Open APIs for Open Minds

FIWARE: supporting an (IoT) Cloud for RDA in Europe

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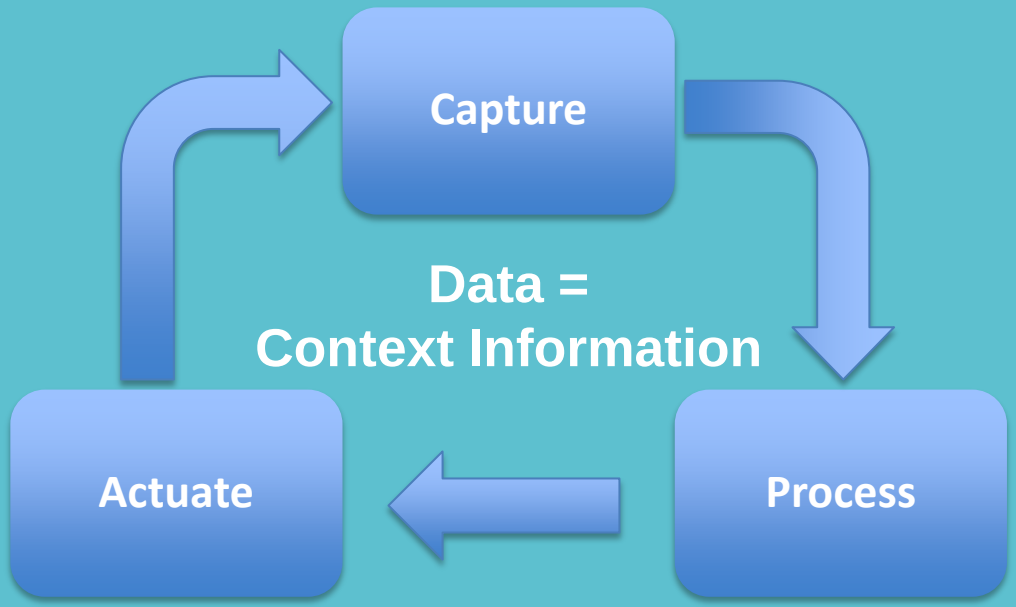
FIWARE: Definition of Smart Solution

Smart Solutions gather data from many different sources (including but not limited to IoT) to build a “picture” of the real world and then process and analyze that information in order to implement the desired intelligent behavior (which may imply changing the real world)



CONTEXT
MATTERS

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Implementing Smart Solutions requires gathering and managing context information at large scale

Smart Cities

Shop
- Location
- Business name
- Franchise
- offerings

Citizen
- Birthday
- Preferences
- Location
- ToDo list

Bus
- Location
- No. passengers
- Driver
- Licence plate

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Implementing Smart Solutions requires gathering and managing context information at large scale

Smart Industry

Gas Tank
- Station
- Max Volume
- Current Level
- Min Threshold
- Temperature

Station
- Location
- Owner
- SLA

Tanker
- Driver
- Location
- Max Volume
- Current Level
- Speed
- Direction

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Implementing Smart Solutions requires gathering and managing context information at large scale

