Use of Ontologies within the Open Geospatial Consortium

Luis Bermudez. Ph.D.

Director of Interoperability Certification

2012-11-01

Slide title

- Clarifications
  - OGC
  - Ontologies
- Need of URIs at OGC
- Management of OGC URIs
- GeoSPARQL
- Cool Experiments

# OGC

475 volunteer organizations

4307 Users

60 Standards

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NOAA
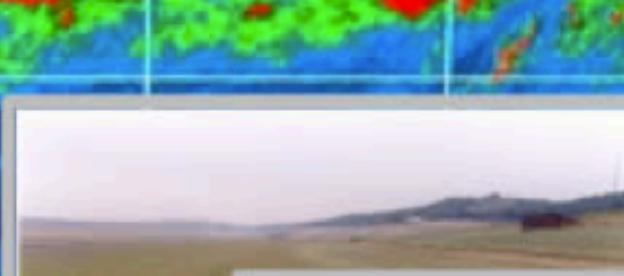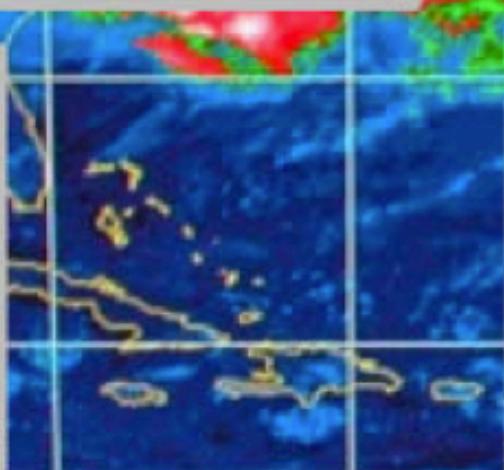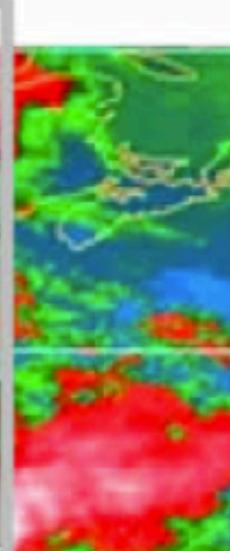
Earth science
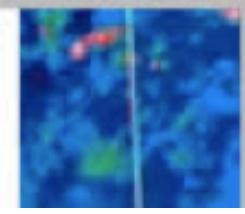
CO$_2$ Emissions from Fossil Fuel Combustion by End-Use Sector, 2002

Industry
337 MMTC
25%

Buildings
658 MMTC
43%

Transportation
482 MMTC
32%

Industrial
80 MMTC
5%

Commercial
265 MMTC
17%

Residential
313 MMTC
21%
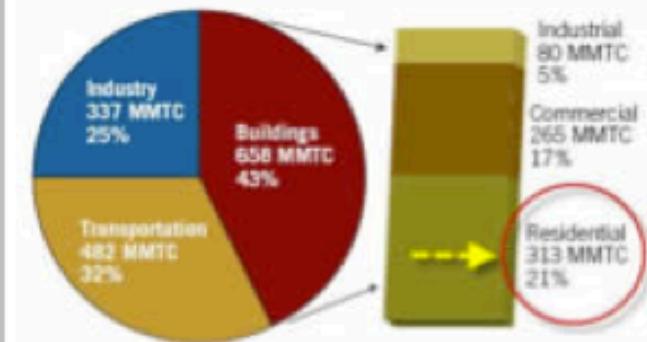
source: Pew Center on Global Climate Change

GEOSCIENCE DEPENDS ON GEOSPATIAL INFORMATION STANDARDS

Siri Jodha Khalsa, University of Colorado, US
George Percivall, Open Geospatial Consortium (OGC), US

IGARSS 2010 Session: International Open Standards for Geosciences – Standards Development

THE IEEE COMMITTEE ON EARTH OBSERVATIONS STANDARDS WORKING GROUP

GEOSS, INSPIRE AND GMES, AN ACTION IN SUPPORT (GIGAS)

A DISTRIBUTED LIDAR PROCESSING MODEL BASED ON OWS AND BPEL

AIR QUALITY COMMUNITY EXPERIENCES AND PERSPECTIVES ON INTERNATIONAL INTEROPERABILITY STANDARDS

**OPEN STANDARDS IN THE INTEGRATED OCEAN OBSERVING SYSTEM (IOOS)**

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So..

