



# Open Access and Open Standards in Environmental Policies

## Environmental Information

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<http://www.opengeospatial.org>

# The presentation is about ...

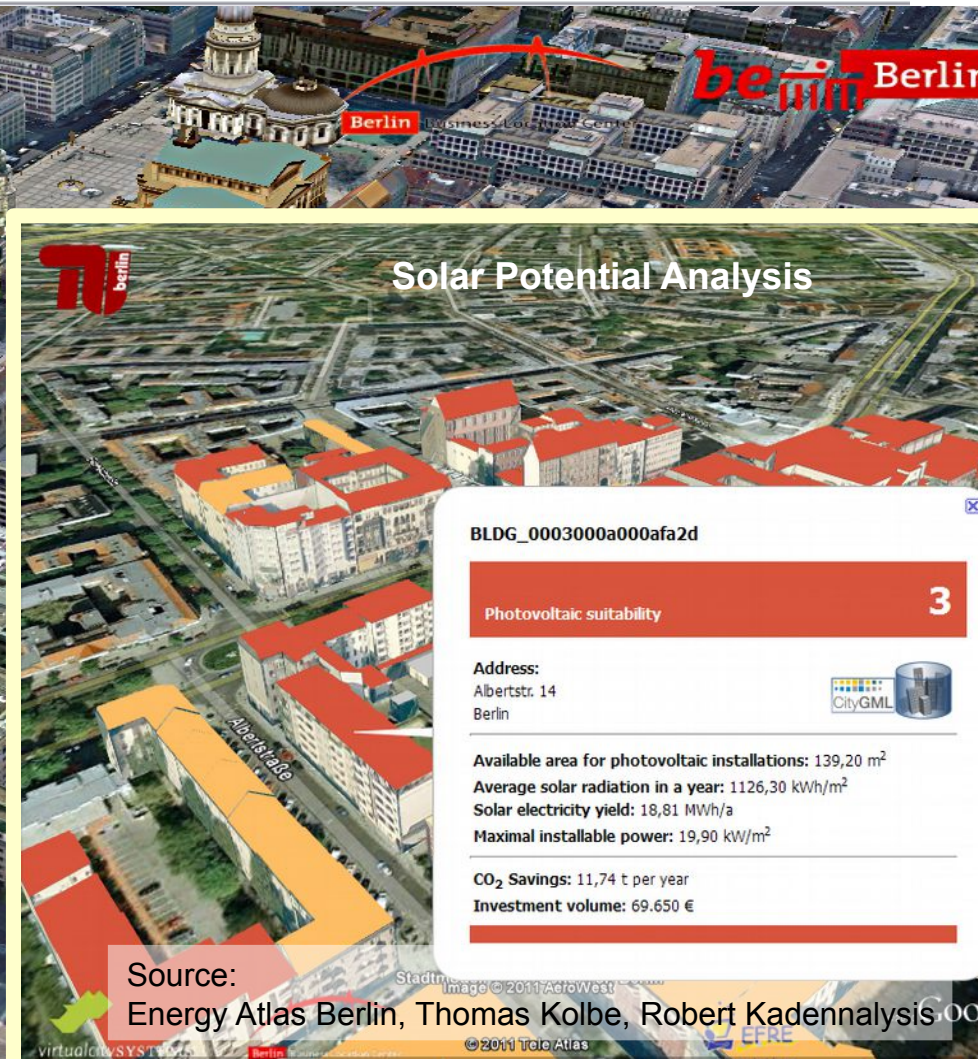
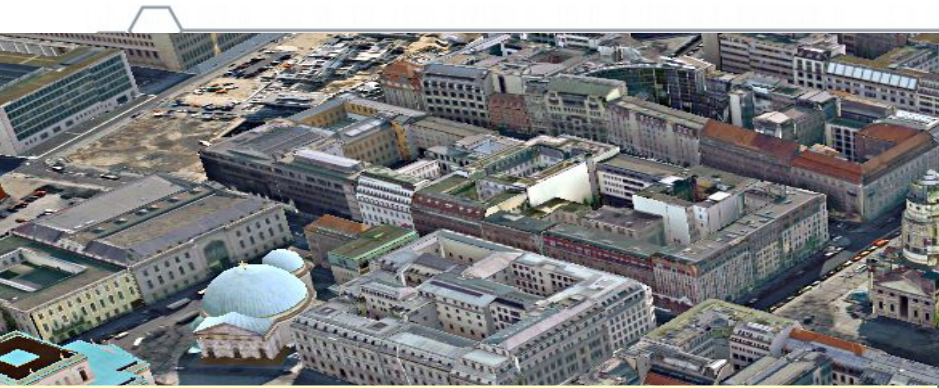
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- ... interoperability and open standards
- ... the Open Geospatial Consortium
- ... examples & OGC standards