Smart Agro

Crop
- Humidity
- Leaf area
- Age

Drone
- Location
- Battery level
- Speed
- Direction

Tractor
- Location
- Speed
- Direction

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What if …


there were
a standard API
for accessing
context information?
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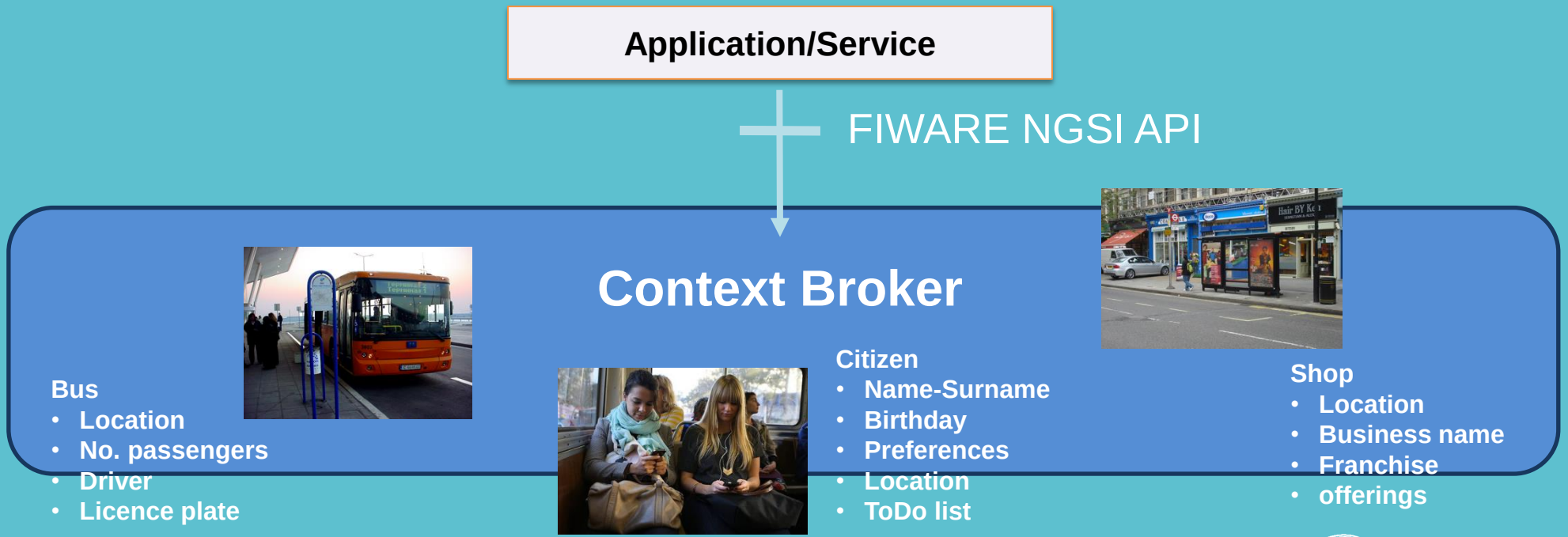
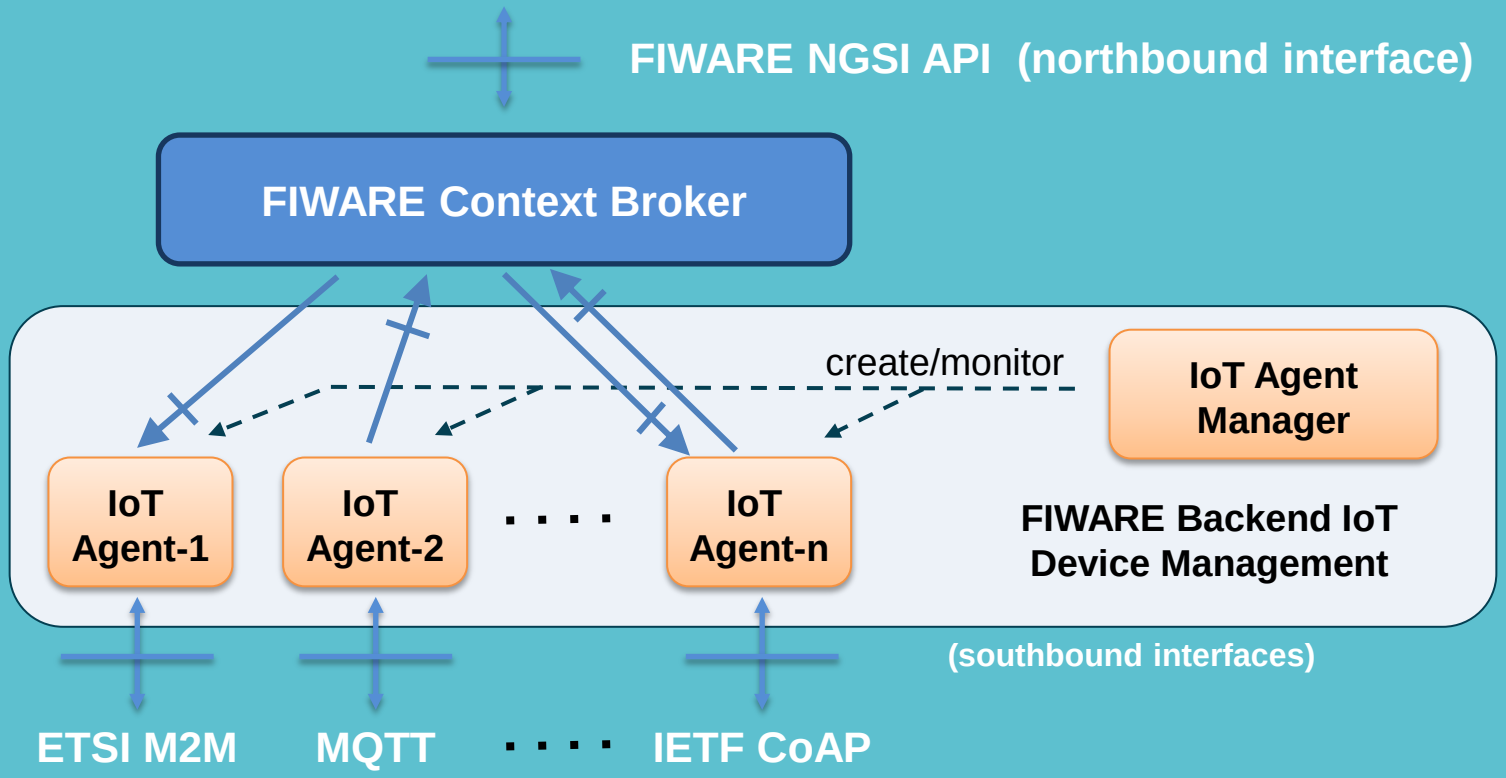
Context Information Management in FIWARE

- The OMA NGSI-9/10 API is a simple yet powerful public, royalty-free standard API for managing Context information
- The FIWARE NGSI API is the Restful binding of OMA NGSI and uses JSON: any web/backend programmer gets quickly used to it
- FIWARE NGSI supports geo-queries, soon Linked Data (JSON-LD)



Integration with sensor networks (1/2)

- FIWARE NGSI is capable to deal with the wide variety of IoT protocols today
- Rather than trying to solve the battle of standards at IoT level, it brings a standard where no standard exists today: context information management



IoT would be an enabler, no barriers because of complexity

"I don't care what low-level IoT protocol is used"

"I should not need to handle connectivity with IoT devices"

GET <Oauth token>
/V1/contextEntities/crop1/attributes/humidity

Standard API

Context Broker

Reading the value provided by a sensor should be as easy as reading an attribute of an entity

