

ubiwhere

Suiting the future of smart mobility



hello@ubiwhere.com

From Portugal to the world **with love.**

Founded in 2007, Ubiwhere is focused on Research, Development and Innovation of software-based solutions in the areas of Smart Cities, Telecom and Future Internet, and New Technologies.

We have the innate desire of changing the World.

That's why we create, design and develop solutions that improve people's life. Day by day, our multi-skilled team works to bridge the existing gaps in the market.

— **We are here for the long run!
Let's start?**

ubiwhere





SMART CITIES

We believe in a sustainable world where people feel happy.

That's why we work every day to be leaders in Smart Cities and everything they involve: Environment, Mobility, Tourism, Energy and more.



TELCO & FUTURE INTERNET

The Internet is not everywhere yet, but that's what we work for.

Today, everything happens at an amazing pace and, therefore, better infrastructure and networks are needed to keep up with developments.

Research and development of intelligent solutions for the Internet of the Future is one of our priorities.



NEW TECH_ NOLOGIES

Every day there are new technological advances in the most diverse areas.

As an experienced technology company, we have the mission of being at the forefront of innovation and supporting companies and communities in creating new ideas that help make the World a better place.

We believe that great partners empower great ideas and build the best business.

Meet some of them.



We have been cooperating in strategic alliances to benefit from each other's experience and gain a competitive advantage in the market.

Here are a few of them.



ubiwhere

Let's go for it?

