ORCHESTRA *CITIES*

BY **MARTEL INNOVATE**

AN OPEN PLATFORM FOR CITIES TO DEVELOP AND SHARE SMART CITY SERVICES

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ORCHESTRA CITIES IS A DATA AND IOT-DRIVEN SOLUTION DESIGNED TO CONNECT SMART DEVICES, CITIZENS AND CITIES IN A COLLABORATIVE ENVIRONMENT

At **Martel Innovate**, we believe that any city should be able to access smart services.By allowing cities to easily share data and metrics, Orchestra Cities can reduce costs as well as help empower the creation of larger ecosystems.

Orchestra Cities was designed as a citizen-centric platform, prioritizing the needs of city inhabitants such as security, mobility, health and efficiency. But it also understands the needs of public officers and business operators.

Orchestra Cities is a data and IoT-driven solution designed to connect smart devices, citizens and cities ina collaborative environment

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PRODUCT SHEET

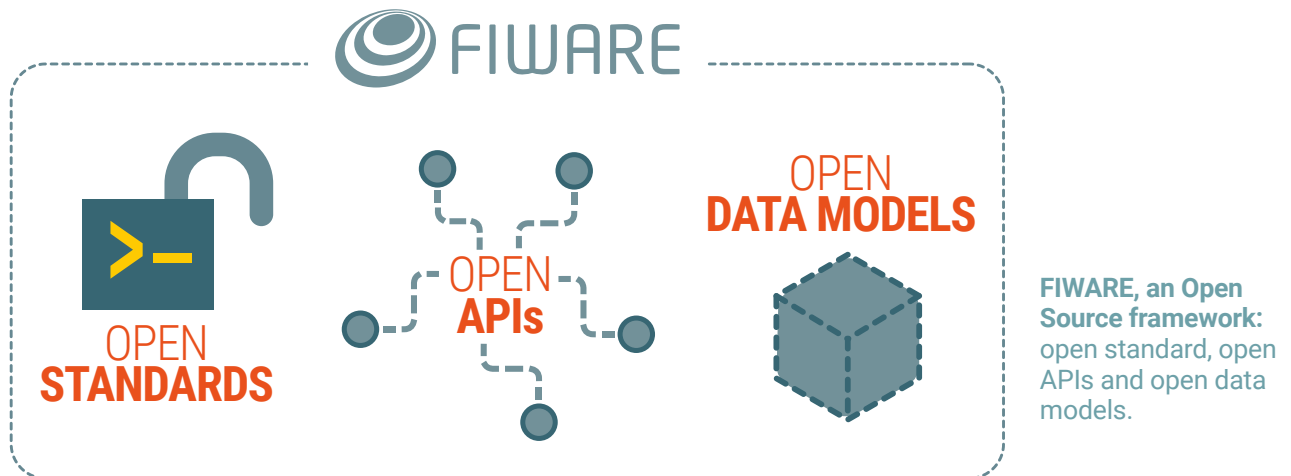|	
FEATURES	Security Management Device Management Data Management Dashboard Management Data Integration Management
IOT STANDARDS	COAP, MQTT, AMQP, LORAWAN
SECURITY STANDARDS	OAUTH 2.0, OIDC, SAML, KERBEROS, LDAP, X.509
SUPPORTED CLOUDS	AWS, GCE, AZURE, OpenStack, VWMARE vCloud

1
CONCEPT

TECHNOLOGY IS NOTHING.
WHAT'S IMPORTANT IS THAT
YOU HAVE A FAITH IN PEOPLE,
THAT THEY'RE BASICALLY
GOOD AND SMART, AND IF
YOU GIVE THEM TOOLS,
THEY'LL DO WONDERFUL
THINGS WITH THEM.

Steve Jobs

WHY ORCHESTRA CITIES?

The Smart City solutions market is mostly driven by large players that rely on proprietary technologies. Recently, a wave of solutions adopting an Open approach has grown to impact the Smart City market.

