Flood application on gLite

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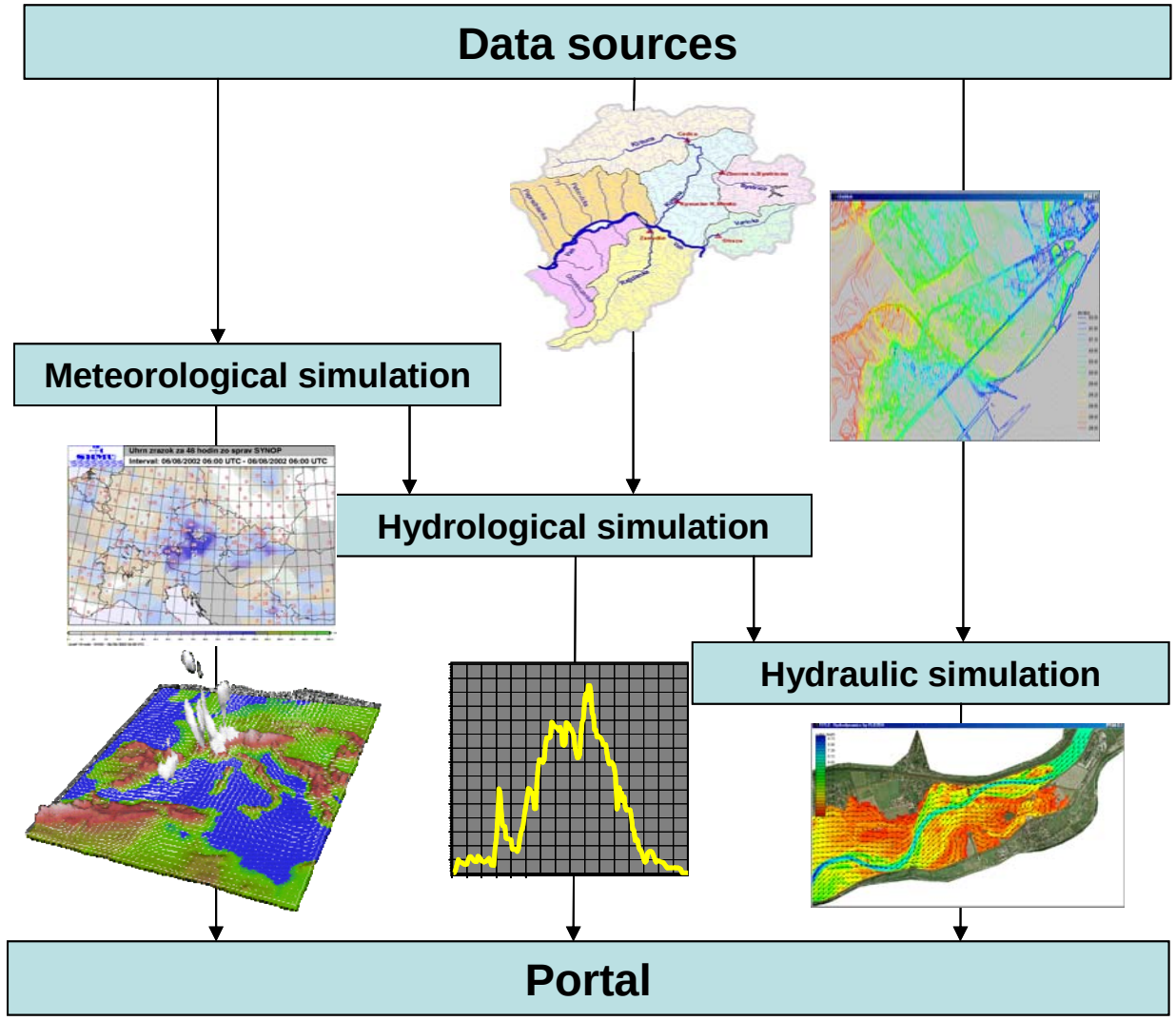
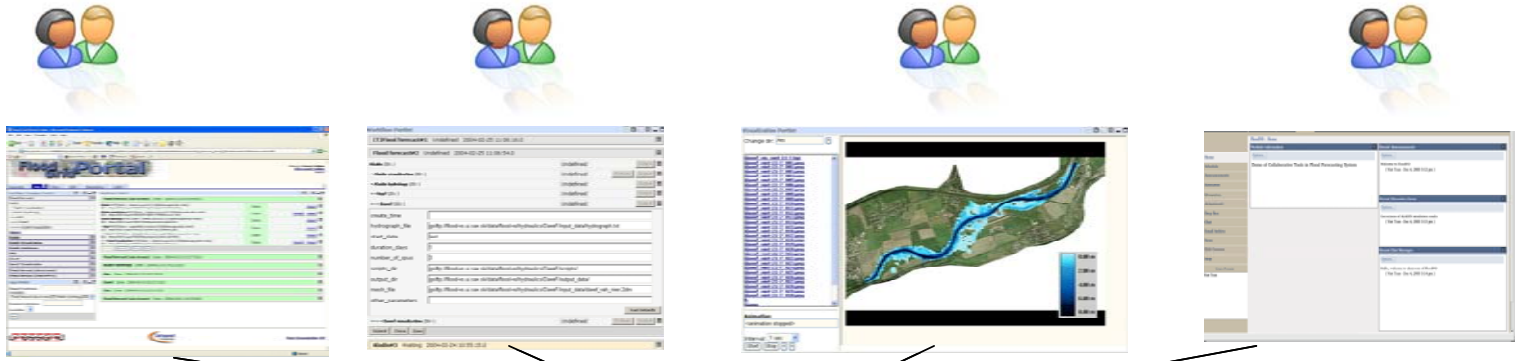
History of Flood application

