

UNICORE deployment in Polish NGI Lesson learned

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- ◆ 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

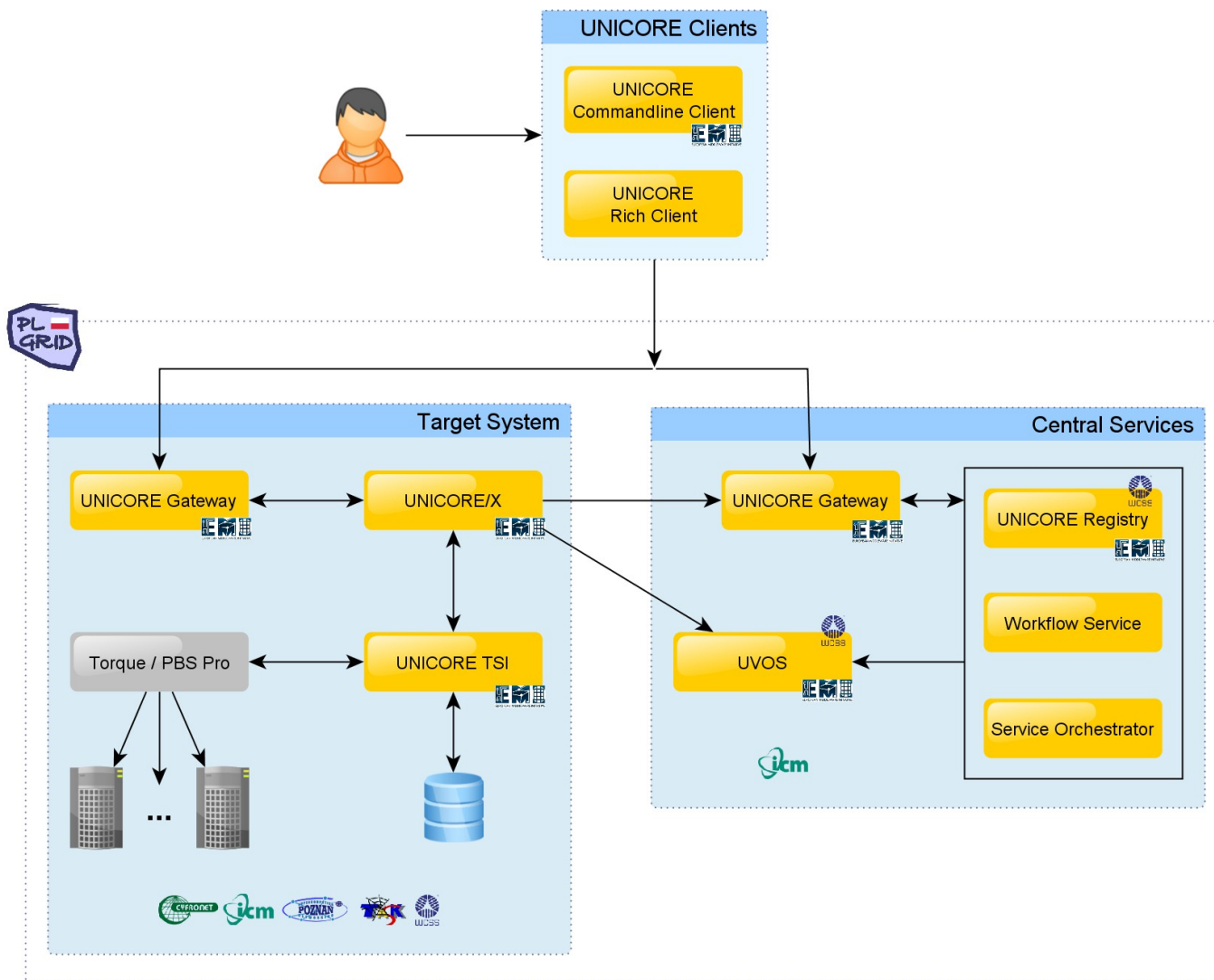
88	Cyfronet Poland	Cluster Platform 3000 BL 2x220, Xeon X5650 6C 2.66 GHz, Infiniband / 2011 HP	15264	128.79	162.41
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PL-Grid resources

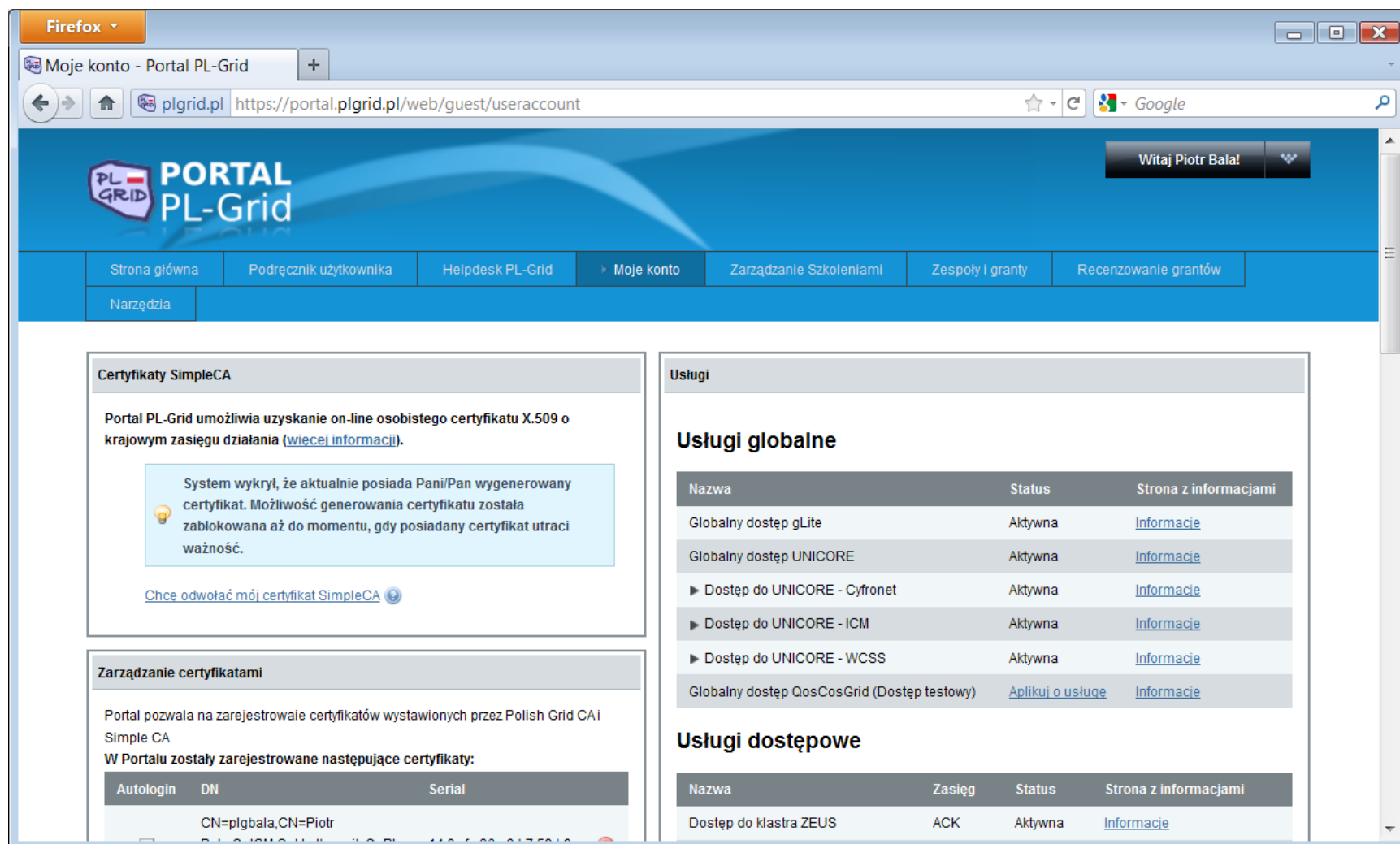
- ◆ PL-Grid resources
 - ◆ Number of cores: 23 616
 - ◆ CPU: 230,16 TFlops
 - ◆ Disk: 3,6 PB
 - ◆ Memory: 51,33 TB
 - ◆ Additional resources can be committed by partners
- ◆ UNICORE installed in all 5 centers
 - ◆ Services have to be maintained till 2017
- ◆ UNICORE central services run by ICM
 - ◆ Backup copy of Registry and UVOS run by WCSS



UNICORE Production Infrastructure



Integration with PL-Grid Portal



Firefox | **Moje konto - Portal PL-Grid** | <https://portal.plgrid.pl/web/guest/useraccount> | **Google**

Witaj Piotr Bala!

PORTAL PL-Grid

[Strona główna](#) | [Podręcznik użytkownika](#) | [Helpdesk PL-Grid](#) | **Moje konto** | [Zarządzanie Szkoleniami](#) | [Zespoły i granty](#) | [Recenzowanie grantów](#)

[Narzędzia](#)

Certyfikaty SimpleCA

Portal PL-Grid umożliwia uzyskanie on-line osobistego certyfikatu X.509 o krajowym zasięgu działania ([więcej informacji](#)).

System wykrył, że aktualnie posiada Pani/Pan wygenerowany certyfikat. Możliwość generowania certyfikatu została zablokowana aż do momentu, gdy posiadany certyfikat utraci ważność.

[Chcę odwołać mój certyfikat SimpleCA](#)

Zarządzanie certyfikatami

Portal pozwala na zarejestrowanie certyfikatów wystawionych przez Polish Grid CA i Simple CA

W Portalu zostały zarejestrowane następujące certyfikaty:

Autologin	DN	Serial
	CN=plgbala,CN=Piotr	

Usługi

Usługi globalne

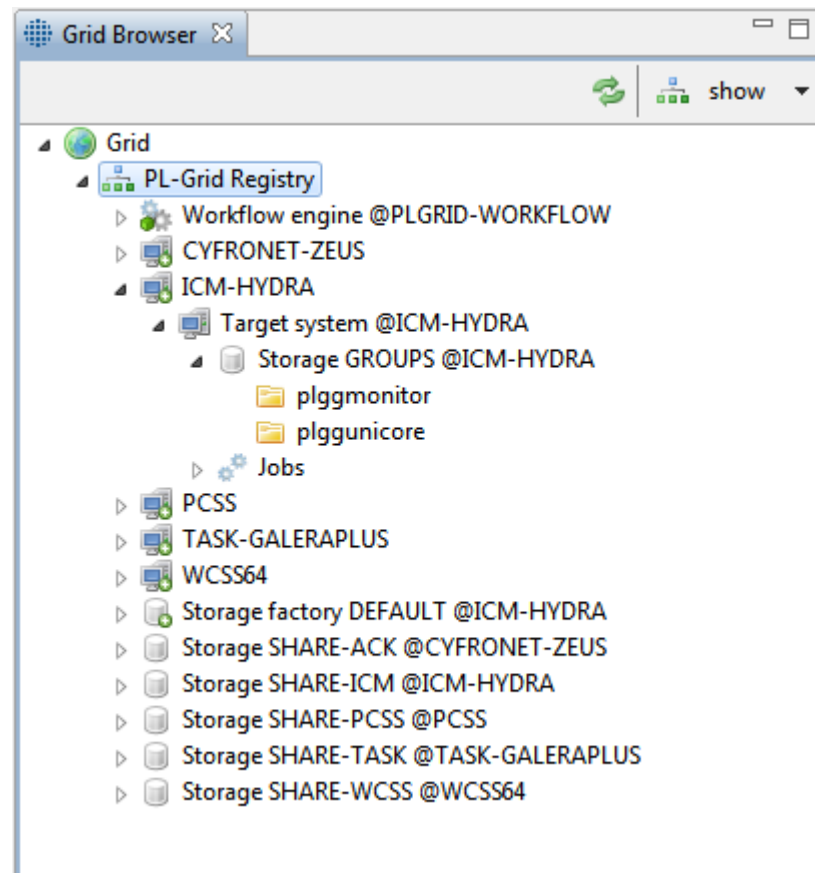
Nazwa	Status	Strona z informacjami
Globalny dostęp gLite	Aktywna	Informacje
Globalny dostęp UNICORE	Aktywna	Informacje
▶ Dostęp do UNICORE - Cyfronet	Aktywna	Informacje
▶ Dostęp do UNICORE - ICM	Aktywna	Informacje
▶ Dostęp do UNICORE - WCSS	Aktywna	Informacje
Globalny dostęp QosCosGrid (Dostęp testowy)	Aplikuj o usługę	Informacje

