Using Resources of Multiple Grids with the Grid Service Provider
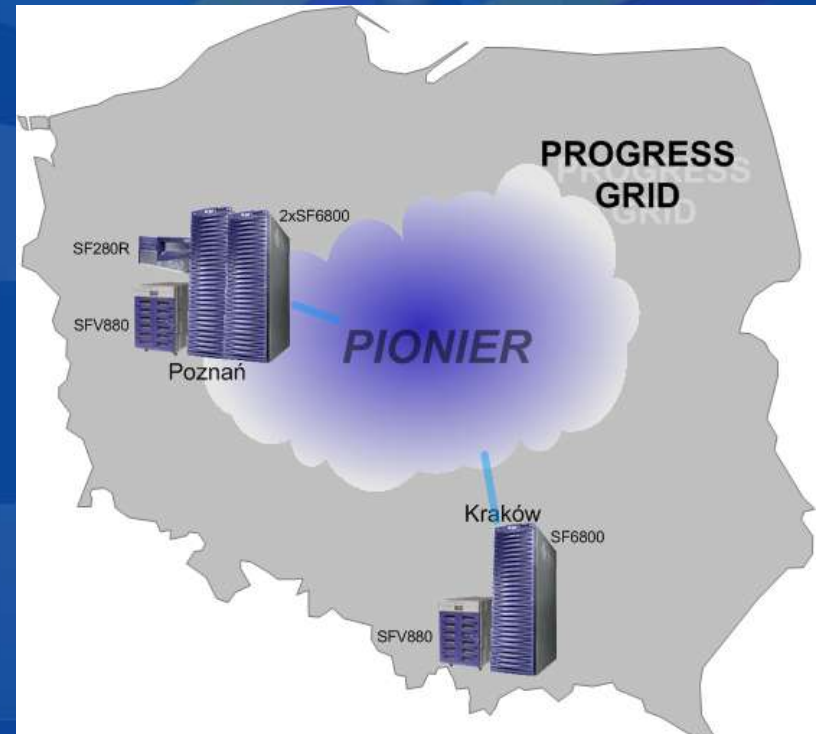
Micha?Kosiedowski

PROGRESS: GEW'2003

Grid Service Provider

- The Grid Service Provider came as a result of research done within the PROGRESS project:
  - Project Partners
    - **SUN Microsystems Poland**
    - **PSNC IBCh Pozna?**
    - Cyfronet AMM, Kraków
    - Technical University ?ód?
  - Co-funded by The State Committee for Scientific Research (KBN) and SUN Microsystems Poland
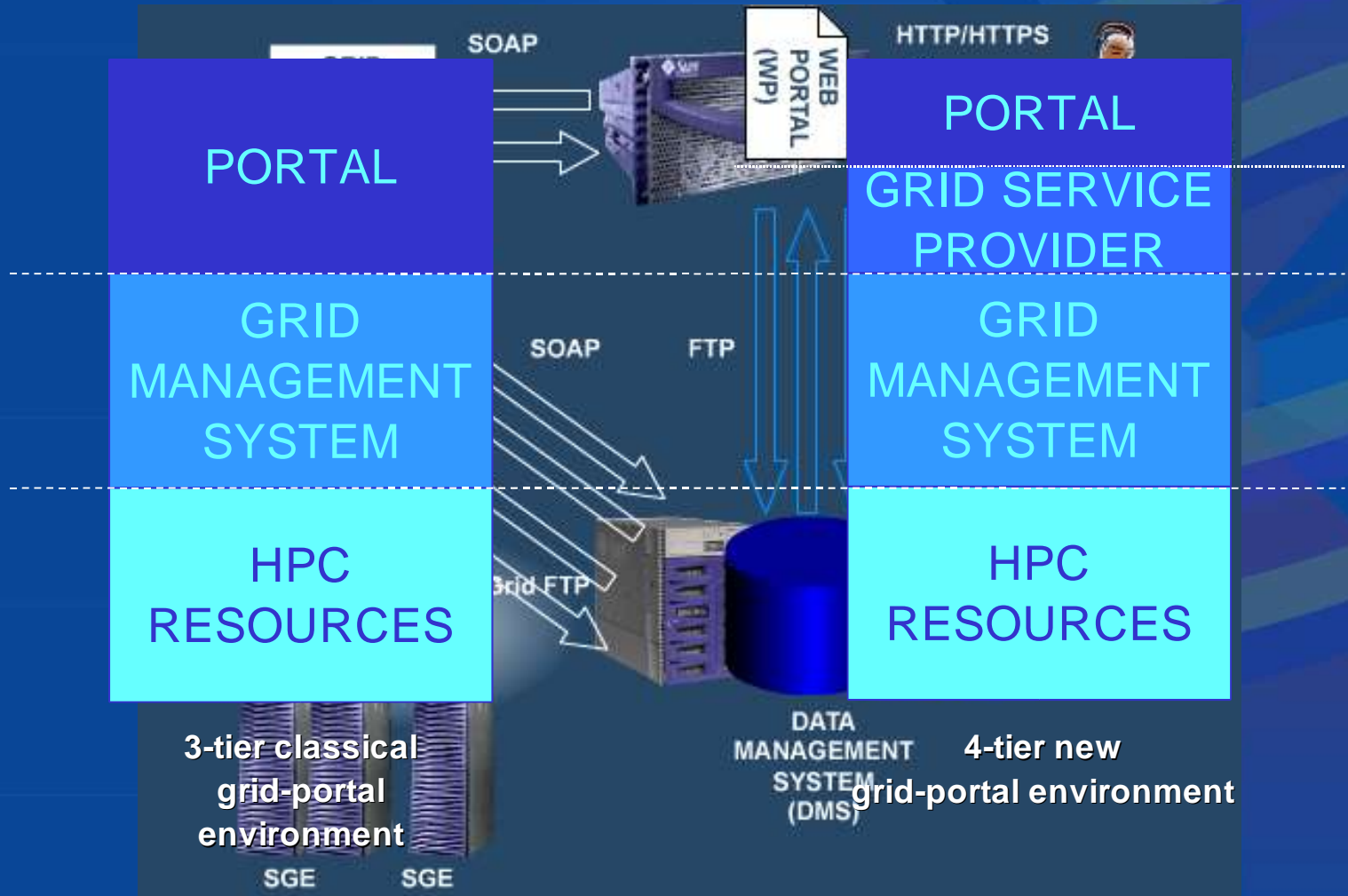
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PROGRESS Grid

