
Polish Grid

# Structure and Status of National Grid Initiative in Poland

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with

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# Outline

- Polish Grid (PL-Grid)
  - Motivation
  - Foundations
- PL-Grid Project
  - Infrastucture
  - Workpackages
- Collaboration – dissemination
- Summary

# CYFRONET Motivation for PL-Grid Initiative

## International Projects

- 6WINIT (IST-2000-25153) (2001-2003)
  - IPv6 Wireless Internet IniTiative
- **CROSSGRID** (IST-2001-32243), coordinator (2002-2005)
  - Development of Grid Environments for Interactive Applications
- PELLUCID (IST-2001-34519) (2002-2004)
  - A Platform for Organizationally Mobile Public Employees
- **GridStart** (IST-2001-34808) (2002-2005)
  - Grid dissemination, standarisation, applications, roadmap ...
- Pro-Access (IST-2001-38626) (2002-2004)
  - Improving Access to Advanced Concepts In Medical Informatics
- **EGEE I/II/III** (2004-2006-2008-2010) (running CE ROC)
  - Enabling Grids for e-Science in Europe (EU 6-7FP)
- K-WfGrid (FP6-511385) (2004-2007)
  - Knowledge-based Workflow System for Grid Applications
- **CoreGrid** (FP6-IST 004265) (2004-2008)
  - European Research Network ...
- Virolab (FP6-027446) (2006-2009)
  - A virtual laboratory for decision support in viral diseases treatment
- Gredia (FP6-34363) (2006-2008)
  - Grid enabled access to rich media content
- **Int.eu.grid** (FP6-031857) (2006-2008)
  - Interactive European Grid
- **EGI_DS** (FP7-RI-211693) (2007-2013) (participation in Policy Board)
  - European Grid Initiative
- **PRACE** (FP7-RI-211528) (2007-2013) (subcontractor of PCSS)
  - Partnership for Advanced Computing in Europe

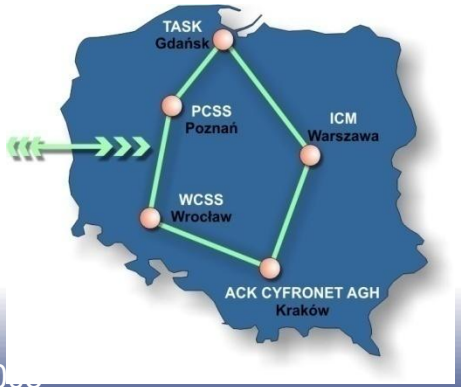
## Polish Projects

- PIONIER (Polish Optical Network)
- PROGRESS (SUN + GRID)
- SGIgrid (SGI + GRID)
- CLUSTERIX („cluster of clusters")
- KCT (Cracow Telemedicine Center)
- KMD (National Data Storage)

## Close collaboration

with Institute of Computer Science AGH-UST

## Invitation to establish PL-Grid



# Partners' Motivation

| No. | Acronym | Period | | Polish Partners |
|---|---|---|---|---|
| 1 | EUROGRID | 2000 | 2003 | ICM |
| 2 | PRO-ACCESS | 2001 | 2004 | ACK Cyfronet AGH |
| 3 | CROSSGRID | 2002 | 2005 | ACK Cyfronet AGH, ICM, PCSS |
| 4 | GRIP | 2002 | 2003 | ICM |
| 5 | Progress | 2001 | 2003 | PCSS, ACK Cyfronet and others |
| 6 | SGI Grid | 2002 | 2005 | ACK Cyfronet AGH, PCSS, WCSS, TASK and others |
| 7 | Clusterix | 2003 | 2005 | Polish MANs |
| 8 | Virolab | 2006 | 2009 | ACK Cyfronet AGH |
| 9 | EGEE I | 2004 | 2006 | ACK Cyfronet AGH, ICM, PCSS, WCSS |
| 10 | EGEE II | 2006 | 2008 | ACK Cyfronet AGH, ICM, PCSS, WCSS |
| 11 | EGEE III | 2008 | 2010 | ACK Cyfronet AGH, ICM, PCSS, WCSS |
| 12 | Int.eu.grid | 2006 | 2008 | ACK Cyfronet AGH, ICM, PCSS |
| 13 | K-Wf Grid | 2004 | 2007 | ACK Cyfronet AGH |
| 14 | Ambient Networks | 2006 | 2007 | ACK Cyfronet AGH |
| 15 | GREDIA | 2006 | 2009 | ACK Cyfronet AGH |
| 16 | iTVP | 2002 | 2007 | ACK Cyfronet AGH, ICM, PCSS |

