UNICORE deployment in Polish NGI Lesson learned

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EUROPEAN UNION

PL-Grid

- ◆ National Grid Initiative
- ◆ Partners:
  - ♦ Polish supercomputer centers
  - ♦ CYFRONET, ICM, PCSS, WCSS, TASK

- ◆ Project goals was:
  - ♦ Build and operate Polish National Grid
  - ♦ Provide training and user's support
  - ♦ Provide support for application deployment on the Grid

- ◆ ICM in PL-Grid
  - ♦ Training
  - ♦ Application support
  - ♦ UNICORE Operating Center
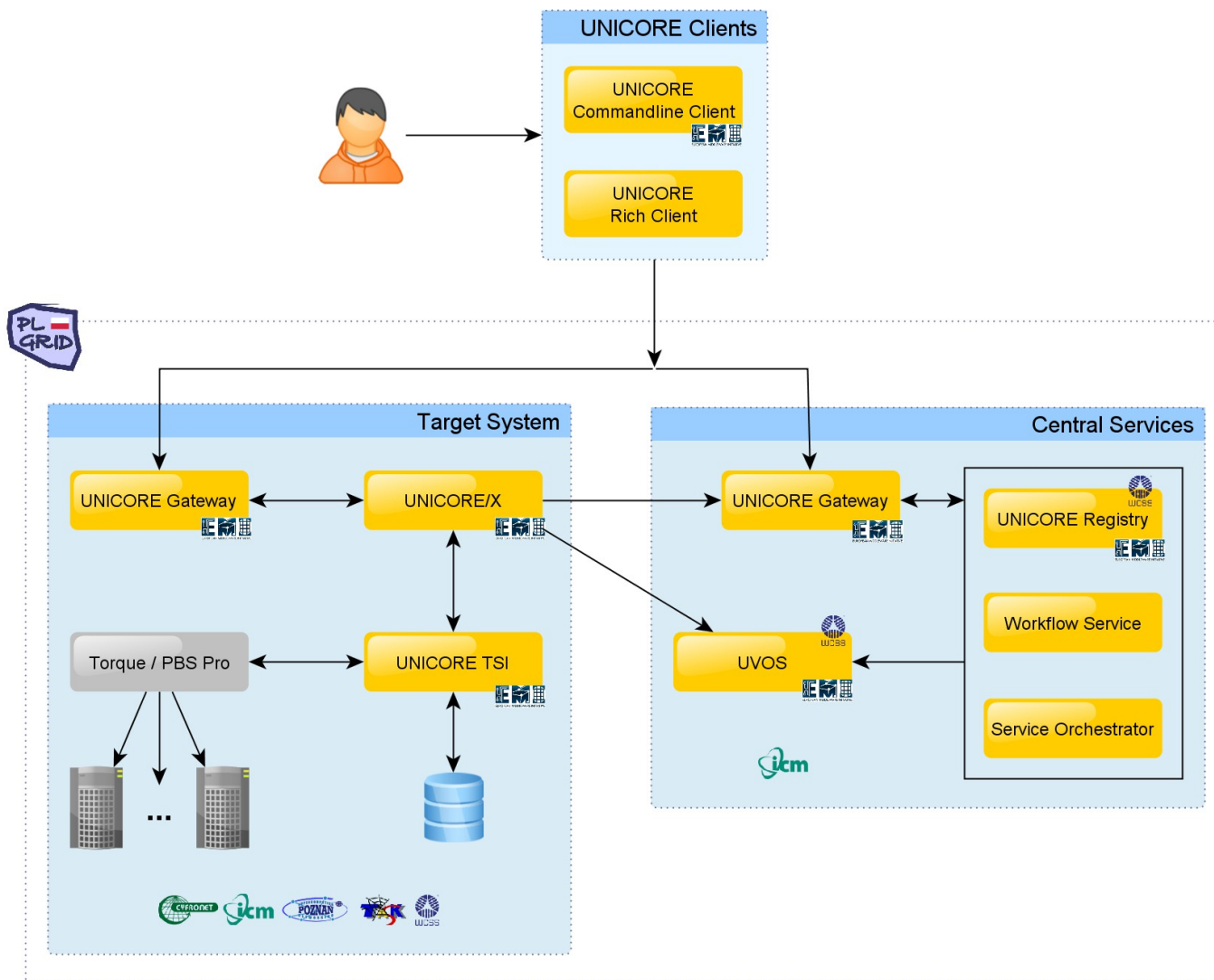
TOP500 List - November 2011

88	Cyfronet Poland	Cluster Platform 3000 BL 2x220, Xeon X5650 6C 2.66 GHz, Infiniband / 2011 HP	15264	128.79	162.41

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PL-Grid resources
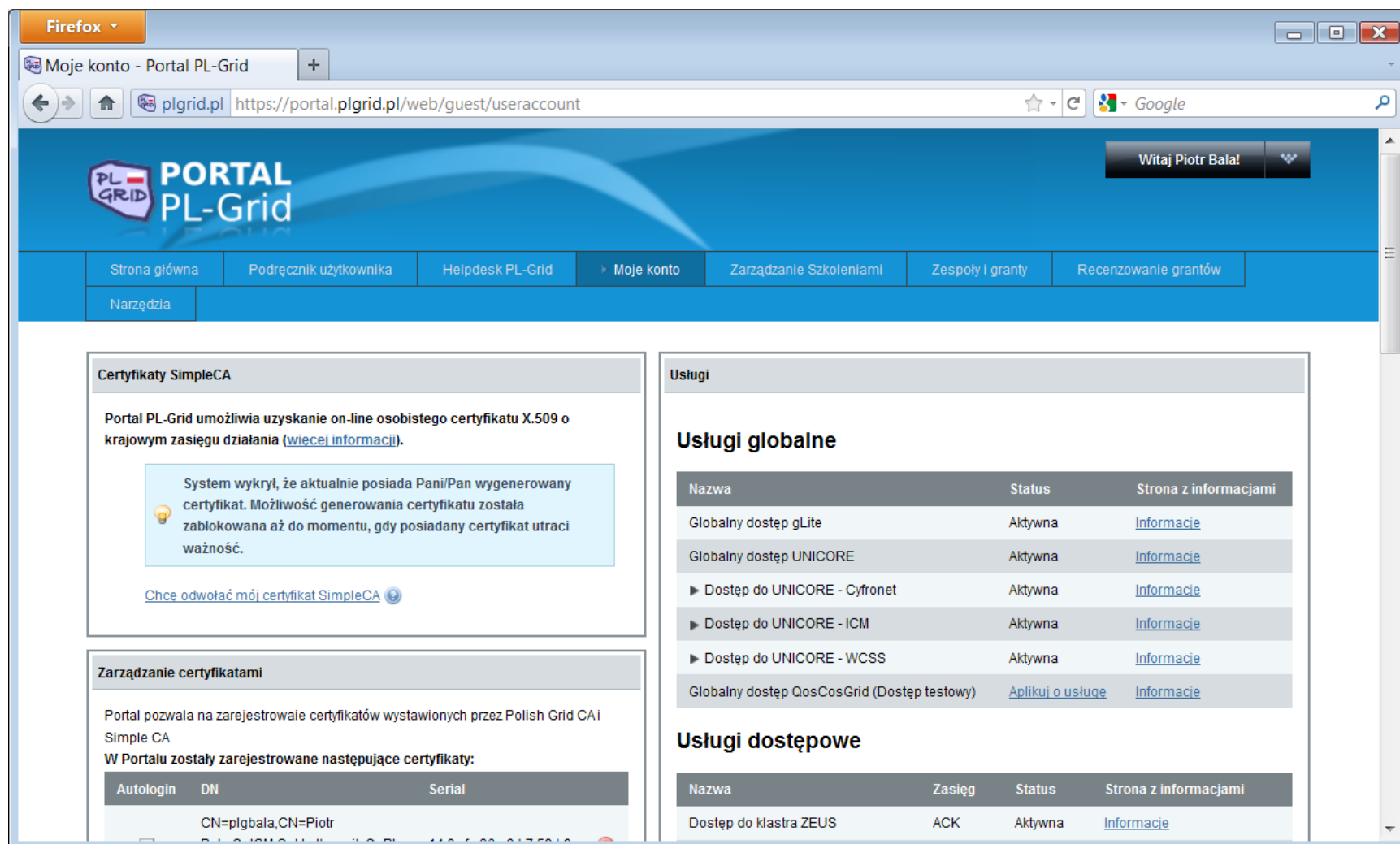
◆ PL-Grid resources
- ♦ Number of cores: 23 616
- ♦ CPU: 230,16 TFlops
- ♦ Disk: 3,6 PB
- ♦ Memory: 51,33 TB

- ♦ Additional resources can be commited by partners

◆ UNICORE installed in all 5 centers
- ♦ Services have to be maintained till 2017

◆ UNICORE central services run by ICM
- ♦ Backup copy of Registry and UVOS run by WCSS

UNICORE Production Infrastructure

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Integration with PL-Grid Portal

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What User Needs to Know

◆ PL-Grid portal is central service responsible for users managements
  ♦ Users registration
  ♦ Integrated service of certificates issuing (PL-Grid Simple CA)
  ♦ Certificate registration
  ♦ Activation of UNICORE access
  ♦ UNICORE e-learning materials
  ♦ Scientific groups management

◆ http://helpdesk.plgrid.pl
  ♦ When there are problems

◆ Grid Resource Bazaar
  ♦ Groups' grants application
  ♦ Only for groups' coordinators

