

# The Smart Door

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Architecture

## 1 Decisions

### 1.1 Why do we not use the lowPy?

We decided not to use the lowPy due to its lower performance. For our project, we use a display screen, and we process the passwords on the Gateway. Because we decided to do this, we use a Raspberry Pi instead which has a lot more processing power than the lowPy. In addition, we already had a Raspberry Pi 4 with some additional components at home and therefore didn't have to buy a new one.

### 1.2 Why we not use LoraWAN?

We aren't using the LoraWAN network, because in our IoT system we already have a Gateway, which are our Raspberry Pi's. We have sensors like a microphone, display, and Bluetooth devices which are communicating with our microcontrollers, and only our microcontrollers are then connected to the Wi-Fi. For example, using the Google API for speech recognition. Thus, we don't have any need to use LoraWAN.

### 1.3 Why do we use two Raspberry Pi's?

We decided to use two separate Raspberry Pi's for our project. One for the microphone integration and Bluetooth device detection, and one for the display which is already attached to a Raspberry Pi.

### 1.4 Why do we not host the database locally on the Raspberry Pi?

We decided to host the database on an external server because now both Raspberry Pi's need to have access to the database. The initial idea was to host the database on a local docker image on the Raspberry Pi. But since we now have two Raspberry Pi's we need to exclude the database to have the possibility to access it from both Raspberry Pi's. We could have decided to still follow the old approach, but this would complicate the communication with the database.

## 2 Software architecture

### 2.1 Raspberry Pi 3 UI

- Register an account (I.E. Pairing device)
  - Select Bluetooth device
  - Enter Username
  - Enter account Password
  - Optional: (email confirmation)
  - Enter door commands: (open, close, lock, unlock)
- Change settings
  - Have your Bluetooth device nearby (security feature)
  - Login with Username and Password
  - Change settings in UI and save
- Delete account
  - Have your Bluetooth device nearby (security feature)
  - Login with Username and Password
  - Press delete account
  - Confirm deletion
- Activate/Deactivate account
  - Have your Bluetooth device nearby (security feature)
  - Login with Username and Password
  - Press activate / deactivate account
- List of registered users
  - Username
  - Activated
  - Deactivated

### 2.2 Database schema

- user
  - userId
  - username
  - password (hashed)
  - isActivated
  - Bluetooth device (BD\_ADDR)
- user\_commands
  - userId
  - open
  - close
  - lock
  - unlock
- user\_interaction\_log
  - userId
  - command
  - timestamp

### 3 Hardware architecture