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IoT would be an enabler, no barriers because of complexity

"I don't care what low-level IoT protocol is used"

"I should not need to handle connectivity with IoT devices"

PUT <Oauth token>
/V1/contextEntities/crop1/attributes/watering "on"

Standard API

Context Broker

Actuation on a device should come as a side effect derived from updating the attribute of an entity

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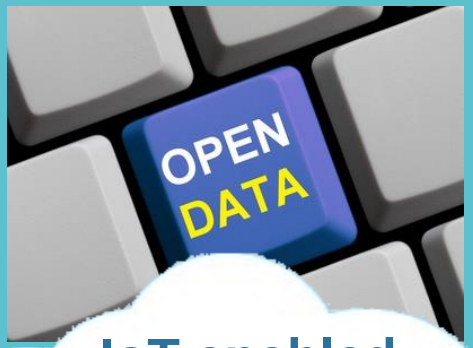
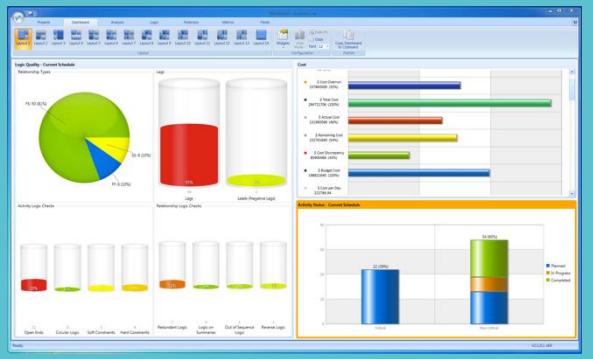
Once context information is gathered, other useful FIWARE enablers can be used

Advanced Web-based UI (AR, 3D)

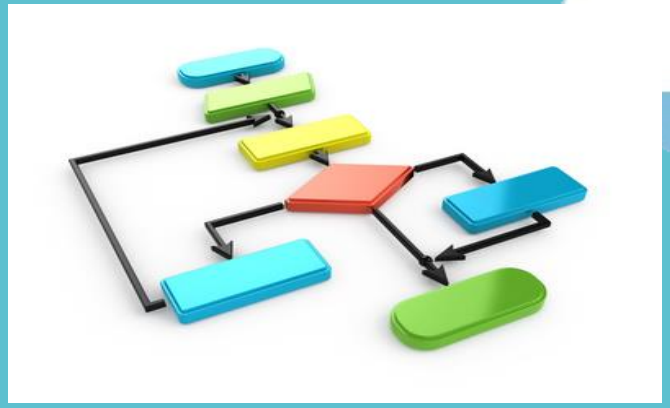
Open data publication



Data/Apps visualization



IoT-enabled Context Information Management



Complex Event Processing

Multimedia processing

Big Data Analysis

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FIWARE is at the center of major de-jure and de-facto standardization efforts

The GSMA has published a Reference Architecture for IoT Big Data Ecosystem which recommends to mobile operators

FIWARE NGSIv2 should be supported by implementers delivering the IoT Big Data ecosystem

TM Forum, the global industry association for digital business, is working with FIWARE to deliver the key building blocks for enabling and connecting Smart City ecosystems.

TM Forum is supporting FIWARE NGSI REST-based APIs for real-time access to contextual information for cities.

ETSI has announced the creation of a new Industry Specification Group on cross-sector Context Information Management (ISG CIM) for smart cities applications and beyond.