# Partners' Motivation

| No. | Acronym | Period | | Polish Partners |
|---|---|---|---|---|
| **17** | **Cracow Telemedicine Center** | 2001 | 2003 | ACK Cyfronet AGH, Depts. of Computer Science and of Telecommunications AGH, Depts. of Collegium Medicum UJ |
| **18** | **UniGrids** | 2004 | 2006 | ICM |
| **19** | **CoreGrid** | 2004 | 2007 | ACK Cyfronet AGH, PCSS |
| **20** | **BalticGrid** | 2005 | 2008 | IFJ PAN, PCSS |
| **21** | **BalticGrid-II** | 2008 | 2010 | IFJ PAN, PCSS |
| **22** | **RINGrid** | 2006 | 2008 | PCSS |
| **23** | **EXPReS** | 2006 | 2009 | PCSS, Astronomy Center |
| **24** | **Phosphorus** | 2006 | 2009 | PCSS |
| **25** | **DORII** | 2008 | 2010 | PCSS |
| **26** | **Euforia** | 2008 | 2010 | PCSS |
| **27** | **g-Eclipse** | 2006 | 2009 | PCSS |
| **28** | **PRACE** | 2008 | 2010 | PCSS (subcontractors: ACK Cyfronet AGH, ICM, TASK, WCSS) |

# Partners' Motivation

| No. | Acronym | Period | | Polish Partners |
|---|---|---|---|---|
| 29 | National Data Storage | 2007 | 2009 | PCSS, ACK Cyfronet AGH, TASK, WCSS and others |
| 30 | e-IRGSP2 | 2002 | 2004 | PCSS |
| 31 | Porta Optica Study | 2006 | 2007 | PCSS |
| 32 | GridLab | 2002 | 2004 | PCSS |
| 33 | InteliGrid | 2004 | 2007 | PCSS |
| 34 | HPC-Europa | 2004 | 2007 | PCSS |
| 35 | BREIN | 2006 | 2009 | PCSS |
| 36 | BEinGRID | 2006 | 2009 | PCSS |
| 37 | ACGT | 2006 | 2009 | PCSS |
| 38 | OMII-EUROPE | 2006 | 2007 | PCSS |
| 39 | QosCosGrid | 2006 | 2008 | PCSS |
| 40 | Chemomentum | 2006 | 2008 | ICM |

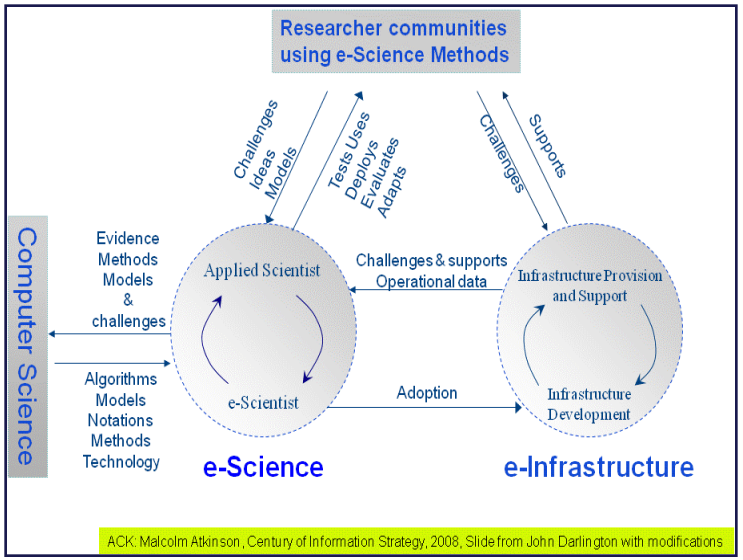
# Need by Polish Scientific Communities

**Distribution of Polish publications in period 01.2004 – 04.2008**
**according to**
**Science Citation Index Expanded + Social Science Citation Index + Arts & Humanities Citation Index**

| Scientific Community / Representative | % Polish publications |
|---|---|
| Warsaw / ICM | 29,0 % |
| Cracow / Cyfronet | 16,4 % |
| Wrocław / WCSS | 11,1 % |
| Poznań / PCSS | 10,1 % |
| Gdańsk / TASK | 6,8 % |
| SUM | 73,4 % |
| Poland | 100 % |

# Need for e-Science Approach

- E-Science: collaborative research supported by advanced distributed computations
  - Multi-disciplinary, Multi-Site and Multi-National
  - Building with and demanding advances in Computing/Computer Sciences
- Goal: to enable better research in all disciplines
- System-level Science: beyond individual phenomena, components interact and interrelate
  - to generate, interpret and analyse rich data resources
    - From experiments, observations and simulations
    - Quality management, preservation and reliable evidence
  - to develop and explore models and simulations
    - Computation and data at all scales
    - Trustworthy, economic, timely and relevant results
  - to enable dynamic distributed collaboration
    - Facilitating collaboration with information and resource sharing
    - Security, trust, reliability, accountability, manageability and agility




I. Foster, System Level Science and System Level Models, Snowmass, August 1-2, 2007
M. Atkinson, e-Science (...), Grid2006 & 2-nd Int.Conf.e-Social Science 2006, National e-Science Centre UK

# National and International Initiatives


- Ongoing European and Worldwide consolidation
  - EGEE
  - EGI_DS, EGI
  - DEISA
  - PRACE
  - .....

