



# **Raspberry Pi Clusters – Hands-On – Week 2**

HPCC Presentation 10-23-23  
Sean Mapes

# Overview

- **Master Setup**
- **Nodes Setup**

**Ask any questions as you  
have them!**

# Master Setup

- **DNSMasq Configuration**

- Change the following in `/etc/dnsmasq.conf`
  - Uncomment `server=/localnet`
    - Add your master node's IP to the end, like `server=/localnet/192.168.1.45`
  - Uncomment `local=/localnet`
  - Uncomment `expand-hosts`
  - Uncomment `domain=localnet`
  - Change `dhcp-range` to have the first 3 bytes to match your IP
- `sudo service dnsmasq start`

# Master Setup

- **DNS Configuration**
  - Add the following to `/etc/resolv.conf`
    - `nameserver MASTER_IP`
  - Reboot

# Nodes Setup

- **Plug the master into the switch first**
- **Plug all the nodes into the switch after the master has started up**
  - We need the nodes to use the master as it's DHCP server

# Nodes Setup

- **Get the nodes IP addresses**
  - `ip a`
    - Record the IP address and hostname
- **Test ping the master**
  - `ping -c 3 MASTER_IP`
    - Where MASTER\_IP is the IP address of the master

# Nodes Setup

- **Python**

- `sudo apt install python-pip python-dev`

- **MPI**

- `sudo apt install mpich`
- `sudo pip install mpi4py`

# Nodes Setup

- **On the master:**
  - Make a file in /home/pi named HOSTFILE
  - Edit /home/pi/HOSTFILE
    - Write localhost, followed by a list the IP addresses of the nodes, separated by a new line
  - Edit /etc/hosts (optional)
    - At the end of the file, type the IP addresses of the nodes followed by an alias for them (hostname)



# Nodes Setup

- **On the master:**
  - Test SSH to the nodes
    - `ssh pi@NODE_IP`
      - Where NODE\_IP is the IP address of a node
  - Copy over the SSH key over to each node
    - `ssh-copy-id -i .ssh/id_rsa.pub`
  - Edit `~/.bashrc` (optional)
    - Add alias `HOSTNAME='ssh pi@NODE_IP'` for each node

# Testing

- **Test MPI without a script**

- `mpiexec -hostfile HOSTFILE hostname`
  - The hostfile option tells MPI where a hostfile is located, and within that file is a list of our IP address for MPI to execute off of
  - Hostname is the command we are running, in this case it should identify the hostname of the system it is running on
  - If successful, there should be 3 different hostnames present (master and two nodes)