



# Poland

## networking, digital divide and grid projects

M. Pzybylski

The Poznan Supercomputing and Networking Center, Poznan, Poland

M. Turala

The Henryk Niewodniczanski Instytut of Nuclear Physics PAN and ACK Cyfronet AGH,  
Krakow, Poland



# Outline

- PIONIER project and CBDF
- Digital divide and „Porta Optica“
- Polish participation in grid projects
- Summary





# PIONIER project

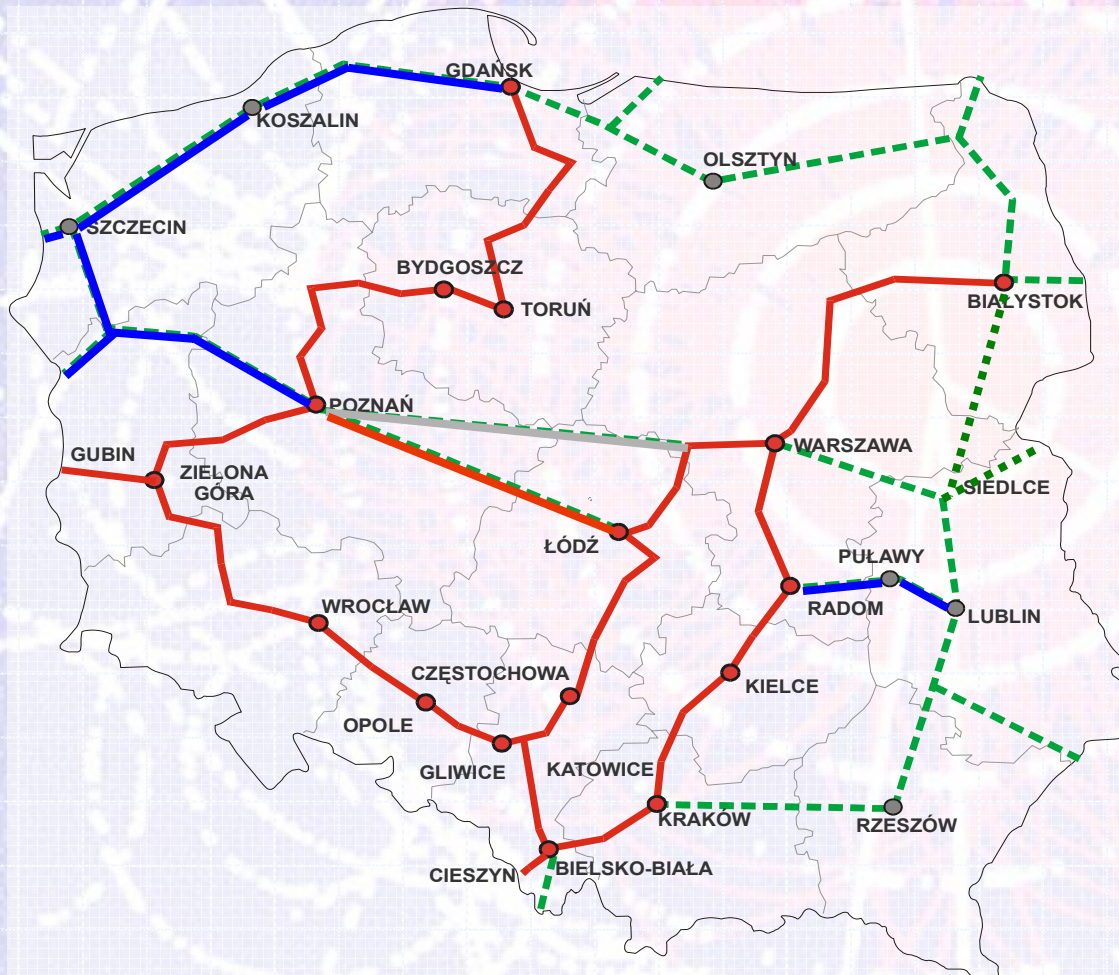


# PIONIER location





# PIONIER infrastructure



- Installed fiber
- PIONIER nodes
- Fibers+pipes (end of 2005)
- - - Fibers+pipes (end of 2006)



# PIONIER infrastructure

## Total fiber infrastructure:

- 22000 pair\*km installed (2 CBDF - DE, CZ)
- 15000 pair\*km under construction  
(+2 CBDF - DE, DE)
- 14000 pair\*km planned  
(+6 CBDF - RU, LT, BY, UA, SK)
- 2763 pair\*km used
- 22 MANs connected
- 10GE transmission (over DWDM)



