Boston University
Electrical & Computer Engineering
EC463 Capstone Senior Design Project

Second Prototype Testing Plan

by

Team #18
Team Greener Living
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Required Material

Hardware:

- DHT22 Temperature and Humidity Sensor
    - Measures temperature and humidity in real time.
- Etekcity Energy Monitoring Plug
    - Measures the connected device's power usage in real time

Software:

- Python 2 scripts
    - First collects temperature and humidity data, and stores them in an influx database in the raspberry pi. The second does the same but with the energy monitoring plug.
- Raspberry Pi Zero W
    - Show that a local instance of InfluxDB is working and is able to receive data between energy monitor and itself
    - Show that a local instance of grafana is also working and able to connect to the database
        - Display data onto dashboard
        - Customize time-scale
- Web Application
    - Implement Grafana dashboards
    - HTML and CSS website implementation

Setup

The set up consists of two parts: the hardware, specifically the raspberry pi zero w, the DHT22 sensor and the ESW15 plug, and the software, the scripts that will record the collected data in influxdb, and the display using grafana. The DHT22 sensor is directly connected to the Raspberry Pi, while the plug will be connected to a mobile or laptop charger at a power outlet. Due to the restrictions of BU's 802.1x WiFi, the raspberry pi and plug are connected to a mobile hotspot. The raspberry pi will run 2 scripts: the first will collect the data from the DHT22 sensor and store it into an influx database, and the second does the same with the plug but in a different database. Those two databases are connected to a local instance of grafana which will graph the data in a dashboard with a custom timescale.

Pre-testing Setup Procedure:

1. Enable the local instance of influxDB on Raspberry Pi
    a. Influxdb in one window (which shows the logging) on port 8086
    b. Influx in second window to show access to influxCLI for database
2. Enable the local instance of Grafana on Raspberry Pi
    a. The login tab will be in port 3000 as default, or change port to 8080 or similar to avoid extra Windows permissions
    b. The url will be http://raspberrypiip:3000
3. Open the local instance of the Greener Living website

Testing Procedure:

1. Show that the measurement is going into InfluxDB on the Raspberry Pi
    a. Run a quick query on the database to show data is truly going through
2. Access Grafana's interface which the user/password would be admin
    a. Show the integration of the local database and Grafana (data sources tab)
    b. Show the creation of a panel (graph within the dashboard)
3. Show that the energy, temperature and humidity are being collected is updating in real time
    a. Show customization of the panels and all the options it allows
    b. The tagset location
    c. Axis and graph manipulations
    d. Time range manipulations (something the customer requested)
    e. The user can take a link,snapshot, or embed a iFrame onto their own website (in this case our own website)
4. Show website designs

Measurable Criteria

- Grafana is able to integrate with InfluxDB
- Grafana is able to create dashboard or panels that satisfies customer's needs

- The energy monitoring plug is working as intended and displaying energy in real time.
- The energy monitoring plug can connect to the Raspberry Pi, and store the data in an influx database.
- The temperature and humidity sensor is working as intended, storing the data in an influx database in real time, and displaying the data in real-time.
- Website is set up and needs graph input and general design edits