# Urban Sustainability





# Pandemic Disease Events



Source: de.dreamstime.com



<http://www.popsoci.com/sites/popsoci.com/files/images/2008/07/sars.jpg>



FreeFoto.com



# Extreme Weather / Climate Change

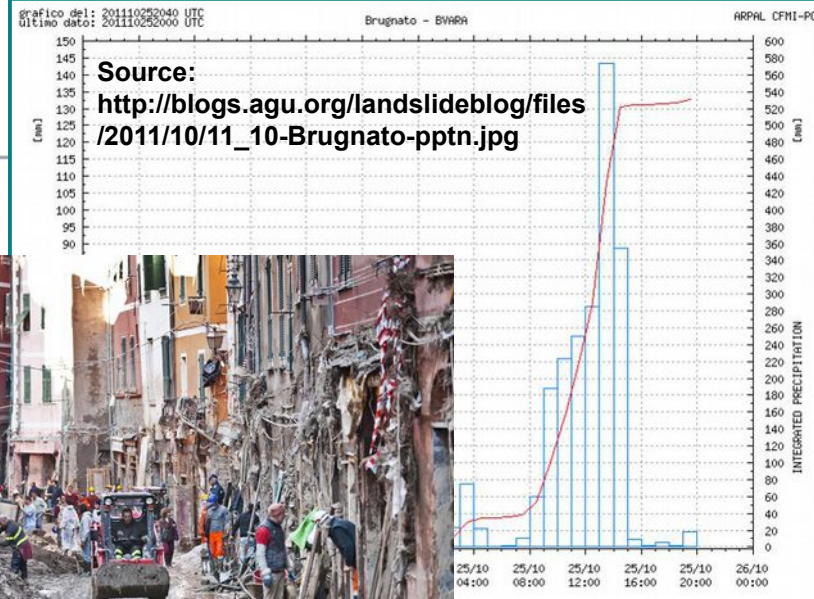


Source: <http://www.itar-tass.com/en/c680/864095.html>

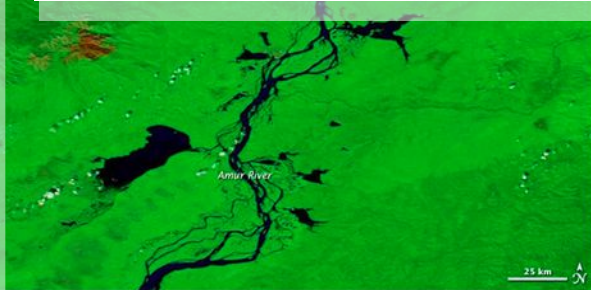
Photo ITAR-TASS/ Dmitry Morgulis



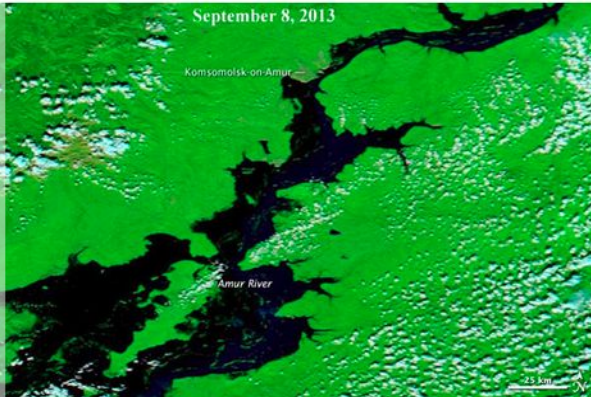
Source: National Geographic, photo and caption by Andrea Barletta



Source: <http://icons.wxug.com/hurricane/2013/russia-flood.jpg>



September 8, 2013



Oxfam East Africa at <http://www.flickr.com/photos/46434833@N05/5933226731>





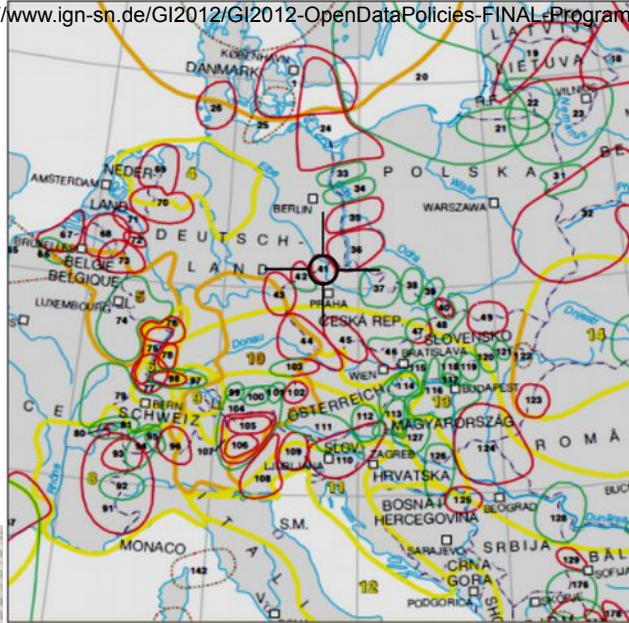
# Cross-Boundary Information Sharing



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:Blauess\\_Wunder\\_Hochwasser\\_2002.JPG](http://de.wikipedia.org/w/index.php?title=Datei:Blauess_Wunder_Hochwasser_2002.JPG)



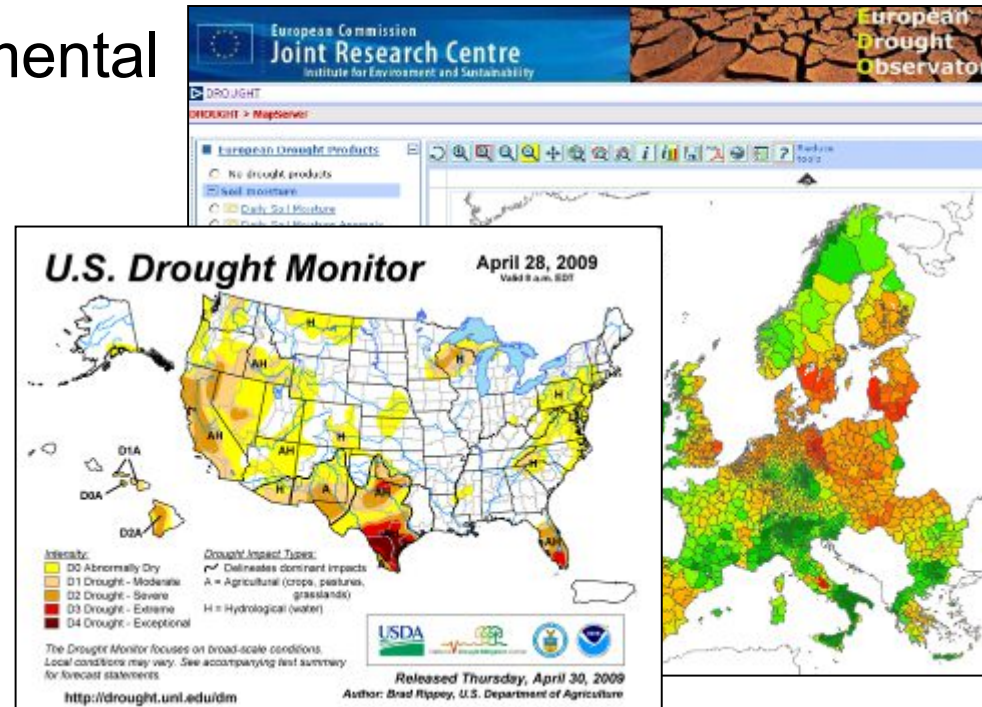
**The ability to access, fuse and apply diverse data sources is critical to situational awareness**

# Improving Knowledge Sharing and Transfer



We are addressing critical issues, that need cooperation:

- Growth in urban centers and coastal areas
- Climate Change, Environmental Monitoring
- Water Resource availability and quality
- Emergency planning, preparedness & response
- Aviation Safety  
...and many more



<http://www.ogcnetwork.net/pub/ogcnetwork/GEOSS/AIP3/index.html>



# 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
- 490+ member organisations (industry, government, academia) (Sept 2014) <http://www.opengeospatial.org/ogc/members>

