

# Accelerating Smart Cities with Location Standards

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The world's leading and comprehensive  
community of experts making location information:



Findable



Accessible



Interoperable



Reusable



**OGC**<sup>®</sup>

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Forum

Open  
Standards

OGC

# What is OGC?

**A Global consortium** representing over 500 industry, government, research and academic member organizations:

**A hub for thought leadership and innovation** for all things related to location

**A neutral and trusted forum** for tackling interoperability issues within and across communities

**A consensus-based open standards organization** for location information

<http://www.ogc.org>





# Location as Integrating Power for Smart, Safe and Resilient Cities

- Space and Time are the fundamental organizing principles for understanding the activities of people and the built environment of the places
- Location information provides critical insights for resource planning, delivery of citizen services and communication of key messages
- Urban Internet of Things (IoT) is emerging as an extremely effective method for sensing and responding to all types of situation: environmental, transportation, emergency management, public safety and disaster response



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## In plain English

- Where are citizens? Where are the city's resources?
- What's the city's landscape and how to visualize it?
- How are the networks connected?
- How is the infrastructure modeled?
- Where are the energy sources and how they're distributed?
- Where are the vehicles? Where are the ambulances?
- .....





## Workshop exploring

- Smart City indicators and Quality of Life
- CityGML & 3D
- IndoorML
- Moving Features
- Weather & the Smart City
- SensorThings & IoT
- Smart City Standards Architecture



# Fast Forward to 2019-20 Innovation Initiatives

## SCIRA

Public Safety for  
Smart Cities

[ogc.org/scira](http://ogc.org/scira)



## The OGC 3D Internet of Things Platform for Smart Cities Pilot

[ogc.org/3dplatform](http://ogc.org/3dplatform)



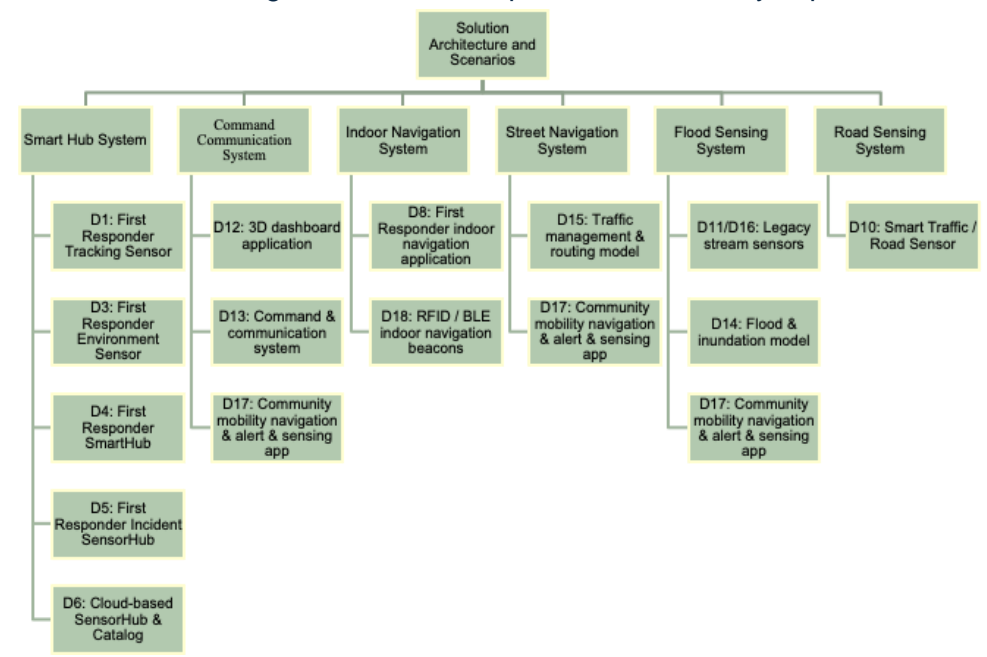
# Fast Forward to 2019-20 Innovation Initiatives