# PIONIER infrastructure - transmission 4Q2005





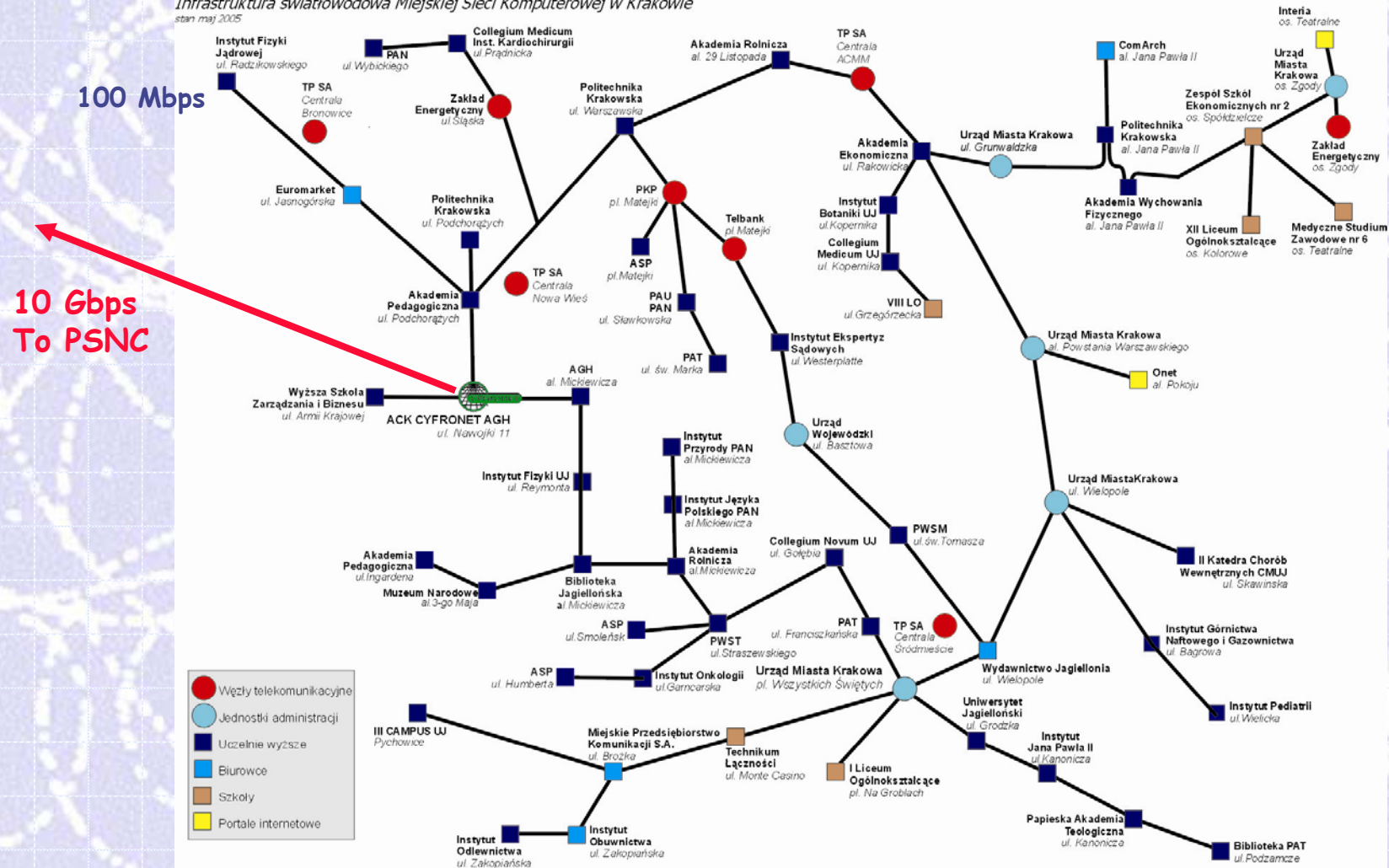
# PIONIER infrastructure

- pre-2004 links: 12 x G.652 + 4 x G.655  
(2763 km)
- post-2004 links: 2 x tube; 1 tube equipped with 18 x G.652 + 6 x G.655
  - 1286 km under construction (planned for 30/IX/2005)
  - 1159 km planned for IVQ2006 (not yet started)



# Networking infrastructure in Cracow

Infrastruktura światłowodowa Miejskiej Sieci Komputerowej w Krakowie  
stan maj 2005





