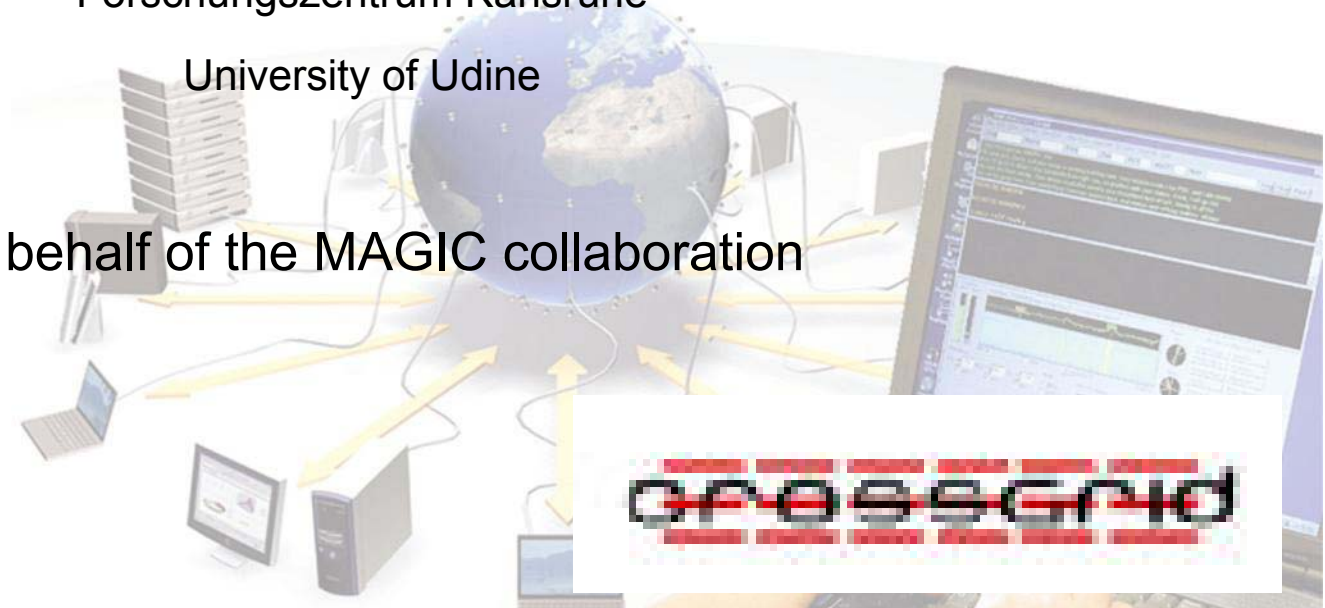# The MAGIC telescope

and the Grid

Harald Kornmayer, Alberto Forti

Forschungszentrum Karlsruhe

University of Udine

On behalf of the MAGIC collaboration

Outline

- First demo → Harald

- MAGIC

- Use Cases & Demonstration

- MAGIC and GILDA – Roberto

- MAGIC at CrossGrid

- Plans

MAGIC Telescope

- Ground based
  Air Cerenkov Telescope

- LaPalma,
  Canary Islands
  (28° North, 18° West)

- 17 m diameter

- operation since autumn 2003
  (still in commissioning)

- Collaborators:

