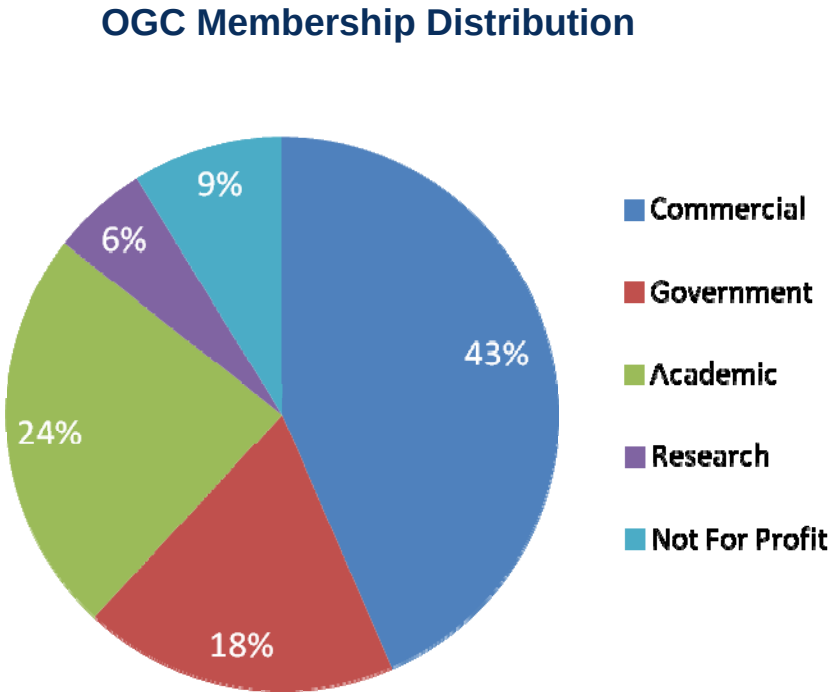
OGC OWS-9 Update

Nadine Alameh, Ph.D.
Director, Interoperability Programs
nalameh@opengeospatial.org

Luis Bermudez, Ph.D.
Director, Certification Programs
lbermudez@opengeospatial.org

OGC Snapshot

- A Voluntary Consensus Standards Organization, founded in 1994.
- 464 members
- 38 adopted standards
- Hundreds of product implementations
- Broad user community implementation worldwide
- Alliance partnerships with 30+ standards & professional orgs



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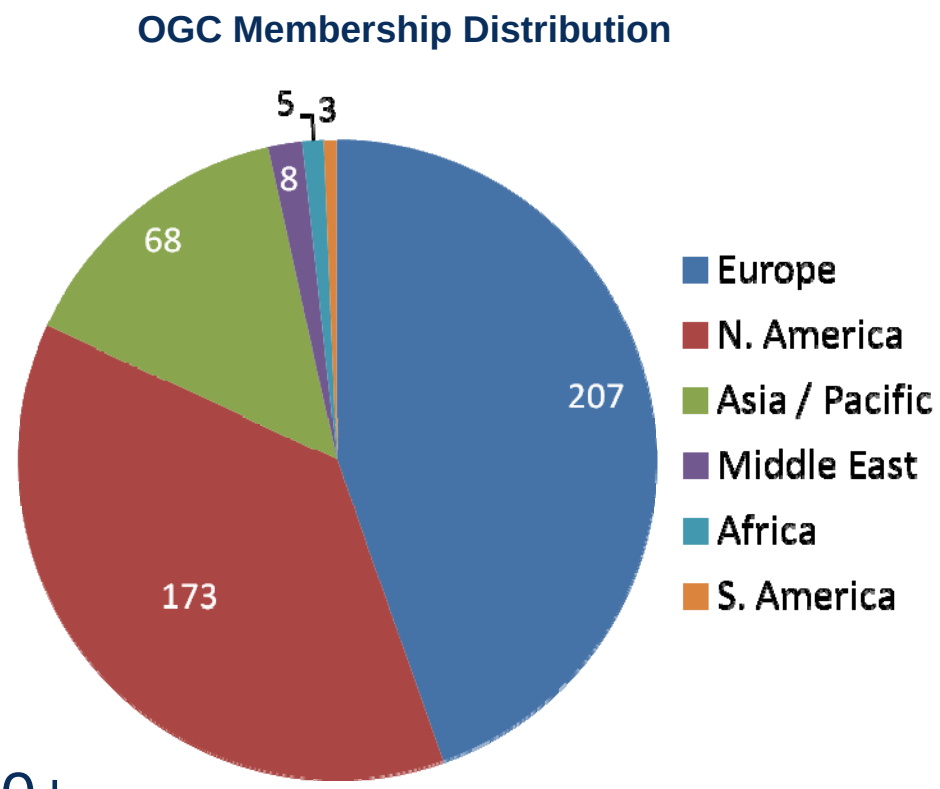

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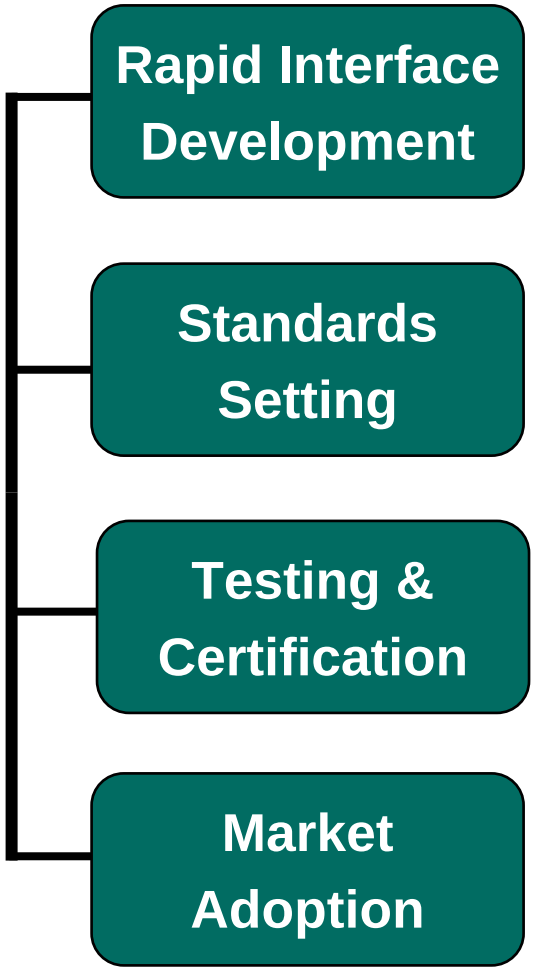
Standards are like parachutes...
...they work best when they're open.

OGC's Approach for Advancing Interoperability

- ***Interoperability Program*** **(IP)** - a global, innovative, hands-on rapid prototyping and testing program designed to unite users and industry in accelerating interface development and validation, and delivery of interoperability to market
- ***Specification Development Program*** – Consensus standards process similar to other Industry consortia (World Wide Web Consortium W3C, OMG etc.).
- ***Compliance Testing and Certification Program*** - allows organizations that implement an OGC standard to test their implementations with mandatory and optional elements of that standard
- ***Marketing and Communications Program*** – education and training, encourage take up of OGC specifications, business development, communications programs



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OWS-9 Master Schedule

Date	Milestone
22 February 2012	RFQ/CFP Issued
9 March 2012	Bidder's Clarification Telecon
19 March 2012	Clarifications session at TC
6 April 2012	RFQ responses Due
14-16 May 2012	Kickoff workshop (Fairfax, VA)
20 July 2012	Preliminary Design and Implementations
21 Dec 2012	Demonstrations and final deliverables
Jan 14-18 2013	**Demonstration event at OGC TC (Esri campus, CA)**

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OWS-9 Sponsors

National Geospatial-Intelligence Agency
Know the Earth... Show the Way... Understand the World

Federal Aviation Administration

EUROCONTROL

USGS
science for a changing world

US Army Corps of Engineers
Army Geospatial Center

NASA

[dstl]
Defence Science & Technology Laboratory

LOCKHEED MARTIN

CREAF
Centre for Ecological Research and Forestry Applications

GeoViQua

GeoConnections
Mapping the future together online

Natural Resources Canada
www.nrcan.gc.ca

OGC®
Making location count.

OWS-9 Participants

OWS-9 Activity Threads

NGA & LMCO

Security and Services Interoperability (SSI)

- Security Management
- UML-GML Schema Tools
- Web Services Façade
- Architecture Profiles
- Bulk Data Transfer

FAA & Eurocontrol

Aviation

- AIXM and WXXM
- Discover, Retrieve, Portray
- Geometry Processing
- Transmission to Aircraft
- Conceptual Mapping Tool

NGA

Compliance (CITE)

- WMS 1.3 Server
- WMS 1.3 Client
- WFS 2.0
- GML 3.2.1
- OWS Context 1.0
- SWE
- WCS–EO 1.0
- TEAM Engine

NGA, AGC, UK DSTL, FAA, USGS, GeoConnections NRCan, CREAF-GeoViqua-EC

Cross-Community Interoperability (CCI)

- Semantic mediation
- Query results delivery
- Data provenance & QA
- Single Point of Entry Global Gazetteer

NGA, NASA, UK DSTL, CREAF-GeoViqua-EC

OWS Innovations

- Geo Mobile Apps
- Web Mapping
- Coverage Access
- GPS Messages

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Aviation building on previous initiatives

2008	2009	2010	2011
OWS 6		OWS 7	FAA SAA Pilot / OWS 8

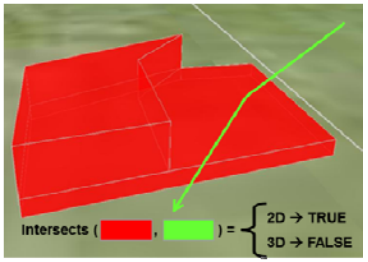
- Laying the foundation
  - AIXM over WFS
  - 4D trajectory filtering
  - Event Architecture
  - Digital NOTAMs
- Outcomes