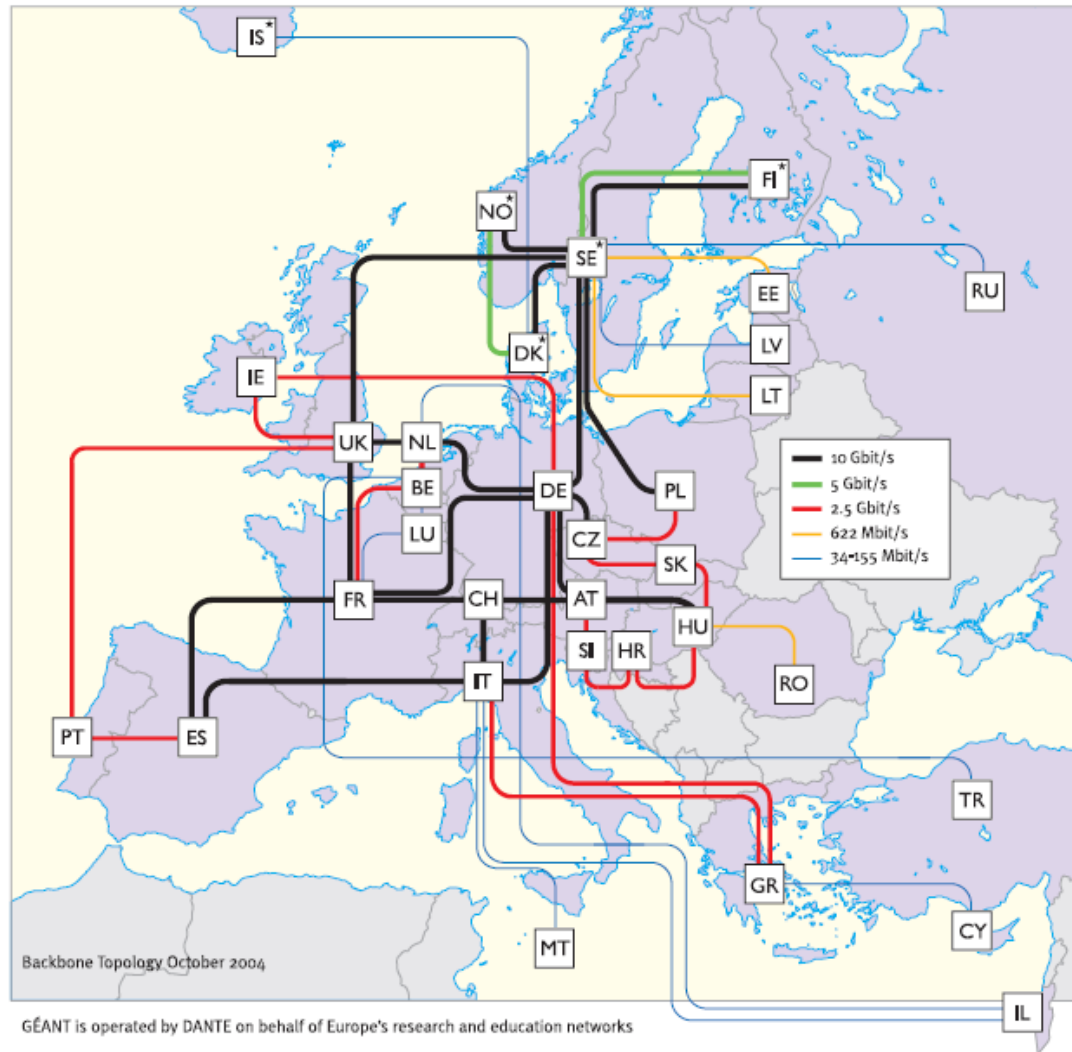


# Digital Divide



# Where is the digital divide in Europe?

