

SPRINT4.0

*STRATEGIC PARTNERSHIP FOR INDUSTRY 4.0 INNOVATION
ADVANCED TRAINING*

Testing the use-case format for SPRINT4.0 using a real case as testbed.

"An innovative IoT monitoring system for industrial refrigeration"

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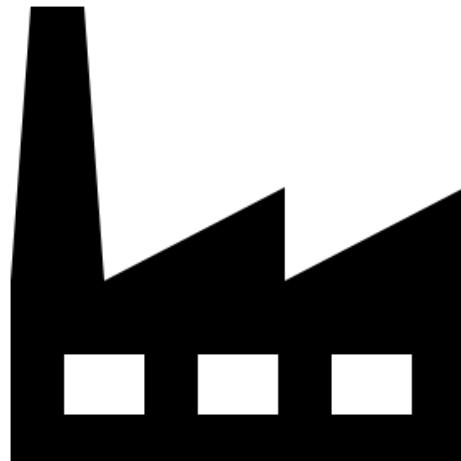
AGENZIA
NAZIONALE
INDIRE

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- 1. Company**
- 2. Context description**
- 3. Problem to be solved**
- 4. Solution**

COMPANY DESCRIPTION

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Very short description of the company:
Who is it and what it produce?
Which is it its value proposition to the market?
Dimension: is it a start-up or a big company?
Which are its strengths and weaknesses?

COMPANY DESCRIPTION



Name: Baglioni s.r.l

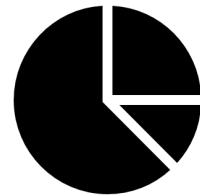
Description: Baglioni srl installs, repairs, maintains and markets refrigeration, air conditioning and air treatment.

Value proposition to the market: Our future is made of the passion for quality, applied to the new challenges of tomorrow: research and development, relationship and environmental sustainability.

Dimension: SME

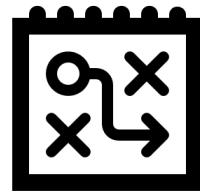
Strengths: openness to the use of new technologies

Weaknesses: lack of technological competence



- MARKET

Describe the market in which the company operates:
number and type of actors, barriers, competitors