# PL-Grid Foundations

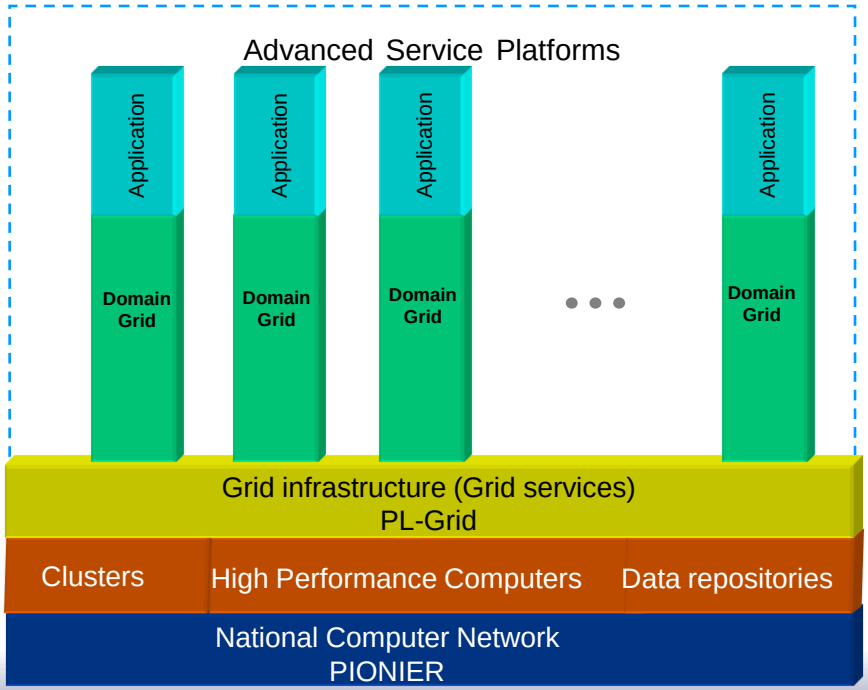
Response to the needs of Polish scientists and ongoing Grid activities in Poland, other European countries and all over the world

- Motivation
  - E-Science approach to research
  - EGI initiative ongoing in collaboration with NGIs
- Creation of Polish Grid (PL-Grid) Consortium: http://plgrid.pl
  - Agreement signed in January 2007
- PL-Grid Project (2009-2011)
  - Application in Operational Programme Innovative Economy, Activity 2.3 (in Sept. 2008)
- Consortium made up of five largest Polish supercomputing and networking centres (founders)

