

IoT & 3D Intelligent Systems project
University of Modena and Reggio Emilia



SMASHBOX



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State of the art



safety deposit box systems are obsolete

Once customers enter into a lease agreement for a safe deposit box, a physical key is assigned to them and this could lead to several problems

The key could be lost

The bank cannot retain a copy of the key due to privacy regulations, complicating the recovery process

No intercommunication between boxes

every box is separated from the others, if one of them has been compromised the other are not informed



SMASHBOX

security problems

current security technology

- boxes are located in vault rooms
 - boxes are closed through physical key
 - vault rooms are protected by alarms and security cameras
-

problems

- no alarm for a single box
- no intercommunication between all the boxes
- lack of control on box parameters

So we thought about a
possible solution...



SMASHBOX

Secure Monitoring And Smart Hub for Biometric Optical boxes



SMASHBOX

vision



**“SMASHBOX is redefining the traditional concept
of bank safe deposit boxes, transforming them into intelligent, interconnected, and biometrically
secured systems.**

**We are moving beyond static, conventional storage models to usher in a new era of dynamic,
personalized, and digitally enhanced security.”**



who we are

We are two students of Artificial Intelligence Engineering, passionate about technological innovation, security systems, and the future of smart infrastructures.



Francesco Marzo



Simone Bugo

The Birth of SMASHBOX

Driven by a shared vision to revolutionize traditional banking security, we created SMASHBOX: an intelligent, interconnected, and biometrically secured system of safe deposit boxes



key point



Innovators in Security Technology

We combine advanced sensor networks, biometric authentication, and smart connectivity to revolutionize traditional safe deposit boxes.



Bridging Physical and Digital Worlds

Our solutions connect physical security infrastructure with real-time digital monitoring, empowering customers with greater control and awareness.



Focused on Personalized Safety

SMASHBOX offers a user-centric experience: each safe deposit box is individually monitored, alert-enabled, and biometrically protected.

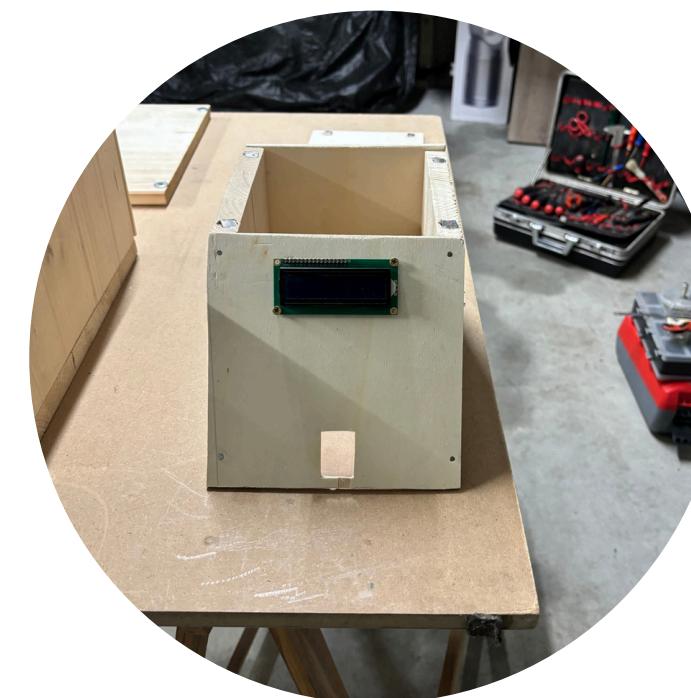


Our Product

Hardware Part

SmashBox is composed by two main physical parts:

