Remote Controlled Modularised System

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Project Description:

In 2015/16 I studied a Post-Graduate Diploma in Business and Management at Queen's University of Belfast. As a final project I designed a business project in which I had to determine a possible way of building a home automation start up business. The report was focussed more on the business point of view rather than the technical aspect. The idea of business was to develop a home automation system. The system would be divided on a local network and a remote accessibility. The local network would be composed by a main hub which would be connected to other modules around the house using power line communications or wireless communication. These modules would be sensors and actuators that should be able to be added or removed from the system easily. The local system would have internet access to allow remote accessibility and monitoring form smart devices such as phone, tables or laptops. The full report can be found in the git repository: https://github.com/AlvaroSanchezDomingo/Computer-Systems-IoT-Project/blob/master/Documents/Business%20project.pdf

This time I want to focus on the technical aspect of this idea of business. I want to be able to prototype this idea of home modularised home automation system with my current available resources. My proposal for this project would be to create a main hub controller that would handle the communication between the local modules and the remote platform. I would like to create at least three modules connected with the main hub via Wifi. One of those modules would be a digital sensor, another one would be an analogue sensor and another one would be a digital output. A remote platform would manage the data from the local hub and also would allow monitoring and controlling the local system from anywhere in the world using a smart device or an internet browser.

Tools, Technologies and Equipment:

Local Modules:
Module 1: ESP8266 Ex ESP-01 program in Arduino IDE.

Module 2: ESP8266 Feather Huzzah from adafruit program in Arduino IDE.

Module 3: Raspberry Pi program in python.

Local modules would be connected with the local hub via wifi through a router. They would use TCP/IP Sockets for communication with the main hub.

Main local Hub:

Hub: Raspberry Pi program in python.

Main local hub will be connected with the local modules via wifi through a router It would use TCP/IP Sockets for communication with the modules. On the other side, the main local hub will be connected to the internet through the router to allow communications to a MQTT broker. The hub would work as a translator between the modules and the MQTT broker.

Remote MQTT Broker:

Remote MQTT Broker: I would use the cloud platform called Beebotte. It is a cloud platform that connects anything in real-time using a rich API supporting REST, WebSockets and MQTT.

This platform would work as a MQTT broker for the local hub, for a phone MQTT Client dashboard and potentially for other MQTT Clients. The platform would have API to give access to the data from other applications. I want to create a web app that uses this API for controlling and monitoring the local system.

Phone MQTT Client:

Phone MQTT Client: MQTT Dash application. It works as a pub-sub MQTT client for monitoring and controlling data from the MQTT broker.

Web App:

Web App: Develop and deployed in glitch for prototyping. Program in HTML, CSS and JavaScript. It would use beebotte API to access the beebotte resources.

Repository:
https://github.com/AlvaroSanchezDomingo/Computer-Systems-IoT-Project