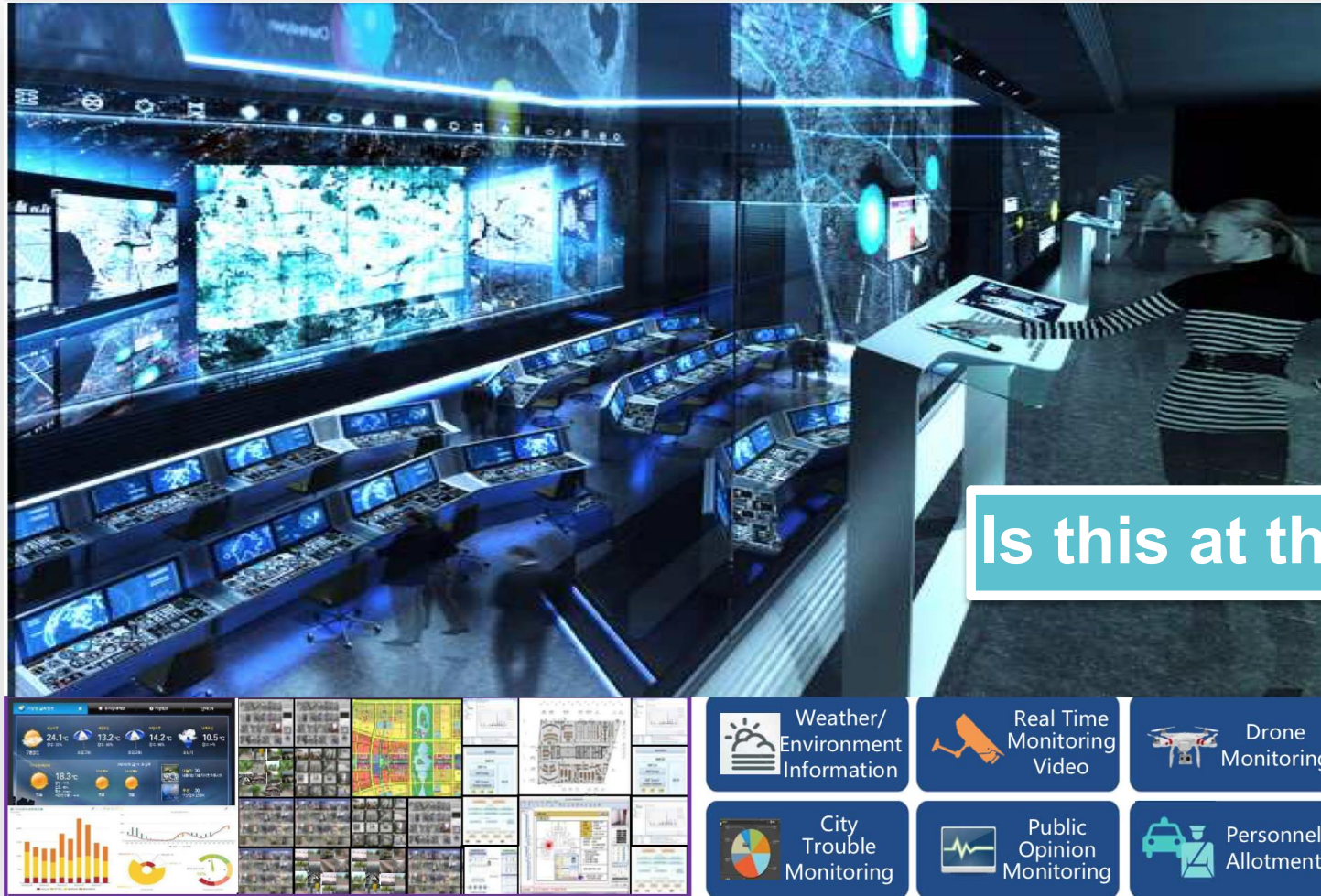


Open APIs  
for Open  
Minds

# Beyond technology

*Design of the **smart** digital future*  
*IoT Week 2019 Aarhus*



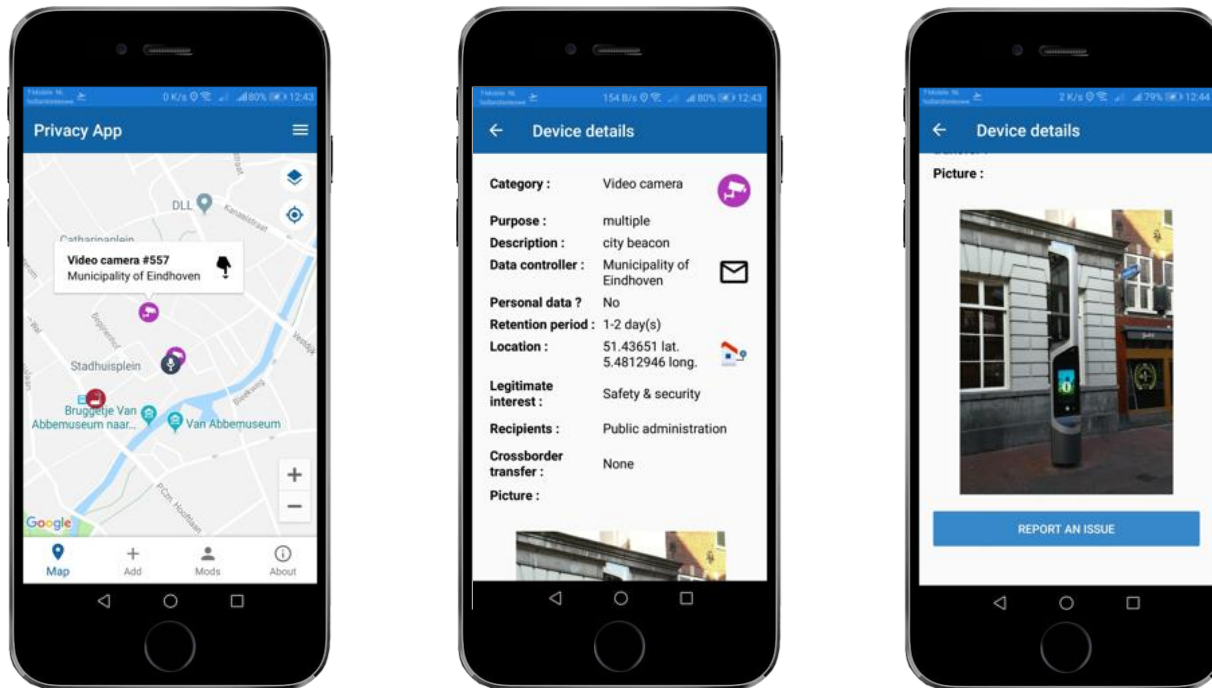


George Orwell and beyond

Is this at the core of a „smart“ city?

