

# Energy Management System

THE WEB APPLICATION

## Overview

- ▶ Display energy usage statistics
- ▶ Naming/Grouping of outlet modules
- ▶ Scheduling (on/off) of outlet modules
- ▶ Server stuff
- ▶ Database stuff
- ▶ Focus on usability and look

# Marketing Requirements

1. The system shall allow for control of individual outlets.
2. The system shall provide intuitive visual representations of usage data.
3. The system shall have low cost in comparison to competitive products.
4. The system shall be easy to install by a professional.
5. The system shall have an easy to use interface.
6. The system shall be of reasonable size in comparison to existing systems.
7. The system shall consume minimal power.

# Embedded Platform

- ▶ Price
- ▶ Amount of memory (RAM)
- ▶ Power consumption
- ▶ Ease of use (subjective)

## Raspberry Pi 2

Product	Raspberry Pi 2 Model B+	BeagleBone Black Rev. C
Price	\$35	\$55
Size	3.370" x 2.224"	3.4" x 2.15"
Processor	Broadcom BCM2836	AM3358BZCZ100
Cores	4	1
Clock Speed	900 MHz	1 GHz
RAM	1 GB	512 MB
Onboard Flash	None	4 GB
External Storage	microSD	microSD
Operating Voltage	5V	5V
Power	230 - 800 mA	210 - 460 mA
Digital GPIO	40	65
Analog Inputs	None	7
I2C	Yes	Yes
SPI	Yes	Yes
Ethernet	10/100 RJ45	10/100 RJ45
USB	4	1
Video Out	HDMI	micro HDMI

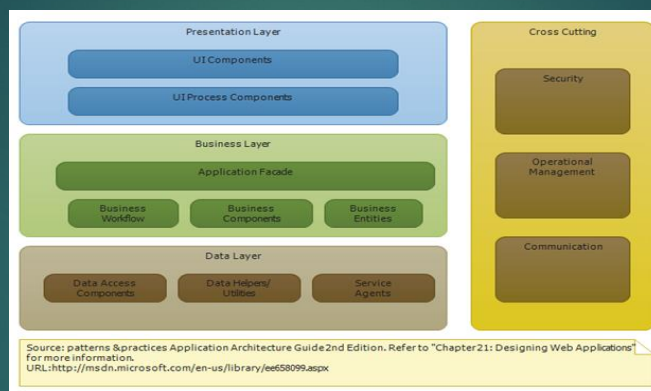
# Server/Framework

- ▶ Overhead (Memory Usage)
- ▶ Language
- ▶ Ease of Setup (subjective)

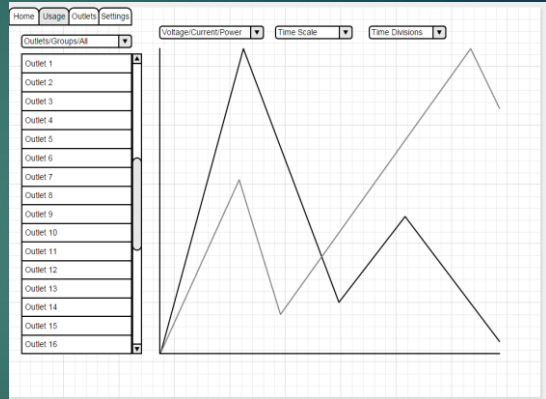
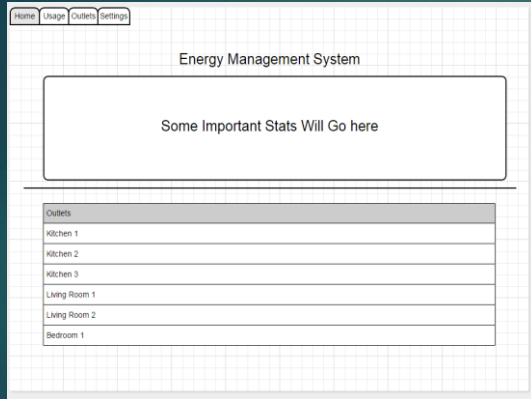
Setup	Apache Tomcat	Django on Apache	HTML/JavaScript on Apache
Idle Memory Consumption	~150 MB	20-30 MB	?
Language	Java	Python	HTML/JavaScript/PHP/Python
Ease of setup (5 = easiest)	3	2	5

## Django?

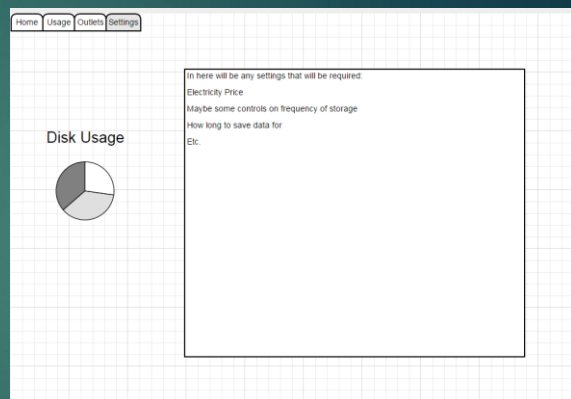
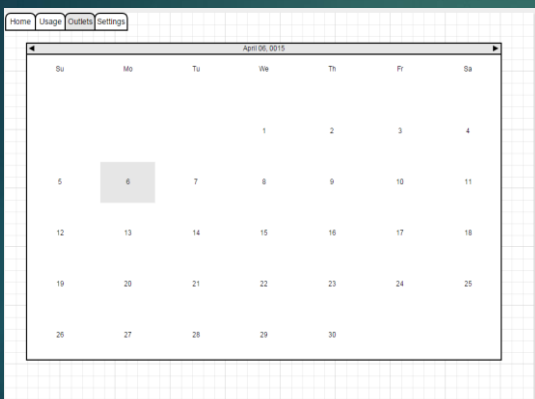
# Design



# UI Mockup

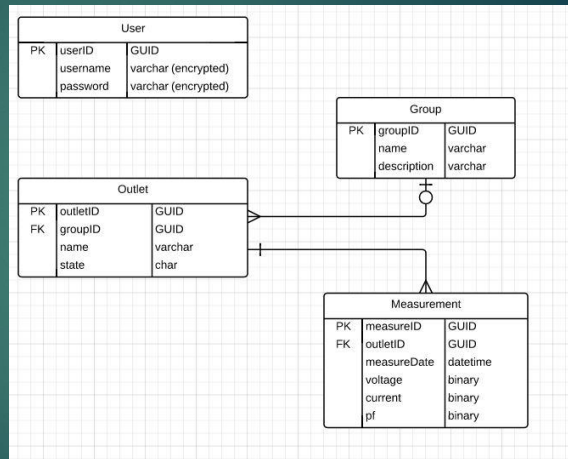


# UI Mockup cont.



# Database

- ▶ Application Users
- ▶ Outlet Modules
- ▶ Groups
- ▶ Measurements
- ▶ Other Things
  - ▶ Settings
  - ▶ UI State
  - ▶ Etc...



# Testing

- ▶ Use software testing strategy that we all know and love...
- ▶ Focus on functionality and usability
- ▶ External Usability Tests
- ▶ Components
  - ▶ Security/Login
  - ▶ Naming and Grouping
  - ▶ Charts
  - ▶ Scheduling
  - ▶ Database Things
  - ▶ Hardware Interface

# Uncertainties

- ▶ Raspberry Pi Performance
  - ▶ Memory Usage
  - ▶ Processing Power
- ▶ Django
  - ▶ Unfamiliar
  - ▶ Enough Functionality?
  - ▶ Setup Time
- ▶ Time...

Questions??