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Chair, Open & Agile Smart Cities (OASC)

Coordinator, SynchroniCity / NGIoT
Chair, Danish Standards Committee on SCC (ISO TC268)
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Mission: To create a global smart city market based on the needs of cities and communities
—
Demand-side
—
Global network of national networks
—
124 cities
25 countries
Europe, Latin America, Asia-Pacific
—
Council of Cities Coordinator: Ghent
BoD representative: Carouge (Geneva)
OASC and SynchroniCity support the Declaration of IoT for Sustainable Development

1. Promoting the development and adoption of IoT technologies for the benefit of humanity, the environment and sustainable development. This includes promoting policies to facilitate research, innovation, and development of new solutions and enabling policies that support job creation. Enhancing economic growth in the IoT sector and reducing the digital divide between developed and developing countries is vital, to ensure the benefits of IoT technologies are accessible to all. IoT technologies can improve access to basic services, such as water and sanitation, and can contribute to achieving the United Nations Sustainable Development Goals (SDGs).

2. Ensuring the implementation of the IoT in urban and rural contexts to foster the application of IoTs in improving services to build smarter and more resilient cities and communities. This includes the development of IoT-based solutions that can improve the quality of life for all individuals, by promoting accessibility, enhancing public safety, and improving the efficiency of services. IoT technologies can significantly contribute to reducing poverty and improving health outcomes in rural and remote areas.

3. Promoting a broad, vibrant, and secure ecosystem for IoT, including support for start-ups and investors. This includes promoting policies to facilitate research, innovation, and development of new solutions and enabling policies that support job creation. Enhancing economic growth in the IoT sector and reducing the digital divide between developed and developing countries is vital, to ensure the benefits of IoT technologies are accessible to all. IoT technologies can improve access to basic services, such as water and sanitation, and can contribute to achieving the United Nations Sustainable Development Goals (SDGs).

4. Encouraging the development and implementation of standards that facilitate interoperability among IoT technologies and solutions. In order to pave the way to an open and interoperable IoT ecosystem, rapid, cost-effective solutions in line with the vision for an open economy.

5. Adopting new and innovative IoT applications to deal with challenges associated with hunger, water supply, and food security through resource monitoring and crop yield models. IoT technologies can detect and monitor crop health, water usage, and disease outbreak, which can help farmers make informed decisions and improve crop yields. IoT technologies can also be used for remote monitoring of livestock and fish, which can help reduce animal disease and improve productivity.

6. Supporting innovation in the use of IoT for risk reduction and climate change mitigation. IoT technologies can help in the early detection and mitigation of natural disasters, such as floods, hurricanes, and earthquakes. IoT sensors can be used to monitor weather conditions and predict extreme weather events, allowing for early warning systems to be put in place. IoT technologies can also be used for smart irrigation, which can help reduce water waste and improve crop yields.

7. Identifying and supporting the growing trend of using IoT technologies for education and improving the access to educational content and educational resources for all learners. IoT technologies can be used to create interactive and engaging learning experiences, allowing for personalized learning and real-time feedback. IoT technologies can also be used to create virtual classrooms and interactive educational programmes for vulnerable segments of society.

8. Embracing the application of IoT for biodiversity conservation and ecological monitoring. IoT technologies can help in the monitoring of endangered species and their habitats, allowing for the early detection of threats and the implementation of conservation measures. IoT technologies can also be used for the monitoring of pollution levels and the measurement of greenhouse gas emissions.

9. Contributing to global research and discussion on all green smart and sustainable cities through global initiatives. The collaborative framework of SynchroniCity is designed to facilitate global research and discussion on IoT technologies, allowing for the sharing of best practices and the development of new solutions. The framework has the ability to gather and analyse real-time information for practical purposes and to respond to new challenges and opportunities.

10. Promoting international dialogue and cooperation on the IoT for sustainable development. This includes promoting policies and enabling environments that foster the development and adoption of IoT technologies in developing countries. IoT technologies can help in the reduction of poverty and the improvement of health outcomes in developing countries. IoT technologies can also be used for the monitoring of natural resources and the implementation of sustainable development policies.
International Body Impact Award

The winner is...
Cities need strong support for digital transition in the next long-term budget

The digital transition is currently revolutionising European cities. It is transforming service delivery locally with the potential of creating better and more accessible services at lower operating costs to the benefit of citizens. At the same time, it is a long term process, which will require sustained support in the coming years to fully reap the potential benefits and ensure all cities across Europe are on track.