Usługi dostępne

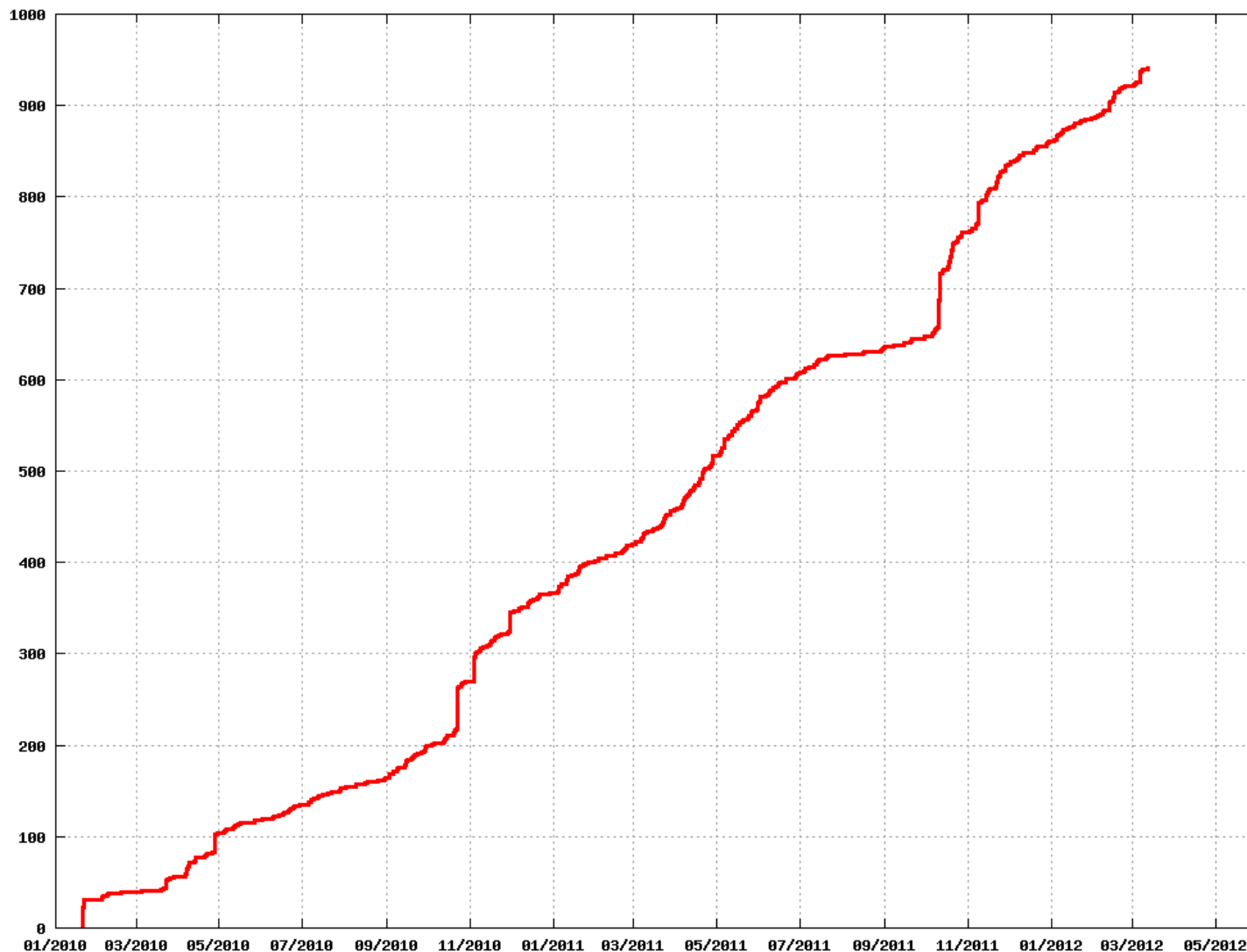
Nazwa	Zasięg	Status	Strona z informacjami
Dostęp do klastra ZEUS	ACK	Aktywna	Informacje

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

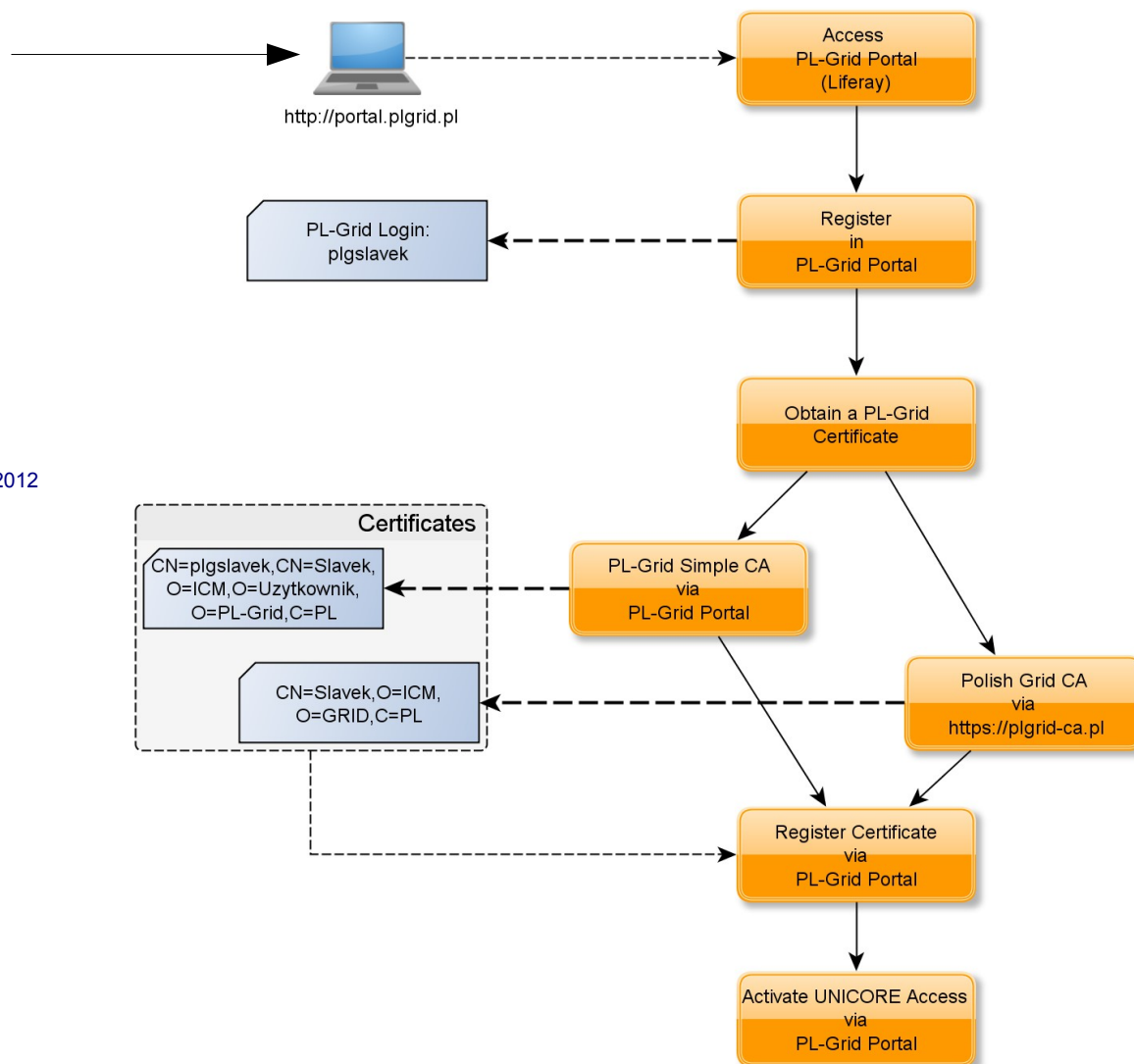


Getting Access to PL-Grid by Users

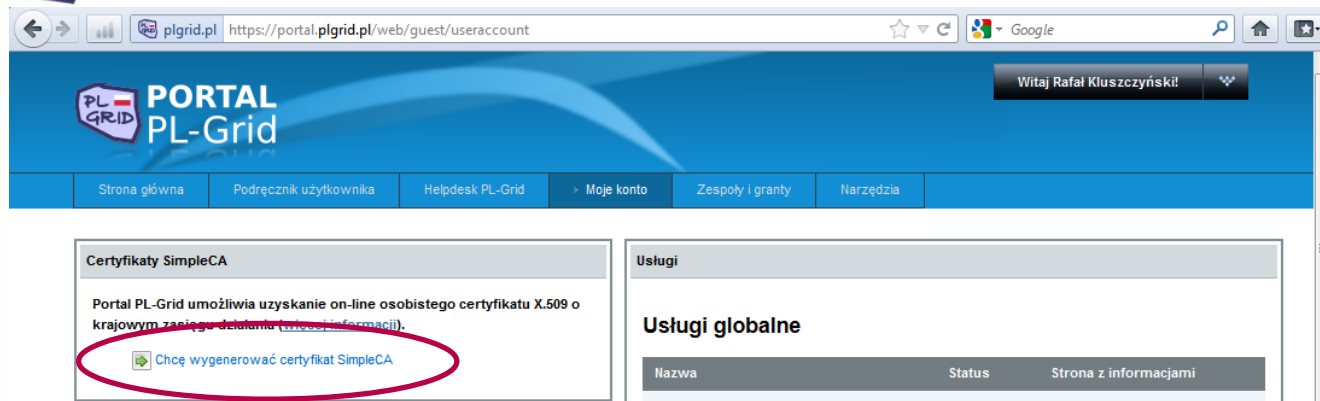


Slavek

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



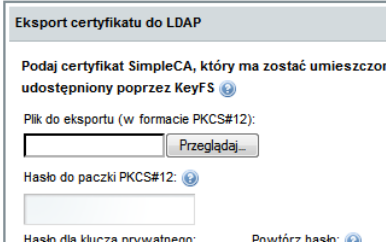
PL-Grid Simple CA Certificates



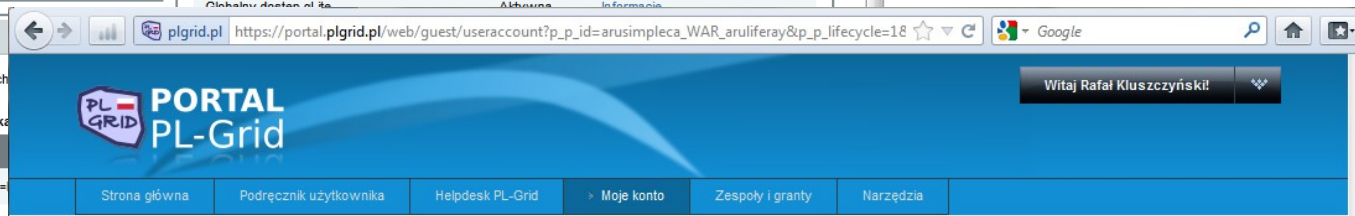
The screenshot shows the PL-Grid portal homepage. The header includes the PL-Grid logo and a navigation bar with links: Strona główna, Podręcznik użytkownika, Helpdesk PL-Grid, Moje konto, Zespoły i granty, and Narzędzia. A welcome message "Witaj Rafał Kluszczyński!" is displayed. The main content area is divided into two columns. The left column, titled "Certyfikaty SimpleCA", contains a text block explaining the portal's purpose and a button labeled "Chcę wygenerować certyfikat SimpleCA" which is circled in red. The right column, titled "Usługi", contains a section for "Usługi globalne" with a table listing services.