Some data use in Science is served via OGC standards

- netCDF
- KML
- WMS
- SOS
- WPS

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Observation - 24/7 Model Timeseries Comparison

Wave Height (Observed/Model Data Comparison) - Buoy 44004
(NDBC Observations/WW3 Model)

Forecast hour

Observation Min: 1.87 Max: 2.71
Forecast Min: 0.5916 Max: 1.7690

Observations
WW3

Wave Height (Meters)

10/13 12:00 --> 10/15 12:00 UTC (2008)

SEA SURFACE TEMPERATURE - 18 FEB 2008 - NCEP UW-SSEC
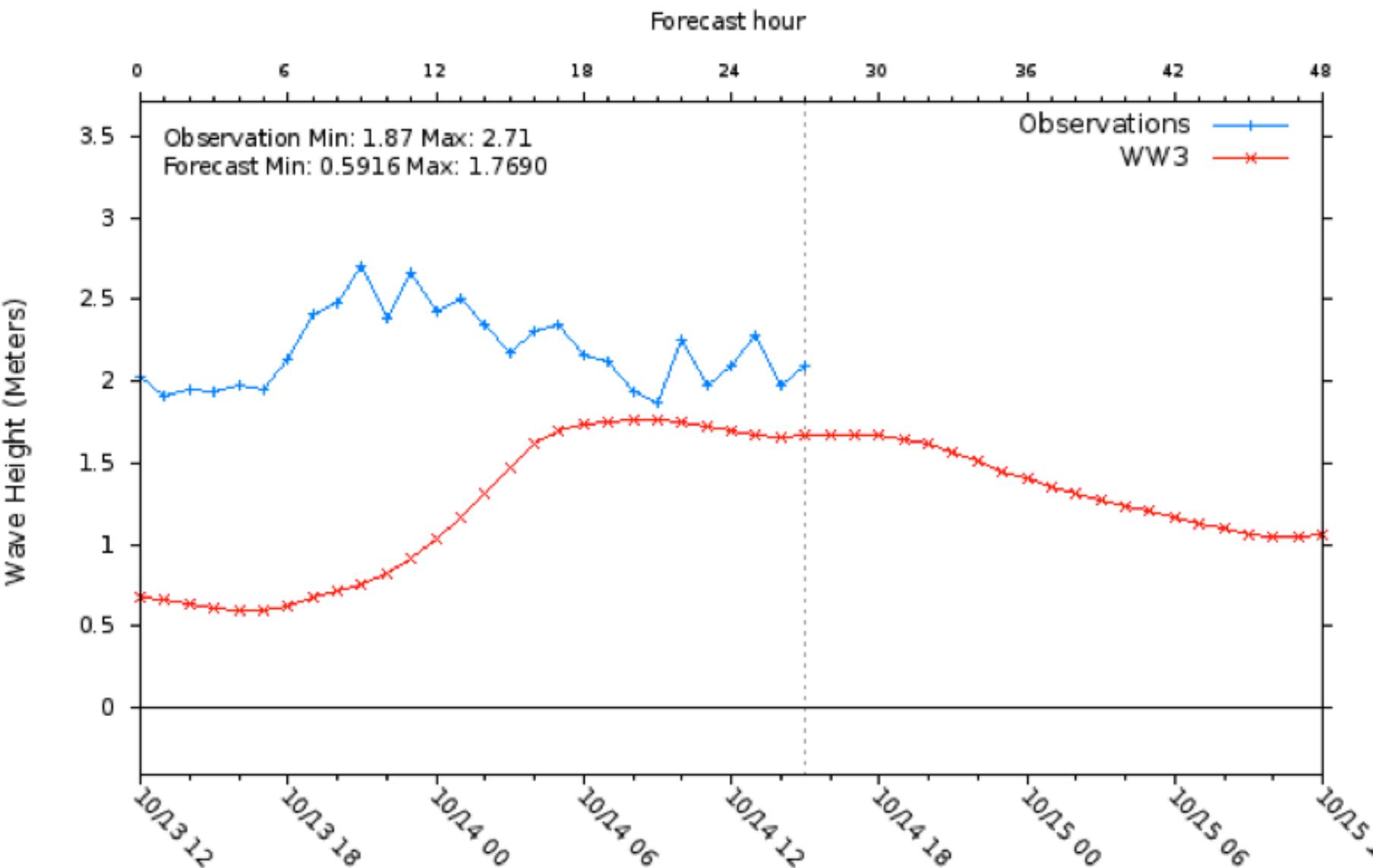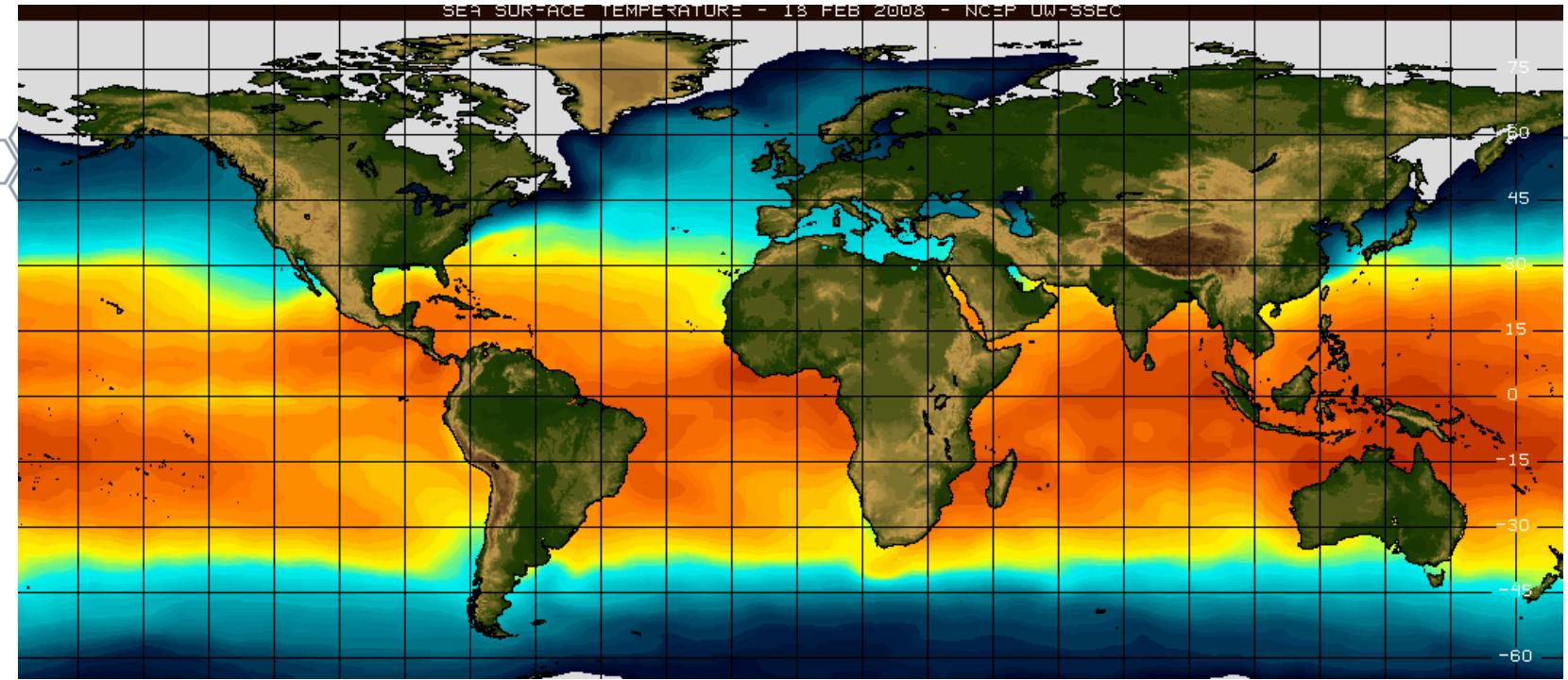
SST, sea water temperature, water temperature, temp ...

