4- Node Raspberry Pi Cluster

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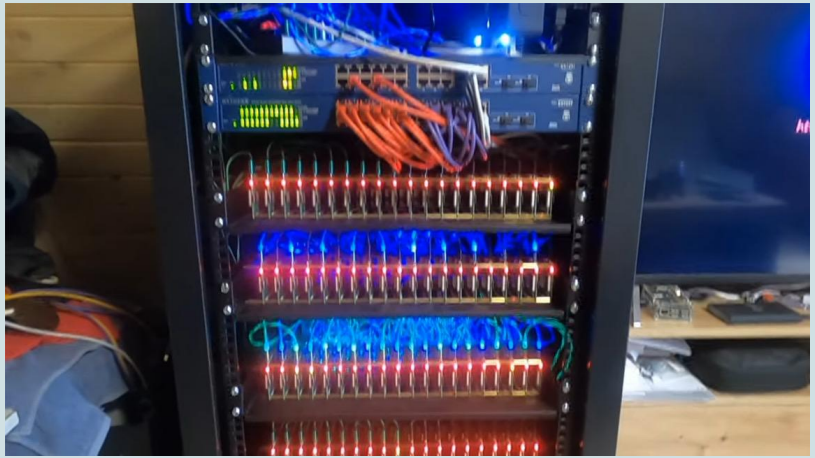
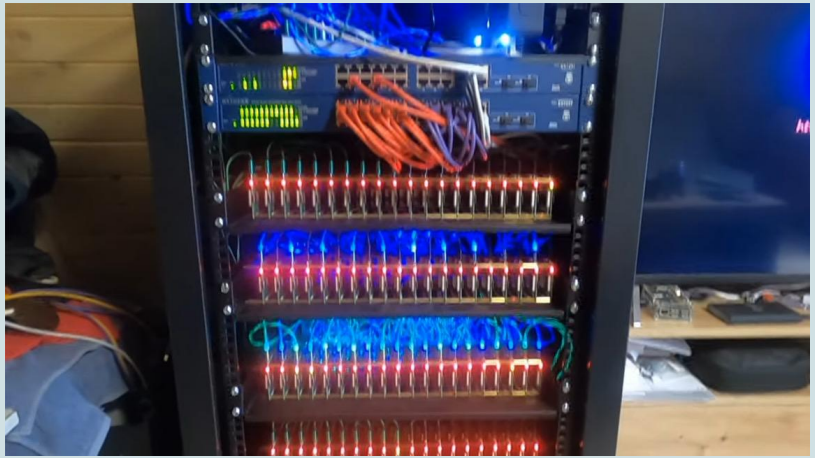
Background

- Raspberry pi’s are a cheap and simple option to learn basic coding and programming
- A Raspberry pi cluster involves combining multiple raspberry pi’s to share the load of heavier task, like running a complicated server, managing multiple different aspects of a smart home, etc
    - not for gaming



Background

- Generally, one Raspberry Pi (or node) is set up to be the what's called a ”master controller” while the other ones are set up as ”workers.”
- the master controller is told what to do specifically and dishes out the duties to the others



