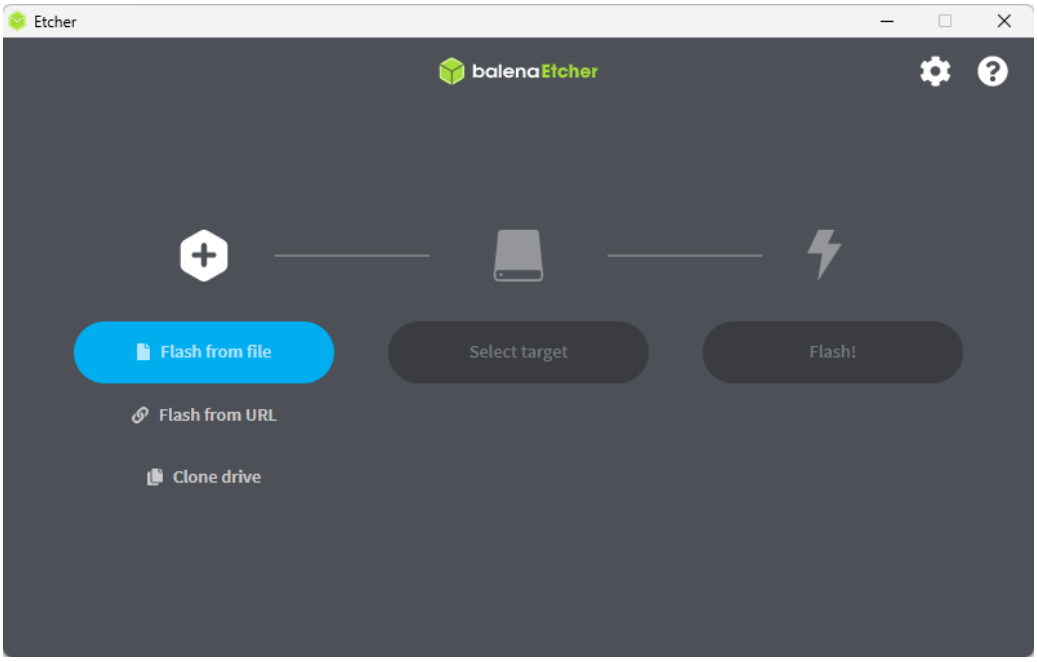
Building a Proxmox Virtual Environment

Things you'll need before getting started:

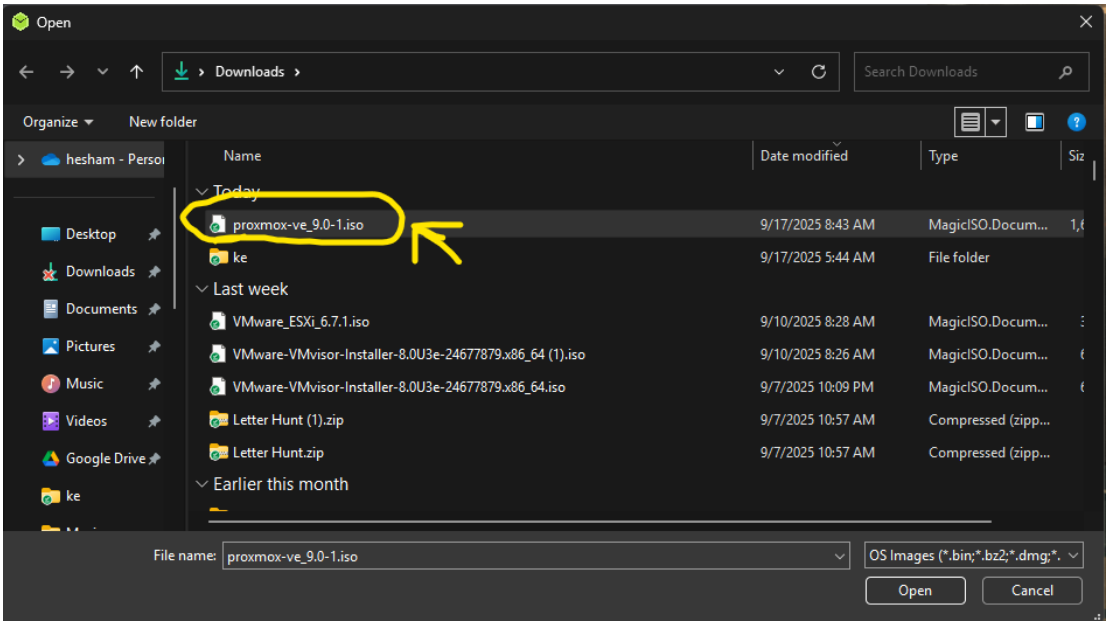
1. A PC Tower or Server. (The more storage and RAM, the better. More core CPUs will be ideal here. Any hardware will work with Proxmox as long as it's not a single-board computer like a Raspberry Pi.)
2. A copy of Proxmox Virtual Environment.
3. A USB stick with at least 16GB of storage.
4. Software for burning the ISO into the USB stick.