## **Poland (2)**

- Polish Association for Spatial Information (PASI)
- Polish Geological Institute - National Research Institute

## **Austria (8)**

## **Czech Republic (2)**

## **Finland (5)**

## **Germany (47)**

## **Hungary (2)**

## **Italy (14)**

## **Romania (1)**

## **Serbia (1)**



# Interoperability Issues

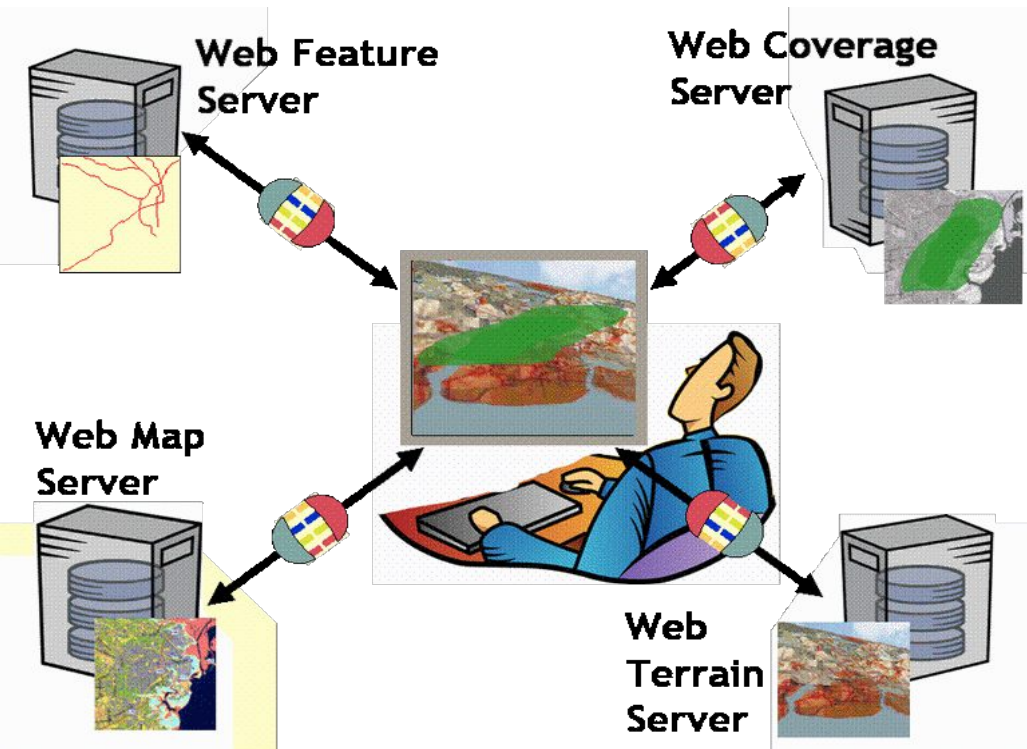


- „We **can't share** maps on the Web.“
- „We **can't deliver** data to different systems easily.“
- „We **don't have** a common language to speak about our geospatial data or our services.“
- „We **can't find** and pull together data from our automated sensors.“

# OGC at a glance (2)



- 35+ adopted OGC Standards (some are ISO Standards)  
<http://www.opengeospatial.org/standards>
- Several hundred 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.



# What is an OGC Standard?



- A document, established by consensus, approved by the OGC membership (balance of interest, all members have an equal vote)
- Provides, rules, guidelines or characteristics
- Implementable in software
- Open standards does not mean open source software (Free Software). OGC/OSGeo Paper on Open Source Software and Open Standards: [http://wiki.osgeo.org/wiki/Open\\_Source\\_and\\_Open\\_Standards](http://wiki.osgeo.org/wiki/Open_Source_and_Open_Standards)
- 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 functionality desired
  - Avoid “lock in” to a proprietary architecture
- **Stimulates innovation beyond the standard by companies that seek to differentiate themselves.**

**„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**

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)



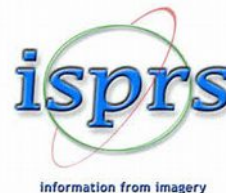
# OGC at a glance (3)



- 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>



# OGC Activities Driven by Community Needs



## Education & Research



## Sustainable Development



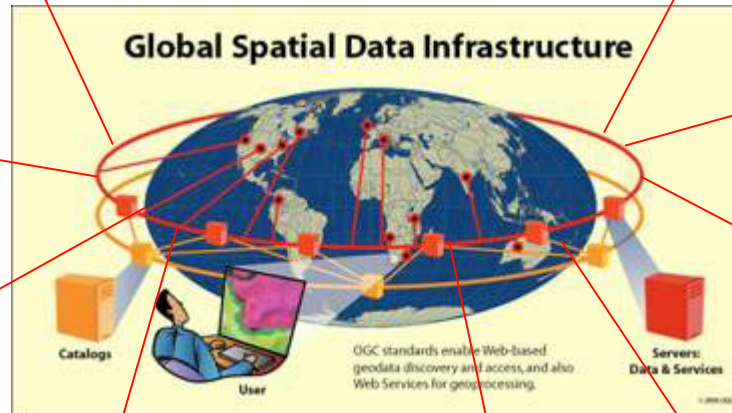
## Defence



## Health



## Emergency Services, Disaster Management



## E -Government



## Energy



## Consumer Services, Real Time Information



## Geosciences: land, sea, air information



## and influenced by ...



- **Policy** – addressing the wide variation in policy worldwide related to information -sharing, -access and use, -funding, -privacy, etc.
- **Changing Technology** – The Cloud, Mobile Applications, Geolocated devices and Sensors, Social Networking etc.
- **Language** – not just spoken and written language but: Semantics, vocabularies, content models, ontologies
- **Members, regional requirements, public input** – and many more





