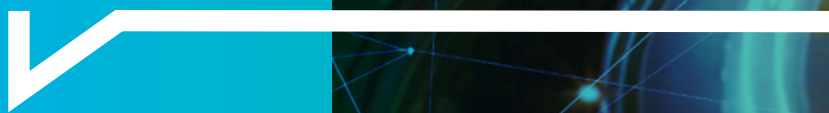




FIWARE FOR SMART CITIES AND TERRITORIES: A DIGITAL TRANSFORMATION JOURNEY



Smart City realizations are driven by urgent and complex needs. **Making a city “smart” means performing a more efficient and inclusive management of services and turning the city into an ICT enabler for innovation, economic growth and well-being.** “Smartness” is also about using the right technology to exploit data purposefully, enabling better decisions and automating processes, to ultimately improve the daily life of citizens, ease business operations, and grow life and business opportunities. **By adopting common standard APIs and information models, and evolving their open data policies,** cities can follow the steps of a digital transformation journey to achieve these objectives, minimizing efforts and costs, while maximizing impact. **Teaming up with other cities** and becoming part of powerful ecosystems in which they can connect, collaborate, co-create and co-invest. Ultimately, joining forces in such a way, can unlock additional values coming from the **creation of a sustainable single digital market of interoperable and portable solutions** that can be adapted and replicated according to the needs of each city. Cities adopting this open and forward-looking mindset have already proven to be quicker, less trial-and-error-driven and more efficient in their investment plans, as well as in the creation of higher citizens’ satisfaction.

Cities are increasingly adopting FIWARE to combine the power of data technology with inter-cities’ collaborations. **FIWARE,** as a world-wide leading Open Source technology in the digitization market, **has become the de-facto standard for Smart Cities,** and as such, helps cities’ decision makers and system integrators alike to incorporate standards for stronger interoperability, faster time-to-market, security of investment and replicability (portability). Avoiding island (or silo) solutions of just one single city or territory, prevents cities from losing out in innovation, best-practises and cost awareness. Together with its ecosystems of members, partners, iHubs, evangelists and academia, **FIWARE also acts as an enabling force for inter-city and inter-country collaboration and co-creation.**



“FIWARE - A Framework for Success”

What makes the FIWARE approach unique and powerful is the curated framework of **Open Source software platform components** which can be assembled and, together with third-party components, used to build entire platforms that support a **faster, easier and cheaper development of Smart Solutions.** With FIWARE, Public Administrations have the chance to implement Smart City platform strategies that **avoid vendor lock-ins and facilitate collaborations towards the development of a sustainable market.**

- **Open Standards** allow for **cross-domain and cross-border interoperability and replicability of solutions.** Providers of these solutions can develop once and deploy in multiple cities when they adopt de-facto standards. This way, open standards contribute to the development of a market with appealing incentives, from financial to social benefits, helping a truly innovative ecosystem emerge.
- **Open Source** is a powerful weapon for driving the **definition of standards following a “driven-by-implementation” and agile approach.** Thanks to Open Source-based technology smaller companies can build business cases for customers who find it challenging to buy a product/service from a large corporation. Large players, on the other hand, can secure their position working at the edge of innovation. From a business perspective, Open Source is relevant due to its power of commoditizing elements in the technology stack, ultimately impacting positively those companies whose core business is not selling general-purpose platform software but adjacent components / products / services.

Cities and system integrators alike benefit from FIWARE’s growing Community and Ecosystem bringing together specialists and organizations continuously building on the FIWARE success story:

250+
Smart Cities
References

8,000+
Developers
contributing
to FIWARE
technologies

430+ Members
from **50+** countries

180+
Powered by FIWARE
solutions in FIWARE
Marketplace

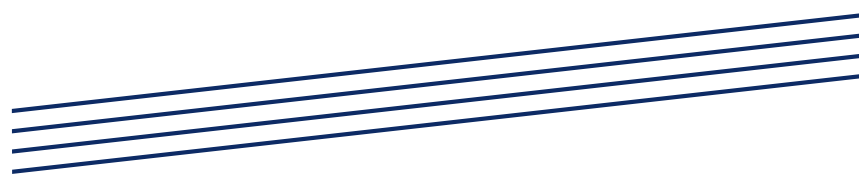
100+
Evangelists

26
FIWARE iHubs

35+
Global Strategic and
Media Partnerships

10
FIWARE Lab Nodes

30+
Global Leading
Events



>>> Context Data in the Digital Realm

Today, every city in the world, no matter their particular constraints (e.g. finance, complexity, space), can take intelligent, practical steps toward making their city more livable, workable, sustainable, and simply smarter. **Data is at the center of the new digital life and linked to our daily activities in cities.** Information coming from many different sources is generated every second, including end users' personal devices, sensors and surveillance cameras deployed across the city, information systems, social networks or third-party applications. **When properly managed, this large amount of data can feed into a Digital Twin representation of the city** that describes what is or may be happening in the city.

Digital Twins have become an essential tool utilized to create Smart Cities. As a virtual representation of a physical entity (e.g. a street, a building, a car) or a logical entity (e.g. a helpdesk ticket issued by a city, a weather alert generated) in the real world, it reflects the behavior or state of the entity it represents - like a mirror. The concept is still very recent in the Smart Cities domain, but it is predicted to become mainstream within the next five to ten years.

