Data is more valuable
as a shared resource

**Standards make this
sharing possible**

Safe, Resilient Future Cities

Denise McKenzie
Executive Director
31 July 2017

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Making location count.

77% of the surveyed IoT experts claimed that **Interoperability** is the biggest challenge currently facing the Internet of Things

(IoT Nexus, 2015)

Machina Research

Open standards in IoT deployments would accelerate growth by 27% and reduce deployment costs by 30%

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Handbook: Internet of Things Alliances and Consortia

Location, semantics and a focus on coordination
(**Arrows** indicate OGC Alliance Partners)

OGC Alliance Partners
A Critical Resource for Advancing Standards
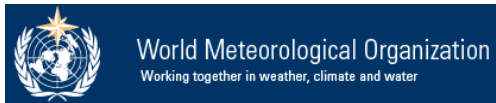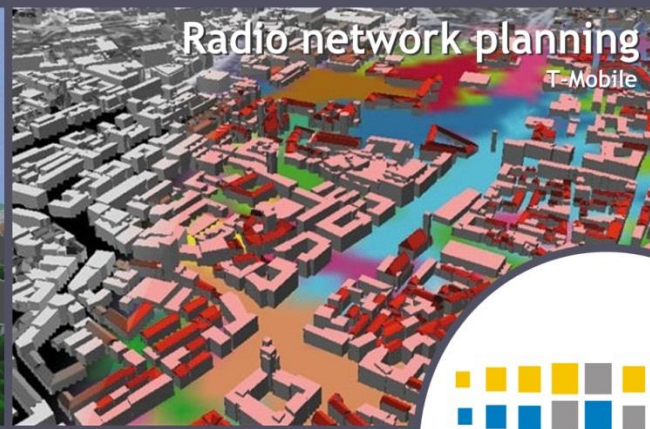

