Meteorology & Oceanography Domain Working Group Activities in Open Geospatial Consortium and World Wide Web Consortium

Chris Little, Met Office
IT Fellow
OGC Architecture Board

ECMWF Reading, 2018-10-16
Chris Little, Chair Met Ocean DWG

Co-chairs:
Frédéric Guillaud, Météo-France

Steve Olson, US NWS
Introduction

• OGC Overview
• Other Standards organisations
• Met Ocean Domain WG
• Work done
• Issues
• Current activities, including W3C, ISO
• Questions & Answers
OGC Overview

• International, non-profit, consortium, established 1994
• Develop publicly available interface standards for geospatial data and services
• >525 companies, govt. agencies, universities, individuals
• Voluntary consensus processes:
  • Specify
  • Implement
  • Interoperability Experiments
  • Change standards/implementations
  • Repeat
• “The only game in town” for geospatial standards
• Several standards adopted by ISO, WMO and W3C
• Standards specified by Governments (e.g. INSPIRE)
• Significant Open Source community support
Other Standard Organisations

- WMO
- ICAO
- ISO
- ITU
- UNESCO/IOC
- IHO
- IMO
- ...
- IETF (Internet Engineering Task Force)
- IANA (Internet Assigned Name Authority)
- IEEE (Institute of Electrical and Electronic Engineers)
- ...
- W3C (World Wide Web Consortium)
- OASIS (Organization for the Advancement of Structured Information Standards)
- OMG (Object Management Group)
- ...
Where does OGC fit in the ‘standards’ world?

- **ISO / CEN**
  - Nations
  - Domains: Object / Abstract Models, Content, Vocabulary

- **OGC**
  - Software Interfaces: Instantiate Domain and De jure into Infrastructure

- **IETF / W3C**
  - Infrastructure: WSDL, UDDI, SOAP, XML, HTTP/S

© 2010 Open Geospatial Consortium Inc.
OGC: Membership Distribution

- Europe: 207
- N. America: 173
- Asia / Pacific: 68
- Middle East: 5
- Africa: 3
- S. America: 8

© 2012, Open Geospatial Consortium
OGC: Who and What?

- Funded by members
- 38 adopted standards
- Freely available
- Hundreds of product implementations
- Broad user community implementation worldwide
- Alliance partnerships with 30+ standards & professional orgs
- Some standards fast tracked in ISO
- Community standards adopted: e.g. KML, GeoTIFF, LAS
OGC Interoperability Program

- Specification Program
- OGC Network
- Plugfest
- Pilot
- Interoperability Experiment
- Testbed

Types of Interoperability Program Initiatives

Specifications, Implementations, Demonstrations

© 2013, Open Geospatial Consortium
OGC Specifications - How?

• Voluntary consensus processes:
  • Specify
  • Implement
  • Interoperability Experiments
  • Change standards/implementations
  • Repeat

• Technical & Planning committees every 3 months

• Standard Working Groups
  • Project orientated, ‘vertical’
  • Create one standard
  • Change one standard

• Domain Working Groups
  • Programme orientated ‘horizontal’
  • Communities of interest
  • Raise requirements for SWGs
Met Ocean Domain WG

• Regular ECWMF Operations Workshop 2007: recommended workshop/conference on GIS

• 2008: Workshop on Use of GIS/OGC Standards in Met:
  • Review use of OGC (Open Geospatial Consortium) standards in geosciences in Europe & worldwide
  • Promote collaboration between meteorological services in order to define a set of common standards that will enhance interoperability
  • Recommended OGC involvement and establish Met DWG
  • Established major theme: Web Map Services interoperability for NHMSs
Met Ocean Domain WG

- 2007-2008 Météo-France, Met Office join OGC
- 2009 Meteorology & Hydrology DWGs established
- Meteo DWG converts to Met & Ocean DWG
- OGC and WMO signed MoU (Met, Ocean, Hydro)
  Short legal doc, flexible Annex, lightweight – let experts get on with work
- 2nd Workshop on Use of GIS/OGC Standards in Meteorology
  Established second major work theme: Conceptual modelling
- 2010 3rd Workshop on Use of GIS/OGC Standards in Meteorology
  Re-established Interoperability Experiments, SLD/SE styling work started
- 2013 4th Workshop on Use of GIS/OGC Standards in Meteorology
  Continued WMS, Conceptual Modelling, SLD/SE work
  **Temporal DWG started**: leap seconds, Gregorian calendar
  **WCS Extensions**: Met profile, 4D+ not 2D+layers, ensembles, corridors, GRIB2
MetOcean DWG Work done

