

Home Automation Infrastructure

Network

You must have a good network to have a stable home automation platform. I was lucky that my home was wired with CAT5e, but I had to change out all of the phone jacks with CAT5e jacks. I, also, added a patch panel in the garage where the cables terminated.

1. Ubiquity Gateway
2. Ubiquity APs (x4 - 1 AP in mesh mode)
3. TP-Link Gigabit ethernet switches (x4)
4. Moved as much stuff to ethernet as possible
 - a. Ethernet Quirks
 - i. Amazon Fire TV does not work well over ethernet
 - ii. Old 100 base T switches had to go
 - iii. Gaming PC has both ethernet and Wifi running at same time, but it works well
 - iv. Too many Sonos devices with ethernet is an issue where they fight to be primary.

Servers

I'm running two servers neither of which are very powerful.

1. Raspberry Pi 3B running Raspbian
 - a. Home Assistant (only using for up/down monitoring)
 - b. Ubiquity UniFi Network Controller
 - c. tuya-convert when needed to flash
2. Dell workstation (old Pentium 4) with CentOS 7
 - a. MQTT (Mosquito)
 - b. Perl Scripts running under Systemd
 - i. mqtt-listener
 - ii. perl-Power-Outlet-mqtt-listener
 - iii. mqtt-listener-image-sms
 - c. Perl Scripts running under Apache CGI
 - i. [Power-Outlet](http://horton.internal.net/power-outlet/) - Lights - <http://horton.internal.net/power-outlet/>
 - ii. Drive Way Sensor - <http://horton.internal.net/mqtt-listener-image-sms/cgi-bin/mqtt-listener-image-sms.cgi>
 - d. CronTab
 - e. Sonos API - <http://horton.internal.net:5005/>
 - f. [Power::Outlet](#)
 - g. [SMS::Send](#)
 - i. <https://voip.ms/>

Home Automation Hardware (Outlets and Switches)

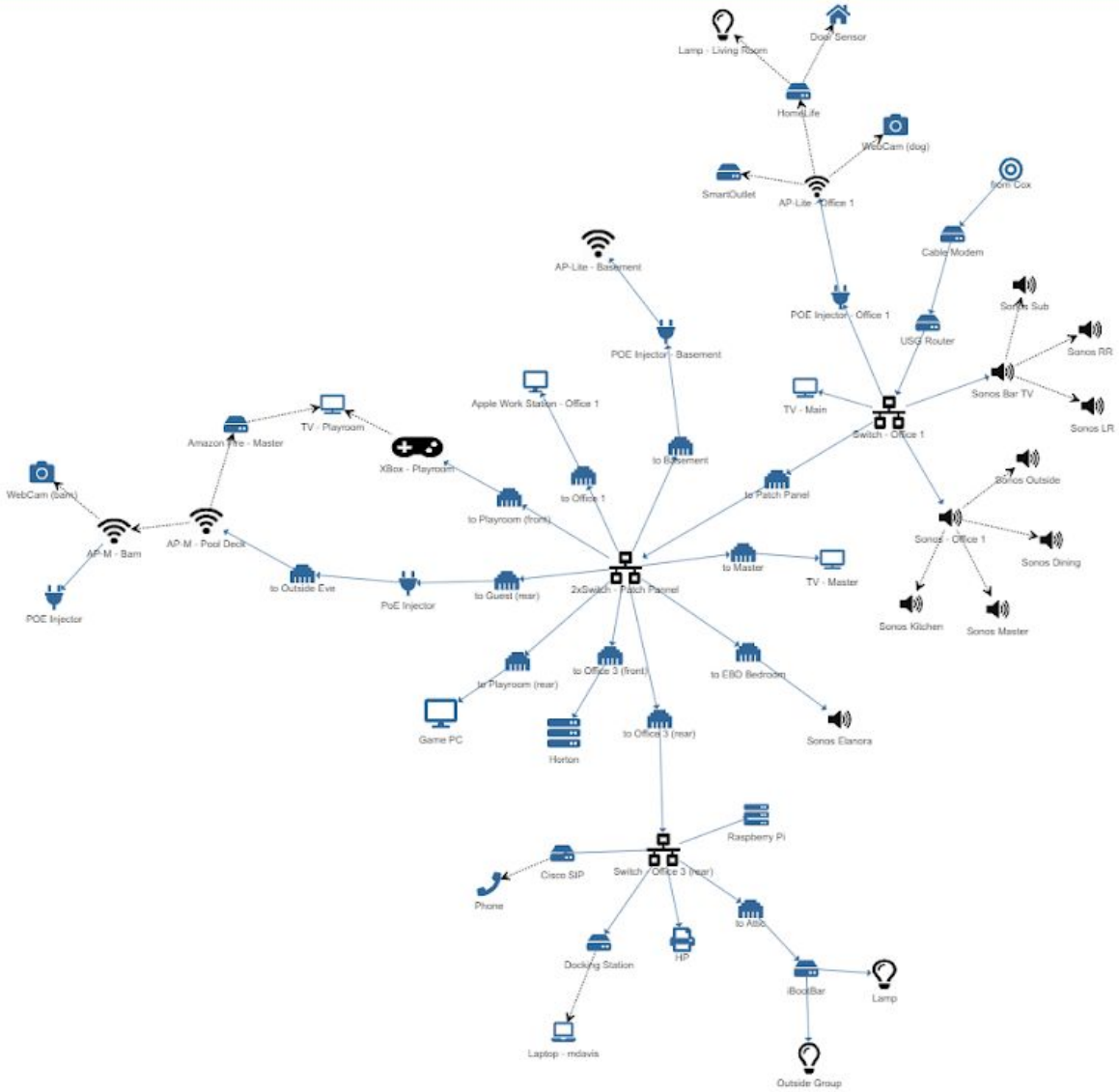
I have only purchased ESP8266 hardware that supports Tasmota and can be flashed with Tuya-Convert or has a Do-it-yourself mode (ref Tasmota Device Templates Repository). I use Tasmota firmware but

