

Open APIs
for Open
Minds

How to start into FIWARE: Technische Einführung

30.08.2022, ADV Tagung, Wien

Gernot Boege

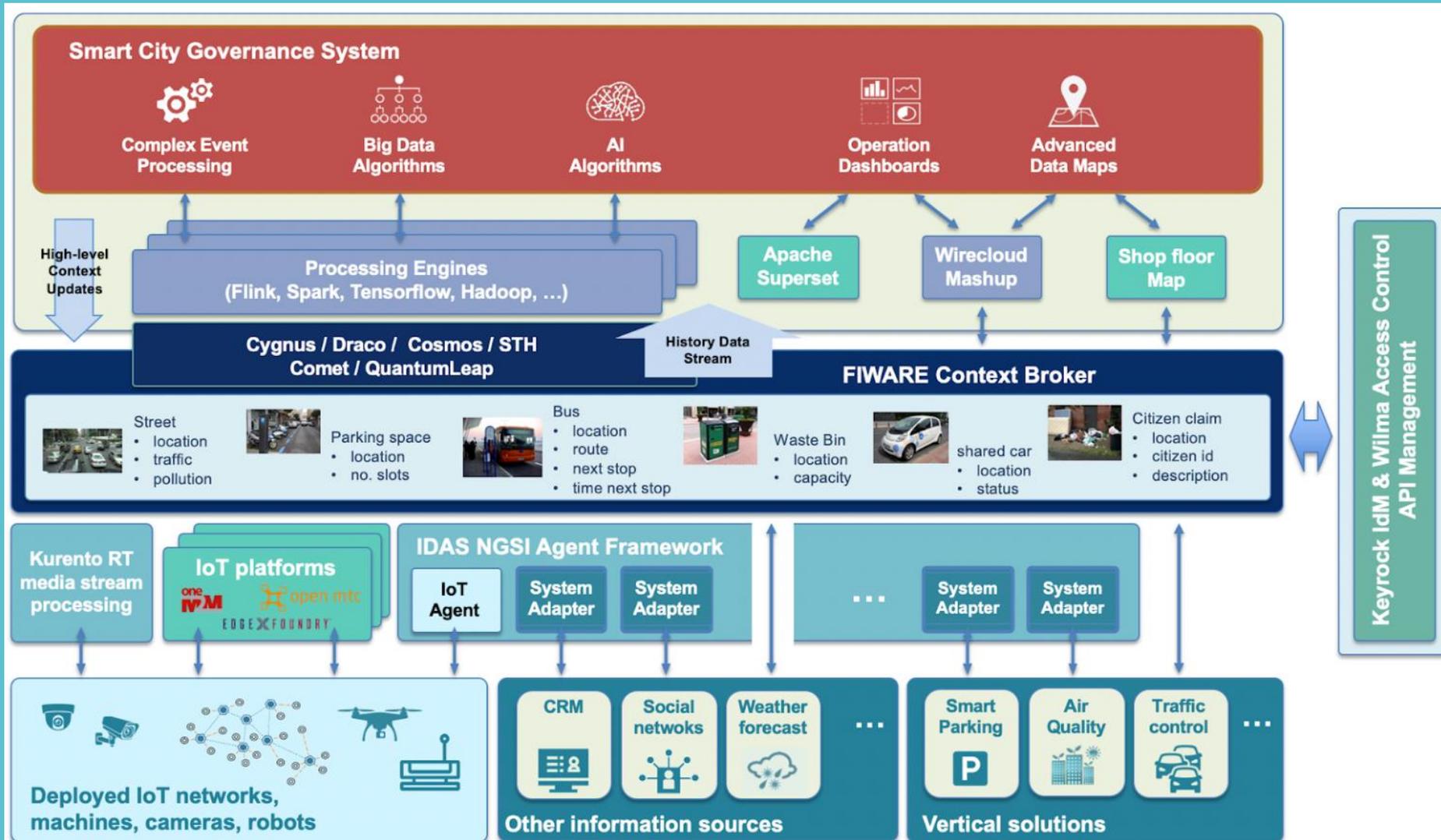
FIWARE Solution Architect



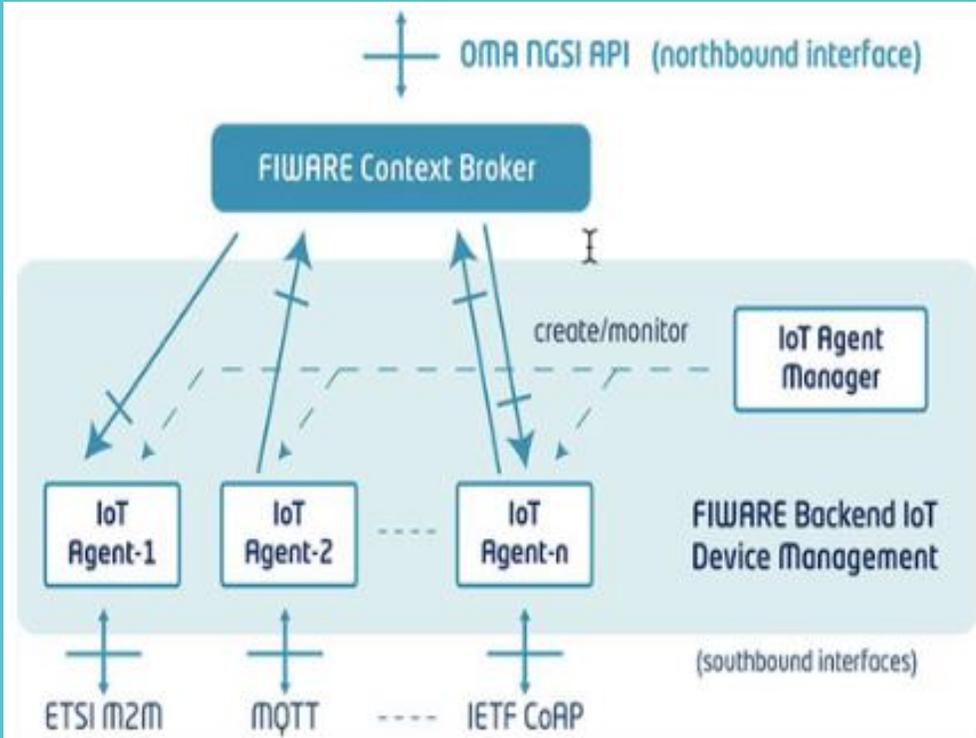
Das neue digitale Leben wird bestimmt durch Kontext-Informationen. Kontext-Informationen, die beschreiben was passiert, wo, wann, warum, ...