Any software architecture “powered by FIWARE”, corresponding to a smart city vertical solution or the overall smart city platform, **is built around a Digital Twin data representation of the real world.** This representation is built upon **entities**, the so-called Digital Twins, characterized by attributes whose values are gathered from many different sources and are constantly maintained and accessible in right-time. These **attributes are not only limited to observable (measurable) data, but also inferred (augmented insights and knowledge acquired over time thanks to AI/ML data processing) data.** FIWARE can bring into context all such data, ranging from **static** (e.g. the “license plate” of a bus), to **dynamic** (e.g. the “speed” or “number of passengers” in a bus, the “current traffic” and “predicted traffic in 30 minutes” of a street) and even periodically shifting ones (e.g. the “driver” in a Bus which may change twice a day). Important as it is to monitor current values of attributes, it is also vital to analyze them together with historical values, since this provides the means for forecasting forthcoming states or conditions.

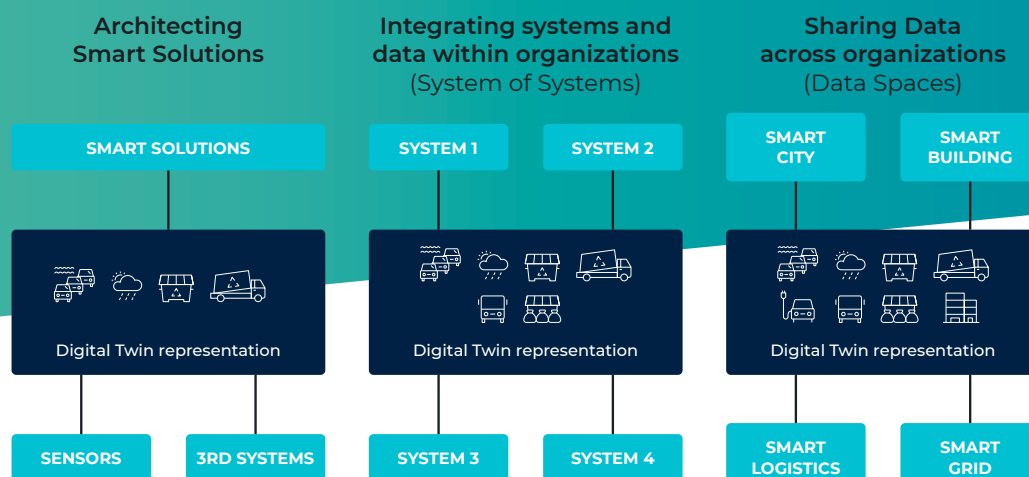
Digital Twins contribute to **safer and more resilient cities**, helping city managers to identify and gather information describing the real world (past and present) which can be processed to **improve planning and effectiveness** in the management of Smart City operations.

Integration at Multiple Levels with FIWARE Digital Twins



Smart City solution providers face the challenge of developing efficient vertical solutions targeted to solve specific challenges, integrating the different verticals within a city to materialize an overall Smart City strategy and bring cities as main drivers of a Data Economy where new data value chains are enabled by the city in partnership with other actors. **A Digital Twin approach provides the basis for data integration at different levels:**

- **Within a vertical smart solution**, solving how main building blocks within the architecture can be integrated;
- **Within a smart organization**, breaking the information silos by bringing support to the integration of different systems within the organization following a system of systems approach;
- **Within a smart data space**, establishing the basic common language that systems linked to the different organizations speak and understand.



Innovations around effective data integration, full interoperability, portability of solutions across platforms, can only be achieved through standardization and **FIWARE brings two essential standards for Digital Twins:**

- 1) An **API**, used for the management of Digital Twin data,
- 2) **Data Models**, to describe the attributes and semantics associated with the different types of Digital Twins.

1) The **NGSI-LD API** provides a simple yet powerful RESTful API using JSON-LD for getting access to context / Digital Twin data. NGSI-LD API specifications have evolved over time driven by feedback from developers and implementation of best-practices.

- ✓ **Simple:** easy to learn and to use by any web developer
- ✓ **Powerful:** supporting subscription/notification, geo queries, federation, pagination and Linked Data
- ✓ **Open:** public and royalty-free specifications
- ✓ **Standard:** first published by ETSI in 2018 continues to evolve successfully
- ✓ **Wealth of Open Source implementations:** available in the FIWARE Catalogue, accelerating the go-to-market
- ✓ **Globally adopted:** proven track-record, best-in-class solutions, network effect
- ✓ **Domain-agnostic:** not tied to smart cities but other domains (logistics, ports, health, ...) which paves the way for integration of cities into data spaces

2) The **Smart Data Models Program** is a global and collaborative program driving the adoption of data models for Digital Twin types as 'de facto' standards across a wide range of domains. Four recognized global organizations (FIWARE, IUDX, OASC, TM Forum) have been unifying open data and Open Source communities to further boost the creation and adoption of Smart Data Models worldwide.

Tangible benefits come from the mapping of these data models into concrete JSON-LD structures that can be used together with NGSI-LD, thus becoming a crucial asset for developers looking for means to guarantee interoperability between different smart solutions.

- ✓ **Agile:** standardisation at market speed (in days/weeks) leveraging existing standards when they exist
- ✓ **Constantly growing:** + 750 new Smart Data Models after its first operational year (projected to grow by 20% of new models/year)
- ✓ **Driven-by-implementation:** based on real use case experiences as opposed to designed by a committee
- ✓ **Open and global:** anyone can join this market oriented program and/or contribute on GitHub



