LET'S DO IT TOGETHER

FIWARE 4CITIES

FIWARE

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FIWARE Foundation e.V.

Urban vision meets digital innovations – the challenges of our time will be solved by using digital solutions. The cities of the future need to be more liveable – created by the citizens.

Pierre Golz

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Editorial

In the future, will cities and human settlements be as healthy, sustainable, safe, resilient, and inclusive as envisioned by the UN Sustainable Development Goal 11? Will cities be able to provide adequate housing, infrastructure, and services to meet the needs of a growing population, or will environmental issues still determine the economic, political and social life of towns and cities?

These are some key questions being looked at from South East Asia to Central America. Whilst our cities house societal and environmental challenges – currently, cities occupy only 3% of the Earth's land, but are responsible for two-thirds of the world's energy demand and 70% of CO2 emissions – they are also the engines of global economic growth, accounting for more than 80% of GDP generated worldwide.

As cities have to do more with less, use technology to their advantage in the wake of growing populations, global pandemics, natural and financial resource constraints, and overburdened infrastructure systems, cities are the places where sustainable and cost-effective remedies are forged.

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More than ever before, sensors across the urban environment are adding a layer of intelligence to physical and social infrastructure systems. Real-time data and enhanced tech capabilities give agencies the ability to respond more effectively to what is happening at any given moment.

Yet, cities need better data, the right skills and manpower, and great freedom to implement smart technologies. And this is where FIWARE lends a helping hand. Hundreds of cities have already adopted FIWARE tech and open common standards to become more efficient and resilient to environmental challenges, providing citizens with a better place to work, live and socialise.

The world is a big place and there is further room for FIWARE to grow. The first edition of this booklet is a footprint of how FIWARE has been helping cities to get their smart city projects off the ground. It aims to help cities understand the potential of Open Source tech and open common standards, and to help private-sector companies and citizens prepare for the coming wave of change.

Happy reading.

Ulrich Ahle
CEO, FIWARE Foundation

Dario Avallone
Chairman, FIWARE Foundation Board of Directors

Foreword

Renato De Castro

Smart city expert and author of “City SmartUp”

I tend to steer clear of the term smart city, mainly because cities are more than simply smart. Dynamic ecosystems developed based on a complex interaction between different actors - private and public businesses, not-for-profit, social enterprises, citizens, etc. - cities are an evolutionary process.

I prefer to use the term smarter cities. Cities should not be seen as a kind of “final destination”, or a position in a global rank, but rather evolving entities that are meant to be on an endless path toward unlocking their transformative power.

BACK TO THE INDEX

In order to keep up with the current digital transformation, cities must look at ways to transform themselves into enablers of economic growth, innovation and well-being. The journey isn't short of obstacles but it is worthwhile.

In this booklet, you will find cities from Austria, Belgium, France, Germany, India, Italy, Japan, the Netherlands, Portugal, Spain, Sweden, UK and Uruguay that have already found the right partner to accompany them on their digital vision.

By following and using FIWARE's open common standards and tech, these cities are delivering state-of-the-art smart, digital, sustainable and effective strategies and public services.

You can be next. Join us on this journey.

About Renato De Castro

A smart city expert and author of "City Smart Up", Renato is currently leading a team of business analysts at the Department of Decision Support at the Abu Dhabi Executive Office (ADEO). Previously, Renato served as the CEO of City SmartUp, a consultancy company specialised in digital transformation for cities. He has visited 30+ countries to discuss smart cities and advise local and national governments on urban projects.

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Voices from the industry

East Asia

Kyong-yul Lee

Secretary-General,
WeGO

The COVID-19 pandemic testifies that smart technology and the digitization of governments are key to finding fast and efficient solutions to urban problems. As a result, an increasing number of cities are aiming to become smart in this extraordinary period. It's the way to live better in post-COVID times.

Then, what is needed? Technology is, of course, crucial. But public private partnerships (PPPs) matter too, along with international collaboration and networking, as smart city projects are not one-offs, but rather evolutionary.

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One project begets another and we need to continuously work in order to maintain and improve our cities. For this, we need committed citizens, companies, public administrations, academia, non-for-profit, and associations willing to partner up. We need to learn from others by sharing best practices, for instance.

Even the most advanced cities have a lot to learn from cities that may be at a more developing stage. Hence, WeGO tries to facilitate this and develop regional networks, in Northeast Asia, Latin America, and Africa at the moment. In alignment with FIWARE's mission, WeGO shares its commitment toward ensuring that cities worldwide can learn from each other, as intended by this booklet.

About Kyong-Yul Lee

Prior to joining WeGO, Kyong-yul Lee enjoyed a successful life in the diplomatic service for 30+ years. With a major in Economics, he joined the Korean Ministry of Foreign Affairs in 1985. Among his diplomatic roles, he served as the Korean Ambassador to Kyrgyzstan and Angola. He supported establishing the Korea International Cooperation Agency (KOICA) in 1989, and facilitated Korea's accession to the OECD in 1996.

Voices from the industry

USA

Jason Whittet

Digital Innovation Lead Smart Cities, Amazon Web Services

Although Open Source solutions have been around since the beginning of computing, right now is an exciting moment where Open Source has never been more needed or accessible to cities.

Advances in cloud computing and networking - combined with cities being eager to innovate - have led to an increase in the number of Open Source solutions created each year, as well as the maturity and quality of those solutions. At AWS, for instance, we have been heavily supporting the public sector.

Adopting an Open Source approach can be powerful and collaborative, allowing cities to build on or improve solutions, while making it easier to replicate at a faster pace.

Initiatives such as FIWARE's universal set of standards for context data management enable cities to more easily implement Open Source and have grown significantly in use since its founding in Germany in 2016.

While early use was centered in Europe, cities in the USA have become increasingly comfortable with Open Source and FIWARE is poised for expansion. Look for USA use cases to start coming out in early 2021.

About Jason Whittet

Jason Whittet works for AWS as the Digital Innovation Lead at the Arizona State University (ASU) Smart Cities Cloud Innovation Center. See some of the Open Source solutions Jason has helped cities create here: smartchallenges.asu.edu. Jason also serves as the Co-Chair for the Data Super Cluster at the National Institute of Standards and Technology Global City Teams Challenge. He is a graduate of ASU and lives in Scottsdale, Arizona.

Voices from the industry

LATAM

Jaime Ruiz Huescar

Co-Founder,
CITIES FORUM

The Latin American Economic Outlook 2020: Digital Transformation for Building Back Better highlights how COVID-19 is leaving a profound effect on Latin America and the Caribbean socio-economic scene, further stressing the complex path faced by a region with dire structural challenges.

This is precisely why the foundations of the development model in the region must be reworked. Digital transformation can help to turn the tide, strengthen productivity and increase levels of inclusion and well-being.

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Latin America is tackling a rapid digital transformation across its cities and in the public services they offer. However, change may not come fast. This is why planned development models and new services need to be standardized and harmonized in order to allow cities to benefit from the data they generate.

FIWARE is the platform orchestrating this integration and the development of smart cities in Latin America in the fields of IoT, cloud computing and open data.

Read on and learn how this platform is being used to boost interoperability and standardization. We hope this booklet serves as an inspiration for cities and private companies to join the thriving FIWARE Community.

About Jaime Ruiz Huescar

Co-founder of CITIES FORUM, Jaime is managing some of the most relevant projects and initiatives in the fields of sustainable urban development and smart cities in Europe and Latam. An expert evaluator of the European Commission in e-mobility, Jaime is also a renowned speaker at key international events on the mentioned fields.

Voices from the industry

Europe

Bettina Tratz-Ryan

Research Vice-President,
Gartner

The days when a city's government – or even its digitalization organization – could undertake a smart city project on its own are long gone. That siloed approach has been rendered obsolete by sweeping social, economic and technological changes. And while it might be adequate in itself, it clearly won't scale. True smart city development can only be achieved via urban ecosystems involving a broad range of stakeholders. City residents worldwide, and especially in mature economies, are demanding a voice in urban development decisions. Their voices have, of course, been louder during the COVID-19 pandemic.

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Residents want to be informed and consulted about the pandemic's impact on their communities, and their cities' responses to it. But they also want to be heard on public safety, parks and playgrounds and other amenities, public transit and parking, and a myriad of other issues.

And their expectations are heightened by the ongoing trend toward consumerization and democratization, with online shopping and other activities shifting the economic balance of power to the individual.

Businesses and industry organizations clearly have a stake in these same issues, because they impact their ability to do business efficiently and, crucially, to attract high-value employees. Educational institutions, too, can benefit from ecosystem development and contribute to it, not least as incubators for next-generation workforce skills and technology innovation.

Technology providers are playing an expanding role, as well. And emerging projects like Alphabet's Sidewalk Labs community development project show that the digital giants are ready to play an active — and important — role in the life of cities. All of these stakeholders connect with each other through a consistent exchange of best practices, goals and information to advance and scale services.

The currency for that exchange is data. This data will be available in business models that address issues like parking availability, in operations systems dealing with concerns like energy management, or in citizen data like information on movement patterns through green spaces.

Data exchange on a large scale, taking open data and providing standardized data governance around it, will enable a structured and trustworthy approach to a joint execution of smart city ecosystem value.

About Bettina Tratz-Ryan

Vice President Research at the Gartner[1] Industry Research Team, Bettina is responsible for intelligent urban ecosystem research that includes smart city and industry stakeholders, as well as the digitization efforts in the manufacturing ecosystems. As part of her smart city research, she analyzes the strategic citizen impact and business value of data and information analytics, Internet of Things, open data marketplaces, applications and complex architectures for cities, the development of digital society and their industrial environment.

[1] "From Smart City to Intelligent Urban Ecosystem - Unlocking Data Value Is the Key to Cities' Industrial Partnerships" - published on 29 October 2020.

THE SMART CITIES INDEX

City of Vienna

Vienna is known for being one of the world's smartest cities. Aiming to have all their citizens benefiting from the digital transformation, Austria's capital has been building its "Smart City Strategy" since 2014 and is consistently implementing it.

This city is one of the pioneers in projects that use digital technologies to optimize various areas such as mobility, environment, e-health, etc.

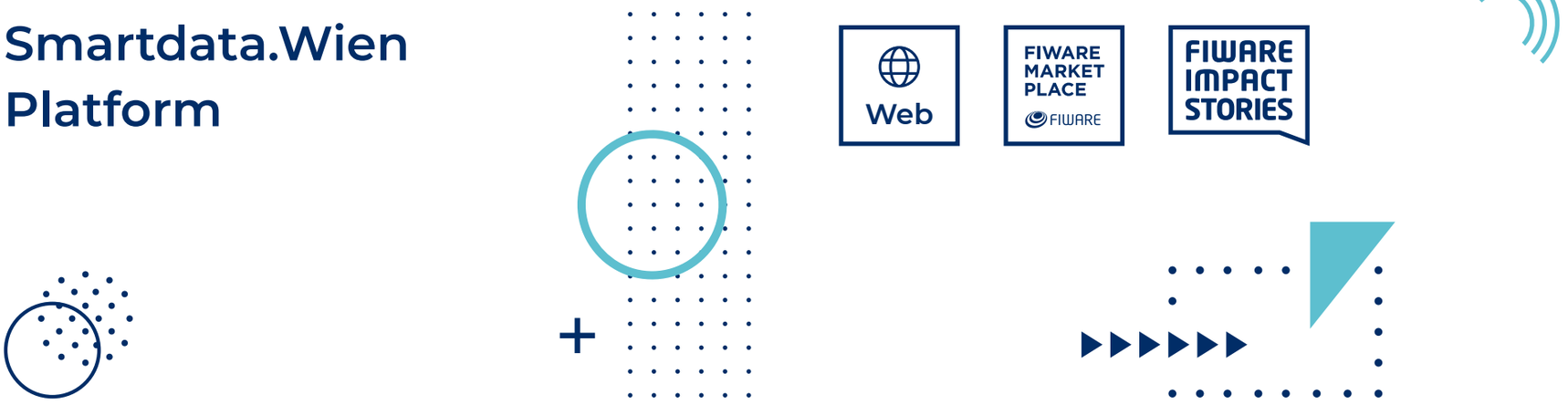
Vienna is also the first German-speaking city to have launched Open Government Data – an open and transparent system that makes city data available to the public for their further use.

In addition, the city has introduced a standardized monitoring system for all of its smart city projects. Everything is coordinated by the central Smart City Agency, a unit that pools technical expertise and promotes links between the city administration, research, business, and industry.

City of Vienna

City strategy official website

Smartdata.Wien Platform



Cities have data, but often in non-standard legacy formats. Smartdata.wien aims to take various data sources and make them accessible via a single unified portal. The platform uses FIWARE Orion Context Broker, currently promoted as a Connecting Europe Facility Building Block (CEF building block), providing a global standard NGSI-based API for large-scale contextual information management. FIWARE Orion Context Broker also works as a hub of contexts by sending data to several services, such as notifications, that can be used to automatically send every change to a historical database – in this particular case, the so-called “Data Lake.” A security layer ensures that whoever is authorized to do so can see and access the data.

Thanks to this initiative, three use cases so far have come to life: Facility Management, Monitoring Mobility, and Harmonisation of Facility and Energy Information.

The work was done in co-operation with Profirator, Smart Cities Lab, Trigyn, Swiss Smart Technlogies, and Verocity.

City of Brussels

Brussels is not only considered the de facto capital of the European Union, but also Belgium's capital and the heart of the Brussels Capital Region including 18 municipalities located around the city.

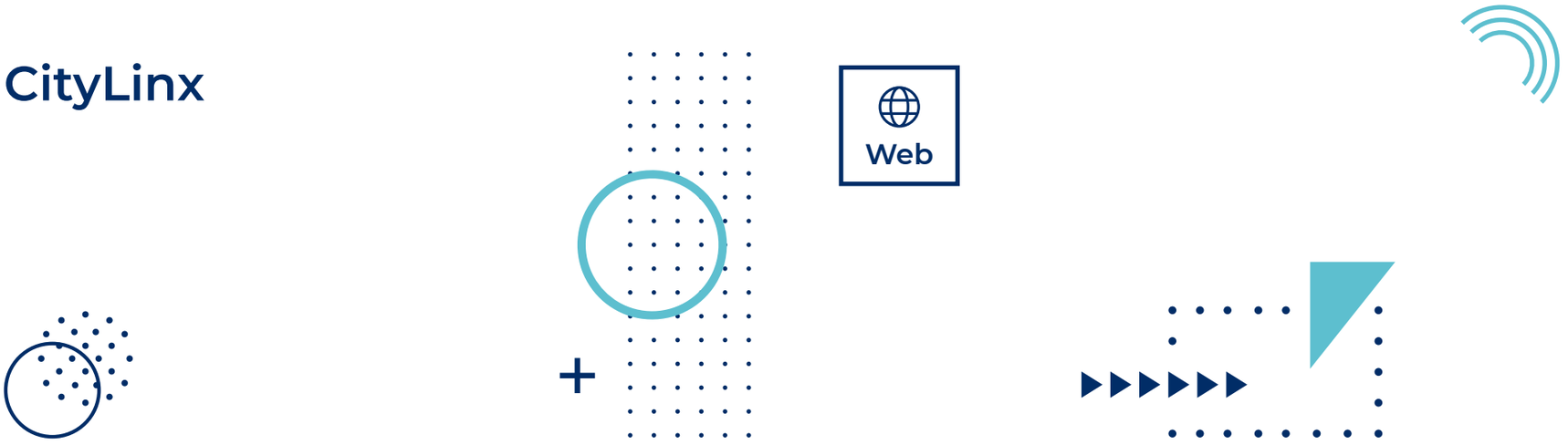
The region is one of three federal states in Belgium. As of 2019, more than 1,2 million people were living in the Brussels Capital Region.