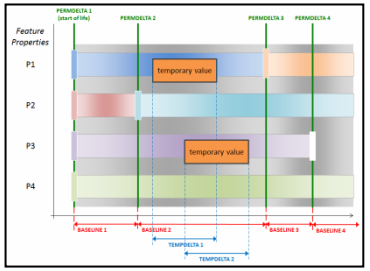
- Enable the federated disseminate SAA information
  - AIXM, WXXM, DNFS
  - Retrieval
  - Portrayal
  - Update
  - Weather
  - Notification tools
  - Access Control to AIXM
  - Update Notifications
- Outcomes:
  - SAA via OGC COTS
  - WFS 2.0 validation/refactoring
  - Aviation Clients
  - Event Service
  - SLD for WXXM guidance
  - Authoritative Data Source for AIXM
  - CRS to AIXM
  - Portrayal Event Architecture
  - CRS to WFS/FE
  - AIXM compression
  - SLD for ICAO

http://www.opengeospatial.org/domain/aviation

OWS-9 Aviation Thread Scope

- Advancing the Aviation Architecture
  - Advance interoperable data retrieval
  - Mature metadata use
  - Develop interoperable data transmission to aircraft management
  - Advance discovery interoperability
  - Advance interoperable styling and portrayal
  - Integrate geometry processing services
- Advancing system stability and compliance
  - Investigate system performance and endurance
  - Mature system conformance
- Advancing modeling support
  - Advance conceptual modeling and mapping tool support





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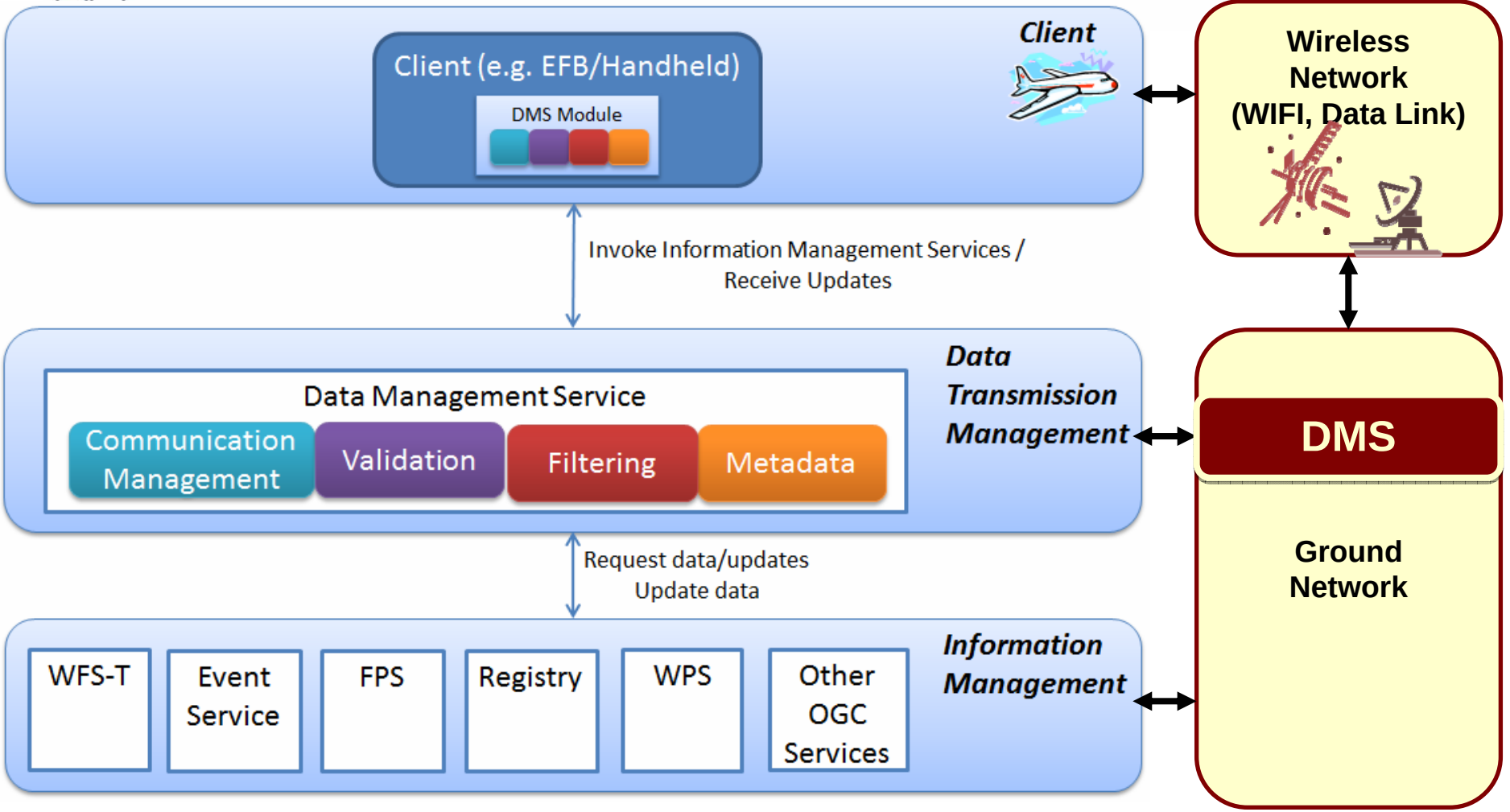
Develop interoperable data transmission to aircraft management



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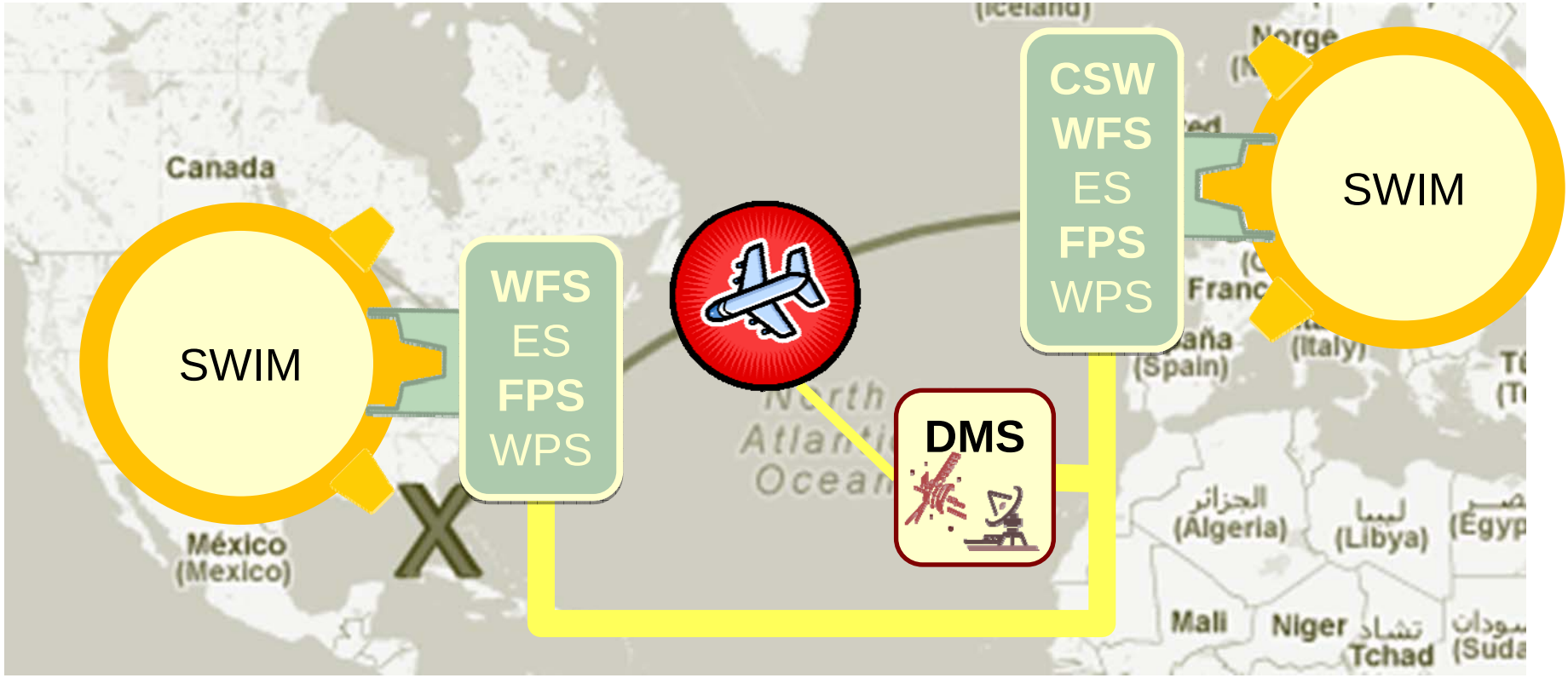
Leverage open standards
Maintain interoperability between clients and services

Scenario - Transition between SWIM environments



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Compliance in OWS-9

How do we know if these services are compliant ?

