Open Geospatial Consortium: Open Standards for Open Geospatial Data

March 6, 2019
Josh Lieberman
Director of Innovation Programs
OGC Mission and Open Data

• “To advance the development and use of international standards and supporting services that promote geospatial interoperability.”

• Geospatial information systems interoperate by exchanging geospatial information effectively (interfacial, syntactic, geometric, semantic levels) using interface, model, and encoding standards general to data and specific to geodata.

• Standards facilitate bilateral interoperability, but are absolutely necessary for multilateral / unexpected interoperability applications.

• Open data access and open use licensing complement open standards to maximize breadth and variety of data sharing, leading ideally to maximum data value.
Spatial Data on the Web Best Practices

- Joint product of OGC and W3C collaboration
- Joint document can be found here: [https://www.w3.org/TR/sdw-bp/](https://www.w3.org/TR/sdw-bp/)
- “Spatial data, like any other data, should be published on the Web. By this we mean more than providing spatial data file downloads or services; for data to be on the Web, the resources it describes need to be identified using HTTP URIs, be published in such a way that they are indexable by search engines, and be connected, or linked, to other resources.”

- Examples of best practices:
  - Best Practice 1: Use globally unique persistent HTTP URIs for Spatial Things
  - Best Practice 2: Make your spatial data indexable by search engines
  - Best Practice 3: Link resources together to create the Web of data
  - Best Practice 12: Expose spatial data through 'convenience APIs'
  - The rest of the best practices provide more detail on specific aspects of publishing spatial data on the Web, such as metadata, geometries, CRS information, versioned data, and so on.
NYC Open Data Portal

- Open Data Portal is a wonderful initiative that could be even better.
- Example of unexpected use: OGC CityGML model built from NYC open data leading to visualization & modeling possibilities for city and community.
- Major value of open data is “unexpected use” enabled by open standards, facilitated by consumer feedback on successes and failures.
- Portal API’s based on Socrata use OData and other Web-friendly approaches; useability could be improved by following SDW BP recommendations.
NYC CityGML Model from NYC Open Data

The 3D CityGML model is Open Data! Download: www.gis.bgu.tum.de/en/projects/new-york-city-3d/

- only 2D and 2.5D data given \(\rightarrow\) generation of 3D geometries
  - volumetric building and tree models
  - all other feature types mapped onto the terrain
  - special treatment of road geometries to include different height levels

- data heterogeneity
  - different coordinate reference systems
  - different exchange formats (Shapefiles, ESRI GeoDB, Excel etc.)
  - no standardized semantic data model / ontology (each department defines their own data structures)
  - 1:1, 1:n, and n:m mappings required

- huge data volume
  - large area with > 1 million buildings; big DTM;
    in total about 4 million objects
Additional Thoughts

• Federated model (physical and/or virtual) can improve currency, enforce standards conformance.

• Storage fit for use
  – Filesystems for datasets
  – RDB’s for granular API access
  – Graph stores for linked data

• Linking can balance between integration for usability and segmentation for security

• Privacy controls such as differential privacy budgeting can widen the scope of publishable data

• Explainability computations can increase usability

• Spatial spatial spatial

• Concurrent use by city agencies could improve capacity, bring more outside ideas into city operations
Concluding Thoughts

- Geography vs GIS
- Ease of use vs There be (MAUP) Dragons
- VGI opportunities and challenges (noise vs bias)
- Unexpected use may be inappropriate use, but may also motivate better data.
- Does it matter and is it possible to quantify the economic benefits of open data in order to support and fund it