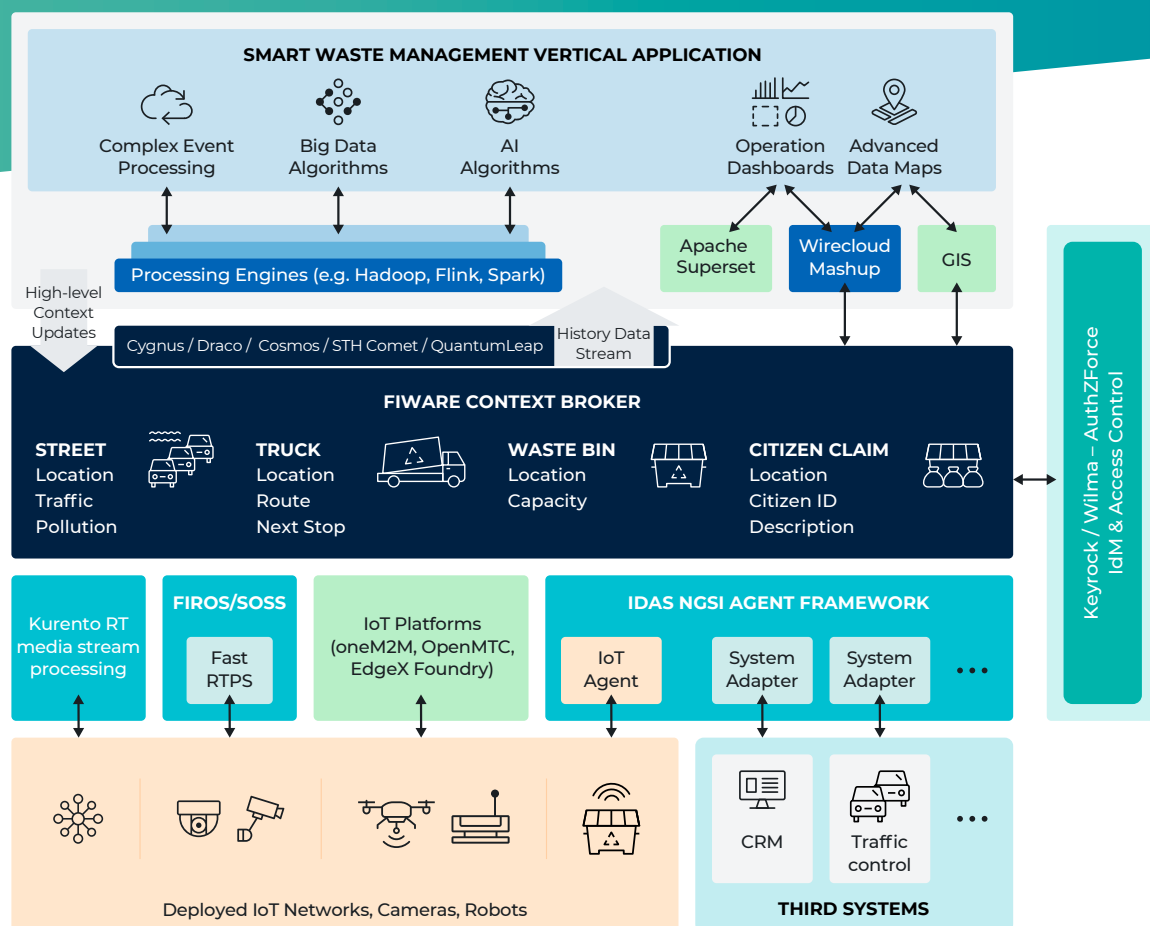
smartdatamodels.org



github.com/smart-data-models

Architecting Smart City Vertical Solutions >>>

By using FIWARE, system integrators have the highest probability of creating sustainable commercial successes, scaling up their Smart City solutions across several cities. The **FIWARE Reference Architecture for Smart City vertical solutions** is based on open standards and thus allows the creation of adaptable, flexible and interoperable applications at minimal cost. Different sources of data consumed or produced by these solutions (e.g. waste management, mobility, air quality and noise) can be integrated with existing systems and provide real-time information and metrics in an unified, integrated and understandable way.



FIWARE is not about taking it all or nothing. Third party platform components can be integrated to build hybrid platforms.

The Reference Architecture of Smart City Vertical solutions 'Powered by FIWARE' offers clear guidelines for System Integrators:

- **Data Management:** the **FIWARE Context Broker** component is at the core of the architecture, keeping a Digital Twin representation of real world entities relevant to the specific problem addressed (e.g. Smart Waste Management). All interactions between applications or platform components and the Context Broker take place using the **NGSI-LD API**.
- **Data Acquisition:** southbound to the Context Broker, **the NGSI IoT Agents**, available as part of the FIWARE IDAS framework, can be used to connect to IoT devices (sensors/actuators), cameras, and other information systems and services. Alternatively, third party IoT platforms can be integrated as well as components facilitating the development of interfaces to connect to robotic systems or video cameras.
- **Data Processing, Analysis and Visualization:** northbound to the Context Broker, a number of FIWARE components are offered to support real-time monitoring and big data analysis or AI/ML processing of the streams of historic data generated as context / Digital Twin information:
 - a. **Advanced Wirecloud Mashup** and **Business Intelligence** components;
 - b. A number of **FIWARE Data Connectors** (Cygnus, Draco Cosmos, STH Comet, QuantumLeap), available to facilitate transference of historic context / Digital Twin information to different kind of data sinks, including most popular **Apache processing engines (Spark, Flink, Hadoop)** and visualization and Business Intelligence tools (e.g. **Grafana, Apache Superset**).

Transversal to the three layers, a number of FIWARE components support **Identity and Access Management** (e.g. Keyrock, API Umbrella, AuthZForce) to ensure that data is accessible to entitled end users and applications only.





System of Systems Approach for a Smart City Reference Architecture

Most municipalities have in the past already invested in vertical solutions (e.g. waste management, traffic management) as well as geoinformation systems or information systems implementing administration processes that now need to be integrated in order to perform a **holistic management of services at overall city level**.