The forerunner technology leading this wave is FIWARE, the most mature Open Source framework available today dealing with requirements for Smart Cities. The Orchestra Cities concept takes on FIWARE principles and strives to push them further.

OPEN STANDARDS

OPEN APIs

OPEN DATA MODELS

**FIWARE, an Open Source framework:** open standard, open APIs and open data models.

The concept of Openness informs the architecture and features of FIWARE and Orchestra Cities in multiple ways, as shown above.

Orchestra Cities embraces the triple openness above and aims to extend them to enable City-to-City collaboration and Citizens-to-City collaboration.

Specifically, what does it mean? Orchestra Cities aims at building a collaborative space for shaping a sustainable and participatory future for our cities, where:

- Citizens can share data from their devices with other citizens or with the city
- Businesses can easily build services on top of APIs that are shared across different cities
- Cities can benefit from data published by other cities to create analysis, comparisons and forecast
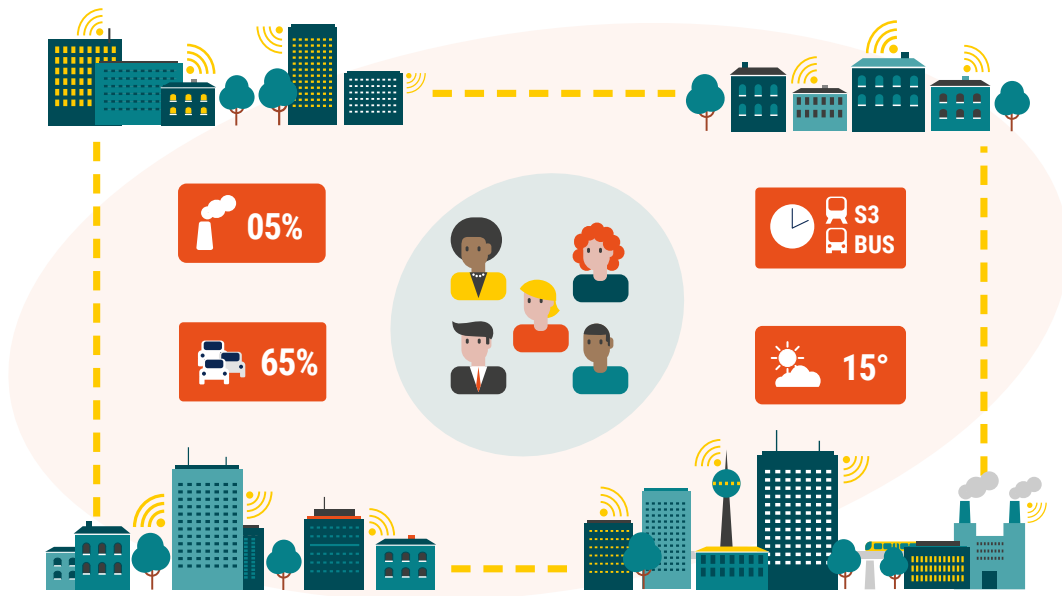
Orchestra Cities differs from other platforms by taking the approach that the most efficient and effective way to deliver on the three previous goals is to support multiple cities in a single platform. This approach brings several advantages in terms of costs, scalability and modularity.

KEY BENEFITS

- Support the migration from vertical data silos[1] to a unified data space for a single integrated view over the city

- A collaborative space where different cities can share data and services, while retaining control on their own data

- Modular and flexible approach where each city can acquire just the needed services and resource quotas

- Reduced ownerships costs thanks to the possibility of sharing the platform among different cities

- Leverage Open Standards and Open Source code, thus building on the work of a large European and global community

- Allow citizens and businesses to take part on the city services co-creation process

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[1] The concept of **vertical data silos** refers to data stored in different not interoperable platforms (e.g. waste management, parking management).

List of the key benefits of Orchestra Cities platform

2
STORIES

EKZ

Elektrizitätswerke des Kantons Zürich (EKZ) delivers cost-effective, safe, and environmentally responsible energy to one million people in Switzerland. The power and flexibility of Orchestra Cities allows EKZ to offer cities a tailored, multi-tenant support for multiple use cases.