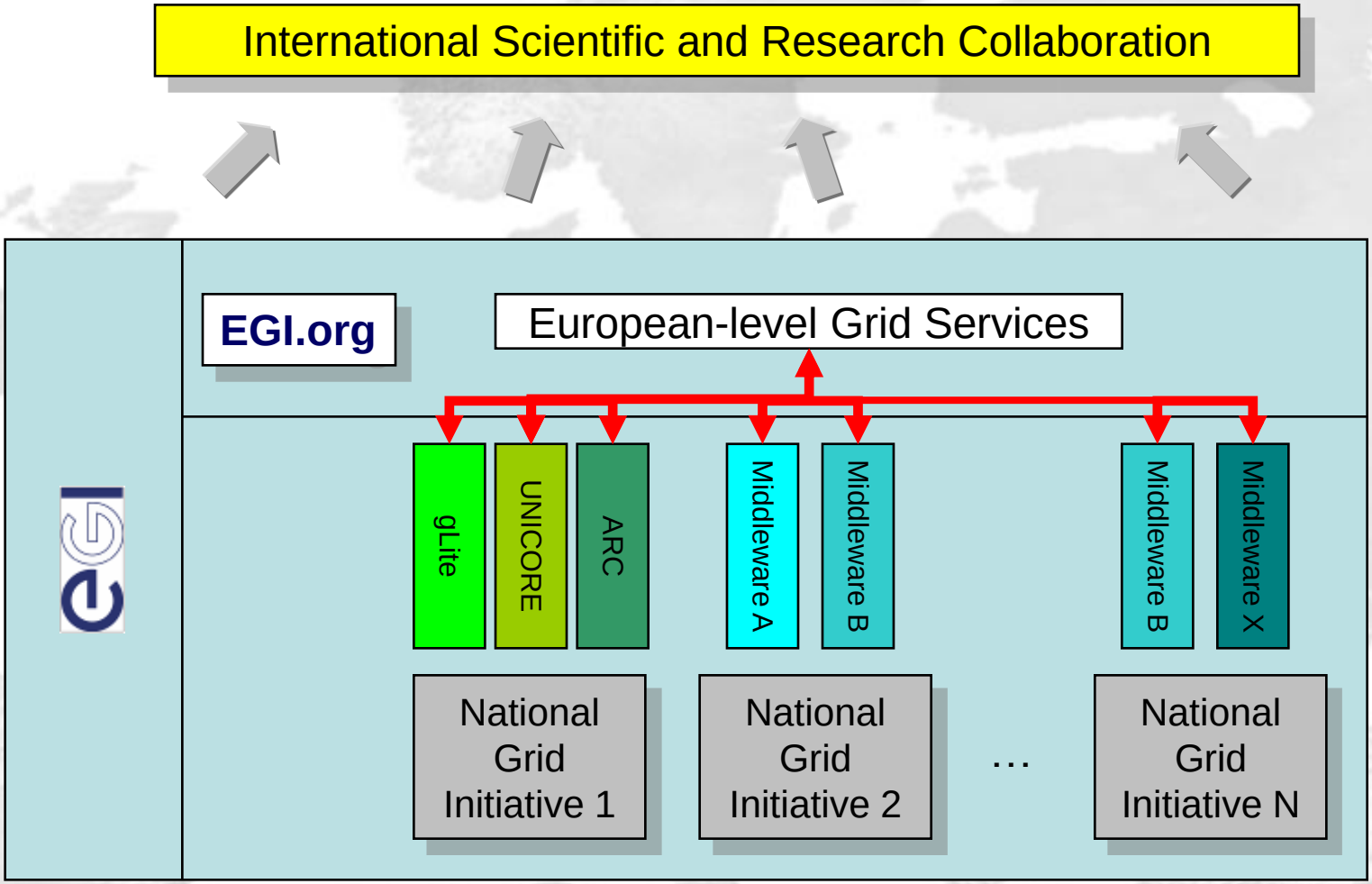
- Academic Computer Center Cyfronet AGH (**ACK CYFRONET AGH**) -- Coordinator
- Poznań Supercomputing and Networking Center (**PCSS**)
- Wrocław Centre for Networking and Supercomputing (**WCSS**)
- Academic Computer Center in Gdańsk (**TASK**)
- Interdisciplinary Center for Math. and Computat. Modelling, Warsaw University (**ICM**)

# PL-Grid Infrastructure

- Assumptions
  - Polish Grid is going to have a common base infrastructure – similarly to solutions adopted in other countries.
  - Specialized, domain Grid systems – including services and tools focused on specific types of applications – will be built upon this infrastructure.
  - These domain Grid systems can be further developed and maintained in the framework of separate projects.
  - Such an approach should enable efficient use of available financial resources.



