



Grid Activities in Poland

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Outline

- PSNC
- National Program PIONIER
- Sample projects: **Progress** and **Clusterix**

R&D Center

PSNC was established in 1993
and is an R&D Center in:

– New Generation Networks

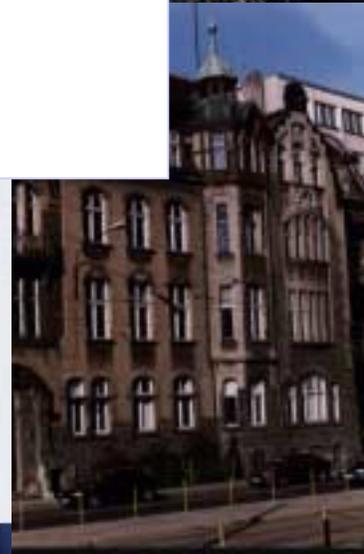
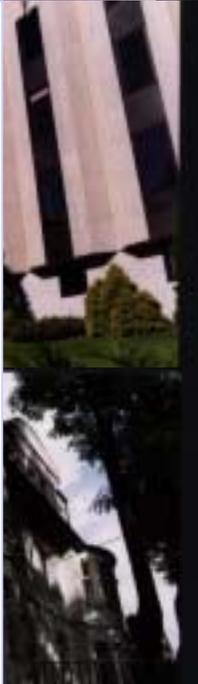
- POZMAN and PIONIER networks operator
- 6-NET, SEQUIN, ATRIUM, MUPBED projects

– HPC and Grids

- **5FP**: GRIDLAB (coord.), CROSSGRID, GRIDSTART
- **6FP**: HPC-Europa, InteliGrid, GridCoord, CoreGrid, EGEE
- **National**: **Progress**, **Clusterix**, VLab
- European Grid Support Center
- Globus Academic Affiliate
- CEGC member

– Portals and Content Management Tools

- Polish Educational Portal "Interkl@sa",
- Multimedia City Guide,
- Digital Library Framework,
- Interactive TV



PIONIER

- National Infrastructure and R&D program
- Full title: Polish Optical Internet – Advanced Applications, Services and Tools for Information Society
 - Building the national optical network (see: A. Binczewski presentation)
 - Developing Grid and other services and tools for applications
 - Projects: Progress, Clusterix, SGIGrid, iTV, and more

