

## Overview of the GEO Grid Security

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We have been leading the "GEO (Global Earth Observation) Grid" project since 2005 which is primarily aiming at providing an E-Science infrastructure for worldwide Earth Sciences community. In the community there are wide varieties of existing data sets including satellite imagery, geological data, and ground sensed data that each data owner insists own licensing policy. Based on a concept of a Virtual Organization (VO), the GEO Grid is designed to integrate all the relevant data virtually, enabled by Grid technology, and is accessible as a set of services. In this presentation, firstly we present design principles of the GEO Grid Security infrastructure that are determined based on accommodating users requirements for publishing, managing, and using data. Secondly, software architecture and its implementations are specified where we take the Grid computing and Web service technologies as the core components that comply with standard set of technologies and protocols. The GEO Grid system uses the GSI and VO-level authorization mechanisms using Virtual Organization Membership Services (VOMS). In addition, in order to provide a ease-of-use interface for end users, the account and credential management service is setup with GAMA (Grid Account Management Architecture), which consists of a set of portlets that provide an interface for users to request an account, login, and access other Web-based applications on the portal, and provide project administrators the ability to easily define policies and perform user management tasks. We have integrated GAMA and VOMS so that VOMS proxy credential will be generated when a user login to the portal. All services must be capable of GSI-based authentication and VOMS-based authorization. We confirmed that all server-side middleware, GT GRAM for computation, OGSA-DAI for data access, GridFTP for data transfer, and GridSite for Apache, satisfy this requirement. VO-level access control realizes flexible and scalable security infrastructure, which controls access according to the service provider's policy and scales up the size of VOs and the number of users. Feasibility of the GEO Grid security was demonstrated through the development processes of the GEO Grid system.