Project Design Phase-I

Solution Architecture

Date	**06 May 2023**
Team ID	**NM2023TMID01199**
Project Name	**Smart billing system for water suppliers**

Solution Architecture:

Solution architecture is a complex process – with many sub-processes – that bridges

the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

The Solution architecture of our project “SMART BILLING SYSTEM FOR WATER SUPPLIERS” are shown in below graph.

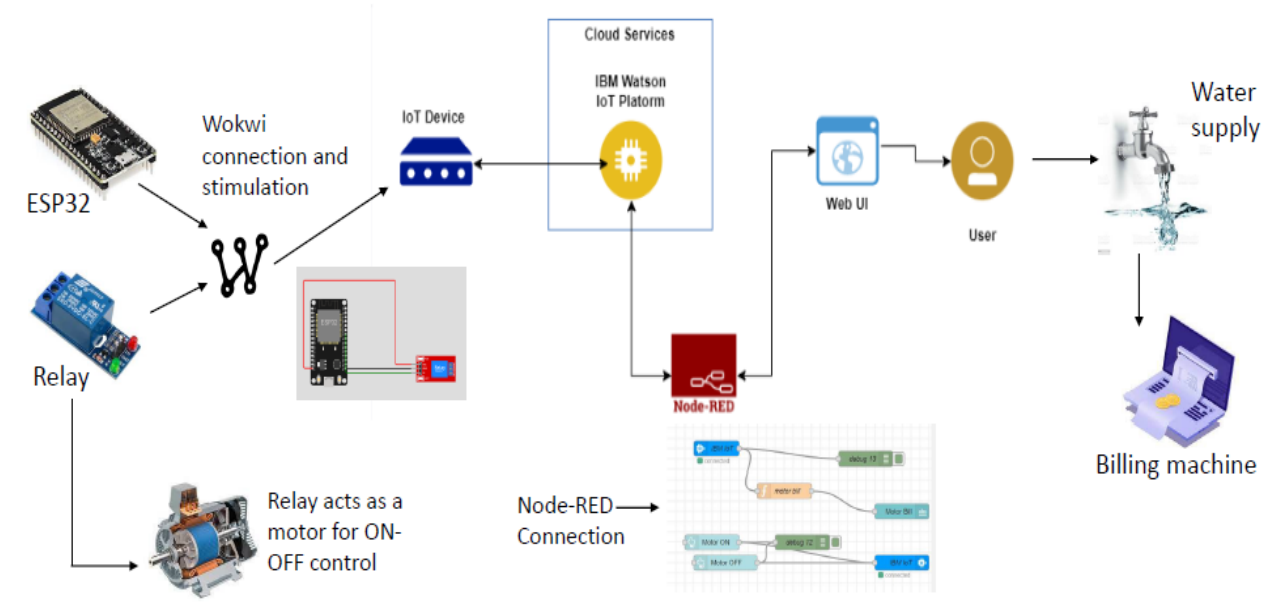


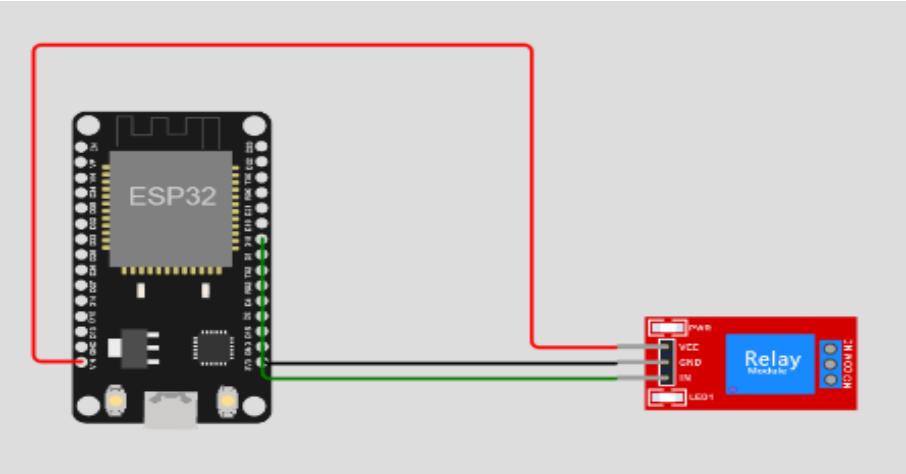
Figure 1: Architecture and data flow of the Smart billing system for water suppliers.