The data collection, integration, geo-tagging and time series capabilities of Quantum Leap enable sophisticated, multi-dimensional visualization of data, such as air quality.

Orchestra Cities scalable back-end reliably delivers real-time data streams to both Web dashboards and end-user mobile applications.

EKZ platform: two screenshot examples, Home and Air Quality sections.
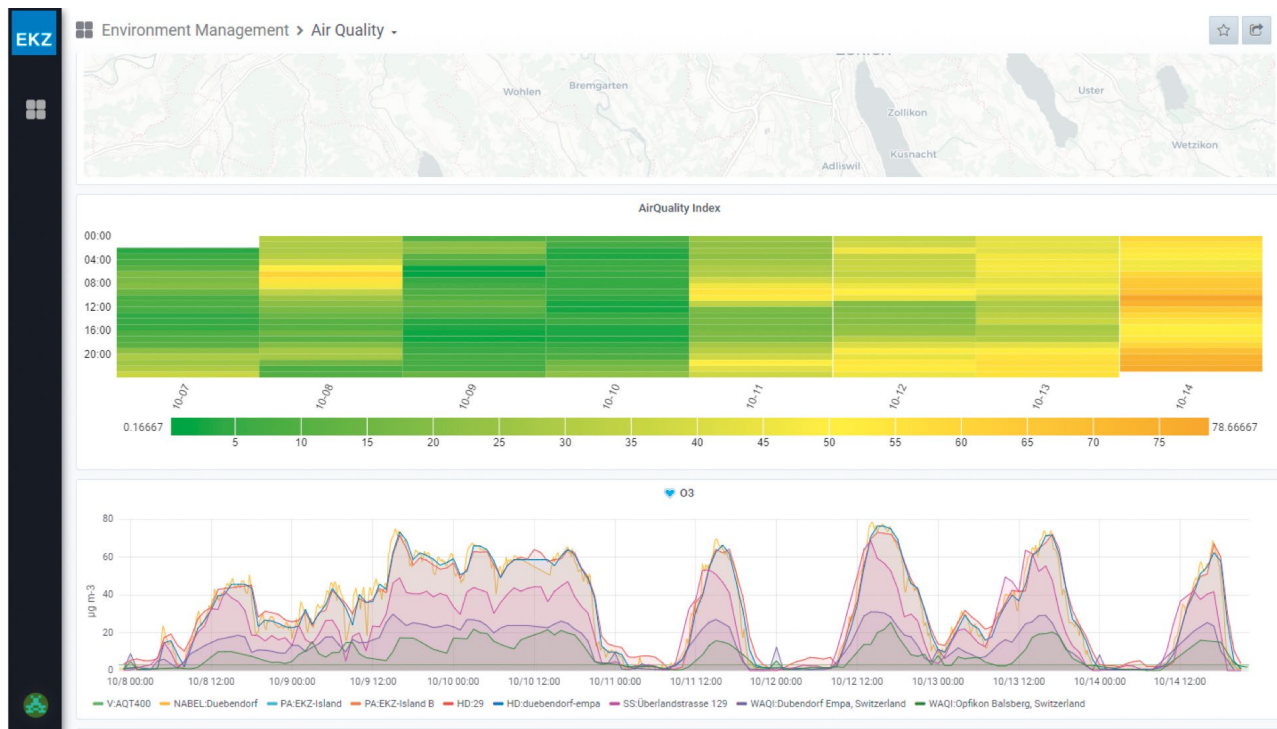
CITY OF WOLFSBURG