Number of PL-Grid Users

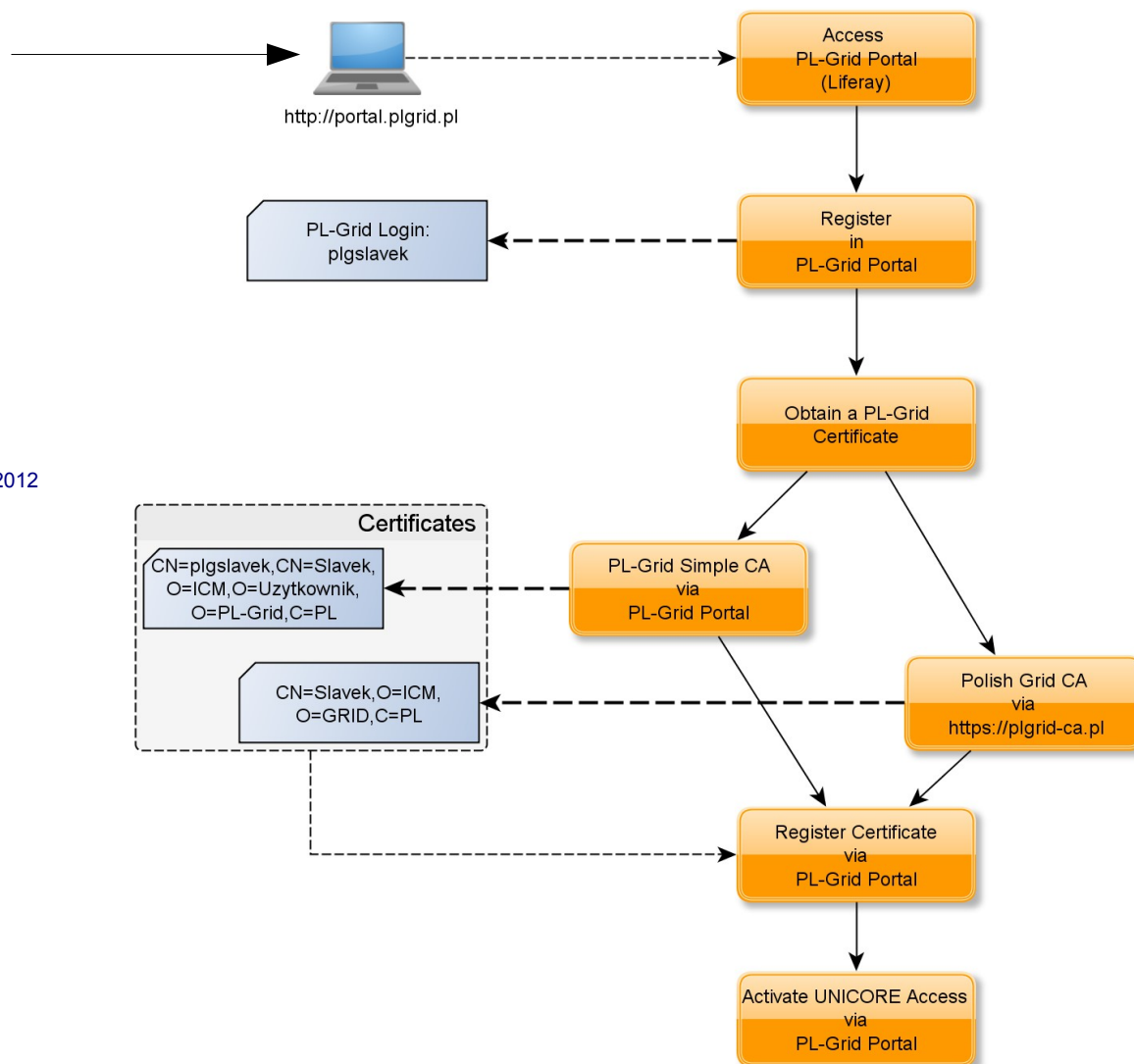INNOVATIVE ECONOMY
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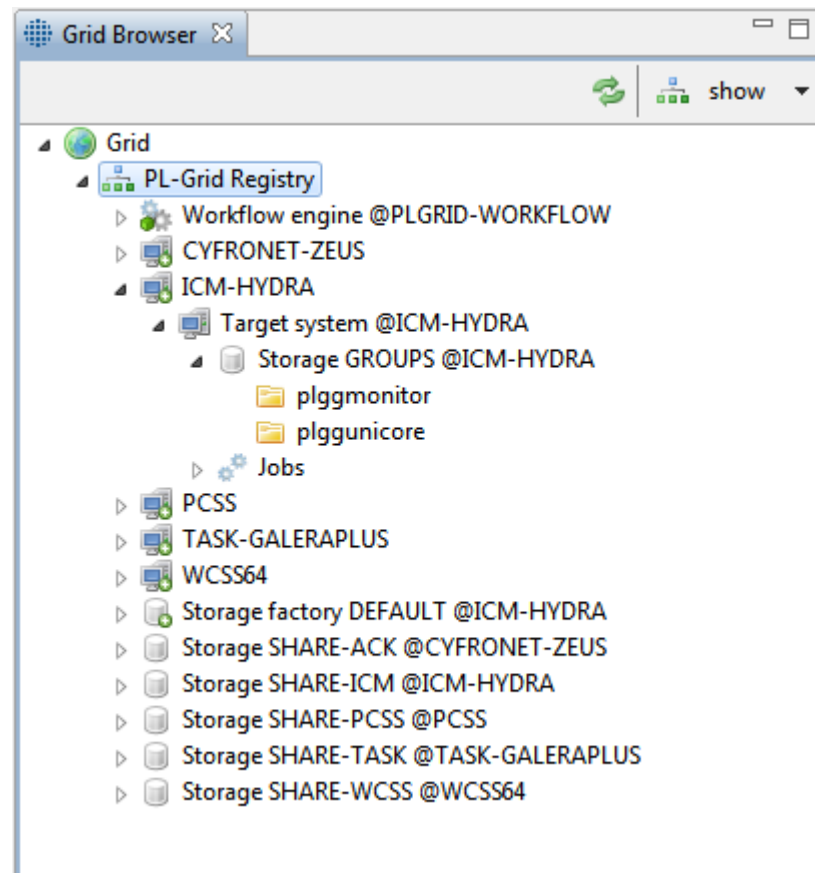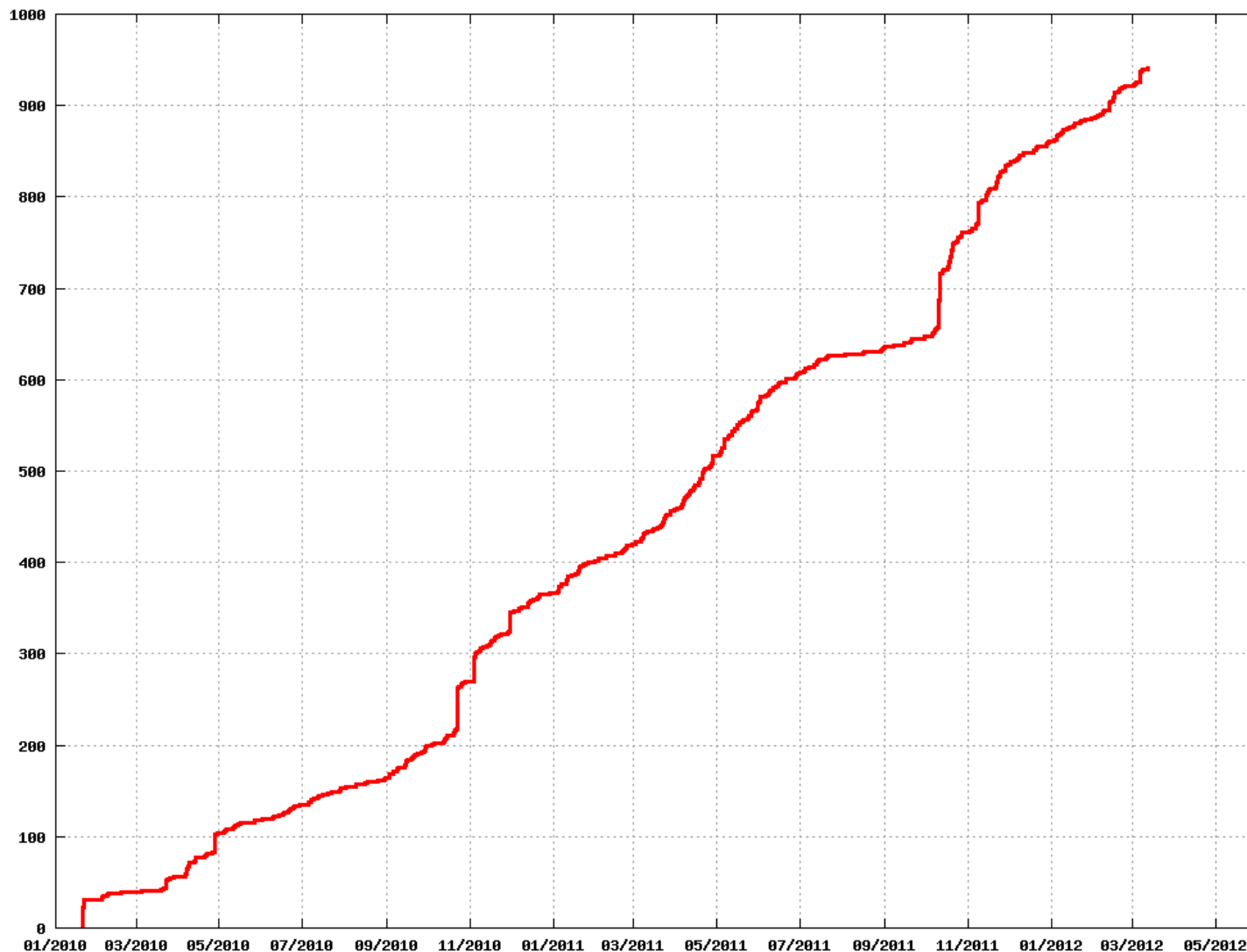
Getting Access to PL-Grid by Users

http://portal.plgrid.pl

Slavek

http://en.mascots.uefa.com/uefaeuro2012

PL-Grid Login: plgslavek

Access PL-Grid Portal (Liferay)

Register in PL-Grid Portal

Obtain a PL-Grid Certificate

Certificates

CN=plgslavek,CN=Slavek, O=ICM,O=Uzytkownik, O=PL-Grid,C=PL

CN=Slavek,O=ICM, O=GRID,C=PL

PL-Grid Simple CA via PL-Grid Portal

Polish Grid CA via https://plgrid-ca.pl

Register Certificate via PL-Grid Portal

Activate UNICORE Access via PL-Grid Portal

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PL-Grid Simple CA Certificates

UVOS as UNICORE Attribute Source

◆ **PL-Grid uses UVOS (UNICORE VO System) as users attribute source**
  ♦ Each site has its own branch
  ♦ Site administrator may change roles and Xlogins of his branch

◆ **UNICORE components in PL-Grid use "pull mode" of authorization**

◆ **For other tools UVOS server web authentication extensions is used**
  ♦ UNICORE accounting portal