Flow of a Project:

The data flow of my project is discussed with step by step process as below.

Step-1: (Wokwi Connections)

Using wokwi software, the ESP32 (Microcontroller) and Relay is connected as shown in fig below.



Here, the relay is acts as a MOTOR such that when the relay (motor) is ON and OFF. After the Connections are made, the coding part is begin as per the project requirements.

Step-2: (IOT Device)

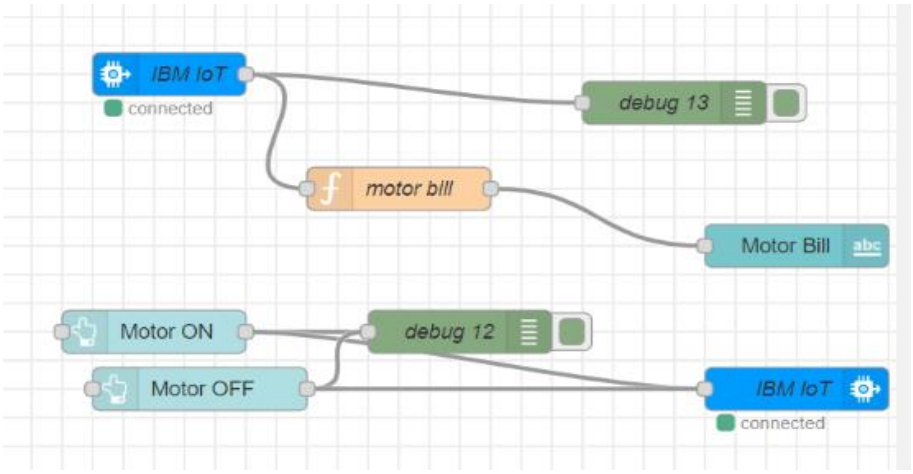
The above mentioned connections are made with physical components is referred as an "IOT Device"

Step-3: (IBM Watson platform)

The IBM Watson IOT Platform is a fully managed, cloud-hosted service that makes it simple to derive value from Internet of Things (IOT) devices. It provides capabilities such as device registration, connectivity, control, rapid visualization and storage of IOT data. So here, our Wokwi Connections is fed to the Cloud services via IBM watson IOT Platform for further steps.

Step-4: (Node-RED)

Node-RED is a programming tool for wiring together hardware devices, APIs and online services in new and interesting ways. It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palatte that can be deployed to its runtime in a single-click. So, after the IBM Platform coordination, We Connect this source file to Node-RED and make a connections like as shown below.



Step-5: (Web UI)

A web-User interface or web app allows the user to interact with content or software running on a remote server through a web browser. The content or web page is downloaded from the Web server and the user can interact with this content in a web browser, which acts as a client.

Step-6: (User)

Finally the web application is ready in previous step. So that the user can easily access it for billing their respective water payment process. In our Project, We designed this web application with considering two cases namely

- When motor=OFF, No payment is generated.
- When motor=ON, it noted how many hours it is On and calculate the bill immediately with respect to time.

Features:

There are many vital features that our solution model had. Such as

- To reduce many malpractices are done while paying the bill
- Inorder to Compromise Unrecognized charges on payment
- Statement errors, calculated errors on the bill is reduced
- Missing or misapplied payments or other credits is recovered
- Reducing man-power
- Consumption of time and effort is low
- Establishing good relationship between water supplier and customer.
- Reduce Financial loss of supplier due to manual errors

These are the Flow of our respective Project “SMART BILLING SYSTEM FOR WATER SUPPLIERS” and its Solution Architecture.