# Group Project

## Biometric Systems

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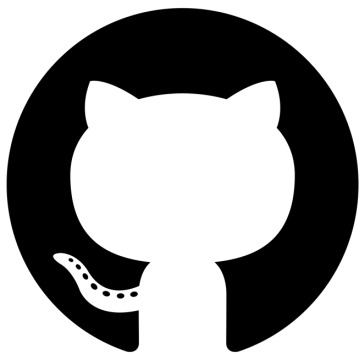
# Premise

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.

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# Overview

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

- A **web interface**[1] 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**[2] that queries the faces database and recognizes faces using the **@ageitgey's tool**[3].
- A **database based on Blockchain**[4] that is an open source wrapper for a blockchain database that can be queried with standard SQL syntax. Implemented on the API server too.

[1] Hosted by Github Pages: https://pages.github.com/
[2] Hosted by Digital Ocean: https://www.digitalocean.com/
[3] Github project here: https://github.com/ageitgey/face_recognition
[4] Implemented by Bigchaindb: https://www.bigchaindb.com/

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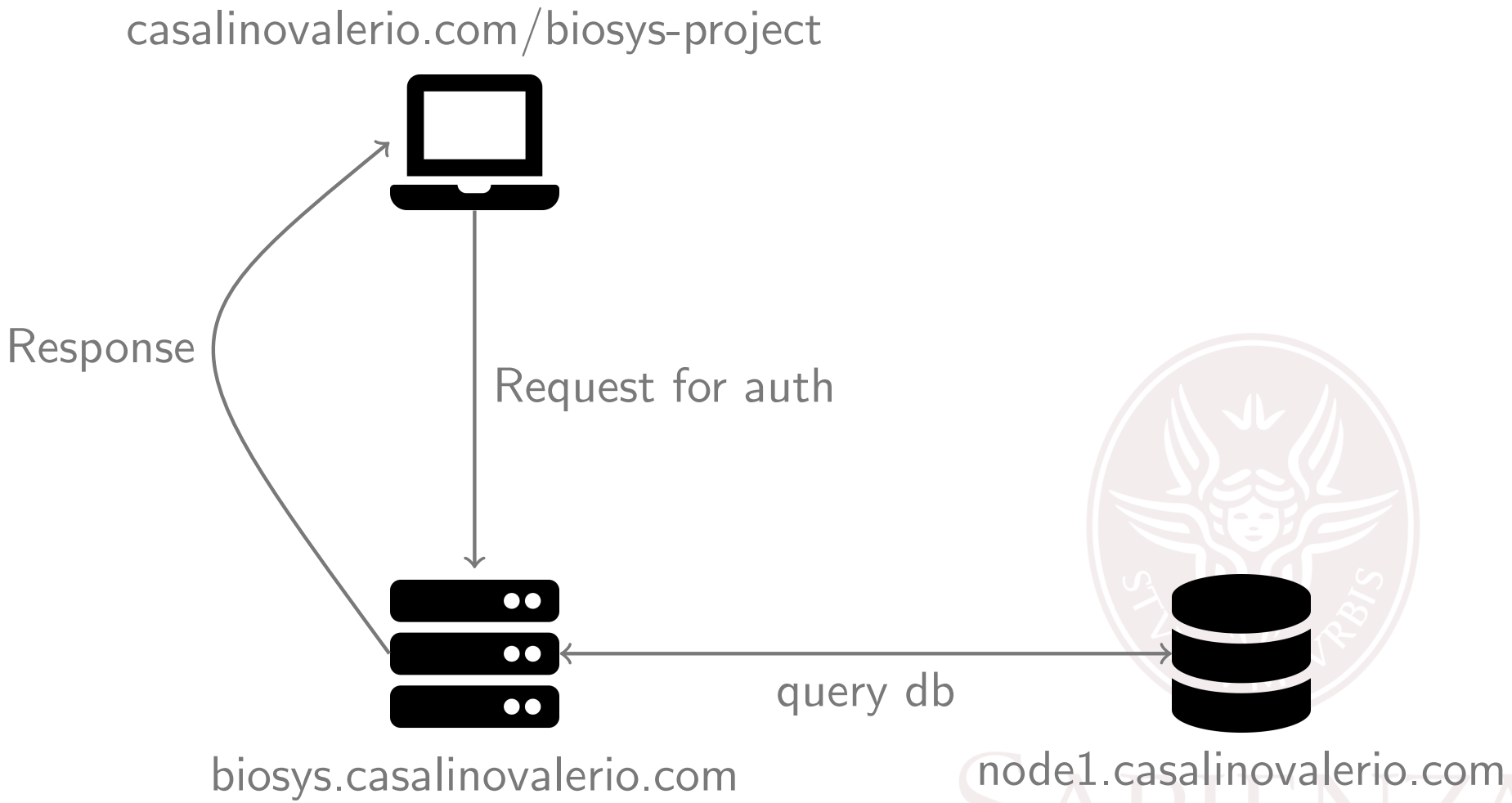
# Overview scheme[5]




