LET'S DO IT TOGETHER

FIWARE 4CITIES

FIWARE

Ed. 6 – November 2024
FIWARE Foundation e.V.

Cities are not only the stage where our lives play out, they are also an expression of their citizens and who they are. By reshaping them today we are paving the way for a better tomorrow.

Ugo Valenti

Director of Smart City Expo World Congress

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FIWARE is up and running in **more than 400 cities** in over **35 countries** worldwide.
This book deep dives into 167 of them.

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Editorial

Will future cities be as sustainable, resilient, and inclusive as envisioned by the UN's Sustainable Development Goal 11? Can urban centres balance rapid population growth with pressing environmental sustainability needs while ensuring safety, inclusivity, and equitable access to essential services?

As urban populations grow, the challenge is clear: cities must do more with less. Technology, with its potential to address environmental, financial, and infrastructural constraints through more innovative energy management, AI-driven urban planning, and the deployment of IoT devices, is a key part of the solution. These technologies can provide real-time traffic patterns and air quality data, helping cities manage their resources more efficiently.

Cities are undergoing a significant transformation in 2024. 5G networks and IoT devices enable real-time monitoring of critical systems such as energy, waste management, and public safety, enhancing the efficiency of city operations. AI and edge computing allow faster, intuitive, localised decision-making, ensuring cities can better adapt to changing conditions and improve resource allocation.

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While technology offers many solutions, cities face challenges beyond adopting new technologies. Better data infrastructure and enhanced cybersecurity are essential to ensure that smart cities are secure and inclusive. Active citizen engagement is also crucial, fostering a sense of ownership and involvement in these smart transformations. Citizen-centric solutions, such as participatory planning platforms and community-based sustainability initiatives, will be vital.

FIWARE is leading the way in helping hundreds of cities worldwide adopt open-source platforms, driving innovation in sustainable governance, public services, energy management, and digital equity. These open standards empower cities to tailor solutions to their unique needs while fostering collaboration between the public and private sectors. This approach builds resilience and promotes smarter, greener, and more livable urban spaces.

This book showcases how FIWARE empowers cities to become more innovative, resilient, and equipped to meet future challenges. As the global landscape evolves, FIWARE's open technologies will continue to play a critical role in shaping the cities of tomorrow, ensuring they remain adaptive, inclusive, and sustainable.

Chandra Challagonda
CEO, FIWARE Foundation

Yasunori Mochizuki
Chairman, FIWARE Foundation BoD

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 towards unlocking their transformative power.

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In order to keep up with 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 book, 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.

Voices from the industry

Media

Luke Antoniou

Senior Editor,
SmartCitiesWorld

As digitisation of city services and processes continues apace, city authorities must acknowledge the new range of threats they could become subject to.

The smart city concept has evolved dramatically in the years since its inception, expanding to ensure that urban sustainability, inclusivity, equity and liveability are all central to the development of modern cities.

Even with the expansion of the definition, technology implementation is critical in aiding cities to achieve their goals, with

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all of the above objectives hinging in some way on the successful rollout of new technology. In becoming ever-more reliant on digital solutions to solve urban challenges, our cities are becoming more open to cyber-threats at a time when cyber-criminals are only becoming more capable, and their attacks more complex.

Communication technologies, alongside data collection and analysis, are central to the completion of smart city strategies, yet present some of the most obvious targets for cyber-attackers. Looking at traffic networks, the communication between traffic lights and traffic control systems are often unencrypted, leaving critical infrastructure potentially unprotected from attack. Meanwhile, data collection sensors can be hacked to send forged data back to control centres to spark unnecessary concern, response and use of resources, potentially drawing attention away from other targets. On a more significant scale, the prevalence of DoS and DDoS attacks could have a chaotic impact on basic city needs should attackers turn their attention to preventing smart grid control access.

Without action to protect against numerous and changing threats like these, cities could be open to repeated and increasingly dangerous cyber-attacks. Protection requires the building of up-to-date, flexible digital privacy and security measures into technological solutions, and commitment from cities to procure solutions whose cyber-security credentials, authentication and encryption are

industry leading, while upgrading existing systems to ensure they meet the same standards.

FIWARE sets technology standards for smart cities around the world, making data and systems truly interoperable. Not only does city infrastructure need to be secure in terms of the data it collects and processes, citizens also require their data and identities in smart cities to be protected. FIWARE context data in smart city solutions is no exception and therefore trusts existing cybersecurity standards like eIDAS and Oauth.

SmartCitiesWorld.net will be covering urban cyber-security in more depth in its upcoming Data & Connectivity Report and Webinar in May 2022.

SmartCitiesWorld's mission is to be the world-leading platform for sharing ideas to solve urban challenges that enable us to live in more resilient, sustainable, safe, and prosperous environments. SmartCitiesWorld provides a quality, comprehensive and current global content resource for urban leaders and their partners. Through their platform, they encourage the smart city ecosystem to share their experiences and learn from each other. In this way SmartCitiesWorld enables connections between smart city challenges, solutions, industry peers, suppliers, and partners through their web platform, virtual, and face-to-face events. SmartCitiesWorld

is a trusted source of news and analysis and expert opinion that attracts over 1 million readers per year including 30,000+ members from the public, private, NGO and academic sectors who have registered to access our content.

SmartCitiesWorld understands the importance of values in a business and so do our employees. That's why we asked our employees to define and write our values. These demonstrate the ethos you will experience when dealing with SmartCitiesWorld and the principles we hold close to our hearts. SmartCitiesWorld aims to be sustainable, transparent, inclusive, innovative, passionate, and, last but not least, collaborative.

About Luke Antoniou

Luke Antoniou is senior editor of SmartCitiesWorld and has been reporting on the implementation of smart technologies that benefit citizens and the public sector for four years. He has a particularly keen interest in smart and sustainable mobility and its role in influencing the decisions of urban planners, citizens and governments alike. As rapid urbanisation continues, Luke keeps his finger on the pulse of the myriad urban challenges facing local and central governments, making new connections in the public and private sectors and finding new angles from which to cover the latest smart city developments around the world.

Voices from the industry

East Asia

Kyong-yul Lee

Secretary-General, WeGO
July 2018 – September 2021

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 leads to 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 book.

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

Ali Benfattoum

IoT & Smart Cities Specialist,
Amazon Web Services

Territories have the mission to deliver a good quality of life for their residents while facing growing and complex environmental, economic, and social challenges. Data is critical to gain insights that help optimize hard and soft infrastructure and build and operate efficient and sustainable services. However, one of the biggest challenges territories face is to break down silos and bring data together into one single space from different sources.

A territory becomes “smart” when it can collect data from multiple and heterogeneous sources and turn data into insights that support

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informed decisions. This involves interacting with an ecosystem of solution providers and sharing data securely across different departments and with external organizations.

FIWARE sits at the intersection of open source and open standard enabling its vibrant community of users and solution providers to design smart and interoperable solutions to solve the complex challenges territories are facing. I believe this approach is good for everyone and is a critical success factor every territory should build upon.

I am proud to be part and support this community with solutions like the Garnet Framework (formerly known as Smart Territory Framework), an open-source framework for building scalable, reliable and interoperable platforms leveraging open standards, FIWARE open-source technology and AWS Cloud services.

About Ali Benfattoum

Ali Benfattoum is a Technology Evangelist for IoT and Smart Cities at Amazon Web Services. With over 12 years of experience in IoT and Smart Cities, Ali brings his technical expertise to enable and help customers and partners to accelerate their IoT and Smart Cities projects. Ali also holds an executive MBA, giving him the ability to zoom out and help customers and partners at a strategic level.

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 book 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 towards 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 such as 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

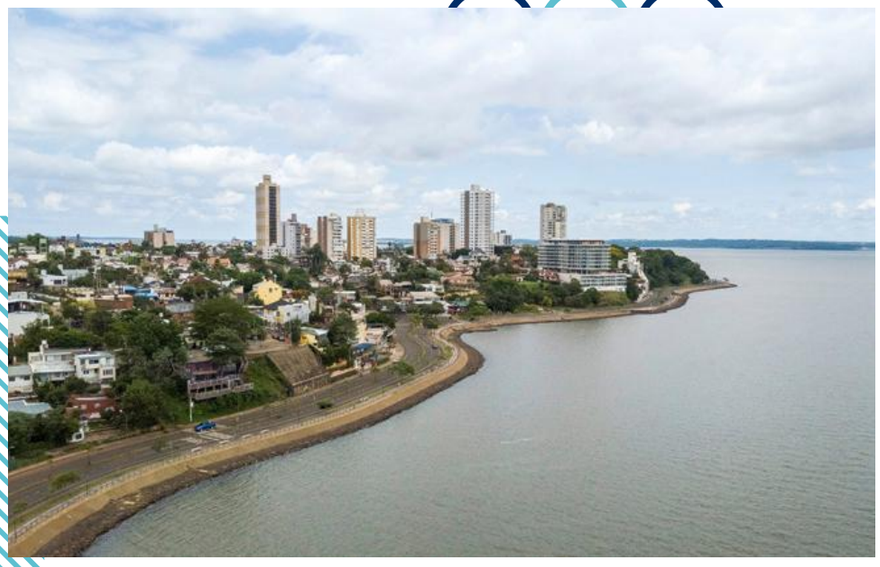
Vice President Research at the Gartner[1] Industry Research Team, Bettina is responsible for intelligent urban ecosystem research that includes smart city and industry stakeholders, as well as the digitization efforts in the manufacturing ecosystems. As part of her smart city research, she analyzes the 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.

FIWARE

THE SMART CITIES INDEX

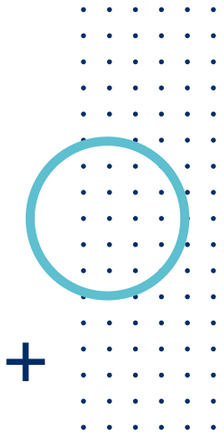
City of Posadas



Posadas is the capital city of the province and is the administrative, commercial and cultural centre of the region in North East Argentina with a metropolitan population of 320,000 inhabitants. Impacting growth significantly in the entire Northeast region, it is consolidated as a centre of services (events and business tourism segment) and distribution for this region. This is possible thanks to its strategic location, its excellent connectivity, and because it holds one of the most important border crossings of the country, linking the cities of Posadas (Argentina) with Encarnación (Paraguay) through the International Bridge San Roque González de Santa Cruz. The city distributes visitor flows to the Iguazú Falls (Natural Wonder of the World) and the Iberá Wetlands.

Its Smart City Strategy has been promoting a Smart Tourism development plan, proposing a new innovative model of tourism management (participatory and comprehensive), which involves a series of concrete actions in the territory, bringing benefits and improvements to both the tourists and the posadeños (citizens).

Intelligent Tourism Platform



The platform seeks to compile, organise and analyse different sources of information, creating dynamic graphs and reports adapted to the needs of the destination and making it possible to download the information. It also facilitates access and dissemination of knowhow. It's a comprehensive system contributing to an improvement of the strategic planning processes of the entire sector, allowing joint work between private and public sector, institutions, organisations, tourists and citizens.

Specific benefits for the private sector come from its support to identify business opportunities. The public sector profits from actions and strategies based on knowledge and data evidence implemented to improve the quality of life of the resident and enhance the tourist experience of the visitor.

To guarantee a successful project realization, it was decided to use the MVC model, which is a design pattern structured by three components: model, view and controller. The FIWARE platform was the main and only mandatory component covering "Powered by FIWARE" technology and FIWARE Context Broker.

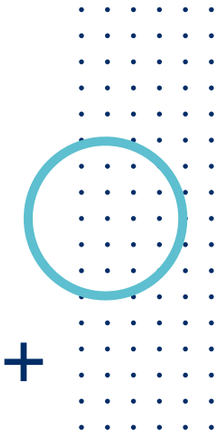
City of Brisbane

Brisbane is the capital and most populous city of the Australian state of Queensland and the third-most populous city in Australia with a population of around 2,6 million inhabitants. It lies at the centre of the South East Queensland metropolitan region, which encompasses a population of around 3,8 million. Geographically, it is Australia's largest metropolitan area.

The city has strengths in technology, including mining research and green energy, medicine and biotechnology, digital industries, and robotics. Being a transport hub, Brisbane is served by large rail, bus and ferry networks, as well as Australia's largest airport and third-largest seaport. The city will host the Olympic Games 2032.

The Smart City Strategy aims to work with residents, businesses, universities and start-ups to explore how innovation, technology and data can help accelerate Brisbane's progress towards achieving the broader city goals of liveability, sustainability and prosperity. This means the strategy isn't driven by the latest technology, but rather by what will deliver a better Brisbane for residents, visitors, workers and businesses.

[ui!] UrbanInsight



[ui!] UrbanInsight is an open, vendor-neutral platform for delivering urban insights from real-time, data driven urban intelligence. This is based on data collected from IoT sensors deployed through an urban fabric. UrbanInsight ingests, stores, analyses, visualises, alerts and reports on this data. UrbanInsight provides a single point-of-truth which allows city officers and citizens to gain deep situational awareness of the city and use the resultant insights to shape actions for the benefit of all.

In Brisbane, The Urban Institute Pty Ltd provides the city with an [ui!] UrbanInsight platform that collects context data from different kind of sensors tracking people flows, counting bicycles and scooters, and monitoring the environment. Moreover, the platform provides a Smart Lighting Management solution. A critical component of UrbanInsight is the idea of measurement classes – common data models for each kind of urban data that allows UrbanInsight to integrate and orchestrate data. UrbanInsight measurement classes are based on FIWARE data models.

Many of [ui!]'s solutions are deployed in the field in partnership with Ene.Hub.

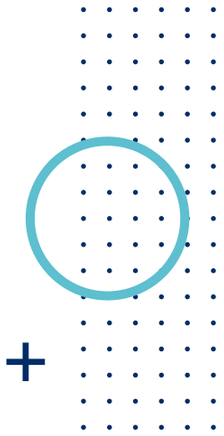
Sunshine Coast Council

Sunshine Coast is a peri-urban region in South East Queensland, Australia, with a population of 330,000 inhabitants. It is located 100 km north of the centre of Brisbane in South East Queensland, on the Coral Sea coastline, and will be a co-host of the Olympic Games 2032. Its main economic drivers are Tourism and Agriculture. Sunshine Coast is worldwide known for its surf spots.

The Smart City Program of the region enables Sunshine Coast Council to use technology to deliver services more efficiently and improve the lifestyle of residents while realising the vision to be Australia's most sustainable region – healthy, smart, creative.

In December 2016, Sunshine Coast Council adopted the Smart City Implementation Program (SCIP) to guide the deployment of Smart City solutions across the region in a staged manner. By using information and communications technology to connect people, processes, data and things, the city is able to improve quality of life, stimulate economic growth and ensure environmental sustainability throughout the region.

[ui!] UrbanInsights



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The UrbanInsight platform in the region of Sunshine Coast includes a platform for the management of solar energy systems, solutions for public transport management, public WiFi, and tracking of people flows. Additionally, the platform gathers environmental data including flood data.

A critical component of UrbanInsight is the idea of measurement classes – common data models for each kind of urban data that allows UrbanInsight to integrate and orchestrate data. UrbanInsight measurement classes are based on FIWARE data models.

City of Vienna

Vienna is known for being one of the world's smartest cities. Aiming to have all their citizens benefiting from 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.

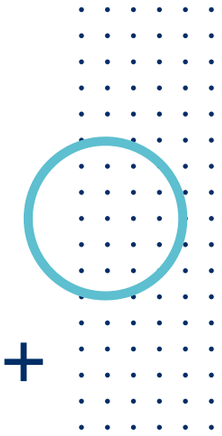
Vienna is also the first German-speaking city to have launched Open Government Data – an open and transparent system that makes city data available to the public for their further use.

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 Antwerp

Antwerp is the largest city and the second largest metropolitan area in Belgium.

While the city is home to 520,000 people, the respective metropolitan area counts 1,200,000 inhabitants. The city is located on the river Scheldt close to the Dutch border in the North of Belgium providing its harbor with an access to the North Sea.

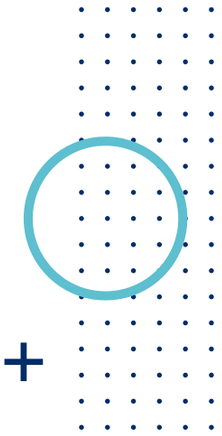
The Port of Antwerp is the second largest harbor in Europe and among the twenty largest harbors in the world. With roughly 140,000 employees it is the economic key driver in the region.

With its Smart City policy, the city of Antwerp aims to become one of the most innovative Smart Cities in the world.

Since 2017, the Smart City Strategy focuses around five main domains: Smart Governance, Smart Mobility, Smart Energy and Materials, Smart Security and Smart Citizens.

Moreover, the data collected from these domains is collected and distributed on one platform.

Generic IoT Platform Sirus City Store



To help the city of Antwerp combine all their data gathered in their Smart City in one platform, Sirus and the city set up a Generic IoT Platform (GIP) to combine data in real time so other applications can make use of this data.

Before establishing the Generic IoT Platform the data from Smart Applications were often enclosed in vertical silos. To reach interoperability between these silos, FIWARE's Context Broker is at the heart of the Generic IoT Platform, allowing different sensors and systems to communicate with each other, creating endless possibilities for the city of the future.

But there's more! The gathered data is translated into European standards and made available for the public. Thanks to this, SMEs and bigger enterprises can implement their solutions easily in the Smart City of Antwerp. Moreover, start-ups can use it to test their newly developed solutions. In this way the city and Sirus improved the innovation environment of the whole metropolitan area.

City of Bruges

Bruges is the capital city of the West Flanders province in the Flemish Region of Belgium. It is home to approximately 118,000 people and is known for its mediaeval architecture and picturesque canals.

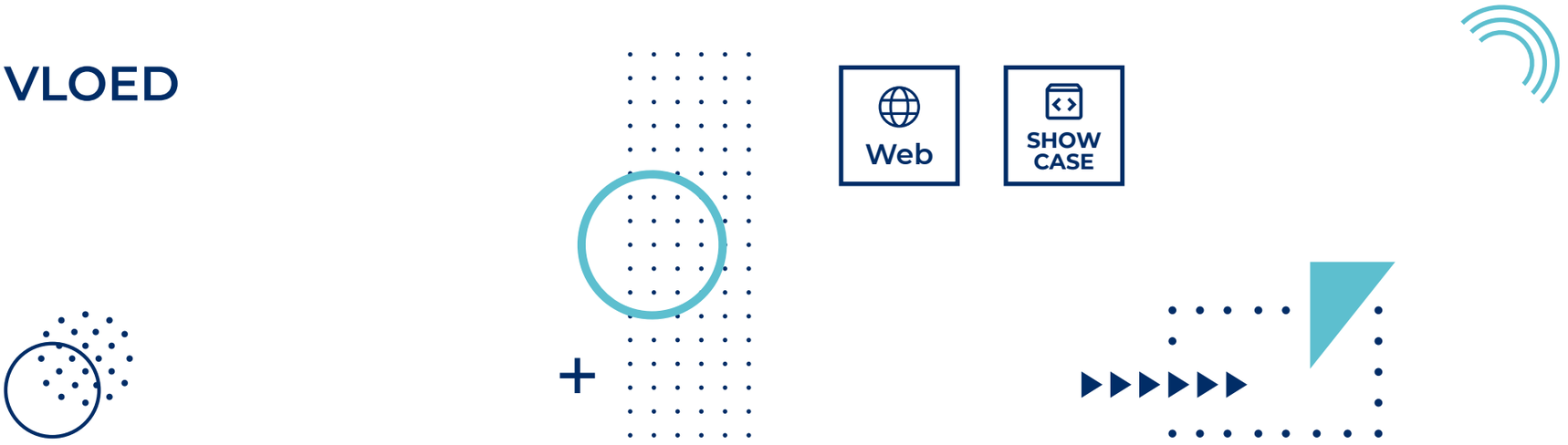
The rich history of Bruges is reflected in its well-preserved buildings and monuments. The city's historic centre, a UNESCO World Heritage site, boasts numerous landmarks such as the Belfry of Bruges, the Basilica of the Holy Blood, and various churches and mediaeval buildings.

Known as the Venice of the North, Bruges is loved for its many canals and unquestionable, authentic charm.

The city has taken several initiatives and implemented smart city strategies, such as smart parking sensors, crowd flow monitoring, water level monitors, and air quality sensors, to improve the quality of life of its citizens and enhance sustainability. Together with its citizens, research and private organisations, Bruges aims to reduce local emissions of CO_2 by almost half by 2030.

The city's collaboration with Leuven and Roeselare on the smart city data platform, Urban Sense, enables Bruges to make data-driven policy decisions that improve efficiency and the well-being of its citizens.

VLOED



As part of its Smart City strategy, Bruges is committed to expanding data capabilities. Measuring crowd and people flows can be useful for the local economic sector. Through the VLOED project, a collaboration between Bruges and Ghent, crowd densities and economic impacts are measured using various sensor technologies like cameras and RF beacons. The data is then analysed to detect trends, predict algorithms, and explore correlations with events like shopping Sundays. This solution serves as a prediction tool for the city and local merchants.

Data is gathered on the Urban Sense platform, a consortium between the companies Cegeka and Sirus, in collaboration with the cities of Bruges, Roeselare, and Leuven. The data platform for cities and municipalities unlocks the value of all possible types of data, using FIWARE generic enablers. It offers a variety of solutions including analytical and visualisation tools, data science, AI, and application and service development. The data is based on shared data models and delivered via open standards like NGSI-LD, enabling cities to collaborate with different parties to create innovative solutions for future challenges.

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.

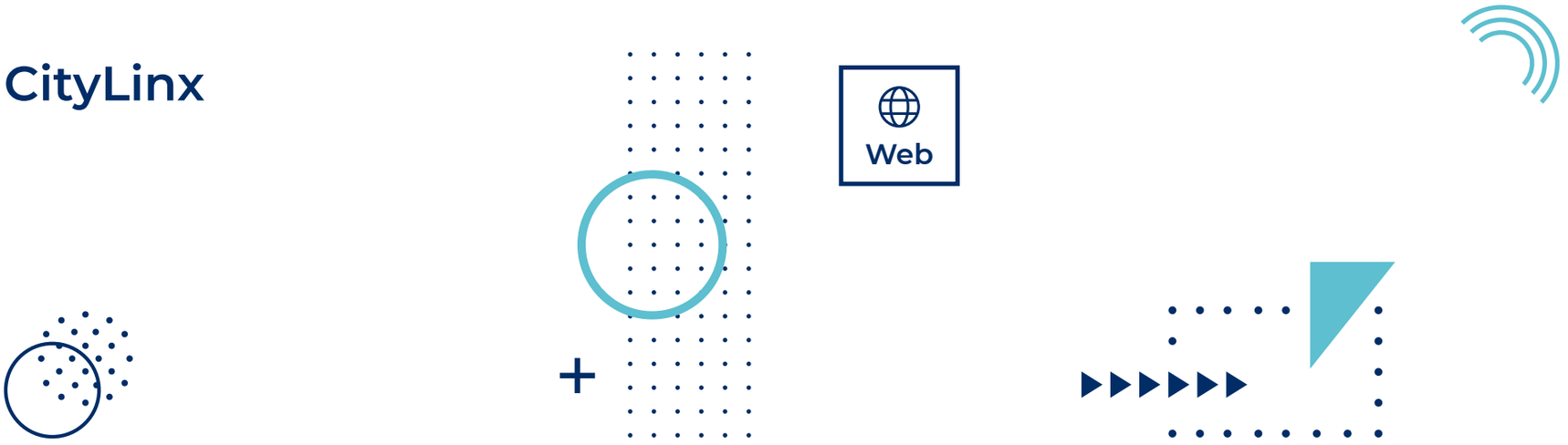
The region is one of three federal states in Belgium. As of 2021, more than 2,1 million people were living in the Brussels Capital Region.

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 Brussels digital strategy. The Brussels-Capital Region's definition of the Smart City is "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 technologies to ease CityLinx™'s integration in complex smart city tenders.

City of Leuven

Leuven is the capital of the province of Flemish Brabant in the Flemish Region of Belgium. It is home to 100,000 inhabitants and hosts over 60,000 students at KU Leuven, one of the oldest universities of North-West Europe. Leuven has committed to becoming a climate neutral city by 2030 and formed a cooperation model with citizens, companies, and research institutes through the NGO 'Leuven 2030'. Leuven is running several projects in fields like energy, food consumption, and mobility, to contribute to a sustainable and climate-neutral future. Because of its efforts and inclusive approach, Leuven was recognized as the European Capital of Innovation in 2020 and is one of the cities in the '100 Climate-Neutral and Smart Cities by 2030' mission. It also received the 2018 European Green Leaf award. Sustainable food consumption and agriculture are top priorities in the city's policymaking. Leuven's local food strategy involves over 100 stakeholders. It aims to help local companies reach their potential in sustainable food production and reduce food waste at every step in the food production chain. Booming urban logistics is also a big challenge for transporters and merchants. Overcoming this challenge requires rethinking regulation in the city and smart use of technology to understand the city's logistics and promote sustainable mobility.

leuven

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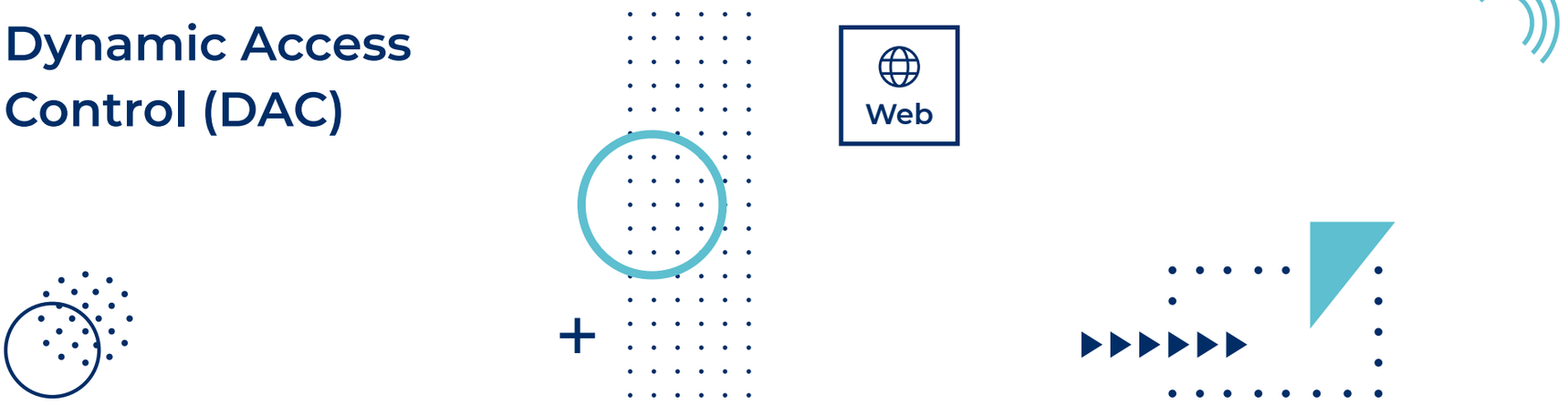
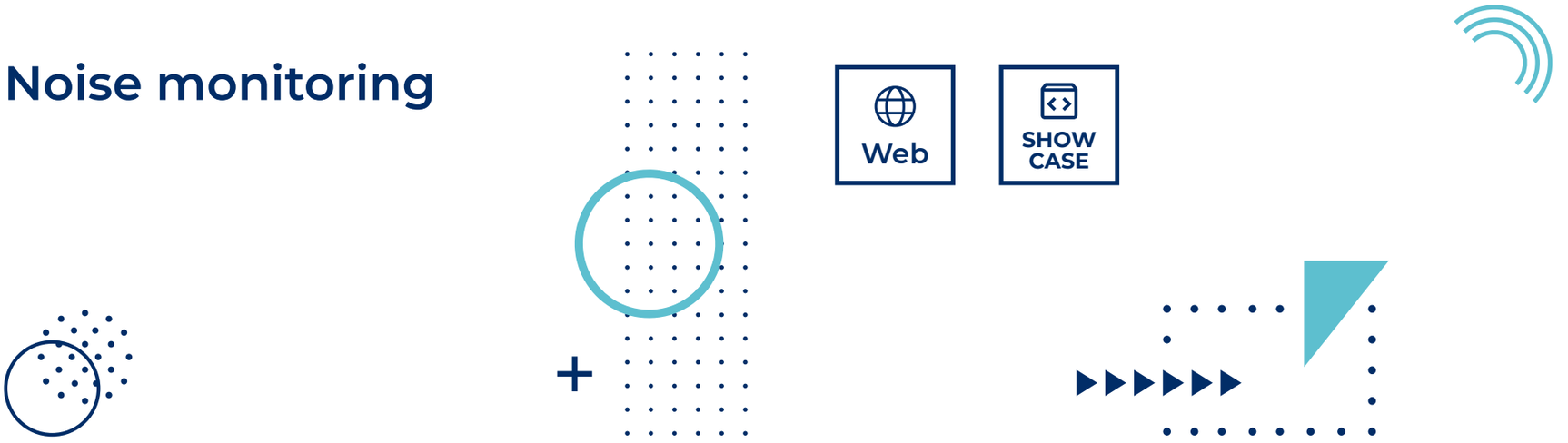
Dynamic Access Control (DAC)



The DAC provides a profitable and efficient model for local goods promotion, and connects all actors in the supply chain; from farmers and public administrations, to shops and restaurants. The solution collects data about logistics in the city and provides real-time information from different sources. Blockchain technologies and efficient data-sharing improve the logistics tracking for locally produced food and increase trust in collaborations. By making city regulations customizable and transforming centralised databases into trusted DLTs, it is possible to optimise city access for motorised vehicles. This can also reduce their carbon footprint by granting extra time for zero-emission local food delivery vehicles. This use case belongs to the Token Project, funded by the EC and led by IMEC and VIL. Other actors involved in the supply chain include Kort'om Leuven, Linked.farm, Geosparc, and logistic service providers like Ninatrans and CityDepot. Token brings the opportunity to perform a first assessment of the DAC according to different criteria like parking, traffic, types of local goods, and shops. Further actions will include integration of multiple actors and cities, focus on communicating existing rules and proposing alternative (sustainable) delivery solutions.

Noise monitoring



Leuven is a student city with a vibrant night-life, which can result in noisy streets at night. The noise monitoring project aims to reduce this noise by placing sound level sensors at several points along specific streets. These sensors are connected to the Urban Sense data platform and can collect the level, pitch, type and frequency of sounds, allowing for an objective measurement of the noise.

The system uses artificial intelligence to classify the noise by origin, distinguishing between human, music, or motor sounds. When the system detects disturbing noise caused by people, instead of punishment, it encourages better behaviour by dimming or brightening the streetlights to alert them. Additionally, a message can be projected on the ground, reminding them to keep the noise down.

By analysing the data collected, the city can learn at what days and times the most noise is detected, and test different nudges to see what works the best. This information can be used to predict when noise can be expected and take appropriate measures as needed. If necessary it is technically possible for police to make interventions based on the real-time data provided by this project.

City of Roeselare

Roeselare, situated on the Mandel River and connected to the Leie River, is often called the “Heart of West Flanders” due to its rich cultural and historical heritage. With a population of about 65,000 people, the city boasts many notable landmarks such as the Belfry tower, which is listed as a World Heritage site.

Roeselare’s thriving business community and commitment to innovation and sustainability have led to its transition into a smart city. The Smart City Community, made up of entrepreneurs, local institutions, citizens, and educational representatives anticipate new trends and explore innovative opportunities like smart traffic lights, digitalizing the food sector, and smart water management. Together with the climate plan, these initiatives enhance the city’s quality of life and prepare it for future challenges.

Roeselare is part of the Urban Sense consortium, with Leuven, Bruges and the companies Sirus and Cegeka. The consortium built and manages an urban data platform that has received international recognition, winning both the World Smart City Award and the Agoria Digital Society Award in 2022 for its innovative efforts.

ROESELARE
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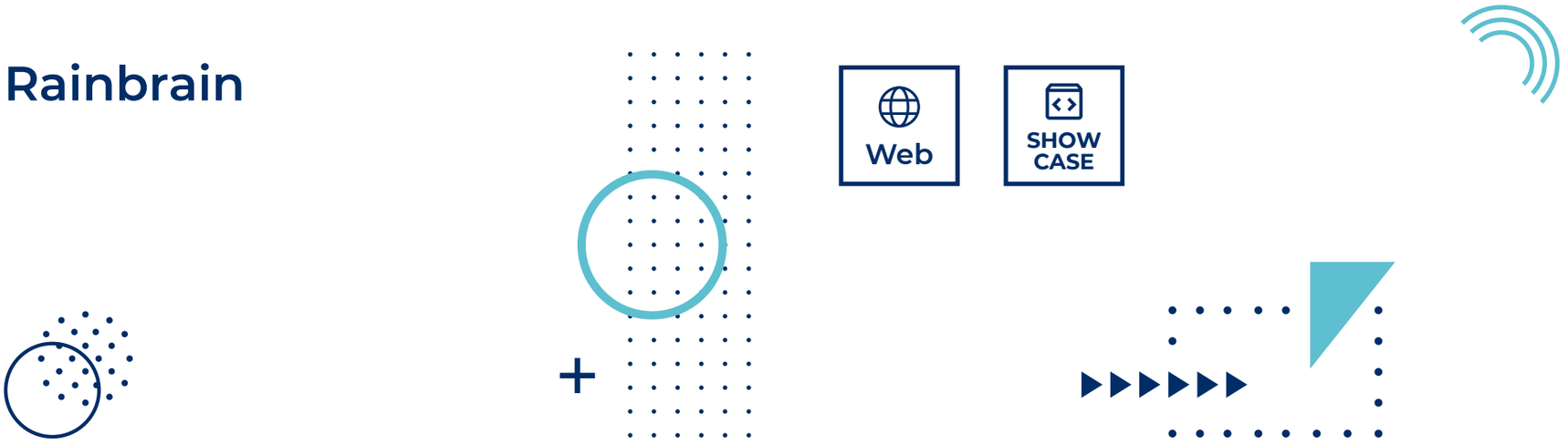
Rainbrain



The Rainbrain project is developing a big data and Internet of Things platform on top of Urban Sense to help cities and water management organisations in monitoring and mitigating the risks of flooding, drought, and poor water quality. This involves collecting data from a rapidly increasing number of sensors across Roeselare's water system, including water quality sensors, pluviometers, and water level sensors. By analysing this data, the city aims to predict and proactively respond to precipitation events, using a dashboard and alerting mechanism to trigger action from both the city and water managers. With these tools the city can better respond to water needs in particular areas and empty the necessary buffer basins in advance.

This effort is further supported by the Smartwaterland project, which offers enormous potential for improved buffer capacity and smart water management by giving problems a high degree of predictability.

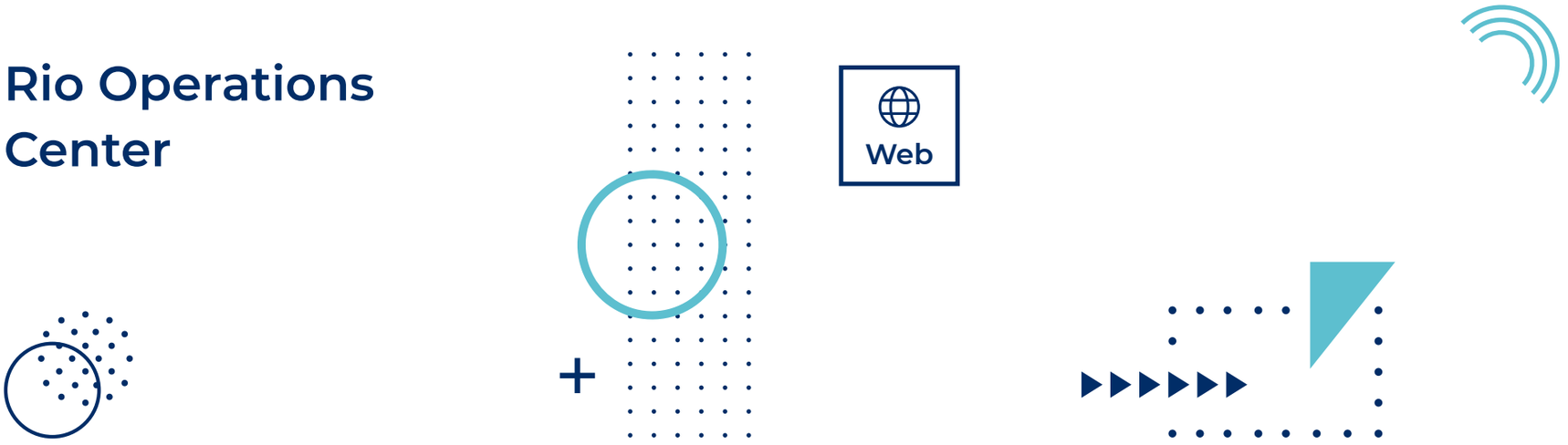
City of Rio de Janeiro

Rio de Janeiro, simply called Rio, is the second-most populous city in Brazil and the sixth-most populous in the Americas. It is the capital of the state of the same name, Brazil's third-most populous state. Some parts of the city have been designated as a World Heritage Site.

Rio is famous for being one of the South-American economic centres and an international tourist destination. Thanks to its natural beauty, pleasant climate, famed carnival and plethora of attractions, Rio welcomes 2 to 3 million international tourists a year.

In 2010, the landslide in Rio was a major social and environmental disaster, and the city had to take action. Spurred on by the forthcoming 2014 FIFA World Cup and 2016 Olympics, they developed an ambitious Operations Centre (COR). It's a data hub sourced throughout Rio about factors such as traffic congestions and weather conditions, and it keeps government and citizens alike briefed with vital information. Their launched program "COR Challenge" is all about Smart City, an open innovation project, where academics, startups, and citizens create innovative solutions to solve the city's most urgent problems.

Rio Operations Center



The most recent edition of the challenge inside the Rio Operations Center (COR) addressed the impact of climate change on the city's public transport system and one of the solutions was developed by VM9, a FIWARE Gold Member. The company, which specializes in IoT, AI, Geostatistics, and structuring of Data Lakes, created a platform that detects anomalies in the city's bus system, remotely and automatically, in real-time, from cross-referencing multiple data sources.

The platform uses the FIWARE Orion Context Broker, the core integration technology in any "Powered by FIWARE" architecture, adopted by the European Commission as a Connecting Europe Facility (CEF) Building Block within their Digital CEF program. The Context Broker is able to handle context information on a large scale by implementing standard REST APIs, easing the process of collecting, managing, using, and sharing data. This will allow COR to receive 'near' real-time alerts and suggestions to each occurrence that impacts the traffic in the city

Region of São Paulo

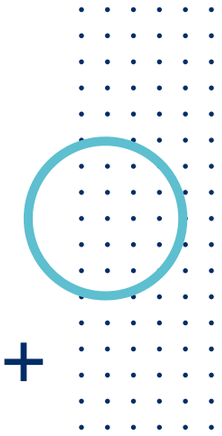
The Metropolitan Region of São Paulo, officially named Região Metropolitana de São Paulo (RMSP), consists of 39 municipalities with São Paulo, the capital of Brazil, among them. There are roughly 23,5 million people living in the area with 12,000,000 living in the capital itself. The area is an economic key driver in Brazil and the whole South-American continent. The city of São Paulo alone is responsible for about 10% of Brazil's Gross Domestic Product and home to the São Paulo Stock Exchange.

In 2017, the city published a "Smart City Master Plan", which defined the new Smart City Strategy. This strategy sets focus on sustainable urban development and aims to increase and enhance public spaces and decrease the usage of cars.

Urban mobility is a focus throughout the plan, which also addresses topics such as Smart Education, Smart Culture, Smart Health, Smart Housing, and Smart Environment.

Among these topics, modern urban challenges like Water and Energy Management will play a key role in the development of São Paulo to become a truly smart region.

Elliot Water



Water is a scarce resource. It is well known that Smart Water Management is a priority for our societies, not least in densely-populated areas of the world like São Paulo where access to water may be even more difficult.

“Elliot Water” is a system that uses IoT technology for data gathering, aiming at reducing data error and cost. It uses telemetry solutions and advanced analytical technologies such as Big Data, Artificial Intelligence and Status Estimation Techniques, allowing an intelligent management of supply networks. Elliot Water is a robust and powerful tool for the management, control and monitoring of water supply and purification networks, hereby turning traditional hydraulic networks into intelligent hydraulic networks.

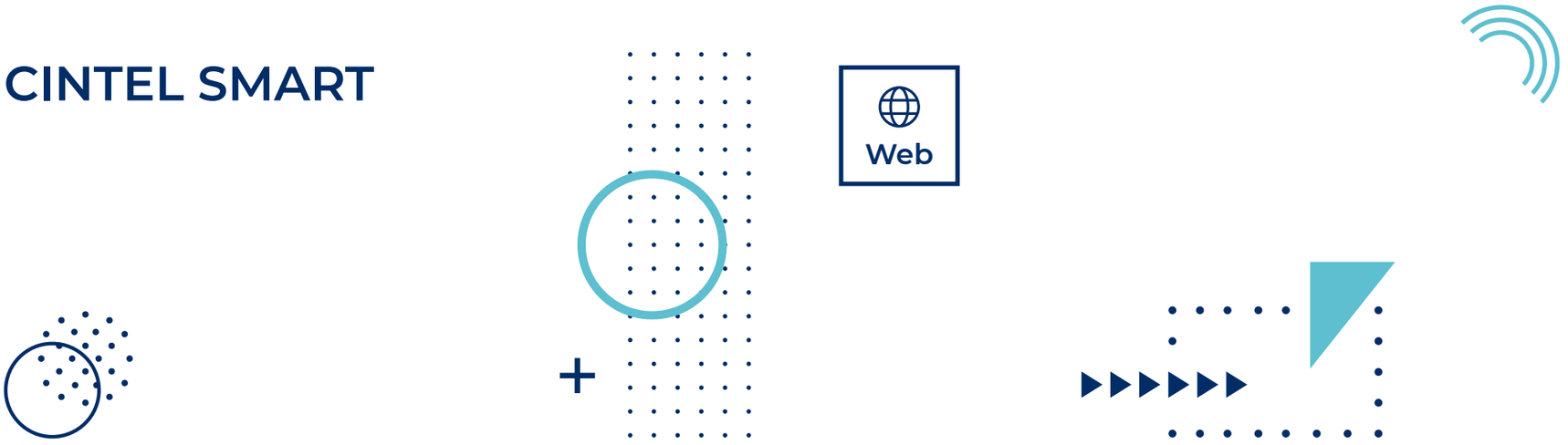
Elliot Cloud supports the local water supply company Sabesp providing a monitoring system, event management and automation data behavior analysis for the operative processes of the Water Management in the region of Capivari and Jundiaí in 13 municipalities and providing a real-time consumption measurement system in the water network for the municipality of Morungaba.

City of Duitama

Duitama is a Colombian municipality, located in the department of Boyacá, in central-eastern Colombia. It has an estimated population of 128,400 inhabitants.

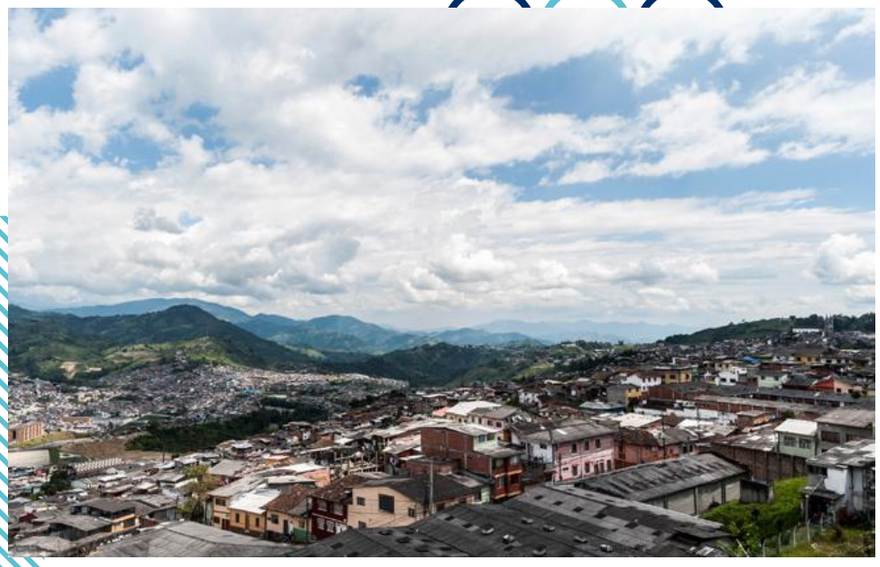
According to the National Administrative Department of Statistics (DANE) in 2022, it is the largest urban centre of the province of Tundama, and is known as “The Pearl of Boyacá”. It is considered the most important terrestrial transport hub in eastern Colombia and is intersected by several of the region’s main roads, including the Central del Norte highway. This makes it a strategic point for the provision of services and the development of industrial and commercial activities in the region.

CINTEL SMART



Duitama is consolidating its position as a pioneering Smart City in the country with the support of the Centre for Research and Development in Information and Communication Technologies (CINTEL). Four verticals were initially implemented: governance, innovation, development of the city's ICT ecosystem, and a technological platform based on FIWARE on AWS (IOT devices, data models, Orion context Broker, Grafana, and others). This has enabled the integration of air quality sensor solutions and the capture and identification of vehicle number plates and people. This data is used to take knowledge-based actions that improve citizens' quality of life. Citizens can also access the city's data to enhance Duitama's local economic development with innovation and create new business models.

City of Manizales

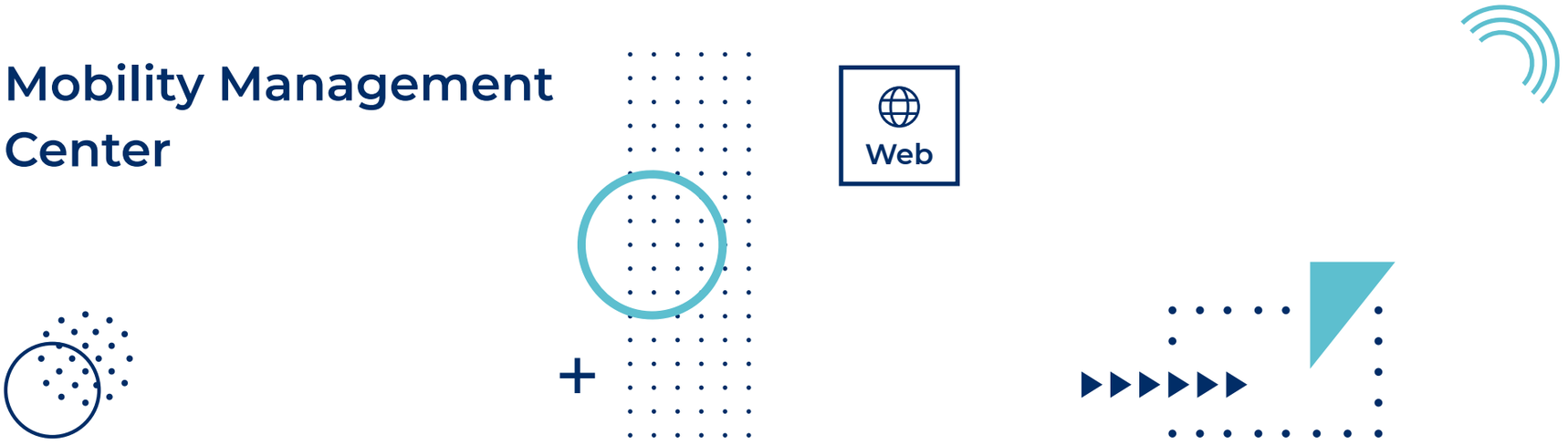


Manizales, capital of the department of Caldas, located in the centre-west of Colombia, with a population of 458,442 inhabitants, has become one of the most populated and competitive cities in the country, with an economy marked largely by the production of coffee, sugar cane, bananas, and mining.