Materials

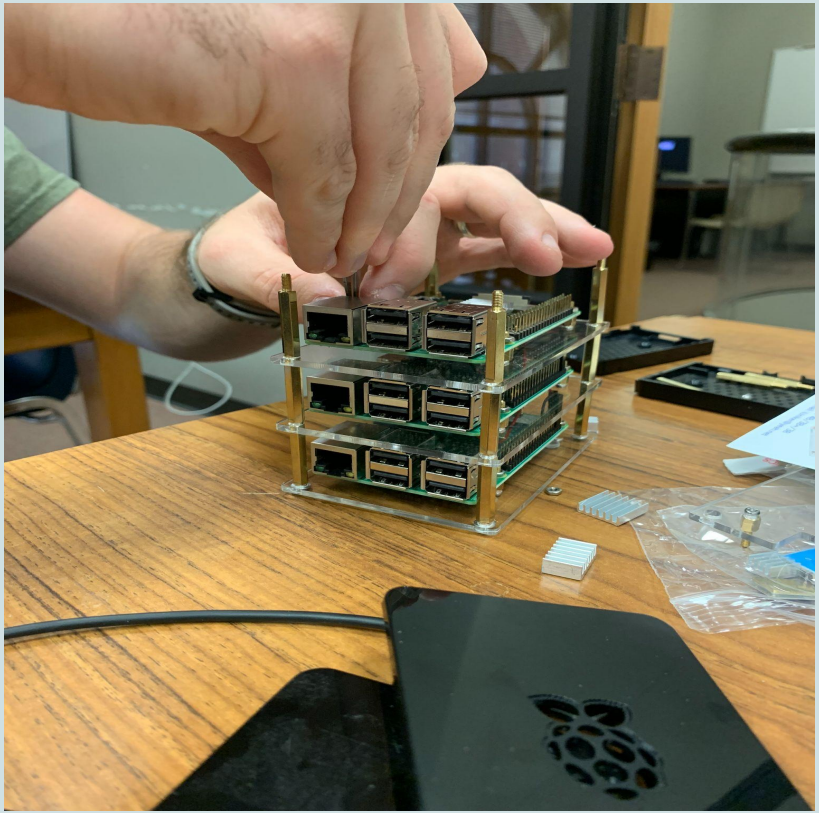
- Casing
- 4 raspberry pi’s
- 4 ethernet cables
- Ethernet hub
- Fans
- Desktop monitor
- HDMI cables

Process

The first step was the assemble the fans onto the casing

Process

Next we assembled the Raspberry pi’s so that they are situated on top of one another



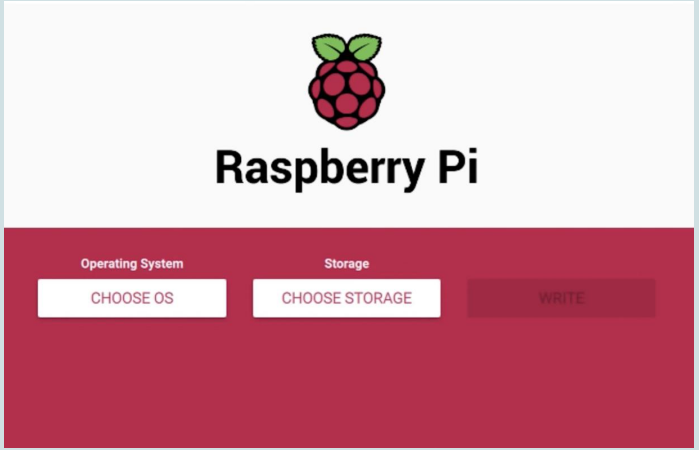
Process

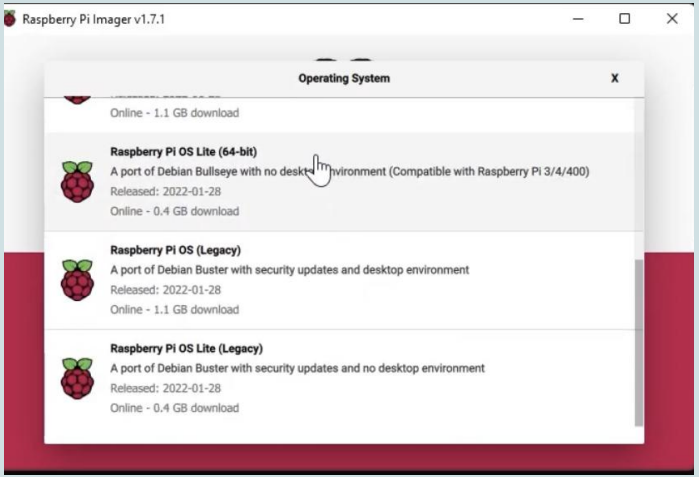
After all nodes are assembled, the raspberry cluster is ready to be connected to the desktop monitor for synchronization.