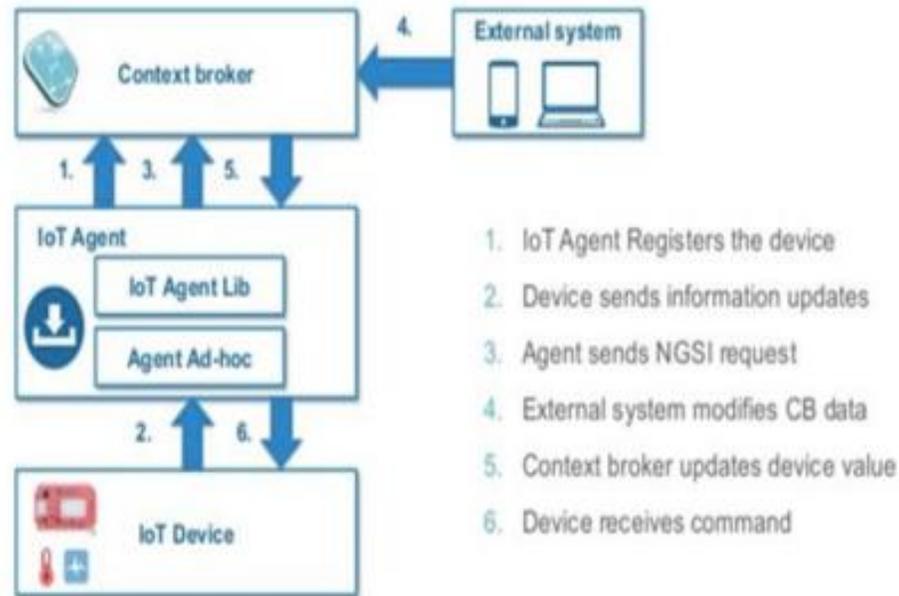
FIWARE Architekturen sind vielfältig



Integration von IoT Daten



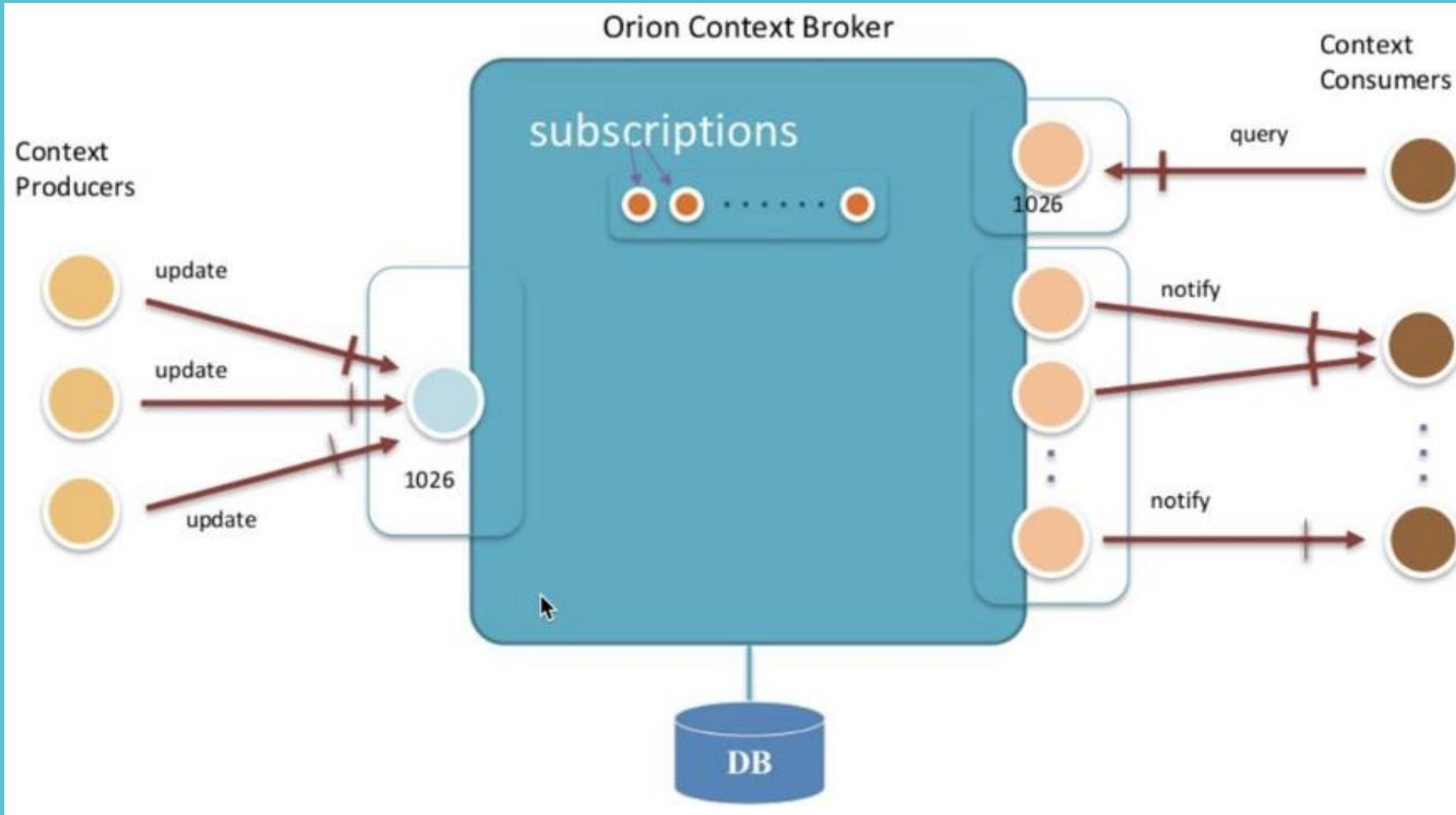
IoT Agents' features



Neu: OPC-UA



FIWARE Context Broker als zentrale Datendrehscheibe



ETSI NGSI-LD als Kommunikationsstandard

4.2.3 Cross Domain Ontology

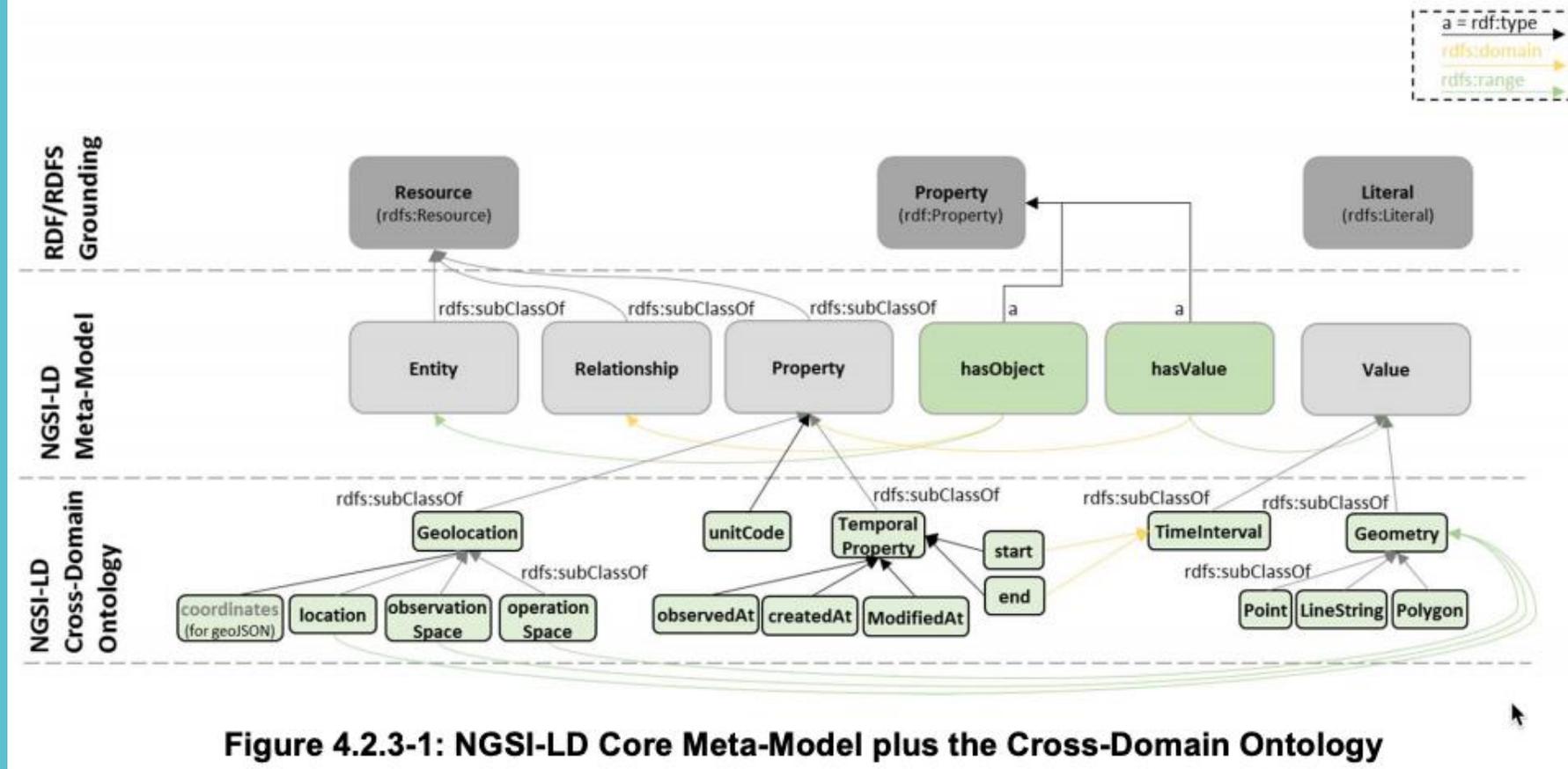


Figure 4.2.3-1: NGSI-LD Core Meta-Model plus the Cross-Domain Ontology

FIWARE data models als Datenstandard

FIWARE DATA MODELS

Welcome to FIWARE Data Models. These data models have been harmonized to enable data portability for different applications including, but not limited, to Smart Cities. They are intended to be used together with FIWARE NGSI version 2. If you want to contribute and create additional data models, please have a look at our repository of data models and the data model development guidelines.



