A TEAM COLLABORATION TOOL AND PLATFORM TO SHARE 3D GEOMODELS
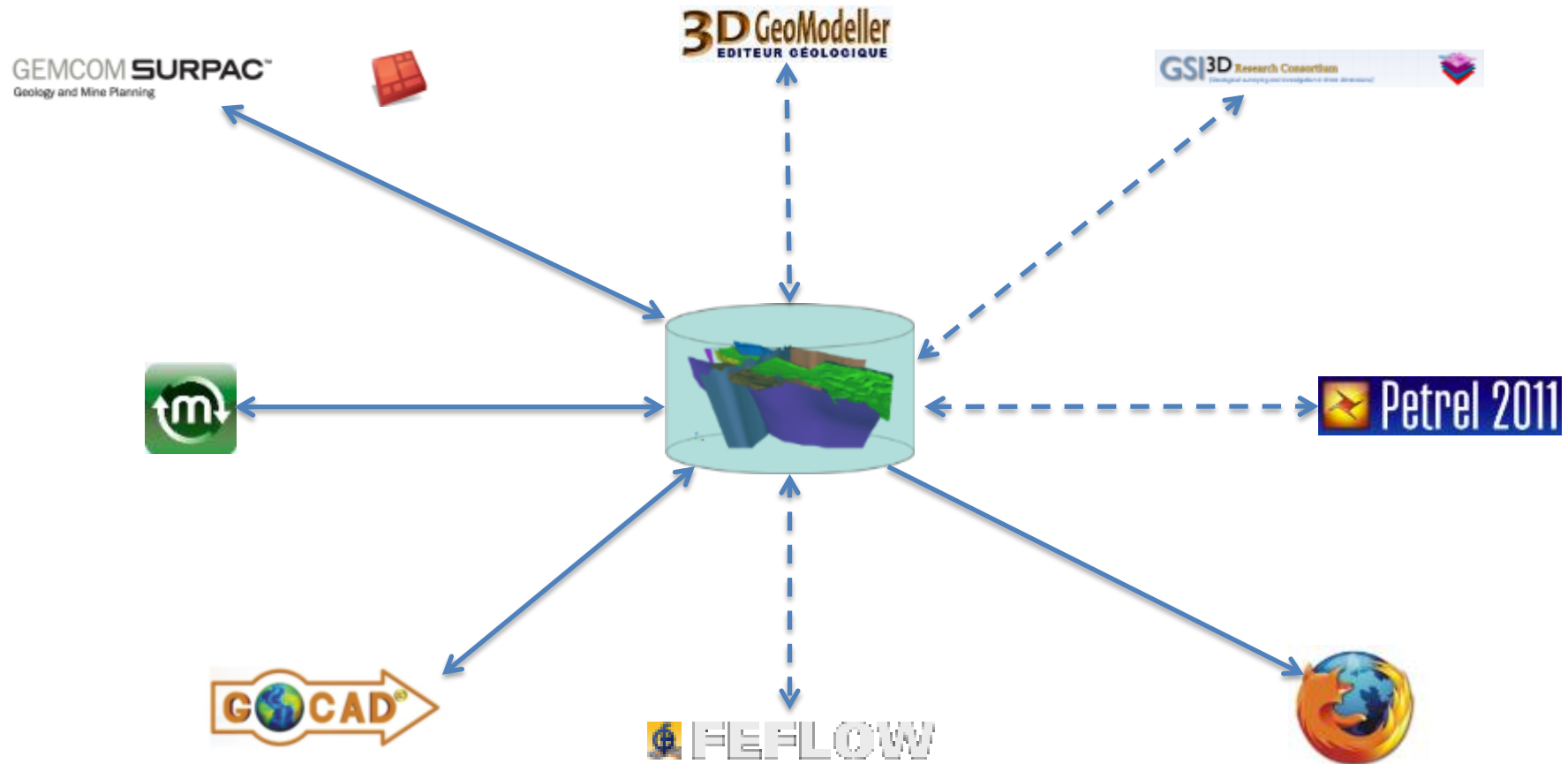
GST – Geosciences in Space and Time

Paul Gabriel[1,2], Jan Gietzel[1,2], Helmut Schaeben[2]

[1] GiGa infosystems, Freiberg, Germany

[2] Geophysics and Geoscience Informatics
TU Bergakademie Freiberg, Germany

Origin of the software GST

Ian Jackson et al. (2010)
Geoinformatics: Transforming data to knowledge for geosciences
GSA Today 20 (12), 4-10, doi 10.1130/GSATG85A.1

Provenance in Earth Science Cyberinfrastructure
(A White Paper for NSF EarthCube)

Provenance records the derivation history of a data product including
- the algorithms used,
- the process steps taken,
- the computing environment run,
- data sources input to the processes,
- the organization/person responsible for the product,
- etc.