Moreover, Brussels is home to the most important institutions of the European Union; among them the European Commission and the European Parliament.

With the ambition to become a smart city, Brussels is increasingly presenting new ideas and projects to achieve this.

The primary goal is to improve the quality of life of everyone – citizens, visitors, commuters, and businesses. The city pursues its own smart city strategy under the name smartcity.brussels, which is the backbone of the Brussels digital strategy. The Brussels-Capital Region's definition of the smart city is "as a city which uses smart solutions, based on data and certain technologies, which can lead to improved quality of life in a region".

CityLinx



CityLinx™ is a Smart City Software platform developed by BeeZeeLinx for the Intelligent StreetLight Project in Brussels. This project was run by ENGIE providing cities and integrators with complete vertical business applications such as Smart Streetlighting, Smart Environment, Smart Parking, and Smart Traffic. In early 2020, CityLinx™ won the largest European IoT tender for Brussels, Belgium, to control and monitor the 85,000 streetlights of the 19 communes of the Brussels Region.

The solution allows cities to control, command, monitor, and configure any type of IoT device from any supplier connected to any IoT network. This way, cities can enhance their operations, optimize energy consumption and reduce maintenance costs for applications such as street lighting, water, and building energy efficiency, among others.

FIWARE is used as one of the main technology to ease CityLinx™'s integration in complex smart city tenders.

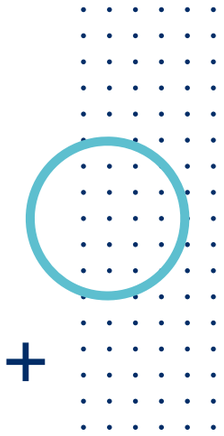
Aix-Marseille-Provence Metropolis

As the largest urban area in France and comprising 92 municipalities, the Aix-Marseille-Provence Metropolis, located at the mediterranean coast in the South of France is at the forefront of smart cities' technological innovations. The metropolitan area also topped the ranking of the most advanced smart city in France in 2019, most notably thanks to the number of projects, the number of contracts, the diversity and maturity of those projects.

The city wants to focus its development on improving and operating the city using new technologies based on what has made its reputation for a very long time: its citizens' quality of life.

Aix-Marseille-Provence puts citizens at heart to bring on an industrial and societal revolution that positively impacts citizens in their daily lives and the modernization of territories.

Digital Alliance for Marseille Sustainability



As the Aix-Marseille-Provence Metropolis makes the environment a top priority, air quality becomes the Environmental Agenda's first axis. In this context, the cities launched, with its partners, the DIAMS (Digital Alliance for Marseille Sustainability) project which is 80% funded by the European Union.

The project consists of deploying a platform for the exchange of data on air quality and digital services that allows everyone (political decision-makers, experts, citizens, civil society, economic actors, for example) to commit themselves to develop coordinated action plans at all territorial levels (individual, hyper-local, urban, regional, national and supranational). 2,000 mobile sensors are available to citizens and public service actors, thus becoming actors in pollution monitoring.

Air quality data is collected through a digital platform set up by Atos, and made available in Open Data, to promote the creation of new applications.

City of Saint-Quentin

Saint-Quentin is an urban community of 80,000 inhabitants located in the north of France. The historic city of Saint-Quentin nowadays aims to protect and develop the environment and pursue a local approach. Following this approach, youth, sports, and culture are promoted in Saint-Quentin.

Robonumerics is an industrial revolution that started at Saint-Quentin in factories that have been integrating more and more sophisticated robots over time. Digital technologies that associate artificial intelligence with robotics are spreading in various activities such as agriculture, home care services, and the Internet of Things (IoT). These robonumeric technologies generate growth, competitiveness, and job creation in all areas.

Saint-Quentin is dedicated to achieving its aims and figures as a front-runner territory in digital transformation.

Smart Irrigation

In cooperation with EGM, Hostabee, and Faubourg Numérique, the solution provides end-to-end connectivity to optimize the irrigation of sports fields in the city of Saint-Quentin. Sensors (humidity, weather) and actuators (mower, sprinklers) are connected through LoRaWAN and 3/4G, whereas the core is managed using the Stellio NGSI-LD broker. FIWARE technology was the crucial element to achieve a sustainable smart watering solution. It gave the base to Saint-Quentin to handle the long list of technical constraints and requirements to address to implement a solution matching the users' needs. This solution aims to help the city to modernize the management of maintenance operations in stadiums and reducing water and fertilizer inputs, among other purposes.

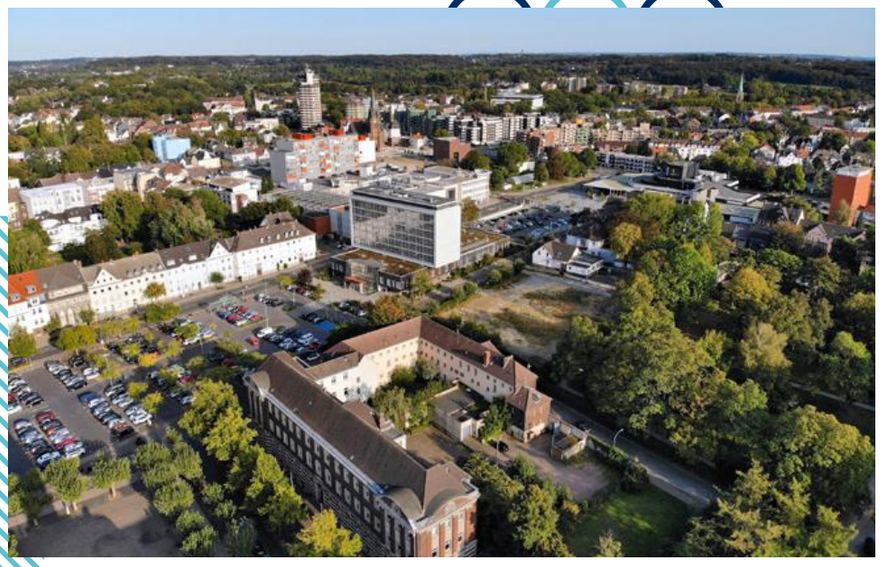
Web FIWARE IMPACT STORIES

Connected Canteens

To help fight food waste in school restaurants, the city of Saint-Quentin wishes to have a supervision tool that can rationalize the management of orders and carry out sensitization actions. Its Education Department aims to improve catering in schools with two challenges: 1) optimize the management of meal orders; 2) raise awareness and tackle food waste of children. This dual objective brought to life the concept of "Connected Canteens" in cooperation with EGM, Hostabee, Faubourg Numérique. A FIWARE platform has been deployed, connected over Sigfox and menus, canteens reservation and attendance are registered from the education department through an NGSI-LD context broker (Stellio) to provide decision support to the city.

Web

City of Herne



Urban, digital, and international. The city of Herne is taking big steps forward towards its digital transformation. Where coal and steel once resulted in Germany's economic boom, the focus has shifted to a greener, resilient, sustainable urban development, both social and economic.

Digitalization holds great potential for Herne, which is located in the heart of the Ruhr region.

Much attention has therefore been put on, for instance, new ways of communication, both socially and professionally, to bring about new educational opportunities for lifelong learning and individual support. Digital education is one of the pillars of a digital sovereign society. In turn, there are also economic benefits such as new events (like Digital.Herne.Business), innovative and data-driven urban development, business models, and higher productivity. All these factors have already begun to accelerate the city and region's added value in its modernization process.

Stadt Herne

City strategy official website

KlimaViertel

Web

FIWARE IMPACT STORIES

The KlimaViertel in the German city of Herne in North Rhine-Westphalia (NRW) is a great example of how the FIWARE Context Broker can quickly enable the deployment of an infrastructure to support a local energy community.

The project is the result of cooperation among Stadtwerke Herne (the local utility of the city of Herne), Accelogress, and Waterkotte, and it has the ambition to connect and monitor the energy production and consumption in a real-life living lab composed of a number of energy autarchic buildings.

The architecture, designed to integrate the various data sources, leverages the FIWARE Context Broker as a data aggregator.

In addition, Grafana (a multi-platform Open Source analytics and interactive visualization web application) has been used to develop a series of dashboards to present a real-time overview of the actual energy production and consumption.

City of Kiel

In September 2020, the state capital and port city of Kiel was selected as one of the 32 projects in the “Smart Cities Model Projects” initiative.

Kiel faces several challenges, including the mobility and energy transition, compliance with air quality, marine protection, and many more issues that would highly benefit from innovative, interoperable smart solutions.

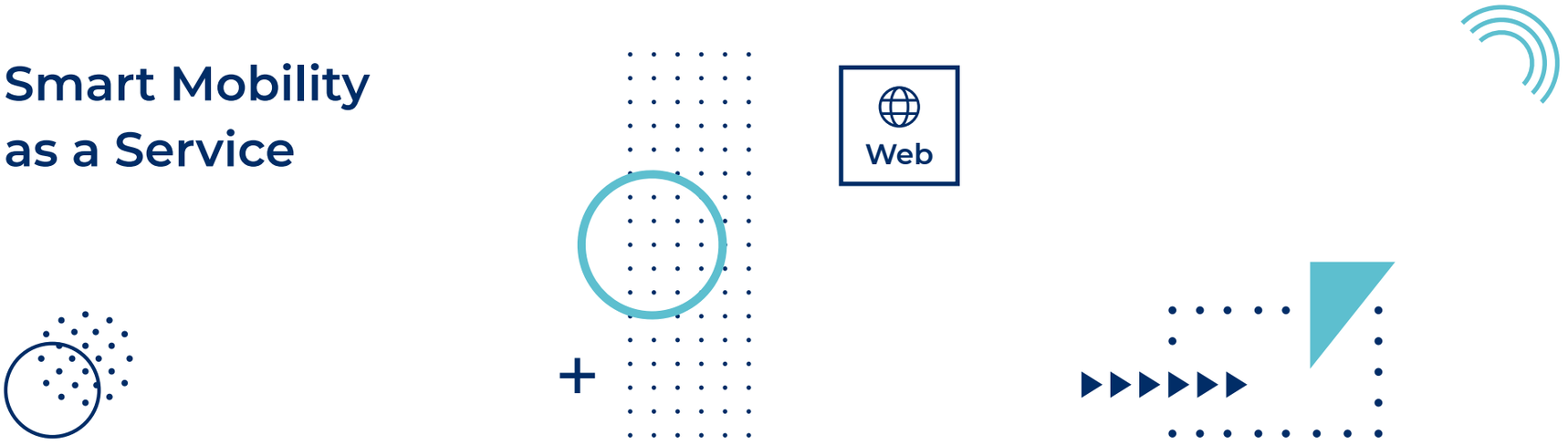
With its Smart City Strategy, it wants to create the conceptual framework for the use of digitalization to boost sustainability and participation. The Smart KielRegion platform will be a cornerstone of this positive shift.

The seven-year Smart KielRegion project aims to actively involve its citizens in the upcoming urban development processes, hereby also giving them the opportunity to experience and gain a better understanding of topics such as coastal and marine protection.

Kiel. Kiel
Sailing. City.

City strategy official website

Smart Mobility as a Service



To intensify multi- and intermodal forms of mobility, the KielRegion has been implementing a network of mobility stations with the help of the Smart MaaS project which created a digital twin of the mobility stations. A mobility station is the spatial combination of different mobility offers and services, creating a holistic, user-friendly mobility system.

Mobility stations create mobility hubs that improve the mobility of both citizens and tourists. They offer good alternatives for movement within the city and the region - even without a car.

The stations link diverse offers of ride-sharing or car-sharing as well as connections to public transport. Transfer points also offer the possibility to safely park a bicycle or e-bike or to charge one's own e-car.

In peripheral areas of the city, the stations are supplemented by commuter parking spaces, creating ecological, social, and economic added value.

Monheim am Rhein

Building upon its existing technical infrastructure, Monheim am Rhein, which is located on the eastern bank of the river Rhine in the north-west of Germany, decided to transform the city into a modern smart city towards the end of 2016.

As a result, the Monheim 4.0 strategy was brought to life in 2016, with many of its related projects at an advanced stage of planning or already in the implementation phase.

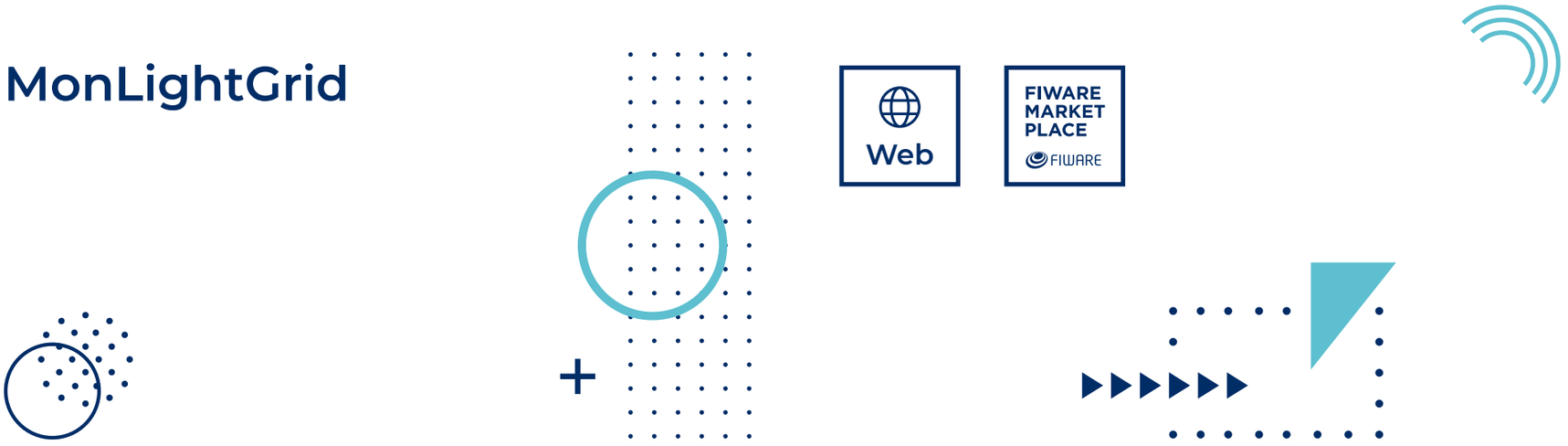
One of the city's goals is to improve the quality of life and the attractiveness of the city and it is, therefore, well on its way to implementing several new projects related to autonomous buses, digital bike rental, car sharing, and a digital citizen account, as well as Smart Metering, Smart Parking and Smart Lighting applications.