PROGRESS

Access to Grid Services and Resources

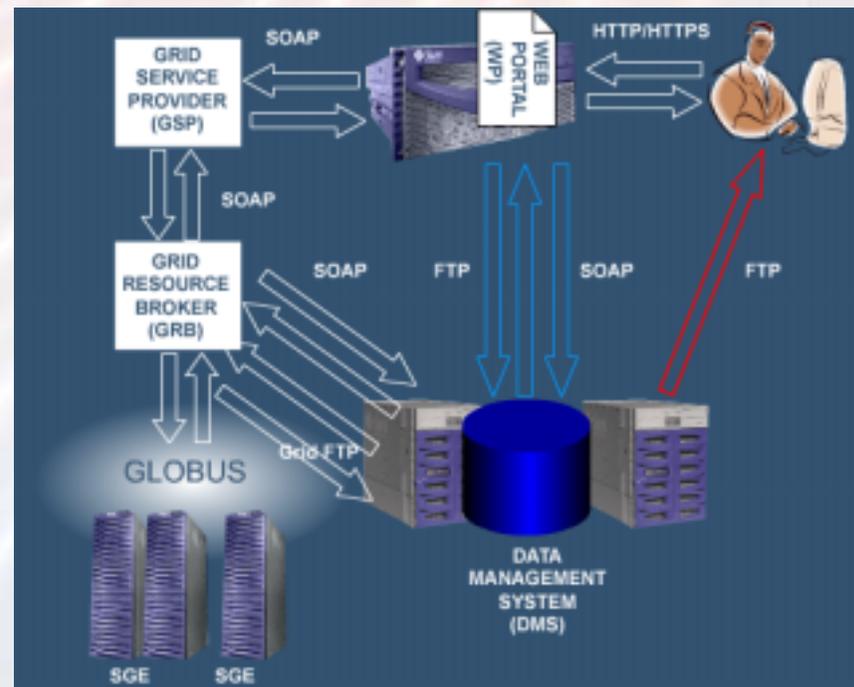
<http://progress.psnc.pl/>

PROGRESS

Access to grid resources and services

PROGRESS

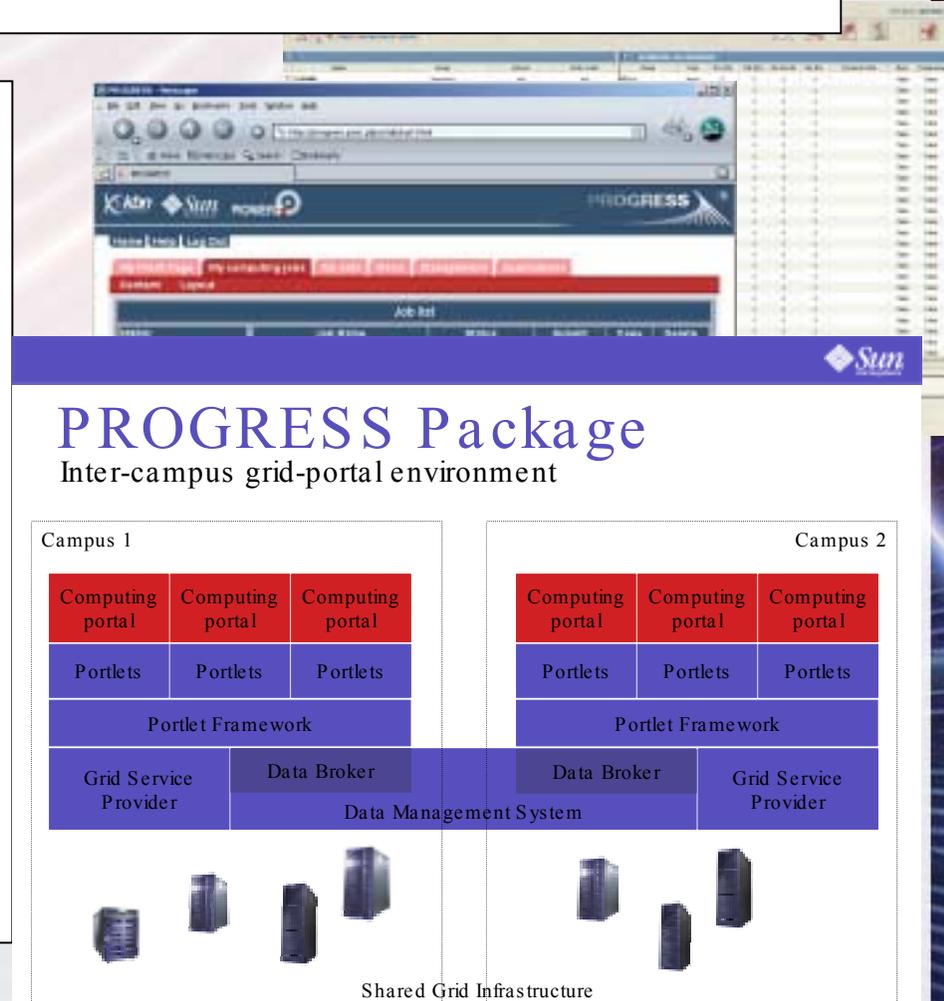
- Duration: 2002-2004
- Novel architecture for the grid-portal environment
- Enabling access to the global grid through the deployment of the PROGRESS open source package



PROGRESS

Results

- Sun Center of Excellence in New Generation Networks, Grid and Portals
- PROGRESS HPC Portal
 - reference installation of the PROGRESS Package
 - Integration of the bioinformatic and chemical applications, and of the gene and protein structures library
 - Cluster of 80 processors
 - Networked Storage of 1,3 TB



PROGRESS

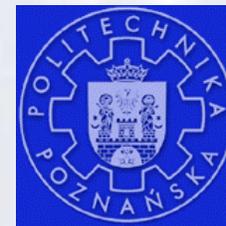
Results

- Presentations and demos at:
 - Supercomputing 2002, 2003 and 2004
 - Sun HPC Consortium Meeting and Sun World Wide Education and Research Conference 2002, 2003, 2004 and 2005
 - Grid Engine Workshop 2002 and 2003
 - Global Grid Forum 2004
- Over 20 publications at national and international level
 - Best Paper Award at the 3rd International Conference on Computational Science in Russia/Australia (2003)
- Cooperation with Sun
 - Sun Whitepaper on grid technologies and Web Services
 - PROGRESS Package embedded in Sun's grid-portal environment offers in Turkey and Canada
 - Test installations in Singapore, UK and China