1. Begin by inserting a USB stick into the computer.
2. Load the ISO burning software (I'm using Balena Etcher, but you can use whatever you want.)

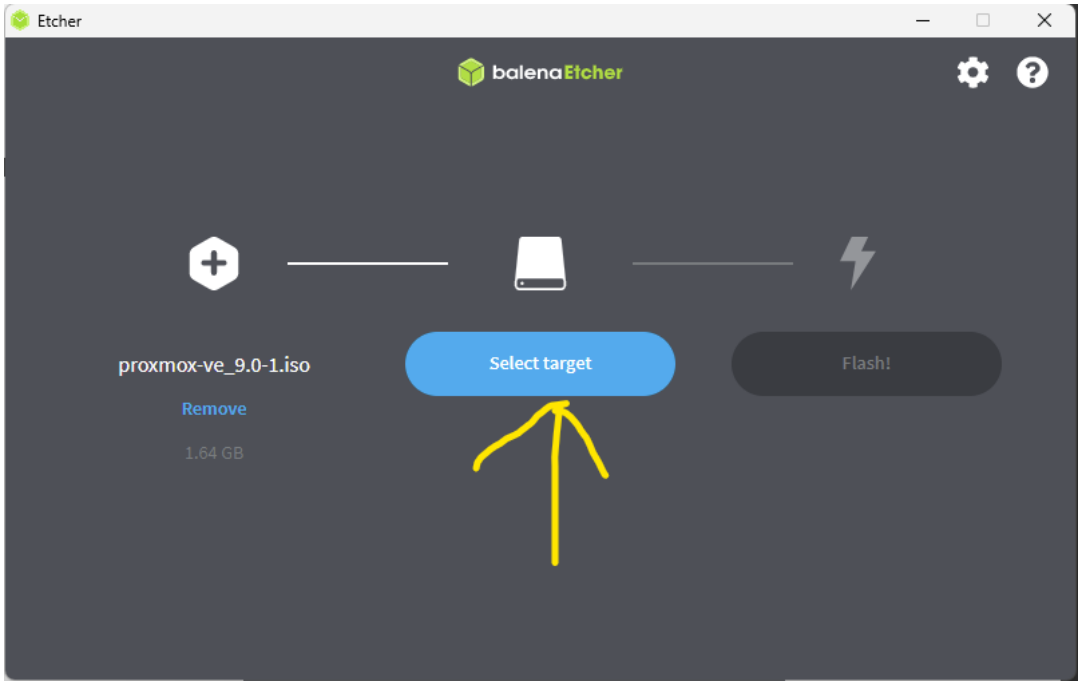


3. Click on "Flash from file" (or open ISO on your preferred ISO burner)

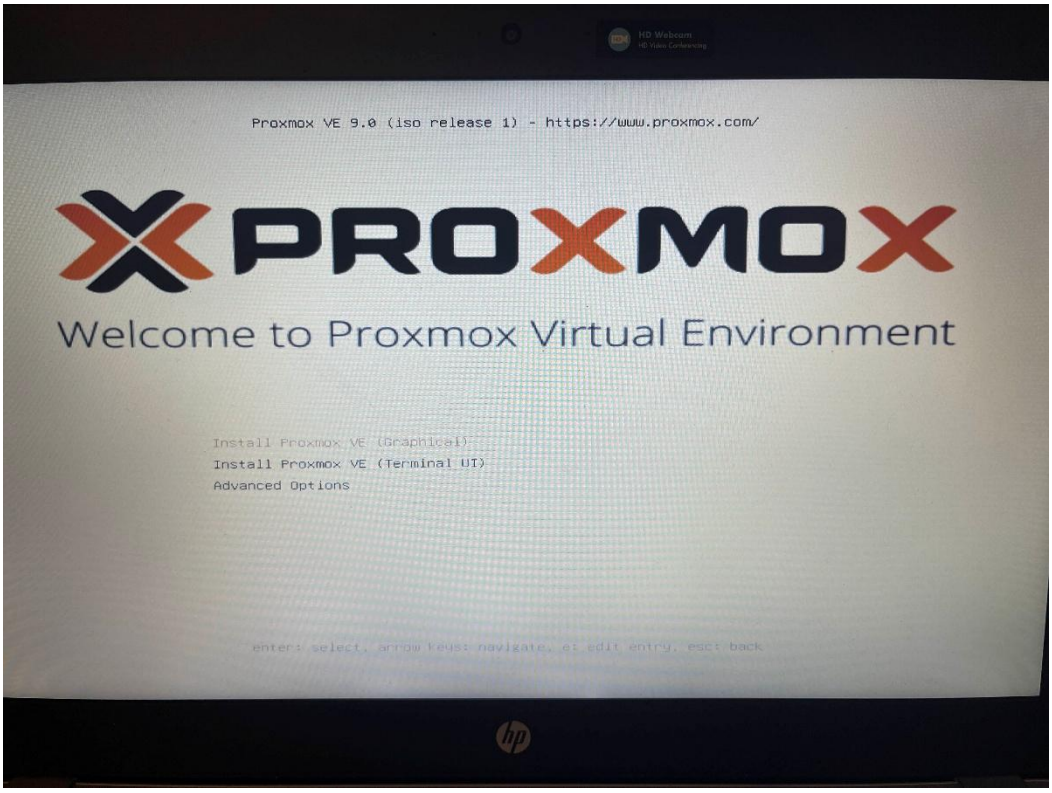
4. Find the “proxmox-ve_9.0.1” file



5. Once you have the ISO selected, you want to go ahead and select what device you’re going to burn it to.