The city-wide full fiber-optic expansion and city-wide Wi-Fi coverage hereby serve as the basis for various smart city projects.

MONHEIM AM RHEIN

City strategy official website

MonLightGrid



The objective of the MonLightGrid project is to implement a modern, citizen-orientated lighting concept that aims to reduce energy consumption, improve local security, optimize private vehicle traffic, and support citizens to raise related issues. To achieve these goals, the city of Monheim trust a FIWARE Platinum Member: Engineering's Digital Enabler integrates different data sources from lamps, street lighting systems, lighting control systems, asset management systems, and geoserver.

Based on the FIWARE data model for Smart Lighting, LoRa IoT devices are integrated and report actual environment data to improve on-demand lighting services. This new service reduces the CO2 footprint and light pollution, which also improves local biodiversity.

One cornerstone of the city of Monheim's climate plan is the development of an energy optimization strategy for decentralized energy production in a district.

Digital Enabler uses smart meter data and combines this data with other IoT-sensor and asset management data to achieve these goals.

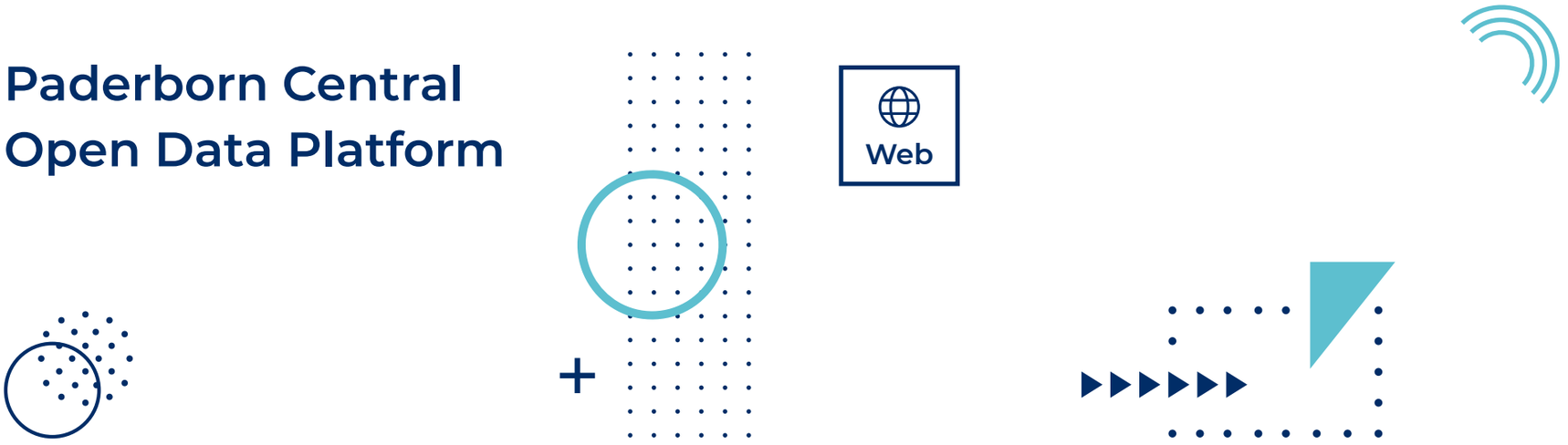
City of Paderborn

Located in North Rhine-Westphalia and with more than 150,000 inhabitants, Paderborn has high ambitions with regards to digitalization. In contrast to its ancient history, the city breathes modernity and digital innovation. As one of the most important centers of the computer science industry in Germany, the city is home to many leading IT companies. Due to this, Paderborn's university also focuses on technological research, being referred to as "University of the information society".

With the aim of building a digital ecosystem for its local economy, Paderborn is currently developing a central open data platform, funded by the state of North Rhine-Westphalia, as part of its funding program to get its regions on the digital path.

A FIWARE Foundation member, Paderborn lays the cornerstone of an innovative Smart City architecture for open data, from which other cities will soon benefit, on a license-charge-free basis.

Paderborn Central Open Data Platform



The FIWARE framework forms the core of the platform, providing features such as context and data management. Paderborn's open data platform uses Open Source components from the FIWARE catalogue with the Orion Context Broker at the heart of it.

The setup of the core platform has been carried out by FIWARE Foundation members HYPERTEGRITY and Profirator. The organizations are part of a large team – which includes UNITY – which supports the city in delivering its digital vision. The platform will gradually be expanded to include further use cases from the fields of IoT, geodata, and tourism.

By making their open data platform available to other cities free of charge in the near future, the benefits are of enormous importance as cities can then skip the time-consuming phase of designing a platform themselves.

City of Wolfsburg

The aim of #WolfsburgDigital, a joint initiative of the Volkswagen Group and the city of Wolfsburg, is to harness the opportunities offered by digitalization and further enhance the attractiveness of Wolfsburg.

Digitalization offers both big opportunities, as well as challenges, for work, society, and industry.

The initiative, therefore, seeks to transform the city into a digital model city. For citizens and visitors, this means gaining access to new goods and services.

With the involvement of a wide array of companies, as well as scientific institutions, #WolfsburgDigital also provides its partners with a suitable environment in which they can pursue their own digital development and projects.

The city's future-oriented vision has already resulted in technology-driven job creation, which will, in turn, attract skilled works and contribute to Wolfsburg's competitiveness as a business location.

Orchestra Cities

Orchestra Cities, developed by the FIWARE member Martel Innovate, is an integrated platform based on FIWARE and other cutting-edge Open Source solutions that brings all the vertical data silos of cities into one place within a cloud-native architecture.

In Wolfsburg, Orchestra Cities delivers on multiple scenarios such as providing citizens with a smart advisory system for domestic waste management. Users can plan the most effective route for waste disposal, considering container type, fill level, and user destination.

A further smart route planning scenario manages electrical vehicles and their charging stations, with their occupancy and supported vehicles.

Web

FIWARE MARKET PLACE

ODP Open Data Platform

The Open Data Platform (ODP), developed by WOBCOM, is built and used for all sensor data and other relevant data in Wolfsburg. All this data is consumed by the Orion Context Broker and the IoT Agent for its LoraWan technology. In combination with other services used, it is establishing not just the latest data but the whole data history. The platform is built in a way that other cities can easily be integrated, allowing for a big pool of open data and optimized collaboration.

To use the ODP effectively, the Wob-App was built. A FIWARE-powered Smart City Platform for the smart management of Smart City services, it consumes all collected platform data and makes it available to everyone using the app.

Web

City of Pune

With its Smart Cities Mission, India started working on a strategy to revitalize its urban areas. Led by the Ministry of Housing and Urban Affairs, the effort has been considerable, given the fact that India has 8,000+ towns and cities.

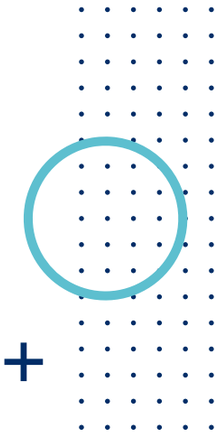
The solution was to focus initially on 100+ cities, with Pune among the cities shortlisted in India's Smart Cities Mission.

To successfully catapult the Mission to the next stage of innovation, India has launched several initiatives in the past years, including the India Urban Data Exchange (IUDX), an Open Source platform that uses the **FIWARE NGSI-LD** specifications already – to be rolled out over existing 100 significant cities over the period of 2021-2023.

Pune's major goals include better access to water, enhanced citizen outreach, and both improved urban mobility and infrastructure in energy, housing, safety and security.

With over six million inhabitants, Pune is the second-largest city in the state of Maharashtra after Mumbai, and stands as an important city, with regard to its economic and industrial growth.

IUDX
India Urban Data Exchange Platform



Created in partnership with the Indian Institute of Science, the IUDX platform's goal is to facilitate a secure, authenticated and managed sharing of data amongst various data platforms thereby helping cities to better focus on unlocking their urban data and ultimately, generate new revenue sources and innovation.

The platform is developer friendly, via definitions of open APIs (application program interfaces) and data schema templates (formats for interpreting data), so that new application ecosystems can flourish.

Pune is one of the three cities deploying the IUDX platform to improve city safety and night travel.

The city has designed a phone-based app that allows people to plan trips, whilst taking safety considerations into account. For this, the datasets will be collected from location wise reported crime data, surveillance camera feeds, street light locations/status, number of people on the street, and so on. Citizens, public transport, and law enforcement agencies are the intended customers of this application, which will soon be available for use by the general public.

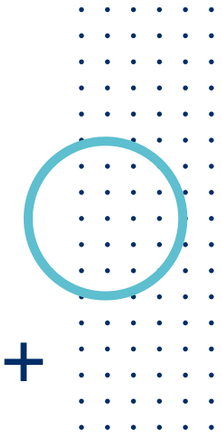
City of Surat

Similar to the other cities that make up the India Smart Cities initiative, Surat Smart City's vision is to ensure its citizens benefit from improved quality of life, and the city does not fall short of smart innovative projects to deliver such a vision. Be it by providing fair access to both social physical infrastructure and improved mobility - through leveraging technology - the city envisions itself as a futuristic global city that fosters its economy, protects the environment and its identity and culture.

With nearly eight million inhabitants, Surat is one of the largest and fastest growing cities in the state of Gujarat. Ranked as the eighth-largest city and ninth largest urban agglomeration in India, it's no wonder that improved mobility and infrastructure are a concern for the city representatives.

In the pursuit of benefiting from the wider innovative and interoperable applications offered by the IUDX platform, the city is the latest to have deployed the Open Source software that uses the **FIWARE NGSI-LD** specifications.

IUDX
India Urban Data Exchange Platform



Waiting for buses without any indication whether they will ever come isn't effective. Surat's Bus Occupancy Use Case organises and onboards data on IUDX from sources such as Surat Money Open Loop Smart Card, QR code-based ticketing, and Google's bus-related real time data.

This data is used to derive the actual bus arrival ETA and the number of passengers on board in real-time, aiding citizens to plan their travels in a more effective fashion. Both commuters as well as institutions will be the major beneficiaries of this initiative.

Having been selected as the platform of choice for the Digital India initiative (launched by India's central Ministry of Electronics and Information Technology - MeitY), IUDX's data exchange platform has already come in handy to Surat in many other ways.

IUDX's data exchange platform software is capable of harvesting data from many subsystems, within a city and opening the data for application developers in FIWARE NGSI-LD format, enabling them to build new applications, and services to help citizens and also ensure interoperability between cities.

City of Varanasi

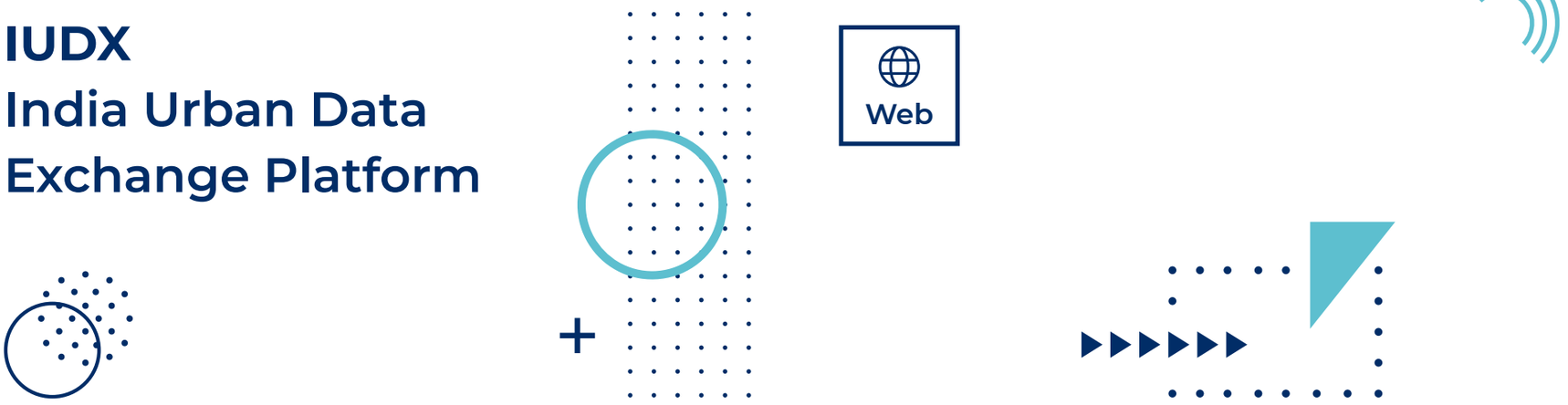
Like Pune, Varanasi features among the 100+ cities selected for India's Smart Cities Mission.

One of the oldest cities of India, Varanasi has been at the forefront of religious and cultural activity since the end of the Bronze Age. The city prides itself as one of the world's biggest cultural and spiritual melting pot.

The city does however cherish innovation as its ancient heritage shares the stage with innovative solutions aimed at enhancing its citizens's overall quality of life. Under the Varanasi Smart City project, basic services delivery and city infrastructure are to be improved and the city is to be fully prepared for disaster mitigation.

With nearly two million inhabitants, Varanasi is one of the three cities deploying the India Urban Data Exchange (IUDX) in 2021, an Open Source software that uses the **FIWARE NGSI-LD** specifications.

IUDX
India Urban Data Exchange Platform



Created in partnership with the Indian Institute of Science, the IUDX platform's goal is to facilitate a secure, authenticated and managed sharing of data amongst various data platforms thereby helping cities to better focus on unlocking its urban data and ultimately, generate new revenue sources and innovation.

Having an effective Waste Management strategy has been a key concern for Indian cities, and Varanasi has been at the core of the issue. Using data originated through the IUDX platform, and aided by the city sanitation department, an app has been created to accurately estimate wet and dry waste volumes.

The aim is to allow the responsible parties to optimize pickups and better plan the sale and recycling of wet waste, hence reducing pollution and opening up business opportunities for many different players.

City of Arezzo

Arezzo is located in the region of Tuscany and home to 99,000 inhabitants. Besides its ancient history which dates back to the fourth century BC, Arezzo aims to become a smarter and more sustainable city nowadays.

Finding the right parking slot in the shortest time period possible represents an issue for all cities around the world.