The municipality of Wolfsburg, Germany, leverages Orchestra Cities to provide citizens with a smart advisory system for domestic waste management. Orchestra Cities helps users to plan the most effective route for waste disposal, blending container type with real-time fill level information and user destination.
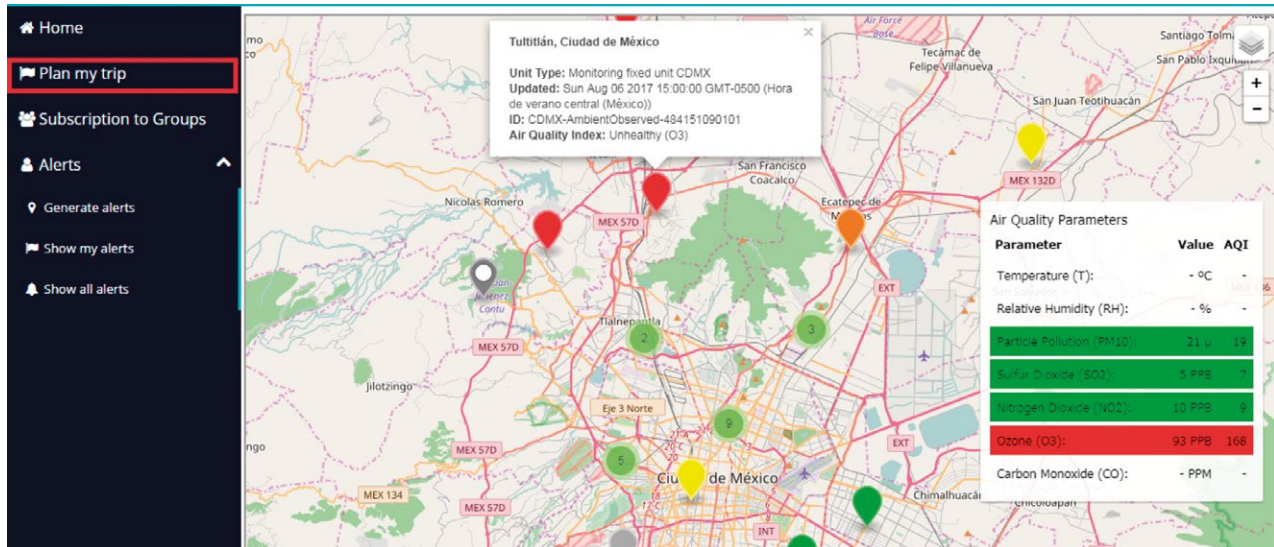
ORCHESTRACITIES.EU
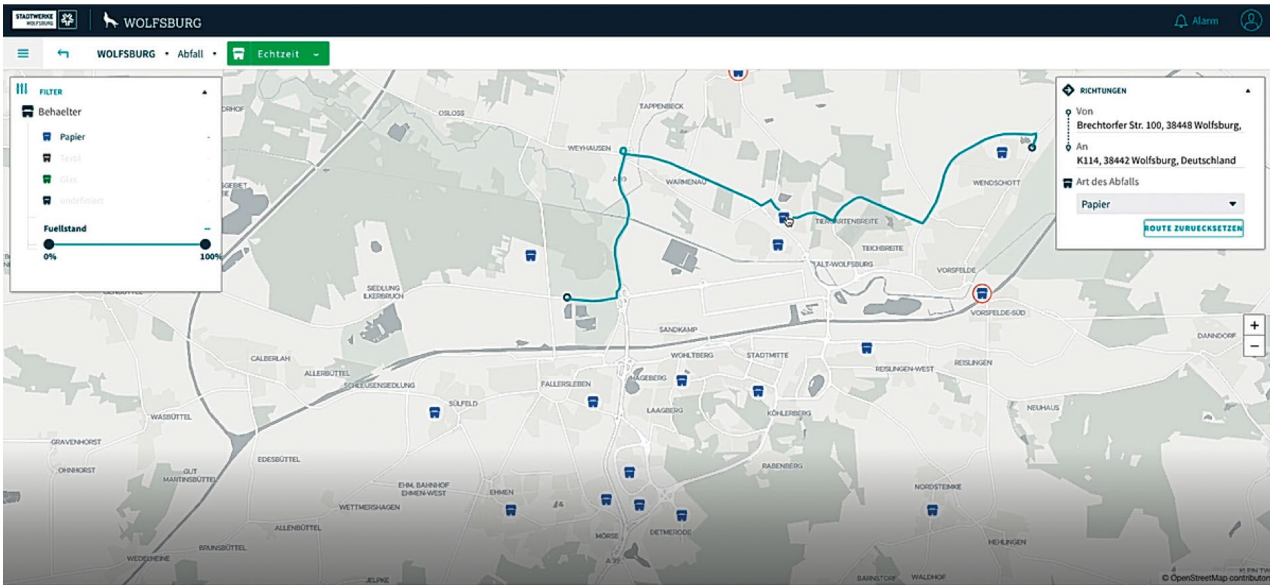
A further scenario where Orchestra Cities delivers smart route planning involves electrical vehicles and the monitoring and management of their charging stations, with their occupancy and supported vehicles.