ALERTS

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

[READ MORE](#)



PARKS & GARDENS

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

[READ MORE](#)



ENVIRONMENT

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

[READ MORE](#)



POINT OF INTEREST

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

[READ MORE](#)



CIVIC ISSUE TRACKING

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

[READ MORE](#)



STREET LIGHTING

Modeling street lights and all their controlling equipment towards energyefficient and effective urban illumination.

[READ MORE](#)



DEVICE

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

[READ MORE](#)



TRANSPORTATION

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

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INDICATORS



WASTE MANAGEMENT

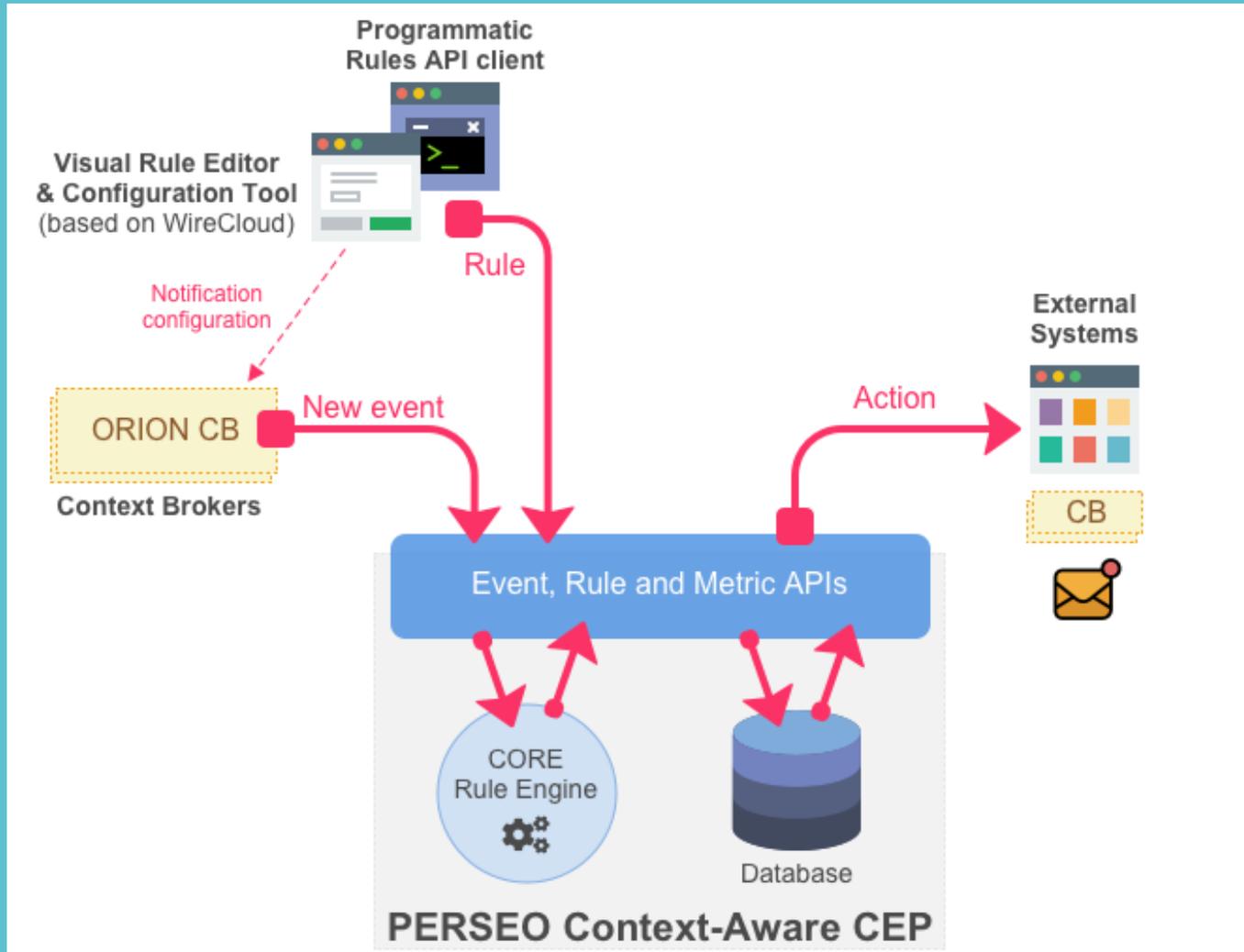
Data Model

A JSON Schema corresponding to this data model can be found here.

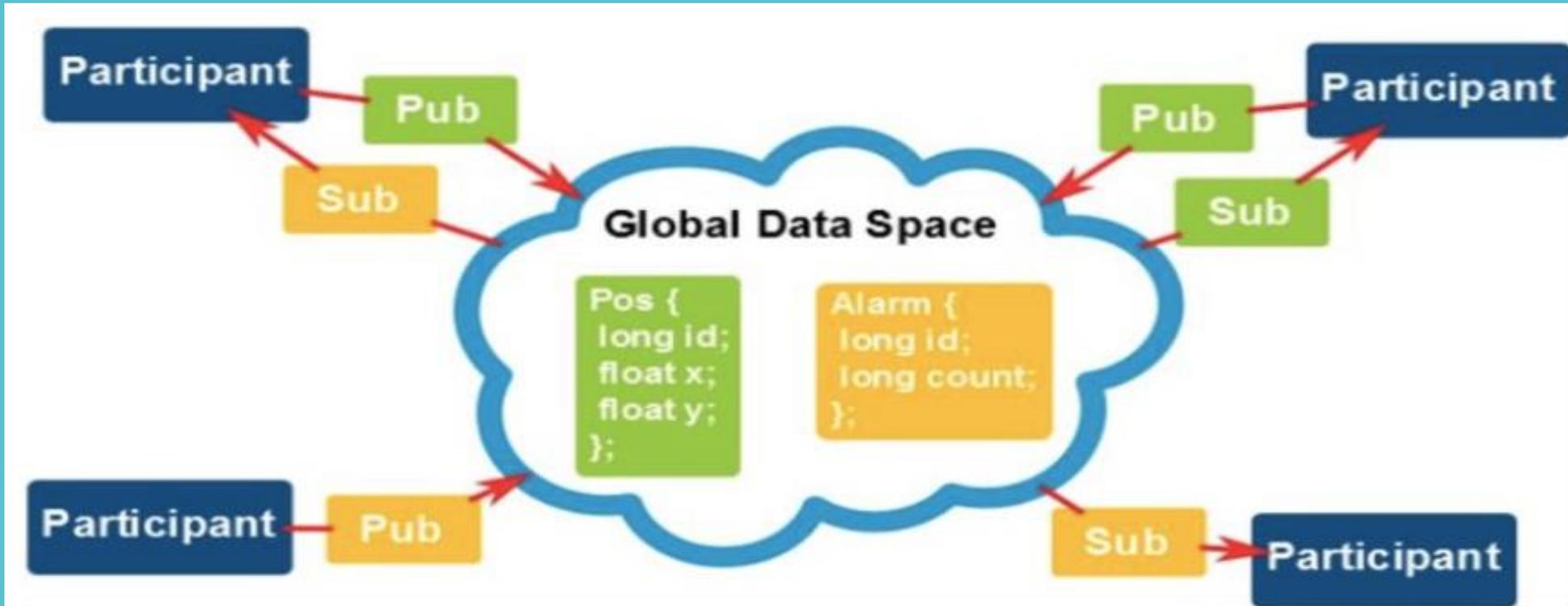
- `id` : Unique identifier.
- `type` : Entity type. It must be equal to `BikeHireDockingStation`.
- `dateCreated` : Entity's creation timestamp.
 - Attribute type: `DateTime`
 - Normative References: `http://schema.org/DateTime`
 - Optional
- `dateModified` : Last update timestamp of this entity.
 - Attribute type: `DateTime`
 - Normative References: `http://schema.org/DateTime`
 - Optional
- `location` : Geolocation of the station represented by a GeoJSON (Multi)Polygon or Point.
 - Attribute type: `geo:json`.
 - Normative References: `https://tools.ietf.org/html/rfc7946`
 - Mandatory if `address` is not defined.
- `address` : Registered docking station site civic address.

```
{
  "id": "malaga-bici-7"
  "type": "BikeHireDockingStation",
  "name": "07-Diputacion",
  "location": {
    "coordinates": [-4.43573, 36.699694],
    "type": "Point"
  },
  "availableBikeNumber": 18,
  "freeSlotNumber": 10,
  "address": {
    "streetAddress": "Paseo Antonio Banderas (Diputación)",
    "addressLocality": "Malaga",
    "addressCountry": "España"
  },
  "description": "Punto de alquiler de bicicletas próximo a Diputación",
  "dateModified": "2017-05-09T09:25:55.00Z"
}
```