FIWARE offers the common foundation for the technical realization of the overall reference architecture for the Smart City. Following a '**system of systems**' approach, a shared Digital Twin representation of the city is maintained so that:

- each system contributes to enrich part of the Digital Twin representation of the city with data they can provide;
- each system accesses data they need from the Digital Twin representation of the city, and thus benefits from information provided by other systems, but decoupled from them;
- the city implements a city-level Integrated Command and Control Center (ICCC) on top of the shared Digital Twin representation of the city which allows the management and analysis of data in a holistic manner for the extraction of more meaningful insights and for a smarter management of city services.

This approach allows for greater flexibility in meeting new demands and often extends to further use and integration of existing legacy systems.

With strong technology assets and a close collaboration with members and partners, FIWARE is uniquely positioned to build the Smart City Ecosystem, which can be the end goal in the operationalization of digital and smart strategies of urban development. The white paper "Smart City Ecosystem: Laying the foundations – using decision-making sovereignty" provides an in-depth look at the precise adoption of Digital Twins to meet the requirements of cities based on a system-of-systems approach.



The **FIWARE Reference Architecture for Smart Cities** brings the **FIWARE Context Broker** component as the centerpiece, holding a **Digital Twin representation of the entire city**. The different vertical smart solutions deployed (e.g. Air Quality Monitoring, Smart Traffic Management, Smart Parking, Smart Waste Management) or City information systems (e.g. Citizen Relationship Management system) are connected to the FIWARE Context Broker contributing the information they manage and accessing the information they need. All interactions between applications or platform components with the Context Broker simply use the **NGSI-LD API**. For those applications and solutions that are not 'Powered by FIWARE' (which translate from whatever API these systems export to NGSI-LD), the creation of NGSI system adapters has not proven to be difficult.

In addition, FIWARE brings a rich suite of complementary components implementing:

- › Interfaces with the Internet of Things (IoT), robots and video cameras;
- › Processes, analysis and visualization of Digital Twin data / context information;
- › Identity and Access management;
- › Data publication and monetization.

Components for the integration of FIWARE Context Broker technology with **Distributed Ledger Technologies** support trustworthy traceability of transactions, which paves the way for implementation of transparency in city processes.

Smart City Governance Systems (or City Integrated Command and Control Centers) built upon this Context / Digital Twin representation are able to monitor the status of the city and extract more valuable insights to support decision making thanks to the application of real-time BigData analysis and AI/ML processing techniques that, leveraging this holistic representation, are able to merge with data coming from multiple sources.



A system of systems approach warrants a number of key properties:

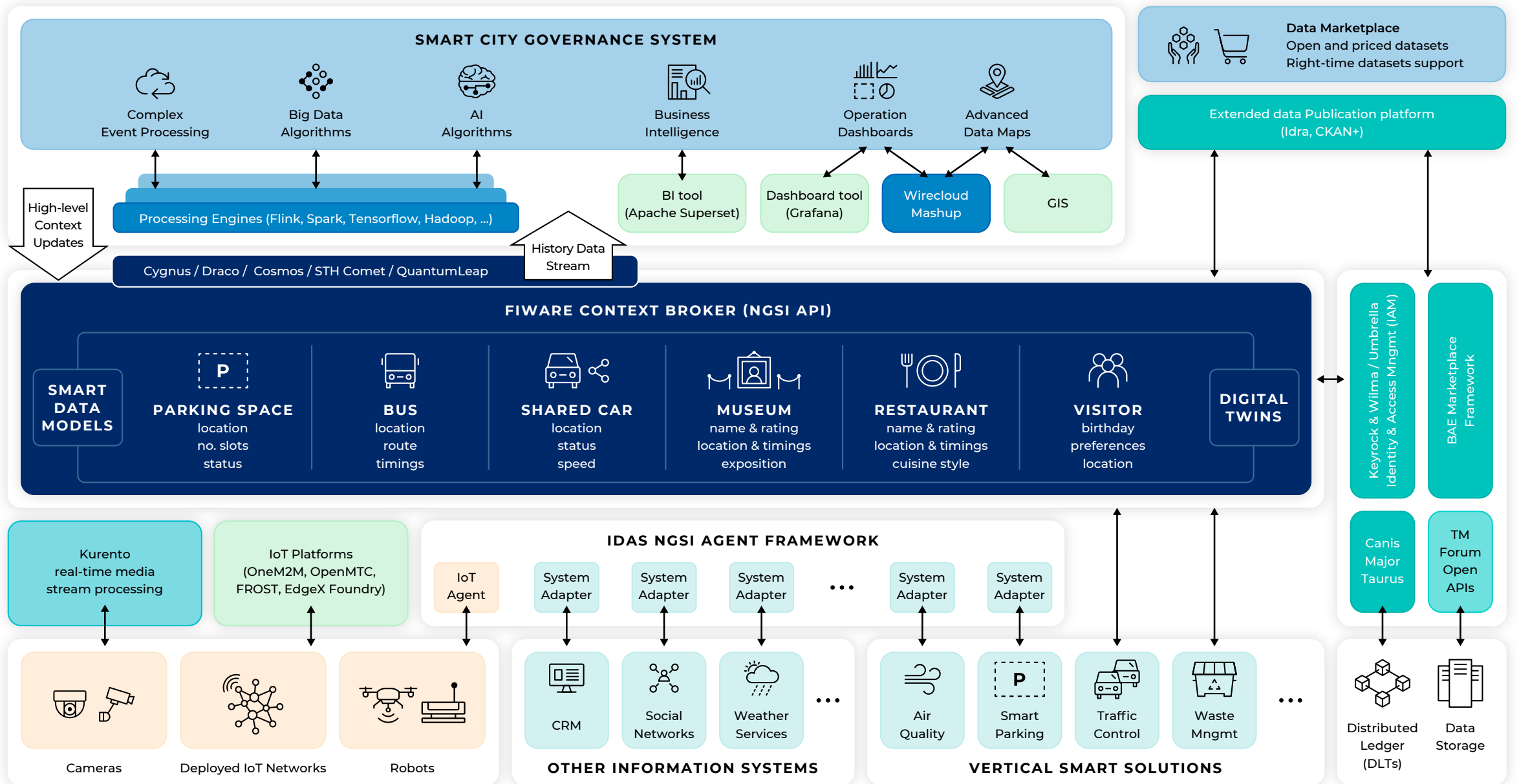
› **Replaceability**, so that systems can be replaced at any time, avoiding vendor lock-in;

› **Extensibility**, meaning new systems can be added easily;

› **Loose coupling**, so that systems can evolve independently;

› **Low intrusiveness**, meaning that legacy systems do not need to change their own architectures.

