Introduction to FIWARE Technology and Success Stories

FIIF - Finnish Industrial Internet Forum

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Outline

- What is FIWARE?
- Introduction to FIWARE Technology
- Success Stories

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FIWARE

What is FIWARE?

FIWARE, when used alone, is often referring to FIWARE Technologies

However, to conveniently answer the question "What is FIWARE?",
one must consider the following pillars:

- FIWARE **Mission**
- FIWARE **Ecosystem**
- FIWARE **Community**
- FIWARE **Technologies**

FIWARE Mission

building an open sustainable **ecosystem** around

public, royalty-free and implementation-driven **software platform standards** that

ease the development of new **Smart Applications** in multiple sectors

FIWARE Ecosystem

FIWARE is **already** a powerful open-source ecosystem

Within this ecosystem, various **stakeholders play crucial roles**, including:

- **Providers** of
  - "Powered by FIWARE" solutions and platforms
  - "FIWARE-ready" devices and systems
  - Service offerings (e.g., coaching, training, consultancy, integration, and support services)

- **End users** who utilize software and service offerings

- **FIWARE Community Members** who actively contribute to grow and further develop FIWARE

FIWARE

FIWARE Community

FIWARE cannot be fully understood without being aware of its **vibrant community**:

- **Members** of the FIWARE Foundation

- **Companies, organizations, and individuals** that contribute to the FIWARE Mission by
  - contributing to the <u>development, evolution, and deployment</u> of FIWARE technologies
  - <u>growing the FIWARE ecosystem</u> and making it sustainable over time
  - <u>committing relevant resources</u> to core FIWARE initiatives such as the FIWARE Lab activities or **FIWARE iHubs Programs**

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FIWARE Technology

"a curated framework of <u>open source</u> **software platform components**

which can be assembled <u>together and with other</u> third-party components

to build platforms that support the development of <u>Smart Solutions</u>

<u>faster, easier and cheaper</u> in **multiple sectors**"

Reference Implementations of FIWARE Components are listed in the FIWARE Catalogue (https://www.fiware.org/catalogue/)
FIWARE Catalogue components are referred to as FIWARE Generic Enablers (FIWARE GEs)

