Spatial Data on the Web Working Group

Geospatial IG @ RDA P9
Barcelona, 5 April 2017
Spatial Data on the Web

Joint effort of the World Wide Web Consortium (W3C) and the Open Geospatial Consortium (OGC)

https://www.w3.org/2015/spatial/charter

It aims at bridging the geospatial and Web platforms, thus facilitating the publication and use of spatial data across these communities

Launched in January 2015

Due to deliver its results in June 2017
Spatial Data on the Web: Mission

1. To determine how spatial information can best be integrated with other data on the Web
2. To determine how machines and people can discover that different facts in different datasets relate to the same place, especially when 'place' is expressed in different ways and at different levels of granularity
3. To identify and assess existing methods and tools and then create a set of best practices for their use
4. Where desirable, to complete the standardization of informal technologies already in widespread use
Spatial Data on the Web: Deliverables

1. Use cases and requirements
   https://www.w3.org/TR/sdw-ucr/
2. Spatial data on the Web best practices
   https://www.w3.org/TR/sdw-bp/
3. Time Ontology
   https://www.w3.org/TR/owl-time/
4. Semantic Sensor Network Vocabulary
   https://www.w3.org/TR/vocab-ssn/
5. Coverages in Linked Data
   https://www.w3.org/TR/eo-qb/
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Best Practices
Spatial Data on the Web Best Practices

**Status**: working draft, final version expected in June 2017

Extending the W3C Recommendation “Data on the Web Best Practices” to cover aspects specifically relating to spatial data

**Topic**: use of Web technologies as they may be applied to location.

**Audience**: practitioners, including Web developers and spatial data custodians

Compiled based on *evidence of real-world application*
<table>
<thead>
<tr>
<th>Webiness</th>
<th>Key spatial aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use globally unique persistent HTTP URIs for spatial things</td>
<td>Provide geometries on the Web in a usable way (to be split in two)</td>
</tr>
<tr>
<td>Make your spatial data indexable by search engines</td>
<td>Use spatial semantics for Spatial Things</td>
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<tr>
<td></td>
<td>Specify Coordinate Reference System for high-precision applications</td>
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<tr>
<td></td>
<td>Describe the location according to a Coordinate Reference System</td>
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## Best Practices: Summary (2/2)

<table>
<thead>
<tr>
<th>Access</th>
<th>Linking spatial data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expose spatial data through 'convenience APIs‘</td>
<td>Publish links from spatial things to related resources (to be split in two)</td>
</tr>
<tr>
<td>Metadata</td>
<td>Other spatial aspects</td>
</tr>
<tr>
<td>Include spatial metadata in dataset metadata</td>
<td>Describe properties that change over time</td>
</tr>
<tr>
<td>Describe the positional accuracy of spatial data</td>
<td>Describe relative positioning</td>
</tr>
</tbody>
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SSN Ontology
Semantic Sensor Network Ontology - previous work

W3C incubator group 2009-11 → OWL-DL ontology for sensing and observations

Harmonized several existing observation models, esp.
- ISO 19156 (OGC Observations and Measurements)
+ integrated Stimulus-Sensor-Observation model

Highly cited in research literature, but very few (none?) operational deployments

Used DOLCE-Ultralite as foundation - complex, non-intuitive in some places

→ revision desirable, dual branding with OGC
Revision: “SOSA”

1. Lightweight core for web community
   ○ ‘schema.org’ semantics - e.g. domainIncludes, rangeIncludes
2. SSN expressivity & OWL axiomatization in ‘vertical extension’ of core
   ○ ... DUL dependency removed
3. Add Actuation and Sampling (IoT applications)

→ Sensing, Observations, Sampling and Actuation ontology

http://w3c.github.io/sdw/ssn/
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OWL-Time Ontology
OWL-Time - previous work

OWL-DL ontology for time entities, *W3C Draft* 2006 [Hobbs and Pan]

Allen’s interval algebra

OWL-Time is a dependency of many subsequent ontologies, *but no formal status*

→ *W3C Recommendation + OGC Standard*
Revision

1. Support non-Gregorian temporal reference systems for time position
   ○ Including ‘numeric’ time values, ordinal timescales (e.g. geologic time), alternative calendars ...
   ○ Allen interval algebra still applies
2. Additional predicates
   ○ hasTRS, hasTime, intervalIn, intervalDisjoint
3. Convenience instances
   ○ Month-of-year [January … December]
4. More complete documentation - formal specification, less narrative

http://w3c.github.io/sdw/time/
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Coverages
Two Approaches to Coverages

1. Start with **RDF Data Cube** (models hypercubes on the Web, based on SDMX)
   - Extend spatio-temporal components
   - Leads to: “Publishing and Using Earth Observation Data with the RDF Data Cube and the Discrete Global Grid System”: [https://www.w3.org/TR/eo-qb/](https://www.w3.org/TR/eo-qb/)

2. **CoverageJSON**, use URIs to denote key concepts such as units, observed properties, coordinate reference systems, domain types, but value space is JSON.

3. Both:
   - Aim to enable processing of coverages in Web applications;
   - Semi-experimental, not ready for full standardisation
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