



Enabling Grids for E-sciencE

The EGEE Project

- GridKa as part of the European e-Science Initiative

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Linux Tag 22-25/06/2005



Forschungszentrum Karlsruhe
in der Helmholtz-Gemeinschaft



- Several projects in FP5* (DataGrid, DataTAG, CrossGrid, etc...) and in other EGEE partner states (VDT, Globus, Condor, etc...) demonstrated the viability of Grid technology for data intensive science and produced a large amount of functional middleware
- Next step - *major production infrastructure*
 - proposed to the EU in 2003
- Strong interest from dedicated user communities
 - High Energy Physics
 - Biomedicine

* 5th Framework Programme

EGEE committed to “hit the ground running” at the proposal submission time in 2003

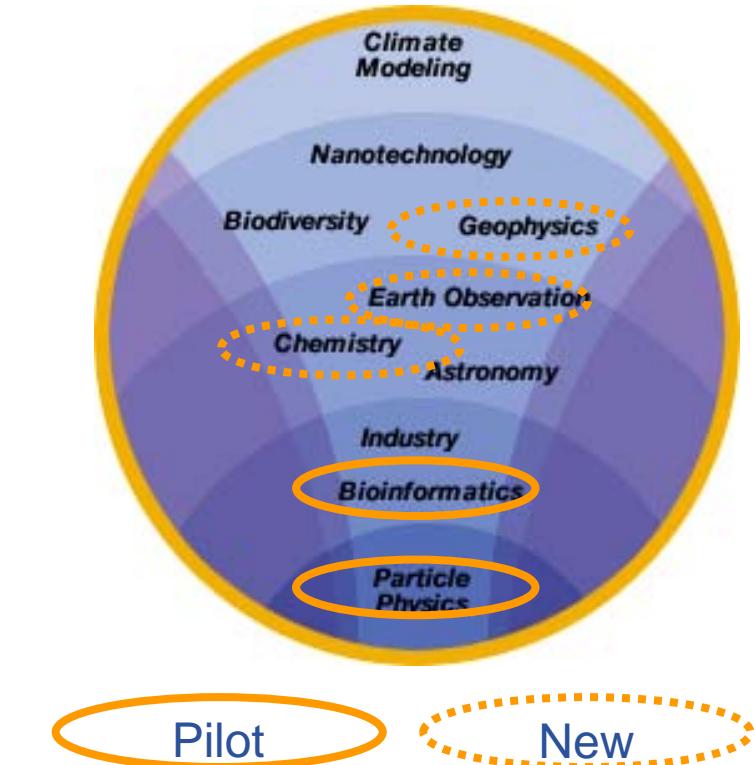
- Strong HEP community focused on the LCG project
- EGEE profits from the resources - no funded computing/data resources in EGEE
- EGEE profits from the HEP applications
- LCG obtains additional production and operation efforts
- LCG contributes specs to new production quality middleware and profit from EGEE S/W development
- LCG has strict deadlines and quality criteria that constantly push EGEE
- Shared management and technical infrastructure
- Many common partners and regional/national funding agencies



Within a four year programme:

- **Build, deploy and operate a consistent, robust and secure grid that attracts new computing resources**
- **Improve and maintain the middleware in order to deliver a reliable service to users**
- **Attract new users from science and industry and ensure training and support for them**

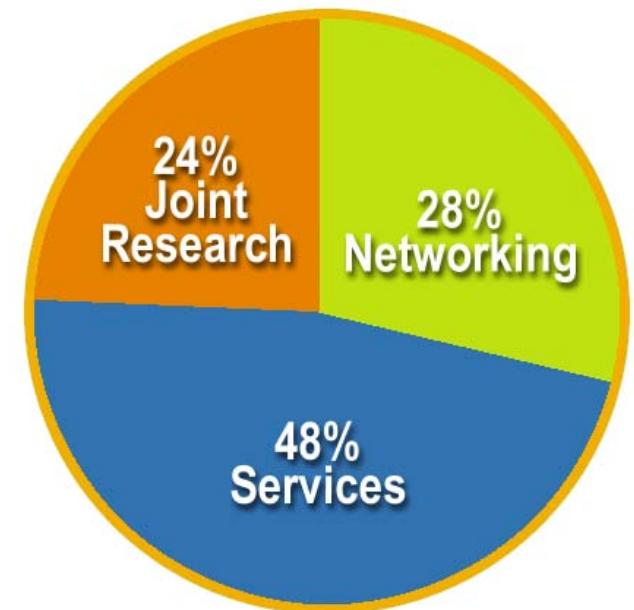
- **Establish production quality sustained Grid services**
 - 3000 users from at least 5 disciplines
 - integrate 50 sites into a common infrastructure
 - offer 5 Petabytes (10^{15}) storage
- **Demonstrate a viable general process to bring other scientific communities on board**
- **Propose a second phase in mid 2005 to take over EGEE in early 2006**



