Design of PowerCost Application

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1. Introduction

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1.1. Background

I purchased an EMU-2 home energy display from Puget Sound Energy (PSE). The EMU-2 unit is manufactured by Rainforest Automation. PSE intended customers to use the EMU-2 to ascertain how much electricity each appliance uses in an effort to reduce electricity usage. A customer would put batteries in the unit, walk around and turn on and off various appliances to see the usage. My intent from the start was to track the kWh electricity usage over time. I can see what hours of the day have the most usage and I can track the daily usage as I progress through the monthly billing cycle.

I searched for a way to script the collection of data. I found the emu_power Python library that automated the interface between Python and the EMU-2 serial device. The same Python script can run on Linux and Windows computers with the only difference being the device name. Windows 11 has a USB-Serial emulation port.

emu_power is based on the XML spec for the Rainforest RAVEN API. The spec is similar to the API that the EMU-2 device uses.

emu-power 1.51: https://pypi.org/project/emu-power/

2. Design

2.1. Database

MySQL

DB setup.sql

```
create database pse;

CREATE TABLE pse.usage_e` (
  `ID` INT NOT NULL AUTO_INCREMENT,
  `UDate` DATE NOT NULL,
  `UTime` TIME NOT NULL,
  `kWh` DECIMAL(7,3) NULL DEFAULT 0.0,
  PRIMARY KEY (`ID`),
  UNIQUE INDEX `I_USAGE_E_UNIQUE` (`ID` ASC) VISIBLE)
COMMENT = 'Puget Sound Energy Electricity Usage for The
Ponderosa';
```

DB setup.sql

```
select
   UDate as Date

,ELT(dayofweek(UDate),'Sunday','Monday','Tuesday','Wednesday'
,'Thursday','Friday','Saturday') as DoW
   ,round(sum(kWh)/count(kWh),3) as kWh_Hr_avg
   ,count(kWh) as hours
   ,sum(kWh) as kWh_day_total
   ,round(((sum(kWh)/count(kWh))*24*0.105),2) as
kWh_day_total_cost
   pse.usage_e
where
   UDate >='2022-11-05' and
   UDate <='2022-12-04'
group by
   UDate
order by
   UDate
;
```

xxxxC:\

2.2. xxx

x

2.3. ~~xxx~~

xxx

```
# Stuff
```

```
zzzz
```