Reaktives Complex Event Processing CEP

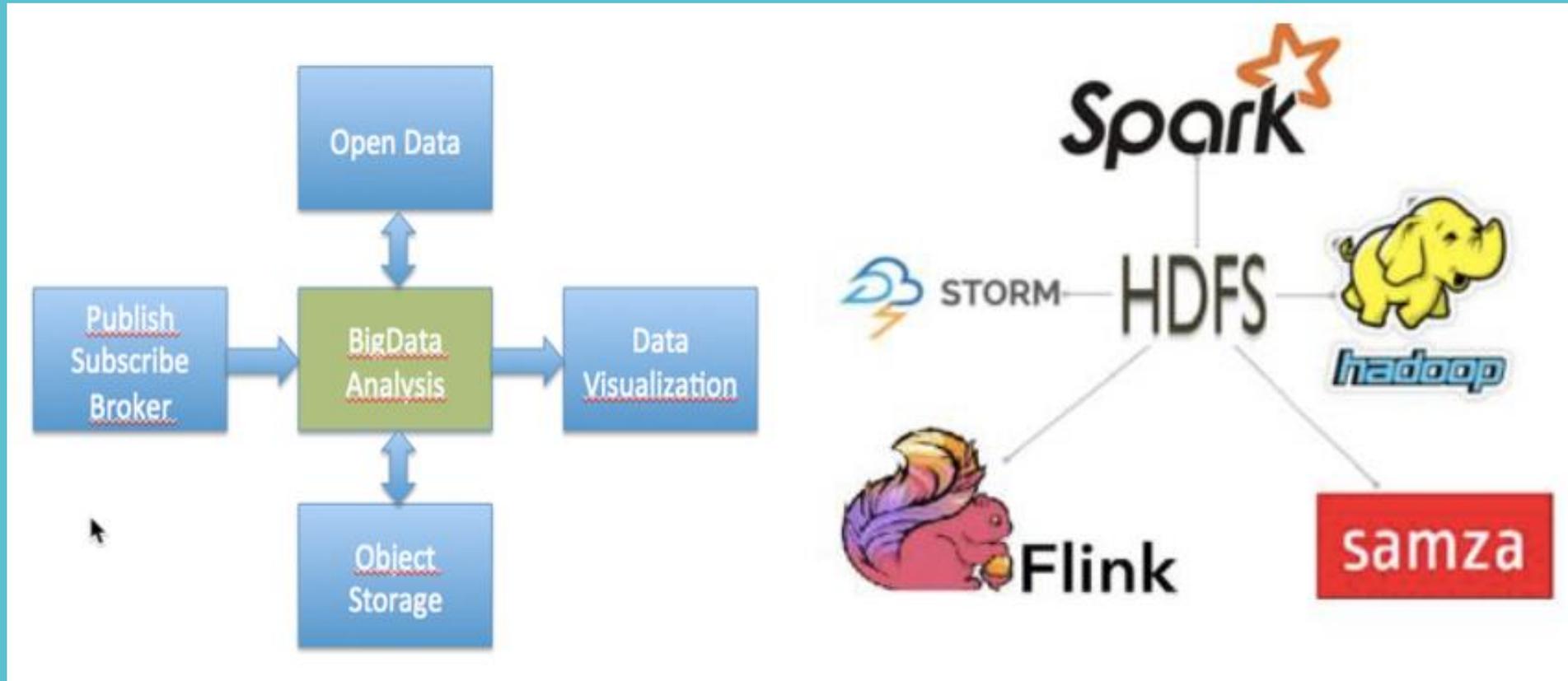


Anbindung von Roboter Daten

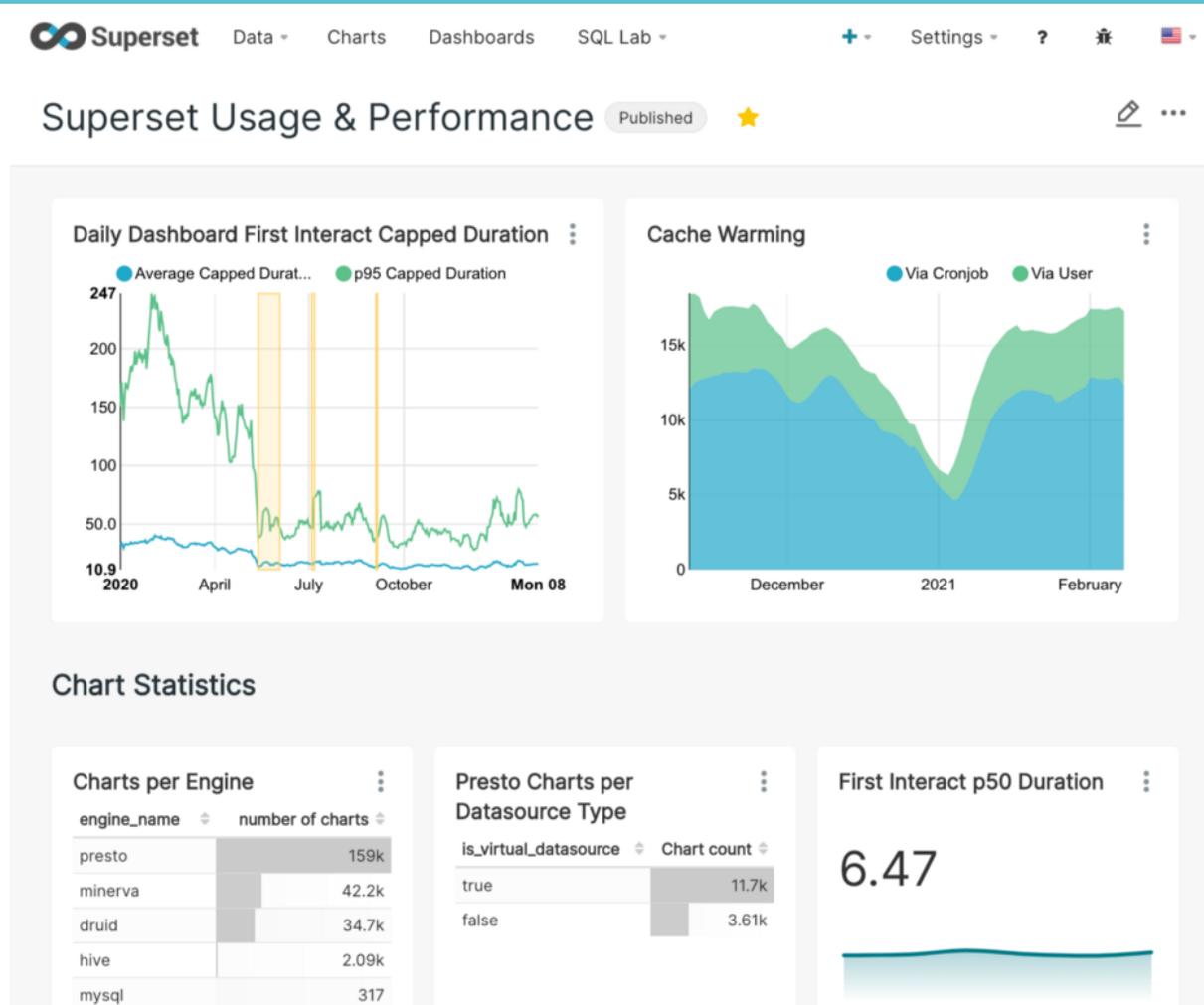


C++ und schneller als z.B. ZeroMQ,
Roboter Operating System ROS2

