



# **The Role of standards bodies in SDIs an insight to the OGC**

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# The OGC's Mission



To advance the development and use of international standards and supporting services that promote geospatial interoperability. To accomplish this mission, OGC serves as the global forum for the collaboration of geospatial data / solution providers and users.



# **What is it all about?**

**Use and Re-Use of location information**

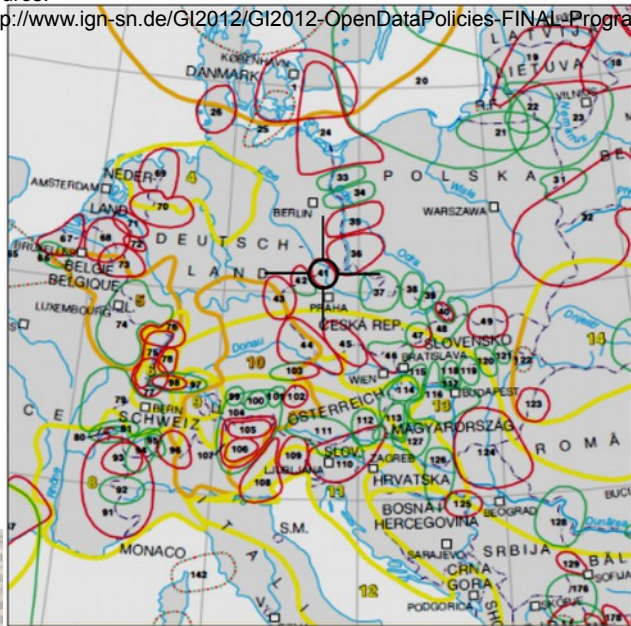
# Cross-Boundary Information Sharing



Continues to be one of our biggest challenges!

Source:

<http://www.ign-sn.de/GI2012/GI2012-OpenDataPolicies-FINAL-Programme-WEB.pdf>



Source:

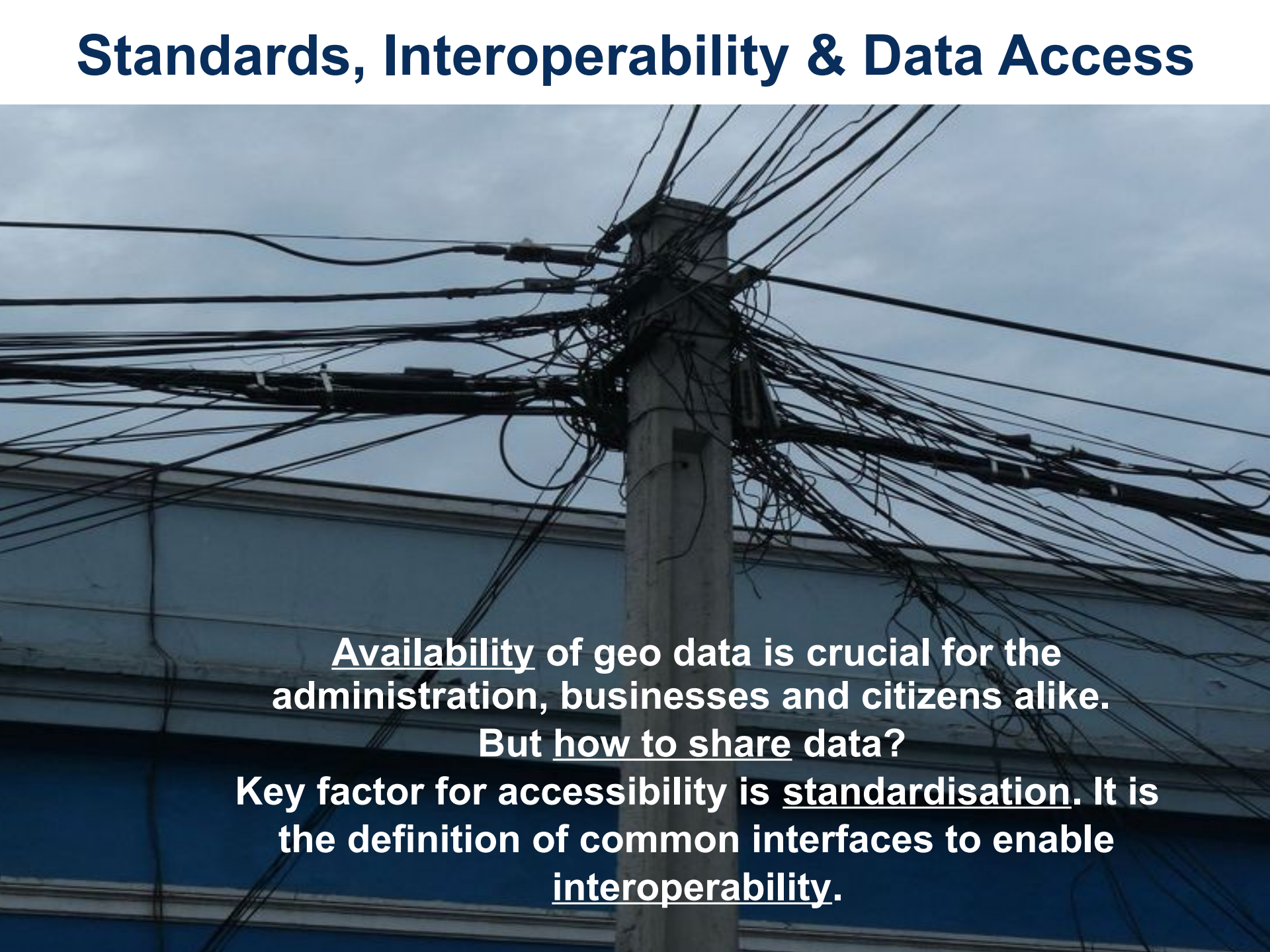
[http://de.wikipedia.org/w/index.php?title=Datei:Blaues\\_Wunder\\_Hochwasser\\_2002.JPG](http://de.wikipedia.org/w/index.php?title=Datei:Blaues_Wunder_Hochwasser_2002.JPG)



