Smart Healthcare for Health Centers and Clinics in Spain

Development of a comprehensive solution for smart and efficient management of health centers and clinics in Spain, promoting quality medical care and a 25% energy savings.

Background

Covering an area of more than 10,000 km2 and serving a population of more than 1 million, the functional and significant central institution manages 213 health centers and clinics caring for the fitness of the large population. Giving consideration to the wide area and scattered distribution, the control and management are complicated, which is crucial to improve user experience, efficiency, and benefits. And it is almost impossible to have 24/7 on-site maintenance and management with manpower, taking effective control of the air conditioning, lighting, and cold equipment, furthermore, realizing data-oriented management to achieve high energy efficiency and smart healthcare.

Challenges

- **Forming an integrated system for offering real-time facility status**

The scattered health centers and clinics in numerous areas can't be easily monitored and managed in real-time especially when it heavily relies on manpower.

- **Improving energy efficiency in a better way**

With more than 200 health centers and clinics, the institution is in urgent need to enhance its management and get maximum benefits through efficiency-oriented optimization.

- **Well matching the existing facilities without undertaking works of replacement**

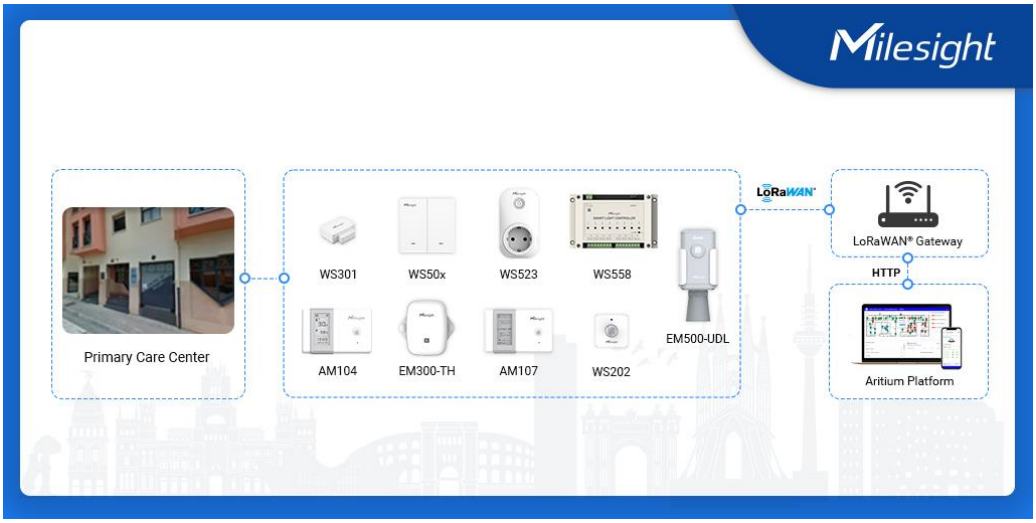
For relatively old facilities, it's challenging to achieve the goal of efficient management and control without breaking the current facility structure which may cause extra work and investment.

- **Integrating information on different aspects to have a comprehensive vision of the facilities**

Getting all-around information including the status of the facilities, air quality, and storage temperature of medicines, also allowing optimization by accurately controlling the lighting, air conditioning, cold equipment, and so on, the system should be an integrated one with all concerned performance.

Solution

More than 100 devices were deployed for the pilot health center. The LoRaWAN® network is created to build the integrated solution to finish the transformation and upgrading. With the help of unique Milesight D2D communication, the Milesight LoRaWAN® node devices directly communicate with one another to achieve smart linkage. The solution mainly focuses on 4 aspects, light control, condition monitoring, indoor air quality monitoring and control, and cold storage monitoring and control. Taking benefits from the great compatibility of Milesight gateways, all these services can be easily integrated into the PCC-Smart management platform which is available to users on mobile and the web, contributing to a smart healthcare solution.



" Although we are still in a very initial phase, this solution offers us all the necessary information to optimize the management of our centers "

- **Light Control**

The Smart Wall Switch WS50X has been deployed for the management and control of lighting in the information desk and rooms. These switches work centrally through programmable routines.

Cooperating with PIR & Light Sensor WS202 which detects presence and illumination, the system realizes smart lighting control via Milesight D2D communication. In addition, the Smart Light Controller WS558 has also been deployed to optimize lighting management in common areas.

By deep learning the working routine and customer habits, the professional Aritium took full advantage of the advanced system to customize different schedule modes, which not only generates energy savings but also creates pleasant environments.

- **Condition Monitoring and Control**

The smart thermostats have been deployed in all the radiators. To improve monitoring of temperature, diesel tank use level, and power consumption, the solution employed the 4-in-1 Indoor Air Quality Sensors AM104, Ultrasonic Distance/Level Sensors EM500-UDL, and Smart Portable Socket WS523. In addition, the Magnetic Contact Switches WS301 has been applied to detect the opening of doors and windows, and the temperature and humidity have also been monitored in rooms and information desk by the 4-in-1 Indoor Air Quality Sensor AM104.