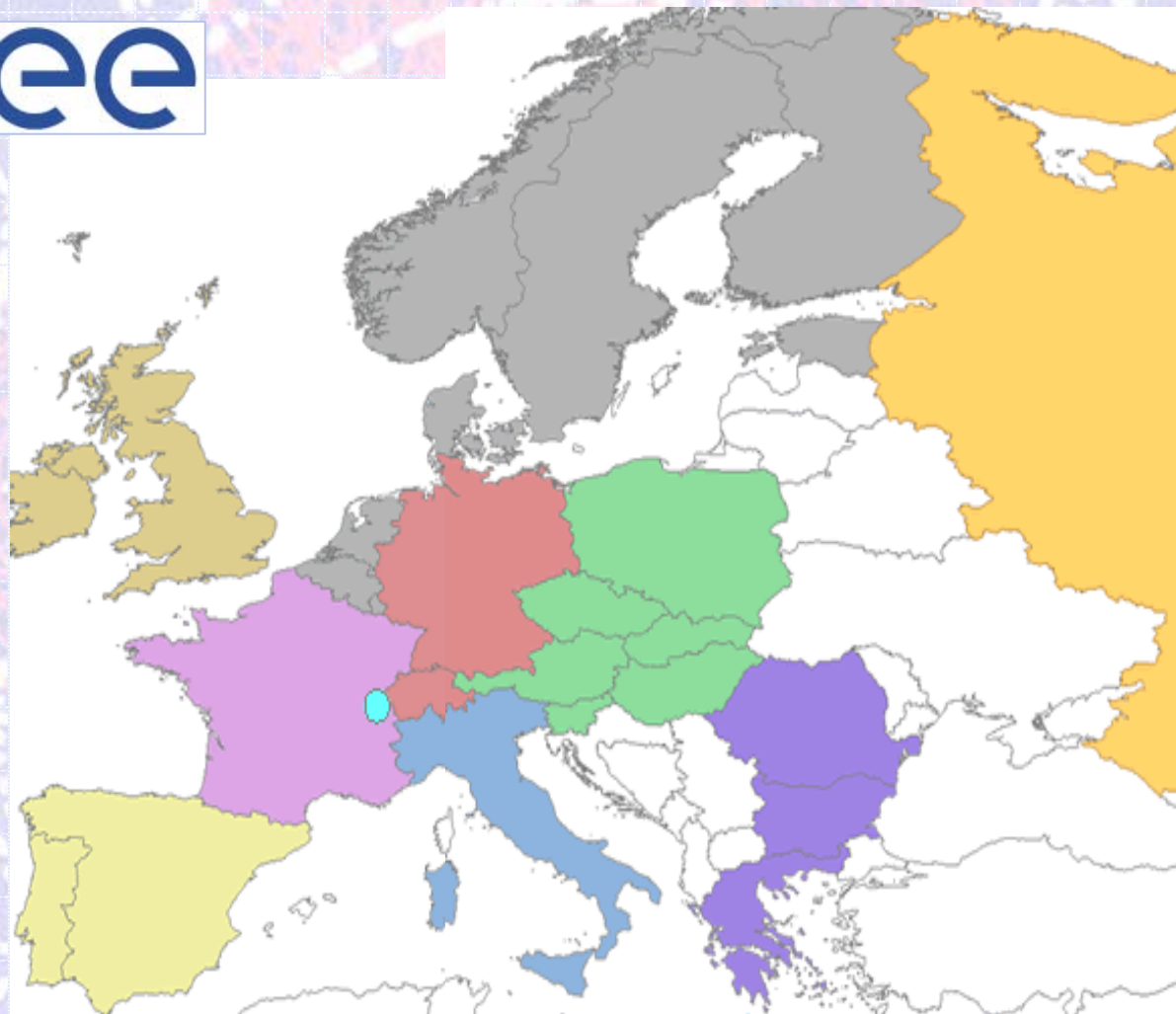
Providing pan-European and international connectivity for research and education