Programming

Now comes the most difficult part:

- raspberry pi imager was installed to burn the operating system onto the SD cards.
    - there were a few different options to choose from, but we ultimately chose the **64-bit Raspberry OS Lite** (this would give a faster download and we had no need of the GUI desktop



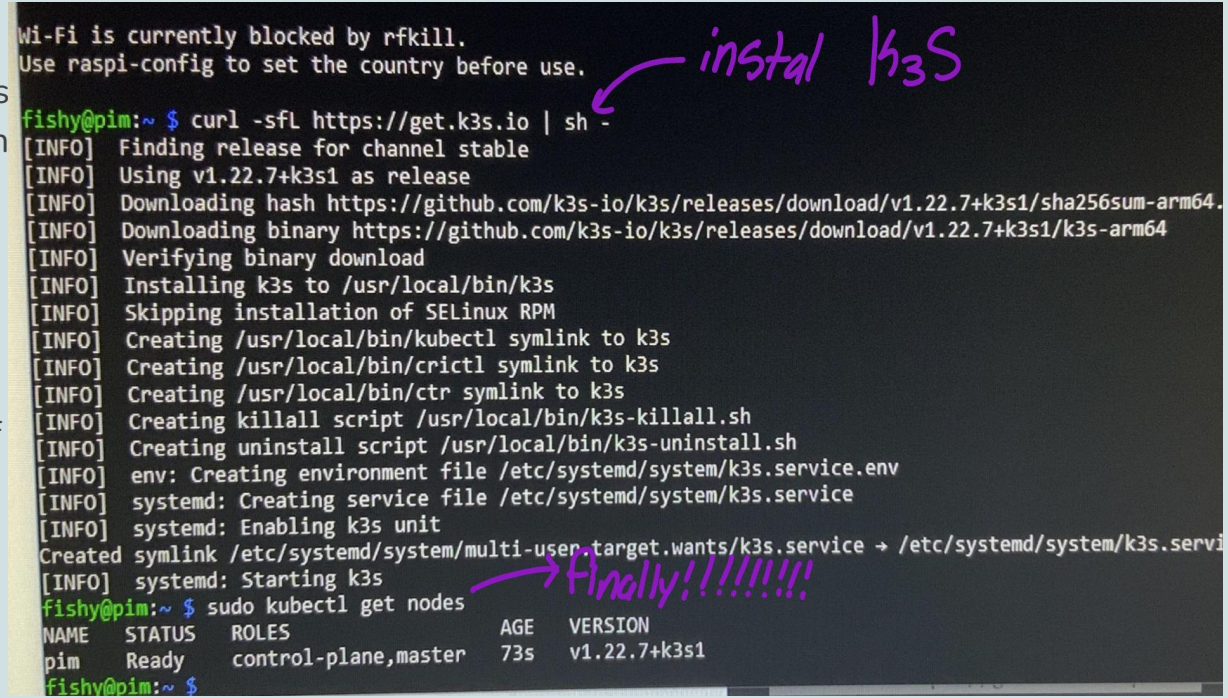


Programming

- Each node was given a name, booted up and a code was run to get their IPs
  - **sudo ip a**
- the following commands were given to open and update a secure shell (SSH) so the nodes could be accessed from a terminal of another computer
  - ssh <username>@>ip address
  - sudo apt update
  - sudo apt upgrade -y

Programming

- After updating a few files already in each node, K3s was installed on each node with th following command:
  - curl -sfL https://get.k3s.io | sh -
- after a reboot, the following the following command was added to check the success of the installation
  - sudo kubectl get nodes

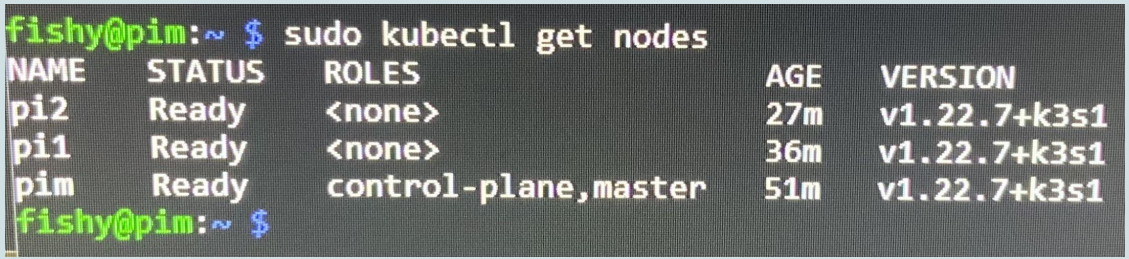


Programming

- master control is done, now on to the workers
  - the same process was repeated for each of the other worker nodes, except instead of the command to install K3s, the following command was inputted to connect the node to the master node