The digital transition processes and initiatives are planned over several years. They are complex and cross-functional. One major challenge for cities is to create or identify budget resources that match the nature of the transition process. Funding tools must support a mixed approach. It is not enough to invest in IT infrastructure. We need to invest in people too. The development of digital skills and improving qualifications will be a vital step in ensuring the competitiveness of the European economy and overcoming the digital divide in the EU. We also need substantial investments in emerging technologies, which have the potential to fully transform the urban environment and our economy. This cross-functional approach is a challenge to current funding programmes and financial instruments at EU level.

The Digital Transition Partnership, with the support of EUROCITIES, OASC and CEMR, calls for a financial framework supporting cities and regions in digital transition to be ensured, as part of European policy and the post-2020 budget.

We strongly support the Commission’s proposal for a Digital Europe Programme, which is an important step in the right direction. In addition, we emphasise that the EU’s cohesion policy must also provide strong support to digital transition, as included in the Commission’s proposals on ERDF (policy objective 1).

We recommend maintaining the proposed programmes and level of budget allocation to ensure essential funding for digital transition in Europe. Empowering cities and regions through financial resources will, in turn, stimulate the market and support European businesses to develop new innovations and create new business opportunities for global digital markets.

A robust model for standards-based innovation and procurement of IoT- and AI-enabled services across domains
Why standards?

Supply-side
• Reusability, replicability, scalability
  → Scale, agile development/deployment

Demand-side
• Replaceability, portability, comparability
  → Choice, efficiency, value-for-money, independence

Both
• Interoperability
  → Reduced risk, increased investments, innovation
Common Technical Ground

1. **OASC** neutral branding (based on standards and consensus specifications)
2. **OASC** Minimal Interoperability Mechanisms (MIMs)
   - Context Information Management
   - Common data models
   - Ecosystem Transaction Management (marketplaces)
3. **SynchroniCity** reference implementation (standards-based)
4. **SynchroniCity** cloud hosting (option)
SYNCHRONICITY

IoT Large-Scale Pilot for Smart Cities & Communities
Deliver a market for IoT- and AI-enabled services for cities & communities in Europe and beyond
piloted in the framework of SynchroniCity
Project Objectives

1. Establish technical foundations
2. Establish marketplace enablers
3. Create reference zones
4. Pilot services that serve citizen needs
5. Establish ecosystem
6. Establish citizen-oriented methods
7. Establish holistic quantification of value
8. Provide insights into new business models
9. Transform city policy-making and planning
APPLICATION DEMOS

1. Carouge, Geneva, Switzerland
2. Helsinki, Finland
3. Manchester, UK
Privacy App

Mandat International - Confidential
Privacy App

Category: Noise sensor
Purpose: Street noise monitoring in three dimensions.
Description: Noise sensor measuring the sound level (dBA).
Data controller: City of Carouge
Retention period: 6-12 months
Location: 46.190125 latitude 6.134022
Legitimate interest: Public health
Recipient: Internal use only
Crossborder transfer: None
Picture:
QR codes for the app
SYNCHRONICITY opens up a global IoT market where cities and businesses develop shared digital services to improve the lives of citizens and grow local economies.

CLOSED SEPTEMBER 30!

OPEN CALL 1st JUNE 2018

TARGET

SME

CONSORCIA

IoT SOLUTIONS

FUND 3M€

CITIES

Helsinki
Manchester
Eindhoven
Antwerp
Carouge
Milan
Santander
Porto

SYNCHRONICITY-IOTEU
@SynchroCityIot
@SyncCityIoT

www.synchronicity-iot.eu
New pilots selected

- 16 pilot groups (out of 133)
- 18 cities (out of 55)
- **39 pilot deployments**
- 6 months to deploy
- Common technical ground

Integrates architectures between SynchroniCity (Smart Cities) and IoF2020 (IoT LSP Food & Farming) and many other initiatives.
**SynchroniCity Architecture Model**

- **IoT Management**: to interact with the devices that use different standards or protocols making them compatible and available to the SynchroniCity platform.

- **Context Information Management**: to manage the context information coming from IoT devices and other public and private data sources.

- **Data Storage Management**: to provide functionalities related to the data storage and data quality interacting with heterogeneous sources.

- **Marketplace**: to implement a hub to enable digital data exchange for urban data and IoT capabilities providing features in order to manage asset catalogues, orders, revenue management.

- **Security**: to provide crucial security properties such as confidentiality, authentication, authorization, integrity, non-repudiation, access control, etc.