- One central part which is used by the bank operator
- Many acquisition boxes which are assigned to the clients



central

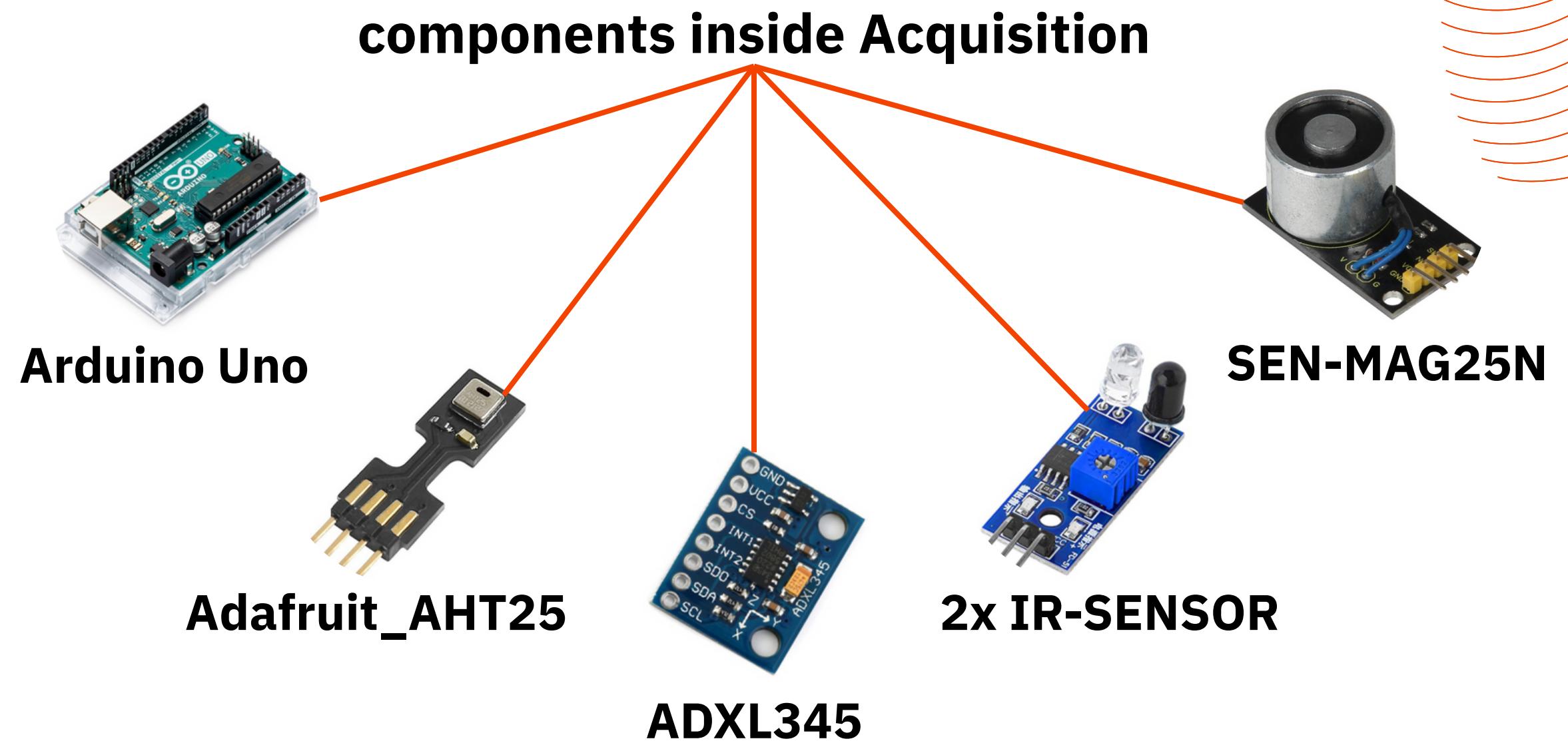
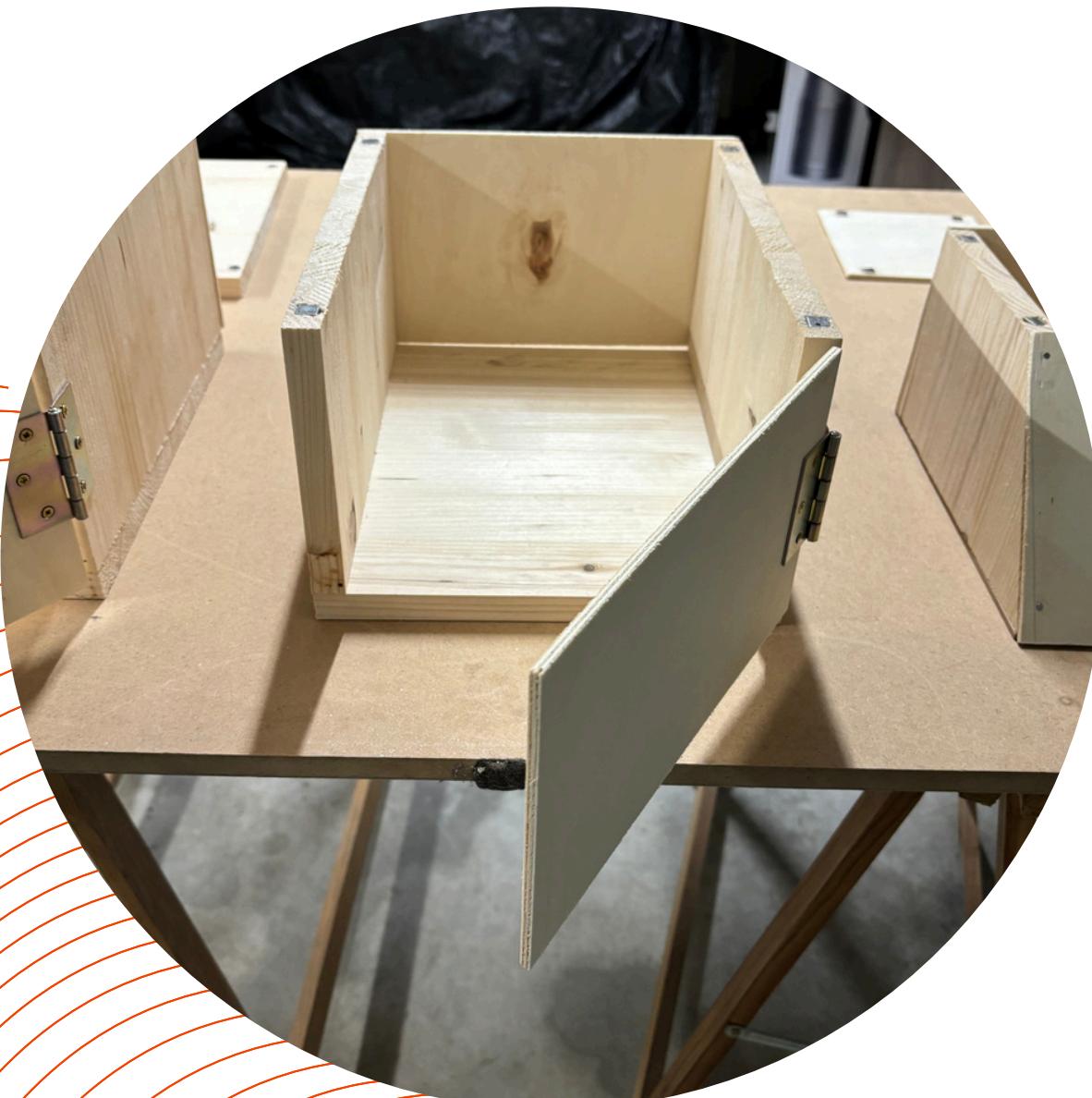