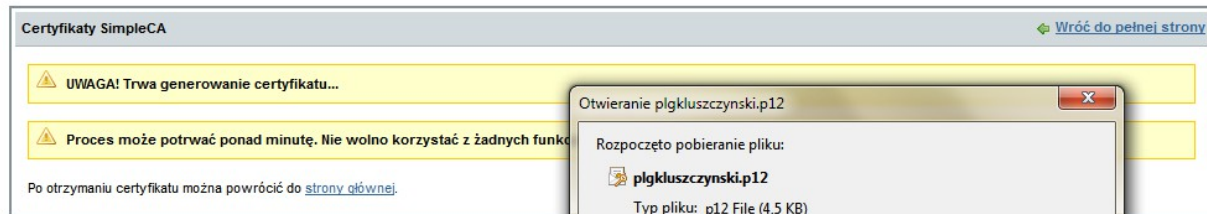
This screenshot shows the "Zarządzanie certyfikatami" (Certificate Management) section. It includes a text block explaining the portal's function and a table listing registered certificates. The table has columns for "Autologin" and "DN". One certificate is listed with the DN "CN=Rafał Kluszczyński,O=ICM,O=GRID,C=PL".



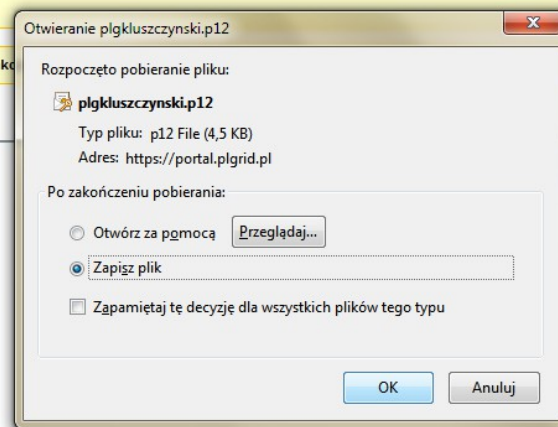
This screenshot shows the "Eksport certyfikatu do LDAP" (Export certificate to LDAP) section. It contains a text block explaining the process and a form for entering the certificate details. The form includes a field for the file name (PKCS#12) and a field for the password. A "Przełączaj..." button is also visible.



This is a repeated screenshot of the PL-Grid portal homepage, showing the same navigation bar, welcome message, and main content area as the first screenshot.



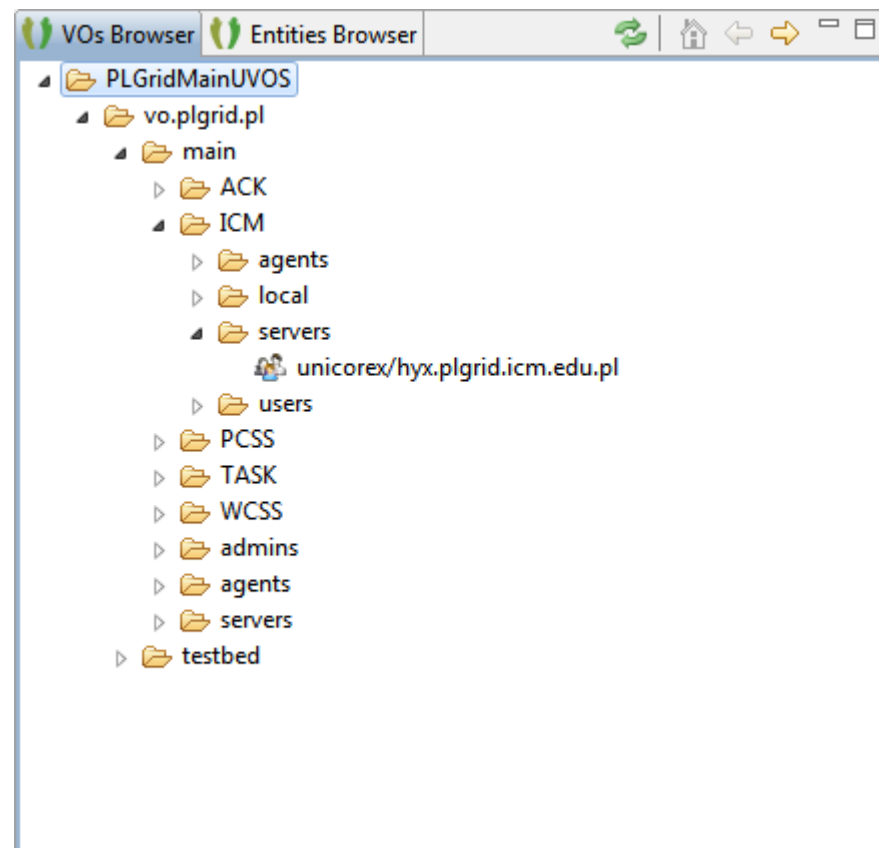
This screenshot shows the "Certyfikaty SimpleCA" section during the certificate generation process. It features a yellow warning banner that reads "UWAGA! Trwa generowanie certyfikatu..." (Warning! Certificate generation is in progress...). Below the banner, a message states "Proces może potrwać ponad minutę. Nie wolno korzystać z żadnych funkcji" (The process may take more than a minute. Do not use any functions). A link to the main page is provided at the bottom.



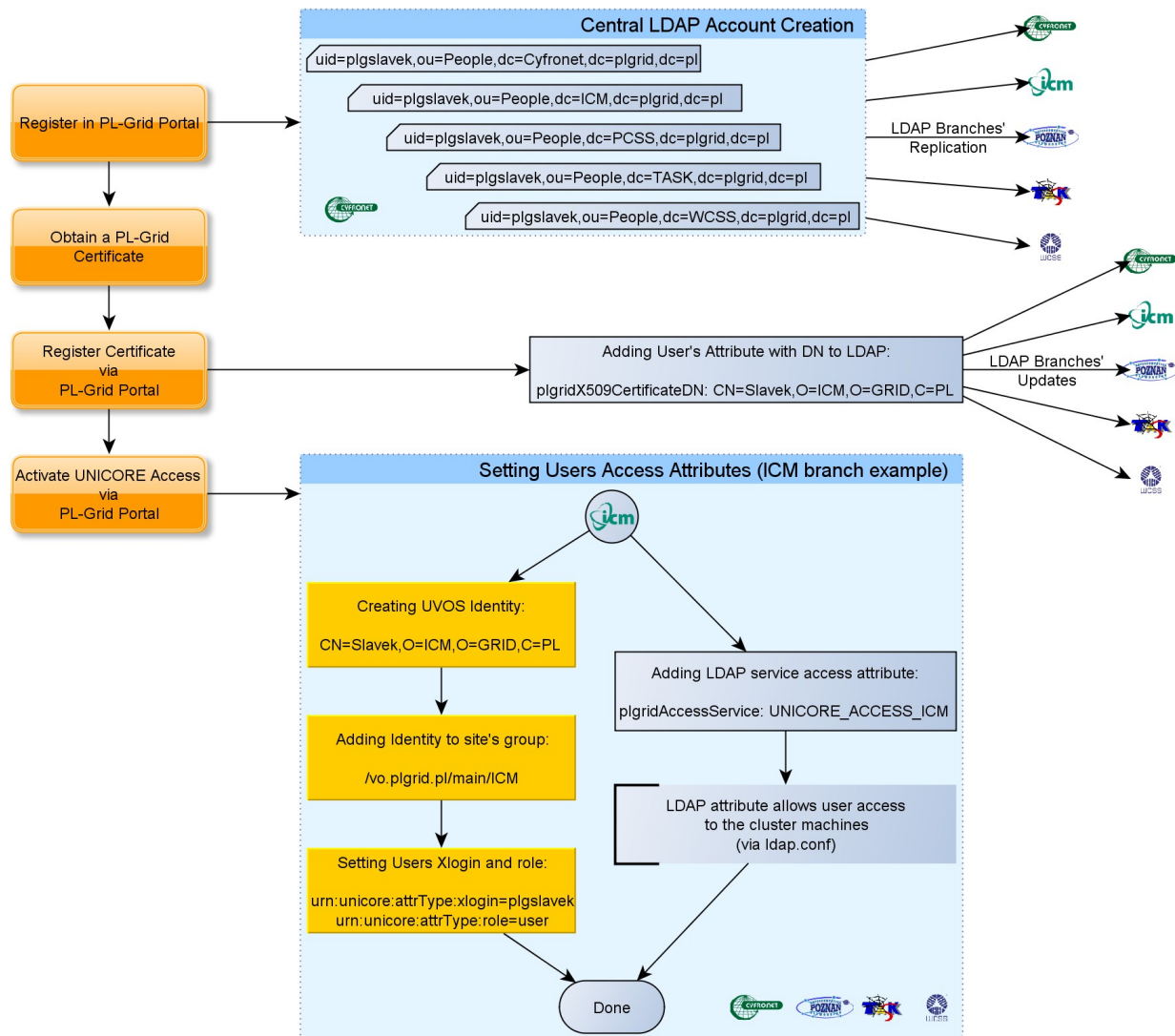
This screenshot shows a file download dialog box titled "Otwieranie plgkluszczyński.p12". It displays the file name "plgkluszczyński.p12", the file type "Typ pliku: p12 File (4,5 KB)", and the address "Adres: https://portal.plgrid.pl". The dialog offers three options: "Otwórz za pomocą..." (Open with...), "Zapisz plik" (Save file), and "Zapamiętaj tę decyzję dla wszystkich plików tego typu" (Remember this decision for all files of this type). The "Zapisz plik" option is selected. Buttons for "OK" and "Anuluj" (Cancel) are at the bottom.