Source: Korea Example: Green Trust

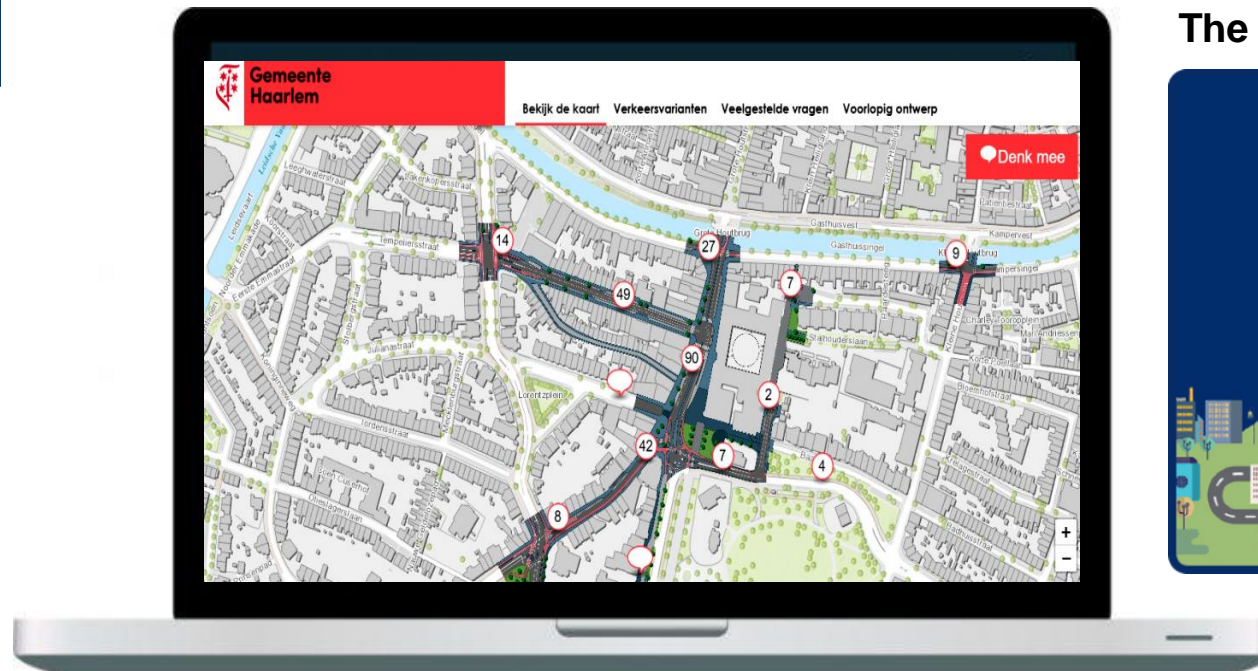
# Eindhoven (Netherlands): Privacy App



**Crowd-sourced repository of all sensors**

**supporting the data-economy while gaining transparency**

# Utrecht (Netherlands)



## The Living Lab Approach





# INTEROPERABILITY

as QUALITY CHARACTERISTICS



Modularity

Scalability

Replicability

Reuseability



Federation

Comparability

Replaceability

Transparency

Open Source

Portability

# Non-Functional requirements



Time to market

Collaboration

New Market

Global Scalability



Federation

Sustainability

Standard based

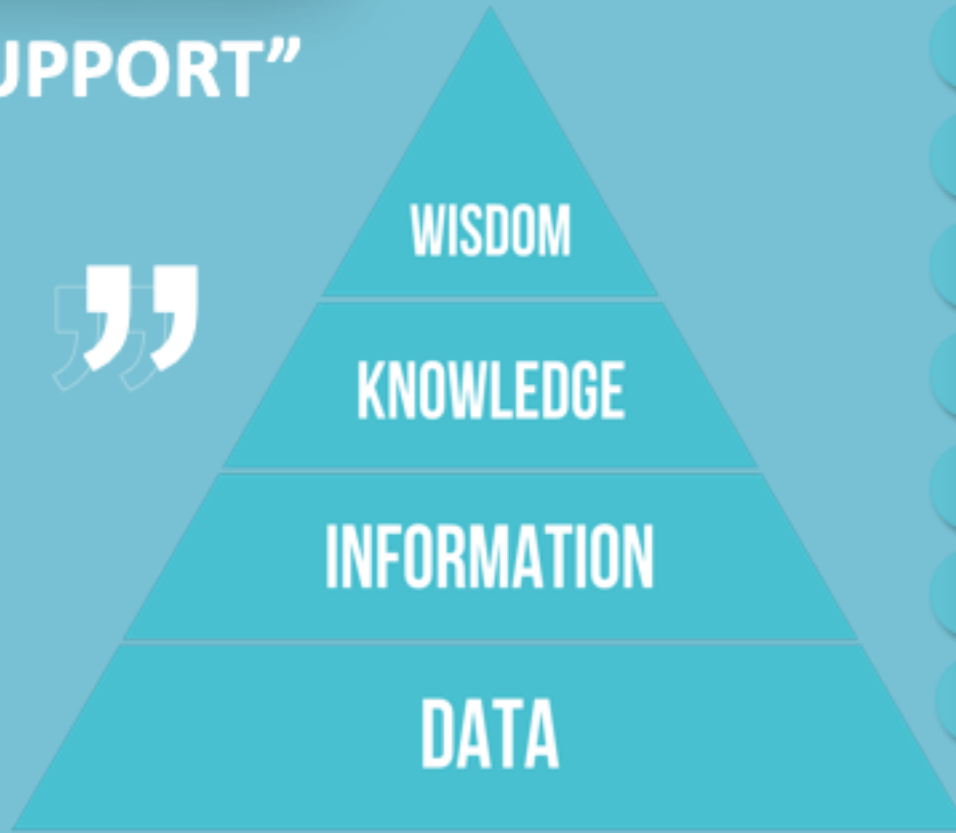
Implementation driven

Low implementation risk

accountable

# DATA ECONOMY

## “SUPPORT”



Edge & Fog computing

Collaboration

Breaking Data Silos

Cross Domain

Platform Agnostic

Community Driven

Open Innovation

Agile & lean

Common Datamodels

Context Aware

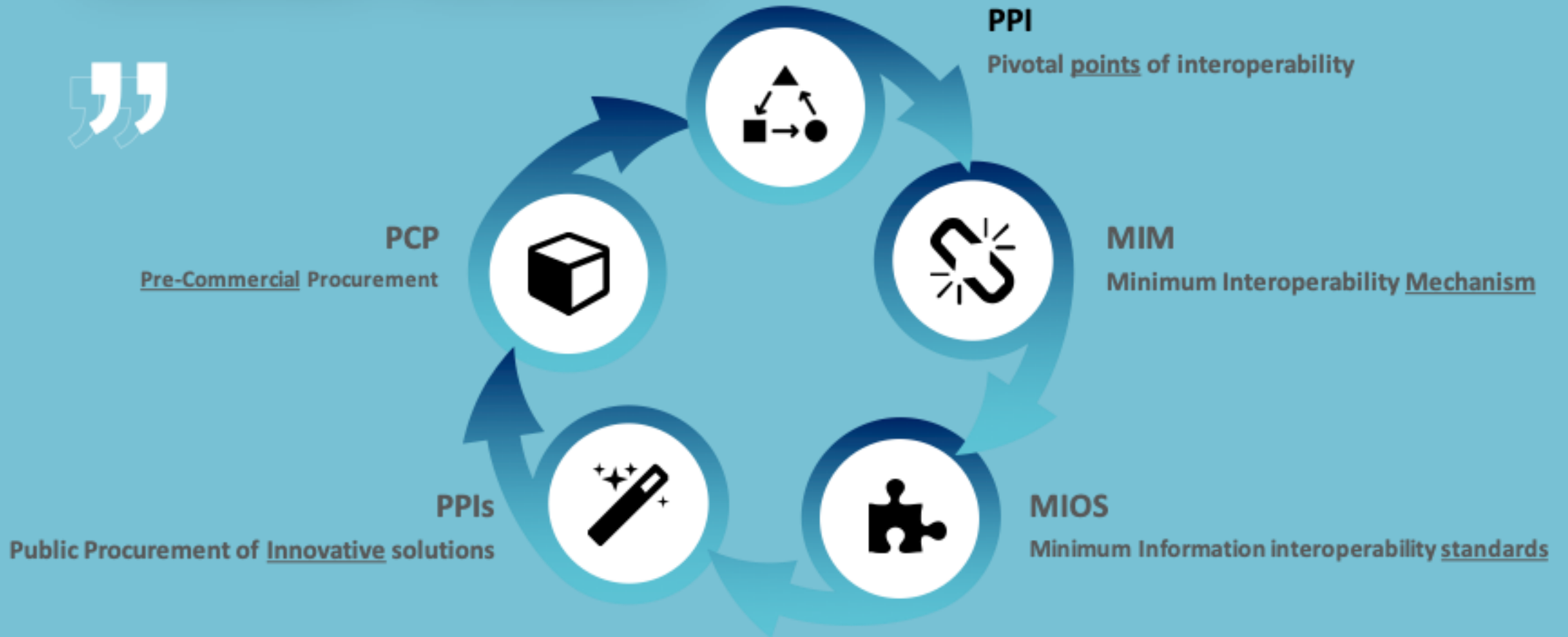
# Procurement Process in 4 steps

## Funnel Approach



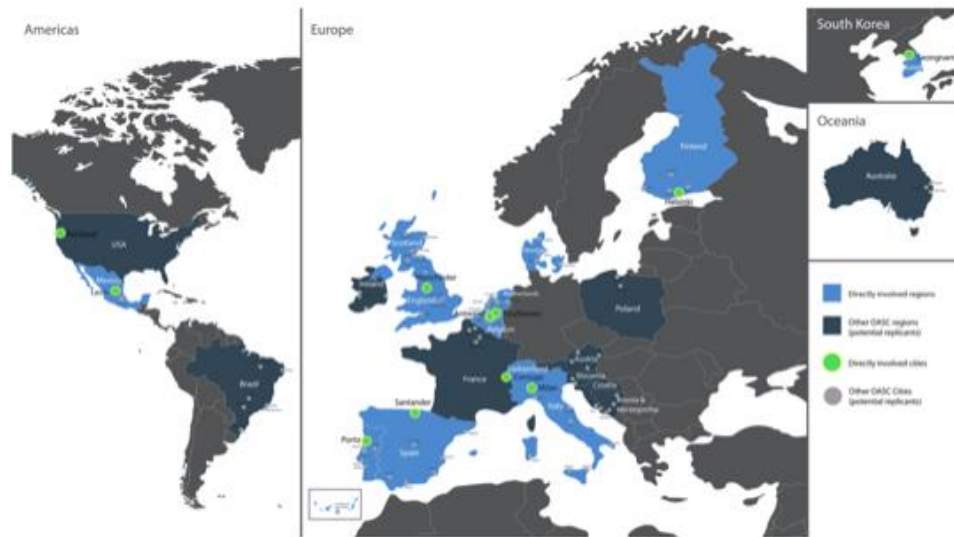


# Consensus Framework



# SynchroniCity

Antwerp (BE), Eindhoven (NL), Helsinki (FI), Manchester (UK), Milan (IT), Porto (PT), Santander (ES), Carouge (CH) ...



**Harmonized ecosystem** for IoT-enabled smart city solutions

**Reference architecture** for the envisioned IoT-enabled city market place

**Identify interoperability points** and **interfaces and data models**

# IDSA



INTERNATIONAL DATA  
SPACES ASSOCIATION

## DISCOVER THE REFERENCE ARCHITECTURE FOR THE DATA ECONOMY

FIND OUR USE CASES AND DEMONSTRATORS  
AT THE IDSA AND FIWARE BOOTH IN HALL 8, C31

