



SMART CITIES AND EHEALTH

FIWARE supports Smart City beach surveillance in Montevideo

With the contribution of



FIWARE - OPEN APIs FOR OPEN MINDS

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Challenge & Context

The beaches of Montevideo are loved by locals and visitors alike and provide an ideal situation to run a data-driven smart city project aimed at improving the beach-going experience. Montevideo has 18 beaches stretching along more than 15km of coastline and more than 30 lifeguard stations. By integrating cutting-edge **FIWARE** technology and open data, a unified system has been created for beach visitors to access real-time information on weather, crowds, beach and safety conditions.

Solution

A system, which runs primarily during the summer season has been integrated with the FIWARE platform, **specifically the Context Broker¹, where data is collected from each lifeguard station.**

Drones act as another collection point, monitoring the beaches for population so as to avoid overcrowding. **Data available to users** of the platform include **weather conditions, a real-time flag status for each of the 18 beaches along with current capacity levels.**

The user interface consists of a GIS (Geographic Information System) web application incorporated within the beach page of the municipality. This information not only consists of the data received from the lifeguard boxes but also adds the values of UV index, temperature and weather. UV index data is obtained from the municipality's own radiometers (connected by **FIWARE** IOT agents) while

¹ A Context Broker Generic Enabler 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 [Orion-LD Context Broker Generic Enabler](#) is a NGSI-LD Broker, which supports the NGSI-LD and the NGSI-v2 APIs.

weather data is obtained through an interconnection with the [INUMET](#) platform² (INstituto Uruguayo de METeorología is the official state meteorological agent). In this way, beach users have real time information on the state of each beach in Montevideo.

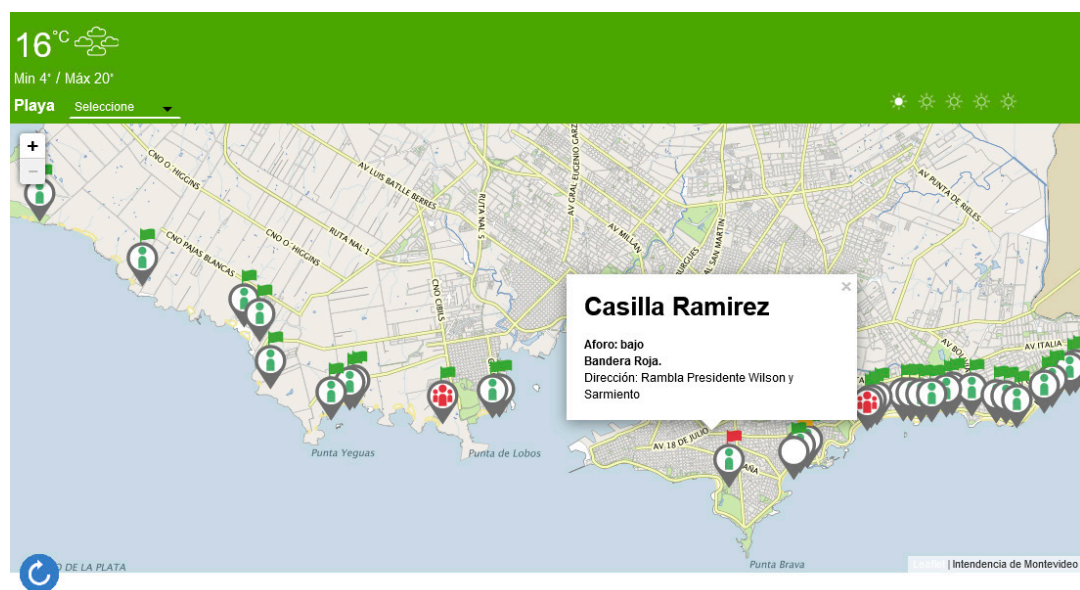


Figure 1 - User Interface - Beach visualization data points

How it works

The first installations with the Context Broker sitting in the center of the solution already contained information on UV radiation measured by sensors and weather

² INUMET (INstituto Uruguayo de METeorología) is the meteorological authority of Uruguay. Its purpose is to provide public meteorological and climatological services, consisting of observing, recording and predicting the weather and climate in the national territory and adjacent oceanic areas.

status/forecast through a B2B integration with the country’s official meteorological institute. In addition, a data model was generated incorporating the lifeguard boxes as entities in the **FIWARE Context Broker and a management system was implemented using different sources to update this information**. The management system is used by the main actors involved: the technicians who monitor the water quality and the lifeguards who define the bathing flag and the beach capacity.