IEEE Transactions on Geoscience and Remote Sensing 2012
Call for papers **Special Issue on Geoscience Data Provenance**

- **Provenance-aware geoscientific data system architecture**,
- Geospatial provenance models for heterogeneous geoscientific data,
- **Provenance and geospatial metadata**,
- Provenance and geoscientific workflow,
- Provenance and Geo-Cyberinfrastructure,
- Provenance capturing in Earth science data and sensor systems,
- **Geoscience data provenance management including storage, query, and dissemination of the provenance**,
- **Interoperability approaches for sharing geoscience data provenance**,
- Geoscience data provenance visualization and navigation,
- Provenance applications in geoscience such as geoscientific data quality evaluation and trust analysis;

GeoMol

Assessing subsurface potentials of the Alpine Foreland Basins
for sustainable planning and use of natural resources

Alpine SPACE

THIS PROJECT IS CO-FUNDED BY THE
EUROPEAN REGIONAL DEVELOPMENT FUND

EUROPEAN TERRITORIAL COOPERATION

investing in your future

EU Project ProMine (2009-2013)

Aims

New nano-particle products from new mineral resources in Europe

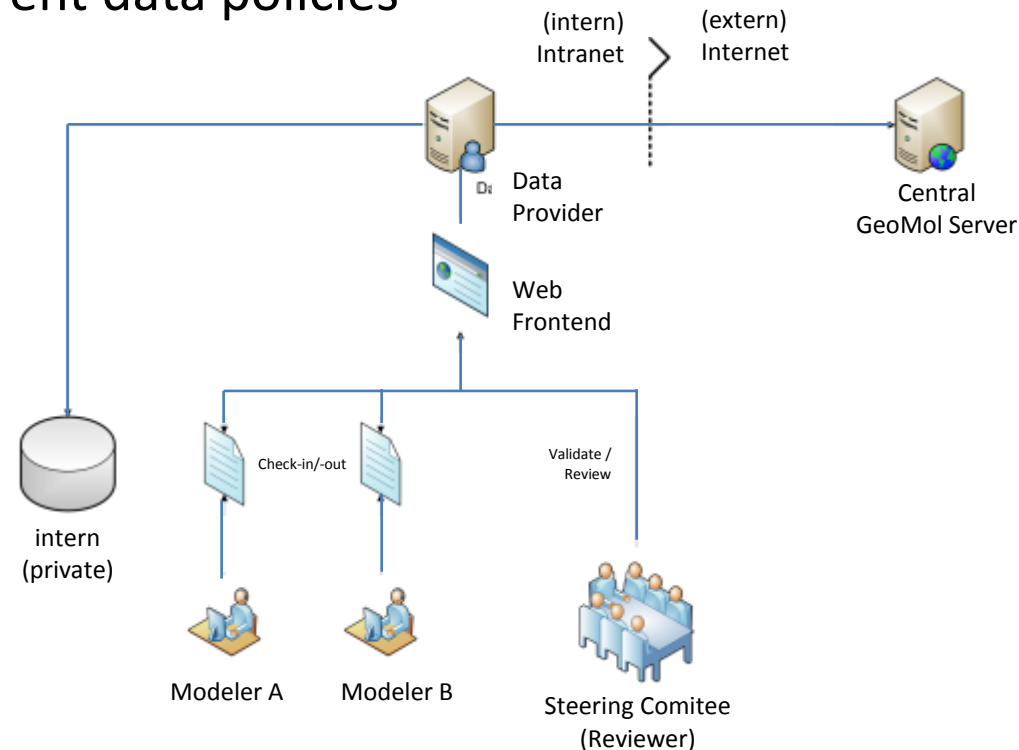## Partners

27 in Europe in 11 countries

IT Infrastructure

Gabriel, P., Gietzel, J., Le, H.H., Schaeben, H., 2015, GST: A network based datastore for geoscience data and geomodels and its implementation – ProMine's contribution towards interoperability, in Weihed, P., (ed.), 3D, 4D and Predictive Modelling of Major Mineral Belts in Europe, Springer