- Cluster of 80 processors

- Networked Storage of 1,3 TB

- Software: ORACLE, HPC Cluster Tools, Sun ONE, Sun Grid Engine

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PROGRESS GPE

SOAP

WEB PORTAL (WP)

HTTP/HTTPS

PORTAL

PORTAL

GRID SERVICE PROVIDER

GRID MANAGEMENT SYSTEM

SOAP

FTP

GRID MANAGEMENT SYSTEM

HPC RESOURCES

Grid FTP

HPC RESOURCES

DATA MANAGEMENT SYSTEM (DMS)

3-tier classical grid-portal environment

4-tier new grid-portal environment

SGE

SGE

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Grid Service Provider

- the use of the grid resources most comfortable to the end users

- allows for easy building of numerous portals and other user interfaces; users can switch from one to another and use the same GSP services

- various web portals sharing the same distributed grid services and resources

- possibility of providing all clients (user interfaces) with computing resources belonging to two or more different grids

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Grid Service Provider (2)

- Necessary services to provide:
  - job submission service
    - managing the creation of user jobs, their submission to the grid and the monitoring of their execution (typically through reverse reporting performed by the Grid Management System about events connected with the execution of jobs)
  - application management service
    - storing information about applications available for running in the grid
    - assisting application developers in adding new applications to the application repository
  - provider management service
    - keeping up-to-date information on the services available with the provider

Portlet

Webservice

Session Bean

Entity Beans

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Job submission service

- computing job building, submitting them to the grid for execution and viewing the results
- job description is prepared using the XRSL language and transferred to the grid resource broker for the execution of the job
- grid resource broker reverse reports on grid events connected with the job
- „workflowed" jobs: sequences and parallels

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Application management srv.

- application repository management

- application descriptor contains a reference to the application executable: a reference to a file stored in the DMS or a path to a binary on grid computing server filesystems

- also included in the application descriptor: available (required or optional) arguments, required environment variables and required input and output files

- applications in PROGRESS may be unconfigured or configured: one executable -> multiple configured applications

- virtual applications

Provider management service

- enables keeping up-to-date information on services available in the grid service provider

- a service descriptor contains information on the Web Service interface: URL at which the service is available, the service namespace reference (URN) and the service WSDL reference