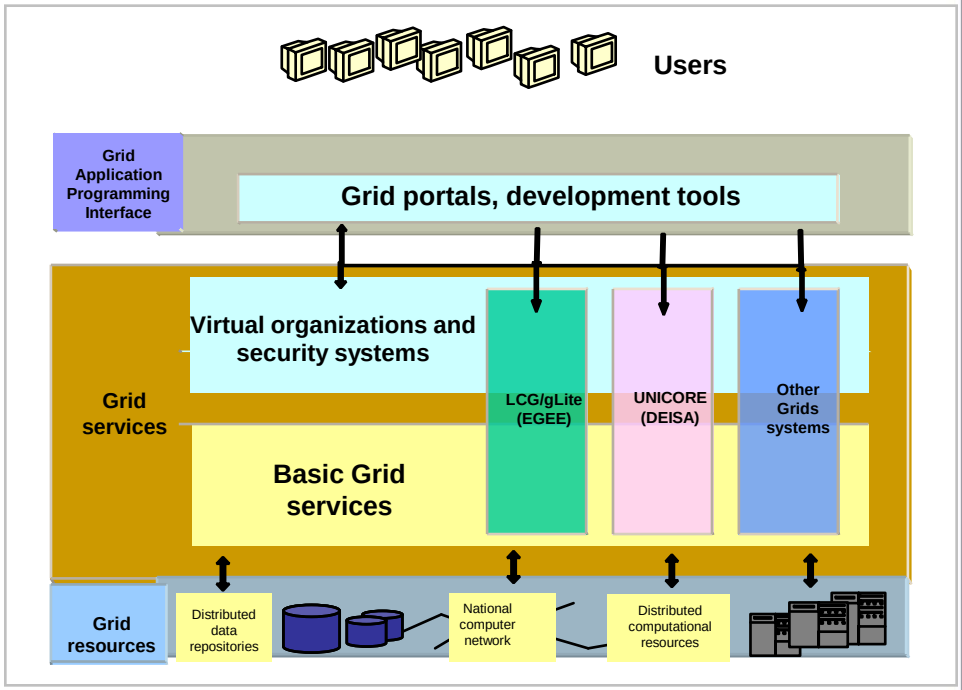
# EGI Infrastructure



# Tasks and Activities

- The Project should provide scientific communities in Poland with Grid services, enabling realization of the e-Science model in various scientific fields.
- We plan to achieve this through:
  - creation of a Grid infrastructure fully compatible and interoperable with European and World Grids thanks to cooperation with teams involved in the development of European Grid systems (EGEE, DEISA, OMII, C-OMEGA, ESFRI),
  - ensuring the operation of this infrastructure in the production mode,
  - enabling the operation of domain Grids,
  - using and propagating Grid standards,
  - adjusting PL-Grid to user needs,
  - integration, testing and installation of software produced by leading Grid Projects (Polish and international),
  - organization of support for PL-Grid users (training, helpdesk, consultations),
  - PL-Grid management.

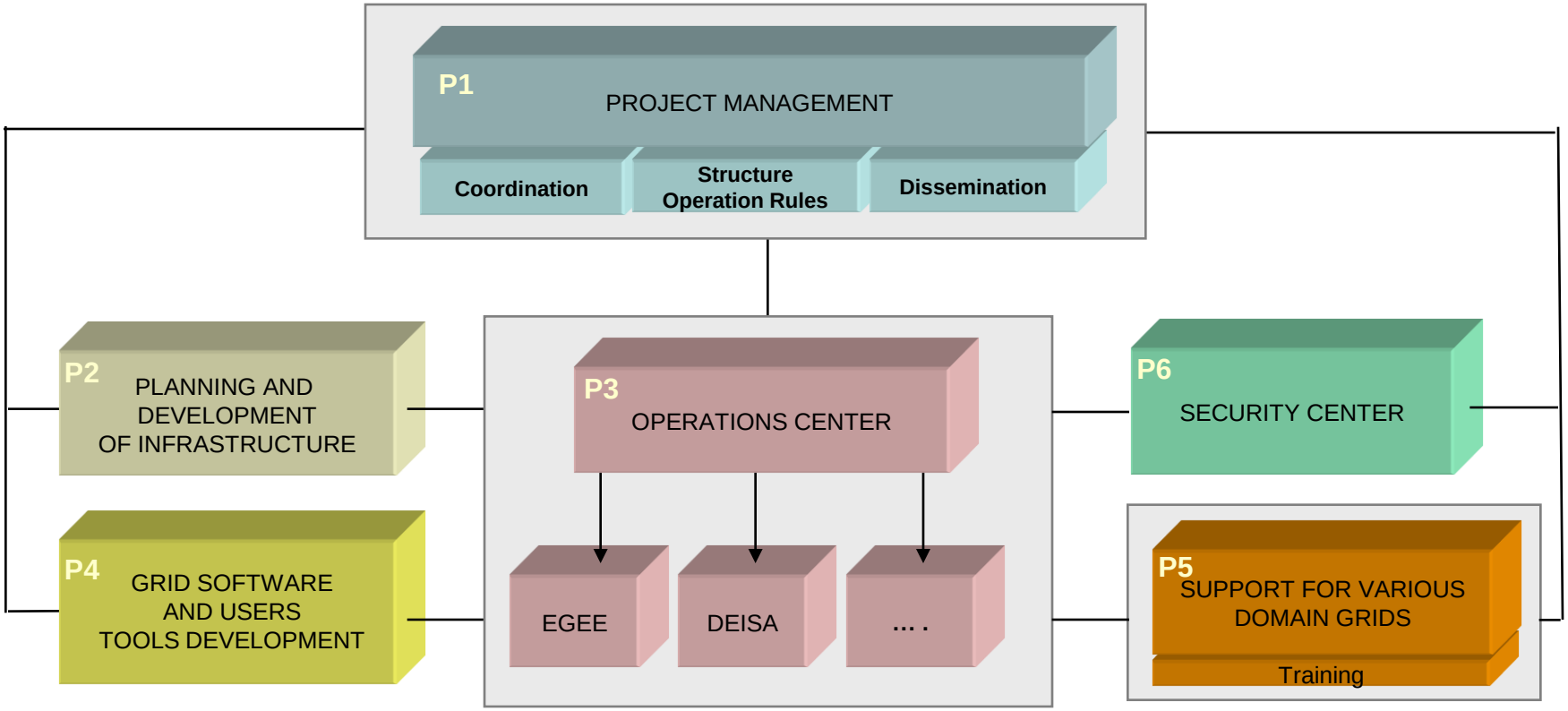
- PL-Grid software will comprise:
  - user tools (portals, systems for applications management and monitoring, result visualization and other purposes, compatible with the lower-layer software used in PL-Grid);
  - software libraries;
  - virtual organization systems: certificates, accounting, security;
  - data management systems: metadata catalogues, replica management, file transfer;
  - resource management systems: job management, applications, grid services and infrastructure monitoring, license management, local resource management.




