

Proposal for a European Interoperability Framework for Smart Cities and Communities (EIF4SCC)

The aim of the EIF4SCC is to provide leaders of EU local administrations with definitions, principles, recommendations, practical use cases drawn from cities and communities from around Europe and beyond, and a common model to facilitate delivery of services to the public across domains, cities, regions and borders.



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In recognition of the importance of interoperability and the specific challenges it presents in a city context, The Commission (DG DIGIT and DG CONNECT) appointed Deloitte and KU Leven to prepare a **“Proposal for a European Interoperability Framework for Smart Cities and Communities”**. While an EIF for eGovernment has been in place since 2010, this is the first time the concepts and ideas developed there have been adapted to the local context.

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Source: European Commission

The framework was developed by building on and finding complementarities with previous and ongoing initiatives, such as the Living-in.EU movement, the 2017 European Interoperability Framework (EIF), the Minimal Interoperability Mechanisms (MIMs Plus) and the outcomes of EU funded initiatives (e.g. Connecting Europe Facility (CEF) Digital Building Blocks, Smart Cities Marketplace,

Intelligent Cities Challenge, Digital Transition Partnership under the Urban Agenda) and EU funded projects (Synchronicity, Triangulum, etc.).

Why do cities and communities need interoperability?

The EIF4SCC aims to provide a generic framework of interoperability of all types, and how it can contribute to the development of a Smart(er) City/Community. **This will pave the way for services for citizens and business to be offered not only in a single city, but also across cities, regions and across borders.**

European Interoperability Framework for Smart Cities and Communities

The EIF4SCC includes **three concepts** (interoperability, smart city or community, EIF4SCC), **five principles** (drawing on the Living-in.EU declaration), and **seven elements** (consisting of the five components of interoperability, one cross-cutting layer – Integrated Service Governance, and a foundational layer of Interoperability Governance).



Source: European Commission

Components of Interoperability

The Proposal for an EIF4SCC identified five facets of interoperability that are important in a city and community context. These are similar to the interoperability 'layers' in the 2017 European Interoperability Framework, with the addition of cultural interoperability. The report provides examples from EU cities to illustrate how these apply in practice.

- **Technical interoperability** refers to the inclusion of interface specifications, interconnection services, data integration services, data presentation and exchange, and secure communication protocols. Open technical specifications should be tailored to the specific context in which they will be used. For example, the Minimal Interoperability Mechanisms (MIMs Plus) and the CEF Building Blocks, based on commonly agreed open standards and open technical specifications, ensure interoperability of data, systems, and services between cities and suppliers around the world, and can guide those working on interoperability in a smart city ecosystem.
- **Semantic interoperability** means that the format and meaning of exchanged data and information is preserved and understood during exchanges between individuals and organisations. Semantic interoperability includes both semantic and syntactic aspects. The semantic aspect refers to the meaning of elements of data and the relationship between them, and includes data models, controlled vocabularies and common code lists to describe data exchanges. The syntactic aspect refers to the exact format of the information to be exchanged in terms of grammar and format.
- **Organisational interoperability** refers to the way in which organisations align their processes, responsibilities and expectations to achieve commonly agreed goals. Organisational interoperability means documenting, integrating or aligning processes and exchanging relevant information. Active involvement of the user community in co-creation of solutions is part of the organisational interoperability component.
- **Legal interoperability** means ensuring that individuals and organisations, be they public or non-public organisations, operating under different legal and regulatory frameworks, procurement rules, policies and strategies, can work together. Policies, regulations and legislation should enable the establishment of services within and between cities and communities. There should be clear agreement on how to deal with differences in policies, regulations and legislation, including the option of new policies, regulations and legislation. The

sharing of data is for example strongly influenced by legal interoperability, as this requires the development and use of data licenses.

- **Cultural interoperability** refers to steps taken by individuals and organisations to take into consideration their social and cultural differences and, if applicable, organisational cultural differences.
- The foundational layer of **interoperability governance** is key to a holistic approach to interoperability. It refers to decisions on interoperability frameworks, institutional arrangements, organisational structures, roles and responsibilities, policies, agreements and other aspects of ensuring and monitoring interoperability at local, national and EU levels. In order to implement these types of interoperability across the complex environment of a city, the proposal includes a conceptual model for Integrated Service Governance, which local authorities can adapt to suit the specific structures within their organisations.

