Orion
Context Broker
in CEF Building Blocks

FIWARE

Open APIs for Open Minds

Orion Context Broker Open Standard Technology for Context Information Management

Data publication platforms have been mostly focused on the publication of static historic data. While the analysis of such data is useful for extracting relevant information for supporting decisions, particularly when there is a large amount of historic data available, real-time data (e.g., the current traffic in a road, or the current location of a train) is needed to fuel the kind of innovative and smart services which will impact the daily life of people and businesses (e.g., mobility services). Managing real-time data gathered from the different vertical systems within an organisation is crucial for generating a holistic view on what is currently going on within the organisation. Processing and analysis of this data, referred as context information, will bring support to adoption of smart decisions or the smart automation of certain processes.

Orion Context Broker enables organisations:

From public administrations to private companies – to collect, manage and share context information. It is a system able to inform in right-time what is currently happening.

For instance, in smart cities it is possible to gather useful information such as traffic status, quality of air data, slot parking available, data about orders (e.g., current location and expected delivery time) shared by package delivery service company, and this is not over...

The Orion Context Broker technology was developed as the core component of the FIWARE platform.

The aim of FIWARE is to provide open platform standards easing the development of smart solutions. This ambitious objective required the definition and development of an open standard technology for context information management.

The FIWARE initiative was born in Europe. Partially funded by the European Commission under the Future Internet PPP Programme; nowadays FIWARE has reached a global dimension.
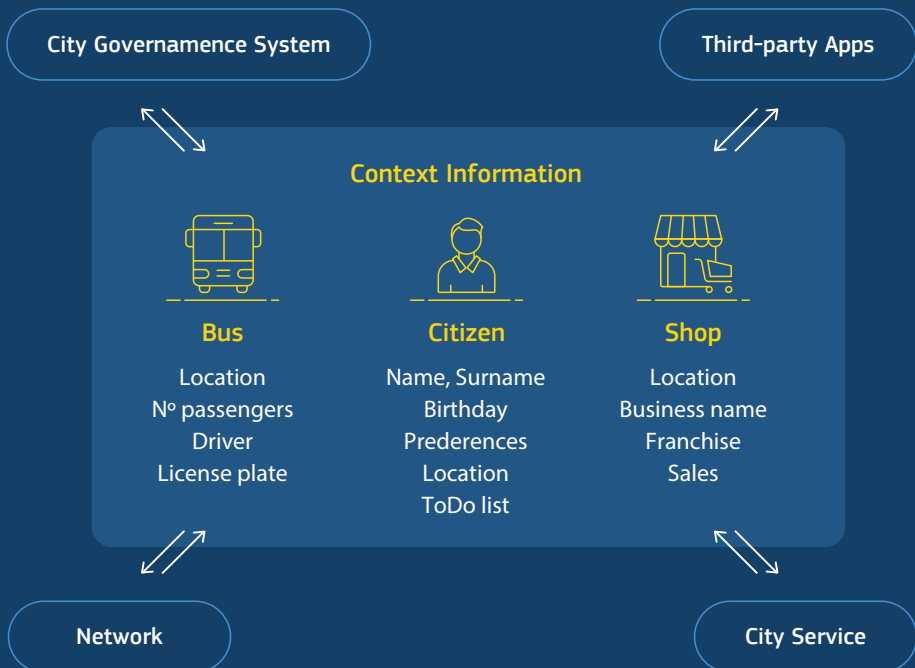
Orion Context Broker can be used in different types of commerce: B2A, B2B, and A2A.

How Orion Context Broker Building Block works

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 by providing data persistence services. TheOrion Context Broker is the core and mandatory component of any smart solution, it enables to manage context information in a highly decentralized and large-scale manner. It provides the FIWARE NGSIv2 API which is a simple yet powerful Restful API enabling to perform updates, queries or subscribe changes on context information.

The Orion Context Broker holds information about the current context. Cygnus captures updates on context information managed by the Orion Context Broker and produces a stream of context data which can then be stored into a specific persistent data sink, such as MySQL, MongoDB, Flink or HDFS for further processing or CKAN for Open Data publication.

Right-time access to context information

City Governamence System

Third-party Apps

Context Information

Bus

Location
Nº passengers
Driver
License plate

Citizen

Name, Surname
Birthday
Prederences
Location
ToDo list

Shop

Location
Business name
Franchise
Sales

Network

City Service

Orion Context Broker
is able to...

