

IoT Platform Project

Project period

April 2018 to March 2022 (planned)

Project overview

In this project, we will share the knowledge gained through functional verification and use case studies of OSS IoT platform with the community and OOL members for the purpose of "promoting data utilization".

In FY2020, we conducted use case verification to evaluate the issues and usefulness of Meteoroid developed by OOL in FY2019 which integrates and manages FIWARE and Function as a Service and conducted activities for improvement of issues obtained through use case verification.

In FY2021, we will conduct functional surveys of new IoT platforms and investigate and verify tools that enable easy visualization and analysis of data accumulated by FIWARE.

Project background

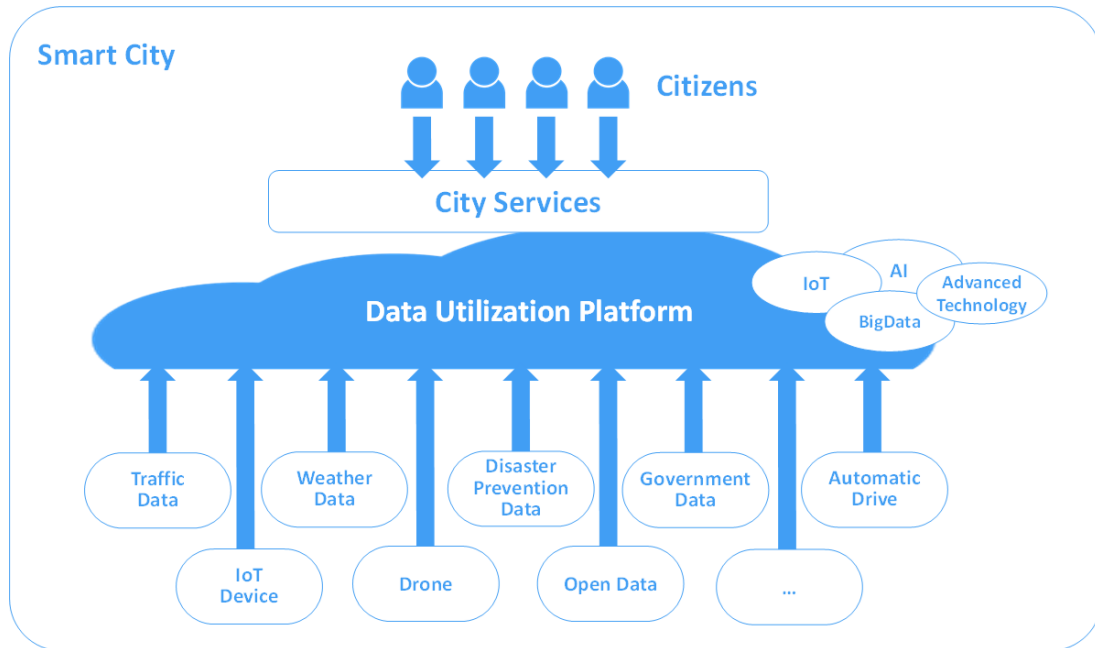
Since establishment, Okinawa Open Laboratory has been dealing with communication and computing technology called SDN/Cloud, and pursuing the technology of transferring data to servers.

Since IoT/AI technology in smart cities has attracted attention as a technological trend in recent years, it is thought that demand for data collection and utilization is getting increased.

IoT platform Project will investigate and verify FIWARE that is OSS IoT platform, and new IoT platforms and will deliver the knowledge obtained, for the purpose of "promoting data utilization".

What is Smart City?

- Applying advanced technologies to urban development such as citizen life and government
- Streamlining the entire city
- Distributing data across various industries



What kind of data utilization platform is needed?