**The ability to access, fuse and apply diverse data sources is critical to situational awareness**



# Standards, Interoperability & Data Access



Availability of geo data is crucial for the administration, businesses and citizens alike.

But how to share data?

Key factor for accessibility is standardisation. It is the definition of common interfaces to enable interoperability.



# Some facts about the OGC



<http://www.youtube.com/ogcvideo>

→ more videos on OGC's Youtube Channel:  
<http://www.youtube.com/user/ogcvideo/videos>

# OGC at a glance (1)



- Founded in 1994, not for profit, consensus based and voluntary
- 515+ member organisations (industry, government, academia) (Oct 2015) <http://www.opengeospatial.org/ogc/members>

## **Finland (5)**

- City of Helsinki
- Finnish Meteorological Institute
- Geological Survey of Finland
- National Land Survey of Finland
- Vaisala

## **Poland (2)**

- Polish Association for Spatial Information
- Polish Geological Institute – National Research Institute

## **Sweden (7)**

- Carmenta AB
- Lantmäteriet
- Saab AB
- Spacemetric AB
- T-Kartor
- Trafikverket (Swedish Transportation Administration)
- Michael Östling

## **Norway (6)**

## **Denmark (4)**

# Example OGC Commercial Members

<http://www.opengeospatial.org/ogc/members>



**BAE SYSTEMS**

**DigitalGlobe**

**Google™**

**Trimble**

**ORACLE®**

**LOCKHEED MARTIN**

**INTERGRAPH**



**AIRBUS**  
DEFENCE & SPACE

**BENTLEY®**

**Pitney Bowes®**

**agi**  
Analysis software for land, sea, air, & space

**VENCORE**

**THALES**

**Spacemetric**

**ENVITIA**  
World Class Spatial Information Technologies

**AUTODESK**

**PCI**  
Geomatics

**Microsoft®**

**1Spatial**

**NAVTEQ™**

**LUCIAD**

**CGI**



**ROLTA**

**Raytheon**

**galdos**  
systems inc

**Skyline®**

**Snowflake**  
software

**HARRIS**

**wikitude**

**CubeWerx**  
Interoperable Services for the Geo-Spatial Web

**OGC®**

**Leica**  
Geosystems

**exactEarth**

Insurance Evolved

**FM Global**

**LIZARDTECH™**  
a celartem Company



# Examples Government Members

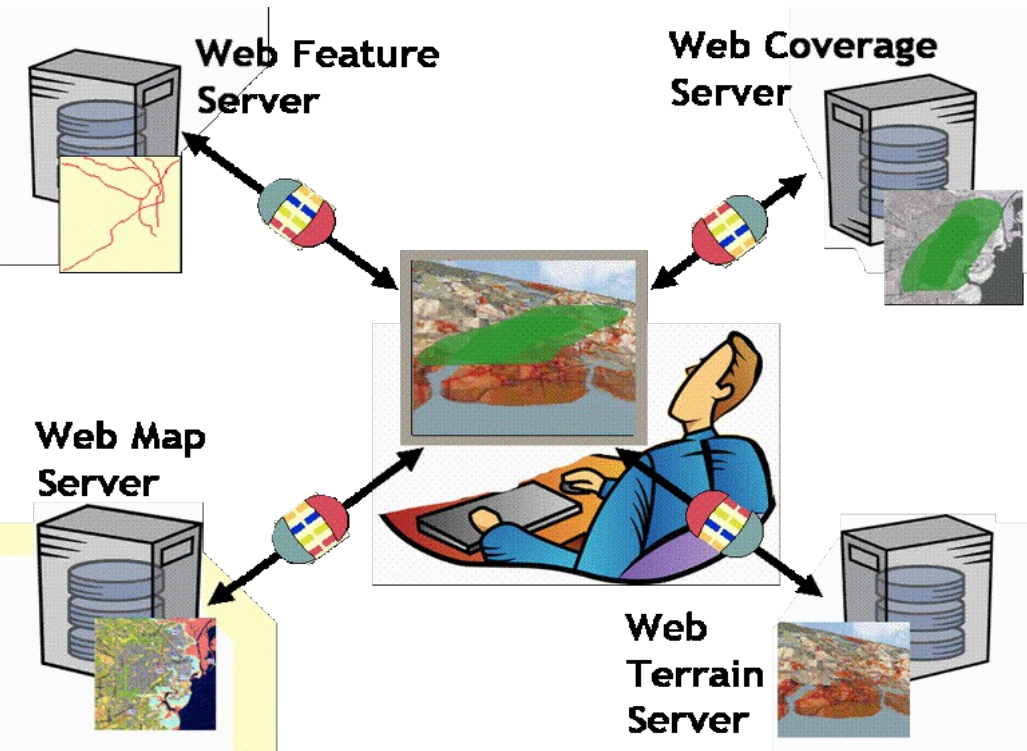


- Ordnance Survey (UK)
- BKG (D)
- Finish Land Survey
- IGN (FR)
- Danish Geodata Agency
- National Agency of Public Registry (Georgia)
- Survey & Land Registration Bureau (Bahrain)
- Natural Resources (CA)
- Ministerio Bienes Nacionales (Chile)
- Ministry of the Environment (FR)
- Cities (Helsinki, Straabourg, Vienna, Rotterdam, etc.)