SST Records.
1978 formed
Record Label

Supersonic
transport
(SST)

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Also in metadata elements

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Ontologies

- Is a specification of a conceptualization – Gruber
- We explicit identify a class and a resource and make a URI
- Keep it simple
- We create classes and properties to fit our needs
- We are not creating upper upper formal ontologies

OGC Produces Hundreds of artifacts per year

OGC Standards List		Best Practices
Specification Profiles		Discussion Papers
Abstract Specification		Deprecated Documents
OGC Reference Model		Retired Documents
OGC Schema Updates		Requests (RFP's, RFQ's...)
Public Engineering Reports		White Papers
TC Policy Directives		Change Requests
GeoDRM Reference Model		Submit Change Request or Requirement

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64 Change Requests were submitted in 2011

Direction Information for the Transition UML class in the data model	11-151	JeaJun Yoo	2011-10-19
Incorrect reference in ows19115subset.xsd	11-156	David Valentine	2011-10-19
Temporal Constraints for State and Transition UML class in the data model	11-149	JeaJun Yoo	2011-10-19
WMTS 1.0 Change Request - Conform to OGC 08-131r3 ModSpec	11-155	Paul Daisey	2011-10-19
Ambiguity in GetRecords TypeNames parameter for CAT 2.0.2	11-173	Enrico Boldrini	2011-12-14
Ambiguity in GetRecords TypeNames parameter for ISO Metadata AP 1.0	11-174	Enrico Boldrini	2011-12-14
Implemenation of required valueOf() function will reduce query/filter efficiency.	11-177	Panagiotis (Peter) A. Vretanos	2011-12-14

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Formal identification

Uniform Resource Names (URN) Namespaces

Last Updated
2012-04-23

Note

This is the Official IANA Registry of URN Namespaces

This registry is also available in plain text.

epcglobal	35	[RFC5134]
cgi	36	[RFC5138]
ogc	37	[RFC5165]
ebu	38	[RFC5174]
3gpp	39	[RFC5279]
dvb	40	[RFC5328]
nena	41	[RFC6061]

IANA RFC 5165

A Uniform Resource Name (URN) Namespace for the Open Geospatial Consortium (OGC)

    urn:ogc:{OGCresource}:{ResourceSpecificString}

An operational OGC URN "resolver" is available at http://urn.opengis.net/. The resolver provides a registry of the currently member approved OGC URN's used in currently approved and implemented OGC standards.

The OGC Naming Authority is a permanent OGC resource. The documents and related OGC URN resources, such as the URN resolver, have stable URLs. The ONA reference is http://www.opengeospatial.org/ogcna.