The FIWARE Smart Cities Reference Architecture



Find a complete overview of FIWARE Components in the FIWARE Catalogue



>>> Cities as Enablers of the Data Economy through Data Spaces

A new Data Economy is emerging, as technological advancements are transforming supply chains into complex mesh ecosystems. Not only as data producers, but also providing the means for third parties to publish their data in data marketplaces they run, **cities are called to play an increasingly important role in this Data Economy**. They are increasingly becoming the platforms for end users and businesses requiring near real-time contextualized data. Based on FIWARE's core capabilities cities become platforms for the publication of the required Context Data being a combination of pieces of information originating from multiple (and new) sources. Due to the rise in data availability and new data-driven insights, more and more data can be exchanged within and among cities and companies. This will spawn a new Data Economy built upon using data to generate value, **ensuring that only owners of the right pieces of information will have the power to drive decisions**.

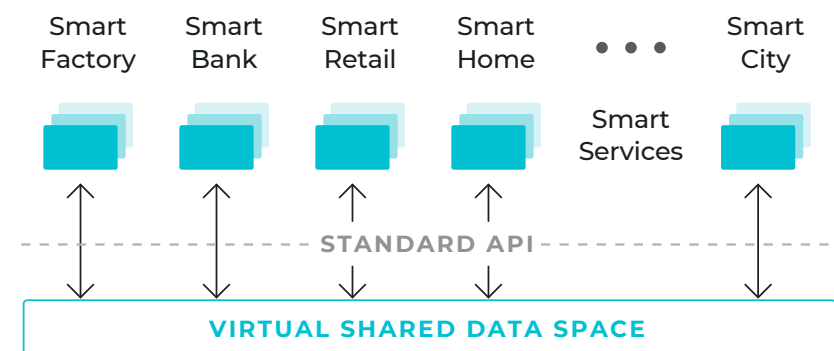
FIWARE brings new economic opportunities to the city, helping solution providers and system integrators to create platform models that **connect consumers and producers**, enabling a federated publication of context data, allowing app builders to find and use data from city and third party sources while preserving Data Sovereignty. User rights acquisition processes and revenue-sharing APIs enable these "consumers and producers" to **buy and sell context / Digital Twin data**, building the basis for the new local Data Economy.

A data space can be defined as a decentralized data ecosystem built around commonly agreed building blocks enabling an effective and trusted sharing of data among participants. **Creation of data spaces will drive the development of the Data Economy and FIWARE brings open standard-based building blocks to make this happen**. Cities connecting to Data Spaces powered by FIWARE can benefit from the data services offered by third-parties and, at the same time, provide data services that will fuel the development of innovative services.

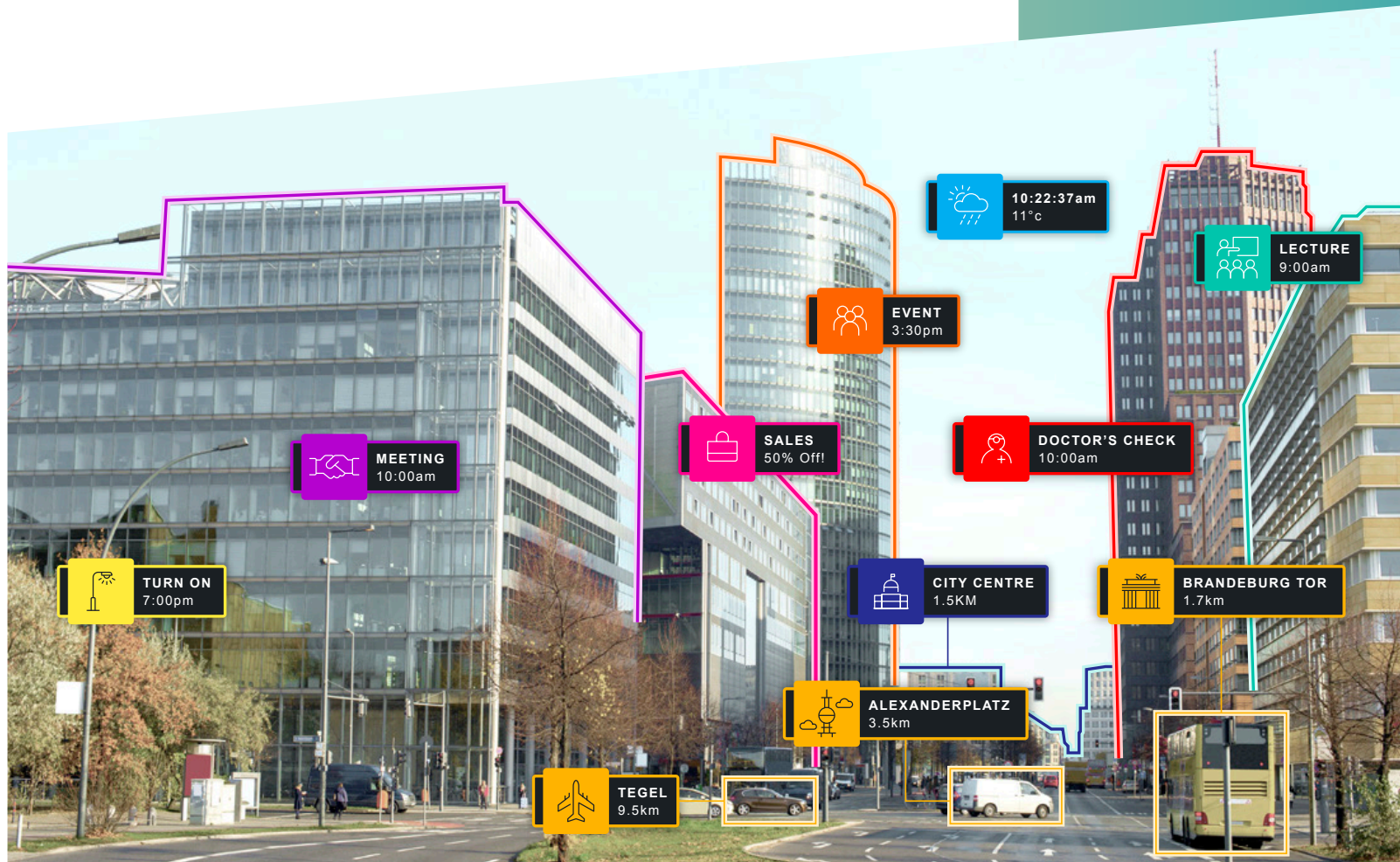
With FIWARE, users in diverse domains can effectively **share and exploit data relevant in other domains thanks to domain-agnostic common APIs, security schemas for data exchange and Smart Data Models**. Furthermore, they can share data under concrete terms and conditions, including pricing or data/usage control policies. This paves the way for the creation of innovative services and business models.