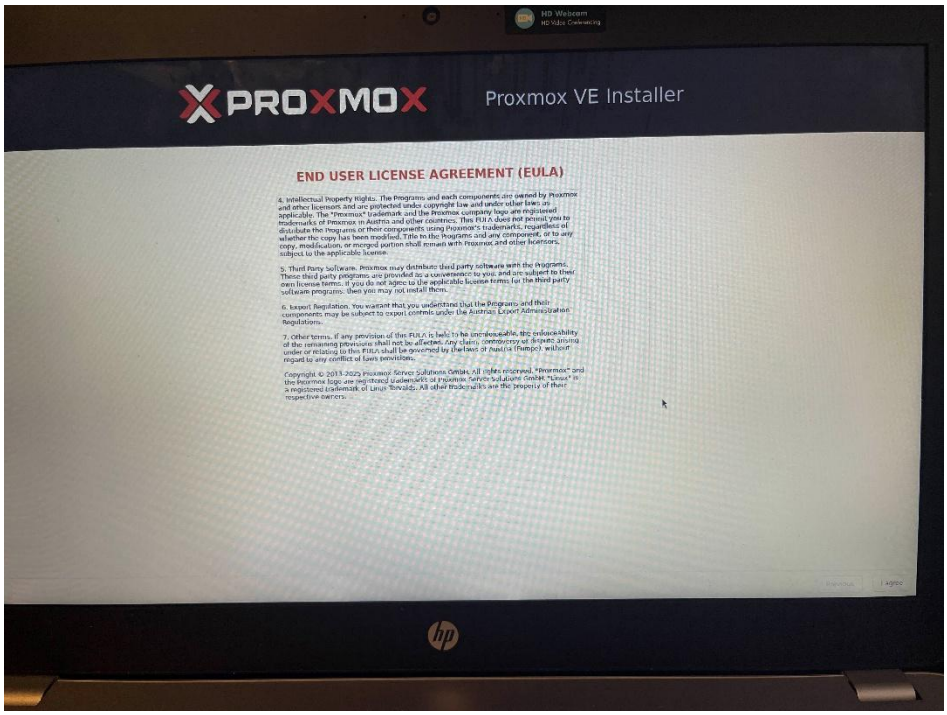
6. You should see the USB stick that you inserted back in Step 1 here. Go ahead and select that USB drive. (NOTE: Proceeding with this will erase everything on your USB drive. Please make sure there is nothing on that USB drive that you want to lose.)
7. Click on Flash and wait for it to be completed.
8. Remove the USB from your computer and insert it into the target computer where you want to install the server OS.