- **70 leading institutions in 27 countries, federated in regional Grids**
- **~32 M Euros EU funding for first 2 years starting 1st April 2004**
- **Leveraging national and regional grid activities**
- **Promoting scientific partnership outside EU**



- **Network Activities**
 - NA1: Project Management
 - NA2: Dissemination and Outreach
 - NA3: User Training and Induction
 - NA4: Application Identification and Support
 - NA5: Policy and International Cooperation
- **Service Activities**
 - SA1: Grid Support, Operation and Management
 - SA2: Network Resource Provision
- **Joint Research Activities**
 - JRA1: Middleware Reengineering + Integration
 - JRA2: Quality Assurance
 - JRA3: Security
 - JRA4: Network Services Development

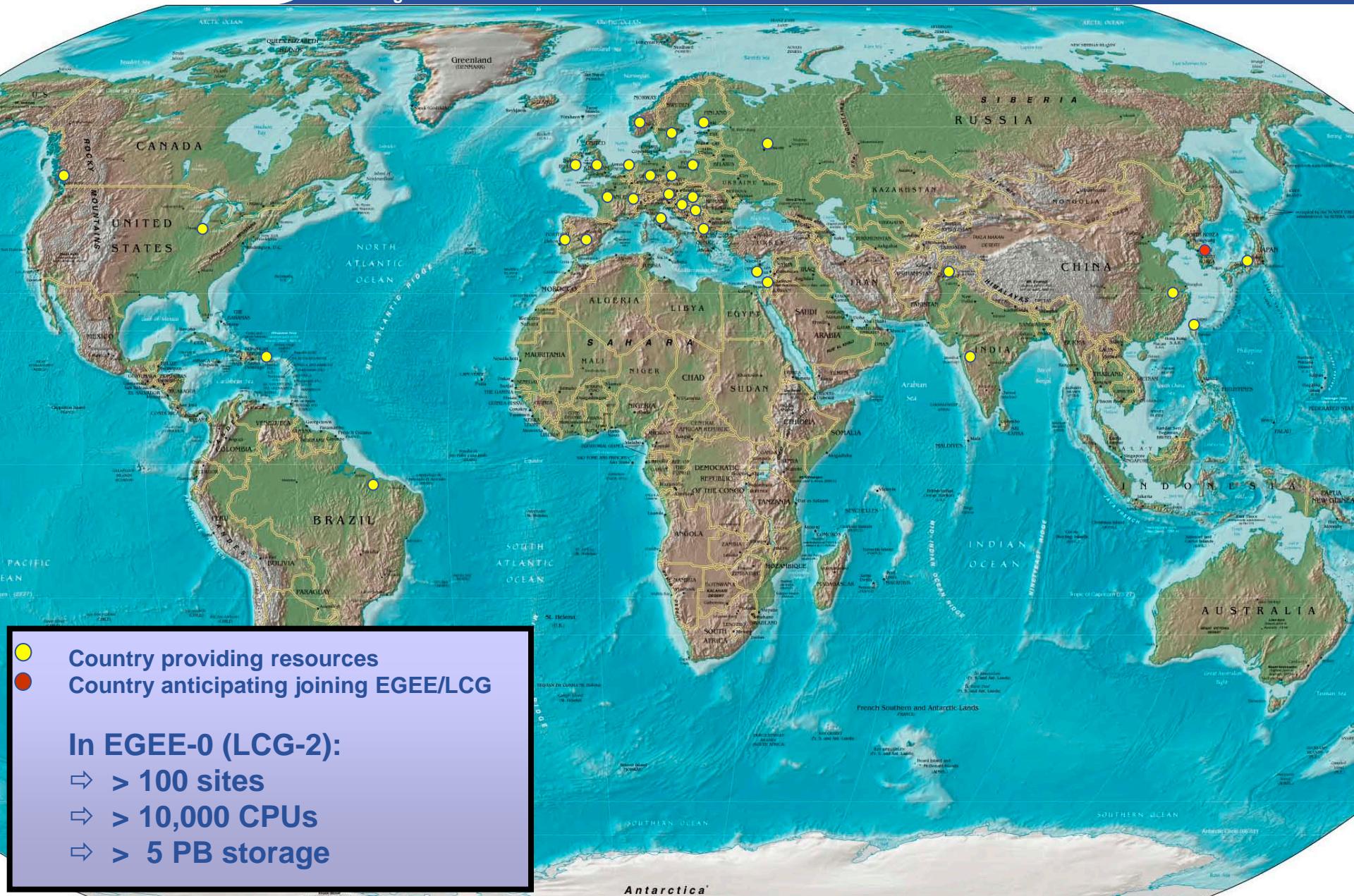


Emphasis in EGEE is on operating a production grid and supporting the end-users

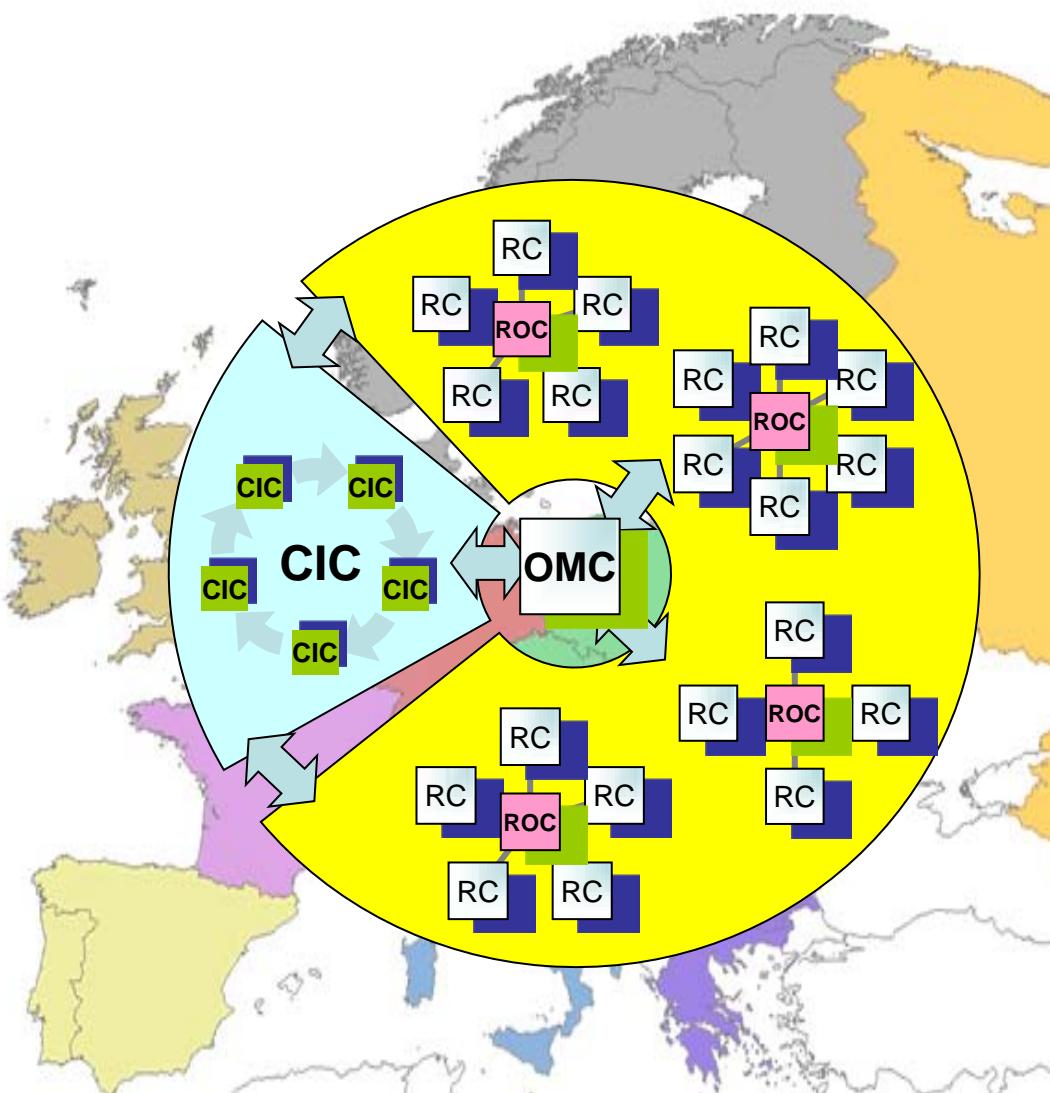
- **NA1:** Project Management
- **NA2:** Dissemination and Outreach **(3)**
- **NA3:** User Training and Induction **(2)**
- **NA4:** Application Identification and Support
- **NA5:** Policy and International Cooperation

- **SA1:** Grid Support, Operation and Management **(1)**
- **SA2:** Network Resource Provision