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



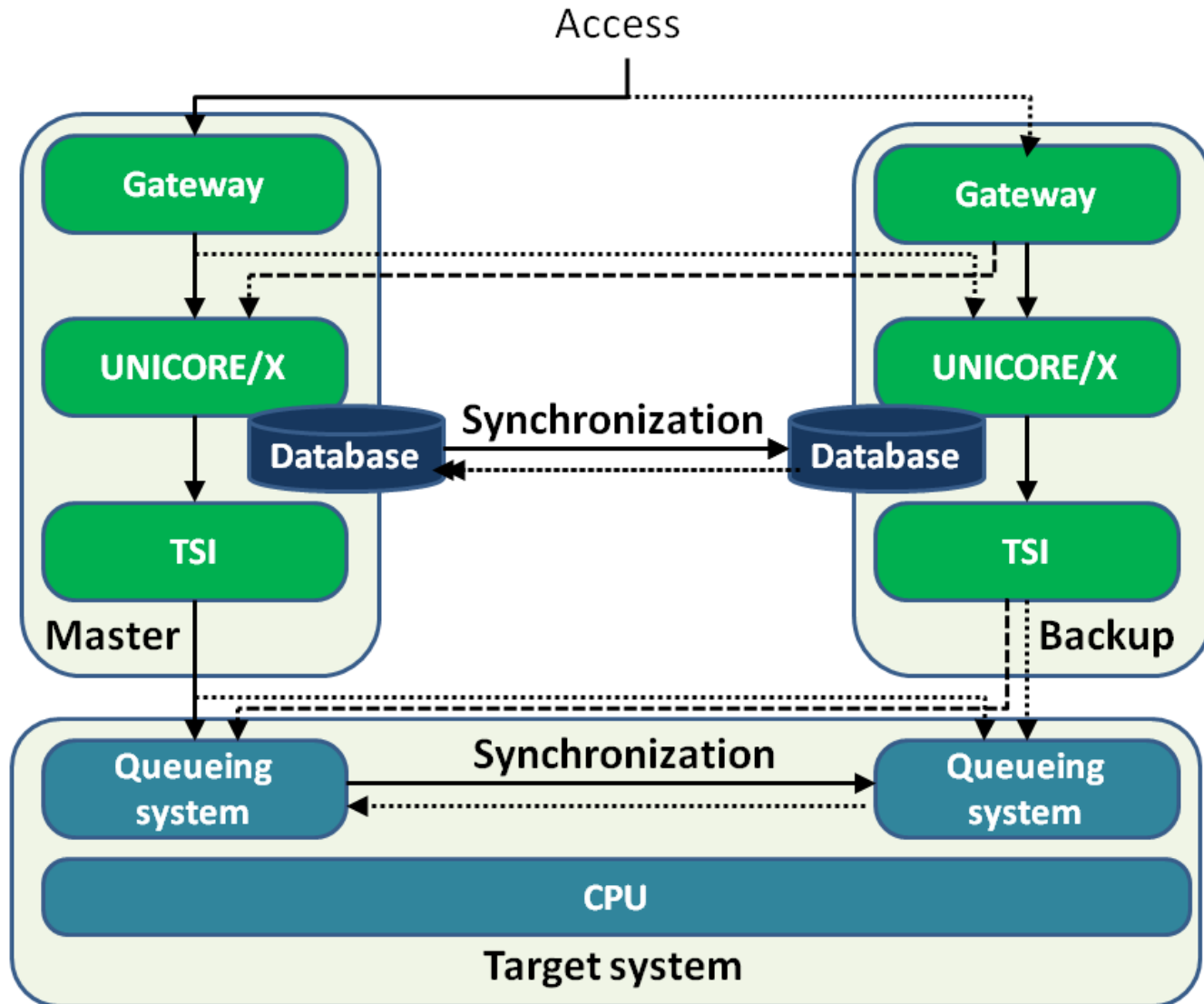
Behind the Scenes (LDAP & UVOS)



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

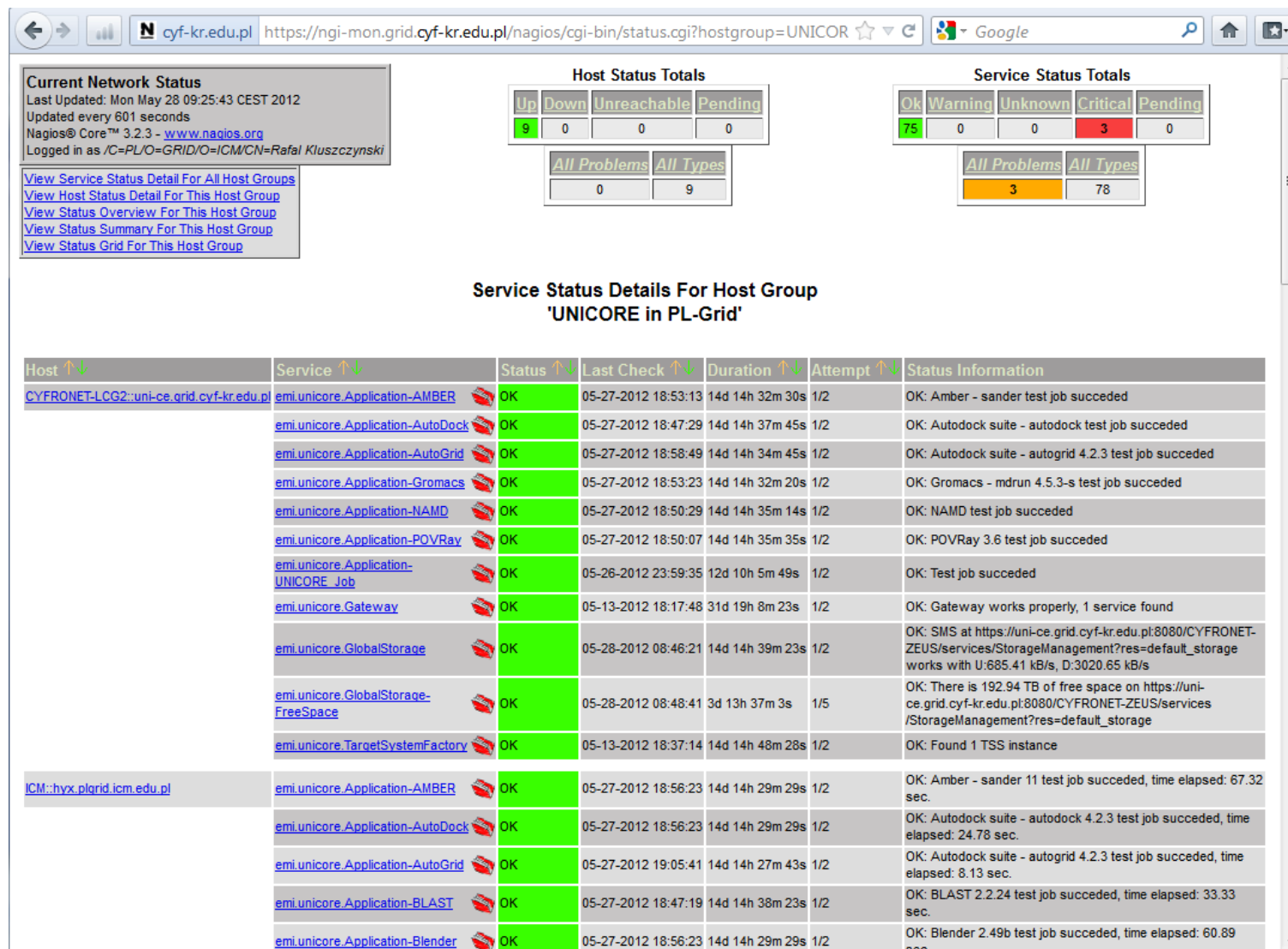
- ◆ PL-Grid participate in Stage Rollout procedure of SAM

GOCDB Types:

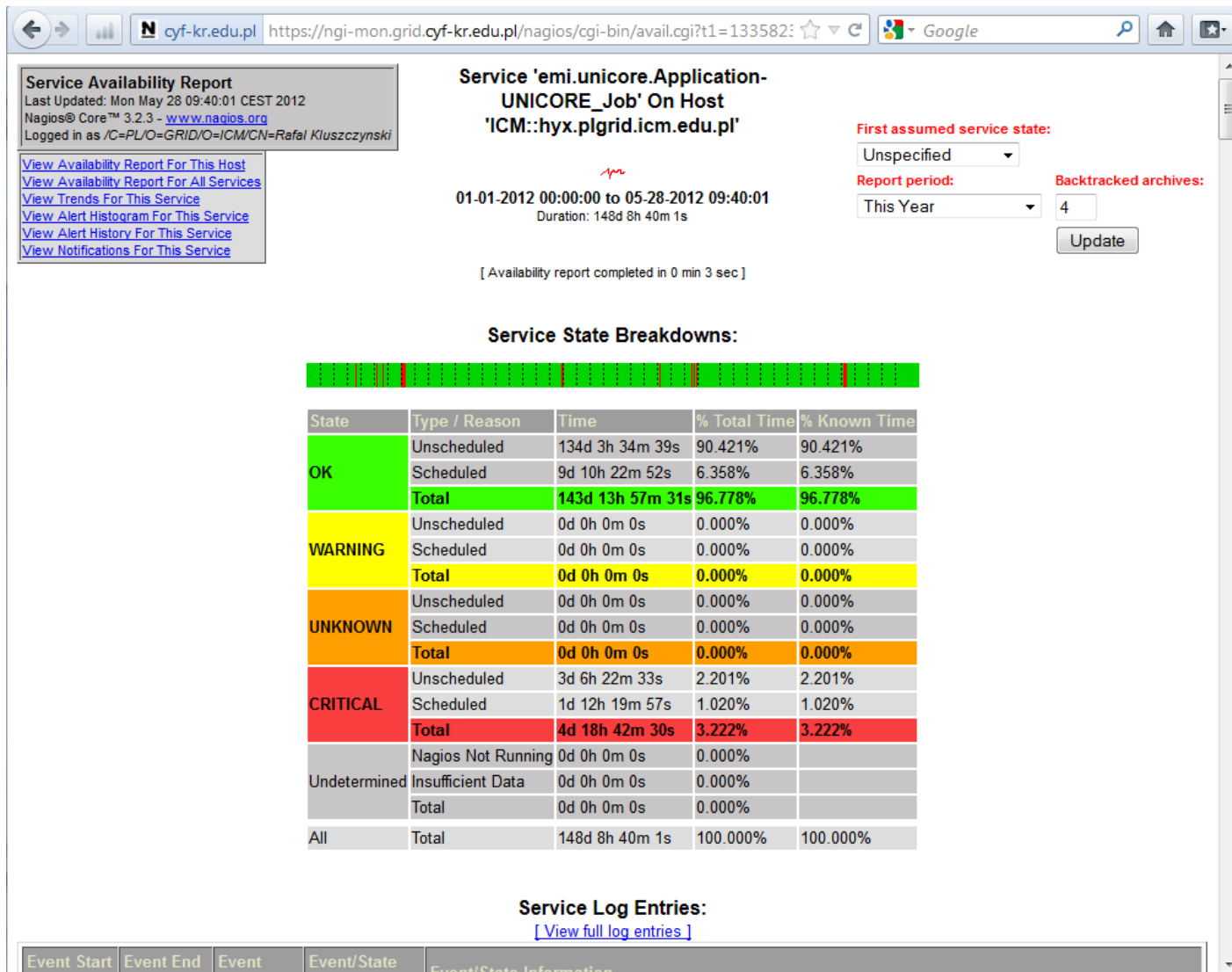
uncore6.Gateway
 uncore6.Registry
 uncore6.ServiceOrchestrator
 uncore6.StorageFactory
 uncore6.StorageManagement
 uncore6.TargetSystemFactory
 uncore6.UVOSAssertionQueryService
 uncore6.WorkflowFactory