In recent years, Manizales has stood out for adopting emerging technologies, implementing solutions that include, among others, intelligent transportation systems, automated mobility procedures, and solutions that seek to improve services and citizens quality of life. It has been recognized as one of the most sustainable cities in Colombia, and it is committed to reduce greenhouse gas emissions by 30% by 2030.

The Colombian Ministry of Information Technologies and Communications (MinTIC) has been promoting the development of smart territory initiatives in the country and accompanying the application of projects, and Manizales was chosen to implement the Mobility Management Center project.

Mobility Management Center



The central axis of the MMC project, in the city of Manizales, is a platform that articulates local information systems, sensor data, and complementary sources of information with a smart city vision. It adopts emerging and disruptive technologies to support management and decision-making at strategic points in the city.

The project also included the deployment of WiFi and Bluetooth sensors for air quality, variable messaging panels, and LPR cameras. When integrated into the platform, these sensors enable the creation of origin and destination matrices, vehicle flows, and average speeds, as well as the detection of licence plates, incidents on the road, and the classification of vehicles.

The platform was developed by using FIWARE elements, including Orion Context Broker, QuantumLeap for storing information in a DB, and Cygnus to manage context history. In addition, an incident management module, 2 user interfaces, one for the CGM operating team and one for citizens, were implemented.

City of Medellín

Surrounded by mountains and beautiful nature, Medellín is situated in the Cordillera Central, in the Andes. It is the second-largest city in Colombia, with over 2.5 million inhabitants. It has an area of 105 km2 of urban land, 270 km2 of rural land, and 5.2 km2 for potential further expansion. It stands out as one of Colombia's main financial, industrial, commercial, and service centres.

Medellín is a Special District of Science, Technology, and Innovation. In 2020, it began the transformation from being the industrial capital of the country to becoming the Software Valley of Colombia. To achieve this, hundreds of activities are being developed that use the technologies of the Fourth Industrial Revolution and the digital economy to improve its inhabitants' quality of life.

Medellín Inteligente

Medellín Inteligente understands the city through the capture of historical and real-time data from different sources such as IoT devices, and from public and third-party applications.

This solution seeks the appropriation, openness, and use of data as a tool for government, citizen action, and decision-making. It follows the guidelines of open and transparent government framed in the city's development plan and complies with the national policy of Digital Government.

Our FIWARE-based platform guarantees the harmonisation of the data from dispersed and heterogeneous data sources. It allows us to generate real-time alerts and big data analysis with AI/ML e.g., in projects like Historical Data Analysis on Teenage Pregnancy and Malnutrition.

City of Sogamoso

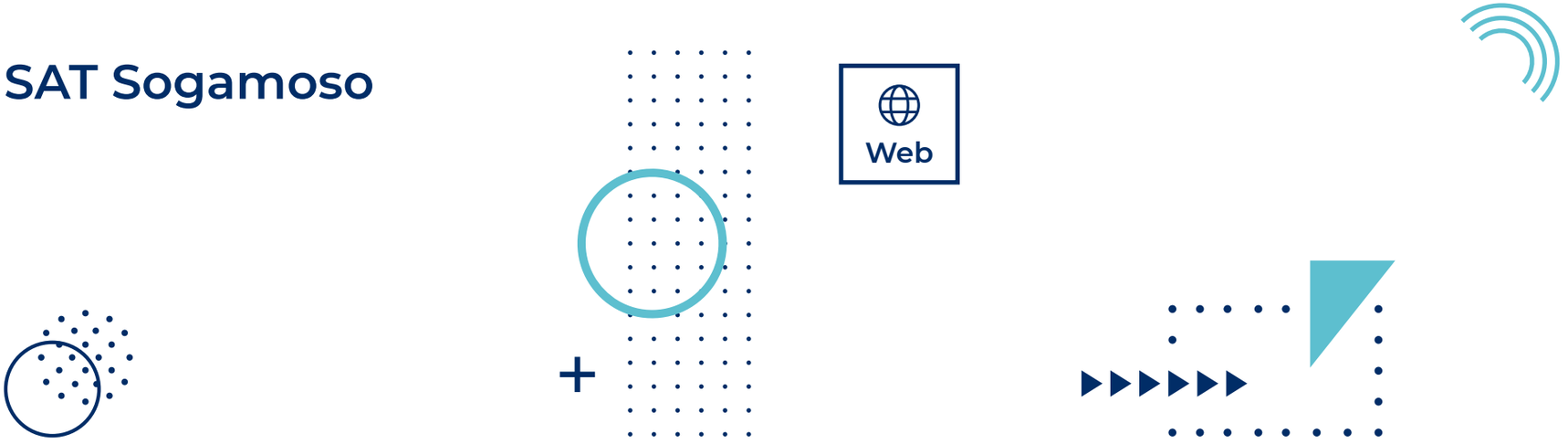
Known as the City of Sun and Steel, Sogamoso is a Colombian municipality located in the Boyacá department's centre-east, 228.5 km northeast of Bogotá. It has an altitude of 2,569 m and an average temperature of 17 °C.

The city's economic base is interregional trade, the steel and construction materials industry, and the exploitation of limestone, coal and marble.

Different strategies were implemented to consolidate Sogamoso as a "smart rural territory".

Among other achievements, this work resulted in 54 institutions having quality internet, 1,252 computers being delivered to rural areas, solar panels being built, river levels being monitored in real-time, implementation of Internet of Things technology in health, training for community action boards, implementation of PPPs in tourism and connectivity, precision agriculture projects, rural lighting, and rural economic development.

SAT Sogamoso



In the municipal risk management area, an early warning system was implemented that monitors the water level of two main rivers in the municipality of Sogamoso in real-time with two meteorological stations. This early warning system is an Internet of Things (IoT) device and is part of Sogamoso's collaborative LoraWAN network that allows the integration of more IoT devices to strengthen the system easily and quickly.

In addition, IoT sensors were installed to monitor air quality variables in community care services in 2 health centres to mitigate post-pandemic risks. The FIWARE-based platform implemented by our technological partner SIOT INGENIERIA, a local company, allowed us to centralise the information of different use cases, receive notifications in real-time and allow the community access to the data.

The main FIWARE components used in the solution were the **Orion-LD context broker**, IoT agent, and quantumleap, among others, along with a web interface developed by SIOT to visualise the data.

City of Dubrovnik

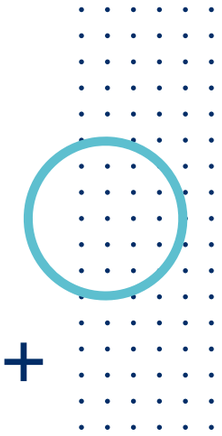
Dubrovnik is a small city located on the South Mediterranean Coast of Croatia. The city was founded in the seventh century and is home to roughly 42,000 inhabitants. With an average of 14,000 visitors per day, it is one of the major touristic centers on the Adriatic coast. The ancient city is a UNESCO cultural heritage and therefore under protection.

The Smart City Strategy of the city focuses on five different domains: Smart Government and Citizen Participation, Smart Community and local business acceleration, Sustainability including Smart Irrigation and Air Monitoring, Visitor Information, and Smart Mobility.

The city developed different applications to make the information available for all citizens and tourists. One application was developed for Citizen Participation and administrative purposes, another one for Smart Parking and Traffic Flows, as well as one to provide tourists with information about sightseeing and accommodations.

The city of Dubrovnik is planning on implementing a city-wide free WiFi and messaging service. The priority within this approach is to let the citizens benefit from the digital transformation of their city 360 degrees.

Snap4City



The solution has been developed for Dubrovnik in the context of HeritData for monitoring the old city with regards to tourism and people flow. To this end, a number of TV cameras and other people counting sensors have been connected to the Orion Context Broker by the Snap4City solution.

The solution also integrates information regarding social media coming from Twitter.

By integrating people flow and social media data, Snap4City has been providing a number of dashboards and data processing services to the citizens.

Dashboards allow the city to see real time data combined with historical data with calendar heatmaps and staked diagrams. Some of the produced results are accessible to the citizens and operators via public dashboards.

The Snap4City solution for Dubrovnik has been developed by DISIT Lab which is a FIWARE Gold member, and it is hosted as a tenant on Snap4city.org service.

City of Aarhus

Aarhus is located on the east coast of Jutland, in the central part of Denmark. It is the second-largest city in the country, and has a population of approximately 350,000 people. It is often considered the cultural capital of Denmark for its vibrant arts scene and numerous cultural events throughout the year. Originally called Aros, the city has a rich history that dates back to the Viking Age. Aros is also the name of the city's art museum where you can take a walk in the famous infinite rainbow on top of the building. Next to the art museum you will find the half of the city that was designed by the world-famous architect Arne Jacobsen in the 1930's.

Aarhus is committed to becoming a Smart City. Its Smart City Strategy focuses on using technology and innovation to improve green transition, sustainability, mobility, and quality of life for its residents. The strategy includes initiatives such as smart mobility solutions, energy-efficient buildings, and digital solutions for citizen engagement. Aarhus is a city that offers a unique blend of ancient history and modern innovation, and this commitment ensures that it will continue to be a leader in urban development and sustainability for years to come.

AARHUS KOMMUNE

City strategy official website

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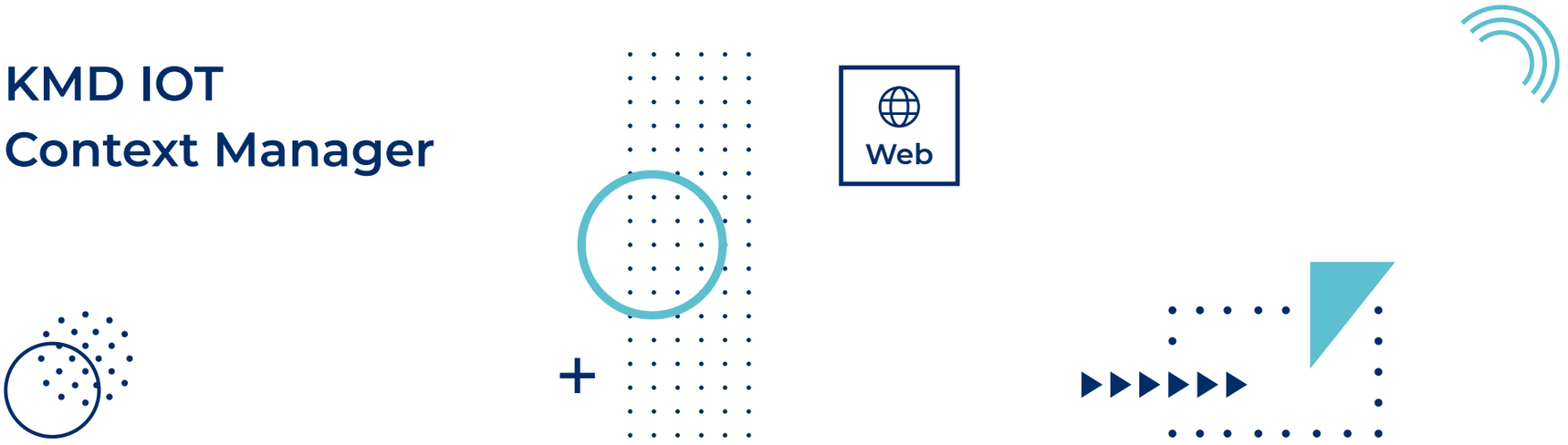
KMD IOT Context Manager



Aarhus Municipality, the second-largest in Denmark, is a driving force in the GovTech Midtjylland technology community that encompasses 16 municipalities. Aarhus leverages the KMD IoT Context Manager platform based on the NEC NGSI-LD Scorpio Broker to strategically approach municipal operations. This platform enables the municipality to consolidate scattered IoT projects, by breaking down silos and collecting and storing data across projects for immediate or future value creation.

Aarhus uses monitoring dashboards for various applications, including tracking life-saving water equipment to ensure a safer city, anonymously counting users in physical spaces like sports arenas and bike lanes, in conjunction with other types of data such as weather and city-wide events. The platform also helps to monitor public toilets for cleaning and maintenance purposes, improve resource utilisation, and enhance citizens' experiences with public facilities. Furthermore, it serves as a research project aimed at predicting and optimising energy consumption across the municipality's building portfolio. This results in a digital twin to Aarhus' efforts to decrease CO2 emissions and reduce energy costs. The goal is to onboard more of the municipalities in GovTech Midtjylland on the platform by the end of 2023.

Municipality of Albertslund

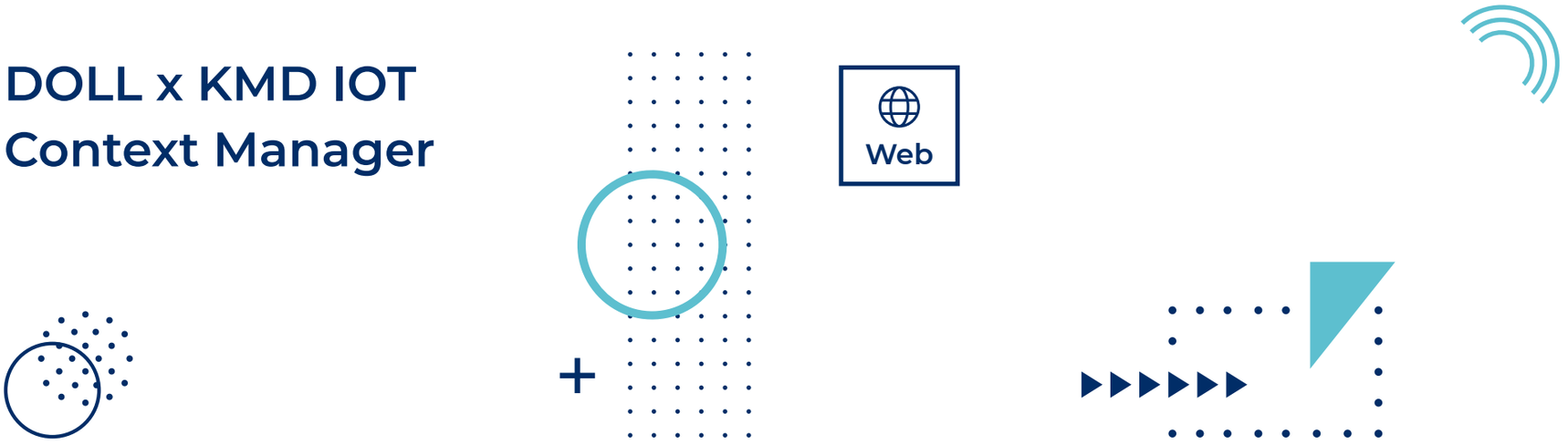
Albertslund is a suburb of Copenhagen with a population of 30,000 people located 15 km away from the city centre. The municipality combines its commitment to sustainable living with innovative low-rise urban planning, integrating water and green spaces into its architecture. The suburb is known for its active community engagement and participation in innovative projects like DOLL, a living lab for smart city technology, to create a forward-thinking municipality that values quality of life and environmental stewardship. Albertslund's participation in DOLL showcases its dedication to embracing cutting-edge technologies and sustainable practices.

In addition to its sustainable practices, the municipality boasts numerous green spaces, parks, and bike paths, to encourage an active and environmentally friendly lifestyle. The city centre also features a variety of shops, restaurants, and cultural venues, providing a vibrant and inclusive community atmosphere.

Albertslund Kommune

City strategy official website

DOLL x KMD IOT Context Manager



DOLL, a living lab for smart city technology, utilises KMD IoT Context Manager to improve urban environments by compiling sensor data from street lighting, traffic patterns, noise, air pollution, and public weather data. The platform enables DOLL to create a digital twin, fostering more complex use cases across data types, and allowing stakeholders to explore IoT-based applications. DOLL offers AI/ML services, which use live and historical data to support decision-making in municipal technology, operations, and urban planning.

Built on open European standards and open-source software, KMD IoT Context Manager simplifies data management, integration complexity, and data sharing for municipalities and energy companies. The platform's core is the NEC NGSI-LD Scorpio Broker, which ensures scalability and coherence, and allows customers to enable data sharing between organisations on a national and international level. This open, vendor-independent solution offers value across industries, even at the most basic IoT level.

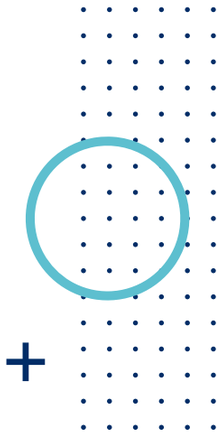
Aix-Marseille-Provence Metropolis

As the largest urban area in France and comprising 92 municipalities, the Aix-Marseille-Provence Metropolis, located 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

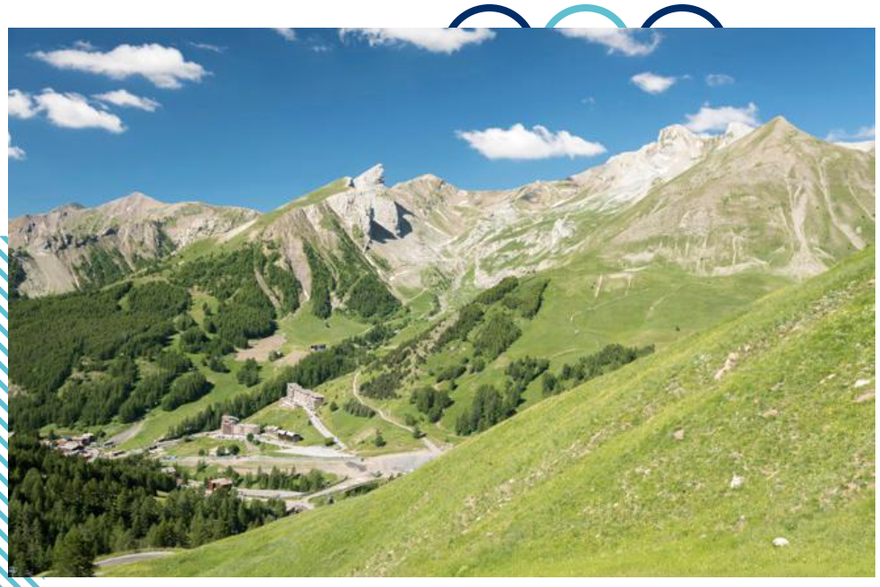


As the Aix-Marseille-Provence Metropolis makes the environment a top priority, air quality becomes the Environmental Agenda's first axis. In this context, the cities launched, with its partners, the DIAMS (Digital Alliance for Marseille Sustainability) project which is 80% funded by the European Union.

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.

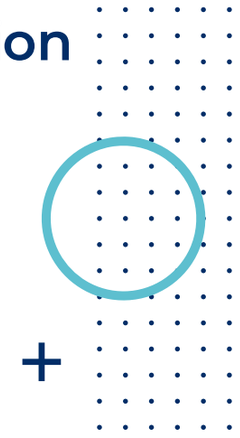
Region of Alpes-Provence Verdon



The Region of Alpes-Provence-Verdon is a French association of communes with the legal form of a communauté de communes in the Alpes-de-Haute-Provence department in the Provence-Alpes-Côte d'Azur region. It was founded in 2016 and includes 41 municipalities with 12,000 inhabitants. The administrative centre is located in the town of Saint-André-les-Alpes. The region is a famous touristic centre in the French alps and well known for skiing in winter and hiking in summer. Digital transition is a major challenge for rural actors, who need to integrate digital technology into the development strategy for their territories.

To support the challenges presented by the digital transition in rural areas, in June 2018, the Regional Rural Network launched an experimental approach in the territory Communauté de Communes Alpes-Provence-Verdon called "Smart Region Alpes-Provence-Verdon''. It was aimed at offering public decision-makers tools that would enable them to identify and consequently anticipate the digital transformations that their rural territory required.

Pastoralism Information Application



Web

In the course of the creation of the “Smart Region Alpes-Provence-Verdon” SERFIM, AWS and the communities in Val d’Allos developed a Smart Tourism solution for pastoralism information. The region of Val d’Allos is a popular hiking area, but at the same time home to a lot of sheep herds moving through the mountains only guarded by their shepherd dogs. Shepherd dogs are not only responsible for keeping the herd together but also for the security of the herd. In the past, hikers encountered dangerous situations with guarding dogs in the area. Thanks to the Pastoralism Information Application, sheep herds and dogs are tracked during the grazing season using LoRaWan. Data and important information are made available to all hikers in a specific web application.

Additionally, the web application offers educational information on the way of pastoralism. The technical heart of the application relies on the Smart Territory Framework and the FIWARE NGSI-LD datamodel specifications.

COMMUNAUTÉ DE COMMUNES ALPES PROVENCE VERDON Sources de lumière

FIWARE

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Metropolitan Region of Nice Côte D'Azur

The Nice - Côte D'Azur metropolitan region is located on the Mediterranean Sea in the South of France near the Italian border and the enclave of Monaco. The region is home to roughly one million inhabitants of which 340,000 live in the city itself. The region's economy is driven by three main factors: 1. the port, which is the main connection to the island of Corsica; 2. the airport, which is the third biggest in France and the gate to the whole touristic hotspot Côte D'Azur and 3. tourism itself.

Being a world pioneer and well-known Smart City, the Nice Côte d'Azur Métropole has taken on the challenge of new technologies and new sectors, and is currently pursuing a resolutely ambitious policy aimed at improving the lives of its inhabitants, optimizing the management of the city and the creation of jobs. Métropole Nice Côte d'Azur places innovation and sustainable development at the heart of its economic development strategy. The many Smart City Initiatives undertaken in its territory have led Métropole Nice Côte d'Azur to reinforce collaboration with major industrial groups, local SMEs and start-ups. The city of Nice is recognized as one of the most innovative cities in Europe in the field of smart and safe cities.

MÉTROPOLE NICE CÔTE D'AZUR

City strategy official website

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Eridanis
Smart City Platform

Web

FIWARE IMPACT STORIES

To operate more efficiently and faster within modern Smart Cities like Nice, FIWARE member Eridanis has developed a standard offering for a master plan of Smart Cities based on an architecture with many components of the FIWARE catalogue, with the Orion Context Broker acting as the main pillar of the solution. The original platform from Eridanis based on FIWARE components was co-created with the city of Nice before becoming a commercial offer via the UGAP (Union des Groupements d'Achats Publics).

The solution has evolved throughout the various projects and currently offers a solid base, able to adapt very quickly to many applications thanks to the flexibility and openness provided by the NGSI protocol as standardized by FIWARE. This core architecture is then adapted to each project specifically, accommodating for different industry domains, cities and territories. Eridanis strives to use the FIWARE defined Smart Data Models within projects, to drive clients toward standards as much as possible whilst ensuring interoperability.

The metropolitan region Nice-Côte D'Azur uses this Smart City Platform for managing its Smart City.

French Riviera

Located at the southeastern tip of the Alpes-Maritimes, along the borders of Italy and the Principality of Monaco, the French Riviera Community (CARF) extends over an exceptional territory, from the shores of the Mediterranean to the peaks of the Mercantour massif, going up the Roya and Bevera valleys. From Menton, the central city of the territory, 15 cities from the urban communities of the coast to the villages of the Middle and High Countries belong to the Community.

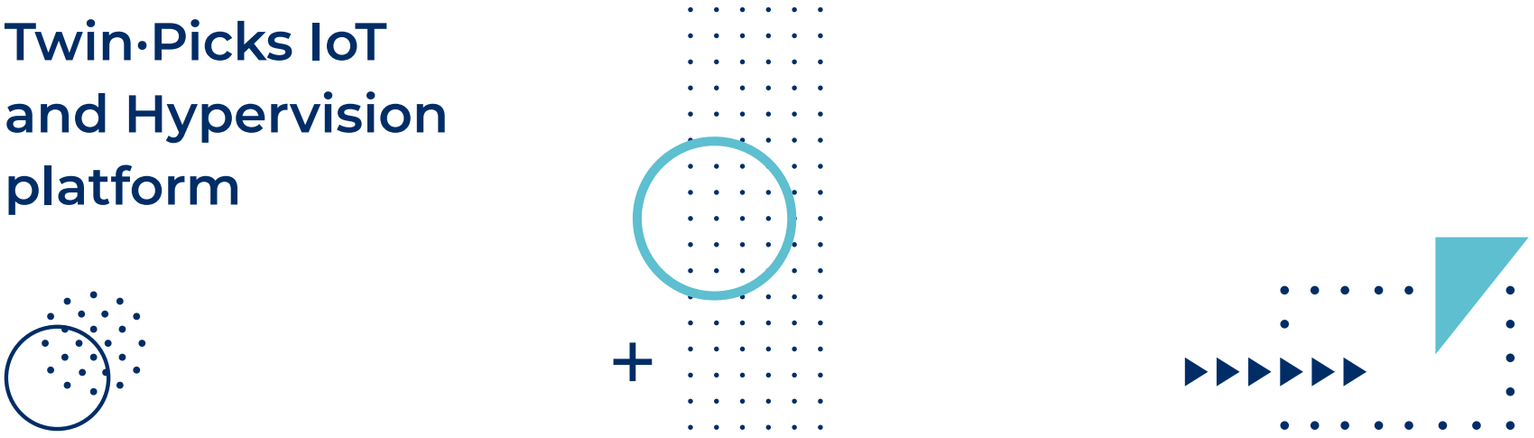
To gain consistency and efficiency, the 15 member municipalities of the territory pool their human, technical and financial resources so that the Community of the French Riviera intervenes directly in the areas of competence entrusted to it and mentioned in its statutes.

These areas of competence include economic development, development of community space (including the organisation of mobility, collective and school transport), social balance of housing, city politics, management of aquatic environments and flood prevention, collection and treatment of household and similar waste, potable water, and collective and non-collective sanitation.

COMMUNAUTÉ DE LA RIVIERA FRANÇAISE

City strategy official website

Twin·Picks IoT and Hypervision platform



CARF offers its municipalities a private and shared LoRaWAN network as well as a data platform allowing each municipality to deploy its own solutions while pooling IT management costs and optimising network coverage. The features include:

- Data-centric management with an NGSI-LD interface provided by the Stellio context broker
- A LoRaWAN network based on the open-source Chirpstack solution
- Data ingestion pipelines performed by a NiFi ETL
- Data visualisation and analysis by Grafana and Superset tools.
- The whole is orchestrated by Twin·Picks.

The platform is hosted in the community's data centre. End-to-end security as well as fine-grained access rights to stored data ensure that users can isolate or share data.

The engineering and deployment of the environment are carried out with the company EGM, which is committed to providing an open and interoperable solution and to transferring skills to the local authority, thus allowing it to gain autonomy and sovereignty over the management of its data environment.

La Réunion

La Réunion or Réunion is an island in the Indian Ocean is an overseas department of France. It is located approximately 500 km east of the island of Madagascar. As of January 2021, it had a population of 858,450.

Like the other four overseas departments, Réunion also holds the status of a region of France, and is an integral part of the French Republic. Réunion is an outermost region of the European Union and is part of the Eurozone.

The economic driver of the region is tourism followed by the production of agricultural goods.

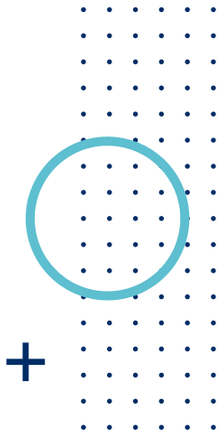
Due to the economic performance heavily relying on the environment, the island's government decided to make the Smart Island Strategy aiming for an ecological and industrial transformation of both the touristic and the agricultural sector. To do so, the city rolled out a pilot project in the community of La Possession and opened a tender for developing a Smart Island Platform for both ecological and industrial transformation.

The tender was won by FIWARE Member Eridanis who is in 2021 developing the digital transformation platform.

VILLE DE LA POSSESSION.RE

City strategy official website

Eridanis Ecological and Industrial Transition Platform



To operate more efficiently and faster within modern Smart Cities and Regions like La Réunion, FIWARE member Eridanis has developed a standard offering for a master plan of Smart Cities based on an architecture with many components of the FIWARE catalogue, with the Orion Context Broker acting as the main pillar of the solution. This offering has been made available through the UGAP (Union des Groupements d'Achats Publics), a privileged vector for public procurement in France.

The solution has evolved throughout the various projects and currently offers a solid base, able to adapt very quickly to many applications thanks to the flexibility and openness provided by the NGSI protocol as standardized by FIWARE. This core architecture is then adapted to each project specifically, accommodating for different industry domains, cities and territories. Eridanis strives to use the FIWARE defined Smart Data Models within projects, to drive clients toward standards as much as possible whilst ensuring interoperability.

On La Réunion this platform is adopted to develop an ecological and industrial transition platform.

VILLE DE LA POSSESSION.RE

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City of Noisy-le-Grand

Noisy-le-Grand is a small city in the suburbs of France's capital Paris and home to roughly 70,000 inhabitants. It is located 15 kilometers East of the city center of Paris. Due to its good connection to the city via train, Noisy-le-Grand is popular to commuters to and from Paris.

The Smart City Strategy of the city is conceptualized around a Smart Data approach. This includes a global database in order to ensure data interoperability of various digital services of the city. Moreover, the strategy aims to develop tools using artificial intelligence to help to improve Smart Mobility, Smart Health and Smart Environment solutions. All of the gathered data is supposed to be collected, analyzed and made available in an Open Data Portal.

Noisy-le-Grand will thus be more transparent for the inhabitants of the city. They will also be able to benefit from a better quality of services thanks to the information shared by the city's digital services.

This way, the city's government wants to ensure that all citizens benefit from the digital transformation of the city.

Eridanis
Open Data Platform

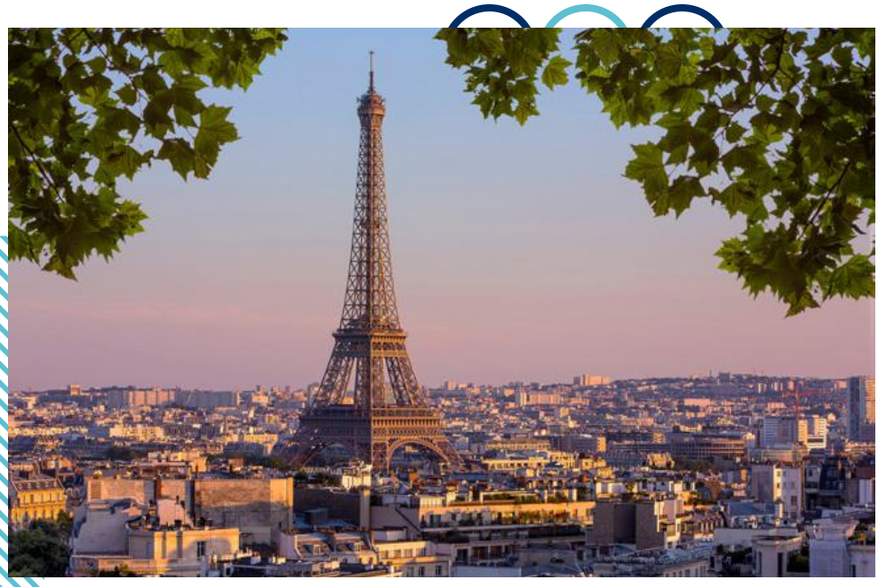
To operate more efficiently and faster within modern Smart Cities like Noisy-le-Grand, FIWARE member Eridanis has developed a standard offering for a master plan of Smart Cities based on an architecture with many components of the FIWARE catalogue, with the Context Broker acting as the main pillar of the solution. This offering was made available through the UGAP, a privileged vector for public procurement in France.

The solution has evolved throughout the various projects and currently offers a solid base, able to adapt to many applications quickly thanks to the flexibility and openness provided by the NGSI protocol as standardized by FIWARE.

This core architecture is adapted to each project specifically, accommodating for different industry domains, cities and territories. Eridanis strives to use the FIWARE defined Smart Data Models within projects, and to drive clients toward standards as much as possible whilst ensuring interoperability.

In Noisy-le-Grand the platform development focusses on an Open Data Platform which is developed using a pilot involving Air Monitoring stations and other IoT devices.

Paris Airport



Paris isn't just the capital of France, it is also recognized as the global epicentre of arts and architecture. With a population of over 2 million people, the city is home to iconic landmarks like the Eiffel Tower, Champs Elysees and Arc de Triomphe, making it one of the world's top tourist destinations. Located in the northern central part of France, Paris is spread across both banks of the Seine River.

It also holds the title of the most-visited city worldwide, with 44 million tourists in 2022. This means that the city and its airports need to aim for optimal business logistics management and a greener way to support their activities. In 2021, the Charles de Gaulle airport initiated the OLGA Project to reduce Groupe ADP's environmental impact, this project aims to improve the aviation sector's environmental impact in an innovative and sustainable way. With Zagreb Airport in Croatia as a partner, the new strategic project focuses on innovative measures to reduce CO_2 emissions, improve air quality, and preserve biodiversity. The results are expected to generate positive environmental and economic impacts that will spread to the local, national, and European levels.

Smart Territories – Aéroport de Paris

Paris Charles de Gaulle is one of the busiest airports in Europe, handling over 85 million passengers annually. The Smart Territories project at Aéroport de Paris seeks to manage airport biodiversity and business logistics through a data platform, while also promoting sustainable and innovative solutions to reduce the aviation sector's environmental impact.

FIWARE offers a potential solution that benefits green activities, knowledge, image, and data exchange between SI applications. The implementation of FIWARE's Context broker NGSI and Data Catalog in the Smart Territories project at Paris Charles de Gaulle has helped to improve flight operations and decarbonize ground operations towards net zero CO2. This has increased the modal share of carbon-free transport for airport-city journeys and helped the airport community and surrounding city by improving air quality.

PARIS AÉROPORT

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.

SAINT QUENTIN

City strategy official website

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Smart Irrigation

In cooperation with EGM, Hostabee, and Faubourg Numérique, a FIWARE iHub, the solution provides end-to-end connectivity to optimize the irrigation of sports fields in the city of Saint-Quentin. Sensors 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 and to implement a solution matching the users' needs. This solution aims to help the city modernize the management of maintenance operations in stadiums and reduce water and fertilizer inputs, among other purposes.

Web FIWARE IMPACT STORIES

Connected Canteens

To 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 objectives: 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 so that menus, canteens reservation and attendance are now registered from the education department through an NGSI-LD context broker (Stellio) to provide decision support to the city.

Web

City of Vers – Pont-du-Gard

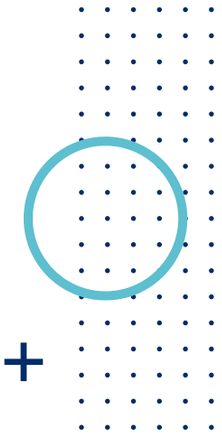
Vers – Pont-du-Gard is a town in the Gard department in Southern France with roughly 10,000 inhabitants. The ancient, Roman aqueduct bridge “Pont-Du-Gard’’ was built in the first century AD to carry water over 50 km to the Roman colony of Nemausus. It crosses the river Gardon near the town. The Pont-du-Gard is the highest of all Roman aqueduct bridges existing, as well as one of the best preserved. It was added to UNESCO’s list of World Heritage Sites in 1985 because of its historical importance.

The aqueduct has been a famous tourist attraction for many years and is with more than 1,500,000 visitors per year one of the five most visited tourist attractions in France.

To manage these high numbers of tourists, the governance of the small town decided for a digitalization of the touristic management system in order to improve the visitor’s experiences.

This digital transformation process is led by the FIWARE member Snap4City.

Snap4City



The solution has been developed for Pont-du-Gard in the context of HeritData to monitor the old bridge with its people flow.

A number of different kinds of sensors for counting people and bikes have been connected to the Orion Context Broker by the Snap4City solution. The solution also integrates information regarding social media coming from Twitter. Thus, the Snap4City solution integrated both people and bike counts or flows and social media to provide a number of dashboards and business intelligence services. Dashboards allow the citizens and city operators to see real time data and historical data through 3D diagrams or stacked diagrams. Some of the produced results are accessible to citizens and operators via public dashboards.

The Snap4City solution for Pont-du-Gard has been developed by DISIT Lab a FIWARE Gold member.

City of Bad Hersfeld

The festival city of Bad Hersfeld, located in the centre of Germany, with its approximately 30,000 citizens belongs to the state of Hesse and, due to its central location, has a high significance for logistics companies and, as a result, a high volume of traffic, especially from trucks and the associated noise and exhaust emissions.

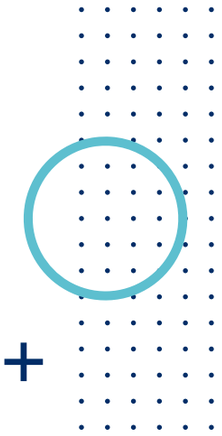
The city of Bad Hersfeld would like to counteract this burden on citizens and has initiated optimization measures by means of a digitization strategy. To obtain a concrete situation report, a central data platform was set up to collect and analyse all existing and new urban data and make it available for further use and measures.

For example, parking systems in the city were made smart and connected and information about free parking spaces, especially in the inner city and commuter parking lots, was collected and made publicly available. Furthermore, noise sensors were installed along a highway, the information from which was also evaluated and gave rise to the introduction of speed reduction through speed limits. Other innovative digitization approaches are currently being implemented or are at the planning stage.

BAD HERSFELD

City strategy official website

[ui!] Urban Pulse



To implement the planned digitization strategy of the city of Bad Hersfeld with its numerous projects, a central, open urban data platform is necessary. The data platform [ui!] UrbanPulse developed by the [ui!] Urban Software Institute was used as the basis for all digitization activities of the city.

Thus, already existing and newly installed sensor data is collected by the data platform, analysed and presented for further processing, such as the display on a [ui!] COCKPIT. On the platforms, which are publicly accessible on the web, citizens can view current parking occupancy rates in the inner city area, commuter parking lots and the parking garages, as well as the condition of the electric charging stations, weather, or the filling level of public trash cans. Digitization within the city administration was also implemented by changing its procurement guidelines for municipal purchases. All public procurement procedures must now be IP-enabled and are stored on [ui!] UrbanPulse. This is a basic requirement when awarding contracts, so that all applicants must observe these digital tender criteria in order to be considered for the award.

BAD HERSFELD

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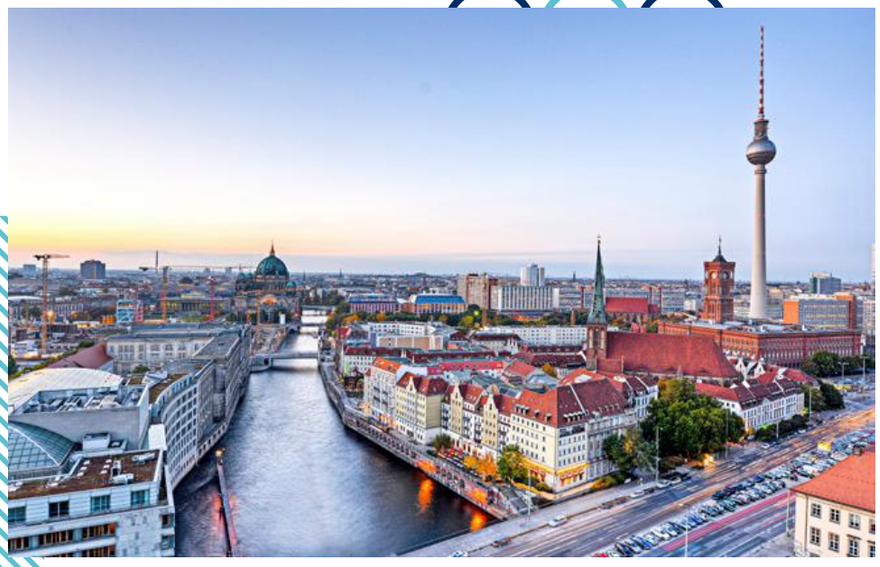
City of Berlin



Berlin is the capital and biggest city in Germany, and home to 3,5 million inhabitants. The city has been growing for years. In 2030, at least 250,000 more people will live in the city than today. This means that the demand for housing is constantly growing, as are the requirements for mobility, infrastructure adjustments, and available resources such as water, energy, data and cultivatable surface. Like many metropolises around the world, Berlin is facing various challenges now and in the future.

The Smart City approach aims to use intelligent technology to find solutions for Berlin's ecological, social, economic and cultural challenges. Berlin aims to preserve and, if possible, enhance its attractiveness and quality of life.

The "Berlin Strategy | Urban Development Concept Berlin 2030" follows a clearly formulated mission statement. The Smart City Strategy Berlin makes part of a framework describing a political-strategic innovation approach. This approach expands and secures the future viability of Berlin in a way that is oriented towards the common good.

BERLIN

City strategy official website

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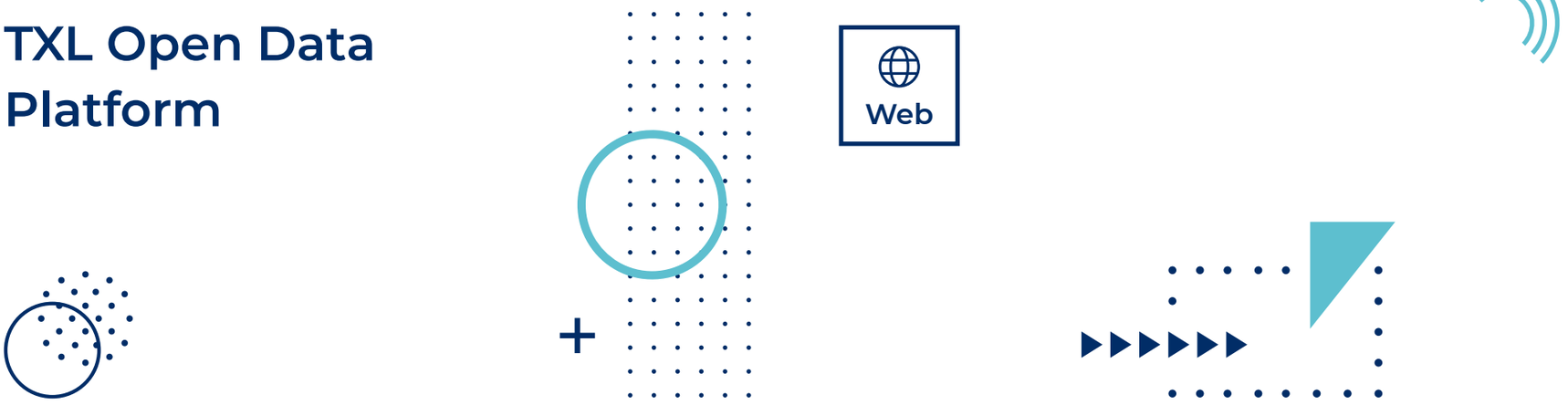
TXL Open Data Platform



Part of Berlin's Smart City strategy is the development of a smart district in the area of one of Berlin's former airports, the Tegel Airport. The former airport is making room for a fully new district in Berlin: "Berlin TXL – the Urban Tech Republic". With this, Berlin is reclaiming a piece of the city to create new spaces for industry, business, and science, also creating an industrial and a research park for urban technologies. This innovation park aims to keep Berlin, a 21st century booming metropolis, going, contributing to job creation and economic growth. It will be the space where urban technologies are researched, developed, produced, tested, and exported.

This new city district is designed as a smart district and connected by an Open Data Platform developed by Hypertegrity.

The platform that follows Paderborn's Open Data Platform as an example, uses FIWARE technologies and supports SensorThings standards. The FIWARE framework forms the core of the platform, providing features such as context and data management. The Open Data platform uses Open Source components from the official FIWARE catalogue with the Orion Context Broker at its heart.

City of Darmstadt

With a population of around 160,000, the digital city of Darmstadt is located in the German state of Hesse, near Frankfurt. It holds the title of “City of Science” due to its numerous colleges and universities with around 41,000 students. Darmstadt is a pioneer and international beacon thanks to the successful R&D work of Darmstadt Technical University for innovative technologies, designed to make citizens’ everyday’s lives easier – in the city and surrounding areas.

The city addresses 13 thematic optimization areas supported by digitization: Education, Cybersecurity, Data Platform, Energy, Society, Health, Commerce & Tourism, IT-Infrastructure, Industry 4.0, Security & Disaster Prevention, Culture, Mobility, and Environment.

The holistic and strategic approach of the so-called city group (city administration and city owned businesses), aims to digitally develop Darmstadt into a Smart City. [ui!], ekom21 and the DA-RZ computer centre jointly implemented in the city of Darmstadt Europe’s largest urban data platform using [ui!] UrbanPulse - powered by FIWARE.

Wissenschaftsstadt Darmstadt

City strategy official website

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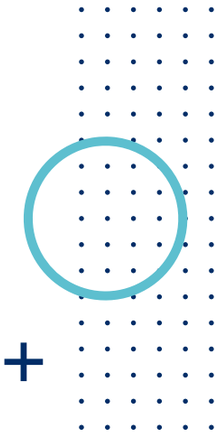
[ui!] Urban Pulse



The city's goal is to support and accelerate necessary urban decision-making and planning processes through the availability and analysis of networked data. The data is non-personal data, such as measurements of the extensive environmental sensor network, data from the mobility volume including public transport and other non-personal data of everyday life - which is collected, processed, analysed and visualised.

Data from different sources are connected in order to further develop the quality of the city's life: e.g. measured values using the data platform or additional data from everyday urban life (people moving in and out, vehicle registrations, etc.).

It is crucial to the city of Darmstadt to involve citizens in planning and decision-making. The public platform COCKPIT offers the opportunity to submit one's own ideas for using the data platform. Currently, data on the environment, traffic, rubbish bins and the zoo are being collected and visualised there.

For all urban data, the city of Darmstadt retains data sovereignty and can thus decide for itself which data is processed further and to whom it is passed on and for what purpose.

City of Dormagen

Dormagen, is a city located in the heart of North Rhine-Westphalia, home to over 65,000 people, in the metropolitan region between Cologne and Düsseldorf. With a focus on technology and industry, Dormagen is a key business hub in the region and a leading industrial site in Germany.