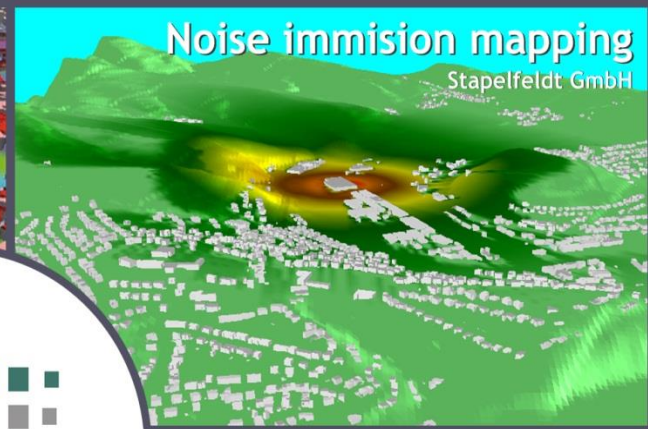… **and others**

Disaster management
Kreis Recklinghausen

Radio network planning
T-Mobile

Noise immision mapping
Stapelfeldt GmbH

CityGML for 3d city models

Police simulator
Rheinmetall Defence Electronics

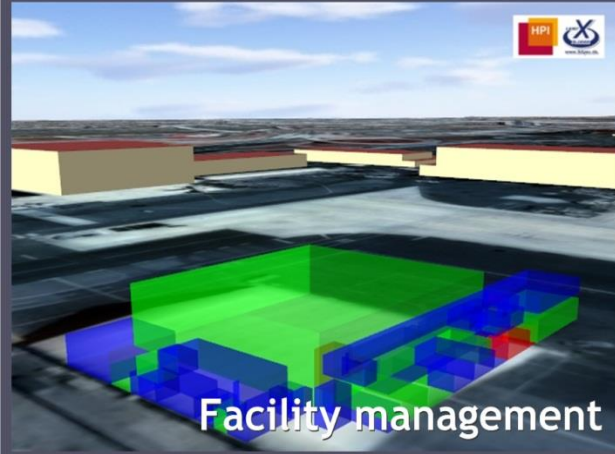Business development & tourism

Navigation

Facility management

Urban planning

Architecture