ProMine
Nano-particle products
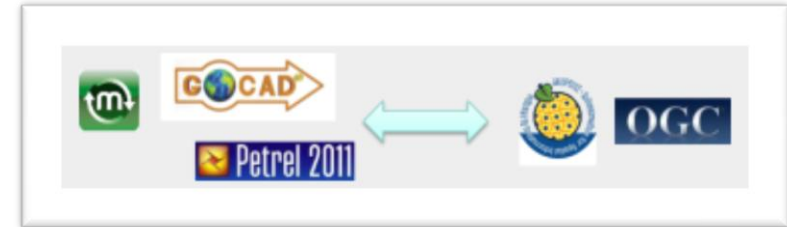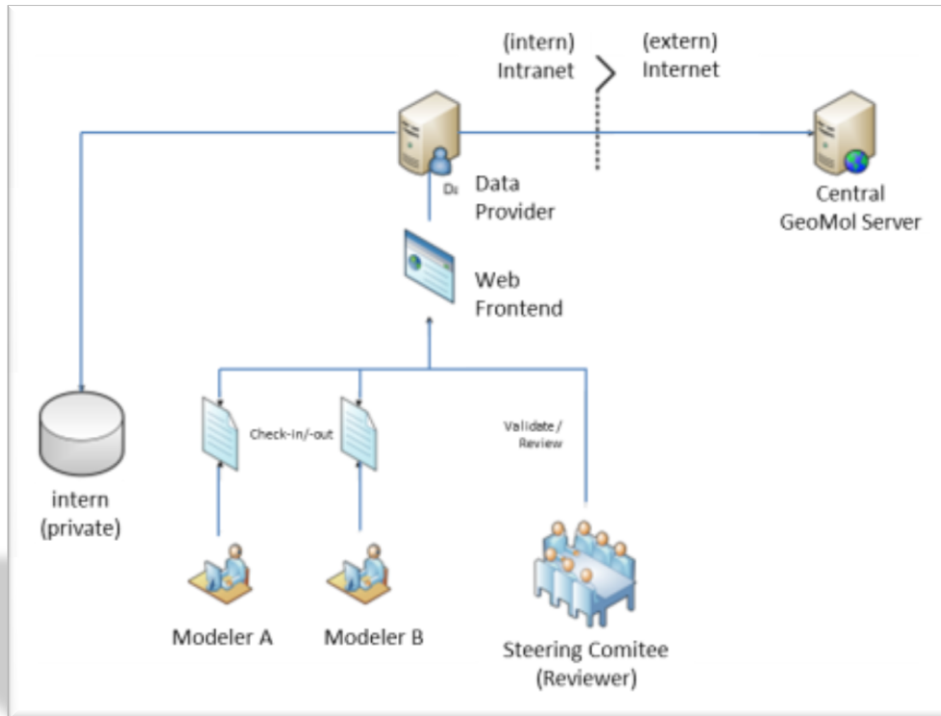from new mineral resources in Europe
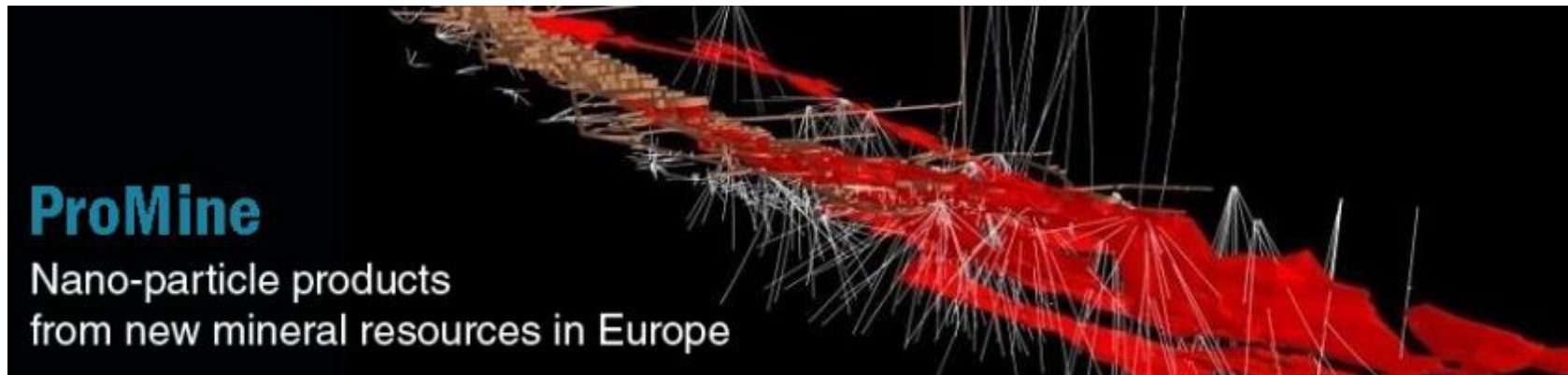
GST is designed to resolve some common problems

- Large models by spatial extension or by spatial resolution

- Several project partners with different data policies

- Different coordinate systems

- Several simultaneous edits
- Keep track of progress by partners
  Management of versions

(intern) Intranet — (extern) Internet

Data Provider

Central GeoMol Server

Web Frontend

intern (private)

Check-in/-out

Validate / Review

Modeler A   Modeler B

Steering Comitee (Reviewer)

What does GST provide?