◆ **Second UVOS is run by WCSS for fail-over scenario**

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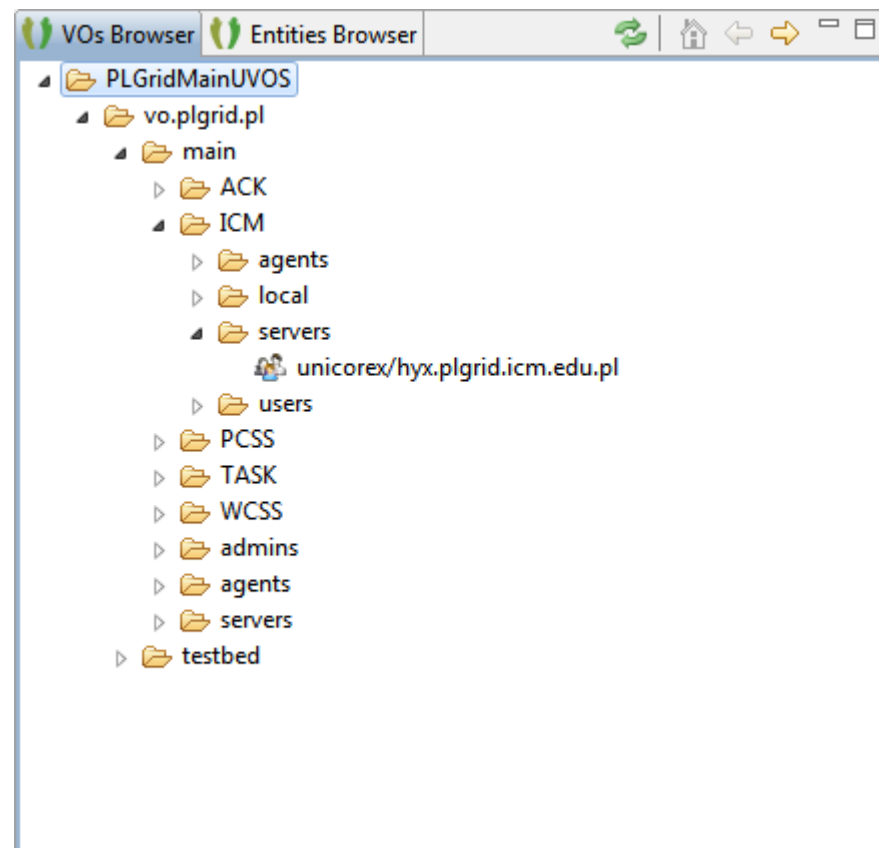
Behind the Scenes (LDAP & UVOS)
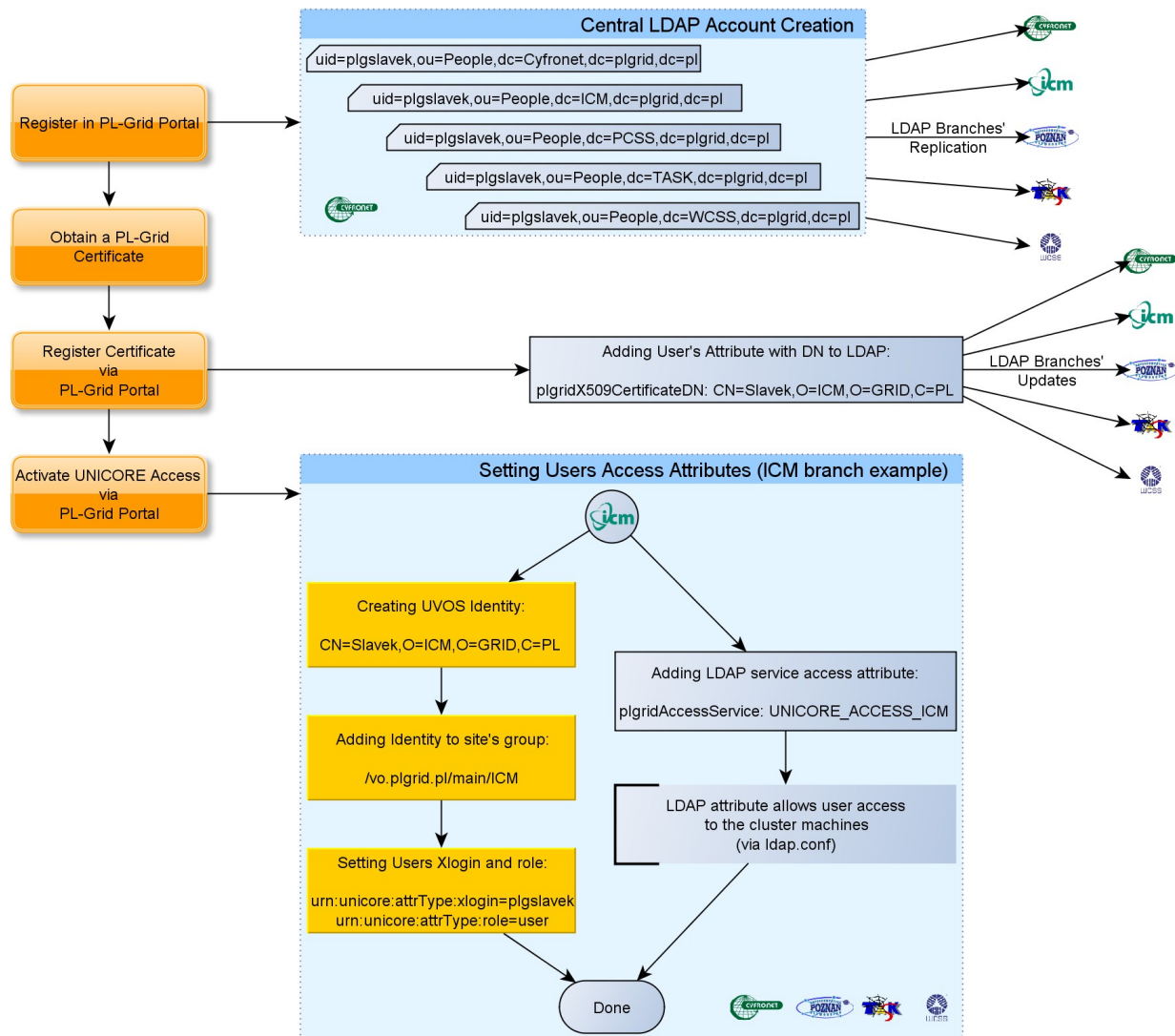
Reliability of Services

◆ In order to maintain reliability of services we need to:
  ♦ Configure HA of services
  ♦ Perform tests of release candidates

◆ Main central services redundancy run by another site WCSS (fail-over scenario)

◆ Target system services redundancy run by ICM
(fail-over scenario of UNICORE/X and TSI services)

◆ Testing Infrastructure
  ♦ Very important (!)
  ♦ Allows to develop new tools and test new configurations and updates
  ♦ Two dedicated virtual target systems:
    ● ICM, University of Warsaw
    ● NCU, Department of Mathematics and Computer Science in Toruń
  ♦ Integrated with the production UVOS but with dedicated branch

Reliability of Target Systems
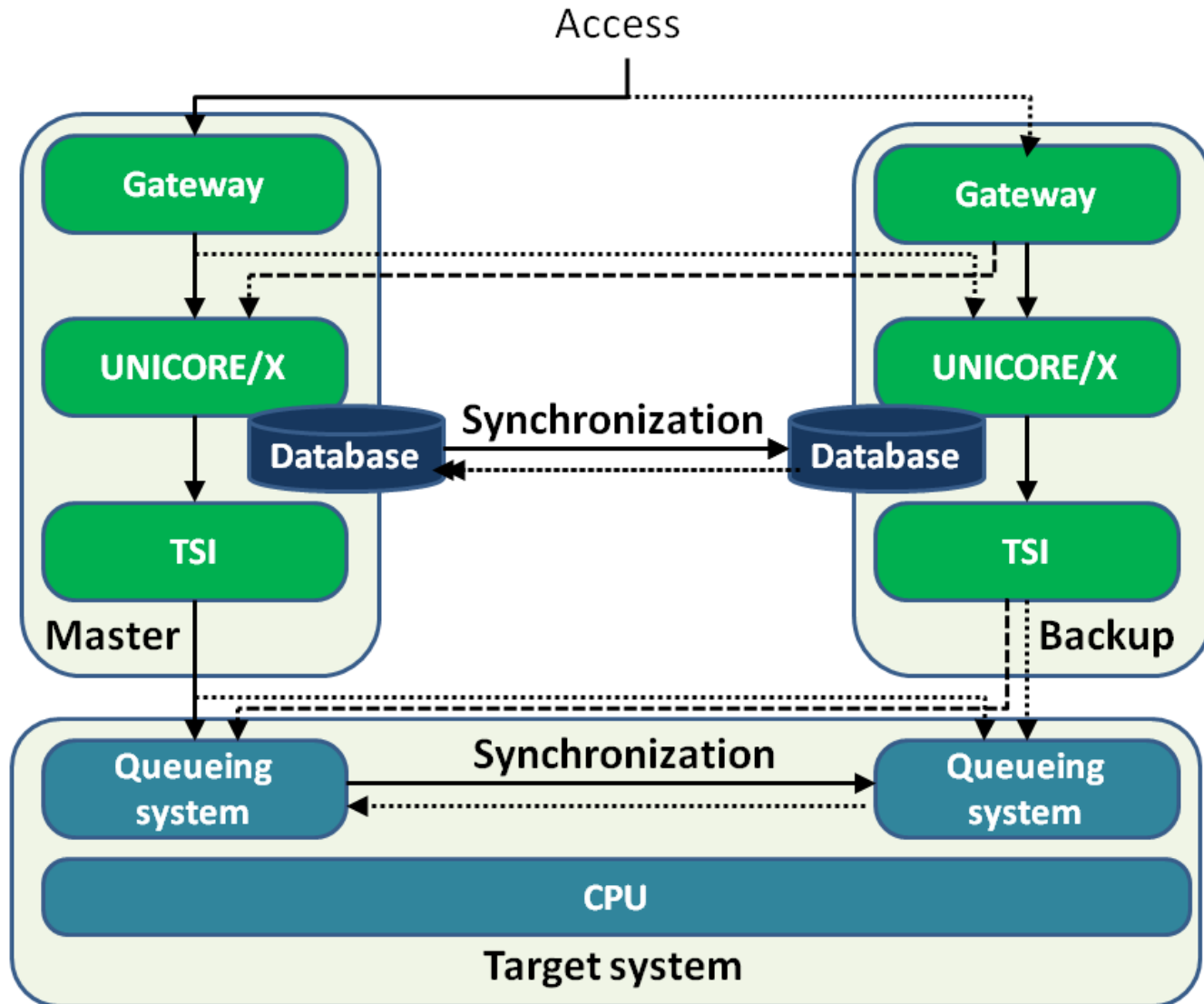
UNICORE Monitoring Infrastructure