### HEAD OFFICE INTERNATIONAL DATA SPACES ASSOCIATION

Joseph-von-Fraunhofer-Str. 2-4  
44227 Dortmund  
Germany  
[info@industrialdataspace.org](mailto:info@industrialdataspace.org)  
[industrialdataspace.org](http://industrialdataspace.org)

### IDSA MEMBERSHIP ADVANTAGES

- Implement use cases
- Drive global standardisation forwards
- Develop architectures
- Design sustainable business models

Become a member

[industrialdataspace.org/en/become-member](http://industrialdataspace.org/en/become-member)

### FIWARE MEMBERSHIP ADVANTAGES

- Have a voice in driving technology change
- Create sustainable business models whilst implementing FIWARE-based solutions
- Help to promote adoption of the FIWARE open standards

Become a member [fiware.org/join](http://fiware.org/join)

### FIWARE FOUNDATION e.V.

Franklinstrasse 13 A  
10587 Berlin  
Germany  
[press.office@fiware.org](mailto:press.office@fiware.org)  
[fiware.org](http://fiware.org)

### ABOUT INTERNATIONAL DATA SPACES ASSOCIATION

The **International Data Spaces (IDS)** approach addresses a key topic in the evolution of **Industrie 4.0**: how companies and institutions can build a space where data is shared in a decentralised manner so that each organization can use available data to improve their processes as well as govern and monetize data exported to third parties.

For this, the **International Data Spaces Association (IDSA)** is creating a reference architecture to implement secure and trustworthy data exchanges where data providers keep control over the use of their data ("data sovereignty"). It also addresses interoperability with many different data types used in global supply chains.