**SCIRA**  
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[ogc.org/scira](http://ogc.org/scira)



## Smart City Interoperability Reference Architecture (SCIRA) DHS S&T-funded Innovation initiative

- Interoperable framework, integrating commercial proprietary IoT sensors for public safety applications demonstrated via an operational exercise conducted in St. Louis involving first responders, emergency managers, and other city officials in real-life events such as floods and fires
- **Premise:** smart safe cities collecting and integrating information using standards, based on location, to be better informed and make wider decisions
- **Purpose:** advance standards for smart safe cities by providing a design toolkit for reusable sustainable incorporation of IoT sensors into City services
- **Outputs:** Deployment guides to use for planning, acquiring, and implementing standards-based, vendor-agnostic and future-proof smart safe city capabilities



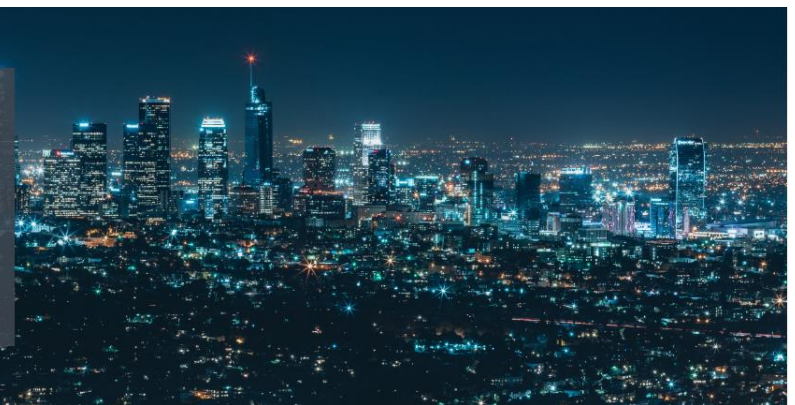


# Fast Forward to 2019-20 Innovation Initiatives

## SCIRA

Public Safety for Smart Cities

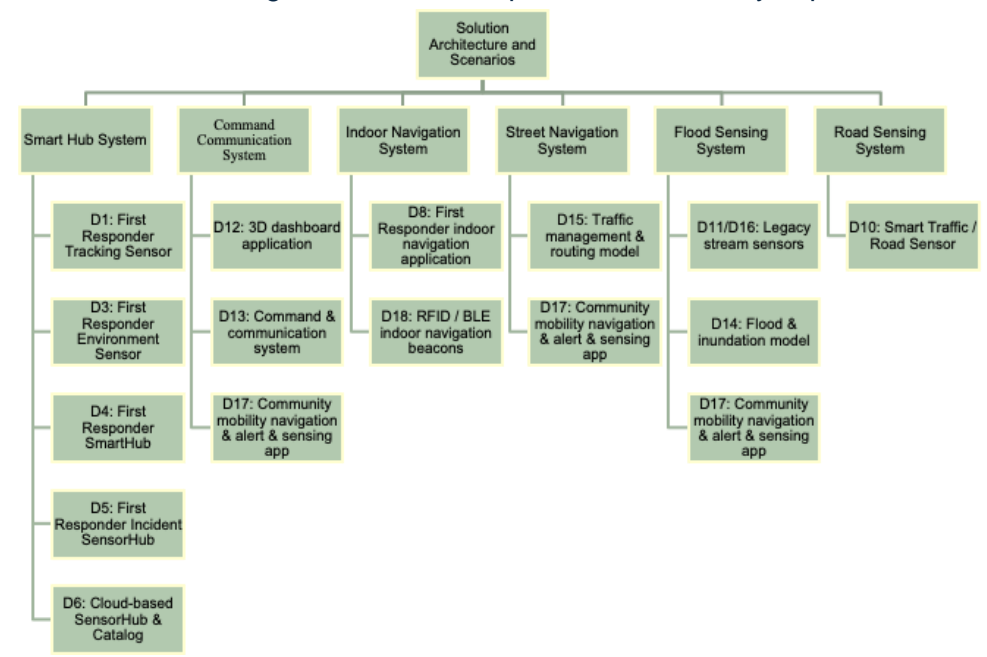
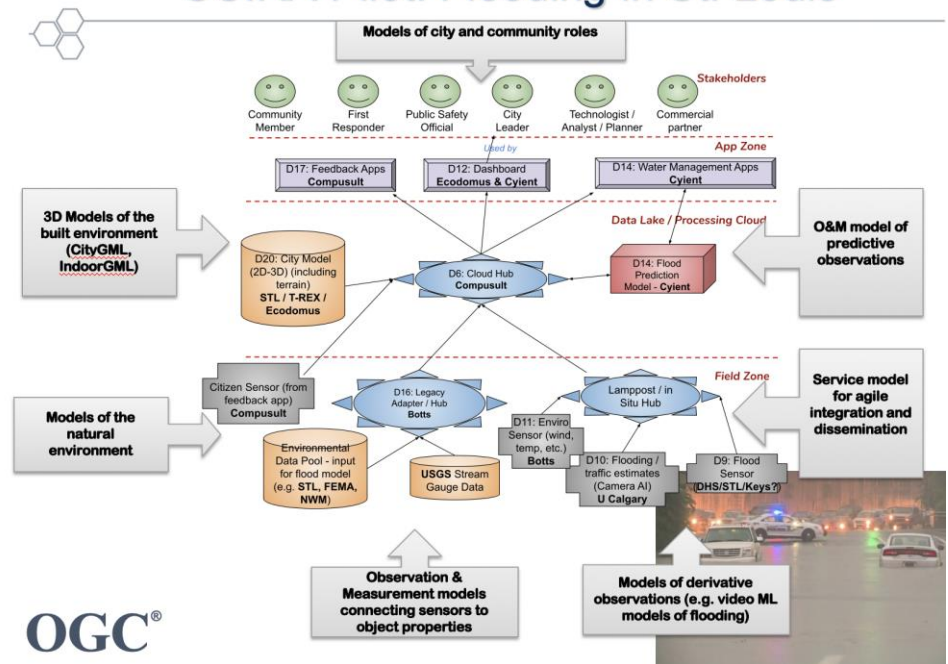
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### SCIRA Pilot: Flooding in St. Louis