Architekturwerkstatt SenStadt Berlin

SWE today

UAV carrying
video camera

Aircraft with
air quality sensors

Data Center
with extended
processing capabilities

Field Operator
with Tablet

Local
Workstation

Mesh Sensor
Network

Processing
Capabilities

OSH
instances
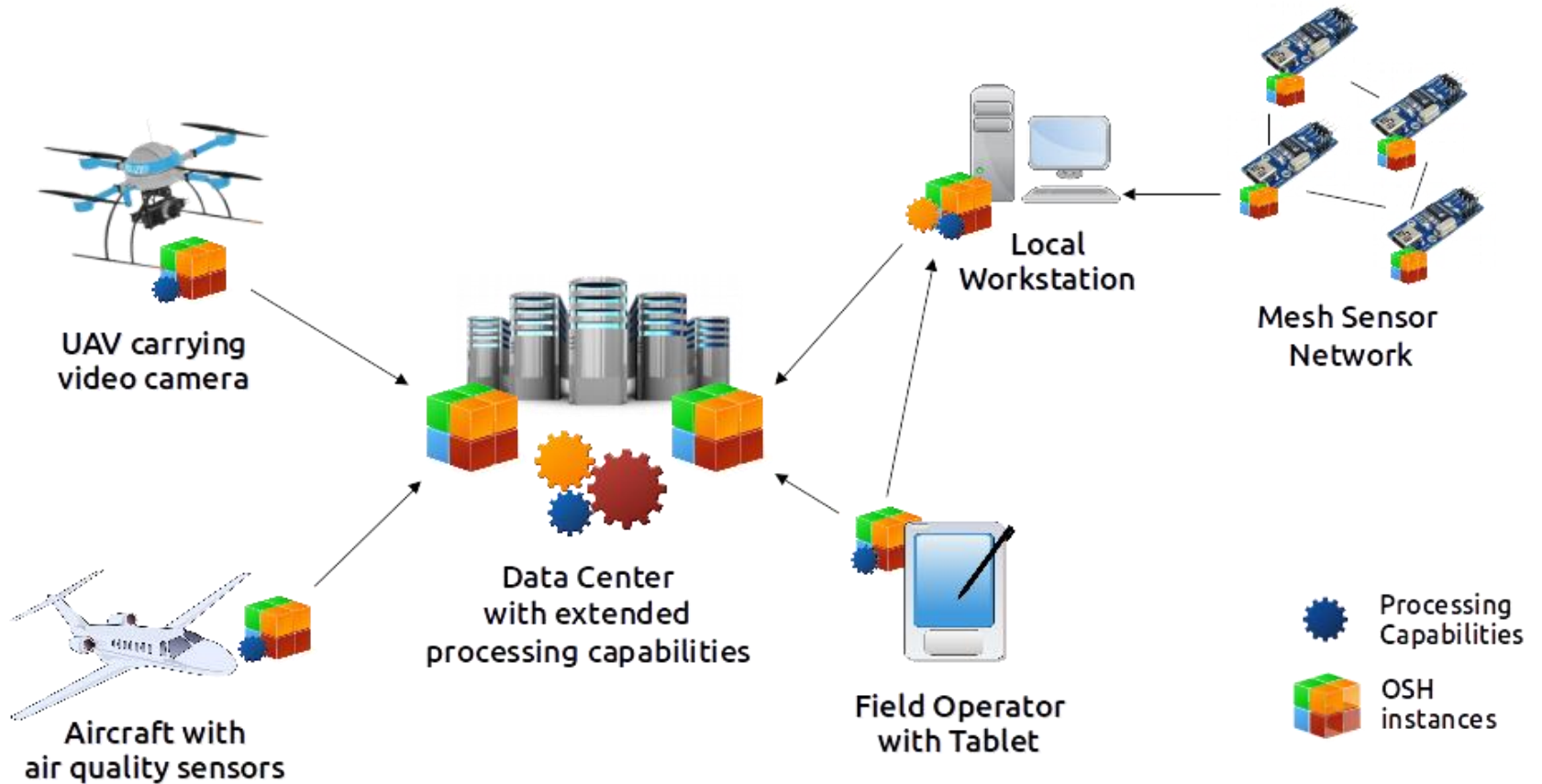
Image courtesy of opensensorhub.org
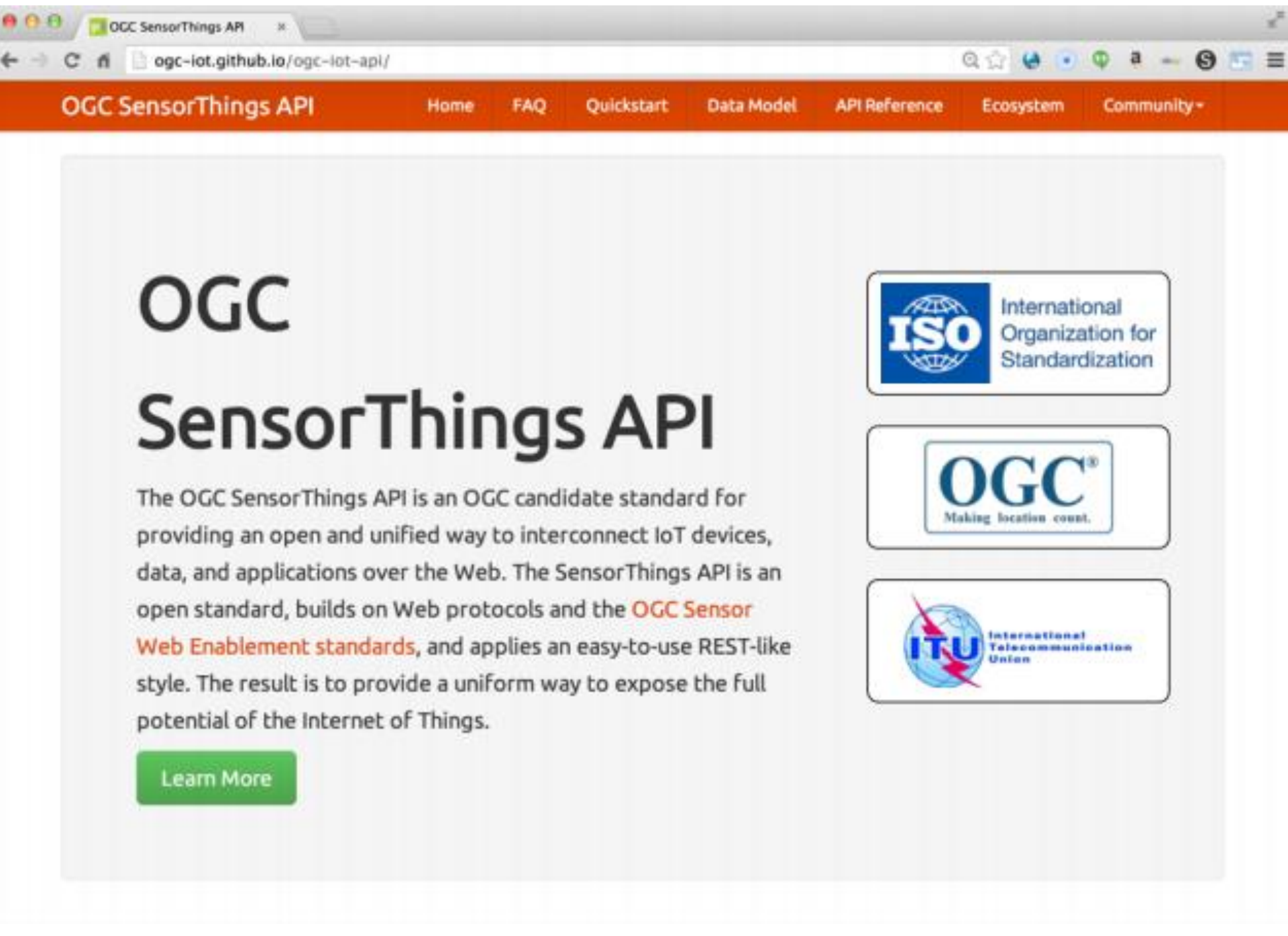
OGC SensorThings API