Register

Register context provider system which can be queried by the Orion Context Broker to get the latest status context, e.g. a system provided by the national meteorology agency which provides updated weather forecasts upon request.

Query

The Orion Context Broker stores Context information updated from applications, so queries are resolved base on that information

Update

e.g send updates on air quality for a given district of the city, weather forecast for a given region or the administrative record created for handling a request issued by a given citizen

Notify

When changes on context information take place (e.g. the air quality in a given street has changed) or with a given frequency (e.g. measures of the traffic in a street each minute)

Orion Context Broker produces benefits from public administrations to private companies and has an impact on citizens' lives

Entities and their Attributes are the basic constructs that describe a Context information Model. Entities represent the items/concepts composing the context. The attributes, whose values change over time, characterise the entities. Taking into account the Smart Cities examples above, entities are "Street", "District" or "Citizen". Attributes of a street can be "name", "traffic density", "temperature", "relevant buildings". Some attributes of entities may be more static while others very dynamic, but this is the intrinsic nature of context information.

Orion Context Broker technology has been adopted by several relevant bodies like GSMA, TMForum, or initiatives like OASC (Open and Agile Smart Cities). It has gained momentum as an open de-facto standard for context information management, enabling a faster and easier development of smart solutions as well as the materialization of a "system of systems" architecture in multiple application domains, particularly the domains of Smart Cities, Smart Agrifood and Smart Industry.

Orion Context Broker integrated with other components makes building up Smart City platforms easy, faster and free
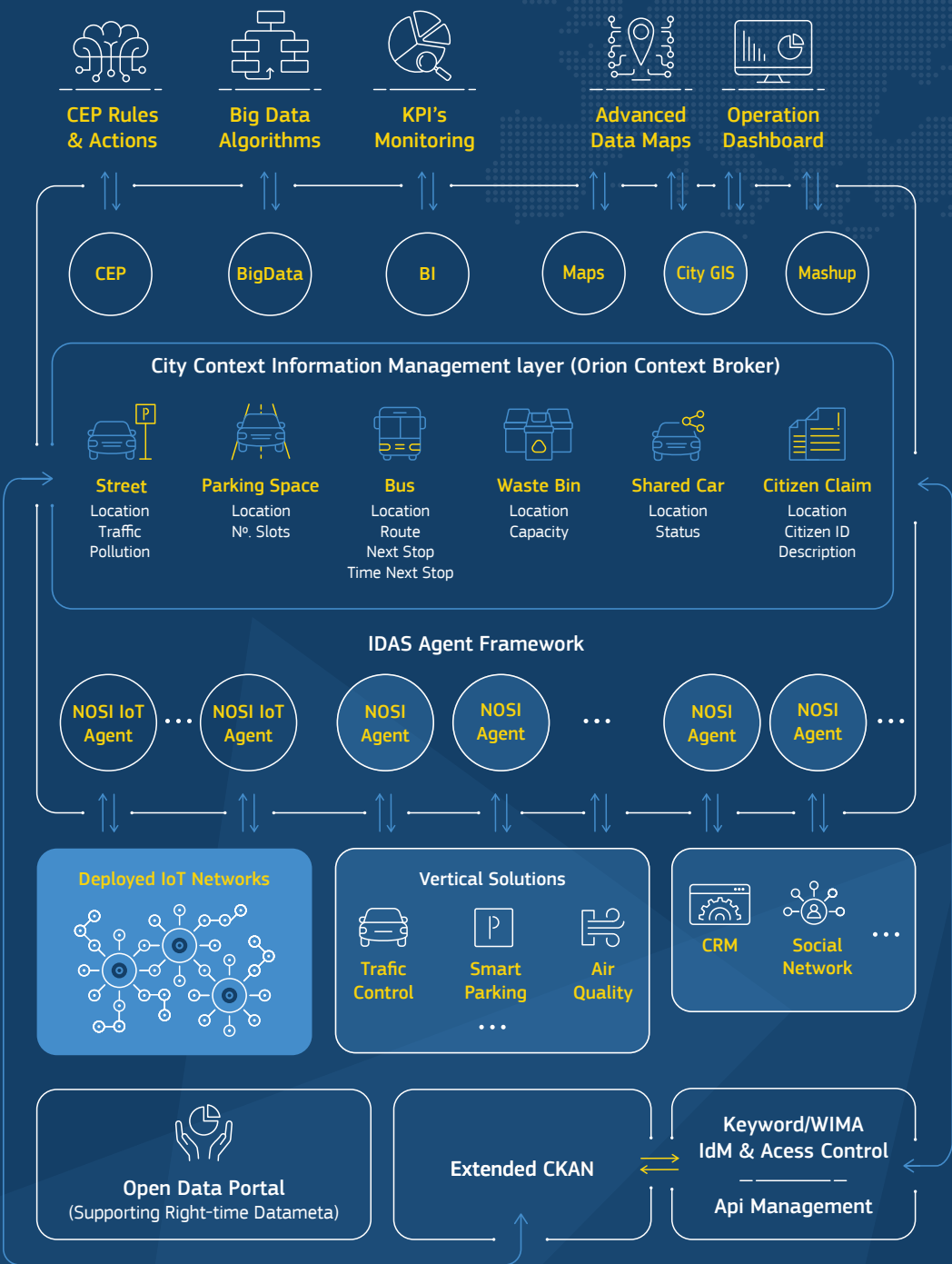
An important aspect is security when accessing the context information. The FIWARE Community has developed a complete suite of components enabling to manage authorization and enforce access control policies when accessing the Orion Context Broker. It relies on well-known and widely adopted standards like OAuth2 and XACML and provides integration with the CEF eID Building Block. Organizations deploying the CEF Orion Context Broker can use alternative security frameworks based on these same standards or different standards.