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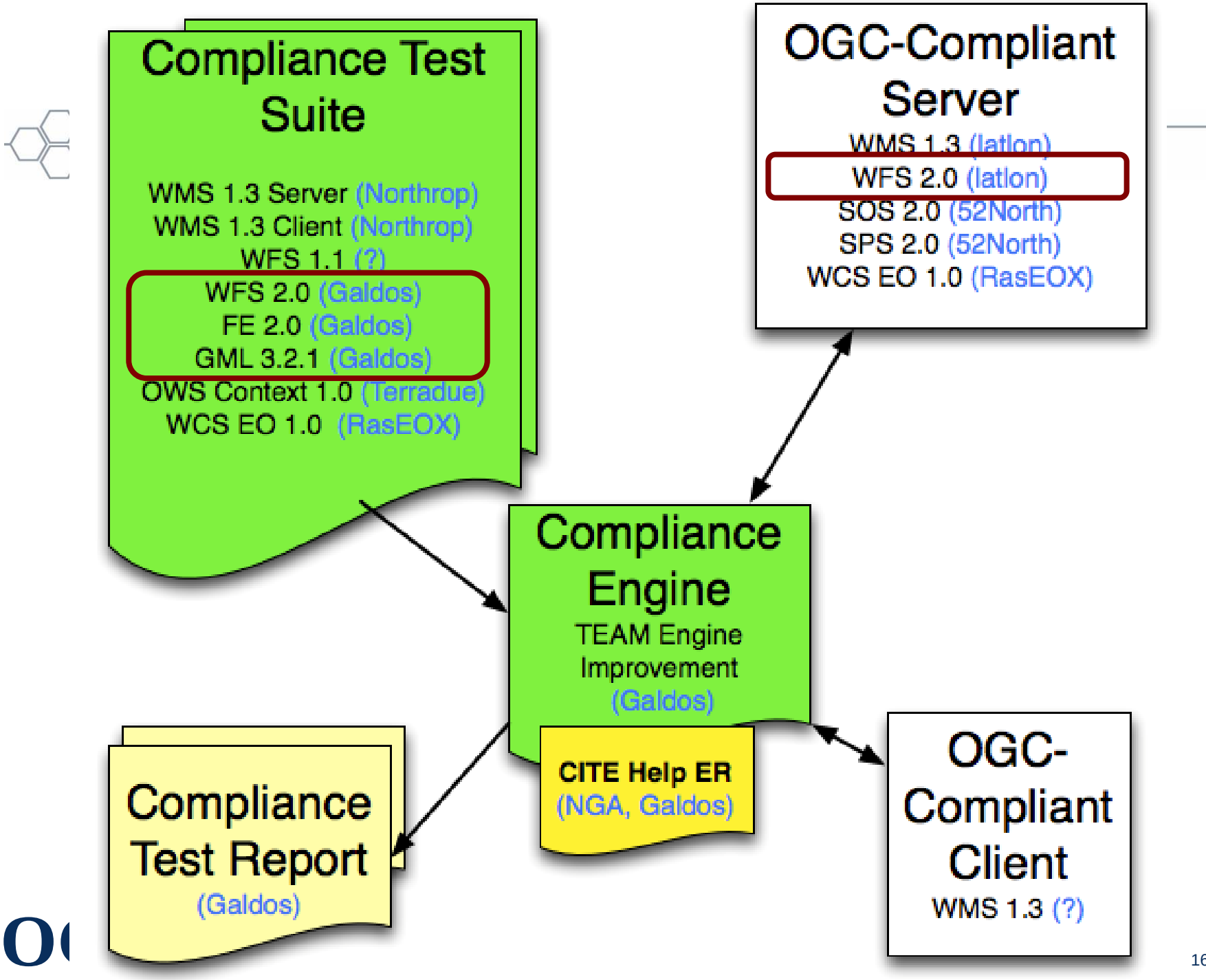

Compliance Test Suite
WMS 1.3 Server (Northrop)
WMS 1.3 Client (Northrop)
WFS 1.1 (?)
WFS 2.0 (Galdos)
FE 2.0 (Galdos)
GML 3.2.1 (Galdos)
OWS Context 1.0 (Terradue)
WCS EO 1.0 (RasEOX)
OGC-Compliant Server
WMS 1.3 (latlon)
WFS 2.0 (latlon)
SOS 2.0 (52North)
SPS 2.0 (52North)
WCS EO 1.0 (RasEOX)
Compliance Engine
TEAM Engine Improvement (Galdos)
CITE Help ER (NGA, Galdos)
Compliance Test Report
(Galdos)
OGC-Compliant Client
WMS 1.3 (?)

Security in OWS-9

- Reasons to focus on security for Geospatial data:

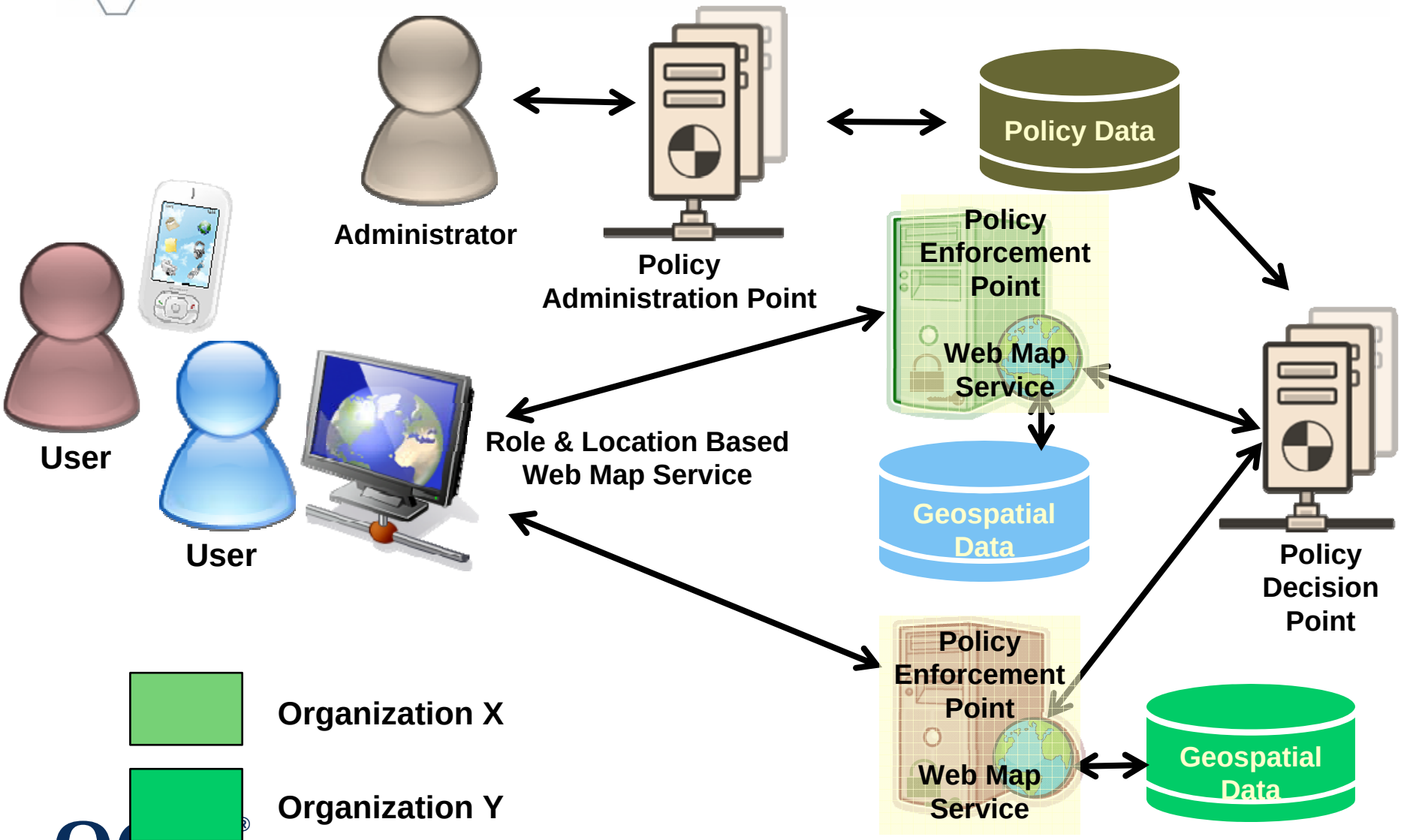
  – GeoXACML has been an OGC Standard since 2008

  – The inclusion of GeoXACML in the U.S. DoD IT Standards Registry as a mandated standard to handle:
    - Control access to location based services, data and applications
    - Exchange / harmonize application, data and services usage rights across jurisdictions based on the GeoXACML Policy Language
    - Declare flexible access rights based on the characteristics of the data

  – The need to secure geospatial on Mobile Devices

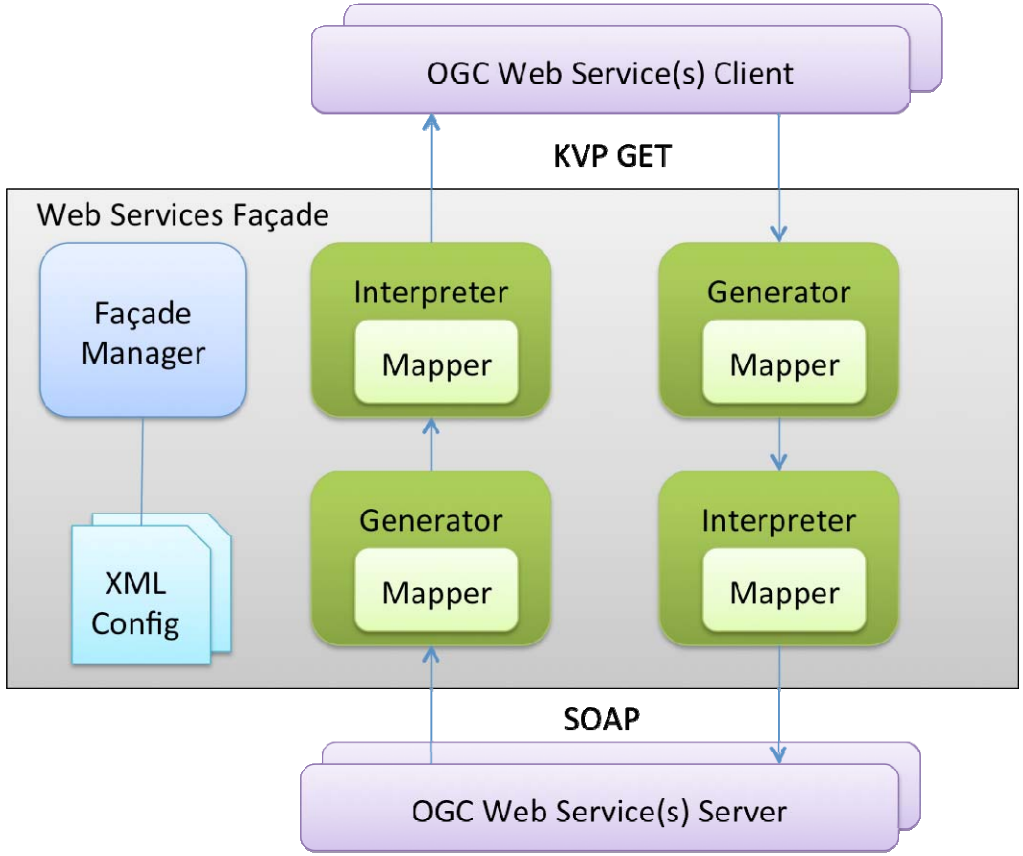
  – Exploring the filtering of services and feature data, filtering areas or shapefiles from a WMS

Security GeoXACML Federated Solution



Web Service Façade in OWS-9

- Provide a HTTP proxy service that translates between a client and server:
  - Convert incoming SOAP to REST
  - Forward REST request to a REST service
  - Interpret REST response to a SOAP response
  - Forward the interpreted SOAP response to request originator.