- Norwegian Building Authority
- National Center for Statistics & Information (Oman)
- Geospatial Information Authority (Japan)
- General Commission for Survey (Saudi Arabia)
- DLR (Germany)
- NGA (USA)
- Nasa (USA)
- DGIWG (Nato)
- Geological Surveys (Poland, France, Finland, UK etc.)
- Meteorological Offices (Romania, D, UK, FR, Finland etc.)
- EUSC/SatCen (EU)
- EMSA (EU)
- EEA (EU)
- ESA – European Satellite Agency
- Eurocontrol
- United Nations

# OGC at a glance (2)



- 50+ adopted OGC Standards (some are ISO Standards)  
<http://www.opengeospatial.org/standards>
- Thousands of software products, implementing OGC Standards  
<http://www.opengeospatial.org/resource/products>



Just as `http://` is the dial tone of the World Wide Web, and `html / xml` are the standard encodings, the geospatial web is enabled by OGC standards.

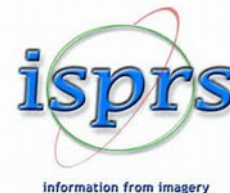
# OGC at a glance (3)



- Broad user community worldwide, many policy positions for National and International Spatial Data Infrastructures based on OGC standards



- Cooperation with other standards organisations and foundations, ISO/TC 211, OSGeo, W3C, OASIS and others  
<http://www.opengeospatial.org/ogc/alliancepartners>



# What is an OGC Standard?



A document, established by consensus and approved by the OGC Membership, that provides rules and guidelines, aimed at the optimum degree of interoperability in a given context.

Implementable in software

OGC standards are Open Standards

- Freely and publicly available
- No license fees
- Vendor neutral

**„What OGC brings to the table is everyone has confidence we won't take advantage of the format or change it in a way that will harm anyone.”**

Michael Weiss-Malik, Google KML product manager



# Why Open Standards?



**Prevents a single, self-interested party from controlling a standard**

**Lower systems and life cycle costs**

**Encourage market competition**

- Choose based on desired functionality
- Avoid “lock in” to a proprietary architecture

**„People want the government to be transparent, so why shouldn't the technology be?“**

**Jim Willis, Director of e-Government at the Rhode Island Secretary of State Office**

**Stimulates innovation beyond the standard by companies that seek to differentiate themselves.**

Source: Open Standards, Open Source, and Open Innovation: Harnessing the Benefits of Openness, April 2006. Committee For Economic Development. [www.ced.org](http://www.ced.org)