Ricardo Vitorino

Smart Cities R&I Manager

rvitorino@ubiwhere.com



SYNCHRONICITY

IoT Large-Scale Pilot for Smart Cities & Communities



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No732240

Co-funded by



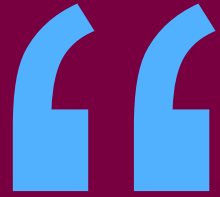
Switzerland



South Korea

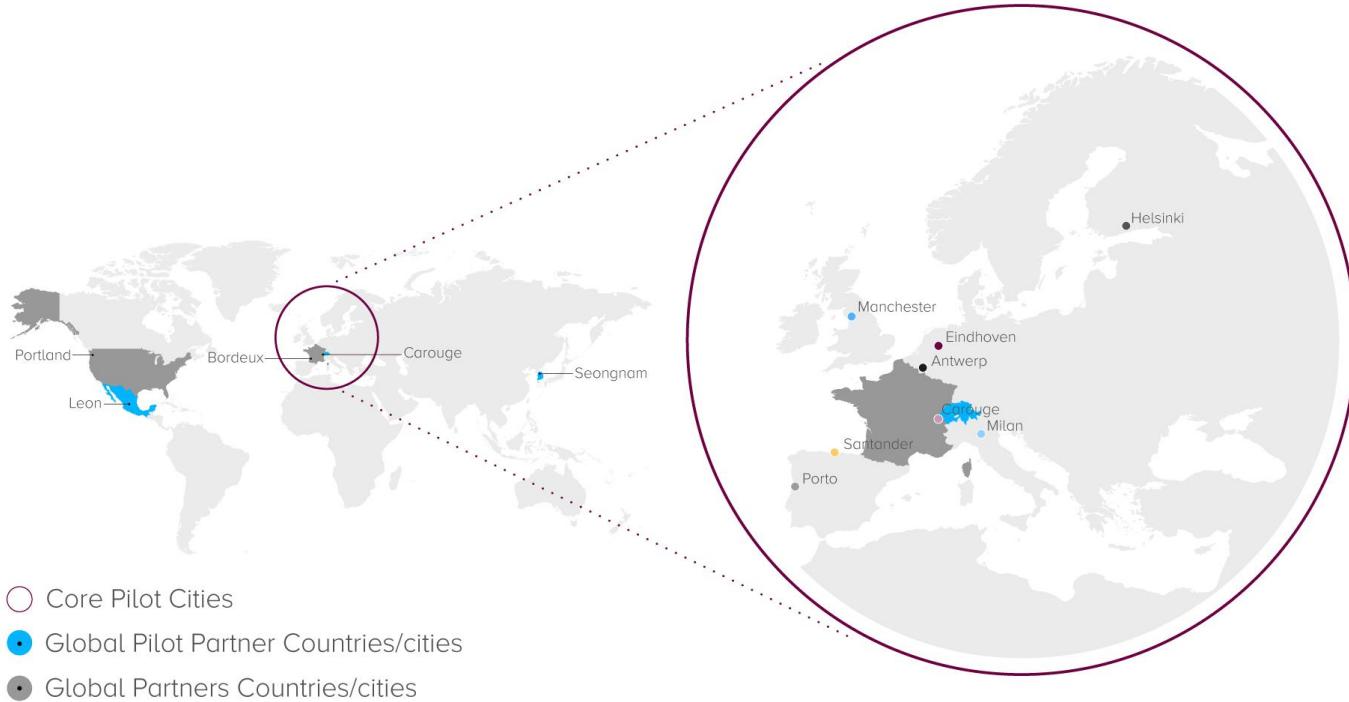


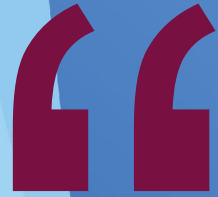
Mexico



**Deliver a market
for IoT-enabled
urban services for
Europe and
beyond**

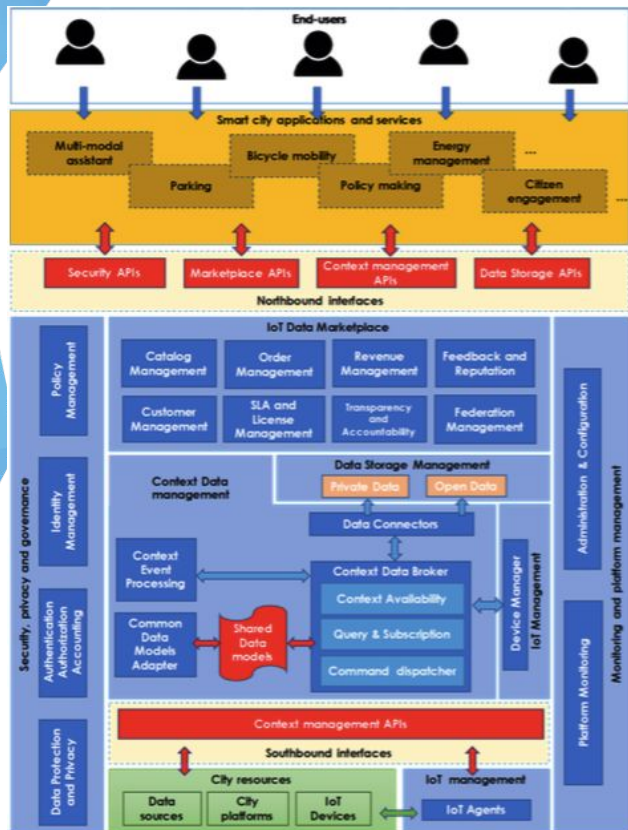
Our Pilot Cities (Reference Zones)





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

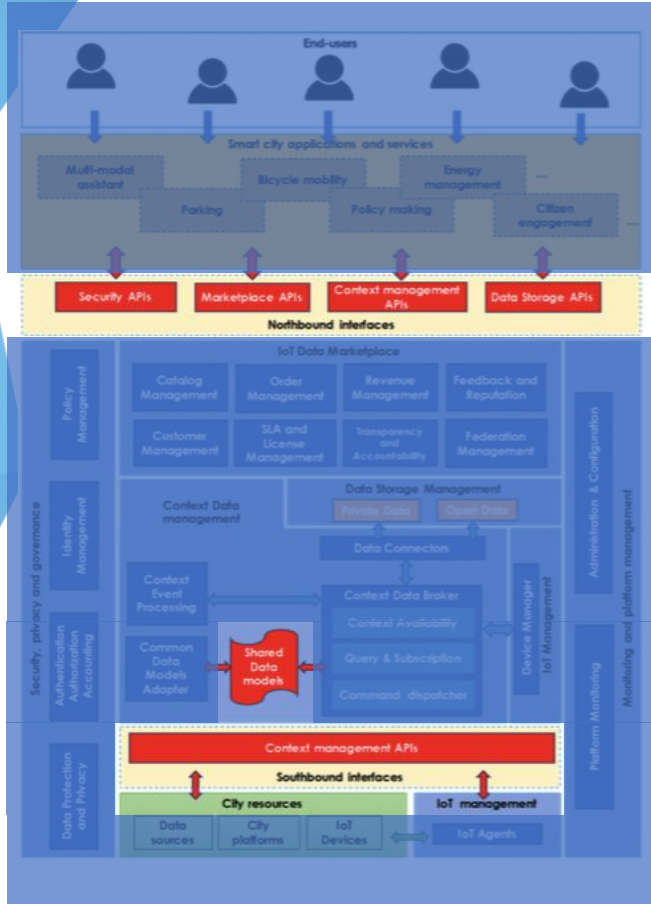
SynchroniCity Reference Architecture



Defines a set of logical components and functionalities that enable different cities to be actively part of IoT Smart City digital single market, the outcome of different inputs:

- **Architecture guidelines and use case analysis**
- **Reference zones compliance:** SynchroniCity reference architecture recalled the proposed layered approach followed in RZ technical baseline
- **Reuse of existing approaches:** the outcome of high-level analysis of the most relevant European initiatives regarding IoT and Smart City platforms showed some commonalities, among the heterogeneous projects, in terms of technologies and functionalities
- **OASC principles:** another relevant approach that has driven the design of logical architecture to achieve the vision of the SynchroniCity project about realization of a common digital single market for IoT-enabled urban services