FIWARE NGSIv2 is the starting point for the CIM API to be specified

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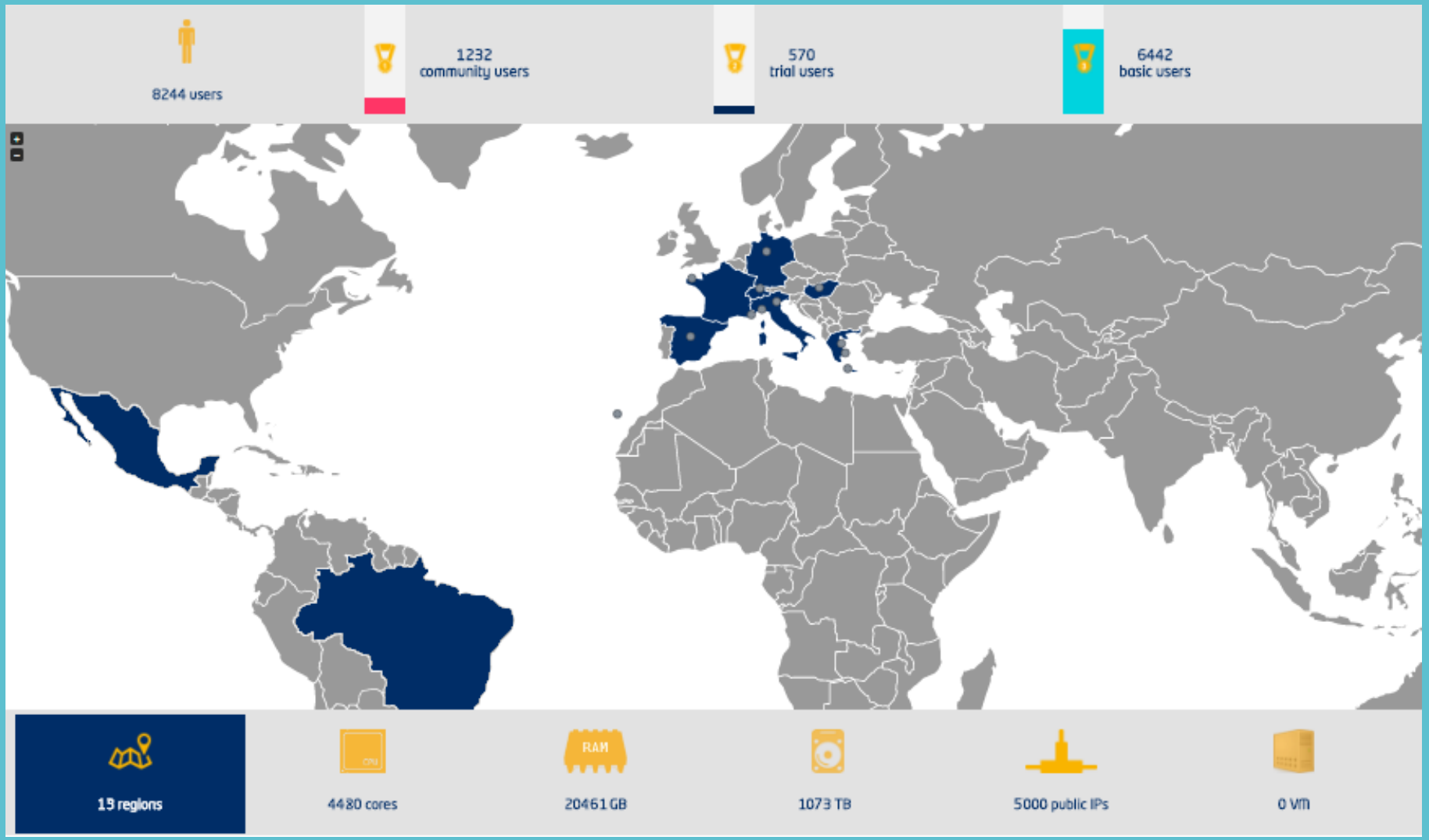
FIWARE Lab



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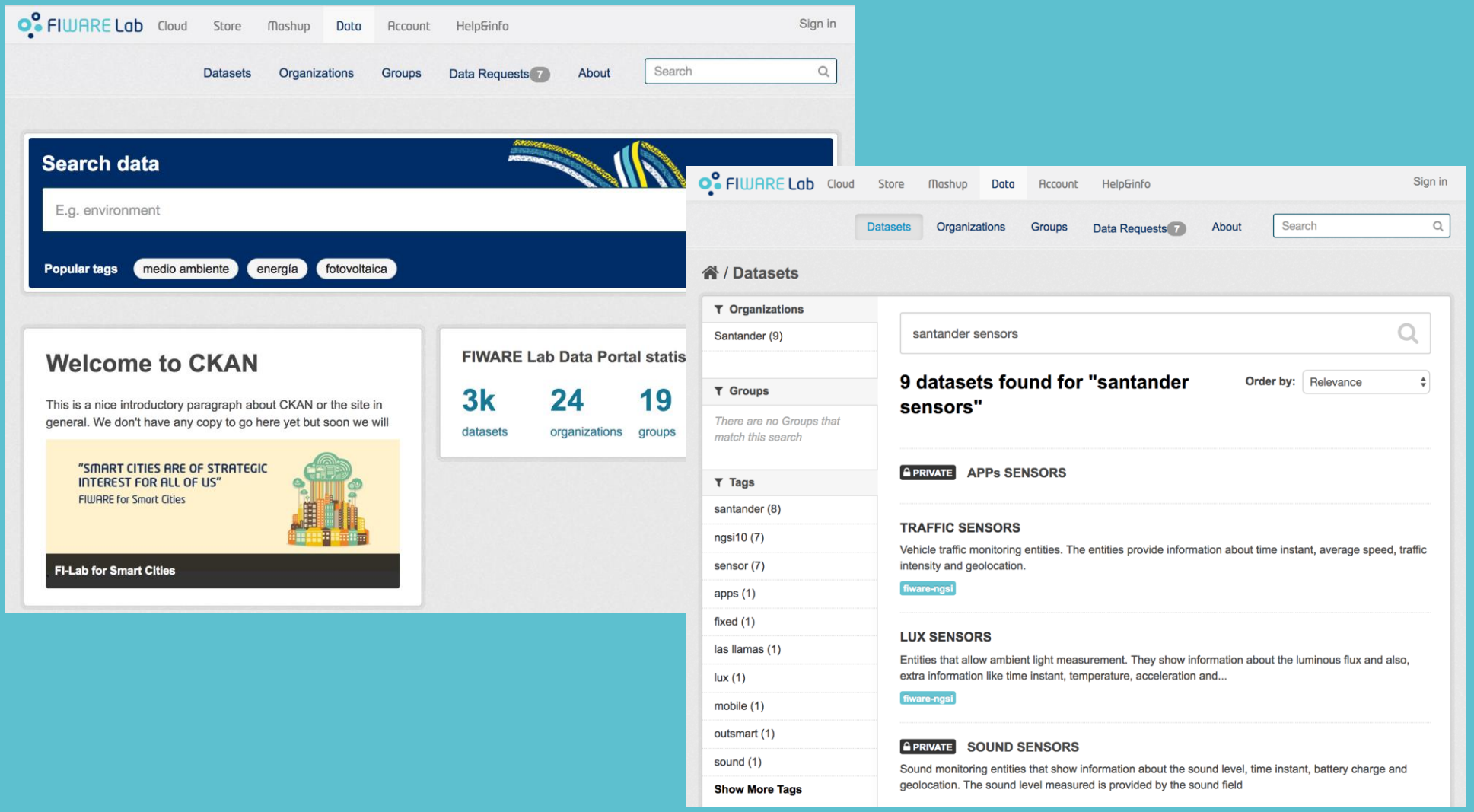
FIWARE Lab data portal