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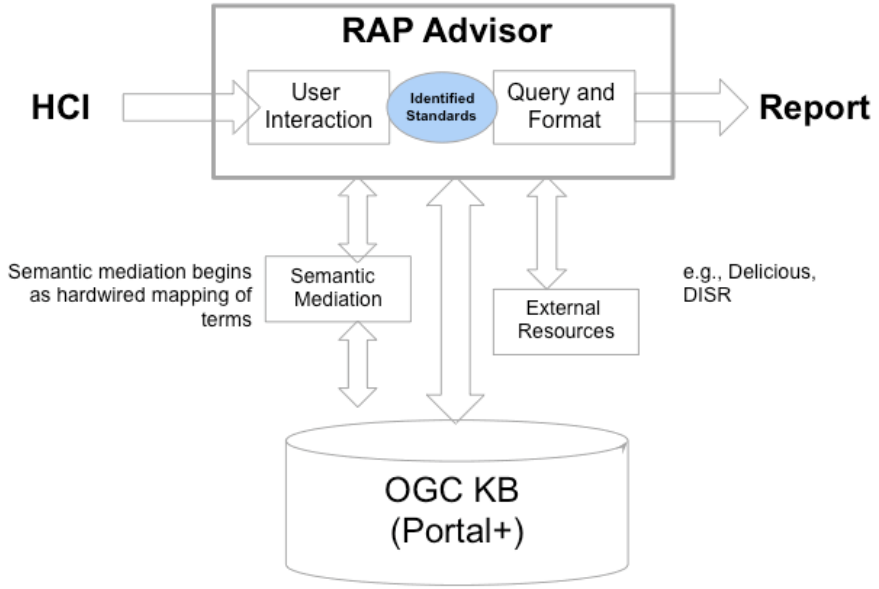
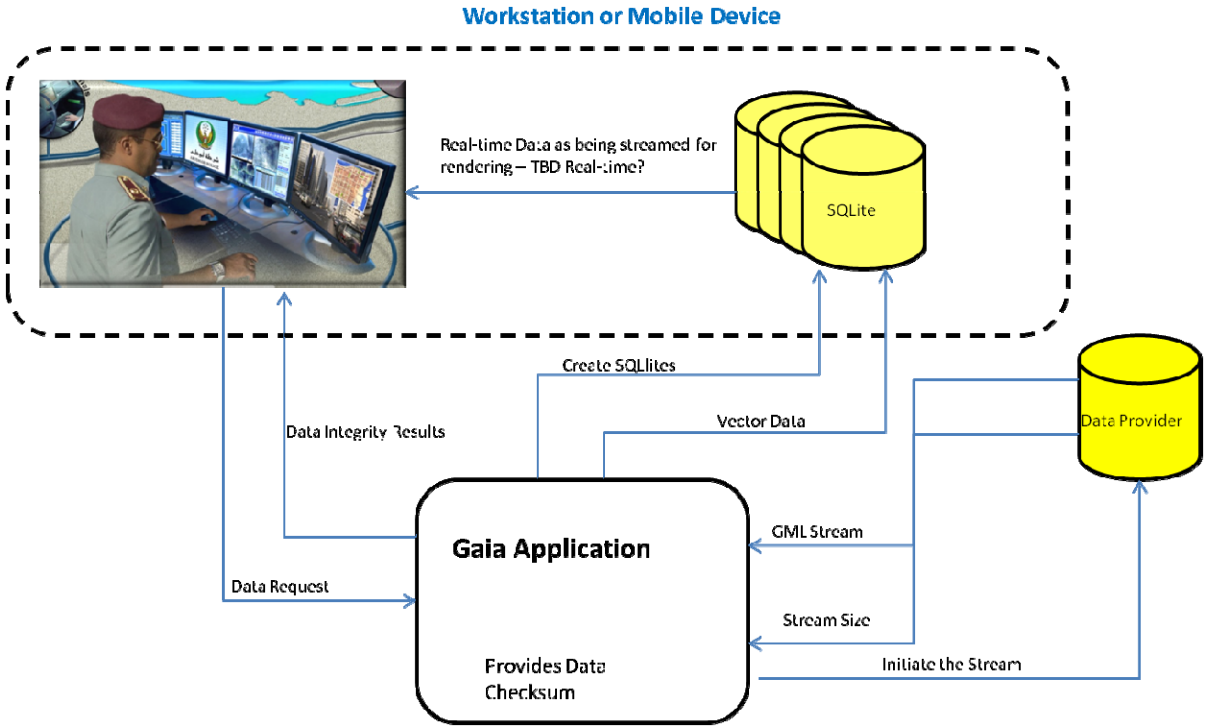
Reference Architecture Profiling in OWS-9

- Web based application that recommends OGC Standards and ORM Sections relevant to a system development;
  - such that a community of interest could derive and build a profile of suitable OGC standards to meet their specific needs.
- Functions
  - Web interface for a user to communicate the scope of their system development.
  - Identify relevant OGC Standards and ORM Sections.
  - Take into account any dependency between different standards.



Bulk Data Transfer & GML Streaming in OWS-9

- Focus on Bulk Data Transfer:
  - Investigating handling large payloads by 'GML' streaming for data Transportation.
  - Developing Data Provider and Data Client components for GML Streaming, data access and packaging
  - The potential use of SQLite/Spatialite to store the data for exploitation on the client side (including packaging data for Android mobile apps)



Vector Data GML Streaming Flow

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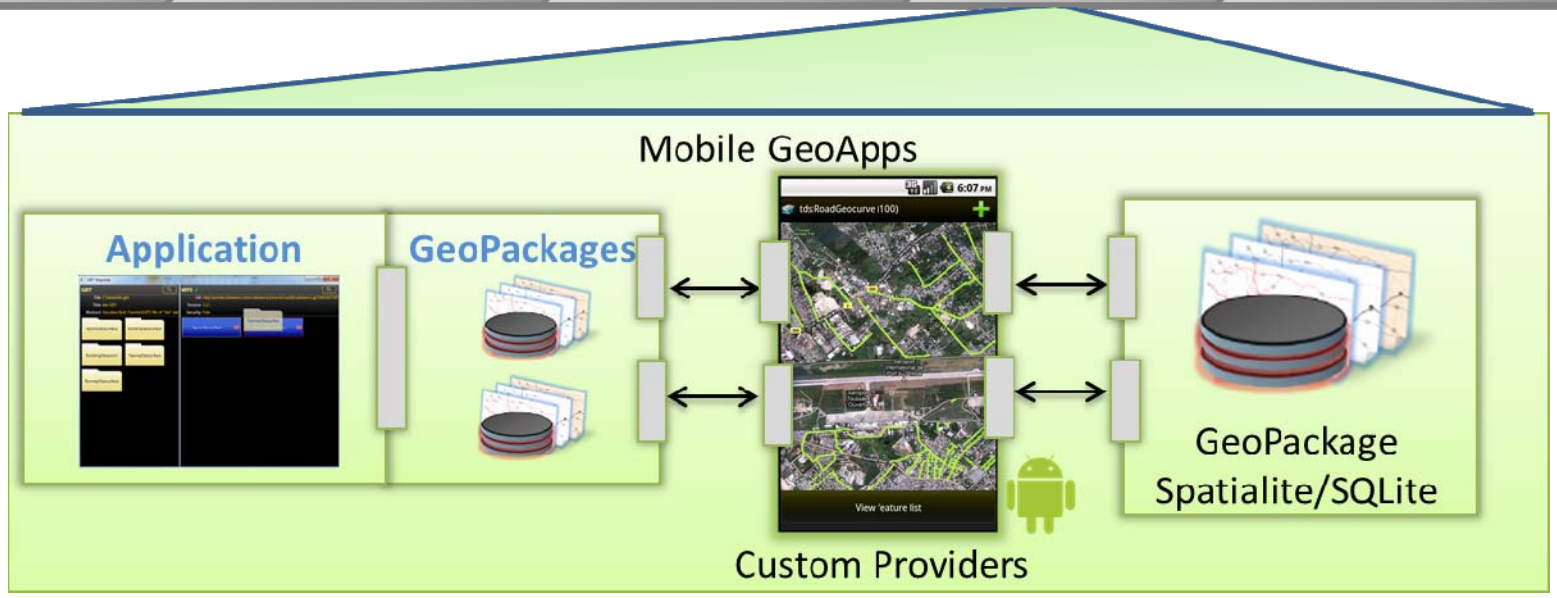
Mobile GeoApps



