



### Tech Trends & the Role of Open Standards an OGC Perspective

Technical Chamber of Greece / Section of Central Macedonia: National Spatial Information Infrastructure A vital tool for the development Thessaloniki, GREECE, 1. December 2017



τεχνικό επιμελητήριο ελλάδας Τμημά κεντρικής μακεδονίας



Athina Trakas Services Director Europe, Central Asia & Africa Open Geospatial Consortium atrakas@opengeospatial.org

## Who am I?

http://www.opengeospatial.org/ogc/organization/staff/atrakas

- work in the field of GIS since 1998
- Finished university with a diploma in Geography.
- Worked for 10 year in the private industry
- Since 2009 I am OGC's Director for Regional Services for Europe, Central Asia & Africa
- I am the contact person for OGC in these regions, responsible for the Consortiums activities and networking, like planning and managing of OGC recruitment, connecting with relevant stakeholder organisations and members.
- Since 2008 I am charter member of OSGeo.



### Introduction



## **The Open Geospatial Consortium**

- Founded in 1994, not for profit, consensus based and voluntary
- International organisation leading development of geospatial standards
- 525+ member organisations (Nov 2017)
  - Africa (6)
  - Asia Pacific (92)
  - **Europe (207)**
  - Middle East (33)
  - North America (187)
  - South America (2)

### Greece:

- → GET Geospatial Enabling Technologies
- Interbalkan Environment Center
- National & Kapodistrian University Athens
- Angelos Tzotsos
- Dimitris Kotzinos

### **The Open Geospatial Consortium**

- 50+ standards (OGC WMS, WFS etc.)
- Thousands of implementations
- Broad user community implementation worldwide
- Alliances and collaborative activities with ISO and many other SDO's
- Many Domain and Standards Working Groups



### How to expand geospatial benefits & value?

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

### 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

"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

• 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

### **UN-GGIM** and the OGC





### What is Global Geospatial Information Management

There is general agreement of an urgent need for an inter-government consultative mechanism that can play a leadership role in setting the agenda for the development of global geospatial information and to promote its use to address key global challenges; to liaise and coordinate among Member States, and between Member States and international organizations.

Overview of the UN Initiative on Global Geospatial Information Management (GGIM) Presented by Mr. Hiroshi Murakami, Co-Chair of the second preparatory meeting on GGIM and Vice-President of PCGIAP

more 🖡

The UN Committee of Experts on Global Geospatial Information Management (UN-GGIM) called for adoption of open standards to seamlessly share and use geospatial and location data around the world. UN-GGIM recognizes the important work done by three international standards development organisations: ©OGC, ISO/TC 211 and IHO.

### **Geospatial Data to Knowledge**



Integration Level

The trajectory from data to geospatial knowledge, enabled by standards.

## OGC

### What does the OGC do?

- Develop <u>open standards</u> and associated standards <u>best practices</u> that promote geospatial <u>interoperability</u>.
- Serve as the <u>global forum</u> for the collaboration of geospatial data / solution providers and users.
- Provide an <u>agile and innovative development</u> environment to evolve, test and validate and adopt open standards.



### **OGC Programs interaction**







# OGC Tech Trends Background

### Working to address future needs

- Innovation
  - Increased emphasis on prototyping ideas with user community and developers
  - Focus on Apps and lightweight standards for developers
  - Taking community leads, requirements and developments as a driver of SDO work
  - Increased collaboration among SDOs to address the growing complexity



### OGC Tech Trends – 2017



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### **Highlighted Topics – near term actions**

- Power of Location
  - People who communicate digitally tend to meet in person
- Spatial/Temporal Models
  - 3D Geo Model creation
  - Indoor positioning
- Big Data and Data Science
  - Machine Learning
  - Modeling, Simulation and Prediction
  - Uncertainty and Veracity

- Spatial Data on the Web
   APIs for the Web
  - Linked data
- New Geo Sources
  - IoT and Sensor Webs
  - Remote sensing on demand
    - UAVs and drones
    - Smallsats
- User platforms & Networks
  - Immersive Geo
  - Ambient Services
- Software development
  - Federation, Pub-Sub

## **OAB Tech Trends & the Innovation Program**

### Current Initiatives

- Testbed 13: Big data, Predictive models, Linked data, Pub-Sub
  → http://www.opengeospatial.org/projects/initiatives/testbed13
- Environmental Linked Features Interoperability Experiment
- Underground Concept Development Study: 3D Geo Model creation
- New initiative planning
  - Develop "prospectus" for trends
  - E.g., Indoor positioning; Ambient services, Immersive Geo
- Watch out for Testbed 14
  - Call for Participation out in Dec 2017
  - http://www.opengeospatial.org/projects/initiatives/testbed14





## OGC Tech Trends Where are we today? Where do we go tomorrow?

More input and details on Github https://github.com/opengeospatial/OGC-Technology-Trends

## **Checkpoint Today**

- SDI's expand around the world
- Influence of Crowdsourcing / VGI
- IoT / Sensors mobile, wearable, and actively sensed
- Mobile First
- Cloud computing
- Big Data / analytics
- Linked Data
- 3D City Models & BIM
- From maps to models and "mapless" decisions
- Industry driving innovation
- Technology disruption is the norm