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

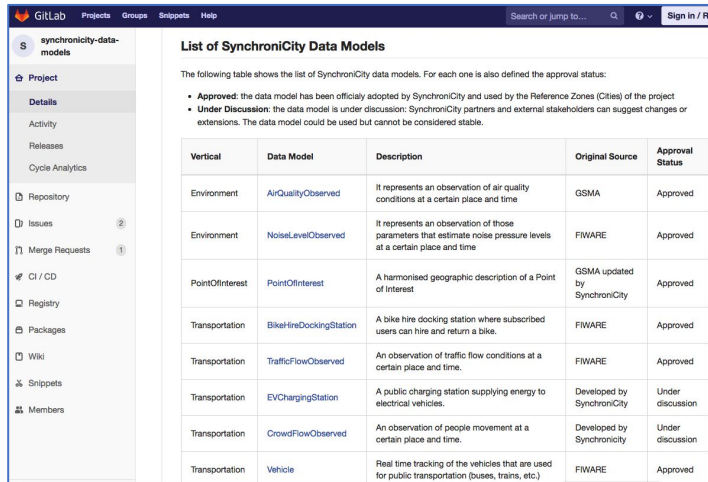
Interoperability Mechanisms

	Description	Specification document (synchronicity-iot.eu/docs/)	Related Standards [and Baselines]
Context Management API	This API allows real-time access to 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 users and applications in order to access 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]

Resources: common data models & API

Common data models and SynchroniCity API represent the concrete implementation of the Interoperability Points:

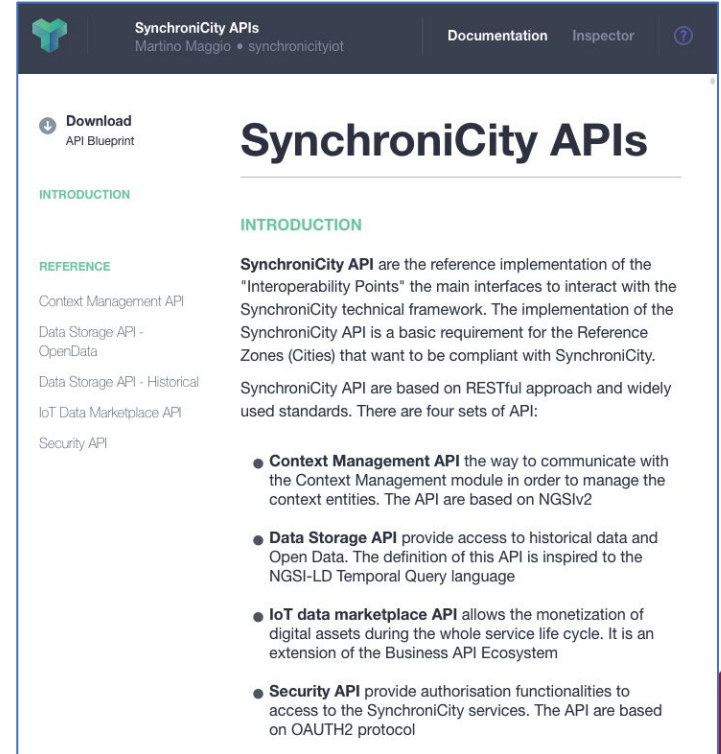
- SynchroniCity defines a set of **common data models** derived from existing initiatives (e.g. FIWARE, GSMA, SAREF) or new ones defined by project members.
- **SynchroniCity API** are the interfaces to interact with the technical framework. You can test the API using the **sandbox**, a cloud test instance.



The screenshot shows a GitLab repository page for 'synchronicity-data-models'. The main content is a table titled 'List of SynchroniCity Data Models'. The table lists various data models with columns for Vertical, Data Model, Description, Original Source, and Approval Status. The models include AirQualityObserved, NoiseLevelObserved, PointOfInterest, BikeHireDockingStation, TrafficFlowObserved, EVChargingStation, CrowdFlowObserved, and Vehicle.

Vertical	Data Model	Description	Original Source	Approval Status
Environment	AirQualityObserved	It represents an observation of air quality conditions at a certain place and time	GSMA	Approved
Environment	NoiseLevelObserved	It represents an observation of those parameters that estimate noise pressure levels at a certain place and time	FIWARE	Approved
	PointOfInterest	A harmonised geographic description of a Point of Interest	GSMA updated by SynchroniCity	Approved
Transportation	BikeHireDockingStation	A bike hire docking station where subscribed users can hire and return a bike.	FIWARE	Approved
Transportation	TrafficFlowObserved	An observation of traffic flow conditions at a certain place and time.	FIWARE	Approved
Transportation	EVChargingStation	A public charging station supplying energy to electrical vehicles.	Developed by SynchroniCity	Under discussion
Transportation	CrowdFlowObserved	An observation of people movement at a certain place and time.	Developed by SynchroniCity	Under discussion
Transportation	Vehicle	Real time tracking of the vehicles that are used for public transportation (buses, trains, etc.)	FIWARE	Approved

<https://gitlab.com/synchronicity-iot>



The screenshot shows the SynchroniCity APIs documentation page. The page title is 'SynchroniCity APIs' and it includes a navigation menu with 'Download API Blueprint', 'INTRODUCTION', and 'REFERENCE'. The 'REFERENCE' section lists several APIs: Context Management API, Data Storage API - OpenData, Data Storage API - Historical, IoT Data Marketplace API, and Security API. The 'INTRODUCTION' section explains that SynchroniCity APIs are the reference implementation of the 'Interoperability Points' and are based on RESTful approach and widely used standards. It lists four sets of APIs: Context Management API, Data Storage API, IoT data marketplace API, and Security API.

