**Homelab Writeup**

**Motivation/Purpose~**

During my sophomore and junior years of college I began to get more involved with virtual machines and home lab type things between my college classes and work. This was a long time coming despite really starting this when I was in high school. This eventually led me to start building out my home lab as my curiosity for learning was getting the best of me through the more complex college classes I would take. I started out my home lab with refurbishing an old computer to be my first server which would be a basic Nginx stack. From there I kept building things out and have reached a decently sized home lab today, which is outlined below.

**Hardware~**

* **Router**: Sagecom RACV1S 802.11ac Wave 2 Wireless and Wired
* **Core Switch**: NetGear ProSafe GS108Ev3 8-Port Gigabit Ethernet Managed Plus
* **Server 1**: OS-Debian GNU/Linux 11 (bullseye) | CPU-Intel i3-3217U (4) @ 1.800GHz RAM-4GB
* **Server 2**: OS-Debian GNU/Linux 12 (bookworm) | CPU: Intel Celeron N5105 (4) @ 2.900GHz RAM-8GB
* **OPNSense** **Firewall**: – VM via Server 2 | CPU: Intel Celeron N5105 (3) @ 2.000GHz RAM-5GB

**Software/Applications Hosted~**

* LibreNMS Network Monitoring System – [Link](https://www.librenms.org/)
* NTFY Notification Sending Service with CronTab – [Link](https://docs.ntfy.sh/install/)
* Passbolt Password Manager – [Link](https://www.passbolt.com/)
* OPNSense Firewall with IPS/IDS – [Link](https://opnsense.org/)
* Network File Share – Code written by myself with PHP/HTML
* Network Diagram Repository – Code written by myself with PHP/HTML
* NetGear Switch Management Interface – [Link](https://www.netgear.com/support/product/gs108ev3/)
* HoneyPot feature for Curious Users that access my Network – Code Written by myself and also uses Grabify as a component - [Link](https://grabify.link/)

**Benefits/Lessons Learned~**

I have learned a lot through building out my home lab over the past few years. The most important thing to call out from my perspective is that the amount of learning via troubleshooting has been insurmountable. Not even the fact that it is really fun but furthermore the particular things about IT such as networking concepts, topology, servers/hosting, Linux/Unix engineering, development/app deployment, documentation, scalability, and even migration. Out of all of those things listed I think the migration piece has to be my favorite. The thing here is that I recently moved residence and I did not want to wipe my server and start over and also has to IP address everything on my new network. I learned a lot from this task but my documentation and close attention to detail made me only take a day or two to get everything up and running on my network again. Although the coolest part in my opinion is that I can connect what I do here in my home lab to what I do in the workplace which connects the dots and ultimately boosts my confidence in the corporate setting.

**Enhancements Moving Forward~**

Going forward I hope to enhance my home lab by adding a SIEM for my firewall specifically and all other traffic as well. I also will eventually either add in another server or upgrade one of my existing to have a bit better hardware and more storage capability. As well I also hope to add another server that would be for hosting full fledged vulnerable virtual machines for testing such a Metasploitable box and other Windows or Unix/Linux operating systems. Lastly down the line I want to also add a Honey Pot that could be used for detecting modern attacks and seeing the strategic ways threat actors have discovered new vulnerabilities in production code.