Mismatch between proprietary formats and GIS standards

Abb. LBEG

- Model repository / Storage solution for a team
- Software to realize a service for 3D geodata

Huge model coverage
Model updates / New data support

![GeoMol logo] Assessing subsurface potentials of the Alpine Foreland Basins for sustainable planning and use of natural resources

Alpine SPACE — THIS PROJECT IS CO-FUNDED BY THE EUROPEAN REGIONAL DEVELOPMENT FUND — investing in your future
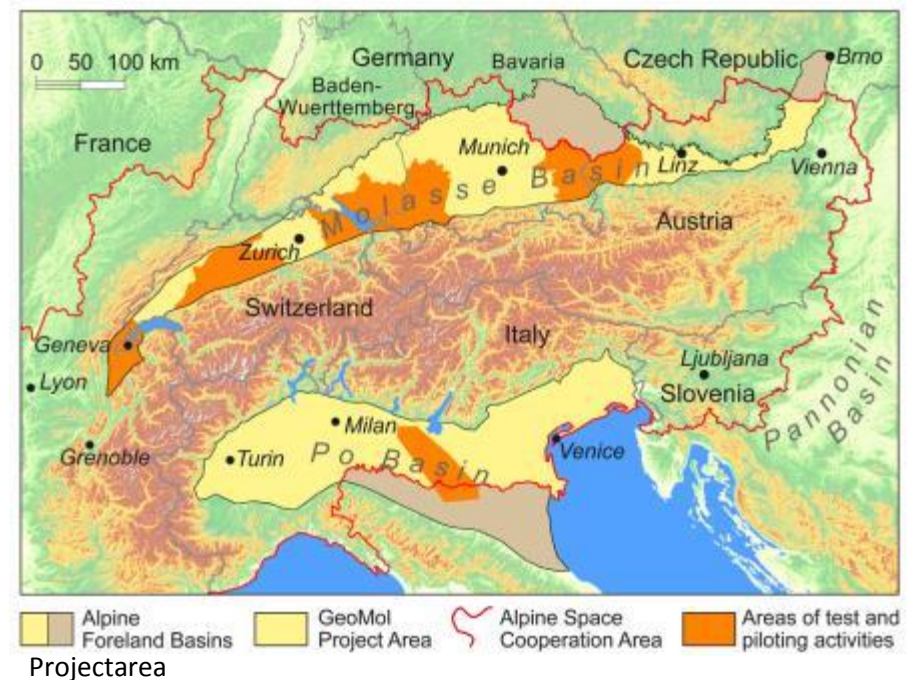
EU Project GeoMol (2012-2015)

Aims

To prepare data on the geological structures and provide consistent 3-dimensional subsurface information to serve transnational decision-making and to make them available also to the interested public.

Partners

Geological Surveys of Bavaria, Baden-Wurttemberg, Switzerland, Austria, Italy, Slovenia, France, and TU BA Freiberg
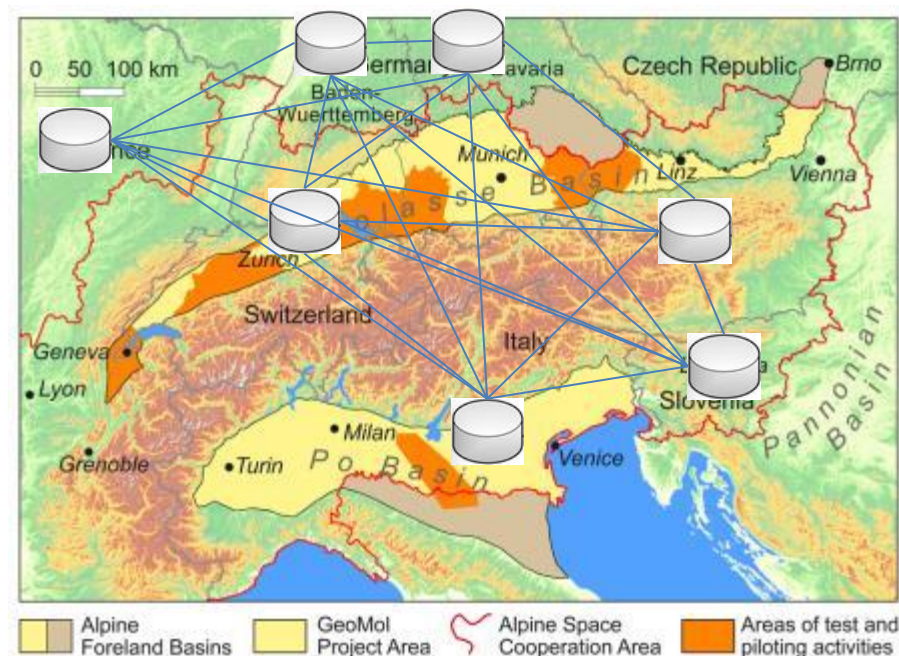
IT Infrastructure