In 2021, Dormagen unveiled its Smart City strategy with the motto “An industrial city in transformation.” This strategy prioritises becoming a more sustainable, digital, and citizen-centric city, with the intention of becoming a more attractive place to live and do business. The Urban Data platform, complemented by a LoRaWAN network and Digital Twin, supports this vision by establishing data infrastructures to facilitate an innovative data ecosystem for integrated urban development, new mobility, and climate protection initiatives.

DORMAGEN Natürlich! Am Rhein.

City strategy official website

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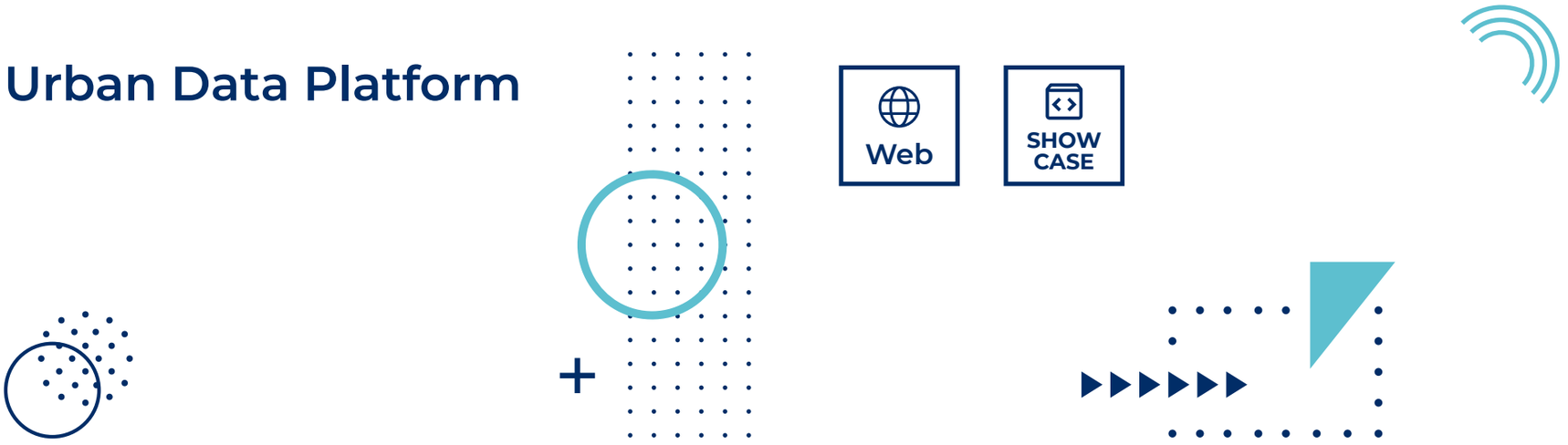
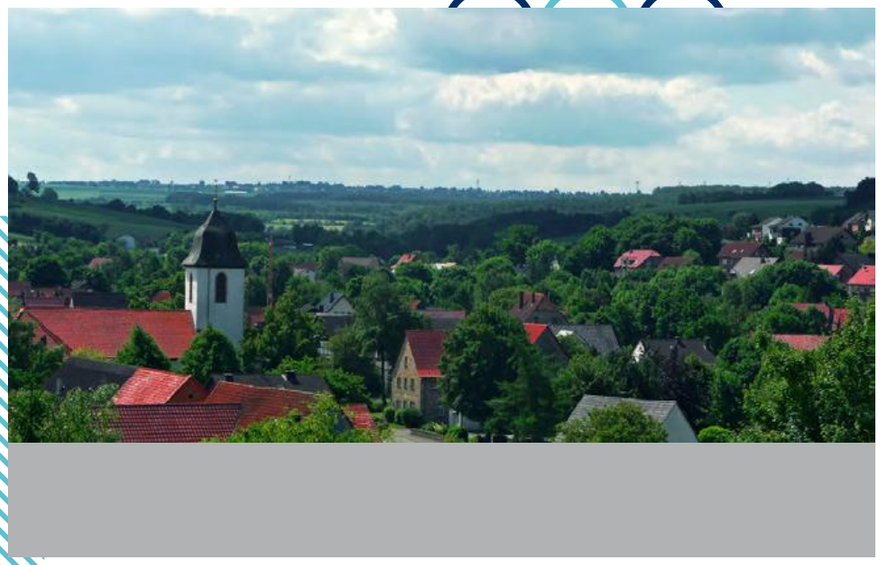
Urban Data Platform



Dormagen has teamed up with Senseering to develop a new Urban Data Platform (UDP) that promotes strong sustainability and resilience within the city. This platform simplifies the Internet of Things (IoT) and adheres to the latest FIWARE standards, utilising the Scorpio Broker. With support from the city's Digital Twin and a city-wide LoRaWAN, the UDP provides valuable insights from big data. Its multi-tenant functionality makes it a smart choice for cities that lack the resources or desire to develop their own data platform.

Smart Visitors has taken last year's people measurement to the next level by incorporating an event calendar, mobility, and weather data. This not only supports event evaluation, but also city planning and mobility offers. To promote sustainability goals, Smart Energy keeps track of the city's carbon footprint by monitoring energy, resource consumption, and mobility data. Smart Water evaluates drainage system status and aggregates environmental and weather data to facilitate flood protection and predictive maintenance. Smart Vacancy proactively manages retail and commercial spaces, promoting a diverse and resilient local economy, ultimately contributing to the improvement of citizens' quality of life.

Village of Borchen-Etteln

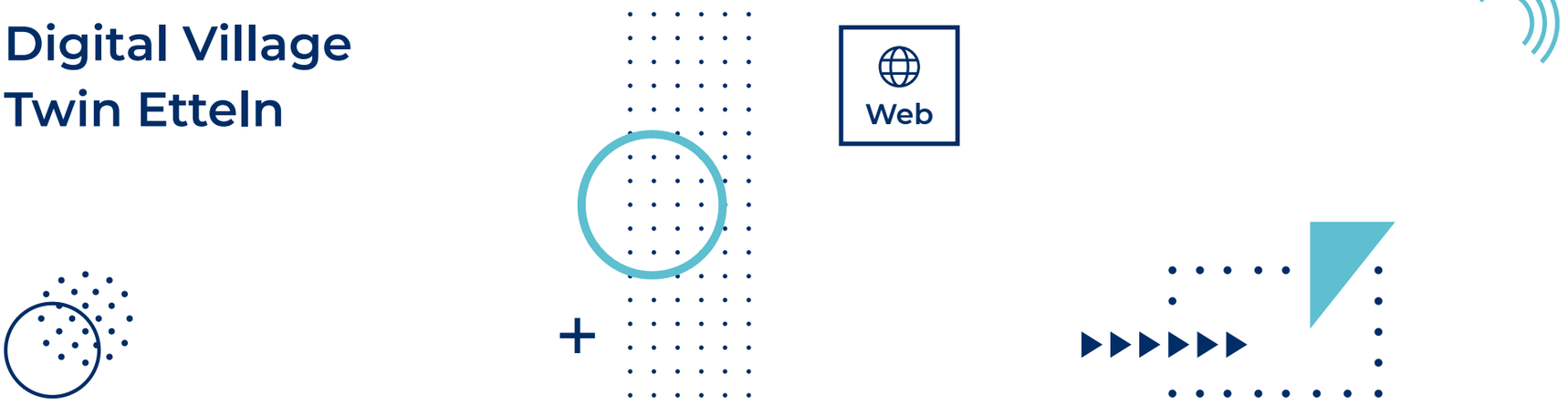


Etteln is a village of 1,850 inhabitants and part of the municipality of Borchen close to Paderborn in Germany. The village has a long-lasting history of its people voluntarily taking care of its infrastructure and environment.

Starting in 2018, this engagement was slowly transferred from analog to digital work. It started with a future conference on digitization in rural areas and was followed in early 2020 by providing the digital infrastructure for future applications. Within the village centre the company Deutsche Glasfaser provided ‘fibre to the home’ but there was no incentive for them to provide anything outside the village centre. The people in the village worked together to deploy another 30 kilometres of fibre and connected 47 houses and farms outside of the village centre to the network. 60 people voluntarily spent 3,500 hours completing this project and finished it within six months.

The basis for the digital future of the village was prepared.

Digital Village Twin Etteln

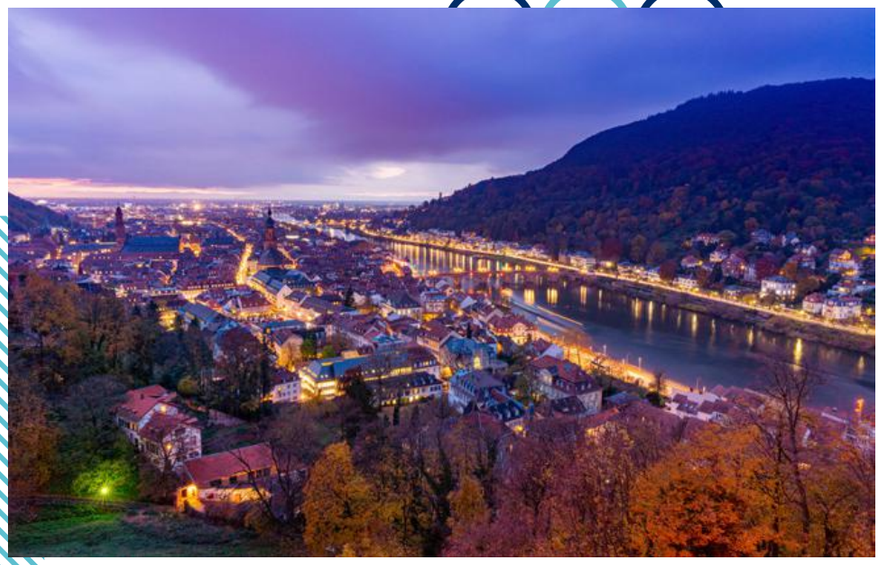


After the implementation of a village app which is used by 800 people in the village, an electric village car (a 7-seater Nissan called ettCAR), and an electric cargo bike called ettCARGO went into operation. They are connected to the internet and can be booked and opened via a smartphone. They can also be used free of charge. At the end of 2022 a FIWARE based Open Data Platform was installed to provide the data integration launchpad for future smart solutions. With this platform a 3D Digital Twin of the village will be created using drones to use as a digital representation of the real world.Once created, different sensors will be installed in and around the village and their data will be made accessible via the 3D Digital Twin.

This project will lay the groundwork for solutions like a flood warning system or autonomously flying drones supporting the fire brigade. The implementation of this project has already been started and is financed by the German government and European Commission.

Etteln is on the way to become a digital lighthouse for all of Germany.

City of Heidelberg



With a population of around 160,000 citizens, the city of Heidelberg is the fifth largest city in Baden-Württemberg (Germany). Amid the Rhine-Neckar metropolitan region, the city on the river Neckar is considered one of the most livable cities in Germany due to its cultural charm, favourable climatic conditions, and urban flair.

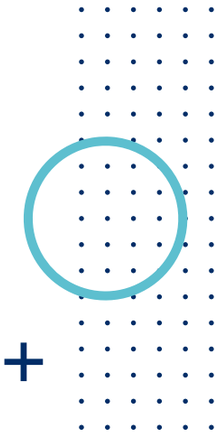
In addition to its tourist attractions, such as the old town and the castle ruins, the city is known for its venerable university dating back to the 14th century, as well as for many other universities and internationally renowned research institutions. Nevertheless, there are challenges for the city of science and culture, especially in the areas of Smart Environment, Smart Mobility, and Smart Citizens that also includes E-Government as well as participation topics.

For example, the topological location of the city on the river Neckar, with its different locations of educational and research institutions, a high commuter rate of working people as well as the pronounced tourism, creates a diverse mobility volume. For the modern and digitally shaped city, this also means dealing intensively with digital solution approaches to maintain and accentuate public services and foster the quality of life on a local/communal and regional level.

Heidelberg

City strategy official website

Urban Data Platform Heidelberg



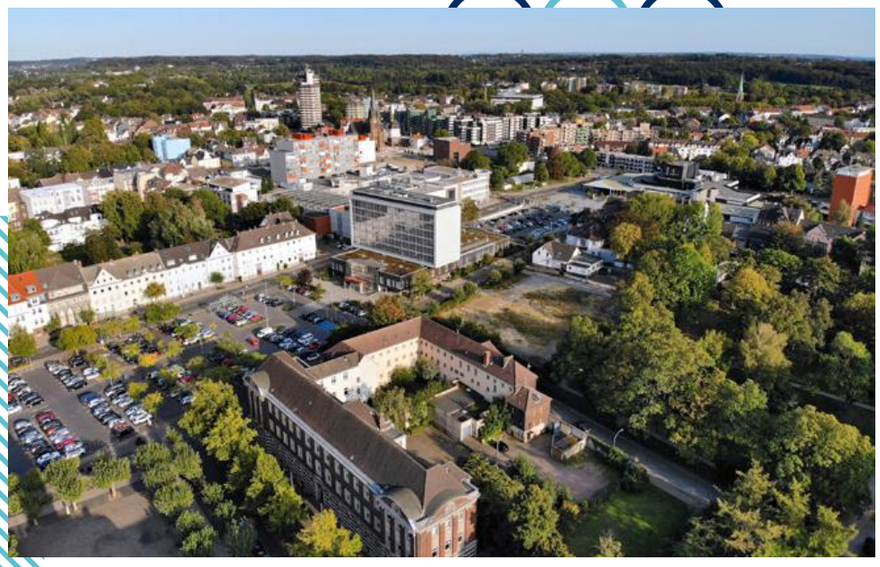
To fulfil the complex cross-administrative and cross-institutional tasks of today as well as address pressing challenges for future city development, the city of Heidelberg relies on the added value of urban data. For this purpose, Heidelberg decided to implement an urban data platform as an essential part of the municipal IT infrastructure. Based on the previous project of the Citizen Compass, the city decided to use a FIWARE based platform solution.

SSoon, this platform will ensure interdepartmental networking and cooperation and increase the shareability and usability of data by utilising the uniform FIWARE standard.

In doing so, existing and future data sources will be integrated using FIWARE data models and used for the development of data-driven decision-making processes in a low-code approach. Further, all of the context data will be published in an Open Data Portal (DataHub) or Heidelberg´s citizen web portal.

Engineering Germany delivers and operates the urban data platform. The platform is fully open source, based on a FIWARE reference architecture, and fulfils the requirements of the national DIN SPEC 91357

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 the cooperation between Stadtwerke Herne (the local utility of the city of Herne), Accelogress, and Waterkotte, and 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 Kaiserslautern

Kaiserslautern: A German City Embracing Smart City Innovations Kaiserslautern, located in southwest Germany, is known for its rich history, contiguous forest area, and large American community. Since 2020, Kaiserslautern has embraced the Smart City concept, aiming to enhance residents' quality of life through digital technologies and smart devices. This strategy focuses on improving the town for residents, visitors, and workers, rather than just implementing the latest technology.

Collecting data is crucial for this transformation, as it helps understand traffic patterns, energy usage, and public service needs, enabling informed decision-making and efficient resource allocation. Therefore, Kaiserslautern is part of the "Southwest-Cluster," a group of Smart Cities in Rhineland-Palatinate and Saarland committed to building a collaborative data platform.

This initiative aims to reduce redundancy, optimise resource use, and achieve cost savings. Additionally, it seeks to increase transparency, allowing citizens to access and understand how decisions are made. Through these efforts, Kaiserslautern is positioning itself as a model for smart urban living.

Open Urban Data Platform Southwest-Cluster

Due to the strict principle of federalism in Germany, every municipality is responsible for its own IT Infrastructure. This results in heterogeneous structures, which are very challenging when it comes to the development of data-driven applications. Imagine you are a developer and you intend to create an app, which navigates you to the nearest free parking lot. In addition to the privately operated parking areas, many parking spaces are publicly owned. You would have to ask for the data in all local governments and you would have to deal with a tremendous amount of different technologies and data-formats.

This is a fundamental issue, which slows down digitalization in Germany – at least for the public sector. One approach to overcome this is to agree on data standards like FIWARE Smart Data Models. Kaiserslautern decided to form a cooperation with five other municipalities to build a collaborative Open Source Urban Data Platform, based on the preparatory work by Berlin TXL and Hypertegrity. This “Southwest-Cluster-Cooperation” is currently implementing a joint water level monitoring and a smart traffic management system with FIWARE Smart Data Models as a common standard.

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 Region 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.

KielRegion

City strategy official website

FIWARE

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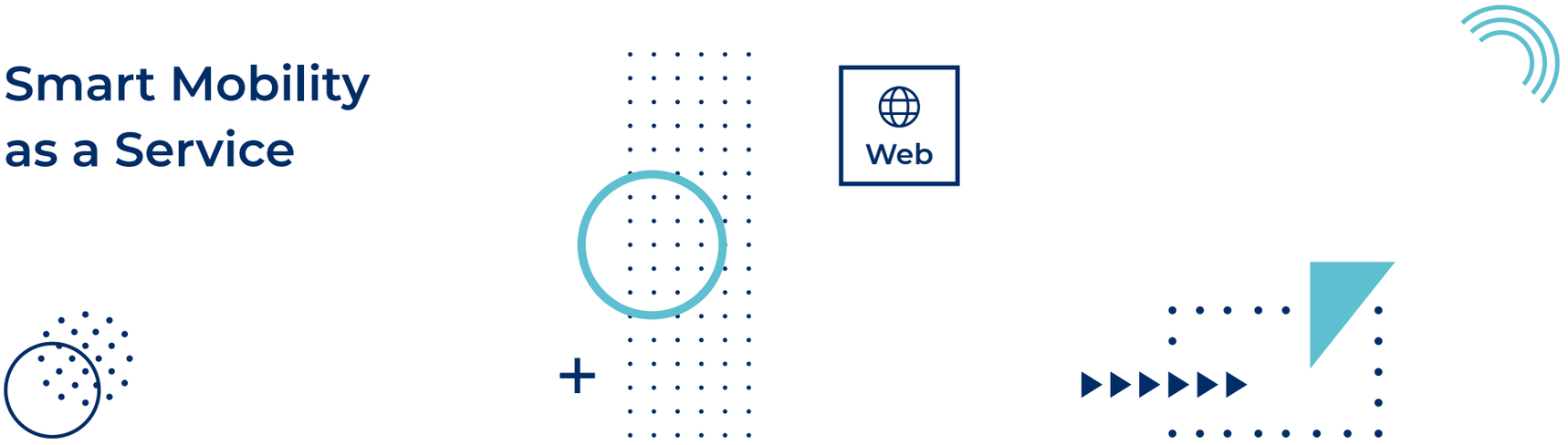
Smart Mobility as a Service



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.

City of Konstanz

Konstanz is located in Southern Germany on the shores of Lake Constance, right at the border with Switzerland. It is of significant cultural and historical importance. With approximately 85,000 inhabitants, it is the biggest city in the administrative district and region of Lake Constance.

It consists of two universities, the University of Konstanz and the University of Applied Sciences (HTWG), as well as many companies in different sectors.

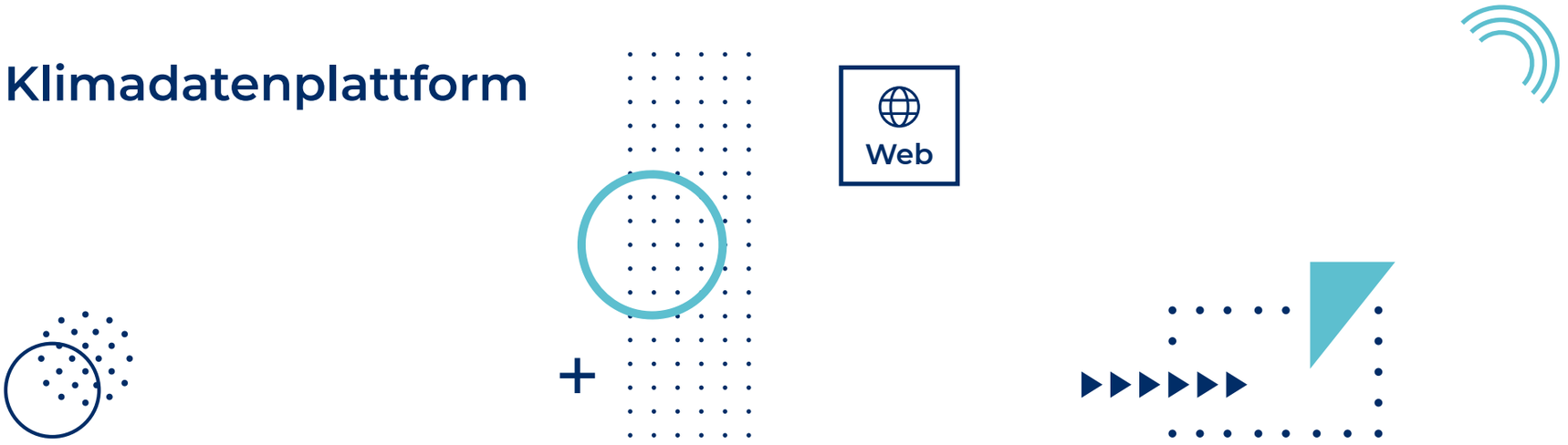
In its Smart Green City program, Konstanz collaborates with partners to develop and improve pilot projects, challenging the following questions: How can we maintain and improve urban living? How can we save energy and use it wisely and efficiently? How can we ensure inclusive participation from all parts of society?

Smart Green City is funded by the Federal Ministry for Housing, Urban Development and Building. The program aims to demonstrate that German cities are becoming role models for sustainable and connected urban environments.

Stadt Konstanz

City strategy official website

Klimadatenplattform



The Klimadatenplattform is an innovative project at the heart of the Smart Green City Konstanz initiative. Designed to build a comprehensive urban data platform focused on climate and environmental data, this project is poised to become the foundational infrastructure for future smart city implementations in Konstanz.

The Klimadatenplattform aims to collect, structure, aggregate, and provide actionable climate and environmental data throughout the city. This robust platform will serve as the central repository for all relevant data, ensuring it is ready and available for analysis and application development. By doing so, it will empower city administrators and citizens alike with valuable insights and tools to foster a more sustainable and informed community.

In partnership with Hypertegrity AG, a distinguished FIWARE Member, the Klimadatenplattform leverages state-of-the-art FIWARE Smart Data models.

City of Langenfeld

The German city of Langenfeld with its approximately 60,000 inhabitants is located in North Rhine-Westphalia near Dusseldorf, and provides a rich shopping experience for the region's citizens. In order to meet the requirements of digitization, the communal company, ''Digital- und Infrastrukturgesellschaft Langenfeld'' (DIL), was founded solely for this purpose. Its scope was to optimise and renew the lighting infrastructure, and thus achieve the sustainable development of a digital infrastructure. The DIL's role also covers topics of sensor technology, Smart City, digital administration, and digital schools.

DIL is intended to secure the digital supply for citizens in the same way as, for example, the waterworks or power plants ensure it for their supply products. This holistic approach builds on the secure and long-term provision of necessary infrastructure, which today includes digital infrastructure in particular, as it is also existential for all providers of urban infrastructure involved.

Another important task of the DIL is to increase the attractiveness of the inner city and improve the safety of the city's recreational parks.

Stadt Langenfeld

City strategy official website

FIWARE

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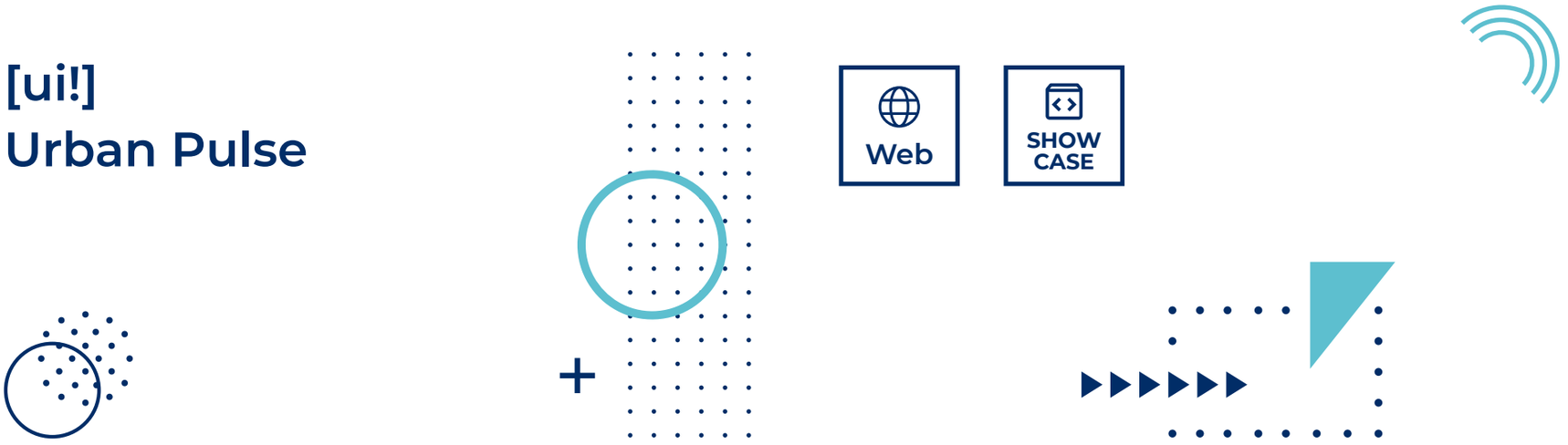
[ui!] Urban Pulse



To achieve the city's goals, [ui!] Urban Software Institute, developed [ui!] UrbanPulse – powered by FIWARE – to collect and analyse existing and new data and make it available for further processing and use.

Some of the data comes from existing sensor systems, other come from newly acquired. The new sensors include environmental sensors, water level sensors for flood prevention, real-time traffic data from traffic cameras and noise sensors. Innovative, intelligent multi-functional lighting columns with motion-dependent lighting control, security cameras, WiFi access points (Public WiFi) and a noise sensor were installed in a park with the support of [ui!] Urban Lighting Innovations, which ensure maximum energy savings and minimum light pollution via sensor-based control. Some of the sites have video cameras, but these are only activated when a maximum permitted noise level is exceeded based on certain noise patterns.

The retailers and the city of Langenfeld receive valuable information about customers, their shopping habits and characteristics, traffic and parking behaviour from the information obtained from the analysis performed by [ui!] UrbanPulse data platform.

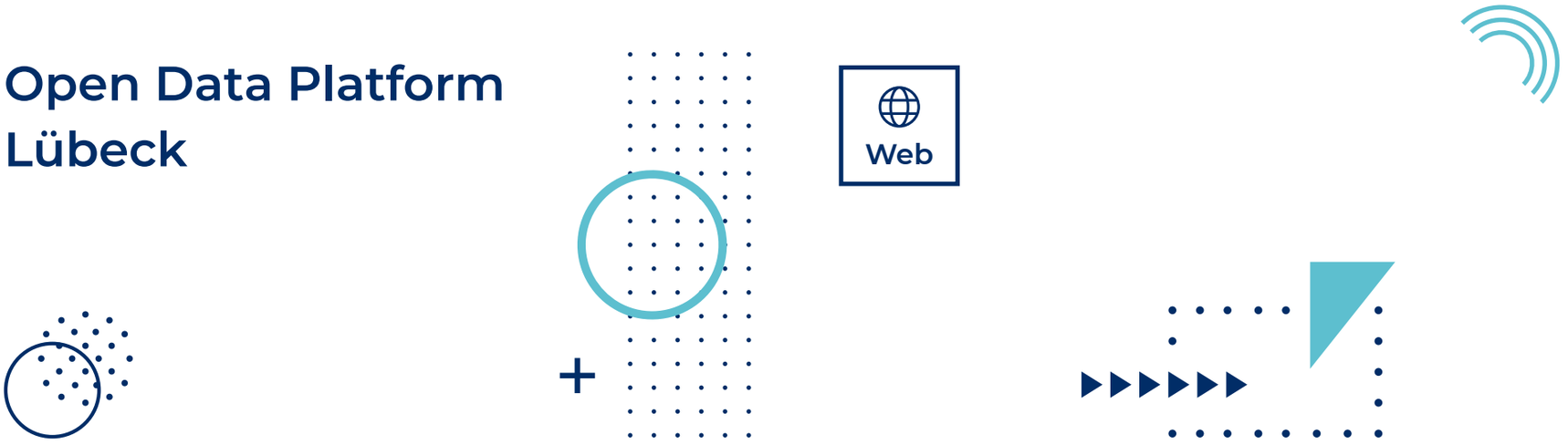
City of Lübeck

Lübeck is a city in Northern Germany, located at the Baltic Sea. Its 220,000 inhabitants make the city the second biggest city on Germany's baltic coast. It is famous for its UNESCO World Heritage old town.

The Smart City strategy aims to create an intelligently connected city that prioritises the needs of people, but balances them with nature and the environment. It is both technologically advanced, efficient and competitive, as well as resource-conserving, nature-oriented and social. This combination is what makes a Smart City so livable.

The first participatory approaches to urban development serve as a starting point for developing a strategy together with the city's residents. In doing so, the experience at the universities, research and transfer institutions will be used. In this way, a direct, lively exchange between the knowledge carriers at the universities and civil society is created, e.g. through new cooperation concepts such as Campus Lübeck, co-working spaces, innovation hubs and much more.

Open Data Platform Lübeck

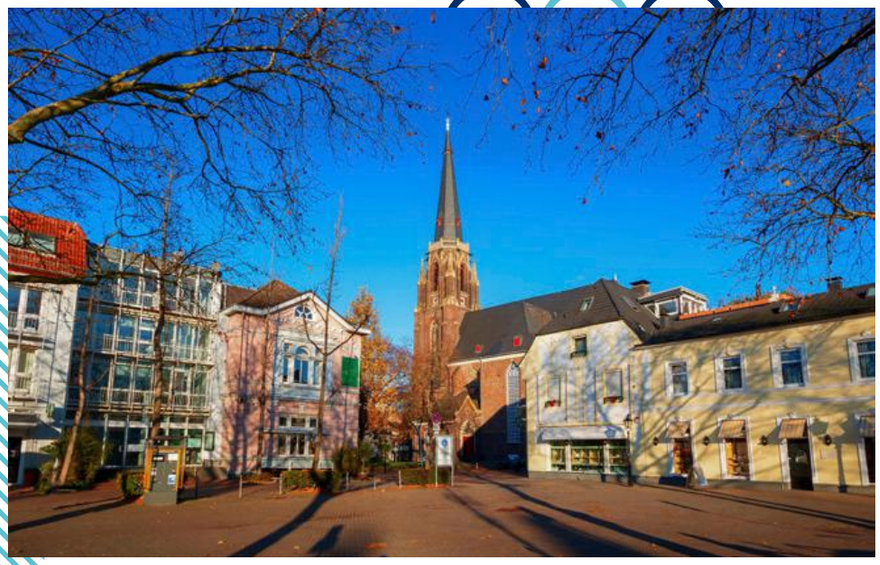


FIWARE Member Travekom developed an Open Data Platform based on FIWARE technology to lift the developed Smart City Strategy off the ground. The growing availability of Big Data, cloud solutions and internet-enabled devices makes it possible to offer so-called smart solutions, i.e. custom-fit data-driven applications for individual use. FIWARE technology sets standards for bringing together existing data from various sources and developing an open-source data model for connected cities and municipalities. Thanks to the unified Smart Data Models and open interfaces, a wide range of smart applications can be developed.

The data sets can be evaluated and made available to users via apps. This applies to statistical data such as population figures or socio-economic figures as well as dynamic data. For example, real-time data from the city can be combined with vehicle data: Driving routes can be linked with flowing traffic and free parking spaces: Mobility becomes more digital and efficient.

Travekom has been testing the FIWARE open data model in combination with their LoRaWAN in a first step in the Hanseatic City of Lübeck.

City of Moers



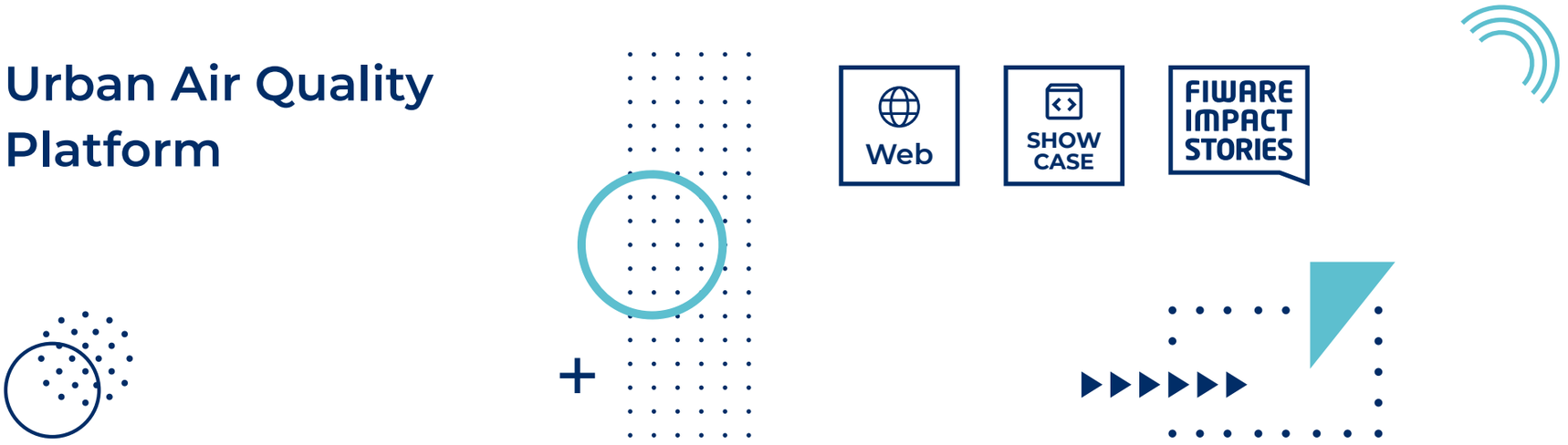
Moers is a German city on the western bank of the Rhine, close to Duisburg and the border to Benelux. Belonging to the district of Wesel in the German state of North-Rhine Westphalia, the city is home to over 100,000 people.

The former earldom of Moers is famous for an exciting history of over 700 years. Its citizens are proud of this diverse cultural landscape and its numerous offers for vibrant shopping and areas to relax. The castle is situated in the heart of the city centre and has evolved to be a museum and theatre today.

Despite or even because of its historical background and development over the last centuries including being part of different states, Moers wants to keep the development going and is aiming to become a Smart City for the benefit of its citizens.

The Smart City strategy includes a collaboration on digital transformation with the neighbour city Neukirchen-Vluyn, for a city-wide LoRaWAN-Network and an Air-Monitoring-Platform.

Urban Air Quality Platform



The Air-Quality-Monitoring platform was set up by FIWARE's Gold Member Breeze Technologies. Breeze Technologies' air quality sensors measure every 30 seconds the most common air pollutants and climate indicators (Temperature, Humidity, CO, CO2, PM2.5, PM10, NO, NO2, SO2, NH3, VOCs, O3). Data can be transmitted to the Breeze Environmental Analytics Cloud through various wireless standards, including WiFi, LTE and LoRaWAN.

Sensor data is checked, filtered and calibrated in real-time to increase data quality and accuracy. The calibration works on the basis of a neural network, including more than 30 different dimensions in correcting the data, e.g. for sensor drift and influences of temperature and humidity.

The Environmental Intelligence Cloud helps Breeze's customers to interpret historic and real-time sensor data even without extensive knowledge in environmental sciences while data is aggregated understandably. The platform offers insights into which situations are critical and need to be surveyed more extensively.

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.

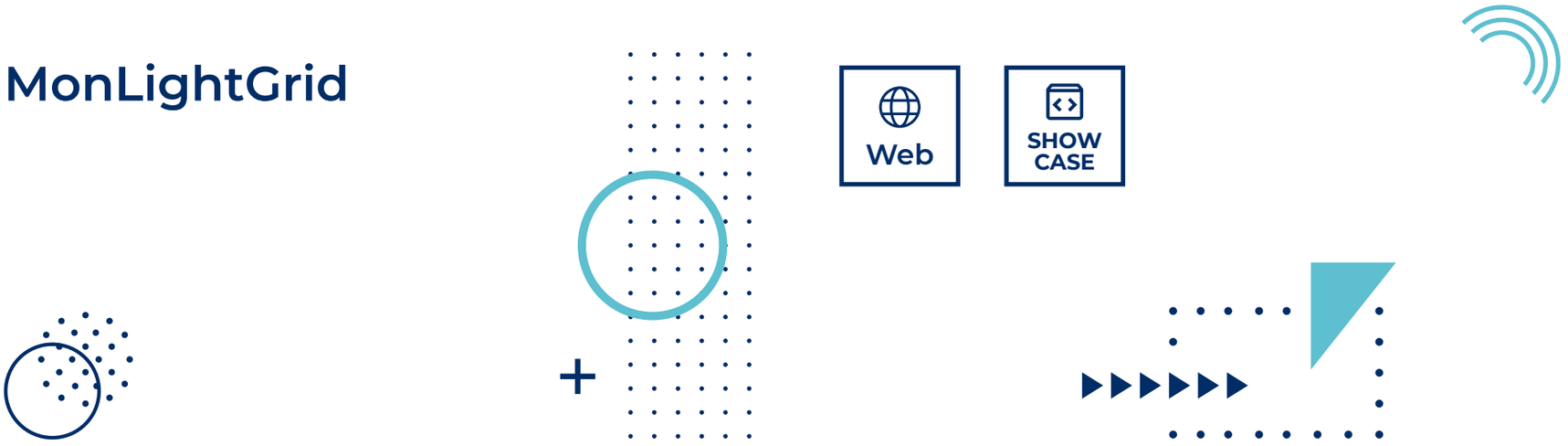
One of the city's goals is to improve the quality of life and the attractiveness of the city and it is, therefore, well on its way to implementing several new projects related to autonomous buses, digital bike rental, car sharing, and a digital citizen account, as well as Smart Metering, Smart Parking 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 trusts 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 CO_2 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.

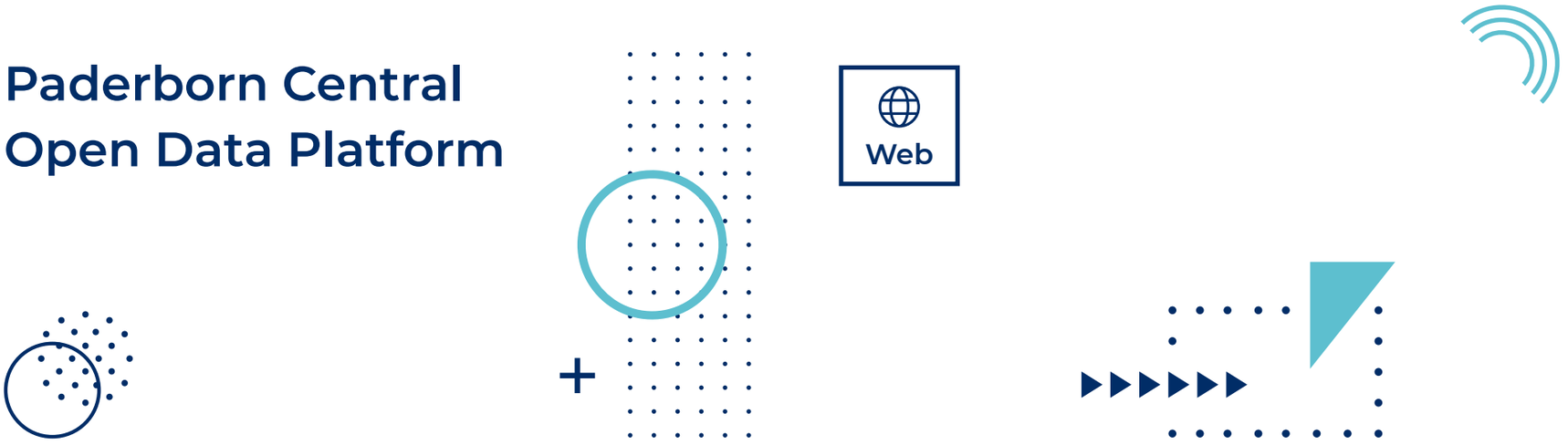
City of Paderborn

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.

Being a FIWARE Foundation member, Paderborn lays the cornerstone of an innovative Smart City architecture for open data, from which other cities already benefit, on a license-charge-free basis. The documentation and Open Data Platform elements can be found on Github.

Paderborn Central Open Data Platform

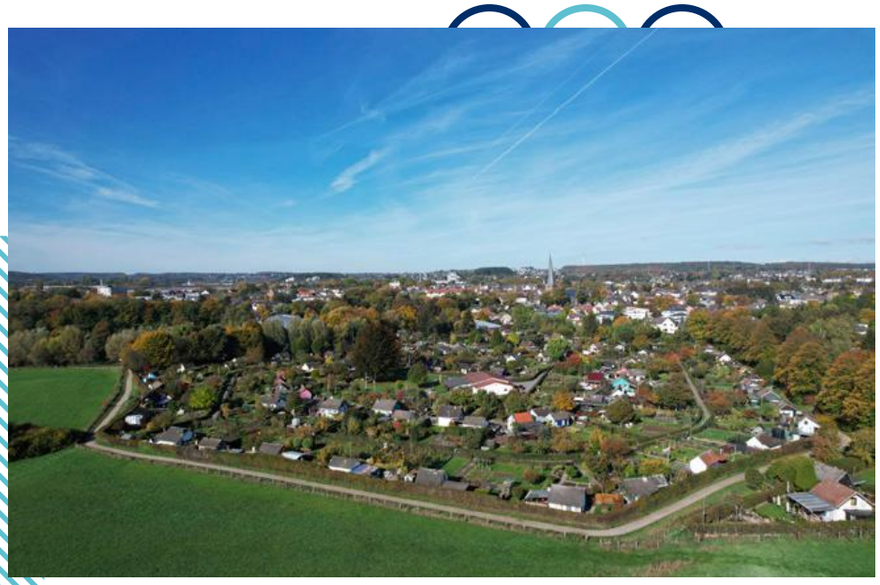


The FIWARE framework forms the core of the platform, providing features such as context and data management. Paderborn's open data platform uses Open Source components from the FIWARE catalogue with the Orion Context Broker at the heart of it.

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 Schwerte



Schwerte, a town in North Rhine-Westphalia, has a population of around 46,000 and is located on the edge of the Ruhr region. The town is characterised by its combination of urban life and natural surroundings.The historic old town in particular, with its half-timbered houses and lively (club) culture, makes Schwerte an attractive place to live.

Thanks to Schwerte's location between the conurbations of the Ruhr region and the local recreational areas in South Westphalia, Schwerte is interesting for both commuters and nature lovers. With the Smart City Strategy DOS2030, the city of Schwerte is pursuing a clear vision for the future. This strategy uses digital technologies to improve the quality of life and shape sustainable urban development. Important projects include the expansion of digital infrastructure, intelligent traffic management and the promotion of digital culture.

The focus here is on the development of an urban data platform for linking and visualisation of data. In addition, the participation of citizens is facilitated by digital platforms. In this way, the city of Schwerte is positioning itself as a future-oriented, sustainable, liveable and social city.

STADT SCHWERTE
Hansestadt an der Ruhr

City strategy official website

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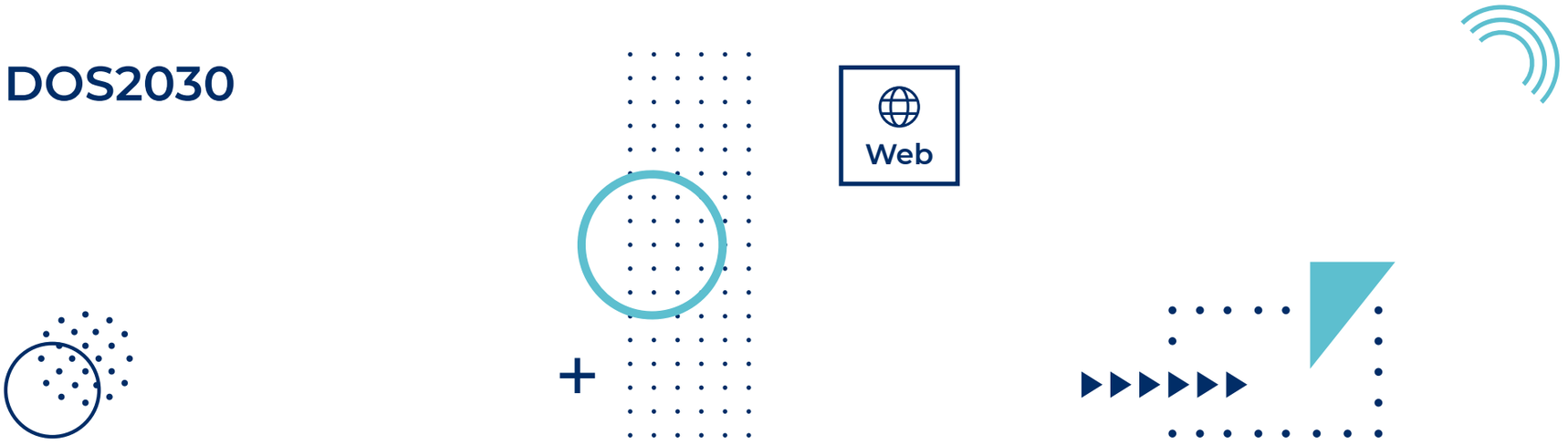
DOS2030



Data platform: The city of Schwerte operates an urban data platform that is based on FIWARE technology and serves as a central hub for collecting and analysing urban data. This platform integrates data from various sources, such as IoT sensors and weather stations, and enables their real-time evaluation.

FIWARE offers the necessary flexibility and interoperability to link different applications and services. This enables seamless integration with other systems and promotes the development of innovative smart city solutions in Schwerte. Digital twins of public buildings: The city of Schwerte uses terrestrial 3D LIDAR scanners to create digital twins of public buildings. These digital models are essential for the planning and maintenance of urban infrastructure.

Environmental, traffic and safety sensors:The city of Schwerte has implemented a network of sensors that collect data on air quality, traffic density and safety. This data is integrated into a FIWARE-based urban data platform to support evidence-based decision-making.

Province of South Westphalia

South Westphalia is the industrial heart of North Rhine-Westphalia.