# OGC Activities Driven by Community Needs



## Education & Research



## Sustainable Development



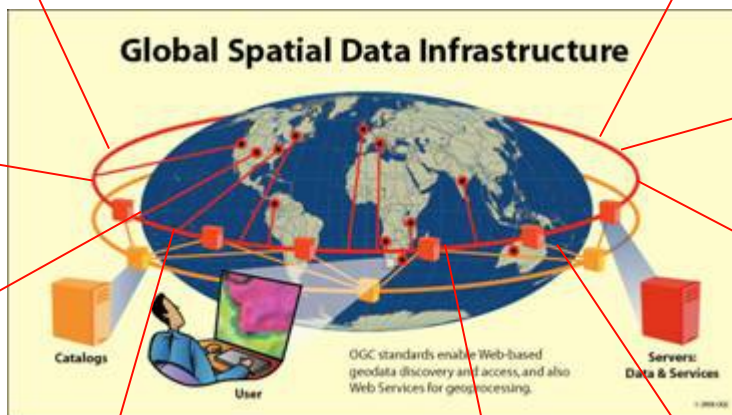
## Defence



## Health



## Emergency Services, Disaster Management



## E -Government



## Energy



## Consumer Services, Real Time Information



## Geosciences: land, sea, air information



-



# **OGC Programs**

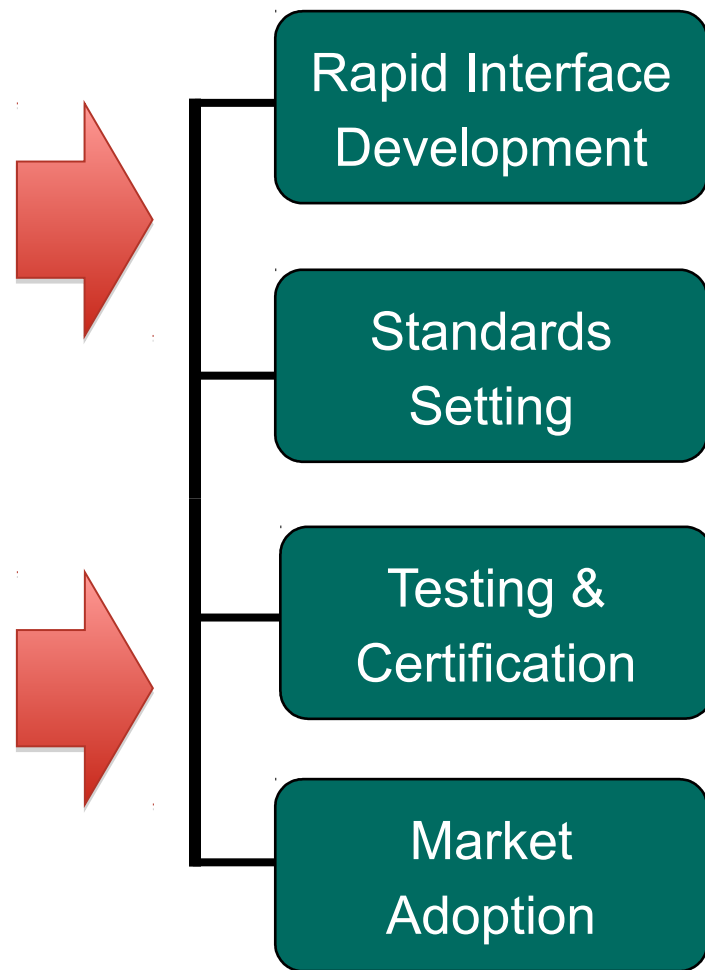
<http://www.opengeospatial.org/ogc/programs>



# Advancing Interoperability – OGC Approach



- **Interoperability Program (IP)** - a global, hands-on rapid prototyping and testing program making use of innovative processes. Designed to unite users and industry in accelerating interface development and validation, and the delivery of interoperability to the market.
- **Standards Program** – formalised, consensus standards development process similar to other Industry consortia and based on commonly agreed, structured and well defined processes.
- **Compliance Testing and Certification Program** - allows organizations that implement an OGC standard to test their implementations with the mandatory elements of that standard
- **Outreach and Communications Program** – education and training, encourage take up of OGC specifications, business development, communications programs



# OGC Standards Consensus Program

## Active Domain Working Groups in the OGC



- Aviation
- Hydrology
- Met & Ocean
- Energy & Utilities
- Emergency & Disaster Management
- Defense & Intelligence
- Earth Systems Science
- Data Quality
- Big Data
- University
- ... and more at <http://www.opengeospatial.org/projects/groups/wg>
- 3D Information Mgmt
- Geosemantics
- Health
- Agriculture
- Urban Planning
- Land & Infrastructure
- Mobile Location Services
- Point Clouds
- Sensors Web for IoT



# SP: Standards Working Groups

<http://www.opengeospatial.org/projects/groups/swg>

## Standards Working Groups

Standards Working Groups (SWG) have specific charter of working on a candidate standard prior to approval as an OGC standard or on making revisions to an existing OGC standard.