boxes



Our Product

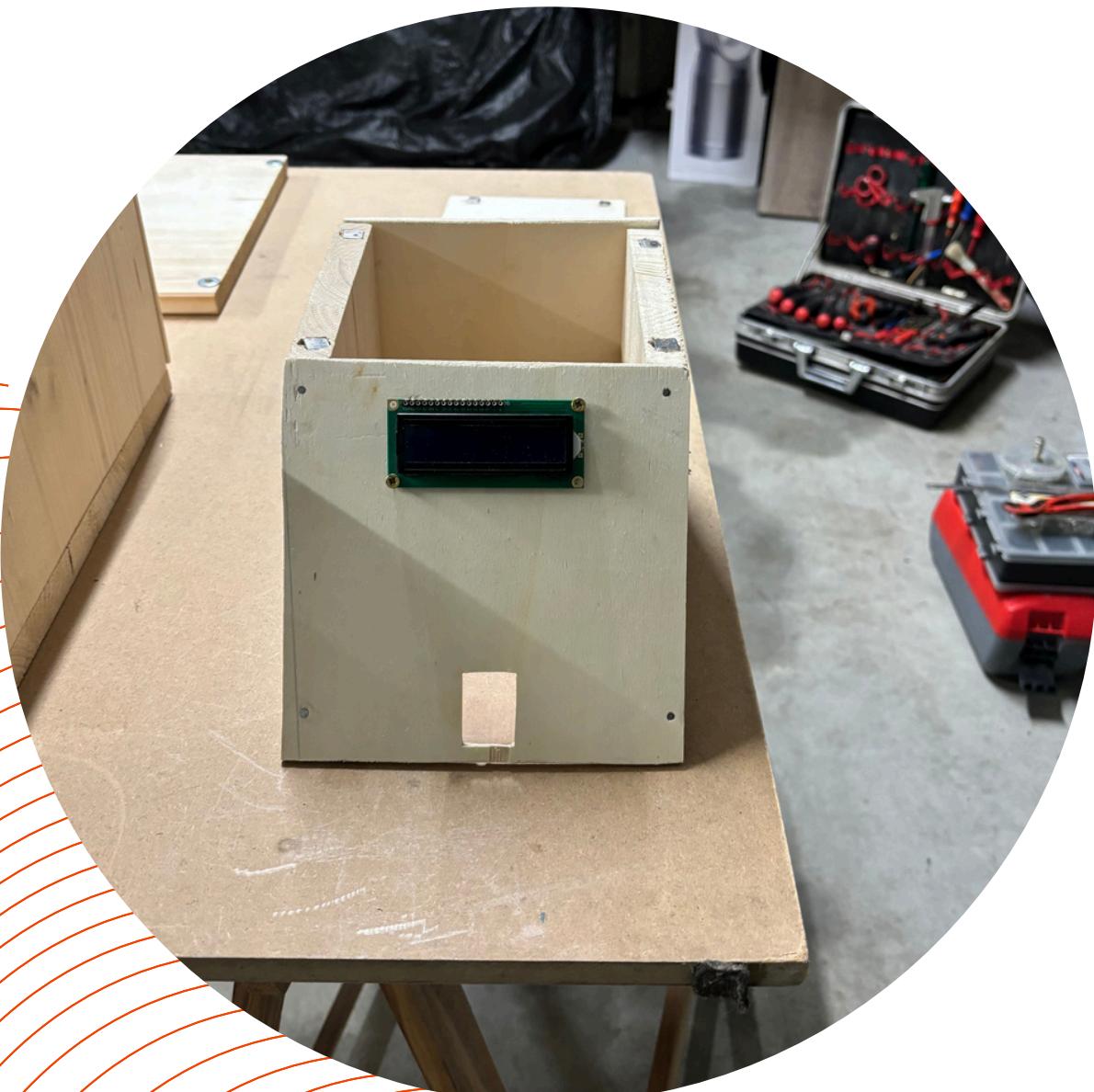
Acquisition description





Our Product

Central description



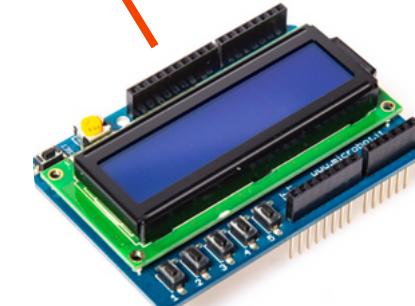
components inside Central



Arduino Uno



JM-101



Display LCD



Button

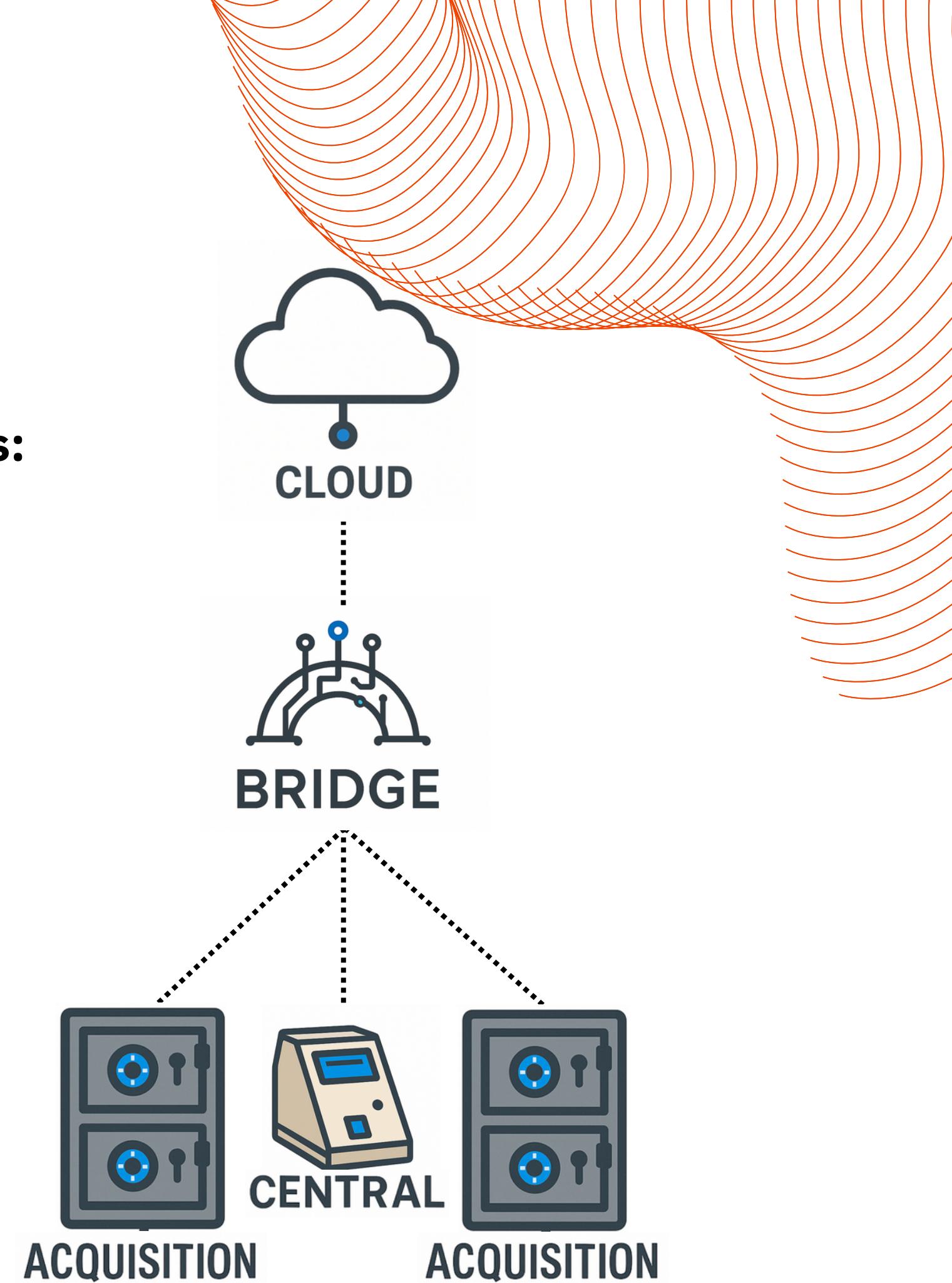


Our Product

Software Part: Bridge

The Bridge is a Python script that performs multiple functions:

2. It manages bidirectional communication between:
 - LOCAL (receives data from Arduino)
 - CLOUD (sends data to the Cloud / receives commands)
2. It uses a Parser to:
 - Unpack the data
 - Perform HTTP/MQTT updates
3. It functions as a central node between:
 - CENTRAL (control logic)
 - Multiple ACQUISITIONS (sensor boxes)
4. In case of a critical event (Safe Mode):
 - The Bridge propagates the command to all the boxes