IFAE Barcelona, UAB Barcelona, Humboldt U. Berlin, UC Davis, U. Lodz, UC Madrid, MPI München, INFN / U. Padova, U. Potchefstrom, INFN / U. Siena, Tuorla Observatory, INFN / U. Udine, U. Würzburg, Yerevan Physics Inst., ETH Zürich
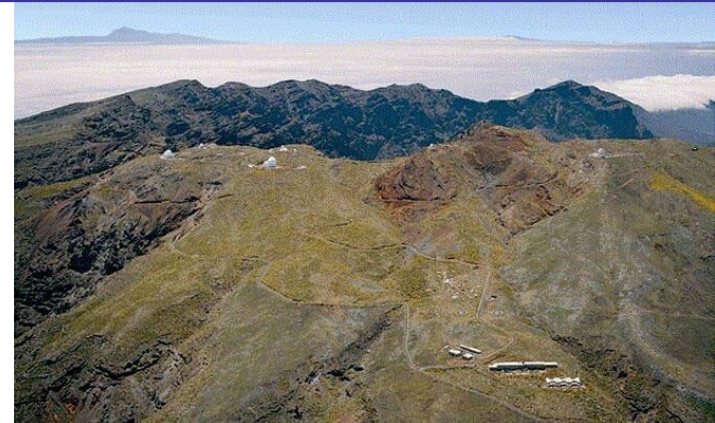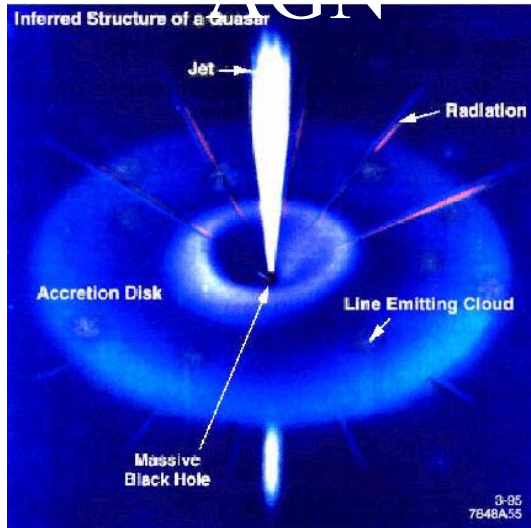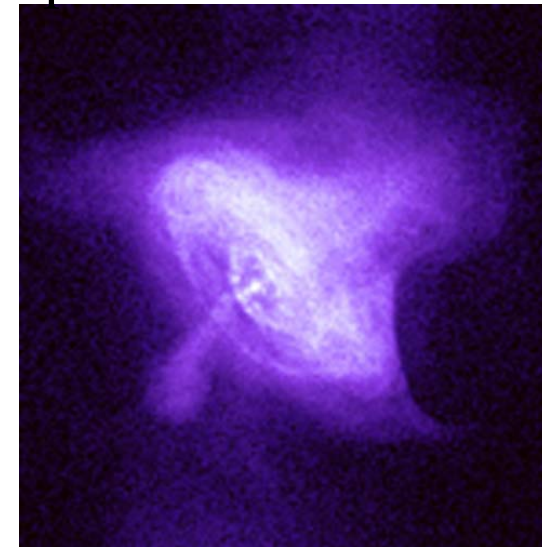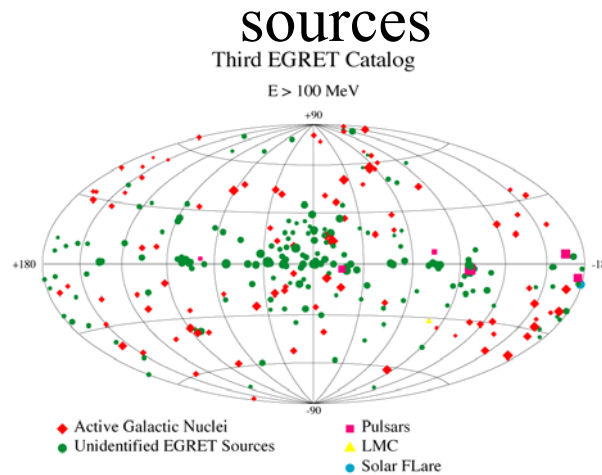
MAGIC – physics goals

Active Galactic Nuclei

(Mkn 501, Mkn 421)