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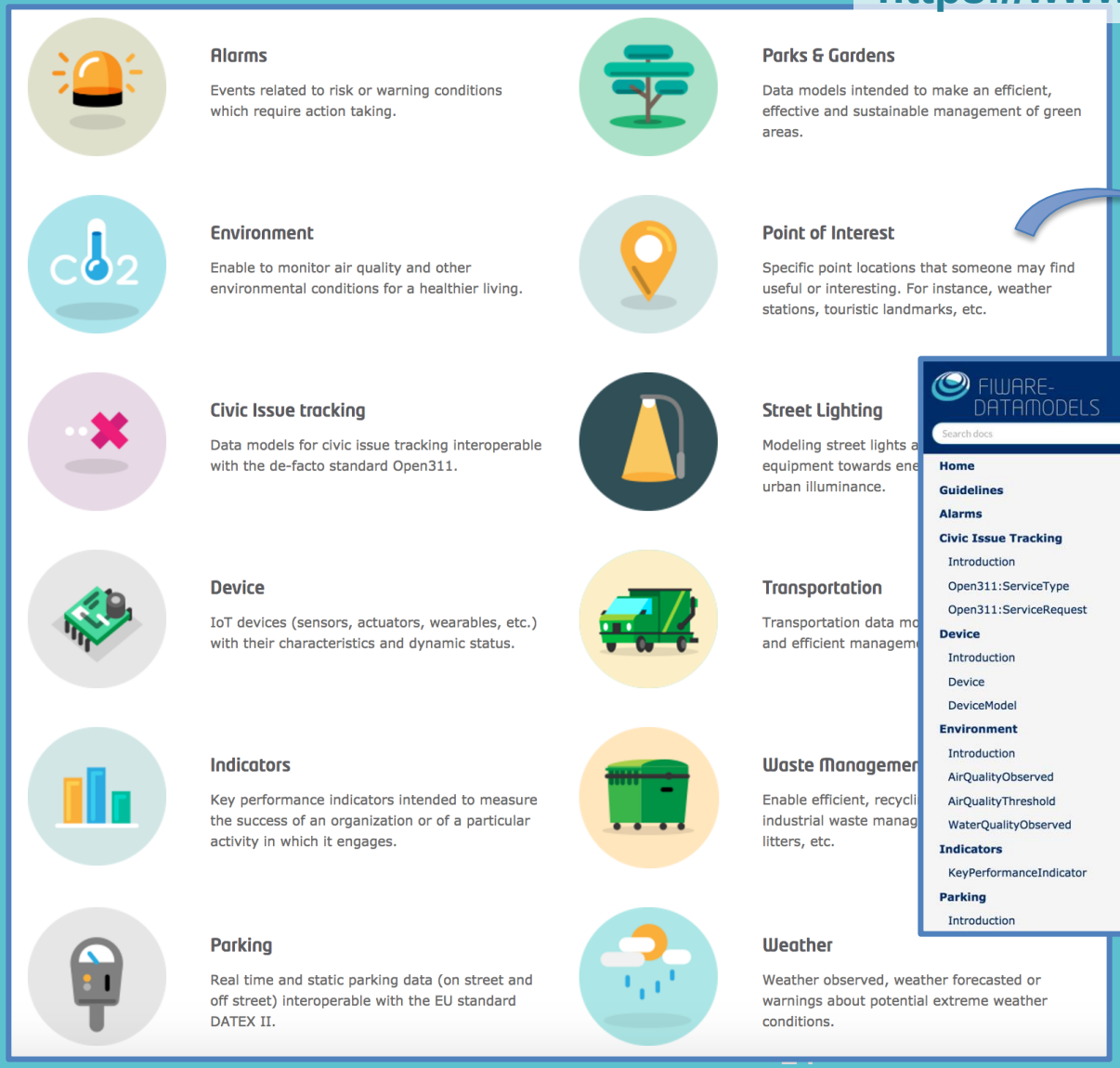
Producing first common information models

https://www.fiware.org/data-models



Alarms
Events related to risk or warning conditions which require action taking.

Parks & Gardens
Data models intended to make an efficient, effective and sustainable management of green areas.

Environment
Enable to monitor air quality and other environmental conditions for a healthier living.

Point of Interest
Specific point locations that someone may find useful or interesting. For instance, weather stations, touristic landmarks, etc.

Civic Issue tracking
Data models for civic issue tracking interoperable with the de-facto standard Open311.

Street Lighting
Modeling street lights a
equipment towards ene
urban illuminance.

Device
IoT devices (sensors, actuators, wearables, etc.) with their characteristics and dynamic status.

