OGC Standards Update
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Orlando

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OGC’S INTEREST
It’s simple

You have this...

...or this

...or this

...and you need to make this...

OGC®

Courtesy CAE
It’s not so simple

You have this...

...or his

...and then push changes

...and you need to make this...

...or this

Courtesy CAE
It’s valuable

Geospatial data should be discoverable, accessible, and reusable for many purposes without multiple format changes.
OGC standards

Validated watertight geometry

Complete web services

Reach-back to data sources

Consistent support for Coordinate Reference Systems

Web processing services and automation

Correlated database
RELEVANT STANDARDS
The CDB standard relies on three important means to organize the data:

- **Tiles** – organization of data by location
- **Layers** – organization of data by type
- **Levels of Detail (LOD)** – organization of data by detail

Tile size and location are specified by CDB.
The amount of data per LOD is specified by CDB.
The data layers are specified by CDB (can be extended).
CityGML - 3D Urban Models

- Urban Planning / Operations
- Emergency Mgt / Response
- Public Safety
- Transportation / Routing / Logistics
- Indoor navigation
- Retail Site analysis
- Sustainable / Green Communities
- City Services Management
- Noise abatement
- Telecommunications placement
- Many other uses…

Source: Thomas Kolbe, Berlin TU

Integrated Outdoor / Indoor location/navigation

- IndoorGML Approved Sept 2014

http://www.opengeospatial.org/projects/groups/indoorgmlswg
ARML 2.0: 1st open, multi-vendor Augmented Reality implementation

AR content encoded in OGC ARML 2.0 standard

Organized by AR Standards

Community Demonstrated at Mobile World Congress 2014

http://www.wired.com/beyond_the_beyond/2014/02/augmented-reality-interoperability-demo/
3DPS: delivery of data or representation

Thick client, delivery of 3D content

Thin client, delivery of queryable images
GeoPackage
universal geodata file format

• GeoPackage is a universal file format for geodata.
  – open, standards-based, application and platform independent, and self-describing.
  – Works on any desktop or mobile OS
  – **Connected / limited / disconnected environment use**

• GeoPackage - the modern alternative to formats like GeoTIFF, SDTS and vendor specific

• **Experience it here:**
  [http://www.ogcnetwork.net/geopackage](http://www.ogcnetwork.net/geopackage)
GeoPackage: Raster Maps, Images and Feature Data in One File

- Imagery: Low – High Resolution
- Raster Maps: Small – Large Scale
- Tile Pyramids: 24 zoom levels
- Landsat imagery
- Intermediate levels
- Aerial imagery

GeoPackage: Single File Sqlite Database containing all data for direct-use on mobile platforms & handheld devices
"Moving features" data describes such things as vehicles, pedestrians, airplanes and ships.

- This is Big Data – high volume, high velocity.

CSV and XML encodings of ISO 19141
Indexed 3D Scene Layer (i3S)
OGC Community Standard

- Developed by Esri
- Implemented by Esri, Vricon, Bentley, Cyclomedia by 2016
- Adopted as an OGC Community standard
## i3S streaming

### Geospatial Data Types

<table>
<thead>
<tr>
<th>Layer Type (example)</th>
<th>Features with Identity</th>
<th>Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3D Object</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Integrated Mesh</td>
<td>No</td>
<td>Triangle Attributes (planned)</td>
</tr>
<tr>
<td>Point</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pointcloud</td>
<td>No</td>
<td>Vertex Attributes</td>
</tr>
<tr>
<td>Line</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Polygon</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Render in Planar and Geocentric modes**

**Vertical frame of reference**
- Ellipsoidal (elevation/height with respect to a reference ellipsoid) or
- Orthometric (elevation/height with respect to a reference geoid/gravity surface)
Cesium 3DTiles

- In approval process as OGC Community standard
- Stream 100K+ buildings
- Mouse over highlight
- Per-building attributes
  - Display
  - Style
- Combine with terrain, imagery, and vector data
New OGC Community Standard Submission

• Presagis is introducing **OpenFlight** as a new Community standard Work Item for consideration by OGC

• Community standard
  – Endorsement by OGC membership of a widely-implemented specification developed outside of OGC
  – Part of the OGC standards baseline
  – Carries the full weight of an OGC standard
  – At time of approval, the specification is frozen and published by OGC; the originating body can continue development of their own version, if desired
  – Examples: GeoRSS, Indexed 3D Scene Layers (I3S), LAS 1.4
Joint AR Standards Advancement

• W3C and OGC together are looking to run a Pilot to address a range of AR interoperability challenges

• Pilot is intended to:
  – Advance or propose W3C and OGC standards related to Augmented Reality.
  – Provide models, interfaces, and an architecture that will enable seamless integration of ‘real world’, geospatial, and web data.
  – Be run as an Initiative of the OGC Innovation Program, co-branded with W3C
Distributed Simulation and Gaming

- Functioning as an ad hoc OGC Working Group
- In consideration by members as a new Domain Working Group
- Led by Modeling and Simulation industry experts

Refs:
OGC Domain Working Groups: http://www.opengeospatial.org/projects/groups/wg
OGC Standards Working Groups: http://www.opengeospatial.org/projects/groups/swg
OGC Standards: http://www.opengeospatial.org/docs/is