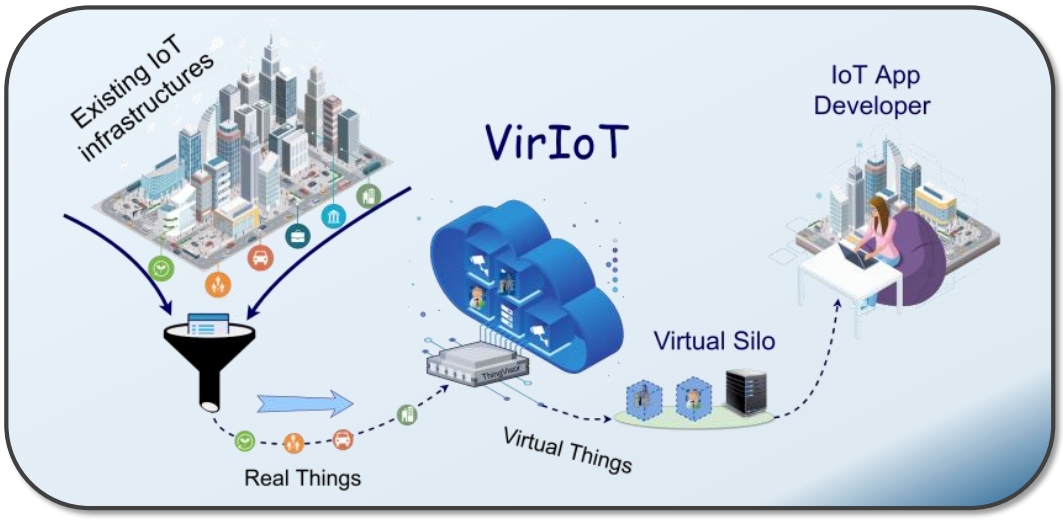
FED4IoT

Project Summary and Lesson Learnt



Today, cloud providers offer services to run IoT applications in their data centers. These services are like LEGO bricks that can be combined to collect, store and process information coming from an external IoT infrastructure that the application provider must have.

In July 2018 - September 2021, the European Commission (EC) and the Japanese Ministry of Internal Affair and Communications (MIC) funded the Fed4IoT project[1], with the goal of developing new IoT cloud services aimed at reducing infrastructural costs for providers of IoT applications.

The main project result is a cloud-of-things platform called VirIoT that offers *things-as-a-service*, and allows application providers to create virtual IoT infrastructures, called

[1] https://fed4iot.org/

Virtual Silos, containing the sensors and actuators their applications require. These applications run outside VirIoT, for example, within and upstream cloud provider. VirIoT just supplies them with the things they need.

VirIoT is devised to support many IoT standards in a single platform. The same IoT data can be exposed to customers using different models and APIs, including oneM2M, NGSI, NGSI-LD. VirIoT will take care of related interoperability issues.

VirIoT can be installed and extended by using Open Source software available on GitHub [2]. VirIoT components are Pods whose Docker images are available on the Docker Hub [3].

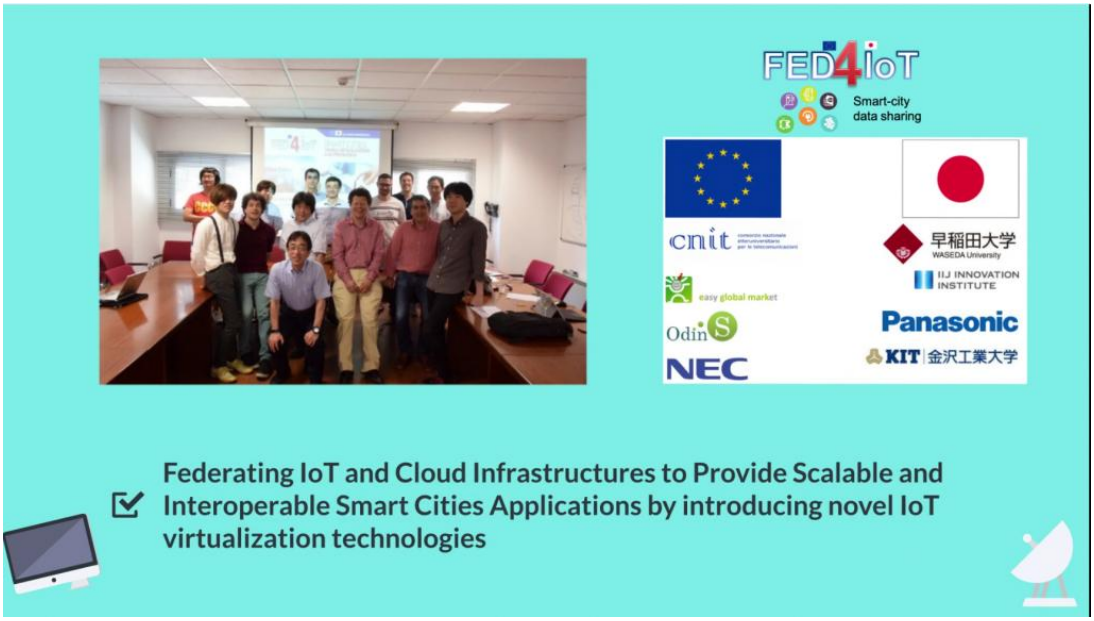
The development of the platform comes out from the fruitful collaboration of a consortium made by European and Japanese partners that successfully developed the different services (Docker containers) of the platform and used them for implementing four project use cases, for thee local applications and a cross-border one.

Despite the COVID-19 pandemic, the consortium has been able to collaborate and, as a result of this kind of EU-Japan synergy, to develop and test, on-filed, an cross-border multi-zone platform, with datacenters and edge-nodes in Europe and Japan. Moreover, the platform and its services have been described in joint research papers.

The integration of many IoT standards into VirIoT, and the important use of the NGSI-LD standard for internal communication and interoperability management, had as a side effect a strong contribution of the project to standardization bodies such as ETSI and ITU.

VirIoT results are currently (2021) exploited: the NGSI-LD broker servers developed for Virtual Silos are used for on-going smart-city projects by NEC, EGM and OdinS; the whole platform is used by an Italian smart-city project that is continuing the open-source development.

[2] https://github.com/fed4iot/VirIoT
[3] https://hub.docker.com/u/fed4iot



The consortium want to thank the MIC and the European Commission for the opportunity they gave us to work together, and the reviewers for guiding us through this process. We think each of us learned something, and not only from a technical point of view, but also from a cultural one. Through these kinds of EU/JP collaborations, the partners share knowledge and ways of working that definitely improve the competitiveness of our communities.

It may happen that in some projects partners develop their own specific business without much collaboration. Definitely this is not our case. We were a unique cross-border team that believed in this project, fostering a fruitful and continuous debate on technical and architectural solutions, the results of which have been: a cohesive platform in which everyone participated with their modules, joint scientific papers and technical standards.