

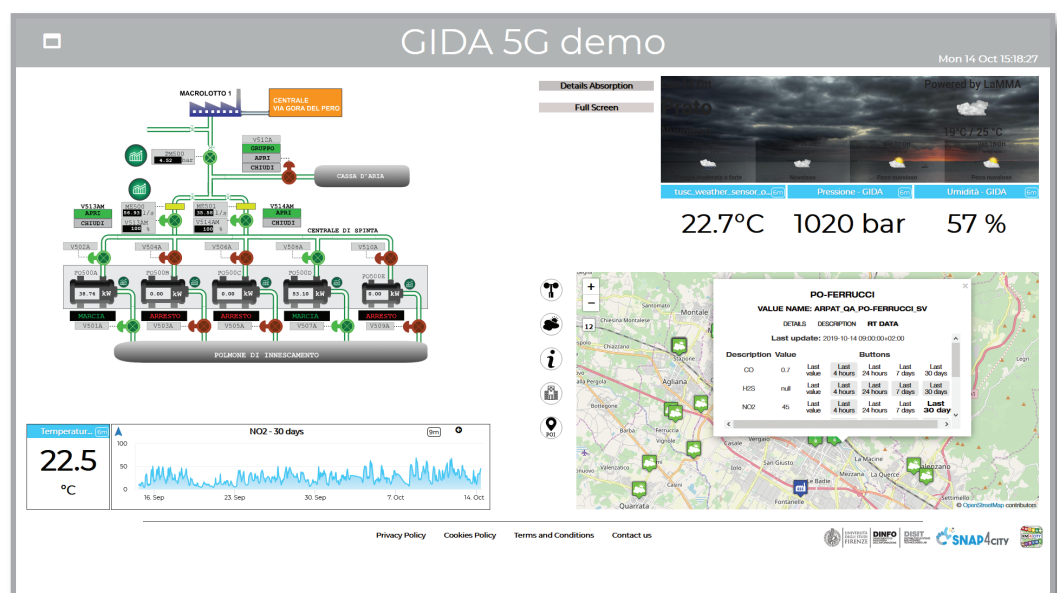
5G Enabled Water Cleaning Control

Water depuration plants are of high relevance in industrial and city areas, they can be regarded as critical infrastructures since the water is a primary needs. GIDA spa (<https://www.gida-spa.it>) is the manager of a number of depuration plants in Italy. Managers of these kind of plants need to: (i) control the status of the plant in real time, onsite and from remote using mobile and web applications (the control has to guarantee a high data rate, where the data stream has to be absolutely secure being the plant a critical infrastructure), (ii) performing an analysis of correlation among industry plant measures and understand eventual smart city context correlations, for example with: weather and environment mainly, heavy traffic (which may be an index of productivity), and other variables as measures by the sensors in the area.

Take a look at the results

To cope with the above needs and to experiment and understand the effectiveness of Industry 4.0 solutions, GIDA has been involved in an experimentation of 5G technologies to verify if their needs can be satisfied by the new technological solutions based on 5G and Smart City IOT. The trial has been developed in collaboration with the major providers of 5G telco in Italy: Wind-3G, Open Fiber in the context of the national industrial pilot of National Ministry in Italy, and with a number of industrial partners such as: ESTRA, ZTE, CELLNEX, e-distribuzione, enel, Poste, etc., and research institutions. In this context, Snap4City has been taken as reference architecture and solution for its capability of covering aspects of IOT, Smart City and Industry 4.0 technologies.

Technically, the industrial plant of GIDA is managed with real-time data flows in ModBUS, thus a process has been located on the ModBUS network to bridging data towards Snap4City in real time through 5G connection, thus enabling the Telecontrol of the plant. To this end, the highest security level, reliability and velocity of data transmission have been major requirements which have been satisfied. In fact, Snap4City supports end-2-end secure connections from IOT Devices and field up to the final remote user interface and dashboards. Snap4City also passed 2 Penetration Tests in 2019 with major international companies of the sectors.



In the solution, the data received in push into Snap4City are stored to perform historical reasoning and analysis with respect to the smart city data, such as weather and environmental data, and thus shown on Dashboard. The dashboard presented in this paper has been developed including a technical Synoptic representing the most relevant parts of the GIDA plant to monitor in real time the information, plus smart city information and interactive panels. The dashboard operator may see the information regarding Smart City context and environmental data, weather data and forecast, together with those of the Industrial water depuration plant, with the possibility of inspecting the time trends. The authorized personnel of the GIDA plant can access from any location, from web and mobile devices to the control panel dashboard provided by Snap4City. The connection from GIDA to web browser is end-2-end secure performed in TLS, Web Sockets.

The Dashboard includes real time values and trends of some aspects of the depuration plant, and of IOT devices located in the plant for monitoring temperature and humidity. On the other hand the map in the dashboard shows the position of GIDA plant the available IOT smart city sensors in the area. The user may access to the data of those sensors and may visualize their trends. The user may perform time browsing to see the historical values of the monitored variables.

The Role of Snap4City

In the context of this pilot, the data collected on GIDA plant for water depuration are sent via 5G to Snap4City for telecontrol of the plant. The above presented Synoptic allows monitoring in real time the information and the operator may see together the information regarding Smart City environmental data together with those of the Industrial water depuration plant. It may be possible to perform actions on the plant, for example to act on pump in presence of critical conditions.

Where you can test

The above solution cannot be accessed without the authorisation for safety reasons. On the other hand, you can ask at authorized personnel of Snap4City to see a demo of the Dashboard and solution. Moreover, in the public Dashboards, accessible from <https://www.snap4city.org>, you can access to some similar demonstrative interfaces.

Other examples and connected scenarios:

- Snap4Industry Slides: <https://www.snap4city.org/369>
- Custom Synoptics and Dashboards: <https://www.snap4city.org/504>
- What If analysis dashboard online help: <https://www.snap4city.org/521>
- Data Analytics: the cases of Antwerp and Helsinki, and general views: <https://www.snap4city.org/524>
- Snap4Industry, in Italian: <https://www.snap4city.org/367>

Extended version accessible from: <https://www.snap4city.org/547>

Contact: <https://www.snap4city.org>

Partners: Wind/3G, GIDA, ESTRA, Comune di Prato, UNIFI-DINFO



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