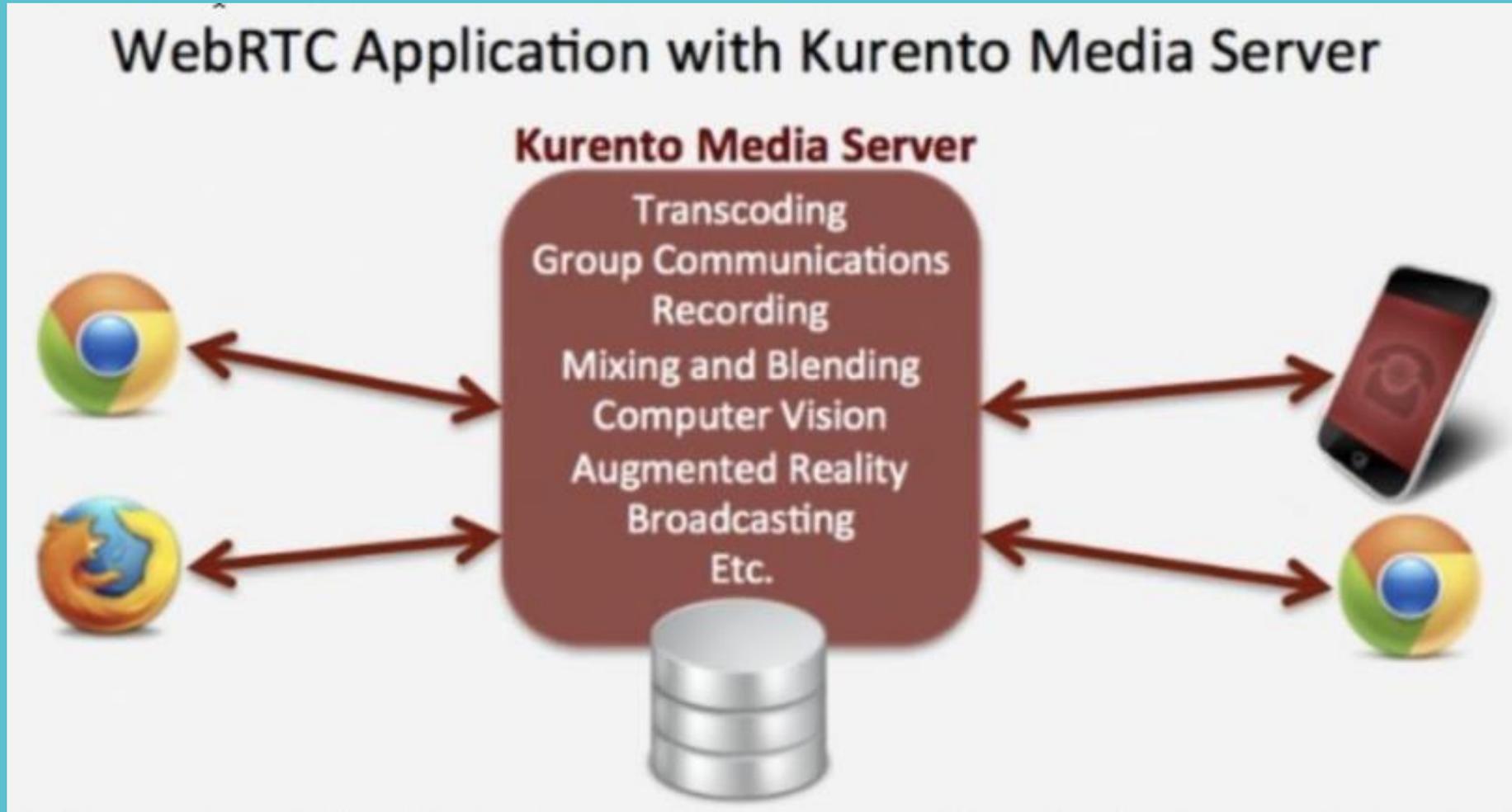
Anbindung von BigData Systemen und Streaming Frameworks



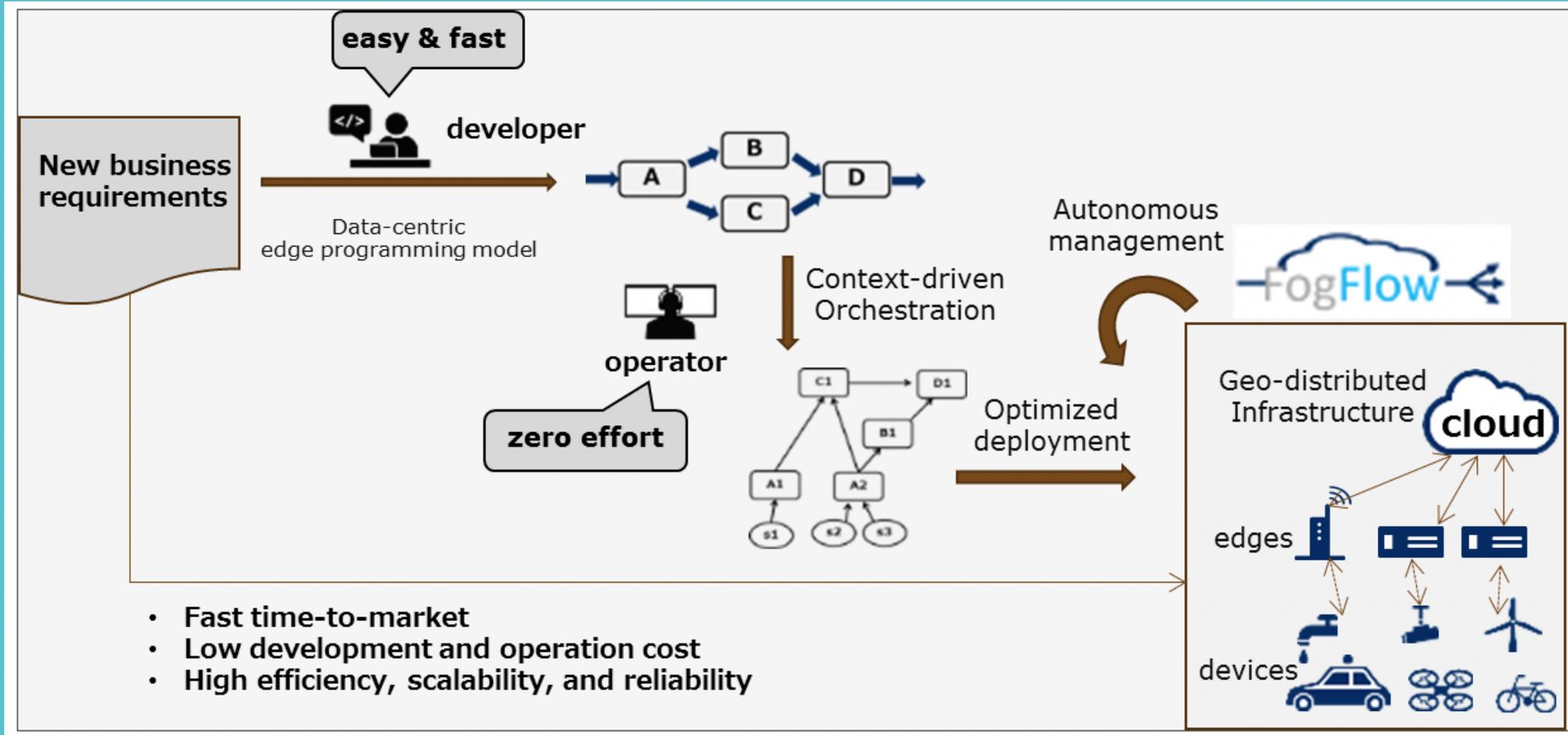
Business Intelligence, Reporting und Dashboarding Lösungen