### ACTIVE PART IN DESIGNING THE ARCHITECTURE OF THE IDS

With the establishment of the International Data Spaces Association, business and industry take an active part in designing the architecture of the **IDS**. More than 80 companies and institutions from 16 countries are members of the association. The International Data Spaces Association pools the requirements on IDS, organizes the knowledge exchange between research and business and develops guidelines for the certification, standardization and utilization of the results emerging from the different IDS-related research projects on the European and national level.

### ABOUT FIWARE

**FIWARE** is an Open Source initiative whose mission is to build an open sustainable ecosystem around public, royalty-free and implementation-driven software platform standards for the development of Smart Applications in multiple sectors. One of the strategic areas is **Industrie 4.0**. The FIWARE platform provides a rather simple yet powerful set of Application Programming Interfaces (APIs) and also combines components enabling the connection to the Internet of Things with Context Information Management and Big Data services on the Cloud.

The **FIWARE Foundation** is the legal independent body providing shared resources to help achieving the FIWARE mission. The FIWARE Foundation is open: anybody can join contributing to a transparent governance of FIWARE activities and rising through the ranks, based on merit.

### COMMON MISSION

International Data Spaces Association and FIWARE Foundation are working together on the first open source implementation of the **IDS Reference Architecture**. Its main component is the **IDS Connector** which, based on the **FIWARE Context Broker** and other complementary FIWARE technologies, manages all aspects related to the publication of and the access to data. Both the IDS and FIWARE platforms are listed as promising digital industrial platforms built on European strength in a recent report published by the European Union on the progress of the Digitising European Industry (DEI) initiative.

### WHY

In the context of **Digitising European Industry (DEI)**, the EU invests around €300 million in next-generation platform building and piloting, during the 2018-20 period. The European Commission invites you to a workshop on '**Advanced & Interoperable Digital B2B Platforms for Smart Factories and Energy**' which aims to foster cooperation of stakeholders across value chains, user-supplier integration, and fast adoption of emerging standards.



<https://www.industrialdataspaces.org/cooperation-with-a-great-future-idsa-and-fiware-working-together/>

INTERNATIONAL DATA  
SPACES ASSOCIATION

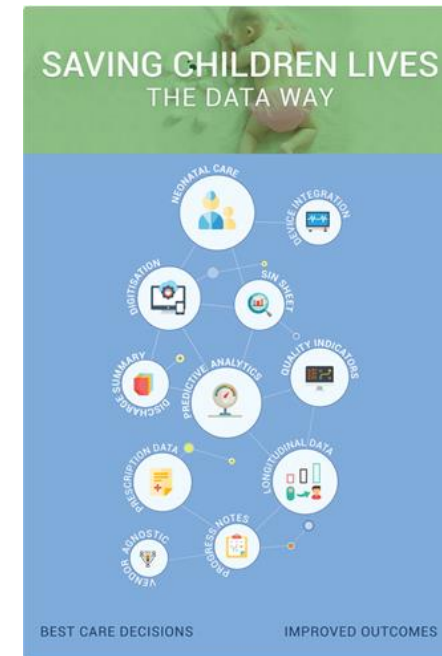




# Saving Children Lives: The data way

**Adapting information technology in  
healthcare services...**

**Errors in manually** plotting the  
parameters in growth charts results in  
missed opportunities for early detection  
of growth disorders in children



Harpreet Singh

<http://inicucloud.com/publications.html>







## Reducing flooding in rice paddies with data

**11.3** gigatons of carbon dioxide emissions can be reduced,  
Farmers could realize **\$519 billion** in additional profits  
and can dramatically reduce greenhouse gas emissions,  
and conserve water and boost yields.



Architecture / Topologie  
Atomic Microservices (GE / SE)  
Minimum Interoperability Mechanism (MIM)

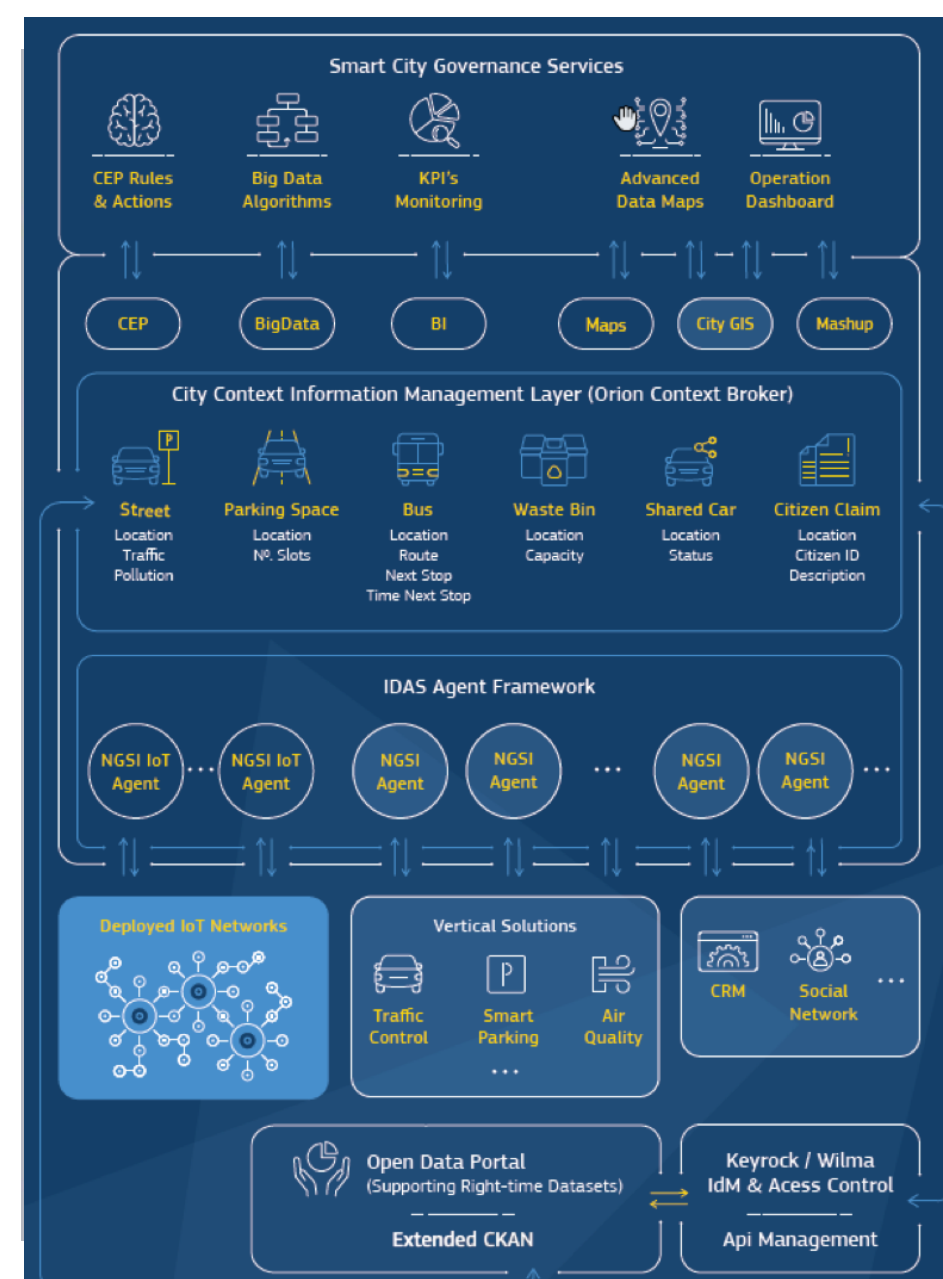
The Broker is in the heart of  
every information based platform  
and solution