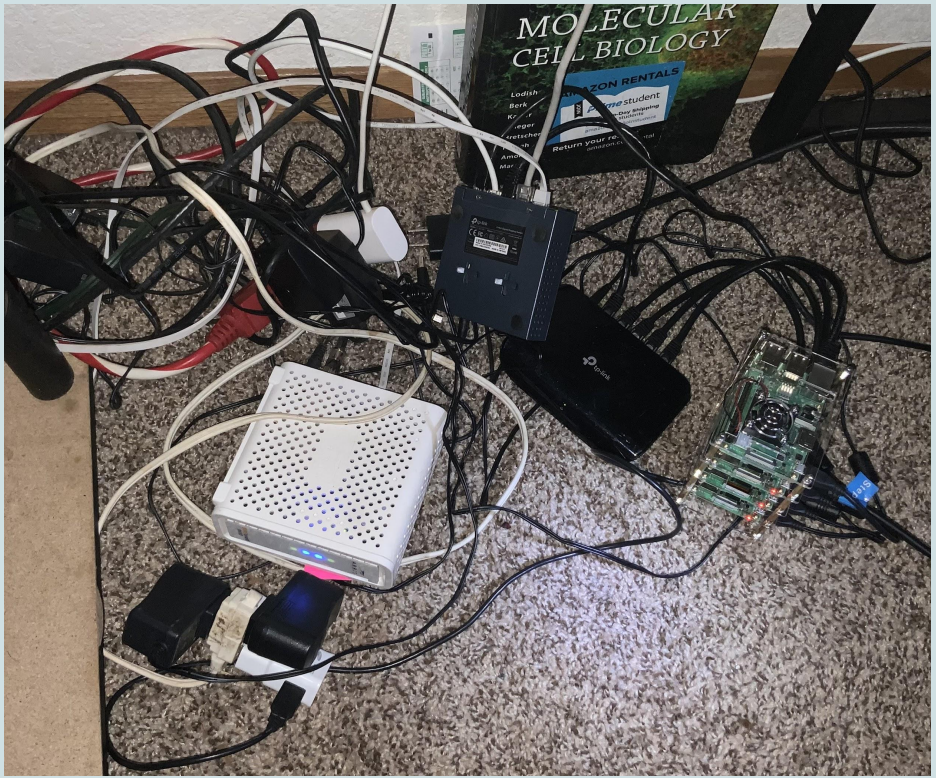
Programming

- We now have Raspberry Pi cluster with 4 nodes (1 master and 3 workers)
  - However one of the nodes were corrupted and there were a few setbacks which made us have to restart multiple times
  - As long as they continue to hold, we will download a program called Rancher that would give us visuals on how powerful this computer actually is, maybe even add a few servers



Programming

- This was the end result after one of the nodes became corrupted and (one of the times) we had to restart



Programming

- We are hoping to try and make the system self running, where there won't be any need for an outside computer but right now it just wasn't working out
  - We may be able to do this by setting all pi's up on the WiFi and setting one with the GUI desktop interface but when we tried earlier it didn't work
  - But now with the better understanding we have of the process it may be possible

Works Cited

Wybiral, Davy, director. *Building a 4-Node Raspberry Pi Cluster*. *Youtube.com*, 27 Jan. 2018, https://www.youtube.com/watch?v=H2rTecSO0gk. Accessed 8 Apr. 2022.

https://www.youtube.com/watch?v=eZ74x6dVYes

https://www.seancarney.ca/2020/10/09/quickly-create-polished-professional-reports-with-markdown-and-r/