

Substation Logging System

CS421-22 Mini Project Report

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Problem Statement

The project was adopted taking into account the human resources which goes into manual data logging at various electric substations of IIT Patna.

Objectives of the project include:

- Automated logging of data available from EM-6400 meters installed in IIT Patna substation.
- Create user interface for better visualization of electric consumption data.
- Making data easily available for monitoring as well as analysis purposes.

Components Used

Logging system has been designed and optimized taking into consideration various hardware as well as software components as listed below:

- Hardware components:
 - CH340G chip (USB to RS485 converter)
 - RaspberryPi - Raspberry Pi is a single board computer which mimics the functionality of a computer system at a mini-level. Pi 3 has been used in this project for reception of data streams from CH340G chip and uploading in the remote server (REST API calls) using C++ programming.
 - Wifi router
- Software components:
 - Libmodbus - Libmodbus is a library to send/receive data with a device which respects the Modbus protocol.
 - CPP
 - Django -Django is a high-level Python Web framework for server development.
 - MySQL - Relational Database System
 - Web Technologies like HTML, CSS and JS

Architecture

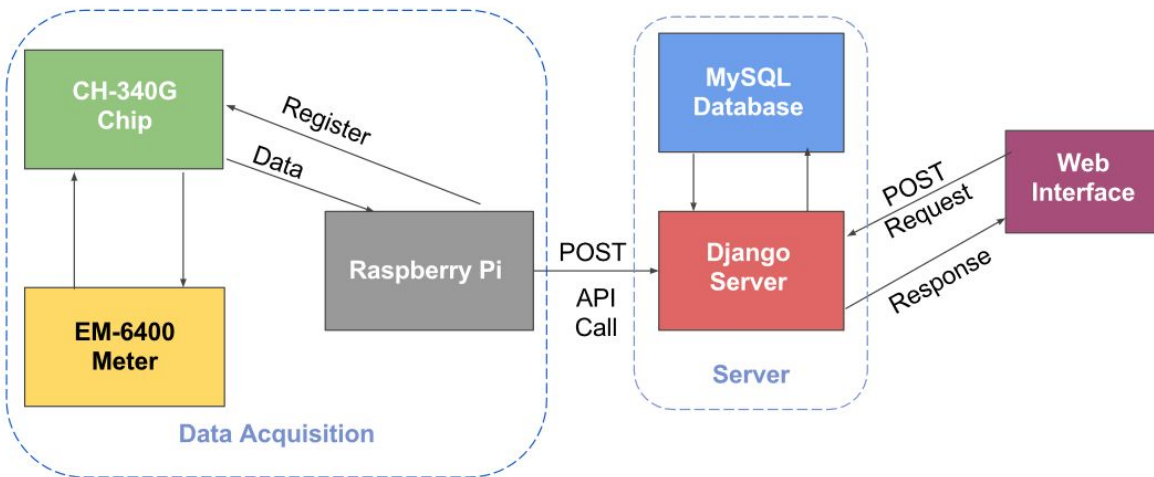


Fig 1. Architecture

Conclusion

Substation Data Logging System (SDLS) has been deployed successfully and tested in one of the substations in our campus. It streams in data every minute into the server which are dynamically shown in admin console of SDLS web interface.

This system would, inarguably, help in faster and accurate modelling of power consumption in the college, thus providing a helping hand to the upcoming research works in the field of smart grids.

Future Works

The project can be extended to :

- Encompass data analytics to server.
 - Machine learning models to predict power surges.
 - Time series modelling of power consumptions.
 - Automated regulatory systems for the grids.
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