FIWARE brings all the necessary technology Building Blocks for the creation of data spaces ensuring:

- › **Data Interoperability:** supporting efficient data exchange among participants creating a common language based on NGSI-LD as a standard API for the exchange of Digital Twin data, security schemas for data exchange and Smart Data Models;
- › **Data Sovereignty and Trust:** empowering participants to exercise sovereignty over data they share through the adoption of common standards for managing the identity of participants, verifying their truthfulness, and enforcing data access and usage control policies;
- › **Data Value Creation:** enabling participants to collaborate in the development of multi-sided markets where they can generate value out of data sharing (i.e. creating data value chains).



The Smart Cities Transformation Journey >>>



FIWARE is teaming up with main industry players and global organizations to support Smart Cities in their **digital transformation journey**. Together we can and must scale up faster!



1

Exploiting Data across verticals

Breaking information silos through shared context data space with standard API
Enabling overall City-level Governance Solutions

2

Collaborating towards a sustainable market

Common Information Models
Full interoperability between cities and within the city
Enabling portability of solutions across cities

3

Supporting Open Innovation

Right-time context information published as open data to third parties
Authorization and access control (API management)

4

Enabling the Data Economy

City as a platform including also third party data enabling innovative business models
Open and commercial data enabling multi-side markets

Adoption at Global Scale >>> FIWARE Smart Cities Ecosystem

Reflecting the diversity of the market, FIWARE has been involved in participating or leading **strategic collaborations to grow adoption by cities around the globe**. Known for its wide-spanning smart cities ecosystem, FIWARE collaborates and unifies voices and leaders from SMEs to global companies, from academia to accelerators, from standardization organizations to analysts. Important partnerships include:

> IUDX (India Urban Data Exchange)

This partnership is a major milestone in the globalization of Open Source and standard technologies developed by FIWARE and paves the way for a growing and sustainable ecosystem scaling up to nation-wide approaches and to realize uniform and seamless platform strategies. IUDX is an **Open Source software platform, based on the same standards implemented by FIWARE**, that has been facilitating secure and authenticated exchange of data amongst various data platforms onboarding over the following years to more than 100 Indian major cities, with 10 cities already up and running.

IUDX is additionally one of the four global players leading, together with FIWARE, OASC and TM Forum, the definition of common data models for cities under the umbrella of the **Smart Data Models Program**.

> OASC (Open and Agile Smart Cities)

A non-profit organization that connects more than 150 cities and communities worldwide to learn from each other and exchange digital, data-driven solutions based on Minimal Interoperability Mechanisms (MIMs) with the goal of creating and shaping the nascent global smart city data and services market. OASC adopted the **ETSI NGSI-LD API as a baseline**.

> European Commission

In 2018, the EC selected the **FIWARE Context Broker Technology as their fifth Connecting Europe Facility (CEF) Building Block** within the Digital CEF (Connecting Europe Facility) program. Since then, the EC officially recommends the FIWARE Context Broker to the public and private sector, as well as industrial players within and outside the European Union (EU). Players on their way to adopt this technology for the publication of real-time context data are thus enabled to foster the development of a next generation of products and services, which can be replicated (ported) across member states and interoperate cross-border.

> ETSI (European Telecommunications Standards Institute)

A European Standards Organization created in 1988, acting as a recognized standards body dealing with telecommunications, broadcasting and other electronic communications networks and services. The collaboration led fruitfully to the first version of **ETSI NGSI-LD API specification** in 2018 which was based on the FIWARE NGSIv2 specifications developed by the FIWARE Community. It continues to evolve based on the active contribution of members of the Community. The publication of the NGSI-LD API specifications by ETSI represents a major milestone since cities can refer to an open specification supported by a reputed global standardization body in their Public Procurement processes.



