

Web based 3D Visualization for COMSOL Multiphysics®

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Introduction:

For teaching, product or research presentations and in future multiphysics problem solving environments an available and lightweight visualization solution is needed. Using standardized web technology a interactive web application for different platforms and its backend is presented.

Visualisation System Setup

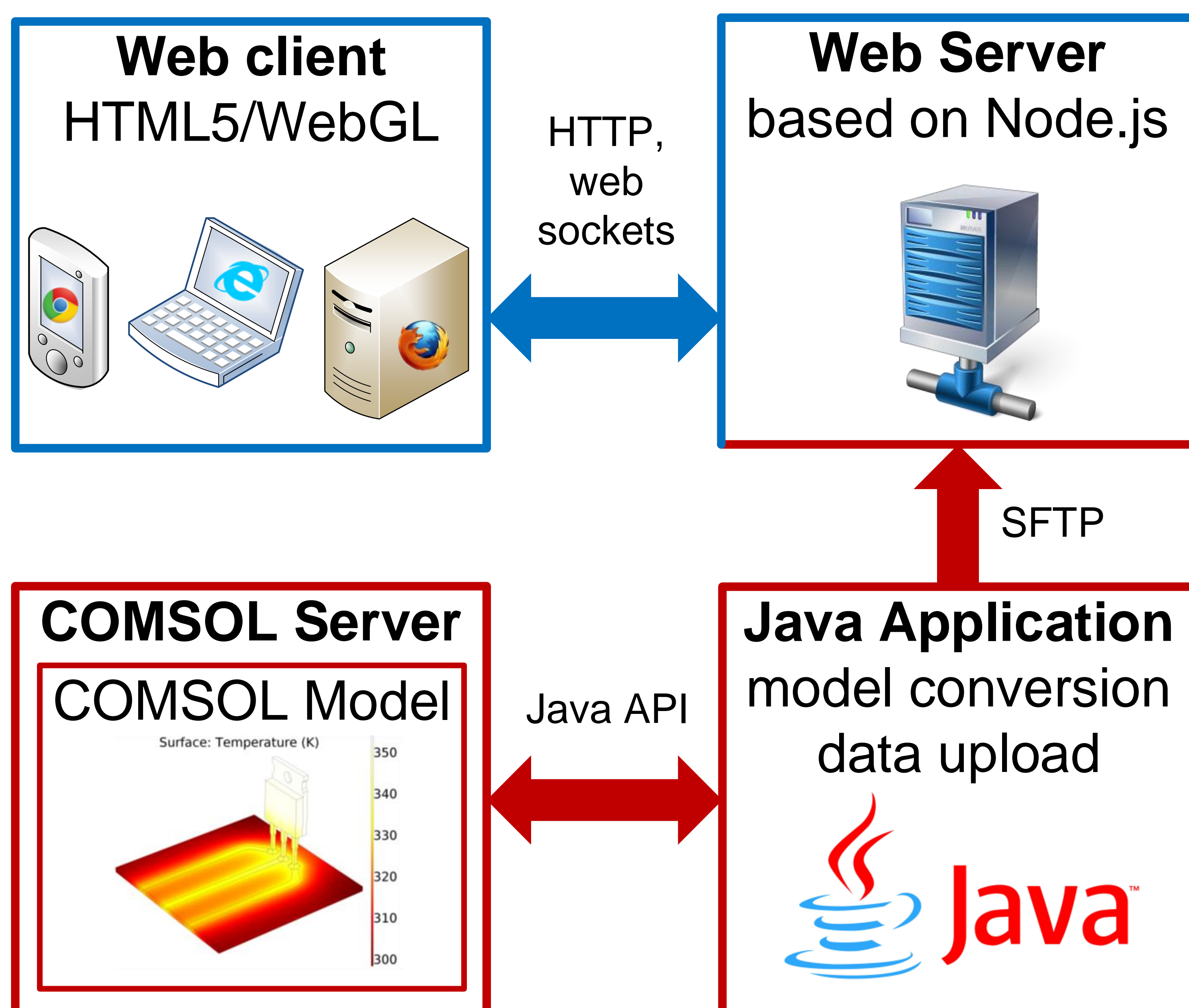


Figure 1. System architecture

Web Server:

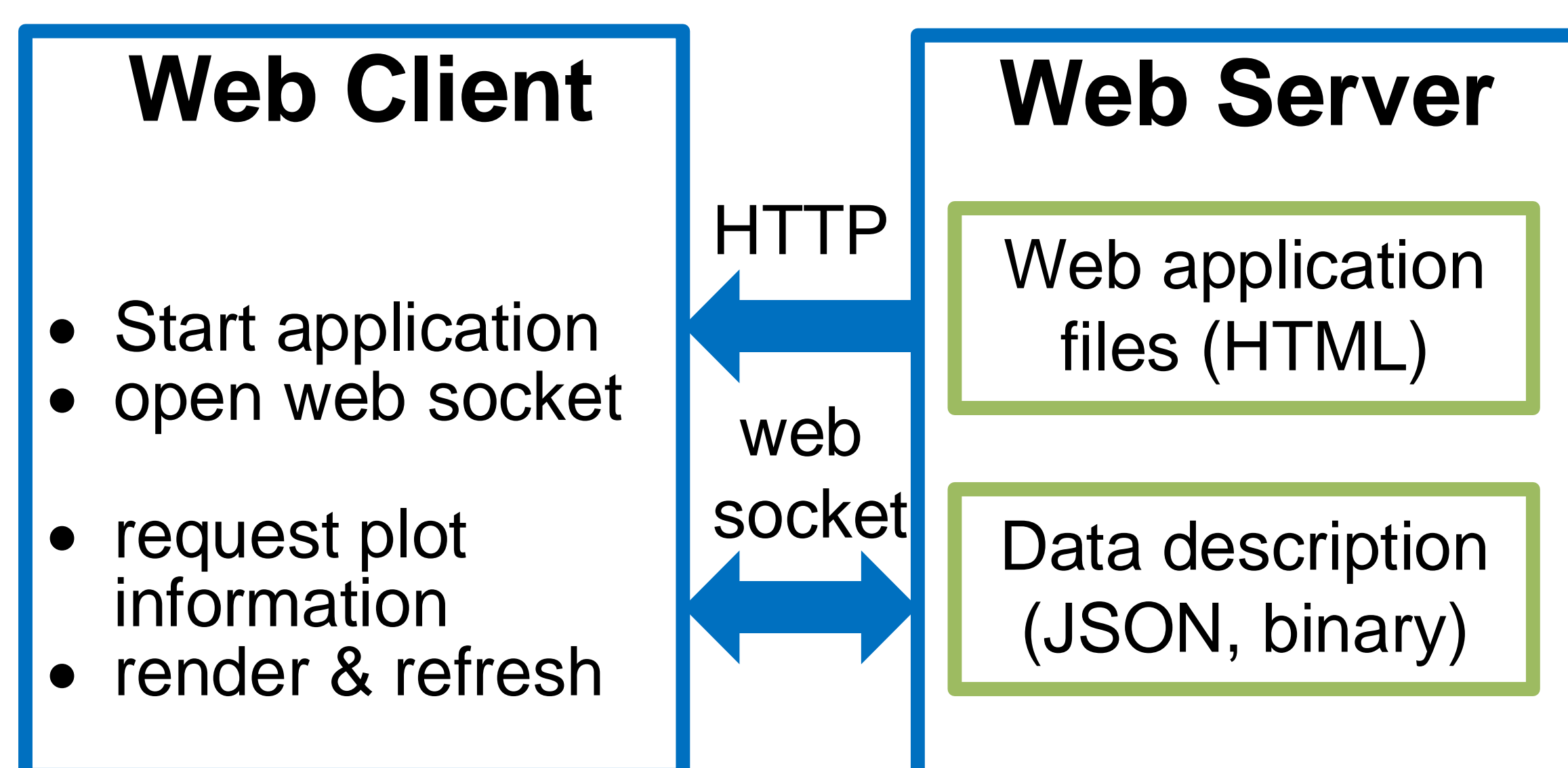


Figure 2. Web application initialization

Model name	Plot type	Size [kB]
Inductive Heating	Surface	290
Power Transistor	Surface	898
Power Transistor	Arrow Volume	120