NGSI v2



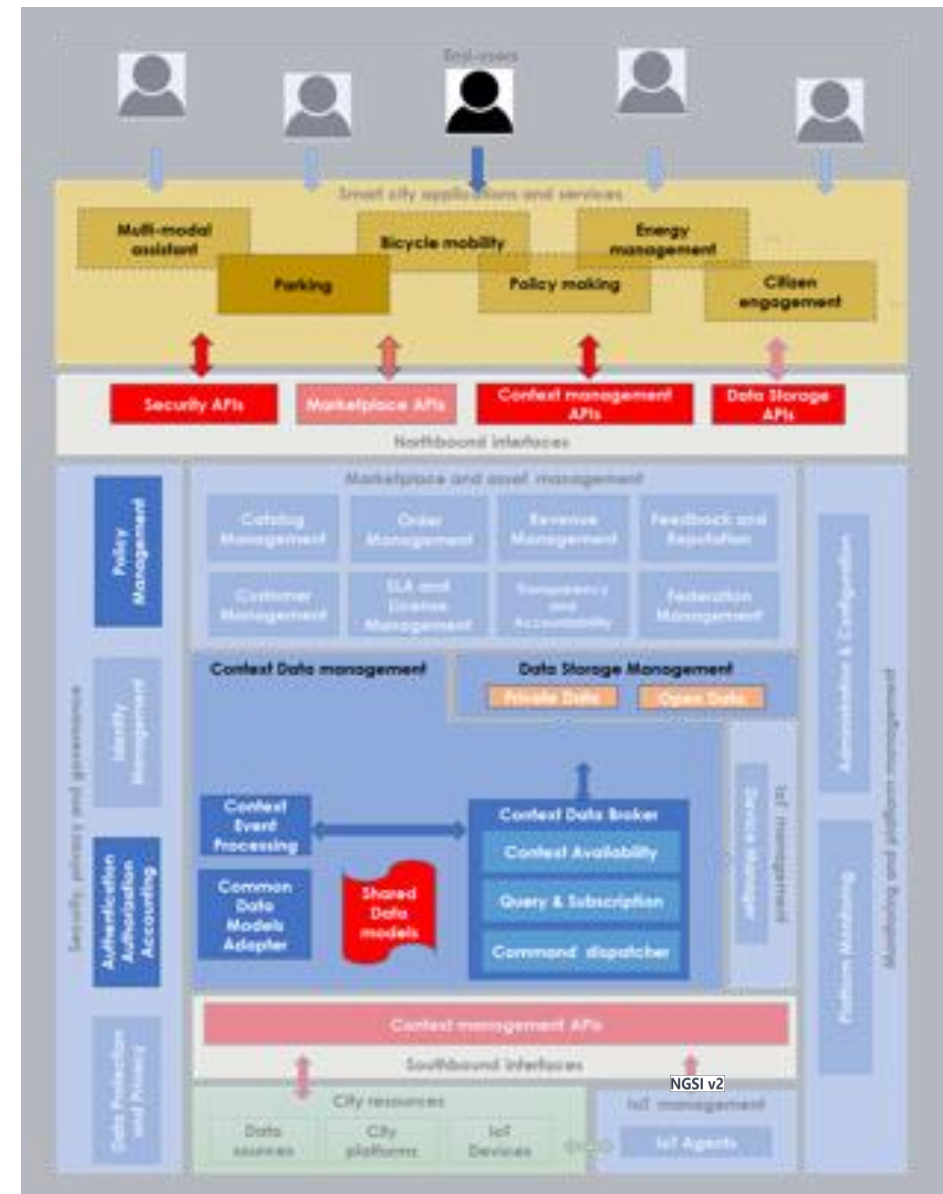
Cygnus



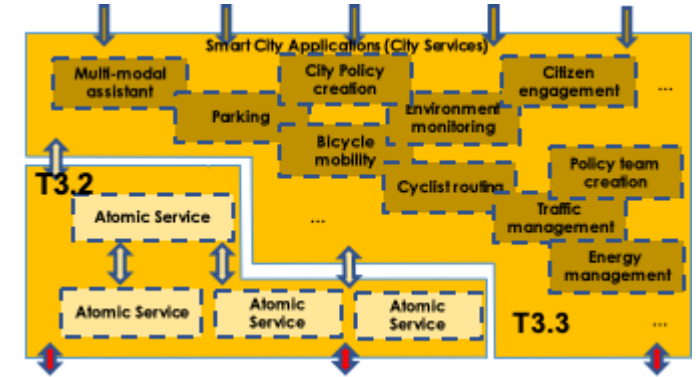
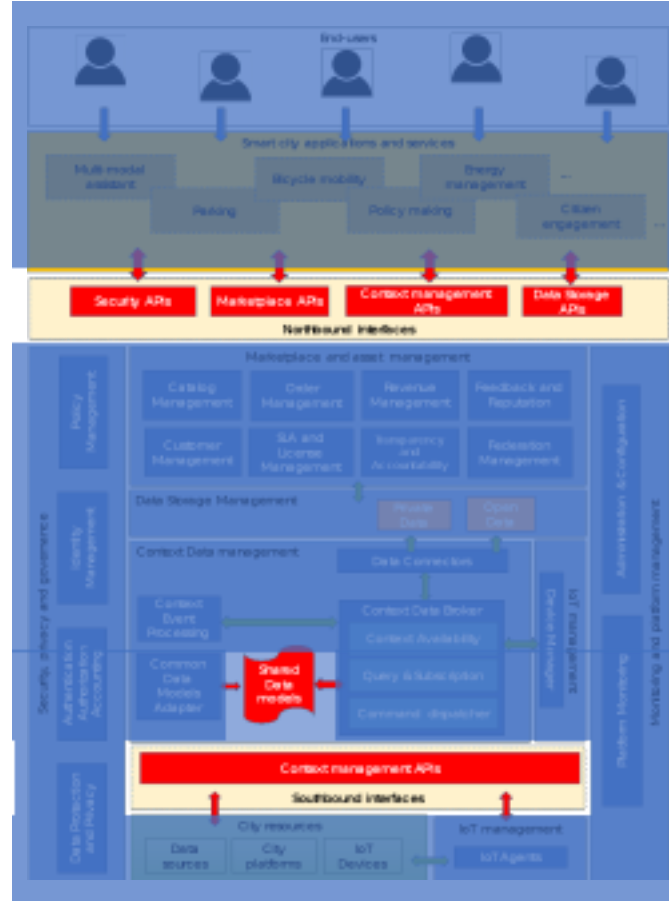
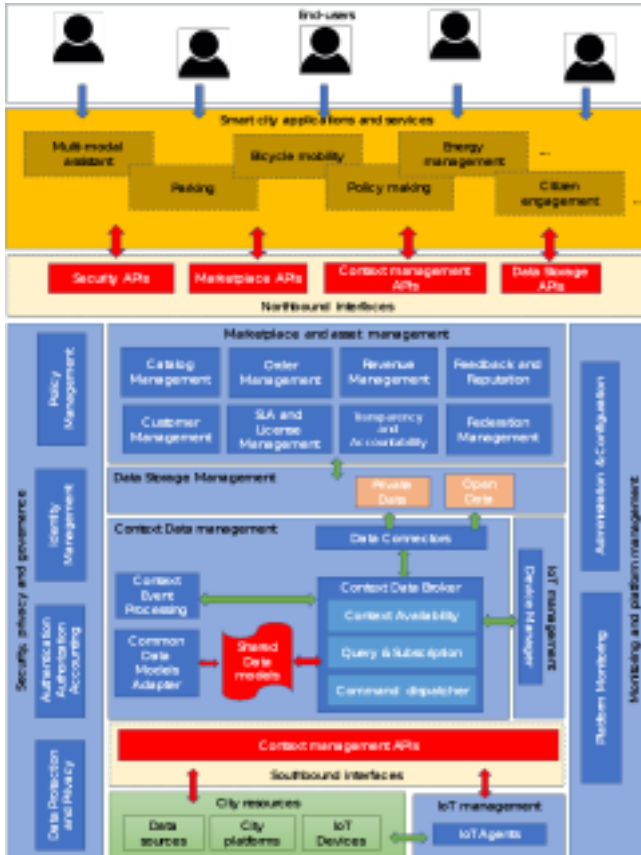


Architecture / Topologie  
Atomic Microservices (GE / SE)  