Developed by TU Freiberg, implemented and maintained by GiGa infosystems

![GeoMol logo — Assessing subsurface potentials of the Alpine Foreland Basins for sustainable planning and use of natural resources]

GeoMol's tasks to cope with

- Harmonization of data policies

- GST as central data hub, but distributed processing

- SRS Transformation

- Data
  - Pilot Areas
  - Private and locally stored models
  - Public Domain models

Data Providers to GeoMol

Map legend:
- Alpine Foreland Basins
- GeoMol Project Area
- Alpine Space Cooperation Area
- Areas of test and piloting activities

GST's resolution

- 3 Access levels (groups):
  - Public
    - Data for the public
    - Access: by anyone visting www.geomol.eu
  - Partners
    - Data for GeoMol intern partners
    - Access: by anyone invited in partners group
  - Private
    - Data of institution
    - Access: by GeoMol internals
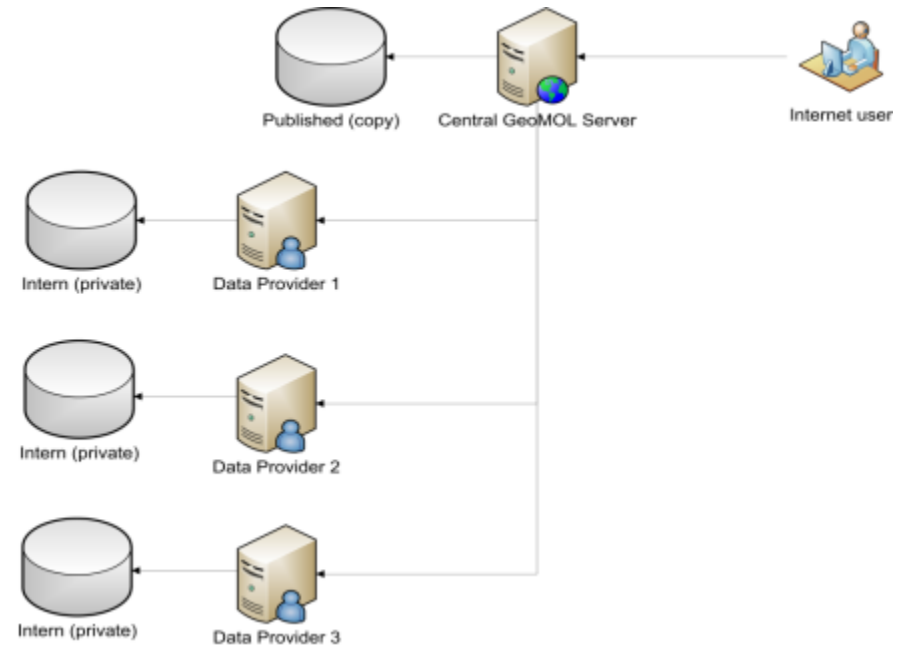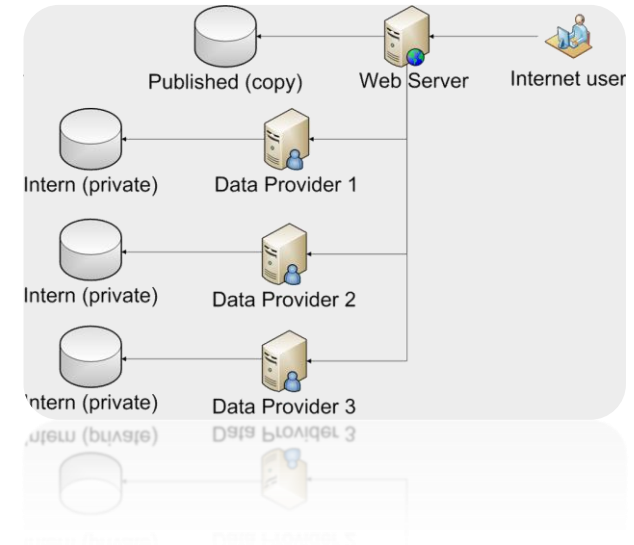