slide courtesy of The Carbon Project

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For More Information

Open Geospatial Consortium, Inc
www.opengeospatial.org

OGC on YouTube
http://www.youtube.com/user/ogcvideo

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nalameh@opengeospatial.org

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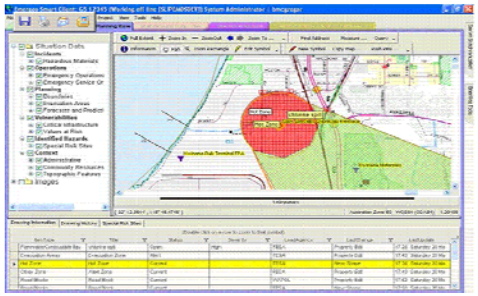
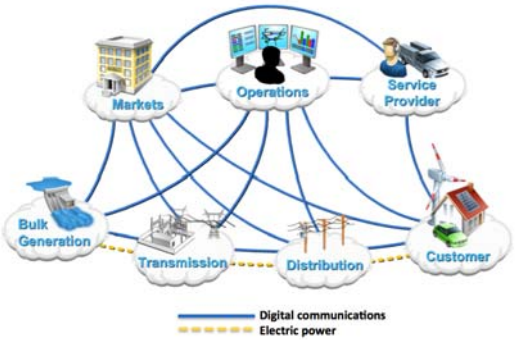
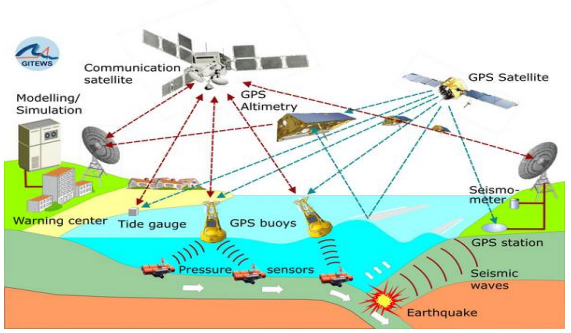
lbermudez@opengeospatial.org







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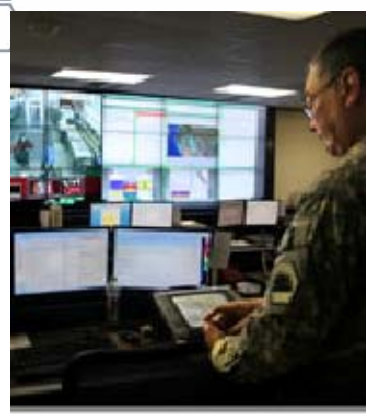
OGC Web Services Initiative 9

Cross Community Interoperability (CCI) Aviation Semantic Mediation

Luis Bermudez (OGC)
Gobe Hobona (Envitia)
Robin Houtmeyers (Luciad)

Silver Spring, MD Aug 29, 2012

OWS-8 CCI – Motivation Scenario



California National Guard

Prefers

NGA model - Local Topographic Data Store (LTDS)

Monterey Airport Field operator

Prefers

USGS model - The National Map (TNM)

Mediate

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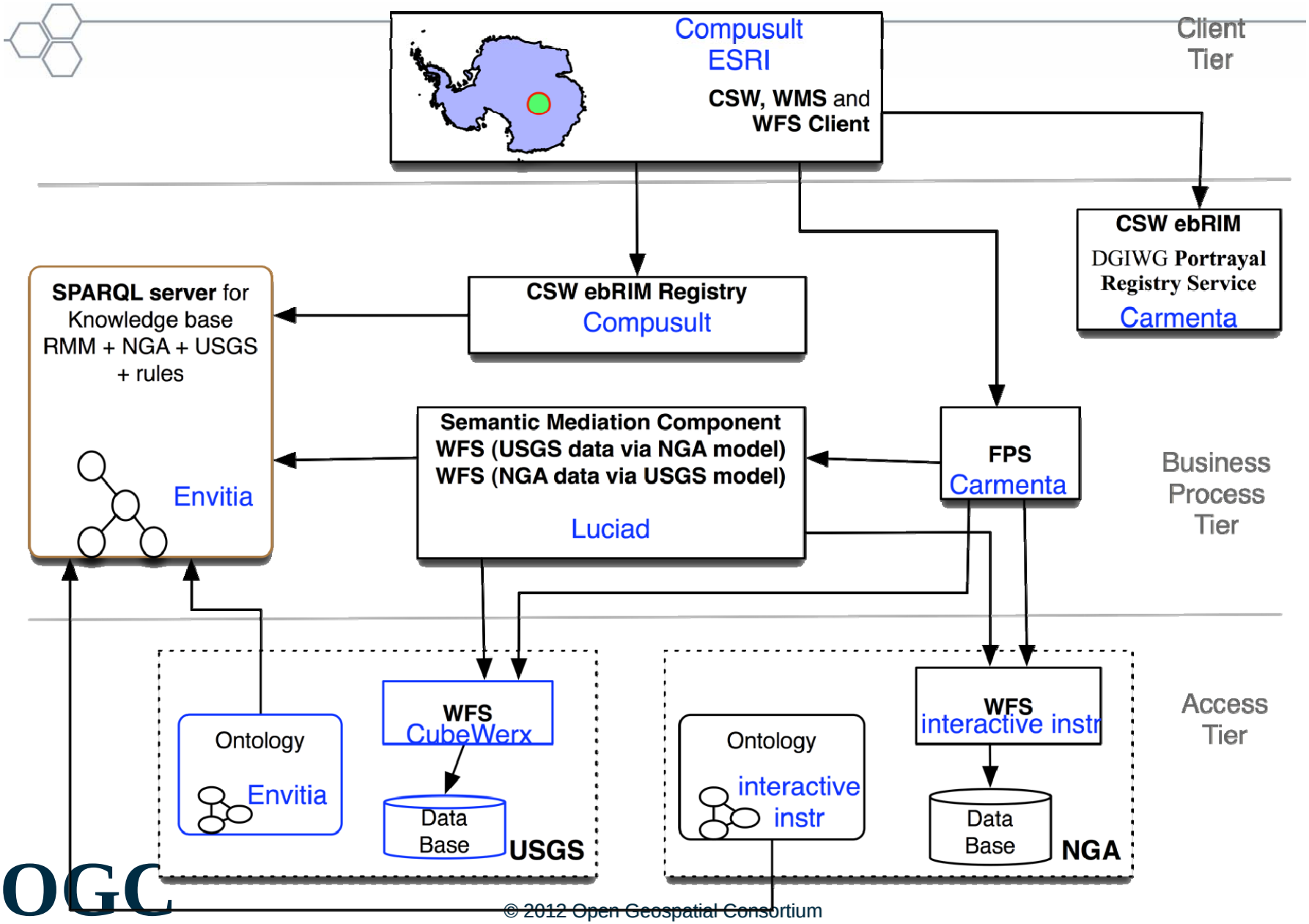
OWS-8 CCI Architecture



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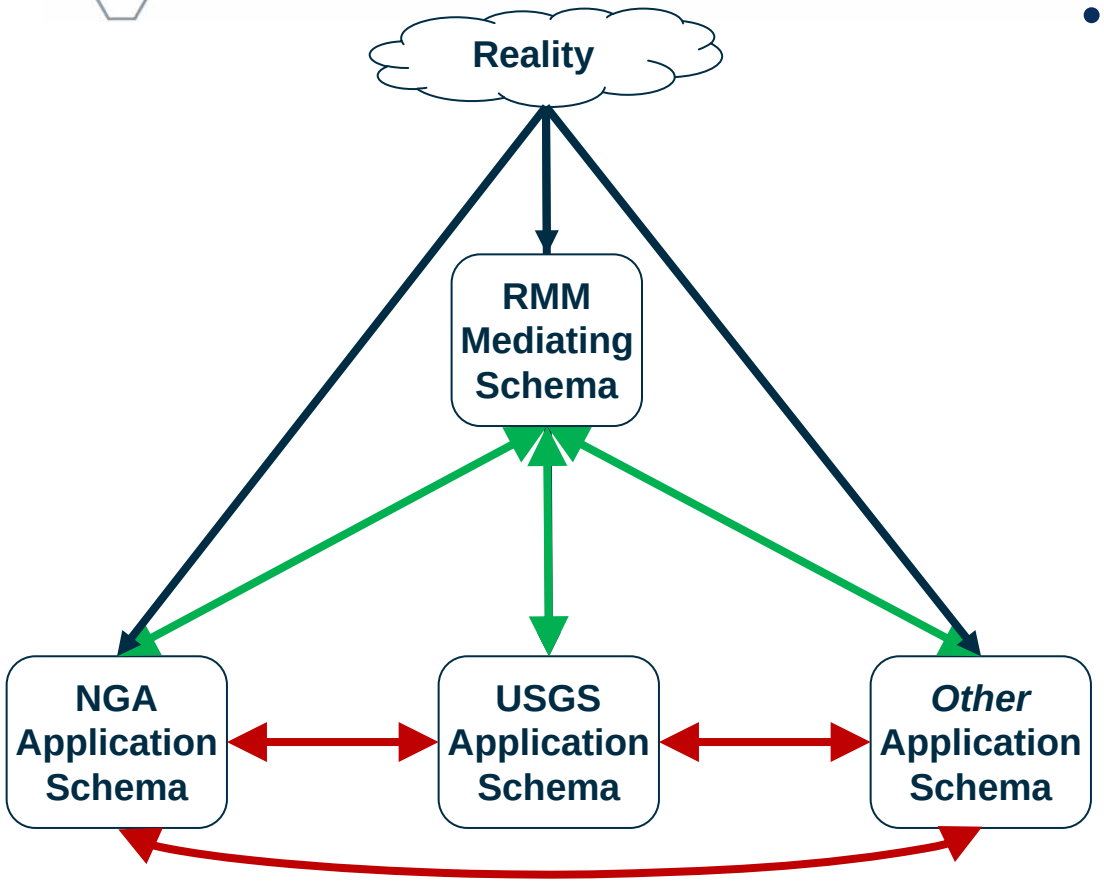
Ontologies Developed for CCI in OWS-8