Minimum Interoperability Mechanism (MIM)

The Broker is in the heart of  
every information based platform  
and solution



# SynchroniCity: Technical resources: Architecture and MIMs

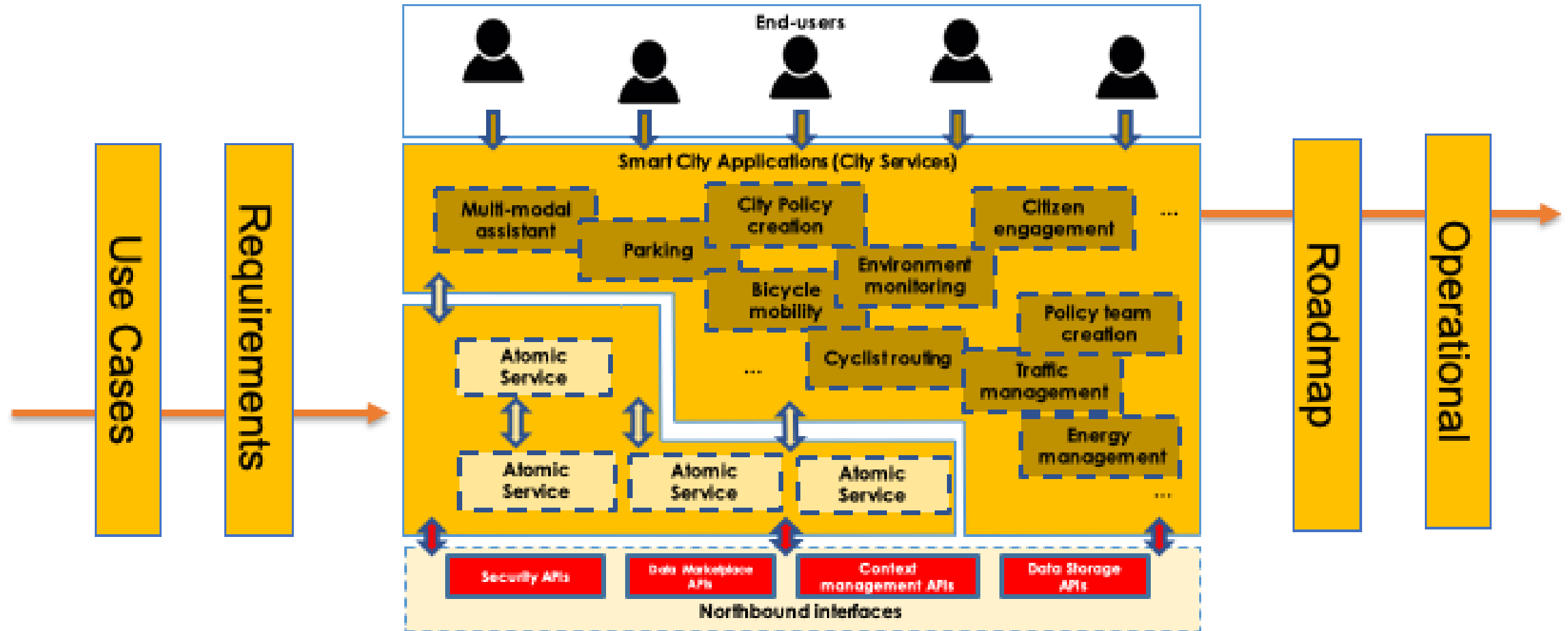


Architecture / Topologie  
Atomic Microservices (GE / SE)