# Fast Forward to 2019-20 Innovation Initiatives

## 3D IoT Platform for Smart Cities Pilot

- Advance the use of open standards for integrating environmental, building and IoT data in smart cities ; sponsored by the Korea Land and Housing Corporation
- **Scenarios:** Real-time monitoring on indoor occupancy (IndoorML + SensorThings) and real-time monitoring on micro-dust (CityGML + SensorThings) – with model provision and sensor aggregation via OGC feature and process services and APIs
- Underscored the importance of keeping the design, physical, and digital representations of built environment and environment sensing elements aligned with each other
- A significant part of the challenge accompanying the transition to smart buildings / districts / cities is retrofitting existing structures with sensing elements and digital "twin" model information



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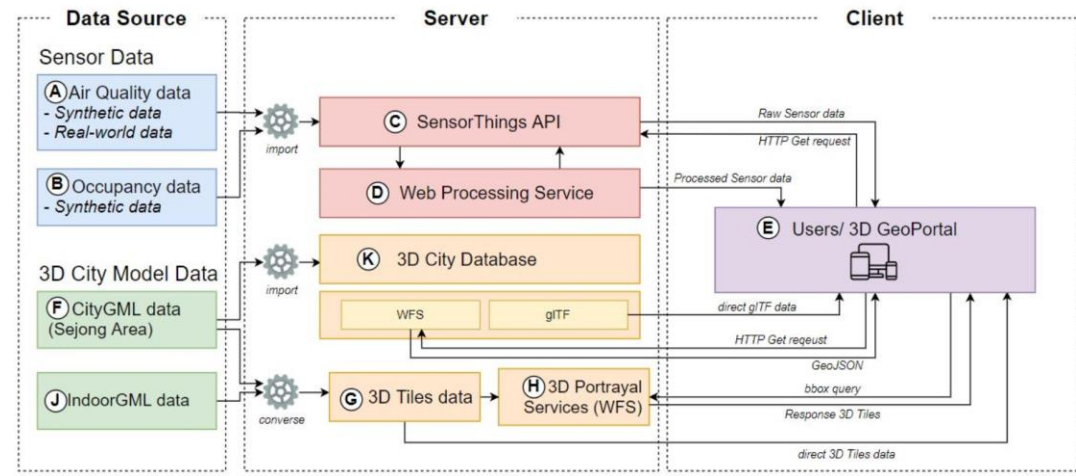