- Ontology developed from NGA and USGS application schemas
- Ontology encoded in semantic web languages
  - Resource Description Framework (RDF)
  - Web Ontology Language (OWL)
  - Simple Knowledge Organisation System (SKOS)
- Ontologies published through a SPARQL server
  - Query interface for the RDF triples
- Mappings between NGA and USGS ontologies facilitated by a mediating ontology
  - Rosetta Mediation Model (RMM)

Mappings through the OWS-8 Mediation Model



- Rosetta Mediation Model (RMM)
  - Adopted surrogate model (RMM-S)
  - Equal to TDS but with different namespace
  - Consists of all TDS feature types
  - Extendable with TNM feature types not covered by TDS

Red: Without RMM-S
Green: With RMM-S

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OWS-9 CCI Aviation

- Challenge
  - Demonstrate the querying of Aviation data through user terminology from the Pilots' Glossary
- Semantic Mediation Requirements
  - Implement user friendly interfaces that are based on understood concepts (glossary)
  - Interface with web services based on OGC standards and offering data modelled on the Aeronautical Information Exchange Model (AIXM)
  - Experimental application of the FAA Air Transportation Information Ontology

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OWS-9 CCI Aviation Architecture

Pilots

Air Traffic Control

Client

Web Feature Service

AIXM Data (GML)

Web Processing Service

SPARQL Server

Ontology (RDF/OWL)

FAA Air Transportation Information Ontology

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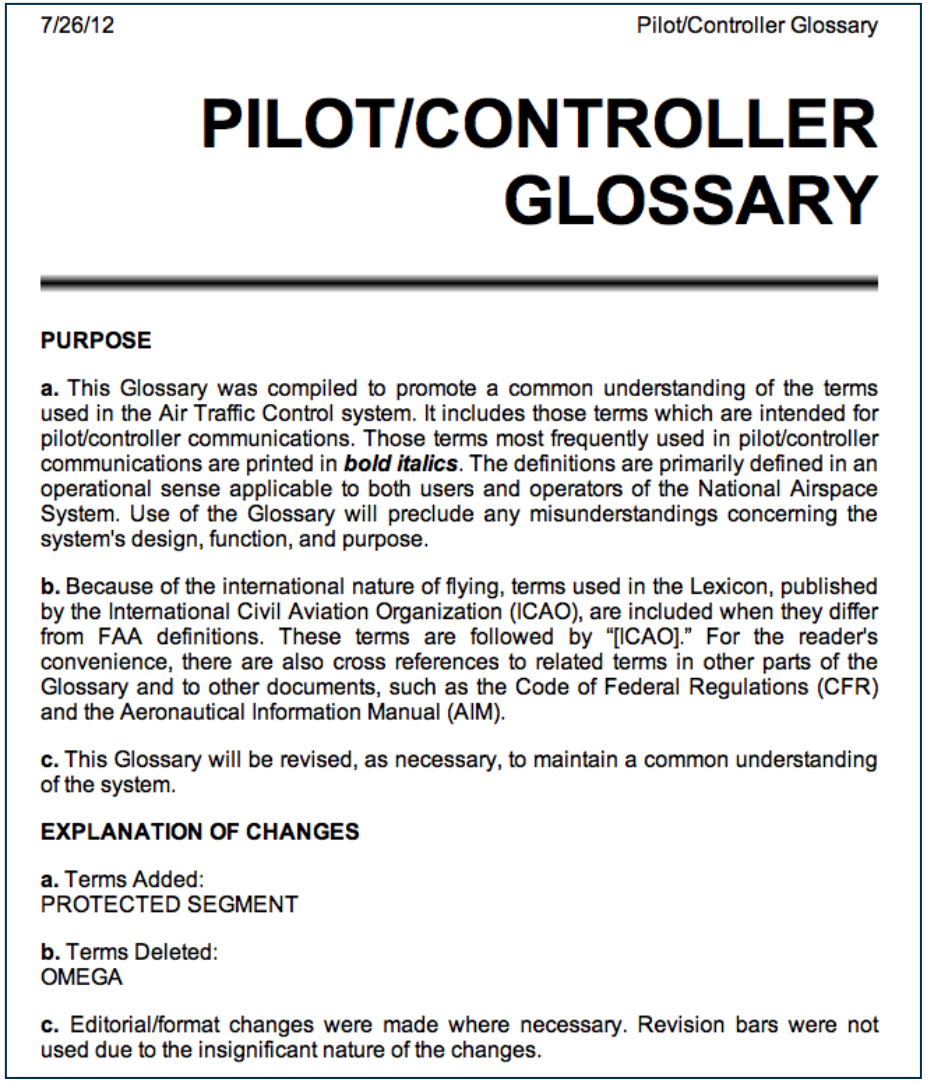
OWS-9 CCI Aviation Client

- Pilots terminology
  - Using **Air Transportation Information Ontology**

    Includes Pilot Controller Glossary for the JPAMS project (air traffic control procedures)



7/26/12 Pilot/Controller Glossary

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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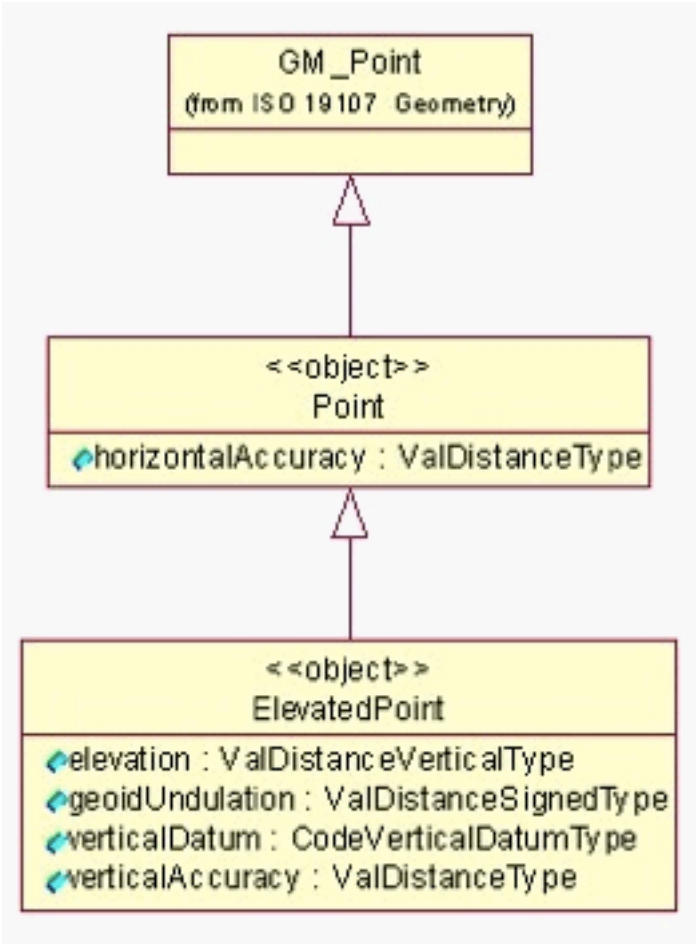
AIXM features



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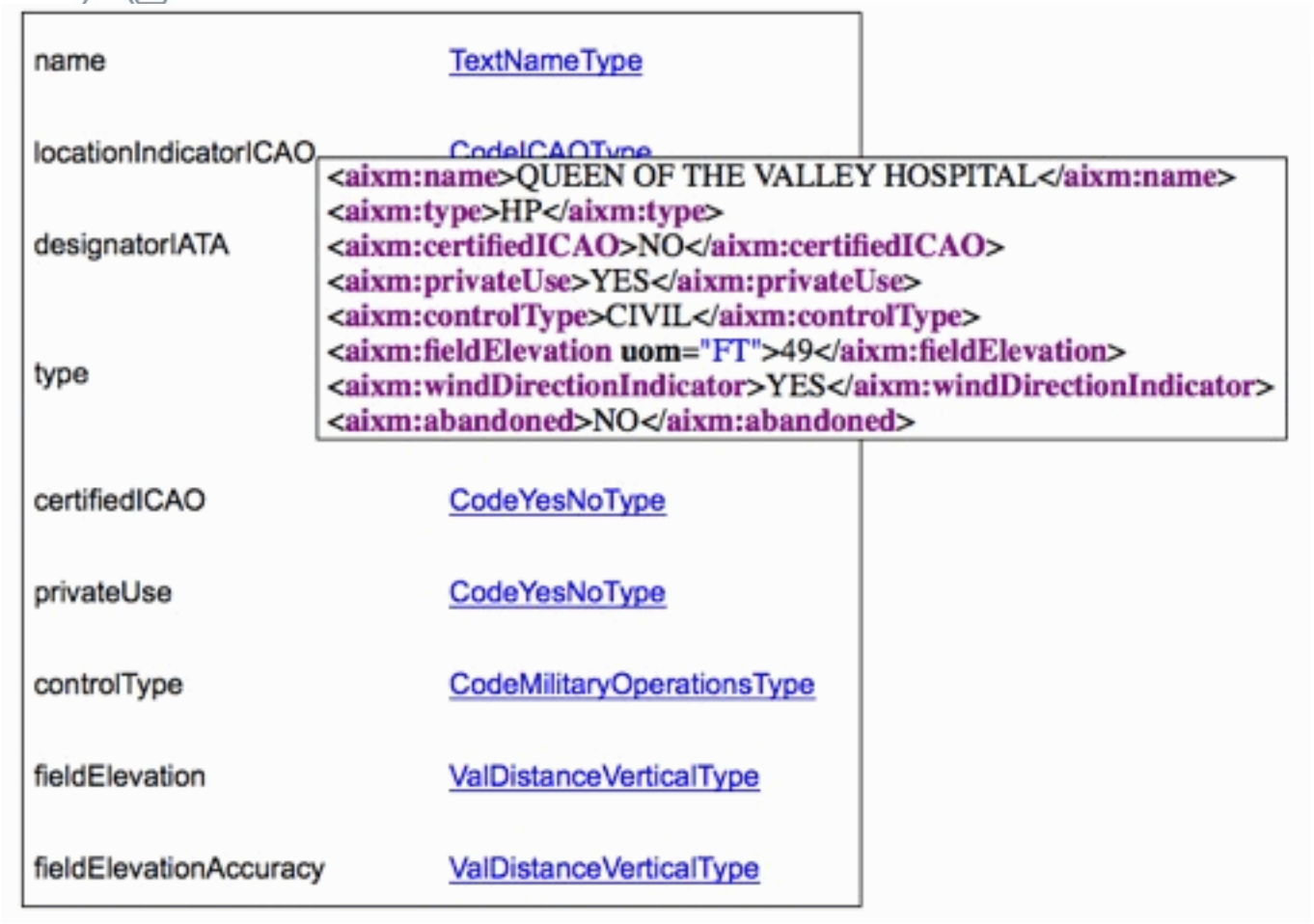
AIXM features



