Derek White

EET 131

Why I want to be an Engineer

There are a variety of reasons why I want to be an Engineer. The reasoning is quite vast, yet also incredibly specific for each field. I want to solve a variety of problems I see every day, to not only fix the problems I have issues with-but also to solve the problems for others.

The first problem I continue to run into is the lack of open hardware in the Internet of Things (IoT) field. I have noticed a lack in a variety of hardware that can run on self-hosted IoT software such as *MyCroft*, a Free and Open Source Software (FOSS) alternative to Amazon Alexa, or Google Home. Additionally, I want an Open Source hardware smart doorbell, and smart door lock with a variety of functionality that utilizes complete open protocol in its networking stack so I can have ease of porting to other softwares in case one project dies, or a better one comes out. For example, the current best solution I know of for a smart doorbell/smart doorlock combo as it stands is the *Ubiquiti Unifi G4 Doorbell Pro* and the *Ubiquiti Unifi G4 Doorlock*, which both are self-hostable for the benefit of privacy and lack of a monthly bill for its usage, however is proprietary software and locked down to its ecosystem requiring you to continue buying products from the *Ubiquiti Unifi* line. Adding in the Open Network Video Interface Forum (ONVIF) would resolve both of those issues for an open hardware + software solution.

The second problem has to do with Network hardware, and the software controllers for them. My current network stack in my house contains a variety of hardware and different product lines that I want to have contained within one Software Defined Network (SDN) controller, which will state if any firmware updates are available and allow me to apply them from one location. Unfortunately, the three major SDN controllers are locked down to their own ecosystems, such as *Cisco Meraki*, *Ubiquiti UNMS*, and *Ubiquiti Unifi*. The hardware I have requires the use case of two of these controllers, which is absurd, if a controller was written and utilized open protocols such as Secure Shell (SSH), Trivial File Transfer Protocol (TFTP), and Internet Control Message Protocol (ICMP), this problem can quite easily be resolved; all that would remain is having a set of scripts to push to each device to update them, apply configurations for the network via the shell, and then write the graphical user interface for ease of use and monitoring (which can also be modularized into other software, such as a Grafana front end).

The final issue I will write about, but definitely not the last problem I have, is the lack of modernizing old laptops. Laptops are constantly thrown out due to having old hardware whenever they begin to show their age. I have two laptops I regularly use (*IBM Lenovo Thinkpad T60* and *Panasonic CF-52*

Toughbook), but their performance is extremely slow due to them being from 2007 and 2008. If I was to design a new motherboard, as well as a Graphical Processing Unit and use an Open Source ISA such as RISC-V, as well as add in modern inputs and outputs such as USB 3.1 support, 802.11ax, Bluetooth 5.0, Power over Ethernet for charging the laptop (or USB-C), modernized displays... New life can be breathed into the laptops and less electronic and plastic waste will contribute to the landfills. Additionally, due to both of these laptops being adored by enthusiasts, I would consider it to be a high badge of honor.

I hope that I have given some outstanding examples of my reasoning for why I want to become and Engineer, and for any who read this later, I hope I can inspire you as well to contribute back to the Open Source community that continues to grow in strength for the benefit of others. The Open Source community is what educated me this far, and what led me to wanting to become and Engineer so I can give back as well.