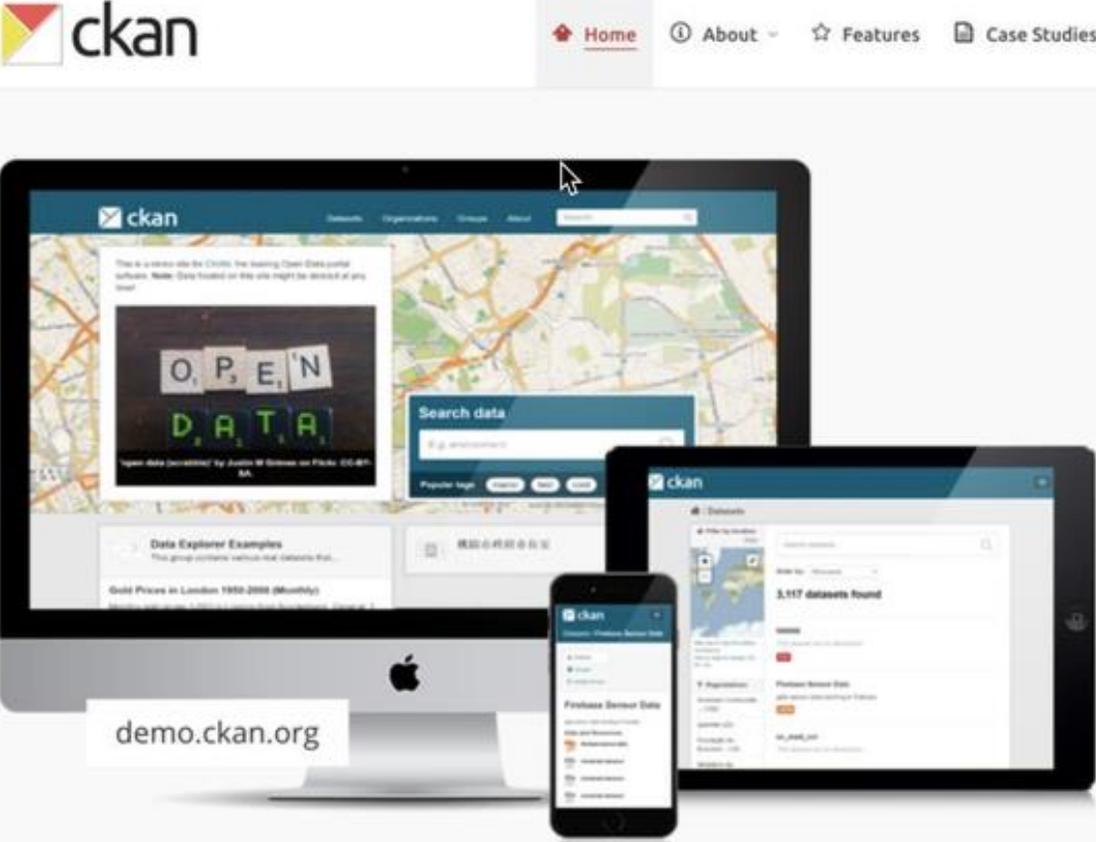
Streaming Media Processing



Cloud-Edge processing mit FogFlow



Integration bekannter Open Data Portale



CKAN, the world's leading Open Source data portal platform

CKAN is a powerful data management system that makes data accessible – by providing tools to streamline publishing, sharing, finding and using data.

- IdM Extension - Login with FIWARE
- Private datasets - Limited visibility
- NGSI Extension - NGSI queries as datasets
- Store publisher extension
- WireCloud view extension
- Data request extension
- Monetization architecture

Monetarisierung von Daten

The screenshot displays the FIWARE My Inventory dashboard. At the top left, the FIWARE logo and 'My Inventory' title are visible. The top right shows a shopping cart icon and the user name 'Pablo Nunez'. A left-hand navigation menu includes 'Home', 'My inventory', 'My stock', 'Revenue Sharing', 'Products', and 'Product Orders'. The main content area features two widgets: 'Wirecloud Basic Chart' (v0.1, 42 minutes ago) and 'Usage' (v0.1, 5 minutes ago), both with 'Active' status indicators. Below these, a row of five colored boxes represents different API offerings: 'Product Lifecycle Management API' (orange), 'Product Catalog API' (blue), 'Product Ordering API' (purple), 'Usage Management API' (green), and 'Billing API' (dark green). At the bottom, these are mapped to lifecycle stages: 'Product Definition', 'Product Offering', 'Product Ordering/Activation', 'Product Usage & Mediation', and 'Billing Invoice'.

Eine komplette Single-Sign-On SSO Security Lösung

Diagram illustrating a Single-Sign-On (SSO) system. The central element is the **FIWARE Account**, which is connected to various applications represented by icons around a circular path. Below the diagram, the text **SSO** is displayed.

Log In

Email

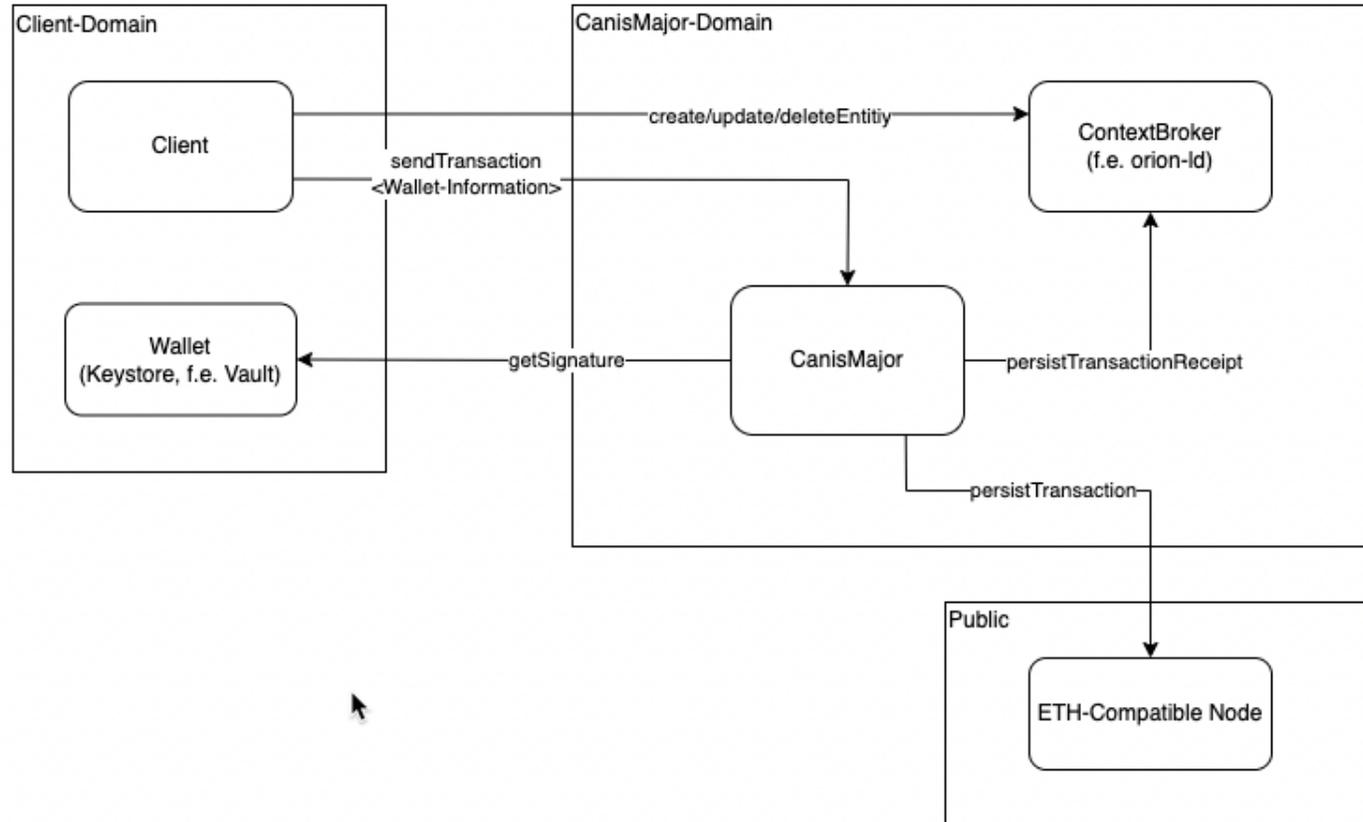
Password

remember me **Sign In**

[Sign up](#) | [Forgot password](#) | [Didn't receive confirmation instructions?](#)