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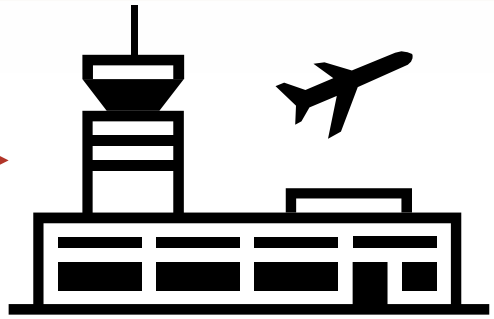
OWS-9 CCI Aviation Architecture

Pilots

Pilot Controller Glossary



Air Traffic Control

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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WPS SPARQL Server provides mappings

```
<wps:Execute service="WPS" version="1.0.0" xmlns:wps="http://www.opengis.net/wps/1.0.0"
xmlns:ows="http://www.opengis.net/ows/1.1" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.opengis.net/wps/1.0.0
 http://schemas.opengis.net/wps/1.0.0/wpsExecute_request.xsd">
 <ows:Identifier>com.envitia.ows9.cciaviation.CCIAviationProcess</ows:Identifier>
 <wps:DataInputs>
   <wps:Input>
     <ows:Identifier>query</ows:Identifier>
     <wps:Data>
       <wps:LiteralData>High Speed Taxiway</wps:LiteralData>
     </wps:Data>
   </wps:Input>
 </wps:DataInputs>
 <wps:ResponseForm>
   <wps:ResponseDocument storeExecuteResponse="false" lineage="false" status="false">
     <wps:Output>
       <ows:Identifier>result</ows:Identifier>
       <ows:Title>result</ows:Title>
       <ows:Abstract>result</ows:Abstract>
     </wps:Output>
   </wps:ResponseDocument>
 </wps:ResponseForm>
```