- **JRA1:** Middleware Reengineering + Integration
- **JRA2:** Quality Assurance
- **JRA3:** Security
- **JRA4:** Network Services Development



SA1 Operations Structure



Operations Management Centre (OMC)

- At CERN – coordination etc

Core Infrastructure Centres (CIC)

- Manage daily grid operations – oversight, troubleshooting
- Run essential infrastructure services
- Provide 2nd level support to ROCs
- UK/I, Fr, It, CERN, + Russia (M12)
- Taipei also run a CIC

Regional Operations Centres (ROC)

- Act as front-line support for user and operations issues
- Provide local knowledge and adaptations
- One in each region – many distributed

Resource Centres (RC)

- The sites providing resources

User Support Centre (GGUS)

- In FZK – manage PTS – provide single point of contact (service desk)

Enabling Grids for E-sciencE

All in One Dashboard

The screenshot shows a web-based dashboard for managing grid operations. It includes several panels:

- Scheduled downtimes in GOCDB**: A table listing scheduled maintenance events across different sites.
- Contact a given site for a given problem**: A panel for selecting problems, sub-problems, and sites.
- Site Functional Tests**: A section indicating if any tests are currently open in Savannah for specific sites.
- LCG2 sites - Tasks: Browse - 2005-Jan-24 16:58**: A detailed view of tasks for LCG2 sites, showing 52 matching items.
- Critical tests failed**, **Job submission failed**, and **Job list match failed**: Three separate lists of failing sites.

- Here are only a few examples:

GIIS Monitor

CERN SITE DATA BASE	
Address: <input type="text" value="RAL - LCG2"/> status: <input checked="" type="checkbox"/> RAL - LCG2	
 Logged In: Paul Nicoula (Site Admin) Authorized CERN member, recently  CERN LCG2	
DB system and web interface designed and maintained by Paul Nicoula in Science Grid Operations Center, PAU	
Site Information - RAL-LCG2	
RDO: Official Name: Rutherford Appleton Laboratory Department Homepage: http://cern.ch/rutherfordappletonlab/ Contact email: RAL-Grid@cern.ch Emergency telephone: +44 (0) 1237 440000 CERN email: cerngrid@cern.ch Operated by: RAL-Grid Supported VO's: CMS, ATLAS, LHCb Grids: LCG2	LHC: RAL-GridPP Tier-1 Computing, Didcotshire UK RAL: http://cern.ch/rutherfordappletonlab/lhc/ LHCb: http://cern.ch/rutherfordappletonlab/lhc/lhcbsite/ ATLAS: http://cern.ch/rutherfordappletonlab/lhc/atlas/ CMS: http://cern.ch/rutherfordappletonlab/lhc/cms/ LCG2: http://cern.ch/rutherfordappletonlab/lcg2/
<input checked="" type="checkbox"/> View Site	

GOC Data Base

The screenshot shows the GridICE web interface with the following sections:

- GridICE** logo with tagline "the ease of the grid".
- Site view**, **VO view**, **Job Monitoring**, **Geo view**, **Grid view**.
- Help** and **About** links.
- Job Monitoring** section with a link to **view History**.
- VO name: Jobs Running** table:

	VO totals	view graph
Jobs Queued	Jobs Total	Jobs Total
afasi	0	111
afasi	0	2
deneb	2	13
deneb	0	15
deneb	0	19
deneb	0	19
TOTAL	2	169
	2	171
- VO name: Jobs Running** table with Site Name: **afasi_wm1** and **afasi**:

	Site Name: afasi_wm1	view graph
Jobs Queued	Jobs Total	Jobs Total
afasi	0	111
afasi	0	2
TOTAL	0	113
	0	113
- VO name: Jobs Running** table with Site Name: **afasi_cegs-cesp.us** and **afasi**:

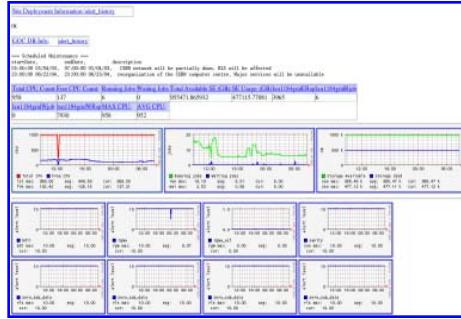
	Site Name: afasi_cegs-cesp.us	view graph
Jobs Queued	Jobs Total	Jobs Total
afasi	1	1
deneb	0	1
TOTAL	1	2
	1	2
- VO name: Jobs Running** table with Site Name: **bastille** and **afasi**:

	Site Name: bastille	view graph
Jobs Queued	Jobs Total	Jobs Total
afasi	1	0
deneb	0	1
TOTAL	1	1
	1	1
- VO name: Jobs Running** table with Site Name: **cegs-cesp.us** and **afasi**:

	Site Name: cegs-cesp.us	view graph
Jobs Queued	Jobs Total	Jobs Total
afasi	0	4
deneb	0	4
TOTAL	0	8
	0	8
- VO name: Jobs Running** table with Site Name: **cegs-cesp.us** and **deneb**:

	Site Name: cegs-cesp.us	view graph
Jobs Queued	Jobs Total	Jobs Total
deneb	0	4
TOTAL	0	4
	0	4

GridIce = VO view



GIIS Monitor graphs

Scheduled Downtimes

The screenshot shows the GridCE web interface with the following details:

- GridCE** logo with tagline "the eye of the grid".
- Site view**, **VO view**, **Job Monitoring**, **Geo view** menu items.
- Select Site** dropdown menu.
- pp.rl.ac.uk** highlighted in blue.
- https://gridce131.grid.rl.ac.uk:443** URL.
- CE UpTime: 14-16:59**
- Last: 0.0-0.0**
- Processes** table:

Process Name	Status	Instf	Run
adg-gridkeeper	S	1	14:18
lmon-agent	S	3	14:18
glite-rcmds	S	35	14:18
glite-rcsh	S	1	14:18
glite-rcshd	S	1	14:18
glite-rcshrd	S	1	14:18
glite-server	S	1	4:21
ndgrid	S	1	14:18
- ce-access-node** highlighted in blue.
- Generated: Wed, 19 Jan 2005 08:27:00 -0000**

GridIce – fabric view

Sites Functional Tests and History

Live Job Monitor

The screenshot displays a map of the world with numerous green dots representing different computing sites. Each dot is accompanied by a small legend indicating its status: a black dot means 'No information', a grey dot means 'Unknown status', a red dot means 'Expired', a blue dot means 'OK', and a yellow dot means 'CRITICAL'. The map includes labels for continents like Europe, Asia, North America, and Australia. A legend box in the bottom left corner provides a key for these status indicators.

Certificate Lifetime Monitor

Accounting

> Accounting Home

Accounting Plots

> Normalised CPU

> CIC View

> ROC View

> Country View

> Custom Query

> Site View

> Privacy Statement

General

> Contact the GOC accounting team

GOC Accounting Services

Latest News

- Tues-18-2005:

We have released a new version (3-4-40) of the accounting processor which minor fixes to the derivation of SpecInt v



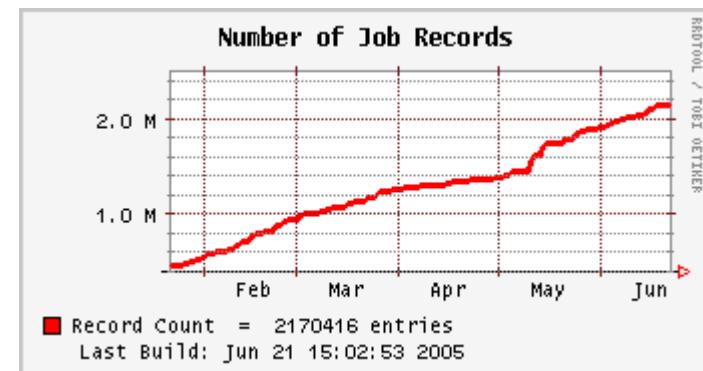
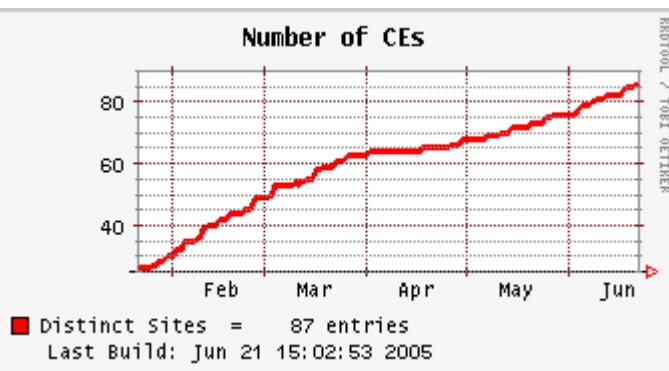
Accounting RPMs Download: [RPM-3.4.41](#) [Release-Notes](#) [Installation Guide](#) [FAQ](#)

- Dec-02-2004:

The Accounting Service is live today.