Real-time dashboards offer a higher degree of interactive UX through the Urbo framework and scenario-specific customisations.
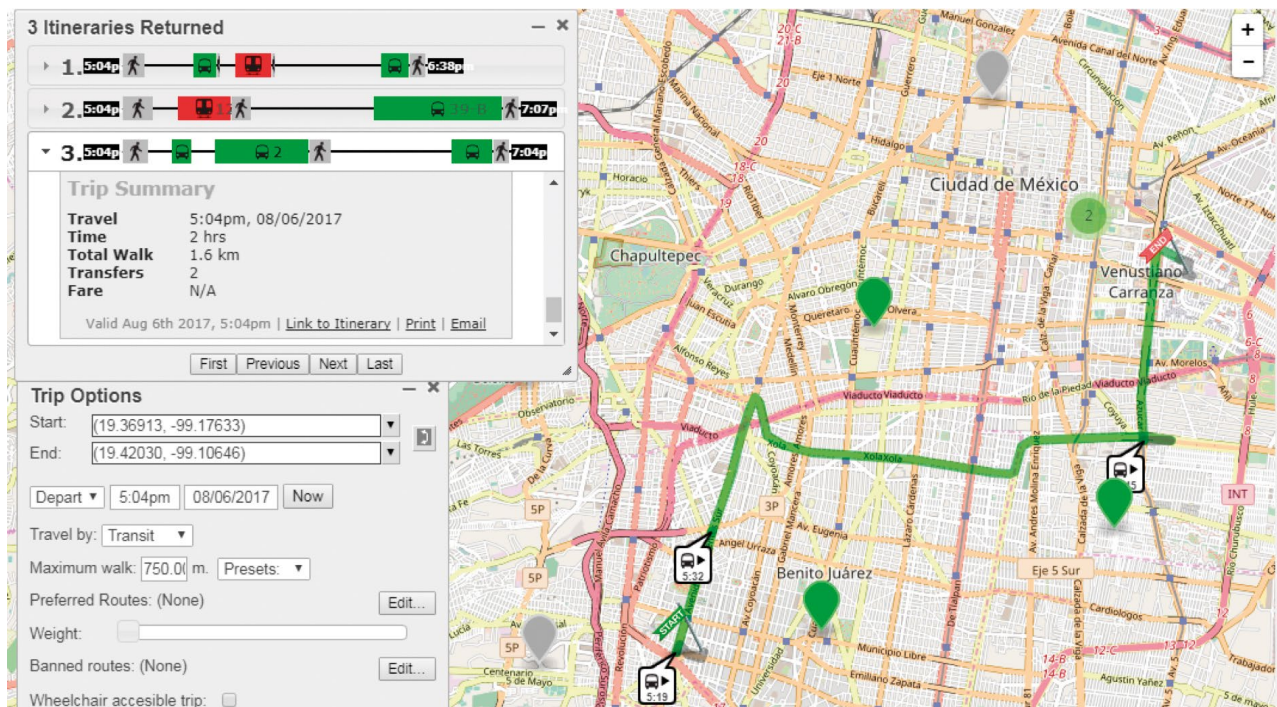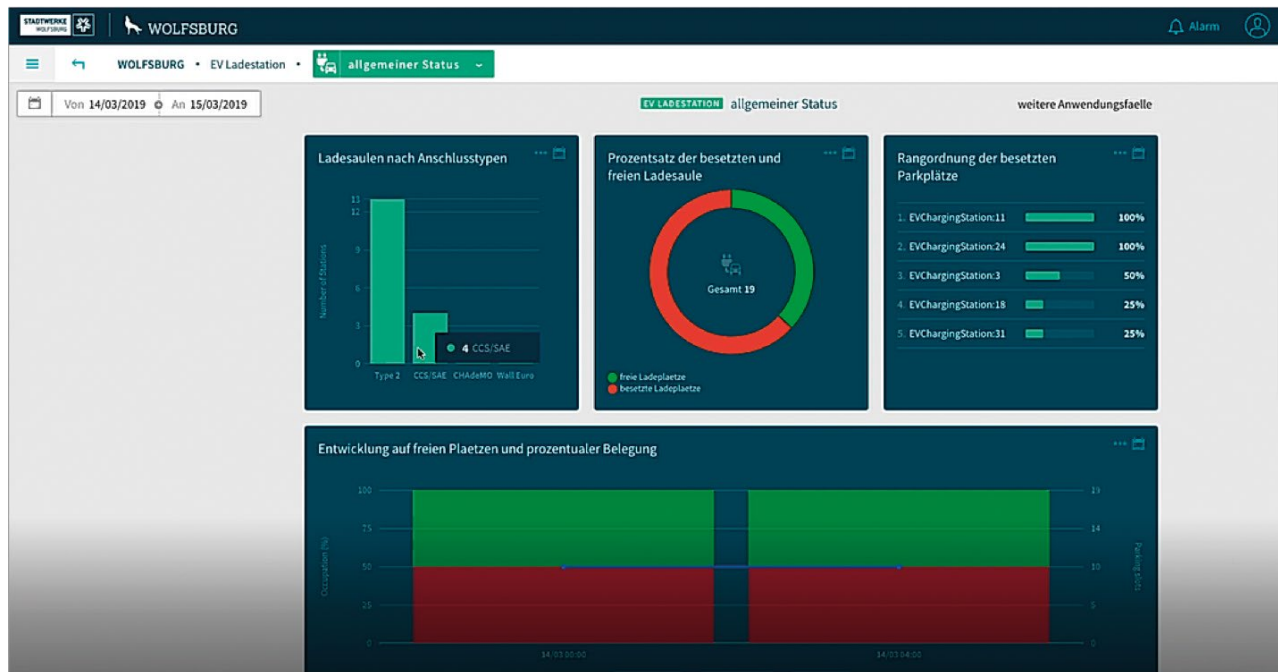
GREEN ROUTE APPLICATION