◆ Based on Nagios probes

◆ Integrated with EGI
  ♦ UNICORE GOCDB Types
  ♦ Alarms escalation to Dashboard EGI
  ♦ Included working probes in SAM 17 (announced as internal release):
    ● emi.unicore.Gateway
    ● emi.unicore.Registry
    ● emi.unicore.TargetSystemFactory
    ● emi.unicore.GlobalStorage
    ● emi.unicore.UVOS
   ● emi.unicore.ServiceOrchestartor
    ● emi.unicore.WorkflowService
  ♦ PL-Grid participate in Stage Rollout procedure of SAM

GOCDB Types:
unicore6.Gateway
unicore6.Registry
unicore6.ServiceOrchestrator
unicore6.StorageFactory
unicore6.StorageManagement
unicore6.TargetSystemFactory
unicore6.UVOSAssertionQueryService
unicore6.WorkflowFactory

◆ Additional probes used in PL-Grid:
  ♦ emi.unicore.UNICORE_Job, emi.unicore.GridWorkflow, emi.unicore.StorageFactory
  ♦ emi.unicore.Application: *Amber, AutoGrid, BLAST, Blender, Cfour, Clustal, Fluent, Gaussian, Gromacs, Lammps, Matlab, Mopac, Meep, NAMD, NWChem, NetLogo, Nmag, POVRay, R*
  ♦ LogWatcher for UNICORE
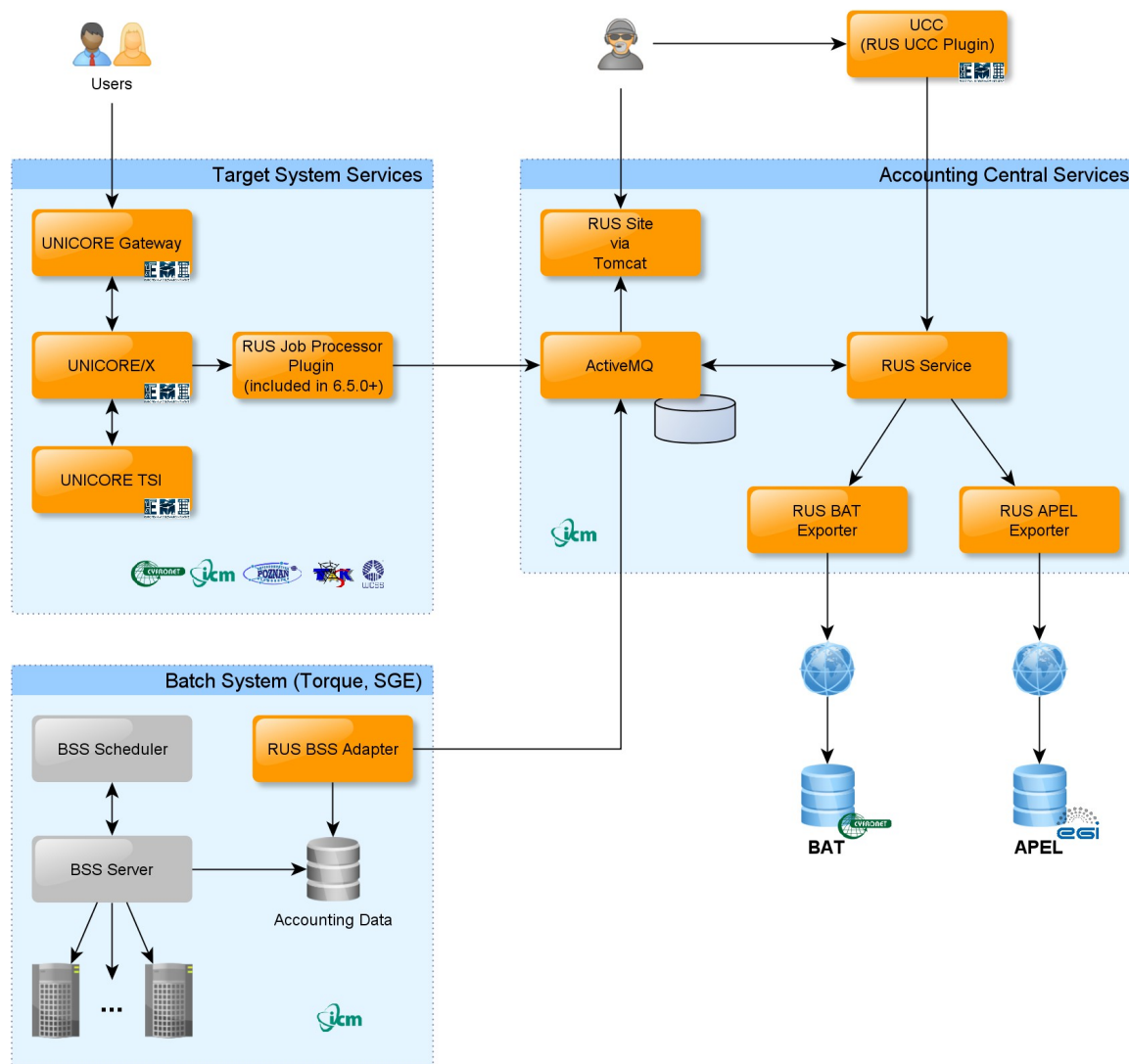
UNICORE Services Status in Nagios
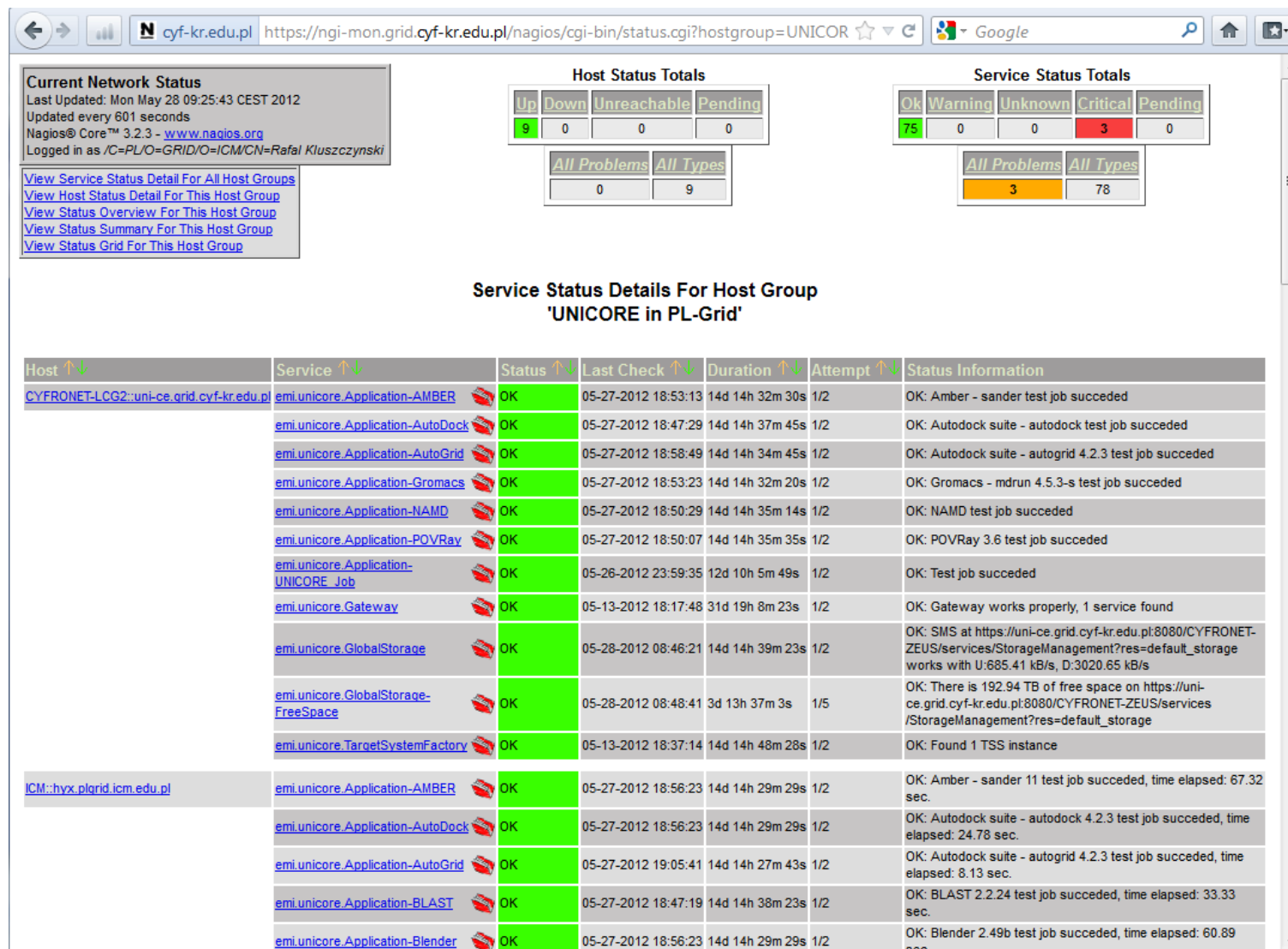
Nagios Availability Report
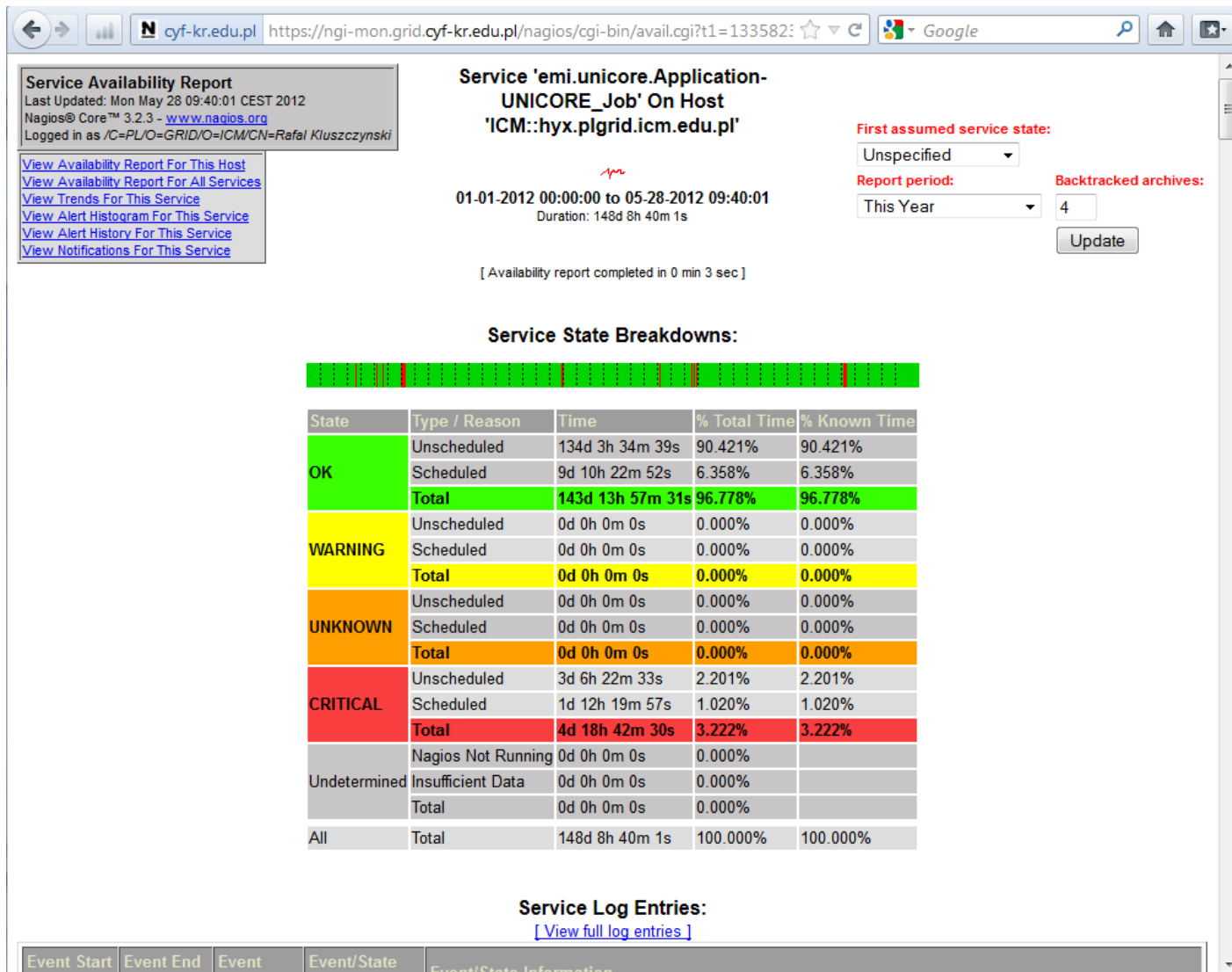
UNICORE Accounting

