

The Development of a Geospatial Grid by Integrating OGC Web Services with Globus-based Grid Technology

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Geospatial science is the science and art of acquiring, archiving, manipulating, analyzing, communicating, and utilizing spatially explicit data for understanding physical, biological, and social systems on the Earth's surface or near the surface. In order to share distributed geospatial resources and facilitate the interoperability, the Open Geospatial Consortium (OGC), an industry-government-academia consortium, has developed a set of widely accepted web-based interoperability standards and protocols. Grid is a rapidly developing technology, originally motivated and supported by science and engineering requiring high-end computing, for sharing geographically distributed high-end computing resources. The vision of Grid is to enable resource sharing and coordinated problem solving in dynamic, multi-institutional virtual organizations. Geospatial Grid is the extension and application of Grid technology in the geospatial discipline. Geospatial Grid technology makes Grid technology geospatially enabled. This presentation discusses problems associated with directly using Globus-based Grid technology in the geospatial disciplines, the needs for geospatial Grids, and the features of geospatial Grids. Then, it discusses a geospatial Grid architecture which integrates OGC technology with Globus-based Grid technology. The architecture enables the geospatial science community to access Grid-managed distributed geospatial resources through OGC interfaces without needing to either know or interface with underlying Grid infrastructure. It also discusses the implementation of the architecture in the real distributed geospatial environment with involvement of multiple geospatial archives and organizations for providing seamless discovery of and access to those distributed geospatial resources. In addition, this presentation explores the relationship between geospatial processing models and the concept of virtual geospatial products, presents a way to express virtual geospatial products as geospatial processing models, and details the method and implementation for converting the models to executable workflows for materializing virtual products.

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