there are other firmware competitors like ESPHome, ESPurna, ESPEasy, ESPhomeYAML that I have not tried.

1. Original Hardware (about 15 years old now)
 - a. iBootBar – SNMP controlled
 - i. controls the main house outdoor lights.
2. ESP8266 “Tasmota” Hardware – http, mqtt or rule controlled but I use http
 - a. Teckin SR40 - Wall Outlet
 - b. Gosund WP3 - Plug with Button
 - i. Used to turn on/off the down lights on my barn
 - ii. Used to turn on/off the Christmas tree
 - c. MoKo YX-WS01A - Plug with Button
 - i. Button press triggers an mqtt event to turn on the outside lights to let the dogs out after midnight lights out. Perl script power-outlet-mqtt-listener.pl and YAML /etc/power-outlet-mqtt-listener.yml
 - d. Teckin SS31 - Outdoor Smart Outlet
 - i. Used to turn on/off the deck rope lights
3. DIY Hardware – only http controlled
 - a. Sonoff Mini – 3-way switch insert
 - i. Installed behind wall switches which make the light a 3-way with wifi.
 - ii. I find that the original firmware is stable, but it only supports an http api e.g. no support for sunrise, sunset, rules or mqtt.
4. Driveway Sensor
 - a. Inductive Loop Vehicle Detector – contact relay closes when metal vehicle drives over coil – same hardware used to monitor traffic lights and security gates.
 - b. Sonoff Mini – Tasmota Firmware –contact relay to MQTT proxy
5. Sonos – PLAY:1
 - a. Configured to use SonosNet not Wifi
6. Web Camera
 - a. Left over web cam from a Cox Home automation promotion