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http URIs ✔

We identify more than documents

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OGC Definition types

http://www.opengis.net/def/def-type/

label	OGC Definition types	🔍
created	14/02/2012	‹ 🔍 ›
creator	OGC Naming Authority	🔍
member	**Authorities for definitions endorsed by the OGC**	
	Classification schemes	
	Coordinate axes	
	Coordinate Axis Directions	
	Coordinate operation methods	
	Coordinate operation parameters	
	Coordinate Operations	
	Coordinate Reference Systems	
	Coordinate Systems	
	Data or processing service types	
	Datatypes	

OGC Document element types

http://www.opengis.net/def/doc-element/

label	OGC Document element types	🔍
created	14/02/2012	< 🔍 >
creator	OGC Naming Authority	🔍
member	Document clause	🔍
	Document figure	🔍
	Document table	🔍
	Term and definition	🔍
see also	ogc-na-policies	
	DOC	

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Coverage Type

title	CoverageType
label	Coverage Type
	Coverage Types
modified	11/10/2012
created	2010-11-23
creator	European Space Agency
	Spot Image S.A.
definition	Specifies if the imagery should be acquired in one or multiple passes
member	Mono-Pass
	Mono-Pass
	Multi-Pass
	Multi-Pass
	Single Swath
	Single Swath

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Vocabulary Server

1. Vocabularies are formalized using RDF/SKOS
2. Expert users want to connect to a SPARQL endpoint
3. Normal users need a simple interface with basic queries
   – "find concept by-label"
4. Vocabularies are strongly governed
   – read-only access for most users
5. Service owner ≠ content URI owner
   – same content may be hosted in multiple services

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- OGC Definition URIs are hosted/ redirected to SISSvoc

http://def.seegrid.csiro.au/sissvoc/ogc-def/concept? labelcontains=water

http://www.opengis.net/def/waterml/2.0/medium/PoreWater

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OGC Naming Authority

- Subcommittee of the Technical Committee (TC)
- Manages the register resources
- Coordinates with OGC staff the publication of the registry
- Every standard that is submitted for publication passes through the OGG-NA

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Conclusions OGC URIs

- Some Science Data is published via OGC Standards

- OGC standards now are filled of URIs to identify OGC resources and standards related resources

- Governed and maintained by OGC Naming Authority

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OGC GeoSPARQL - A Geographic Query Language for RDF Data

Approval Date: 2012-04-27

Publication Date: 2012-09-10

Document uri: http://www.opengis.net/doc/IS/geosparql/1.0

Reference number of this OGC® project document: OGC 11-052r4

Version: 1.0

Category: OGC® Implementation Standard

Editors: Matthew Perry and John Herring

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http://www.opengis.net/ont/geosparql