9. Boot into the USB drive that you inserted. This usually requires you to click F2 or Delete when the computer turns on. (This will depend mostly on the computer, but those two are the most common.)
10. Once you give it a minute to boot, you should be greeted with this screen here.



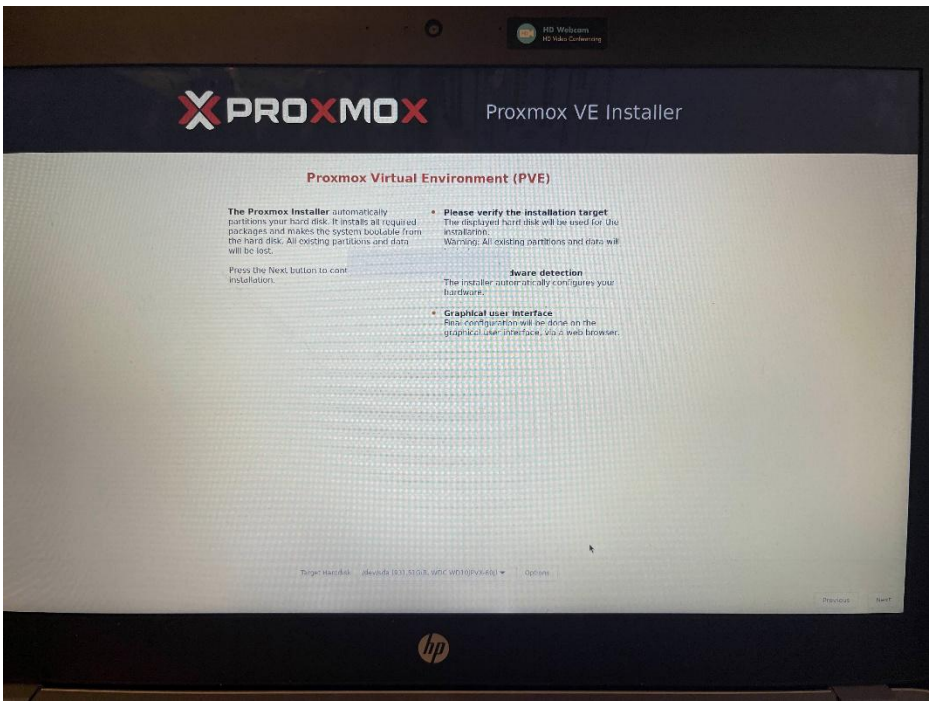
11. This will show three options:
    a. **Install Proxmox VE (graphical)**
    b. **Install Proxmox VE (Terminal UI)**
    c. **Advanced options**