Unidentified EGRET sources

Supernova Remnants
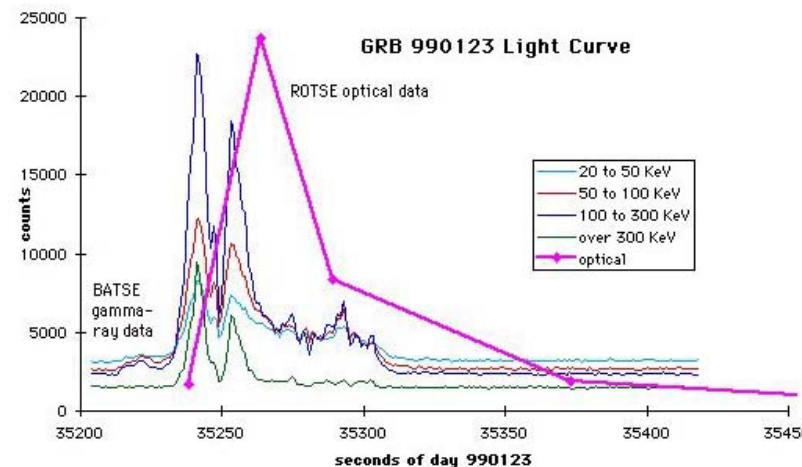

Crab nebular by Chandra

Gamma Ray Bursts

MAGIC – ground based γ-ray astronomy

Gamma ray flux is low
→huge collection area is required
→ only ground based observations possible

1. Primary particle creates an extensive air shower
2. Secondary particles produce cerenkov light
3. Telescope collects the Cerenkov light to the focal plan
4. The camera system DAQ records the showers
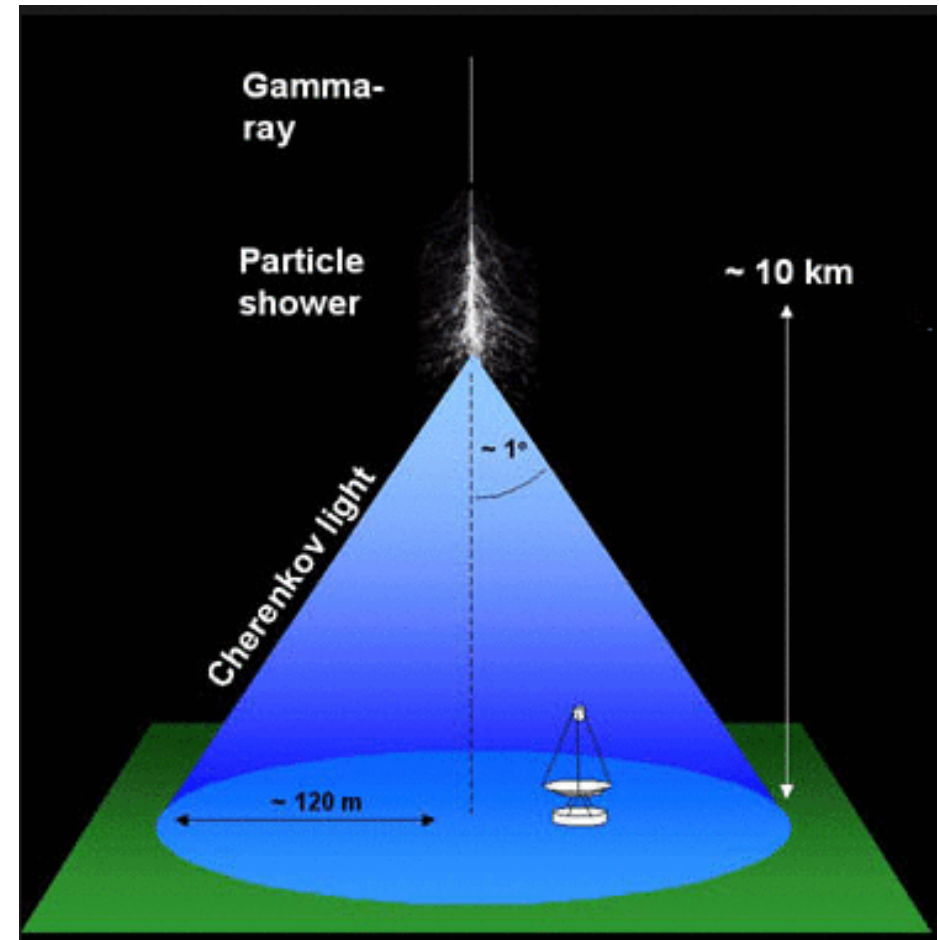
The cosmic rays consist mainly of hadronic primaries.
A gamma/hadron separation based on MC simulations is needed.