[5] Icons are licensed under CC-BY 4.0. https://fontawesome.com/license

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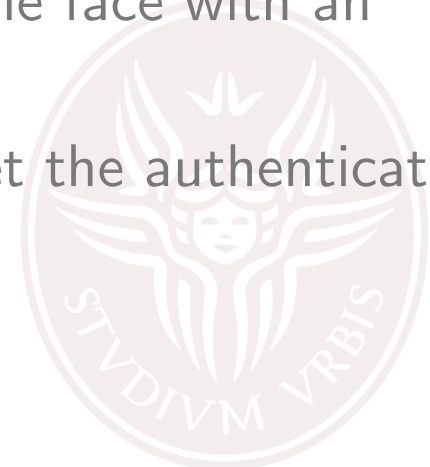
# The web Application

The web application perform the authentication as follows:

- Captures frames in a canvas.
- Analyzes them through the opencv's javascript[6].
- As the time one button is pressed, the canvas frame is sent to our server[7], which can register the face, or match the face with an already registered user.
- In the end, you can be registered, or you can get the authentication response status.




[6] https://tinyurl.com/s2yprk7

[7] https://biosys.casalinovalerio.com

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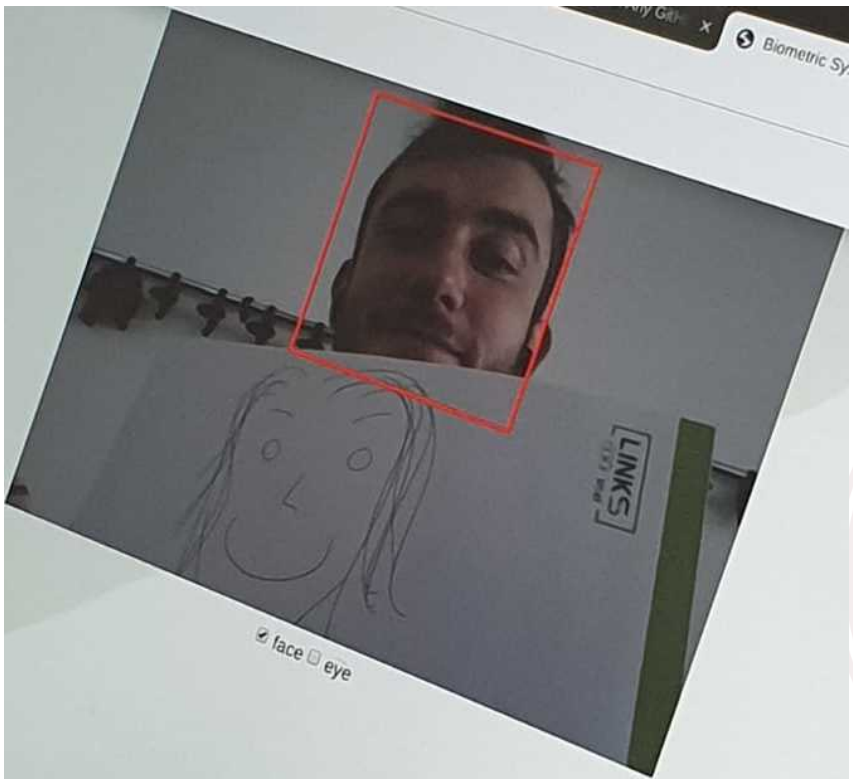
# Does it work?

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

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# The Block-chain database

As database for new faces, we implemented a **Block-chain**.
We used an open-source implementation of it, called BigchainDB[8].
We also used Docker[9] to deploy 4 containers running the application.

[8] Main page: https://www.bigchaindb.com. Documentation here.
[9] Main page: https://www.docker.com.