    Go ahead and click on Install Proxmox VE (graphical)

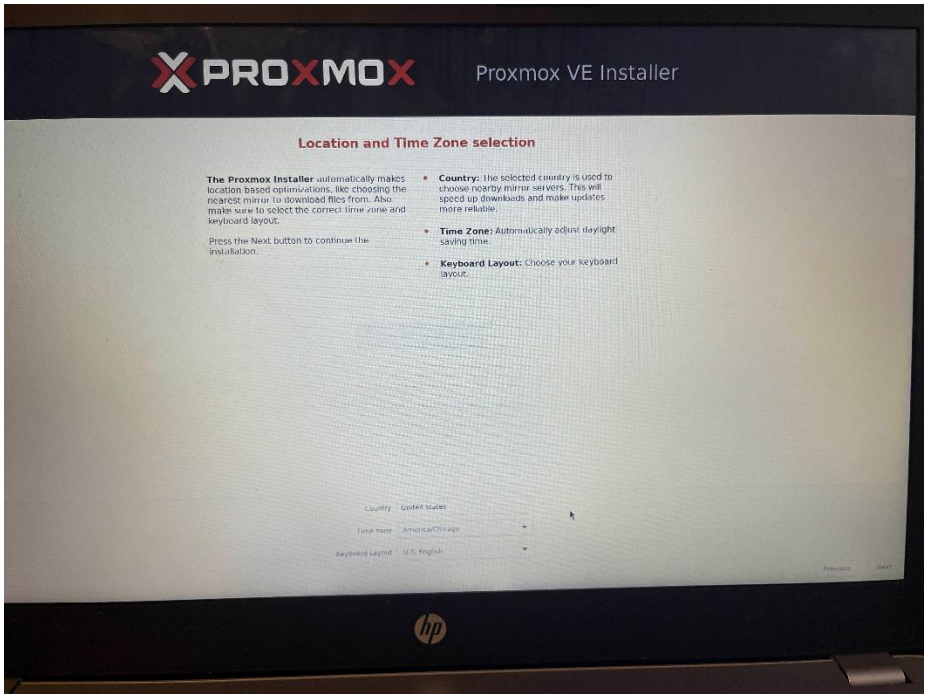
12. The next screen will show the End User License Agreement (EULA). Click on I Agree and proceed.



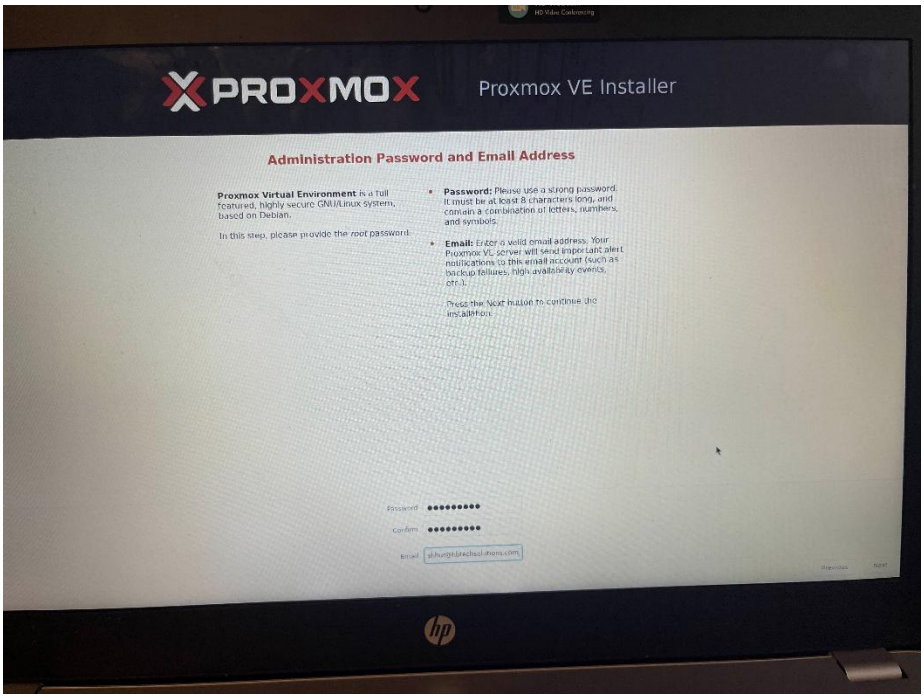
13. This page will allow you to select where you want to install Proxmox. Unless you have more than one hard drive to select from, stick to the default selection and click next.