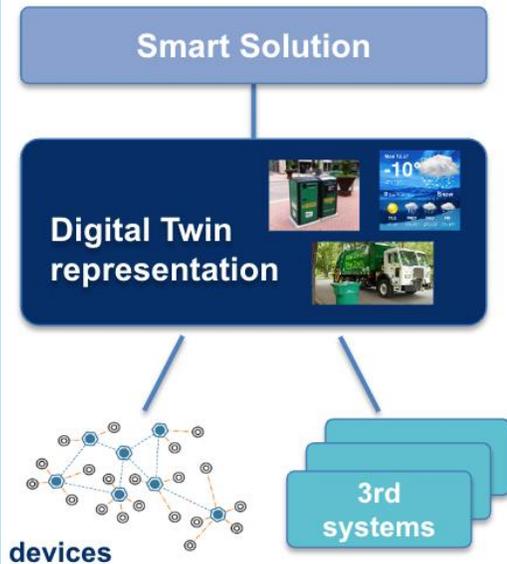
Blockchain Integration

CanisMajor - FIWARE DLT Adaptor

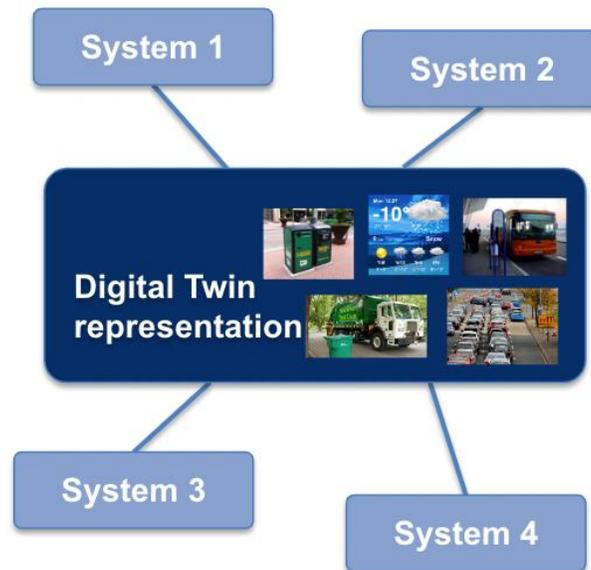


Data spaces Integration

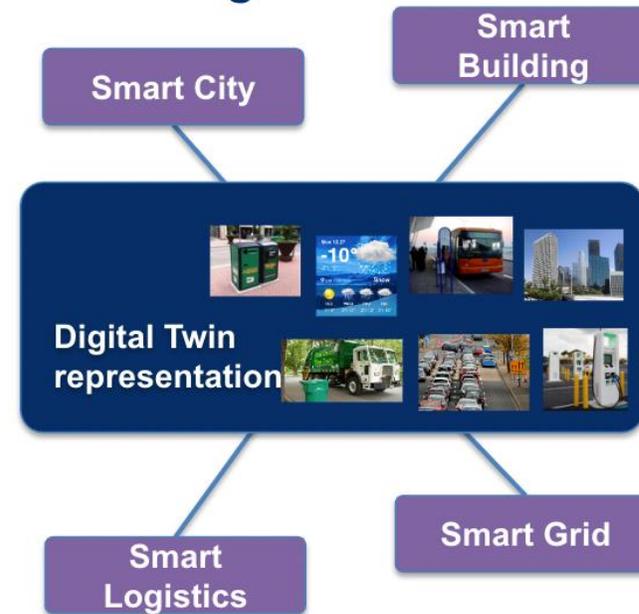
Architecting Smart Solutions



Integrating systems and data within organizations (system of systems)



Sharing Data across organizations



FIWARE: Digitale Transformation zu Smart Cities

1



2



3



4

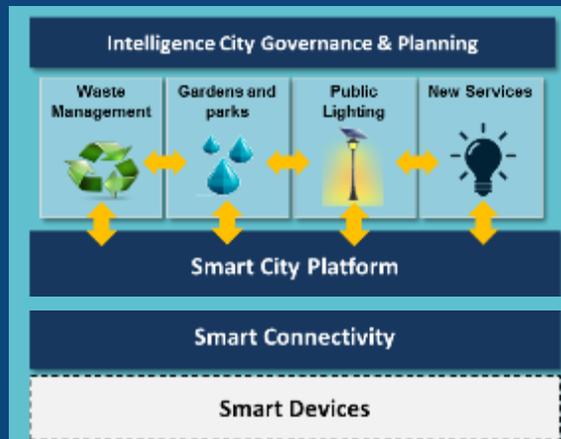
Effizient und Offen

- Vertikale Lösungen (einige IoT basiert) erzeugen Nutzen in 'Silos'
- Historische Daten als 'Open Data'
- Informationen weiter in 'Silos'



Wirklich 'Smart'

- Horizontale Plattform für den Zugriff auf 'right-time' Kontext Informationen
- Gemeinsames Datenmodell
- Smart City Governance Lösung



Nutzbarmachung von 'right-time' Open Data

- Bereitstellung von 'right-time' Kontext Informationen
- Authorisierung und Zugriffskontrolle (API-Management)
- Offenes Ecosystem



Realisierung der Data Economy

- City als Plattform inklusive Daten von Drittanbietern für innovative Geschäftsmodelle
- Errichtung von 'multi-sided markets'



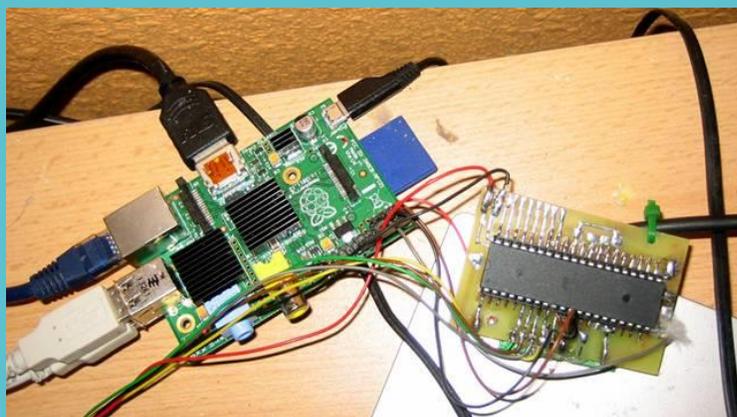
Ein Projekt starten



FIWARE Lab zum Ausprobieren oder BYOD



Vom kleinen Feierabend/Schüler Projekt ...



The screenshot shows the M5Stack IDE interface. On the left, there's a terminal window displaying sensor data: temp, Hum, and Baro. The main area shows a code editor with a script. The script starts with a 'Setup' block containing 'Connect to Wi-Fi SSID' and 'PASSWORD'. This is followed by a 'Loop' block with an 'if' statement: 'if wifi is connected' leads to a 'do' block with 'Set Screen backgroundColor' (green), 'Wait 1 s', 'Set Screen backgroundColor' (red), and 'Wait 1 s'. The 'else' block contains 'Connect to Wi-Fi SSID' and 'PASSWORD' followed by 'Set Screen backgroundColor' (blue). A sidebar on the right lists various hardware modules like Lists, Map, JSON, Easy I/O, PIN, PWM, ADC, DAC, UART, I2C, Execute, and Network.

... bis zum Einsatz in professionellen Umgebungen

README.md

FIWARE Helm Repository for Generic Enablers

FIWARE Deployment Tools license MIT tag fiware
Artifact Hub fiware Chart Test passing downloads 9.2k

Repository for providing [HELM Charts](#) of Generic Enablers from the [FIWARE Catalogue](#). The charts can be install into [Kubernetes](#) with [helm3](#).

FIWARE is a curated framework of open source platform components which can be assembled together and with other third-party platform components to accelerate the development of Smart Solutions. The main and only mandatory component of any "Powered by FIWARE" platform or solution is a [FIWARE Context Broker](#) Generic Enabler, bringing a cornerstone function in any smart solution: the need to manage context information, enabling to perform updates and bring access to context.