Screen Shots

- Network Diagram - <https://www.yworks.com/products/yed-live>



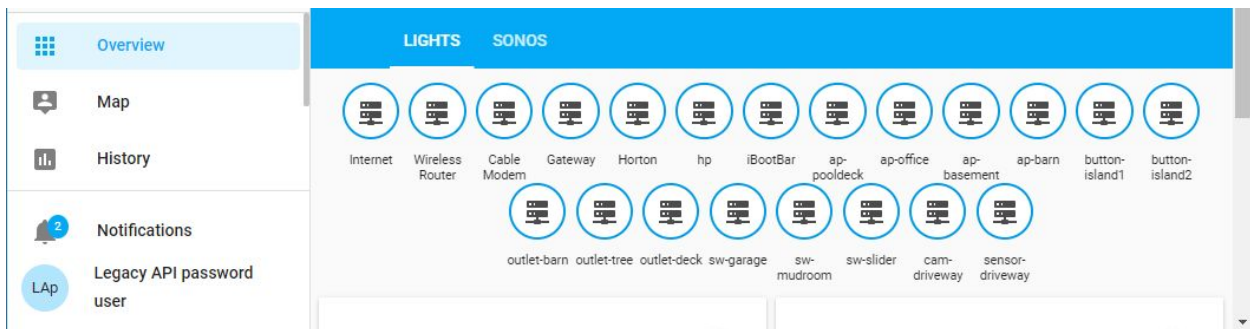
- Ubiquiti Controller <https://pi.internal.net:8443/>

DEVICE NAME	IP ADDRESS ↑	STATUS	EXPERIENCE	MODEL	VERSION	UPTIME	CLIENTS
gw	192.168.33.1	CONNECTED	100%	UniFi Security Gateway 3P	4.4.51.5287926	46d 8h 55m 8s	45
ap-office	192.168.33.45	CONNECTED	99%	UniFi AP-AC-Lite	4.3.20.11298	18d 19h 55m 28s	13
ap-basement	192.168.33.46	CONNECTED	98%	UniFi AP-AC-Lite	4.3.20.11298	18d 20h 1m 3s	8
ap-pooldeck	192.168.33.47	CONNECTED	98%	UniFi AP-AC-Mesh	4.3.20.11298	18d 20h 14m 58s	4
ap-barn	192.168.33.48	CONNECTED WIRELESS	98%	UniFi AP-AC-Mesh	4.3.20.11298	18d 19h 44m 38s	2

1-5 of 5 devices Rows per page: 50



- Home Assistant - <http://pi.internal.net/>



- Mosquito – MQTT

Subscriber Example: `mosquitto_sub -t "#" -v`

```

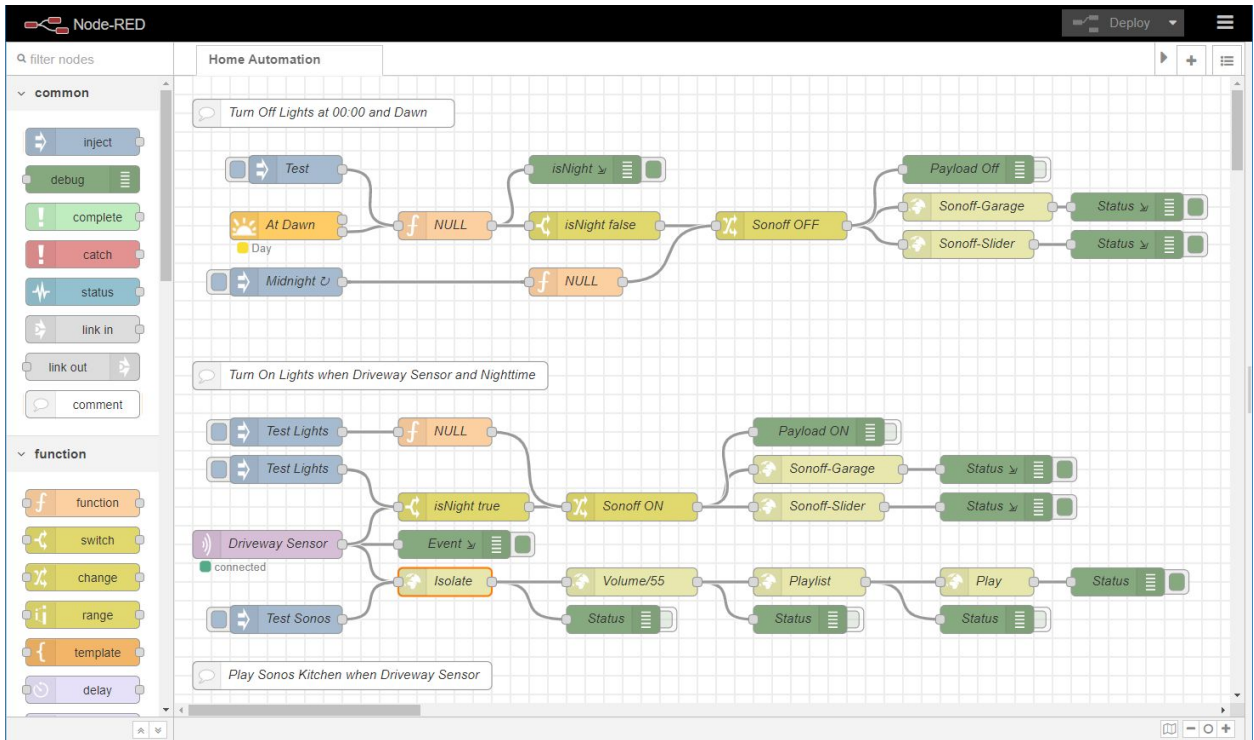
mdavis@horton:~
[mdavis@horton ~]$ mosquitto_sub -t "#" -v
tele/mokol/LWT Online
tele/moko2/LWT Online
tele/outlet-barn/LWT Online
tele/minil/LWT Online
tele/outlet-deck/LWT Online
tele/outlet-tree/LWT Online
tele/mqtt-listener/LWT Online
tele/power-outlet-mqtt-listener/LWT Online
tele/mqtt-listener-image-sms/LWT Online
tele/mqtt-listener-sms/LWT Online
tele/node-red/LWT Online
my/topic/thing payload