Indeed, not finding the right parking slot at the right moment means a waste of valuable citizens' time, an increase in the level of citizens' stress, a loss in the city's economic performance, and a consequent increase of both CO2 and greenhouse gas emissions.

In addition, there is also an increase in potential car crashes caused by the abundance of vehicles moving around disorganized parking lots.

To answer all these challenges in a smart way while providing an efficient and effective service to their citizens or visitors, Arezzo has decided to implement a smart parking platform.

Atam Parking App

Web

FIWARE IMPACT STORIES

The FIWARE-based (CEF Context Broker) Smart Parking Platform, developed by the FIWARE member phoops srl in collaboration with Atam, allows Arezzo's citizens to search and pay for their parking solutions directly from their smartphones.

Thanks to the app, citizens can check all the available parking locations, pick their favorite parking slot, park their car and pay directly with their smartphones.

Thanks to an in-built push notification system, the app will warn the end-users when their parking subscription is close to an end allowing them to extend it just with a single tap.

Users can also pay for their monthly subscription directly from the app while managing and registering multiple vehicles.

The platform is complemented with functions dedicated to the parking manager (e.g. publishing news) and it allows the municipal police to check for the parking slot payment and/or subscription's validity in real-time.

City of Florence

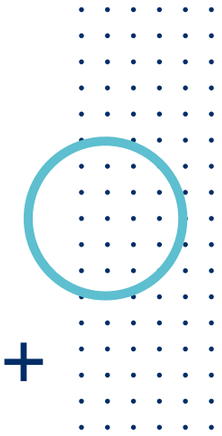
Florence is located in central Italy and the capital of the Tuscany region. The metropolitan area of Florence, Prato and Pistoia is home to circa 1,5 million inhabitants.

The city of Florence demonstrates how to efficiently manage urban mobility, delivering timing services to their citizens. Cities are locations with a high level of accumulating economic activity in dense urban tissue.

A solid transport system is surely enough one of the main challenges of city managers. Avoiding traffic congestion, longer commuting time, and promoting public transport, are some of the crucial challenges that cities face.

Florence has moved one step forward, building a platform that, on the one hand, delivers timely and reliable services and information to its citizens, and, on the other hand, provides the municipality's personnel with a reliable instrument to monitor and manage urban mobility following the Mobility as a Service logic.

Info-Mobility Florence



Web

FIWARE IMPACT STORIES

The FIWARE-based (using the CEF Context Broker) IF (Info-Mobility Florence) platform was created with and developed for the Municipality of Florence and its citizens. It actively collects information from different streams, including user-generated content and municipal ordinances, and delivers them to the end-users.

The IF platform, developed by phoops srl, has two main endpoints: a mobile app and a web-app.

The mobile app delivers all the information available (ie. car crashes, important mobility events, and mobility services like e-charger presence and status) to Florence's citizens in real-time, and through it, citizens can directly communicate with the Municipality (public administration).

The web-App, on the other hand, is integrated within the already existing smart city systems and allows the public operator to monitor urban mobility in real-time spotting eventual crisis areas.

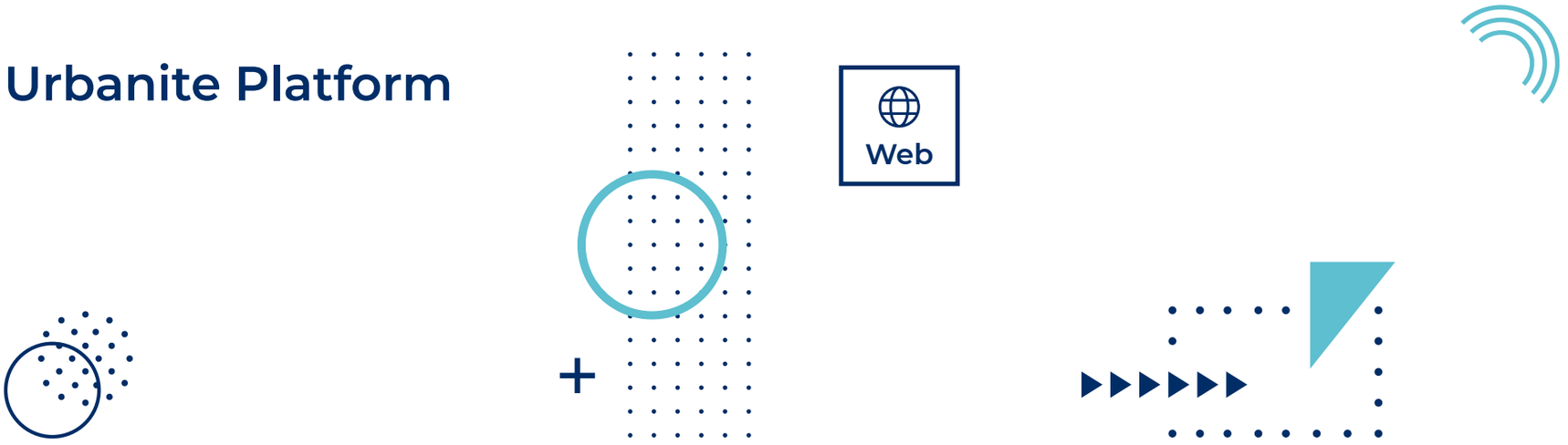
City of Messina

The city of Messina, which is the third-largest city in Sicily with 250,000 inhabitants, is a vital service center for the surrounding municipalities, for the Calabria region and Straits area.

Since Messina is located between 32 kilometers of hills and sea, its geographical peculiarities and the role as the main connection between Sicily and the Italian peninsula, have a huge impact on the mobility of its citizens.

For this reason, the city of Messina aims to build mobility services able to fulfill the needs of citizens, dwellers, commuters, and visitors, allowing them to move around and through the city seamlessly. In addition, it wants to optimize the management and interaction among mobility services and monitoring systems in the urban area, reducing the waste of resources and costs for the Public Administration.

Urbanite Platform



In the context of the URBANITE H2020 project, the city of Messina, supported by ALMA Digit SRL and Engineering Ingegneria Informatica SpA, is testing the URBANITE Platform that integrates FIWARE technology (i.e. Idra incubated GE and Smart Data Models) for data collection, harmonization, and management.

The platform is empowered with simulation capabilities to support decision-makers in the management of mobility.

The platform leverages FIWARE as a means for interoperability to harmonize data coming from scattered and heterogeneous data sources; FIWARE Smart Data Models and NGSI-LD specifications represent the interoperability points enabling the “lingua franca” of the platform. Part of this picture is the development of a FIWARE based “virtual device” software stack for edge devices as an abstraction of a physical device. A virtual device is a sub-section of an NGSI-LD “device” type in which a specific configuration is applied.

City of Rome

The municipality of Rome, which is the capital of Italy, represents a population of 2,800,000 inhabitants. It administers the territory extending over an area of 1,285 square kilometers.

The Municipality's competencies cover, among others, mobility and transport, social inclusion and protection, environment, protection of cultural heritage, tourism, schools and educational services, and job placement.

Since 2016, Rome is an intermediate body of the EU National Operational Programme Metropolitan Cities 2014/20.

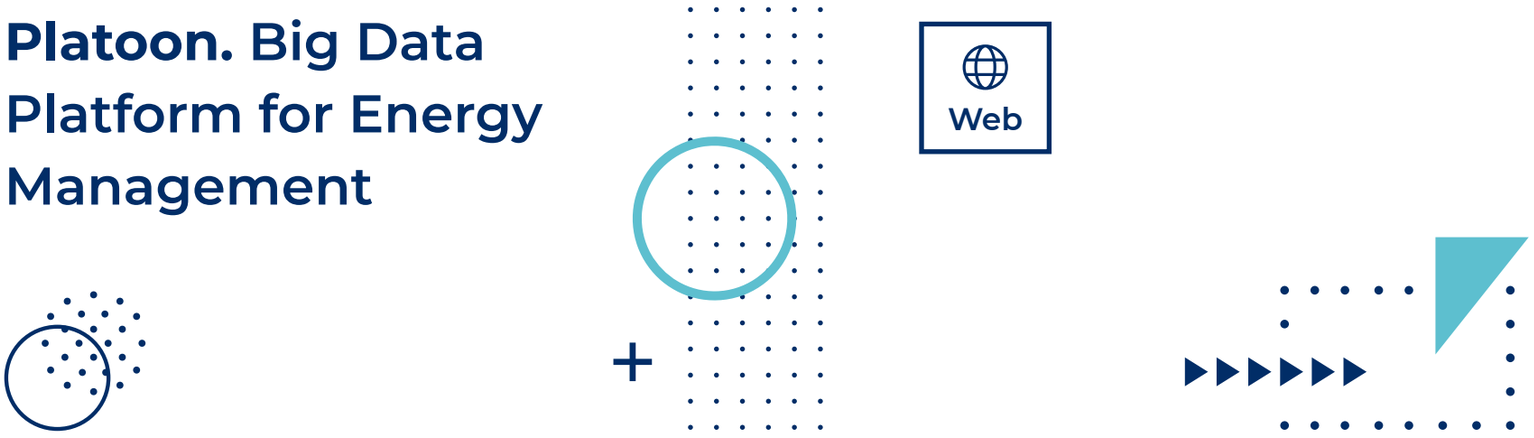
It is also contributing to the EU Urban Agenda as a member of the partnership on the digital transition.

Roma Capitale represents a large asset owner and energy-intensive multi-site user. It manages 1,200 buildings, mainly schools, public offices, museums, libraries, and residential buildings, that consume around 156,000,000 kWh/year in thermal energy and 110,000,000 kWh/year in electrical energy.

ROMA CAPITALE

City strategy official website

Platoon. Big Data Platform for Energy Management



According to the massive use of energy in its buildings, and in the context of the PLATOON H2020 project, the Municipality of Rome is implementing a set of energy data analytics applications to cover different use cases: including GIS visualization for the energy consumption (EC) in buildings and general energy performances (EP); predicting energy usage of the buildings by analyzing multiple factors, and simulating future consumption scenarios for different time/functional use profiles of buildings or changes in performance.

For the implementation of the PLATOON solutions, the Municipality of Rome will take advantage of the Digital Enabler, Engineering's powered by FIWARE ecosystem platform, which enables multi-domain data integration, harmonization, and multi-device interoperability supporting data-driven decision-making processes.

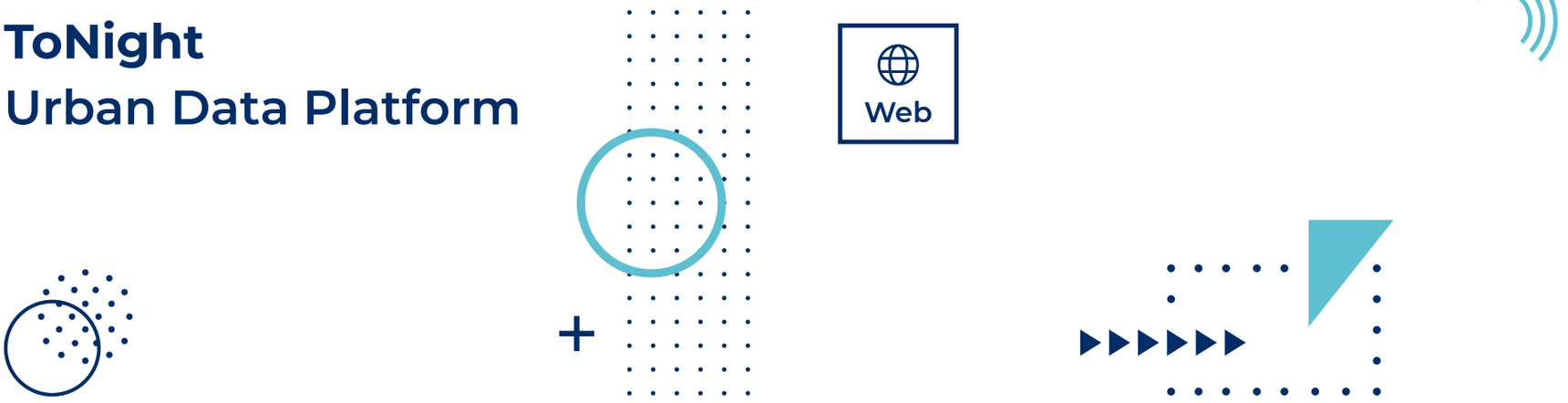
City of Turin

Turin is an important cultural and business center in the North of Italy and capital of the region Piedmont. The metropolitan area is home to 2,2 million inhabitants of which 850,000 are living in the city.

Making urban spaces more liveable and safer during the night is a major issue for the city of Turin and its residents. During the day, services and economic activities provide citizens with a feeling of security. During the night, these activities are considerably reduced, so the task of protecting the public falls heavily on the local authorities.

In addition, Turin is facing rapid social change that puts increased pressure on its public spaces at night, including changes in the population mix, urban lifestyles, and worsening of the socio-economic conditions. The ToNite project allows the city to face the challenge by implementing multidisciplinary solutions which will help both local authorities and citizens to understand the evolving demands on public spaces at night.

ToNight
Urban Data Platform



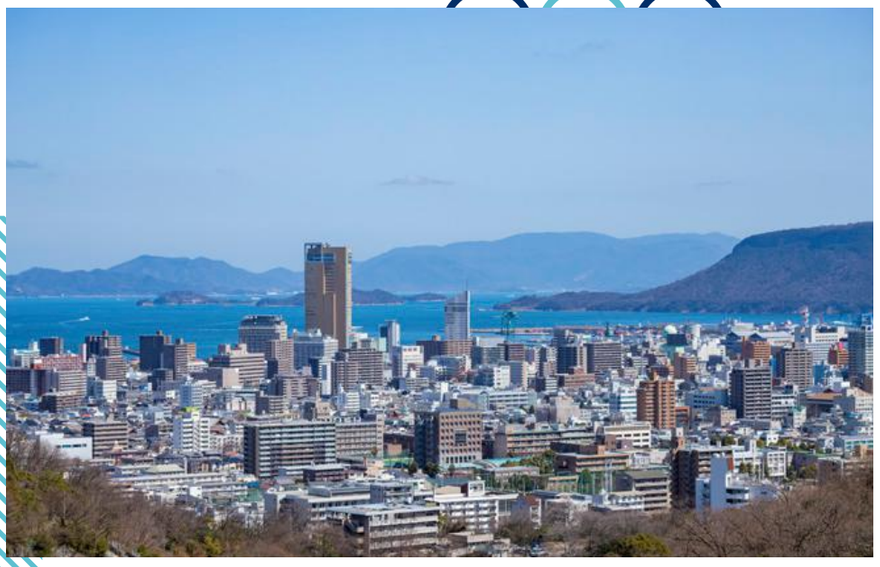
The ToNite Urban Data Platform is dedicated to understanding and analyzing urban insecurity phenomena, and providing open intelligence to improve citizens' awareness regarding their culture and perception of security.