SynchroniCity APIs

INTRODUCTION

SynchroniCity API are the reference implementation of the "Interoperability Points" the main interfaces to interact with the SynchroniCity technical framework. The implementation of the SynchroniCity API is a basic requirement for the Reference Zones (Cities) that want to be compliant with SynchroniCity.

SynchroniCity API are based on RESTful approach and widely used standards. There are four sets of API:

- **Context Management API** the way to communicate with the Context Management module in order to manage the context entities. The API are based on NGSIv2
- **Data Storage API** provide access to historical data and Open Data. The definition of this API is inspired to the NGSI-LD Temporal Query language
- **IoT data marketplace API** allows the monetization of digital assets during the whole service life cycle. It is an extension of the Business API Ecosystem
- **Security API** provide authorisation functionalities to access to the SynchroniCity services. The API are based on OAUTH2 protocol

<https://synchronicityiot.docs.apiary.io>

Internal Use Cases

**Human centric
traffic management**



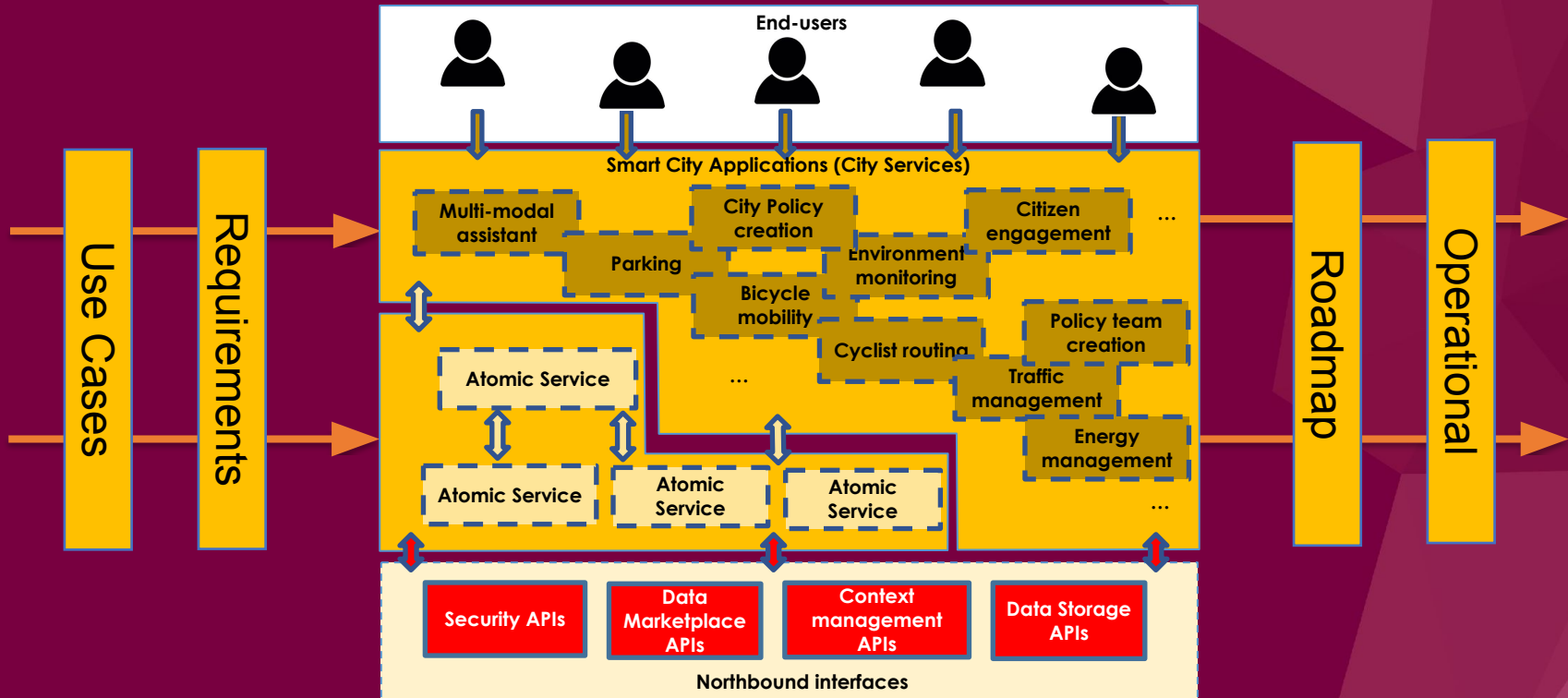
**Multimodal
Transportation**



**Community Policy
Suite**



Atomic and Application Services





The Atomic Service is a good opportunity to test the SynchroniCity framework and OASC principles. It could be easily replicated, accelerating new developments, in many cities which provides and implement these principles.