The OGC SensorThings API is an OGC candidate standard for providing an open and unified way to interconnect IoT devices, data, and applications over the Web. The SensorThings API is an open standard, builds on Web protocols and the OGC Sensor Web Enablement standards, and applies an easy-to-use REST-like style. The result is to provide a uniform way to expose the full potential of the Internet of Things.

Learn More

An OGC Framework for Smart Cities

- "OGC Smart Cities Spatial Information Framework"
  - https://portal.opengeospatial.org/files/?artifact_id=61188

- Influenced by:
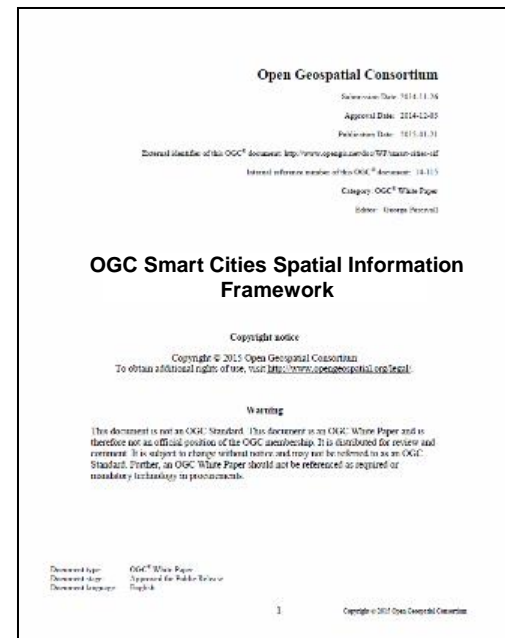 - OGC's geospatial, sensor, processing, mobile standards work
  - Survey of Smart City Standards Activities:
    - JTC 1, ITU, ISO, BSI, DIN, others
  - Survey of OGC CityGML implementations

- Goals:
  - Pilot Smart Cities Spatial Framework in select cities (http://www.opengeospatial.org/blog/1886)
  - Advance an OGC Best Practice for Location Enabled Smart Cities

Open Geospatial Consortium

OGC Smart Cities Spatial Information Framework

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Urban Platform

ESPRESSO and European Innovation Partnership for Smart Cities and Communities

The Urban Platform as an enabler for *Smart* Smart City initiatives, based on open standards, avoiding vendor lock-in and increased competition

Connect, Collect, Comprehend, Create

ESPRESSO has on board:

4 Standard Developing Organisations: DIN, ETSI, OGC, bSI

2 Cities: Rotterdam and Tartu

Urban Platform to be used by developers, decision makers, procurement, …

Urban Platform

ESPRESSO and European Innovation Partnership for Smart Cities and Communities

- Capability Map
- Information Systems Architecture

Based on :