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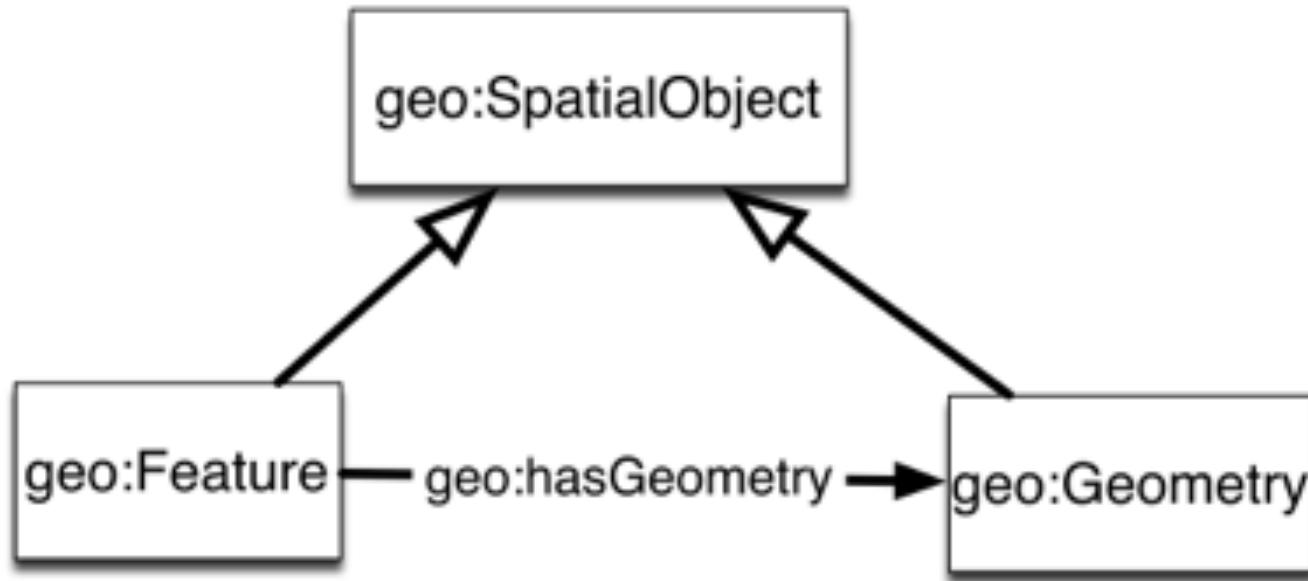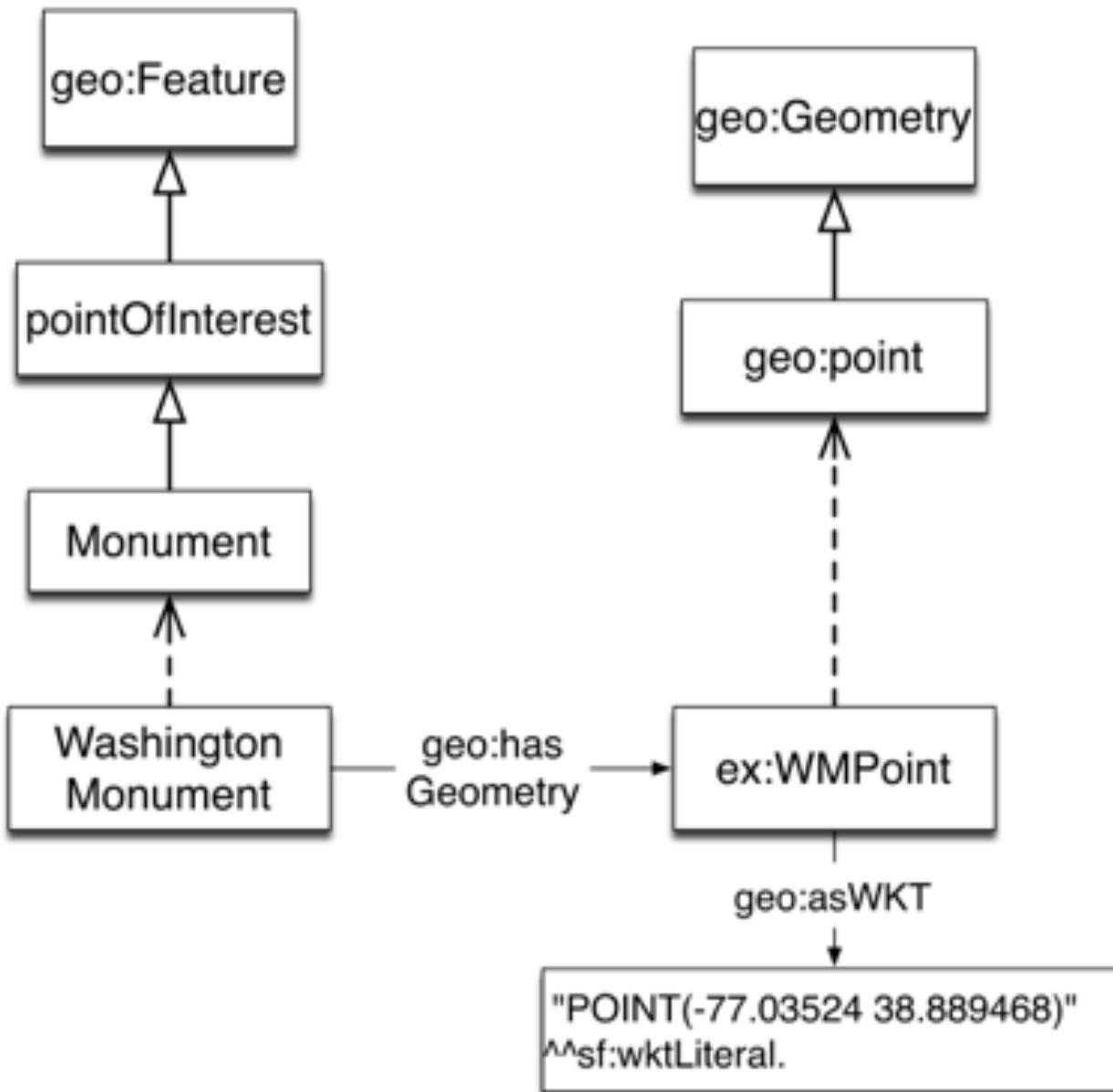
Geospatial Properties

- geo:ehContains
- geo:ehCoveredBy
- geo:ehCovers
- geo:ehDisjoint
- geo:ehEquals
- geo:ehInside
- geo:ehMeet
- geo:ehOverlap

- geo:sfContains
- geo:sfCrosses
- geo:sfDisjoint
- geo:sfEquals
- geo:sfIntersects
- geo:sfOverlaps
- geo:sfTouches
- geo:sfWithin