- **Flood application is continually developed in**
  - ANFAS: datA fusioN for Flood Analysis and decision Support,(2000-03) IST-1999-11676
    - Data fusion, hydraulic modeling
    - Cluster computing
    - Remote processing
  - CrossGrid: Development of Grid Environment for Interactive Applications (2002-05) IST-2001-32243
    - More models (meteorology, hydrology)
    - Grid computing
    - Metadata catalog
    - Portal
  - EGEE: Enabling Grids for E-sciencE (2004-2006) INFSO-RI-508833
    - Porting to gLite
    - Working in Earth Science Research Virtual Organization (ESR VO)
- **Collaboration with Slovak Hydro-meteorological Institute (SHMI) and Slovak Water Research Institute (WRI)**

Flood forecasting problem



FloodGrid Portal



Portal

Workflow management | Data management | Visualization | Collaboration

Models: ALADIN, HSPF, DaveF

Data

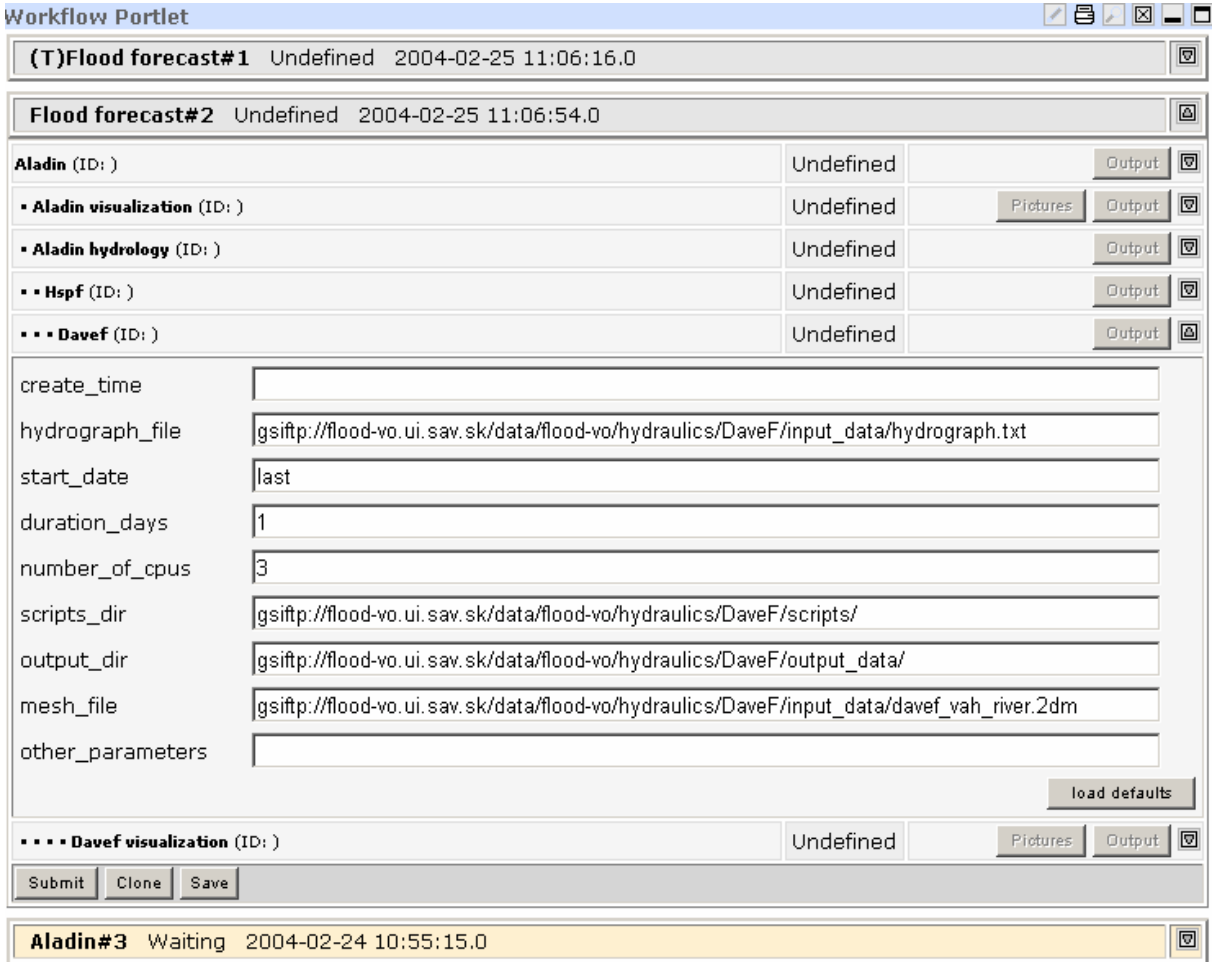
Computational resources

GRID

Workflow management

- Manages and executes jobs with data dependences
- Cooperates with gLite resource broker to find suitable computing element for running simulation
- Monitors status of jobs
- Abilities to use predefined workflow templates, spawning running workflow, modifying parameters of jobs

Workflow management



Data management

- **Many kinds of data in FloodGrid**
  - Meteorological, hydrological, hydraulic
  - Generated by simulations or obtained from sensors
  - Permanent or periodically updated
  - Publicly available or with restricted access
- **Using metadata catalog for describing data**
- **Data are store in storage elements and are accessed via Grid protocols**
- **Operation: query, adding, modification, deleting**