It improves decision makers' capabilities to monitor the current situation, detect the rise of new phenomena, and understand communities' needs by collecting, processing, and visualizing heterogeneous data generated by the city infrastructures and its communities in the context of urban security.

The platform is based on the Digital Enabler, which is Engineering's FIWARE-enabled Internet of Everything platform that bridges the gap between data providers and data consumers, guaranteeing a robust end-to-end process of data discovery, collection, harmonization, and visualization.

Turin is leading the partnership composed by Torino Wireless Foundation, Engineering Ingegneria Informatica, Experientia, SocialFare, European Forum For Urban Security (Efus), Espereal Technologies and ANCI.

City of Takamatsu



Takamatsu is a city that has been actively promoting its smart city policy.

Setting the target to become “a city of sustainable growth”, it aims to meet specific regional challenges and stimulate regional economic growth through digital innovation. It does this through the collection, sharing, and re-use of a wide range of IoT data. For instance, one of the first-year initiatives promoted by the city is its disaster resilience initiative.

It, hereby, works toward maintaining a safe and secure community for its citizens by working on a real-time understanding of risky situations, thereby accommodating early and appropriate evacuation plans for citizens.

In 2018, Takamatsu adopted FIWARE to move their vision for a smarter city forward under the framework of the Ministry of Internal Affairs and Communications project, which highlights cross-segment utilization of data to deliver truly smart services.

瀬戸の都 高松

City strategy official website

FIWARE

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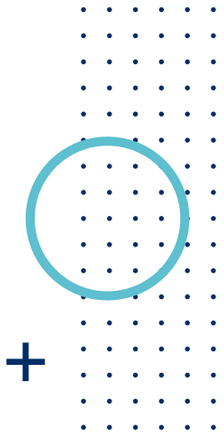
Common IoT Platform



Takamatsu City's IoT-based visualization system for disaster management integrates a wide selection of information and visualizes the real-time emergency situation on the integrated dashboard. It allows the city to mitigate disaster damages by proactively delivering flood sandbags and notifying the local traffic service providers of an emergency situation.

In addition, the municipality can make quick and timely decisions when ordering or advising evacuation.

Takamatsu City's data-sharing-oriented Common IoT Platform is based on FIWARE technology.

The platform stores and manages acquired data in a unified manner using its context management function and provides it to the data user in the form of a standard API.

In addition, the system offers API management services, geospatial mapping, history management, and ID management (authentication and approval).

City of Eindhoven

Eindhoven aims to create a ‘smart society’ and it hereby views citizens as key players in addressing challenges and problems. The city is, therefore, human-driven, supported by technology and design.

To realize its vision of being a truly smart society, the city council set up the Smart Society Programme, which focuses on the areas of data infrastructure, living labs, community, and ecosystem.

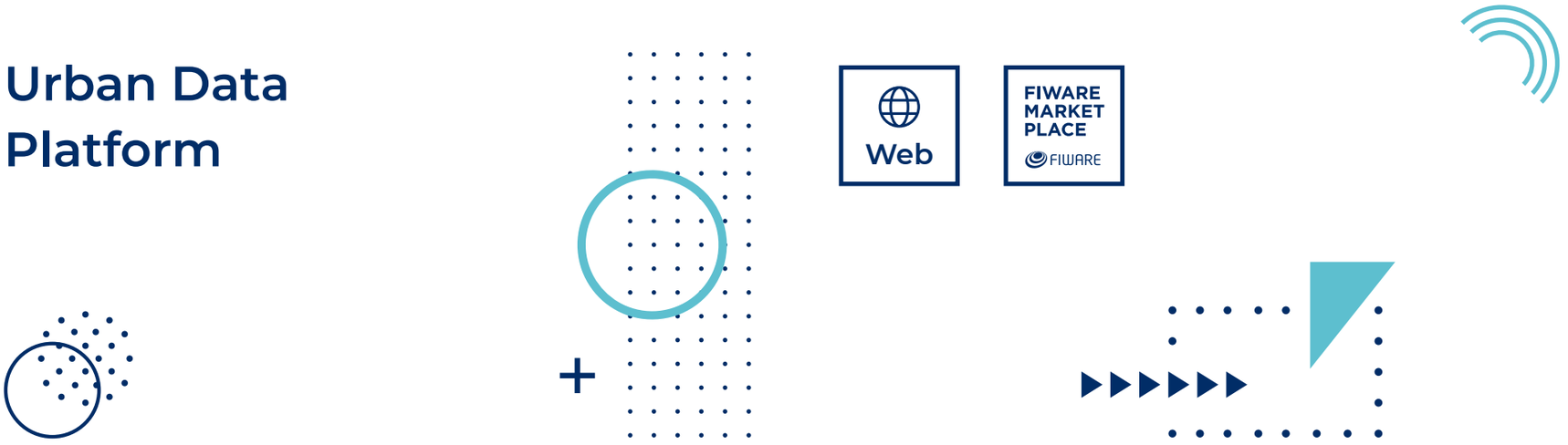
Social issues are hereby collected from the bottom up, giving citizens the freedom to express their worries, needs, and frustrations, and shared with potential partners, experts and designers.

The city collects and analyses data on mobility, environment, energy, and public safety. Not only can this improve city management and services, but it also opens up the potential for interested parties to build innovative solutions for societal challenges, based on data.

EINDHOVEN

City strategy official website

Urban Data Platform



Eindhoven's Urban Data Platform, developed by the FIWARE platinum member Atos allows the local authorities to improve quality of life by taking advantage of a Data Platform that is fully interoperable - based on the Minimal Interoperability Mechanisms defined in the SynchroniCity project.

Designed like a puzzle, customers can pick up all the components they need to deliver the most valuable data-based services to all stakeholders of their influence area.

That approach gives customers unique agility; they can start with a little topic and progressively enrich their service offering. Furthermore, it provides the guarantee of investment sustainability.

When a component is out of date, it can be switched. Moreover, the heart of the platform is based on an Open Source and open standard component (the Orion Context Broker), which is supported by the European Union as part of its sovereign strategy in data management.

Utrecht Region

By 2030, more than 80% of the Dutch population will live in urban areas.

The development and maintenance of a healthy living environment are therefore of crucial importance for the health and well-being of the people.

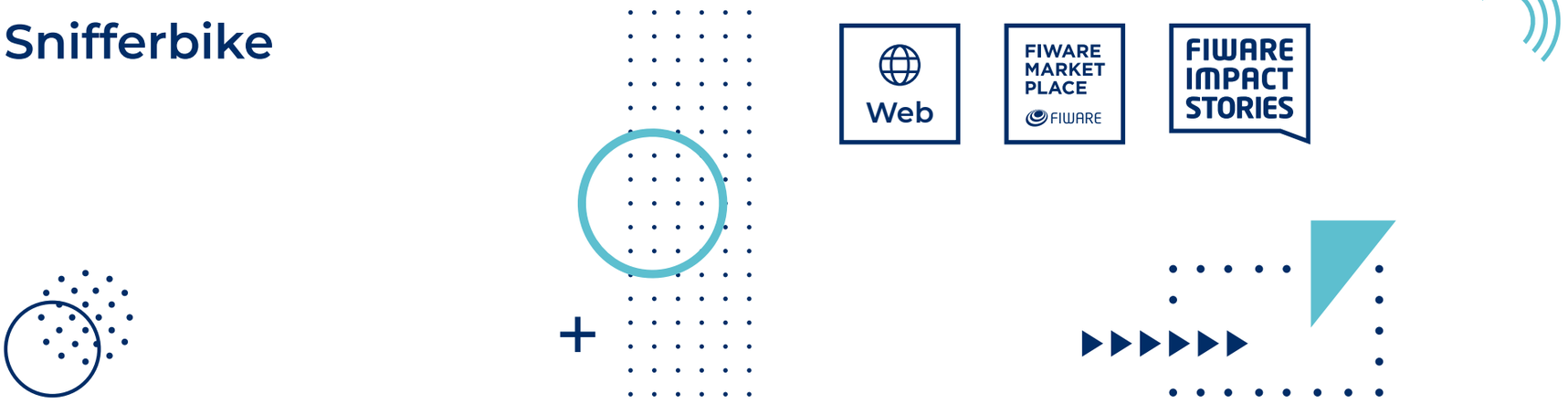
One specific area that impacts healthy urban living is mobility and air pollution. Although people in The Netherlands cycle a lot, there is a shortage in valuable and usable data about cycling compared to car traffic. The result is that cycling is often underexposed in mobility policies.

The Utrecht Region wants to be a leader with regard to cycle knowledge, data, and tools. Its strategy is about “Healthy Urban Living” and it contributes to that with various FIWARE-related projects, also including EV-charging stations (charging station data and parking sensors to provide better information about usage), the IRIS-project (energy transition) and their open data portal.

Utrecht Region

City strategy official website

Snifferbike



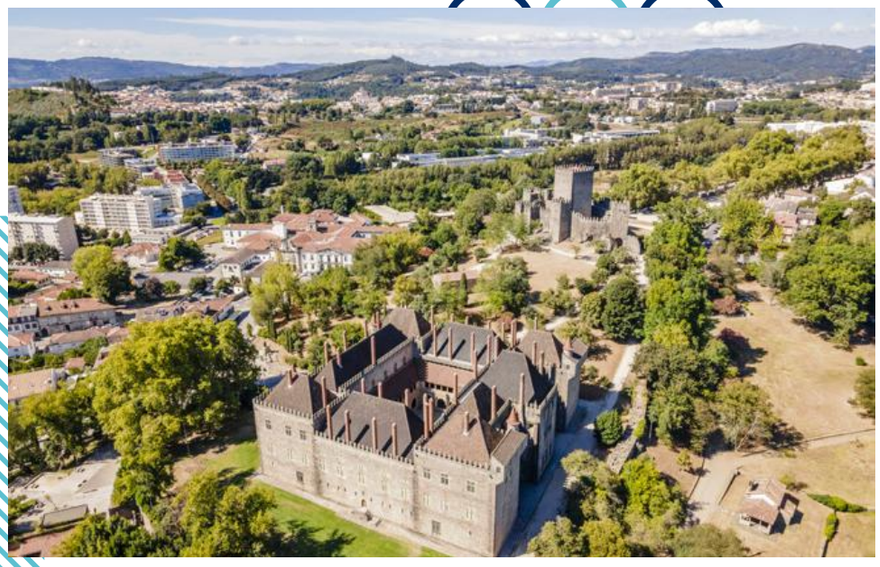
The Snifferbike project started in 2018 as a collaboration between the province of Utrecht, Civity, SODAQ, and RIVM (the Dutch National Institute for Public Health and the Environment).

The Snifferbike sensors measure particulate matter (PM), but also GPS-coordinates, Volatile Organic Compounds (VOCs), temperature, air pressure, humidity, and irregularities of the road (accelerometer). In addition, it conducts anonymous tracking of cyclists to identify habits and determine where cycling infrastructure could be improved based on traffic patterns.

A mobile application for citizens allows cyclists to track air quality and to choose healthier routes.

A management dashboard also provides indispensable data on the current state of the environment, which is essential for policymakers tackling environmental and mobility issues, as well as for local research agencies, in order to create a healthy urban space for all.

City of Guimarães



Guimarães is a city in northern Portugal, often referred to as the “birthplace of the Portuguese nationality”. Today, Guimarães is one of the most entrepreneurial, innovative, and industrial cities in Portugal.

The city and its digital transformation model, have won awards like ACEPI Navegantes XXI’s Best Digital City Award, the Most Sustainable City in Portugal Award in 2017, and the Perfect City Award in Connectivity and Innovation.

It is developing an integrated strategy to continue building itself as an innovative and sustainable city. The basis for this strategy relies on the use of information and communication technologies and other means to improve the quality of life, efficiency of urban operation and services, and competitiveness.

Fostering local development, economic growth, and citizens’ engagement through the deployment of innovative digital solutions is the ultimate mission of the city of Guimarães.

Urban Platform

Web

FIWARE MARKET PLACE

FIWARE IMPACT STORIES

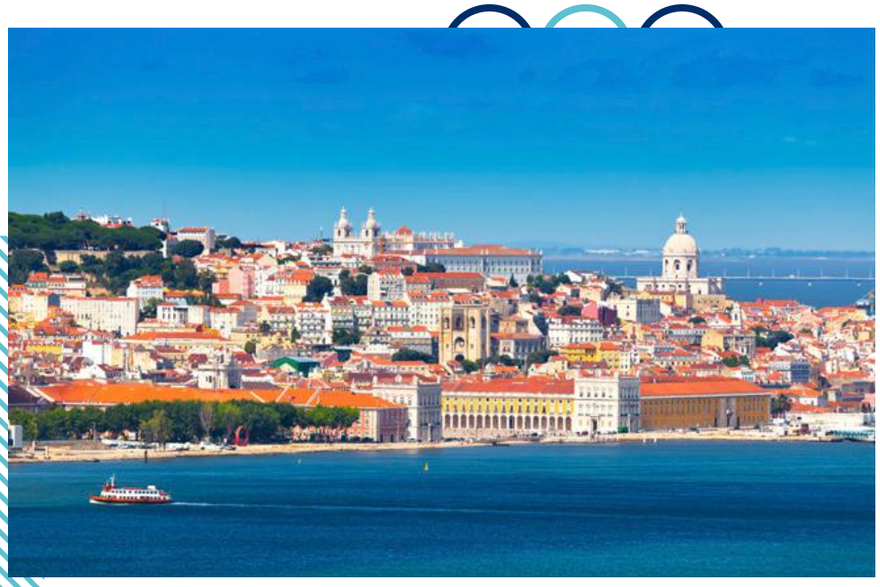
Focused on addressing the challenges faced by future cities, the Urban Platform developed by FIWARE Gold member Ubiwhere is a cloud solution powered by data (open, public, and private), open standards, and Open Source software.

It allows data collection and processing in various domains in a single customizable dashboard, crossing them and presenting indicators in a unified form.

The application of intelligent methods, both in real-time and in batch, offers valuable insights for the cities' whole value chain, helping them make more and better-informed decisions. End-users can define and customize dashboard layouts and all dashboards (maps, graphs, indicators) by filtering information from any available source and combining it into different domains.

Thanks to FIWARE's NGSI and Smart Data Models, the Urban Platform is a user-friendly platform and helps cities increase transparency by making data openly available to the community. Ubiwhere's smart city solutions are now available in more than 60 cities around the world.

City of Lisbon



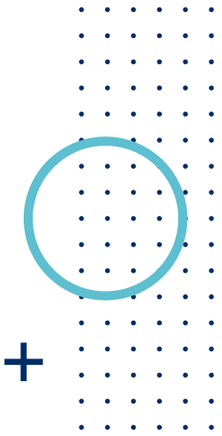
Lisbon is the capital and largest city of Portugal. With a population of around 550,000 habitants, it has a smart city strategy which sets the citizens and their needs at its core. Technology is just a means to an end: the city aims to become sustainable, competitive, participatory, creative, innovative and citizen-centric.

