Future Intelligent Quality Assurance for Release Enhancement

fiQare

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Project Websites

www.celticnext.eu/project-fiqare

https://fiqare.eu

The main objective of fiQare is to create an intelligent certification system in cloud security and IoT, and to improve the quality within FIWARE platform, with the aim of making it safer and more reliable.

An important step has been achieved by fiQare in the intelligent automated certification systems' area to improve the cloud and IoT security further. A milestone in the quality assurance of software code has been achieved thanks to fiQare that increases the reliability and safety of the FIWARE platform through intelligent automated code quality control.

In fiQare, Emergya, Secmotic, Tiga and Ubiwhere were responsible for the research and evaluation of the quality of FIWARE, applying the ISO/IEC 25010:2011 regulation. UMA worked on the development of an artificial intelligence, capable of analysing the software automatically. Furthermore, they worked on detecting improvement in code quality.

Main focus

fiQare achieved the design, development, and execution of an innovative "artificial intelligence Quality Assurance (QA) methodology" through the research and application of the eight axes of the ISO 25010 applied the FIWARE Gen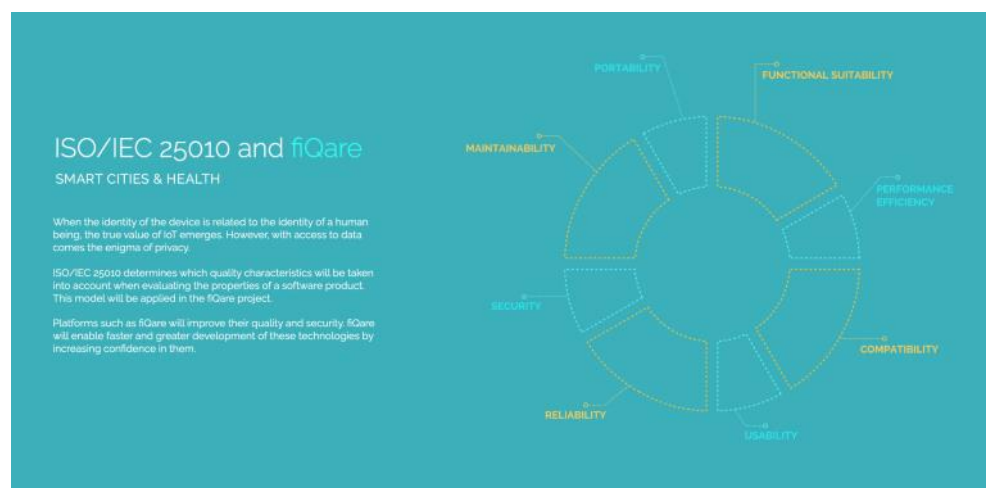eric Enablers (GEs), finishing with the development of two use cases in real environment (Smart Cities and Smart Health) and the improvements of a set of GEs selected, providing them to the FIWARE Community.

Artificial Intelligence Tools developed in this Project are the core of the QA process it allows to automatically test the software and to check their quality in terms of functionality, performance, security, reliability, usability, maintainability, compatibility and portability. This A.I. performance the develop cost depending on the magnitude of the lines of code to improve.

Approach

fiQare project was structured in three phases:

- A Context Broker **Generic Enabler (GE)** is the core and mandatory component of any "Powered by FIWARE" platform or solution. It enables to manage context information in a highly decentralized and large-scale manner.

- The first phase consisted of testing the set of GEs selected quality following the eight axes of the ISO 25010.

- The second phase involved the development of a set of intelligent tools (based in Artificial Intelligence) to solve the identified problems. These tools are the core of this platform as they provide companies in-

ISO/IEC 25010 and fiQare
SMART CITIES & HEALTH

When the identity of the device is related to the identity of a human being, the true value of IoT emerges. However, with access to data comes the enigma of privacy.

ISO/IEC 25010 determines which quality characteristics will be taken into account when evaluating the properties of a software product. This model will be applied in the fiQare project.

Platforms such as fiQare will improve their quality and security. fiQare will enable faster and greater development of these technologies by increasing confidence in them.

volved with beyond-the-state-of-the-art tools to be used. Moreover, the goal was to actively build a set of enhanced GEs and utilities for the FIWARE community. fiQare solutions improves the quality of code, detects problems in communication. The project successfully improved the quality of existing code of the GE's and passed the FIWARE Foundation Quality Control approval process for code release.

- Use cases in the smart cities and smart health were in the focus of the project.

Sensing/monitoring the city and applying data science on the information gathered by real IoT devices working in several urban environments have been one use case. The second one was about Internet of Health things for smart home assisted living. Moreover, the intelligent testing tools have been improved based on the results obtained in a real environment.

This project had a balance between science for a sound analysis and its validation in building new and more reliable services. It also included academic nodes to interact with companies in making transference from university and has produced a wealth of information and concrete results for business plans to promote knowledge and smart tools and applications in IoT and smart cities.

Achieved results

Partners of this project are proud of the common achieved results and their individual contributions and excellence in their field of competence. The union of the different members of the consortium has led to the achievement of ambitious goals set at the beginning and that were intended that, based on the analysis of the open-source GE's of the FIWARE Foundation, the consortium could contribute to their improvement and also set up platforms for Smart Cities and Smart Health using the different FIWARE GE's and those improved by the partners.

In consortium's opinion, meticulous work has been done reviewing the main ISO 25010 categories in a comprehensive way, the scrutiny and selection of the most versatile tools on the market for defect detection, and above all, the search, classification and justification of defects detection rules for software.

All this has resulted in a significant improvement in quality when testing has been performed. The new coded tests (increasing the coverage) have helped to detect new issues and generate improved versions of the selected GEs. There is also an important new volume of scientific information on the GEs, and advances towards the second half of the project for more intelligent tools and a wider impact in quality over all ISO axes.

The platforms obtained to smart cities and smart health have been successfully tested and they could be great products in the near future.

Following positive points of this project have been identified:

- the collaboration between the different partners,
- being official contributors to the FIWARE Foundation, and,
- that the platforms created serve as a basis for future IoT projects of consortium partners' companies.

Weaker point has been also identified:

there are still some GE's that are not mature enough and that a lot of work is going to be needed to have a standard front end that everyone can use and build on, as at present each company must make its own since FIWARE does not provide it.

In summary, the project has been a success in all its aspects, and the consortium is very happy with the results.

Impact

For the consortium, having obtained a fully functional smart city and smart health platforms based on FIWARE puts us in the market with a product which can be beneficial for the society and at the same time, brings economic benefits to the consortium members. Also, being a contributor to the FIWARE foundation allows us to have a better perspective of where the IoT world is going and to be a major contributor to it.

On the other hand, there are two special impacts obtained in the Project by us:

Creation of a quality analysis methodology based on ISO25010.

Creation of an AI for automatic analysis and improvement of code quality based on that methodology. This is the main impact R&D obtained.

Finally, the product and the material obtained from the project has been a success for the consortium.

About Celtic–Plus

Celtic-Plus is an industry-driven European research initiative to define, perform and finance through public and private funding common research projects in the area of telecommunications, new media, future Internet, and applications & services focusing on a new „Smart Connected World" paradigm. Celtic-Plus is a EUREKA ICT cluster and belongs to the inter-governmental EUREKA network. Celtic-Plus is open to any type of company covering the Celtic-Plus research areas, large industry as well as small companies

or universities and research organisations. Even companies outside the EUREKA countries may get some possibilities to join a Celtic-Plus project under certain conditions.

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