- In the framework of PL-Grid, three Grid structures, namely production, development and testing, will be maintained. These structures are reflected by the activities performed within work packages.

# Planned Realization of Aims

The PL-Grid Project is split into several workpackages



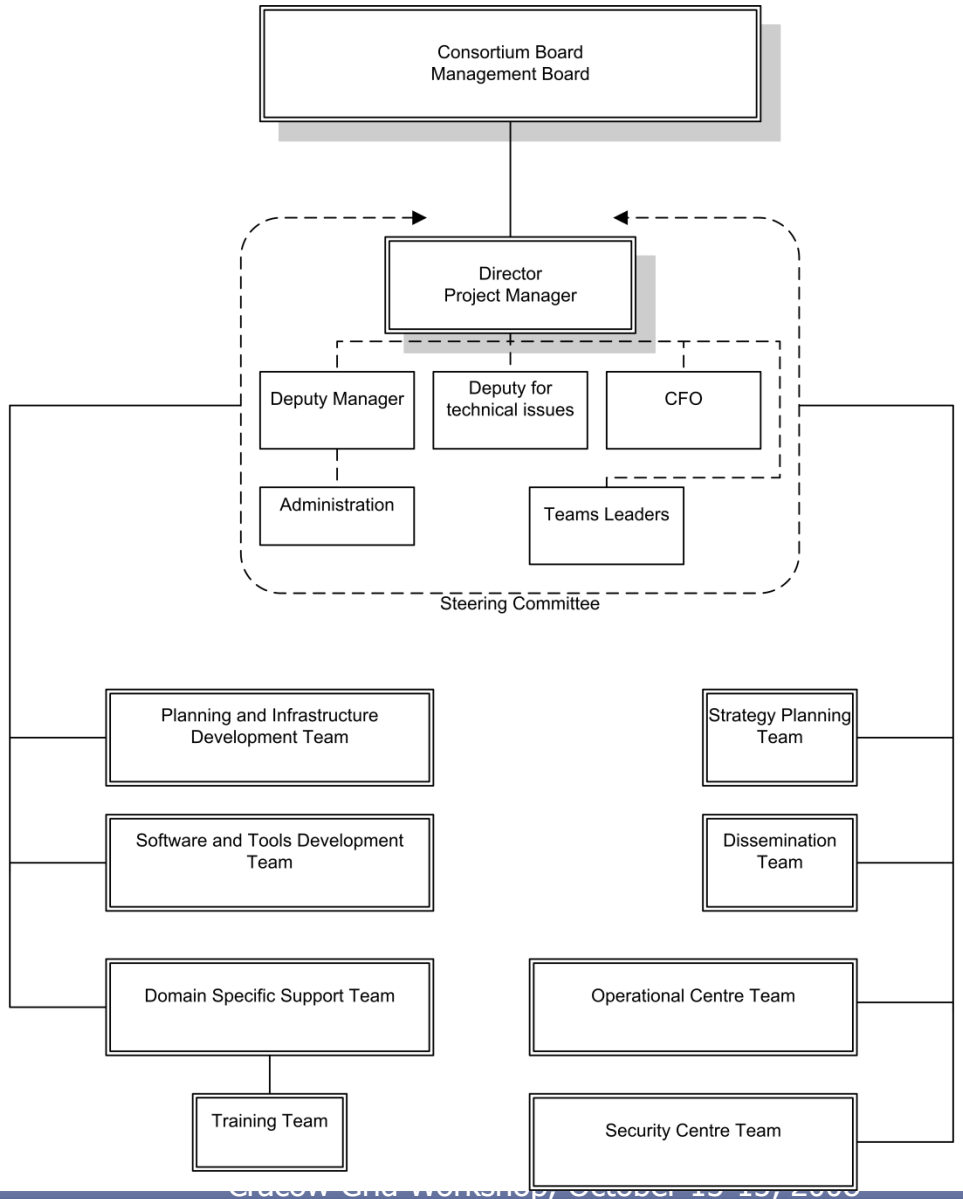

Main Project Indicators:

- Peak Perf.: 215 Tflops
- Disk Storage: 2500 TB

# Workpackages Distribution

- Project management (including structure and dissemination) – *coordinated by ACK CYFRONET AGH (Kraków),*
- Planning and development of infrastructure – *TASK (Gdańsk),*
- Operations Center – *ACK CYFRONET AGH*
- Grid Software and Users Tools development – *PCSS (Poznań),*
- Support for domain Grids – *ICM (Warsaw),*
- Security Center – *WCSS (Wrocław)*