# OGC Standards and Policy



pol·icy

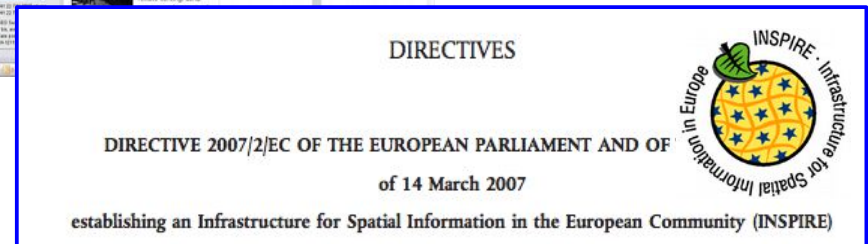
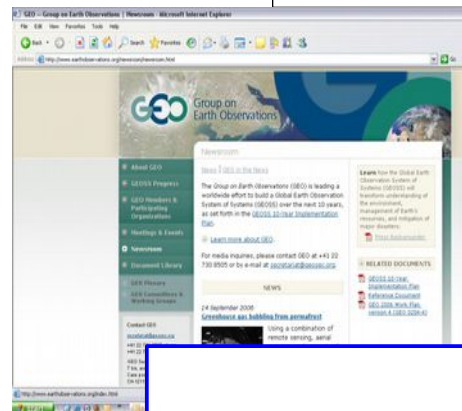
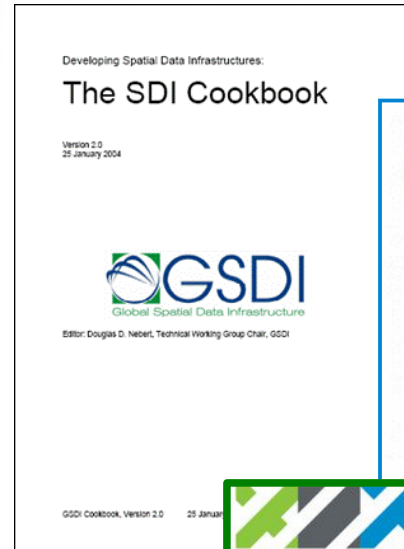
statement of id  
government,

# OGC standards and policy

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



- Group on Earth Observation (GEO) & Global Earth Observation System of Systems (GEOSS)
- GSDI, UNSDI and UN-GGIM
- European Environment Agency
- European INSPIRE Directive
- GeoConnections Canada
- National legislation, e.g. the Netherlands, UK Ordnance Survey
- and many more...





# INSPIRE & OGC



# OGC and INSPIRE (1)



**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.I Lutz, JRC) (<http://www.opengeospatial.org/event?category=ogctcpc>)
- OGC Market Report „Open Standards in INSPIRE“  
<http://www.opengeospatial.org/pressroom/marketreport/inspire>
- INSPIRE Legally Mandated Organisations (LMO), INSPIRE Spatial Data Interest Communities (SDIC), IOC Task Force.

# 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:

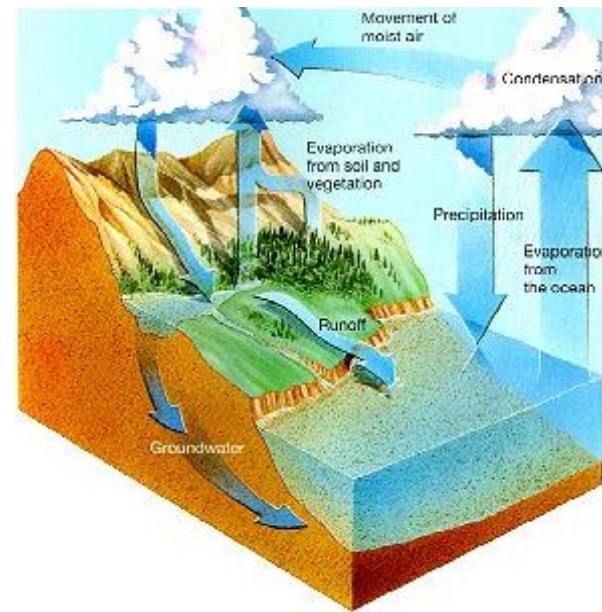
- Pre-defined data sets => standard Internet protocols (like FTP)
- Direct access data with queries
- Web Feature Service: OGC WFS / ISO 19142
- Filter Encoding: OGC Filter Encoding / ISO 19143

## INSPIRE Coordinate Transformation service:

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



# Use Cases & OGC Standards

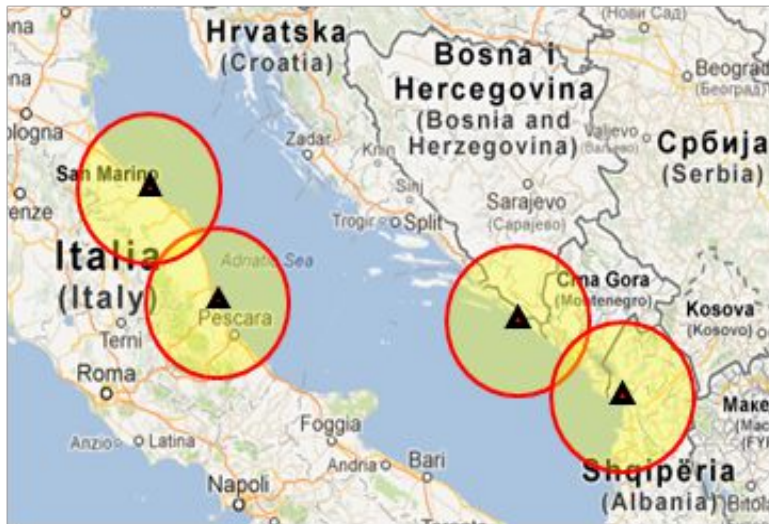




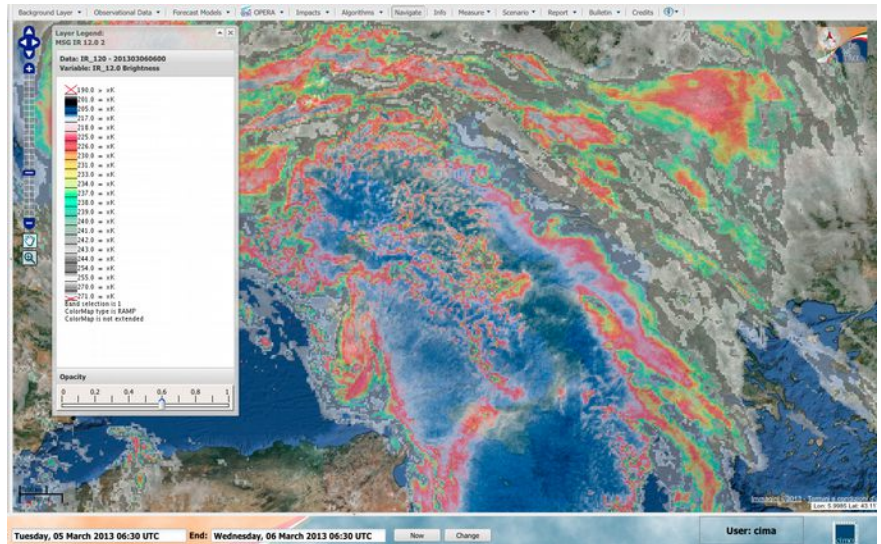
# Example ADRIARadNet (2)