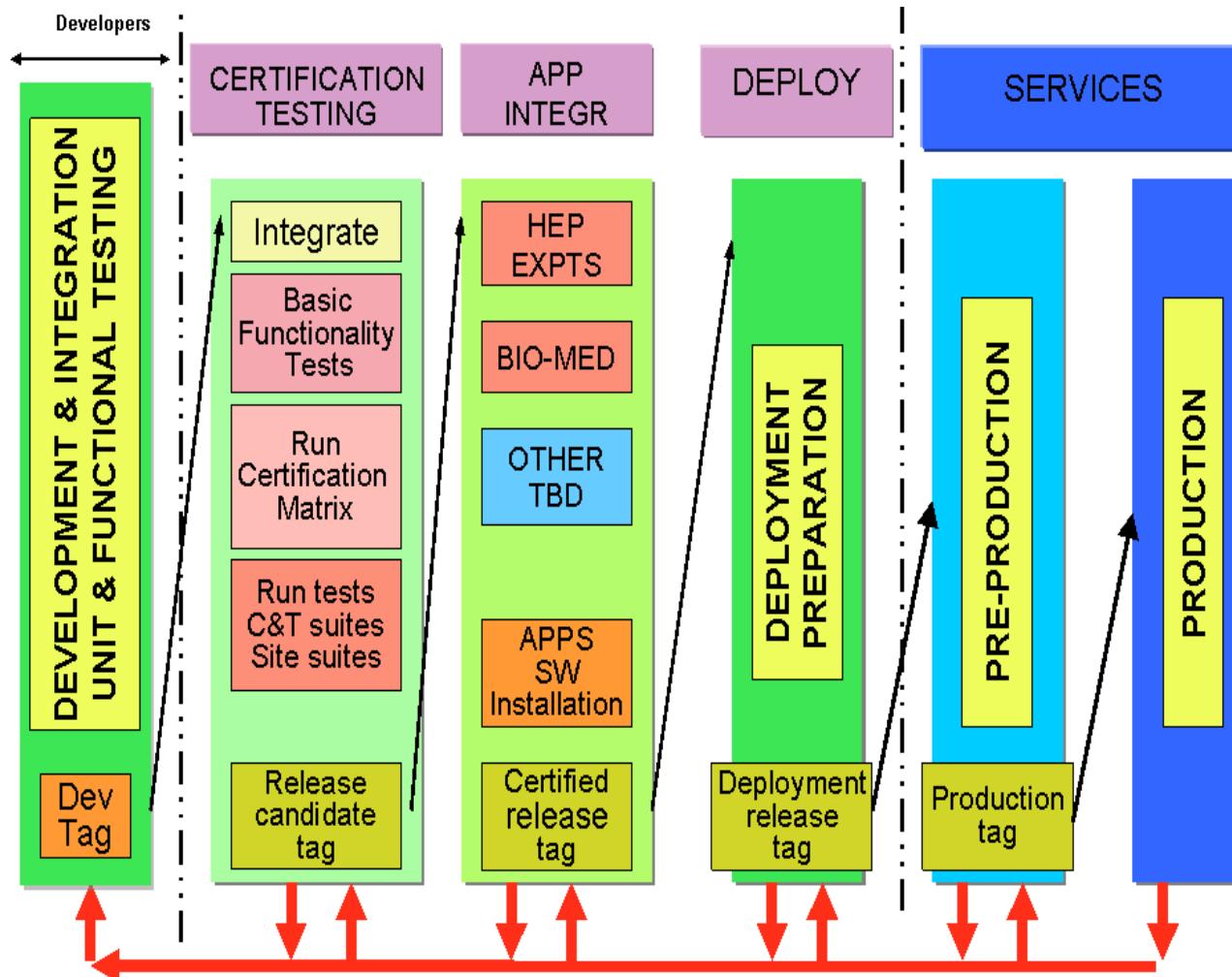
Database Statistics

Total Number of Records in Database

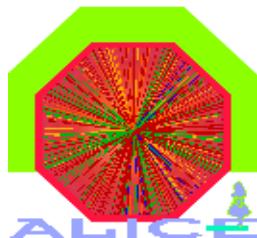


Since LCG 2.4.0 Release: 87 Sites publishing data to GOC (Jun 21th 2005)

Over 2 Million Job records, ~ 80K records per week



- From LCG 1.0 to **GLite**
- Roll-out on **>100 sites !**



Atlas



LHC experiments

have “real” physics data!



(SLAC, USA)



(FermiLab ,USA)



(FermiLab ,USA)



(CERN)

non-LHC experiments



regional
for DE/CH

LHC experiments



A collage of logos for LHC experiments. It includes the CMS logo (yellow and blue), the ATLAS logo (purple globe), the LCG logo (green and yellow squares), and the HCP logo (purple and white). The word "regional" is written in large, bold, orange letters across the top of the collage, and "for DE/CH" is written below it in large, bold, orange letters.

have “real” physics data!