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Excellent Article
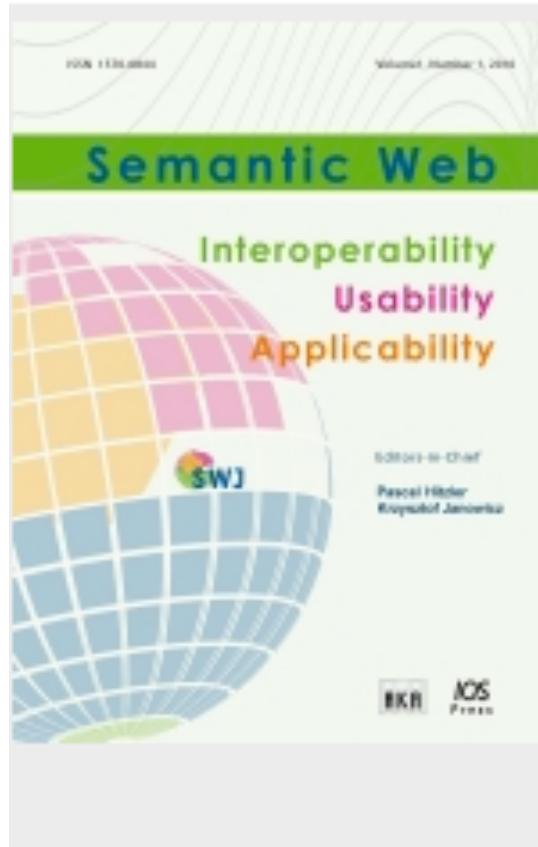
Enabling the geospatial Semantic Web with Parliament and GeoSPARQL

Journal	Semantic Web
Publisher	IOS Press
ISSN	1570-0844 (Print)
	2210-4968 (Online)
Subject	Information Technology, Artificial Intelligence and Theory of Computation
Issue	Volume 3, Number 4 / 2012
Pages	355-370
DOI	10.3233/SW-2012-0065
Subject Group	Computer & Communication Sciences

Semantic Web

Interoperability
Usability
Applicability

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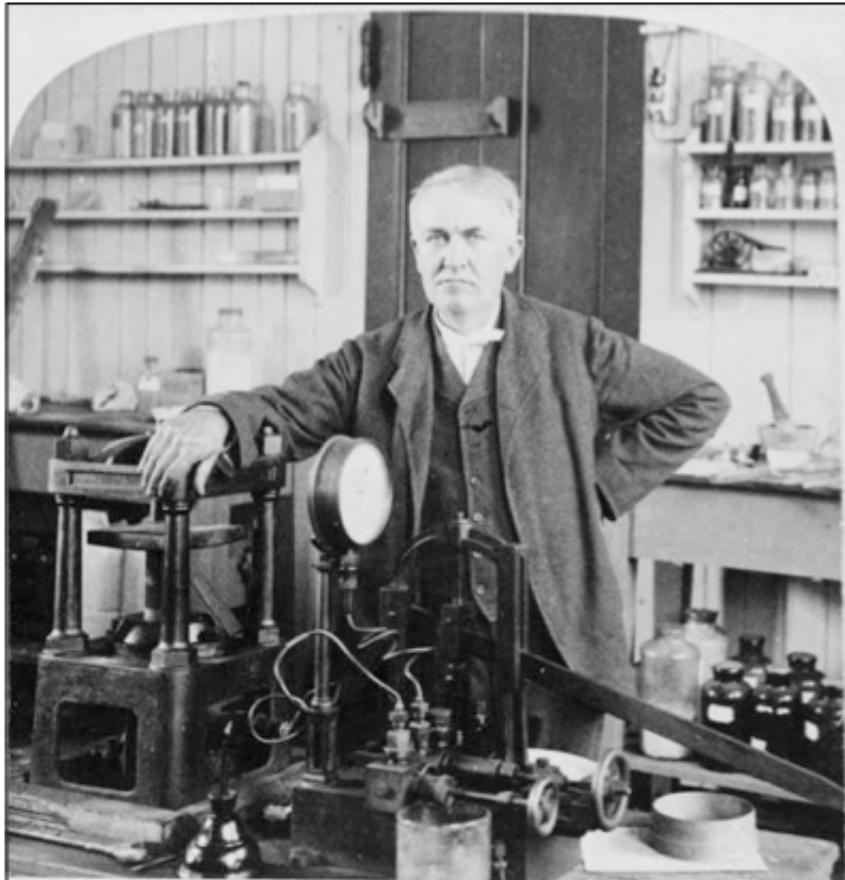
I have not failed, I've just found 10,000 ways that won't work.

Thomas Edison

OWS-8 CCI – Motivation Scenario
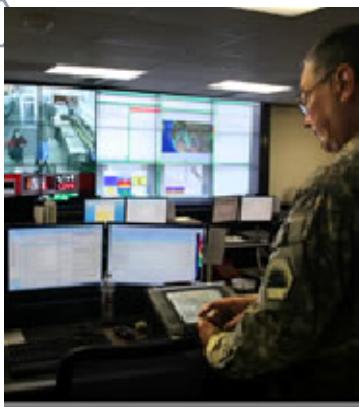
California National Guard

Monterey Airport Field operator

Prefers

Prefers

NGA model - Local Topographic Data Store (LTDS)

USGS model - The National Map (TNM)