# Where is the digital divide in Europe?

EGEE



courtesy of  
D. Foster

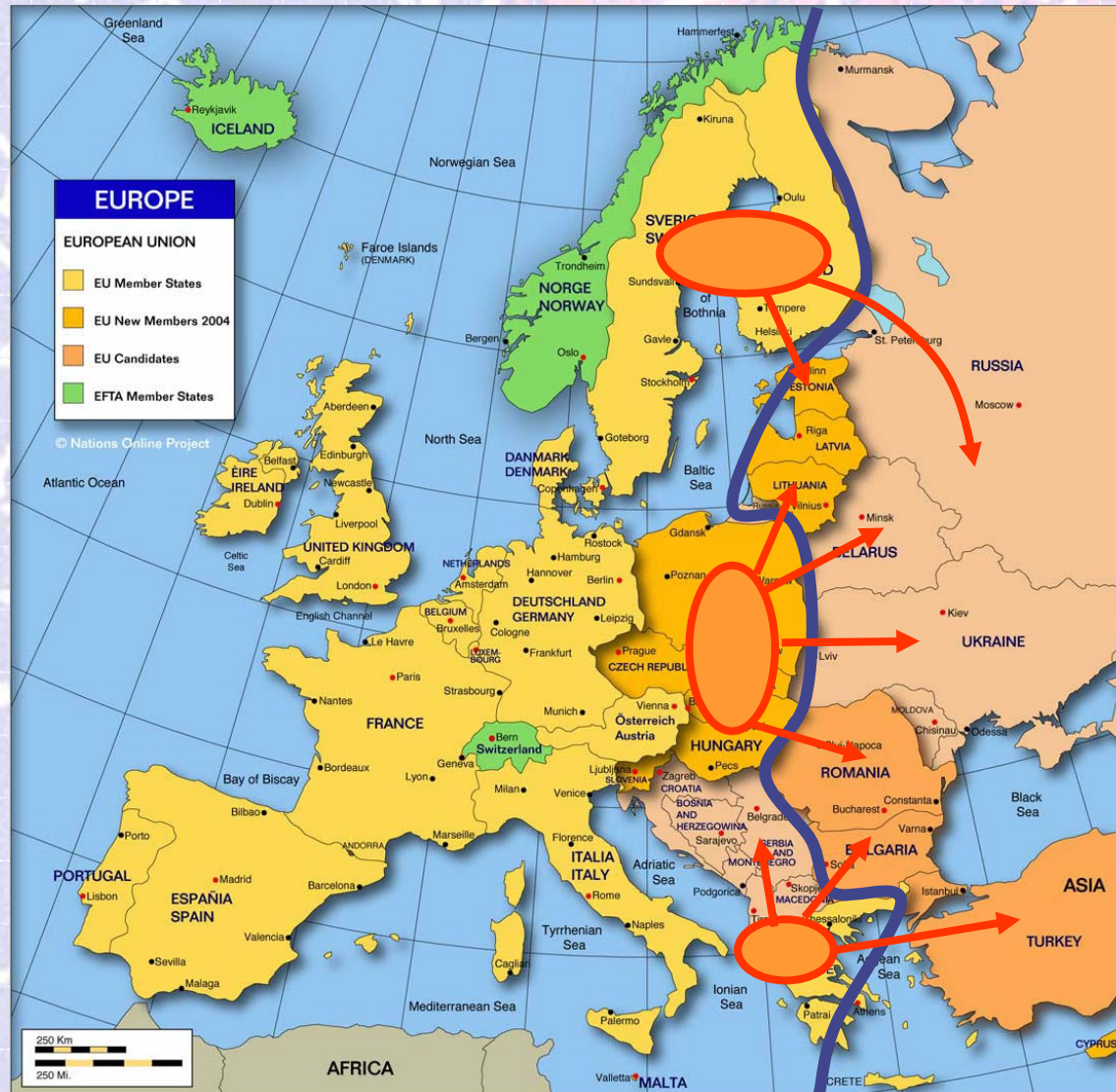


# Where is the digital divide in Europe?





# „Porta Optica - a coordinated task...



- CE countries - CBDF links to EE neighbours:
  - Poland: DF connectivity to every eastern neighbour
  - Scandinavia: the northern route
  - GRNET: activity in the Balkan region (SEEREN/SEEFIRE) + the south route
- GEANT/TERENA: political and organisational support
- all: influencing the EE countries wrt. DF acquisition, importance of DF infrastructure and the business models



# „Porta Optica“

- a distributed optical gateway from GEANT to EE

- a chance for closer scientific collaboration by the means of providing multichannel/ multilambda Internet connections between neighbouring countries of CE/EE
- an easy way to extend GEANT to Eastern European countries - a true, future-proof dark fiber connectivity for the whole Europe
- Porta Optica Study proposal has been submitted to FP6 Infrastructures call, as an integration of latest SEEFIRE/ GEANT/ PIONIER ideas on network construction for the EE countries



# PIONIER CBDF locations





## CBDF results

- relatively easy installation (@1Gbit/s) - 120km LH color GBICs
- one technology - PIONIER, CESNET & SANET operate with 10GE/GE
- quite difficult coordination of management procedures



