

IST 004664

Interoperability of Virtual Organizations
on Complex Semantic Grid

Data management and the IntelGrid user scenarios

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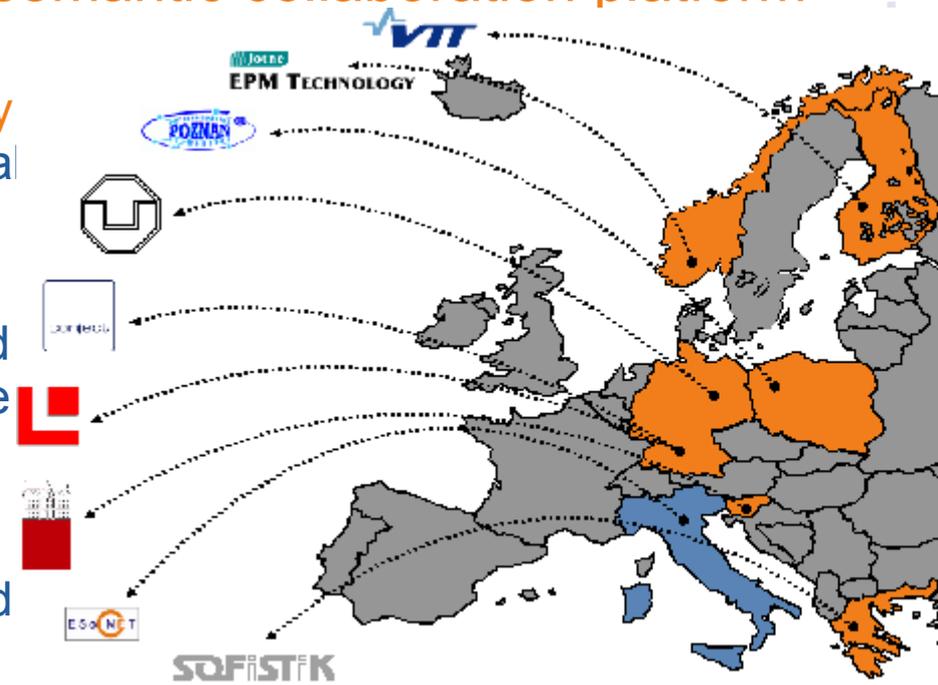
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Content

- IntelGrid project overview
- User scenarios
 - Generic engineering process
 - Example user scenario
- Data management
 - Requirements
 - Extensions to OGSA-DAI

InteliGrid project overview

- Sept 2004 – Feb 2007 (30 months)
- Effort 360 person months
- Partners 9 / 6 countries: research, infrastructure, ASP, industry, users
- InteliGrid vision: **Grid as a semantic collaboration platform**
 - **Semantic:** grid committed to an ontology combining IT and professional concepts
 - **Collaboration:** secure, shared access to grid resources for members of the highly dynamic VO
 - **Platform:** shared toolkit code
 - on servers and clients for grid access; committed to the ontology



InteliGrid difference

- **Not dealing** specifically with high performance computing
- **Industrial orientation**
 - 4 industrial partners, 1 industrial association
 - technology push / pull
 - several industrial domains
- **Complex products**
 - series of one or few
 - described not in documents but in highly structured databases
- **Production process**
 - unique, on of a kind
- **Virtual organizations**
 - highly dynamic (SMEs)
 - specific end user requirements