- ◆ 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



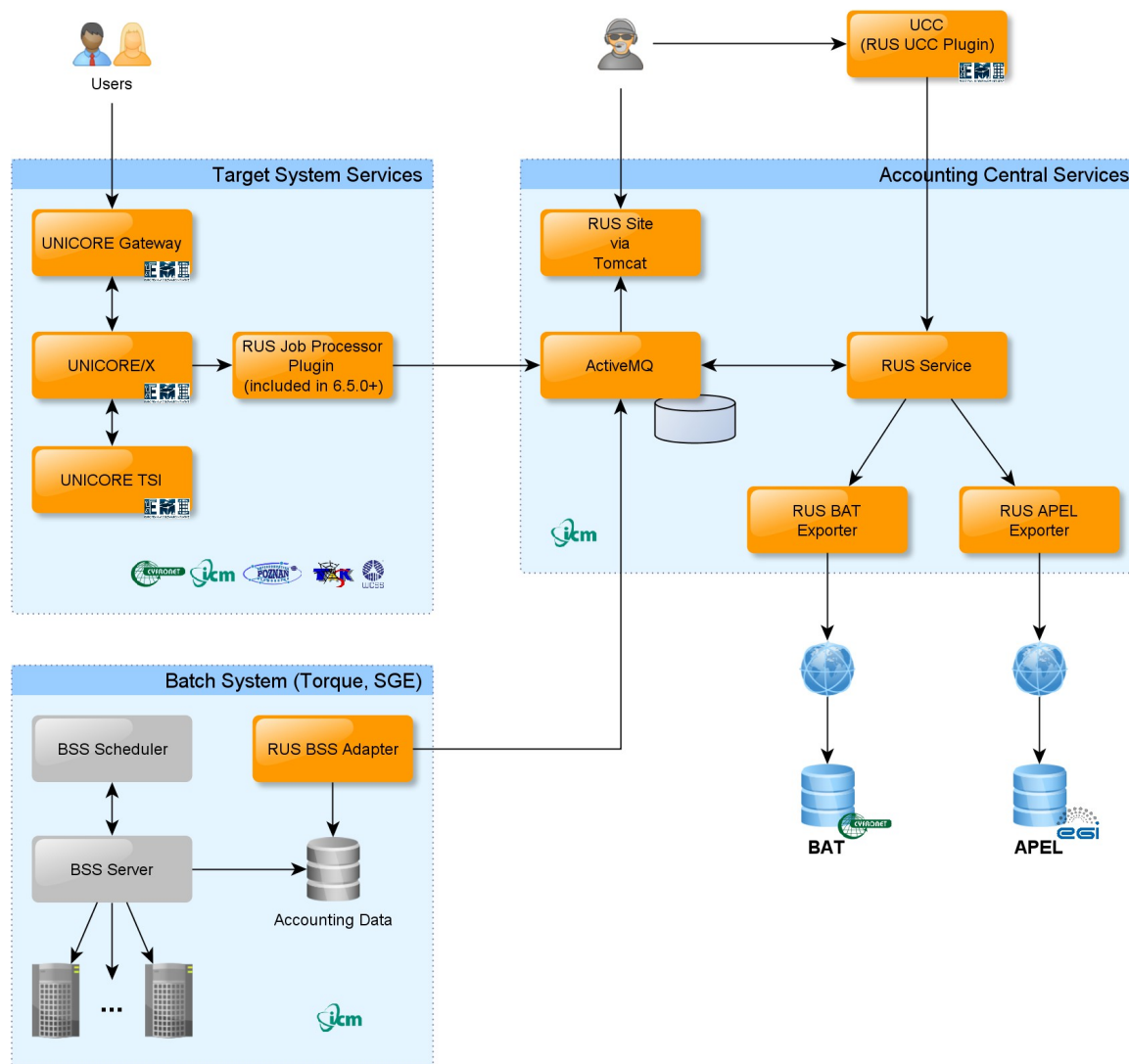
Nagios Availability Report



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



UNICORE Accounting Portal

[View records](#)
[View statistics](#)
[Usage graph](#)
[Logout](#)

Search Criteria:

User: -- any user --

Bss host:

-- any bss host --
batch.grid.cyf-kr.edu.pl
ce.reef.man.poznan.pl
ce2.polgrid.pl

Queue:

-- any queue --
alice
atlas
batch

Status:

-- any status --
aborted
completed
failed

VO:

-- any vo --
-- no vo --
vo.plgrid.pl

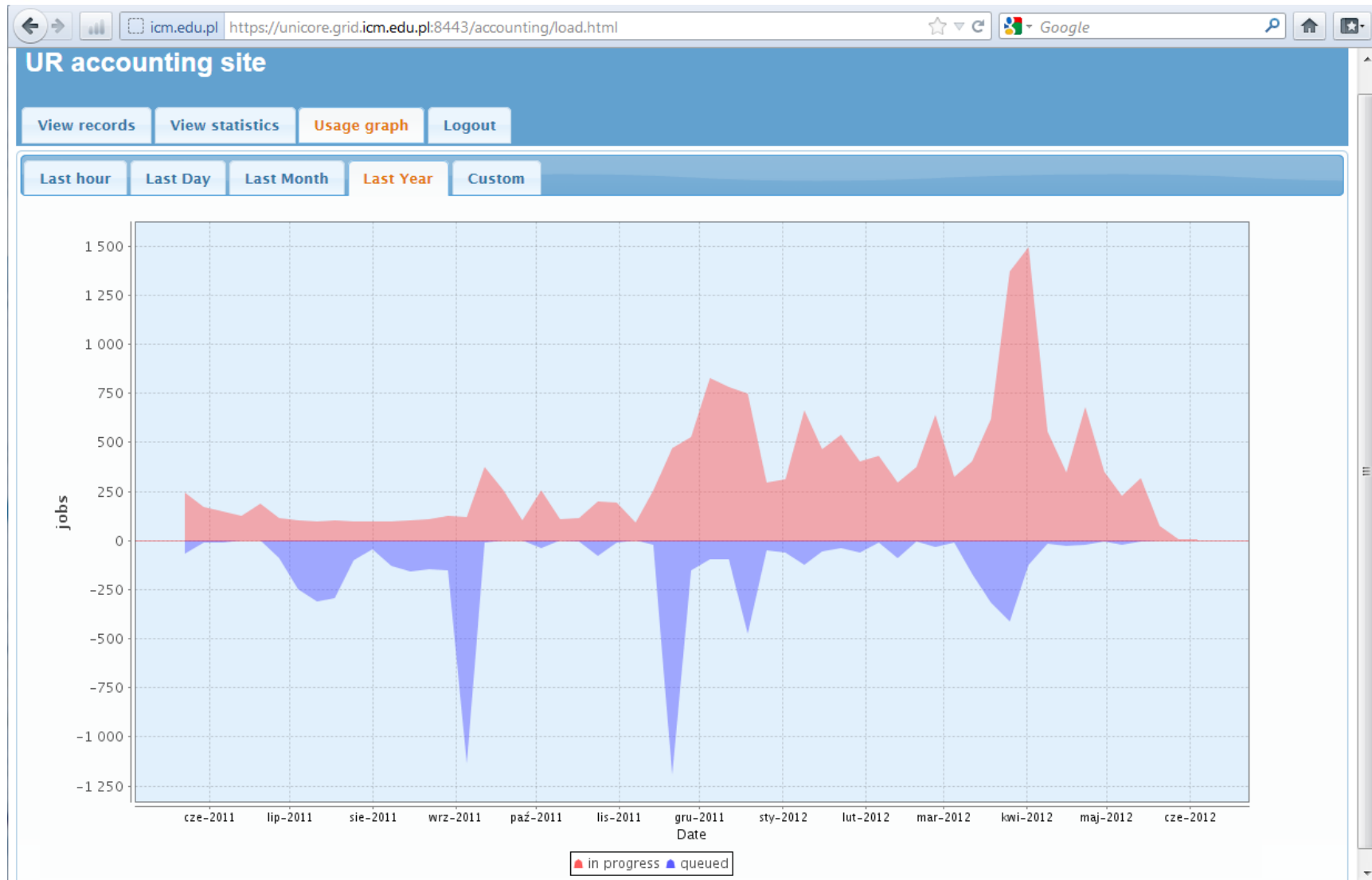
Date from:

Date to:

Search

Id	Job id	User DN	Status	Queue	Start Date	End Date
1221888	2701819 - nova	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221887	2701817 - nova	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221886	2701816 - nova	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221885	21127017 - batch.grid.cyf-kr.edu.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221884	64473 - cream.grid.task.gda.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221883	21127004 - batch.grid.cyf-kr.edu.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221882	2701815 - nova	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221880	2701814 - nova	CN=Pawel Wolniewicz - nagios, O=PSNC, O=GRID, C=PL	completed			
1221879	64472 - cream.grid.task.gda.pl	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221877	578687 - qot4.plgrid.icm.edu.pl	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed	plgrid3	05/27/2012 11:06:02	05/27/2012 11:06:08
1221876	6488379 - ce.reef.man.poznan.pl	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221874	21126890 - batch.grid.cyf-kr.edu.pl	CN=Pawel Wolniewicz - nagios, O=PSNC, O=GRID, C=PL	completed			
1221873	2701813 - nova	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221872	2701812 - nova	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221871	2701811 - nova	CN=Tadeusz Szymocha - SAM, O=Cyfronet, O=GRID, C=PL	completed			
1221870	64471 - cream.grid.task.gda.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221869	6488340 - ce.reef.man.poznan.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221868	578685 - qot4.plgrid.icm.edu.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed	plgrid3	05/27/2012 11:05:02	05/27/2012 11:05:02
1221867	21126867 - batch.grid.cyf-kr.edu.pl	CN=Rafal Kluszczyński, O=ICM, O=GRID, C=PL	completed			
1221864	578682 - qot4.plgrid.icm.edu.pl	CN=Pawel Wolniewicz - nagios, O=PSNC, O=GRID, C=PL	completed	plgrid3	05/27/2012 10:53:01	05/27/2012 10:53:02
1221863	21126582 - batch.grid.cyf-kr.edu.pl	CN=nagios/alfred.studmat.umk.pl, O=ICM, O=Usluga, O=PL-Grid, C=PL	completed			