The smart mobility application Green Route directly connects the Orchestra Cities platform with Mexico City travellers that care for their health just as much as their time.

Orchestra Cities integrates an air quality sensor network of 47 base stations in Mexico City with traffic and public transportation data.

This provides citizens with the best route that combines public transportation, walking and city pollution avoidance. Through their mobile app, users know the best route in real time and receive relevant alerts from the communities they decide to join.

3
PLATFORM

AS AN ARTIFICIAL WORLD,
SO THE CITY SHOULD BE
IN THE BEST SENSE:
MADE BY ART, SHAPED
FOR HUMAN PURPOSES.

Kevin Lynch

The platform, as depicted in the picture above, is composed of different microservices that are orchestrated using state-of-the-art solutions such as Docker[2] and Kubernetes[3].

Orchestra Cities functionalities available as of today include:

- Security Management
- Device Management
- Data Management
- Dashboard Management
- Data Integration Management

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[2] https://www.docker.com

[3] https://kubernetes.io
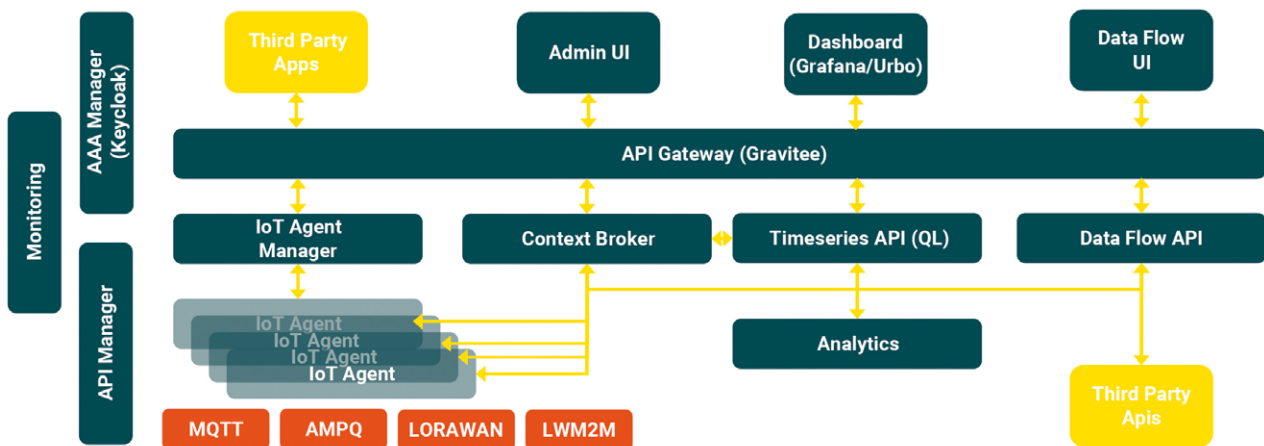
OPEN STANDARDS

Orchestra Cities relies on different Open Standards that facilitate the integration with existing solutions.

SECURITY	OAUTH 2.0, OIDC, SAML, KERBEROS, LDAP, X.509
IOT	**Protocols:** UL, JSON, LWM2M **Transport:** HTTP, COAP, MQTT, AMQP, LORAWAN
DATA EXCHANGE	**Protocols:** JSON/REST, XML/SOAP, FTP/HTTP, WEBSOCKETS **Data format:** NGSI, JSON, GEOJSON, CSV, EXCEL, TEXT
CLOUD	Docker, Kubernetes

4
ROADMAP

IF EVERYONE IS MOVING
FORWARD TOGETHER,
THEN SUCCESS TAKES CARE
OF ITSELF.

Michael Jordan

Orchestra Cities is under active development, these are some of the features we plan to work on in 2020:

- **Live City:** add new use cases to our City-Centric App supporting pre- cooked scenarios to help the management of cities based on Smart Data models[9]. E.g. status of waste bins, parking, ...

- **Machine Learning:** extend demonstrators to show how Machine Learning can be applied to create models and data forecasts in Orchestra Cities

- **Linked Data:** explore the integration of NGSI-LD in the platform by testing components supporting NGSI-LD as of today

- **Advanced data access control:** increasing control on data access via more fine grained access policies

- **Supporting edge computing solutions:** a demonstrator of how services can be deployed across the cloud-edge

- **Blockchain:** explore hashing of data to collect proof of data integrity

- Improved **integration with CKAN**

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[9] https://fiware-datamodels.readthedocs.io/en/latest/index.html