User scenarios

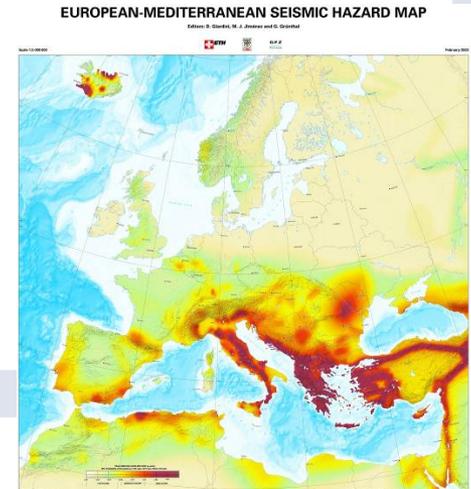
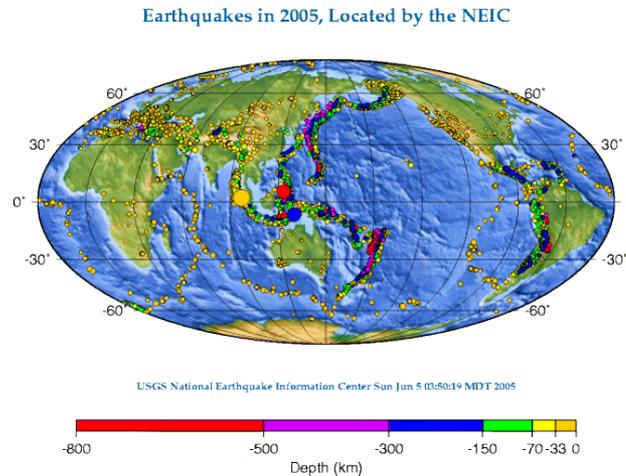
- Several engineering domains
- Generic engineering process
- Basic steps:
 - find object to work on (with the aid of semantics)
 - match object to tool (with the aid of semantics)
 - work on the object with the tool
 - store work results (semantically annotated)



Scenario: Earthquake Engineering Design

■ The story:

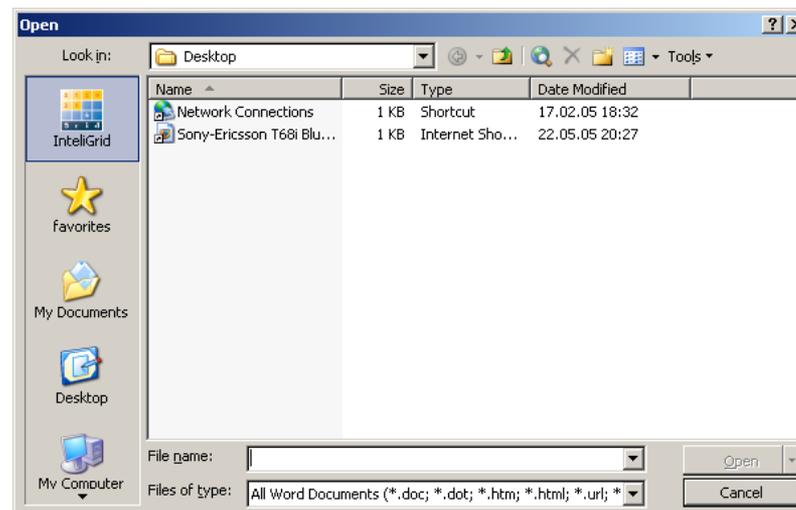
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- (2) Finding the relevant proposed structural designs that are then transformed into calculation models.
- (3) Evaluate and select an optimal design of a building.
- (4) Evaluation through non-linear static and dynamic structural analysis.
- (5) Results are semantically annotated and stored on a grid.
- (6) Parametric analysis to determine actual performance and safety level.
 - (a) Determining hazard functions.
 - (b) Selecting representative earthquake accelerograms.
 - (c) Running a parametric analysis on a high-throughput grid resource
- (7) Workflow semantically annotated and stored for future re-evaluation