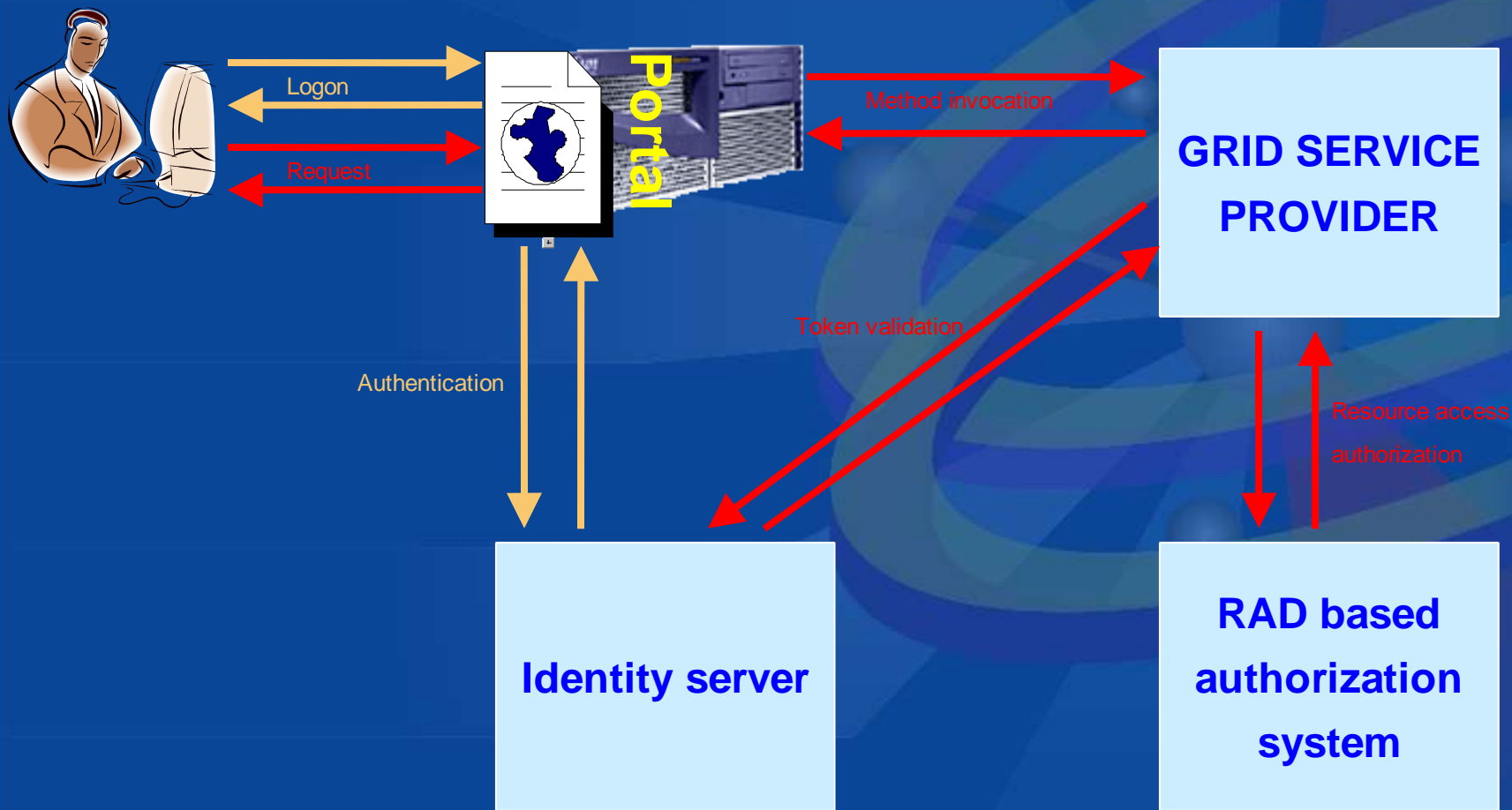- services may have multiple instances: informational services

