OGC Sensor Observation Service (SOS)

Observation data, such as hydrological/hydrographical measurements or meteorological observations are an important input for many decision-making processes, research activities, and information systems. The World Wide Web (WWW) is an excellent communication layer supporting the efficient collection and exchange of these data sets. However, when sharing data over the WWW it is important to have a common approach defining how to request data sets and how to encode the data (i.e. specification of data formats). The figures below illustrate the advantages of using standards. Figure 1 shows the situation without the application of standards: each data consumer needs to be customized to the interfaces of all data sources it accesses. This means that in the worst case, development efforts are necessary for each pair of data consumer and provider. If more data consumers and sources exist, the necessary efforts grow dramatically.

![Figure 1: High amount of integration efforts in case of heterogeneous data access mechanisms](image1.png)

Figure 2 depicts the benefits of applying standards. Each data provider and consumer needs to be adjusted only once to support a commonly agreed standard. Thus, if a client application accesses further data sources, no further customization efforts are necessary, if the data source supports the agreed standards.

![Figure 2: Easier integration of new data sources by using interoperable standards](image2.png)
The definition of such a common data access method is the objective of the Sensor Observation Service (SOS) standard developed by the Open Geospatial Consortium (OGC), an international standardization organization with members from industry, academia, and public administration. The SOS standard describes how computer programs can request observation data via the Web from observation data repositories. This includes also filters through which clients can specify which data sets they want to download (e.g. temporal sub-setting, specification of the measurement parameters that are of interest, etc).

The core functionality of the SOS interface comprises:

- Access to metadata about the measurement processes (sensors) that have generated observation data
- Download of observation data based on various filter criteria to access only the subset of data that is relevant for a certain data consumer
- Provision of further related data (e.g. locations of sensor stations)

The SOS standard is complemented by the OGC SOS 2.0 Hydrology Profile Best Practice Paper, which provides recommendations how the SOS specification should be used in hydrological applications.

References

- SOS introduction: http://www.ogcnetwork.net/sos_intro
- Web Page introducing WaterML 2.0, an output format used by the SOS standard: http://www.waterml2.org/
- 52°North Sensor Observation Service implementation (open source): http://52north.org/sos
- 52°North SOS-based data viewer: http://sensorweb.demo.52north.org/client/#/?timespan=2016-07-06T04%3A33%3A32%2B02%3A00%2F2016-07-07T04%3A33%3A32%2B02%3A00&ts=fluggs__15