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The GEON Service-Oriented Architecture

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The Geosciences Network (GEON, www.geongrid.org) project has been developing cyberinfrastructure for data sharing in the Earth Science community based on a service-oriented architecture. We have identified a standard “*software stack*”, which includes a standardized set of software modules and corresponding service interfaces. The system employs *Grid certificates* for distributed user authentication. We have also developed a *GEON Portal* to provide online access to these services, using a set of *portlets*.

The service-oriented approach has enabled us to extend the GEON network to new sites, and easily deploy the GEON infrastructure to new projects. For example, we have deployed test nodes in India, Australia and New Zealand. In collaboration with the PRAGMA project (Pacific Rim Assembly for Grid Middleware Applications, www.pragma-grid.net), we have established a Geosciences Working Group and we are in the process of developing service interoperability experiments across these sites, beginning with AIST, Japan. As part of these experiments, we will define catalog services and a search capability that will allow users to discover data across an international network of data sites. The GEON service-oriented approach is also being used in the *EarthScope Data Portal* to enable users to discover and access EarthScope data from three different distributed data archives.

We will also describe our new initiative called, the *OpenEarth Framework (OEF)*, whose objective is to develop open standards and services to enable integration of 3D and 4D earth science data. We have identified three sets of services in the OEF: *Dataset Access Services*, *Data Modeling Services*, and *Data Interaction Services*, to support data access, data manipulation, and interactive data visualization.