Telemedicine

- Building on the achievements of the PROGRESS project
 - utilization of the PROGRESS architecture and package
 - grid data management
- Surgery
 - Teleconsultancy
 - Reference cases
 - E-learning
 - Knowledge library





CLUSTERIX -

*National **CLUSTER** of **LI**nu**X** Systems*

<http://clusterix.pcz.pl>



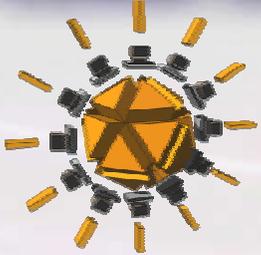
Clusterix - current state

- project started on January 2004
- the entire project will last 32 months with two stages:
 - research and development - first 22 months
 - **deployment - starting after the R&D phase**
- 12 members - Polish supercomputing centers and MANs
- 16 Workpackages
- 53 % funded by the consortium members, and 47 % - by the Ministry of Scientific Research and Information Technology



Partners

- Częstochowa University of Technology (coordinator)
- Poznań Supercomputing and Networking Center (PNSC)
- Academic Computing Center CYFRONET AGH, Kraków
- Academic Computing Center in Gdańsk (TASK)
- Wrocław Supercomputing and Networking Center (WCSS)
- Technical University of Białystok
- Technical University of Łódź
- Marie Curie-Skłodowska University in Lublin
- Warsaw University of Technology
- Technical University of Szczecin
- Opole University
- University of Zielona Góra



Main goals

- to develop mechanisms and tools that allow the deployment of a **production Grid environment**
- basic infrastructure consists of local LINUX clusters with 64-bit architecture located in geographically distant independent centers connected by the fast backbone provided by the Polish Optical Network PIONIER
- existing and newly built LINUX clusters, with both 32- and 64-bit architecture, will be dynamically connected to the basic infrastructure
- as a result, a distributed PC-cluster of a new generation is built, with a dynamically changing size, fully operational and integrated with services offered by other projects, especially projects related to the PIONIER program



Pilot installation



- 3000+ km of fibers with 10Gbps throughput with DWDM technology
- 2 VLANs with dedicated 1 Gbps bandwidth for Clusterix network
- whole network has dual-stack network with IPv4 and IPv6 fully enabled



Applications

- selected end-user's applications are developed for the experimental verification of the project assumptions and results, as well as to achieve real application results
- running both HTC applications as well as large-scale distributed applications that require parallel use of one or more local clusters (meta-applications)
- two directions:
 - adaptation of existing applications for Grids
 - development of new applications



HADRON - Simulation of Compressible Flows



RESEARCH GOALS (VISION 2020):

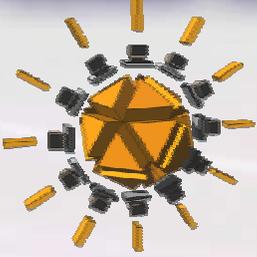
- Cost-efficient aircraft > fuel consumption
- Quieter aircraft

Jacek Rokicki, Institute of Aeroanautics and Applied Mechanics
Warsaw University of Technology (WUT)