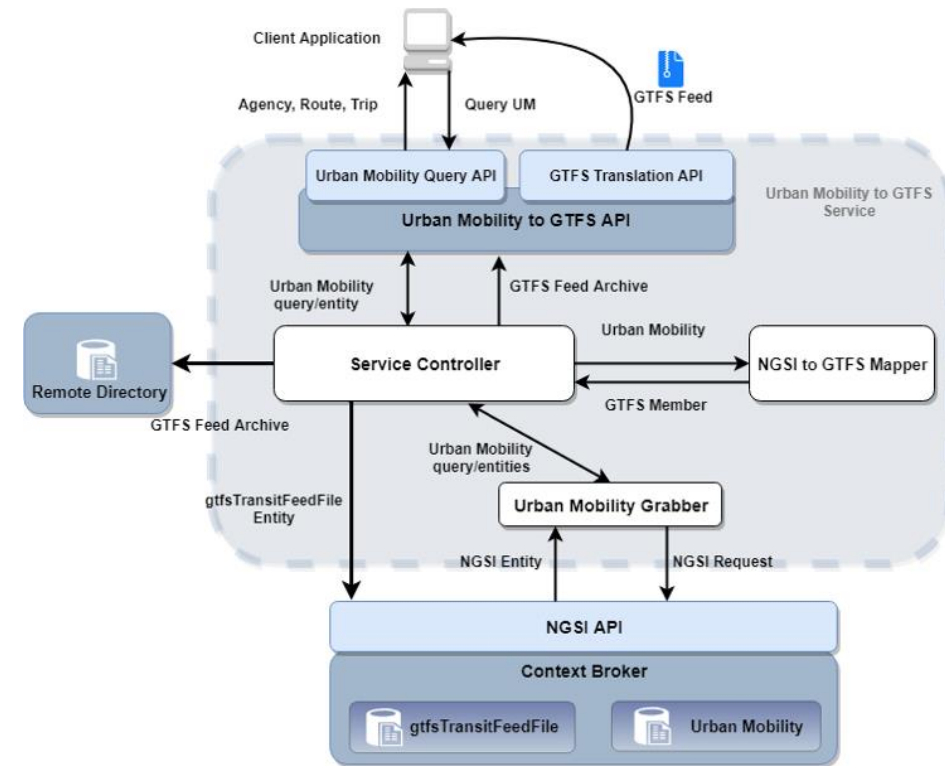
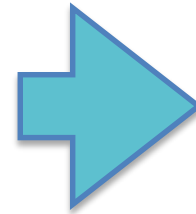
Minimum Interoperability  
Mechanism (MIM)

# Architecture / Topologie Atomic Microservices (GE / SE)

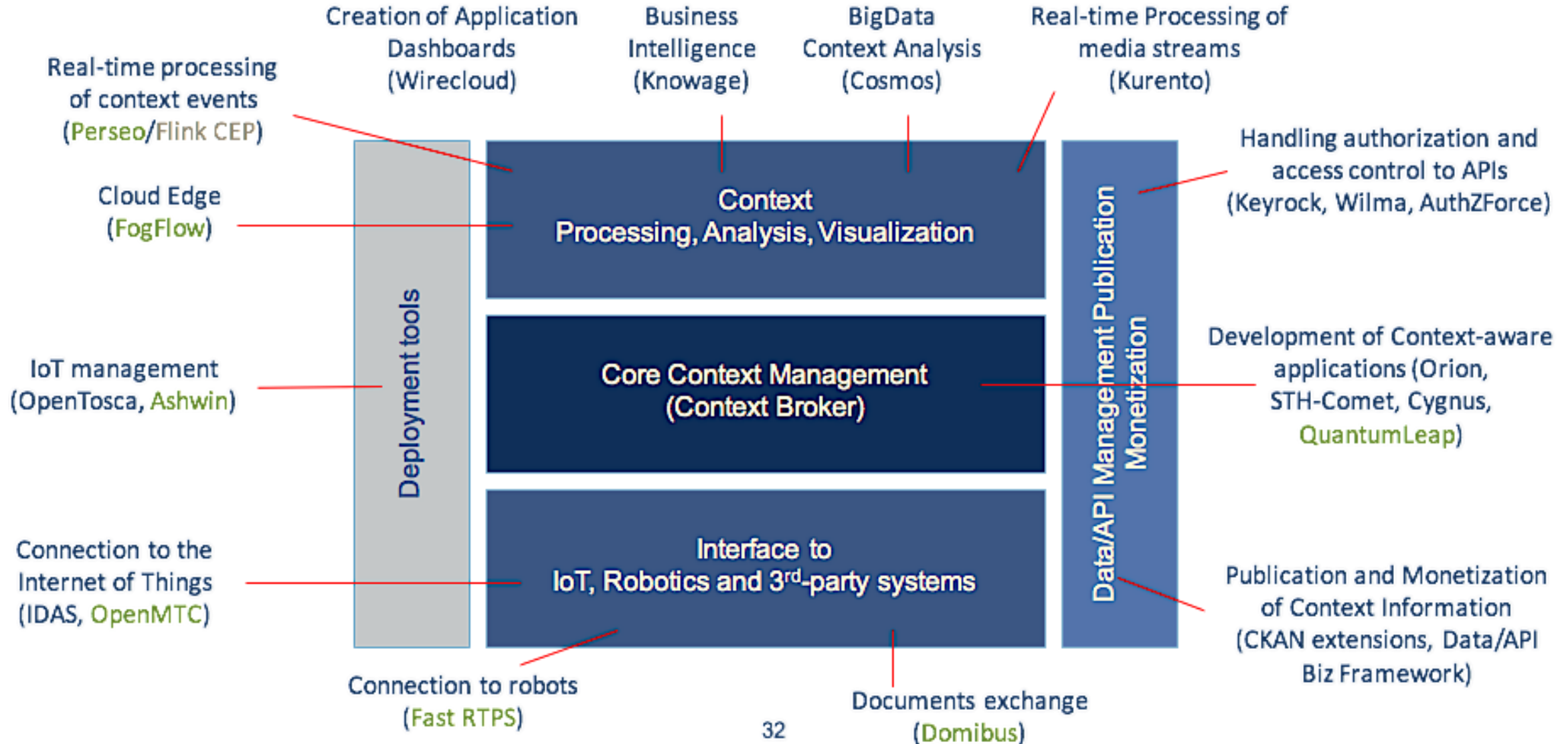
## Minimum Interoperability Mechanism (MIM)



# Architecture / Topologie Atomic Microservices (GE / SE) Minimum Interoperability Mechanism (MIM) in Mobility



# Mapping of FIWARE components, API's and new advancements







People walk past a Huawei store in Beijing on July 20, 2015. The Chinese telecoms equipment giant dominates the 5G wireless technology market, as part of Beijing's goals to achieve tech self-reliance. (Greg Baker/AFP/Getty Images)

## China's New Strategy for Tech Domination: China Standards 2035

BY ANNIE WU, EPOCH TIMES

October 31, 2018 Updated: November 1, 2018

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In the trade dispute with China, the United States has repeatedly called out the Chinese regime for its state-sponsored development of advanced technologies—accusing Beijing of undermining fair competition while justifying the theft of foreign technology to serve national interests of becoming a high-tech manufacturing powerhouse.

The industrial plan “[Made in China 2025](#)”—which proposes gearing China toward achieving self-sufficiency in 10 tech sectors by the year 2025—was cited repeatedly as evidence of Beijing's aggressive ambition.

## China's New Strategy 2035: Standards

To dominate cutting-edge technologies like artificial intelligence (AI), cloud computing, IoT (internet of things), and big data, China intends to accelerate efforts to develop technical standards, eventually exporting them to the international market, the report said.