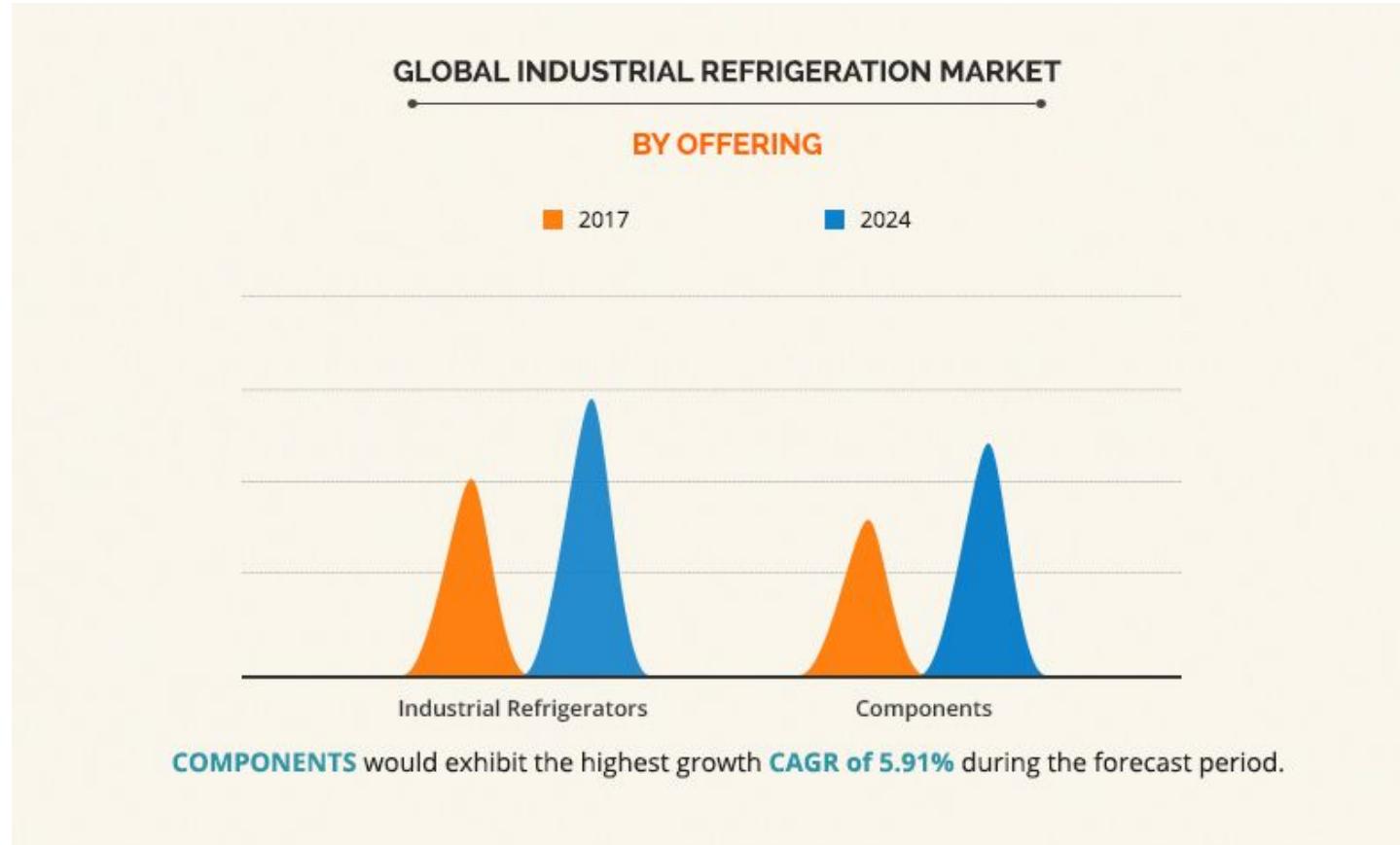


- VALUE CHAIN

Describe relevant aspects of company/market value
chain: logistics, distribution channels, operations, etc. - if
any -

CONTEXT DESCRIPTION - MARKET

Industrial Refrigeration Market Expected to Reach \$14,525.7 Million, Globally, by 2024



PROBLEM TO BE SOLVED

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- PROBLEM

Outline the problem to be solved and how it was addressed before the innovation process.



- INVOLVED PROCESSES

Which internal and external processes are involved?



- INVOLVED STAKEHOLDERS

Which stakeholders are involved in the process? How are they impacted?



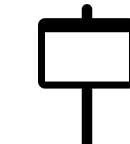
- MAIN OBSTACLES

What are the main obstacles to the problem resolution?



- STATE OF THE ART

There is any solution already on the market? How have other companies, in the same or in different sectors solved this issue ?



PROBLEM TO BE SOLVED - OVERVIEW



A properly set and monitored industrial refrigeration system means that large quantities of food are kept fresh longer. If the temperature falls above or below a certain temperature, the damage can be great. This is why the monitoring of industrial refrigerations systems is crucial. And not just the temperature, but humidity and other environmental parameters.



- OVERALL APPROACH IN PROBLEM RESOLUTION

Describe how did you approached the problem: how did you analysed the problem? On what did you focus at first in the innovation process?



- SELECTED TECHNOLOGY

Which technology did you choose? Why? How did you select it?



- LEVEL OF INNOVATION PROVIDED

Why and how the new solution provided a improved level of technology?



SOLUTION - OVERVIEW



IOT SOLUTION FOR MONITORING AND CONTROL INDUSTRIAL REFRIGERATION SYSTEMS



An IoT system has been implemented to monitor and control both old and modern industrial refrigeration systems.

Through various sensors, it monitors parameters like temperature and humidity and alerts the system if values go to low or too high. This keeps the organic mater fresh and healthy.

The add-on adds typical functionalities of the IoT, without invasive interventions and apparatus replacements.

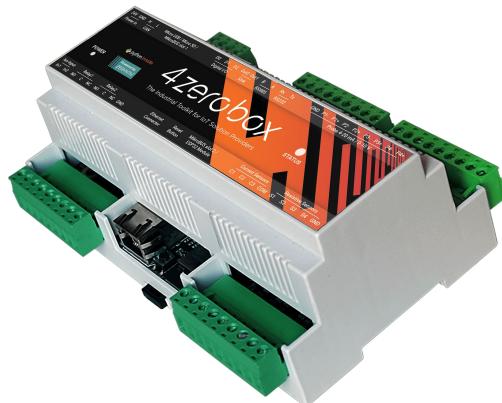
The solution is called **Wiref** and it's derived from **4ZeroPlatform**

SOLUTION - SELECTED TECHNOLOGY



4zeroplatform

TOI provides **4ZeroPlatform**: a plug-and-play data gathering, processing, and reporting solution for small and large enterprises who need to achieve full **visibility** and **optimization** of Industrial Processes.



