A Comparative Evaluation of OGC Sensor Observation Service Implementations

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Abstract

Sensor Observation Service (SOS) is a web specification standard defined by the Open Geospatial Consortium (OGC) as a part of Sensor Web Enablement (SWE) suite. SOS defines a web service interface built with the intention to allow users to discover, access, and manage sensor data and meta-data in an interoperable and standardized way. The SOS standard is a step towards data interoperability among heterogeneous sensor observation data as they are collected in various domains. A number of standard compliant SOS implementations are available that are either open source or proprietary. The study elaborates and evaluates SOS implementations in terms of their completeness with regard to the standard, specifically in terms of the mandatory core operations, transactional and enhanced operations. It also discusses about their APIs, features, software architecture and configurations, user documentation and support, the ease of the deployment process, the usability of the provided user interface, available extensions, and performance. A set of in-situ soil moisture observations acquired in different research projects is used as benchmark data to compare the performance of the implementations. We discuss about the procedure and the effort required for creating meta-data for in-situ soil moisture sensor observations, the ease of inserting the in-situ soil moisture data, procedure for querying this sensor observation data, and query response time of different implementations when executed with the same data on the same hardware. Besides this, we discuss pros and cons of different implementations as well as various challenges experienced while working with these SOS implementations. The outcome of this study is supposed to 1) help SOS end users to choose a system based on their requirements, and 2) give insights to SOS developers and the standardization community by identifying a room for improvement.