



D4.1 FIWARE4_Raw water supply system real-time operational management

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Executive Summary

Fiware4Water (F4W) intends to link the water sector to the FIWARE smart solution platform by demonstrating its capabilities and the potential of its interoperable and standardised interfaces for both water sector end-users (cities, water utilities, water authorities, citizens and consumers), and solution providers (private utilities, SMEs, developers).

This deliverable reports the deployment and demonstration of FIWARE-enabled applications and services in the raw-water external conveyance system that serves the greater metropolitan area of Athens (Greece), as part of the activities of Task 4.1. The conveyance system, which is composed by aqueducts of length more than 495km, is operated by the Athens Water Supply and Sewerage Company (EYDAP S.A.), the largest water company in Greece. To ensure high reliability of operations, a key target of EYDAP, within F4W, is to upgrade the real-time operational management of the raw-water supply system by integrating data sources from different sensors, installed by different vendors over the years, into a common information system, taking advantage of the data portability and integration functionalities, provided by the FIWARE. Taking advantage of the integrated source of data, a new platform, along with a series of analytics, have been developed to enable the operational staff of EYDAP to monitor the system on real-time basis, and get advice on the optimal management of the large system.

NTUA and EYDAP designed a FIWARE-enabled reference architecture and deployed it to integrate seamlessly the co-existing utility's metering systems, and to enable their communication with third-party analytics and models, in a standardised way. The solution has been implemented in the "Giona – Dafnoulá" aqueduct, with total length 131 km, and integrated data sources, associated with both quantitative and qualitative parameters of raw-water, into a unique information system. Specifically, FIWARE-enabled solution allowed the integration of real-time data from existing sensors of the conveyance system: 18 quality sensors in total measuring temperature, turbidity and conductivity, 20 water level meters, 9 water flow meters, 8 sluice gate opening meters, as well as daily water inflows and outflows in the 4 water treatment plants of EYDAP. Furthermore, 5 new water level meters and 1 new flowmeter have been installed in the framework of F4W.

Going one step further, a new web platform has been developed to enable the operational staff of EYDAP to process, analyse and visualise data from the integrated sensors, allowing the combined monitoring of flow and quality characteristics of raw water via a single web portal, on real-time basis. For this purpose, the Nessie system (a Web Server and Data Analysis & Archiving Engine, developed by NTUA, for the collection, analysis and visualisation of high-resolution data from sensors) was customised to the specific requirements of EYDAP. Furthermore, the platform has been integrated with a series of applications (developed in the framework of WP3), allowing their deployment in an operational context. Specifically, the platform aims to support EYDAP in decision making by providing advice on the optimal settings of sluice gates (flow regulation structures), early warnings for high turbidity events, forecasts on the level of turbidity, and estimations of water supply volumes one-day ahead.

To deploy the above solutions, fully operational and functional connectors have been developed to integrate FIWARE components (e.g., Orion-LD Context Broker) with the legacy system of EYDAP and the Nessie-based web platform, consisting of the two systems FIWARE-compliant.

As discussed in Section VIII, the FIWARE-enabled solution developed for the large and complex raw-water conveyance system of EYDAP has great potential for further uptake both within EYDAP as well as in other large-scale raw-water conveyance systems in Europe.

Related Deliverables

D1.1: “Requirements from Demo Cases” and D1.2: “Requirements from end-users”, which describe the requirements of the smart solutions developed in WP3.

D2.1: Specification of system architecture for water management, cybersecurity and quality monitoring, which provide guidelines to implement FIWARE-enabled architectures.

D3.1: FIWARE-enabled applications for Raw Water Supply, which describes the smart solution developed in Task 3.1 (WP3) for Athens Demo Case.

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List of Acronyms/Glossary

CB	Context Broker
DW	Data warehouse (of EYDAP) – Database that stores the data from the legacy system of EYDAP
EAV	European Added Value
EYDAP	Athens Water Supply and Sewerage Company
IoT	Internet of Things
F4W	Fiware4Water project
NGI	Next Generation Internet <i>The Next Generation Internet (NGI) initiative, launched by the European Commission in the autumn of 2016, aims to shape the future internet as an interoperable platform ecosystem that embodies the values that Europe holds dear: openness, inclusivity, transparency, privacy, cooperation, and protection of data.</i>
NTUA	National Technical University of Athens
WPL	Work Packages Leaders
WTP	Water Treatment Plant