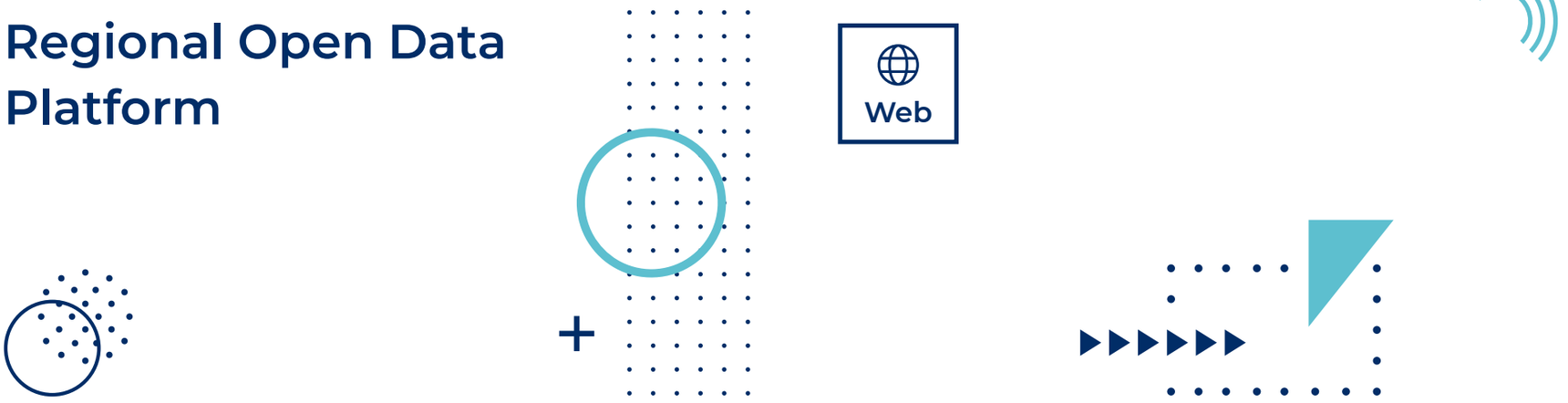
The region consists of the five districts of Soest, Olpe, Siegen-Wittgenstein, Märkischer Kreis and Hochsauerlandkreis, with over 1,4 million inhabitants spanning over 900 villages in 59 municipalities. Within the region, a cooperation of the cities Arnsberg, Bad Berleburg, Menden, Olpe and Soest along with the Südwestfalen Agentur anticipates implementing the region's first Smart Cities in a pilot project promoted by the Federal Ministry for Housing, Urban Development and Building.

In 2020, the cooperation published the "Smart Cities Framework Strategy for South Westphalia", a brief document in which the five cities define the term and its objectives valid for a whole region. Among several measures, the cities committed on creating a shared open data platform to unite work forces and to prevent isolation of key technologies. Setting common grounds enables the whole region to contribute to innovation and to benefit from an open-source use case pool. The project pays special attention to enabling benefits also in rural areas which face different challenges than urban centres.

Südwestfalen
ALLES ECHT!

City strategy official website

Regional Open Data Platform



The five cooperation partners are developing a FIWARE-based platform as a basic infrastructure for the whole region with 59 cities. It will act as an enabler for 50+ smart city projects which are planned in the five cities' strategies. Starting with an open data portal, further use cases will cover multimodal mobility services, micro-climate data from private households as well as energy-optimizations in municipal buildings.

An innovative aspect of the platform is its "5+1" tenants. Based on an IT architecture from FIWARE partners Paderborn and Berlin, South-Westphalia will set up one tenant per city.

In addition, one overarching ("+1") tenant will be able to receive data from the five cities and aggregate it on a regional level. By this approach, citizens do not only benefit from innovative use cases, but also from a regional use case pool and seamless data transfers between the partnering cities. The platform will grow stepwise until 2026 with the clear aim to multiply to all 59 cities in the region.

City of Steinheim

The small town of Steinheim Westphalia is a city in the German state of North Rhine-Westphalia and belongs to the district of Höxter. Steinheim is located in the region of East Westphalia-Lippe, in which the three major cities, Bielefeld, Paderborn, and Gütersloh are located. Overall, the region around Steinheim is very rural and is characterised by a lot of agriculture and natural areas. With about 13,000 inhabitants and a population density of about 166 people per square kilometre, Steinheim is the most densely populated municipality in the district of Höxter after the city of Höxter itself. It is also an important, central point for the surrounding communities and villages.

The most important waterway in the area is the Emmer River, which is dammed in the city of Schieder to form a natural reservoir, called Schiederstausee. Unfortunately, Steinheim is particularly affected by flood events. Both the Emmer River, which runs right through the centre of town, and many smaller inflows, such as the Heubach River, have been known to flood. For this reason, an area-wide sensor network was installed along the Emmer and Heubach River to monitor the water levels.

Stadt Steinheim Westfalen

City strategy official website

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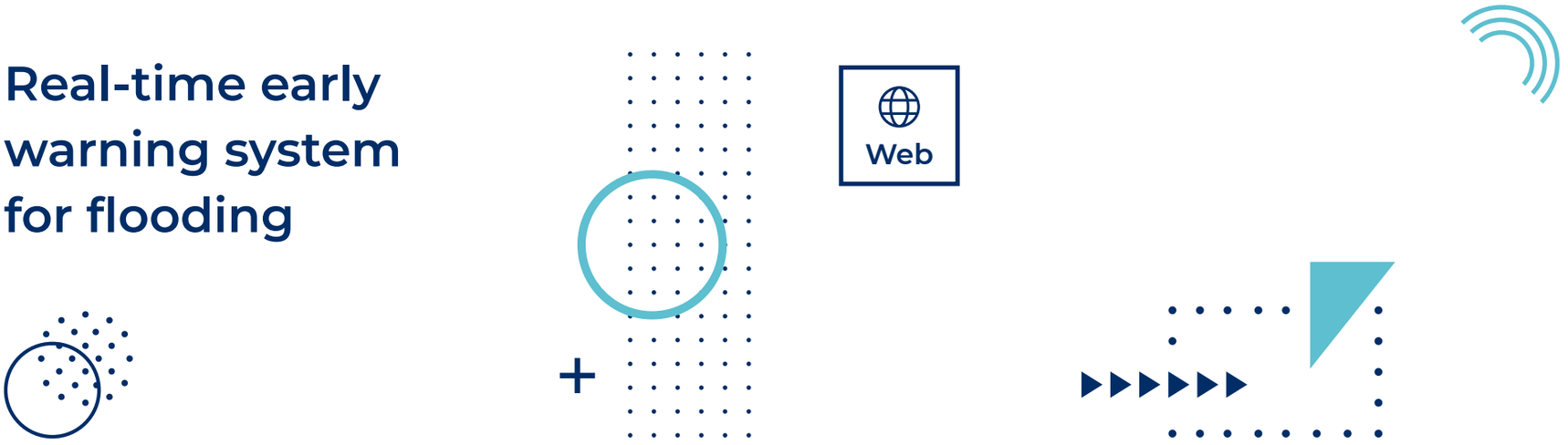
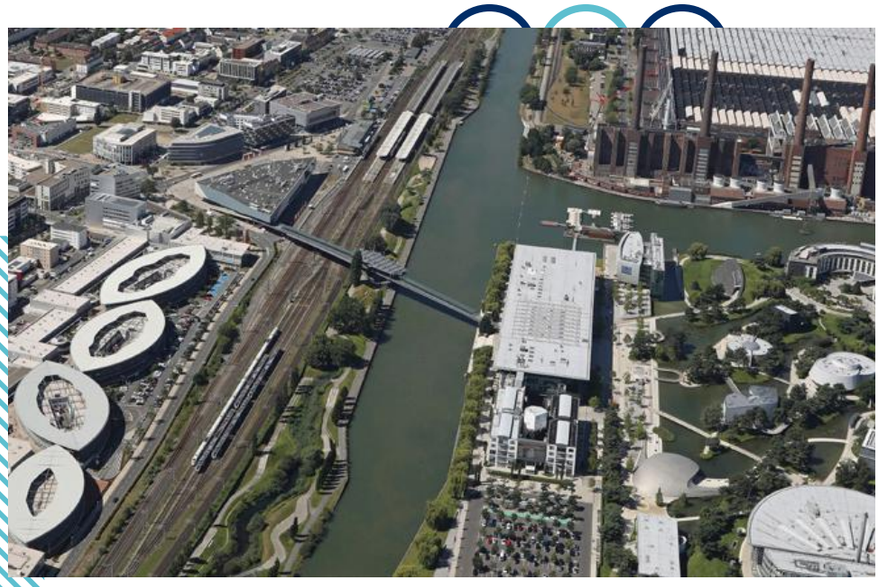
Real-time early warning system for flooding



The Internet of Things, and artificial intelligence, offer an interesting opportunity for the development of a real-time early warning system. For this purpose, water level sensors were installed at selected locations along the Emmer River in Steinheim at various bridges. Their measurement data is transmitted via gateways using the LoRaWAN standard to a server at the Fraunhofer Institute in Lemgo for evaluation. Once there, the storage, processing, and web-based visualisation of the data takes place via a dashboard on the urban data platform FIWARE. The development of this solution was carried out in cooperation with partners from the city of Steinheim, the energy service Westfalen Weser Netz, and Fraunhofer Institute in Lemgo.

As a first step the data will be used to set up an information system to monitor water levels.In the second step, the data will be analysed to identify causal relationships. The last step includes the setup of the early warning system, in which the knowledge gained from the first steps and AI-based forecasts will be used to integrate warning functions into the system.

City of Wolfsburg



The aim of #WolfsburgDigital, a joint initiative of the city of Wolfsburg and the Volkswagen Group, 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.

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, including environmental and weather data, mobility and traffic data, budget data, and even minutes from public meetings. All this data is consumed by the Orion Context Broker and the IoT Agent for its LoRaWAN technology. Together, they make up the two most important services of the platform. 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.

Web

WOBApp

To use the Open Data Platform effectively, the WOBApp 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.

Its purpose is to be the interface between the city, citizens, private companies, and the region. Some examples include Smart Waste collection (citizens have an overview of the waste management for their own address), Smart Parking, and Smart Mobility (ie. charging stations, and the user is, for instance, able to get informed about bus arrival times). Wolfsburg is constantly building and realizing new use cases, using its infrastructure layer as planned.

Web

City of Athens

Athens is the capital and largest city of Greece located on the Southern Mediterranean coastline of the country. It is one of the oldest cities in the world and is a cultural and economic center of South Eastern Europe. The city is home to 670,000 people with the metropolitan area even counting roughly 3 million inhabitants.

The most important economic sectors are finance and tourism with the port of Piraeus being Europe's largest and the world's second largest passenger port. Athens wants to combine its ancient history with innovation and become a truly smart city.

Its Smart City Strategy puts the citizen at heart and aims to improve the life of everyone by making life and administration easier, faster and more reliable.

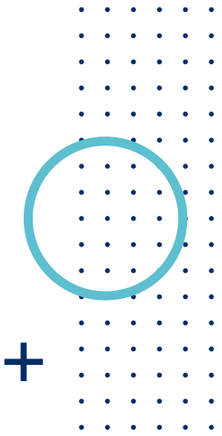
The city drives its digital transformation constantly through the introduction of web services like apps for tourists and citizens as well as the improvement of its own digital infrastructure.

Another important goal of the strategy is to make the city more inclusive, giving people with special needs the possibility to equally enjoy the city.

CITY OF ATHENS

City strategy official website

SaMMY



Tourism is the biggest economic sector in the region of Athens. Besides the various ancient sites of Athens, yachting counts for a big part of tourism.

SaMMY's advanced technologies transform a common marina into a 'Smart Marina'.

A multi-purpose sensor grid consisting of waterproof wireless sensors is enrolled to feed a central system and provide booking, meteorological and environmental information. These services are facilitated through the installation of different types of sensors, such as ultrasound, meteorological, water quality, and wave measurement, which collect data and monitor the conditions within the Marina in real-time.

SaMMY has been designed to cope with all the aforementioned problems through an innovative digital platform. The marina facilities and the berth spaces are visually managed, map represented and allow the end-users (skippers or yacht owners) to book a space for a specific period, according to the available berth spaces of the marina. The system also provides information about the marina regulations, the pricing policy and the amenities offered by the marina.

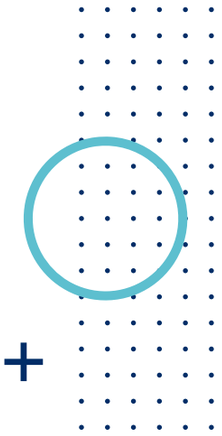
Island of Naxos

The island of Naxos is the largest in the Cyclades island complex. It is home to 22,000 year-round residents and welcomes more than 130,000 tourists during the summer.

The island experiences many of the challenges faced by other Greek islands. The limited transportation options to Chora, the island's main settlement, presents problems such as limited access to health services. Additionally, the island's other infrastructure, like its road network, local marina, parking lots, water supply, waste management, and power generation, can struggle to meet demands, especially during the summer. The geography of Naxos and Small Cyclades—a cluster of four small islands—is the ideal location for experimenting with technological solutions that entail transferring goods over the sea.

Greece has set ambitious targets and is moving fast with its digital transformation. With projects such as Smart Island, AWS seeks to be part of the major effort that is underway, providing tools and solutions for the digital transformation of the state, its cities, and its enterprises both large and small in the years to come.

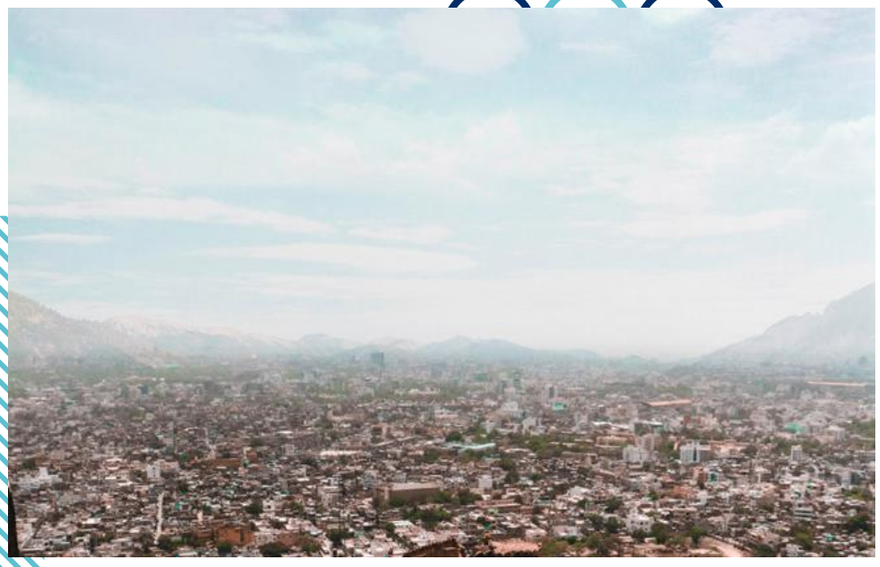
Smart Island solutions



Smart Island runs on the AWS cloud, and introduces solutions for mobility, primary healthcare, and transport of goods by 'smartening' existing infrastructure. The project's solutions have been developed based on four pillars: sustainability, telehealth, leisure, and digital skills. Initiatives being explored under these pillars include: Solutions 'smartening' existing infrastructure, such as the Naxos marina, using advanced IoT technologies and sensors that make infrastructure more resilient, efficient, and environmentally friendly. Solutions for mobility, such as smart taxi payments, smart parking sensors, and electric vehicle chargers. Vessel monitoring and reporting from a coastline tower. Solutions for primary healthcare, such as blood sample and medical supplies transfer and a telemedicine service. Tailored digital training for public officials, civil servants, and residents. An online booking system for citizen services The Naxos Smart Island project will be built around the AWS Smart Territory Framework, which combines AWS services with the global industry standards and open source offerings of the FIWARE ecosystem. This will maximise benefits for the citizens of Naxos by allowing non-personally identifiable information (PII) data to be securely and simply shared between government departments and external organisations.

INDIA

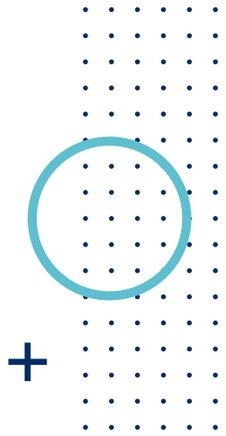
India with 50 cities



India Urban Data Exchange (IUDX) is a transformative initiative by India's Ministry of Housing and Urban Affairs to provide a data exchange platform for Indian cities. IUDX has been proposing this platform to more than 4,000 Indian smart cities and towns, allowing them to take control of their data resources, improve their governments, and create new sources of revenue. IUDX aims to roll-out this platform across the country, and has already partnered with the following 50 cities to create compelling use cases that will benefit cities and citizens alike: **Agartala, Agra, Ahmedabad, Aurangabad, Bareilly, Bengaluru, Belagavi, Bhopal, Bhubaneswar, Bilaspur, Chandigarh, Chennai, Coimbatore, Dahod, Davanagere, Dehradun, Dharamshala, Faridabad, Gandhinagar, Gwalior, Hyderabad, Jaipur, Jammu, Kalyan-Dombivli, Kannur, Kanpur, Karimnagar, Kohima, Lucknow, Nagpur, Namchi, New Town Kolkata, Pasighat, Pimpi Chinchwad, Prayagraj, Pune, Raipur, Rajkot, Ranchi, Sagar, Satna, Shimla, Sranagar, Surat, Thiruvananthapuram, Thoothukudi, Tumakuru, Vadodara, Varanasi, Visakhapatnam.**

14th of these cities and their use cases are described in detail in this book.

IUDX (Indian Urban Data Exchange)



IUDX is an open source software platform that facilitates secure and authenticated data exchange amongst various data platforms, third-party applications, data producers, and consumers. The platform has already been scaled up across 33 cities, and is planned to grow nationally in a uniform and seamless manner. The platform provides data owners with full control over what data to expose and to whom. Built-in accounting mechanisms enable it to connect with payment gateways, forming the foundation for a data marketplace. IUDX was developed using FIWARE technology, and is developer-friendly, with open API definitions and data schema templates (formats for interpreting data) that enable the creation of a whole new application ecosystem.

IUDX serves as a seamless interface for data providers and users, including ULBs, to share, request, and access datasets related to cities, urban governance, and urban service delivery.

City of Agartala

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.

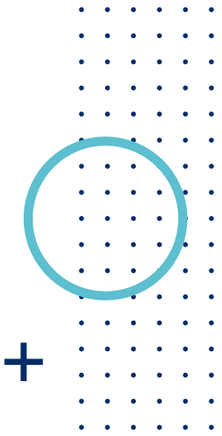
The solution was to initially focus on major 100+ cities, with Agartala among the cities shortlisted in India's Smart Cities Mission.

To successfully catapult the mission to the next stage of innovation, India 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 – to be rolled out to 100+ major cities between 2021 and 2023.

Agartala is the capital city of the Indian state of Tripura, and is one of the largest cities in Northeast India and the seat of the Government of Tripura. Agartala is India's third international internet gateway after the ones in Mumbai and Chennai.

Its Smart City projects focus on an Integrated Control and Command Center and a Vehicular Monitoring System.

IUDX
India Urban Data Exchange Platform



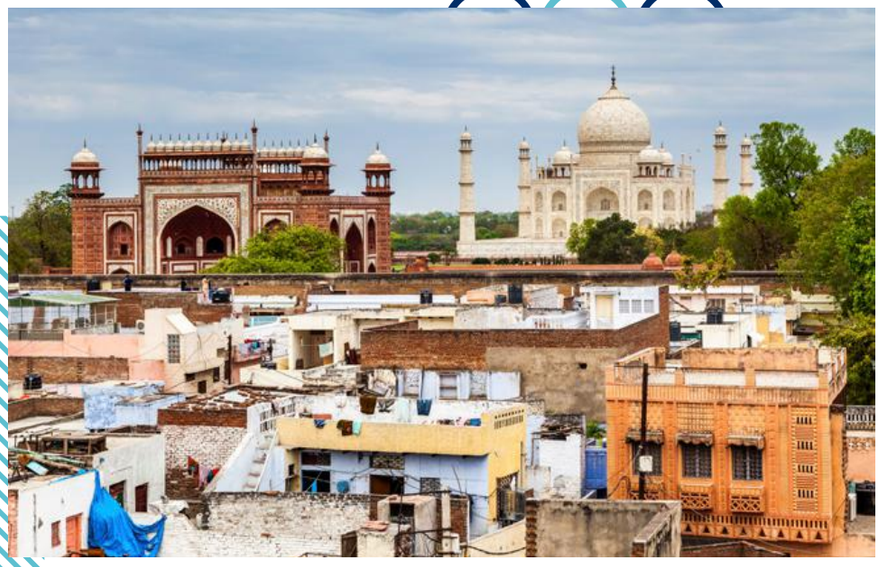
Created in partnership with the Indian Institute of Science, the IUDX platform's goal is to facilitate a secure, authenticated and managed sharing of data amongst various data platforms thereby helping cities to better focus on unlocking their urban data and ultimately, generate new revenue sources and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

The platform is developer friendly, thanks to its definitions of open APIs (Application Program Interfaces) and data schema templates (formats for interpreting data), so that new application ecosystems can flourish.

Agartala is one out of more than 100 major Indian cities adapting the IUDX platform by 2023 and one out of ten that are already up and running since mid 2021.

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, but also ensure interoperability between cities.

City of Agra

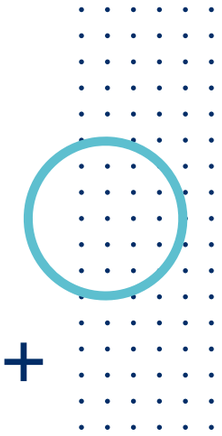


Agra is a city on the banks of the Yamuna river in the Indian state of Uttar Pradesh, about 210 kilometres south of the national capital New Delhi and 335 km west of the state capital Lucknow. With a population of roughly 1,6 million, Agra is the fourth-most populous city in Uttar Pradesh and twenty-third most populous city in India.

Its notable historical period began during Sikandar Lodi's reign, but the golden age of the city began with the Mughals. Agra was the foremost city of the Indian subcontinent and the capital of the Mughal Empire. Under Mughal rule, Agra became a centre for learning, arts, commerce, and religion, and saw the construction of the Agra Fort, Sikandra and Agra's most prized monument, the Taj Mahal, built by Shah Jahan as a mausoleum for his favourite empress.

Due to its rich history, the city aims to develop the city further on and form a Smart City. The city's Smart City vision is based on the aspirations of its people and the analytical assessment of strength, weaknesses, opportunities and threats for the city and aims to create a tourist-friendly, livable, and sustainable city for everyone.

IUDX
India Urban Data Exchange Platform



With its Smart Cities Mission, India started working on a strategy to revitalise 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.

Agra was selected as Smart City in September 2016 in the third round of the Smart Cities Challenge. Following this, a special purpose vehicle (SPV), Agra Smart City limited, was set up under the Companies Act to implement the development work at city level. The SPV is headed by the divisional Commissioner and will plan, approve, implement, manage, monitor and evaluate Smart City-related projects.

The Indian Urban Data Exchange Platform is an Open Data platform with the goal 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 first data sets provided within the platform circle around tourist attractions, traffic data and a GIS data set.

City of Bengaluru

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 initially focus on 100+ cities, with Bengaluru 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 – to be rolled out to 100+ major cities between 2021 and 2023.

Bengaluru, officially known as Bengaluru, is the capital and largest city of the Indian state of Karnataka. It has a population of over 8 million inhabitants with more than 11 million people living in the greater area of the city.

Its Smart City Strategy is built around on four different aspects: Citizens and Stakeholders, Environmental Responsibility, Safety Awareness and Employee Inclusiveness.

IUDX
India Urban Data Exchange Platform

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Bengaluru is one out of more than 100 major Indian cities adapting the IUDX platform by 2023 and one out of ten that are already up and running since mid 2021 to improve city safety and night travel.

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, but also ensure interoperability between cities.

City of Bhopal

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 initially focus on 100+ cities, with Bhopal among the cities shortlisted in India's Smart Cities Mission.

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Bhopal is the capital city of the Indian state of Madhya Pradesh. It has a population of roughly 2 million inhabitants and considered to be one of Indua's greenest cities.

Its Smart City Strategy focusses on four different aspects: Transport and Mobility, Heritage and History, Solid Waste Management and Smart Health.

IUDX
India Urban Data Exchange Platform

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City of Bhubaneswar

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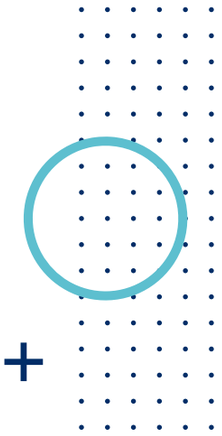
Bhubaneswar or Bhubaneshwar is the capital and largest city of the Indian state of Odisha. It has a population of roughly 840,000 inhabitants. Because of the more than 700 temples that used to stand here, the city is often referred to as "Temple City".

Its Smart City Strategy aims for more through less resources and aims for a citizen centered, more sustainable city impacting diverse parts of the citizen's life.

IUDX
India Urban Data Exchange Platform



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City of Chennai

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 initially focus on 100+ cities, with Chennai 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 – to be rolled out to 100+ major cities between 2021 and 2023.

Chennai, also known as Madras, is the largest cultural, economic and educational centre of South India. With a population of roughly 9 million inhabitants, the city of Chennai is the sixth largest city in India.

Its Smart City Strategy aims to make the city greener through Smart Environment, Smart Mobility, Smart Transportation solutions as well as Smart Technologies, and more sustainable through Smart Energy and Smart Water strategies.

IUDX
India Urban Data Exchange Platform

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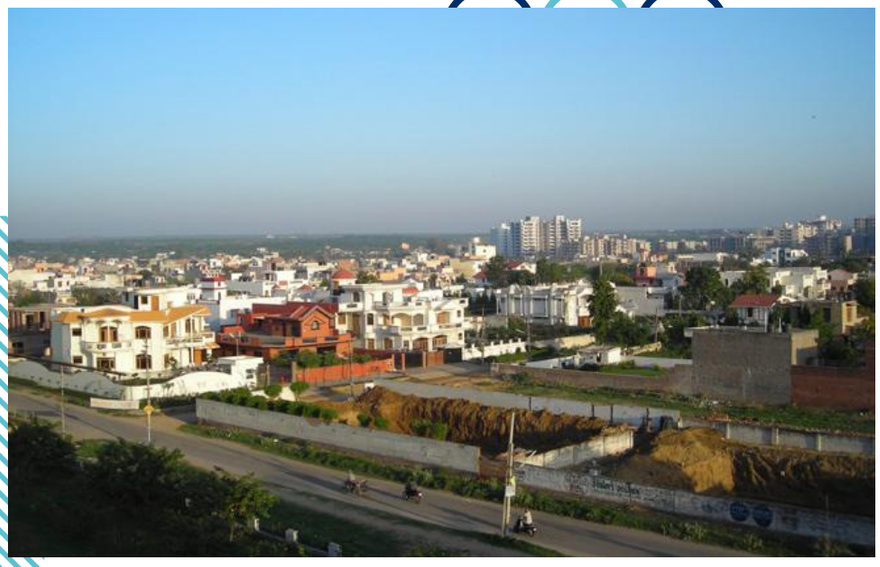
City of Faridabad



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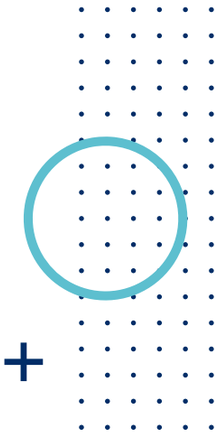
Faridabad is the most populous city in the Indian state of Haryana and is one of the major satellite cities of Delhi. Its Smart City Strategy aims to work on five major challenges: Promotion of eco-friendly Mobility, revival of open Green Spaces, reducing road congestion, a safer city, and a Smart and Sustainable Infrastructure.

IUDX
India Urban Data Exchange Platform



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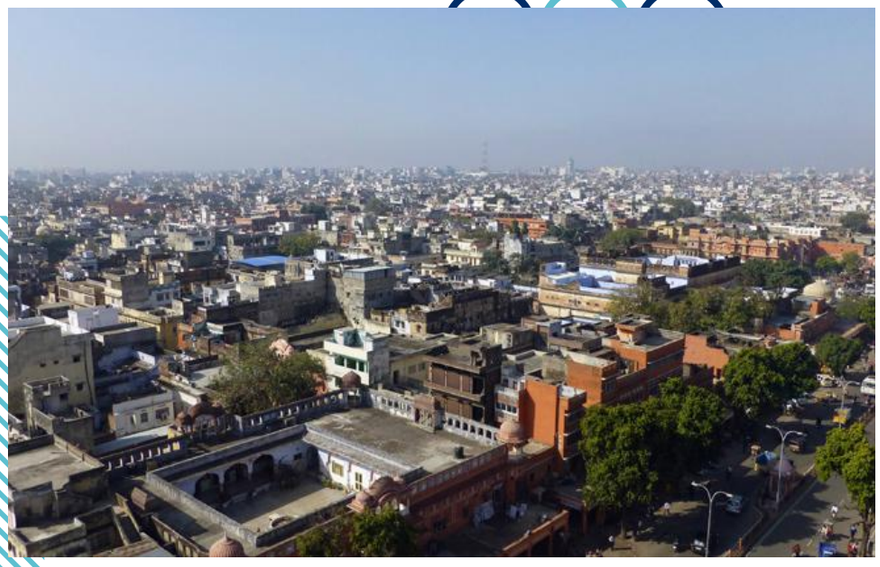
City of Jaipur

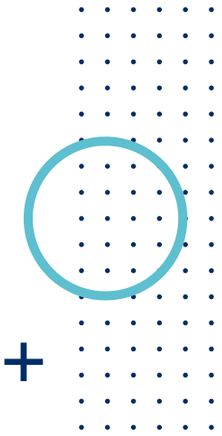


Jaipur, formerly Jeypore, is the capital and largest city of the Indian state of Rajasthan. As of 2011, the city had a population of 3,1 million, making it the tenth most populous city in the country. Jaipur is also known as the Pink City, due to the dominant colour scheme of its buildings. It is also known as the Paris of India. After independence in 1947, Jaipur was made the capital of the newly formed state of Rajasthan.

Jaipur is a popular tourist destination in India and forms a part of the Golden Triangle tourist circuit along with Delhi and Agra. On 6 July 2019, UNESCO World Heritage Committee inscribed Jaipur the “Pink City of India” among its World Heritage Sites. The city is also home to the UNESCO World Heritage Sites Amer Fort and Jantar Mantar.

The Smart City strategy of Jaipur aspires to leverage its heritage and tourism, through innovative and inclusive solutions, to enhance the quality of life. To do so the city has started several projects and platform implementations in the areas of Air Quality Monitoring, online citizen services and Open Data Portals.

IUDX
India Urban Data Exchange Platform



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The Smart City of Jaipur published their own Open Data Platform in the beginning of 2022 and already implemented two Data Sets available to all citizens to improve the transparency of the government's decisions. One data set is about tourist activities and sightseeing opportunities and the other one shows the water level of several manholes across the city, which allows the city to maintain the water and canalisation systems in a more effective way.

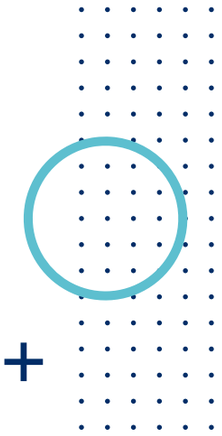
City of Kohima

Kohima is the capital city of India's north eastern state of Nagaland. With a resident population of almost 100,000, it is the second largest city in the state. Originally known as Kewhira, Kohima was founded in 1878 when the British Empire established its headquarters in the then Naga Hills.

It officially became the capital after the state of Nagaland was inaugurated in 1963. It has a very pleasant climate which is surrounded by scenic mountains ideal for tourists with all the major trekking destinations which are all easily accessible from Kohima. With its Smart Cities Mission, India started working on a strategy to revitalise 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+ cities. The solution was to initially focus on 100+ cities, with Kohima among the cities shortlisted in India's Smart Cities Mission.

Kohima's vision of a Smart City is "to leverage Kohima's geo-strategic location to foster sustainable and resilient community-led development as a regional hub for tourism & transit complemented by its significant natural and cultural assets".

IUDX
India Urban Data Exchange Platform



The Open Data Platform "Indian Urban Data Exchange Platform" is based on FIWARE's NGSI-LD format and uses the de-facto standardised data models developed in the Smart Data Models program led by FIWARE, IUDX, tmforum and OASC. It was developed in a 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 first data set available in the city of Kohima is a data set to make tourist attractions publicly available to all citizens and tourists. Other Smart City projects that are supposed to feed data into the Open Data platform include Smart Parking, Public WiFi, and the Kohima Integrated Command and Control Centre (KICCC). The KICCC with smart solutions is a pan-city IoE (Internet of Everything), AI (Artificial Intelligence) and IoT (Internet of Things) technology platform for Kohima Smart City which will install and manage all smart solutions in the city.

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.

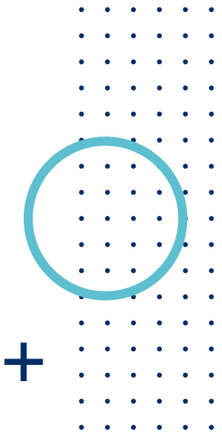
The solution was to initially focus on 100+ cities, with Pune among the cities shortlisted in India's Smart Cities Mission.

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 – to be rolled out to 100+ major cities between 2021 and 2023.

Pune's major goals include the realization of better access to water, an 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 holds a significant role for its economic importance and being an industrial power house.

IUDX
India Urban Data Exchange Platform



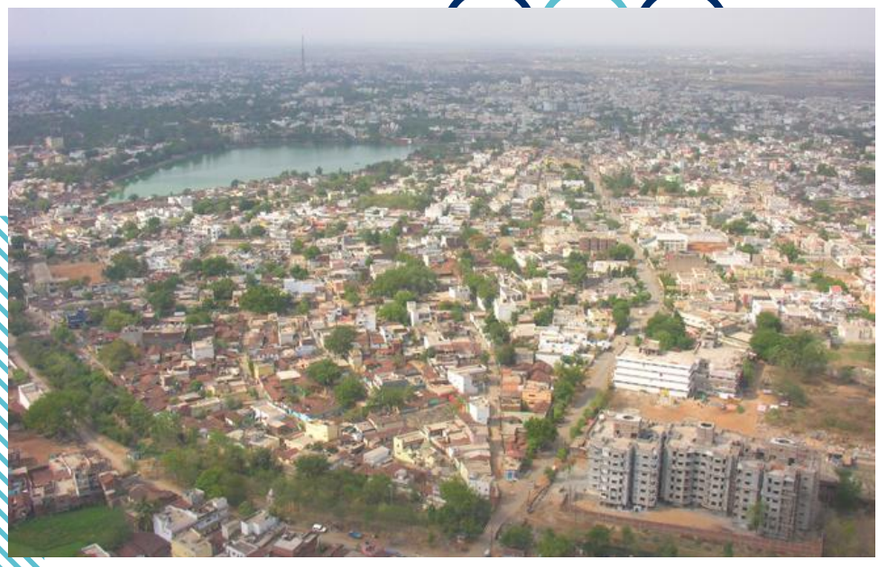
Created in partnership with the Indian Institute of Science, the IUDX platform's goal is to facilitate a secure, authenticated and managed sharing of data amongst various data platforms thereby helping cities to better focus on unlocking their urban data and ultimately, generate new revenue sources and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

The platform is developer friendly, thanks to its 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 out of more than 100 major Indian cities adapting the IUDX platform by 2023 and one out of ten that are already up and running since mid 2021.

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 but also ensure interoperability between cities.

City of Raipur



Raipur is the capital city of the Indian state of Chhattisgarh. Raipur is also the administrative headquarters of Raipur district and the largest city of the state. It was a part of Madhya Pradesh before the state of Chhattisgarh was formed on 1 November 2000. It is a major commercial hub for trade and commerce in the region. It has exponential industrial growth, and has become a major business hub in Central India. The city has a population of 1,2 million inhabitants.

The Smart City Strategy aims to be modern in the use of technology, uphold worthy traditions and core values, and conserve the prevailing man-nature symbiotic culture as well as abundant natural and cultural assets in the region. The citizens will be offered a wide range of living options with equity and dignity. The city wants to be an agent of economic change and social transformation in the state, an efficient engine of growth and prosperity, a servicing hub not only in manufacturing of goods but also in Information Technology and Biotechnology sectors and become a financial centre of the region.

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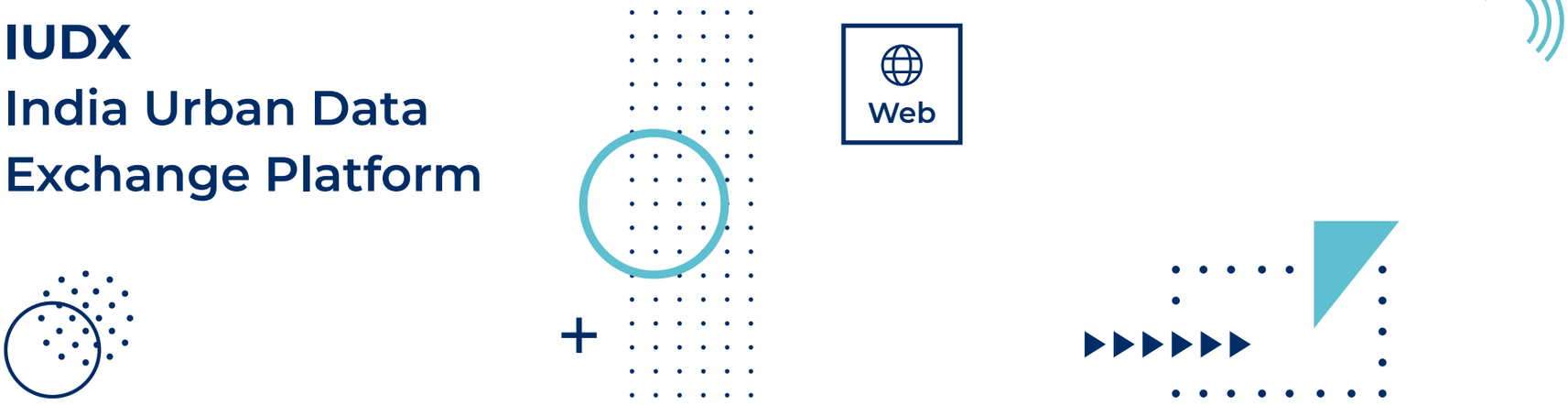

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If the city has an ICCC system, IUDX will integrate with the existing APIs and provide the ability to share data coming from city solutions and also from other private and public sources that are not currently being sent to ICCC. As IUDX integrates solution APIs of multiple vendors, the system will become vendor agnostic and hence no lock-in with the first vendor for renewals. This is possible because of open source and open standards. Access to pre-negotiated relationships with private data providers where privately owned and public data would be needed to solve some of the city's pressing problems. If the city does not have ICCC then IUDX will allow an ICCC app to be created that can provide ICCC function at a dramatically lower cost.

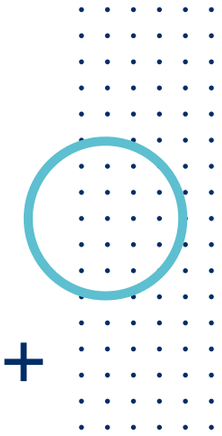
City of Surat

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.

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City of Vadodara

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 initially focus on 100+ cities, with Vadodara 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 – to be rolled out to 100+ major cities between 2021 and 2023.

Vadodara, also known as Baroda, serves as the administrative headquarters of the Vadodara district. It is home to 3,500,000 inhabitants. The city is famous for its cultural heritage and its impressive landmarks. Vadodara's Smart City Strategy aims for enhancing quality of life for the citizens by providing equal access to Best Quality Infrastructure, Social Infrastructure and Mobility through leveraging state of the art technology.

IUDX
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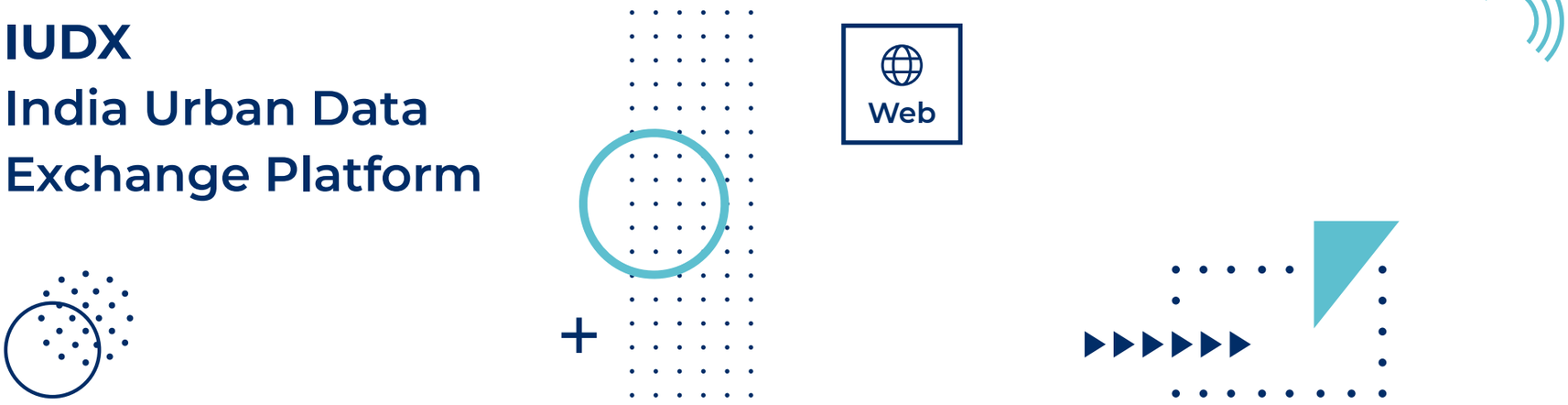

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City of Varanasi

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 pots.

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 ten cities deploying the India Urban Data Exchange (IUDX) in 2021, an Open Source software that uses the FIWARE NGSI-LD specifications.

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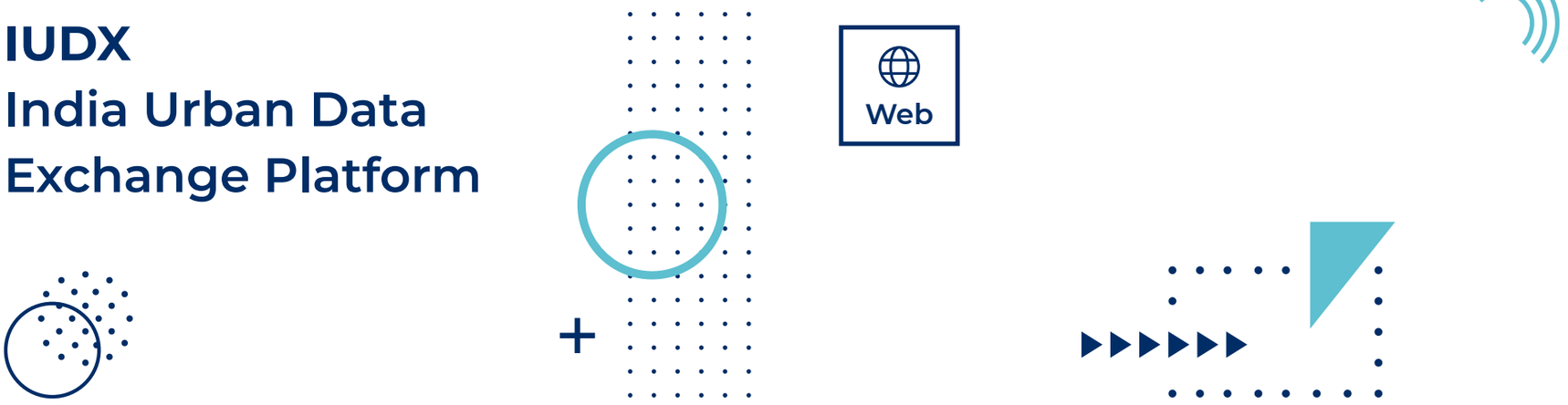

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Having an effective Waste Management strategy has been a key concern for Indian cities, and Varanasi has been at the core of the issue. Using data originated through the IUDX platform, and aided by the city sanitation department, an app has been created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

The app includes an in-built push platform notification system that warns the end-user when their parking subscription is close to an end allowing them to extend it with just 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 vidity 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.

While cities are locations with a high level of accumulated economic activity in a dense urban tissue, the city ofFlorence demonstrates how to efficiently manage urban mobility, deliveringtiming services to their citizens.

A solid transport system is surely one of the main challenges of city managers. Avoiding traffic congestion, long commuting time, and promoting public transport, are just some of the most pressing 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 IF (Info-Mobility Florence) platform (using the CEF Context Broker) 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 most relevant information to Florence's citizens (e.g.: car crashes, important mobility events, and mobility services like e-charger presence and status) in real-time, so that they 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 potential crisis areas even ahead of time.

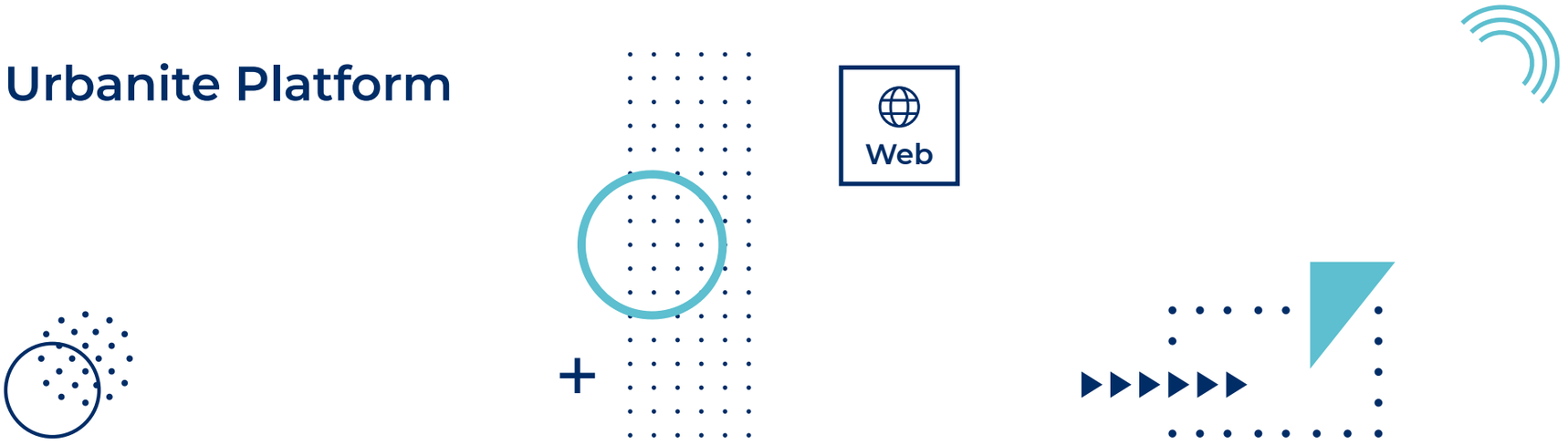
City of Messina

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 alike.

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 to move seamlessly within the city as well as the the wider region. 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.