◆ Integrated with the PL-Grid Infrastructure

◆ Central Accounting Services:
- ◆ RUS Service – processes accounting data
- ◆ RUS BAT Exporter – publishing accounting data to national PL-Grid database
- ◆ RUS Site – accounting portal allowing to access data and statistics
- ◆ ActiveMQ – broker for storing messages

◆ Target System Services:
- ◆ RUS Job Processor – sends grid level accounting information about jobs
  - ● Included in UNICORE/X 6.5.0+
- ◆ RUS BSSAdapter – processing BSS accounting data based on log files

◆ RUS UCC Plugin – allows to access data from command line and also to reprocess defined accounting data for exporters

◆ RUS APEL Exporter – almost ready to publish accounting data to EGI database

UNICORE Accounting Infrastructure

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UNICORE Accounting Portal

Usage Graph In Accounting Portal
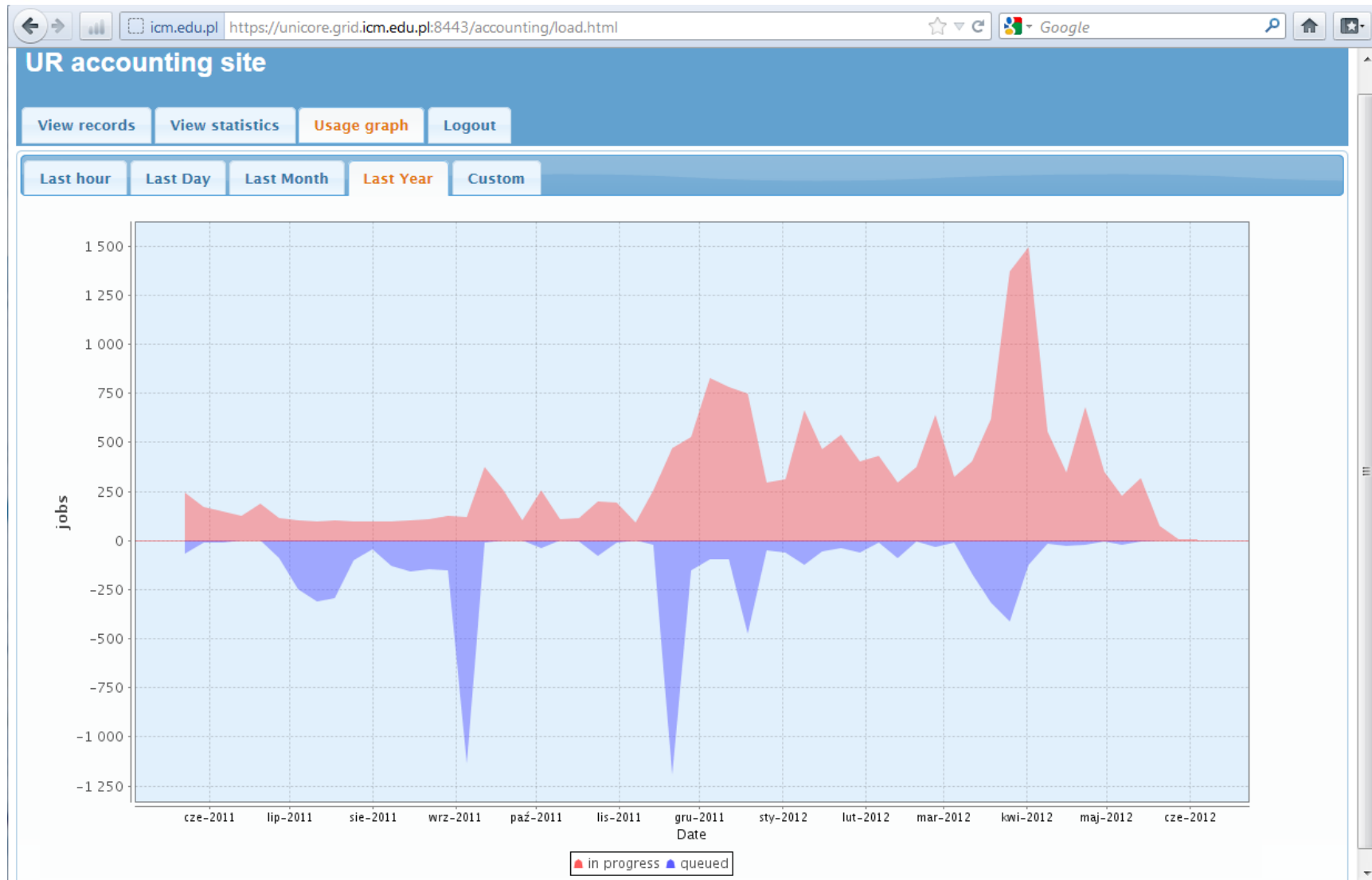
UNICORE Trainings

◆ PL-Grid portal support also organization of user trainings

    ♦ Users register accounts available only for training

    ♦ Organizer determines which services should users have (like "UNICORE Access")

◆ On-line course management

    ♦ PL-Grid portal allows to apply for a course

    ♦ Courses are integrated with BlackBoard

    ♦ Many UNICORE tutorials like:

        ● *Getting UNICORE access in PL-Grid*

        ● *UNICORE clients configuration*

        ● *Running jobs and workflows with UNICORE*

        ● *Accessing storage in UNICORE*

◆ PL-Grid Users Manual available in PL-Grid Portal

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Users' First UNICORE Access

http://portal.plgrid.pl

Access UNICORE Tutorials via PL-Grid Portal

PL-Grid Users Manual

Online Course Management

Choose UNICORE Client

Sign Up for On-line Training Course about UNICORE

Set PKCS12 path in UCC Preferences File

Import PKCS12 file into URC keystore

Get Accepted

PL-Grid Profile's URL

Use Client Configuration Module to set Registries & Trusted CA Certificates

BlackBoard LMS

Access BlackBoard Courses

- How to get UNICORE Access
- UNICORE Clients Configuration
- How to run a Job
- How to run a Workflow
- How to access Storages