Name	Lead **
<a href="#">ARML 2.0 SWG</a> (ARML 2.0 SWG)	Martin Lechner, Wikitude GmbH.
<a href="#">Catalogue Services 3.0 SWG</a> (Cat 3.0 SWG)	Doug Nebert, US Geological Survey (USGS)
<a href="#">CF-NetCDF 1.0 SWG</a> (CF-NetCDF1.0SWG)	Ben Domenico, University Corporation for Atmospheric Research (UCAR)
<a href="#">CityGML SWG</a> (CityGML SWG)	Carsten Roensdorf, Ordnance Survey
<a href="#">ebRIM AP of CSW SWG</a> (ebRIM AP of CSW)	Frédéric Houbie, Intergraph Corporation
<a href="#">ebXML RegRep SWG</a> (ebXMLRegRepSWG)	Frédéric Houbie, Intergraph Corporation
<a href="#">GeoAPI 3.0 SWG</a> (GeoAPI 3.0 SWG)	Martin Desruisseaux, GEOMATYS
<a href="#">Geographic Linkage Service 1.0 SWG</a> (GLS 1.0 SWG)	Peter Schut, GeoConnections - Natural Resources Canada
<a href="#">GeoServices Rest SWG</a> (GServRestSWG)	Satish Sankaran, Esri
<a href="#">GeoSPARQL SWG</a> (GeoSPARQL SWG)	Carl Reed III, Open Geospatial Consortium, Inc.
<a href="#">GeoSynchronization 1.0 SWG</a> (Geosync SWG)	Panagiotis (Peter) A. Vretanos, City of York
<a href="#">GeoXACML SWG</a> (GeoXACML SWG)	Jan Herrmann, Technische Universität München, Dept. of Informatics
<a href="#">GML 3.3 SWG</a> (GML 3.3 SWG)	Clemens Portele, interactive instruments GmbH
<a href="#">GMLJP2 1.1 SWG</a> (GMLJP2-1.1SWG)	Lucio Colaiaicomo, European Union Satellite Centre
<a href="#">IndoorGML SWG</a> (IndoorGML SWG)	Ki-Joune Li, Pusan National University
<a href="#">KML 2.3 SWG</a> (KML SWG)	David Burggraf, Galdos Systems Inc.
<a href="#">O&amp;M 2.0 SWG</a> (OM 2.0 SWG)	Simon Cox, CSIRO
<a href="#">OLS 1.3 SWG</a> (OLS 1.3 SWG)	Carl Stephen Smyth, MAGIC Services Forum
<a href="#">Open GeoSMS SWG</a> (Open GeoSMS SWG)	Kuo-Yu Chuang, Industrial Technology Research Institute
<a href="#">Ordering Services for Earth Observation Products SWG</a> (order-eo1.0.swg)	Daniele Marchionni, European Space Agency (ESA)
<a href="#">OWS Common 1.2 SWG</a> (OWSCommon1.2SWG)	James Greenwood, SeiCorp, Inc.
<a href="#">OWS Context SWG</a> (OWScontextSWG)	David Wesloh, US National Geospatial-Intelligence Agency (NGA)

... work on  
candidate  
OGC  
standards  
prior to  
approval,  
make  
revisions to  
existing OGC  
standard.



# OGC Interoperability Program



<http://www.youtube.com/user/ogcvideo/videos>  
→ OGC Interoperability Program Introduction



# OGC Interoperability Program



- Innovation: agile development environment to rapidly develop, test, validate and demonstrate new standards based on real world use cases and under market conditions
- Collaboration: aligns technology users and providers to work collaboratively on identified user requirements
- Cost sharing: effective way to share costs of developing well-crafted standards
- Repeatable: process for building & exercising private-public partnership to drive global trends in technology and interoperability

# OGC Interoperability Program Focus

## Initiatives in Planning / Development



### Testbed Themes

- Aviation
- Earth Observation
- Urban Resilience
- Cross Community Interoperability (Semantics)
- Defense/Intelligence
- Emergency Management
- Big Data / Geoanalytics

### Pilots

- FutureCities (Spatial Standards Frameworks)
- Maritime Domain Awareness
- Emergency Management Messaging
- Arctic SDI
- Aviation
- Oil Spill Response
- Land Information Mgt

# IP Program – Players & Return on Invest



**OGC staff** manages the entire process with policies and procedures proven to produce results.

## **Sponsors**

- Contribute financial resources in support of an initiative
- Drive requirements, technical scope, agenda, demonstration form and content of an initiative

## **Participants**

- Contribute to the definition of interfaces, prototypical implementations and other engineering support
- Contribute in-kind funding

## **Return on Investment**

- for every one US\$ or € in sponsorship funding the testbeds have yielded between **2.5 and 4 times**
- Participants contribute more in in-kind resources (labor, software, etc) than is provided in Sponsor funding.



