Development of Sensor Web Applications with Open Source Software

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When developing client applications for OGC Web services, it is necessary to implement connectors that are able to interact with the according service interfaces. Since the interaction with OGC Web services is standardized and thus common for multiple client applications, the open source initiative 52°North started in 2006 the development of the OX-Framework – a software framework whose architecture can be used to ease and encapsulate the utilization of OGC Web Services. This framework has gained maturity in the past years and has recently been used as the technological basis for innovative Sensor Web applications in several projects. This presentation gives a quick overview of the framework's architecture and subsequently presents three examples of open source Sensor Web applications built on top of it.

A plugin mechanism for service connector components enables the OX-framework to access arbitrary types of OGC web services. These plugins make the functionality of the different Web services available to the framework and the applications. Such plugins have been developed for the OGC Sensor Web services, like the Sensor Observation Service (SOS), the Sensor Alert Service (SAS) and the Sensor Planning Service (SPS), but also for other OGC Web Services like the Web Coverage Service (WCS) and the Web Mapping Service (WMS).

The OX-Framework has been used to develop a web-based client capable of interacting with the SOS as well as the SAS instance. The application can be used to request sensor data from an SOS and generate visual representations of time series diagrams or spreadsheets. Additionally, the user can register at an SAS for subscribing to notifications of certain events (e.g.: "Notify me via SMS if the wind speed at weather station XY is greater than 55 knots").

Furthermore, the framework has been used for the implementation of a Google Maps based client to display sensor data and metadata in its geospatial context. The user can access an SOS to display the offered features (e.g. weather stations) in the commonly known map view. Further information about the features (e.g. the observed phenomena) as well as related time series diagrams can be displayed.

Besides those web-based solutions classical desktop GIS are still important to the users. Due to this fact we have extended the open source desktop GIS uDig so that an SOS becomes usable as a new kind of data source. By the means of the framework and the implemented SOS plugin, sensor data can now be queried and displayed in the uDig environment.

Beyond those three examples of Sensor Web applications further Sensor Web applications have been realized and it is possible to easily develop new ones upon the OX-Framework. This presentation shall encourage the audience to integrate Sensor Web technologies into their projects by making use of existing software solutions and reusing proven and tested implementations.