# Management and Organization

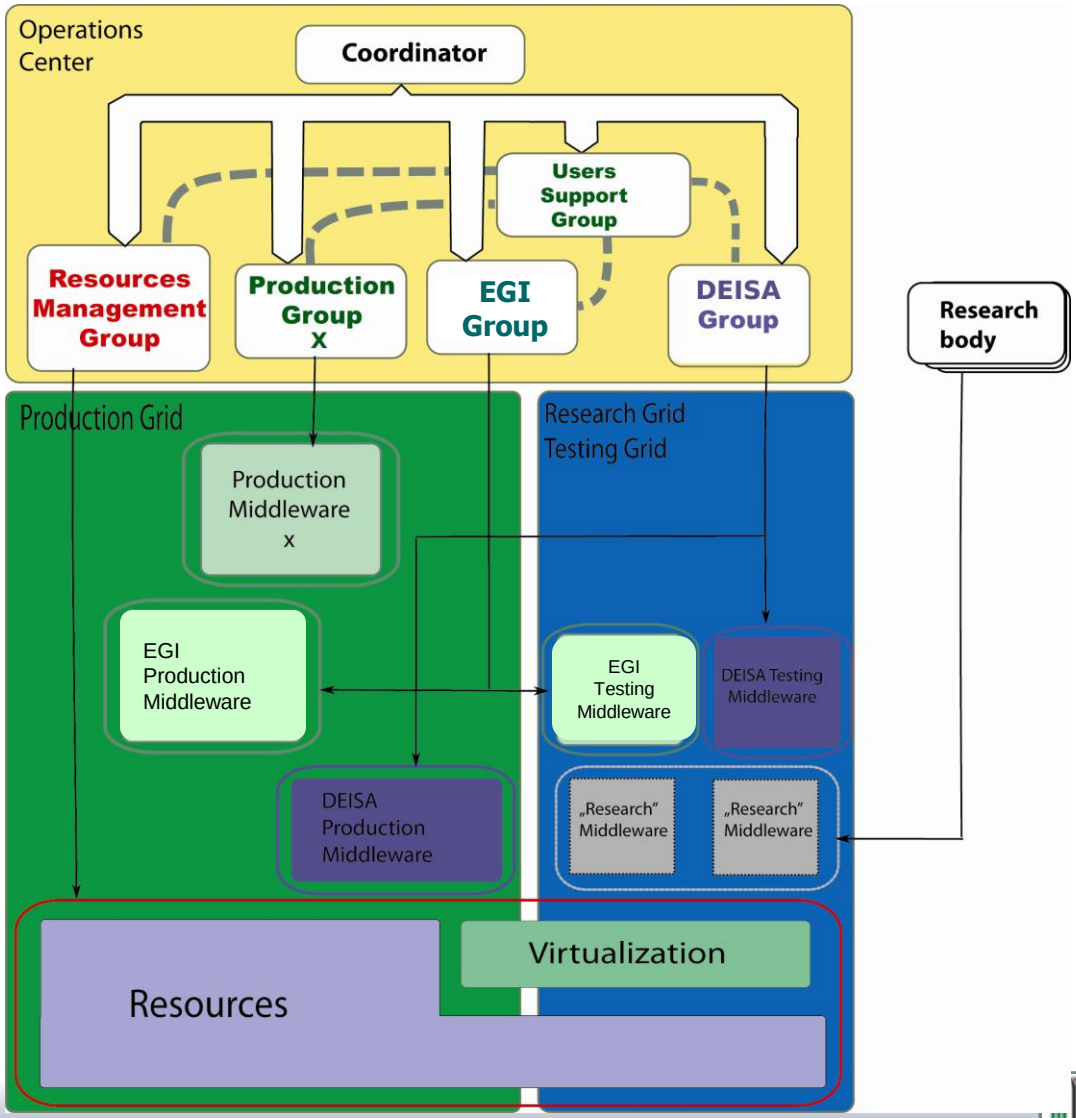


# WP2: Planning of Infrastructure Development

- Analysis of users' requirement
- Analysis of worldwide activity in infrastructure development

# WP3: Operations Center's tasks

- Coordination
- Management and accounting
- EGI and DEISA collaboration
- Users' requirements



# WP4: Grid Software and Users Tools

- Analysis of users' requirement
- Software repository
- Rengineering of tools and applications
- High-level virtual organizations using knowledge, data access
- Virtual laboratory, workflows
- Tools for management, monitoring and security

# WP5: Support and Training

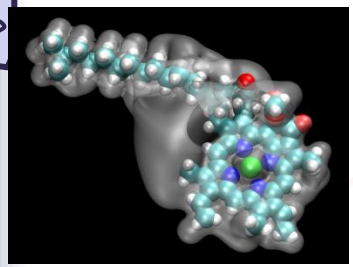
- Users' support
- Making commercial software available for the users (license activity)
- Training, education

# WP6: Security

- Users' support
  - Authorization, authentication, ...
  - Certificates ...