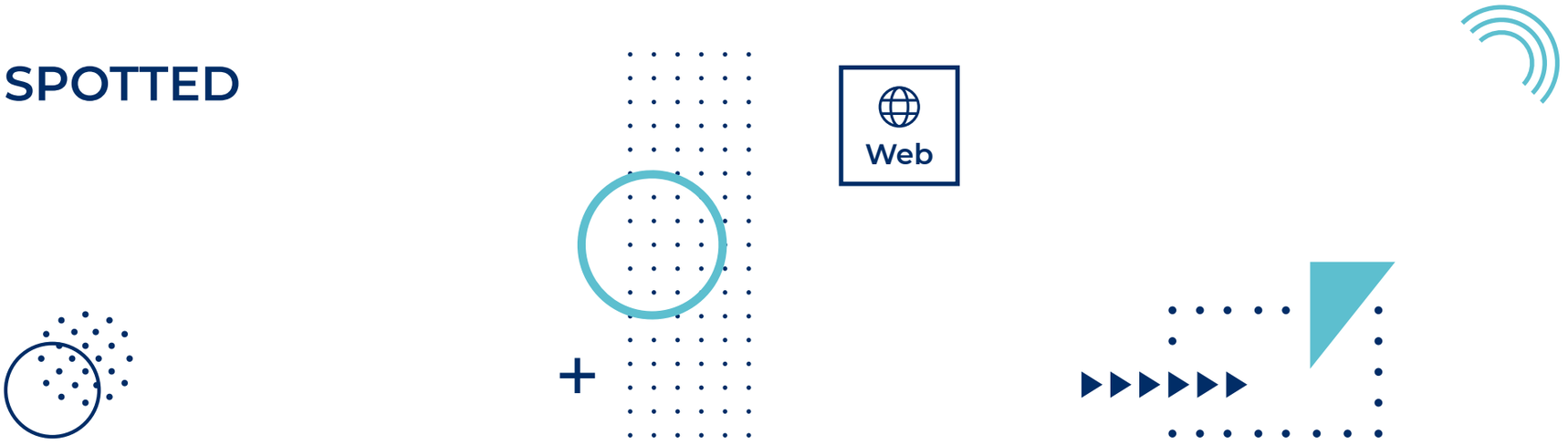
City of Milan

The city of Milan, located in Northern Italy, is the capital of the Lombardy Region and the second largest city in Italy. It has a territory of around 182 km2 and almost 1.4 million inhabitants. It is also located at the centre of an even larger metropolitan area, estimated to be the largest in Italy and one of the largest in the EU.Milan is one of the world's most important commercial and financial hubs.

For Milan, a smart city must not be technology-driven only, but also centred on its citizens. The Milan Smart City comprises smart mobility, a smart environment, smart Inclusion, and smart citizenship. This bold agenda includes the re-orientation of demand for transport services, the standardisation of payment technologies and methods, and the adoption of a range of energy-efficient solutions.

Internationally, Milan has an active role in five major global and European urban networks: C40, 100 Resilient Cities, the Global Covenant of Mayors for Climate & Energy, Eurocities, the Climate KIC and the Urban Mobility KIC.

SPOTTED



SPOTTED aims to provide an innovative solution based on the integration and customised processing of massive Open Data collections, including Earth Observation (EO) data, to monitor and support decision makers in the field of green areas management.

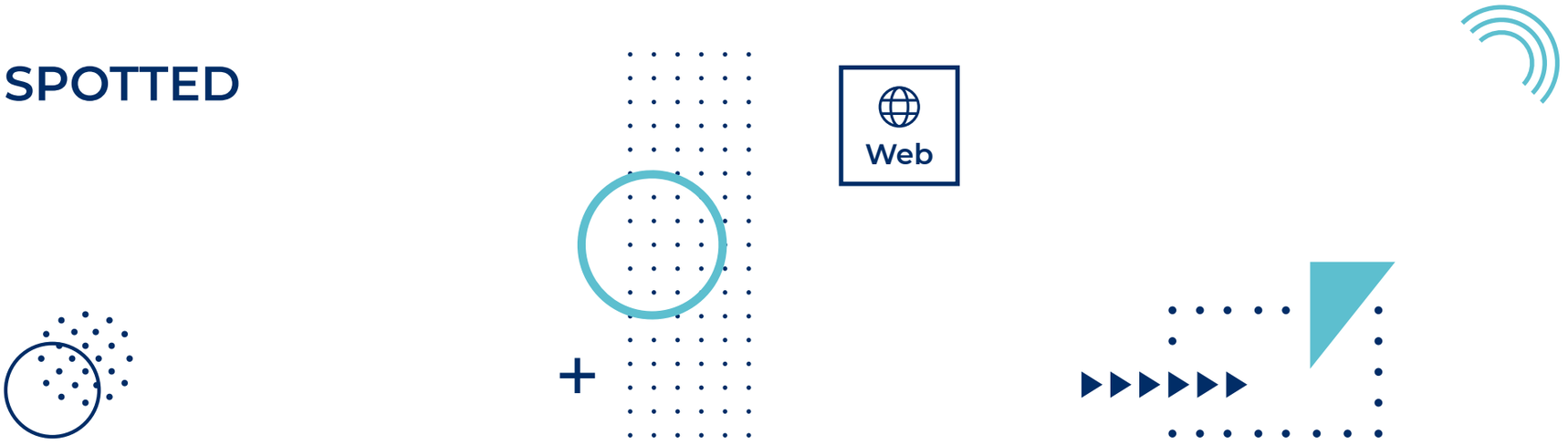
The European Commission under the Connecting Europe Facilities (CEF) has funded Milan's participation in SPOTTED.

This solution will generate innovation and high value creation through the implementation of a pilot in Milan. This pilot will be focused on the monitoring and planning of green areas in the city in relation to different factors like tourism impact, quality of life, and economic growth. With SPOTTED, Milan is developing a data platform to analyse and predict urban, social, and economic impacts of green transformation initiatives. The platform is serving as a practical policy-making asset, as it provides machine learning tools to assess, plan, and develop sustainability programs. Some of these programs include ForestaMI, the Milan building regeneration plan, or the municipal de-sealing action.

City of Naples

Naples is the third largest city by population in Italy, with 921,142 inhabitants. The city is located on the coast of Southern Italy, a territory marked by socioeconomic vulnerability. It is connected to the high-speed railway network and Capodichino International Airport and has 12.4 million yearly transits. The two-thousand-year-old historical centre and its archaeological and architectural stratifications see a constant flow of tourists attracted by a unique mix of cultural assets and a Mediterranean lifestyle. To reinforce the capacity to transform and adapt to challenges, the strategy for an attractive, sustainable city involves actions on the administration's technological environment with tools that can describe the urban environment, manage public space regeneration and assess social impact and equity in resource management. Geospatial data infrastructures offer a knowledge framework on fragile landscapes, human activities, and potential regeneration opportunities. IoT, DT simulation, and organisational innovation support local actors in maintenance and risk prediction for data-driven, effective decisions. Planners and social participation initiatives use technologies to implement the rules that are the impulse for natural capital preservation and regeneration of the urban environment.

SPOTTED



In collaboration with Latitudo 40 and other project partners (Engineering and GisSky), the SPOTTED EU project has developed an innovative urban analytics solution for Naples, Italy. This cutting-edge technology harnesses the power of FIWARE components to provide valuable insights into urban heat wave risks. By leveraging satellite data and advanced algorithms, the solution generates a detailed risk index ranging from 0 to 100, identifying the most vulnerable areas to extreme temperatures. The high spatial resolution of 10 metres enables precise analysis down to individual buildings. City planners can use the data to develop targeted mitigation and adaptation strategies, focusing resources on the most critical areas. Emergency services can better prepare for heat wave-related incidents, while healthcare providers can proactively address the needs of vulnerable populations like children and the elderly. The SPOTTED solution, powered by FIWARE, showcases the potential of smart city technologies to enhance public safety, improve quality of life, and build resilience in the face of climate change. As Naples embraces this innovative approach, it sets an example for other cities interested in creating a sustainable and livable future for their residents.

City of Perugia

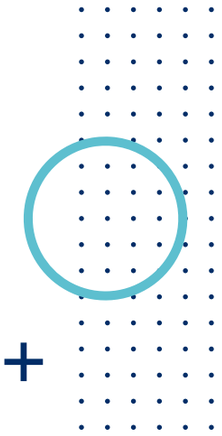
The city of Perugia is the main urban centre of central Italy and capital of the Umbria region. Perugia has a population of around 165,000 inhabitants, a municipal area that extends for about 449 km² with a population density of 363.32 inhabitants / km². A vast territory that requires maximum efficiency in the provision of urban services to citizens and a continuous construction of communication channels between decision-makers and citizens. The city has an important tourist flow and welcomes a large number of students from all over the country, thanks to the quality of its university institutes.

To face the needs of the city, the municipality has developed a smart city transformation strategy – called Agenda Urbana – with the goal of improving services and the lives of citizens. The project strategy is based on the value of city data, so the main improvement concerns the data collection and management system; moreover, the smart city transformation process requires the integration of IoT services and technologies, a Decision Support System and other tools to promote the active participation of citizens.

Comune di Perugia

City strategy official website

WiseTown



Web SHOW CASE FIWARE IMPACT STORIES

WiseTown is the enabling infrastructure for Smart City. The solution collects data from different sources: Territorial Information System, IoT sensors, monitoring systems installed in the city, open data, historical data as well as data coming from applications used in public administration and external parties. In addition, there are several services to interact with the information collected: components to support the decision-making process, monitor specific areas in case of city events or emergencies, analyse spatial data, and share urban development with citizens.

WiseTown brings significant benefits, allowing the adoption of useful tools in responding effectively and efficiently to the needs of citizens: a range of solutions, already approved at European level based on a standardisation that involves costs and resources optimization.

The solution is based on FIWARE technology: FIWARE Context Broker is the Generic Enabler chosen to be used as a messaging and context information management broker.

City of Rome

The municipality of Rome, which is the capital of Italy, represents a population of 2,800,000 inhabitants. It administers a 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.

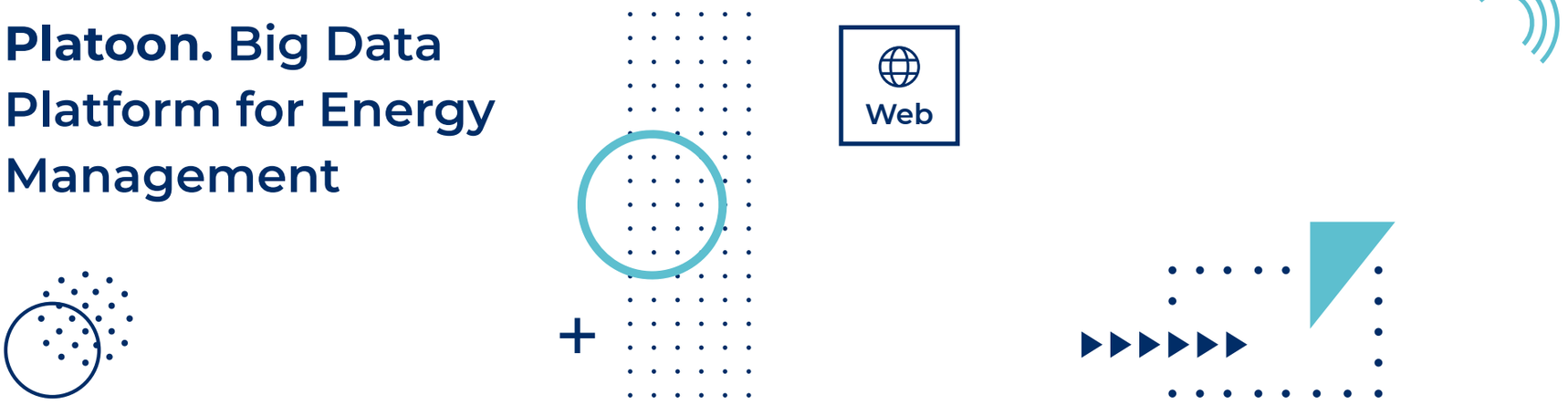
It is also contributing to the EU Urban Agenda as a member of the partnership for the digital transition.

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 energyin its buildings, the Municipality of Rome has been implementing, in the context of the PLATOON H2020 project, a set of energy data analytics applications to cover different use cases:

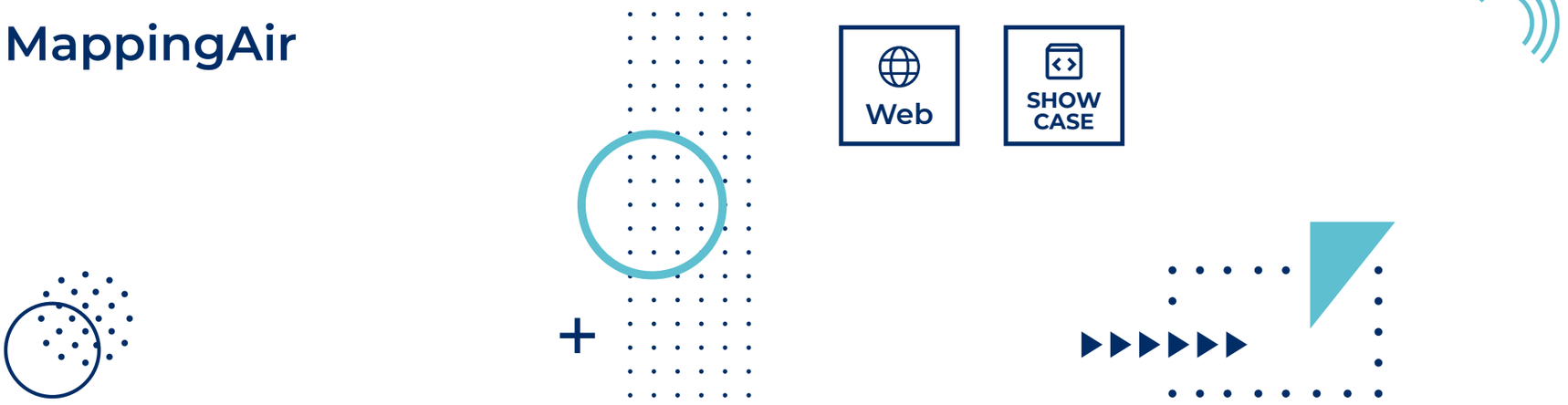
- Include GIS visualization for the energy consumption (EC) in buildings and general energy performances (EP);
- Predict energy usage of the buildings by analyzing multiple factors;
- Simulate future consumption scenarios for different time/functional use profiles of buildings or changes in performance.

The Municipality of Rome is using Engineering's Digital Enabler (Powered by FIWARE) to implement the PLATOON solutions.

The Digital Enabler is responsible for themulti-domain data integration, harmonization, and multi-device interoperability supporting data-driven decision-making processes.

ROMA CAPITALE

MappingAir



Bettair is a Platform as a Service that permits, for the first time with low investment, the user to map air and noise pollution in cities on a previously unimaginable scale. The project aims to further develop the mapping of air pollution in cities with high spatial and temporal resolution. This is done with the deployment of extremely accurate gas sensors using the Bettair advanced post-processing algorithm.

During the selection of the location in Rome, the project focused on defining the methodology to perfectly identify the best possible distribution of the devices. When installing equipment in the public ground of a city, its design and placement should take into account the aesthetics and visual identity of the environment. Fortunately, the Bettair static node was designed with this in mind. The device is one of the most compact instruments available on the market, with a volume below 4,500 cm3 and a weight below 1.5 kg,

For this deployment, Bettair leverages the Connecting Europe Facility with Orion Context Broker to offer a united platform using a micro-service architecture. The Context Broker allows the platform to handle large amounts of air quality data, and integrate it into the Smart City Platform of Rome.

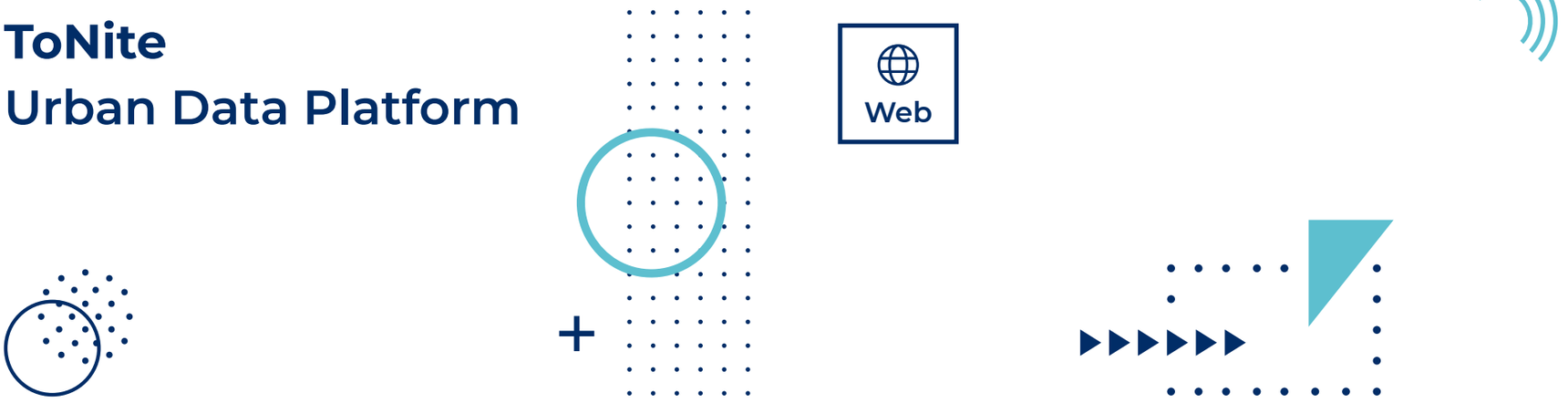
City of Turin

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 help both local authorities and citizens understand the evolving demands of public spaces at night.

ToNite
Urban Data Platform



The ToNite Urban Data Platform has been implemented to understand and analyze urban insecurity phenomena, 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 Kakogawa

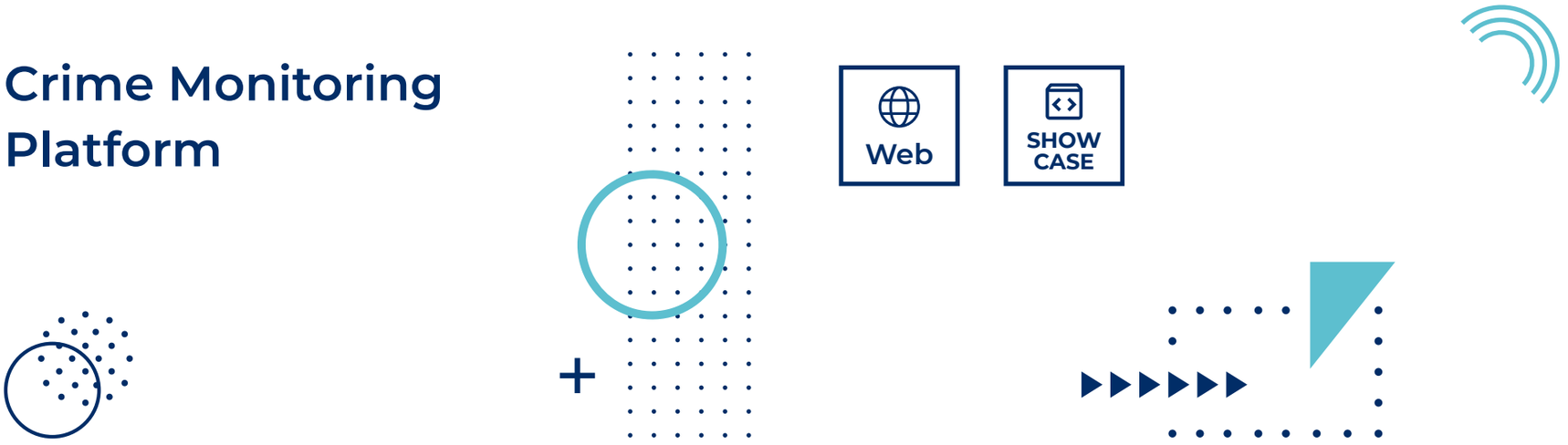
Kakogawa is a city located in Hyōgo Prefecture, Japan, with roughly 266,500 inhabitants (as of 2016), and well known for its cultural and culinary heritage.

The city is part of the Western Japanese railway system and therefore well-connected to other important cities like Osaka and Kobe.

The city faces high crime rates, which determines the Smart City Strategy of the city's government. The strategy tries to deter terrorism and crime while protecting the citizens, making the city more enjoyable and thereby increasing its attractiveness also for tourists. The second part of the strategy aims to respond to the increase in disasters associated with climate change.

The city tackles these challenges with detection, prediction and advanced analytics of Big Data collected by sensors throughout the whole city. The analyzed and anonymous data is used to identify potential dangerous and disaster situations and and inform citizens through push-type notifications when it comes to warnings or evacuations.

Crime Monitoring Platform



In 2018 the city government made an attempt to reduce crime rates in the district of Hyogo. Kakogawa city's municipal government, in cooperation with the Ministry of Internal Affairs and Communications and private businesses, including NEC among others, installed a smart networked camera and sensor system to allow residents to help keep the neighborhood safe, whilst protecting their data and privacy.

Popularly known as the Mimamori system, it consisted of about 1,500 networked cameras - mainly around schools and school routes and 2,000 sensors. The system is able to detect residents carrying Bluetooth Low Energy tags to confirm their location. The city used FIWARE open source components to power some of its Smart City projects and protect their data. In the further development of Kakogawa's Smart City the city introduced a FIWARE-based platform that accumulates data from various sectors and publicizes them as Open Data in an aim to improve convenience and comfort for citizens; create a safe and secure city through public-private sector collaboration; activate the economy; create new businesses; and improve the transparency and reliability of the local government.

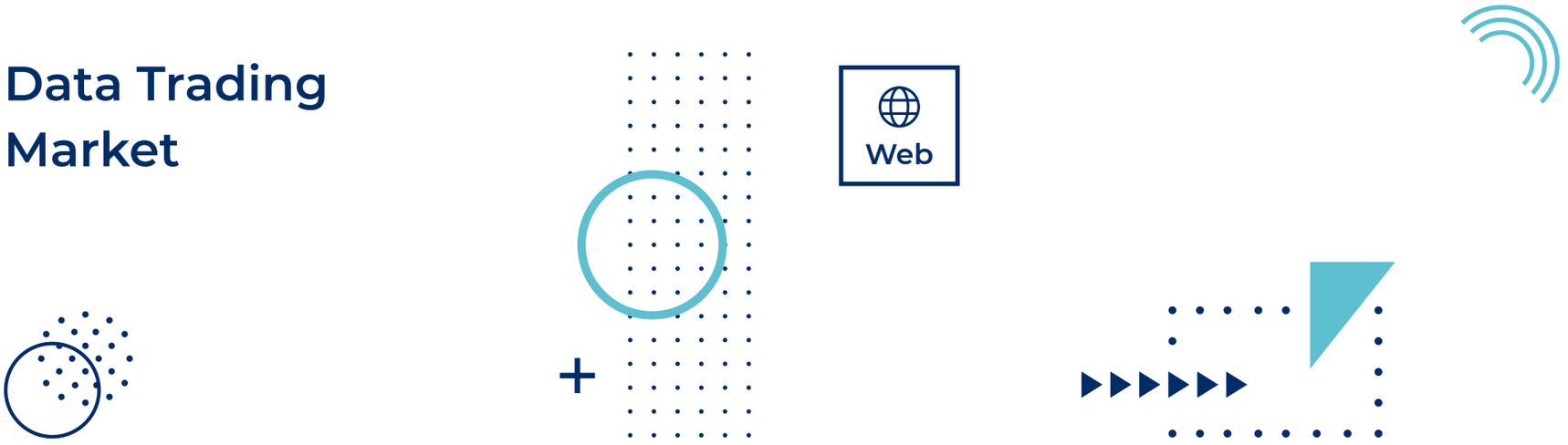
City of Sapporo

Sapporo is the capital of Hokkaido, the northmost major island of Japan, with 1.95 million inhabitants. It is the political, economic, and cultural centre of Hokkaido, and the 1972 Winter Olympic Games made it famous worldwide. The city has modern urban functions in its central area and rich nature in the suburbs. This harmony has made Sapporo the top-ranked Japanese city in terms of attractiveness. Every February, the Sapporo Snow Festival welcomes 2 million tourist visitors.

The ICT strategy for Sapporo has been to solve regional problems and to create innovation. The city implemented “Sapporo’s ICT Utilisation Platform” in 2017 and has supported public-private data collaboration and utilisation.

As the next step, the city government concluded that it was necessary to encourage the participation of a greater number of business actors whilst enhancing the variety and quality of data to be shared. Finally, the city launched the Data Trading Market, where both open data and priced private-sector data are exchanged monolithically.

Data Trading Market



The City of Sapporo launched the Data Trading Market in December 2022 as a first-of-its-kind initiative in Japan championed by the local government. The aim is to enable the sharing of data owned by both public and private sectors on top of the internet toward new business creation and solving region-specific problems. Expected use cases include using people flow pattern data in underground shopping complexes for shop owners planning a branch opening strategy. As a technical consideration, the city regarded trading business-owned data and alternative data from IoT devices as the key to realising a sustainable community. The Data Trading Market should also be open to anyone via API, and the adoption of globally recognised open standards was another key.

FIWARE's Context Broker was adopted as a good match for such a policy, and NEC became the system provider for the Data Trading Market, which integrates open government data and data provided by business players. For the operation and management of the Data Trading Market, the city administration collaborates with the regional organisations of Sapporo Electronics and Industries Cultivation Foundation and Sapporo Innovation Lab.

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.

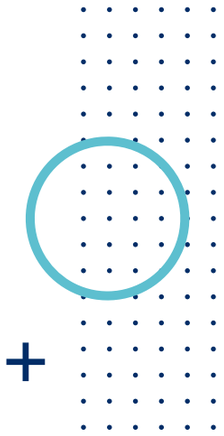
It, hereby, works toward maintaining a safe and secure community for its citizens by working on a real-time understanding of risky situations, thereby accommodating early and appropriate evacuation plans for citizens.

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

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 Toyama

Toyama is the capital city of Toyama Prefecture, Japan, located on the coast of the Sea of Japan in the Chūbu region about 300 km northwest of Tokyo. As of June 2019, the city had an estimated population of 415,844.

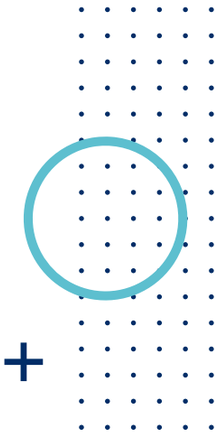
The city has been designated an environmental model city by the national government for its efforts to reduce the emission of greenhouse gases.

It's Smart City Strategy covers two major paths working hand in hand: the Compact City Strategy and the Resilient City Strategy.

The Compact City Strategy is centered around the aging society aiming to make the city accessible for the elderly and persons with special needs relying on Smart Mobility and Housing. At the same time the city follows a strategy to to become greener, more sustainable, and resilient. This strategy focuses on Waste Management, resiliency against flooding and sustainable technology.

The vision of both strategies targets four different areas: people, infrastructure, environment and prosperity. The city of Toyama is part of the 100 resilient cities network.

Face Recognition Software



By leveraging many of the key IT solutions of its new I:Delight concept, NEC has created a new suite of digital transformation solutions which has enabled Toyama City to realize its Smart City transformation. For locals, it can significantly reduce the pains of everyday life and bring them closer to their hometown in unique and different ways. Such Smart City initiatives can also make places more attractive for tourists, allowing any city to be instantly accessible and convenient for travelers.

Utilizing NEC's facial recognition system, users are able to make touchless payments at stores around the city by simply enrolling their face and credit card information on their smartphones and will additionally be be greeted by personalized welcome messages at electronic billboards at the Hokuriku Shinkansen Toyama Station.

Smart City features such as the widespread adoption of NEC's facial recognition system not only provide advanced services to Toyama City, they also help the city create an identity for itself.

Region of Casablanca-Settat

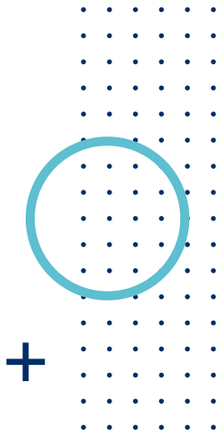
Casablanca, with 3,71 million inhabitants in the urban area and over 4,27 million in the Greater Casablanca, is the largest city and the economic centre of Morocco, second largest city in the Maghreb region and the eighth-largest in the Arab world. Casablanca is Morocco's chief port and one of the largest financial centres in Africa. Casablanca-Settat Region, had a gross domestic product of 290 billion Moroccan dirhams in 2020, accounting for 32% of Morocco's GDP and ranking first among Moroccan regions.

Its economy is primarily based on services and industry.

The Region of Casablanca-Settat has expressed the need for a smart solution to improve quality of life for Casablanca's inhabitants, enhance mobility at the regional level, promote economic attractiveness and improve the city climate.

Maroc Numeric Cluster, a recognised FIWARE iHub, has signed an agreement with the public sector represented by the Region of Casablanca-Settat for a duration of 3 years on 6 different projects to transform the region into a Smart Territory using FIWARE.

Casablanca Smart Territory



The strategic goal of the Casablanca Smart Territory Platform is to provide a set of tools and paradigms for optimization of resources and sustainability of eco-friendly socio-economic development. This will be achieved through using infrastructures and innovative ICT tools for interconnecting city systems such as transport, health, education, economy, environment and governance. It also aims at improving citizens' daily life and facilitating citizens' access to city services while giving them the opportunity, through better connectivity and eco-citizenship sensitization and promotion, to become key players in the development of their city.

A participatory oriented social innovation approach will allow, step by step, to build a set of interconnected pilot projects and sites. It will also gradually set up a sustainable smart city collaborative innovation ecosystem ultimately creating a sustainable inclusive economy which turns societal and economic challenges into business opportunities.

FIWARE APIs is providing a way to deploy efficient, cost effective and replicable solutions, provided that acceptance by the users is effective.

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.

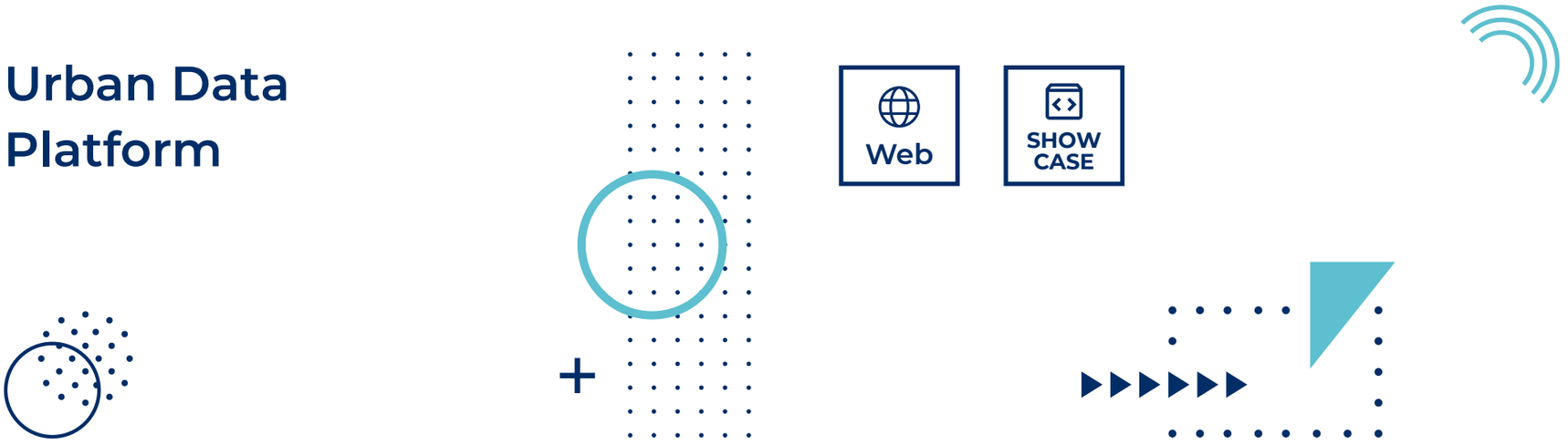
Social issues are hereby collected from the bottom up, giving citizens the freedom to express their worries, needs, and frustrations, and shared with potential partners, experts and designers.

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 ("MIMs") defined in the SynchroniCity project.

Designed like a puzzle, customers can pick up 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 smaller topic and progressively enrich their service offering while the investment sustainability can be secured. 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 Commission as part of its strategy for a newly defined data sovereignty.

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 quality. Although people in The Netherlands cycle a lot, there is a shortage in valuable and usable data about cycling compared to car traffic. As a result, cycling is often underexposed in mobility policies.

The Utrecht Region wants to be a leader with regards 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 Panama

Panama City, the capital of Panama, is a vibrant metropolis located at the Pacific entrance of the Panama Canal. With a population of approximately 1.5 million, it is the largest city in the country and a central hub for commerce, banking, and tourism in Central America. Panama City is renowned for its strategic geographic location, connecting the Atlantic and Pacific Oceans via the iconic Panama Canal, which plays a crucial role in global maritime trade.

As a cultural and economic centre, Panama City also boasts a rich history, diverse architecture, and a rapidly growing skyline.

Panama City's Smart City Strategy leverages technology to enhance urban living and sustainability. The city aims to improve public services, infrastructure, and resource management through innovative solutions. Key initiatives include deploying IoT devices for real-time data collection, developing a new platform to monitor the vehicles that facilitate the transportation of ships crossing the Panama Canal, and implementing advanced water management and early warning systems. The strategy emphasises collaboration with both private and public sectors to create a resilient, efficient, and inclusive urban environment.

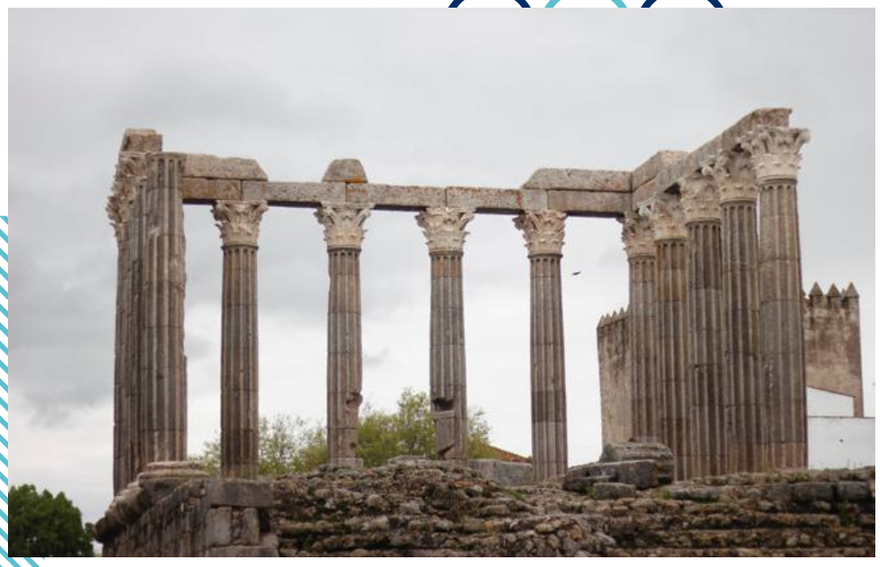
AsterIoT Platform: Empowering Urban Solutions

The AsterIoT platform by GrupoTX enhances urban management in Panama City with FIWARE open standards and AWS Garnet, providing real-time data and analytics for key city and canal operations. AsterIoT leverages FIWARE smart data models and the FIWARE Context Broker to ensure scalable, efficient deployment across applications.

For water management with IDAAN, AsterIoT monitors tank levels, water quality, and pump maintenance, with sensor data transmitted via LoRaWAN, enabling effective decision-making. In the Panama Canal, AsterIoT improves safety by gathering contextual data from locks, locomotives, and vessels, enhancing operational awareness along this critical global route. SINAPROC relies on AsterIoT's early warning system, which monitors flood risks using ultrasonic sensors on bridges to detect rising water levels and provide timely alerts for rapid responses.

AsterIoT's scalable design is expanding to monitor additional rivers and incorporates AI-based forecasts to advance early warning capabilities across Panama City. With AWS Garnet and FIWARE smart data models, AsterIoT offers a powerful, adaptable platform for comprehensive urban management.

City of Évora



Évora is considered to be the capital of Alentejo, in Portugal; and the center of the fifth biggest municipality in Portugal, with about 47,000 inhabitants as of 2021. The city is composed of a historical city center and modern,urban parishes where most of the population live. Its historical city centre is one of the richest monuments in Portugal, earning the city the title of museum-city. The museum-city whose roots go back to Roman times belongs to the Unesco's World Heritage List and is the only Portuguese city to belong to the Most Ancient European Towns Network.

In spite of, or perhaps due to, its duality between the historical city centre and the more modern parishes, Évora aims to become a Smart City, without compromising cultural heritage, having recently focused on designing a strategy to achieve such a goal.

The city's strategy focuses firstly on energetic optimization, deploying innovative citizen-centered solutions for energy transition and sustainability making urban spaces safer, healthier, cheaper and more efficient.

ÉVORA
Câmara Municipal

City strategy official website

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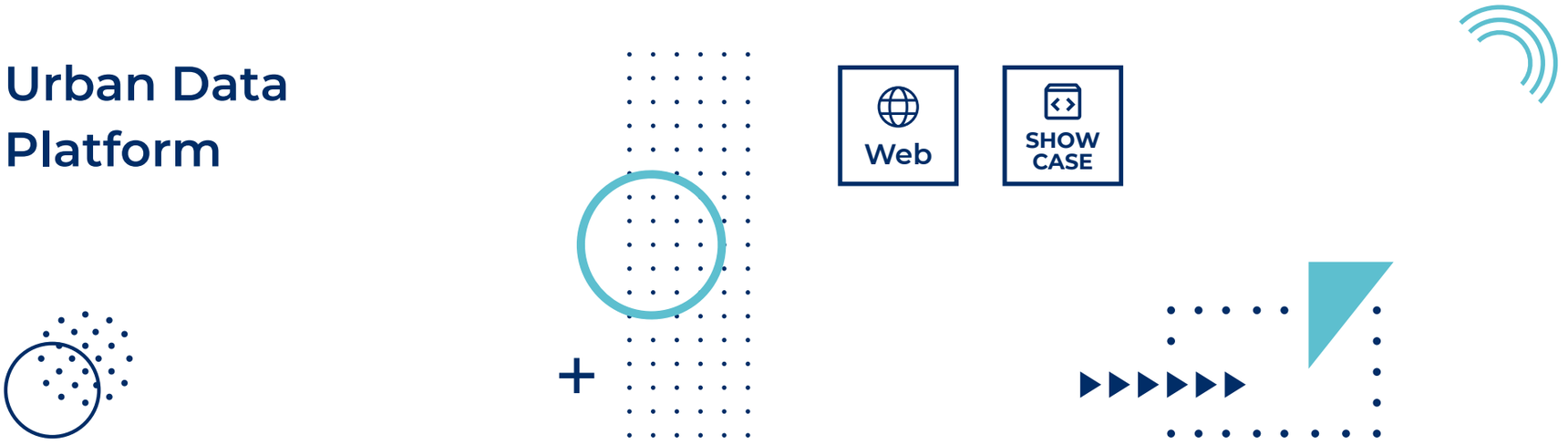
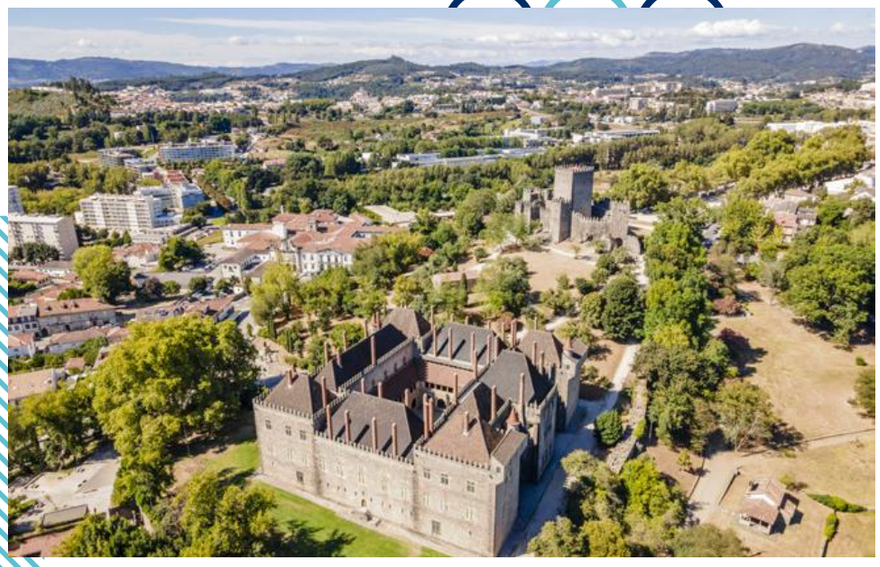
Urban Data Platform



The Urban Platform was created from Ubiwhere's vision of providing cities with a holistic view of their urban environment. Made for cities actively looking to contribute back to those who manage it and to their inhabitants, Ubiwhere started developing several solutions for the demanding challenges that smart cities face, such as reducing environmental emissions, improving energy and mobility efficiency, and reaching sustainability.

With the Sustainable Development Goals in mind, the Urban Platform presents itself as an aggregating solution for the different sectors of a city, helping to fulfill these goals while enhancing the digitisation of the city and integrating other systems. To achieve this, the Urban Platform offers a global and integrated view of cities by displaying information of several domains in real-time in a customisable dashboard, according to each client's preferences. The Urban Platform gathers data from a variety of sources, be it from sensors, platforms or services via APIs. FIWARE's NGSI and Smart Data Models have been used in building the Urban Platform, giving it a competitive advantage.

City of Guimarães



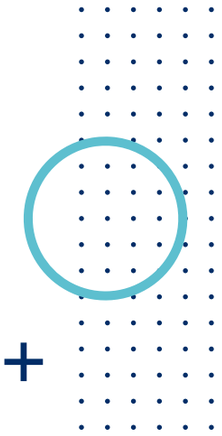
Guimarães is a city in northern Portugal, often referred to as the “birthplace of the Portuguese nationality”. Today, Guimarães is one of the most entrepreneurial, innovative, and industrial cities in Portugal.

The city and its digital transformation model have won several awards such as 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



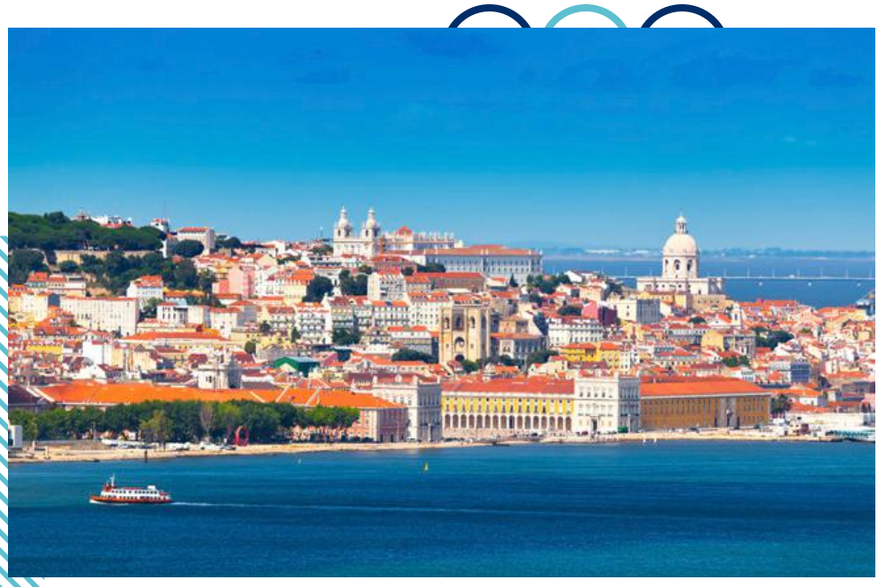
Focused on addressing the challenges faced by future cities, the Urban Platform developed by FIWARE Gold Member Ubiwhere is a cloud solution powered by data (open, public, and private), open standards, and Open Source software.

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. By 2021, Ubiwhere's smart solutions had been available in more than 60 cities around the world.

City of Lisbon



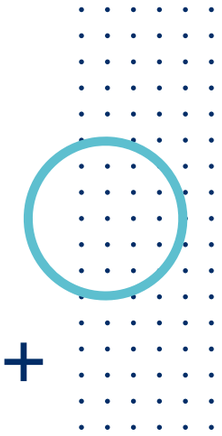
Lisbon is the capital and largest city of Portugal. With a population of around 550,000 habitants, it has a smart city strategy which sets the citizens and their needs at its core. Technology is just a means to an end: the city aims to become sustainable, competitive, participatory, creative, innovative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

Travel and tourism, meanwhile, is a vital industry for the country and keeps 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.

Tourists' spending and 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

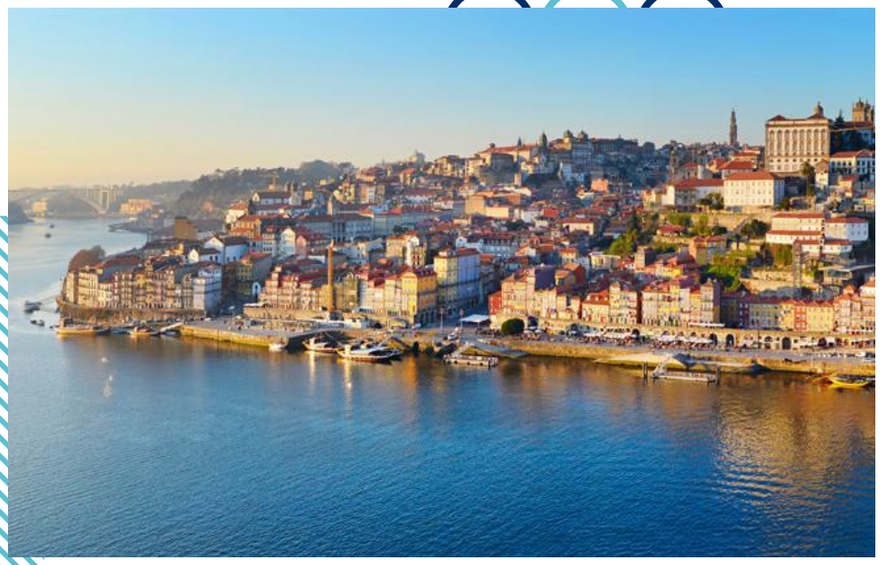


To accomplish the smart city project, improving daily operation and coordination of multiple city services, the Portuguese capital has entered in a partnership with the FIWARE platinum member NEC.

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.

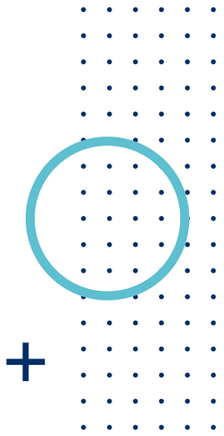
In 2014, the municipality proposed a broader and more ambitious strategy to develop citizen-driven services with a high impact in increasing the city's attractiveness for entrepreneurs, reducing social exclusion, and increasing the city's sustainability.