Usage Graph In Accounting Portal



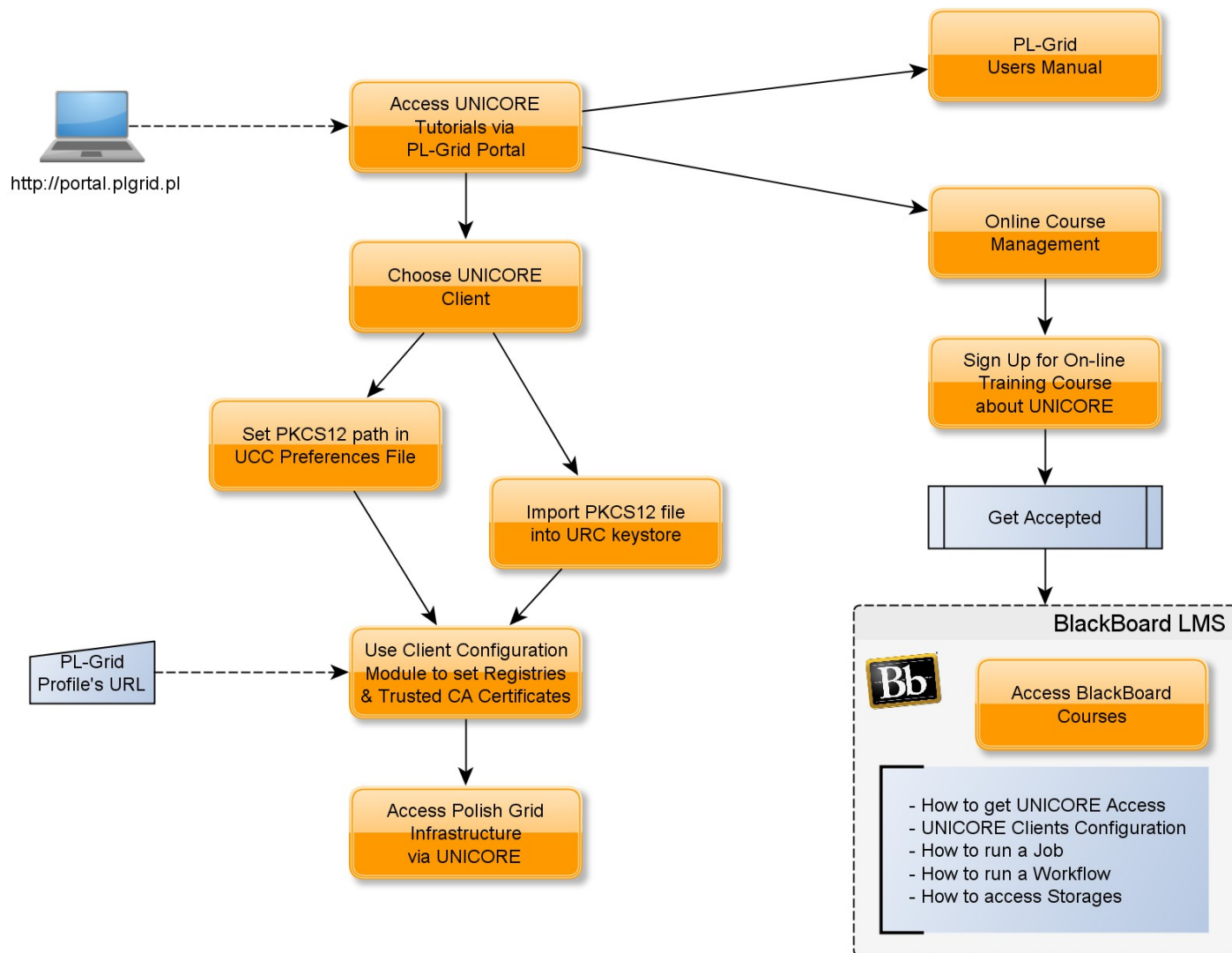
UNICORE Trainings

- ◆ 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

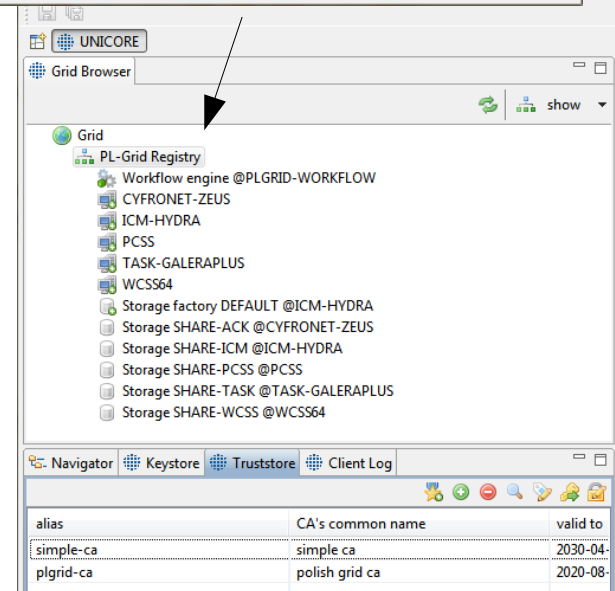
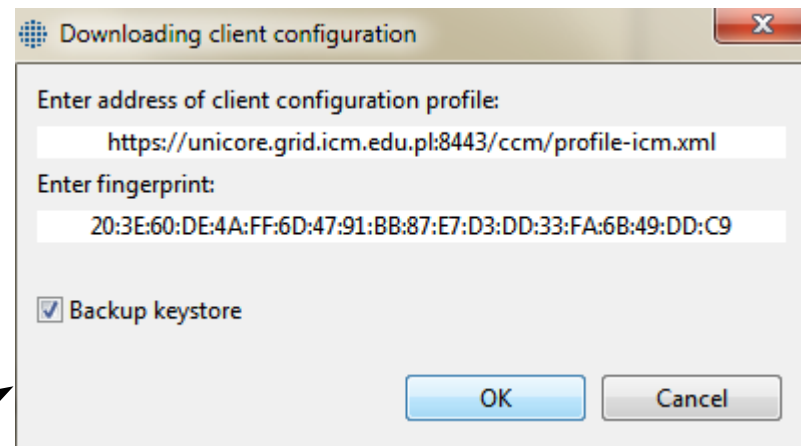
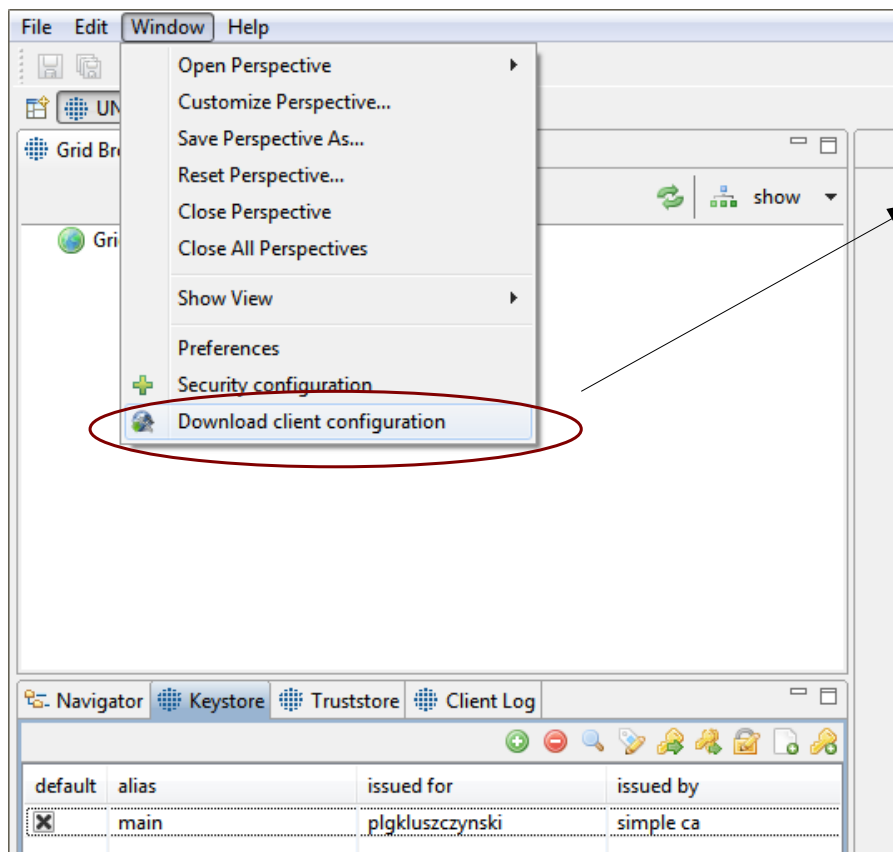
Users' First UNICORE Access