Travel and tourism, meanwhile, is a vital industry for the country and is booming. The number of tourists visiting Portugal grew 13 percent in 2016, to exceed 10 million for the first time – the sixth consecutive year of record growth.

Tourist arrivals and all travel-related revenues account for about 10 percent of Portugal's gross domestic product. The tourism sector is also a key source of employment.

The historic Portuguese capital is implementing a smart city infrastructure aimed at improving the daily operation and coordination of multiple city services, boosting security and ultimately improving the quality of life for residents.

NEC Cloud City Operation Center



Web

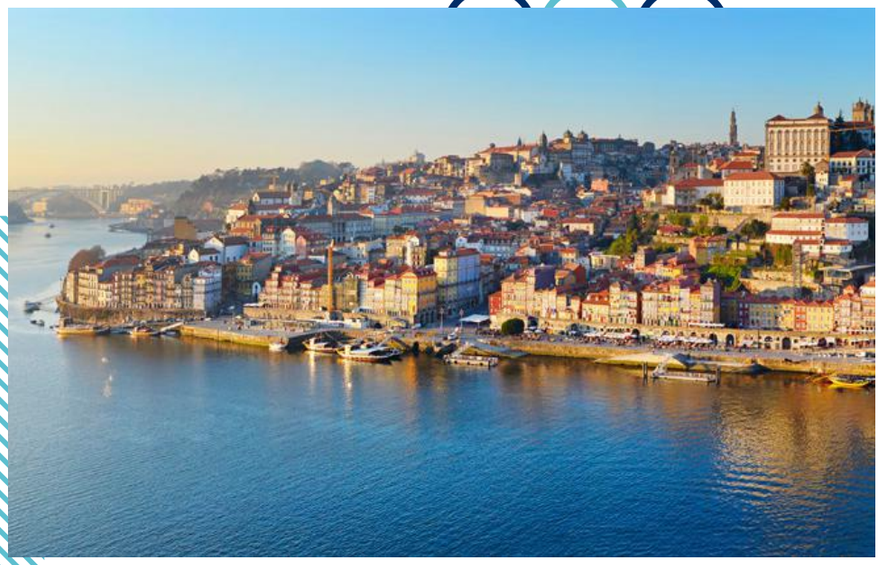
FIWARE MARKET PLACE

To accomplish the smart city project, improving daily operation and coordination of multiple city services, the Portuguese capital has entered in a partnership with the FIWARE platinum member NEC.

The Cloud City Operation Center (CCOC) is aimed to be used as the “brain”of the city. This system allows the local government to have a better understanding of what is happening in their system. In fact, it provides tools to “listen” and “comprehend” what is happening all over the city. By having access to this information, local governments can make better decisions and provide the city’s residents with accurate information. The CCOC, which has been adapted to Lisbon’s needs and named as Lisbon Intelligent Management Platform, integrates more than 200 layers of information, including real-time data, and provides data and analytics to its users and to citizens through the Lisbon 24 App.

The Lisbon Intelligent Management Platform has become the city’s major data integrator, with the capacity to support business processes or provide data to other solutions for the management of specific vertical services.

City of Porto



In Portugal's northern region, Porto stands out as the most significant city exploiting its manufacturing industry, broad economic dynamics, activities, businesses, and services. Making Porto a Smart City plays a crucial role in this city's strategy, with a citizen-centered vision for sustainability, energy efficiency, R&D, and all-encompassing economic expansion.

Porto focuses on improving urban spaces, social cohesion, sustainable development, and local economy, promoting the consolidation of a strong local innovation ecosystem.

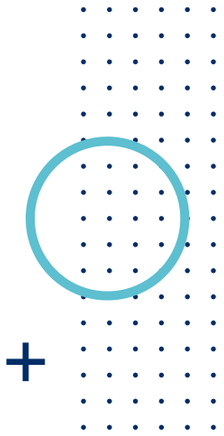
In 2014, the municipality proposed a broader and more ambitious strategy to develop citizen-driven services with a high impact in increasing the city's attractiveness for entrepreneurs, reducing social exclusion, and increasing the city's sustainability.

Today, Porto is embracing the concept of Smart City by promoting a well aligned strategy at the city level and adopting open platforms like FIWARE, and actively integrating networks such as Open and Agile Smart Cities (OASC).

Porto.

City strategy official website →

SynchroniCity



SynchroniCity was one of the European IoT Large-Scale Pilots (LSP) funded by the European Union's Horizon 2020 research and innovation program.

The project aimed to open up a global market for IoT and AI-enabled services for cities and communities. 38 partners worldwide from business, academia, municipalities, and NGOs are contributing to the project. It is an ambitious digitalization strategy that projects the architecture of a global marketplace for the development of IoT solutions and Artificial Intelligence services.

This platform enables access to spots and interfaces of interoperability, and data models for several verticals, creating a balanced and reliable ecosystem where creators and distributors of solutions and devices and system integrators are able to openly compete.

Badajoz Provincial Council

The “Smart Province - Badajoz Es Más” project is an initiative funded and carried out by the Provincial Council of Badajoz with the objective of providing technological tools and services in order to develop municipalities with a better quality of life through sustainable development, based on IoT and Big Data technologies with the aim of turning the province of Badajoz into a Smart Territory or Smart Province. Since it started, in 2018, the project has integrated data from thirty different verticals in the Provincial Platform for better management and improvement of public services.

The benefits of these developments have been perceived by the Badajoz Provincial Council, improving the analysis and treatment of their internal data, but they have also had an impact on improving the quality of life of citizens, either indirectly with solutions such as Smart Waste Management, Smart Management of the Water Cycle, Smart Lighting, Smart Irrigation, Smart Environmental Management and Smart Heritage Management or directly via Smart Parking, Smart Crosswalks, Smart Beaches and Smart Management of Sports Facilities.

DIPUTACIÓN DE BADAJOZ

City strategy official website

FIWARE

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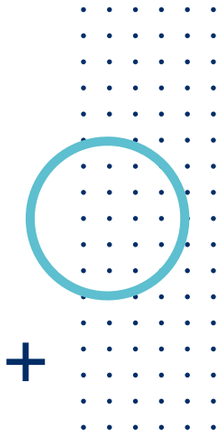
Badajoz Provincial Council Solutions



Currently, solutions have been deployed in more than 20 municipalities. Until today, the main projects are located in Badajoz, Olivenza, Orellana, Cheles, Castuera, Valdelacalzada, Medellín and Villafranca de los Barros, but the objective of the project is to reach each municipality. As success stories of citizen-oriented solutions the Smart Crosswalk installed in Olivenza and Valdelacalzada, Smart Parking in Olivenza or Smart Beaches in Cheles and Orellana, both beaches with the national category of blue flag, can be mentioned. In the next few months the Badajoz Provincial Council will start a new project called “Badajoz Provincial Council: Smart Tourist Destination” closely related to the Provincial Platform, which will deploy many more solutions in the province mainly related to tourism. This project will involve municipalities and citizens in a much more direct way and it will suppose a new impulse for the adoption of these technologies as an axis of change and innovation in the province.

Specific services and resources Powered by FIWARE are: Provincial Platform for Smart Public Services Management, Technical Office, FIWARE Space recognized as a FIWARE iHub.

DIPUTACIÓN DE BADAJOZ

Almendralejo and Badajoz City Council

Within the Alba Smart Project, Badajoz and Almendralejo are bringing technology closer to citizens, enabling three fundamental actions.

Firstly, improving public services and municipal management, allowing more detailed knowledge of them and optimising public resources. Secondly, provide public and accessible information to citizens through digital tools improving their quality of life. Thirdly, further data processing and development opportunities for local companies and entrepreneurs who can benefit from the newly generated data.

These services are supported by an interoperable city platform that unifies information from multiple devices and integrates a set of vertical systems and services. This optimization of the entire smart city infrastructure and processes aims to support an innovation ecosystem that allows local entrepreneurs and developers to create new valuable services. This is based on the public information of the City Councils, promoting e-Government and fostering cooperation between different councils and municipalities to improve internal management and reduce administrative burdens for citizens and companies.

AYUNTAMIENTO ALMENDRALEJO

Ayuntamiento de Badajoz

City strategy official website

FIWARE

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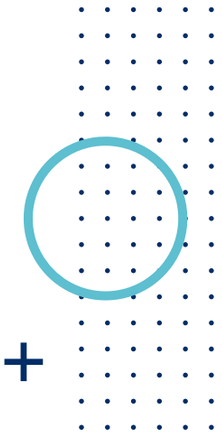
Open Data Portal



Web

FIWARE MARKET PLACE

Open data has great potential to generate economic value. The ability to collect, publish and reuse public sector data enables individuals, organisations and administrations themselves to innovate and collaborate with each other. The openness of information improves overall transparency, the quality of policy decision-making and government processes.

Through the Open Data and Transparency portal that collects data from the city's platform, citizens and visitors can search for relevant information on municipal management and also contribute through online surveys, as well as an urban incident app that will allow them to report problems in real time. The portal improves the efficiency and competitiveness of municipalities, helping citizens to form an objective opinion on the state of the city and increases trust in government processes.

The Alba Smart 2020 initiative is part of the 1st Call for Smart Cities launched by the Ministry of Energy, Tourism and Digital Agenda, through Red.es and co-financed by the European Regional Development Fund (ERDF).

City of Málaga

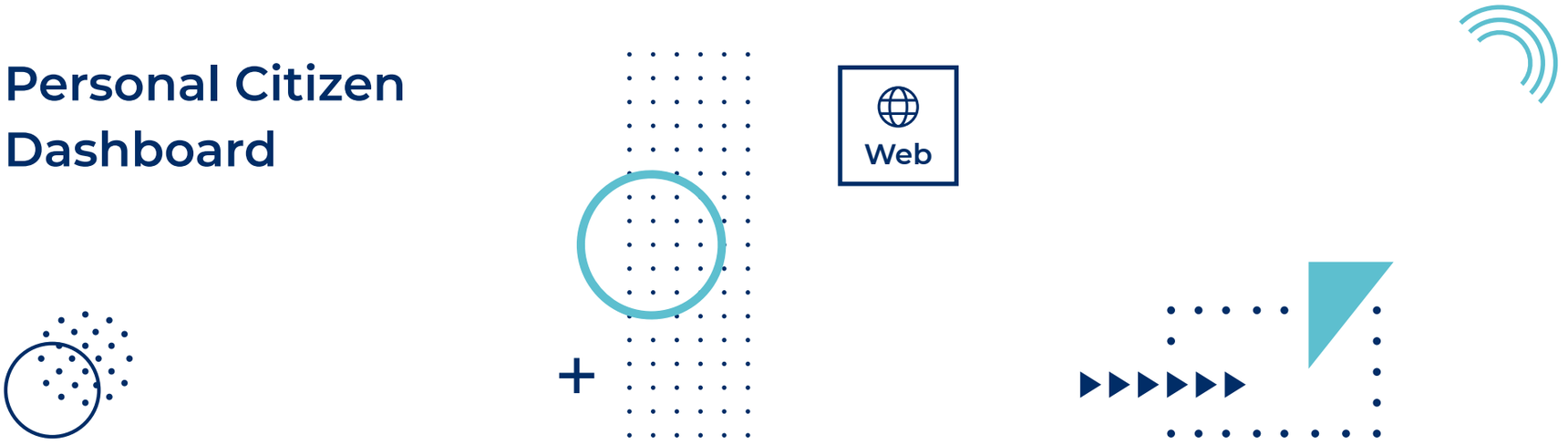
The present and future of Málaga are written under the title “Málaga Smart”, linked to the combination of four elements: Territory, Citizenship, Technology and Innovation, and where each of the actions undertaken are carried out in a sustainable and integrative way, achieving maximum efficiency in the city and maximum quality of life for those who live in Málaga.

Málaga stands out as a smart city at national and international level for its actions in energy efficiency, the promotion and attraction of research and innovation projects as well as the acceleration of companies, which have led to a significant improvement in the management of the city and a reduction in the costs of public services.

Málaga Smart includes 204 projects to consolidate Málaga as a technological, innovative and intelligent city, a benchmark for modernisation and innovation based on the promotion of research, knowledge and the use of new technologies.

The city has been named European Capital of Smart Tourism 2020. Sustainability, innovation and culture are key concepts in its planning.

Personal Citizen Dashboard



The City of Málaga (Spain) has a substantial amount of data currently with more than 900 datasets. The main problem to solve is the aggregation of this data in a way that promotes easy accessibility for citizens use on a daily basis. The personal citizen dashboard connects web components to each open data dataset that can be configured by the user according to personal preferences on data sources and display dashboards. For example when planning a route you can see the traffic situation in real time by selecting only relevant components such as “traffic cameras” and “parking zones”.

More than 80 different geoportal layers can be added by the user such as tourism related layers which include touristic locations (e.g. theatres, museums, galleries), or sports venues (e.g. sport fields, street workout zones), environment-related areas (e.g. recycling zones), health emergency spaces (e.g. location of defibrillators).

Málaga has received several recognitions and awards thanks to the portal including “2020 Best project award in transparency, openness, access to information and reuse”.

City of Molina de Segura

Molina de Segura is a Spanish municipality with over 70,000 inhabitants and the fourth largest municipality in the Region of Murcia. Being located in the agglomeration of the metropolitan area of the Region of Murcia, Molina de Segura has the highest economic income in the region: the per capita income is the highest one per inhabitant and dozens of leading national companies in different fields have offices in the city.

The city was awarded the Citizens' Award for its Strategy of Sustainable and Integrated Urban Development, "Molina 2020 Avanza Contigo."

Molina de Segura is a pioneer as the first municipality in the region to draft a plan to foster its transformation into a smart city.

Planned for the 2014-2020 implementation period, the city has implemented its plan to lead the transformation to become more open, transparent, and citizen-oriented while promoting sustainable growth.
This covers a wide range of initiatives to integrate digital technologies in all aspects of the city's offerings to improve the quality of life for its residents.