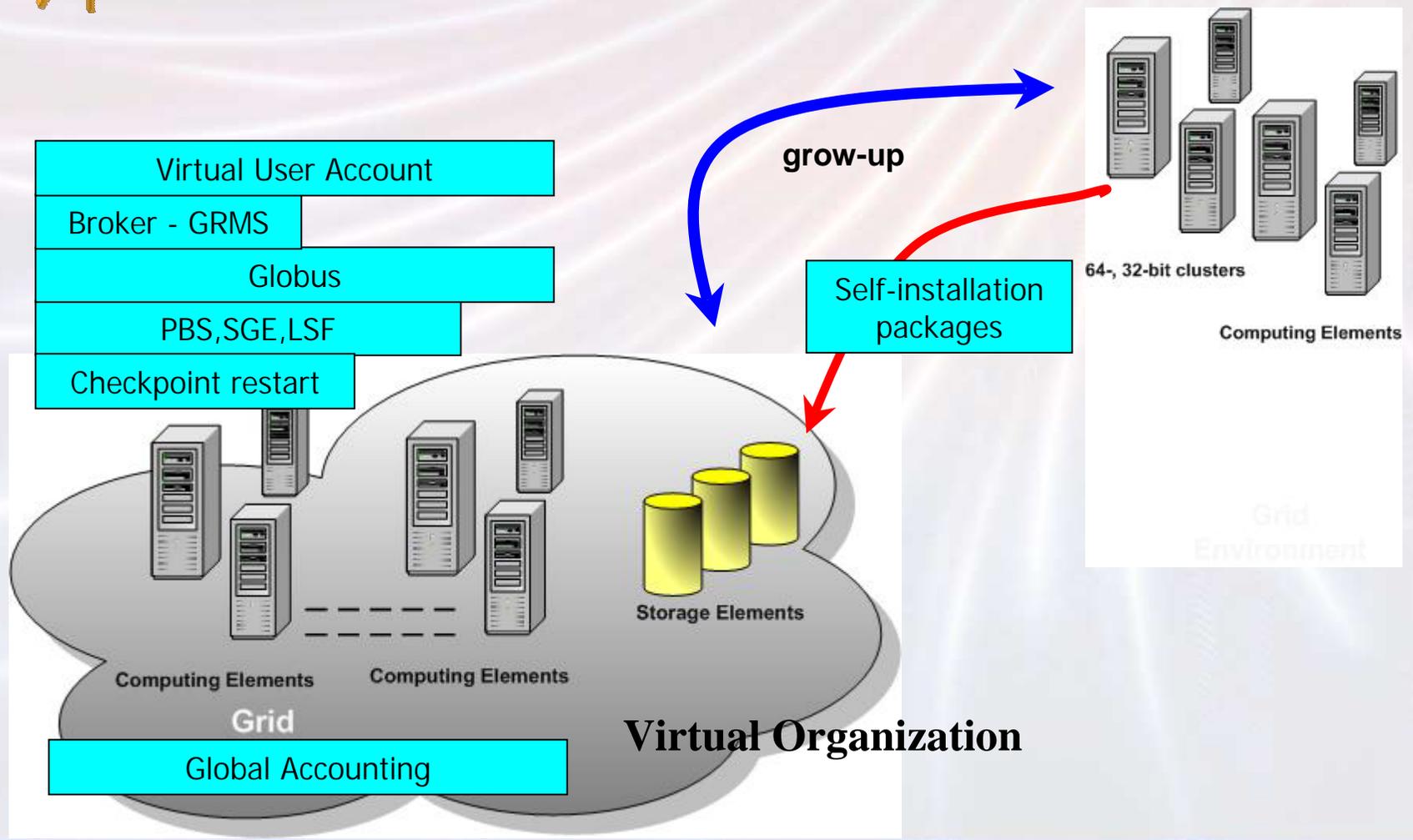


Middleware in Clusterix

- the software developed is based on *Globus Toolkit 2.4* plus web services - with *Globus 2.4* available in *Globus 3.2* distribution
 - this makes the created software easier to reuse
 - allows for interoperability with other *Grid* systems on the service level
- *Open Source* technology, including *LINUX* (Debian, kernel 2.6.x) and batch systems (*Open PBS*, *SGE*)
 - open software is easier to integrate with existing and new products
 - allows anybody to access the project source code, modify it and publish the changes
 - makes the software more reliable and secure
- existing software will be used extensively in the *CLUSTERIX* project, e.g., *GridLab* broker, *Virtual User Account* (*SGIgrid*)



Integrating new clusters





Clusterix summary

- 250+ Itanium2 cpus distributed on 12 sites
 - peak installation with 800+ cpus (4,5 Tflops, 12-2004)
- Middleware stack
- Applications
- Deployment phase starts very soon (10.2005)

- Connects dyn. clusters from anywhere (clusters from campuses and universities)

The Future

- PIONIER2: The Infrastructure for Research and Education for 2006-2010 (?)
 - More Grid projects will probably be funded