More global Organizations partnering with FIWARE

TM Forum

An alliance of 850+ global companies working together to break down technology and cultural barriers between digital service providers, technology suppliers, consultancies and systems integrators. FIWARE Foundation started its collaboration in 2018 with the aim of **supporting the transformation of cities into platforms that bring support to development of a Data Economy**. Both organizations collaborate **additionally in the definition of Data Models for Smart Cities under the Smart Data Models Program** serving as the basis for Common Information Models already adopted by cities. Another area of joint forces covers the development of components enabling the evolution of Open Data Portals into Data Marketplaces relying on TM Forum Open APIs.

GSMA (Global System for Mobile Communications)

An industry organisation founded in 1982 that represents the interests of mobile network operators worldwide with 750+ mobile operators members and 400+ companies in the broader mobile ecosystem. Through the IoT BigData Ecosystem program to which also FIWARE contributed, mobile operators and their industry partners collaborate in the creation of an ecosystem where development of IoT-enabled BigData services can be accelerated through the delivery of key APIs and harmonized data sets. Under the umbrella of this program, GSMA published a **Reference Architecture for IoT Big Data Ecosystems recommended to mobile operators that position ETSI NGSI-LD as the core API for data management** and development of applications. GSMA also produced **several harmonized data models which have now been integrated in the Smart Data Models Program**.

NIST (National Institute of Standards and Technology)

A physical sciences laboratory and non-regulatory agency of the United States Department of Commerce whose mission is to promote American innovation and industrial competitiveness. With the aim of developing the common architectural principles for Smart Cities, NIST launched in 2016 a global coalition to define an IoT-Enabled Smart City Framework that identified **pivotal points of interoperability**, where emerging alignment on standards could enable the landscape of diverse but interoperable smart city solutions. Within the framework, FIWARE NGSI was identified as one strong standard candidate enabling interoperability within a city and portability of solutions across cities.

IDSA (International Data Spaces Association)

Carrying out the mission to create the future of the global, digital economy. Its 130+ member companies and institutions, of which FIWARE is one, have created the International Data Spaces Reference Architecture Model (IDS RAM), supporting a sovereign and trusted data exchange, in which all participants can realise the full value of their data. The collaboration started in 2017 focusing on an **Open Source implementation of the IDS Connector technology as an optional element in the FIWARE Catalogue** making systems "Powered by FIWARE" able to participate in data spaces based on the IDS RAM.

BDVA (Big Data Value Association)

An industry-driven international not-profit organisation with 230+ members all over Europe that focuses on enabling the digital transformation of the economy and society through data and Artificial Intelligence by advancing in areas such as Big Data and AI technologies and services, data platforms and data spaces, industrial AI, data-driven value creation, standardisation, and skills. Collaboration with FIWARE started at the end of 2020 to drive the **adoption of data spaces across Europe and beyond** through a common framework to exchange of data and trading of big data and AI services based on Digital Twins.

Gaia-X

A non-profit organization representing the next generation of data infrastructure through an open, transparent and secure digital ecosystem, where data and services can be made available, collated and shared in an environment of trust. **FIWARE is a Day-1 member** of Gaia-X and contributes with Open Source and open data expertise and use-cases.

In September 2021, **BDVA, FIWARE, Gaia-X, IDSA founded a milestone setting alliance to accelerate Business Transformation in the Data Economy and make Data Spaces really happen.**

>> Spotlight - Thriving Smart City projects with FIWARE



FIWARE has been supporting cities for many years to get their Smart City strategies off the ground. More than **250 cities in over 30 countries worldwide** trust in using FIWARE technologies and with a global impact increasing day by day.

ARGENTINA

Buenos Aires, La Plata, Catamarca, Posadas

AUSTRIA

Vienna, Graz

BELGIUM

Brussels, Antwerp, Bruges, Ghent, Leuven, Mechelen, Roeselare

BRAZIL

Angra dos Reis, Brasília, Campo Grande, Curitiba, Florianópolis, Nova Friburgo, Palmas, Recife, Rio Branco, Rio de Janeiro, Salvador, São Paulo, Uberlândia

COLOMBIA

Medellin

CROAZIA

Dubrovnik

FINLAND

Helsinki, Tampere

FRANCE

Aix-Marseille, Perpignan, Nice, Noisy-Le-Grand, Saint-Quentin, Vers - Pont du Gard

GREECE

Athens

GERMANY

Arnsberg, Bamberg, Berlin, Bad Berleburg, Herne, Heidelberg, Kiel, Lemgo, Lübeck, Menden, Monheim, Olpe, Paderborn, Soest, Wolfsburg

INDIA

Agartala, Bareilly, Bengaluru, Bhopal, Bhubaneswar, Chennai, Faridabad, Noida, Pune, Surat, Varanasi, Vadodara

ITALY

Arezzo, Florence, Garda Lake area, Genoa, Livorno, Messina, Milan, Modena, Pisa, Pistoia, Rome, Turin, Tuscani, Veneto, Vicenza, Volterra

JAPAN

Kakogawa, Niihama, Okinawa Prefecture, Shizuoka Prefecture, Takamatsu, Toyama

MALAYSIA

Penang

MÉXICO

Aguascalientes, Ciudad de México

MOROCCO

Casablanca

NETHERLANDS

Amsterdam, Eindhoven, Enschede, Hilversum, The Hague, Utrecht

PERÚ

Lima

POLAND

Poznan

PORTUGAL

Guimarães, Lisbon, Porto

SPAIN

Algeciras, Almendralejo, Ávila, Badajoz, Barcelona, Benidorm, Cádiz, Calpe, Calvia, Cartagena, Castellón, Ceutí, Córdoba, Denia, Dos Hermanas, Fuerteventura, Girona, Gran Canaria, Granada, Guadalajara, Huelva, Junta Andalucía, Junta Castilla León, La Manga, La Palma, La Rinconada, Lanzarote, Logroño, Lucena, Madrid, Málaga, Mallorca, Molina de Segura, Murcia, Onda, Osuna, Palencia, Pizarra, Sabadell, San Sebastián, Santander, Santiago de Compostela, Segovia, Sevilla, Soria, Toledo, Utrera, Valdepeñas, Valencia, Vallat, Vigo, Villarreal, Zamora, Zaragoza