Distributed organized data base featuring a role based web access

What GST looks like
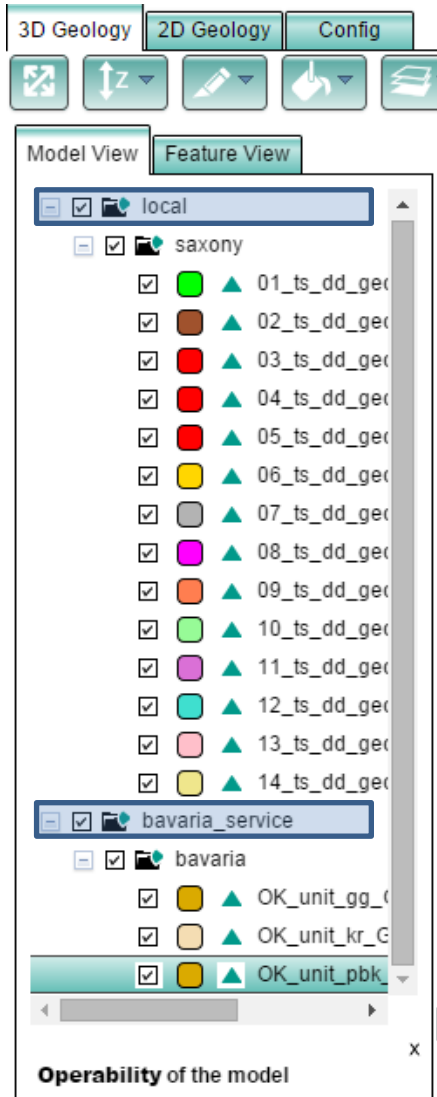
- Root Level in Tree: Services
 - 1.: Local Service
  - Next: Registered Services

- Using the login each service can present data based on the login account (Access Levels)
  - Public (no login)
  - Partner
  - Private

GeoMol

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How data is presented

3D Realtime Viewer
GST Web

* Inspect 3D-Models (WebGL)

* Showing 3D-Details of (sub)regions

* Zoom / Pane

* Change background, exaggerate hight

* Include WMS as textured planes

* Store scenes to be sent via eMail

   * More than just a 3D pdf! Not a fixed model.
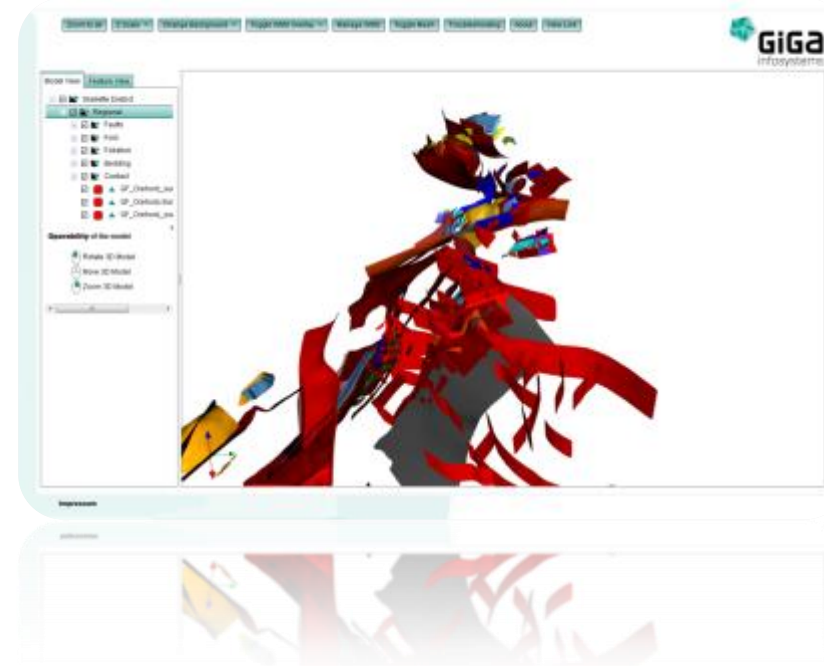
How data is presented

> Usefull for the GeoMol overview model!
> But what about more detailed models?

