Geophysical Research Abstracts
Vol. 13, EGU2011-4498, 2011
EGU General Assembly 2011

Towards Modular Service Definitions for Sensor, Simulation, and Statistics Data

Peter Baumann
Jacobs University, Bremen, Germany (p.baumann@jacobs-university.de)

In the classical triad of vector, raster, and meta data it is the raster part which is not sufficiently supported in SDIs and e-Science services nowadays. In terms of open standards, the Open Geospatial Consortium (OGC) supports this triad with three core standards, Web Feature Service (WFS), Web Coverage Service (WCS), and Catalog Service (CS-W) with further standards building upon these and extending the service portfolio. Raster data – or, more generally: *coverages*, defined as "space-time varying phenomena" [5] – pose particular challenges to user-oriented, flexible, modular services as they appear in manifold variations within and across the Earth and Space Sciences disciplines.

The new WCS 2.0 standard closes this gap by providing a function-rich, concise, modular, and testable service interface definition which allows efficient and scalable implementations. The specification is separated into coverage data structure definition [1] harmonized with GML 3.2.1 and service definition [2]. This allows service standards – such as SWE and WPS – to use and exchange coverages independently from WCS. The data structure adopts the GML 3.2.1 coverage model with a minimal, backwards compatible addition to achieve informational completeness. The service definition consists of a minimal, mandatory Core with a net payload of only 30 pages of requirements; Extensions specify additional possible service facets. A minimal implementation needs to implement the core, one format encoding extension, and one protocol binding extension.

This completely overhauled WCS specification offers significant advantages over previous versions:

- support for general multi-dimensional raster data and a broad range of further coverage types, such as point clouds, curvilinear grids, and iso-surfaces;
- crisp and easy to understand for implementers and data users;
- flexible and adaptive to a broad range of different domains, such as web mapping, remote sensing, climate and ocean research, and geology;
- allowing for efficient and scalable implementations, such as multi-Petabyte object access;
- harmonized with Geography Markup Language (GML) and Sensor Web Enablement (SWE);
- reflecting OGC's core/extension model for modular specifications; and
- clear semantics and improved conformance testability of the specification.

In parallel to specification writing, implementation has been pursued to verify viability of the concepts [7]. The WCS 2.0 specification package is available for no fee on the OGC website [6]. An Earth Observation Application Profile of WCS is under work; it links SWE O&M metadata with coverages and adds spatio-temporal retrieval capabilities to the service.

WCS 2.0 was the first to follow OGC's recently established Core/Extension specification paradigm for modular specifications and, as such, had a trailblazer function. Several further OGC specifications under work, such as WMS 2.0 and netCDF, are building on the experience gained by WCS; actually, all future OGC standards will follow the Core/Extension scheme.

In our talk, we will present WCS 2.0 and discuss its technical ramifications as well as its strategic impact for OGC and INSPIRE. Further, we exemplify difficulties arising in standards development when preserving existing data and software assets while embracing technical progress.

References

1. Baumann, P. (ed.): GML 3.2.1 Application Schema for Coverages. OGC document 09-146r1
2. Baumann, P. (ed.): WCS 2.0 Core. OGC document 09-110r3
3. Baumann, P. (ed.): WCS 2.0 overview. OGC document 09-153
4. Baumann, P.: The OGC Web Coverage Processing Service (WCPS) Standard. Geoinformatica, 14(4)2010, pp. 447ff, DOI 10.1007/s10707-009-0087-2
5. N.n.: OGC 07-011, *Abstract Specification Topic 6: The Coverage Type and its Subtypes*, version 7.0 (identical to ISO 19123:2005)
6. www.opengeospatial.org/standards/wcs, last seen: 10-jan-2011
7. www.rasdaman.org, last seen: 10-jan-2011
8. Yu, J., Baumann, P.: Formal semantic-aware Conformance Testing for Geo Raster Web Services. Proc. ONTOSE, Hammamet, Tunisia, June 7 - 8, 2010

Acknowledgement

This work is being supported by ESA as part of the HMA-FO project.