# Dissemination Activities

- EGI_DS – Coordinator activity
  - Policy Board (deputy: M. Turala),
  - NGI Observers -- „Polish Experts" (WP3, WP5) participation in Workshops, resulted in EGI_DS draft deliverables, use-cases ...
- EGEE
  - From Cyfronet: chairing Resource Allocation Group in EGEE-III – trying to influence EGI
    - Group has a mandate to manage current process of resource allocation in EGEE and propose better model for future
    - More: https://twiki.cern.ch/twiki/bin/view/EGEE/RAG
- E-IRG – Coordinator activity
  - Workshops
  - Discussions on EGEE – EGI – NGI future
- ENPG seminar in Cracow (2008)
- Others
  - CGW 2007 (and 2008)
  - Cyfronet Users' Annual Conference (2008)
  - Cyfronet Open Day (2007, 2008)



# Other Activities

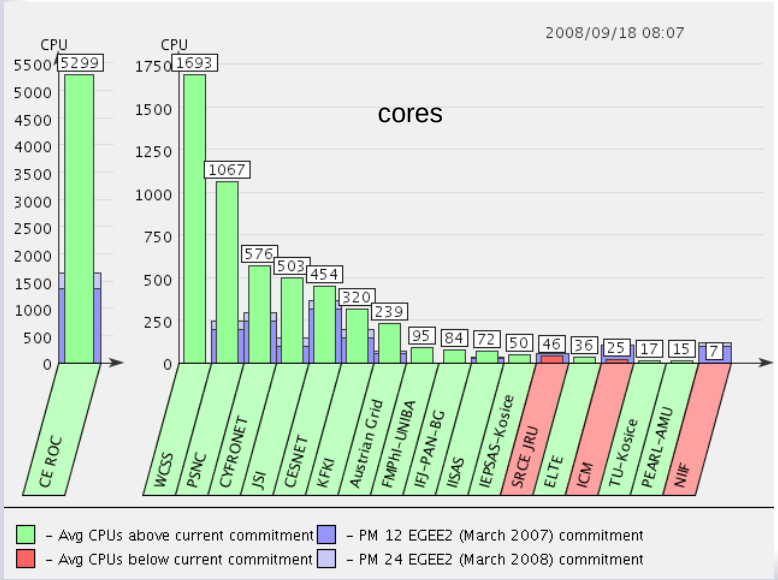
- Computational Chemistry in EGEE
  - Third CPU power consumer
    - Nearly 3 million of jobs executed during 2007
  - Lead by Cyfronet since 2006
    - Recently management of Computational Chemistry Cluster of Excellence
  - In parallel current effort include:
    - Grid ports of commercial and non commercial software packages with particular focus on their parallel version
    - Development of “experiment centric” grid web portal for chemists
- EGEE III / CE ROC

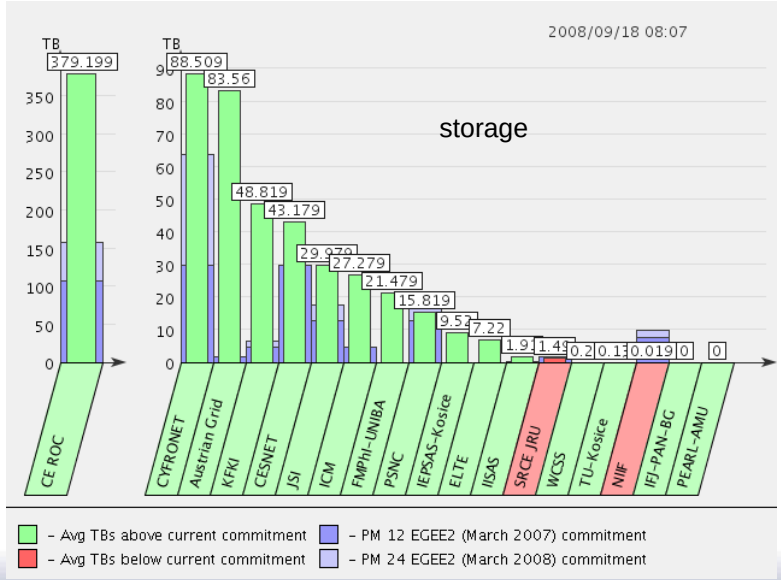
# EGEE-III / CE ROC

Polish Grid

- **CE ROC – coordinator: ACK CYFRONET-AGH**
  - Consortium consists of institutes from 7 countries: Austria (2), Croatia (3), Czech (1), Hungary (5), Poland (4), Slovakia (1), Slovenia (1)
  - Operate, maintain and support EGEE Grid Infrastructure in CE region
  - Virtual Organizations supported in Central European region: HEP, computational chemistry, biomedicine, pharmacology, astrophysics, earth science and regional users (VOCE VO)


## Published by sites






# Conclusions

- Consortium established
- Proposal prepared – application for funds in Operational Programme Innovative Economy, activity 2.3 (in Sept. 2008)
- International activity undertaken
- We believe that PL-Grid is a strategic initiative boosting international collaboration and scientific activity with Polish Institutions allowing for e-Science approach