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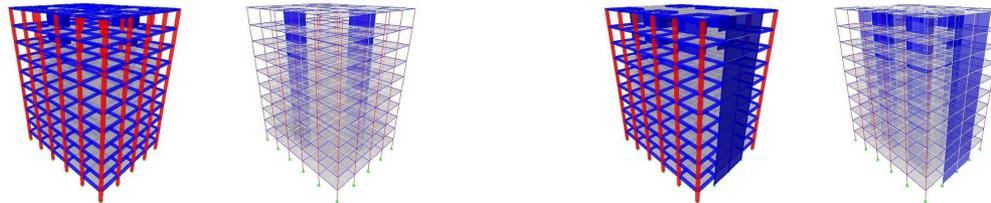
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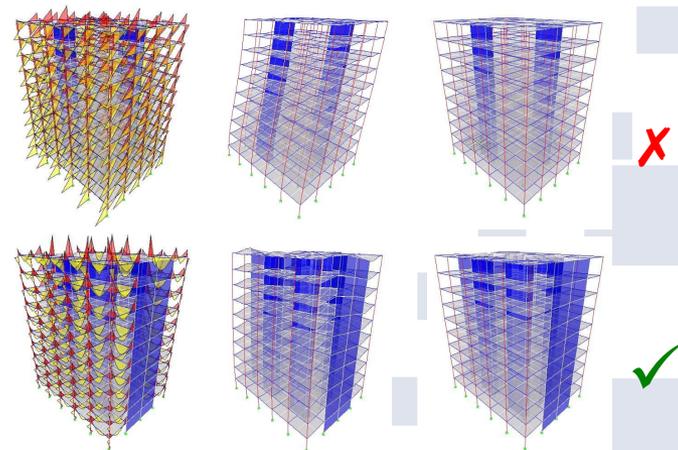
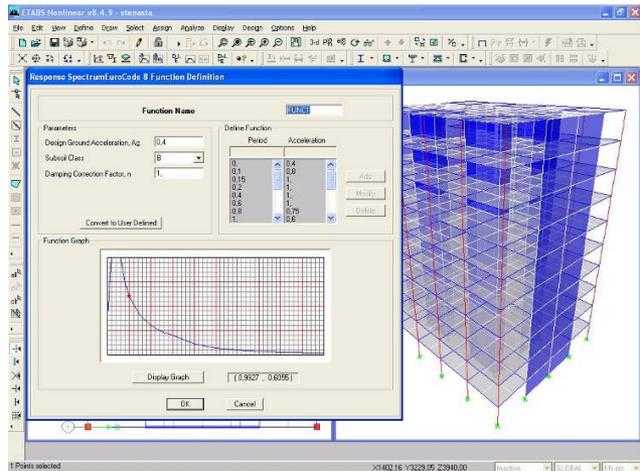
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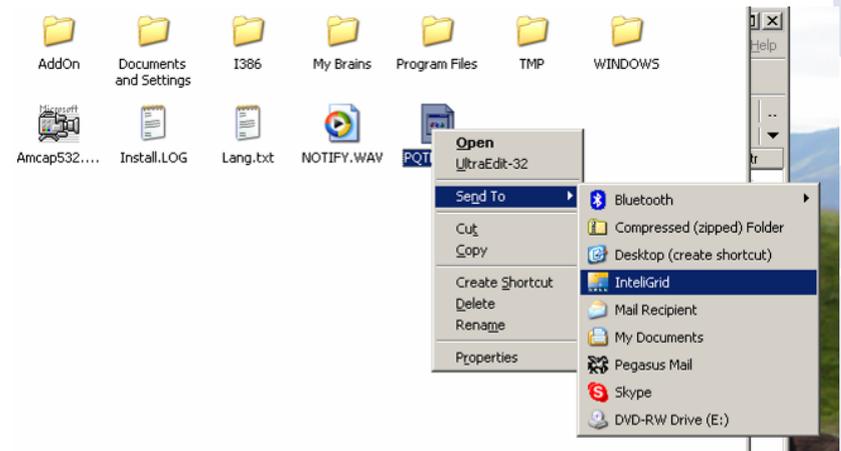
