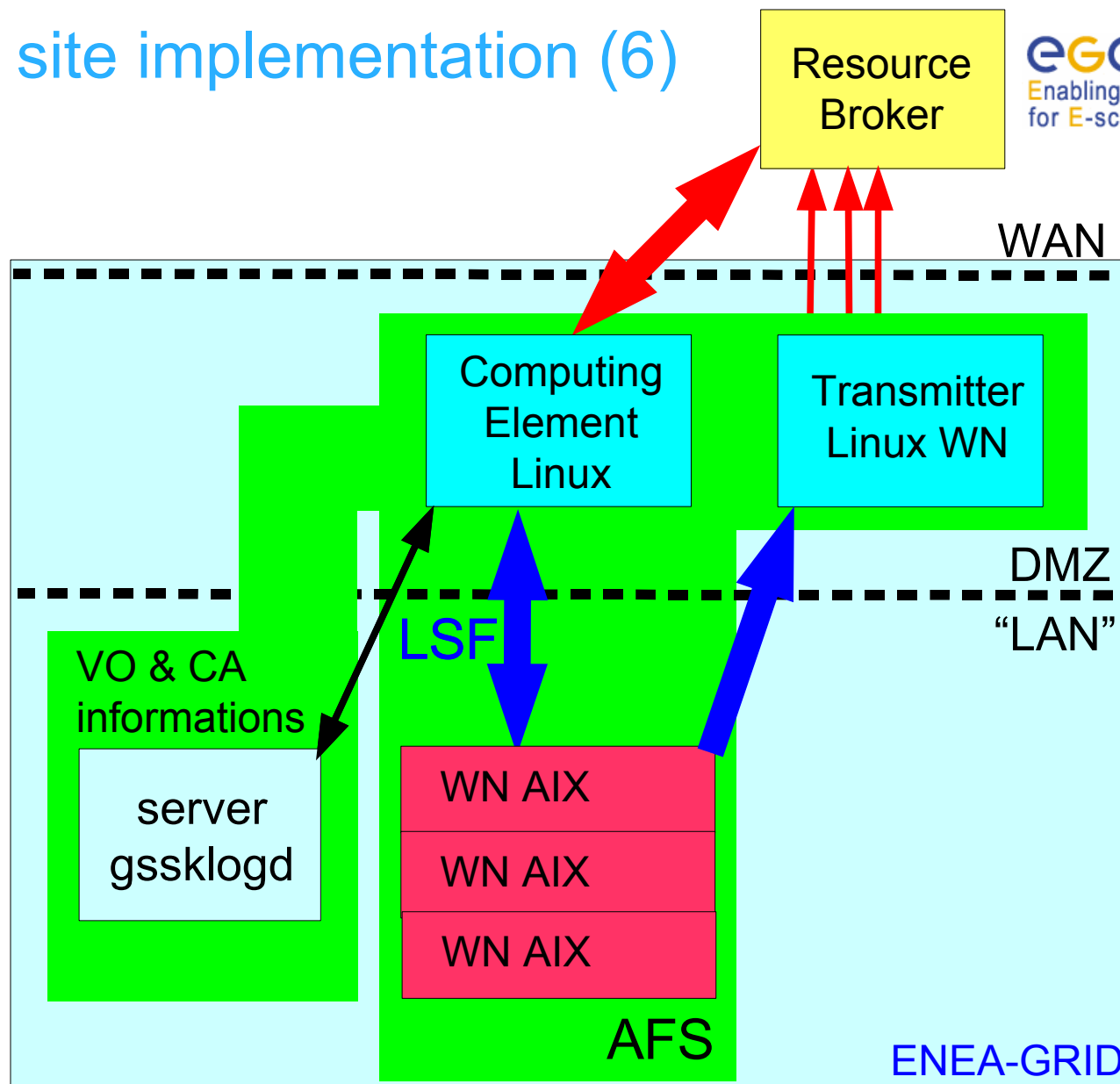
A modified module has been prepared to achieve compatibility:
gssklog is invoked always with -principal parameter

EGEE ENEA site implementation (6)

GRID users are AFS users so **a modified gssklogd server is required** to obtain an AFS token from the X509 certificate.

AFS can be used to provide to the gssklogd daemon the information about VO and CA

These information are automatically updated by the CE



Status and discussion

ENEA Linux site: Glite 3.0 certified

CE/SE: egce.frascati.enea.it / egse.frascati.enea.it

WN: 14 Linux P4, 1.8 Ghz, 1 GB

ENEA AIX site: Glite 3.0 certification in progress

CE/SE: egceaix.frascati.enea.it / egseaix.frascati.enea.it

WN: 96 cpu SP4, 1.9 Ghz

BENEFITS of the gateway approach: Any Platform/OS with AFS/LSF

LIMITS of the gateway approach

- **Not a completely standard site** [but EGEE Certification job runs well]
 - GRID API are not available [How to “Flag” it ?]
 - Some WN monitoring components are unavailable
- “OS” flag not yet implemented [VO tag defined, but not sufficient!]

Documentation

- An EGEE Technical Note (EGEE-TR-2006-006) is available :

Title: "AFS Pool Account Users - GSSKLOG and LCMAPS extension to support AFS users as EGEE pool account users"

[<http://www.afs.enea.it/project/eneaegee/>]

- The patched source of lcms_afs module [lcm_aps_afs.c] is available and submitted to lcms package developers.
- A patch to the standard gssklog-0.11 package is available.
- The patch to gssklog package has been presented to the AFS Best Practices Workshop 2006 [<http://pmw.org/afsbpw06>] and submitted to Doug Engert.

Work in progress

- **CE Glite**
 - CE already installed. Porting of the solution adopted in LCG CE not yet completed
- **MPI Job support**
 - ENEA is strongly interested in “transparent” MPI support by EGEE middleware
 - MPI support must take advantage of the benefits of a shared file system for user HOMEs (as OpenAFS)
- **Access to other platform:**
 - ALTIX clusters (32 cpu; 32 Gb shared memory)
 - Tests succesfully performed also on: MacOSX, Irix