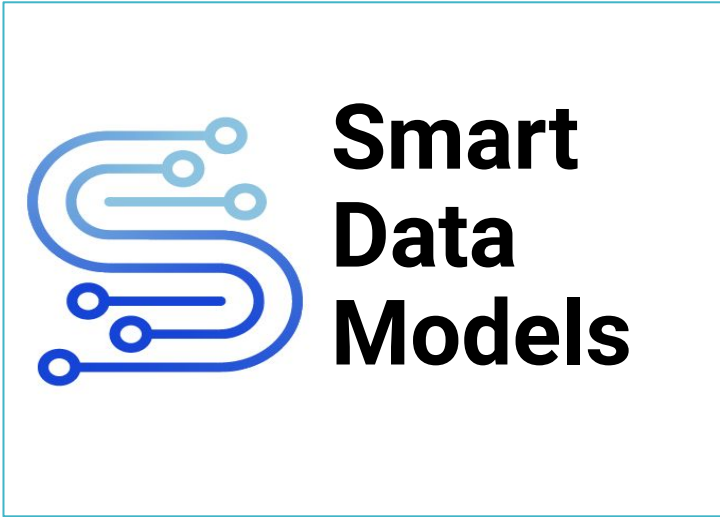# Introduction to FIWARE Technologies

- Major Building Blocks
- Open Standard API
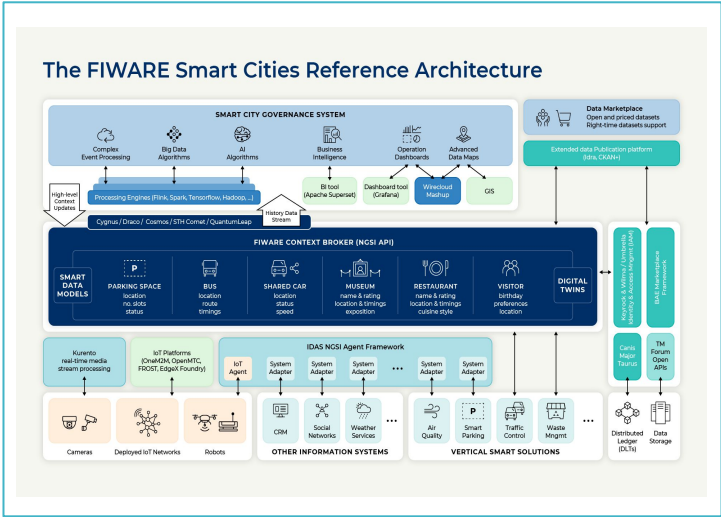- Smart Data Models
- Software Enablers
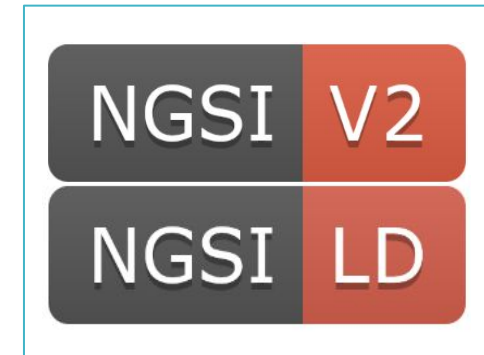
FIWARE

Major Building Blocks

Open Standard API

Open Data Models

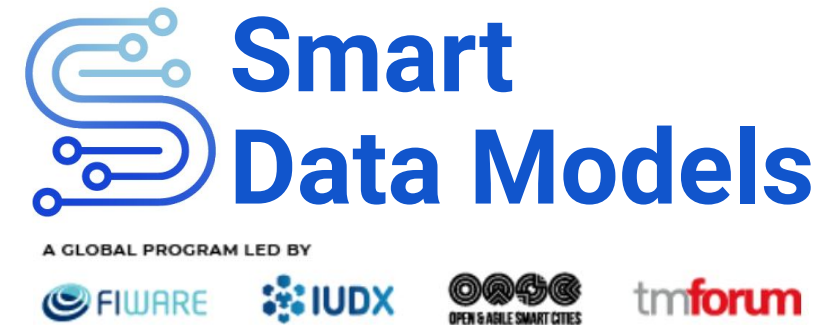Open Reference Architectures
and
Open Source Software Platform Enablers

The NGSI API (Open Standard)

- The NGSI API offers a simple yet robust RESTful interface for accessing context data digital twin data

- NGSI Operations
  - CRUD Operations
  - Queries
  - Properties
  - Relationships
  - Subscriptions
  - Registrations
  - Temporal Operations
  - Advanced features for federation & actuation

- Software components which fully implement the NGSI API are referred to as NGSI Context Brokers →