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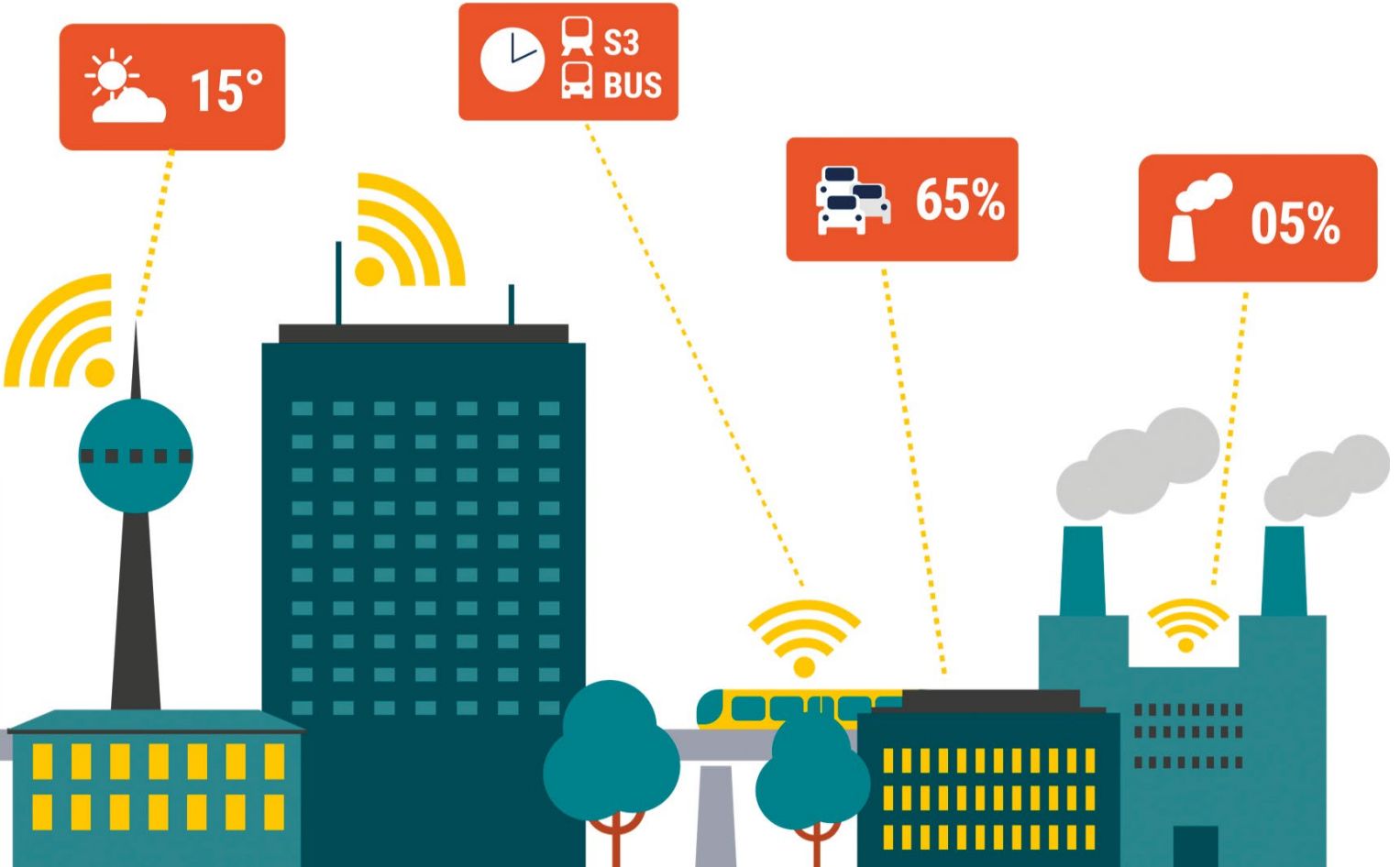
5
PARTNERS

IT IS THE LONG HISTORY
OF HUMANKIND THAT
THOSE WHO LEARNED
TO COLLABORATE
AND IMPROVISE MOST
EFFECTIVELY HAVE
PREVAILED.

Charles Darwin

ORCHESTRA CITIES
CITIES
BY MARTEL INNOVATE

To develop our solutions and to test them we have worked and continue to work with a number of selected partners.

Atos

FIWARE

redhat.

Telefónica

Gravitee Source

ubiwhere

therapænis

hop ubiquitous

SYNELIXIS

Solutions have been tested in POC with:

ANTWERP WOLFSBURG

MEXICO CITY

ZURICH

HELSINKI

ORCHESTRACITIES.COM

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KEEP IN TOUCH!

DO YOU WANT TO BE THE NEXT ORCHESTRA CITY?

CONTACT US AT **INFO@ORCHESTRACITIES.COM**