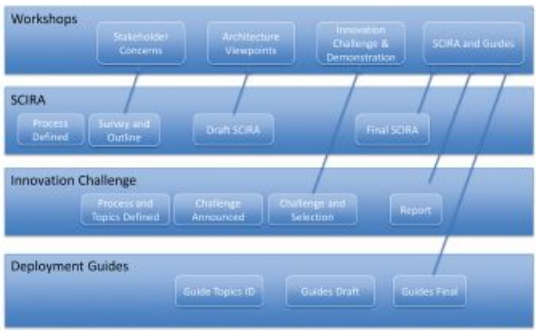
SCIRA - Guides for Smarter Cities



The Open Geospatial Consortium (OGC), with support from the US Department of Homeland Security (DHS), is currently leading a process to create a Smart City Interoperability Reference Architecture (SCIRA). SCIRA will provide free deployment guides and reusable patterns that municipalities can use to plan, acquire, and implement standards-based, cost-effective, vendor-agnostic, and future-proof smart city IT systems and networks using technologies such as Internet of Things (IoT), Sensor Webs, and Geospatial Information.

SCIRA defines interoperability requirements based on a system-of-systems approach, meaning that municipalities are able to build up smart cities one project at a time, safe in the knowledge that future expansions will work with, build upon, and gain value from the systems that they're implementing.

The SCIRA Deployment Guides aim to provide plain-language guidance on implementing the architecture, and will address a range of smart city functional areas, such as transportation and connectivity. Crucially, the guides will come in different forms for the different audiences relevant to smart city capability development, including City Managers, City IT Managers, City Innovators, DevOps Facilitators, and Commercial Providers.

A key emphasis of SCIRA will be to enhance community resilience in the face of human- or nature-caused emergencies and catastrophes, and to aid in the DHS First Responders Group's mission to "identify, validate, and facilitate the fulfilment of (first responders') needs through the use of existing and emerging technologies, knowledge products, and standards."

Open Standards, Open Options

Crucial to creating 'future proof' smart cities will be the incorporation of open interface and content standards in its solutions. When a solution is implemented using open standards, all it takes for any future project to be compatible is for it to be designed around open standards, too - which is a requirement achievable by any reputable vendor. By using open standards, even competing technology providers can create solutions that 'just work' with each other. This means that municipalities using open standards in their IT infrastructure are free to choose the most appropriate solution to derive value from their existing systems, rather than having to return to a single provider every time, commission potentially expensive data transformation systems, or at worst, start anew and render an old system obsolete.

OGC has decades of expertise in creating, maintaining, and guiding implementation of freely available open standards through its formal consensus-based Standards Program. Further, OGC's Innovation Program has run over 100 rapid, agile, collaborative prototyping and research initiatives that 'stress test' and refine new and evolving standards in real-world scenarios, making sure they continue to develop alongside changing technologies.

One recent example of an OGC Innovation Program initiative in the smart cities space is its successful Future Cities Pilot (FCP) Project. Phase 1 of FCP demonstrated how the use of geospatial and 3D building information data together can provide stakeholders with information, knowledge, and insight that enhance financial, environmental, and social outcomes for citizens. Phase 2 of FCP, currently underway, is aimed at improving the automation in the flow of data, as well as addressing a number of related interoperability challenges.

OGC also successfully completed an Incident Management Information Sharing Internet of Things Pilot Project (IMIS IoT Pilot) in 2016. The IMIS IoT Pilot produced initial specifications, profiles, best practices, and demonstration designs for connecting sensors and response information systems in a just-in-time fashion to aid in the management of a range of different incidents.

Additionally, the OGC Innovation Program is currently running an Underground Project that will lead to improved public safety, project delivery, and urban resilience from a secure 3D repository of urban underground infrastructure. An Underground Concept Development Study (CDS) paved the way for an Underground Pilot with a data content model known as the Model for

Underground Data Definition and Integration (MUDDI). The MUDDI is the starting point for a Workshop and Pilot, and will lead to verified, standards-based interoperability for 'smarter' underground projects in cities around the world.