4zerobox

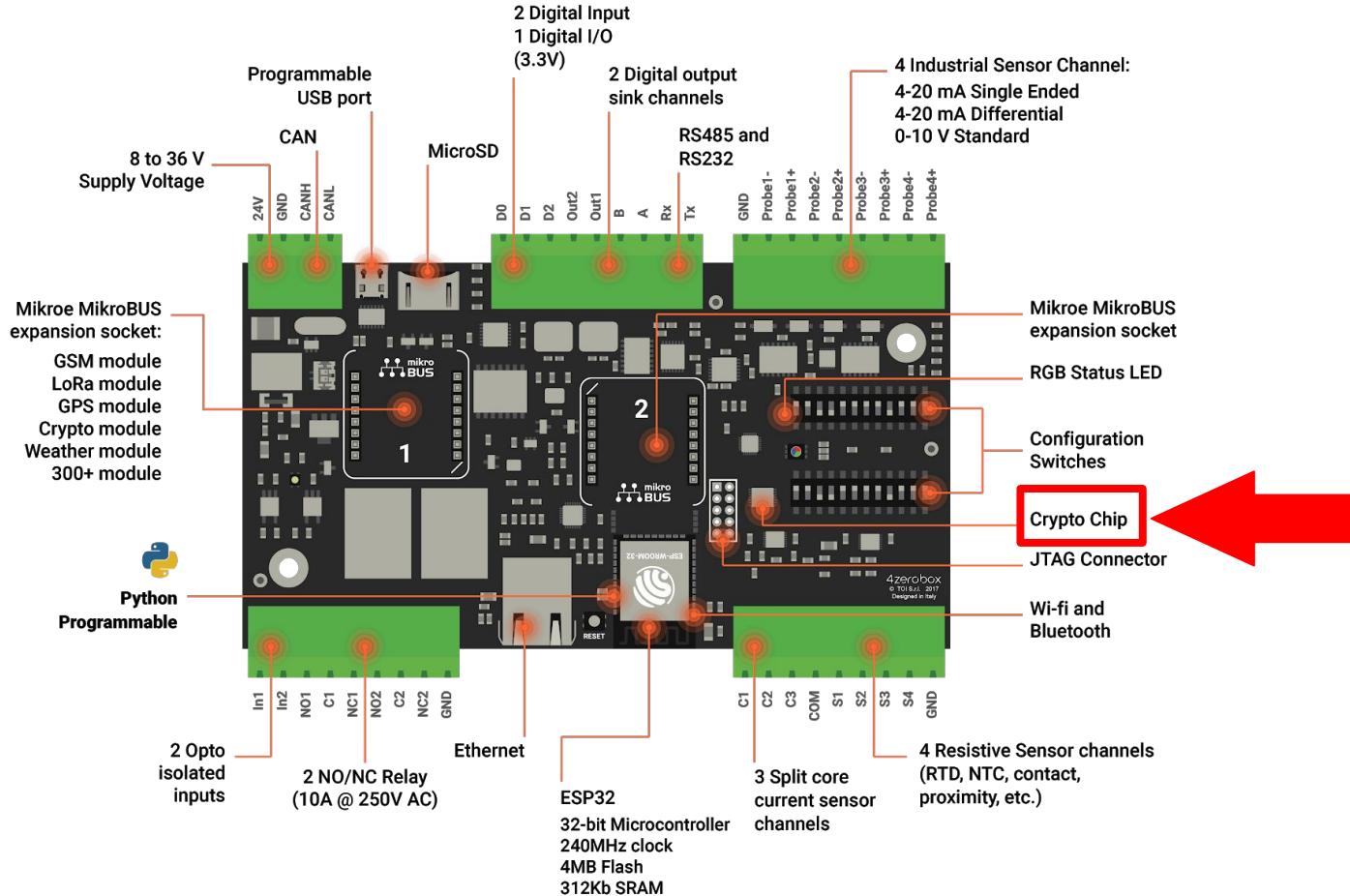


4zeromanager

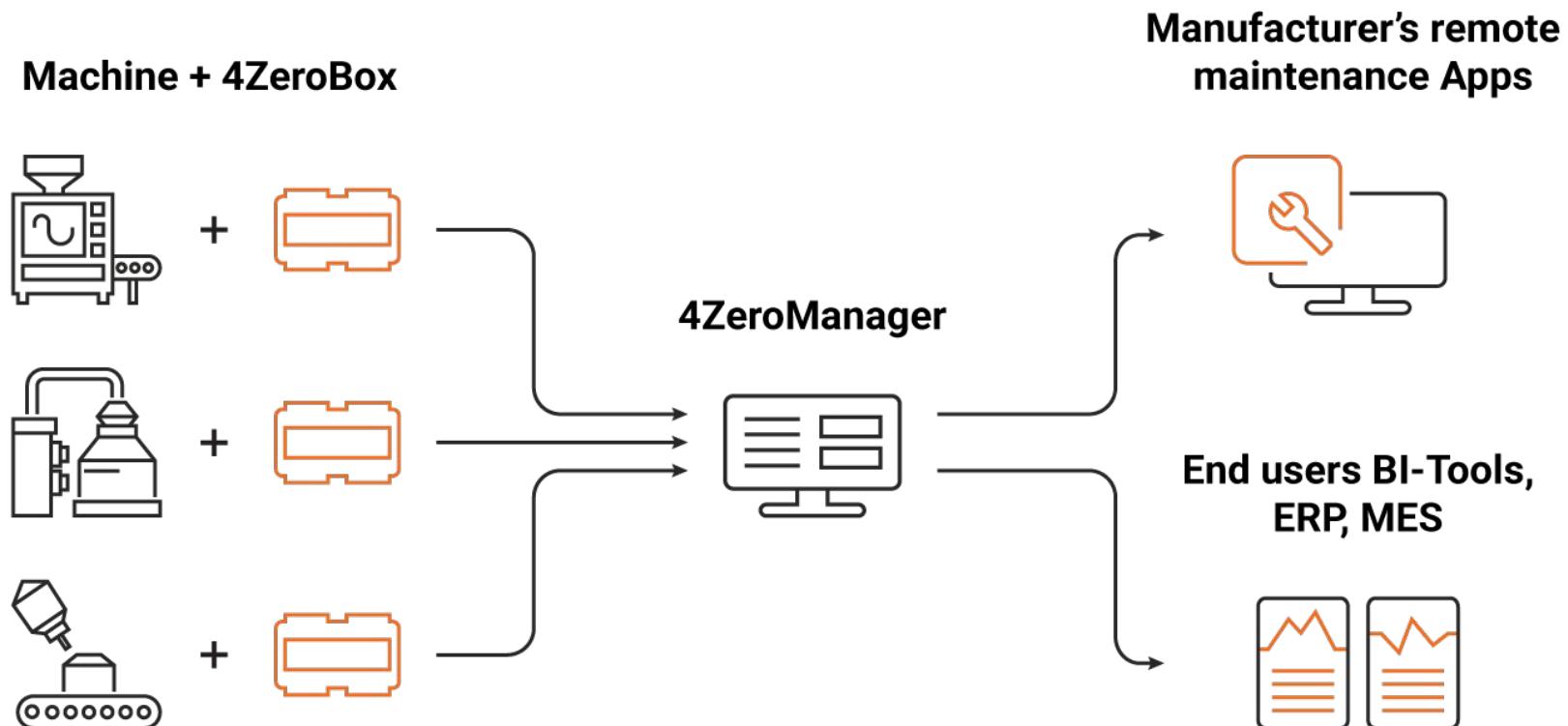
SOLUTION - SELECTED TECHNOLOGY



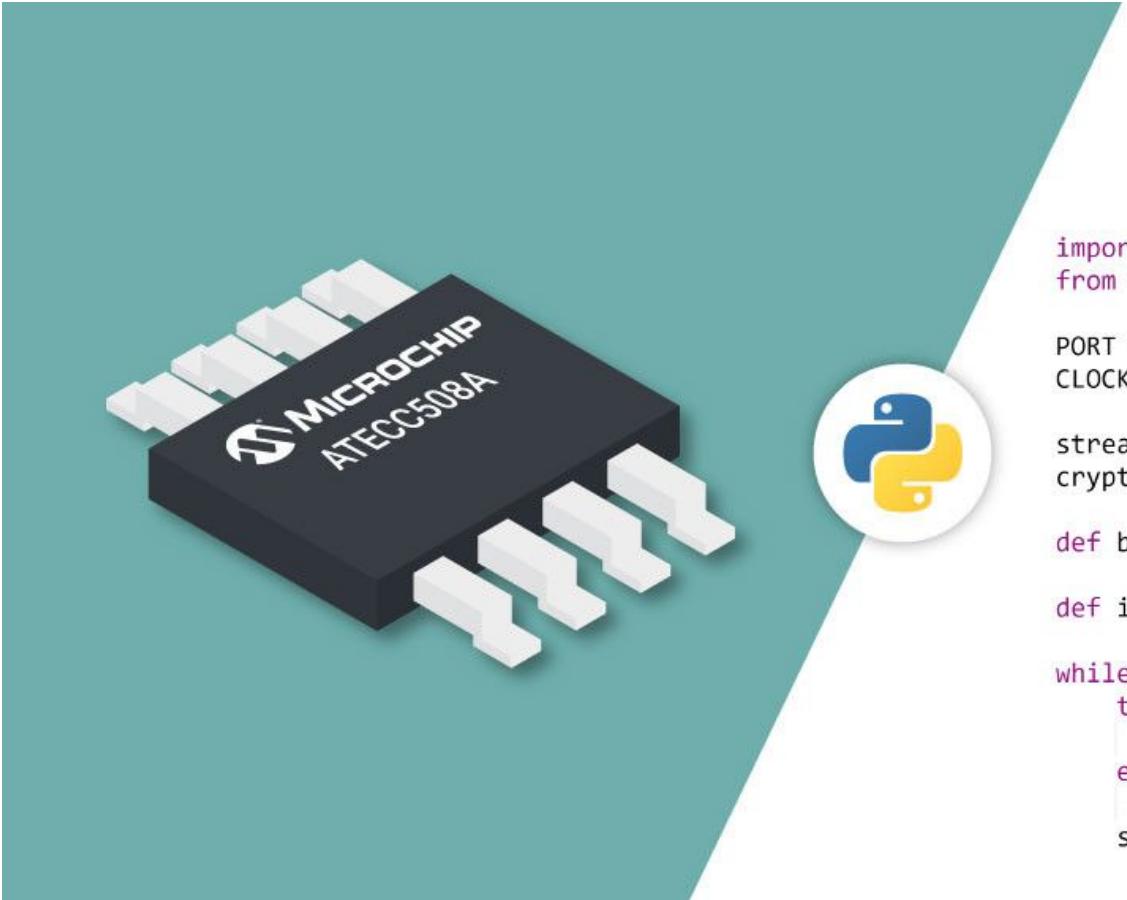
4zero**box**



SOLUTION - SELECTED TECHNOLOGY



SOLUTION - SELECTED TECHNOLOGY



ZERYNTH®
Your Ideas. Embedded

```
import streams
from microchip.ateccx08a import ateccx08a

PORT = I2C0
CLOCK = 100000

streams.serial()
crypto = ateccx08a.ATECC508A(PORT, clk=CLOCK)

def bytes_hex(data): pass

def info_cmd_test(): pass

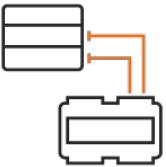
while True:
    try:
        info_cmd_test()
    except Exception as err:
        print(err)
    sleep(1000)
```

<https://www.zerynth.com/blog/zerynth-supports-microchips-ateccx08a-cryptographic-secure-elements/>

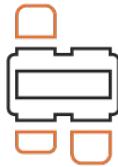
SOLUTION - SELECTED TECHNOLOGY



4zero^{box}



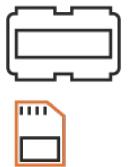
Analog and digital ports for connection to industrial sensors and PLC