The NGSI Standard - ETSI's Industry Specification Group on cross-cutting Context Information Management (ISG CIM) https://www.etsi.org/committee/cim
NGSI-LD tutorials - https://ngsi-ld-tutorials.readthedocs.io/
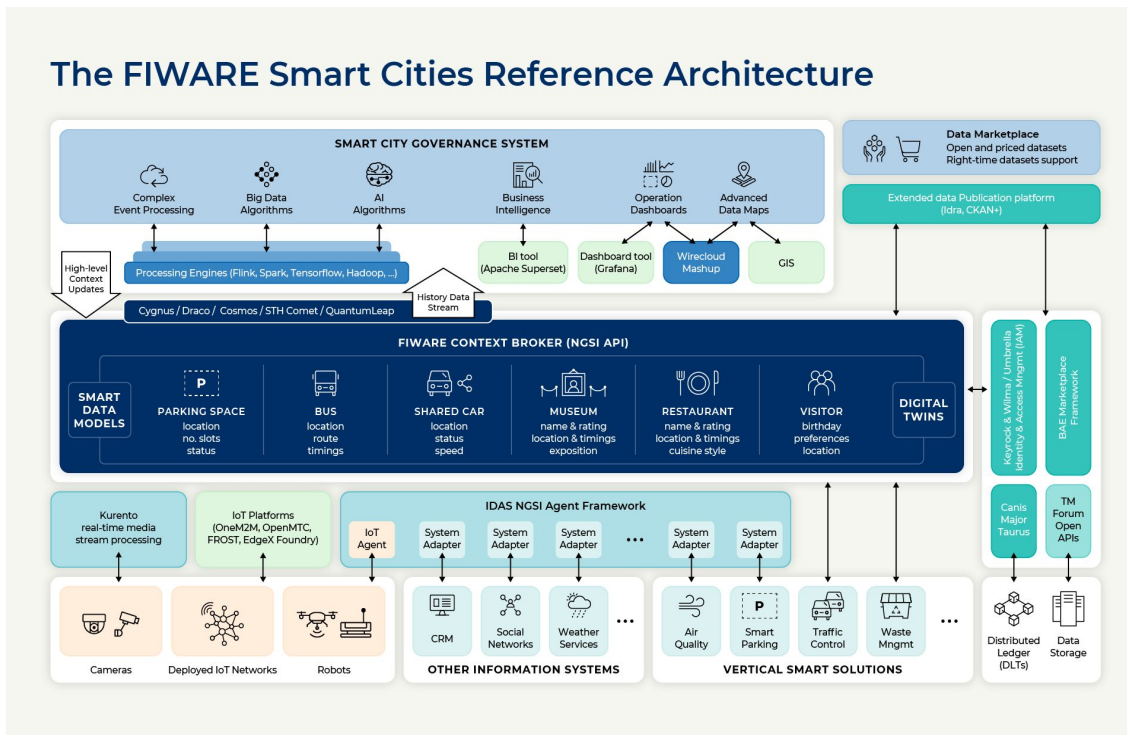NGSI-V2 tutorials - https://fiware-tutorials.readthedocs.io/en/latest/

Smart Data Models

- Smart Data models (SDMs) allow actual data interchange between organizations by providing open licensed shared data models according to the principles of agile standardization

- Highlight Features:
  - Free and open-licensed (0€ cost)
  - Multisector
  - Based on real use cases & adopted open standards
  - Collaborative
  - Standardisation at market speed
  - Customizable to local needs
  - Compatible with linked data

Smart Data Models Site: https://smartdatamodels.org/

Open Reference Architectures & Open Source Software Platform Enablers (FIWARE GEs)

The FIWARE Smart Cities Reference Architecture

Open source SW Platform enablers are organized into architecture chapters:

- Core Context Management

- Interfacing with IoT, Robots, and 3rd Party Systems

- Context Data Processing, Analysis and Visualization

- Context Data/API Management, Security, Publication and Monetization

- Deployment Tools

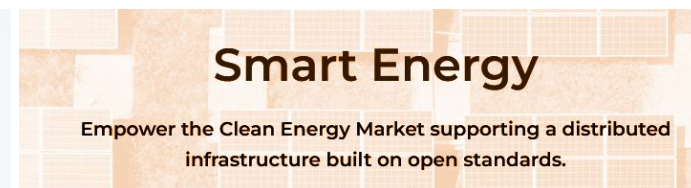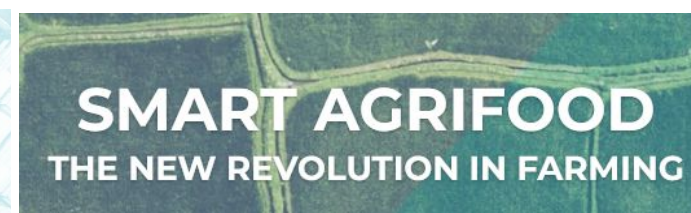The FIWARE Reference Architecture explained: https://www.fiware.org/wp-content/uploads/FF_PositionPaper_FIWARE4DigitalTwins.pdf

FIWARE

Success Stories

- Domains
- Digital Twins
- Data Spaces
- Global Impact Stories
- FIWARE in Finland

FIWARE

Domains

LET'S DO IT TOGETHER
FIWARE 4CITIES
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FIWARE Foundation e.V.