Access Polish Grid Infrastructure via UNICORE
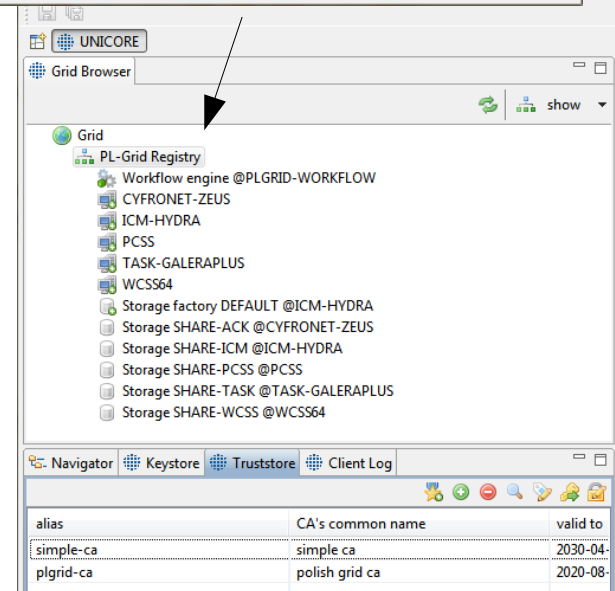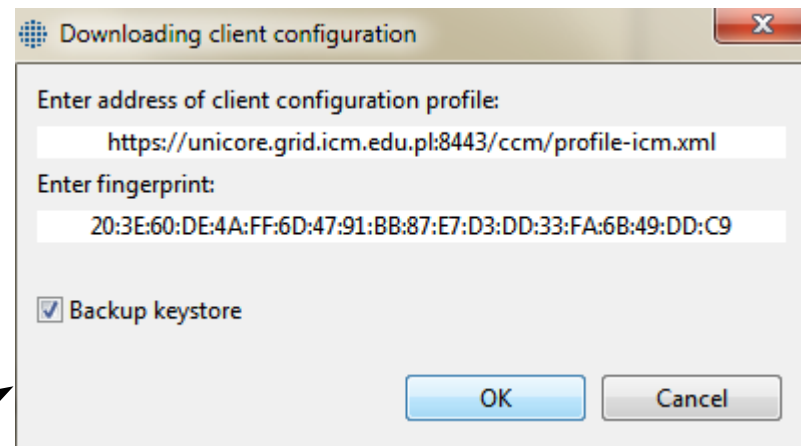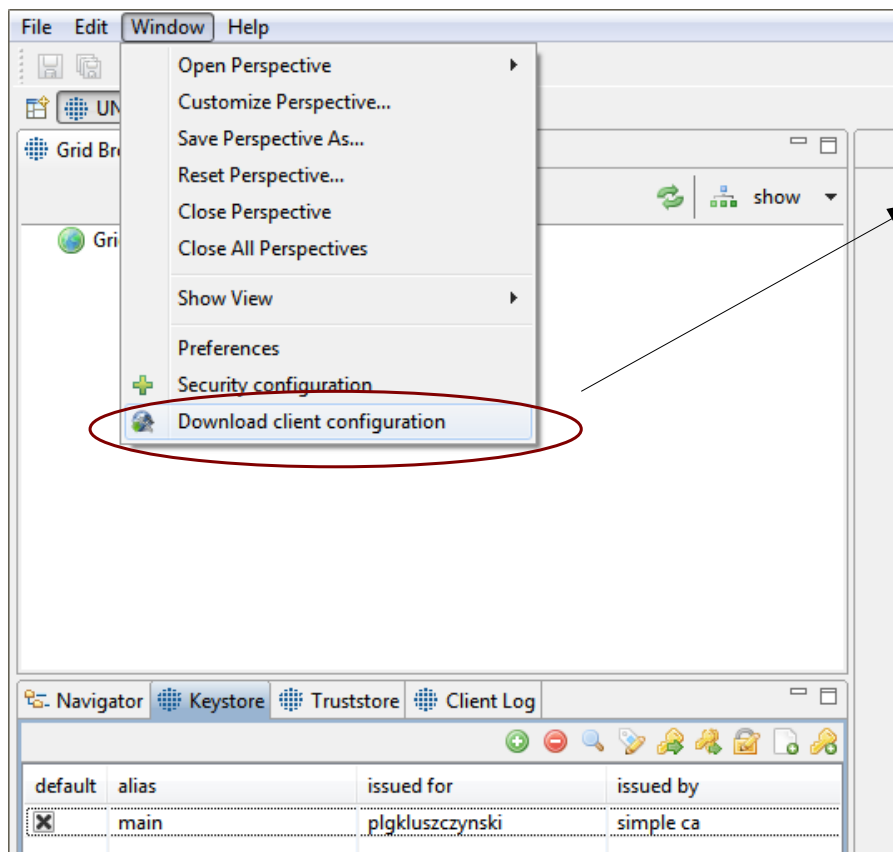
Client Configuration Manager (CCM)

◆ CCM allows to set quickly users' Grid environment by XML profile file:
  ◆ Adds registries
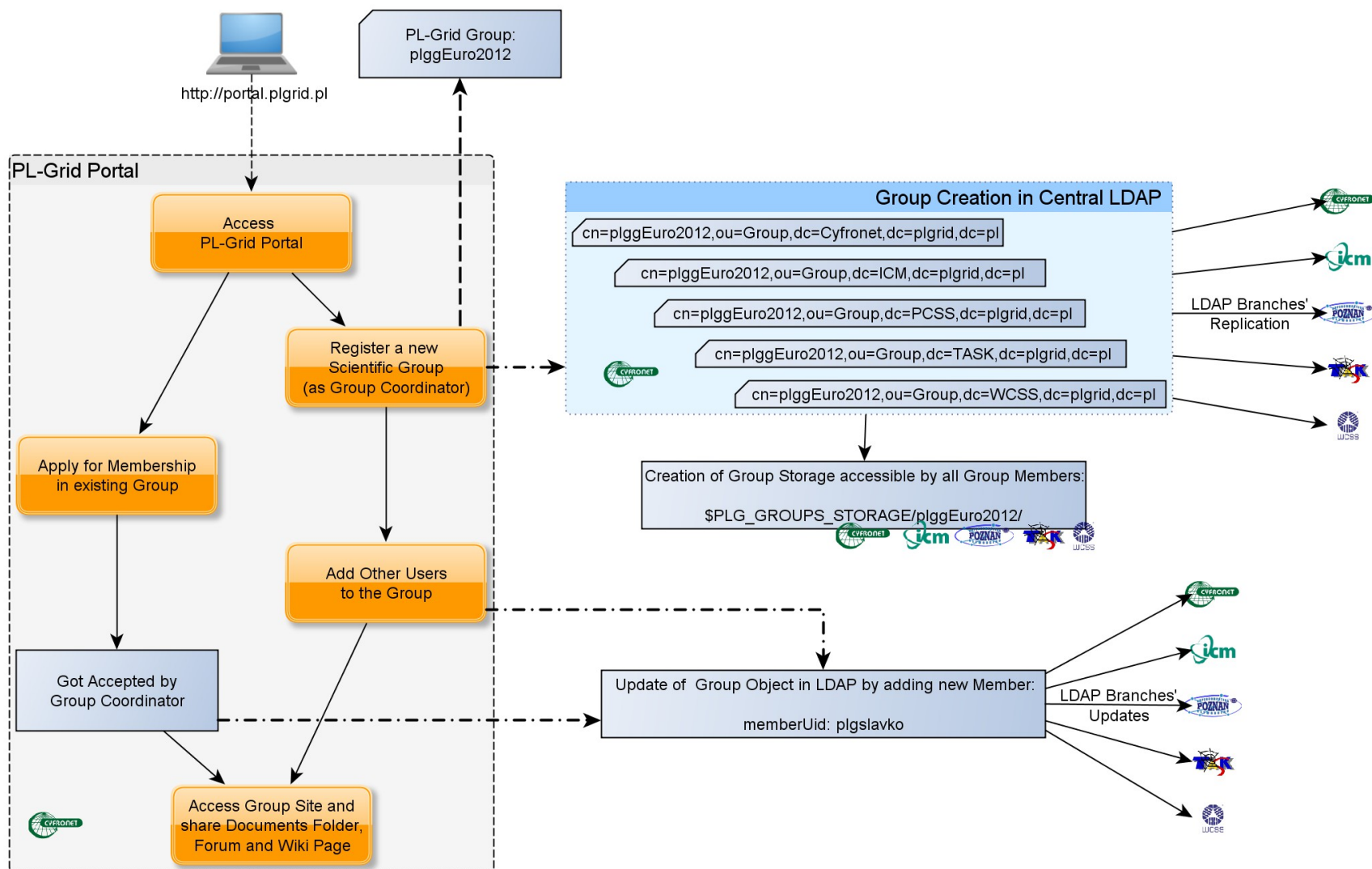 ◆ Adds trusted CA certificates
  ◆ Adds UNICORE clients extensions

Scientific Groups Support

◆ Scientific experiments often need collaboration

◆ PL-Grid offers support for scientific groups
  - ♦ Separate documents folder, forum and wiki portlets in PL-Grid portal
  - ♦ Storage accessible by all group members
    (via Target System Storage)

◆ Users can form a scientific groups:
  - ♦ Every group has a coordinator
  - ♦ Coordinator may apply for a grant
  - ♦ Grants are assigned to scientific groups
    (max. walltime, storage size)