- Open standards, Market & vendor agnostic
- No prescription of solutions nor technologies
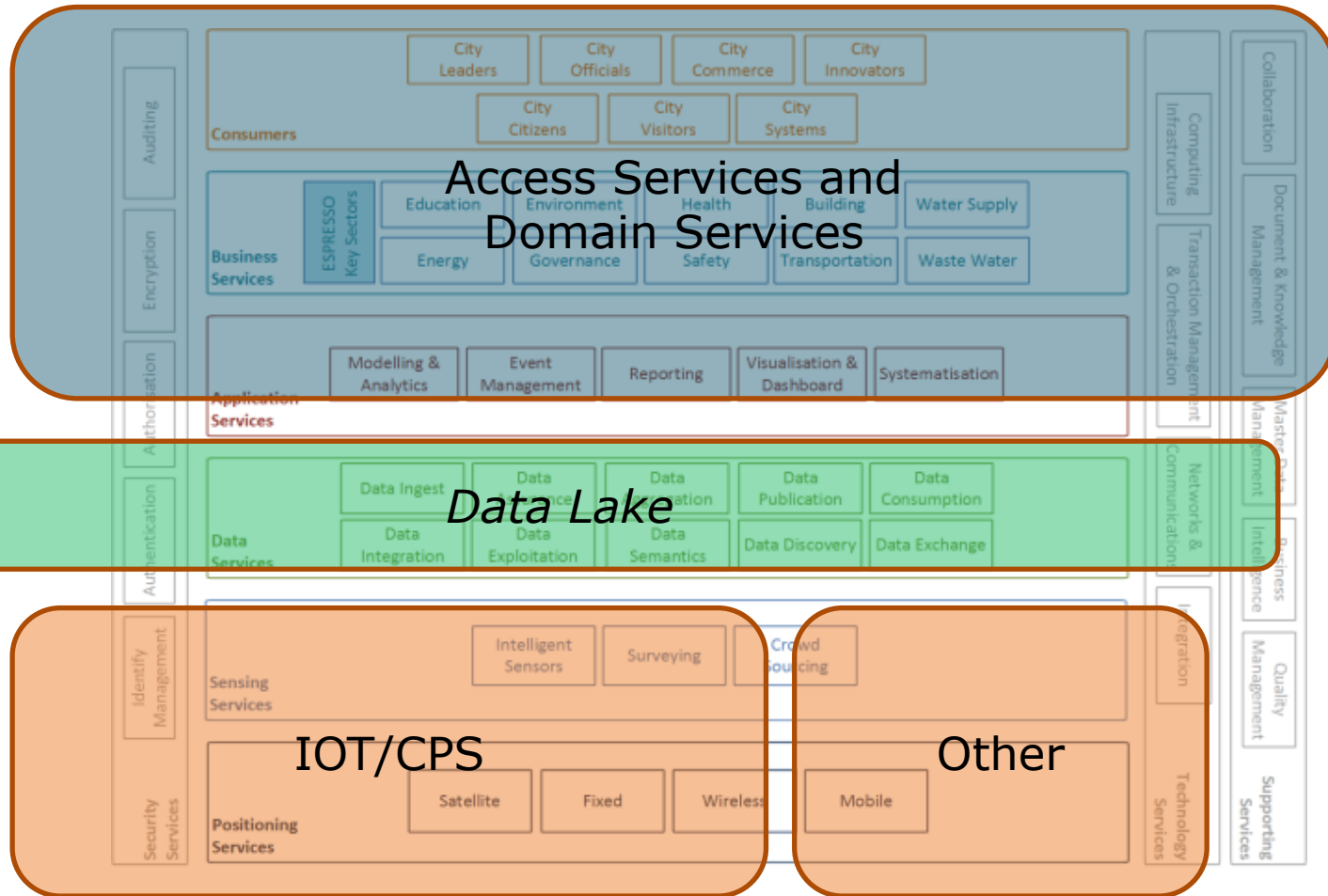- Modular, Incrementally achievable
- Capability and layered based

Existing city architectures

EIP SCC WS2 (See later today)
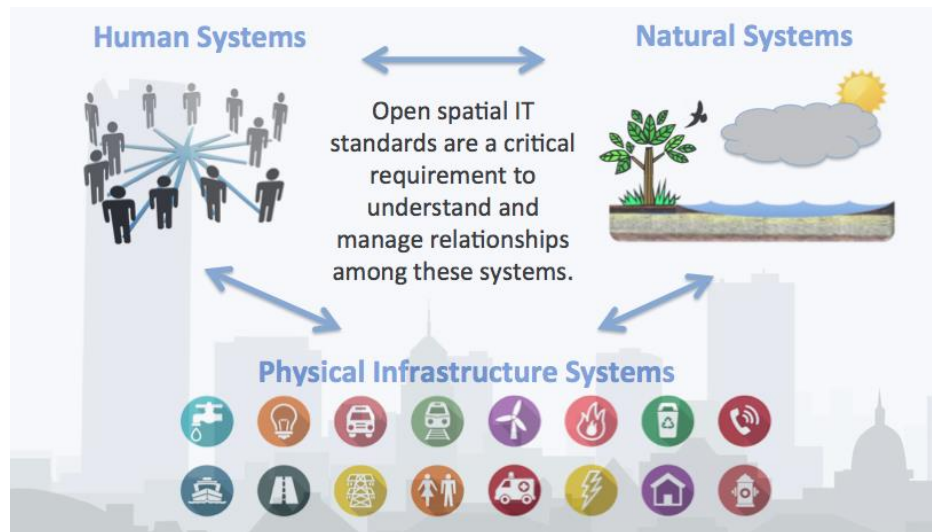
ITU-T WG20, ISO/IEC JTC1, ETSI, …

Information Architecture

© ESPRESSO

FutureCities Pilot

- Coordinated effort between OGC and buildingSMART International
- Seeking sponsors, most of work is intended to occur in Europe
- Pilot will demonstrate and enhance the ability of cities to use diverse, interoperating spatial technologies to deliver improved quality of life, civic initiatives, and resilience

Human Systems **Natural Systems**

Open spatial IT standards are a critical requirement to understand and manage relationships among these systems.