Porto.

digitransit

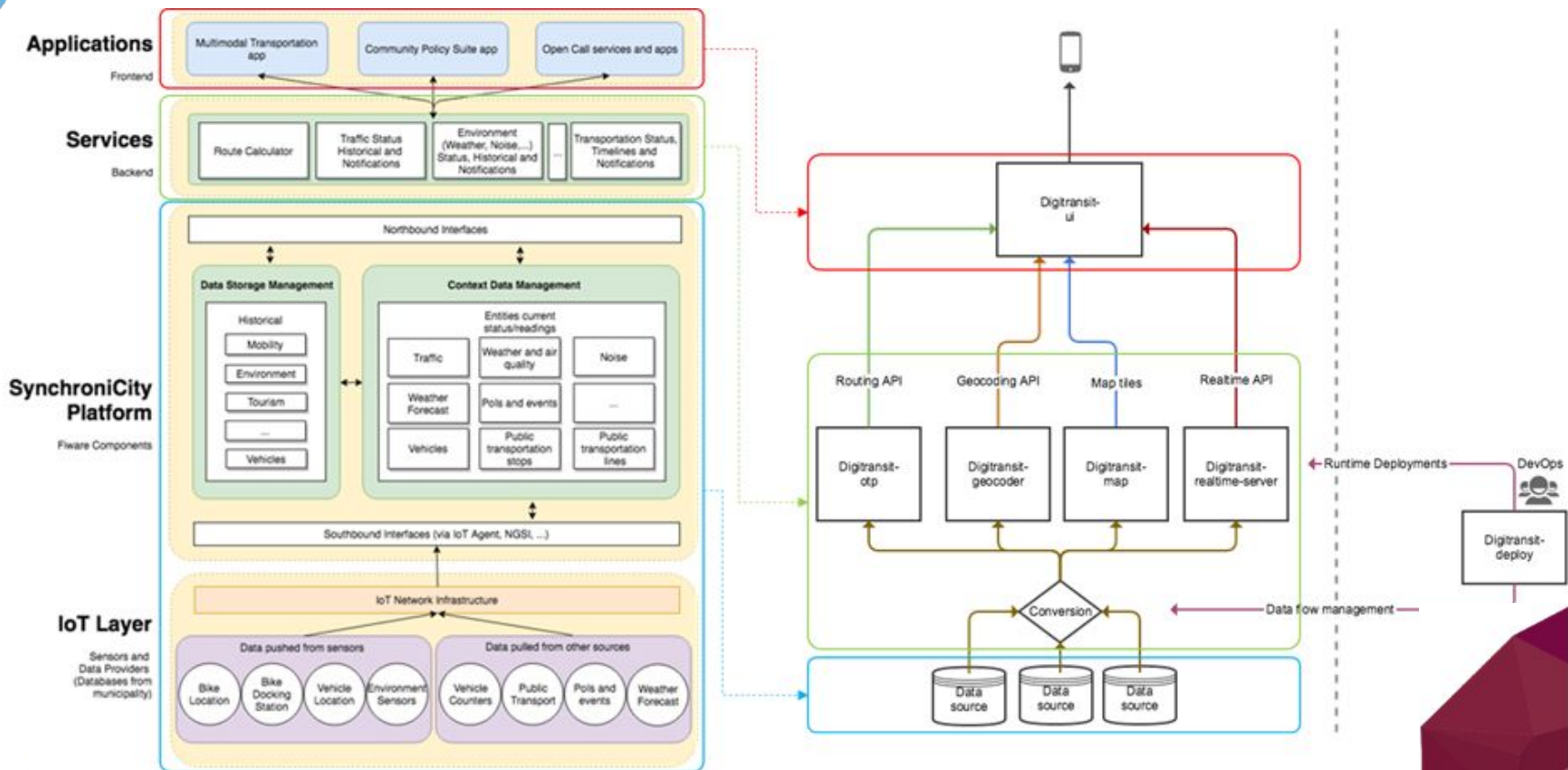
The next generation journey planner in the making.
Contribute and leave your mark!



Multimodal service at Porto

- Development of a comprehensive **journey planner**
- Data sources (static and dynamic):
 - **Transportation network** (schedules, stops and stations, routes and lines, ticketing and pricing, etc.)
 - **Vehicle-sharing systems** (docking and parking locations and status, vehicle availability)
 - **POIs and events;**
 - **Environmental** conditions (noise, air quality and meteorological parameters), weather forecasts and alerts;
 - **Traffic** flow and constraints;
 - **Geographical** data (highway, city roads and streets, bicycle path, sidewalks, etc.)

Architecture



Multimodal service at Porto

The screenshot displays the website for the multimodal service in Porto. The browser address bar shows `mmt.portodigital.pt`. The page header includes the logo "Porto.", navigation links for "SIGN IN", "EN", "PT", and "MMT", and a warning icon. A search bar at the top left contains the placeholder text "Search origin, route or stop". The main content area features a map of Porto with several blue location pins and green circular markers. A white overlay panel on the right side of the map is titled "NEAR YOU" and "FAVORITES". Under the heading "Specify origin", there are two options: "Use current location" (with a radio button) and "Aeroporto Francisco Sá Carneiro" (with a checked checkbox). The footer of the page contains copyright information "© MMT 2019" and links for "Contact us", "About the service", "Terms and Conditions", and "Privacy Policy".