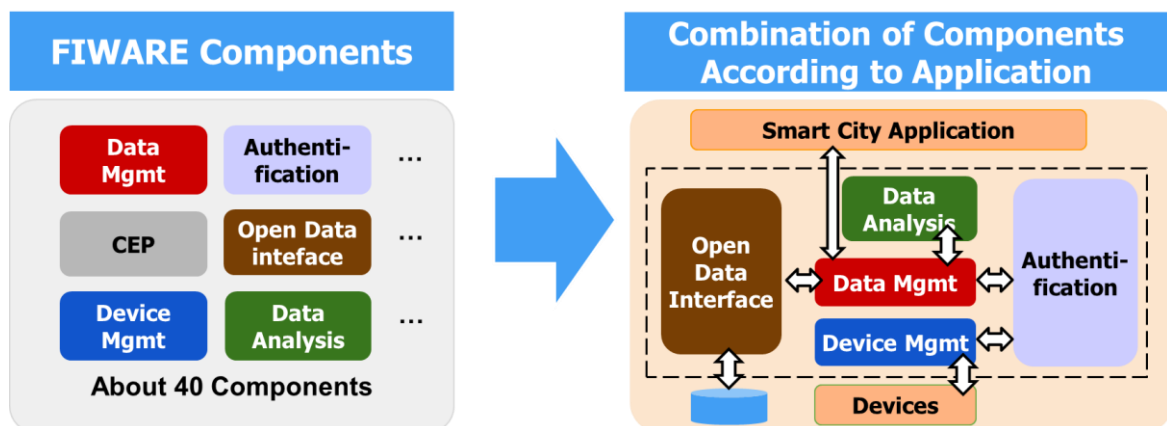
- The following items are necessary to promote data utilization.
 1. Standard data models
 2. Open APIs for standard data access
 3. Open Source Software (OSS)

What is FIWARE?

- A collection of software for IoT application development
- Developed by next-generation Internet public-private program in EU
- Strengthening the competitiveness of EU in next-generation Internet technology and supporting the development of smart applications in the social and public sectors
- Used by European municipalities and startups (used in 110 cities and 25 countries)
 - Santander Smart Garbage Collection, Spain
 - Measurement of river level in Takamatsu City, Japan (disaster prevention)
 - etc...

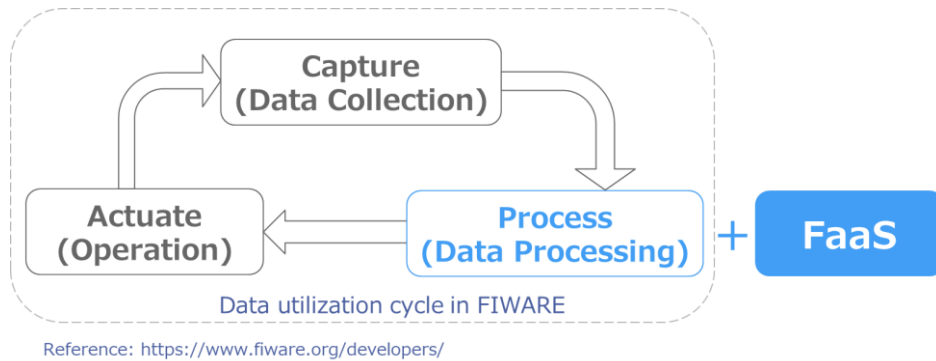


- Open Source Software (OSS)
- Each component conforms to a standardized API (NGSI)
- Use any combination of necessary components



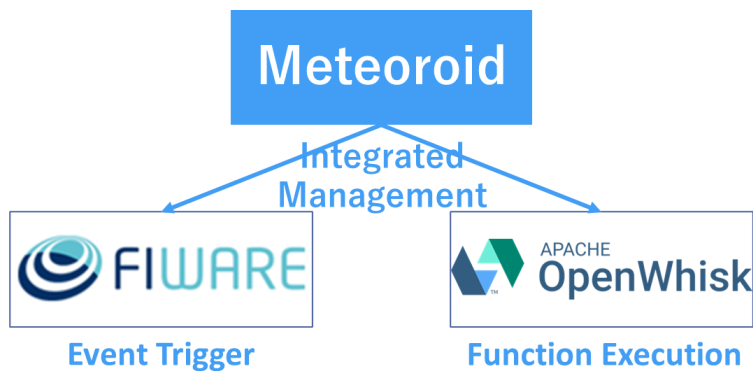
FIWARE Data Utilization Cycles and Challenges

- FIWARE data utilization cycle lacks Process (data processing) functionality
- Enhance Process functionality by combining Function as a Service (FaaS)
 - *FaaS is an event-driven serverless application execution environment.