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WPS responds AIXM features from a WFS

```
<ns:ProcessOutputs>
   <ns:Output>
   <ns1:Identifier
   xmlns:ns1="http://www.opengis.net/ows/1.1">result</ns1:Identifier>
   <ns1:Title xmlns:ns1="http://www.opengis.net/ows/1.1">result</ns1:Title>
   <ns:Data>
      <ns:LiteralData dataType="xs:string">
         <![CDATA[

            http://demo.snowflakesoftware.com/AIXM51_WFS2/GOPublisherWFS?
            service=wfs&acceptversions=2.0.0&request=GetFeature&maxfeatures=10&
            typenames=aixm:TaxiwayElement#http://demo.snowflakesoftware.com/
            AIXM51_WFS2/GOPublisherWFS?service=wfs&acceptversions=2.0.0&request
            =GetFeature&maxfeatures=10&typenames=aixm:Taxiway
      ]]>
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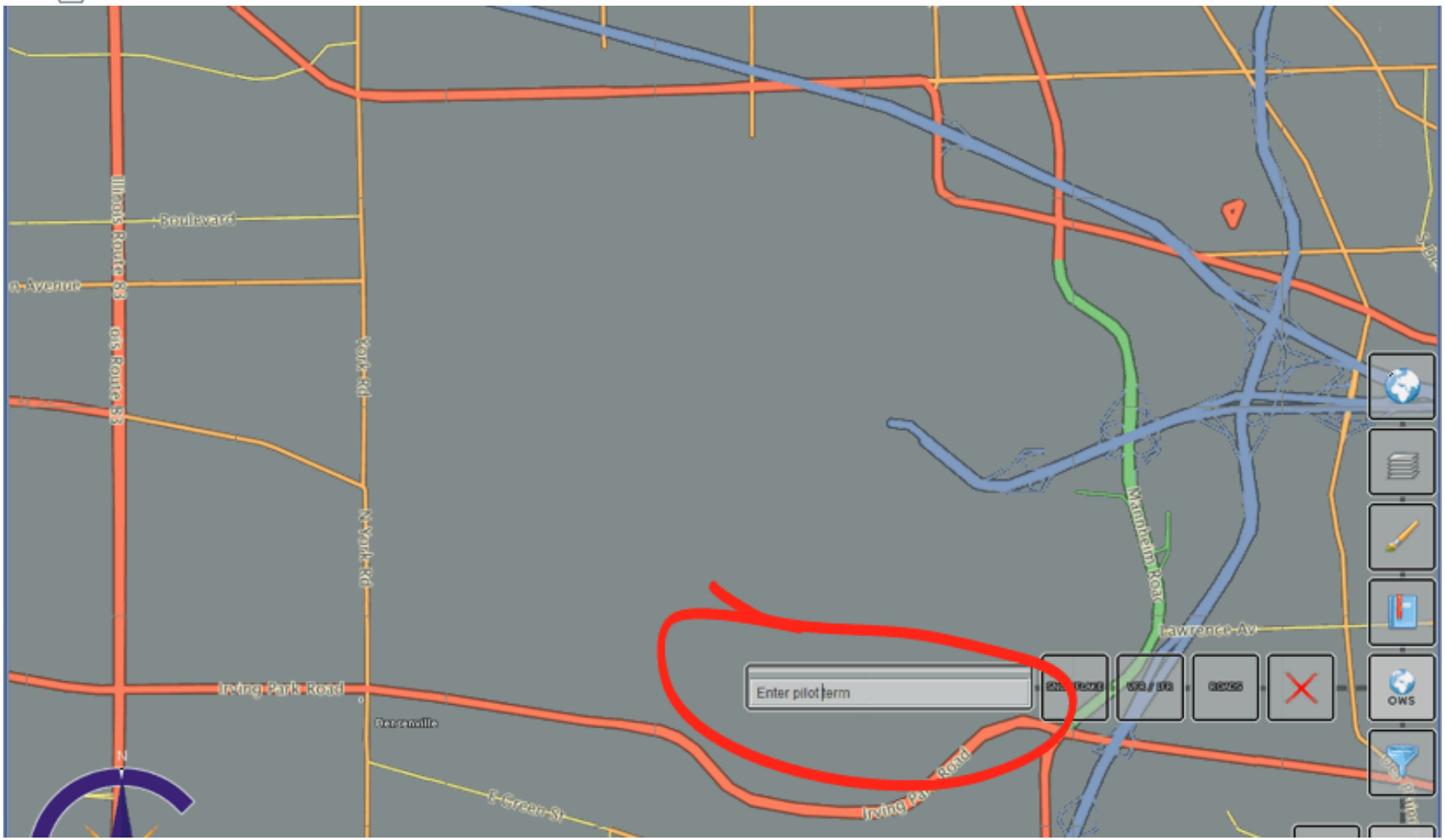
Luciad Aviation Client



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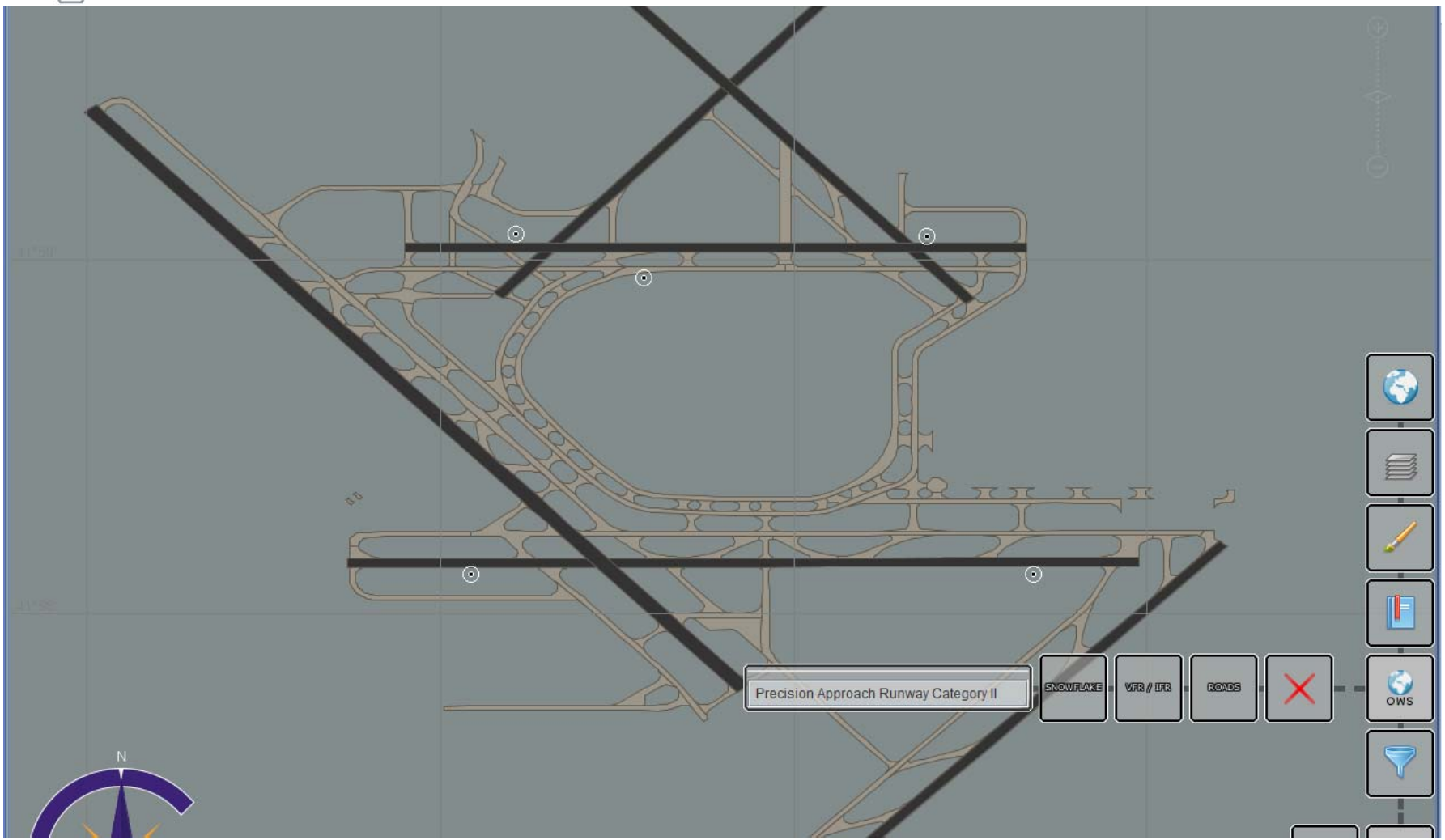

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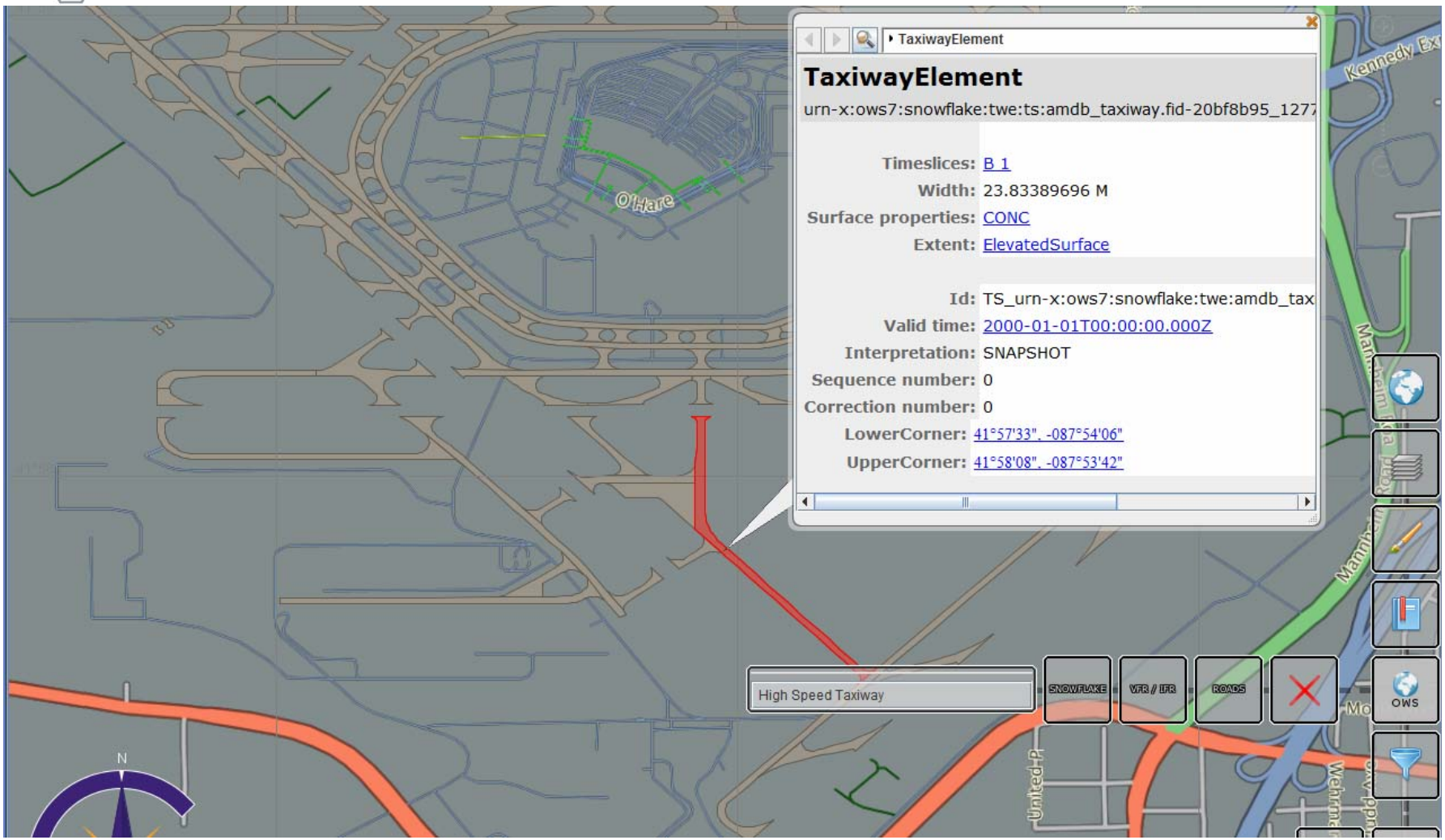

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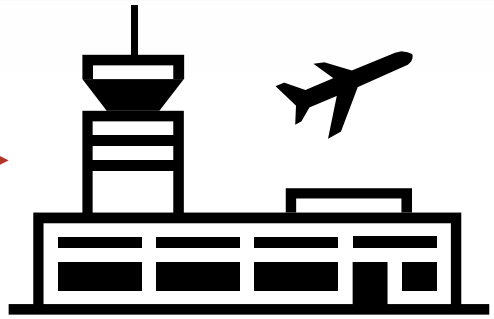
What if we want to plugin another terminology or service?

Pilots

Other terminology



Air Traffic Control

Client

Web Feature Service

AIXM Data (GML) + other source ?

Web Processing Service

SPARQL Server

Add ontologies and mappings to the SPARQL server

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Other semantic work in OGC

- Previous related IP activities
  - OGC Geospatial Semantic Web Interoperability Experiment
  - OGC Ocean Science Interoperability Experiment
  - OWS 8 and 9 Cross Community Interoperability Thread
- Standard Working Groups
  - GeoSPARQL
- Committees
  - An OGC Naming Authority Subcommittee

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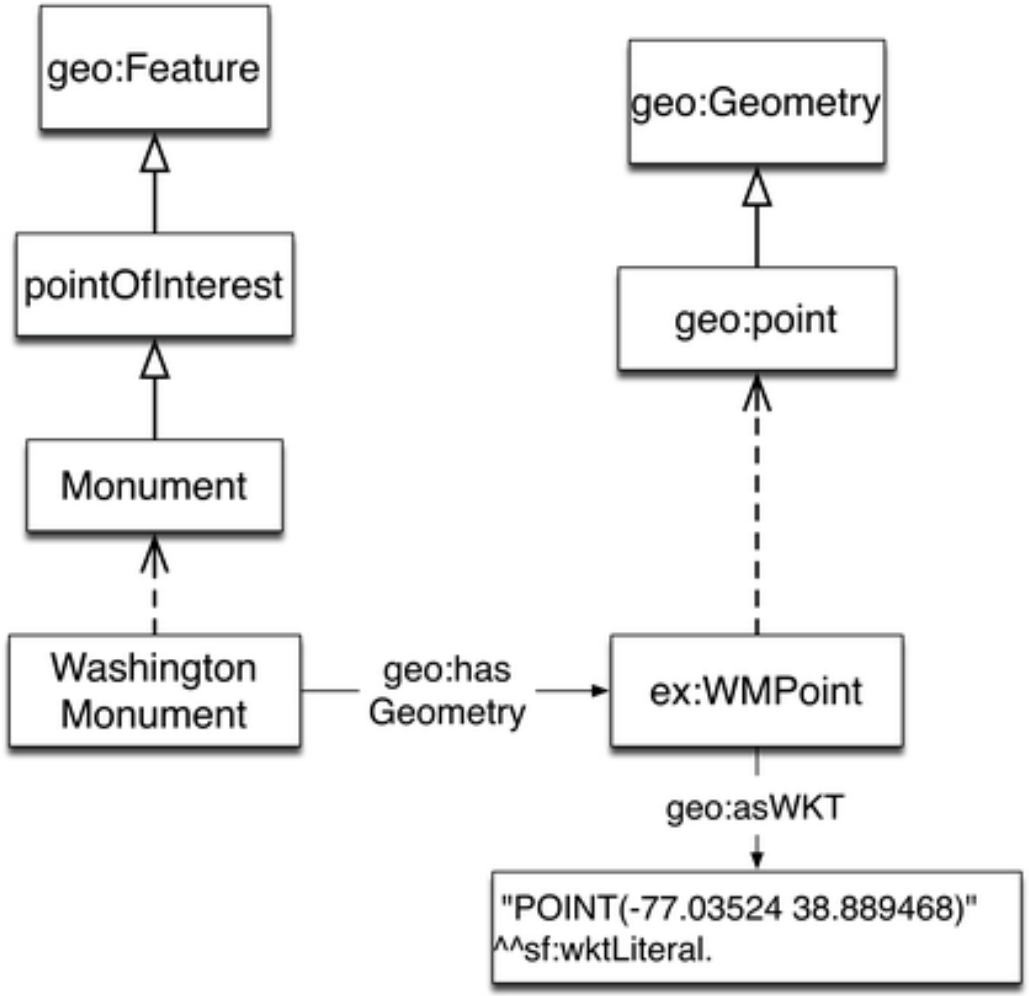
GeoSPARQL



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