

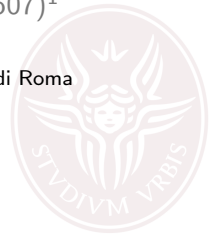
# Group Project

## Biometric Systems

Valerio Casalino (1916394)<sup>1</sup>    Mario Tobia Vendrame (1922290)<sup>1</sup>  
Shaahin Sabeti Moghaddam (1917507)<sup>1</sup>

<sup>1</sup>Cybersecurity Master @ Sapienza Università di Roma

Fall 2019



SAPIENZA  
UNIVERSITÀ DI ROMA

# Table of Contents

**General Concepts & Decisions**

Front-end Implementation

Data-set Management

Biometric Scanning Integration

Performance Assessment

Conclusions



SAPIENZA  
UNIVERSITÀ DI ROMA

# Premise

Before we start, let us say that all of our work, included this own presentation, is open sourced and available on Github:



<https://github.com/casalinovalerio/biosys-project>

There is also a script to replicate our setup for future projects.

# Overview

We wanted a face recognition based authentication application that is simple, yet particular. We deployed our test using:

- ▶ A **web interface**<sup>1</sup> that works as a demonstrative placeholder. It gets the face with the camera, makes requests to our API server, which returns only a binary value for the success of the authentication.
- ▶ An **API server**<sup>2</sup> that queries the faces database and recognizes faces using the **@ageitgey's tool**<sup>3</sup>.
- ▶ A **database based on Blockchain**<sup>4</sup> that is an open source wrapper for a blockchain database that can be queried with standard SQL syntax. Implemented on the API server too.

---

<sup>1</sup>Hosted by Github Pages: <https://pages.github.com/>

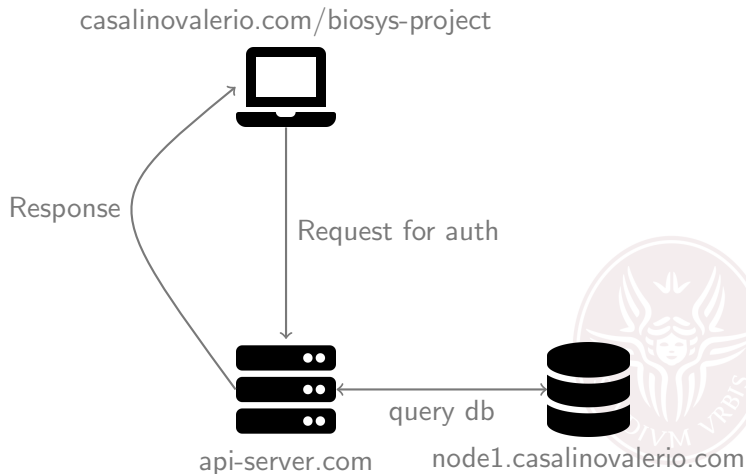
<sup>2</sup>Hosted by Digital Ocean: <https://www.digitalocean.com/>

<sup>3</sup>Github project here: [https://github.com/ageitgey/face\\_recognition](https://github.com/ageitgey/face_recognition)

<sup>4</sup>Implemented by Bigchaindb: <https://www.bigchaindb.com/>



# Overview scheme<sup>5</sup>



<sup>5</sup>Icons are licensed under CC-BY 4.0. <https://fontawesome.com/license>

# Table of Contents

General Concepts & Decisions

**Front-end Implementation**

Data-set Management

Biometric Scanning Integration

Performance Assessment

Conclusions



SAPIENZA  
UNIVERSITÀ DI ROMA

# The web Application

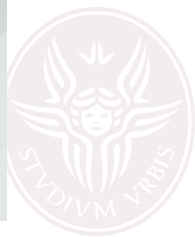
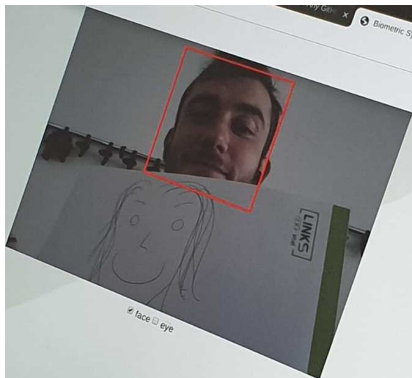
Some words on how it is done. opencv, javascript etc...