```

Publisher Example: `mosquitto_pub -t my/topic/thing -m payload`

```
mdavis@horton:~  
[mdavis@horton ~]$ mosquitto_pub -t my/topic/thing -m payload  
[mdavis@horton ~]$
```

- Node-Red - <http://horton.internal.net:1880/>
 - a. Concepts <https://nodered.org/docs/user-guide/concepts>
 - b. Add-ons - nighttime



Drive Sensor





The Future

- New Server
 - a. I'm not quite sure what I want to move to but I'm looking into a NAS solution which can run a Linux VM or dockers. (e.g. Synology) My issue is that I have 6TB of drive space that is old SATA that is not supported on newer NASes.
- Crontab
 - a. I'd like to move crontab entries to Node-Red. I think it's more visual but not as succinct and capable.
- SMS:Send
 - a. Perl's SMS::Send is a great architecture and concept and I have not found a similar concept in Python language which can be plugged into Node Red. Or a way to plug Perl into Node Red.
- Ubiquiti UniFi Network Controller
 - a. I'd like to move to their cloud key solution. If I were to start my network today it would be hard to beat the Dream Machine with the indoor/outdoor Flex HD units.
- AP mesh link to barn
 - a. I want to move to a MoCA 2.0 based ethernet over COAX, but it is expensive for no gain in capability.
- Home Assistant
 - a. I am not a fan of Home Assistant. I would like to find a nice network monitoring solution.
- iBoorBar
 - a. The iBoorBar is slow (2-5 seconds for on/off). The newer ESP8266 Tasmota based power strips would be much faster (~300-500 ms for on/off).
- Power Monitoring
 - a. I want to monitor my well pump for on/off just to see how it is performing. We had an issue where it ran 24 hours a day from months before we figure out the issue.
 - b. PZEM-004T but I have not seen a commercial unit yet.
<https://tasmota.github.io/docs/PZEM-0XX/>
- Motion Detectors
 - a. I'm interested in motion sensors but have not yet found any hardware that I'm impressed with.
- SMS Driveway sensor
 - a. I'd like to reduce the size of the image to send on SMS just the part with the vehicle. Maybe using opencv lib to find image differences.
- Zigbee lights
 - a. I have one Zigbee light bulb but I'm not sure I want to start down that path

Thoughts

What do I need to do if I ever sell my house? A bunch of the home automation is "fixed" to the home so it would convey but my servers are not "fixed".

Michael R. Davis Home Automation Software

[Power::Outlet](#)

[SMS-Send-VoIP-MS-0.03](#)

This document is:

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