MAGIC – Monte Carlo Simulation

- Based on the air shower simulation program CORSIKA

- Simulation of hadronic background is very CPU consuming

  - to simulate the background of one night, 70 CPUs (P4 2GHz) needs to run 19200 days

  - to simulate the gamma events of one night for a Crab like source takes 288 days.

  - The detector/atmosphere is volatile.

- Only with a coordinated effort can help to connect distributed resources

    → **MAGIC Grid**

Simulation – first test on GILDA

- The GILDA testbed can be used to get experience on the GRID middleware

- NA4 implemented a webportal for MAGIC to submit one simulation on the GILDA testbed.

- The MMCS software was packed in a rpm to deploy it on the GILDA testbed

- → demo

MMCS use cases

User want to run and control simulations
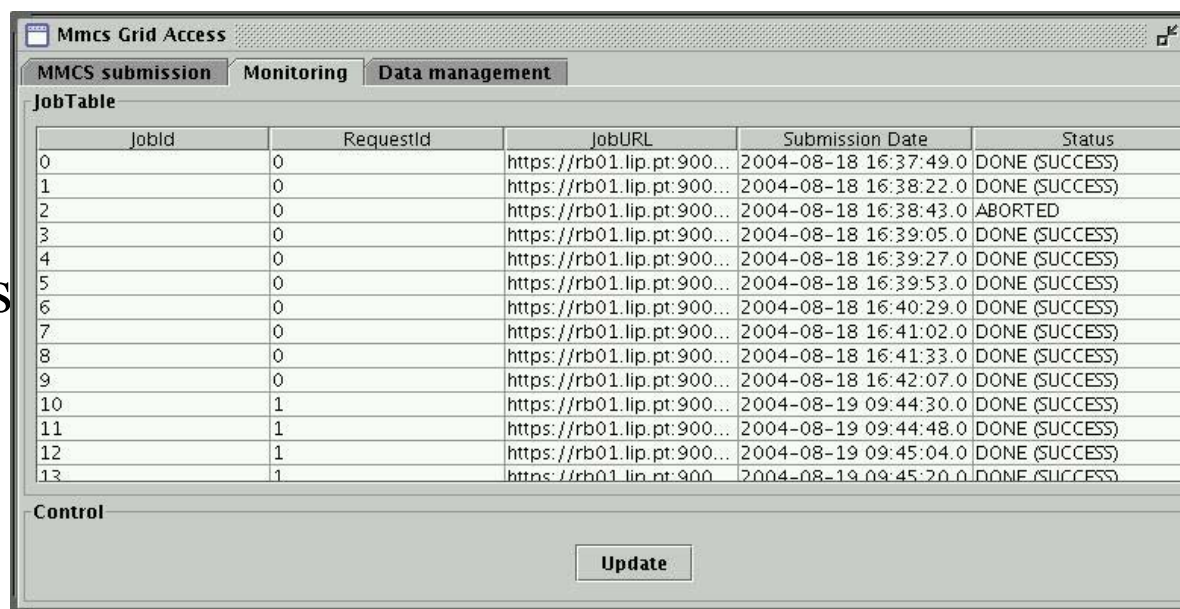- Driven by three use cases
  - Submit jobs
  - Monitor jobs
  - Manage data
- Easy to use GUI
  - Hide LCG commands
  - Java swing GUI
- Job Monitoring and
Data Management based
on a dedicated database