Physical Infrastructure Systems

http://www.opengeospatial.org/pressroom/pressreleases/2290

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Future Cities Pilot – Phase 1

- Youtube link to the video shown
- https://www.youtube.com/watch?v=aSQFIPwf2oM

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Adding Dynamic Processes to Urban Models
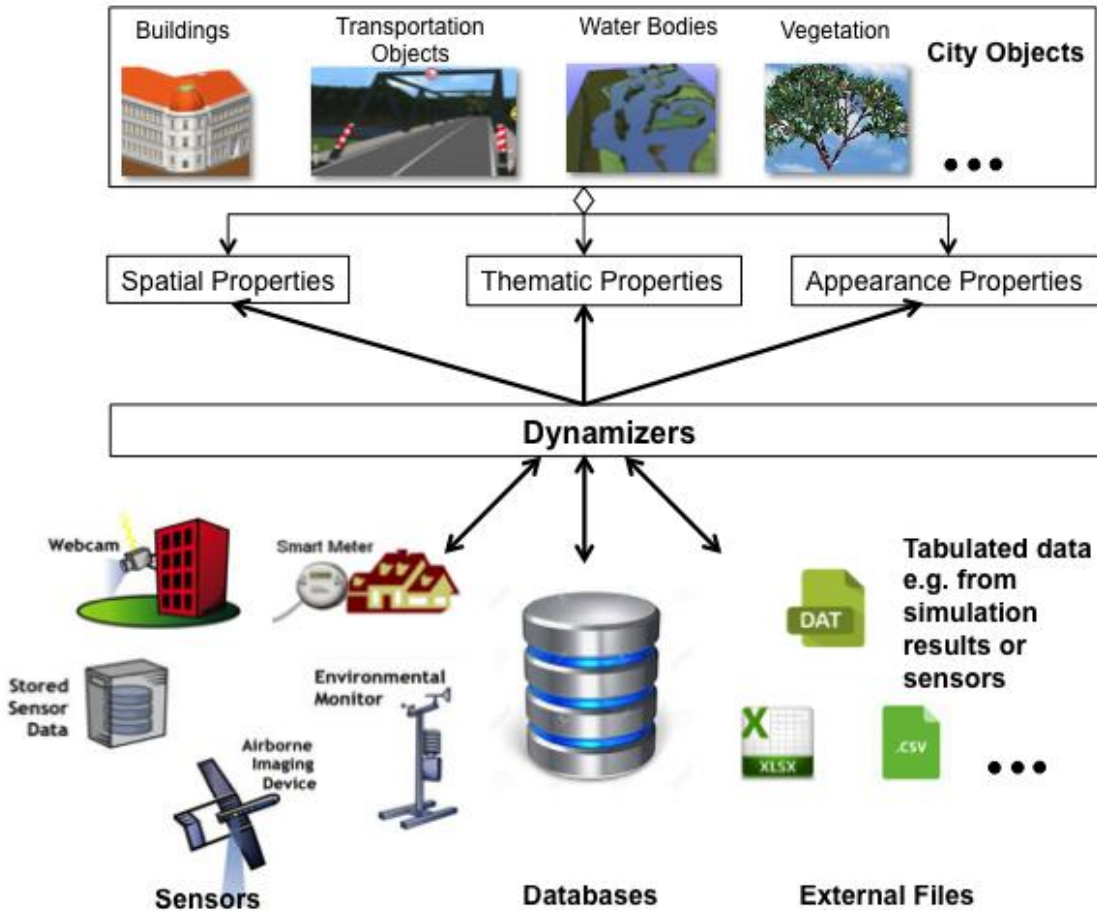
Dynamizers

- Enhance properties of city objects by overriding static values

- Time-variant values from sensors, simulations, and external files

Future City Pilot 1 Scenario: Health

- ## Building Humidity and Heat during weather extremes
  - Dynamize: Override static CityGML properties with dynamic observations from SOS
  - Identify residents of senior living facility at risk