3D Realtime Viewer
GST Web
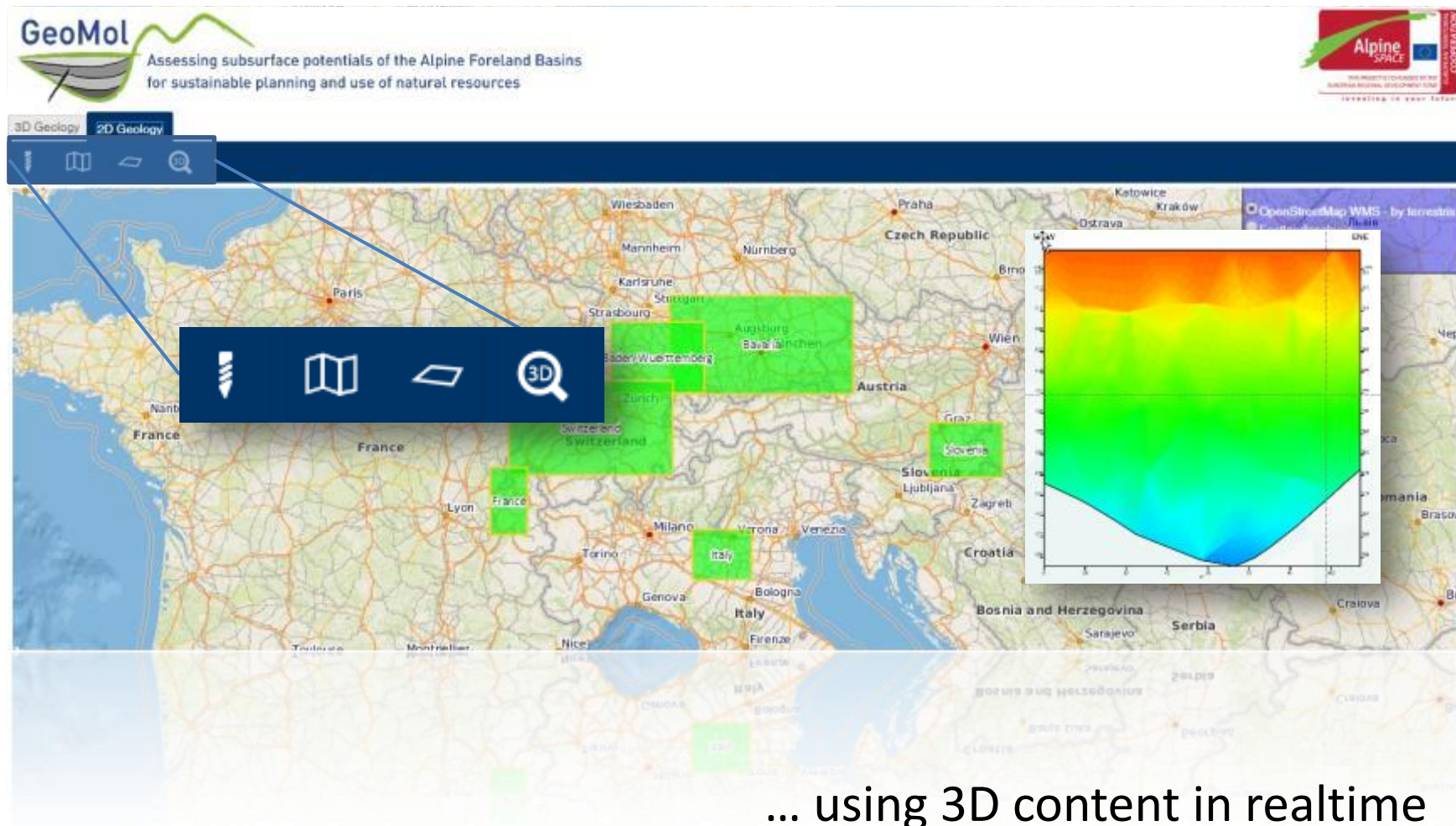
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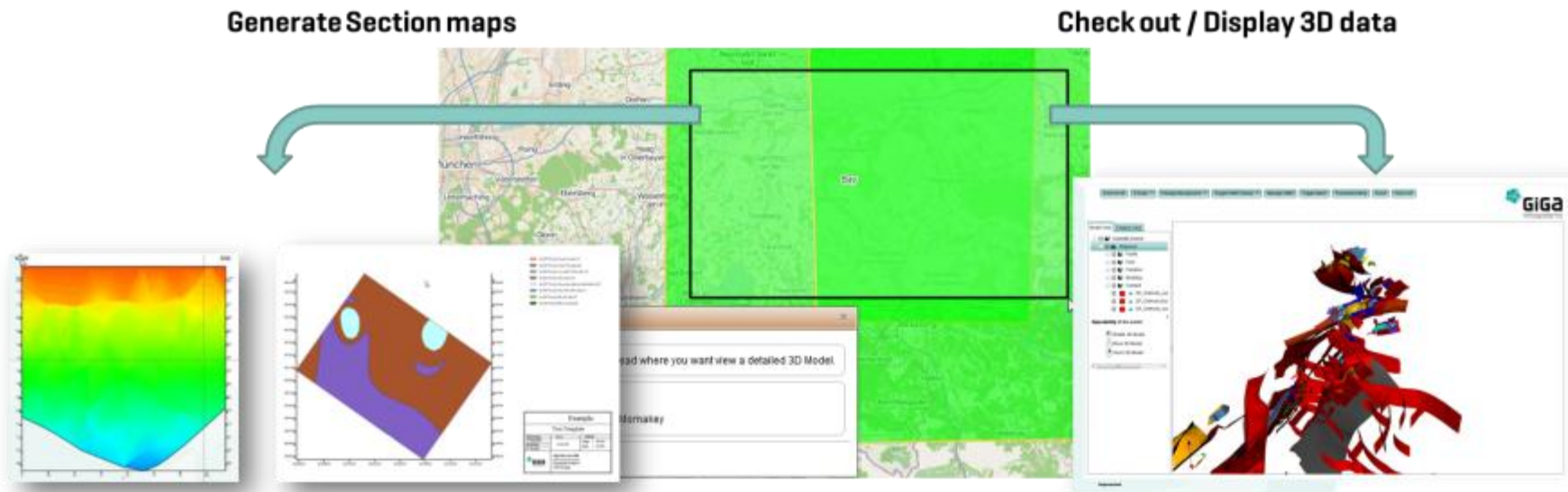
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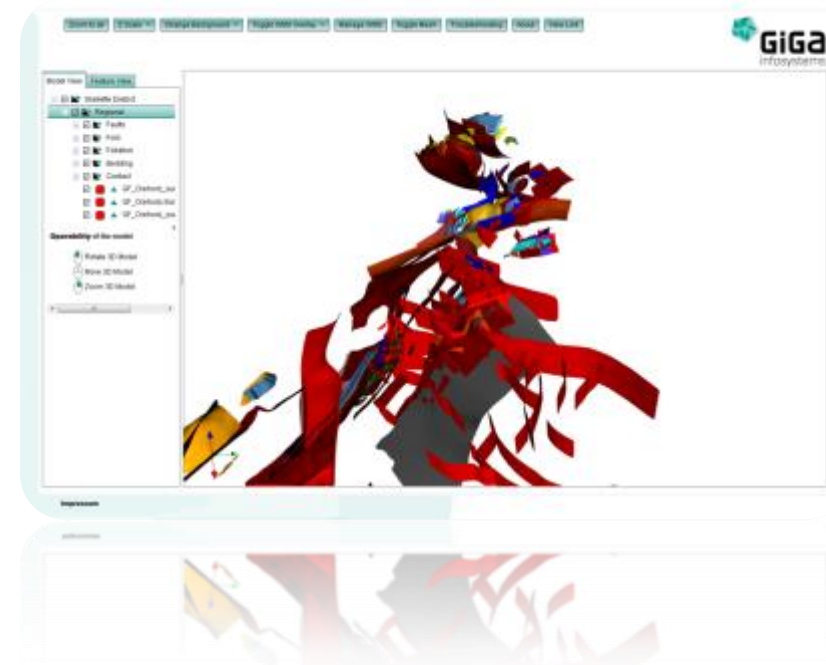
GST Web is presented as 2D Map application

