

The Solid Earth Research Virtual Observatory: A web-based system for modeling multi-scale earthquake processes

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We are building a new Problem Solving Environment for use by the seismological, crustal deformation, and tectonics communities for developing an understanding of active tectonic and earthquake processes. The top-level operational architecture of our solid earth research virtual observatory (SERVO) shows science users interacting with interface programs as well as modeling, simulation, and analysis tools. The general architecture follows the "Web Services" model being developed by business interests, but is applied to scientific applications and supporting software resources (such as databases). The system is divided into three tiers: a user interface layer (implemented as a browser interface), a system resource layer, and a middle control layer that maintains proxies (or brokers) to the system resources. The middle tier provides a uniform interface to the resource layer. Following the Web Services approach, we define XML interface abstractions (in WSDL) for basic services (such as File Management) and implement the interface with appropriate technologies (such as with a relational database). Communication between the services is done with an XML messaging architecture (SOAP). Our initial focus is to integrate time-dependent crustal deformation models into the system including both layered analytical and heterogeneous finite element models.