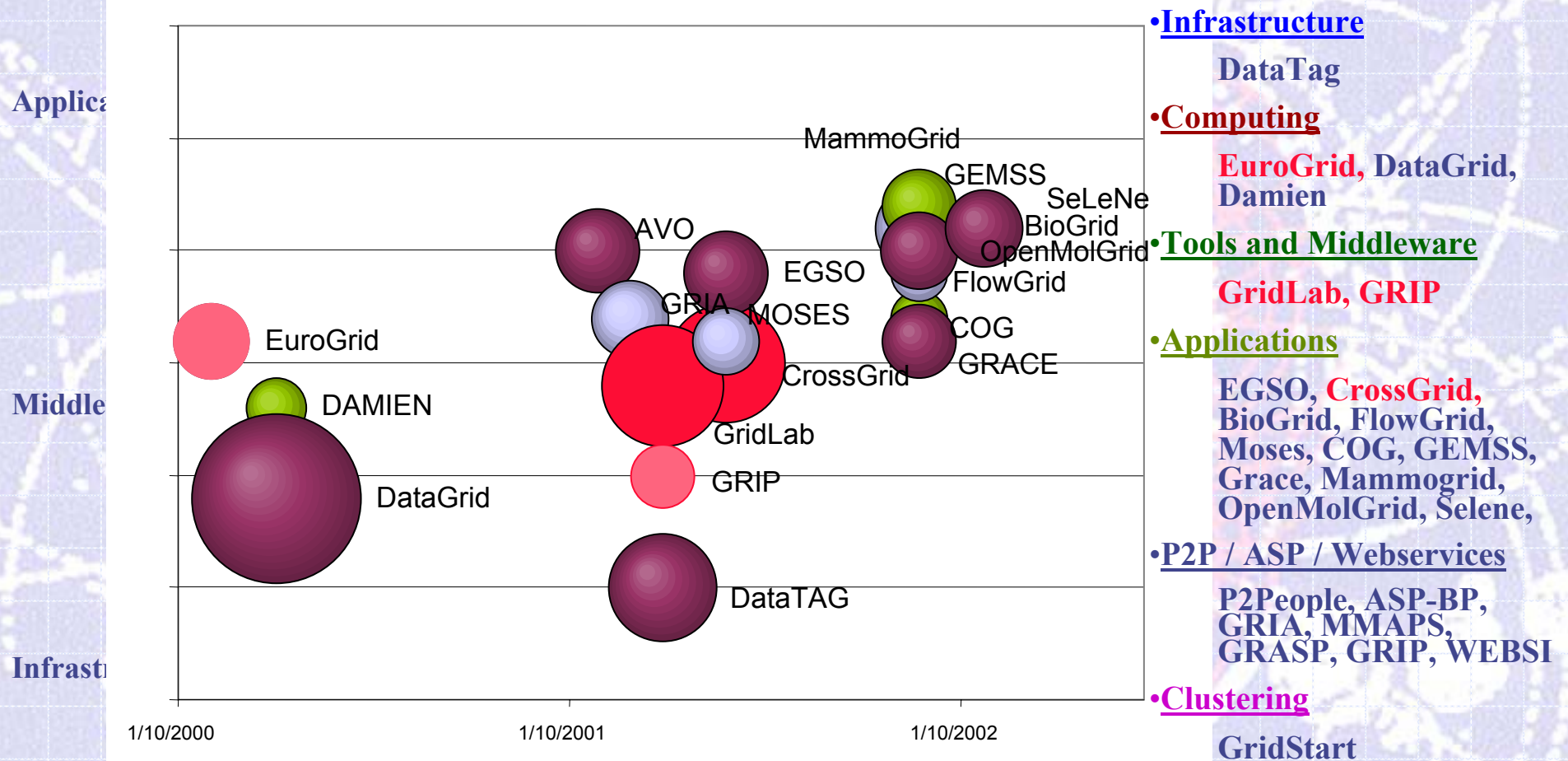


# Grid projects



# EU FP5 Grid Projects 2000-2004

(EU Funding: 58 M€)





# Polish Participation in FP5 Grid Research Projects

## 2 Polish-led Projects (out of 12)

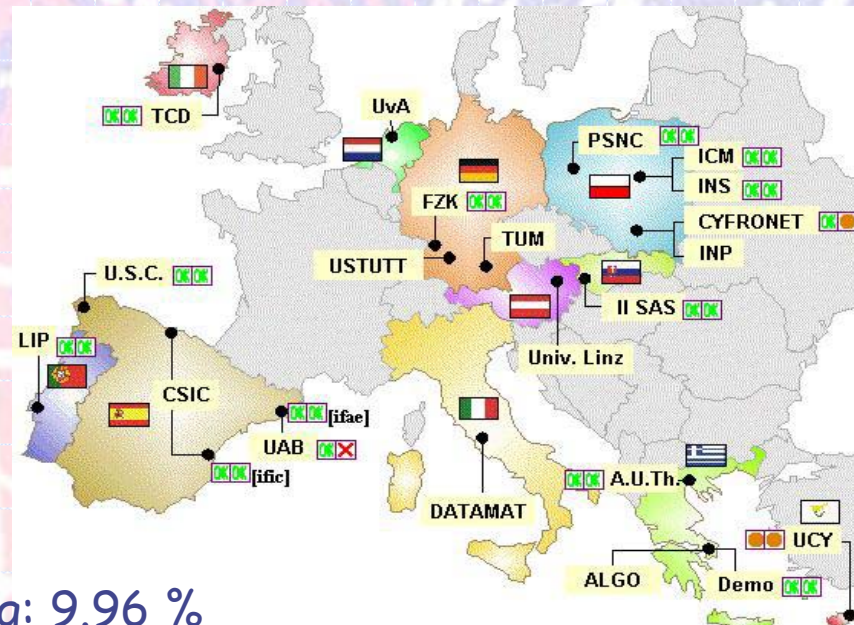
- **CrossGrid**
  - ◆ **CYFRONET Cracow**
  - ◆ **ICM Warsaw**
  - ◆ **PSNC Poznan**
  - ◆ **INP Cracow**
  - ◆ **INS Warsaw**
- **GridLab**
  - ◆ **PSNC Poznan**

## Significant share of funding to Poland versus EU25

- FP5 IST Grid Research Funding: 9.96 %
- FP5 wider IST Grid Project Funding: 5 %
- GDP: 3.8 %
- Population: 8.8 %

## Participation in the EU 6 FP growing:

- EGEE, Kwf-Grid, CoreGrid, NextGrid...
- Several new proposals submitted ....