- WMSv1.3 Best Practice for Time and Elevation
- WMSv1.3 Best Practice for Ensembles of Forecasts
- O&M Conceptual Model IWXXM (ICAO & WMO)
- WMO and ICAO weather symbols in SVG on GitHub
- WCS2.1 Extensions:
  - Met Ocean Profile
  - Corridors
  - Polygons
  - NetCDF and GRIB2 payload encodings
- TimeseriesML1.0 (derived from Hydrology Timeseries)
W3C/OGC work done

Joint Spatial Data on the Web WG established/disbanded
• SDW Best Practice – candidate Recommendation
• (SDW Use Cases and Requirements – Tech Note)
• (Data on the Web BP – Recommendation)
• OWL-Time ontology – Recommendation
• Semantic Sensor Network ontology – Recommendation
• Publishing & using EO Data with RDF DataCube & DGGS (Discrete Global Grid System) – Tech Note
• QB4ST: RDF Data Cube extensions for spatio-temporal components – Tech Note
• Overview of the CoverageJSON format – Tech Note
2D vs 4D

- WMS Best Practices built on ‘Layers Model’
- Traditional cartographic model of layers broken
- 100 parameters x 100 times x 100 levels x 100 ensembles x 10 different models = 1 billion layers to select from.

Lots of 3+D activity:
- Multi-player Gaming, military & aviation simulation
- Drones & autonomous vehicles: above / on / below surface
- Indoor navigation
- Smart Cities
- Below ground
- Marine, Space, Met Ocean, etc
- None is built on traditional 2D cartography
Big Data (in the Cloud) hard to move, “Move apps to data”

• Cross domain science is where the action is
• Improve Discovery metadata
• But metadata open ended, does not describe how to use data
• Metadata not granular enough (ICSU RDA Research Data Alliance, formed Task Force this month)
• Metadata also in knowledge graphs on the Semantic Web
• Data stays in domain specific binary formats

• Use APIs, REST architecture, OpenAPI framework, registers and registries
• Latest OGC standard WFSv3 uses this pattern
Met Ocean DWG work now

- WCSv2.1 Extensions
  - Met Ocean Profile
  - Corridors
  - Polygons
  - (Tiles)
- TimeseriesMLv1.2: multiple parameters, non-regular time intervals
- Joint OGC / ISO 19111 CRS revision
- How to use Cesium/3D Tiles standard?
- Liaise with W3C/OGC SDW Interest Group (like a Domain WG, raise requirements for standards WGs)
- Visualisation Whitepaper: Portrayal should start from 3/4D not 2D
- API Weather on the Web
  - Using OpenAPI
  - Based on WFS3 patterns
W3C work now

• Spatial Data on the Web WG now formally closed
• Spatial Data on the Web IG now active:
  • Maintain existing DWBP, SDWBP, ontologies
• Incubate and nurture new standardisation activities:
  • GeoWeb roadmap
  • MapML, WebVideoMapTracks, CityJSON, CoverageJSON,
  • Statistical Data on the Web BP
  • Stats language metadata to qualify data
  • Time language metadata – climatological periods, stats
• Using GitHub, projects and process ‘Funnel’
• RDA Granularity Task Force
OGC is more global, rather than American
- has opened up processes to external community groups
  - Twiki, mailing lists
- is updating standards from client/server to RESTful
- Is restructuring standards to a ‘Core & Extensions’ model
- In middle of ‘2D+Layers’ versus ‘4D+slice & dice’ churn
- Interoperability Experiments & Test Beds still heavyweight, to protect members’ IPR - Not an issue for Met Ocean
- Has taken on Met Ocean requirements in key standards, even when Met Ocean people not actively involved

- W3C for scalable, REST pattern, browser-based, cross-domain issues
- More volunteers and experts needed – it’s FUN!
Questions? Answers??
'you said there would be biscuits!?'