- **Indoor Air Quality Monitoring and Control**

The 7-in-1 Indoor Air Quality Sensors AM107 has been deployed to monitor CO2 levels in common areas. Driven by accurate information, further controlling and management can be made to improve indoor air quality to bring better user and staff experiences.

- **Cold Storage Monitoring and Control**

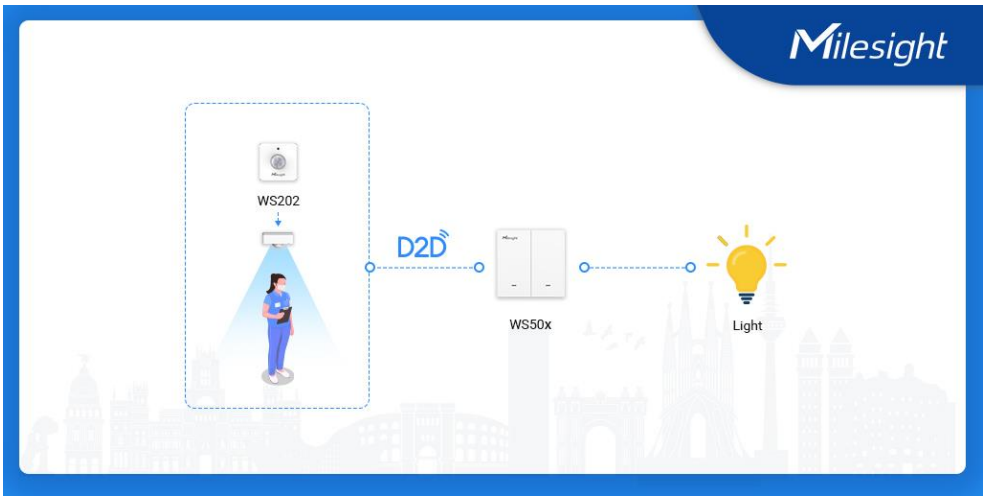
The Temperature & Humidity Sensors EM300-TH have been deployed to monitor the storage condition of medicines and vaccines to guarantee that the environment is in a good state. And once the storage condition goes wrong, adjustments can be made to take it back to ideal condition.

Highlights

Milesight independently develops the state-of-the-art technology Milesight D2D communication which is a device-to-device communication protocol that enables Milesight LoRaWAN® node devices to directly communicate with one another without a LoRaWAN® Gateway. It greatly promoted efficiency and realized smart control with low latency of less than 1 second response time. The connection between Milesight PIR & Light Sensor WS202, Smart Wall Switch WS50X, Smart Light Controller WS558, Smart Portable Socket WS523, and Magnetic Contact Switches WS301 fast got smart linkage in lighting control, condition monitoring, and integrated management.

Why Milesight D2D Communication?

- Low latency (less than 1 second in the same room)
- Low power for battery operation onboth sides
- Long range and as secure as LoRaWAN®
- No useless beaconing and difficult synchronization
- Initial feature which coexisted with LoRaWAN®
- No additional hardware and LoRaWAN® gateways areneeded, leading to cost saving



Key benefits

- **Lighting Efficiency Improved**

By smartly controlling the lighting, the solution allows for integrated centralized routines and combining the activation of the switches with presence detectors. The utilization of lighting is optimized, which prevents the lighting from being in the condition of turning on even when it is in unnecessary conditions and therefore realizes power saving.

- **Heating Efficiency Improved**

By controlling the heating through smart thermostats, also incorporating door and window opening detection sensors, the solution greatly saves the fuel consumption for heating, which brings a win-win result in economic savings and CO2 reduction. As the data shows, 25% of the fuel is saved in consumption.

	Season 2020 - 2021			Season 2022 - 2023		
Start date	05/01/2021	11/02/2021	06/04/2021	12/12/2022		
Finish date	11/02/2021	06/04/2021	20/05/2021	03/01/2022		
Total days	37	54	44	22		
Total consumption (l)	1500	2400	1500	652		
Daily consumption (l/day)	40,54	44,44	34,09	29,64		
Daily consumption (average)	40			29,64		

- **Management Efficiency Improved**

By getting information on the central platform in real-time, maintenance teams can save unnecessary trips to inspect the state of the facilities. In this way, working efficiency is optimized and fuel consumption is reduced.

- **Better Working Experience**

By intelligently controlling the heating and lighting, and monitoring the air quality in real-time, the health center environments can be ensured at an optimal level, avoiding uncomfortable temperature conditions for both staff and patients.

About Aritium

Aritium is a company that was born with the determination to transform the way in which hospitals and healthcare organizations operate around the world by developing the concept of the “Smart Hospital”. To do so, based on its platform (Aritium Platform), it develops and deploys innovative solutions based on the IoT (Internet of Things) and AI (Artificial Intelligence), with the aim of optimizing and automating various processes in the healthcare field. From systems for monitoring environmental conditions to solutions for automatically monitoring the vital signs of patients, Aritium's goal is to automate different tasks and processes to allow healthcare professionals to spend more time on what they do best: taking care of the patients. Find more information at https://aritium.com/