# OGC Compliance Program



Learn in 2 minutes why you need to get OGC Certification:



<http://www.opengeospatial.org/compliance>



# Implementations can get OGC Certified



The OGC  
compliant  
Mark

Related to a  
specific  
product and  
standard

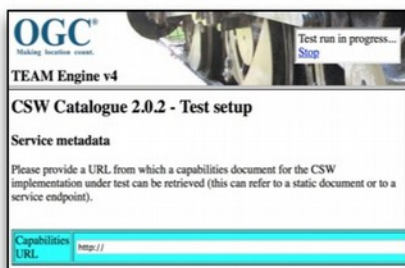


Granted to an  
organization as  
proof of proper  
implementation  
of an OGC  
Standard

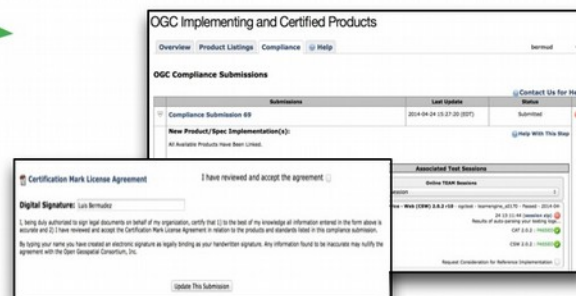
# How does it work?



1 Test in the OGC  
Free testing Facility



2 Apply for  
certification online



organizations  
Promote their  
certification

4 Product appears  
as compliant in  
the OGC database



3 Pay for use  
of license  
\$160 - \$11,200

# More information, help and questions



**Luis Bermudez**, Director Compliance Program

[lbermudez@opengeospatial.org](mailto:lbermudez@opengeospatial.org)

CITE Forum (any question about testing and tools, about 300 members)

Question about certification  
[compliance@opengeospatial.org](mailto:compliance@opengeospatial.org)



**Dr. Luis Bermudez**  
Executive Director Compliance Program



# INSPIRE & OGC

# OGC and INSPIRE <sup>(1)</sup>



- **Many OGC members are involved in the INSPIRE process and vice-versa**
- Memorandum of Understanding / Collaboration Agreement with the Joint Research Center (<http://www.opengeospatial.org/pressroom/pressreleases/2052>)
- Regular INSPIRE session during OGC Technical Committee meetings in Europe and closer relationship with the INSPIRE Maintenance and Implementation Group (planning and coordination with M. Lutz, JRC)
- OGC Market Report „Open Standards in INSPIRE“  
<http://www.opengeospatial.org/pressroom/marketreport/inspire>



# INSPIRE technical architecture



## INSPIRE Discovery service:

- OGC Catalogue Service for the Web (CSW)
- Query language: OGC Filter Encoding

## INSPIRE View service:

- ISO 19128 : WMS (Web Map Service) 1.3 (extensions)

## INSPIRE Download service:

- Pre-defined data sets => standard Internet protocols (like FTP)
- Direct access data with queries
- Web Feature Service: OGC WFS / ISO 19142
- Filter Encoding: OGC Filter Encoding / ISO 19143

## INSPIRE Coordinate Transformation service:

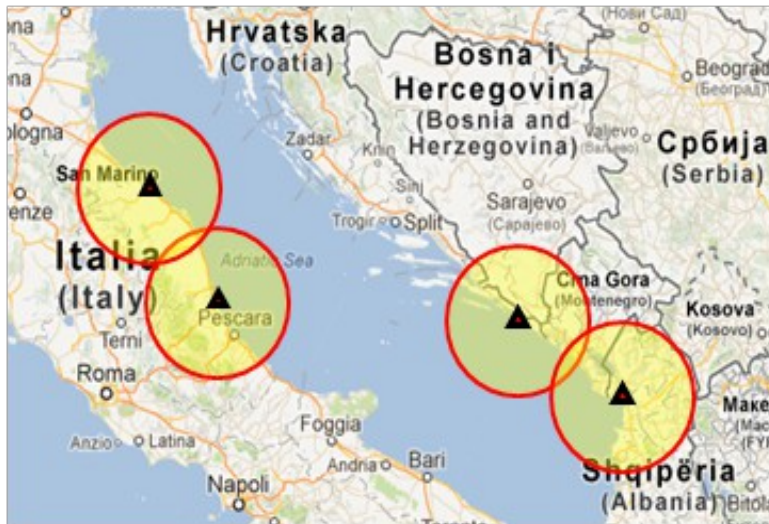
- An Application Profile of the Web Processing service (WPS) based on the Web Coordinate Transformation Service (WCTS)

<http://www.opengeospatial.org/pressroom/marketreport/inspire>  
“Open Standards in INSPIRE”  
OGC Market Report