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.

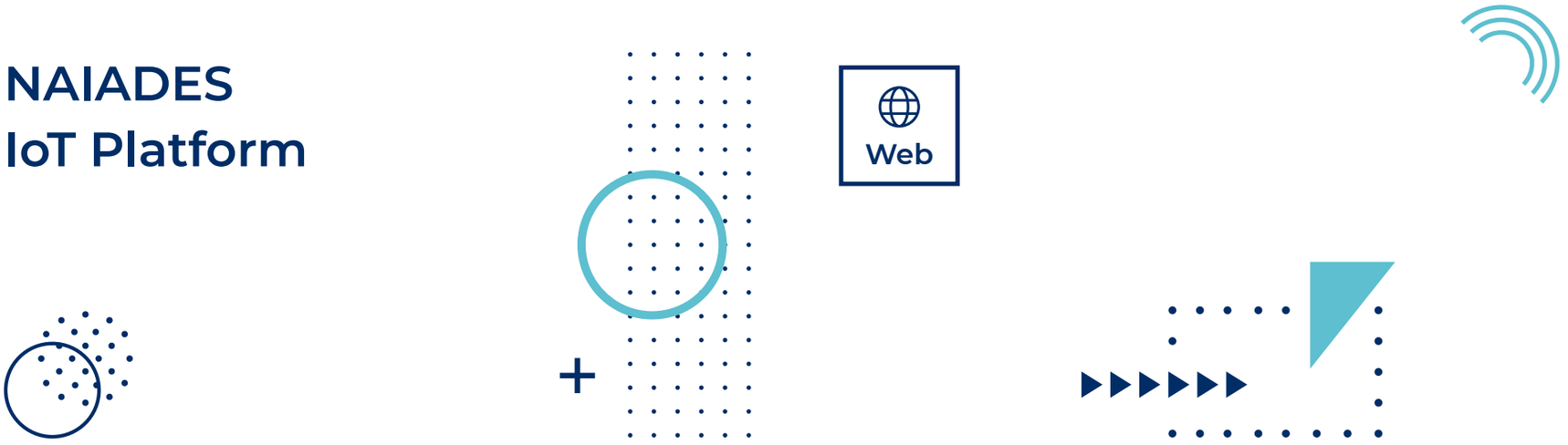
This platform enables access to spots and interfaces of interoperability, and data models for several verticals, creating a balanced and reliable ecosystem where creators and distributors of solutions and devices and system integrators are able to openly compete.

City of Brăila

Brăila is the capital of the county of the same name located in the Muntenia region of Romania. The city and county are located in Eastern Romania approximately 150 kilometres from the Mediterranean Sea. The city is an industrial and cultural centre of Romania, its rich history includes periods of Turkish and Wallachian governance in former times.

To tackle urban challenges the city developed a Smart City Strategy. The main focus of this digitalisation strategy is the improvement of citizens' lives. This includes Smart Lighting using more than 13,000 lighting fixtures which can be managed in a central platform, 354 cameras for video surveillance and a monitoring system, free WiFi in public places, online payment of taxes and duties, Smart Parking including online payment, e-Governance services such as appointments for new documents, Smart Mobility using live-data of the public transport system, a Smart Tourism solution to guide tourists through the sightseeing tours and Smart Water Management.

NAIADES IoT Platform



CUP Dunarea Braila is seeking smart solutions that will help its water distribution network be utilised in a better way. In order to serve the needs, the FIWARE compliant NAIADES IoT Platform (by UDG Alliance) integrates intelligent tools (by AIMEN, IHE-DELFT and JSI) in the project. These tools focus on three key areas that will help to improve the overall service quality for the end user.

The first tool is a demand prediction system that is capable of estimating the volume of water required by the network. This prediction is based on historical data, taken from sensors inside the network, as well as on weather conditions. Such an estimate helps to reduce energy waste and network stress.

The second tool is a comprehensive leak detection system, which uses on-site noise, pressure and flow sensors to detect anomalies via an AI driven algorithm. Sensor data from multiple locations is correlated in order to pinpoint the location of a possible leak.

Lastly, there is the water treatment optimization system, which is capable of offering a more accurate need-based formula for treating raw water, leading to a decrease in needle resource waste.

City of Madinah

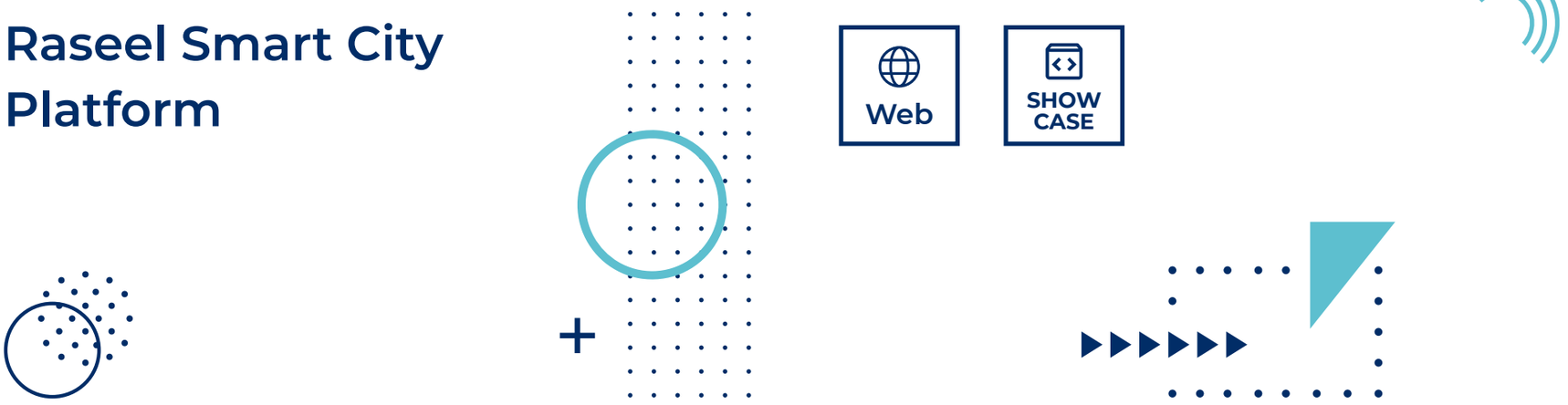
Madinah is known as the second holiest city in Islam after Makkah. As of 2020, the estimated population of the city is 1.5 million, making it the fourth-most populous city in the country. The city is distributed over 589 km2, of which 293 km2 constitute the city's urban area. The rest is occupied by the Hejaz Mountains, empty valleys, agricultural spaces, and older dormant volcanoes. The city is listed in IMD Smart City Index 2021 and ranked 2nd Smart City in Saudi Arabia following the capital city of Riyadh.

The Madinah Smart City Program has developed the Madinah Smart City Strategy as the first smart city strategy in Saudi Arabia. It engages city departments, national government agencies, the private sector, and most importantly the citizens of the city. The strategy is human-centred, and utilises technology for support and not as an objective. It is defined by six priority sectors: well-being, tourism, environment, mobility, business, and old neighbourhoods. With this strategy, Madinah aims to become the most tranquil smart city in the world.

هيئة تطوير منطقة المدينة المنورة
Al Madinah Region Development Authority

City strategy official website

Raseel Smart City Platform



Raseel is the first Smart City platform in Saudi Arabia. It is an interoperable, innovation enabled, and silo-free city platform. Raseel uses FIWARE components such as Orion Context Broker, Cygnus, and STH-Comet as well as open source components supported by FIWARE: CKAN, Kong, and Keycloak. The platform's smart solutions focus on facilitating the integration of city management into governmental departments, improving residents' quality of life, enriching visitors' experiences, guaranteeing low business entry cost for SMEs, and simplifying coding for developers.

With partners like FIWARE, Iviva, Accenture, Deloitte and AWS Madinah City implements its platform through five transformative values: seamless city data, efficient city management, human-centred city services, unparalleled data analytics, and sustainable innovation.

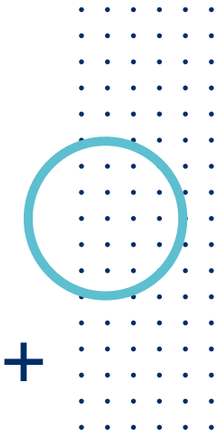
City of Alcoi

Alcoi is an industrial and university city, region and municipality located in the Valencian Community, Spain, with a population of 61,135 residents as of 2018.

The “Alcoi Smart City” strategy is designed to adopt public-private collaboration models in the business ecosystem of the region and encourage strategic alliances between the public administration, institutions, private operators, large companies and SMEs. The project aims to help the municipality of Alcoy to address the challenges of today’s cities by providing insight into the evolving patterns of city problems through the use of a city platform that enables data collection and analysis, thus improving the lives of citizens from the point of view of efficiency and effectiveness.

The city’s operational plan is made up of specific initiatives or projects aimed at solving specific challenges in the short and medium term, through the appropriate use of ICTs, the design of efficient solutions and driving local agents for the development of new local technology-based industries.

Alcoi Smart City Platform



The Alcoi Smart City Platform – designed by Telefónica – helpsthe municipality to understand the evolution patterns by using a city platform that collects data and allows its analysis.

The project includes the installation of an IoT node for the collection of information at building level, considered as one of the basic elements in the city ecosystem that provides a lot of relevant information for energy management making the city more sustainable. The possibility to analyse information generated by buildings will not only improve quality of life, providing services such as security, alarms to disasters, but will also improve the services offered by the city thanks to the integration of the information of the building with the city.

The most innovative aspects of the project is to create one single platform for the entire city council where city information is integrated, independently of providers and services and the use of this scalable platform with the capacity to integrate new services and share information with APIs to third party systems.

City of Algeciras

Algeciras is a municipality in the province of Cadiz (Spain) with a population of 123,078 inhabitants and located 104 km from the capital. It is the largest city located on the Bay of Gibraltar.

The Port of Algeciras is one of the biggest ports of Europe, one of the major links between Africa and Europe and one of the two economic drivers in the region. The other one is tourism. In recent years, Algeciras has undertaken a series of actions with the aim of improving the social, economic and environmental sustainability of the municipality.

The Smart City Master Plan of the regional government, follows this approach and additionally aims to enable social inclusion, improve the quality of life of its citizens and foster the sustainable development of the local economy.

The city is a pioneer of the Urban Agenda for Andalusia 2030, promoting innovation and the use of advanced technologies in order to developa new economic model improving the city's Smart Management.

Light Pollution Monitoring

Web

FIWARE IMPACT STORIES

In order to preserve and improve the quality of the night sky with regards to Astro Tourism, Algeciras set itself the challenge of using technology to reduce the environmental impact produced by the municipality's public lighting systems. Light pollution in Algeciras has been on the increase in recent years following the successive expansions of the maritime port lands, and the consequent increase of its activities that run 24 hours a day, 7 days a week.

The direct effect of light pollution is the loss of quality of the night sky, which has far-reaching economic, social, cultural and environmental consequences.

The solution, developed by Green Globe and FIWARE Zone, chosen by the City Council of Algeciras aims to solve light pollution using a FIWARE technology solution with which real-time monitoring of the quality of the night sky of the city could again be carried out.

The objectives pursued were: to understand the situation and evolution of the quality of the night sky in the municipality and to gain the necessary data in order to design an intelligent and sustainable public lighting system.

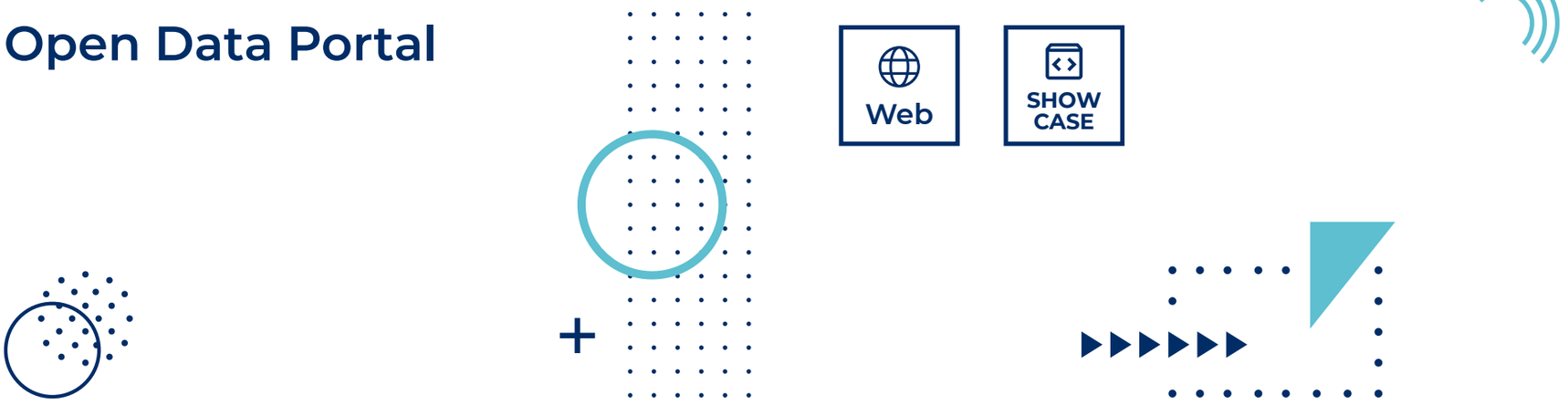
Almendralejo and Badajoz City Council

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.

Open Data Portal



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 allows 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 run by Telefónica and 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).

Badajoz Provincial Council

The province of Badajoz is an administrative region in southwestern Spain, a province of nearly 22,000 km2 with 669,000 inhabitants scattered throughout its 165 municipalities. As one of the least densely populated regions in the country, nearly 70% of the population lives in municipalities with less than 20,000 inhabitants. These smaller localities rely on the Provincial Council to provide public services such as sanitation, waste management, public infrastructure, etc. Tackling the digital transformation of such a sparsely populated province comes with many challenges, such as a geographically wide area of operation, different underlying infrastructure to that found in bigger cities, and the need to cover a variety of very different municipalities.
The Provincial Council has implemented a centralised approach to digitalisation, providing a single, adaptable FIWARE-based Smart Platform that includes a supporting attendant expert staff. Implementation is carried out by either adding a layer of digitalisation to new or pre-existing public services or by allowing municipalities to determine the needs of their citizens and the best area to apply the Council's resources.
The FIWARE Space initiative is part of the global project "Badajoz Es Más" and active Premium category iHUB.

DIPUTACIÓN DE BADAJOZ

City strategy official website →

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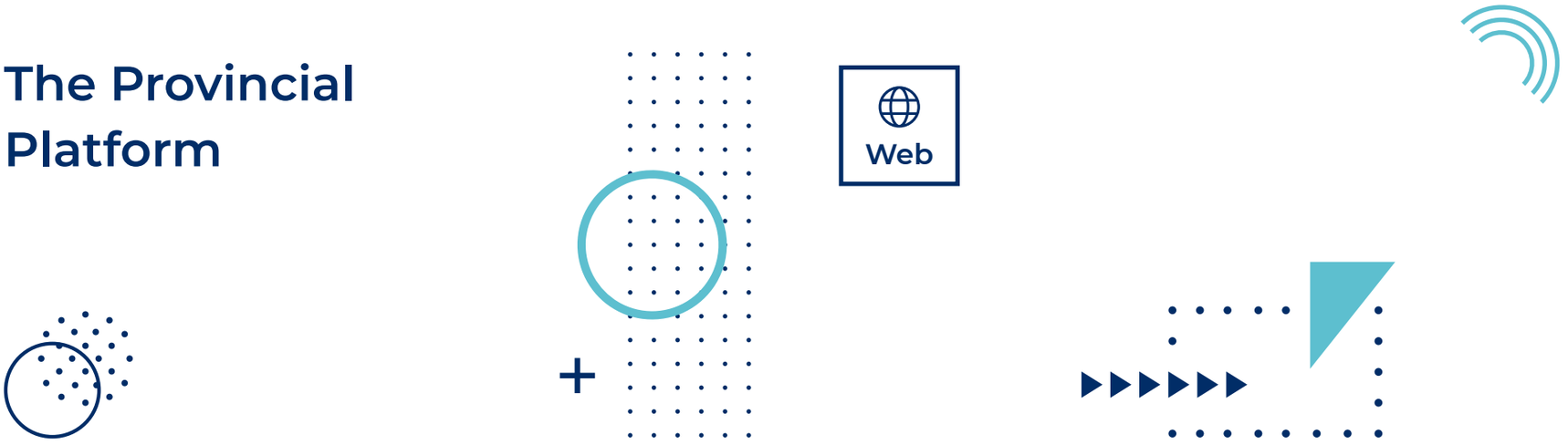
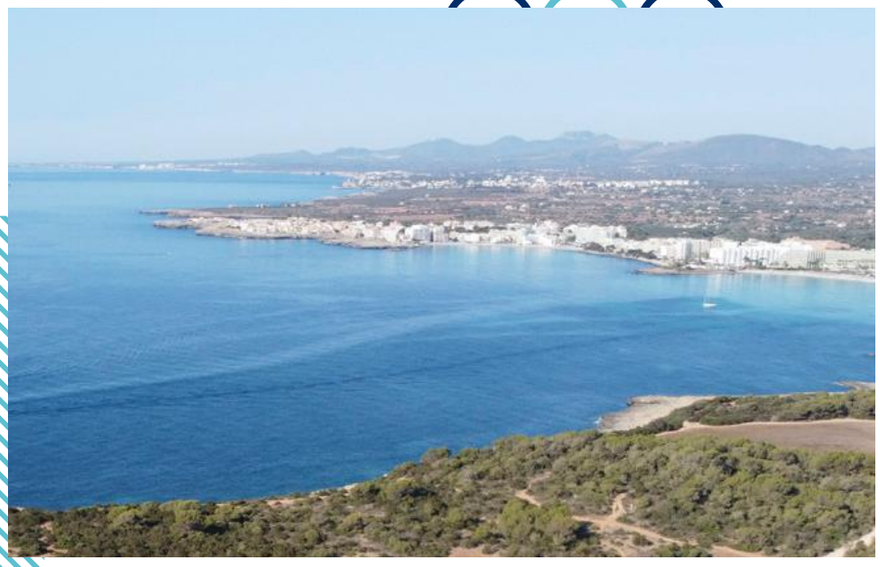
The Provincial Platform



The core of the province of Badajoz's strategy for digitalisation —as implemented by the "Badajoz Es Más" initiative, the council's overarching program for digital transformation— is the Provincial Platform for Smart Management of Public Services. This modular platform manages all the information from the nearly 50 smart solutions (YouTube video) implemented throughout the province and gathers it within a single data repository. These solutions range from traffic flow and EV charging station monitoring to street lighting and energy management for public infrastructure. This repository makes it available to the concerned parties (citizens, administration officials, technicians, etc.) either through a series of dashboards or through direct access to the database. The Provincial Platform uses the **FIWARE Orion Context Broker** as its core management tool. It also provides several functionalities using other components of the FIWARE Catalogue, such as Cygnus for data persistence, Keystone for identity management and authentication, Perseo for complex event processing, and a range of IoT Agents. Other functions, such as visualisation, are handled through external tools. This modularity ensures that the Provincial Platform can answer to the needs of all municipalities in the province.

Ports of Balears



The Balearic Islands Port Authority manages, administers, and operates 5 ports in the Balearic Islands: Palma and Alcúdia (in Mallorca), Maó (in Menorca), Eivissa (on the island of the same name) and La Savina (in Formentera).

The Port of Palma de Mallorca has one of the highest rates of cruise traffic in the Mediterranean. It is also the third-ranked port in Europe in terms of passenger transport, an international benchmark in ship repair and maintenance, and has been included in the Mediterranean Corridor as a node of the Trans-EuropeanTransport Network.

The Balearic Islands Port Authority has promoted a series of infrastructure projects that could constitute the nodes of its own innovative ecosystem. These projects promote and develop research, technological development, and innovation activities in the maritime sector. They also promote and manage a digital platform at the service of the port community that helps create innovative solutions to the different problems that arise in port operations.

iGreenPort: a dataspace to monitor seawater quality in SmartPorts

Web

Did you know that the largest living being in the world, 8 km in diameter is in danger of extinction? This is the Posidonia Oceanic plant meadows in the Balearic Islands. It is an aquatic plant endemic to the Mediterranean, and was declared a World Heritage Site. iGreenPort arises from the need of Balearic Islands Port Authority to digitise the monitoring of the port seawater quality, due to the high impact of maritime traffic on Posidonia.

iGreenPort consists of a Dataspace to share and consume environmental and operational data in near real time, through a FIWARE-powered platform with an i4Trust . Heat maps with seawater indicators, reports to identify ships that could cause pollution incidents, dashboards, and predictive models can be created.

iGreenPort is made up of a consortium of companies led by HIADES Business Patterns. HIADES is a technology firm located in the Canary Islands, with an international presence in more than 20 ports. Its product 'AMURA' and its Smartport solution 'AURORA", are both powered by FIWARE. Among other participants are Pilots of Palma, MNX Online, and Pleyone.

City of Barcelona

The city of Barcelona is located in the autonomous region of Catalonia on the Mediterranean coast in the North-East of Spain. It is not only the region's capital, but also the second biggest municipality in Spain and home to 1,6 million inhabitants. The metropolitan area even counts 5,6 million inhabitants. The city is an important economic, financial and cultural center in Europe, economically being one of the strongest performing cities in the whole European Union.

The Smart City Strategy – Barcelona Digital City – focuses on investing in digital public infrastructures that can enable higher-quality public services and usher in a more sustainable and collaborative economy and society and aims to create a truly democratic city where technology empowers citizens and enables businesses to grow faster and sustainably using Open Data and public knowledge accessible to everyone.

To fulfil this goal the strategy is split in three axes: Digital Transformation, Digital Innovation and Digital Empowerment.

Ajuntament de Barcelona

City strategy official website

Bettair

In Barcelona, Bettair deployed a network of 26 gas sensors called Bettair® Static Node to collect data about the harmful gases NO2, NO, CO or H2S and O3 or SO2. Additionally, the sensors are equipped with an Optical Particle Counter and are capable of measuring Temperature (°C), Relative Humidity (%RH), Atmospheric Pressure (hPa) and Ambient Noise (dbA).

Bettair® is a Platform as a Service (PaaS) that permits to map urban air pollution in cities on a previously unimaginable scale by using an advanced post-processing algorithm. A proprietary calibration process combined with the use of unsupervised machine learning techniques to take into account both the known and unknown factors that affect the sensors allows Bettair® to increase the accuracy of the measurement up to 90% and more depending on the pollutant. This solution helps Barcelona to protect their citizens against harmful gases and fight climate change at the same time.

The FIWARE Context Broker manages the air pollution information sent by the Bettair® Static Nodes. The nodes do not require any external power supply and transmit data directly to a server for cloud processing.

Provincial Council of Cadiz

Cadiz is the capital of the Province of Cadiz in the autonomous community of Andalusia. With over 1.2 million inhabitants, it is a bustling, cosmopolitan city. It was founded by the Phoenicians and is considered to be one of the oldest cities in Western Europe. The city's port was also selected by Columbus as the starting point for his second voyage to the New World. Due to its location and ancient history, tourism is a large industry in Cadiz. Beaches, culture, golf, wind sports, and cruises all offer an important source of income for the city.

The Provincial Council of Cadiz aims to apply sustainable policies in tourism management and planning throughout the territory. Through the implementation of a single, standardised, transversal, and open tourism destination platform, the Council has developed a Tourism Intelligence System. This system is used for the efficient and sustainable management of resources, like electricity, water, and fuel. A comprehensive and quality offer will be adapted to the needs of visitors throughout their travel cycle. This offer will optimise the operating costs of energy consumption and the economic and environmental impact associated with tourism.

Diputación de Cádiz

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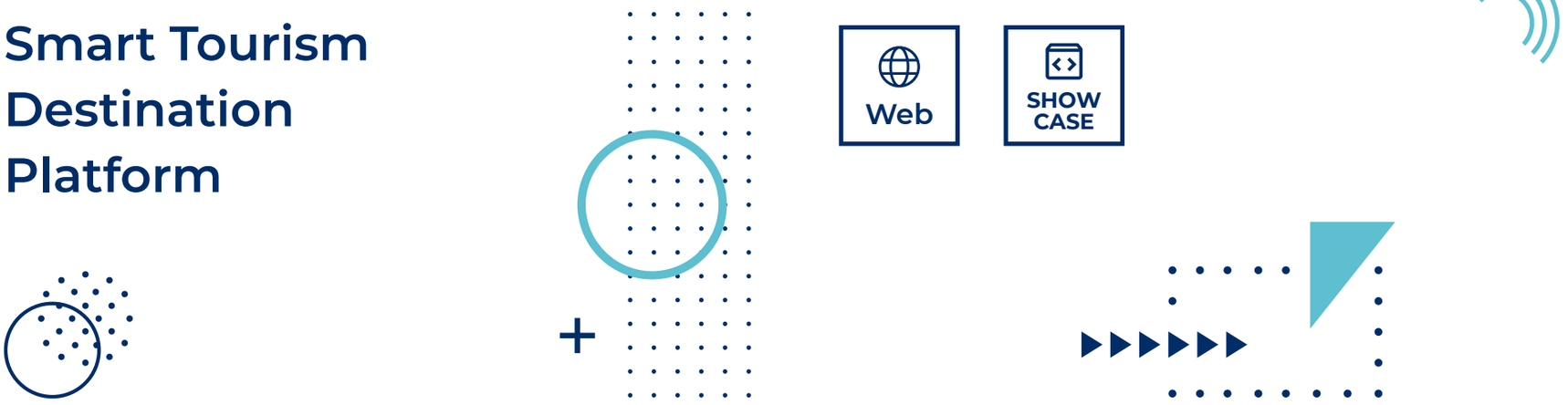
Smart Tourism Destination Platform



The Tourism Intelligence System, managed by Cotesa and Telefónica, intends to build an innovative and sustainable tourist destination. In this destination, new technologies will inform both the Diputación de Cádiz and the different town councils of the influx of visitors in real time. Additionally, tourist behaviour will be monitored through different indicators from a single and transversal control panel.

The DTI platform facilitates the analysis of data including demographic data, origin of tourist flow, accommodation data, and occupancy rates of tourist housing in the province. It accomplishes this by making use of different data sources including anonymous detection of mobile devices, interaction with social networks, the tourism website of the provincial council and tourist accommodation data from various sources.

Utilizing the DTI platform, both the provincial council of Cadiz and the municipalities of the province will be able to adjust the tourist resources to the real needs of visitors regarding public transport, the availability of public water sources, and building amenities.

City of Cartagena

Cartagena, a historic port city in Spain, boasts a population of approximately 216,000 inhabitants. Located on the southeastern coast of Spain, this ancient city is renowned for its rich cultural heritage, strategic maritime position, and economic significance. Its history as a significant naval port continues to influence its modern identity. Cartagena's unique selling point (USP) lies in its blend of historic allure and its pivotal role as a cultural and economic hub. With its Mediterranean climate and scenic coastline, Cartagena attracts tourists and businesses alike, fostering a lively cultural scene and a robust economy.

Cartagena's Smart City Strategy is a visionary approach to urban management, focusing on sustainable development and technological integration. The strategy employs innovative IoT, AI, and Smart City technologies in collaboration with Libelium, enhancing urban functionality and environmental management. Key features include real-time air quality monitoring, noise level assessment, and weather condition tracking through an extensive LoRa metropolitan network. The city utilises AI-driven analytics to process vast amounts of data, enabling evidence-based decision-making for urban planning and pollution control.

Ayuntamiento Cartagena
www.cartagena.es

City strategy official website

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Smart Irrigation and Air Quality Monitoring

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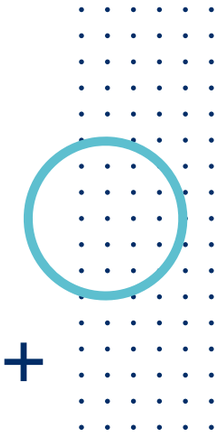
In recent years, citizen well-being in Cartagena has been challenged by high levels of particulate matter and pollutant gases, as well as climate change-induced extreme weather conditions that reduced rainfall and even droughts, leading to increased water consumption. Looking for ways to meet goals in sustainable development and citizen well-being, the city implemented a solution to enable the real-time monitoring of water consumption, air quality and weather conditions.

Designed and deployed by HOP Ubiquitous, the solution implements Orion Context Broker to consolidate data from Smart Water management systems and Air Quality and Weather Monitoring. HOPU supplies the city with a Smart Irrigation solution for parks and gardens that allows the city to monitor the status of green areas in real time. Furthermore, Air Quality monitoring was deployed in the whole city using FIWARE-ready IoT devices measuring temperature, humidity, atmospheric pressure and climate-damaging gases. Moreover, six bus stations were equipped with devices that not only monitor the air quality but are also capable of crowd and energy consumption monitoring.

Envair360



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Envair360, developed by Libelium, is an advanced software solution that integrates extensive air quality, environmental, and noise data with powerful algorithmic models like Munich, Street Canyon, CHIMERE, and WRF. This integration provides hyper-local knowledge of air quality conditions, which is crucial for designing and managing low-emission zones (LEZs) in Cartagena. It also helps predict pollution levels and reduce exposure to harmful pollutants. By providing real-time monitoring and AI-driven analysis of air quality data, the solution enables the city to make informed decisions that directly improve living conditions for its residents.

Envair360 integrates seamlessly with FIWARE technologies, which support the efficient management of city services through open, **standardised APIs**. These technologies allow for real-time data collection, analysis, and application, facilitating better urban planning and environmental management. FIWARE's capabilities are central to deploying scalable and replicable smart city solutions across global contexts.

The project is a collaboration between the municipality of Cartagena and Libelium. Together, they have leveraged technology to tackle urban environmental challenges.

Castellon Provincial Council

Castellón is a province in the northern part of the Valencian Community on the Mediterranean Sea in Spain. Castellón's capital is Castellón de la Plana. The province had a population of 579,962 as of the start of 2019, 85% of whom were living along the long coastline of the province. Due to this long coastline, but also heritage sites located in the province the main economic driver in the region today is tourism.

The SmartVillages initiative is part of an overall project of the Castellón Provincial Council called "Intelligent Rural Territory of the Province of Castellón" which aims to move towards a more modern, agile and efficient management of the main public services in the province.

The initiative has received the enerTIC 2020 award, which accredits it as the best municipal digitisation plan in the European Union. The award was shared with Telefónica who worked closely with the province for the development and deployment of the technological platform.

DIPUTACIÓ D E CASTELLÓ

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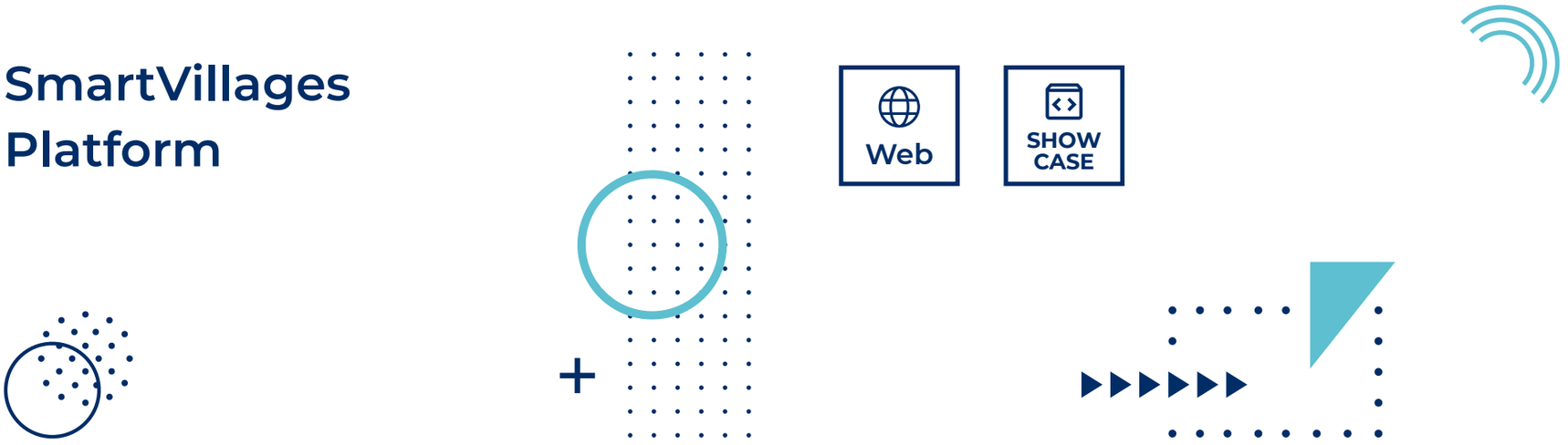
SmartVillages Platform



The SmartVillages platform run by Telefónica is a technological solution based on standards that offer the ability to monitor and centrally manage a scalable set of public services. It has been created to be exploited by municipalities of the province, as well as the different management areas of the Provincial Council itself to develop new smart sensor networks, management solutions and smart services in addition. The initiative also offers training and technical support to the service providers of these municipalities, in order to facilitate the integration of the solutions within the platform.

The main services of the Smart Villages platform are: Integration of all vertical smart street lighting remote management solutions in the 29 municipalities; 4 pilots of Pumping Management, Water Metre Management, Pipeline Management, Irrigation Management, a Big Data Platform for Smart Tourism, Waste Management Services, Monitoring of electrical panels in buildings, and Service Management.

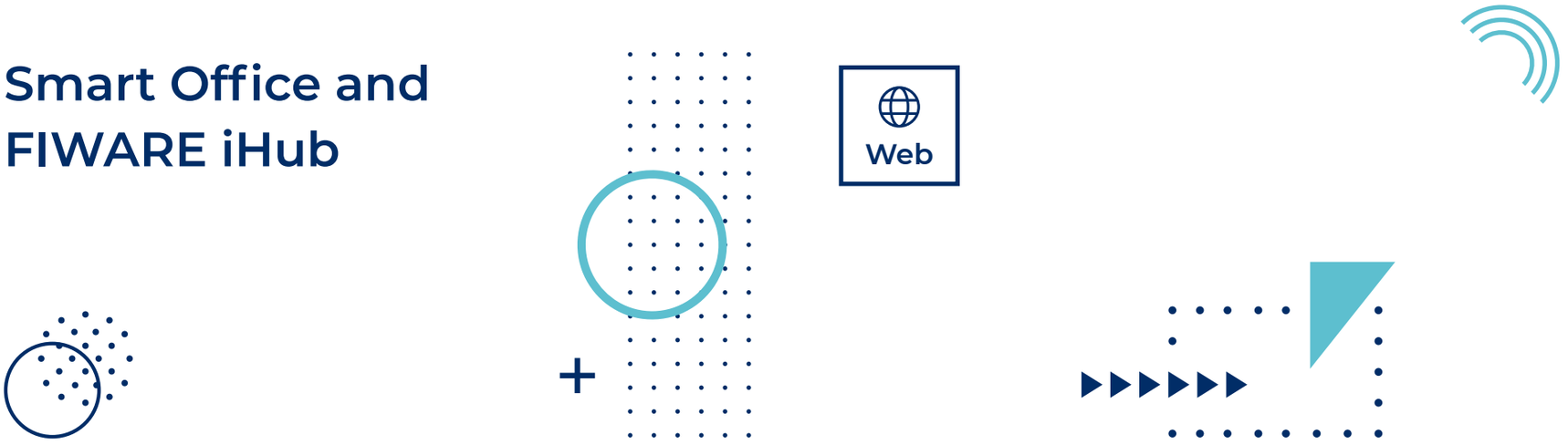
Region of Castilla-La Mancha

Castilla-La Mancha (CLM) is a region located in the central part of Spain, consisting of 919 municipalities in five provinces. The Regional Ministry of Sustainable Development aims to enhance the potential of its villages and people, particularly in the direction of the current green and digital transition.

The CLM Smart Rural Territory Ecosystem, is designed under the EU's Smart Village principles and aligned with the Regional Strategy against Depopulation in CLM 2021-2031. It is an open innovation ecosystem that follows a collaborative and cooperative governance approach, involving citizens, universities, public administrations, and companies to improve quality of life, service efficiency, innovation, and competitiveness.

Training and talent development are essential to implementing a single smart territory model in all rural municipalities in the CLM region. The ecosystem creates a collaborative environment around a smart management model of municipal services that relies on data, in line with the UNE 178601:2022 standard.

Smart Office and FIWARE iHub



According to the UNE 178104:2017 standard, smart city services require a smart city management platform to ensure their proper operation, efficiency, performance, security, and scalability. Innovation is crucial for territorial growth, market system creation, and transformation.

The technological layer that integrates services offered to citizens from different municipalities should have information capturing, and management capabilities as well as the ability to coordinate inter-municipal services. The Smart Office will be supported by a FIWARE iHub, which, in partnership with other international actors,will promote, demonstrate, standardise, and provide training in accordance with European standards based on FIWARE.

The primary goal of this project is to boost innovation and digitalization to benefit all stakeholders in the ecosystem, promote investment, and encourage innovative public procurement.

Region of Castilla and León

Castilla and León is an autonomous community in north-western Spain.

It is the largest autonomous community in Spain in terms of area, covering 94,222 km2 and home to roughly 2,5 million inhabitants.

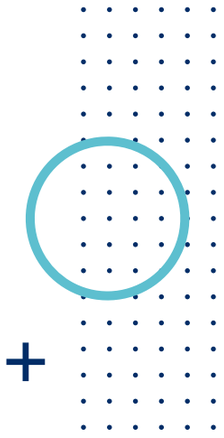
The Regional Ministry of Development and Environment of the Regional Government of Castilla and León has been developing a Digital Municipalities Network since 2007, aimed at promoting quality online local public services for citizens, companies and organisations using Information and Communication Technologies.

Following the specific objectives of the Digital Agenda for Castilla and León 2014-2020 to promote e-administration and digital public services in local entities, the Regional Government has worked recently in consolidating a strategy of administrative collaboration with local public entities through this network to support further development of projects and actions related to Digital Public Services and the Digital Knowledge Society. This way all inhabitants can mutually benefit from each other's experience and knowledge in the successful development of projects, and obtain benefits in the implementation of actions.

Junta de Castilla y León

City strategy official website

Smart Region Castilla and Léon



The project “Territorio Rural Inteligente de Castilla and León”, is a collaboration between the Junta de Castilla y León, Provincial Councils and Town Councils to implement a multi-entity and modular common platform for the intelligent and coordinated management of public services by the Local Administrations.

Main strategic objectives are to increase the efficiency of public services managed by the Local Administrations of Castilla and León through the use of the Internet of Things, to improve the quality of life of citizens in rural areas in a sustainable way and to fix population by offering 4.0 services and creating new business opportunities for local companies. The platform is a transversal and multi-entity solution based on standards that facilitate interoperability and the development of new services by third parties.

The first phase of the project – run by Telefónica – included included the management of public lighting, waste collection and water management services in a global and integrated way. Today it allows the management of other services, such as smart heritage, smart parking, citizen incidents, environmental monitoring, and Smart Tourism.

City of El Prat de Llobregat

El Prat de Llobregat is a Catalan municipality with a privileged location next to the city of Barcelona. The city is located on the Llobregat River Delta, on the Mediterranean Sea, and is home to one of the largest infrastructure projects in the country, the Barcelona-El Prat airport.

The Prat City Council has initiated a major commitment to digital transformation and the implementation of a city-wide operating system. Their aim is to create a smart, cohesive, and sustainable city model, which includes innovative initiatives like the IBAM project.

Ajuntament del Prat de Llobregat

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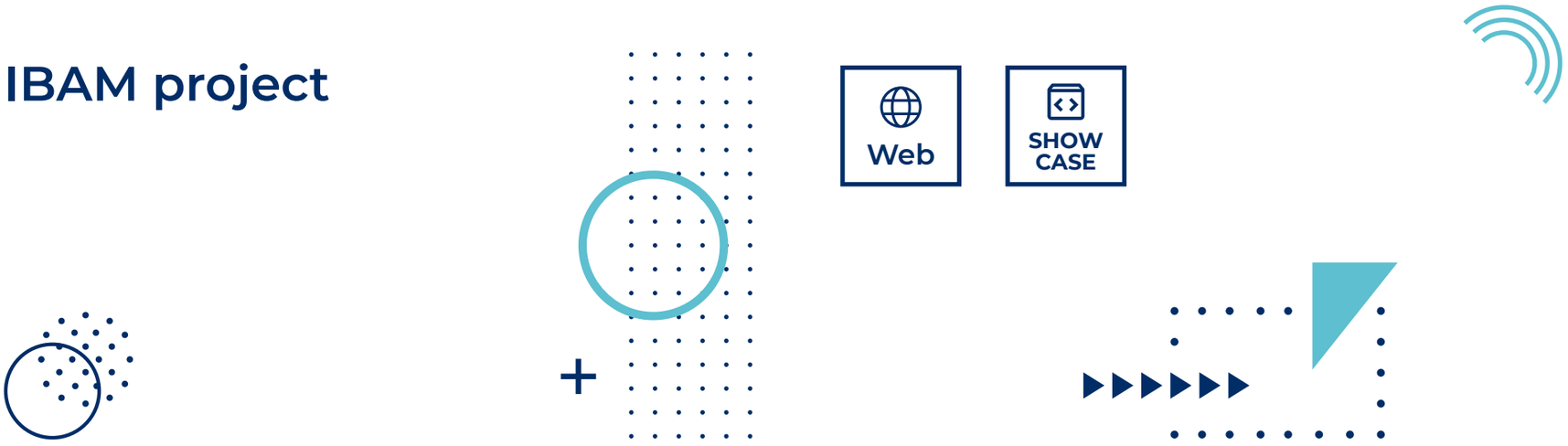
IBAM project



The goal of IBAM is to reduce the computational cost of air quality simulation for urban environments and to give Bettair Cities access to affordable and state-of-the-art real time air quality modelling tools.

When deploying IBAM, Bettair leveraged FIWARE's Context Broker to offer a united platform using a micro-service architecture. The Context Broker allows the platform to handle large amounts of data. A dataset of thousands of urban geometries from European capitals is being used to run simulations of their wind and dispersion patterns. Deep Neural Networks are then able to perform simulations on new geometries instantaneously with high precision.

Bettair's IBAM project is an efficient and low-cost AI solution to model air quality in cities with up to 1m2 resolution in near real-time. It is also able to combine sensor measurements and AI simulations to extract precise information about local emissions and pollutant concentrations in cities. This information is all made available in Bettair's platform and enables individuals and communities to take collective actions to improve air quality for everyone.

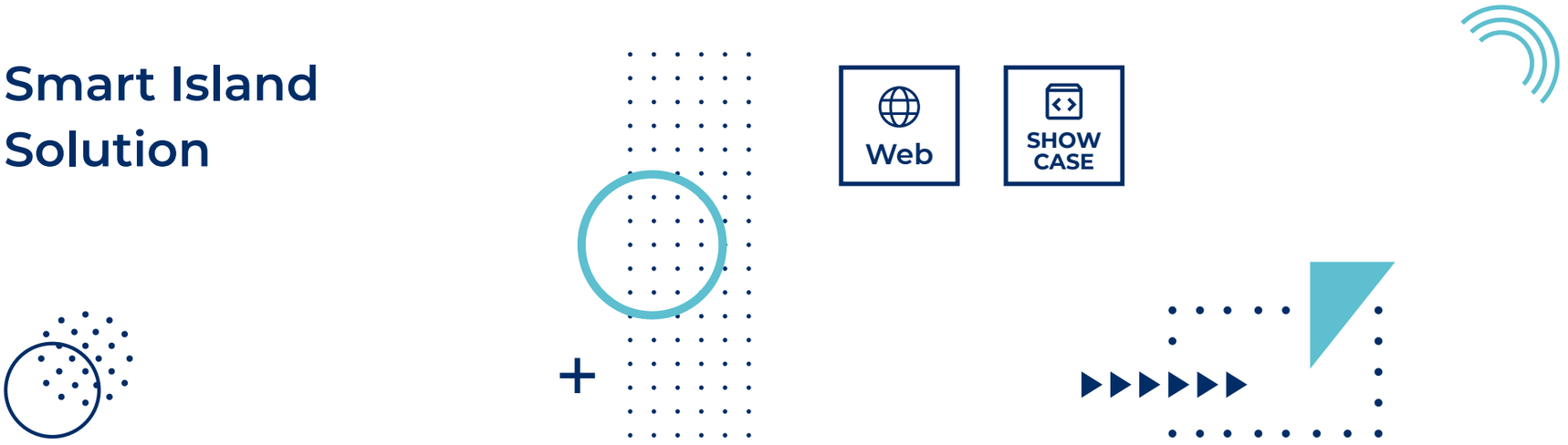
Fuerteventura Island

Fuerteventura is the fourth biggest of the Canary Islands off the West African coast and has 119,732 inhabitants as of 2021.

The island was declared a Biosphere Reserve in 2009 and Starlight Reserve in 2015 by UNESCO for the whole island territory, amounting to more than 48,000 hectares of protected area. Its natural monuments, parks and landscapes are living witnesses of its volcanic origins. Such as the lava fields, home to an endless variety of highly valuable native flora and fauna, which are tightly protected by many environmental projects focused on optimising energy consumption and reducing environmental footprint from decreased CO2 emissions.

The Smart Island Platform by Telefónica will will support digitalisation and efficiency of the services offered by the public administration and businesses, rationalising its operating costs and reducing its environmental footprint. It will provide a single vision and integrated management of information, thus providing greater control over processes and facilitating decision-making.

Smart Island Solution



Fuerteventura Open Island contemplates the implementation of a comprehensive solution to develop a Smart Island, focusing on areas such as E-Government, Smart Government, Waste and Energy Management of public lighting, integrating everything through a smart platform and feeding other systems, such as a system of data utilisation (Open Data), portals or a mobile application. In addition, a Data Processing Centre due to be located in the Fuerteventura Technology Park will house the project's services and hardware infrastructure necessary to manage everything, providing greater support to the administrations when interacting telematically. The centre is a model of shared management of digital services at the island level where all public administrations will work together.

The Fuerteventura Smart Island initiative also contemplates the execution of all the necessary actions for the implementation of an integral electronic processing platform in all the public administrations of the island. The registry assistance offices will be strengthened, providing them with new equipment to speed up and improve procedures for citizens.

Port of Huelva

Huelva is located in the South Eastern Atlantic coast of Spain. Founded in 1250 BC, the city is home to roughly 150,000 inhabitants. It is a touristic hotspot and home to the second biggest port in the Andalusia region.

The Port of Huelva is among the 5 ports with the highest volume of port traffic in Spain. It comes in at No. 25 in terms of traffic in Europe. The Port of Huelva is located in the Southwest of the Iberian Peninsula, which makes it a strategic enclave as an import/export port and hub for the new trends in international maritime trade, especially between Europe and the Atlantic.