The FIWARE Community has also developed several components enabling the publication of real-time/API data resources (NGSI datasets) in data publication portals like CKAN. It also has developed components enabling the monetization of datasets, including real-time/API datasets.

Building around the Orion Context Broker, a rich suite of complementary FIWARE components are available, dealing with:

1 Interfacing with the IoT, Robots and third party systems, for capturing updates on context information and translating required actions

2 Context Data/API management, publication and monetization, implementing the expected smart behaviour of applications and/or assisting end-users in making smart decisions

3 Processing analysis and visualization of context information, bringing support to usage control and the opportunity to publish and monetize part of managed context data.

Smart city Gorvernance Service

CEP Rules & Actions

Big Data Algorithms

KPI's Monitoring

Advanced Data Maps

Operation Dashboard

CEP

BigData

BI

Maps

City GIS

Mashup

City Context Information Management layer (Orion Context Broker)

Street
Location
Traffic
Pollution

Parking Space
Location
Nº. Slots

Bus
Location
Route
Next Stop
Time Next Stop

Waste Bin
Location
Capacity

Shared Car
Location
Status

Citizen Claim
Location
Citizen ID
Description

IDAS Agent Framework

NOSI IoT Agent

...

NOSI IoT Agent

NOSI Agent

NOSI Agent

...

NOSI Agent

NOSI Agent

...

Deployed IoT Networks

Vertical Solutions

Trafic Control

Smart Parking

Air Quality

...

CRM

Social Network

...

Open Data Portal
(Supporting Right-time Datameta)

Extended CKAN

Keyword/WIMA
IdM & Acess Control

Api Management

FIWARE Context Broker in Connecting Europe Facility

The Connecting Europe Facility (CEF) supports trans-European networks and infrastructures which fill in the missing links of Europe's energy, transport and telecommunications sectors. A budget of €870 million is earmarked for trans- European digital services for 2014-2020.

Supported projects facilitate cross-border interaction between public administrations, businesses and citizens by deploying Digital Service Infrastructures (DSIs).
The overall objective is to create a European ecosystem of interoperable digital services that make the Digital Single Market work in practice.

The Connecting Europe Building Blocks offer basic capabilities that can be used in any European project to facilitate the delivery of digital public services across borders. The basis for the CEF building blocks are interoperability agreements between European Union member states.

The aim of the building blocks is thus to ensure interoperability between IT system so that citizens, businesses and administrations can benefit from seamless digital public services wherever they may be in Europe. Since 2014 Connecting Europe Building Blocks have been deployed and reused in more complex digital services across Europe with Connecting Europe Facility Support

Read more on CEF Context Broker

To find out more about Connecting Europe Facilities visit:
https://ec.europa.eu/inea/en/connecting-europe-facility/cef-telecom

To find out more about cef cb visit:
https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Context+Broker

To learn more about FIWARE visit:
https://www.fiware.org

Connecting
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