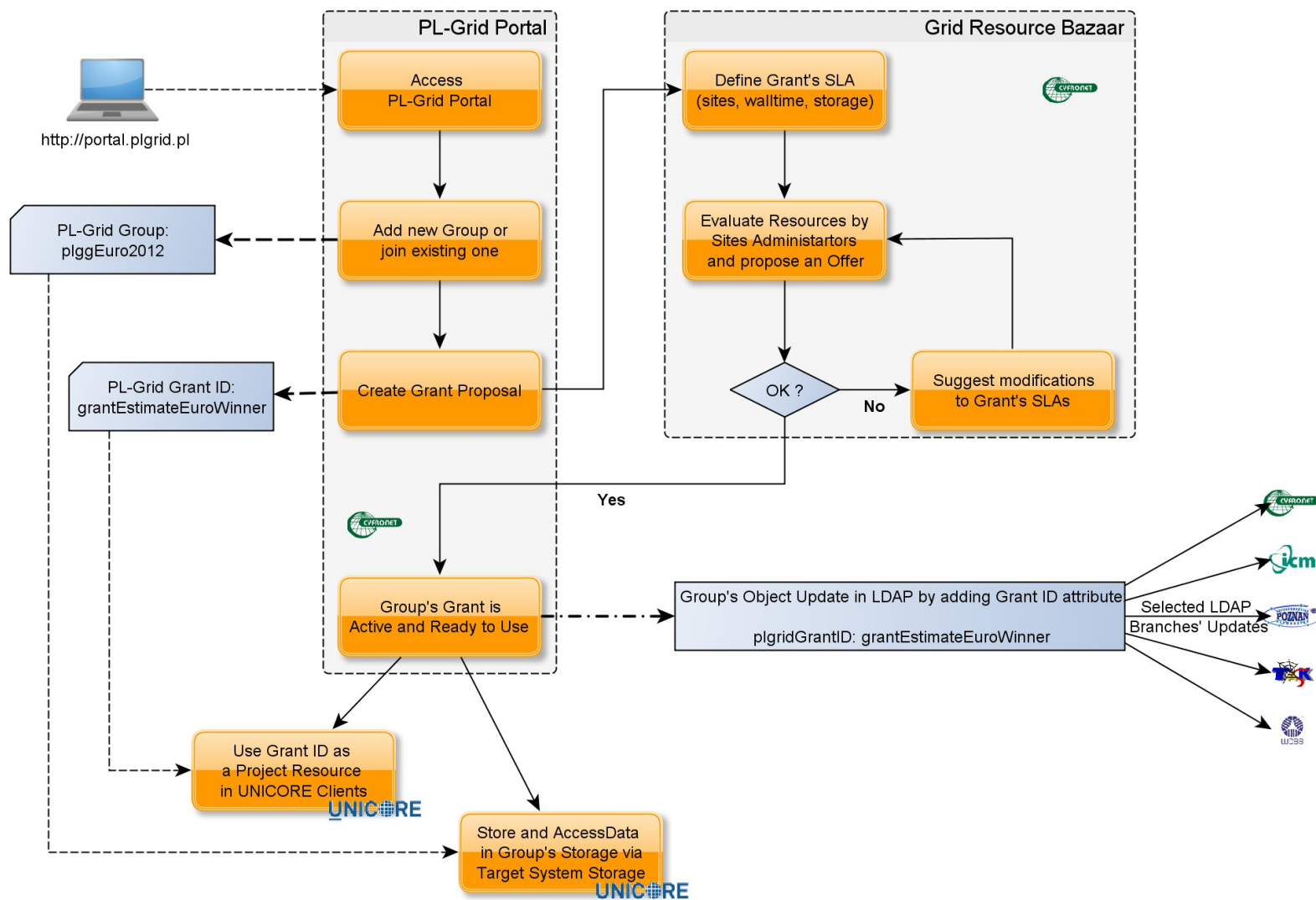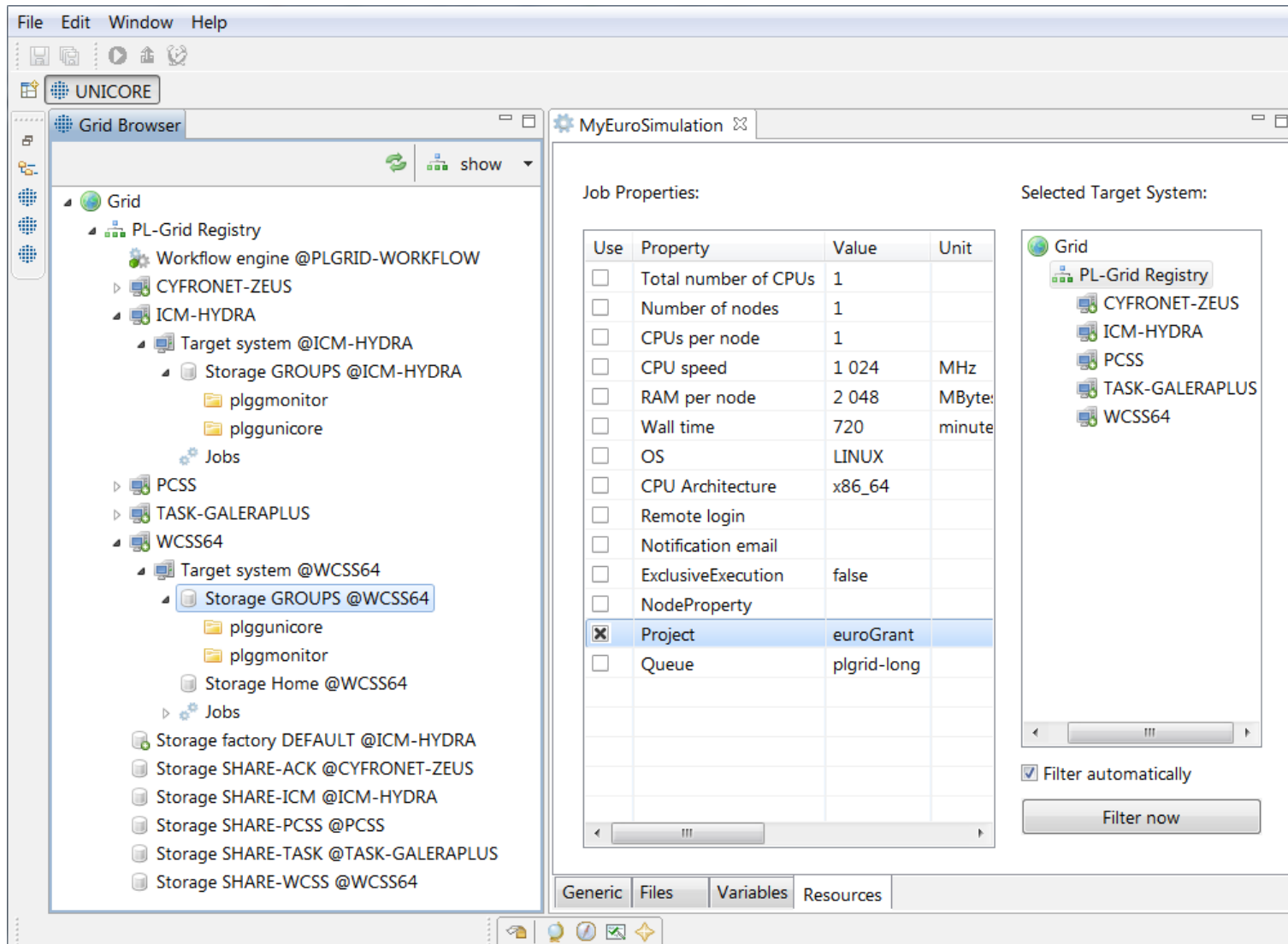◆ Every user has his personal grant at start
  to be able to use the Grid

http://en.mascots.uefa.com/uefaeuro2012

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Scientific Group Registration

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Group's Grant Application

Groups and Grants in URC

PL-Grid Usage (walltime hours)

Legend:
- vo.plgrid.pl
- UNICORE
- LHC
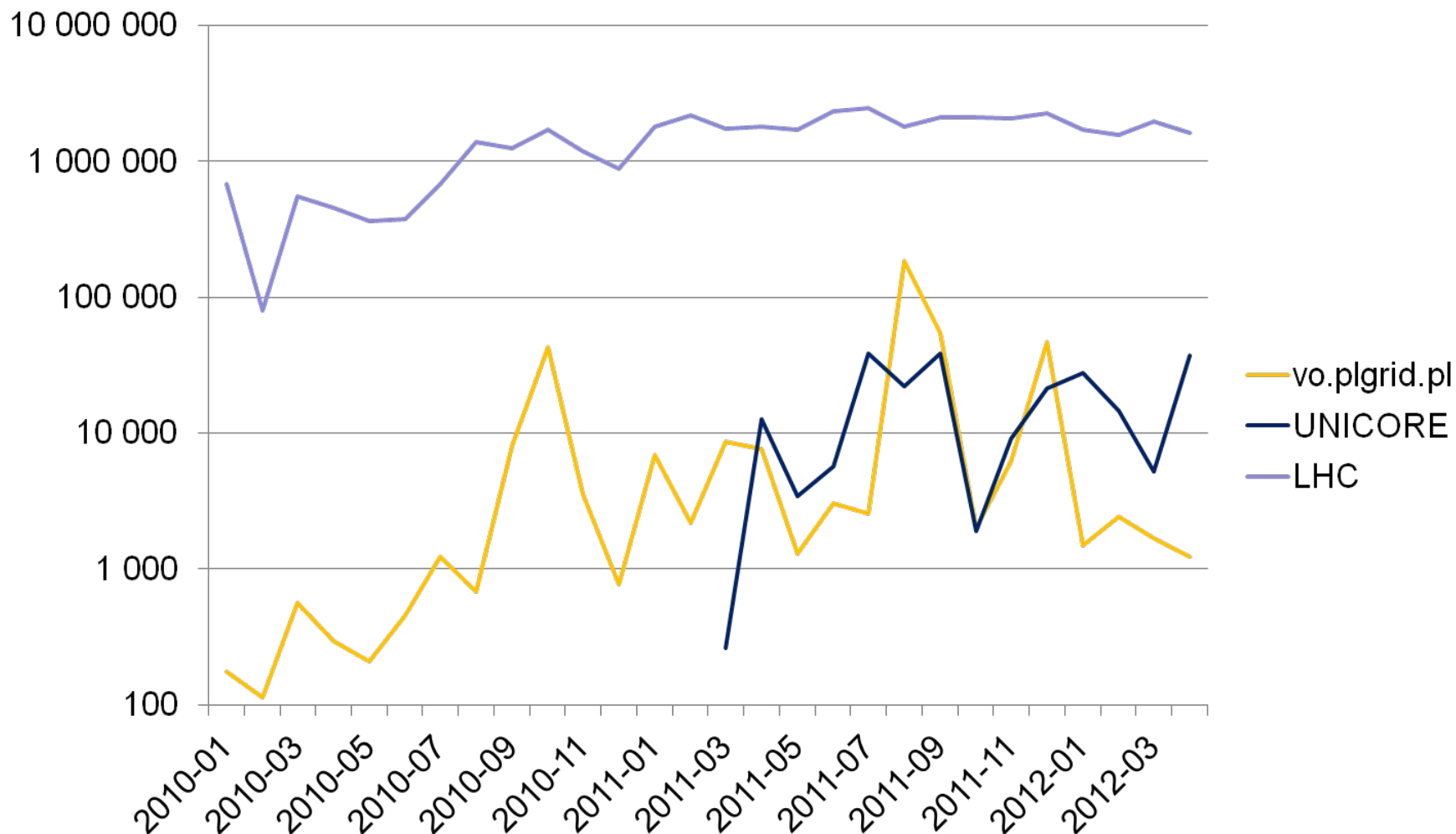
Example – Processing of Genetic Data

◆ Department of Molecular and Forensic Genetics, Institute of Forensic Medicine, Ludwik Rydygier Collegium Medicum, Nicolaus Copernicus University

◆ The Postgraduate School of Molecular Medicine, Medical University of Warsaw

◆ Analysis of patients' mtDNA having colorectal cancer (mutation identification)

