



SAPIENZA
UNIVERSITÀ DI ROMA



FROM PLASTER TALK TO...

PLASTER SAFE

LET'S START AGAIN!



Moving
artworks still
represents a
problem

Corrections after comments

Nice the personas and the needs appear credible, but focus on a single one.



We have focused on two personas:

- ***courier***: takes care of moving the statues and accompanies them throughout their transport;
- ***archivist***: manages and controls the events of remote transport.

Why gyroscopes and accelerometers. What is the purpose?



The goal is to monitor:

- the *harmful movements* of statues to avoid possible damage
- control *the temperature* to avoid thermal shock, which is a huge issue with plaster in general

THE NEW SOLUTION

The main goal of **PlasterSafe** is to control the maintenance of statues during particular complex movements

1

ARCHIVISTS



Employers responsible for maintaining the collection of artifacts to the museum and plan exchanges between various exhibitions. They need to have a general overview of the statues that are currently moved.

This measures will be useful for **Condition Report**, a document used by **every museum**.

2

COURIERS



Employers who has the duty to carry a statue from one destination to another. He should have a **real-time response** from the statue itself, to see if any strange behaviour has been detected.

A NEW USER EVALUATION

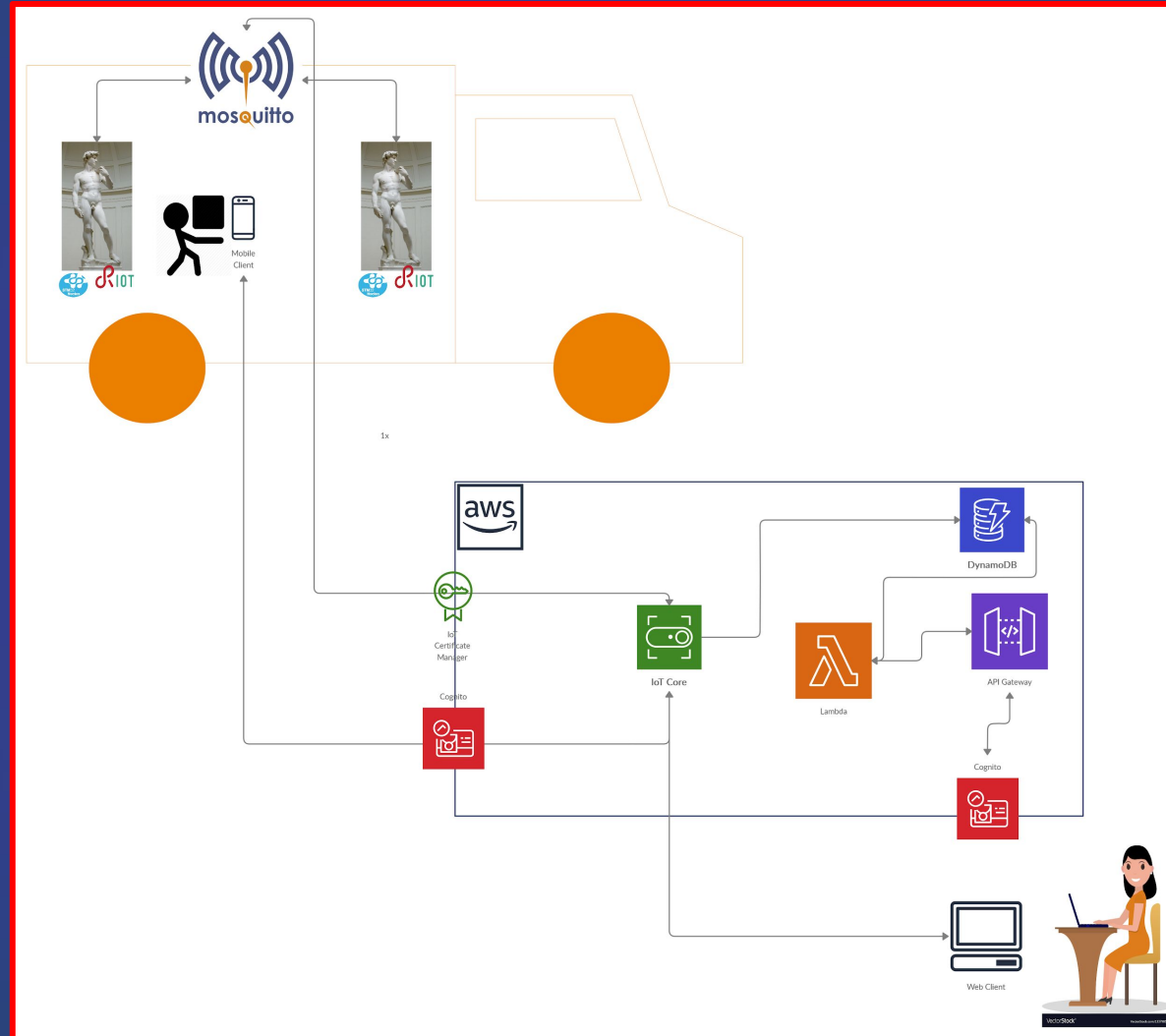
The evaluations were elaborated following a conference with [Raffaella Bucolo](#), [Claudia Carlucci](#) and [Mariateresa Curcio](#) from **Museo dell'Arte Classica - Sapienza**, who provided us with essential information to understand how the movement of the statues is managed:

- Movements occur mostly outside the museum, for exhibitions of all kinds;
- Monitoring the temperature is essential for the health of the statues;
- It is essential to warn critical situations for statues;
- The possibility of downloading the data in a *csv format* to write a *condition report*

THE NEW ARCHITECTURE

MQTT-SN
PROTOCOL
BETWEEN
PLASTERS AND
LOCAL GATEWAY

DATA STORED TO
DYNAMODB AND
RETRIEVED
THROUGH API
GATEWAY



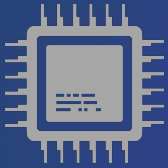
MQTT PROTOCOL
BETWEEN LOCAL
GATEWAY AND
CLOUD

TOPIC USED BY
WEB APPLICATION
THROUGH
WEBSOCKET
CONNECTION

OUR SOLUTION

BOARD

1



M3 Open Node

Accelerometer | keep track of the statue's movements ([L3G4200D](#))

Termometer | monitor the physical state of the statue ([LPS331AP](#))

DASHBOARD

2



**HTML5 + JS ES6 +
CSS BOOTSTRAP**

A web-based platform, accessible from all devices, where museum workers can monitor the measures retrieved by the board

DEVELOPMENT UP TO NOW

1

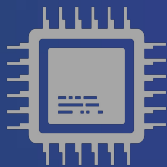
DASHBOARD



We created the web application that receives data from the cloud and allows us to view it. It currently does not allow other actions. This application will be used by the museum's workers to check the status of the statue.

2

BOARD



The data sent to the web application are emulated, we used a Python script that generates random values and sends them to the Cloud via the *MQTT protocol*.

WHAT WE HAVE DONE

Created a
workable product



See the project design on *GitHub*

Test it



Simulate the moving statue (Python Script)
Amazon Web Services (IoT Core)
Real and functioning Web Dashboard (HTML5)

Get feedbacks
from the Sapienza
Museum directors



The conference with the museum directors
confirmed the usefulness of our idea and solution

Repeat until succeed



We are experimenting with the best solution





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PLASTER SAFE

**FROM HERE TO THE THIRD
DELIVERY**

MISSING WORK FOR THE THIRD DELIVERY

1

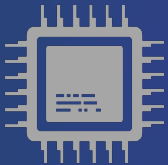
DASHBOARD



- Improve User Experience
- Warn archivists and couriers of any problems with the statue
- Access to the application based on roles
- Export plaster's data for *Condition Report*

2

BOARD



- Create the firmware for the board that reads and sends the sensor data
- Implement a logic which tells to the statue whether is moving or not

EVALUATIONS FOR THE THIRD DELIVERY

- It will be essential to address the final price for each resource used on AWS.
- Latency of the messages will be evaluated: since the information about statues movements relates to their security, timeliness is important.
- By analyzing the latency we will also be able to evaluate the overall efficiency of our system.
- For the user experience, we will show our solution to museum workers and obtain feedbacks.