SAPIENZA  
UNIVERSITÀ DI ROMA

# Does it work?

We actually did some **serious** testing on it. As you can clearly see in the picture below, it works!





# Table of Contents

General Concepts & Decisions

Front-end Implementation

**Data-set Management**

Biometric Scanning Integration

Performance Assessment

Conclusions



SAPIENZA  
UNIVERSITÀ DI ROMA

# The Block-chain database

As database for new faces, we implemented a **Block-chain**.

We used an open-source implementation of it, called BigchainDB<sup>6</sup>.

We also used Docker<sup>7</sup> to deploy 4 containers running the application.

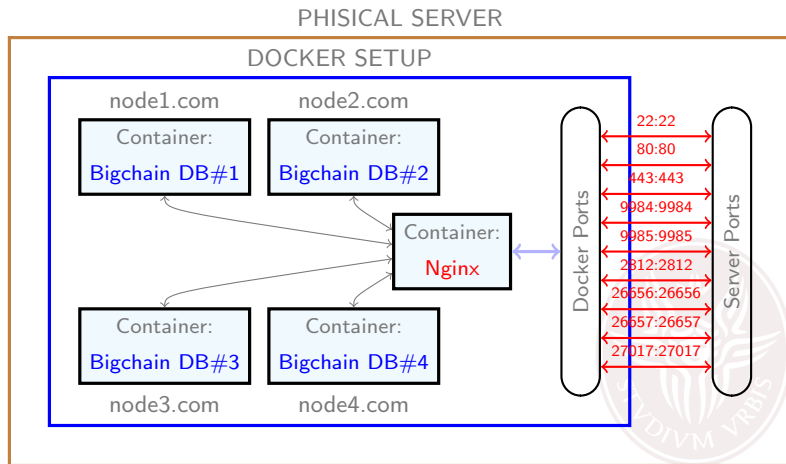


---

<sup>6</sup>Main page: <https://www.bigchaindb.com>. Documentation [here](#).

<sup>7</sup>Main page: <https://www.docker.com>.

# Architecture Implementation<sup>8</sup>



<sup>8</sup>This is absolutely not meant for a real deployment!!

# How to interact with the DB

We are assuming that we have an established connection set up.

## Query data

```
connection.searchAssets('AwesomeAsset')  
.then(assets => console.log('Found assets:', assets))  
// Read the console to look at the assets
```

## Load data (make a transaction)

```
// Create transaction first (txTransferBob)  
driver.Transaction.signTransaction(txTransferBob,  
  alice.privateKey);  
conn.postTransactionCommit(txTransferBobSigned);
```

Simple as that...

# Table of Contents

General Concepts & Decisions

Front-end Implementation

Data-set Management

**Biometric Scanning Integration**

Performance Assessment

Conclusions



SAPIENZA  
UNIVERSITÀ DI ROMA

# Table of Contents

General Concepts & Decisions

Front-end Implementation

Data-set Management

Biometric Scanning Integration

**Performance Assessment**

Conclusions



SAPIENZA  
UNIVERSITÀ DI ROMA

# Table of Contents

General Concepts & Decisions

Front-end Implementation

Data-set Management

Biometric Scanning Integration

Performance Assessment

**Conclusions**



SAPIENZA  
UNIVERSITÀ DI ROMA

# Conclusions

Greetings...

Actual deployment considerations...

Performance considerations...



SAPIENZA  
UNIVERSITÀ DI ROMA



# The Group

This is a great ending message from chilled-capibaras!



This is a real cool catchy phrase!!