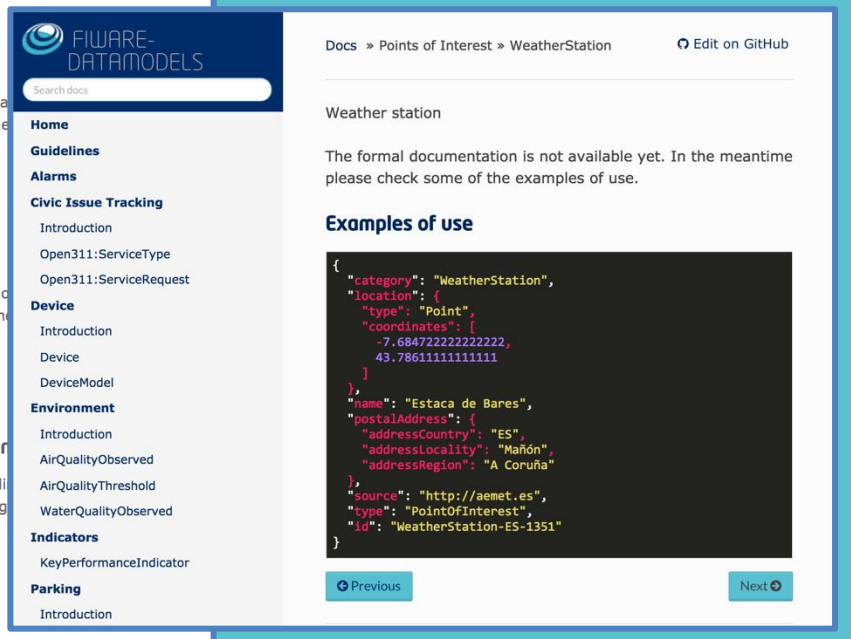
Transportation
Transportation data mo
and efficient manageme

Indicators
Key performance indicators intended to measure the success of an organization or of a particular activity in which it engages.

Waste Managemer
Enable efficient, recycli
industrial waste manag
litters, etc.

Parking
Real time and static parking data (on street and off street) interoperable with the EU standard DATEX II.

Weather
Weather observed, weather forecasted or warnings about potential extreme weather conditions.



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FIWARE data models

Alarms

Events related to risk or warning conditions which require action taking.

Parks & Gardens

Data models intended to make an efficient, effective and sustainable management of green areas.

Environment

Enable to monitor air quality and other environmental conditions for a healthier living.

Point of Interest

Specific point locations that someone may find useful or interesting. For instance, weather stations, touristic landmarks, etc.

Civic Issue tracking

Data models for civic issue tracking interoperable with the de-facto standard Open311.

Street Lighting

Modeling street lights and all their controlling equipment towards energy-efficient and effective urban illuminance.

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FIWARE data models

Device

IoT devices (sensors, actuators, wearables, etc.) with their characteristics and dynamic status.

Transportation

Transportation data models for smart mobility and efficient management of municipal services.

Indicators

Key performance indicators intended to measure the success of an organization or of a particular activity in which it engages.

Waste Management

Enable efficient, recycling friendly, municipal or industrial waste management using containers, litters, etc.

Parking

Real time and static parking data (on street and off street) interoperable with the EU standard DATEX II.

Weather

Weather observed, weather forecasted or warnings about potential extreme weather conditions.

FIWARE

The journey from more efficient cities into engines of growth as enablers of the Data Economy

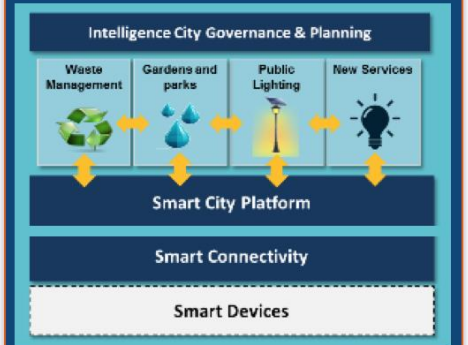
1 2 3 4

Efficient and Open

- Vertical solutions (some being IoT-enabled) bringing efficiency in silos
- Historic data as open data
- Information still in vertical silos, no global picture

Truly Smart

- Horizontal platform integrating "right-time" context info from different vertical services
- Predictive and prescriptive models



Unleashing Right-time Open Data

- right-time context info published to third parties
- exchange of context info with other domains (support to data sovereignty)

Support to Data Economy

- city as a platform including also 3rd party data enabling innovative business models
- open and commercial data enabling multi-side markets

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Front-runner Cities initiative

- Host an Advanced Open Data Portal on FIWARE Lab where front-runner cities connect and publish data
  - Managing NGSI API queries as “dynamic” datasets
  - Assignment of Access Rights Policies to datasets
  - Managing Access Rights acquisition
  - Binding pricing to datasets (acquisition and access)

- Open Data Publication framework based on:
  - Extended CKAN
  - FIWARE Biz Framework components relying on TM Forum Business Open APIs for monetization

tmforum

Open APIs

- **Catalog**
- **Product offering**
- **Product inventory**
- **Billing**
- **Party/Customer**