What is Meteoroid?

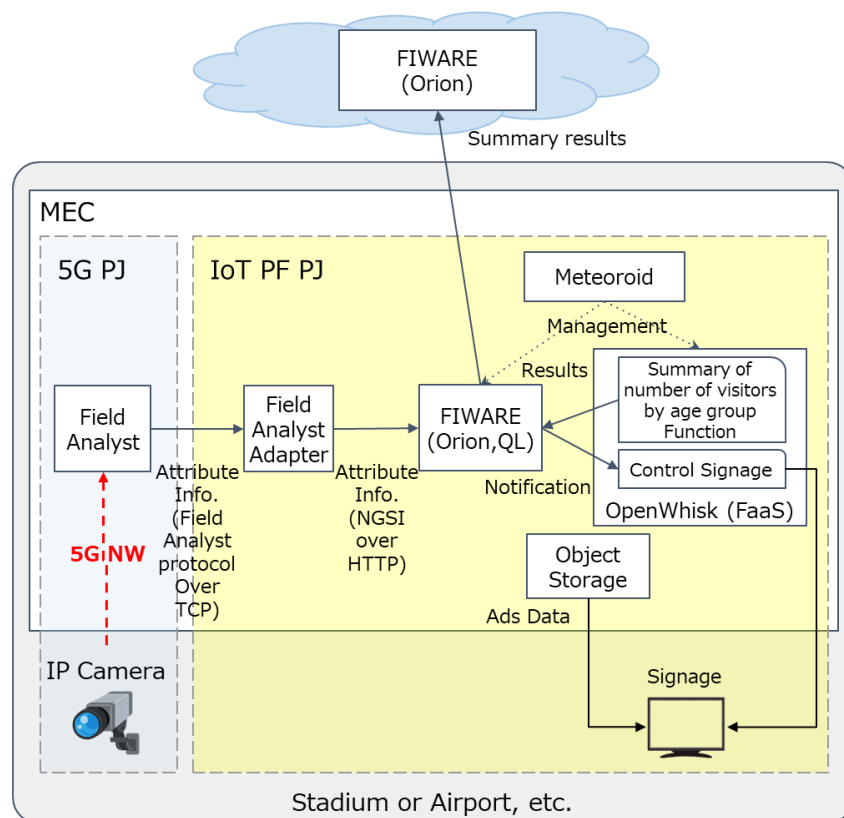
- Meteoroid is an OSS developed by OOL that integrates FIWARE (IoT platform) and Apache OpenWhisk (FaaS platform) for event-driven processing within the FIWARE ecosystem



Apache OpenWhisk is an OSS FaaS platform published by IBM in 2016

IoT x 5G Use Case Image

- Use Case
 - Assume the entrance of a stadium or an airport
 - Signage displays ads according to the attributes (age) of the visitor
 - FieldAnalyst collects individual attribute information, notifies and accumulates to MEC FIWARE every 3 seconds
 - Control signage by Function according to the attribute information. The number of visitors by age group is calculated once a day
 - The calculated results are stored in FIWARE in the cloud. The ads data (image) is obtained from Object Storage.



Use Case Verification Results and Issues

- Use case verification results using Meteoroid
 - Confirmed that events (person detection) and their corresponding processing (signage control by age) could be linked, and event-driven processing in FIWARE could be easily realized
 - Leveraged FIWARE as a MEC Application (cooperation between FIWARE and 5G MEC)
- Issues
 - Meteoroid CLI documentation is insufficient. For example, logging method, etc.
 - Documents will be improved.
 - Hard to use FIWARE APIs
 - Orion, FIWARE main component, and client library of QuantumLeap will be researched and developed

OOL Deliverables

- Presented in Okinawa Open Days 2020 (2020.12.10)
 - 5G and IoT Project Initiatives for Next-Generation Smart Cities
<https://www.youtube.com/watch?v=QlZZZZXWM08>
- Released Meteoroid as open source from OOL
<https://github.com/OkinawaOpenLaboratory/fiware-meteoroid>
- Developed QuantumLeap client libraries
<https://github.com/OkinawaOpenLaboratory/QuantumLeapClient>