◆ GS FLX Instrument (Roche Diagnostics) and its software

◆ Thanks for UNICORE File Transfer Daemon and UFTP clients support **!**

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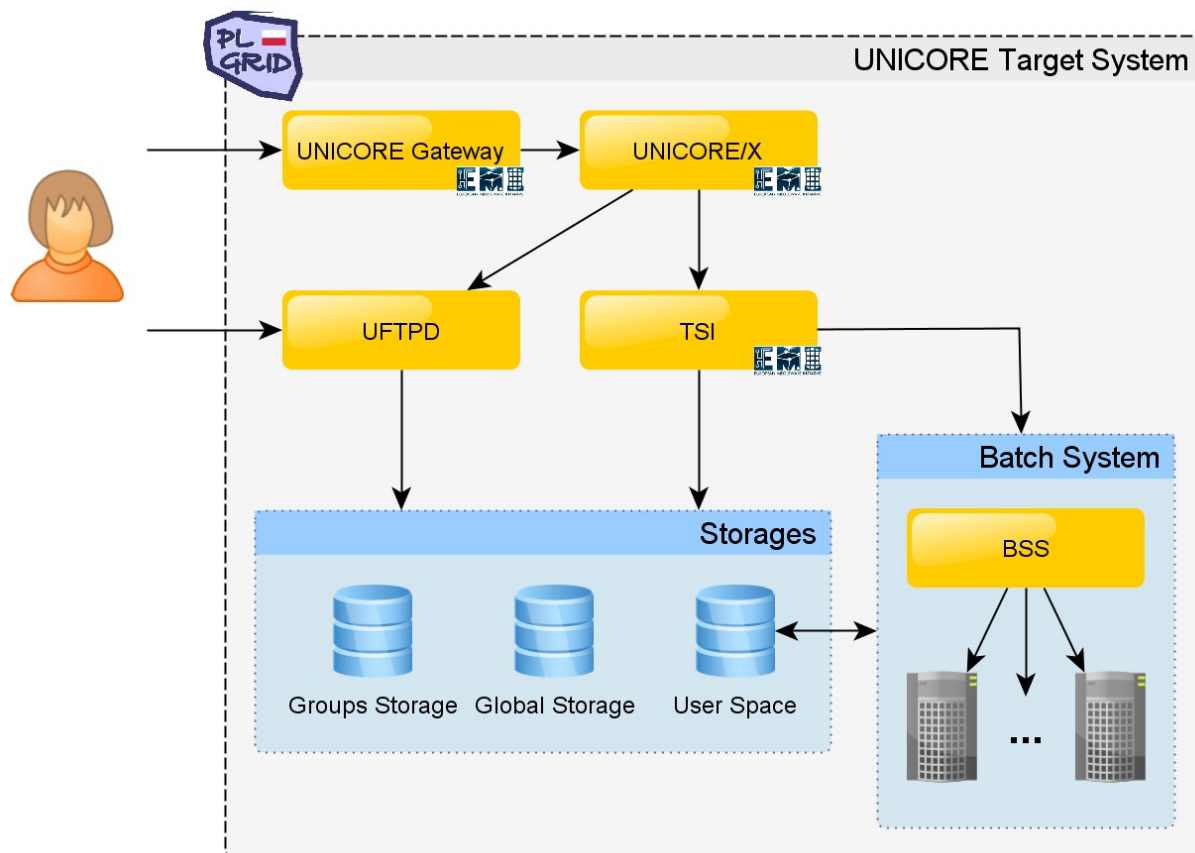
Experiment's Workflow
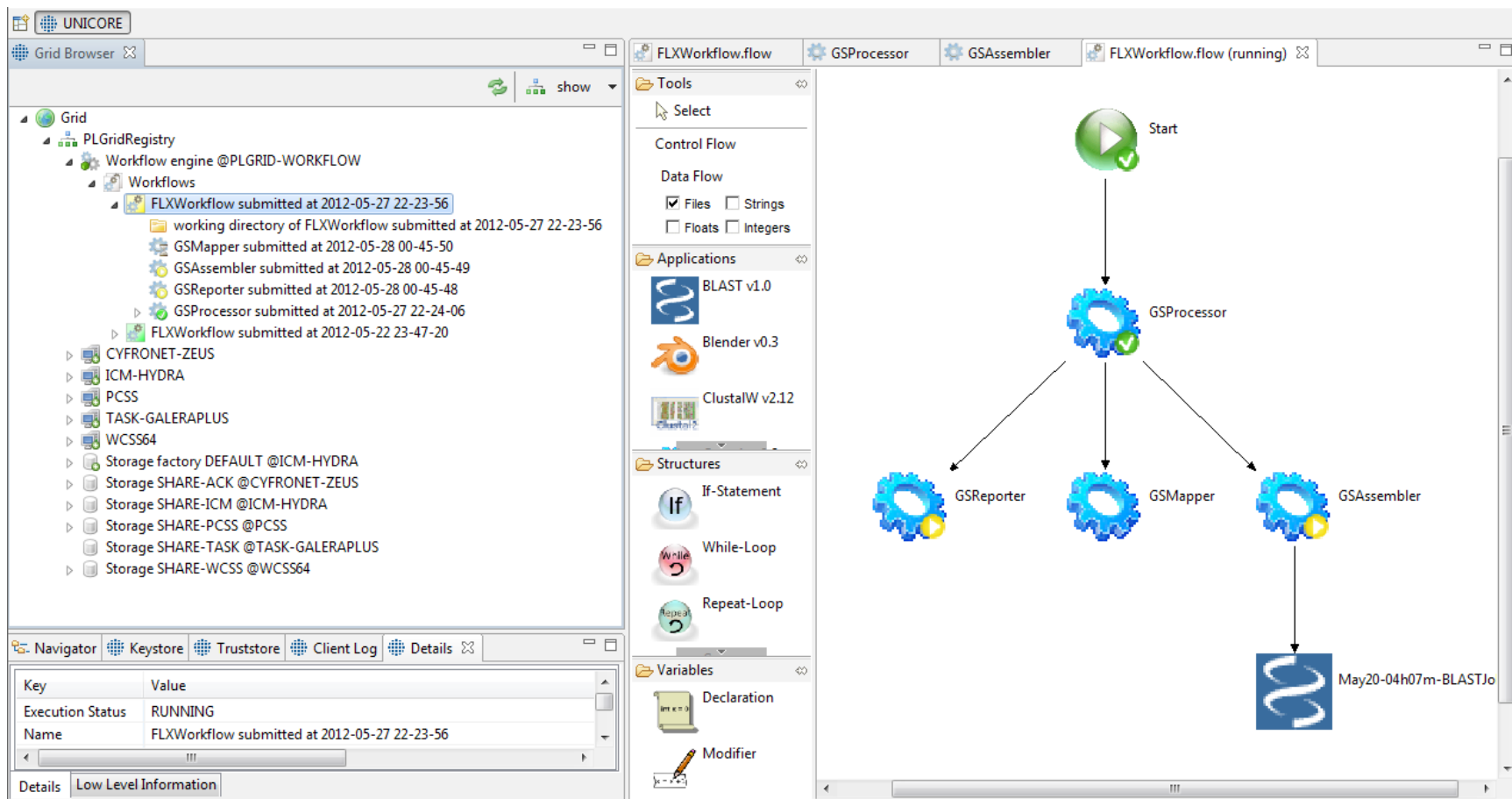
PL-Grid Plus

- ◆ 3 Year Project

- ◆ Focus on applications

- ◆ ICM coordinates 3 domain Grids:
  - ♦ Bioinformatics
  - ♦ Health and medicine
  - ♦ Material sciences

- ◆ Science gateways:
  - ♦ Still open issue
  - ♦ Hosted in Liferay portal

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PL-Grid Plus

◆ Hopefully, it will also end with a success...

http://www.tofurious.com/marketing-tips/what-success-really-looks-like/

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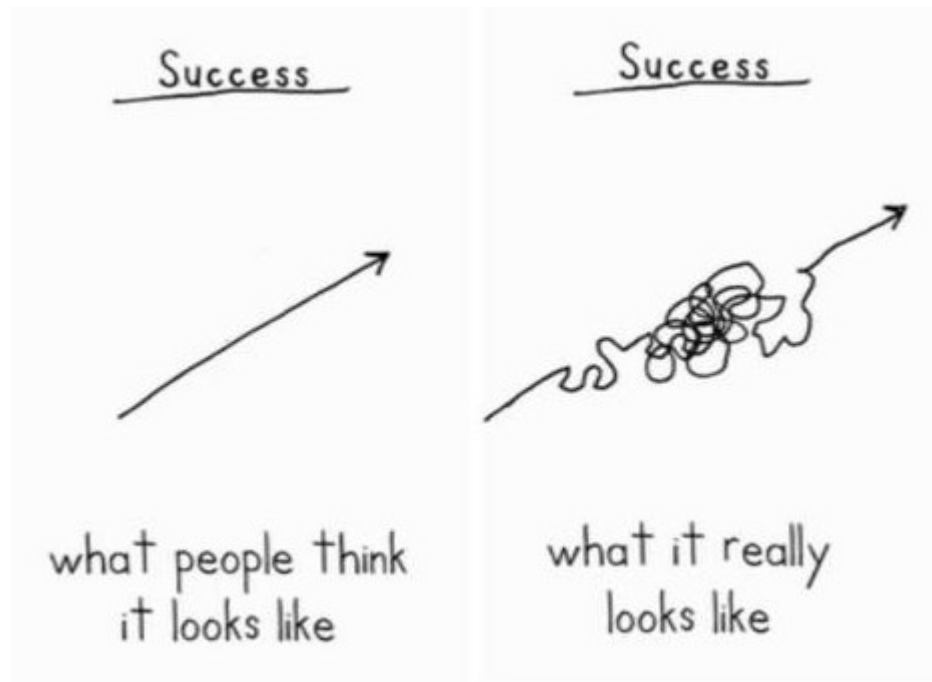
Many THANKS!

◆ What do we appreciate?

- ♦ UNICORE itself ;)
- ♦ UNICORE Clients (URC, UCC)
- ♦ UNICORE File Transfer Daemon **!**
- ♦ RPM packages **!**
  (it really boosted deployment and is helping in maintaining services)

◆ Who do we thanks?

- ♦ All UNICORE Team for a great support
- ♦ B.Schuler and B.Demuth for suggestions and taking into account our requests
- ♦ M.Strzelecki for great UNICORE monitoring support
- ♦ M.Lewandowski for UNICORE Accounting framework
- ♦ UNICORE administrators of other PL-Grid sites:
  - L.Flis (CYFRONET)
  - F.Klajn (WCSS)
  - M.Samson (TASK)
  - Z.Filutowska (PCSS)
- ♦ ICM Hydra cluster administrators

Thank You for Your Attention

http://en.mascots.uefa.com/uefaeuro2012

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