Multimodal service at Porto

The screenshot displays the MMT Porto website interface. At the top, the header includes the logo "Porto.", navigation links for "SIGN IN", "EN", "PT", and "MMT", and a warning icon. A search bar is positioned at the top left with the placeholder text "Search origin, route or stop". The main area is a map of Porto, Portugal, with various districts and landmarks labeled. A pop-up window is centered on the map, titled "AGRUPAMENTO DE ESCOLAS CAROLINA MICHAELIS", providing information about the school grouping and offering "Route from here" and "Route here" options. On the right side, a sidebar menu is visible with "NEAR YOU" and "FAVORITES" options. Below "NEAR YOU", there is a "Specify origin" section with two radio button options: "Use current location" and "Aeroporto Francisco Sá Carneiro", where the second option is selected. At the bottom left, a "I'M TRAVELING BY" section offers four travel mode icons: Public transport, Walking, Bicycle, and Car. The footer contains copyright information "© MMT 2019", contact links, and a "500 m" scale bar.

Porto.

SIGN IN EN PT MMT

Search origin, route or stop

AGRUPAMENTO DE ESCOLAS CAROLINA MICHAELIS
The Carolina Michaëlis grouping of schools covers different levels of education: preschool education...

Route from here Route here

NEAR YOU FAVORITES

Specify origin

Use current location

Aeroporto Francisco Sá Carneiro

I'M TRAVELING BY

Public transport Walking Bicycle Car

© MMT 2019 Contact us About the service Terms and Conditions Privacy Policy

500 m

OpenStreetMap

Multimodal service at Porto

The screenshot displays the website mmt.portodigital.pt in a browser. The page features a dark blue header with the word "Porto." on the left and navigation links for "SIGN IN", "EN", "PT", and "MMT" on the right. A search bar is positioned at the top left, with the current location "Rua Infanta Dª Maria, 4050-350" entered. Below the search bar is a map of the area, showing various streets and bus stops. A "NEAR YOU" panel is open on the right side of the map, displaying a list of nearby stops with their respective routes, destinations, and departure times. The list includes stops like Fanzeres, Senhora da Hora, ISMAI, Campanha, Aeroporto, Senhor de Matosinhos, Estadio do Dragao, Povo de Varzim, Forum, and Cordoaria (via P. Moreira).

NEAR YOU

To stop	Route	Destination	Leaves	Next
50m	M F	Fanzeres	Now	8 min
50m	M F	Senhora da Hora	1 min	10:12
50m	M C	ISMAI	4 min	10:35
50m	M C	Campanha	5 min	10:35
50m	M E	Aeroporto	7 min	10:32
50m	M A	Senhor de Matosinhos	10:11	10:21
50m	M A	Estadio do Dragao	10:11	10:21
50m	M B	Estadio do Dragao	10:13	10:44
50m	M B	Povo de Varzim	10:14	10:43
50m	M E	Estadio do Dragao	10:17	10:41
50m	M C	Forum	10:20	10:51
50m	M C	Campanha	10:20	10:48
50m	M B Expr	Estadio do Dragao	10:26	10:57
50m	M B Expr	Povo de Varzim Expresso	10:29	10:54
170m	602	Cordoaria (via P. Moreira)	10:11	10:43
170m	301	Circular Sá da Bandeira - H...	10:15	10:37
170m	602	Cordoaria (via P. Moreira)	10:28	11:03

© MMT 2019 [Contact us](#) [About the service](#) [Terms and Conditions](#) [Privacy Policy](#)

Multimodal service at Porto

The screenshot shows the website **Porto.** with the URL `mmt.portodigital.pt`. The search bar contains the address **Rua Infanta Dª Maria, 4050-350**. Below the search bar, a list of nearby transit stops is displayed:

- estádio do
- Estádio do Dragão (Porto, Portugal)
- Estádio do Mar (Senhora da Hora, Portugal)
- Estádio do Passal (Portugal)
- Estádio do Gulpilhares (Portugal)
- Estádio do Laranjal (São Pedro da Cova, Portugal)
- Estádio do Padroense FC (Padrão da Légua, Portugal)
- Estádio do Mar (Matosinhos, Portugal)
- Estádio do Desportivo de Ronfe (Portugal)
- Estádio do Clube Desportivo Trofense (Trofa, Portugal)
- Estádio do Campo Futebol Clube (Retorta, Portugal)

On the right side, a table titled **NEAR YOU** and **FAVORITES** shows transit routes:

To stop	Route	Destination	Leaves	Next
50m	M C	ISMAI	Now	10:35
50m	M C	Campanha	1 min	10:35
50m	M E	Aeroporto	3 min	10:32
50m	M F	Fanzeres	4 min	10:23
50m	M F	Senhora da Hora	6 min	10:24
50m	M B	Estadio do Dragao	7 min	10:44
50m	M B	Povoa de Varzim	8 min	10:43
50m	M A	Senhor de Matosinhos	10:15	10:25
50m	M A	Estadio do Dragao	10:15	10:25
50m	M E	Estadio do Dragao	10:17	10:41
50m	M C	Forum	10:20	10:51
50m	M C	Campanha	10:20	10:48
50m	M B Expr	Estadio do Dragao	10:26	10:57
50m	M B Expr	Povoa de Varzim Expresso	10:29	10:54
170m	602	Cordoaria (via P. Moreira)	6 min	10:43
170m	301	Circular Sá da Bandeira - H...	10:15	10:37
170m	602	Cordoaria (via P. Moreira)	10:28	11:03

At the bottom of the page, there is a footer with the following text: **MMT 2019**, [Contact us](#), [About the service](#), [Terms and Conditions](#), and [Privacy Policy](#).

Multimodal service at Porto

Porto. SIGN IN EN PT MMT

Itinerary suggestions

Rua Infanta Dª Maria, 4050-350

Estádio do Dragão, Porto, Portugal

I'm traveling by

10:01 Today Leaving at Settings

Default settings

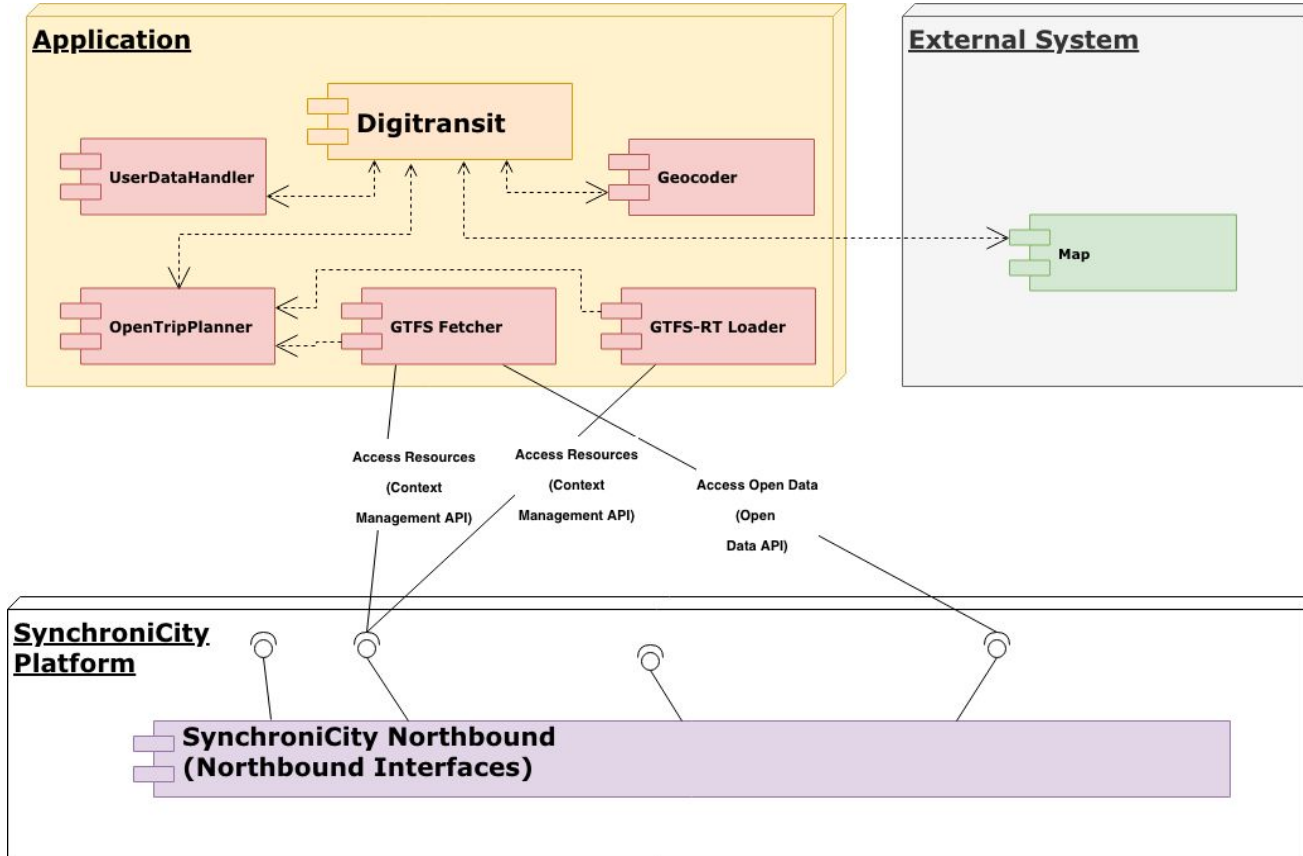
Carolina Michaelis	10:05		10:25	20 min	200 m
Carolina Michaelis	10:08		10:28	20 min	200 m
Carolina Michaelis	10:01		10:32	31 min	200 m
Carolina Michaelis	10:12		10:32	20 min	200 m
Carolina Michaelis	10:18		10:39	21 min	200 m

Map showing the route in Porto, Portugal, starting from Rua Infanta Dª Maria and ending at Estádio do Dragão. The route is highlighted in orange and includes a walk segment.