**CROSSGRID**  
**Testbed in Action**

based on presentation of M. Lemke



# Polish CLUSTERIX Linux Grid

*National  
CLUSTER of LINUX  
Systems*

to develop mechanisms and tools that allow the deployment of a production-class Grid environment with the basic infrastructure comprising local PC-clusters based on 64-bit Linux machines located in geographically distant independent centers connected by the fast backbone network provided by the Polish Optical Network PIONIER





# BalticGrid initiative



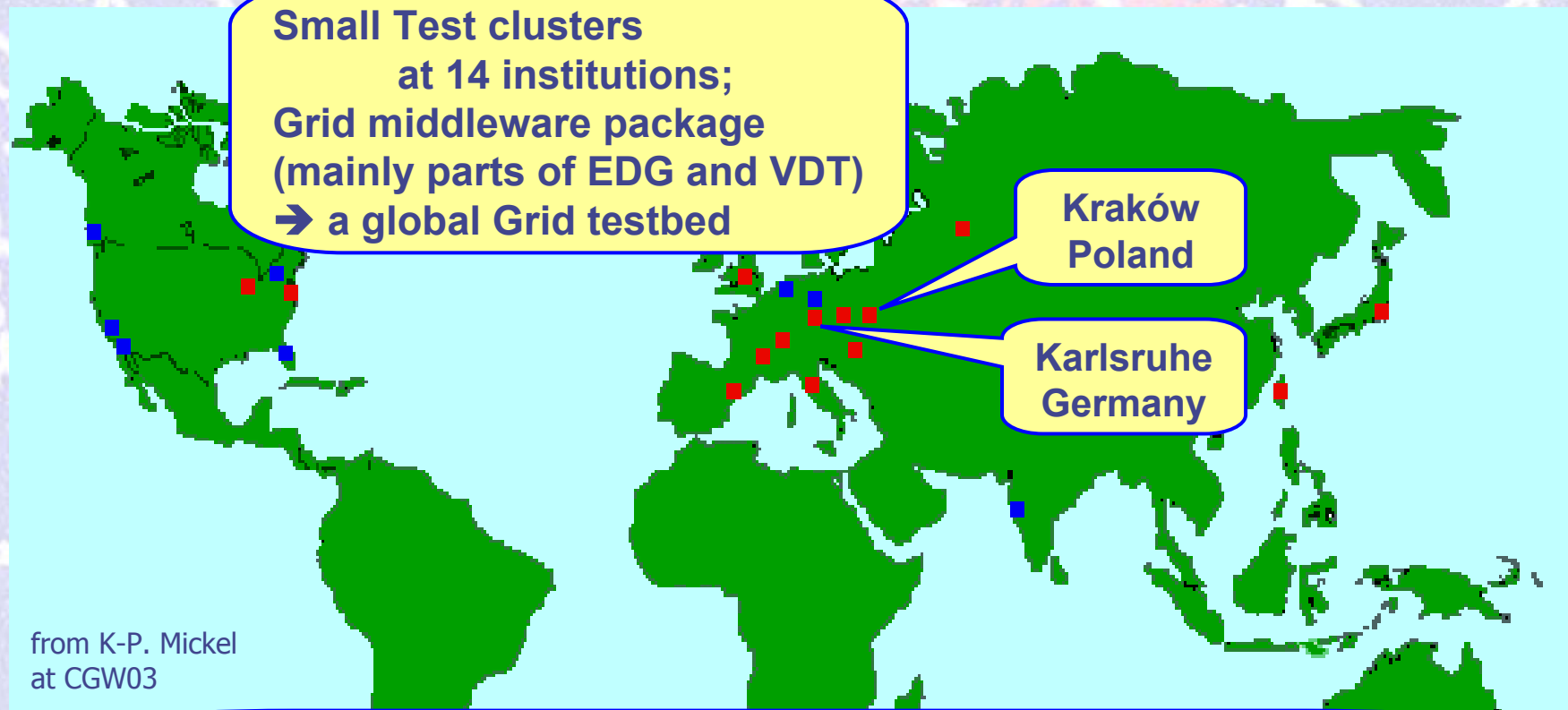
- Estonian Educational and Research Network, EENet
- Keemilise ja Bioloogilise Füüsika Instituut, NICPB
- Institute of Mathematics and Computer Science, IMCS UL
- Riga Technical University, RTU
- Vilnius University, VU
- Institute of Theoretical Physics and Astronomy, ITPA
- Poznan Supercomputing and Networking Center, PSNC
- Instytut Fizyki Jadrowej, im. Henryka Niewodniczanskiego, Polskiej Akademii Nauk, IFJ PAN
- Paralleldatorcentrum at Kungl Tekniska Högskolan, KTH PDC
- CERN

**Proposal to the recent EU 6 FP call (research infrastructure) submitted**



# ACC Cyfronet in LCG-1

Sept. 2003: Sites taking part in the **initial** LCG service (red dots)



from K-P. Mickel  
at CGW03

**This was the very first really running global computing and data Grid, which covered participants on three continents**



# Polish Tier2

Clusters at ACC Cyfronet Cracow and ICM Warsaw

Developments are mainly due to the participation in EU Projects, CrossGrid i EGEE

## ACC Cyfronet

### Processors

- 4 x dual PIII 1GHz, 512MB RAM, 40GB HDD
- 13 x dual Xeon 2.6GHz, 1GB RAM, 120GB HDD
- 23 x dual Xeon 2.4GHz, 1GB RAM, 40GB HDD
- 32 x dual Xeon 2.8GHz, 2GB RAM, 80GB HDD
- 20 x dual Itanium2 1.3GHz, 2GB RAM, 2x36GB SCSI HDD