SENEGAL

Dakar

SWEDEN

Sweden: Alvesta, Åkersberga, Eksjö, Eslöv, Gislaved, Gnosjö, Göteborg, Gotland, Habo, Halmstad, Haninge, Härnösand, Helsingborg, Eskilstuna, Jönköping, Kalmar, Karlstad, Kristianstad, Lessebo, Lund, Malmö, Mölndal, Mullsjö, Nässjö, Norrköping, Örebro, Österåker, Salem, Sävsjö, Solna, Sölvesborg, Southwest Skåne, Stockholm, Sundbyberg, Sundsvall, Täby, Tingsryd, Tyresö, Uppsala, Vaggeryd, Värnamo, Västerås, Vaxholm, Växjö

SWITZERLAND

Carouge, Zürich

UK

Great Torrington, Aberdeen

URUGUAY

Montevideo

USA

Independence, Oregon



The full and updated list of Smart Cities where FIWARE is creating impact can always be seen at fiware.org

We help leading cities from across the globe to get their smart city projects off the ground. The first edition of the **#FIWARE4Cities** booklet, with **62 cities** and **66 solutions** from **18 countries**, is a footprint that aims to help cities understand the potential of Open Source technology and open common standards, as well as to help private-sector companies and citizens prepare for the coming wave of change.



#FIWARE4Cities
booklet and survey

We celebrate and promote thriving Smart Cities with true inspiring **Impact Stories** of innovation and business impact from the FIWARE Community to solve challenges in different domains within a city and beyond.



FIWARE Impact Stories

We offer first-hand access to a wide range of solutions, platforms, technologies, training, coaching, consultancy, integration and support services through the **FIWARE Marketplace**. The **Powered by FIWARE** and **FIWARE-ready** labels help entrepreneurs gain visibility and credibility, essential to building partnerships and gaining market traction.



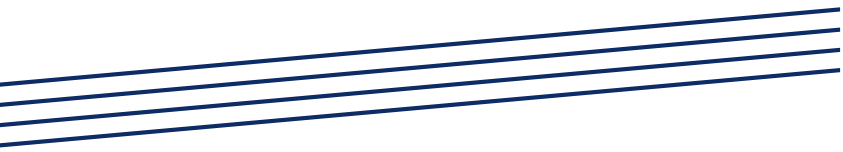
FIWARE Marketplace

We showcase how life in a Smart City can be easier. The **Smart World by FIWARE** features the potential of Open Source technology for Smart Cities, Smart Mobility, Smart Industry, Smart Energy and Smart AgriFood and how they interact with one another to power up cities.



Smart World by FIWARE

>>> Making cities inclusive, safe, resilient and sustainable



As more and more people move into urban areas, a thorough management of urban growth needs to be in place in order for global issues to be tackled and sustainable development fully achieved. To this end, B20, the private sector's voice of the G20 community, addresses the global challenges and priorities defined by the G20 countries, by building solid consensus amongst business leaders, international organizations and civil society.

B20 Tokyo Summit Joint Recommendations have been towards making Smart Cities the main focus of the G20's efforts to implement Society 5.0 (Japan's smart vision of the future) for the **Sustainable Development Goals (SDGs)**. In line with its commitment from public administrations and private businesses towards the SDGs, FIWARE has been guiding cities and industries to deliver their digital vision, with the active involvement of all the relevant actors.

The FIWARE Community fully endorses the SDGs and is working hard to help cities to deliver them. For instance, the **FIWARE Booklet: Fighting Climate Change** features 30+ game changing solutions based on FIWARE that have become vital to the fight against climate change and are, ultimately, setting common standards for Smart Cities on this topic.

Going forward, the FIWARE Community is also developing a vision on the role of cities and citizens as prosumers of energy (not just consumers but producers) to achieve the goals set by EU Green Deal.



Fighting Climate Change
with FIWARE

>>> Join our ranks!



With more than 430 global members in five key domains- Smart Cities, Smart Energy, Smart Industry, Smart Agrifood and Smart Water-FIWARE Foundation is taking the lead in Open Source collaborative ecosystems setting new standards, on a global scale.

Together with its members, FIWARE strives to promote transparency, sustainability, accountability, and economic development by means of laying down the foundation for smart, user-centric digital solutions.

- › **FIWARE Foundation Membership.** Ready to join and shape the cities of the future? As a FIWARE Foundation member, you benefit from the extensive experience and network of our ecosystem made up of small, medium and large global enterprises, startups, end-users, universities, ICT infrastructure providers, and associations.
- › **FIWARE Smart Cities Domain Committee.** FIWARE Members can join our Committee and Boards to bring their vision, experience and knowledge to steer the direction of FIWARE in the specific domain of Smart Cities.



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- › **FIWARE iHubs.** A growing network of FIWARE iHubs helps local digital businesses to be more competitive in the growing digital economy, building communities that will, in turn, enable these businesses to thrive not only at a regional but on a global level. Discover how to get started with FIWARE iHubs.



- › **The FIWARE Technical Steering Committee** governs the technical direction of the FIWARE platform and activities of the FIWARE Open Source Community. Members of FIWARE Foundation are welcomed to attend Technical Steering Committee meetings and follow-up first-hand the progress on the various technical activities - Join us If you want to contribute and impact future developments.





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FIWARE, the Open Source
Platform for our Smart
Digital Future

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