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Informational services

- examples of instance enabled services
- intended for use by web portals
- PROGRESS example: short news service
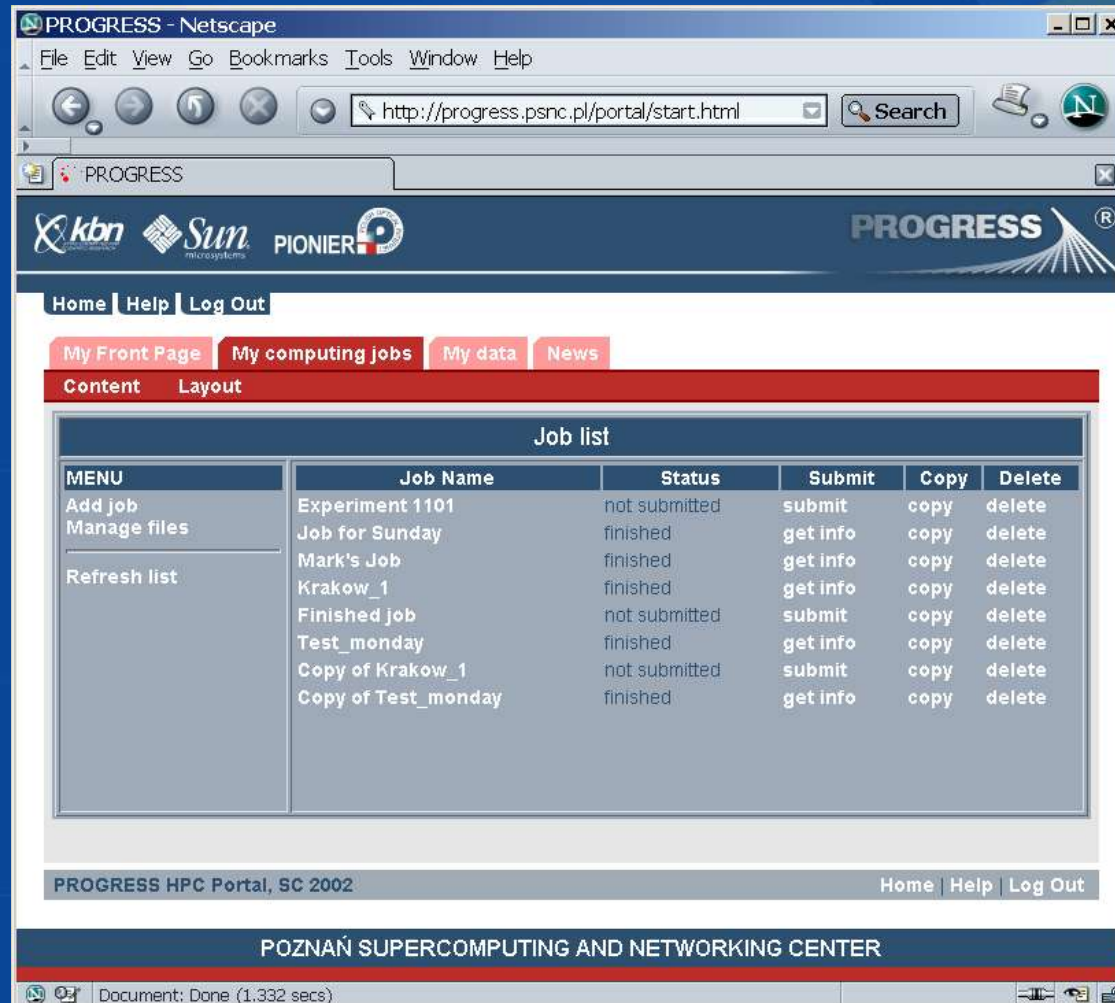- other: document directory, discussion forum (under development)

Other PROGRESS modules

- user interfaces
  - web portal: grid job management, application management, provider management, short news reading and editing, DMS file system management
  - migrating desktop: grid job management and DMS file system management
- grid resource broker: enables the execution of PROGRESS grid jobs in a cluster of three Sun computers; uses XRSL language for grid job descriptions
- data management system: storing the input and output files, metadata, multiple media data containers

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Authorization within GSP

Portal

Logon

Request

Method invocation

GRID SERVICE PROVIDER

Token validation

Authentication

Resource access authorization

Identity server

RAD based authorization system

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PROGRESS HPC Portal

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GSP Release & Future

- The Grid Service Provider software will be released under an open source license in the first half of October

- We will continue the R&D on the Grid Service Provider (new features to be added in future releases)

  – cooperation with multiple grid resource brokers/grid management systems (e.g. the GridLab one)

  – additional functionality (e.g. OGSA interface, cooperation with virtual laboratories)

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Enabling multiple grids

- To enable multiple grids within the GSP, we developed a concept of grid resource broker plug-ins

- The plug-in will be responsible for communication with the grid

- The job submission service will use the proper plug-in whenever there's a need to submit a computing job to a particular grid

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GRB plug-in

- A java class capable of communicating with and submitting computing jobs for execution to a particular grid
- To enable the GRB plug-in concept, there will be a set of entity beans prepared to manage the information about available plug-ins and grids

Available plug-ins

- The GRB plug-in mechanisms are under development
- One of the releases (1.1?) following up the version 1.0 will include a plug-in for the PROGRESS grid resource broker
- Next plug-ins to follow:
  - GridLab
  - SGE?
  - Globus?

PROGRESS

http://progress.psnc.pl/

http://progress.psnc.pl/portal/

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