Visualization of and interaction with 3D building geometries
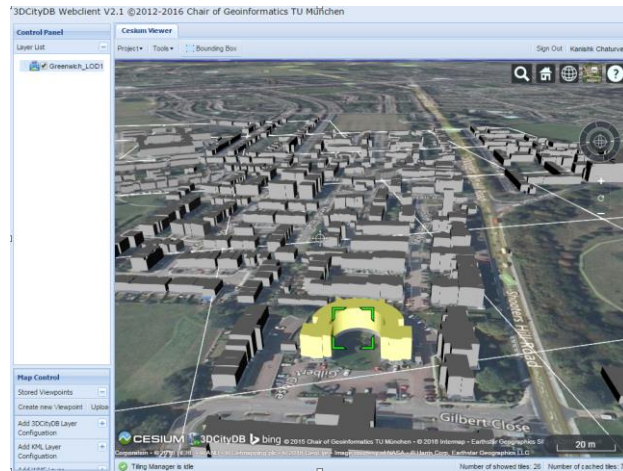
Real-time temperature, humidity accessed from SOS
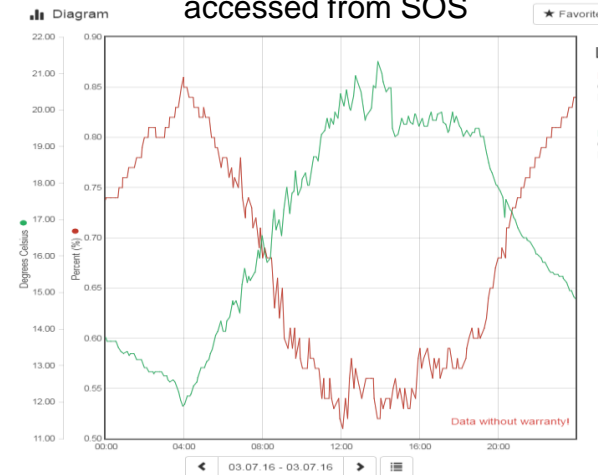
Future City Pilot 1 Scenario: Energy

- Provide better services to the citizens and the energy planners by making sophisticated solar potential analysis.

- Visualization of solar energy production for roofs and facades of building
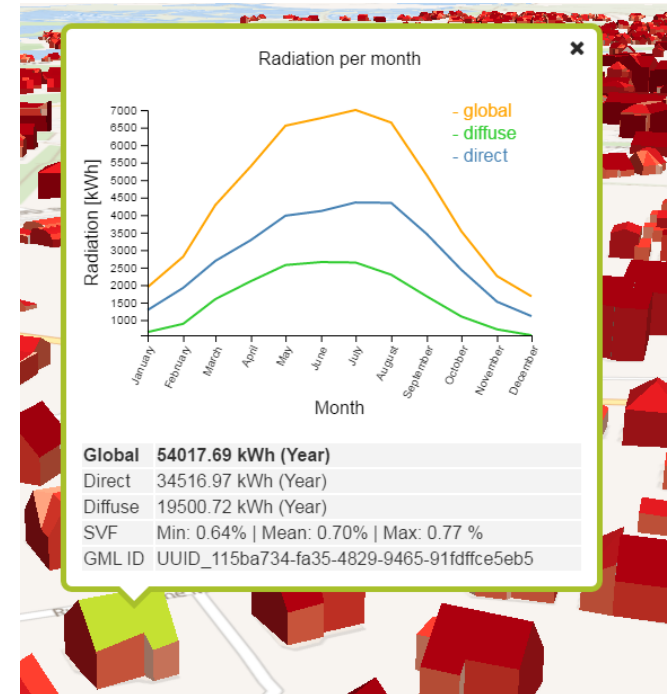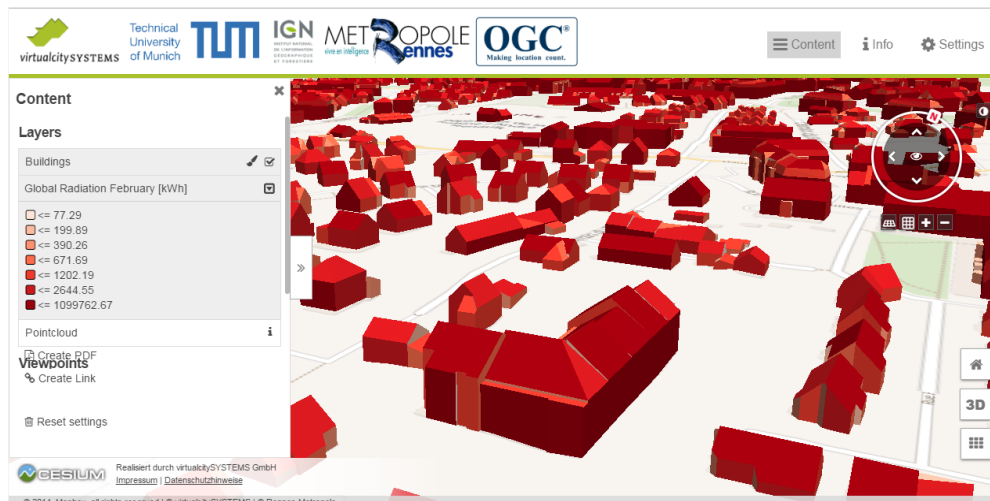
Plans for FCP Phase 2