### In India, Mobile Internet Traffic Surpassed Desktop Internet Usage in May, 2012 - Other Countries to Follow... India Internet Traffic by Type, Desktop vs. Mobile, 12/08 – 11/12



http://www.slideshare.net/kleinerperkins/2012-kpcb-internet-trends-yearend-update

### A Location Linked World



- New York City Pilot
  - Above ground CityGML model complete 2015
  - Below ground Infrastructure model currently being planned
- ESPRESSO
  - OGC-led European Commission funded project on Smart Cities
- OGC Smart Cities Spatial Information Framework White Paper

# **OGC Smart City Activities**

### **OGC Testbed 11, Climate Resilience**

- Cities: San Francisco
- Sponsors: NASA, NGA, USGS,

### OGC Future Cities Pilot, Phase 1

- Cities: Greenwich, Rennes, Sant Cugat del Vallès, Berlin, Rotterdam
- Sponsors: Ordnance Survey GB, Sant Cugat del Vallès, IGN, virtualcitySYSTEMS

### Indian OGC Interoperability Plugfest

Smart Cities and National GIS / National Spatial Data Infrastructure (NSDI) Missions



### **3D City Models**



### **OGC CityGML & IndoorGML**





Source: http://www1.nyc.gov/site/doitt/initiatives/3d-building.page

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- Urban Planning / Operations
- Emergency Mgt / Response
- Transportation / Routing / Logistics
- Indoor navigation
- Retail Site analysis
- Sustainable / Green Communities
- City Services Management
- Noise abatement
- Telecommunications placement
- Many other uses...



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Google pictures

## 50 billions Internet-connected things by 2020 **Sensors <u>Everywhere</u>** (Things or Devices)



## **OGC SensorThings for IoT**

- Builds on OGC Sensor Web Enablement (SWE) standards that are operational around the world
- Builds on Web protocols; easy-to-use
- Super light-weight: ideal for low power / low bandwidth devices
- OGC standard for open access to IoT devices

### Enabling IoT for First Responders To-Be Environment



Source: OGC IMIS IoT Pilot: http://www.opengeospatial.org/projects/initiatives/imisiot

### Internet of Things and OGC Sensor Web

### OGC Sensor Web Enablement

WaterML2 (Profile of O&M)



### **Big Data**





Source: http://technology.ie/big-data-looks-like/

### Now we have all of this IoT data

 It's big by every definition: the traditional 3 "Vs" of big data

-Volume

-Velocity

-Variety

**()(;(**)"



### ... but what makes it scary

- The fourth "V"
  - Volume
  - Velocity
  - Variety
  - Veracity

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### Social Networking / User Generated Information / Crowdsourcing



## **Citizen Science (Domain Working Group)**



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### **Semantic – Semantic Web**

• Web 3.0

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- Linked Data
- Beyond model
- Semantic interoperability
- MoU W3C & OGC
- Spatial Data on the Web WG



"Now! ... That should clear up a few things around here!"

FarSide - Larson





### Emerging OGC Working Groups: Modeling & Simulation

- CDB published OGC Standard
  - "Common Database" broadly used in the marketplace
- LTF (Layered Terrain Format developed by Virtual Heroes)
  - May get introduced to OGC, perhaps as a Community Standard
  - Working with Google on Protobuf implementation (Protobuf is like a simpler XML)
- Domain Working Group formation anticipated for 2017





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## **Emerging: Land Administration DWG**

- Purpose / Scope:
  - Examine existing systems of land administration;
  - Develop best practices regarding standards-based implementations;
  - Identify potential interoperability experiments, pilots and testbeds to validate interoperable solutions
- Emphasis on close coordination with partners in Land Administration
  - SDOs (ISO, OASIS, W3C etc.)
  - Associations (FIG, RICS, etc.)
- Open to OGC members and non-members



## **Emerging: Marine DWG**

## Bathymetric data and Marine SDIs



# $\overset{\text{Maritime monitoring}}{OGC}^{\text{\tiny ®}}$



### Safety of navigation



## **Emerging: Unmanned Systems**

- New Domain Working Group
- Initially conceived to focus on Unmanned Aerial Systems (UAS), but scope has been broadened to all types of platforms
  - Focus will be on autonomous or remotely piloted platforms which acquire data
- UAS use cases include:
  - Exchange of flight plans
  - Metadata for hobbyist sensors
  - Lightweight protocols for sensor management
  - Example Earth Observation: CERTH research
    ECOPTENTIAL Project



Above Ground Biomass

Tree cover density

### Stay curious and participate!

→ avoid re-inventing the wheel, duplication of work and efforts → interoperability & open standards help to sustain investments → key to success: contribution & cooperation on intern'l level

## Thank you for your attention!

### **Athina Trakas**

Director Regional Services Europe, Central-Asia, Africa eMail: atrakas@opengeospatial.org Twitter: @trakasa

With input from I. Simonis, G. Percivall, S. Simmons – thxs!