Note that FIWARE is not about take it all or nothing. With the exception of a mandatory FIWARE Context Broker you should feel free to use other third-party platform components to accelerate the development of Smart Solutions. The main and only mandatory component of any "Powered by FIWARE" platform or solution is a [FIWARE Context Broker](#) Generic Enabler, bringing a cornerstone function in any smart solution: the need to manage context information, enabling to perform updates and bring access to context.



Loadtest for FIWARE Components

FIWARE Core license MIT

[Gatling](#) load tests to run against [FIWARE Components](#) that implement the [NGSI-LD Api](#). The repository also includes [test-reports](#) for various setups of different [FIWARE Components](#).

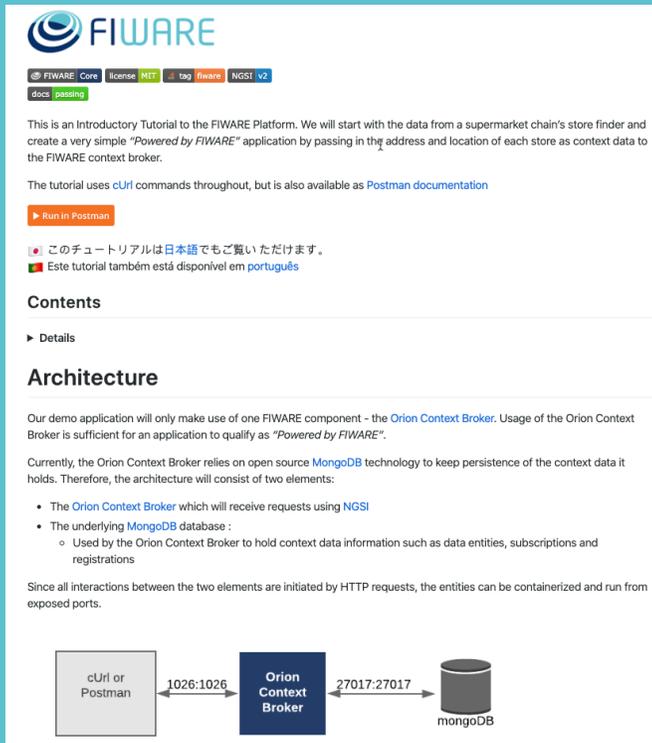
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Reports

Reports of executed tests and the used config can be found in the [testReports-folder](#). You can find all the information about how to setup the tested instances and how to rerun those tests there.

Selber machen, inspirieren lassen oder machen lassen



The screenshot shows the top part of the FIWARE introductory tutorial. It includes the FIWARE logo, navigation links for Core, license, MIT, tag, fiware, and NGSI v2, and a 'docs passing' badge. The main text describes the tutorial's purpose: to introduce the FIWARE Platform using data from a supermarket chain's store finder. It mentions that the tutorial uses cURL commands but also has Postman documentation. There are buttons for 'Run in Postman' and language options for Japanese and Portuguese. A 'Contents' section is visible, followed by an 'Architecture' section which explains that the demo application uses the Orion Context Broker and MongoDB.

- 101. Getting Started
- 102. Entity Relationships
- 103. CRUD Operations
- 104. Context Providers
- 105. Altering the Context Programmatically
- 106. Subscribing to Changes in Context

- 201. Introduction to IoT Sensors
- 202. Provisioning an IoT Agent
- 203. IoT over MQTT
- 250. Introduction to Fast-RTPS and Micro-RTPS

- 101. Getting Started
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- 202. Provisioning an IoT Agent
- 203. IoT over MQTT
- 204. Using an alternative IoT Agent
- 205. Creating a Custom IoT Agent
- 250. Introduction to Fast-RTPS and Micro-RTPS

- 301. Persisting Context Data using Apache Flume (MongoDB, MySQL, PostgreSQL)
- 302. Persisting Context Data using Apache NIFI (MongoDB, MySQL, PostgreSQL)
- 303. Querying Time Series Data (MongoDB)
- 304. Querying Time Series Data (CrateDB)

- 401. Managing Users and Organizations
- 402. Roles and Permissions
- 403. Securing Application Access
- 404. Securing Microservices with a PEP Proxy
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- 406. Administrating XACML via a PAP

- 501. Creating Application Mashups
- 503. Introduction to Media Streams
- 505. Big Data Analysis (Flink)

- 601. Introduction to Linked Data
- 602. Linked Data Relationships and Data Models
- 603. Traversing Linked Data Programmatically

Projektdokumentation: Zentrale Open Data Plattform der Stadt Paderborn

Inhaltsverzeichnis

- Projektdokumentation: Zentrale Open Data Plattform der Stadt Paderborn
 - Allgemeines
 - Inhalte der ersten Veröffentlichung (Stand Juni 2021)
 - Gruppe fiware
 - Gruppe Anliegenmanagement
 - Inhalte der zweiten Veröffentlichung (Projektende, Stand Juli 2022)
 - Gruppe urban-dataspace
 - Austausch zum Projekt
 - Förderhinweis
 - Lizenz

Allgemeines

Herzlich Willkommen auf der Startseite der technischen Projektdokumentation des Förderprojektes Zentrale Open Data Plattform der Stadt Paderborn. Weitere generelle Informationen zum Projekt finden Sie auf der Seite der [Digitalen Heimat Paderborn](#).

Diese Seite dient Ihnen als erster zentraler Einstiegspunkt für die technische Projektdokumentation. Auf den folgenden Seiten finden Sie die aktuellen Arbeitsstände der Plattformkomponenten und den entsprechenden, unter einer jeweiligen Open Source Lizenz veröffentlichten, Quellcode der Software.

Bitte beachten Sie, dass es sich bei den Inhalten der ersten Veröffentlichung im Juni 2021 um einen frühen prototypischen Zwischenstand der Datenplattform handelt.

Die zweite Veröffentlichung gegen Ende Juli 2022 spiegelt den Stand der Entwicklung zu Projektende wieder.

Mithilfe der folgenden Links gelangen Sie direkt zu jeweiligen Repositories der einzelnen Komponenten:



Die Vorteile einer Open-Source-Plattform wie FIWARE

- Die Basissoftware (Plattform und Generic Enablers) ist für jedermann kostenlos und für immer verfügbar – teilweise sind sogar die Endprodukte lizenzkostenfrei
- Eine große Open-Source-Entwickler-Community wartet und entwickelt die grundlegenden Softwarekomponenten weiter
- Eine große Gruppe von globalen Unternehmen und Start-ups bietet Plattformen und Smart Solutions basierend auf der Open-Source-Technologie an
- Niedrigste Betriebskosten für die Endbenutzer
- Standard Datenmodelle und Standard Schnittstellen (APIs) vermeiden einen ‚Vendor-Lock-In-Effekt‘

Öffentlich verfügbare Ressourcen I

- FIWARE Datenmodelle:
<https://github.com/smart-data-models>
- FIWARE Industrie Referenz Architecture:
<https://www.fiware.org/community/smart-industry/>
- Katalog der Komponenten:
<https://www.fiware.org/developers/catalogue/>
- Tutorials (Inhaltsverzeichnis aller derzeit verfügbaren (wird kontinuierlich erweitert):
<https://github.com/Fiware/tutorials.Getting-Started>
- FIWARE Marketplace:
<https://www.fiware.org/marketplace/>

i4Trust 2nd Open Call

i4Trust 2nd Open Call

Data Spaces for effective and trusted data sharing

[Apply now](#)



OPEN CALL CALENDAR

Submission of Application Starts:
May 4, 2022 (10:00, CEST)

Submission Deadline:
September 12, 2022 (16:00, CEST)

i4Trust is a collaborative initiative boosting the development of **innovative services** around new data value chains in multiple sectors

i4Trust is building a sustainable ecosystem where companies will be able to create innovative services by means of breaking "data silos" through **sharing, re-using and trading of data assets**.

FIWARE Summit 2022 Gran Canaria

**FIWARE
Global
Summit**

**Gran Canaria, Spain
14 – 15 September 2022**

#FIWARESummit22

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ASSOCIATION

Das ist FIWARE



**The open source platform
for our smart digital future!**

Thank you!

Gernot Boege
FIWARE Solution Architect

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