- Call for Sponsors & Requirements 2017
- Also in the Geospatial, Civil Engineering & BIM
- Requirements are coming in
- Worldwide scope
- Include Indoor & Facility Management
  - VR, AR?
- Interested to sponsor or participate?
  - Let me know!

Location Powers: Underground

Tuesday 5th September 2017 0900 – 1700

http://www.locationpowers.net/

Geovation Hub, London, UK

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OGC Mobile Location Services Working Group

- Mission of MLS WG: to broaden the use of location-aware technologies in mainstream consumer and business IT infrastructures.
  - Identify MLS technology requirements and solutions
  - Encourage OGC WGs to progress key services and encodings
  - Make recommendations for adoption of mass-market, mobile location services standards.
- Focal point for complementary organizations, such as
  - W3C, OSGeo, Web3D Consortium, Eclipse Foundation
  - Open Mobile Alliance (OMA), Small Cell Forum, GSMA, CTIA
  - Location Based Marketing Association (LBMA)
  - In Location Alliance (ILA)

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OGC Tech Trends – March 2017

Geo Tech Trends

The Power of Location
- people who communicate digitally also tend to meet in person
- Location as an indicator of intent
- Statistics and Geography
- Human Geography

Spatial and Temporal Models
- Point clouds
- SLAM
- 3D Geo model creation
- BIM and GIS integration
- Indoor venue maps
- Indoor Positioining
- Dynamic Datums
- Time stamps to support analytics
- Dynamic Features: 4D Models and positioning
- Multiscale

Big Data
- Cloud and HPC
- Artificial Intelligence
- Workflow and provenance
- Big Data Analytics
- Modeling, Simulation and Prediction

Data Science Analytics
- Machine Learning
- Image processing
- Uncertainty, Veracity
- Conflation analytics
- Spatial-Temporal

Spatial Data on the Web
- Web Trends
- Map projections fit for purpose
- APIs for the Web
- Linked data
  - Text Analytics
  - Semantics
  - Linked Data

New Geo Sources
- IoT and Sensor Webs
- Opportunistic Sensing
- Crowdsourcing
- Volunteered Geographic Information
- UAVs and drones
- Smallsats
- Open Data

User platforms and networks - HSI
- Increasing mobile device capabilities
- Immersive Geo viz: VR, AR and Mixed Reality
- connectivity and bandwidth
- Automotive
- Ambient Services
  - Intelligent devices/AI

Software development
- Software patterns, e.g., federation, pub sub
- Software development trends affecting geospatial
- Blockchain and distributed ledger

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How to get involved?

- Ask for your solutions to be "open" standards compliant
- Become a member
- Join an OGC Forum
- Follow a Domain Working Group
- Visit us at the Technical Meetings in September in Southampton, UK
- Don't be passive, be part of standards innovation!

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Standards should be driven by innovation and achieved through collaboration

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