# SYNCHRONICITY

# Interoperability in practice: results from SynchroniCity project

### **IOT Week** Aarhus, 19<sup>th</sup> June, 2019



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# SynchroniCity

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

It addresses how to <u>incentivise and build trust</u> for companies and citizens to actively participate, in finding <u>common co-created IoT solutions</u> for cities that meet citizen needs and to create an environment of <u>evidencebased solutions</u> that can easily be replicated in other regions.

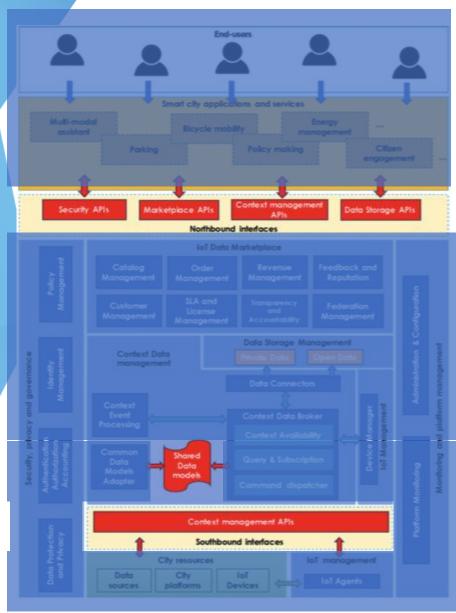


# SynchroniCity Framework principles

- 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**

	Description	Specification document (synchronicity-iot.eu/docs/)	Related Standards [and Baselines]	
Context Management API	This API allow to access to real-time context information from the different cities.	Reference Architecture for IoT Enabled Smart Cities (D2.10)	FIWARE NGSIv2, ETSI NGSI-LD API, ITU-T SG20*/FG- DPM*	
Shared data models	Guidelines and catalogue of common data models in different verticals to enable interoperability for applications and systems among different cities	Guidelines for the definition of OASC Shared Data Models (D2.2) Catalogue of OASC Shared Data Models for Smart City domains (D2.3)	[FIWARE, GSMA, schema.org, Saref, SynchroniCity RZ + partner data models]	
Ecosystem Transaction Management ("Marketplace")	It exposes functionalities such as catalogue management, ordering management, revenue management, SLA, license management etc. Complemented by marketplace for hardware and services.	Basic Data Marketplace Enablers (D2.4) Guidelines for the integration of IoT devices in OASC compliant platforms (D2.6)	[TM Forum API]	
Security API	API to register and authenticate user and applications in order to access to the SynchroniCity-enabled services.	Reference Architecture for IoT Enabled Smart Cities (D2.10)	OAuth2	
Data Storage API	This API allows to access to historical data and open data of the reference zones.	Reference Architecture for IoT Enabled Smart Cities (D2.10)	ETSI NGSI-LD, DCAT-AP [CKAN]	

# Synchronicity results: data interoperability

#### List of SynchroniCity Data Models

The following table shows the list of SynchroniCity data models. For each one is also defined the approval status:

 Approved: the data model has been officially adopted by SynchroniCity and used by the Reference Zones (Cities) of the project
 Under Discussion: the data model is under discussion: SynchroniCity partners and external stakeholders can suggest changes or extensions. The data model could be used but cannot be considered stable.

Vertical	Data Model	Description	
Environment	AirQualityObserved	It represents an observation of air quality conditions at a certain plac and time	
Environment	nment NoiseLevelObserved It represents an observation of those parameter pressure levels at a certain place and time		
PointOfInterest	PointOfInterest	A harmonised geographic description of a Point of Interest	
PointOfInterest	Beach	A harmonised geographic description of a beach	
PointOfInterest	Museum	A harmonised geographic description of a museum	
PointOfInterest	Store	A harmonised geographic description of a store	
Transportation	BikeHireDockingStation	A bike hire docking station where subscribed users can hire and return a bike.	
Transportation	TrafficFlowObserved	An observation of traffic flow conditions at a certain place and time.	
Transportation	EVChargingStation	A public charging station supplying energy to electrical vehicles.	