MOLINA DE SEGURA
Moderna por tradición

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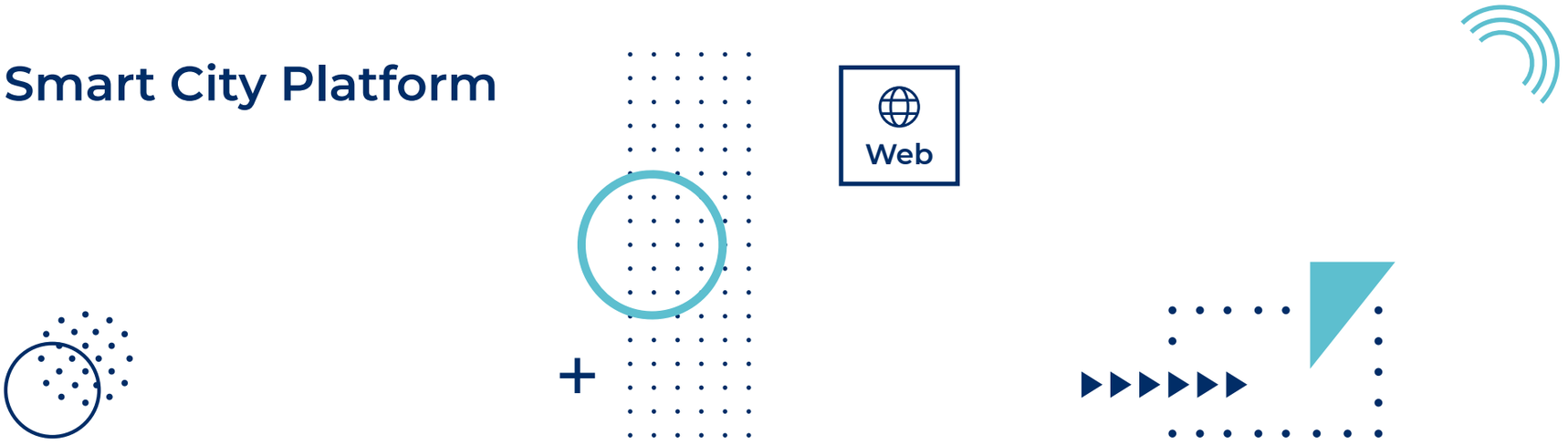
Smart City Platform



Molina de Segura is committed to becoming a more sustainable and socially inclusive environment. It intends to deliver on improved air quality, eco-efficiency and energy savings and accessible green areas for its residents. It also seeks to promote the conservation of biodiversity, promote environmental awareness and reduce noise pollution.

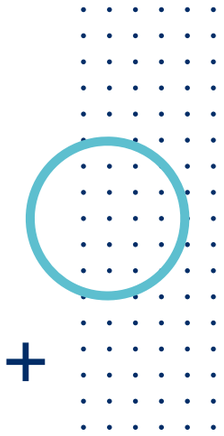
The city has been selected by the European Commission as one of the 100 cities to participate in the ICC (Intelligent Cities Challenge), a unique opportunity to join a community that harnesses advanced technologies to tackle the pandemic crisis and rebuild their economies while steering them towards sustainable, green and smart growth.

A Smart City Platform and FIWARE Ready Smart Solutions are being implemented for Smart Mobility, Air Quality, Noise Monitoring and Data Visualization in real time.

Region of Murcia

The “MiMurcia” strategy aims to bring the City Council closer to the citizens, personalizing the information of the citizen according to their context, location and moment. It is based on four main lines of action. The first proposes the creation of a single monitoring center, which integrates solutions such as a proactive Citizen Relationship Management (CRM) and a smart city platform. The second axis, called ‘Living Murcia’, includes actions to revitalize the city center. These include improving the intermodality of public transport, reducing parking time in the city, intelligent parking and parking for reduced mobility and intelligent pedestrian crossings. Also efficient lighting in the center, noise map of the city, intelligent selective waste collection, promotion of trade in the center and profiling of users and tourists. Thirdly, ‘Enjoy Murcia’, which includes actions focused on the city’s parks and gardens: automated irrigation systems, efficient lighting, surveillance and security, improvement of the municipal wireless network and monitoring of environmental conditions. Finally, there is the ‘MiMurcia’ axis, which aims to provide solutions to citizens through four strategic areas: communication, openness, resolution and sustainability.

MiMurcia Platform



One of the cornerstones of the city platform is the usage of NGSI API to allow the integration of existing and future services. The platform is based on open and interoperable standards to ensure sustainability and extensibility of functionalities. Examples of integrated services include, among others: Incidences, Temperature of town hall buildings, Energy consumption of buildings, Traffic measurements, Parking slots of parking sites, Free parking slots of public rental bike service, Tram, Bus stops and vehicle locations, Rainfall, Solar panels, Irrigation systems, etc...

Finally one of the innovations provided by the new approach of information management in the Murcia city council is related to how to facilitate citizen feedback to the city council activities through improving the citizen participation in daily activities and situations in the city.

All activities are managed and monitored from the Unique Monitoring Center (CEUS).

City of Santander

Santander is the capital of Cantabria Region, situated in the North Coast of Spain. The city's main activities are related to the service sector, therefore the Municipality is focusing efforts to encourage economic and social transformation through the creation of new infrastructure and communication networks, the adoption of intelligent transport and traffic management models and the implementation of a new management and governance model based on broad citizen participation.

The city innovation strategy aims at building an intelligent, innovative and open city model that promotes knowledge and innovation and offers the citizens quality, efficient and collaborative services, encouraging entrepreneurship and the establishment of new business activities. In this strategy, the City Council wants to play an active role in innovation activities enabling the development of pilots and experiments at city level being part of and contributing to innovation processes from the very beginning. Their activity focuses on helping to shape ideas and developments that are closer to society from a technical, practical and economic point of view, making them more viable and more likely to be successfully transferred to society.

SANTANDER CIUDAD

City strategy official website

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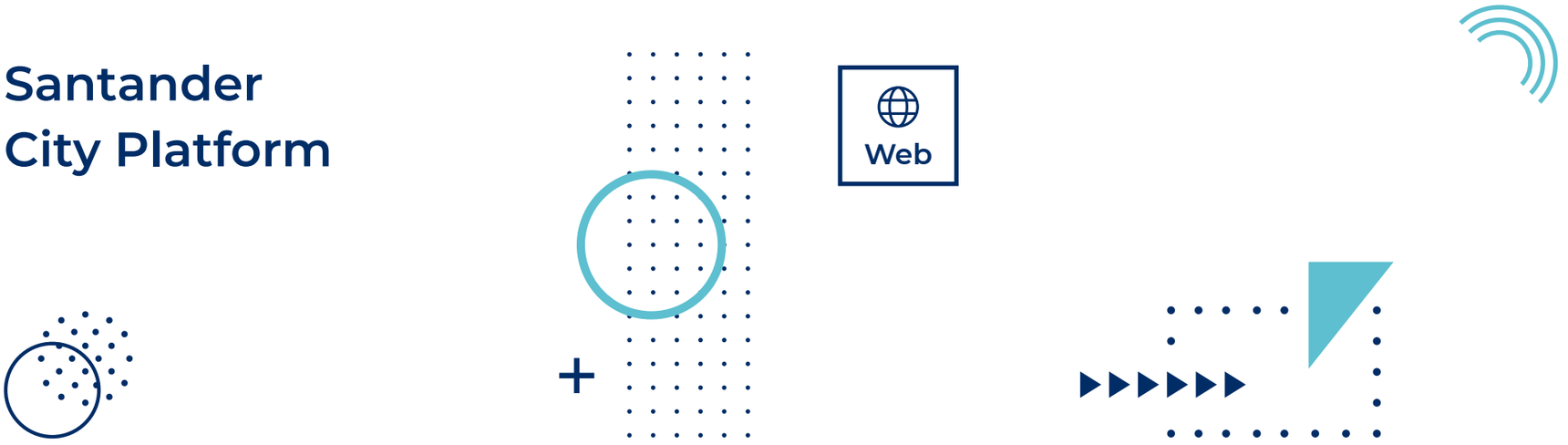
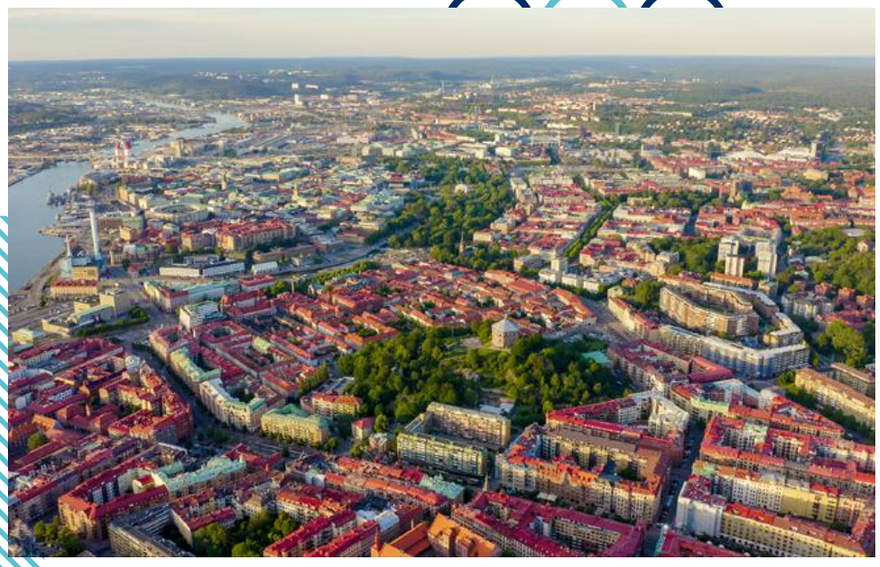
Santander City Platform



The Municipality of Santander follows a constant diagnosis and evaluation of the municipal services in order to establish the technical maturity level, developing pilots through the city lab and projecting transformation models, roadmaps and definition of KPIs. The city is setting up info collection systems in all municipality services to improve operational efficiency and avoid information silos. The implementation of a Smart City platform allows the integration of all the data from municipal services & systems and provides dashboards for integral management. It also supports the integration of data coming from outside the municipality and collaboration with other municipalities in overall optimization processes. City projects related to water, street light, parking and traffic among others have been developed making data available to the local industry. One important consequence is the creation of a new economy around data which eventually fosters new IT based businesses in an open innovation ecosystem for entrepreneurs.

Santander participates in several smart cities initiatives with the SmartSantander project as flagship that marks a before and after in city innovation.

City of Gothenburg



The Scandinavian model for Smart Cities leans towards a focus on citizens' rights, social inclusion and sustainability.

Gothenburg (Göteborg), Sweden's second biggest city, combines vibrant urbanity, a friendly vibe and seaside charm. It regularly tops the smart cities global rankings. Gothenburg has enviable Smart City credentials and the foundations to drive global excellence in the Smart City space for years to come.

The European Capital of Smart Tourism is a competition created by the European Commission to reward cities setting examples in smart, innovative and inclusive tourism solutions. Back in August 2020, Gothenburg was chosen, together with Málaga, as a winner for 2020. The cities appointed as the capital must show strong performance in four categories: accessibility, sustainability, digitalisation and cultural heritage/creativity. In its competition entry, Gothenburg highlighted strengths in all four categories and underlined the ambition to share knowledge and experiences with other destinations.

SCOREwater

SCOREwater focuses on linking the physical and digital world for city water management solutions. SCOREwater's ambition is to be a part of the solution for climate change and urbanization, and to address several of the UN Sustainable Development Goals and the new Urban Waste Water Directive.

SCOREwater uses digital services for cities, such as the FIWARE platform, games, immersive experiences at the local science center to increase public and civil society's commitment to water management. In Gothenburg, SCOREwater is focusing on managing water quality at construction projects, through online water quality monitoring. This data collection is designed to ensure effective water management.

Web

IRIS Project

Gothenburg has reinforced its commitment and global leadership in interoperable and scalable city solutions – becoming front-runner for collaboration between FIWARE and TMforum. The architecture uses the FIWARE NGSI (Next Generation Service Interface) API and TM Forum Open APIs to break information silos within the city, creating a real time view and foundation for overall city-data governance.

By embracing open APIs, cities can evolve their open data policies towards a 'city as a platform' vision supporting a data economy delivering real solutions to today's urban issues and help future proof for tomorrow's requirements.

Web

City of Malmö

Malmö, just across the Öresund strait from Copenhagen in Denmark, is the third largest Swedish city after Stockholm and Gothenburg.

A swirl of diversity, a mishmash of old and new, Malmö is one of the most eclectic cities in Scandinavia and Sweden's most climate smart city that is building a whole new identity around sustainability. Malmö wants to be carbon neutral by 2025 and run 100% of municipal operations on renewables by 2030 – far above the EU target of 49% and national target of 50% and EU target of 49%.

Malmö is striving to create innovative forms of public services and facilitating existing forms of service. Data will be depersonalized and used by researchers, public authorities and businesses who want to help the people of Malmö enjoy an increased quality of life, accompanied by a stronger relationship between the physical city and each individual and an improved re-use of information while reducing the ecological footprint.

City of Malmö

City strategy official website

FISMEP
FIWARE for Smart Energy Platform

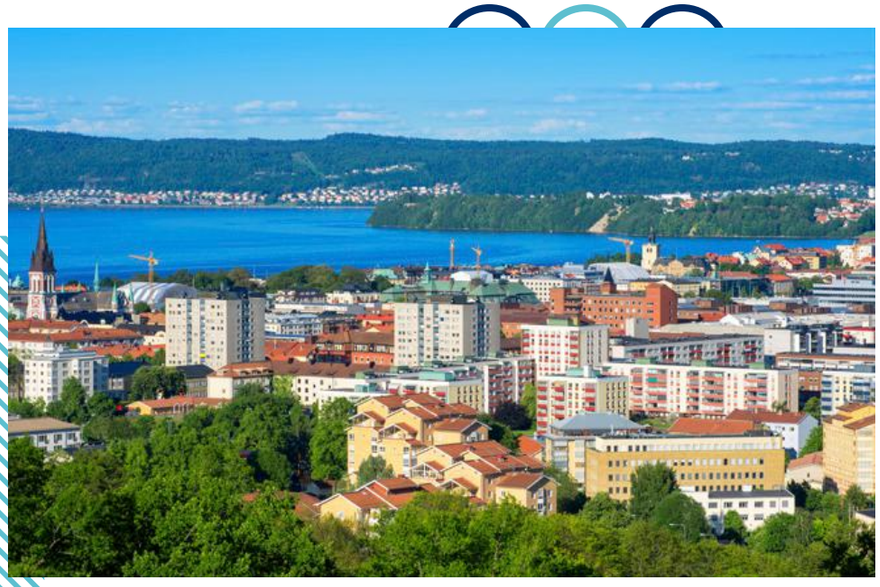
FISMEP pursues an interdisciplinary research approach that includes the fields of energy, information and communication technology (ICT) and social science - one of the three field research areas was carried out in Malmö. The aim was to investigate the residents' perception of indoor temperature conditions and to centrally control load shifting in multi-residential buildings. A second study dealt with the effects of a smart energy platform on user behavior and energy consumption.

A cloud-based, service-oriented Open Source software platform, powered by FIWARE, helped to establish an efficient, automated and sustainable energy supply in the field of distribution grid management.

In addition to a modern energy system oriented towards the concept of the "Smart City", the Open Source principle should enable the connection of external factors such as producers and consumers.