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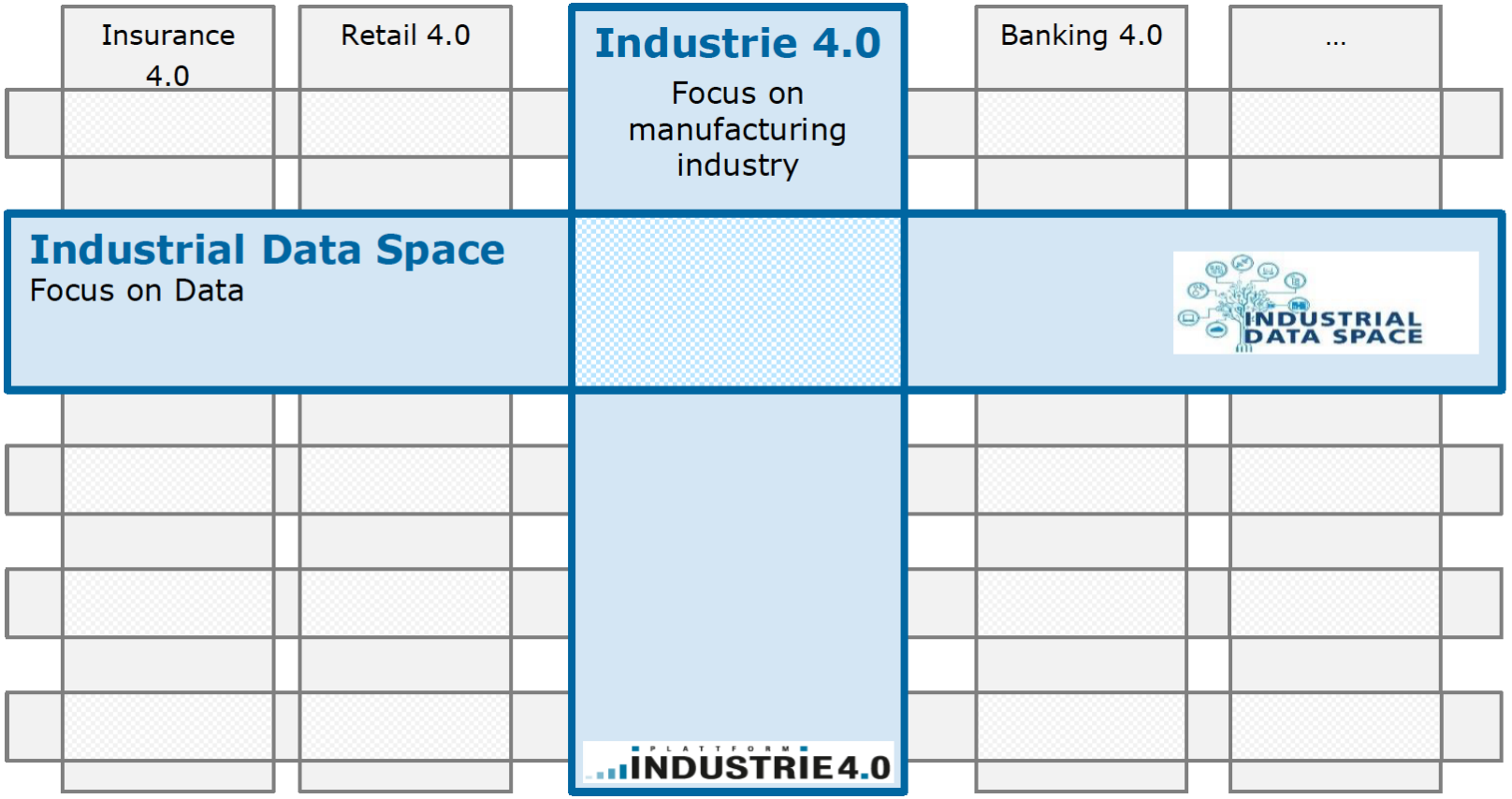
FIWARE meet the requirements of the Industrial Data Space initiative



Smart Services

Data

Networks

Real Time Systems

...

Source: Fraunhofer / IDS

FIWARE

FIWARE meet the requirements of the Industrial Data Space initiative

Decentralization
Federated Architecture

Trustworthiness
Certified Members

Sovereignty
Data and Services

Security
Data Exchange

Openness
Neutral and
User-Driven

Governance
Common Rules of
the Game

Scalability
Network Effects

Ecosystem
Platform and Services

Source: Fraunhofer / IDS

FIWARE

FIWARE will bring a first open source implementation of the IDS Architecture

Basic functionality dealing with registration of Docker files enabling automated deployment and configuration of Data Apps may rely on Docker Hub services

Proposed standard vocabularies are being proposed at https://www.fiware.org/data-models