Of course, there are many other organisations developing IT architecture guidance and standards for use in smart city deployments. As part of the SCIRA project, OGC is closely monitoring these developments and participating in the most promising ones. Part of the work of SCIRA will be to reconcile all of the many existing standards relevant to smart cities.

Steps to SCIRA

The first step to developing the Smart City Interoperability Reference Architecture began with an OGC Concept Development Study (CDS) that involved a Stakeholder Concerns Workshop which was held on 1-2 May 2018, at the Center for Innovative Technology (CIT) in Herndon, VA. The event was jointly organised by OGC's SCIRA initiative and The Smart City IoT Innovation (SCITI) lab of the Center for Innovative Technology (CIT).

The workshop was key to understanding municipal needs and constraints and was organised as a series of conversations to both 'teach and learn' from each other. Participants, including City Managers, City IT Managers, DevOps teams, and Municipal Innovation Leaders, were invited to share their experiences with smart city deployments, including successes and lessons learned. Through a combination of presentations and breakout sessions, the workshop identified the requirements, constraints, and measures of success for smart city innovation that were most important to city stakeholders - particularly from a perspective of repeatable innovation, deployment, and operations. Summaries of the findings and breakout sessions will be used to inform the next phases of SCIRA development.

An Architecture Viewpoints Workshop will also be held involving municipal leaders, first responders, and select stakeholders. This workshop will serve to gather input from participants on the draft SCIRA architecture, including initial contents of each viewpoint as well as its value to municipal planning for Smart City development. As with the Stakeholder Concerns Workshops, the Architecture Viewpoints Workshops shall seek to gather any lessons learned by people involved in existing smart city deployments.

Beginning Q3 2018, the SCIRA CDS will conduct an Innovation Challenge where participants will be challenged to find creative uses for municipal datasets that would make cities smarter and/or safer. The idea behind the Innovation Challenges is to have a fresh set of eyes create some innovative uses of data that weren't considered by the architects of SCIRA. The ideas generated will be used to update the SCIRA.

After the Innovation Challenges have run, a Deployment Guides Workshop will create the first versions of the deployment guides, consistent with the architecture up to that point in time. The guides will then be made available for immediate use by municipal IT decision-makers and DevOps staff. To remain in-step with technology trends, and to make sure that the guides are as beneficial as possible, they will continue to be refined over time. The Deployment Guides Workshop will occur in October 2018.

Refining SCIRA through Pilots

To best test and refine the architecture and deployment guides, OGC's Innovation Program will run a SCIRA Pilot. Starting from Q4 2018, the OGC Pilot will run across multiple cities and will refine elements of the architecture through implementation and testing in functional, 'real world' smart city applications.

This process of iterative refinement and interactive development will result in a reference architecture that is both feasible and effective for smaller municipalities to adopt. Further, the Pilots and deployment guides will reduce the risk that the reference architecture becomes simply 'shelf ware.' The Pilots will create prototype applications that help reduce risks and illuminate opportunities for key parts of the architecture, while the deployment guides will provide for key Smart City staff useful, practical, and actionable direction that is consistent with the reference architecture.

Smart city technology has the potential to simultaneously create efficiencies in governance while providing benefits in infrastructure resilience, public safety, and quality of life for all residents. But while implementing new technology always comes with risks, OGC's SCIRA aims to minimise those risks, and further the spread of beneficial technologies, by providing a freely usable, easily accessible, and proven-working model that will help municipalities of almost any size develop their strategies to achieve a future-proof and budget-friendly smart city implementation.

If you're interested in contributing to any SCIRA activities, please let OGC knowhowand what you wish to contribute by contacting mjlieberman@opengeospatial.org. More information on SCIRA, including the ability to sign up to a regular newsletter, is available on the SCIRA webpage.

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