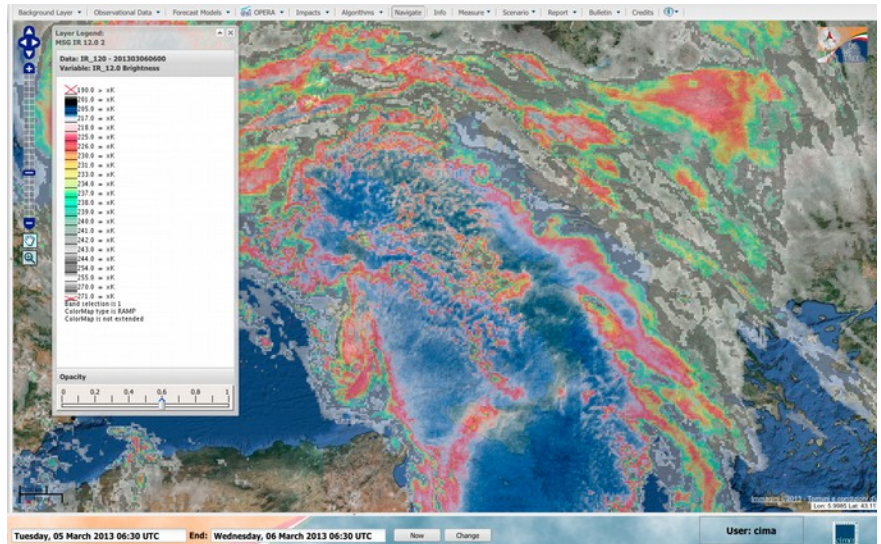
# Example ADRIARadNet (1)

„ADRIatic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision“

## Radar-based products



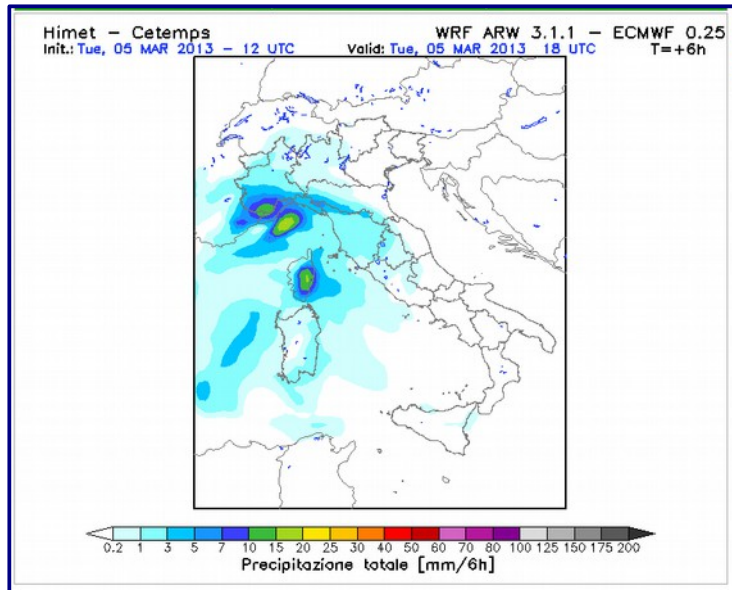
## Satellite products



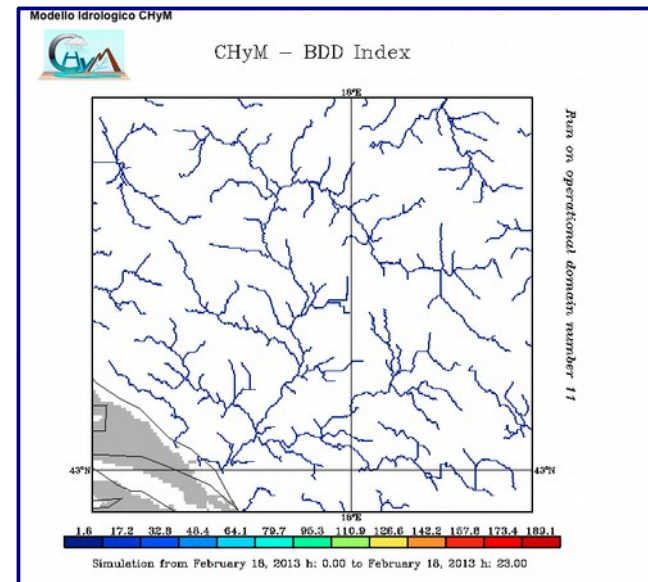
# Example ADRIARadNet (2)

„ADRIatic integrated RADar-based and web-oriented information processing system NETwork to support hydro-meteorological monitoring and civil protection decision“