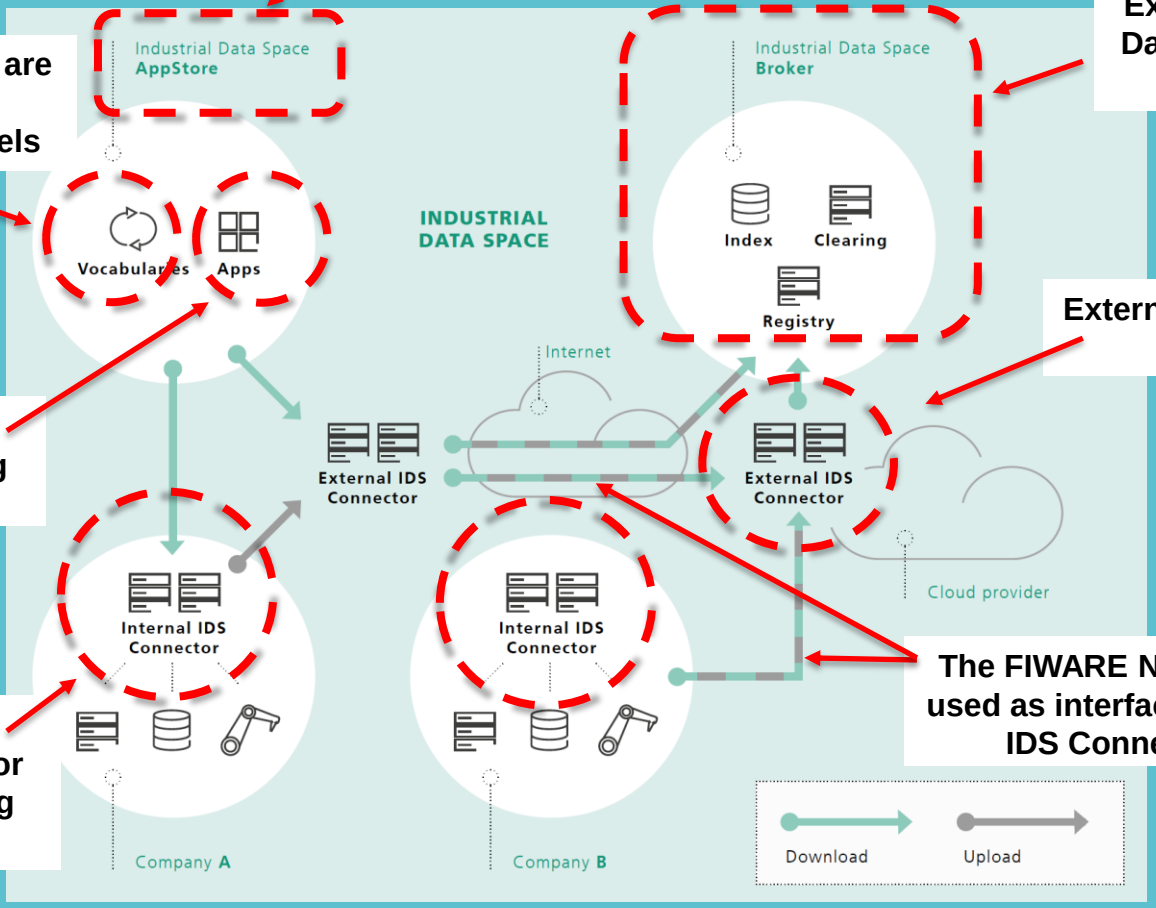
Extended CKAN Data Publication Platform

Data Apps map to NGSI adapters or Apps processing context information

External Context Broker instance

You can deploy Internal Context Broker instances or handle access by enforcing defined access policies

The FIWARE NGSI API is used as interface between IDS Connectors



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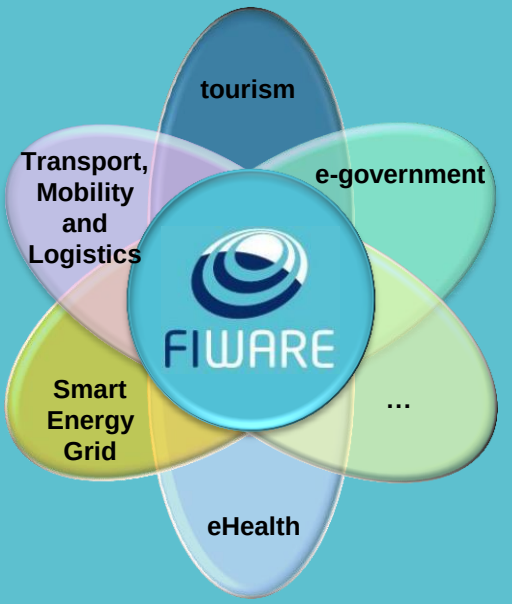
Thoughts for food

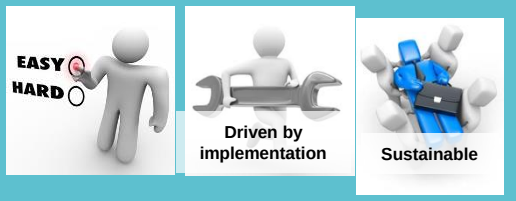
- FIWARE brings a standard for context information management:
  - simple model for representing context information: entity-attribute-value
  - decentralized distributed architecture
  - standard open API for getting access to context information
  - support to data sovereignty and economy of data concepts
- Context data (current and history) may not comprise all kind of data but a rather relevant part, so a standard for context information management may be useful:
  - 75-80% of data scientists time is los with data integration/management work
  - 60% of costs of data intensive projects is spent in pure integration tasks
- FIWARE Lab may emerge as a sandbox environment where:
  - valuable context data for research can be hosted and access policies enforced
  - a directory enabling searching of valuable context data can be hosted
- Major issue is still sustainability for such an environment

FIWARE: Technology but much more

- Mission: build an open sustainable ecosystem around public, royalty-free and implementation-driven software platform standards that will ease the development of new Smart Applications in multiple sectors
- Pillars:

FIWARE	the open source platform of choice for developing smart applications
FIWARE Lab	a meeting point where innovation happens and users can experiment with the technology
FIWARE Accelerate	activate funds and accelerate the business of entrepreneurs using the technology
FIWARE Mundus	reach a global footprint, opening to regions that share the same vision and ambition
FIWARE iHubs	support development of the community at local level, bringing support, training, certification





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DREAM BIG
IT WORKS
FIWARE
Open APIs for Open Minds

Thank you!

http://fiware.org
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