Interoperability in practice: results from SynchroniCity project

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SynchroniCity aims at delivering a Single Digital City Market for Europe by piloting its foundations at scale in reference zones across 8 European cities, involving also other cities globally.

It addresses how to incentivise and build trust for companies and citizens to actively participate, in finding common co-created IoT solutions for cities that meet citizen needs and to create an environment of evidence-based solutions that can easily be replicated in other regions.
SynchroniCity Framework principles

• **Open Architecture and Open API** – no vendor lock-in, no city lock-in

• **Interoperability, replicability** and **reusability** across the cities and across sectors.

• **Reuse** of existing and standard approaches

• **Compliance** with existing technologies of the cities

• **OASC principles** and the definitions of Minimal Interoperability Mechanisms (MIMs)
SynchroniCity architecture and Interoperability Points

- **Interoperability Points** represent the main interfaces that allow a city (or any Reference Zone, RZ) and applications to interact with SynchroniCity platform.

- Interoperability points are independent from the specific software components that realize them and can be implemented by cities in different steps to reach different levels of compliance.

- The architecture has been designed following the OASC principles and the definitions of **Minimal Interoperability Mechanisms** (MIMs). MIMs, are the actual specifications of the interfaces at the Interoperability Points: they are standard API and guidelines that have to be implemented by a city in order to be compliant with the SynchroniCity framework.
## Interoperability Mechanisms

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification document (synchronicity-iot.eu/docs/)</th>
<th>Related Standards [and Baselines]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Context Management API</td>
<td>This API allow to access to real-time context information from the different cities.</td>
<td>Reference Architecture for IoT Enabled Smart Cities (D2.10)</td>
</tr>
<tr>
<td>Shared data models</td>
<td>Guidelines and catalogue of common data models in different verticals to enable interoperability for applications and systems among different cities</td>
<td>Guidelines for the definition of OASC Shared Data Models (D2.2)</td>
</tr>
<tr>
<td>Ecosystem Transaction Management (“Marketplace”)</td>
<td>It exposes functionalities such as catalogue management, ordering management, revenue management, SLA, license management etc. Complemented by marketplace for hardware and services.</td>
<td>Basic Data Marketplace Enablers (D2.4)</td>
</tr>
<tr>
<td>Security API</td>
<td>API to register and authenticate user and applications in order to access to the SynchroniCity-enabled services.</td>
<td>Reference Architecture for IoT Enabled Smart Cities (D2.10)</td>
</tr>
<tr>
<td>Data Storage API</td>
<td>This API allows to access to historical data and open data of the reference zones.</td>
<td>Reference Architecture for IoT Enabled Smart Cities (D2.10)</td>
</tr>
</tbody>
</table>
Synchronicity results: data interoperability

~ 30 Common data models, already adopted by Cities and applications, coming from existing initiatives and developed by SynchroniCity partners

https://gitlab.com/synchronicity-iot/synchronicity-data-models

~ 200K entities published by Cities compliant with SynchroniCity specifications

Synchronicity results: software components

~ 11 Atomic services: generic components based on SynchroniCity specifications useful to build applications and services

Open source components: to simplify the deployment of a ready-to-use SynchroniCity framework

https://gitlab.com/synchronicity-iot
Synchronicity results: Ecosystem transaction management

- to deliver a Digital Single Market for IoT-enabled smart cities in Europe and beyond.
- to open innovation ecosystem around the proposed digital single smart city marketplace.
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