Development of an IoT Device With MQTT Cloud Communications

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CMP408

Introduction

The developer aimed throughout this project to create a project that would allow for cloud and IoT components to communicate efficiently whilst also maintaining a secure channel to ensure security throughout the entire process.

The project aims to communicate JSON data across the MQTT protocol to be uploaded to the cloud upon the press of a button directly connected to the Raspberry Pi used throughout this project.

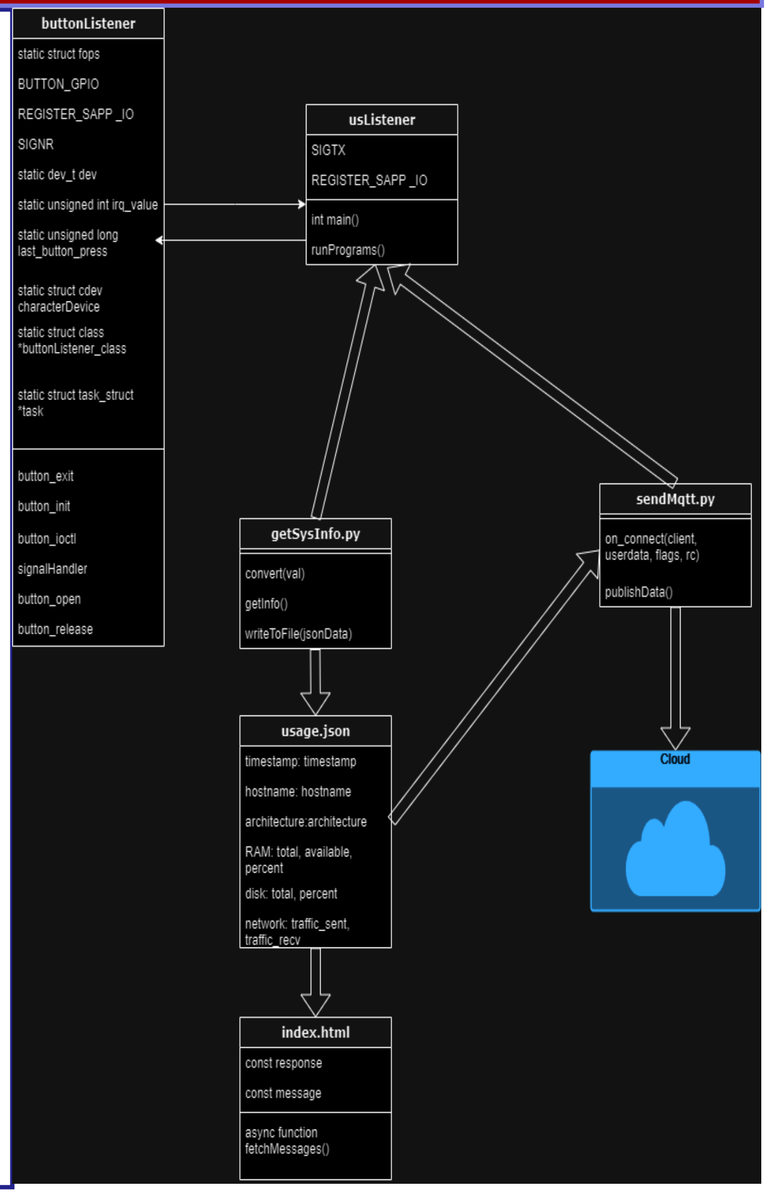
To allow to the developer to measure their success when evaluating this project, the project has been split into three main aims:

- Create scripts to store system information and upload it to the cloud
- Create system architecture to allow for a physical component to be altered because of the projects intended functionality, or responsible for the running of the project's functionality
- Develop a user space application that acts as the middleman between the system architecture and scripts.

Methodology

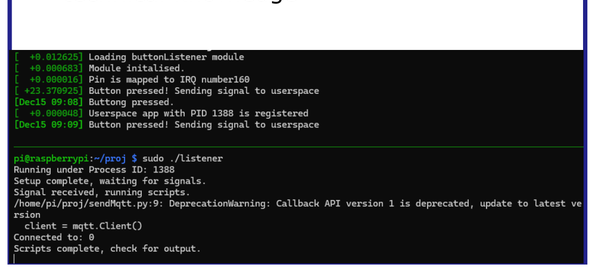
Whilst the developer has not followed a specific methodology throughout this project, they feel that it is worth mentioning the general structure of this project and therefore the necessary steps to ensure that each section is able to work in the most efficient way possible.

- buttonListener is always waiting for a button press to initialise usListener.
- usListener is triggered when the individual involved in the project presses the button, triggering a signal from the LKM that is passed to the application which then controls the additional scripts in the project, sendMqtt.py and getSysInfo.py.
- getSysInfo.py is responsible for collecting all of the information that is sent to the cloud and presented on the website.
- sendMqtt.py is responsible for sending the data collected by getSysInfo.py to the cloud



Project Highlights

- Scripts that automatically collect and upload system information to the cloud
- Website automatically updates upon new data being submitted
- Secure cloud procedures followed to ensure secure transfer of data
- Entire process automated and made easy for accessibility from users with ranging technical knowledge



Future Work

- Look into adding more hardware components
- Adding more functionality to the website, such as the ability to trigger scripts from button press on website

References

Hewlett Packard Enterprise, 2024. *IoT Cloud Computing.* [Online] Available at: https://www.hpe.com/in/en/what-is/iot-cloud-computing.html
[Accessed 15 December 2024].