Conceptual Model for Integrated Service Governance in a Smart City or Community (SCC)

To ensure that EU local administration leaders can easily apply the EIF4SCC to their city or community, a conceptual model for integrated service governance was developed. This conceptual model presents the governance support required for the coordination of activities.



The 2017 European Interoperability Framework refers to the public nature of services and states that European public service provision often requires public administrations to work together to meet end-users' needs and provide **public services in an integrated way**. However, acknowledging the role of non-public administration actors in providing services in the context of a smart city or community, the concept *public* is removed. As a substantial amount of data and information in a smart city context is out of the hands of public administrations, the Integrated Service Governance has to take a broader view.

Integrated Service Governance refers to the governance context and encompasses all components of interoperability: cultural, legal, organisational, semantic and technical. Ensuring interoperability when establishing the cultural context, preparing legal instruments, organising collaboration processes, exchanging data and information, in the delivery of SCC services is a continuous task. Integrated service governance results in an integrated service pathway and shared workflows.

The model contains six essential elements:

1. **Service Users** - inhabitants, visitors, business, organisations and administrators should play an active role in the co-creation of smart city and community services. Service Users can provide their input digitally, leading to improved services offered to them. This dynamic implies a continuous exchange of data, guaranteeing security and privacy.
2. **Integrated SCC Services** - Integrated SCC Services may be offered by the public sector or through collaboration between the public and non-public sector. Examples range from the development of services that are cloud-based and provide a user-friendly interface for Service Users to the development of a Local Digital Twin. A Digital Twin is a digital copy of the city or community that allows policy decisions to be tested in a digital environment. These services can make use of building blocks that are available for reuse. Examples of such building blocks are the ISA² solutions and the Connecting Europe Facility (CEF) Building Blocks, which offer basic capabilities and can be used in any European project to facilitate the delivery of digital public services across borders. Examples of ISA² and CEF Building Blocks include the Core Vocabularies, eSignature and eInvoicing.
3. **Service Providers** - both public and private, provide a variety of services to Service Users

within a city or community. These range from the registration of the birth of a child, to waste collection the management of the streetlights. The interaction between Service Providers and Service Users in the smart city context can occur within a Common SCC Council. The Council brings together these actors and can help to identify service needs, plan their implementation, execute service provision and evaluate outcomes.

4. **Data Sources & Services** - There are many data sources within a city including administrative data, scientific data, crowd-sourced and statistical data, data collected via Internet of Things or data collected via environmental and urban sensors or data generated by people in the city. Data can be classified as open, shared or closed, depending on ownership, privacy and security considerations. Data can be shared between public and non-public actors in the smart city or community to improve service delivery. Services can also be open, shared or closed. Open and shared services, developed by the European Commission and national, regional and local administrations, are available to both public and non-public actors for reuse (for example the CEF Building Blocks). They allow Service Providers to offer integrated services in a cost-effective and standardised way, leading to greater efficiency for Service Providers, and to possible increased user-friendliness for Service Users. Data and services are exchanged by public and private actors through a **Common Smart City or Community Data Platform**, also known as a **Local Data Platform**. All kinds of data available and created in a city can be offered for reuse through the Data Platform under specific reusability conditions. Service Users also play a key role in the Data Platform by generating data through their activity with the city and the use of services offered by Service Providers. The privacy and security of data is of crucial importance and can be facilitated and controlled by the Data Platform.
5. **Technology** - allows for the collection, storing, sharing, updating and preservation of data, and creates the possibility to build reusable services. It allows Service Providers to create services and allows users to take an active role in the creation of those services. Examples of technologies relevant in a SCC context are Artificial Intelligence, Big Data, Blockchain, cloud computing, High Performance Computing, Digital Twins, Data platforms, Internet of Things, Mobile applications, etc.
6. **Security & Privacy** - are primary concerns in the provision of services, and both the public administration and non-public actors must ensure that a privacy-by-design and security-by-design approach is followed. Services should not be vulnerable to attack and must be compliant with contractual and legal obligations regarding data protection and privacy.

Next steps

The European Commission encourages local administrations at regional, city and community level to review the Proposal for a European Interoperability Framework for Smart Cities and Communities (EIF4SCC) and the accompanying Study Report which details the methodology, literature review, and stakeholder engagement process undertaken. The Proposal for an EIF4SCC will be discussed through the Living-in.EU community and through other fora, with a view to its adoption as an official Commission document, based on users' and stakeholders' feedback.

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