Figure 14. Overall architecture

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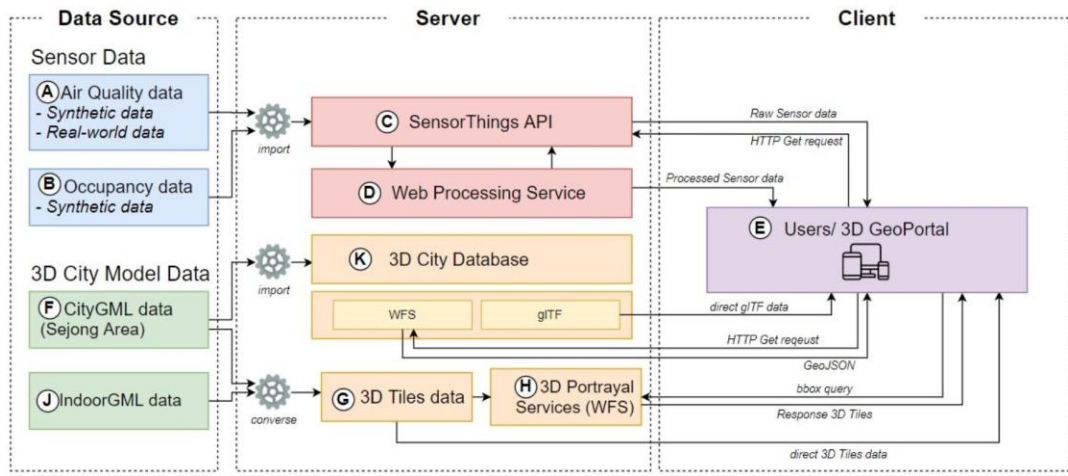
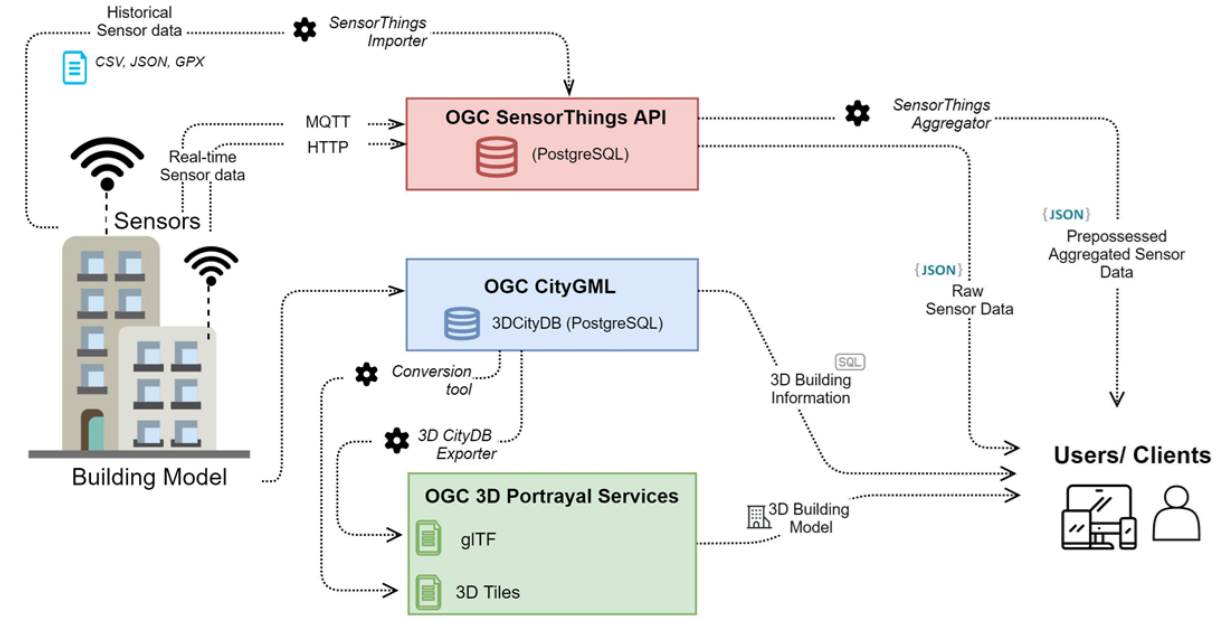


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# OGC Standards enabling to Smart Cities