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

## Radar-based products



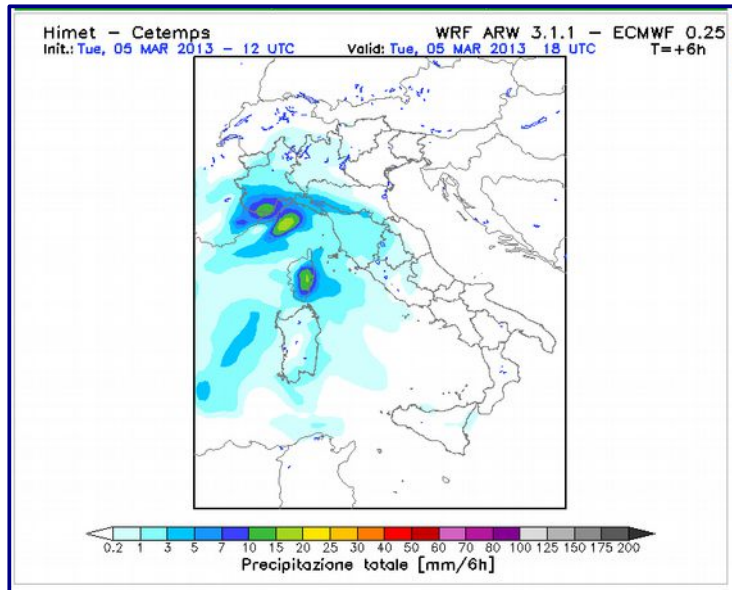
## Satellite products



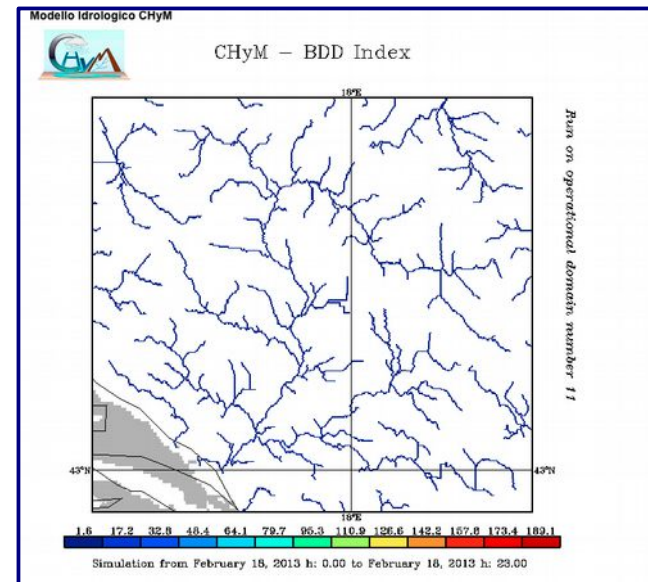
# Example ADRIARadNet (2)