Mediate

Data Source 1

Data Source 2

Data Source n

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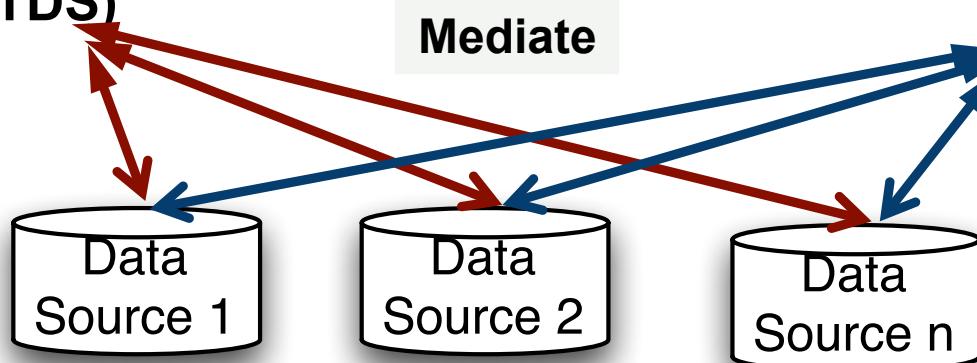
OWS-8 CCI Architecture

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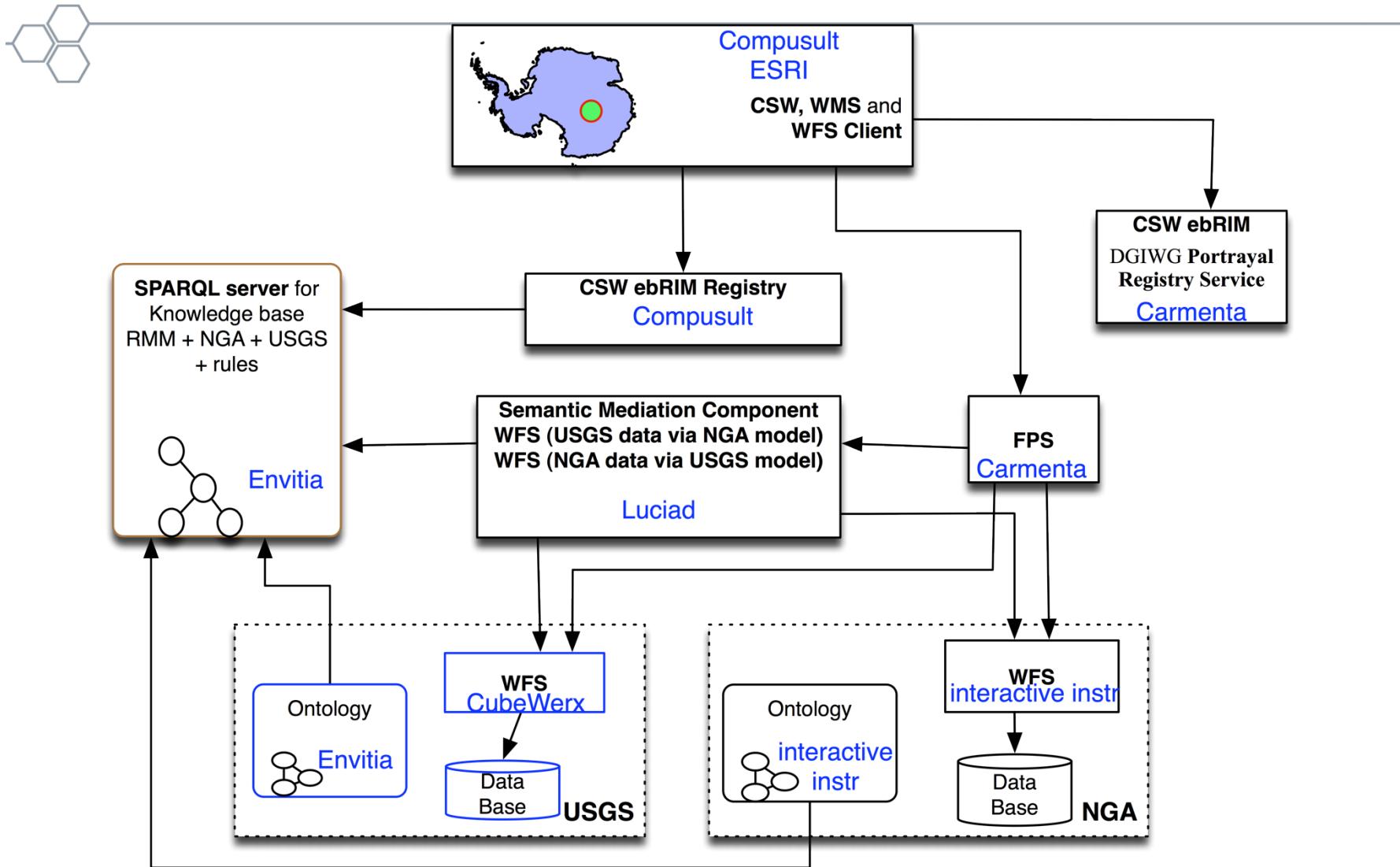
OWS-9 CCI Aviation Client

- Pilots terminology
  - Using **Air Transportation Information Ontology**
    - **Includes** Pilot Controller Glossary for the JPAMS project (air traffic control procedures)