Visualization

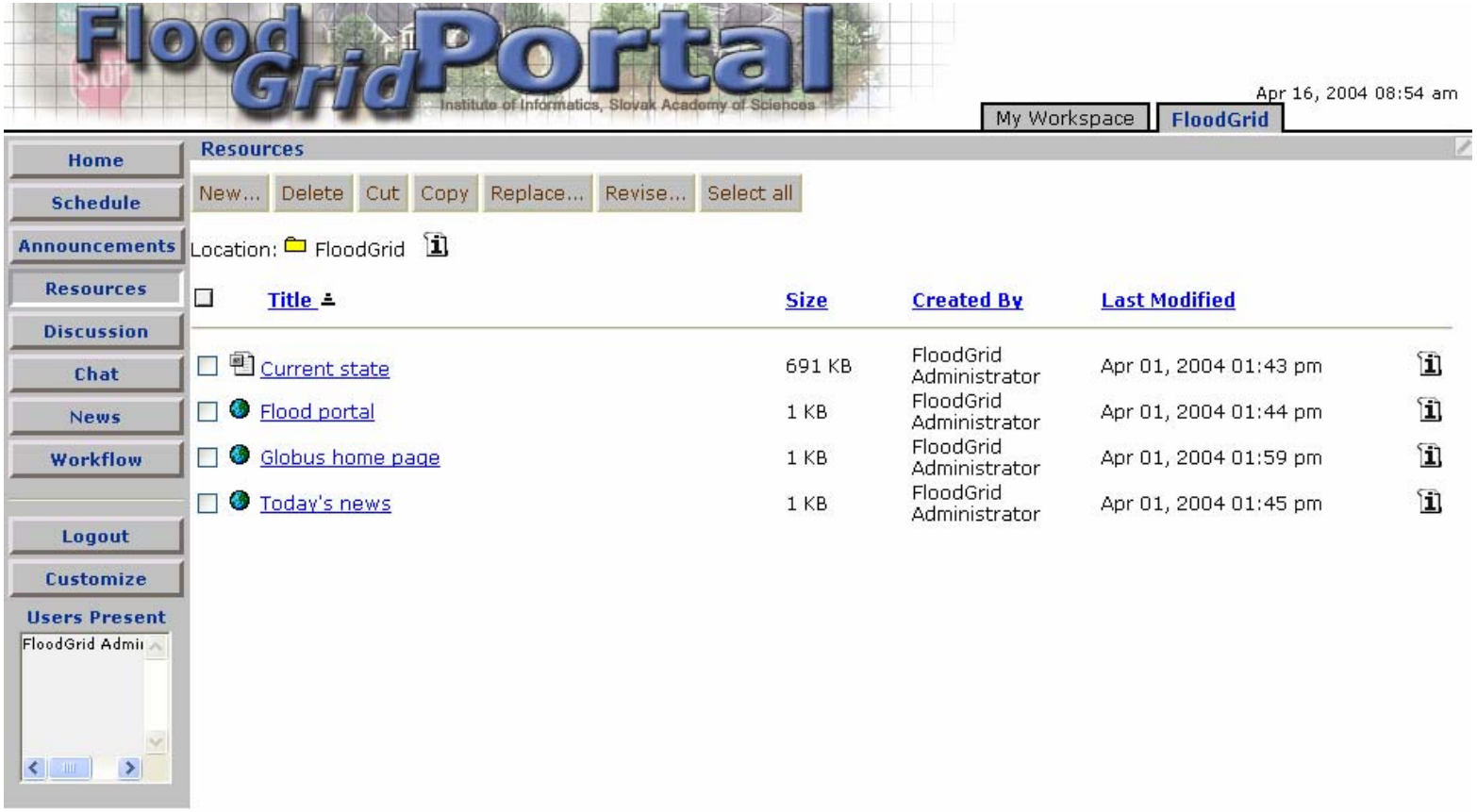
- **Multiple visualization modes according to models and visualization tools**
  - Texts
  - Pictures
  - Animations
  - Virtual reality

Visualization

Collaboration

- Different users groups (experts in meteorology, hydrology, hydraulics, crisis team, river authorities) need to collaborate on flood application
- Portal provides different means of communication among users: chats, mailing lists, discussion groups, file sharing
- Multiple communication channels, access control for every channel
- Collaboration via other shared tools of portal