„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



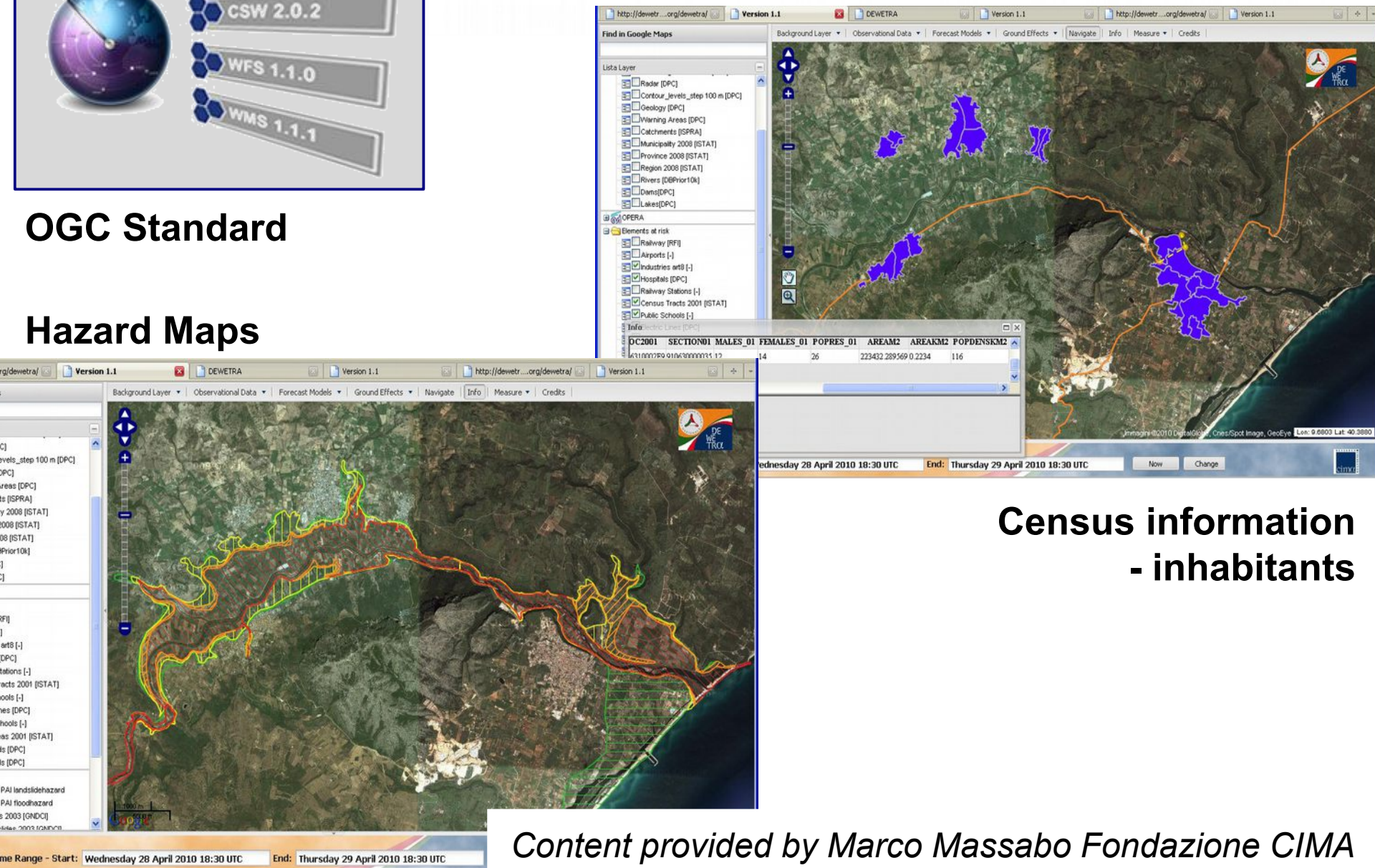


# Example ADRIARadNet (3)



**OGC Standard**

**Hazard Maps**

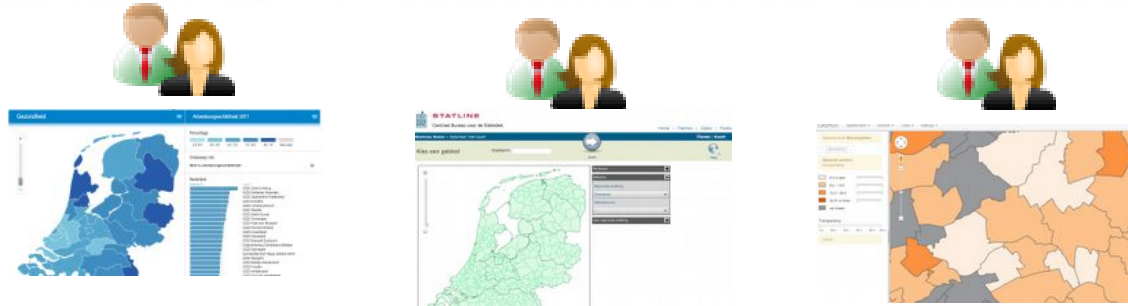


*Content provided by Marco Massabo Fondazione CIMA*

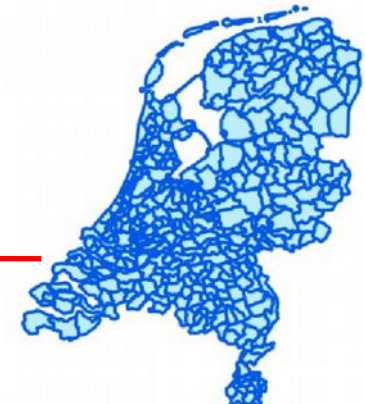


# 1. Introduction of the OGC Table Joining Service

applications



boundary data



tabular data

pc4	wpld woonplaats	adressen	gemeente
5371	3254 Ravenstein	1469	Oss
5371	3256 Deursen-Dennenburg	231	Oss
5371	3257 Huisseling	183	Oss
5371	3263 Overlangel	187	Oss
5371	3259 Dieden	79	Oss
5371	3262 Neerloon	78	Oss
5371	3260 Demen	74	Oss
5371	3261 Neerlangel	28	Oss
5371	3264 Keent	22	Oss



applications



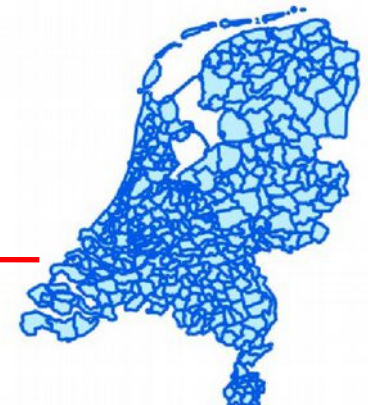
boundary data

tabular data

pc4	wpld woonplaats	adressen gemeente
5371	3254 Ravenstein	1469 Oss
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5371	3257 Huisseling	183 Oss
5371	3263 Overlangel	187 Oss
5371	3259 Dieden	79 Oss
5371	3262 Neerloon	78 Oss
5371	3260 Demen	74 Oss
5371	3261 Neerlangel	28 Oss
5371	3264 Keent	22 Oss



TJS



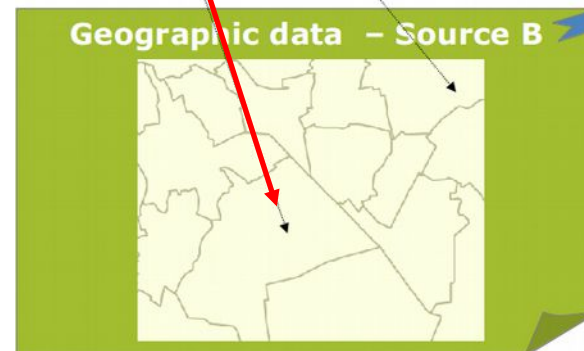
## Table joining (service) and unique id's (keys)

### tabular data

**Unique id's  
(keys)**

**Attribute data – Source A**

Naam	# geldige stemmen	# ongeldige stemmen	# blanco stemmen
Aa en Hunze	15973	11	131
Aalsmeer	7648	9	34
Aalsmeer	17446	42	211
Aalsmeer	18101	13	131
Alblasserwaard	5424	2	44
Ardikinspeken	15887	24	74
Alblasserwaard	10919	20	84
Alblasserwaard	14202	23	134
Alkmaar	63644	77	734
Almelo	37157	84	404
Almere	94134	207	1034
Alphen aan den Rijn	41680	76	474
Alphen-Chaam	5626	11	54
Ameland	2533	4	24
Amersfoort	62699	103	614
Amstelveen	45237	71	314
Amsterdam	36906	1648	4624
Andijk	3641	0	44