It is integrated into the Trans-European Transport Network as a Core Port and is one of the top seven ports in the Spanish system in terms of goods movement. It has become the second fastest growing port in Europe in the last decade. Operating 365 days a year without congestion, the port of Huelva is a reference in Europe as an energy port and in liquid and solid bulk traffic.

It is currently firmly committed to diversifying its activity with the traffic of containerised general cargo through different regular lines to Europe and the Canary Islands.

Puerto de Huelva
Autoridad Portuaria de Huelva

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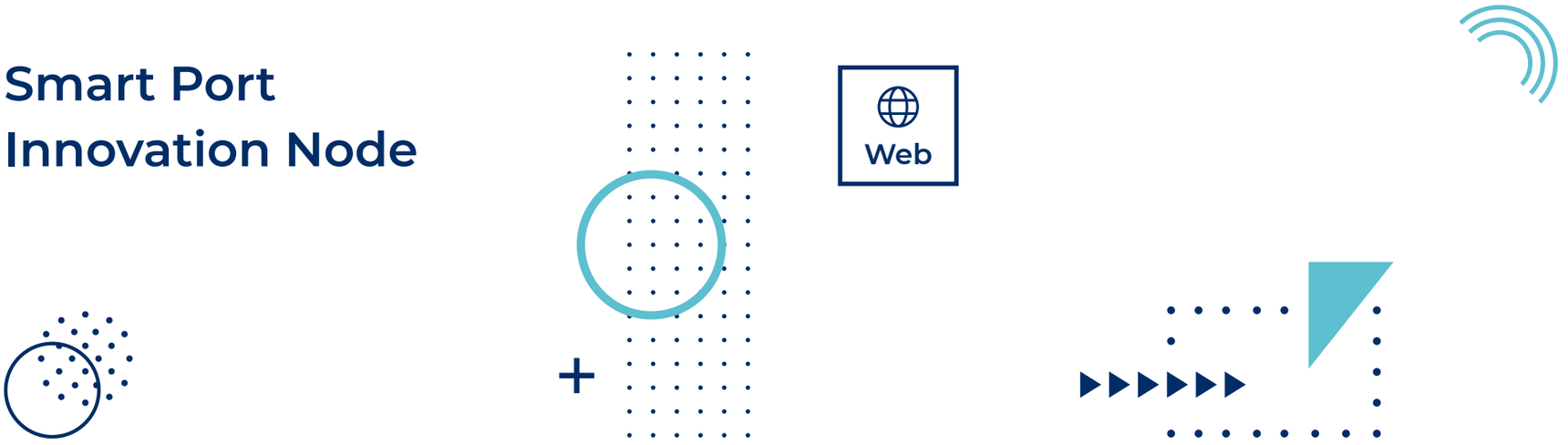
Smart Port Innovation Node



With the port of Huelva being one of the major business centers of the city, its digital transformation is crucial to the development of the city. To achieve this goal, the Port of Huelva decided to found a Digital Innovation Hub later in 2021 focused on the digital transformation of the port sector using FIWARE technologies (FIWARE iHub).

This FIWARE iHub, operated by Telefónica is a physical and virtual space that will integrate all the stages of innovation, from incubation to market launch, including acceleration, mentoring and piloting. The node will be structured on the basis of the search for solutions to real problems in the environment of the Port of Huelva. It will be the first FIWARE iHub worldwide to focus on ports.

The creation of the FIWARE iHub was announced during the celebration of the second Conference on Technological Innovation in Summer 2021. This Conference laid out the wider digital transformation strategy the Port Authority has been undertaken. In this node, Telefónica will provide technical support to Start-Ups and SMEs that can provide technological solutions to the port sector using FIWARE technology.

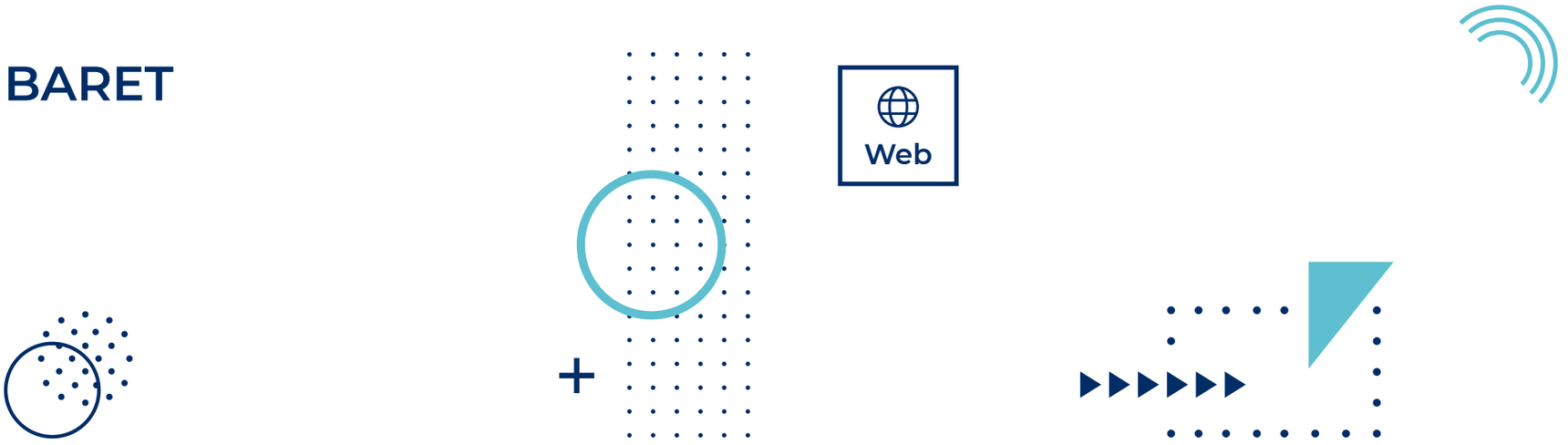
City of Huesca

Huesca is a province of northeastern Spain, in northern Aragon and has 220,000 inhabitants. The capital is Huesca, positioned just south of the central Pyrenees, it borders France and the French Departments of Pyrénées-Atlantiques and Hautes-Pyrénées. The city Huesca itself is one of the smallest provincial capitals in Spain.

Huesca is famous for its main festival, the Fiestas de San Lorenzo, in honour of Saint Lawrence, from the 9th to the 15th of August.

The region, where tourism is one of the biggest economic sectors, is well known for its closeness to the Pyrinees and its tourist attractions related to cultural heritage, sports and gastronomy. The local council of Huesca is committed to diversify, to de-seasonalise and boost tourism products while improving the visitor experience and maintaining a high level of citizen quality of life in an environmentally friendly way. To achieve the aforementioned objectives, the region is undergoing a digital transformation carrying out several projects in a Smart Destination context gathering objective data from several fields.

BARET



In this context, the FIWARE enabled platform BARET provides a way for the council to gather and analyse data to promote policies and a proper governance model around the Smart Destination. To achieve this goal, the platform gathers data from social media, a wide variety of news web pages, press releases and cross-matches them with regional sensor data models, hotel occupation data and sentiment analysis to determine the best local governance policies and predict the best areas to ensure the success of the marketing campaigns in the region. This allows the council to establish workgroups with the touristic agents of the territory and use the gathered data to adapt their value proposals.

FIWARE architecture provides the perfect developing environment for this matter, gathering data from a variety of protocols such as LoRaWAN, REST calls, NB-IoT devices and different nature, cross-matching objective data such as the temperature, air quality parameters and occupation with semantic data obtained from different social networks and review sites. This flexible architecture makes for the perfect foundation for a Smart Destination ecosystem.

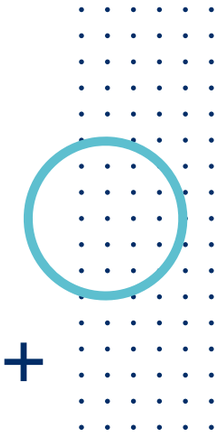
Lanzarote Island

Lanzarote is one of the Canary islands off the coast of West Africa in the Atlantic Ocean. With 152,289 inhabitants as of 2019, Lanzarote is known for its year-round warm weather, beaches and volcanic landscape. It has unique geology and unbeatable scenery, and was declared a Biosphere Reserve in 1993 by UNESCO.

In 2015, Lanzarote started on the road to becoming a Smart Island. This was the first step towards a digital transformation process to make the island an example of good practice in open innovation and Open Data for sustainable tourism development.

The Smart Island Lanzarote Smart Biosphere Reserve initiative, launched in 2019, is aimed at improving the management and productivity of the tourism sector and turning the island into a smart destination to boost the growth of the economy and improve the visitor experience. The initiative includes a holistic and comprehensive platform for public-private collaboration, project management and strategic planning offices, as well as an Innovation Centre that will boost a collaborative ecosystem around the platform to promote and accelerate the digital transformation of the island.

Smart Island Lanzarote



Smart Island Lanzarote Smart Biosphere Reserve is a public-private collaboration platform by Cabildo Lanzarote and Telefónica that provides real-time information on the environment and tourist services and enables collaboration between all actors in the island ecosystem. The platform positions the island as an international example of best practices in customer experience and performance management implementing standards and Open Source technologies.

Visitors are able to access all tourism products in real time with contextual and personalised information that supports decision making and helps to deliver the best experience respecting the environment and social impact of their activities in the island. The Digital Tourism Channel allows tourism agents to improve the efficiency of their operations, maximising their profits and boosting the economy through the consumption of local products and services.

Thanks to a Predictive Sustainability Balanced Scorecard, private and public managers are able to forecast forthcoming states or conditions, optimising their services and operations and improve overall planning and effectiveness.

La Palma Island

La Palma is located in the far northwest of the Canary Islands and belongs to the province of Santa Cruz de Tenerife. It has a population of over 85,000 inhabitants. Divided into 14 municipalities, it has a wide diversity of landscapes and climates that have led it to be declared a Biosphere Reserve by UNESCO and a Starlight Destination for astronomical observation.

La Palma Smart Island is a project run by the Innovation, Projects and Information Society Service of the Cabildo Insular of the island of La Palma. Its objective is to provide the island with technologies that will allow a more efficient management of our resources, services and infrastructures, creating spaces for interaction between citizens, companies and administrations.

The Smart Island Platform will be a key element in the transformation of the island into a Smart Island. It constitutes the heart of the project, allowing all the components and functionalities to be interconnected and centralised in one place, becoming a holistic and integral platform for public-private collaboration that drives local development through the digital transformation of the island.

CABILDO LA PALMA

City strategy official website

FIWARE

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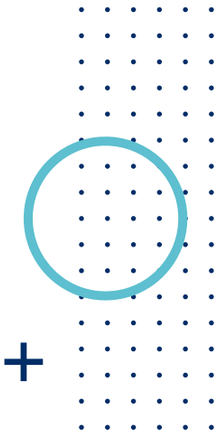
Smart Island Platform



The Smart Island Platform is a horizontal and open platform based on Telefónica's Thinking City Platform that operates in an hybrid on-premise & cloud mode, fully compatible with the requirements of the UNE 178104 standard and the OASC recommendations, which integrates the key technologies for the development of applications in the field of Smart Cities and Smart Islands, mainly using FIWARE specifications, standards and reference implementations, which ensures effective convergence and the creation of an innovation and entrepreneurial ecosystem around it.

The connection with the Internet of Things, the integration of multiple data sources, the storage, access, processing, publication and analysis of both multimedia content and large-scale data (Big Data), the co-creation of applications and content, the development of advanced user interfaces, the creation and maintenance of a semantic model of entities and data that enable the standardised exchange of information, are examples of issues that can be easily addressed using a FIWARE-compatible platform.

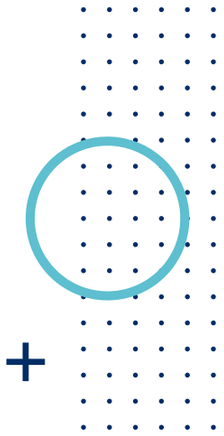
Las Rozas de Madrid

The municipality of Las Rozas de Madrid has one the highest incomes per capita in Spain. The city has experienced a strong population growth, going from 35,137 inhabitants in 1991 to 95,725 registered on January 1, 2022. “Las Rozas Smart City” is a determined commitment to developing a sustainable management model based on innovation, new technologies and attracting talent, as fundamental elements of the city’s future growth strategy.

In this context, the main objective is to improve the quality of life for citizens who live in the municipality and those who come to Las Rozas to work, serving as a hub of business, commercial, tourist and environmental attraction.

In short, Las Rozas Smart City seeks to turn the municipality into a smart city that promotes improving the quality of services, making tools available to citizens that allow them to have a closer and more agile relationship with the city administration.

Smart City Platform



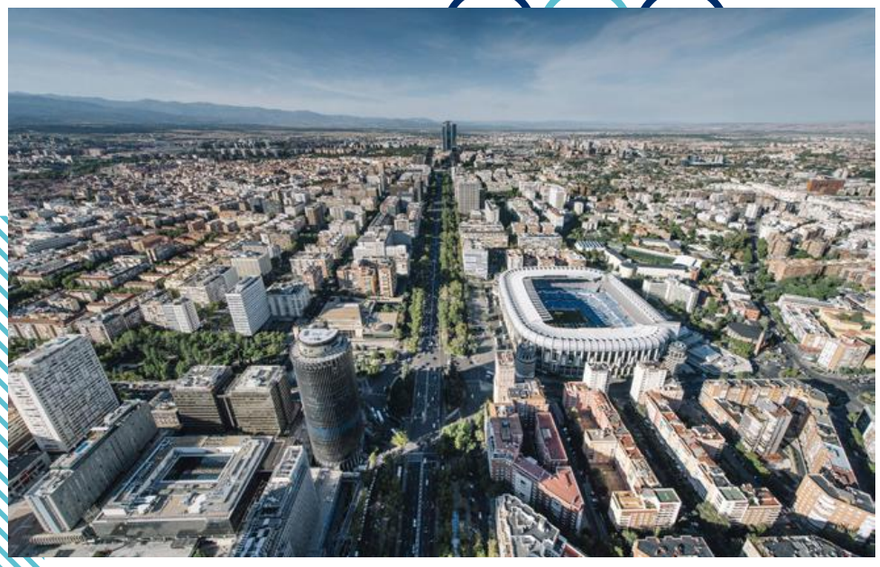
The solution focuses on implementing several verticals in the smart city platform of Las Rozas.

For example, it integrates IoT and Big Data technologies to optimise traffic systems and reduce the city's environmental footprint. It uses traffic analysis and simulation for informed decision-making and the implementation of effective mobility strategies.

It also contributes to the development of Las Rozas as a model of smart and sustainable urban mobility. The module will allow for the scalable integration of IoT devices based on open, non-proprietary standards from international bodies, ensuring full compatibility with the city's intelligent module.

Las Rozas uses the Smart City platform to manage energy supplies and improve efficiency. All data obtained from monitoring will be integrated into the module following the standard format following FIWARE data models to allow them to be cross-referenced and integrated.

City of Madrid



Madrid is the capital of Spain, located in the center of the South-European country and has roughly 3,400,000 inhabitants. The metropolitan area is home to 6,1 million inhabitants making it the biggest city and metropolitan area in Spain. It is – and has been since the ninth century – not only the political center, but also a cultural and economic hotspot of the country. Due to its strong economic output, it is considered to be one of the most important economic centers in Europe.

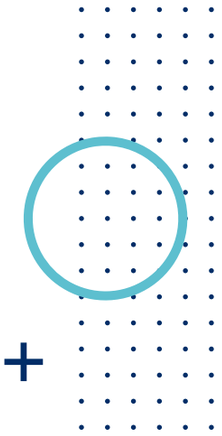
To deal with the challenges of modern cities and societies, Madrid developed a Smart City Strategy aiming for a digital city that not only makes the city more sustainable and resilient, but also empowers the citizens to improve their quality of life.

The strategy covers different aspects of the city's daily challenges: Civic Engagement, Sustainable Urban Development, Smart Transportation and Mobility and Digital Infrastructure.

MADRID

City strategy official website

Open Data Portal



Open Data Portal - A platform to support the decision-making of public administrations.

HOPU's solution allows cities to collect, analyze and visualize a large amount of data related to the environmental situation of cities. This includes sources of data on transport, utilities, Social Media, Open Data and data coming from citizens' own devices to offer an unique indicator that facilitates the understanding of the territory's environmental state. In particular, HOPU focuses on helping sustainable cities working on climate actions in different ways: an Air Quality Index to know the state of air pollution; a Pollen Service to control the particulate matter levels that may affect the population at risk; Sound Level Control to assess noise pollution in cities that affect inhabitants' mental health and finally: People Flow.

This solution uses the FIWARE Context Broker. Following the FIWARE Open Source approach HOPU integrates datasets from different data sources such as energy or water consumption, Social Media, health aspects, among others, offering a solution that allows the analysis of all contextual data, and providing simplified indicators for decision-making.

City of Málaga

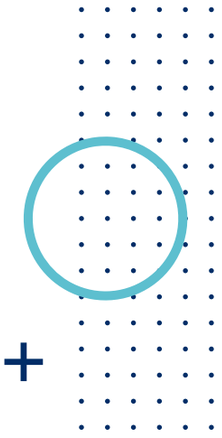
The present and future of Málaga are written under the title “Málaga Smart”, linked to the combination of four elements: Territory, Citizenship, Technology and Innovation, and where each of the actions undertaken are carried out in a sustainable and integrative way, achieving maximum efficiency in the 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) holds a substantial amount of data with more than 900 datasets (as of mid 2021). The main problem to solve is the aggregation of this data in a way that it can promote 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 its portal, “2020 Best project award in transparency, openness, access to information and reuse”.

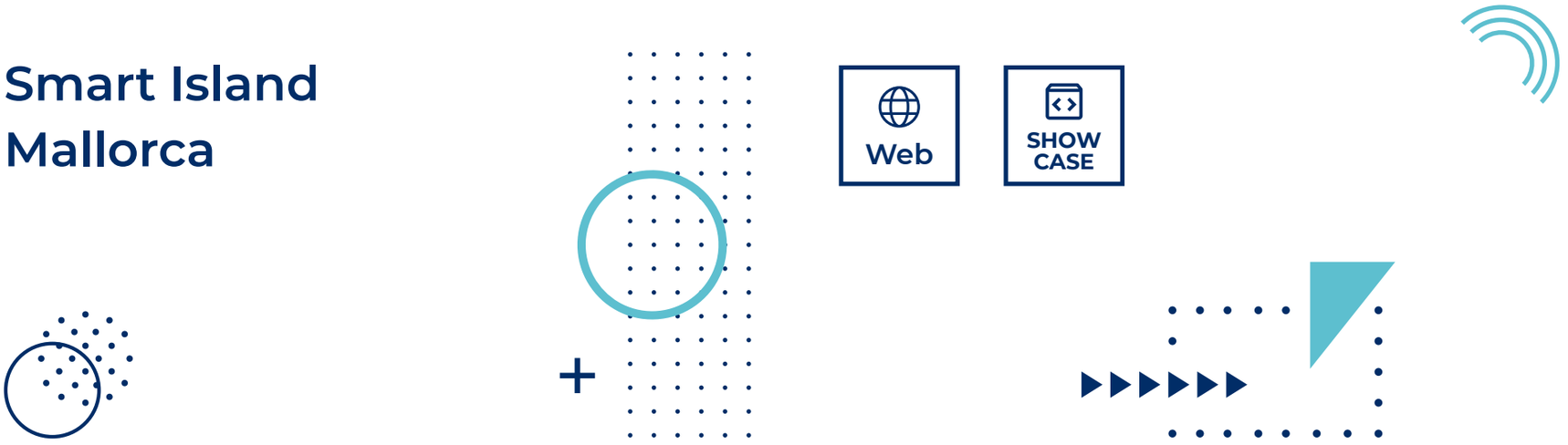
Mallorca Island

Mallorca is the largest island in the Balearic Islands, which are part of Spain and located in the Mediterranean. The capital of the island, Palma, is also the capital of the autonomous community of the Balearic Islands with a population of more than 416,000 inhabitants.

Among its strategic objectives for the coming years are the improvement of the quality of life of the inhabitants of the island, the revitalisation of tourism - to offer a better experience to visitors and expand its impact on the economy - and support for local corporations. The Smart Island Mallorca project plans to launch a platform that will capture and manage the island's information and make it available to citizens in real time.

The Smart Island Mallorca initiative aims to achieve the social and economic well-being of the island's citizens. Through the use of information and communication technologies (ICTs), based on digital infrastructure and digital services, a territory is being built that manages its resources in a more efficient and sustainable way.

Smart Island Mallorca



The Smart Island Mallorca Platform, led by Telefónica, is based on FIWARE technology allowing the integration and standardisation of data regardless of the sources and protocols used. The platform will not only collect the information generated from its implementation, but will also be integrated with systems already in operation to rely on pre-existing information.

The platform will be accessible through a website, smart apps and smart bus stops, tourist information panels and an Open Data Portal, providing the island with an integrated view of service information that will help design and adapt processes in a better way, making governance decisions based on accurate information.

Main benefits include the interconnectivity between all components, providing leaders and managers greater control over processes that will facilitate decision-making, favouring transparency and increasing the efficiency of actions; whilst simultaneously improving the quality of life for citizens.

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 being 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 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

City strategy official website

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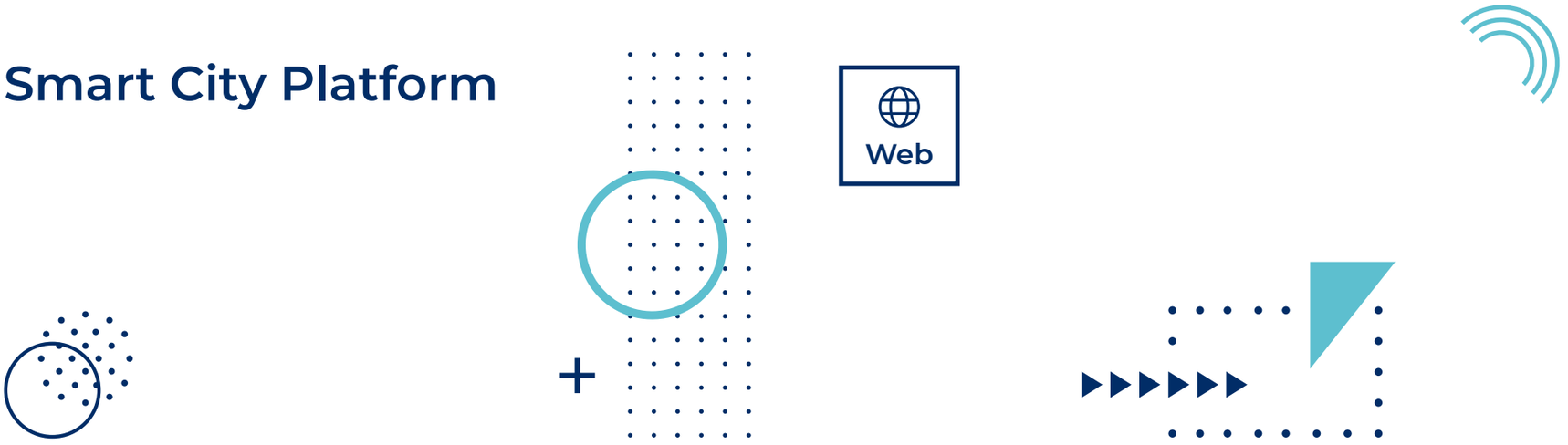
Smart City Platform



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.

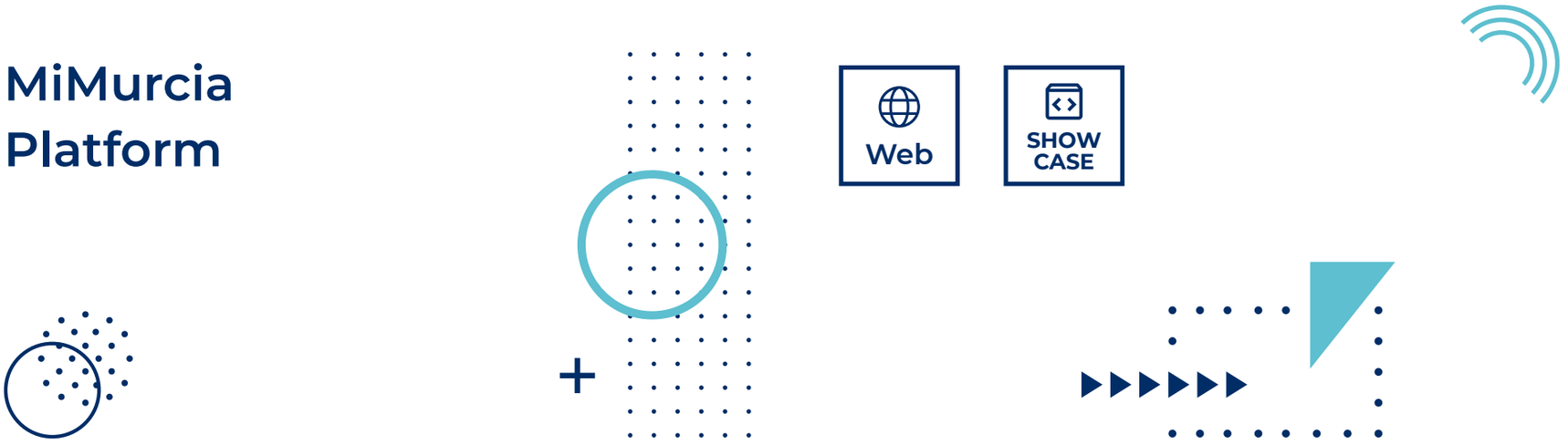
The city has been selected by the European Commission as one of the 100 cities to participate in the ICC (Intelligent Cities Challenge), a unique opportunity to join a community that harnesses advanced technologies to tackle the pandemic crisis and rebuild their economies while steering them towards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

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

City 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 developed by Telefónica 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).

Provincial Council of Pontevedra

Pontevedra, located in Galicia, Spain, covers 4,500 km2 and has a population of 950,000. The province boasts important historical monuments, such as the Cathedral of Tui, the Monastery of Poio, and the Basilica of Santa María la Mayor. In addition, it offers a wide variety of tourist activities including hiking, rural tours, wine tours, thermal tours, and water sports.

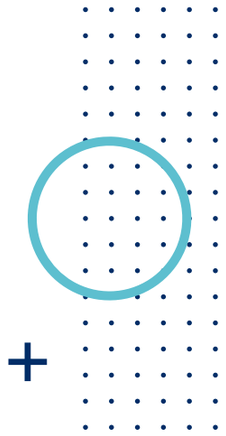
The “Tourist Inside Rías Baixas” project has a 1.9 million euro investment with 60% contributed by Red.es and 40% by the Diputación de Pontevedra. This initiative is part of the National Plan for Smart Territories, a strategy that builds on the previous National Plan for Smart Cities. A total of 25 projects have been selected from 9 autonomous communities, including Galicia, which will involve an investment of 73.97 million euros.

The main actions of Smart Territories currently being carried out by Red.es are the calls for “Destinos Turísticos Inteligentes y Objetos Internos de Ciudad”, which represent an evolution in the development of the Smart City concept. These calls aim to improve the tourist experience at the destination and optimise municipal services by managing information collected from the internal objects of the city.

Deputación Pontevedra

City strategy official website

Tourist Inside Rías Baixas



The Provincial Council of Pontevedra has presented the “Tourist Inside Rías Baixas” project, which is a beneficiary of the “Convocatoria de Destinos Turísticos Inteligentes” of Red.es. Its main objective is to transform Pontevedra into a Smart Tourist Destination.

The initiative promotes the use of information and communication technologies in the tourist sector to make local entities tourist-friendly. The objective is to improve visitors’ experiences and quality of life for residents. FIWOO, a no-code IoT platform based on FIWARE, is used as the main platform for the project. It is where the different dashboards and KPIs are configured to visualise the data collected by various hardware devices installed throughout the province.

Additionally, the project involves the installation of various physical devices. These components include intelligent tourist signage systems, a visitor reception centre, tourist offices, weather stations, beach control and monitoring systems, intelligent waste management, interactive totems, a mobile application for tourists, interactive maps, and immersive technology, among others.

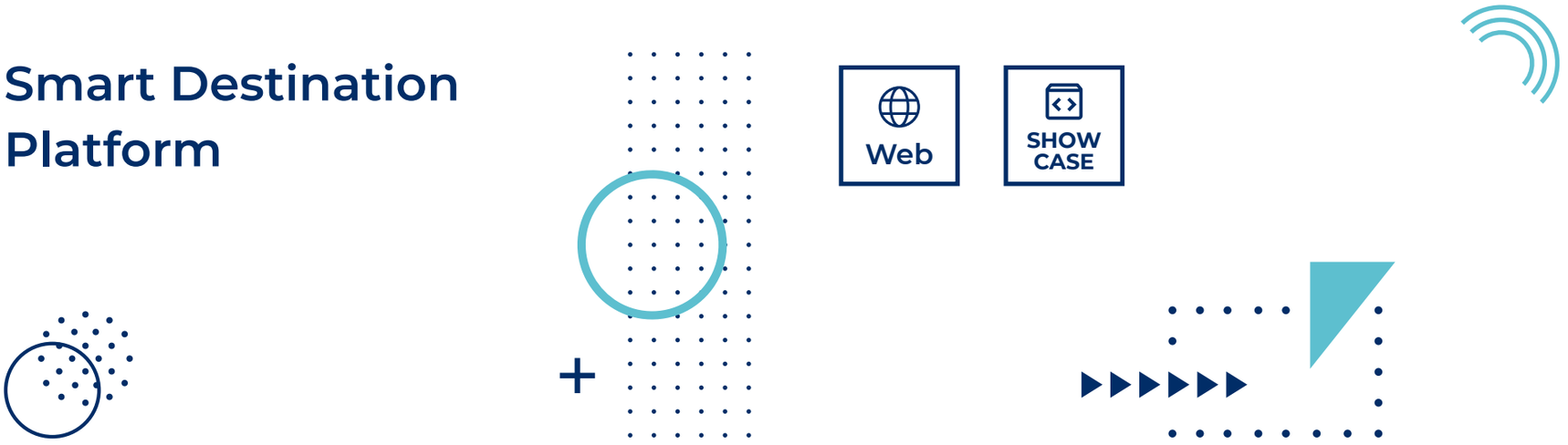
City of Puerto de la Cruz

Puerto de la Cruz is a city and municipality in the northern part of the island of Tenerife, Canary Islands, Spain. The municipality is the smallest in Tenerife square meter-wise. Still its population is 30,483 as of 2018.

Tenerife became an international benchmark for tourism sustainability from the summer of 2021, being the first destination to implement the Sustainable Development Goals (SDGs) after the zero tourism decreed to halt the advance of Covid-19. City managers are committed to support a sustainable touristic offer and promote this approach within the private sector while recommending improved accessibility to promotional tools, as well as in information offices and in the tourism sector in general.

The project “Puerto de la Cruz: Smart Tourist Destination” is based on a public-private collaboration between Telefónica and the city that will help to develop a more efficient city model, that will promote the energy efficiency and the reduction of the carbon footprint associated with the tourist activity in Puerto de la Cruz as well as interoperability within different administrations and agents and universal access to data.

Smart Destination Platform



The Smart Tourist Destination initiative aims to provide a comprehensive vision of the city through the development of a Smart Tourism management system that allows the integration of data, its subsequent analysis and the provision of open data. The three main elements that make up a tourist destination were taken into consideration: supply, demand and management. To this end, the development of three actions have been implemented:

Firstly, a Smart Tourism System that allows the integration of data, its subsequent analysis and the provision of open data.

Secondly, a Smart Signalling System to offer good quality information to the digital tourist, with this information being managed by the municipality itself. Thirdly, Park Expert, a scalable system that integrates existing and future heterogeneous data to offer an estimation of park density Geolocation and Virtualisation to contribute to the dynamization of the local business and helping SMEs to position themselves in a complex digital environment and their potential customers to easily locate their companies and products through easy to use applications.

City of Santander

Santander is the capital of Cantabria Region, situated on 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

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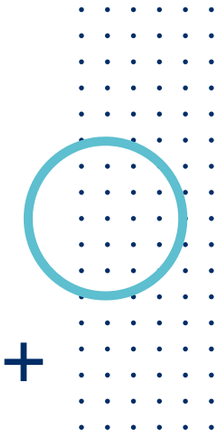
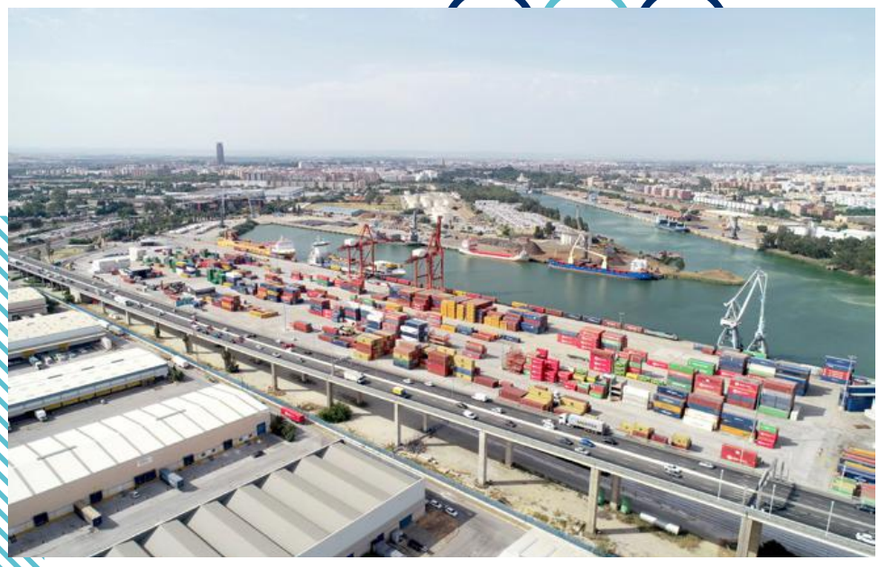
Santander City Platform



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 – led by Telefónica – 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 has been participating in several smart cities initiatives with the SmartSantander project as a flagship that marks a before and after in city innovation.

Port of Seville



The Port of Seville, Spain's only inland seaport, is situated in one of the country's major metropolitan areas, boasting a population of over one and a half million people in the surrounding region. Located in the south of the peninsula, it is a vital hub for cargo generation and a strategic enclave for the European Union.

With complete multimodal connections via maritime, rail, and road transportation, the port features six concessioned terminals and three public docks, spanning over 4,000 metres of mooring line, one million square metres of warehousing space, and a cruise terminal in the city centre.

Moreover, the port encompasses 850 hectares of logistics and industrial development space and serves as a benchmark for agri-foodstuff, steel, and container traffic. It's also home to the first ZAL in Andalusia, a Free Trade Zone, and a cruise terminal in the city centre, making it a prime location for business and tourism alike.

Puerto de Sevilla
Autoridad Portuaria de Sevilla

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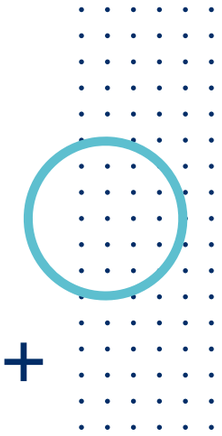
The PAIS Platform



The PAIS Platform, short for “Advance Platform for Service Integration” in Spanish is the primary result of the AIRIS project, which aims to implement the European RIS standard (River Information Services) for optimising navigation to the Port of Seville by digitally monitoring the Guadalquivir estuary.

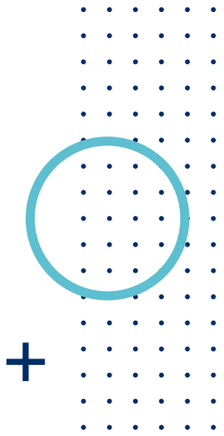
PAIS was designed and developed by Portel and Ficodes as an advanced information system provided to the Seville Port Community. Its main goal is to improve ship traffic management by collecting data from IoT sensors deployed in the river from Sanlúcar de Barrameda to Seville, and external data sources such as AEMET, OPPE and AIS. To achieve this, the digital twin of the port was defined and built on top of the “Powered by FIWARE” platform Opplafy.

Thanks to disruptive technologies and the FIWARE architecture, the Port Authority of Seville can monitor parameters such as water level and quality, currents, tides, vessel positions, and weather forecasts in near real time. Furthermore, PAIS provides information on the traffic of the estuary and facilitates its management by optimising resources. PAIS also offers its context data to the port community, enabling the development of new applications through its NGSI REST api. These factors encourage more efficient coordination of operations throughout the entire port area.

Tenerife Island

Tenerife, the largest of Spain's Canary Islands, is home to over 900,000 inhabitants. Known for its diverse landscapes, rich cultural heritage, and vibrant tourism industry, Tenerife also serves as an economic hub in the region. Recently, Tenerife has been advancing its Smart City Strategy, particularly in response to environmental challenges. The devastating wildfire of 2023, which affected 11 municipalities and burned over 14,000 hectares, prompted the local government to seek innovative technological solutions for better disaster management and environmental monitoring. A key initiative involves the deployment of LoRaWAN technology by Secmotic. This project uses advanced environmental sensors to monitor soil and atmospheric conditions in the affected areas. The initiative ensures extensive data coverage and real-time analysis by installing gateways and sensors, including in remote locations like the Gaitero tower. This system is integrated with the **FIWOO IoT platform based on FIWARE**, enhancing data collection and interpretation for efficient decision-making. Tenerife's embrace of cutting-edge technologies like LoRaWAN and FIWARE underscores its commitment to sustainability and smart urban development, positioning it as a forward-thinking leader in environmental management and digital transformation.

Smart Island Tenerife



The project carried out at Torre de Gaitero, with LoRaWAN and FIWARE, is a public-private collaboration platform between the Excmo. Cabildo Insular de Tenerife and Secmotic that provides real-time information on the environment, facilitating collaboration among all actors in the island's ecosystem. This platform positions Tenerife as an international example of best practices in performance management and user experience, implementing standards and open-source technologies. The system allows environmental agents to improve the efficiency of their operations, maximising their effectiveness and promoting sustainability through continuous and precise monitoring of soil and atmospheric conditions. Thanks to a Predictive Scorecard, public and private managers can anticipate future states or conditions, optimising their services and operations to enhance overall planning and effectiveness.

This innovative solution, based on the FIWOO IoT platform and FIWARE technologies, strengthens Tenerife's resilience to environmental challenges and promotes sustainable urban development.

City of Toledo

Toledo is a city and municipality of Spain and the capital of the province of Toledo. It was declared a World Heritage Site by UNESCO in 1986 for its extensive monumental and cultural heritage. Located on the banks of the Tagus in central Iberia, Toledo is known as the “Imperial City” because it was the main venue of the court of Charles V, Holy Roman Emperor in Spain. The Toledo Smart City project aims to implement an efficient management of public services accessible for all, contributing to the development of the digital economy in the city and the growth and competitiveness of businesses.

The use of information technologies will support innovative projects for the city, especially in terms of citizen participation, and improved accessibility to public services, promoting transparency and universal access to data, as well as interoperability and reuse through standardised open protocols.

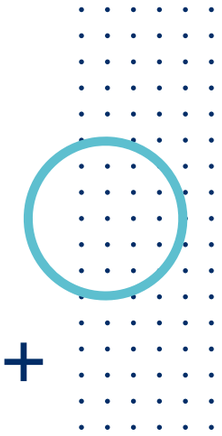
Toledo Smart City initiative aims to provide tools to the municipal corporation to enable better management of the city and the provision of services to citizens, which also makes the town smart(er).

Ayuntamiento de Toledo

City strategy official website

FIWARE

Toledo City Platform



The Smart City Platform by Telefónica acts as a unifying and integrating technological core to enable the control of service provision, data management and communication with citizens. This information and communication architecture has been designed to be robust, open, transversal, scalable, secure and with privacy guarantees, thus making the smart city concept a reality.

The Smart City Platform integrates the following main elements: Dashboards supporting decision-making and providing data that can be made public on the open data portal. The scorecards implemented cover the areas of tourism and mobility and provide information on energy and economic efficiency in the provision of services, which is used to identify areas for improvement and savings. Business analytics and predictive analysis tools to optimise decision-making in real time and to discover trends and patterns in the data that make it possible to anticipate and control events in the city. Smart Channel to involve citizens in decision-making, improve transparency and accessibility to municipal information and increase citizen satisfaction with municipal services.

City of Valencia

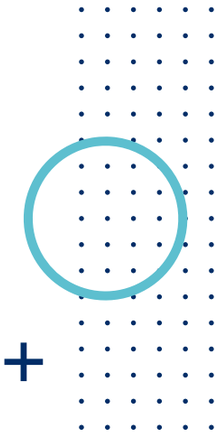
The port city of Valencia lies on Spain's southeastern coast, being the capital of the autonomous community of Valencia and the third-largest city in Spain with 791,413 inhabitants inhabitants.

València is already a benchmark as a smart and sustainable city, being one of the first three cities in the world to be double certified in the measurement of progress by the SDGs and active in various international forums that work to make technology an ally for sustainability, well-being and people's quality of life. The city digitalizes the present to improve the Valencia of the future.

The Smart City competencies were carried out by the IT service from the beginning, but given the importance and evolution of this topic in cities and the importance of centralised ICT management also in the non-administrative field, the government team decided to create the Smart City Office in February 2018 as its own municipal service.

The Smart City Office intends to turn València into a Smart City by helping the services and actors of our socio-economic environment to use technology to solve public problems and achieve a better quality of life for citizens.

VLCi Platform



The VLCi platform, driven by Valencia City Council and Telefónica, was the first Smart City Platform deployed in Spain that complies with FIWARE standards, collecting all types of information from Valencia City Council systems and from the systems and devices deployed in the city. This project (i.e. Impulso VLCi) provides the city with new solutions in five different Smart Areas (mobility, governance, environment, society, well-being). These initiatives represent a major step forward in the field of Smart City development, enriching the VLCi platform with new indicators and information that can be used transversally in the City Council and will have a positive impact on the daily life of citizens.

Further development of the VLCi platform will be part of the Smart City strategy during the next years, focusing on citizen well being, efficiency and sustainability as key factors and will be aligned with the achievement of the Missions Valencia 2030 and the fulfilment of the United Nations Sustainable Development Goals.

City of Vigo

Vigo is a city in the province of Pontevedra, within the autonomous community of Galicia, Spain. Located in the northwest of the Iberian Peninsula, it sits on the southern shore of the Atlantic Ocean.

The municipality has a population of 295,364 as of 2019 including rural suburbs and is the most populous municipality in Galicia. The area of the municipality includes the Cíes Islands, which are part of the Atlantic Islands of the Galicia National Park.

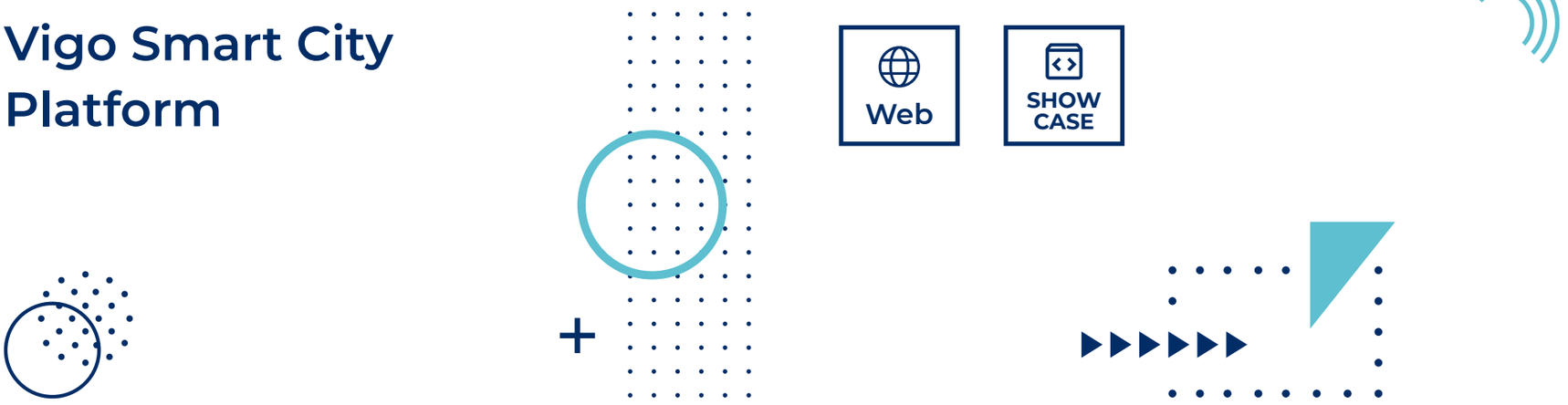
Due to its port, Vigo is one of the region's primary economic agents, whilst being a touristic centre. Close to the Portugal–Spain border, Vigo is part of the Galicia–North Portugal Euroregion and hosts the headquarters of the European Fisheries Control Agency.

The Smart City Strategy of Vigo aims to improve the relationship between citizens and public administration by making the Smart City management more transparent and include citizens in the creation of a smart and inclusive city.

CONCELLO DE VIGO

City strategy official website

Vigo Smart City Platform



Vigo Smart City Platform intends to improve the municipal management and efficiency whilst offering new and innovative services through Apps to citizens, companies and entrepreneurs. It has been selected by IDC as the second best platform in EU and Asia.

The VCI+2.0 platform by Telefónica centralises and structures the city's data in a comprehensive and complete scorecard that provides indicators for decision-making, based on the intelligent analysis of all information. With this dashboard, municipal management gains in efficiency by optimising resources and improving response times. Ready to be integrated with all municipal platforms, this dashboard thus becomes a central management element. The platform also includes an Open Data Portal. Here, any citizen will be able to access the data in different formats for professional or personal use.

The second project linked to the VCI+2.0 platform focuses on the management of interactive routes; it allows the creation and definition of dynamic routes outdoors and indoors. The aim is to enhance the value of the city's heritage, which will serve to promote tourism, culture and leisure.

City of Villarreal

Villarreal is a city in the province of Castellón which is part of the Valencian Community in the east of Spain. The city is a suburb 7 km to the south of the province's capital Castelló de la Plana. Villarreal is separated from Castelló de la Plana by the Millars River. It has 51,367 inhabitants, most of them living in the urban area.

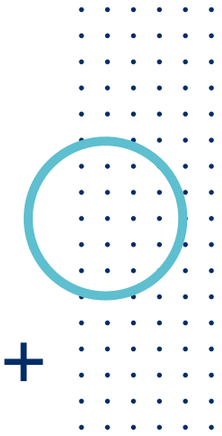
Distinguished as City of Science and Innovation, Villarreal has been incorporating services and improving communications infrastructure for years through different technological alliances in its aim of turning the city into a Smart City.