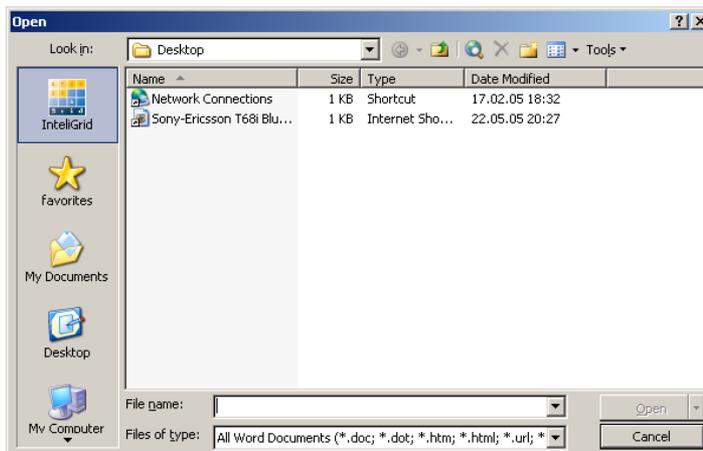
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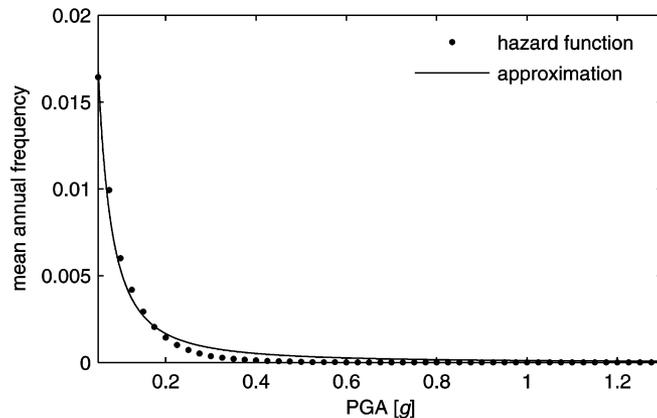
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A hazard function for the region is determined according to different parameters, for example intensity and frequency of earthquakes in the region.