Table 1. Transmission size of plot data

Web Application:

- WebGL is used to directly render the 3D data from COMSOL.
- Shading effects, arrow volumes, stream lines are calculated locally
- Optimized vertex and fragment shader
- Supports touch and common input

GPU	Frames per Second	Model
Nvidia Quadro 600	58.5	Power Transistor, Surface & Arrow Volume ca. 600,000 Triangles
PowerVR SGX544	44.5	

Table 2. Performance of the render

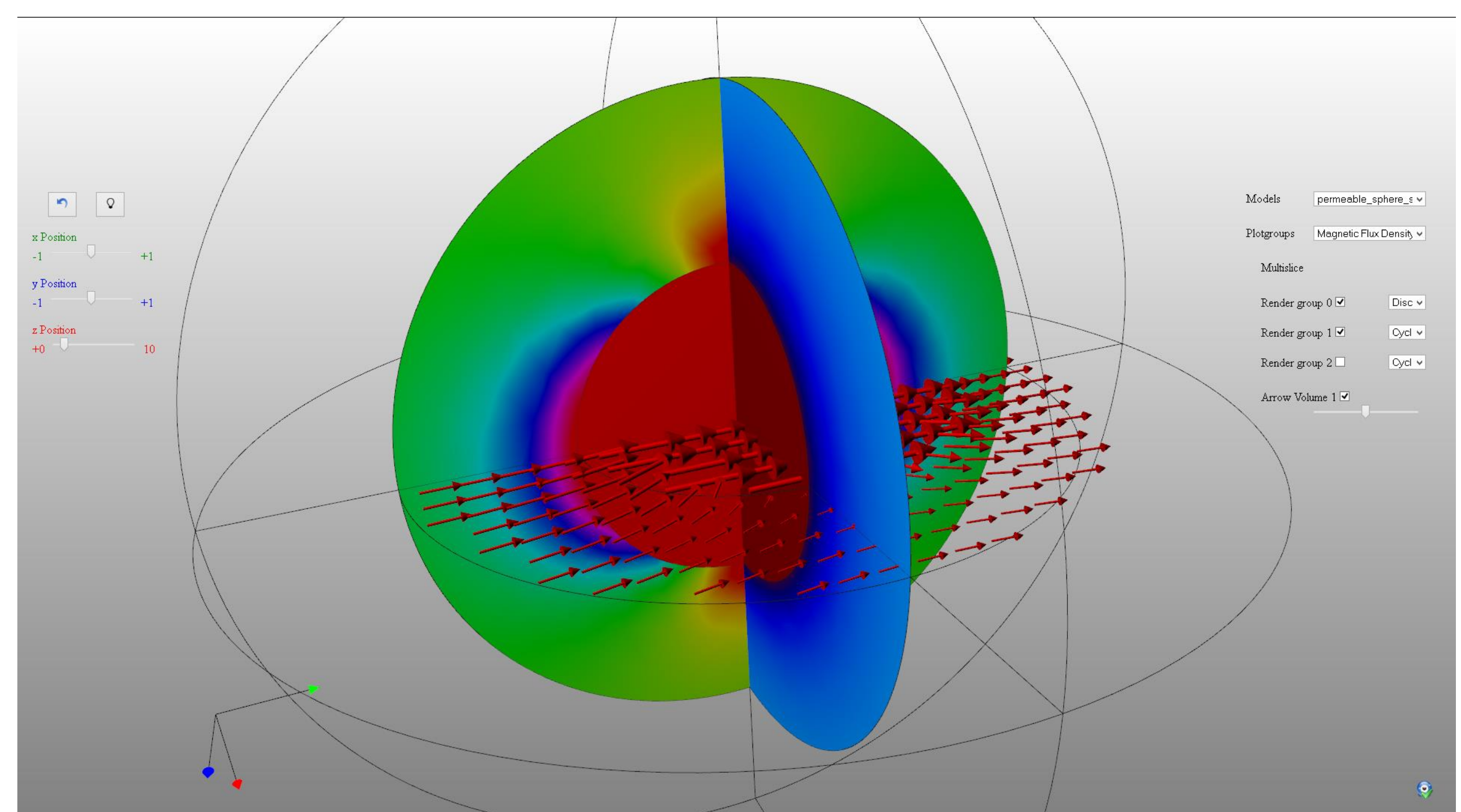


Figure 3. Web application with visualization

Java Application:

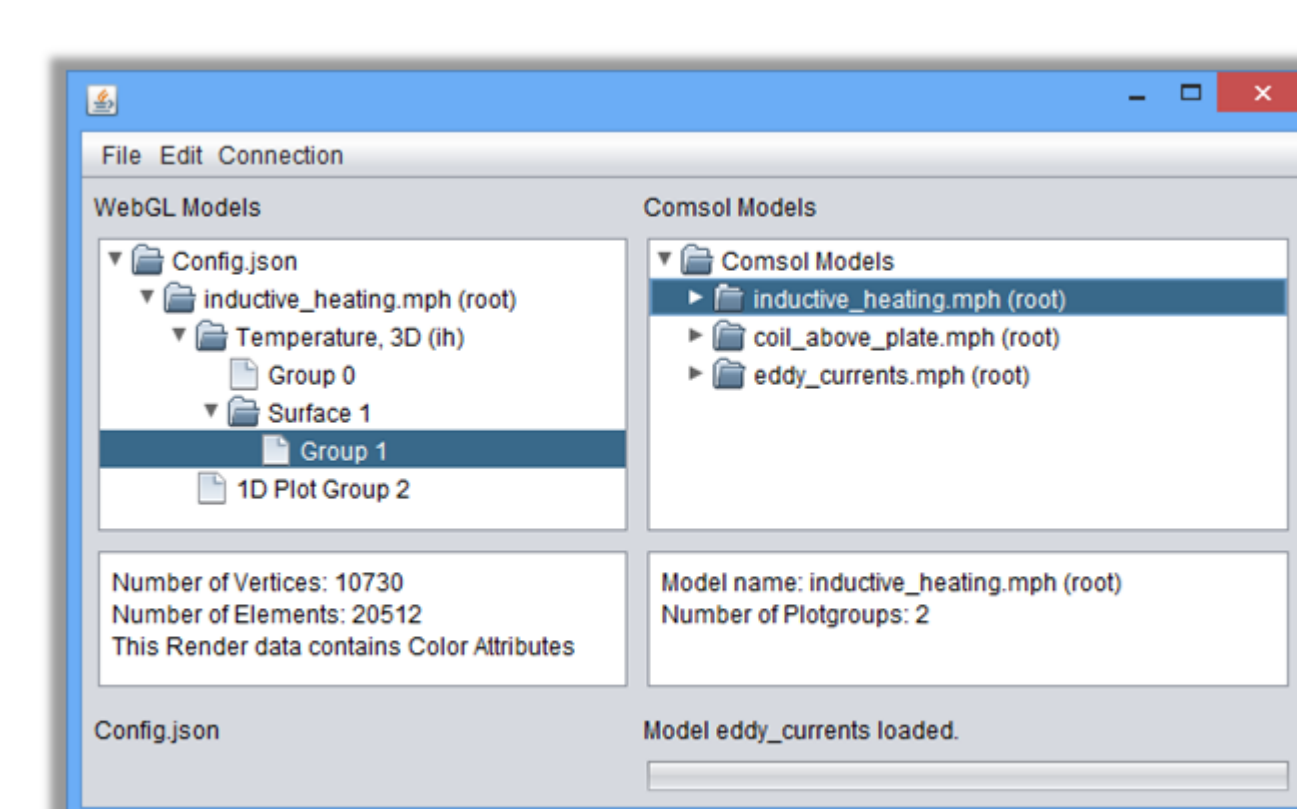


Figure 4. Preprocessor

- Extract data from COMSOL Server
- Use Java API
- Upload graphics data to web server
- Multi model support

Conclusions:

The developed system for web visualization works well. By using WebGL and web sockets the demands on performance and bandwidth are minimal. The handling is intuitive due to modern and common input techniques.