**Storage resource:** 4 TB Storage (Disk Array)

**Networking:** 10 Gbps MAN and GEANT connection

**Users:** mainly physicists i.e. ATLAS, LHCB, ALICE, BELLE, ZEUS, theory; over 100 000 jobs submitted.

**Near Future:** ~ 120 x dual Opteron 2 GHz or Xeon 3.6 GHz , and ~ 20 TB HP XP12000

## ICM Warsaw

Small cluster of PCs is being augmented by about 100 nodes of Opteron machines

Participation in the grid computing projects possible due to excellent Polish networking

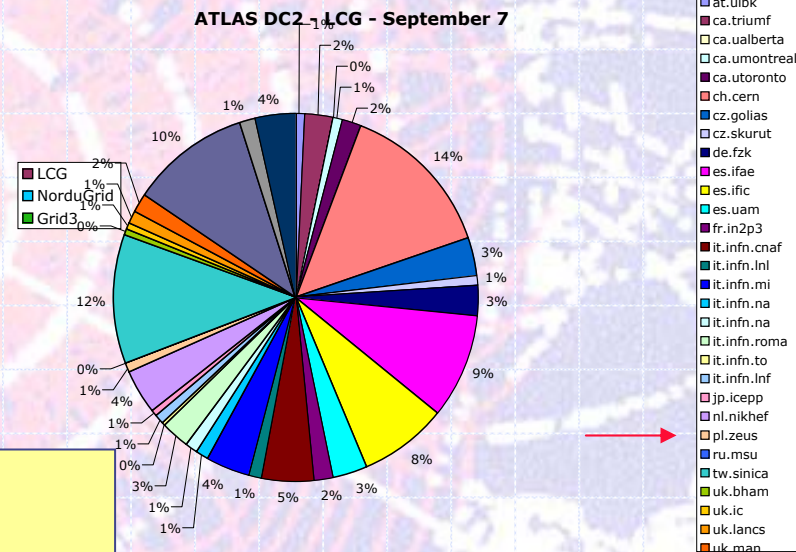
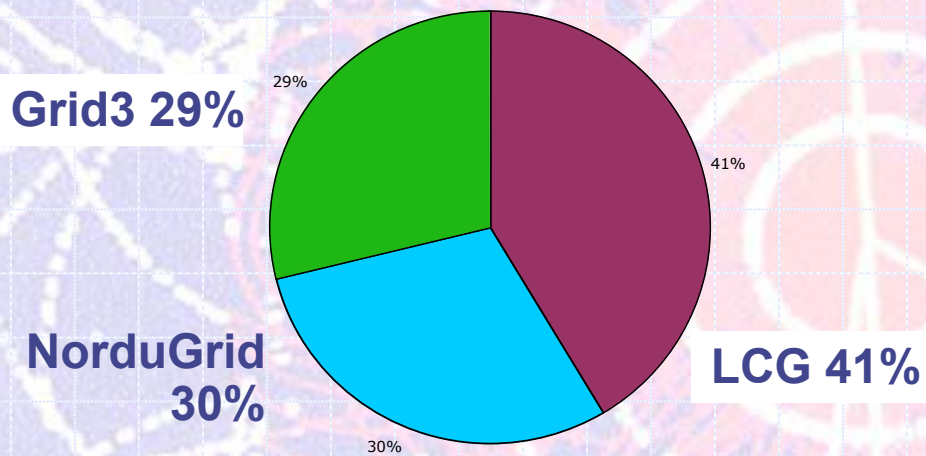




# ATLAS DC Status



- DC2 Phase I started beginning of July, finishing now
- 3 Grids were used
  - LCG (~70 sites, up to 7600 CPUs)
  - NorduGrid (22 sites, ~3280 CPUs (800), ~14TB)
  - Grid3 (28 sites, ~2000 CPUs)



**~ 1350 kSI2k.months**  
**~ 120,000 jobs**  
**~ 10 Million events fully simulated (Geant4)**  
**~ 27 TB**

from L. Robertson  
at C-RRB, Oct. 2004

All 3 Grids have been proven to be usable for a real production



# Summary

- The Polish networking in a good shape due to the PIONIER program
- Poland working towards closing of the European digital divide (CBDF are laid down)
- EE countries need attention and support - invite their representatives to the next workshop
- Polish contribution to EU grid projects is significant
- Development of LCG infrastructure due to participation in EU projects



The background of the slide is a complex network diagram. It features a central structure of concentric red circles, with a white circle at the very center. This central structure is surrounded by a dense web of white and red lines that form a complex, interconnected network. The overall background color is a light blue. The text "Thank you" is centered in the middle of the slide in a bold, red, sans-serif font.

**Thank you**