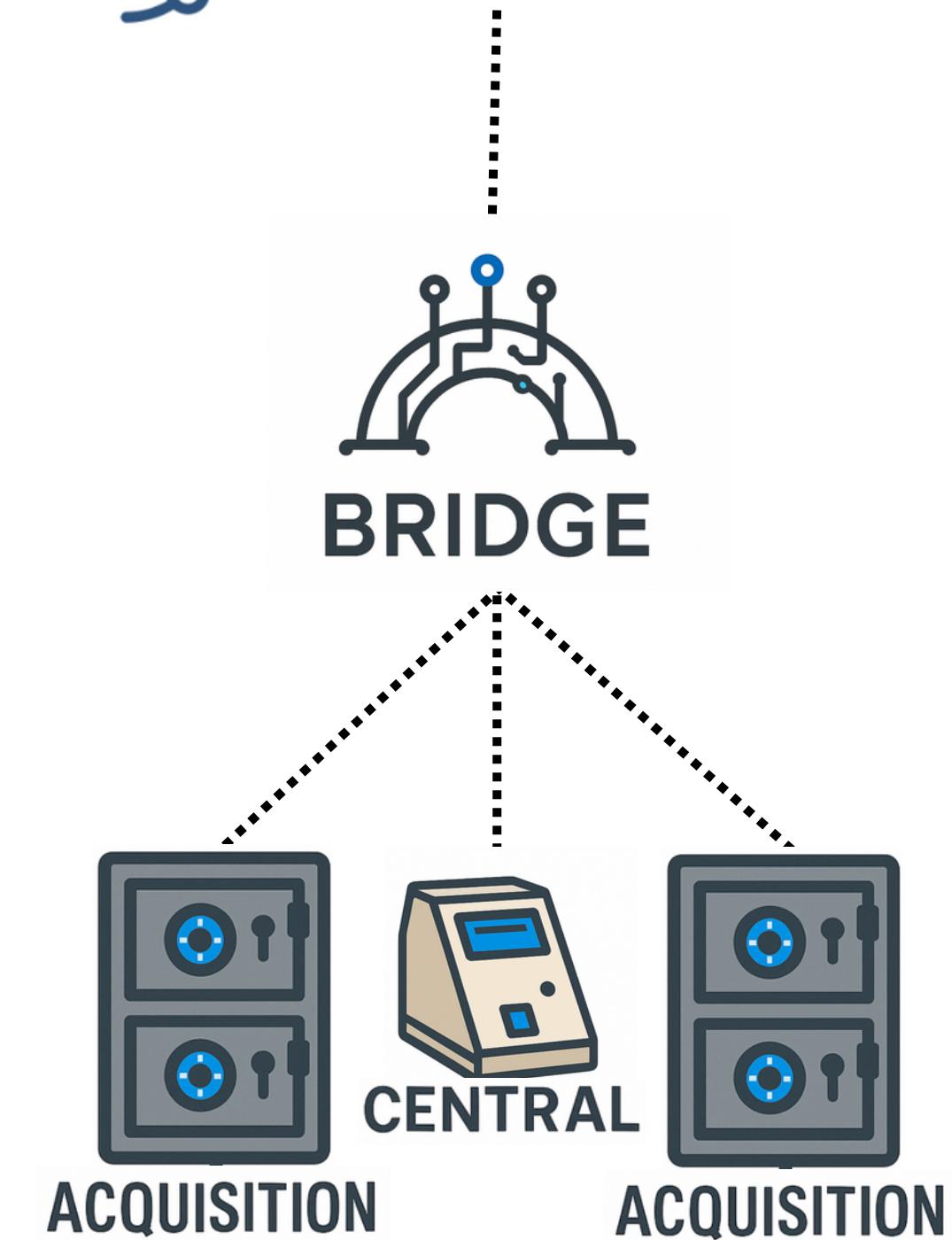
Our Product

Cloud Platform: Thingsboard

Chosen Platform for Remote Monitoring

Main Features:

- Representation of each box through a Digital Twin
- Real-time data visualization (charts, statuses)
- Automatic triggers in response to received events
- Manages the propagation of Safe Mode





Our Product

Telegram Bot

The Telegram bot acts as a secure endpoint for communication between the system and the user.

Real-time notifications:

- Opening of the personal safe deposit box
- Alerts or anomaly reports

Activity history available:

- The user can query the bot to retrieve the log list related to their box

Advantages:

- Instant communication
- Simple and direct interaction
- Increased transparency and security