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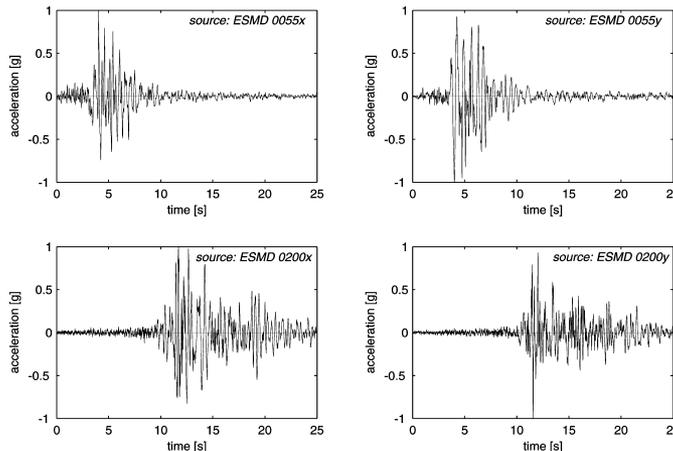
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A number of representative accelerograms are selected from the European Strong-Motion Database (ESMD) access on the Web (<http://www.isesd.cv.ic.ac.uk/>).

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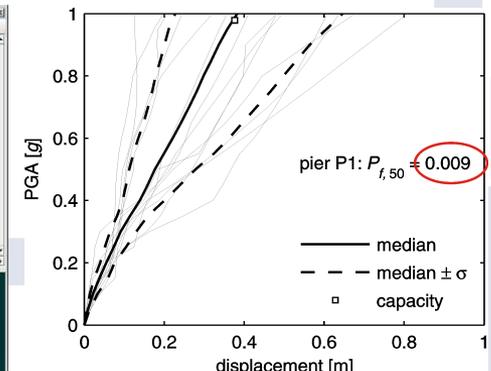
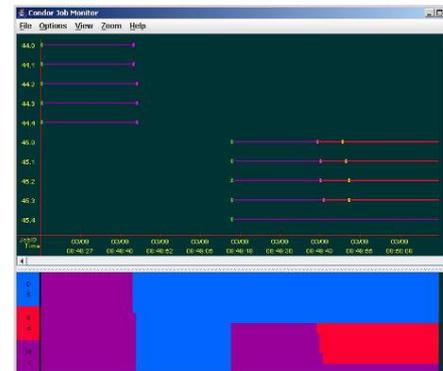
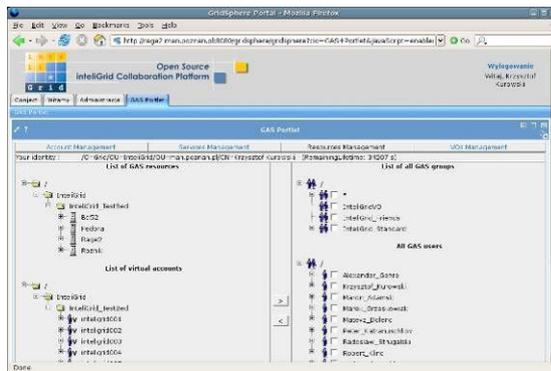
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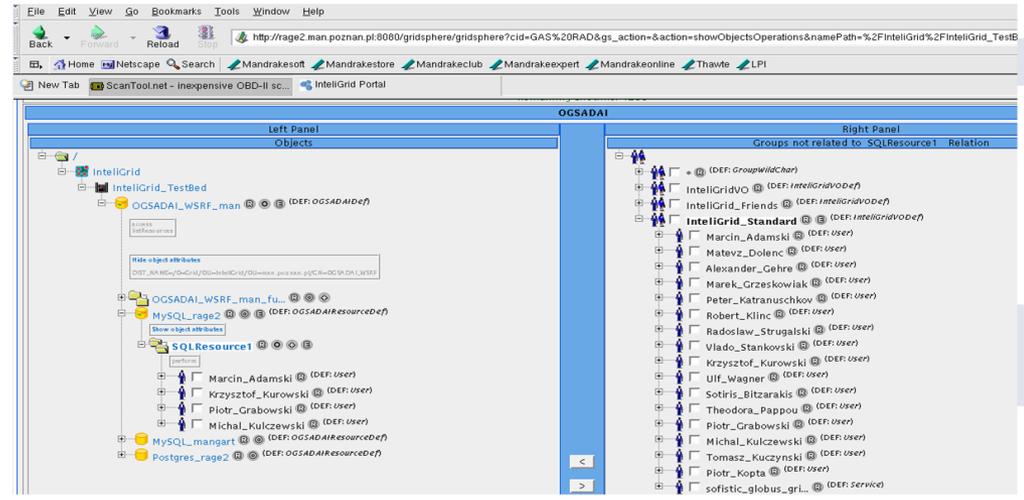
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Data management requirements

1. Security
2. Heterogeneous data sources
3. Availability, virtualization, data location independence
4. Personalised
5. End-user way of working must/should not change

Security

- OGSADAI WSRF is secured by Grid Authorization Service (GAS, GridLab)
- Operations:
 - whether user is allowed to access OGSADAI WSRF service
 - whether user is allowed to list OGSADAI WSRF resources
 - whether user is allowed to perform some action on OGSADAI WSRF resource





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Heterogeneous data sources

- Data sources
 - databases: RDBMS, PMS (OODBMS), XML
 - file systems: local, remote (WebDAV)
 - Internet: http/https, FTP, GridFTP, ...
- OGSA-DAI
 - Enable access to diverse data sources
 - Low level data access technology
 - Extended to support WebDAV and PMS
 - Additional delivery activities