**~ 200K entities** published by Cities compliant with SynchroniCity specifications <u>https://synchronicity-iot.eu/tech/data-and-services/</u>

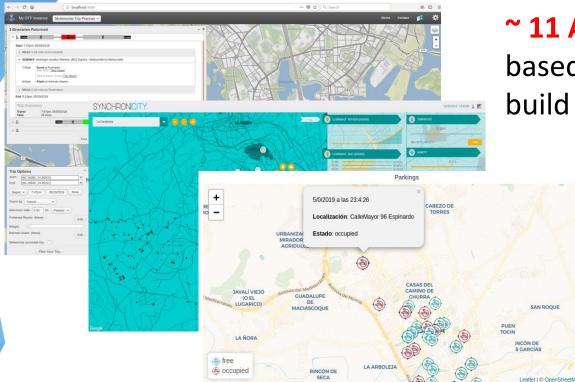
~ **30 Common data models**, already adopted by Cities and applications, coming from existing initiatives and developed by SynchroniCity partners

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



# Synchronicity results: software components

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

https://gitlab.com/synchronicity-iot

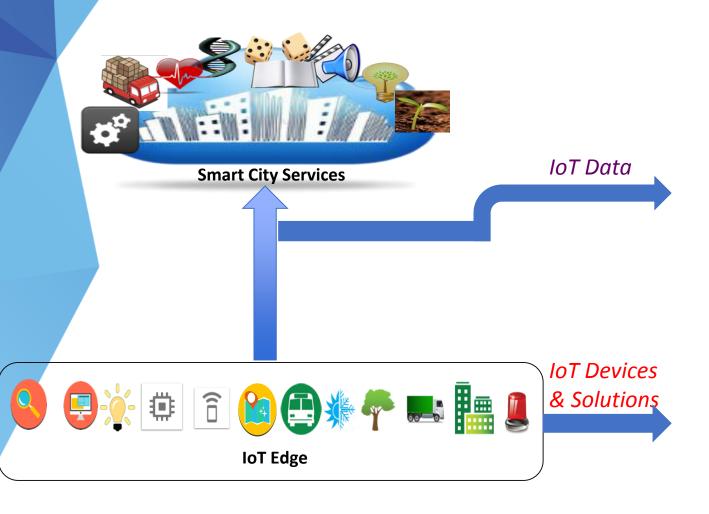
~ 11 Atomic services: generic components based on SynchroniCity specifications useful to build applications and services

	SYNCHRONI	CITY			Docs Aplary Site GitHub					
	Getting Started Download Run Sandbox Baseline NGSI Historical NGSI	Prerequisites Docker Docker Dockerversion Dockerversion Dockerversion Git Git Internet connect	se 1.22.0 or newer (is automaticall installed	i on MacOS and	Prerequisites Download the container configurations Download all the docker images The Contact Broker Historical API and Service Security Framework Optional extra's Jq					
態 synchronicity-iot > Detai	Marketplace Authentication Deployment	The SynchroniCity proje	container configurations ct has made pre-configured versions of its box. Of course you can customise this whe		-					
synchronicity-iot @         Group ID: 3013760         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.         Subgroups and projects       Archived projects         Search by name       Last created										
s synchronici				★ 0 O 1 week ago						
	se Estimator \$\$ 0 se level prediction based on NoiseLevelObserved context elements #Ato 2 weeks			★ 0 O 2 weeks ago						
	elsinki-data 🔹 0 ( Vork-In-Progress data fetchers scripts and docker stuff for Helsinki 2 months ag									
G GTFS Fetcher GTFS Fetcher				★ 0 O 2 weeks ago						
D P privacy-app Information a	vacy-app prmation and documentation for the Privacy App mobile and Web applicati			<ul><li>★ 0</li><li>3 months ago</li></ul>						
	urbanmobility-to-gtfs service converts NGSI Enlities, consumed from an Orion Context Broker			★ 0 O 2 weeks ago						
				<ul><li>★ 0 O</li><li>4 months ago</li></ul>						
	gtfsrt-loader-from-nsgi This service provides notifications of real-time information in GTFS-RT gener			★ 0 S 1 month ago						

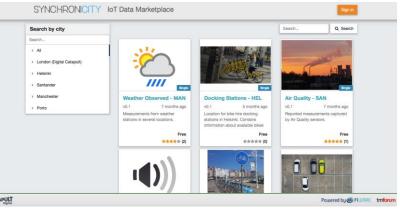
## Synchronicity results: Ecosystem transaction management

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.

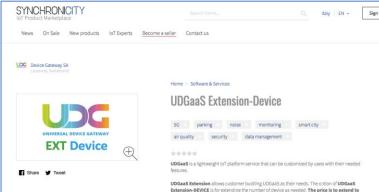


### IoT **Data** Marketplace Open data trading platform



# IoT Product Marketplace

### *Multi-service e-commerce platform*





# Thank you

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