## OGC Standards and Resources

<p><b>Standards</b></p>  <p>International standards that detail conceptual models, interfaces, or encodings to enable interoperability. <a href="#">View our standards.</a></p>	<p><b>Registries</b></p>  <p>Web accessible sources of information about things ("Concepts") the OGC defines or that communities ask that we host on their behalf. Applies FAIR principles for interoperability in systems. <a href="#">Visit the OGC Definition Server.</a></p>
<p><b>Engineering Reports</b></p>  <p>Developed in the OGC Innovation Program to highlight interoperability initiatives being completed by OGC and partners, the standards used, their importance, and potential impacts on the future. <a href="#">Read more about Engineering Reports</a></p>	<p><b>Discussion Papers</b></p>  <p>Technology issues being considered in the Working Groups of the OGC Technical Committee. They create discussion in the geospatial information industry. <a href="#">Read more about Discussion Papers</a></p>
<p><b>Best Practices</b></p>  <p>Member-agreed and approved documents describing the use of one or more OGC standards to address a domain-specific topic or provide a solution to an interoperability challenge. <a href="#">Read More on Best Practices</a></p>	<p><b>Community Practices</b></p>  <p>Documents describing implemented standards, specifications, or technologies that originate outside of OGC, but also address interoperability requirements in geospatial and related communities. Coming Soon</p>
<p><b>White Papers</b></p>  <p>Technology issues of interest to members of the OGC and the geospatial community at large. They provide necessary background to highlight and forecast information and trends. <a href="#">Read more about White Papers</a></p>	<p><b>OGC Reference Model</b></p>  <p>The OGC Reference Model (ORM) describes the OGC Standards Baseline focusing on relationships between the baseline documents. <a href="#">Read the ORM</a></p>

- CityGML – Open data model for storage and exchange of virtual 3D city models
- IndoorGML – Open data model for indoor spatial information
- 3D Tiles – Open data structure for streaming and rendering massive 3D geospatial content such as 3D buildings, BIM/CAD, and Point Clouds
- SensorThings – open way to interconnect IoT devices, data and applications over the Web
- Moving Features – standard encoding representation of movement of geographic features
- GeoPackage – open portable compact format for transferring geospatial information
- Observations and Measurements – standard for observations used in the Sensor Web Enablement suite of standards
- OGC APIs – new suite of resource-centric APIs developed to make it easy for anyone to provide geospatial data on the Web following modern web development practices
- ... and others currently under development like Model for Underground Data Definition and Integration (MUDDI)

<https://www.ogc.org/standards>





# What's next? Emergent Trend Clusters



Responding to COVID-19



Spatial Data on the Web



AI & Machine Learning



Connected Autonomous Vehicles



New Space Exploration



Geo IT Ethics



Cloud Native & Edge Computing



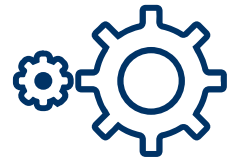
Geospatial Data Science



Immersive Geo: AR XR



Urban Digital Twin



Open API Management



Model Interoperability

OGC Tech Trends [www.ogc.org/OGCTechTrends](http://www.ogc.org/OGCTechTrends)



1. Development and maintenance of a comprehensive SMART Cities open standards framework that includes support integrating geospatial and built environment information, creation and application of detailed 3D urban models, and harnessing data from stationary and mobile sensors and Internet of Things (IoT) devices situated throughout cities.
2. Intensified push for rapid prototyping and engineering initiatives that join users and technology providers together to develop, test, validate and demonstrate potentially new standards-based solutions of relevance to city decision makers
3. Establishment of formal alliances / liaisons with key standards developing organizations and professional associations such to drive more comprehensive and coordinated solutions for cities.



# OGC



# Thank You!

## Community

- 500+ International Members
- 110+ Member Meetings
- 60+ Alliance and Liaison partners
- 50+ Standards Working Groups
- 45+ Domain Standard Working Groups
- 25+ Years of Not for Profit Work
- 10+ Regional and Country Forums

## Innovation

- 120+ Innovation Initiatives
- 380+ Technical reports
- Quarterly Tech Trends monitoring

## Standards

- 65+ Adopted Standards
- 300+ products with 1000+ certified implementations
- 1,700,000+ Operational Data Sets Using OGC Standards

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