Modular hardware with infinite configuration



Multi-connectivity:
GSM, WiFi, Bluetooth,
LoRa, Ethernet



Can retain and store data locally when disconnected



Secure hardware encryption and Blockchain-Ready



Python-Programmable
thanks to Zerynth technology

SOLUTION - SELECTED TECHNOLOGY

4zero manager



Secure and scalable
device provisioning



Remote device
management



Remote device
diagnostics



Firmware Over-The
-Air updates



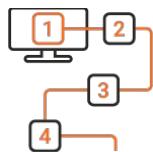
Secure
connectivity



Enterprise software
integrations



Modern user interface
with MQTT Consoles



Step by Step
configuration
tools



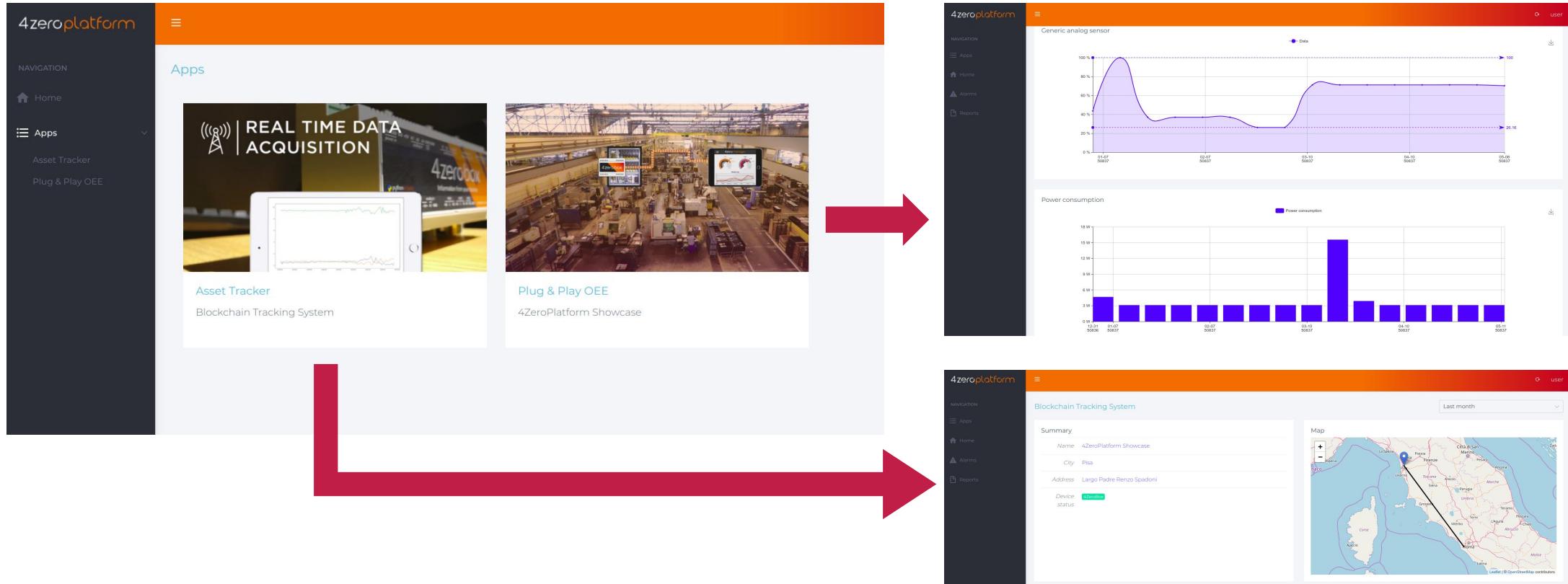
Development
tools



Cloud or on-premises
deployment

SOLUTION - SELECTED TECHNOLOGY

4ZeroManager - Custom Apps integration



SOLUTION - LEVEL OF INNOVATION PROVIDED



INNOVATIVE ARCHITECTURE

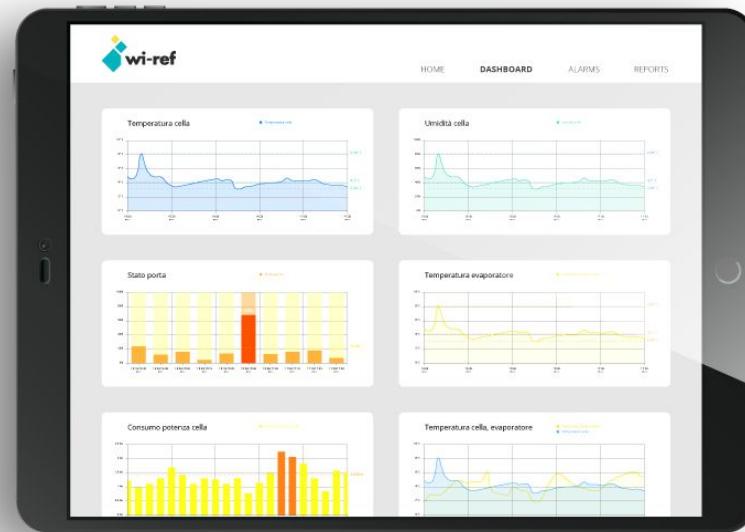
- Temp, humidity, doors and power consumption data acquisition and recording
- Wi-fi connectivity
- Not-invasive interventions and apparatus replacements.