MMCS use cases

User want to run and control simulations

-Driven by three use cases

- Submit jobs

- Monitor jobs

- Manage data

-Easy to use GUI

-Hide LCG commands

-Java swing GUI

-Job Monitoring and

Data Management based

on a dedicated database

MMCS use cases

User want to run and control simulations

-Driven by three use cases

    - Submit jobs

    - Monitor jobs

    - Manage data

-Easy to use GUI

    -Hide LCG commands

    -Java swing GUI

-Job Monitoring and
Data Management based
on a dedicated database

MMCS use cases

User want to run and control simulations

-Driven by three use cases
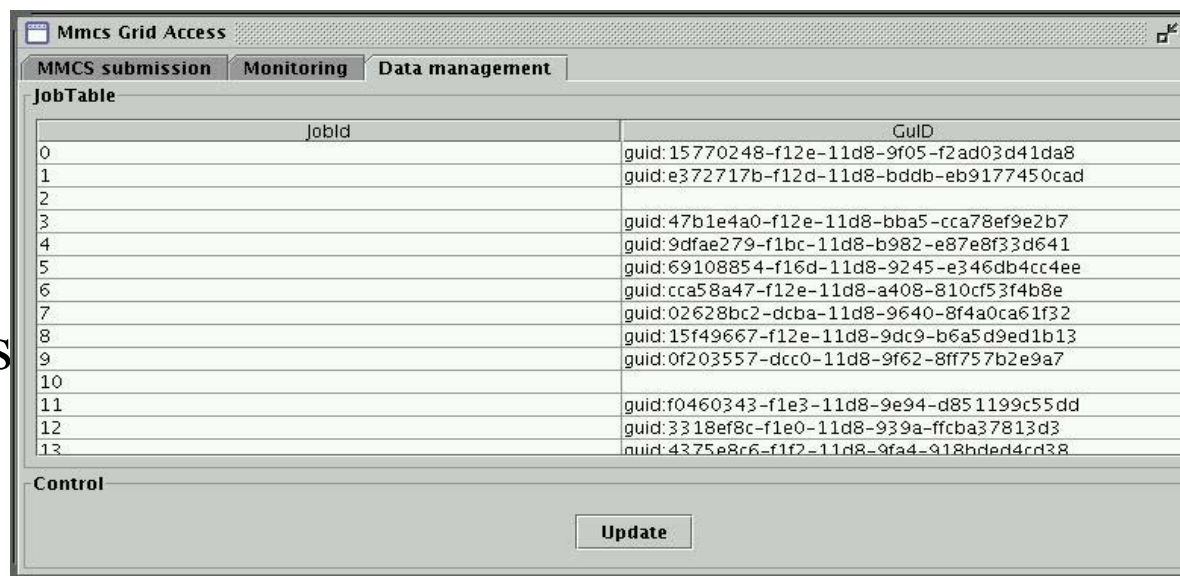
    - Submit jobs

    - Monitor jobs

    - Manage data

-Easy to use GUI

    -Hide LCG commands

    -Java swing GUI

-Job Monitoring and

Data Management based

on a dedicated database

MAGIC @ CrossGrid

- LCG-2 testbed with extentions from CrossGrid

- 16 sites in Europe

MAGIC @ CrossGrid

- LCG-2 testbed with extentions from CrossGrid

- 16 sites in Europe

The first prototype for a MC production system for the MAGIC telescope exists
→A europeanwide system will be setup together with CNAF, PIC and GridKA