- **Monitoring and Platform management**: to provide functionalities to manage platform configuration and to monitor activities of the platform services.

Baseline: SynchroniCity Cities/Reference Zones, OASC, FIWARE, EIP-SCC, NIST IES-CF.


Spec. doc.: Reference Architecture for IoT Enabled Smart Cities (D2.10) [http://synchronicity-iot/docs](http://synchronicity-iot/docs)
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>Interoperability Point</th>
<th>Description</th>
<th>Specification document (synchronicity-iot.eu/docs)</th>
<th>Related Standards [and Baselines]</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Context Information Management</strong></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>
<td>ETSI NGSI-LD API, ITU-T SG20*/FG-DPM* [FIWARE NGSI]</td>
</tr>
<tr>
<td><strong>Shared Data Models</strong></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) Catalogue of OASC Shared Data Models for Smart City domains (D2.3)</td>
<td>[SAREF, FIWARE, GSMA, schema.org, SynchroniCity RZ + partner data models]</td>
</tr>
<tr>
<td><strong>Ecosystem Transaction Management (“Marketplace”)</strong></td>
<td>It exposes functionalities such as catalogue management, ordering management, revenue management, Service Level Agreements (SLA), license management etc. Complemented by marketplaces for hardware and services.</td>
<td>Basic Data Marketplace Enablers (D2.4) Guidelines for the integration of IoT devices in OASC compliant platforms (D2.6)</td>
<td>[TM Forum API, FIWARE Business Ecosystem and Marketplace Enablers API, SynchroniCity API]</td>
</tr>
<tr>
<td><strong>Security API</strong></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>
<td>OAuth2</td>
</tr>
<tr>
<td><strong>Data Storage API</strong></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>
<td>ETSI NGSI-LD, DCAT-AP [CKAN]</td>
</tr>
</tbody>
</table>
3 Steps to Getting Cities Ready

1. Become part of Synchronicity
2. Enable Digital Single Market
3. Integrating with marketplace
Marketplaces (ETM)

- Data
- Services
  - Applications
  - Atomic services
  - Components
- Hardware
- Training
  - On-site
  - Online

These marketplaces are already live in SynchroniCity and partly in IoF2020 (IoT LSP Food & Farming)
Atomic and Application Services

- **End-users**
- **Smart City Applications (City Services)**
  - Multi-modal assistant
  - Parking
  - Bicycle mobility
  - Environment monitoring
  - Cyclist routing
  - Policy team creation
  - Traffic management
  - Energy management
  - Atomic Service
  - Atomic Service
  - Atomic Service
- **City Policy creation**
- **Citizen engagement**
- **Environment monitoring**
- **Cyclist routing**
- **Policy team creation**
- **Traffic management**
- **Energy management**
- **Atomic Service**
- **Atomic Service**
- **Atomic Service**

**Requirements**
- T3.1
- T3.2
- T3.3
- T3.4

**Use Cases**
- Atomic and Application Services
- Security APIs
- Data Marketplace APIs
- Context management APIs
- Data Storage APIs
- Northbound Interfaces

**Roadmap**
Value proposition (1)

Supply-side:
• Scale, agile development/deployment

Demand-side:
• Choice, flexibility, efficiency, value-for-money, independence, economic development

All:
• Reduced risk, increased investments, innovation
Value proposition (2)

- A path from R&I to implementation (+ link AI, 5G, edge)
- Standards-based innovation and procurement across domains
- A common technical ground based on minimal interoperability and city needs
- Emerging standards
- Market validation
- Privacy, trust, security, GDPR compliance
Open? Free?

• Data
• Source
• APIs
• Licenses

Who owns the data, infrastructure?
How to balance security and surveillance?
Who facilitates trust, shares risk?

Up to you!
Cities and communities are different

Organicity
Approach comparison

- Minimal vs. complete
- Architecture framework model vs. reference architecture
- Market enablers vs. challenge-driven (context is king)
- Validated by implementation vs. by committee
- Global vs. national/regional
- Transparent inspection vs. black box
Key events 2019

• Digital Transformation World, Nice, May 14-16
• World Economic Forum U20 (Mayors Summit) → G20, Tokyo/Osaka, Japan, May/June
• IoT Week 2019, Aarhus, Denmark, June 17-21
• Finnish EU Presidency Programme, H2, 2019
• Smart City Expo, Barcelona, November 19-21
• Connected Smart Cities & Communities, Brussels, January 23, 2020