

# A Framework for Developing Web-Service-Based Intelligent Geospatial Knowledge Systems

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## Abstract

This paper discusses an interoperable system framework for developing web-service-based intelligent geospatial knowledge systems. This type of systems facilitates personalized, on-demand geospatial information or knowledge discovery and dissemination. The system will be able to answer “what if” questions by automatically and intelligently chaining individual service modules to form a complex geospatial processing model, matching the input data with the model, and executing the processing model to deliver answers to the users. The system also has the capabilities to evolve and improve by itself. The framework is based on the geo-object and geo-tree concepts, which simulate the geospatial processing models constructed by the experts in geospatial knowledge discovery. The framework also relies on the geospatial interoperability standards, developed primarily by the Open Geospatial Consortium (OGC), recent progress in semantic Web technology and interoperable geospatial Web services. The geo-object and geo-tree concepts provide the mechanism to unify the representation of geospatial data, information, and knowledge, capture the process of geospatial knowledge discovery, manage geospatial knowledge, and enable the dynamic reuse of geospatial knowledge in multiple applications. The framework supports (1) standards-based automated geospatial data and services discovery and access; (2) domain knowledge driven intelligent geo-object decomposition for geo-tree/workflow construction; (3) automated geospatial web service chaining, binding, and execution based on the geo-tree/workflow; and (4) management of workflows and geospatial models.

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