



Distributed Earth observation data integration and on-demand services based on a collaborative framework of geospatial data service gateway

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Earth observation (EO) data obtained by air-borne or space-borne sensors has the characteristics of heterogeneity and geographical distribution of storage. These data sources belong to different organizations or agencies whose data management and storage methods are quite different and geographically distributed. Different data sources provide different data publish platforms or portals. With more Remote sensing sensors used for Earth Observation (EO) missions, different space agencies have distributed archived massive EO data. The distribution of EO data archives and system heterogeneity makes it difficult to efficiently use geospatial data for many EO applications, such as hazard mitigation. To solve the interoperable problems of different EO data systems, an advanced architecture of distributed geospatial data infrastructure is introduced to solve the complexity of distributed and heterogeneous EO data integration and on-demand processing in this paper. The concept and architecture of geospatial data service gateway (GDSG) is proposed to build connection with heterogeneous EO data sources by which EO data can be retrieved and accessed with unified interfaces. The GDSG consists of a set of tools and service to encapsulate heterogeneous geospatial data sources into homogenous service modules. The GDSG modules includes EO metadata harvesters and translators, adaptors to different type of data system, unified data query and access interfaces, EO data cache management, and gateway GUI, etc. The GDSG framework is used to implement interoperability and synchronization between distributed EO data sources with heterogeneous architecture. An on-demand distributed EO data platform is developed to validate the GDSG architecture and implementation techniques. Several distributed EO data achieves are used for test. Flood and earthquake serves as two scenarios for the use cases of distributed EO data integration and interoperability.