Today, the city is moving from data collection from different data sources, to a complete sensorization and monitoring of public services through a horizontal platform run by Telefónica and based on FIWARE standards that will allow citizens to access all the information on the city's urban services in real time and for the Municipality to gain a holistic view on what is happening in the city.

Ajuntament de Vila-real

City strategy official website

Smart City Platform Vila Real

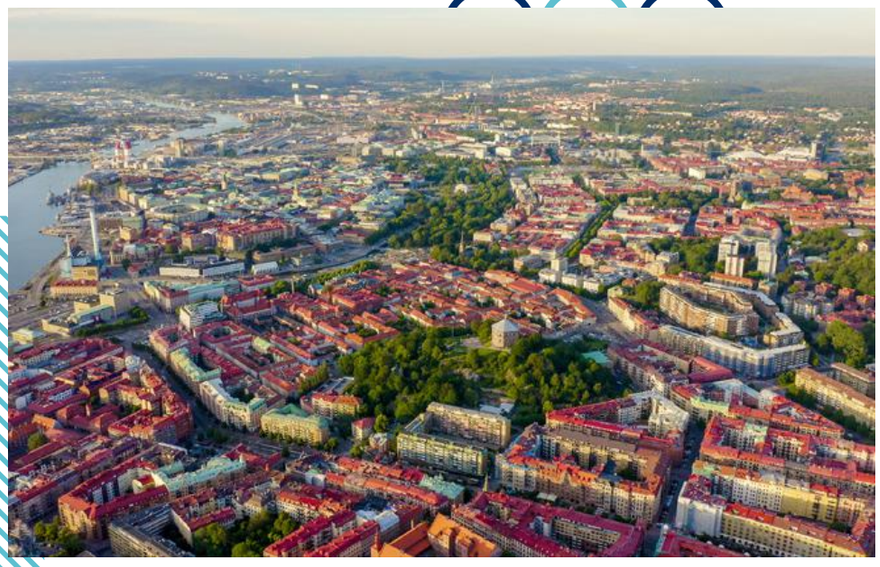


The City Council of Villarreal will provide its citizens with a data platform that will allow access to all the information of urban services of the city in real time. The implementation of the platform, of European FIWARE standard, has been included as one of the main novelties in the tender for the municipal telecommunications contract, with a total value of 1.3 million euros.

Villarreal is launching this Smart City Platform in 2022. Among the applications installed or planned to be launched in 2022 on this platform are: Air Quality monitoring, Smart Irrigation, Lighting control, Energy Management in municipal buildings, control of access to the city and ornamental fountains, as well as monitoring of the water and sewage network.

In addition, in order to take advantage of the possibilities of the FIWARE platform, smart clauses are included in the tenders for the city's digitalisation strategy. This includes public transport contracts, waste collection and street cleaning, the Bicivila't bicycle lending service, cameras for traffic control and safety on public roads and the renewable energy project in 11 schools of the city.

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 a FIWARE Member with Promalaga, as a winner for 2020. 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.

City of Gothenburg

City strategy official website

SCOREwater Project

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 like Gothenburg 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

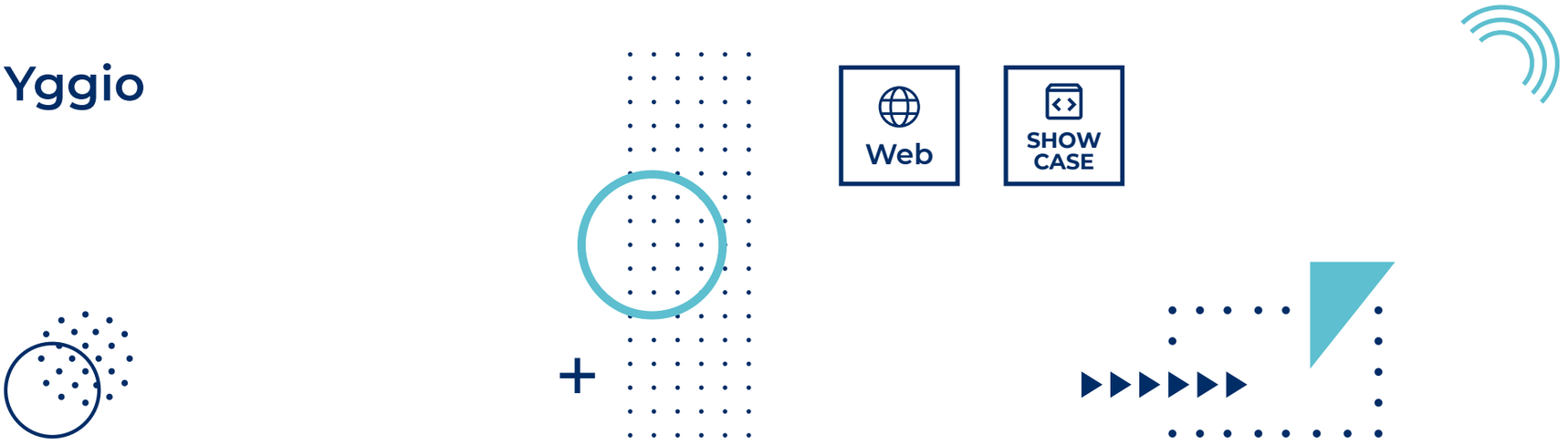
City of Helsingborg

A port city on the Sound, on Sweden's Lund Peninsula, Helsingborg is situated on the narrowest part of Öresund, across the water from its Danish counterpart Helsingør. It was controlled by the Danes up to the Treaty of Roskilde in the 17th century. As Sweden's Most Environmentally Friendly Municipality four years running, Helsingborg is leading the way in sustainable solutions. Electric ferries, a unique three-pipe sewer system, and tree-planting initiatives across the city are just some of the sustainable innovations.

H22 is a major initiative by Helsingborg to develop future welfare solutions aimed at improving quality of life in a smarter, more sustainable city.

Helsingborg is well known throughout Sweden as a collaborative, innovative and exploratory municipality. The different municipal departments as well as the municipality owned companies are all working together, for the greater good.

Yggio

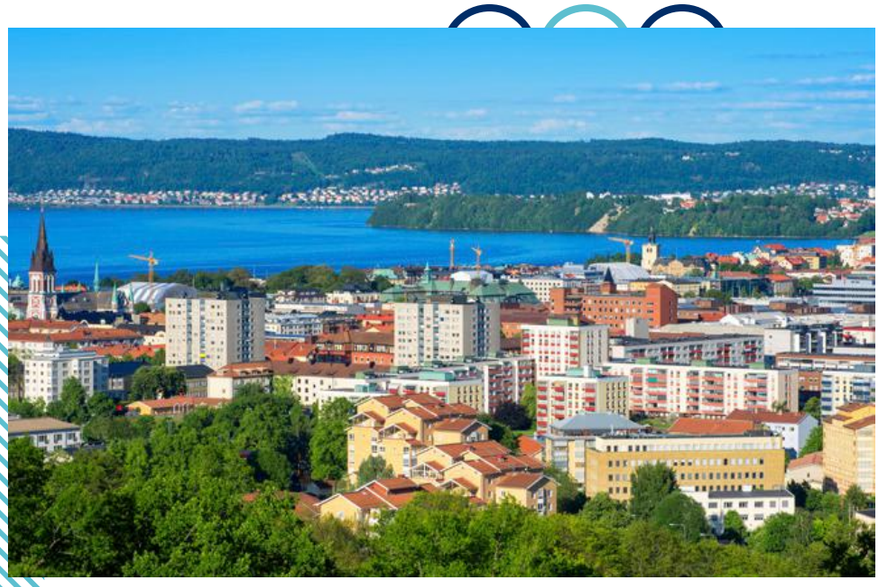


One of the municipality owned companies is broadband organisation Pingday. Pingday delivers broadband using fibre, TV and telephony to the municipality of Helsingborg as well as Bjuv and Höganäs.

Pingday has selected Sensative and Yggio as a central component, where FIWARE NGSIv2 and the FIWARE Smart Data Models were important amongst other requirements.

The city representatives are very active in terms of digitalization, trying to leverage modern technology and IoT in various domains. The city development team is working with smart street lighting, moisture levels in the soil where they have planted trees, life buoys, water measurements etc. The social department is exploring how IoT could help out create better relationships with citizens in need. Schools are being monitored in terms of work environment and food quality. They even measure the queue length to the school cafeteria to excel in planning for lesser foodwast, and so on. It is safe to say that Helsingborg takes smart seriously, and the FIWARE based platform YGGIO and Pingday is at the centre of the digital development.

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.

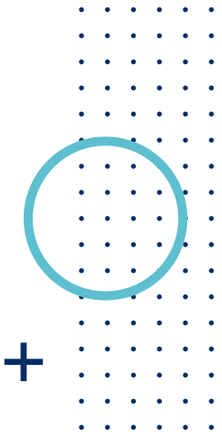
The project, which is ongoing for 2.5 years, with the possibility to do further work, later on, performed a public tender process where Yggio was selected as the central platform. FIWARE was requested by the project as a way of making sure the results of the various implementations will be re-usable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

At Sweden's southernmost tip lies the lively university town of LUND. Historical charm meets innovation between cobblestones and half-timbered houses. Around Lund, enchanting beech forests and bright rapeseed fields invite you to go hiking and cycling. At almost a thousand years old, Lund is one of Sweden's oldest cities and known as a city of history, culture, science and innovation. More than a third of the inhabitants of the city of Lund are students. Smart minds from all over the world flock to the 1000-year-old city, whose university is one of the 100 best in the world.

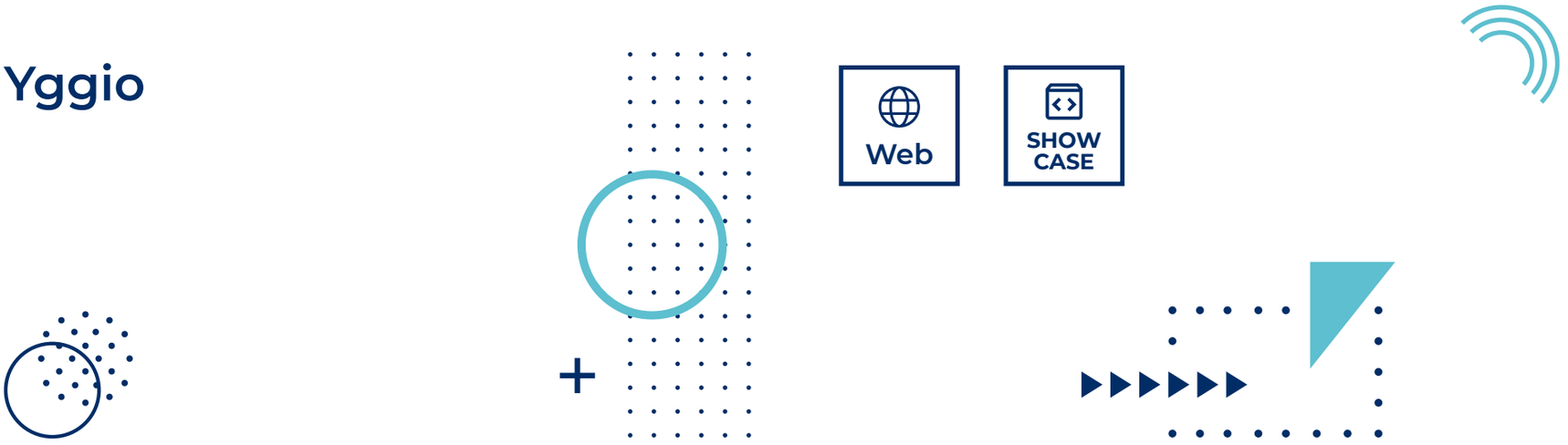
Future by Lund is an innovation platform for development of sustainable and attractive cities. A meeting place for new and established participants side by side that focuses on "Smart Cities & Smart Citizens".

Future by Lund has been active in the Smart City area facilitating many projects for years. The project has created an open digital platform for any actors to take part in and where there has been innovation going on. Mobility solutions, technical department use cases, parks, and football grounds monitoring.

LUNDS KOMMUN

City strategy official website

Yggio



The city of Lund is only one part. The smaller villages around Lund are also in focus in the municipality. The project ‘Smart Villages’ runs in the area of Veberöd, including a connected water tank for cows, water quality in the little river, 3D visualisation of the village are some of the use cases. Today, Lund is vibrant with different use case, and the city as such, as well as the municipality owned companies, are ready to start to scale up and put IoT and data sharing to use.

YGGIO, by Sensative, has been the centrepiece for the digitalization, using FIWARE Smart Data Models and the NGSIv2 API as the entry point for most use cases. As Lund is also the home of Sensative, there is a close relationship between the different companies, the municipality and the University of Lund, all facilitated through Future by Lund.

Yggio acts as a real-time integration layer between services and connected assets, sensors, and networks, enabling multiple users and services to use data generated by both shared and private IoT devices.

City of Malmö

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

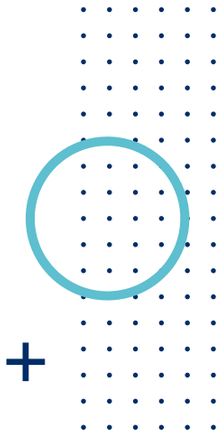
A swirl of diversity, a mishmash of old and new, Malmö is one of the most eclectic cities in Scandinavia and Sweden's most climate smart city that is building a whole new identity around sustainability. Malmö wants to be carbon neutral by 2025 and run 100% of municipal operations on renewables by 2030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



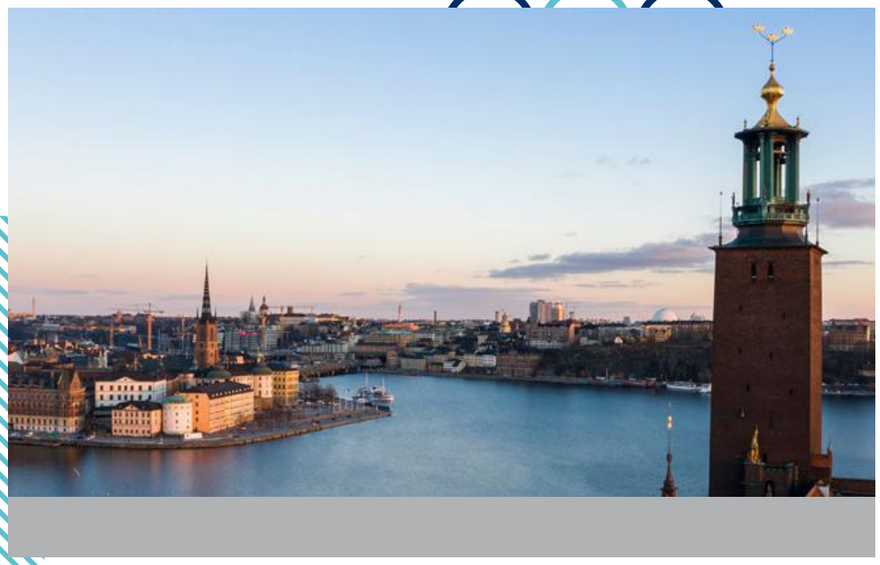
FISMEP pursues an interdisciplinary research approach that includes the fields of energy, information and communication technology (ICT) and social science - one of the three field research areas was carried out in Malmö. The aim was to investigate the residents' perception of indoor temperature conditions 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.

City of Stockholm



Stockholm stretches across 14 islands where Lake Mälaren flows into the Baltic Sea. It is the capital and largest city of Sweden with approximately 1.6 million residents in the urban area and 2.4 million in the metropolitan area.

Stockholm is the economic centre of Sweden and the region accounts for over a third of the country's GDP. It is also among the top 10 regions in Europe by GDP per capita.

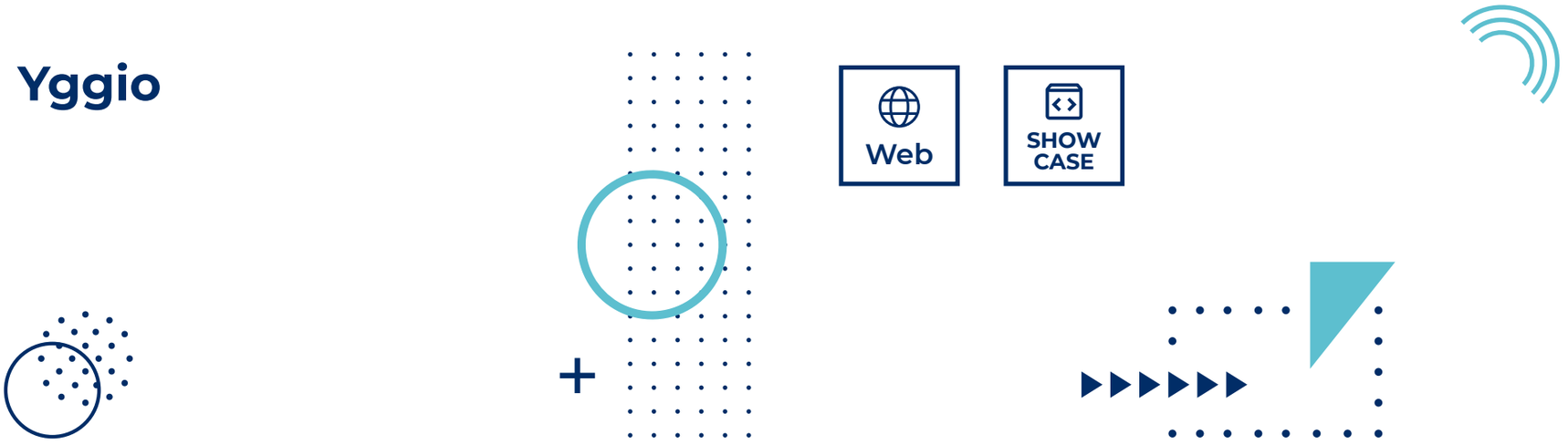
In international rankings, Stockholm is among the top scorers on quality of life, safety, trust, democracy, gender equality, and innovation. People want to live, study, and work here, and the city is growing rapidly. By 2040, the City of Stockholm is estimated to have a population of 1.3 million. This growth will bring challenges, e.g., building housing and adapting the transport infrastructure to keep pace.

Stockholm's current transport infrastructure is feeling the strain, and pedestrians, bicycle paths, and public transport need attention. Additionally, the city needs to focus on a number of other important challenges, such as how to boost Stockholm's competitiveness, reduce the city's environmental impact, and tackle the demands made by a changing climate.

Stockholms stad

City strategy official website →

Yggio



The Stockholm City Council has implemented a Quality Program for all departments, municipal companies, and employees. The six guiding principles lay the foundation for work with quality in the city: Focus on Citizens, Holistic View, Sustainability, Room for Action, Learning, and Openness. This program sets the foundation for continuous improvements, innovation, and digitalisation. A smart city is a sustainable city and this is made possible through connectivity, publicly accessible data, and IT-platforms that can communicate with each other.Stockholm has chosen to embrace a modular IT-systems landscape that strives to put open standards before proprietary solutions. Stockholm's IT-infrastructure is provided by TietoEvry. It will work with Yggio, a FIWARE based IoT-platform that fits the technical requirements and long term goals for Stockholm as an innovative smart city. The platform will be the back-end for implementation of use cases, as well as the development of common standards for how the city of Stockholm can share data with citizens, enterprises, and visitors. With the overarching Quality Program as a foundation, Stockholm continues to plan for growth, cohesiveness, great public spaces, and a climate smart and resilient city.

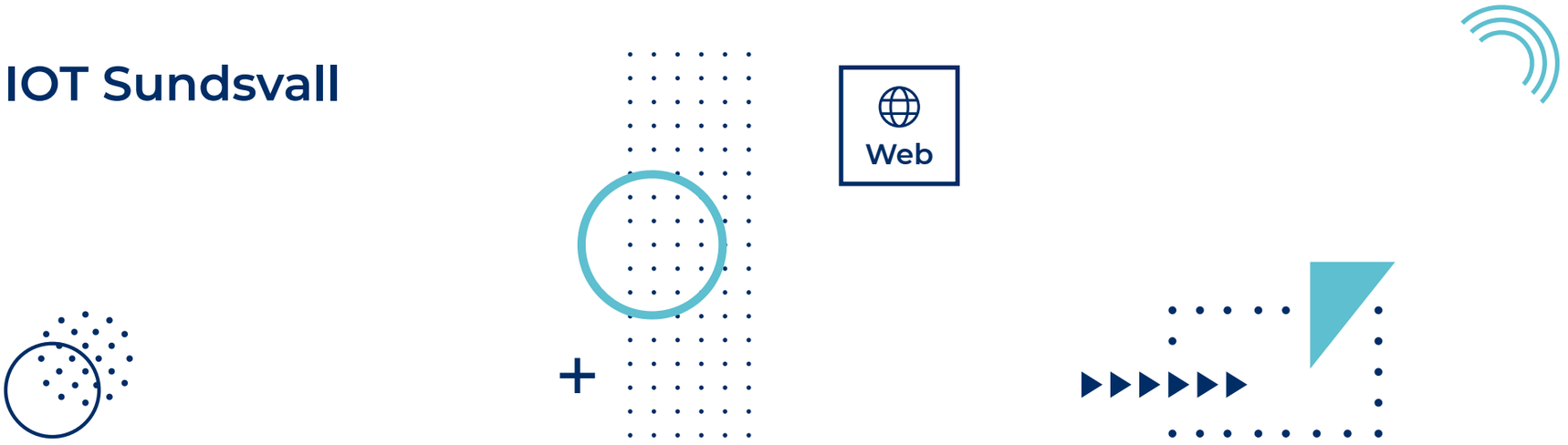
City of Sundsvall

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 Växjö

Växjö, with over 83,000 residents, is an exciting combination of idyllic small town, university location and entertainment metropolis. It's the centre of Småland in southern Sweden and the hub around which the region grows and develops.

Växjö municipality, together with its inhabitants, businesses, and university, has high ambitions to make itself sustainable, energy-efficient and fossil fuel-free.

In Växjö, there are several activities running to make the city smart(er). Two of the Smart City projects are Diaccess and Crossways.

Diacess stands for Digital Acceleration for Medium Sized Sustainable Cities and is an innovation project including all the municipality, companies and academy. The goal is to work towards the Agenda2030, contribute to the ongoing digitalization, develop innovative solutions, and create a collaborative model to work with companies and the municipality.

Crossways is a project that will develop a new housing area: Bäckaslöv in Växjö. Three actors, Skanska, Södra and Combitech partnered up and were appointed to create and develop a new modern sustainable residential area.

Växjö kommun

City strategy official website →

FIWARE

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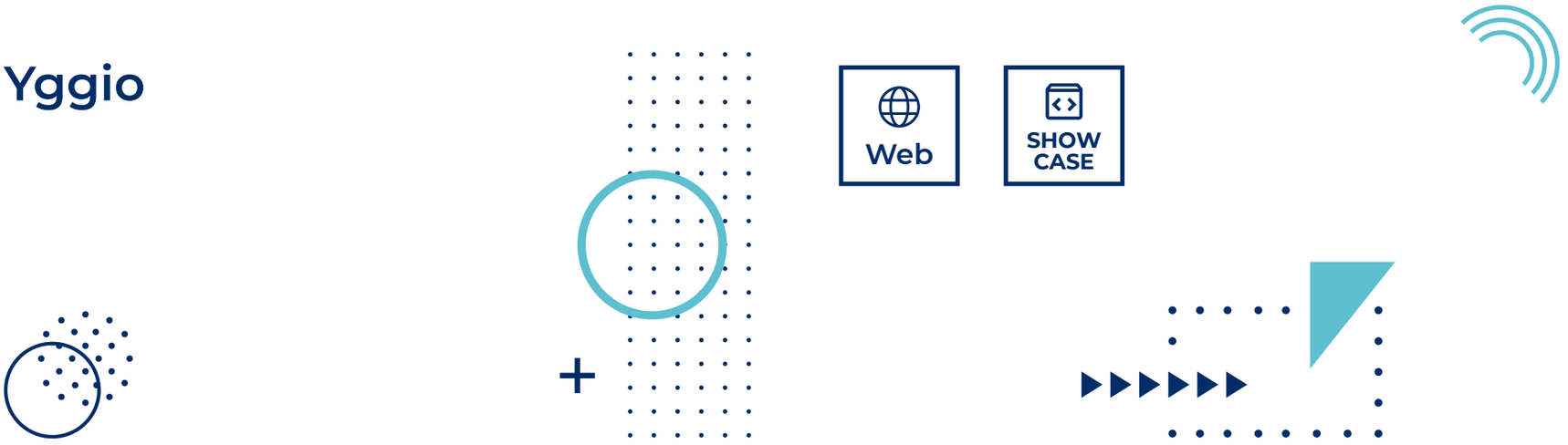
Yggio

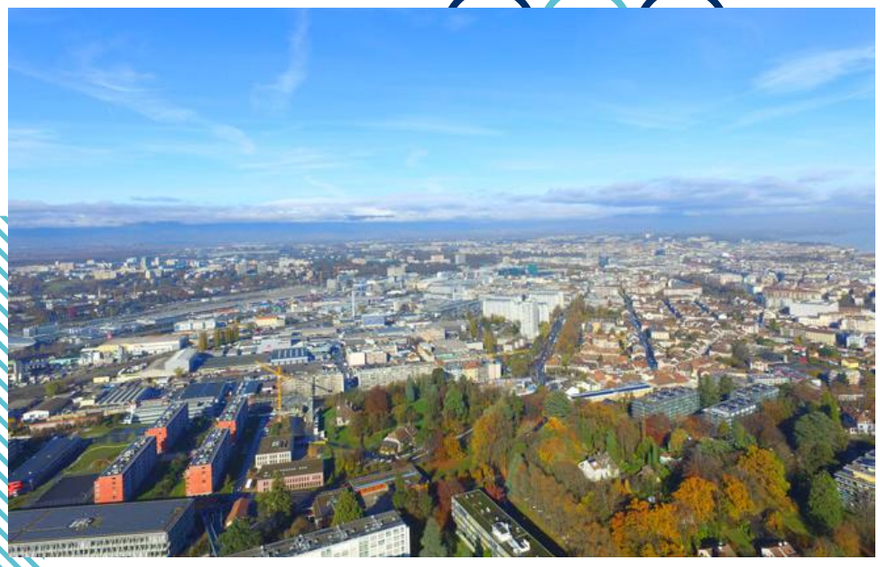


With these projects and activities ongoing, Wexnet needed a technical capability that would cater for many different use cases moving forward. As a municipality owned company, Wexnet ran a public tender process where they requested advanced features and functionality, including a hard requirement to use FIWARE NGSIv2 API.

Sensative, together with Combitech, a SAAB-owned Systems Integrator company, won the deal and are now supplying Wexnet with the platform YGGIO, a FIWARE based IoT and data sharing solution. Yggio acts as a real-time integration layer between services and connected assets, sensors, and networks, enabling multiple users and services to use data generated by both shared and private IoT devices.

Wexnet is creating many different use cases, both on their own and in the two projects. Combitech and Sensative is supporting the use cases. The end goal is a collaborative society with focus, again, on sustainable business models and the global sustainability goals as the scene.

City of Carouge



Carouge is located in the canton of Geneva, Switzerland. The area is a financial centre and hosts many international organisations, financial institutions and industries. The city has been rewarded as a 'Fair Trade town', for its commitment to Fair Trade and sustainable consumption, is recognized as 'City of Energy' thanks to its exemplary energy policy and sustainable actions for the environment, and is committed to become a zero waste city.

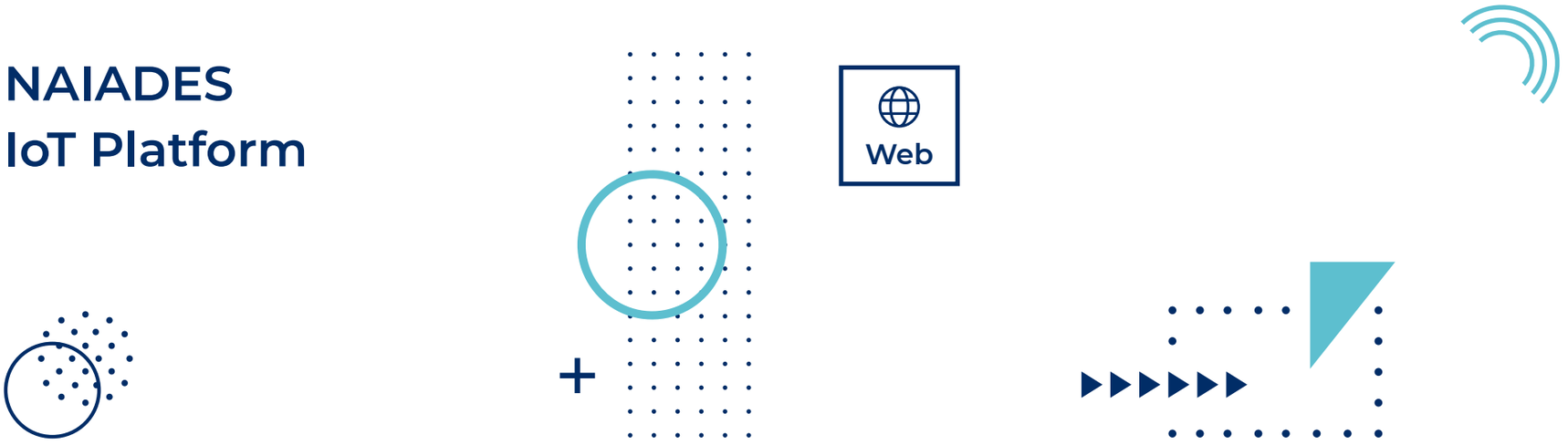
Carouge is also a smart city pioneer and has been supporting innovation by hosting several research projects as a pilot. Now the city is taking the action to tackle one more milestone on UN's sustainable development goals: water resources.

Carouge, which is regularly awarded for its public flowering and green spaces, aims at a more efficient and responsible usage of water as part of its strong commitment to a sustainable use of natural resources and water quality of its fountains and wading pools. Hence, the city is interested in serving as a laboratory for the exploration of smart solutions to improve its water management.

VILLE DE CAROUGE

City strategy official website

NAIADES IoT Platform



The city has identified two objectives for its Smart Water Management: (a) reduction of the amount of water used for the city gardens and of the time required by the city employees and (b) automation of water quality information of the city fountains and improvement of work efficiency on the regular monitoring, which shares many characteristics with public swimming pools in urban environment. Moreover, the management of the water quality of the fountains is directly related to potential health issues for the public and requires them to react quickly when contamination is detected.

NAIADES IoT Platform (UDG Alliance) serves the city to achieve the goal. It is built upon FIWARE standards, NGSI-LD APIs and data models to allow interoperable data communication beyond the project scope. AI solutions, Water quality prediction and Water consumption prediction are added. The results are feeding Water Consumption Awareness dashboards for public employees. Improved water management is absolutely essential for sustainable development and the city expects this solution to reduce potentially inefficient water consumption.

Canton of Zürich

The Canton of Zürich – or region of Zürich – is the most populous canton in Switzerland with about 1,5 million people living there. According to a study the Canton of Zürich expects an increase of the population by 280,000 people by the year 2040. According to the canton's guidelines, 80% of this growth shall take place in urban regions to conserve the scarce resource of land.

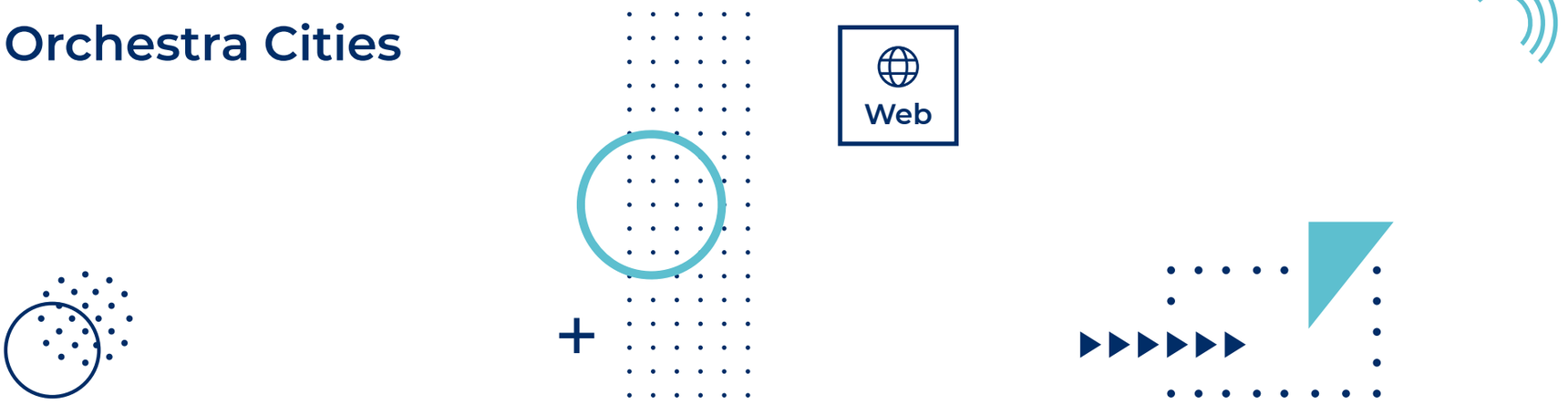
To cater for the increasing population and its demands on the resources, Smart City projects have been on the rise since 2016 in Switzerland. According to one of the surveys conducted by a Swiss University, all Smart City projects were grouped under 9 areas: Governance, Environment, Economy, People, Living, Mobility, Enabler, Infrastructure and Data.

A frequently mentioned project is the "EnergieStadt" certification in Switzerland. An "EnergieStadt" is a municipality or city that continuously advocates the efficient use of energy, climate protection and renewable energies as well as environmentally friendly mobility. Therefore Smart Energy is one of the most important topics of the Smart City Strategy of the Canton of Zürich.

Kanton Zürich
Baudirektion

City strategy official website

Orchestra Cities



Orchestra Cities (OC) is an Open Source Smart City Platform using open APIs and Open Data models. Elektrizitätswerke des Kantons Zürich (EKZ), is the energy provider in the Canton of Zurich catering to about one million people. EKZ combines sensor data and data from open sources shared by its different municipalities so that the municipalities can support Traffic Management, Waste Management and Environmental Monitoring with different services and load levels. OC allows EKZ to tailor the support for multiple use cases with adjustable information sharing, leveraging the platform's multi-tenancy and cloud-native, elastic architecture. OC creates a space where different municipalities can come together and share the fractions of their data and services. These external data sources can be used and integrated with sensor data to provide insightful combinations to city stakeholders.

The data collection, integration, geo-tagging and time series capabilities of Quantum Leap enables sophisticated, multi-dimensional visualization of data, such as air quality. Quantum Leap is part of OC, which was given the status of Generic Enabler by FIWARE.

City of Aberdeen

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

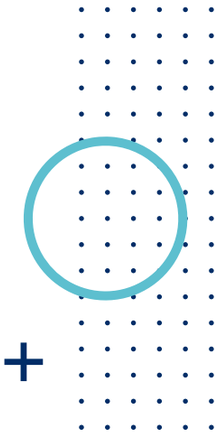
Through the Scottish Cities Alliance, massive investments are being made to make Scotland's cities smarter, using new technologies to accelerate and transform the delivery of city services.

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

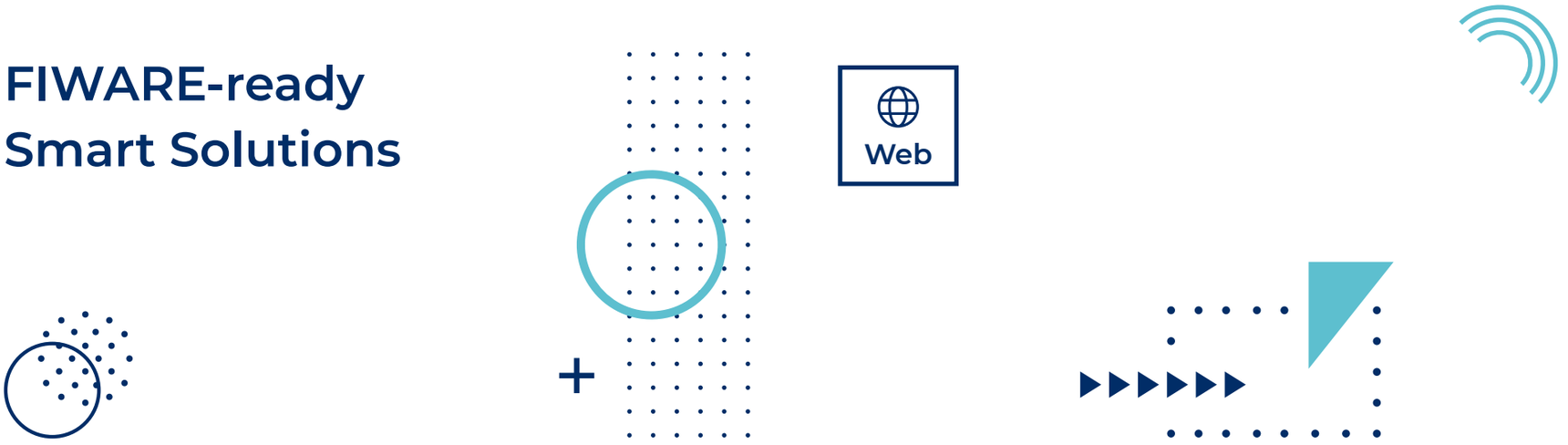
Great Torrington is a small town located in rural North Devon, United Kingdom. Popular with tourists, the town has many attractions ranging from museums to glass factories and lies on the famous Tarka Trail.

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, 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

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

Automated Open Data Portal of the Municipality of Montevideo

Web

Montevideo's smart platform offers information through an open data portal that is automatically maintained on a CKAN server. Datasets are processed and updated daily using CKAN's REST API for publication. The results are communicated via email to both technicians and data managers. There is also a website where configured datasets, historical update results, and other information can be accessed.

CKAN has two environments: one for intranet publication, and the other for using CKAN's "harvesting" process to access datasets marked as public in the internal instance.

Datasets are also published in the national open data catalogue, Agesic, using the same harvesting mechanism.

Among other benefits, access to this data promotes transparency in management and empowers citizens. Enabling the use of this data in the municipality's management promotes innovation mechanisms, and creates opportunities for use in both internal processes and the development of services by third parties.

City of Independence, Oregon

Independence, Oregon is a small city in Western Oregon with a population of 10,000 inhabitants. The city was founded as one of the primary destinations of the Oregon Trail – named for Independence, Missouri where settlers departed.

The city is known as a rural innovation hub that won the FIWARE GCTC Challenge, 2017. The strategy leading to this success aims for building a model for “rural innovation and opportunity”. The strategy focuses on the building of an equitable and accessible Smart Community, the encouragement of entrepreneurial mindsets, the digital transformation of the city’s governance, and the building of a strong digital driven ecosystem in the city.

Different pilot projects fathom the possibilities of improving the citizen’s lives through the digital transformation in fields like Smart Mobility, Data Utilization, Smart Agrifood, and Smart Energy.

The city also founded a maker space to give the citizens the possibility to take part in the digital transformation of the city.

WiseTown Situation Room

Web

SHOW CASE

FIWARE IMPACT STORIES

"WiseTown – Situation Room" is an event management system, based on FIWARE Tech, that has been used for monitoring the security of the biggest 2018 American public event, Independence Day, in the city of Independence, Oregon (USA).

Thanks to this technological ecosystem, the public administration and the citizens of Independence were monitored online to ensure the security of July 4th celebrations. The tool was able to manage, in real time, digital data collected from citizen alerts, IoT sensors, Open Data, georeferenced social media posts and pre-existing data archives.

The FIWARE technology used is the FIWARE Orion Context Broker that can collect and categorize data from IoT sensors in town. In this way, the Situation Room Engine analyzed, ranked and aggregated data, by assigning the ownership of the information to the right person on the road.

The project was developed by WiseTown to provide technology support to the small town of Independence, which has a limited number of personnel dedicated to event security monitoring.

City of Oregon, Oregon

The city of Oregon, Oregon is a small city in the Southern suburbs of Portland, Oregon.

Due to its subway connection with Portland it is an important living space for commuting people working in Portland's city center. Oregon is home to roughly 40,000 inhabitants.

The city's Smart City Strategy is mainly driven by the strategy of the regions metropol Portland "Smart City PDX", which is aiming to better the citizens life in the region using data and technology. The goal is to use data and technology responsibly to support a healthy, safe, more affordable and prosperous Portland region for everyone.

In the suburbs like Oregon City, effective and accessible public transport in combination with Air Quality Monitoring are considered the key to make the city a more sustainable and greener place for living.

To make other digital services of the city more transparent and enhance business activities the city is working on an Open Data Program including a Public Data Lake.

OpenMove MaaS platform

Web SHOW CASE FIWARE IMPACT STORIES

OpenMove recently gained a new customer in the United States operating urban and suburban public transport services.

The solution deployed is a modern Mobility as a Service (MaaS) platform that features omnichannel ticketing (mobile app for users but also solutions for ticket offices and on-board validators) and passenger information, including intermodal journey planning and automated vehicle location.

The system architecture adopts FIWARE technology for interoperability and is completely hardware-agnostic, relying on off-the-shelf devices in order to free customers from vendor lock-in.

OpenMove's approach brings multiple advantages. Citizens can benefit from finding the best route and checking real-time bus arrivals, while transport operators can efficiently evolve to Account-Based Ticketing, which provides huge advantages in terms of flexibility and cost-effectiveness.

Special Features

Trend Article

Lanfranco Marasso

Head of International Digital Innovation & R&D, Almaviva

The future of our cities: “We are the cities we make” [1]

1 Slogan SCEWC 2021

How can future Smart Cities not only be smart, but also sustainable and resilient? The heralded rise of “Smart Cities” was expected to bring data-centric solutions to urban challenges, and equall to territories and country-wide agendas.

Whilst some cities and countries are ahead of the curve, others are now feeling the pressure to upgrade ageing infrastructure and introducing fully new concepts that show a much higher citizen-centric attention. The COVID-19 pandemic, mounting sustainability commitments, resource constraints and continued urban growth are making new cases for investment – but are we sure about how we want our cities and territories to be and further evolve? Do we have the right models, concepts and best technologies at hand to achieve our objectives?

We are all aware that smart cities are futuristic, but they must also learn from the past. “Cities are a collage of history and stories, a composition of fragments,” as the Italian architect Aldo Rossi defined them in 1976. We can learn from their transformations from European mediaeval neighbourhoods into modern cities, How can future Smart Cities not only be smart, but also sustainable and resilient? The heralded rise of “Smart Cities” was expected to bring data-centric solutions to urban challenges, and equall to territories and country-wide agendas.

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We are all aware that smart cities are futuristic, but they must also learn from the past. “Cities are a collage of history and stories, a composition of fragments,” as the Italian architect Aldo Rossi defined them in 1976. We can learn from their transformations from European mediaeval neighbourhoods into modern cities, from pre-industrial cities into Megacities with more than 20 million inhabitants, from industrial cities into green oasis, and so forth. Nowadays, we can acknowledge that cities are basically urban conversations and stories among people, machines, and businesses, and how these conversations combine and connect with one another. Therefore in today’s cities, “smart” and “high-tech” are not necessarily synonymous.

Most Smart City projects don't require advanced degrees in engineering or terabytes of computing power, but a bold and open (source) way to overcome social and data silos, deep knowledge of local problems where open data access can play a significant role, good planning, and a persistent follow-through.

The cities' journey laid out in the soon-to-be-published essay by Lanfranco Marasso (Smart City Program Director), *The Future Of Our Cities*, is covering the understanding of the long history of cities and territories helping us to design the smarter cities of tomorrow, because "We are the cities we make"

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OASC

Open & Agile Smart Cities (OASC): A Common Voice for Cities and Communities Towards the Market

Open & Agile Smart Cities (OASC) is a global network of more than 150 cities in over 30 countries with the mission to ensure a clear voice of cities and communities towards the technology providers and regulators.

OASC promotes the use of Minimal Interoperability Mechanisms (MIMs) to enable even small and medium-sized cities, as well as small and medium-sized companies, to use a common technical ground based on Open Standards. In this way solutions get cheaper, better and contribute to local innovation systems.

The MIMs are vendor-neutral and technology-agnostic and can be integrated with existing systems.

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Central to the OASC approach is the Context Information Management MIM, based on NGSI-LD, which is embedded at the core of the MIMs framework. In this way, OASC is building on the solid work of FIWARE and its partners to develop a whole ecosystem of MIMs.

OASC represents its member cities towards a wide range of stakeholders, including international standards development organisations such as ITU, ISO, IEC and ETSI, European and international institutions, and research and industry bodies.
In Europe, OASC leads the development of the MIMs plus technical specifications, as part of the Living-in.EU movement, aligned with key EU policies including geospatial, personal data and artificial intelligence.

Web

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Smart Data Models

A global program to lead the *de facto* standardisation of Data Models

Smart Data Models is a global and collaborative program driving the adoption as "*de facto*" standards of data models for digital twin classes across a wide range of domains. Mapping of these data models into concrete JSON/JSON-LD structures provided under this program becomes a crucial asset for developers looking for means to guarantee interoperability between different Internet and Cloud solutions, breaking vertical data silos within organizations and enabling data sharing among organizations within data spaces – all at market speed.

This program, led by FIWARE, TM Forum, IUDX and OASC, follows a truly open approach and is boosting the creation of a global

open data and Open Source community. Providing roughly 1200+ new Smart Data Models after its first operational year, it intends to grow at least by 20% of new models on a yearly basis and extends the community by many more co-leading organizations and contributors.

You can join this unique and impactful program anytime by simply contacting us on Github or smartdatamodels.org.

Web

FIWARE Showcase

SHOW CASE

Helping your local companies to make their business visible: matching offer and demand

The FIWARE Showcase serves the purpose of globally disseminating existing commercial offerings around FIWARE.

It is a global one-stop shop that gives visibility to a wide range of “Powered by FIWARE” solutions and platforms, “FIWARE-ready” devices and solutions as well as companies bringing FIWARE-related training/coaching or consultancy, integration and support services.

FIWARE iHubs run by organizations with certified FIWARE experts are entitled to validate products/services offered by companies in their local region so they can be published on the FIWARE Showcase.

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FIWARE4CITIES

FIWARE is up and running in more than 400 cities worldwide! Are you missing your contribution in this book?

To showcase how FIWARE helps cities to lift their Smart City strategies off the ground, we published this book full of examples. You can find all the cities that have implemented FIWARE technology in our Cities Directory. It is in the nature of Open Source that we cannot be aware of every Smart City solution out there built with FIWARE technology.

If you are working in a Smart City (project) with Open Source technology by FIWARE and want to see your solution, platform or city featured in this book, please upload your contribution through this form or contact Oleg Korneev.

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Please be aware that not only every solution or platform text but also every text about one of the Smart Cities needs to be reviewed and accepted by officials. Public available information will be published without consent.

Texts can be shortened to fulfil editorial pre-conditions without amending the meaning of the texts.

FILL IN THE SURVEY

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