**Ultrasonic sensor Integration Overview**

The HC-SR04 ultrasonic sensor has been integrated into our cloud computing framework, initially using simulated sensors from MyDevices.com, simulated devices, but thinking in use the physical sensors powered by ESP8266 microcontrollers. This simulation-based approach facilitates the testing and development without using on hardware, streamlining with real sensors. The HC-SR04 was chosen for its accuracy in measuring distances, making it ideal for applications like object detection and proximity sensing. In this setup, the simulated sensor data is transmitted using MQTT, a lightweight protocol that enables seamless communication between IoT devices and the Node-RED-based cloud platform. To finally give as an output a noise signal or an alarm, otherwise it will shut off the alarm.

**A graph with a couple of rectangular objects

AI-generated content may be incorrect.**

**Data Processing and Visualization**

As the system transitions from a simulated environment to real-world deployment with ESP8266, it will continue to ensure reliable data transmission via MQTT to Node-RED. The ESP8266 will handle sensor readings, convert the data into a readible format, and publish it to designated MQTT topics. Node-RED, running on FlowFuse, will subscribe to these topics, process the incoming data, and update the dashboard dynamically to reflect real time conditions, in this case, the distance parameter.