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



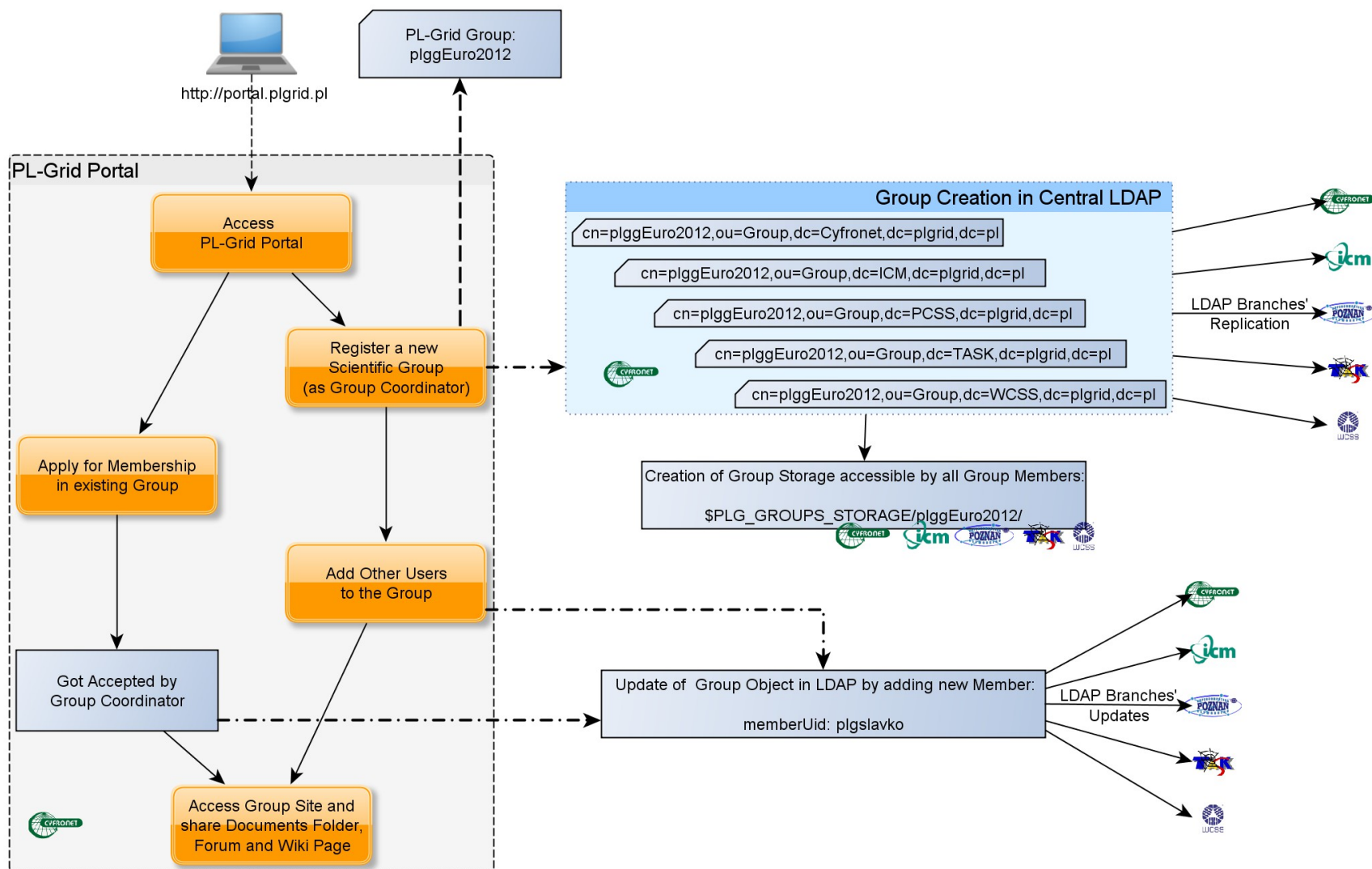
Scientific Groups Support

- ◆ 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

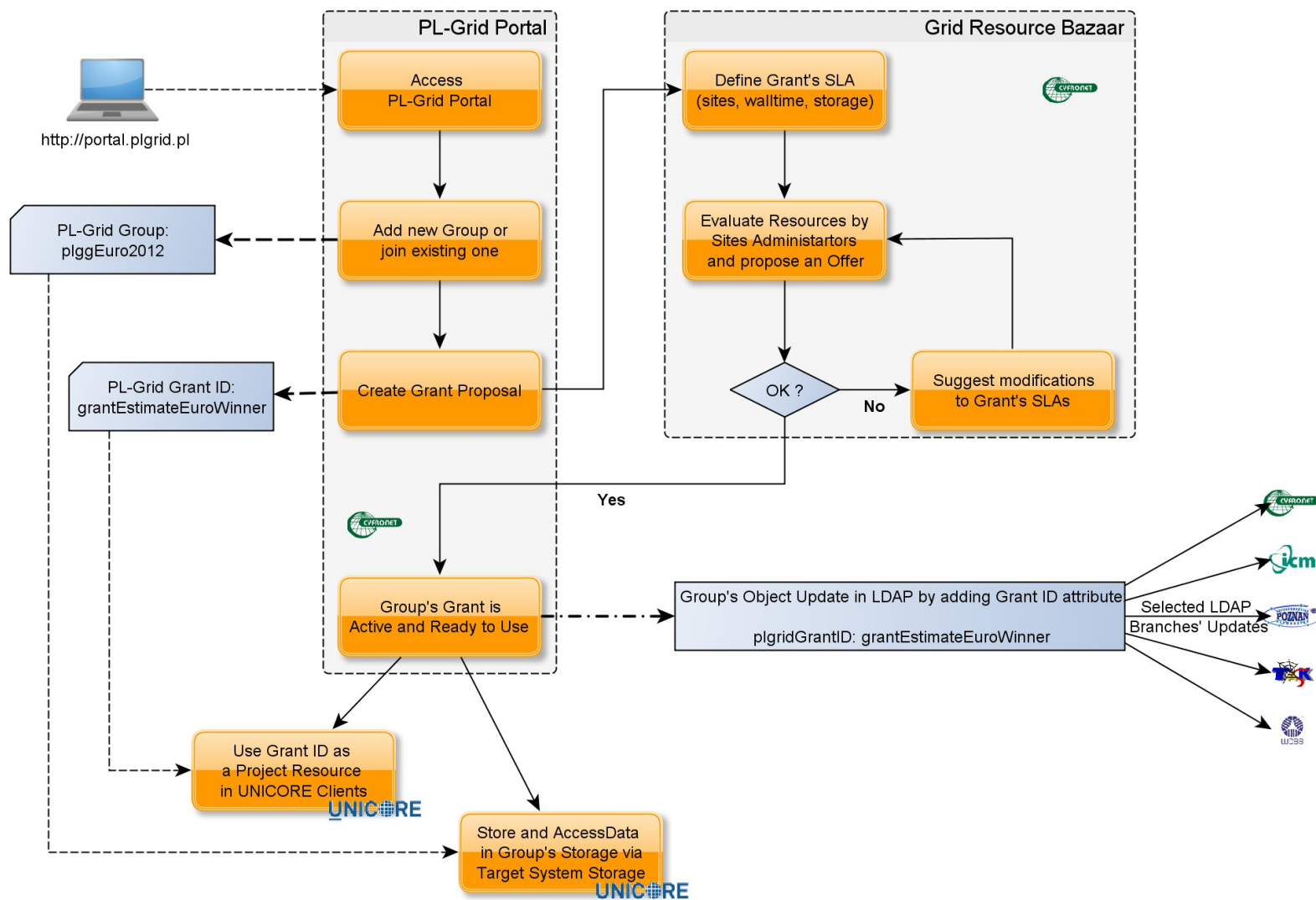


<http://en.mascots.uefa.com/uefaeuro2012>

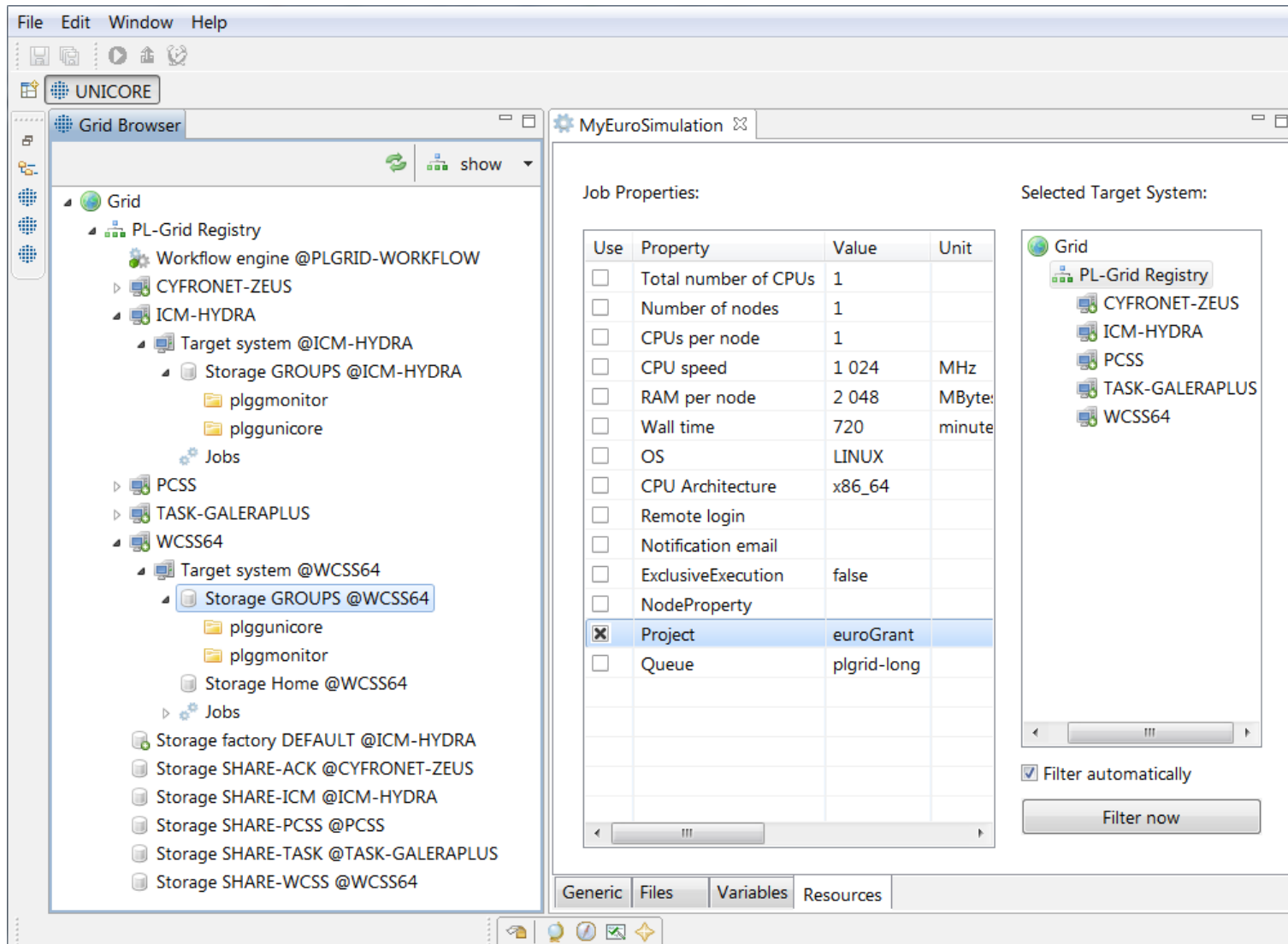
Scientific Group Registration



Group's Grant Application



Groups and Grants in URC



The screenshot shows the UNICORE Grid Browser interface with the 'Grid' tree expanded. The 'Storage GROUPS @WCSS64' folder is selected. The 'MyEuroSimulation' dialog is open, showing the 'Job Properties' tab. The 'Project' property is set to 'euroGrant' and the 'Queue' is set to 'plgrid-long'. The 'Selected Target System' list on the right includes CYFRONET-ZEUS, ICM-HYDRA, PCSS, TASK-GALERAPLUS, and WCSS64.

Grid Browser Tree Structure:

- Grid
 - PL-Grid Registry
 - Workflow engine @PLGRID-WORKFLOW
 - CYFRONET-ZEUS
 - ICM-HYDRA
 - Target system @ICM-HYDRA
 - Storage GROUPS @ICM-HYDRA
 - plggmonitor
 - plggunicore
 - Jobs
 - PCSS
 - TASK-GALERAPLUS
 - WCSS64
 - Target system @WCSS64
 - Storage GROUPS @WCSS64
 - plggunicore
 - plggmonitor
 - Storage Home @WCSS64
 - Jobs
 - Storage factory DEFAULT @ICM-HYDRA
 - Storage SHARE-ACK @CYFRONET-ZEUS
 - Storage SHARE-ICM @ICM-HYDRA
 - Storage SHARE-PCSS @PCSS
 - Storage SHARE-TASK @TASK-GALERAPLUS
 - Storage SHARE-WCSS @WCSS64

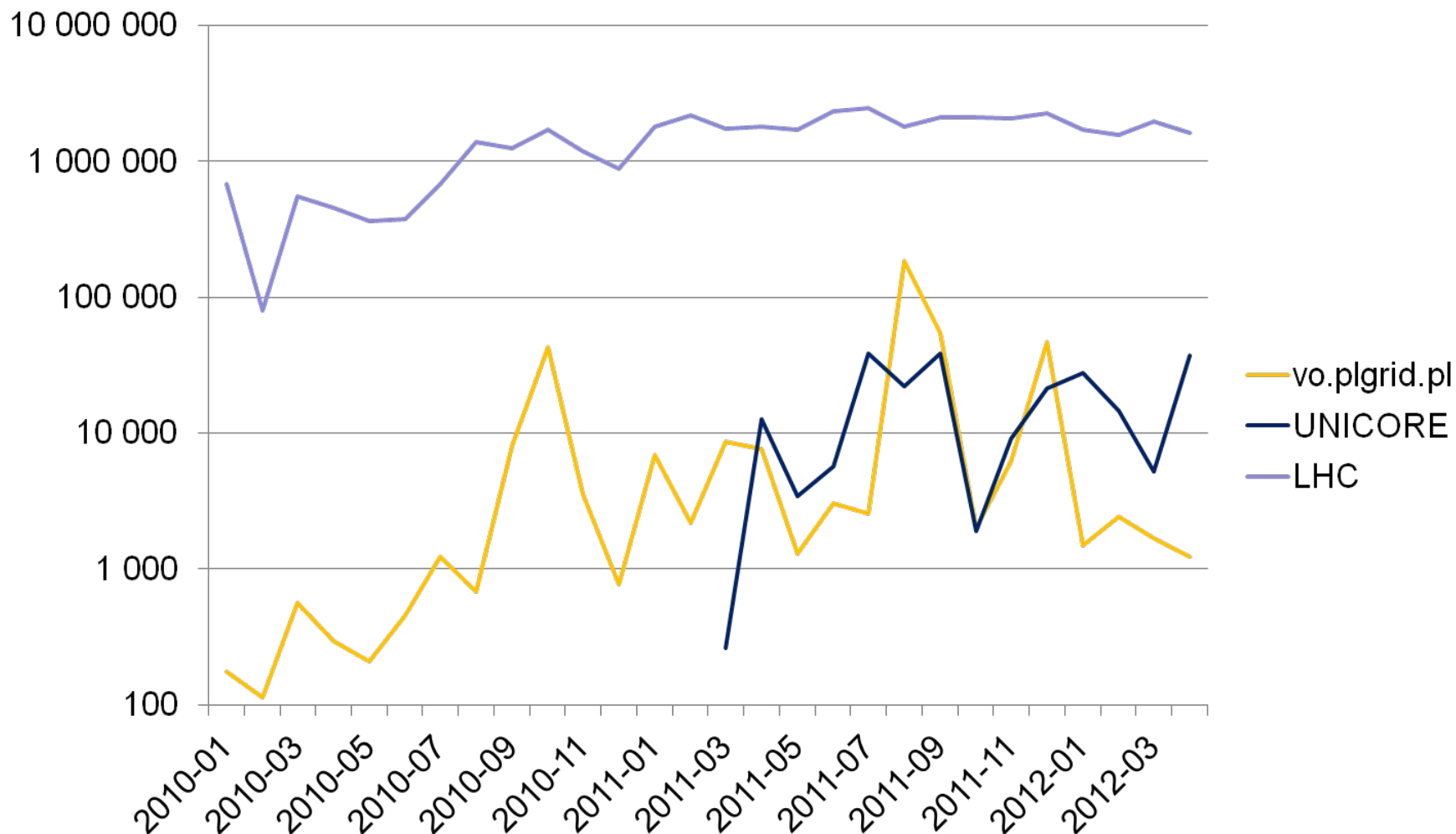
MyEuroSimulation Job Properties:

Use	Property	Value	Unit
<input type="checkbox"/>	Total number of CPUs	1	
<input type="checkbox"/>	Number of nodes	1	
<input type="checkbox"/>	CPUs per node	1	
<input type="checkbox"/>	CPU speed	1 024	MHz
<input type="checkbox"/>	RAM per node	2 048	MByte
<input type="checkbox"/>	Wall time	720	minute
<input type="checkbox"/>	OS	LINUX	
<input type="checkbox"/>	CPU Architecture	x86_64	
<input type="checkbox"/>	Remote login		
<input type="checkbox"/>	Notification email		
<input type="checkbox"/>	ExclusiveExecution	false	
<input type="checkbox"/>	NodeProperty		
<input checked="" type="checkbox"/>	Project	euroGrant	
<input type="checkbox"/>	Queue	plgrid-long	

Selected Target System:

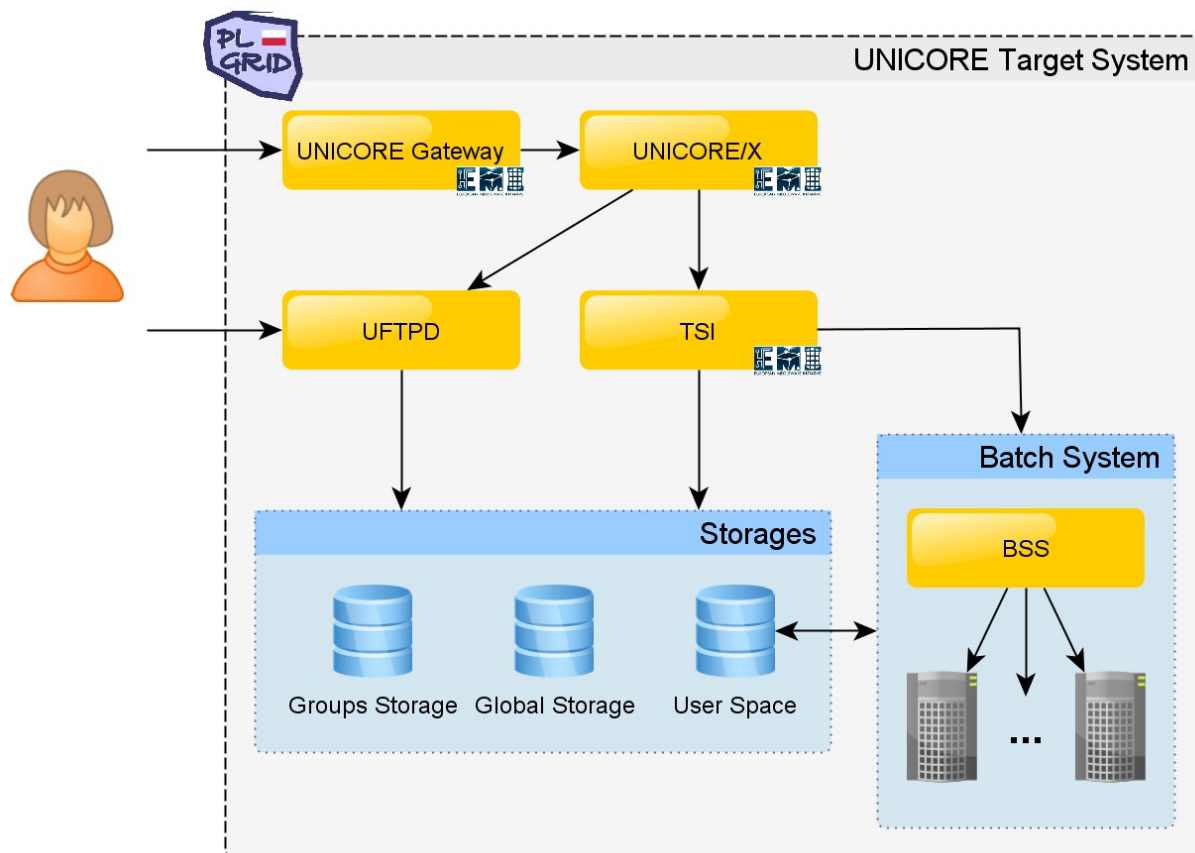
- Grid
 - PL-Grid Registry
 - CYFRONET-ZEUS
 - ICM-HYDRA
 - PCSS
 - TASK-GALERAPLUS
 - WCSS64

PL-Grid Usage (walltime hours)

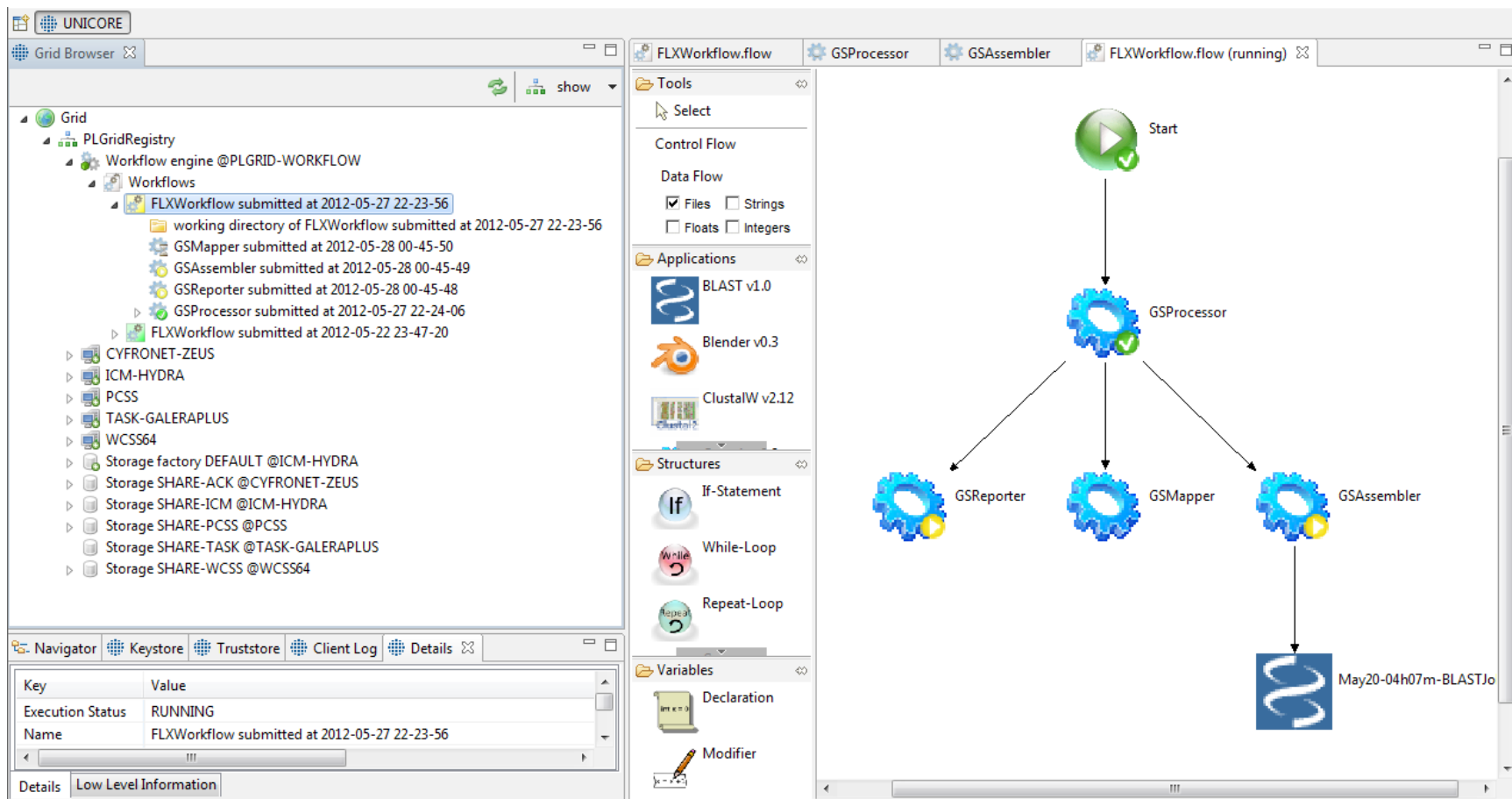


Example – Processing of Genetic Data

- ◆ 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 !



Experiment's Workflow





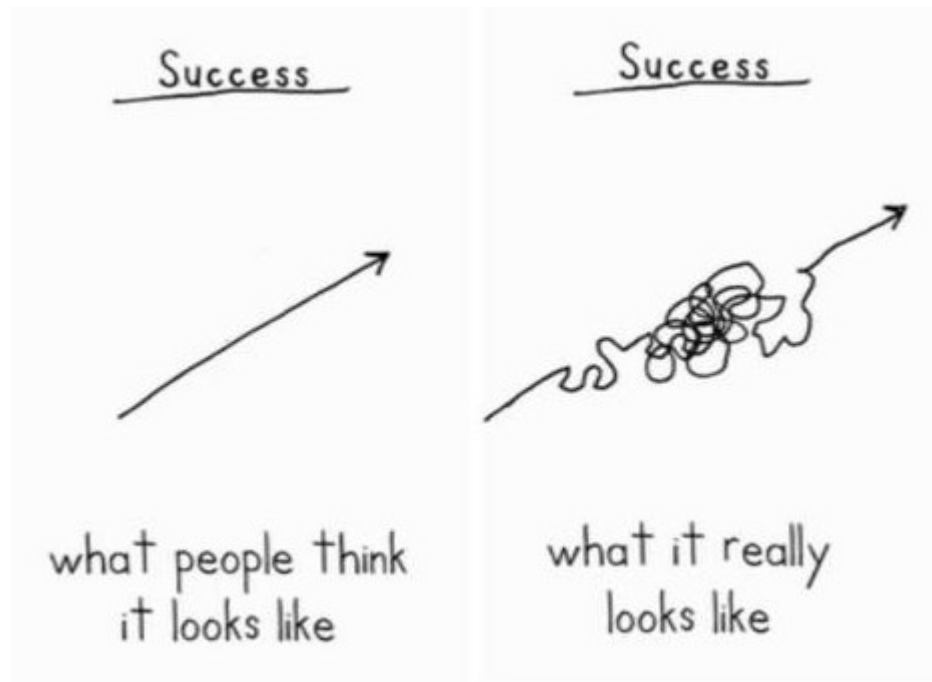
PL-Grid Plus

- ◆ 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



PL-Grid Plus

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



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

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



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