BABAR
(SLAC, USA)



CDF
(FermiLab ,USA)



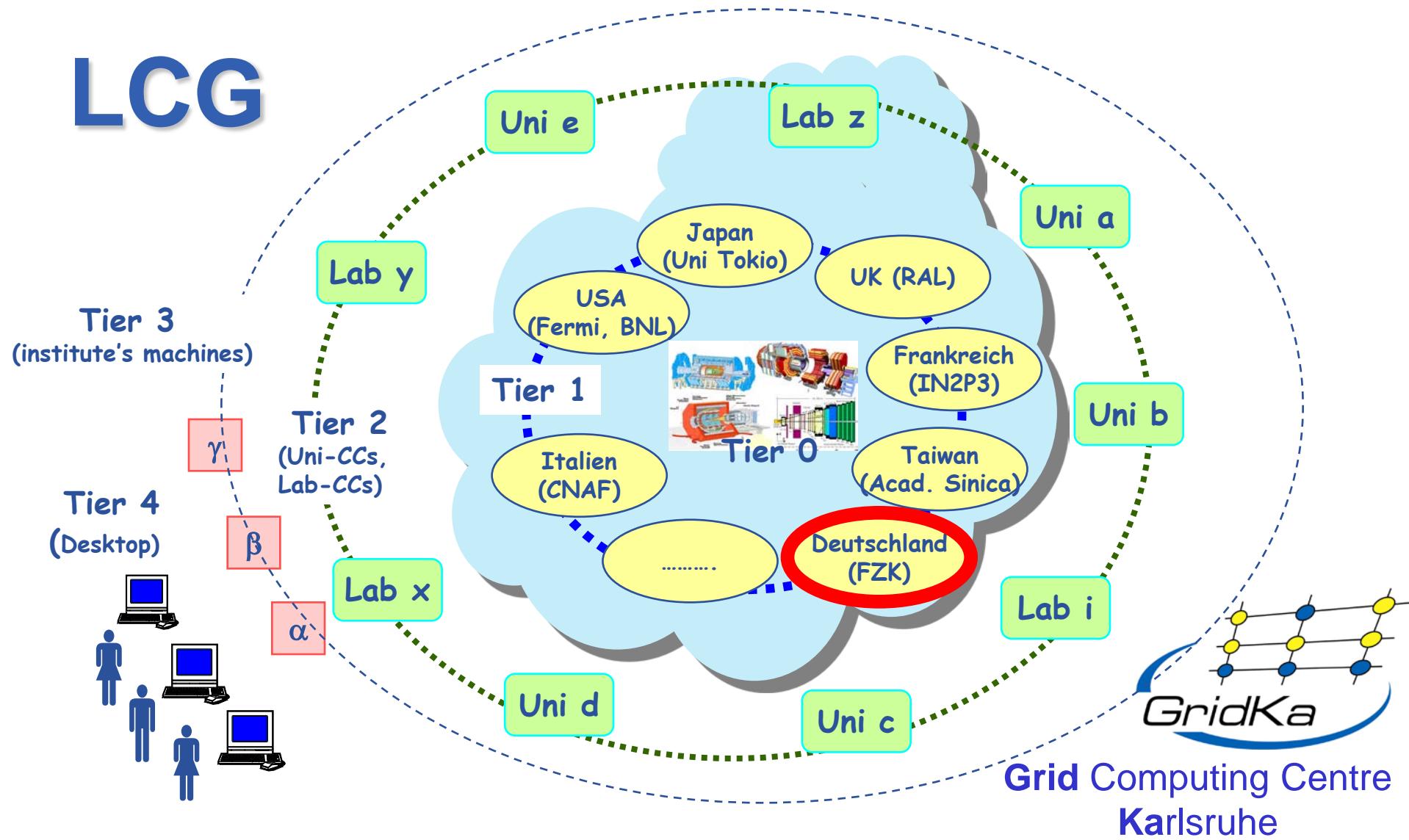
D0
(FermiLab ,USA)



COMPASS
(CERN)