While global technical standards for these technologies have not yet been established, “this is the golden opportunity for our country's industries and standards to realize the goal of ‘overtaking by changing lanes,’” the report quoted an official from China's national technical committee, the Standardization Administration, as saying.

**„overtaking by changing lanes...”**





People walk past a Huawei store in Beijing on July 20, 2015. The Chinese telecoms equipment giant dominates the 5G wireless technology market, as part of Beijing's goals to achieve tech self-reliance. (Greg Baker/AFP/Getty Images)

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# FIWARE-NGSI v2 Specification

This specification defines the FIWARE-NGSI version 2 API. FIWARE-NGSI v2 is intended to manage the entire lifecycle of context information, including updates, queries, registrations, and subscriptions.

The FIWARE NGSI (Next Generation Service Interface) API defines

- a **data model** for context information, based on a simple information model using the notion of *context entities*
- a **context data interface** for exchanging information by means of query, subscription, and update operations
- a **context availability interface** for exchanging information on how to obtain context information (whether to separate the two interfaces is currently under discussion).

<https://fiware.github.io/specifications/ngsiv2/stable/>

ETSI Whitepaper on NGSI-LD [https://www.etsi.org/images/files/ETSIWhitePapers/etsi\\_wp31\\_NGSI\\_API.pdf](https://www.etsi.org/images/files/ETSIWhitePapers/etsi_wp31_NGSI_API.pdf)

# FIWARE-NGSI as CEF Building Block

CEF supports multiple digital infrastructure projects, which contribute to improvements in the daily lives of Europeans through digital inclusion, the connectivity and interoperability of European digital services, and the development of a Digital Single Market.

The CEF Context Broker is composed by two major software components: the Orion Context Broker component which implements the core Context Broker functionality itself and the Cygnus component which complements Orion. Cygnus captures updates on context information managed by the Orion Context Broker and produces a stream of context data history which can then be stored into a specific persistent data sink storage, such as MySQL, MongoDB, Flink or HDFS for further processing or CKAN for Open Data publication.



# FIWARE-NGSI as ETSI Standard

The goal of ISG CIM was to develop technical specifications and reports to enable multiple organisations to develop interoperable software implementations of a cross-cutting Context Information Management (CIM) Layer. It is about bridging the gap between abstract standards and concrete implementations.

The CIM Layer enables applications to update, manage, and access context information from many different sources, as well as publishing that information through interoperable data publication platforms.

The work of ISG CIM will be done in a phased manner. The initial phase will be purely informative and result in an ISG CIM Group Report (GR). It will be followed by a second normative phase resulting in several ISG CIM Group Specifications (GS).

# FIWARE-NGSI as GSMA Standard

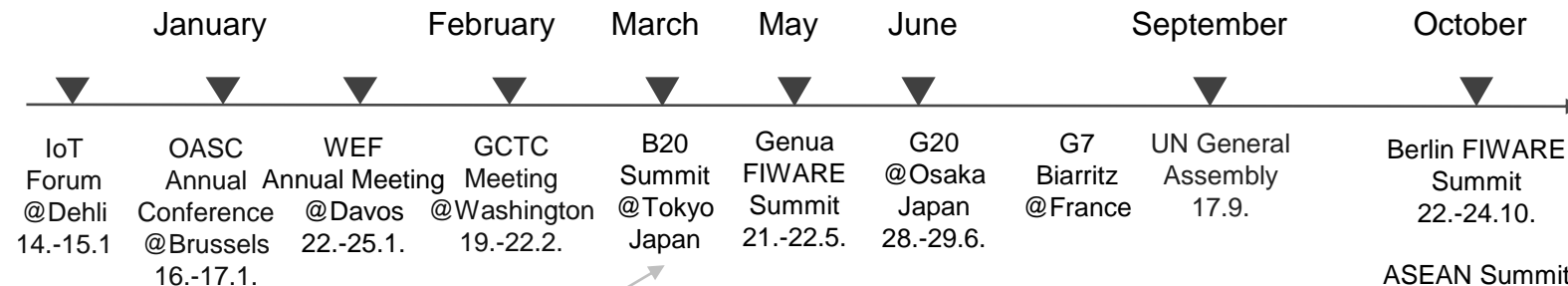
Big Data services based on the Internet of Things identifies the key functions and interfaces that enable IoT Big Data services to be delivered, and makes selections and recommendations particularly in the area of interfaces that support the creation of the IoT Big Data ecosystem. The framework outlines a logical architecture and it should be noted that operators may make different implementation decisions. In addition, not all mobile operators will implement exactly the same IoT Big Data services and this framework provides flexibility for them to approach the market according to their own strategy.

# Towards Open Platform technologies for materializing the Society 5.0

**To realize Society 5.0 at the city level, we aim to create**

- the smart city coalition of cities with system interoperability,**
- data governance framework that ensures data portability for citizens**

## Schedule of International Meetings in 2019



B20 summits are summits of business leaders from the G20 countries. For 2019, it would be organized by Keidanren (a comprehensive economic organization of Japanese major corporations) whose chairman is Mr. Nakanishi, who is also the chairman of Hitachi.



# Towards Open Platform technologies for materializing the Society 5.0



Gaining for **sustainable global marketplace**  
where solutions are **interoperable and replicable**  
thus **investments of the cities are protected**  
and (**vendor lock-in**) (lock-out)



# Towards Open Platform technologies for materializing the Society 5.0



The **governance** , **architecture** and **topology** of adopted open platform technologies as implicit and inseparable quality should also be considered, as should the purely functional features of digital products and services.

Considering a **driven-by-implementation** approach as opposed to a design-by-committee approach is required to ensure an agile adoption.



# Towards Open Platform technologies for materializing the Society 5.0



Shortcomings in the "**right**" management of digitization have had negative effects worldwide and led to distortions.

Non-functional qualities such as **interoperability**, **openness**, **transparency**, **replicability**, **portability** or **modularity** are suitable for significantly enhancing and promoting the purely technical advantages of a digital product or service



Page 10 of 10

Journal Pre-proof

Yellow boxes also mark Indicators for which there are no official metrics, but for which closely related estimates are available that allow informative but imperfect monitoring.

Page 10 of 10



Thank you!

<http://fiware.org>  
Follow @FIWARE on Twitter



Olaf-Gerd Gemein

Business Architect, Serial Entrepreneur

Co-Founder and CEO of Vero City Platform

Chair of Smart Cities Committee and  
Member of Board of Directors FIWARE Foundation, Berlin

Vice-Council Coordinator of Open & Agile Smart Cities Initiative  
Member of Funding Working Group

Advisor VC Fund Future State Foundry

Initiator of „Smart Mobility as a Service Platform“, Germany