Innovative energy services and business ideas are meant to be quickly and easily integrated into the platform and flexibly provided from there.

Region Jönköping County



The project aims to work together with 13 municipalities in the southern inland part of Sweden under the regional project lead.

The targeted area is Smart City and IoT and to find, implement and evaluate different use cases within the municipalities, based on a standardized platform.

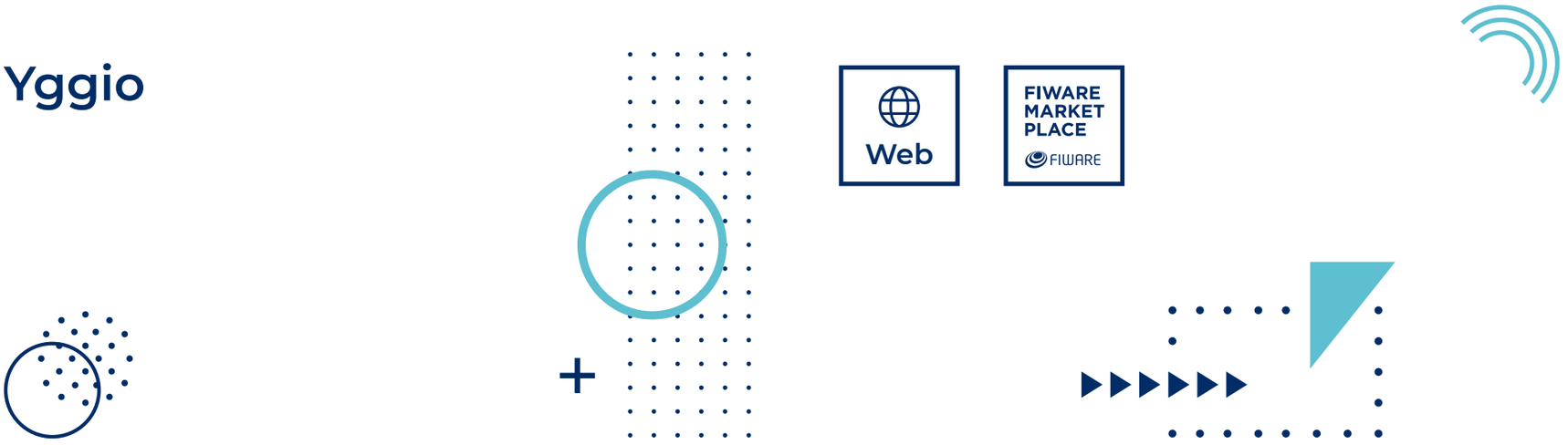
The project, which is ongoing for 2.5 years, with the possibility to do further work, later on, performed a public tender process where Yggio was selected as the central platform. FIWARE was requested by the project as a way of making sure the results of the various implementations will be re-usable in a standardized way.

Domains that will be a focus for the project have not yet been decided by spring 2021. However, the first implementation of water quality and security devices next to lakes is done. In parallel, both Crowd Management in urban areas, as well as Health Care for the elderly, is in the making.

Region Jönköpings län

City strategy official website

Yggio



Sensative – a FIWARE member since 2019 – developed Yggio, a multi-party network platform, based on Open Source and FIWARE. Yggio is designed for security, scalability, integrating into IoT devices and other systems, letting customers and partners use functionality and data to provide world-class services based on the NGSIv2 API.

Yggio is agnostic to various network communication protocols and different types of data sources.

Using Yggio, the project and the municipalities will be able to use various technologies, such as LoRaWAN, NB-IoT, and WIFI, connecting data in FIWARE format to different target systems.

Use, and re-use, of data, will be done in a way that lets the participants focus on non-tech areas – business models, cooperation between different organisations, and information security aspects.

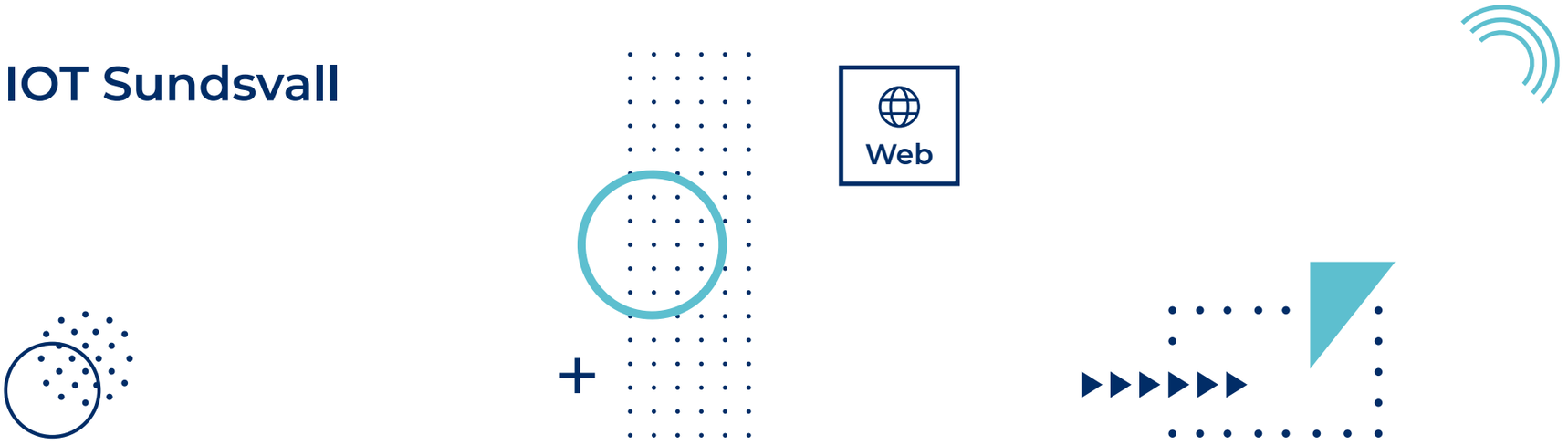
City of Sundsvall

Sundsvall is a city located in central Sweden in the county of Västernorrland. The municipality has a population of 96,000 inhabitants. The aggregated population in the functional region of Sundsvall adds up to 195,000 inhabitants.

The region is the most important economic driver in mid Sweden and characterized by the pulp, paper and forestry industry. Therefore, the energy consumption in the area is high and the city of Sundsvall is aiming to become a smart city and region by investing in different domains of smart solutions such as smart renewable energy, smart freight transportation solutions and a smart city platform.

Moreover, the city of Sundsvall was the host to the Smart Cities and regions summit of the “Vision and Strategies around the Baltic sea” organization in 2018 in which the attendees defined the path in a smart future for the cities and regions around the Baltic Sea.

IOT Sundsvall



Sundsvall Municipality, together with Weevil and several other partners, has started a human centered smart-city project to literally make the city more enjoyable for the citizens.

Through a FIWARE based platform, the city is collecting data generated by IoT sensors and using deep learning analysis to gain insights, understand patterns and classify/ predict meaningful data on weather, snow, slippery roads or the city winterwork. Thanks to data visualization tools, all this data is available for the community to ease the management of city operations and make a more enjoyable city.

Besides snow and other basic weather information the platform gives citizens the possibility to report problems within the city. Hence, the city can plan maintenance more efficiently.

Citizens can use these tools to better plan their winter work thanks to the information provided in the dashboards. They are also encouraged to use an app to go out for a walk and enjoy the city.

City of Aberdeen

Aberdeen is the third-most populated city in Scotland and considered the country's "technological heart."

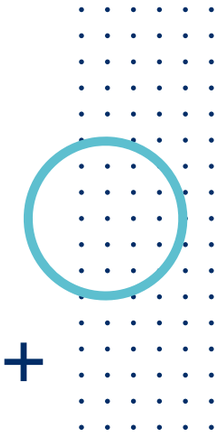
Through the Scottish Cities Alliance, massive investments are being made to make Scotland's cities smarter, using new technologies to accelerate and transform the delivery of city services.

Being a smart city is extremely important in the city's vision to ensure its sustainability, livability, and economic importance going forward and meeting the needs of present and future generations.

Aberdeen has the objective of improving digital connectivity and will be the second spot in the UK to make the transition to "full fibre" broadband Internet.

Diversifying the local economy and becoming a low carbon and sustainable city are other goals of Aberdeen. As such, the Council has developed a Smart City Strategy & Action Plan. This strategy has six key themes: Smart Public Sector, Smart Technology, Smart Mobility, Smart Digital Skills, Smart Tourism, and Smart Living.

A/RportTWIN



Web

FIWARE IMPACT STORIES

A/RporTWIN is the next digital twin powered by the FIWARE platform concerning the management of various infrastructures.

The service can be divided into two main parts: the frontend and visualization-related APIs (models, textures, behaviors, etc.) and the FIWARE-based backend. The latter deals with data sources' connection and implements the general server API allowing the airport system to be updated (e.g., turnaround timeline reports). It is based on FIWARE components providing near real-time (right-time) and batch access to Context/ Digital Twin data by applications.

A/RporTWIN solution is developed throughout 2021 at the Aberdeen International Airport, located in Scotland, UK.

Thanks to the A/RporTWIN deployment, operators can visualize and manage turnaround operations and communicate with airport staff for scheduling flights and reporting delays in near real-time with a digital solution.

City of Great Torrington

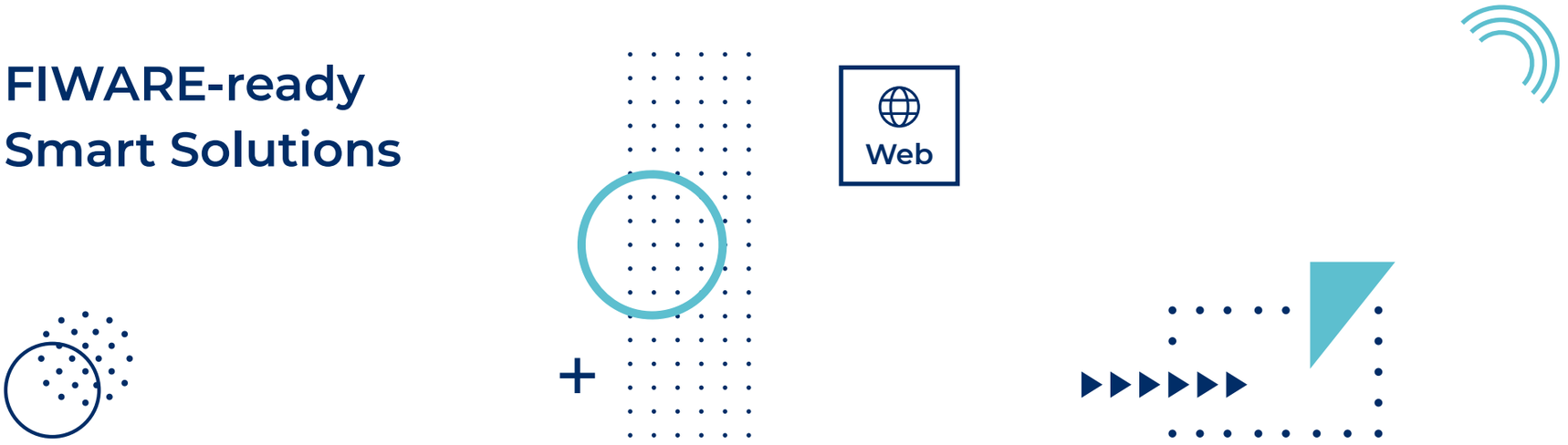
Great Torrington is a small town located in rural North Devon, United Kingdom. Popular with tourists, the town has many attractions ranging from museums to glass factories and lies on the famous Tarka Trail.

In 2019, Liverpool University researchers named Great Torrington the healthiest place to live in the UK and it has been cited as having one of the most active volunteering communities.

Although in many ways Great Torrington contrasts the typical perception of a smart city due to its rural settings and lack of commercialisation, Great Torrington is on the way to becoming a smart town and demonstrates the benefits of technology in smaller, less connected populations.

The Centre for Water Systems (CWS) at the University of Exeter and South West Water (SWW) meets regularly with the community of Great Torrington with a group of people who want to participate in actions which will contribute to solving water-related problems in the area. Together, they started their local Water Forum.

FIWARE-ready Smart Solutions



FIWARE applications are being developed demonstrating the application of innovative smart meters, linked to the FIWARE platform for interoperability and data exchange, big data analytics and development of modules, compatible with FIWARE, for interaction with customers at household level and with the utility, to provide information, feedback and motivation to customers, taking into account the long term existing data from smart meters to optimize overall water consumption.

As part of the FIWARE4Water project, the capabilities and the potential of its interoperable and standardized interfaces for both water sector end-users (cities, water utilities, water authorities, citizens and consumers), and solution providers (private utilities, SMEs, developers) are demonstrated using a FIWARE context broker connected to a Sigfox IoT backend by EGM, a French SME.

The main ambitions include a demonstration of existing and innovative IoT/smart technologies oriented to applications in urban Smart Water Management, as part of a “green” smart city movement.

City of Montevideo

Montevideo, the main city and capital of Uruguay, least is one of the countries with the highest EGDI. “Montevideo Inteligente” is a strategic line that started in 2015, seeking to improve citizen’s quality of life, with an inclusive and sustainable approach, using innovative solutions to encourage participation, promote environmental care and enhance the development of public services.

In 2016, Montevideo Municipality started the development of a service platform based on FIWARE which served to develop new services promoted by the Department of Sustainable & Smart Development, and in November 2018 became a Strategic Gold End User of FIWARE Foundation. Through projects such as the “Montevideo 2030”, the city has kept a sharp eye on the digital future to move towards a leadership position in the ICT area.

The strategy envisages a continuous work for change towards more robust, simple, efficient and compatible systems that provide citizens with a unified universal access (SSO - Single Sign-On) and brings to the Municipality the possibility to cross-reference information between departments and other state agencies.

Intendencia de Montevideo

City strategy official website

FIWARE

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Montevideo API

The solution is based on an interface between platform services and end user to access and share information, supporting an innovation ecosystem for the development of new services that contribute to the economic growth of the city.

Users of the city portal can easily register and manage access to different services like public transport bus locations in real time and estimated time of arrival at bus stops, without administrative hurdles.

The registration process generates a secure identification through unique passwords and updates that allow control of the API calls.

Web

Smart Beach Management Solution Montevideo

Montevideo has 18 authorised beaches and more than 30 lifeguard stations.

Data collected in each lifeguard station, specifically information on the alert flags (safe to swim, sanitary concerns, risk of thunderstorm) and capacity considering crowding indexes are managed by a digital system connected to the FIWARE Platform. An alert system has been recently incorporated as a pilot complementing the lifeguard's visual report in order to enrich information on a beaches' capacity based on real time images captured by drones and processed through Artificial Intelligence algorithms.

Web

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