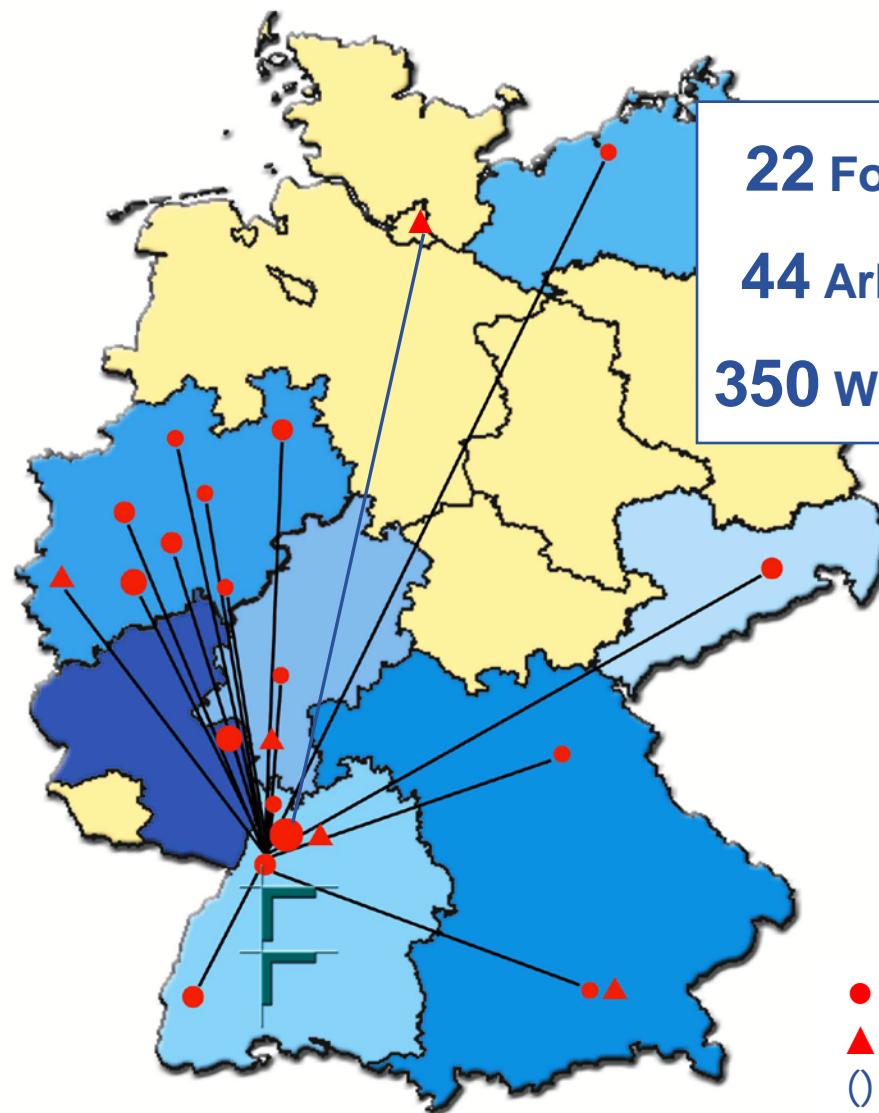
non-LHC experiments

LCG

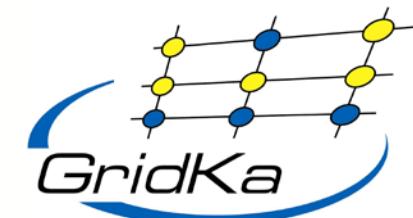


Deutsche Nutzer des GridKa

- Aachen (4)●
- Bielefeld (2)●
- Bochum (2)●
- Bonn (3)●
- Darmstadt (1)▲
- Dortmund (1)●
- Dresden (2)●
- Erlangen (1)●
- Frankfurt (1)●
- Freiburg (2)●
- Hamburg (1)▲
- Heidelberg (1)▲(6)●
- Karlsruhe (2)●
- Mainz (3)●
- Mannheim (1)●
- München (1)●(5)▲
- Münster (1)●
- Rostock (1)●
- Siegen (1)●
- Wuppertal (2)●



22 Forschungseinrichtungen
44 Arbeitsgruppen
350 Wissenschaftler



www.gridka.de

- Universität
- ▲ andere Forschungseinrichtung
- () Anzahl Arbeitsgruppen



- **1280 Linux processors (without servers)**
- **270 TB disk (without local disks)**
- **475 TB tape**
- **1 + 10 Gbit/s WAN**

- In conjunction with the Project Office a series of publicity material has been produced:
 - Fact Sheets
 - Posters
 - Presentations
 - Video
 - Website www.eu-egee.org



- 3rd EGEE Conference, Athens, 18-22 April 2005
- 4th EGEE Conference, Pisa, 24-28 October 2005



Thanks to Fabrizio Gagliardi (CERN), Ian Bird (CERN), Malcom Atkinson (UEDIN), Hélène Cordiere (IN2P3), Dave Kant (RAL) and Torsten Antoni (FZK), whose slides have been used in this talk.