Knowledge of the subsurface is essential in a variety of applications, such as energy production, waste storage, infrastructural construction, mineral resources management and 3D spatial planning. Three-dimensional digital models of the subsurface denote the preferred way to communicate such complex contexts to the public. Therefore, a huge amount of standardized and readily understandable data needs to be transferred to the clients’ devices quickly and easily.

Digital 3D geological models of Switzerland are produced and stored at the Swiss Geological Survey, the competence center of the Swiss Confederation regarding the subsurface. These models are stored in a 3D database and directly visualized in a web browser via a web feature service using X3d and WebGL technology. The visualization offers a basic set of tools (rotating, zooming, panning, basic slicing). The database can be accessed using an API.

**Assignment**

The future requirements for the visualization of digital geomodels using internet standards (no plug-ins) are as follows:

1. A fast and reliable display of millions of data points to be used by standard internet browsers
2. Additional and more advanced tools are needed in order to improve the visualization possibilities (e.g. advanced slicing, partial slicing, etc.)
3. Ability to load more detailed data on the fly, based on direction of view, model parameters or data types
4. Ability to move within the 3D scene along an e.g. interesting geological subsurface structure

**Requirements**

Interest in advanced computer graphics topics and cross platform development as well as UI design. Experience in OpenGL (CG Lab done).

**Work Load**

- 20% theory
- 70% implementation
- 10% testing

**Project Type**

This project can be done as Software project, Master project, Bachelor or Master thesis. Goals are adjusted depending on the project type.

**Supervision**

Prof. Dr. Renato Pajarola
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**Topic**

Interactive 3D Subsurface Data Visualization Tool

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**Assignment**

The future requirements for the visualization of digital geomodels using internet standards (no plug-ins) are as follows:

1. A fast and reliable display of millions of data points to be used by standard internet browsers
2. Additional and more advanced tools are needed in order to improve the visualization possibilities (e.g. advanced slicing, partial slicing, etc.)
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