SOLUTION - LEVEL OF INNOVATION PROVIDED



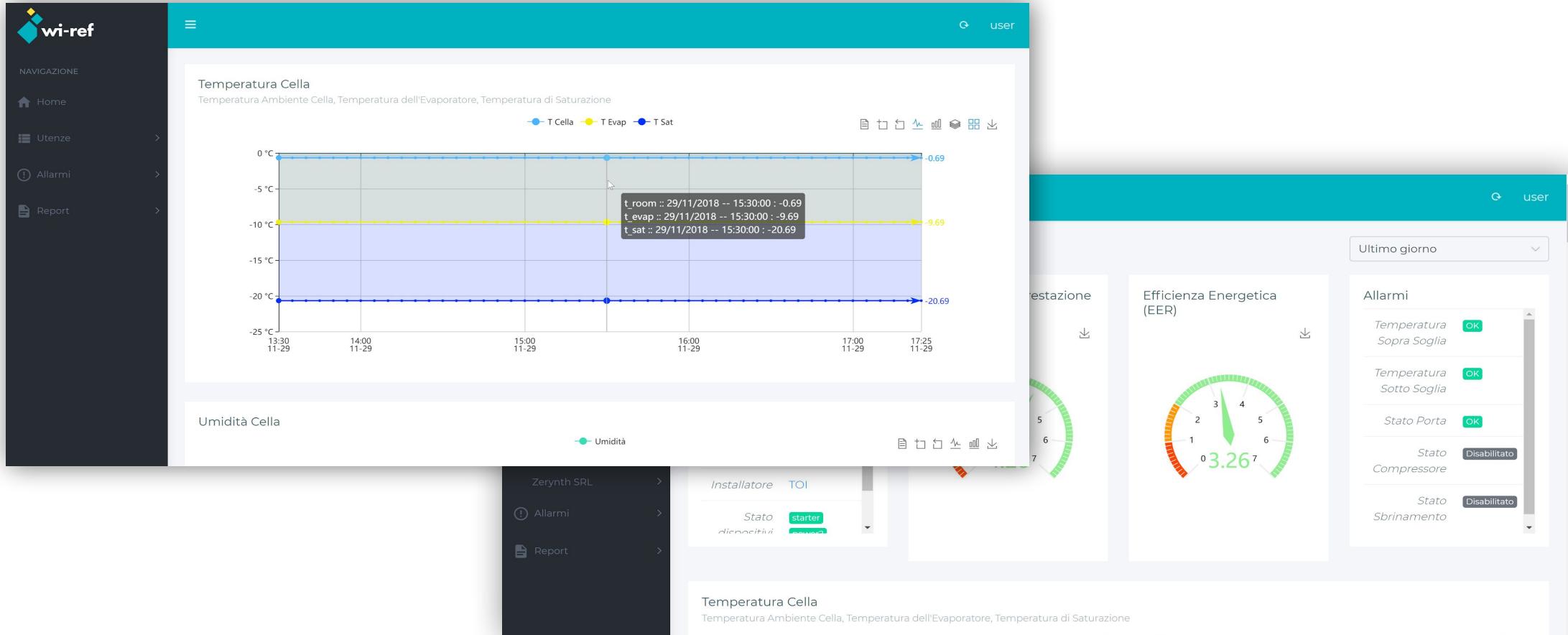
Modular System



SOLUTION - LEVEL OF INNOVATION PROVIDED



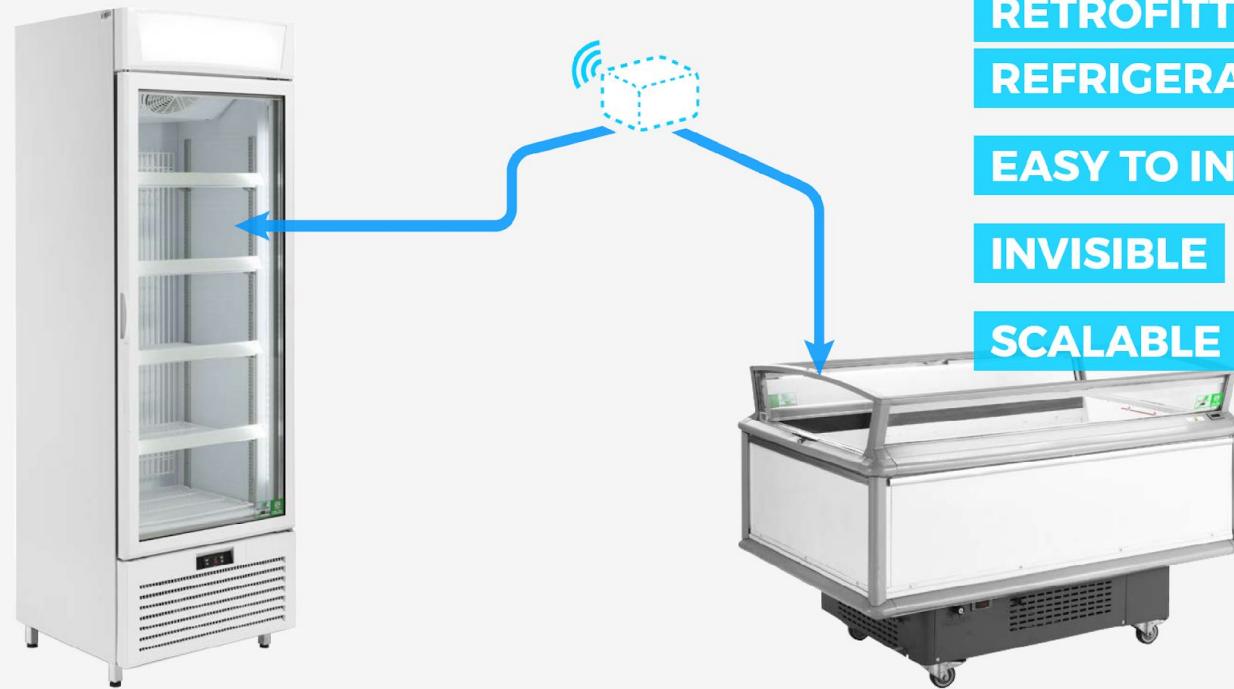
CUSTOM DASHBOARDS



SOLUTION - LEVEL OF INNOVATION PROVIDED



SMART UNIT



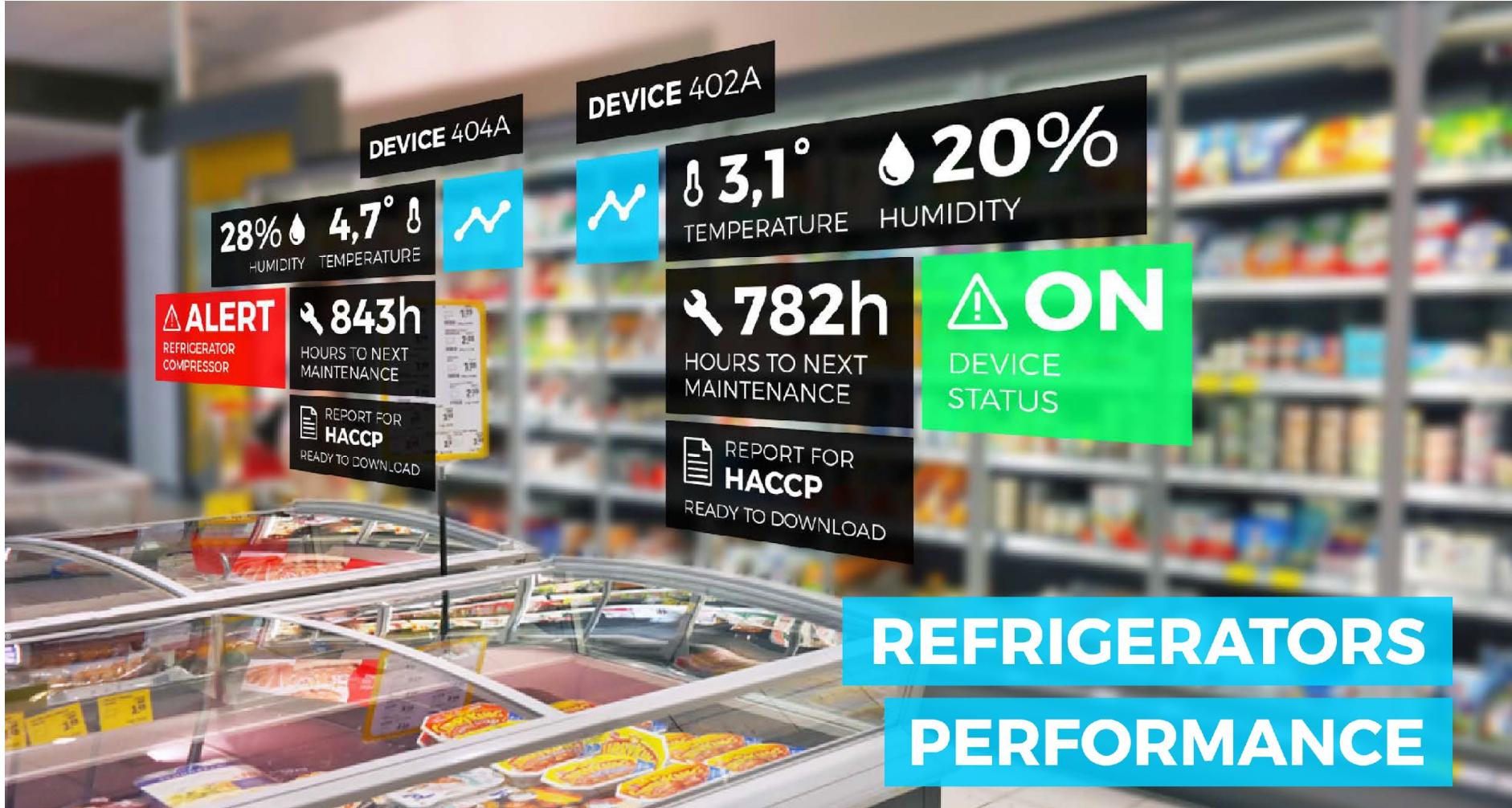
PLUG&PLAY

RETROFITTING EXISTING
REFRIGERATORS

EASY TO INSTALL

INVISIBLE
SCALABLE

SOLUTION - LEVEL OF INNOVATION PROVIDED



REFRIGERATORS
PERFORMANCE

SOLUTION - LEVEL OF INNOVATION PROVIDED



- ACCOMPLISHED OUTCOMES

What has been the outcome of the solution, from an economical, technical and performance standpoint?



- IMPACT

What are the main benefit generated by the solution and for which stakeholders?



- COST AND BENEFIT ANALYSIS

Were the benefit for the company higher than the sustained cost?



ACCOMPLISHED OUTCOMES



4.0 OUTCOMES

- **Efficiency:** reduction of Maintenance costs and energy
- **Quality:** cold chain monitoring meeting HACCP regulation