**OGC TJS**

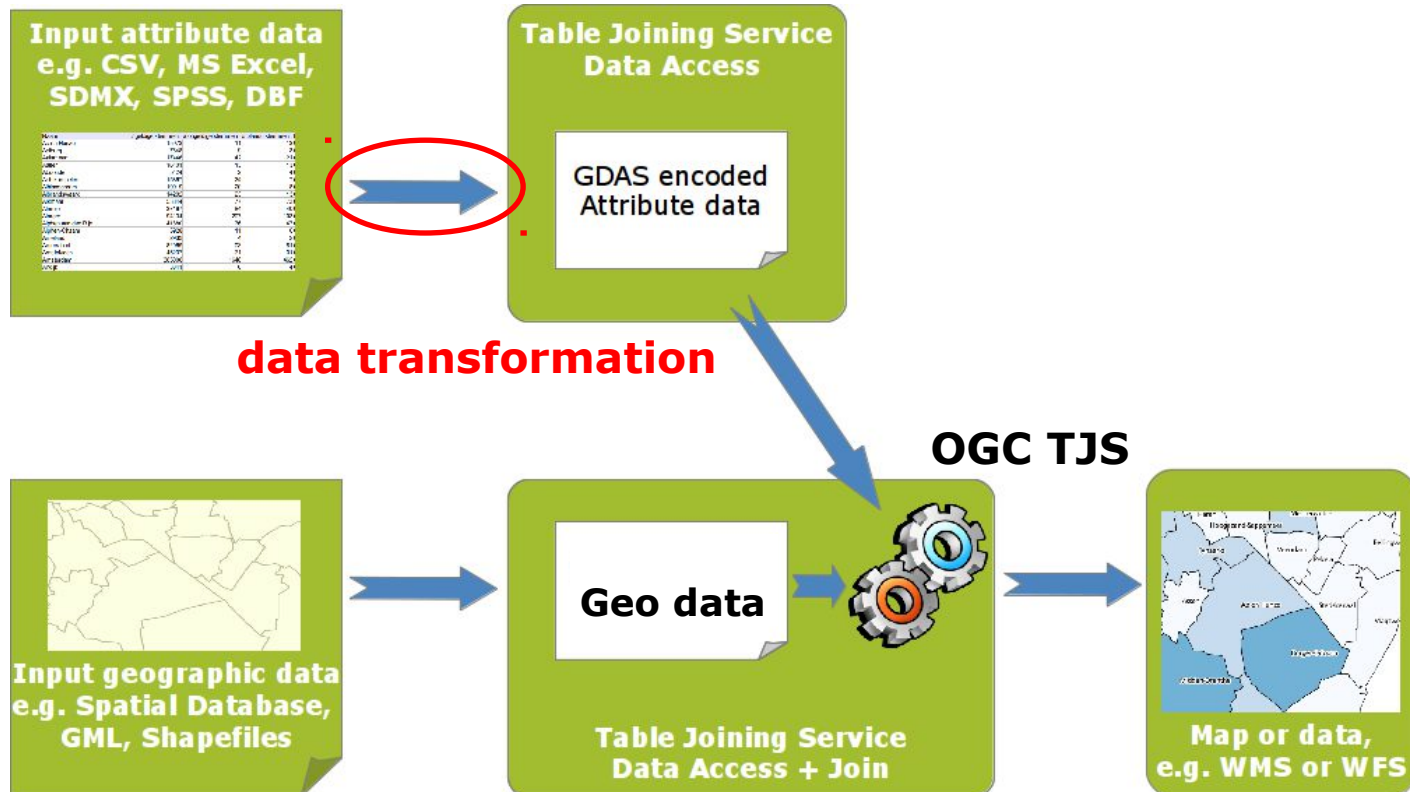


### boundary data



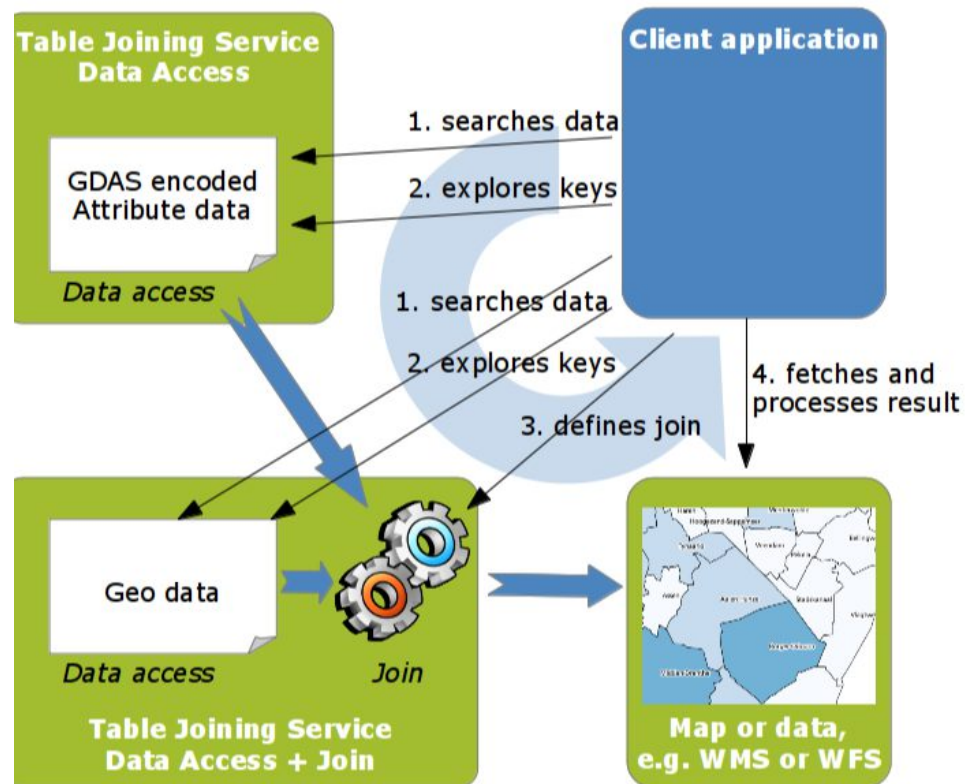
## TJS and the GDAS (XML) data format

### tabular data



## Client application and TJS operations

### tabular data



## OGC TJS operations

### Service Discovery

- GetCapabilities

### Data Access

- DescribeFrameworks
- DescribeDatasets
- DescribeData
- GetData

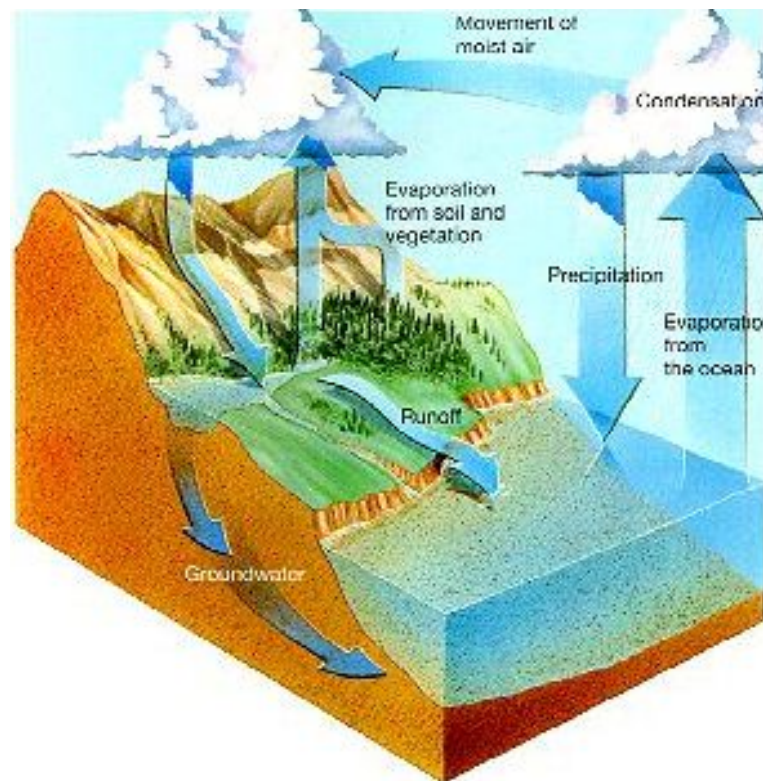
### Data Joining

- DescribeJoinAbilities
- DescribeKey
- JoinData





# Hydrology: Complex Observing Systems



# Building Experience with Water Resources



## Hydrology DWG



OGC®

The **Hydrology Domain Working Group** is a **Joint Working Group** of the World Meteorological Organisation (WMO) and the OGC