The plans for the future
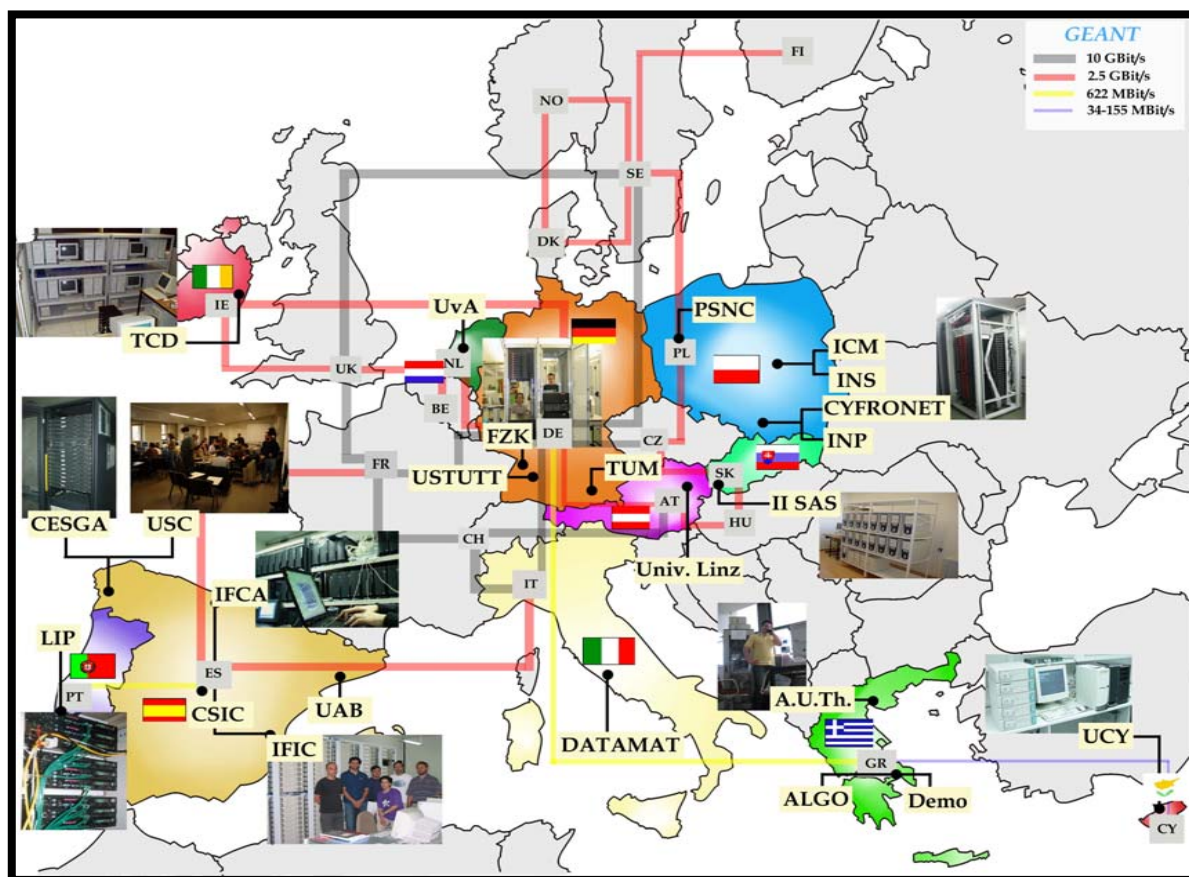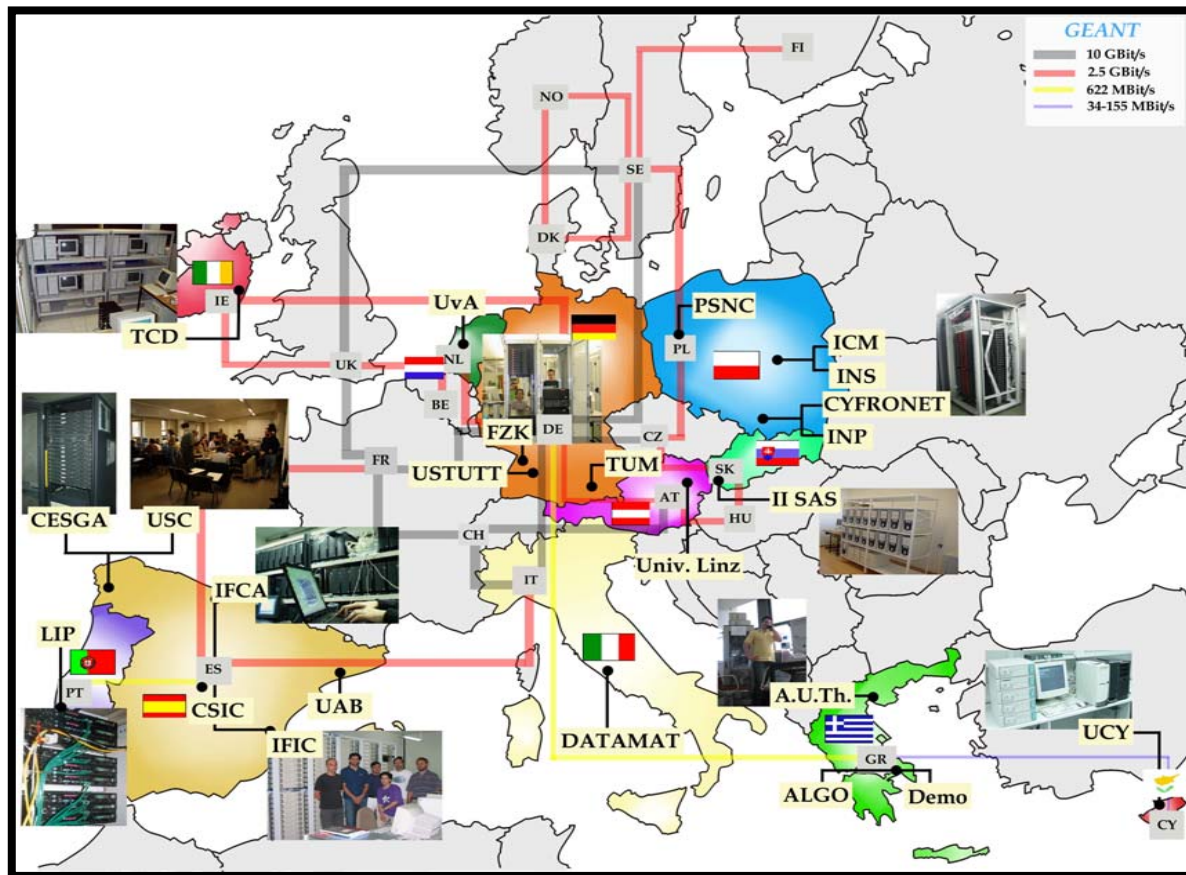
- A magic Virtual Organisation already exists

  - VO server is hosted by SARA/NIKHEF

- CNAF will support the magic VO with a Resource Broker

- PIC will support the magic VO with storage and the RLS

- CNAF, PIC and GridKA will provide CPU cycles

- GILDA can be used for the first test too

- Others sides can join the MC data challange Feb 2005

  - (hopefully)

- Usage of the CrossGrid Migrating Desktop/Roaming Access Server to provide a user friendly GUI for potential Grid Users

Acknowledgement

- Thanks to

  - CNAF, PIC and GridKA for supporting this idea

  - SARA/NIHKEF for hosting the VO service

  - CrossGrid for the usage of the testbed and the migrating desktop

  - The GILDA testbed team for their support (esp. Roberto Barbera)

  - The MAGIC collaborators for supporting this effort

  - EGEE for accepting the MAGIC Grid proposal

  - EGEE for offering a lot of resource in the data challange in Feb 2005