500 m

© OpenStreetMap

Architecture



Atomic Services

Atomic Service	Description
Routing Service	Based on OpenTripPlanner it finds suitable routes combining taxi stops, buses info and bicycle routes (among other available possibilities) between two points and according to user's preferences.
GTFS Fetcher	Extracts data from GTFSTransitFeedFile entities and imports GTFS uploaded files (static timetables and related info) into the OpenTripPlanner platform, making this available for routing calculation (within the Routing Service).
GTFS-RT loader from NGSi	This service consumes Real Time Urban Transport entities (so far, ArrivalEstimation) and generates GTFS-RT feeds from it. These feeds will be later consumed by the Routing Service to calculate/update the requested routes.

Useful links

- <https://synchronicity-iot.eu/tech/>
- <https://synchronicity-iot.eu/media/>
- <https://gitlab.com/synchronicity-iot>
- <https://synchronicityiot.docs.apiary.io>
- <https://hub.docker.com/u/synchronicityiot>

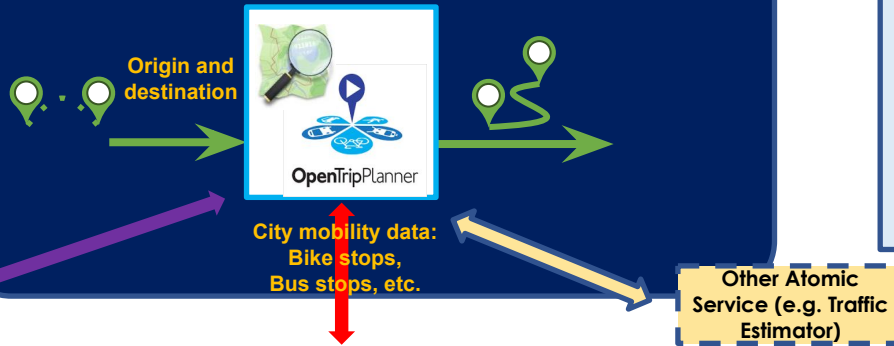
- <https://digitransit.fi/en/>
- <https://mmt.portodigital.pt/>
- <https://www.ubiwhere.com/>

ubiwhere

Routing Service

Route Calculation:

Routing service that allows citizens to execute queries to find routes, bus /taxi stops, city bikes, bicycle routes. On top of it, it also displays (triggers) disruption info and perform itinerary planning.



Adopting RZs:

Helsinki, Milan, Porto, Santander

Developing Team:

FVH, TST

Status:

Release 1 ready, under customization
Published on:
- DockerHub

Security APIs

Data
Marketplace
APIs

Context
management APIs

Data Storage
APIs

SynchroniCity Northbound interfaces

Traffic Estimator Service

Traffic Flow Estimator:

By means of the information retrieved from the different traffic intensity context entities, this service will generate an estimation of the traffic intensity flow in the short term (namely, in the next 15, 30, 45 or 60 minutes).



City mobility data:
Traffic Intensity

External sources
(e.g. weather
forecast)

Security APIs

Data
Marketplace
APIs

Context
management APIs

Data Storage
APIs

SynchroniCity Northbound interfaces

Adopting RZs:

Porto, Santander, Eindhoven (under consideration)

Developing Team:

ATOS, POR, ENG, UC

Status:

Release 1 accomplished

Published on:

- SynchroniCity DockerHub
- SynchroniCity GitLab

Incubated Atomic Services

Siri2gtfsrt

- OpenTripPlanner accepts only one dynamic updater per feed, so a specific converter *siri2gtfsrt* inputs multiple data sources, such as service alerts and vehicle positions, and integrates them into GTFS-RT

RZs:

Helsinki, Porto

Developing Team:

FVH

Ngisi2gtfsrt

- Adapter from NGSI to GTFS-RT for OpenTripPlanner

RZs:

Porto, Santander

Developing Team:

FVH, UC, TST, POR

Pelias (Geocoding and Reverse Geocoding Service)

- Mapping addresses into geographic coordinates such as latitude and longitude in a given coordinate system.
- *Reverse Geocoding* maps given coordinates into human readable addresses.

RZs:

Helsinki, Porto

Developing Team:

FVH

Incubated Atomic Services

Mobility Visualization

- Mobility information from the Routing Service visualized on map
- Maps are also annotated by various data points such as bus stops and park and ride locations.

RZs:

Helsinki, Porto

Developing Team:

[EVH](#)

Route Visualization

- Route drawn on a Map

RZs:

Antwerp

Developing Team:

[Rombit](#)

Date/Time filter function

- Filtering and aggregating NGSi data according to time window and preferences given as input

RZs:

Antwerp

Developing Team:

[Rombit](#)