- FIWARE is well-known for being the most widespread reference open standard for Smart Cities

- FIWARE roadmap already expands into other domains where it has established a strong positioning

Smart Industry
Innovate products and processes, and increase the value with reusable components for Data Spaces and Digital Twins.

SMART AGRIFOOD
THE NEW REVOLUTION IN FARMING

Smart Water
System-of-Systems approach for a sustainable market of interoperable and portable Smart Water solutions.

Smart Energy
Empower the Clean Energy Market supporting a distributed infrastructure built on open standards.

FIWARE4Cities Book https://www.fiware.org/about-us/smart-cities/fiware4cities-book/

Digital Twins and Data Spaces

- NGSI-LD API and FIWARE building blocks along with Smart Data Models ensure **portability and replicability of Digital Twin based solutions**

- Data spaces are the key to achieving sovereign, interoperable and trustworthy data sharing and the central element of a thriving data economy. FIWARE is a **leading technology provider within the DSBA and DSSC ecosystems**

FIWARE for Digital Twins: https://www.fiware.org/marketing-material/fiware-for-digital-twins/
FIWARE for Data Spaces: https://www.fiware.org/marketing-material/fiware-for-data-spaces/
DSBA (Data Spaces Business Alliance): https://data-spaces-business-alliance.eu/dsba-releases-technical-convergence-discussion-document/
DSSC (DAta Spaces Support Centre): https://dssc.eu/

Global Impact Stories (Cont.)

- CollMi: Technology for a more trustable and sustainable **logistics value chain**

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- B2B digital platform

- Logistics companies share deliveries with one another.

- Use Cases:

  - companies with lack resources/interest in a transaction can offer it to another logistics company on the platform

  - company experiencing a period of low activity benefit from platform offerings as an additional source of delivery requests

https://www.fiware.org/2023/08/28/collmi-technology-for-a-more-trustable-and-sustainable-logistics-value-chain/

Global Impact Stories (Cont.)

- CO2-Mute: **Fighting CO2 emission** with data space

A solution to make the most out of data sources, such as traffic data from Tom-Tom, air quality & noise sensors, and data obtained from local weather stations about the environmental status and time range.

- Use Case:
  - Public data analytics service for local governments
  - Focus on urban planning decision making for green spaces
  - Data Anonymization / GDPR Compliance

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Faubourg Numérique
FIWARE iHub

hostabee

MONTEM

SIS.TER®
CONNECTING KNOWLEDGE

https://www.fiware.org/2023/03/06/co2-mute-fighting-co2-emission-with-data-space/

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Global Impact Stories (Cont.)

- AgriSpace4Trust optimises energy inputs in **olive production**

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The agro sector benefits from seamless access to data hubs which utilize local weather stations or agro-environmental sensors and make them accessible to a wider community of local users

- Use Case:
    - findable, accessible, identifiable, reusable, and credible data services
    - enabling data sharing between cooperatives and farm advisors/agronomists
    - Data Anonymization / GDPR Compliance

https://www.fiware.org/2023/03/23/agrispace4trust-optimises-energy-inputs-in-olive-production/

FIWARE in Finland

- FIWARE has already an **active ecosystem in Finland**

- Intensive activity **in TAMK**

- **XAMK** is a FIWARE iHub and this week has organized the FIWARE Fest event
  - Participants such as City of Kuopio, VTT and Contrasec

- **Contrasec** is a Finnish FIWARE member (based in **Tampere**) who are providing smart city services, for cities ilke Berlin-tegel, Kiel and Kiel region.

  - **City of Kuopio** implemented their Datajalostamo with FIWARE Technology https://datajalostamo.fi/
  - Contrasec is consulting the city of Kuopio in the area of Data Platforms

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