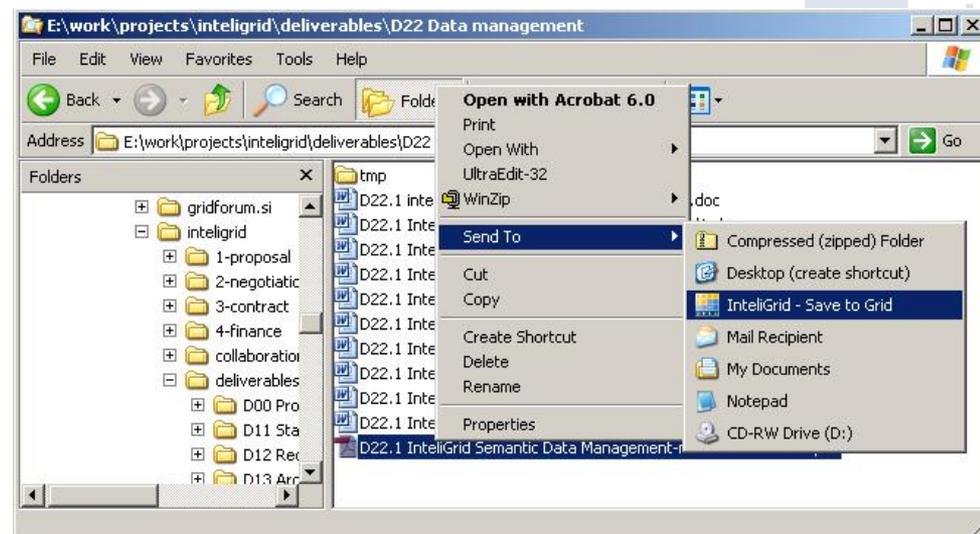
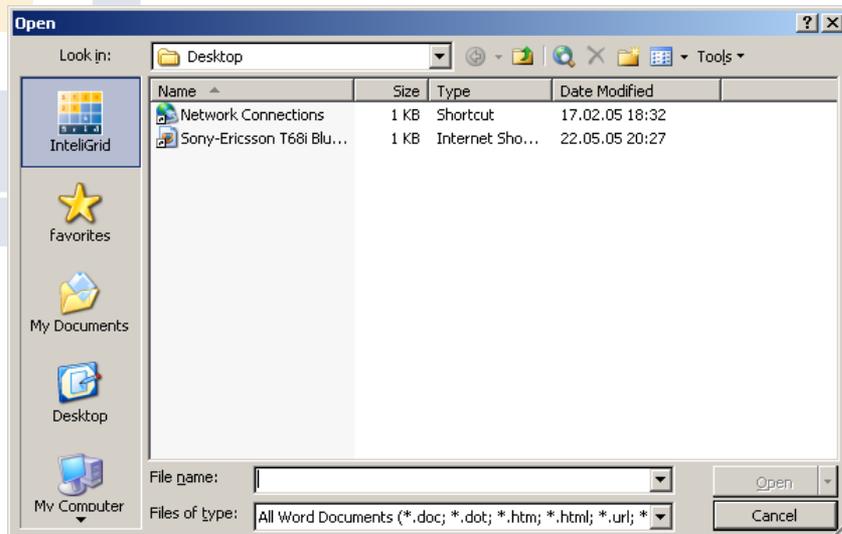
OGSA-DAI / WebDAV

- WebDAV data source
 - similar to file activities in OGSA-DAI
 - integration with OGSA-DAI deployment mech.
- WebDAV delivery activities
 - deliverToWebDAV, deliverFromWebDAV
 - security consideration

```
<deliverToWebDAV name="putWebDAVFile">
  <fromLocal from="dataSink"/>
  <toWebDAV
    host="http://localhost:8090/slide/"
    file="/slide/files/test.txt"
    username="root"
    password="root" />
</deliverToWebDAV>
```


End-user way of working

- should not changed
- support of Windows platform
- grid enable Windows applications (save, load)

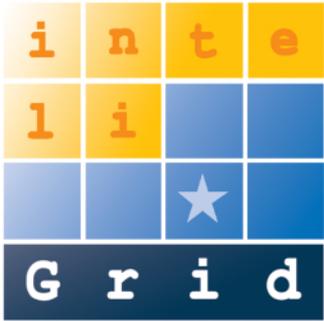




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Conclusions

- End user / industry driven work
 - Not a typical grid project
 - Almost no HPC involved
- Data management
 - OGSA-DAI middleware
 - OGSA-DAI extensions
- Ontology services
 - support virtualization, data location independence
 - Personalization



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The end