PILOT/CONTROLLER GLOSSARY

PURPOSE

a. This Glossary was compiled to promote a common understanding of the terms used in the Air Traffic Control system. It includes those terms which are intended for pilot/controller communications. Those terms most frequently used in pilot/controller communications are printed in *bold italics*. The definitions are primarily defined in an operational sense applicable to both users and operators of the National Airspace System. Use of the Glossary will preclude any misunderstandings concerning the system's design, function, and purpose.

b. Because of the international nature of flying, terms used in the Lexicon, published by the International Civil Aviation Organization (ICAO), are included when they differ from FAA definitions. These terms are followed by "[ICAO]." For the reader's convenience, there are also cross references to related terms in other parts of the Glossary and to other documents, such as the Code of Federal Regulations (CFR) and the Aeronautical Information Manual (AIM).

c. This Glossary will be revised, as necessary, to maintain a common understanding of the system.

EXPLANATION OF CHANGES

a. Terms Added:
PROTECTED SEGMENT

b. Terms Deleted:
OMEGA

c. Editorial/format changes were made where necessary. Revision bars were not used due to the insignificant nature of the changes.

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AIXM features

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AIXM features

name	TextNameType
locationIndicatorICAO	CodeICAOType
designatorIATA	
type	
certifiedICAO	CodeYesNoType
privateUse	CodeYesNoType
controlType	CodeMilitaryOperationsType
fieldElevation	ValDistanceVerticalType
fieldElevationAccuracy	ValDistanceVerticalType

```xml
<aixm:name>QUEEN OF THE VALLEY HOSPITAL</aixm:name>
<aixm:type>HP</aixm:type>
<aixm:certifiedICAO>NO</aixm:certifiedICAO>
<aixm:privateUse>YES</aixm:privateUse>
<aixm:controlType>CIVIL</aixm:controlType>
<aixm:fieldElevation uom="FT">49</aixm:fieldElevation>
<aixm:windDirectionIndicator>YES</aixm:windDirectionIndicator>
<aixm:abandoned>NO</aixm:abandoned>
```

OWS-9 CCI Aviation Architecture

Pilots

Air Traffic Control

Pilot Controller Glossary

Client

Web Feature Service

AIXM Data (GML)

Web Processing Service

SPARQL Server
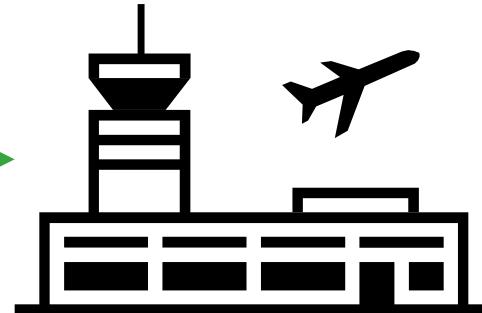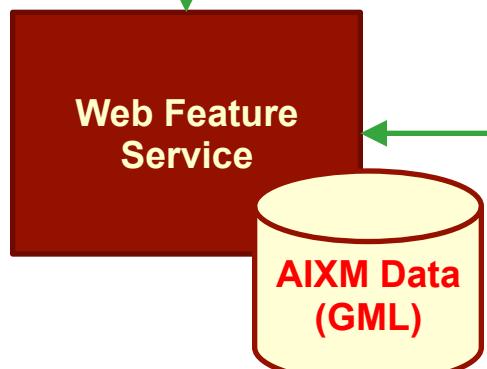
FAA Air Transportation Information Ontology mappings Glossary and AIXM

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OWS9 Geonames

CCI Geonames Demo

Map legend:

- ✈ GNIS Ariport
- ✈ GNS AIRF
- ⛰ GNS MT, MTS, HLL
- ⛰ GNIS Summit
- ⬠ GNS RNCH
- ⬠ GNIS Locale

Labeled features on map:

Mother Grundy Peak, White Mountain, Round Potrero Ranch, Hartley Hill, Hauser Mountain, Curro Ranch, Can, Potrero Peak, Little Tecate Peak, Potrero, El Cañón, Division, Tecate Peak, California, MEXICO, Rancho El Oasis, Tecate, Rancho Loma Linda, Tecate, Rancho El Cañón, Rancho Rosa de Castilla, Rancho San José San José, Rancho La Puerta, Tecate, Rincón Rincón, Santa Lucía, Rancho Las Auras, El Desierto, Rancho Santa Cruz, San Javier San Javier, La Joya, Los Conejos, San Vicente, Rancho Guadalupe, Rancho Alejandra, Rancho San Lorenzo, Granja El Gandul, Rancho Santa Teresa, Rancho El Rosario, Punta Lengua, Punta Lengua, Mina La Afortunada, Cañón Manteca, El Carrizo Carrizo, Rancho El Carrizo

Coordinates: 116°45'W, 116°40'W, 116°35'W, 116°30'W, 32°35'N, 32°30'N

Thank you

- Luis Bermudez lbermudez@opengeospatial.org

- Blog: Is OGC playing with LinkedData http://www.opengeospatial.org/blog/1673

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