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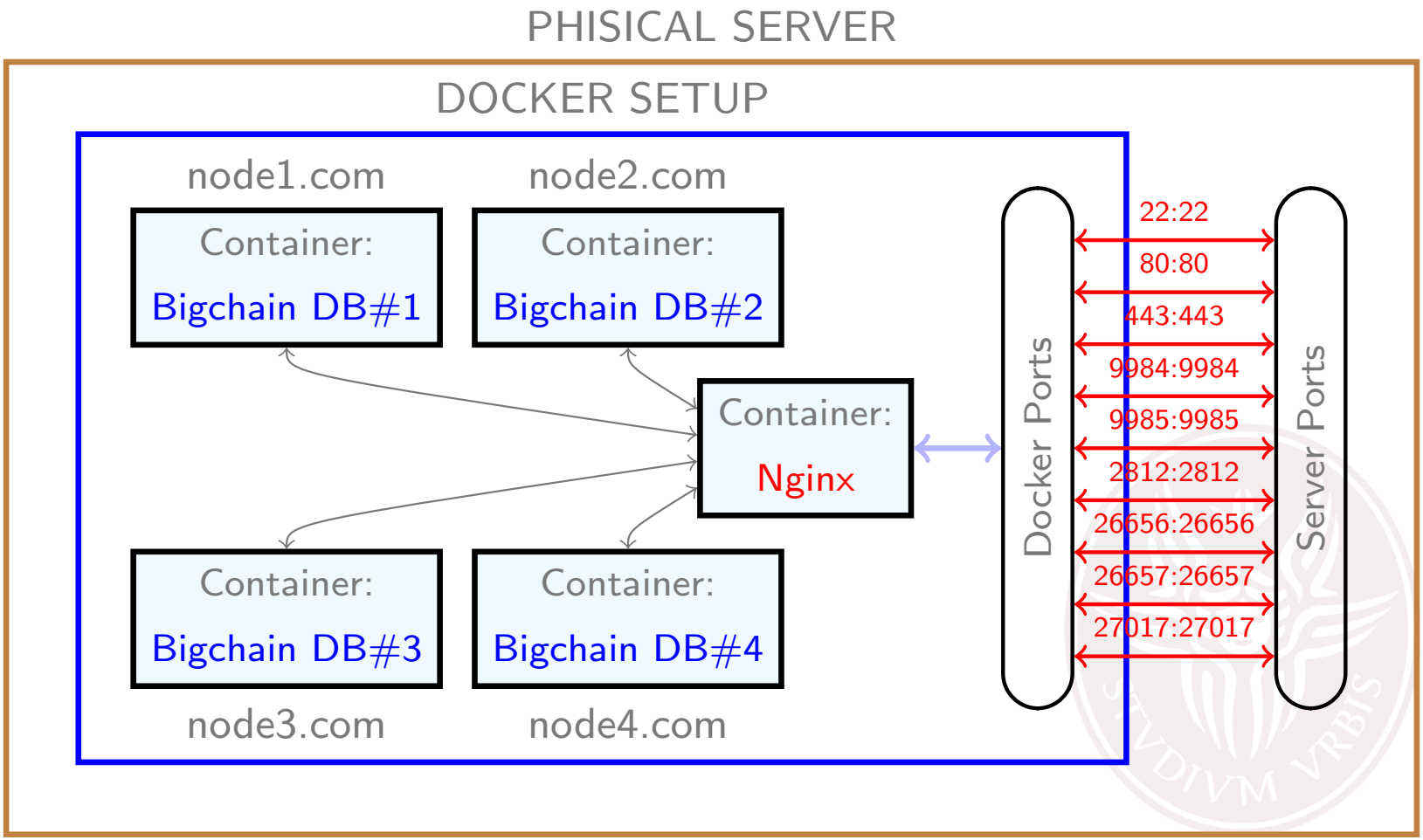
# Architecture Implementation[10]




[10] This is absolutely not meant for a real deployment!!

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# How to interact with the DB

We are assuming that we have an enstablished 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...

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# Connecting the Web app to API server

**Send faces function in web app**

```
  ...
var canvas = document.getElementById("canvasOutput");
picture.src = canvas.toDataURL();
...
xhr.open('POST', 'url/send-faces.php', true);
...
```

**Recognize face function in web app**

```
  ...
var canvas = document.getElementById("canvasOutput");
picture.src = canvas.toDataURL();
...
xhr.open('POST', 'url/reco-faces.php', true);
...
```

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# Connecting the API to the DB

This is how we did it:




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# Getting the response

This is how we did it:




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# How we tested

We tested our solution with a custom script.

**Use the script (to edit)**

```
./test.sh -d /path/to/test-faces
```

For more info on how the script works, just look at it[11], it is open source!

We let the script run on the same server for the longest time possible, until we could obtain a reasonable evaluation.

[11] Script here: `this-is.temp`

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# Testing approach




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# How it performed

Really well, it is a revolutionary project!




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# Conclusions

It wasn't an easy project, but we did our best. At the end of it all, we learned:

- How to gather information on standards and OS solutions available.
- Deploy an actual service relying on ourselves.
- How to evaluate a BS performance in an automatic way.

Performance consideration here.

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# Greetings from the group

This is a really great ending message from the "creative" chilled-capibaras!

And this is a real cool catchy phrase!!

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