## Meteo-forecasting model



## Hydro/Meteorological Model



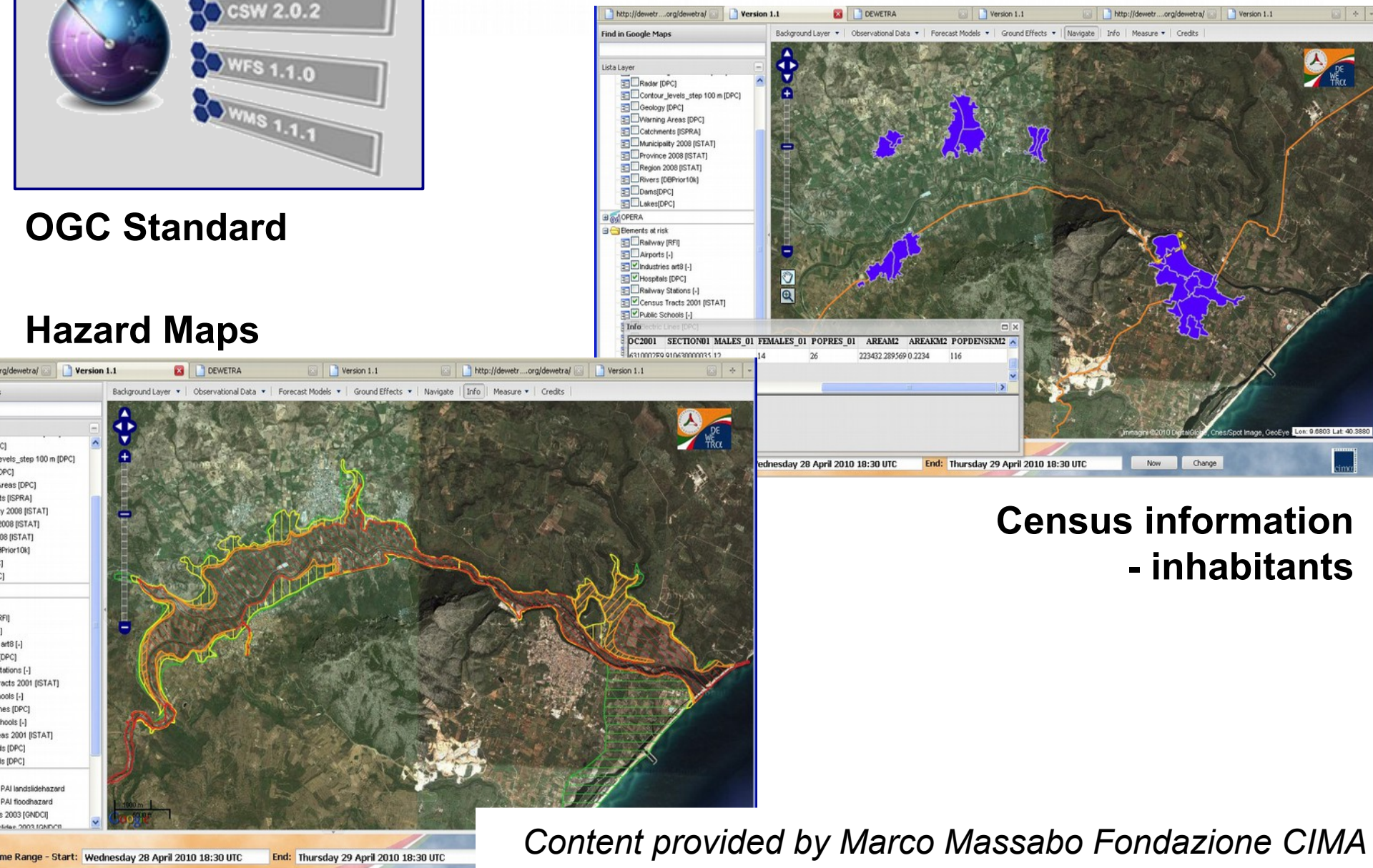


# Example ADRIARadNet (3)



**OGC Standard**

**Hazard Maps**



**Census information  
- inhabitants**

*Content provided by Marco Massabo Fondazione CIMA*



# Summarizing



# Why to get engaged in OGC Programs?



- Address interoperability requirements
- Improve choice and competition in the marketplace
- Reduce technology risks
- Opportunity to cooperatively develop and influence open standards
- Early insight into user requirements for interoperability
- Bring new standards-based products & services into the marketplace earlier
- Broaden market reach via products that implement OGC standards ... and many more...

# Summarizing



- avoid re-inventing the wheel, duplication of work and efforts
- interoperability & open standards help to sustain investments
- cooperation on international level is key to success

# Stay tuned...



- Interested in becoming a member?  
<http://www.opengeospatial.org/ogc/join/levels>
- Join OGC on LinkedIn  
<http://www.linkedin.com/groups?mostPopular=&gid=55322>
- OGC Blog — <http://www.opengeospatial.org/blog>
- Follow us on twitter: @opengeospatial
- Subscribe to the OGC Update
- OGC Youtube Channel  
<http://www.youtube.com/ogcvideo>   <http://www.youtube.com/user/ogcvideo/videos>
- Requests — <http://www.opengeospatial.org/standards/requests>
- Change Requests — <http://www.opengeospatial.org/standards/cr>





**Thank you for your attention  
Questions? Get involved!**



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