The purpose of the Hydrology DWG is to provide a venue and mechanism for seeking technical and institutional solutions to the challenge of describing and exchanging data describing the state and location of water resources, both above and below the ground surface. The path to adoption will be through OGC papers and standards, advanced to ISO where appropriate, and also through the World Meteorological Organization's (WMO) and its Commission for Hydrology (CHy) and Information Systems (WIS) activities.

While CHy has the recognized mandate to publish and promote standards in this area, OGC contributes to the process with its resources and experience in guiding collaborative development among disparate participants in a rapidly evolving technological environment. The OGC Hydrology DWG will provide a means of developing candidate standards for adoption by CHy as appropriate.

The Hydro DWG is open to both member and non member participation and is intended to be a public forum for communication, and both the [email list](#) and the wiki are open to interested parties.

Co:Chairs: David Lemon (CSIRO), Ilya Zaslavsky (SDSC) and Ulrich Looser (GRDC)

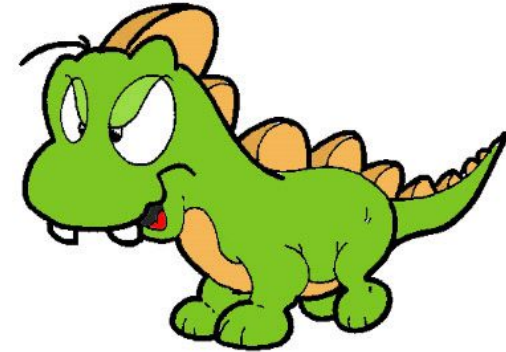
→ <http://www.opengeospatial.org/projects/groups/hydrologydwg>

# Why GeoPackage?

<http://www.opengeospatial.org/standards/geopackage>



- Most file-based geodata formats are tech dinosaurs.
- An explosion of map applications for mobile handheld devices has resulted in a variety of incompatible data formats and interfaces.
- No existing standard addresses the provisioning of all types of geospatial data on traditional computing platforms or assorted makes of mobile handheld devices.
- Web services don't work without internet access.
- The Internet sucks power from a mobile device.



© www.ClipProject.info



# Overview



- **Platform-independent** SQLite database file
- **Vectors**
  - WKB Geometries
  - Linear 2D with optional elevation and measure values
- **Image** Tile Matrices
  - PNG and JPEG
  - Zoom times two (adjacent zoom level pixel sizes)
- **Projection** support



- Read the standard
- Get sample data
- Find implementing software
- Report issues on GitHub



Browse Issues    Milestones

**Everyone's Issues** 19    19 Open    55 Closed    Sort: Newest ▾

Assigned to you	0	<input type="checkbox"/> Close    Label ▾    Assignee ▾    Milestone ▾
Created by you	0	<input type="checkbox"/> <b>REQ 10: table or view?</b> Opened by bradh 2 months ago    1 comment
Mentioning you	0	<input type="checkbox"/> <b>Mapping WKT/WKB to GeoPackage Geomet</b> Opened by bradh 2 months ago    17 comments
No milestone selected		<input type="checkbox"/> <b>/opt/features/geometry_encoding/data/blob</b> Opened by bradh 2 months ago    3 comments
<b>Labels</b>		<input type="checkbox"/> <b>REQ 30 inconsistent with REQ 22</b> #71 Opened by bradh 2 months ago    2 comments
CRITICALITY: MINOR	1	<input type="checkbox"/> <b>Table 41 constraints use old column name</b> #70 Opened by bradh 2 months ago    1 comment
enhancement	1	
CRITICALITY: EDITORIAL	0	



## GeoPackage

[Read the Standard](#)[Find Software](#)[Follow GeoPackage](#)[Fork me on GitHub](#)

### An Open Format for Geospatial Information

GeoPackage is the modern alternative to formats like SDTS and Shapefile. Its SQLite-based format efficiently stores and transfers geographic vector features and image tiles.

GeoPackage is the modern alternative to formats like SDTS and Shapefile. At its core, GeoPackage is simply a SQLite database schema. If you know SQLite, you are close to knowing GeoPackage. Install Spatialite – the premiere spatial extension to SQLite – and you get all the performance of a spatial database along with the convenience of a file-based data set that can be emailed, shared on a USB drive or burned to a DVD.

GeoPackage was carefully designed this way to facilitate widespread adoption and use of a single simple file format by both commercial and open-source software applications – on enterprise production platforms as well as mobile hand-held devices. GeoPackage is a standard from the Open Geospatial Consortium. It was designed and prototyped following a multi-year, open process of requirements testing and public input. It is designed for extension. So if you need more than the core GeoPackage feature set, join OGC's open process to standardize community-tested enhancements.



#### Official Standards Information

For all official, normative information on the GeoPackage standard, including PDF format download, see the [OGC standards program GeoPackage page](#).

[Implementations](#)[Issue Tracker](#)[Sample Data](#)[Mailing List](#)[Implementation Guide](#)[FAQ](#)

For more information (blog & webinar):  
<http://www.opengeospatial.org/blog/1978>



# Summarizing



# 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



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



**Athina Trakas**

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Open Geospatial Consortium

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Mobil: +49 – 173 – 211 2623

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# Why to get engaged in OGC Programs?

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- 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 and services into the marketplace earlier
  - Broaden market reach via products that implement OGC standards ... and many more...

# Stay tuned...



- 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>
- Interested in becoming a member?  
<http://www.opengeospatial.org/ogc/join/levels>
- Requests — <http://www.opengeospatial.org/standards/requests>
- Change Requests — <http://www.opengeospatial.org/standards/cr>