GST Web is presented as 2D Map application

... using 3D content in realtime

Several tools applying 2D maps as interface to get 3D information

Generate Section maps

Check out / Display 3D data

- 2D WebGIS based on Open Layers

- Smart interface for 3D models

- Sections, detailed models, framework models

GeoMol 3D Explorer

Central access point

Through http://geomol.eu
-> 3D Explorer

Website domain:
http://geomol.lfu.bayern.de
(hosted by LfU, RZ Süd)

Software:
GST Web

Thank you!

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Jan.Gietzel@GiGa-infosystems.com
Helmut.Schaeben@tu-freiberg.de

Invitation

On the occasion of its 250th anniversary
TU Bergakademie Freiberg will host the
17 th Annual Conference 2015 of the
International Association for Mathematical Geosciences
Freiberg, Germany, Sep 5-13, 2015
www.iamg2015.de

Including a special session
Presentation of 3D Geomodeling and Mining Software
with **leapfrog**, **midland valley**, and **Mira Geosciences**
www.software-iamg2015.de

GiGa infosystems

* Team of 10 persons

* Oracle Partner, Won GIS Award

* Close Cooperation with TU Bergakademie Freiberg

* Working with

  * Midland Valley (MOVE), DHI-Wasy (Feflow)

* Competences:

  * 3D CAD, Geodatabases, WebGIS, WebGL

  * Oracle, Postgres/PostGIS, MS SQL

* Customers:

  * State geological surveys (current list -> www.giga-infosystems.com)