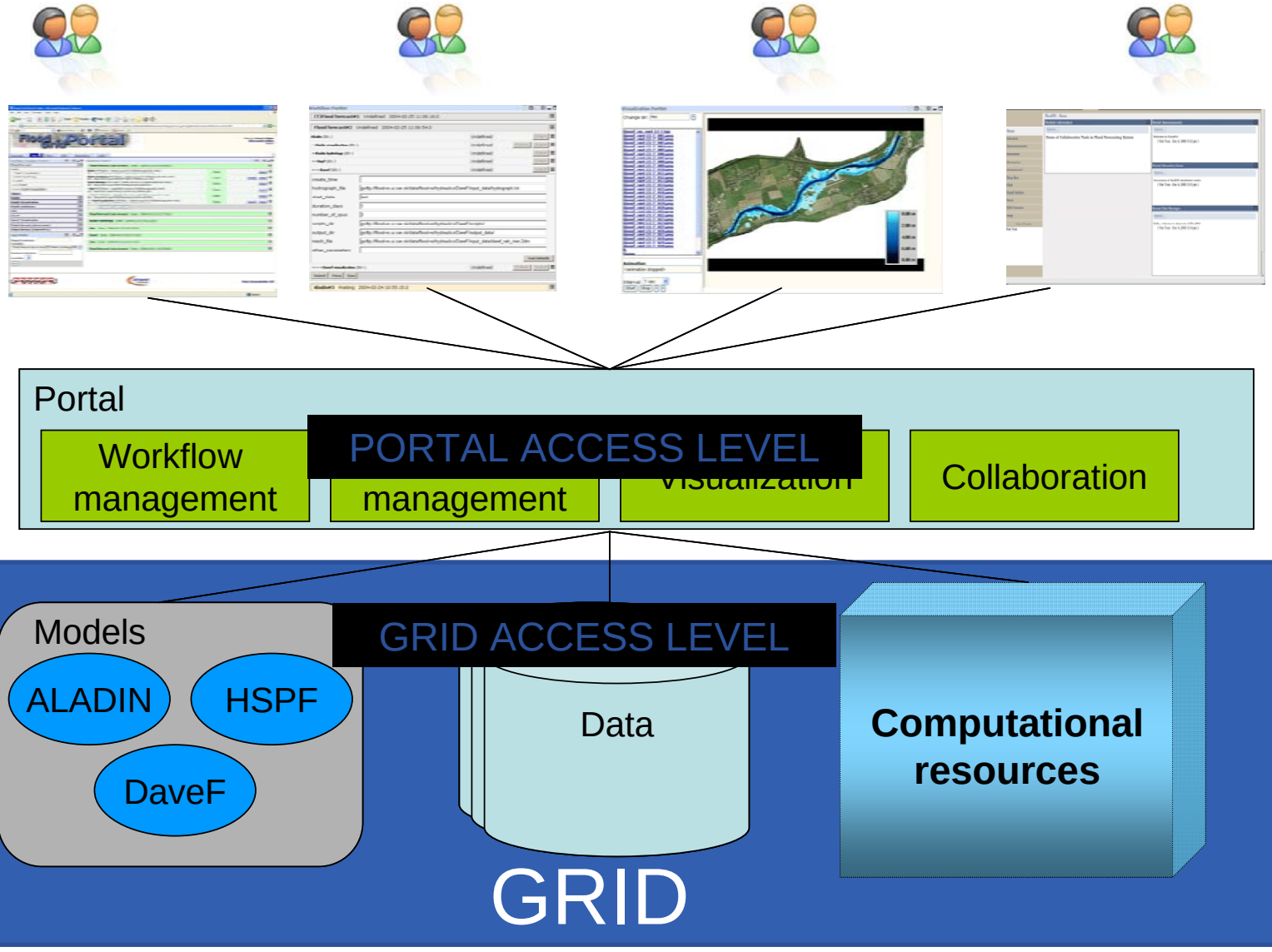
Collaboration



Security

- **Two level of securities: Portal level and Grid level**
- **Portal level:**
  - Secure HTTP access
  - Authentication by passwords
  - Access controls for every tools/resources at portal (individually or by groups)
  - Only for accessing tools/resources located on portal. For accessing physical data, models or computing resource, Grid certificates are needed
- **Grid level:**
  - Authentication by Grid certificates provided by certificate authorities
  - Using secure Grid communication protocols

Security


Portal
Workflow management
PORTAL ACCESS LEVEL
management
Visualization
Collaboration
Models
ALADIN
HSPF
DaveF
GRID ACCESS LEVEL
Data
GRID
Computational resources

Flood application and gLite

- **Requirement: Different user groups (experts, river authorities, crisis team, public) have different access rights to resources**

- **gLite provides solutions for this problem**
  - VOMS with different access rights for different user groups
  - ACL (Access Control List) support for data management

- **Job submission has been ported to gLite**
- **Data management will be next**