A web app has also been created (mobile and on the IM’s website) which consults the status of these different entities in the Context Broker through sources and provides the information visually on a map. One last aspect to highlight is that the services used in this solution are available through the [Open Services](#)³ portal.

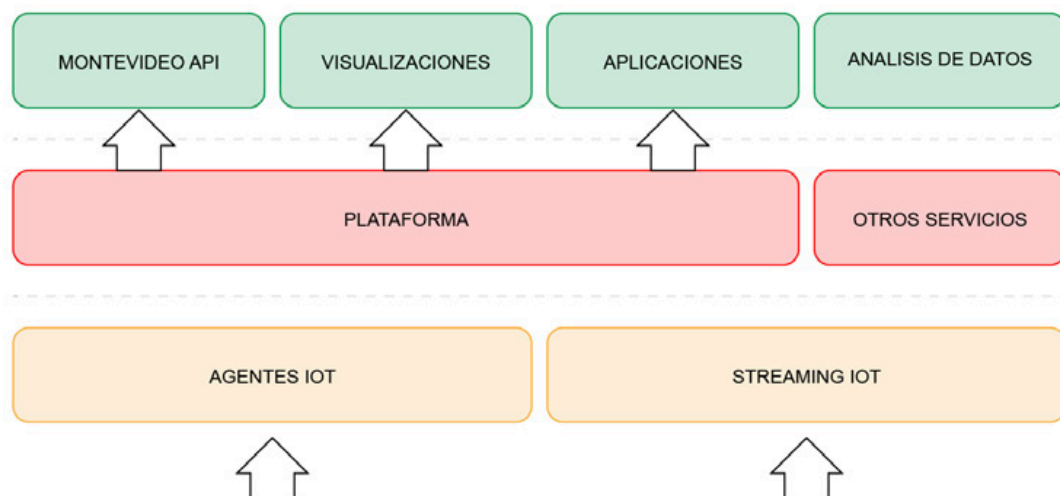


Figure 2 - Solution Architecture Diagram

³ Montevideo API It is the entry point to use the real-time services that the city of Montevideo offers through the application interfaces (APIs).

Benefits & Impact

Both locals and visitors of Montevideo have access to real-time data allowing people to make informed decisions when visiting the beaches. This can aid in distributing the beach goers more evenly across the 18 beaches avoiding overcrowding. Any photos taken by drones once they are processed by analytics are not stored on servers in order to preserve privacy.

The **FIWARE platform is connected to an API Manager providing services to the general public**. In this case, a REST API exposes the same data which is displayed in the application. Although this is available to the general public, it is most frequently used by people in academics and business, for research and applications development. Today it is used, among others, for example, by **DINAMA (National Directorate of Environment)**⁴ to access real-time data from the beaches of Montevideo.

Added value through FIWARE

Montevideo has had the FIWARE platform installed in its infrastructure since 2018.

The platform sits as the fundamental pillar when connecting data from different devices such as radiometers, weather stations (connected by FIWARE IOT agents) and data interconnected with the INUMET platform (the official state agent of meteorology). It has also been key to display the information through this application and the connection with the API Manager.

⁴ DINAMA (National Environment Directorate) aims to achieve adequate environmental protection by promoting sustainable development through the generation and application of instruments aimed at improving the quality of life of the population and the conservation and environmentally responsible use of ecosystems, coordinating the environmental management of public entities and coordinating with the various social actors.

Finally, to highlight the benefits of having a platform that offers open services to citizens, companies, other civil society organizations or academia, they promote an ecosystem that enables the generation of products adding tangible value.

Next steps

Montevideo is currently working on a project to expose open data to citizens through Ckan⁵ connected to the FIWARE platform. This will enable, in addition to having real-time services – through FIWARE and the API Manager – to expose another set of data in open formats, generating a single place to publish and expose this type of institutional information.

References

- [Press release linked to the application](#)
- [Link to the website where the application is shown](#)
- [Link to the download in the playStore of the app](#)
- [Access link to the platform for users](#)

⁵ CKAN is an open data publication platform, widely extended, which enables the publication, search, discovery and consumption of open datasets. In this context, the FIWARE CKAN extensions enhance the default CKAN features in order to integrate this tool within the FIWARE ecosystem, supporting the publication, management and rich visualization of right-time context data, while improving the access control and enabling data monetization.

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