14. The next thing you will see are options for country, time zone, and keyboard layout. I used "United States" for Country, "America/Chicago" for Time Zone (that's the Central Time Zone), and "U.S. English" for Keyboard Layout. After you complete this, click next.

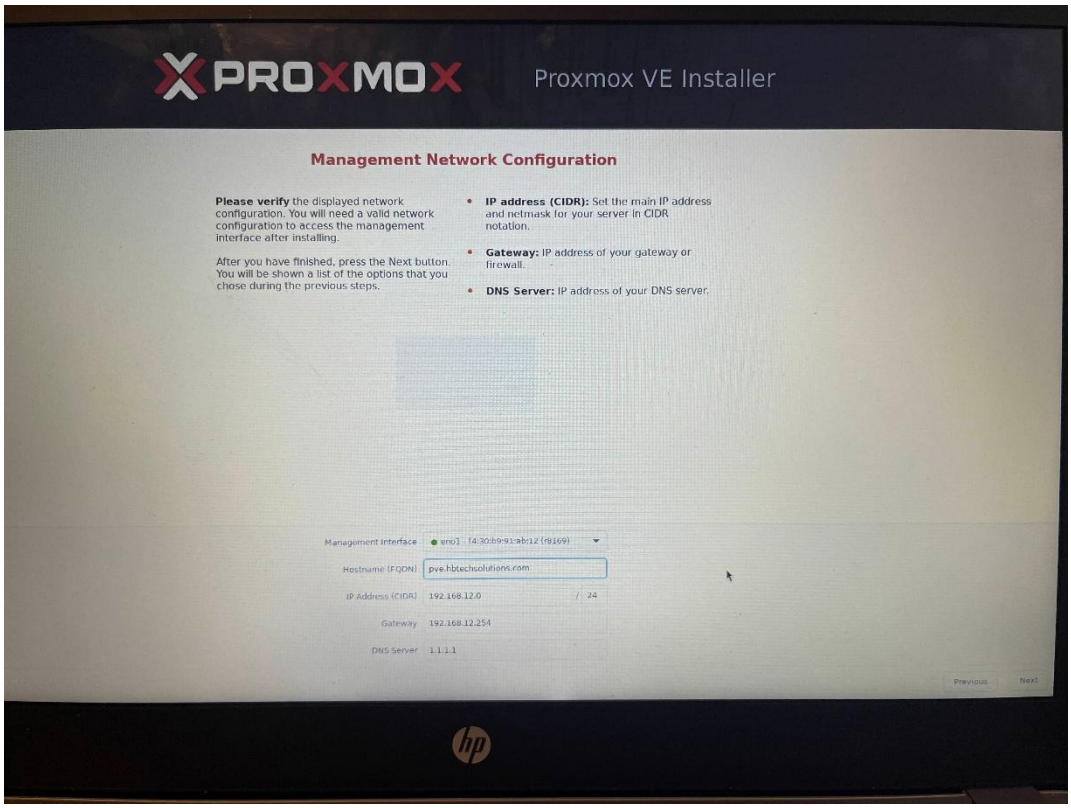


15. This page will allow you to create a password and enter your email. This password is both the root password and the password for the web management page. Click next when finished.

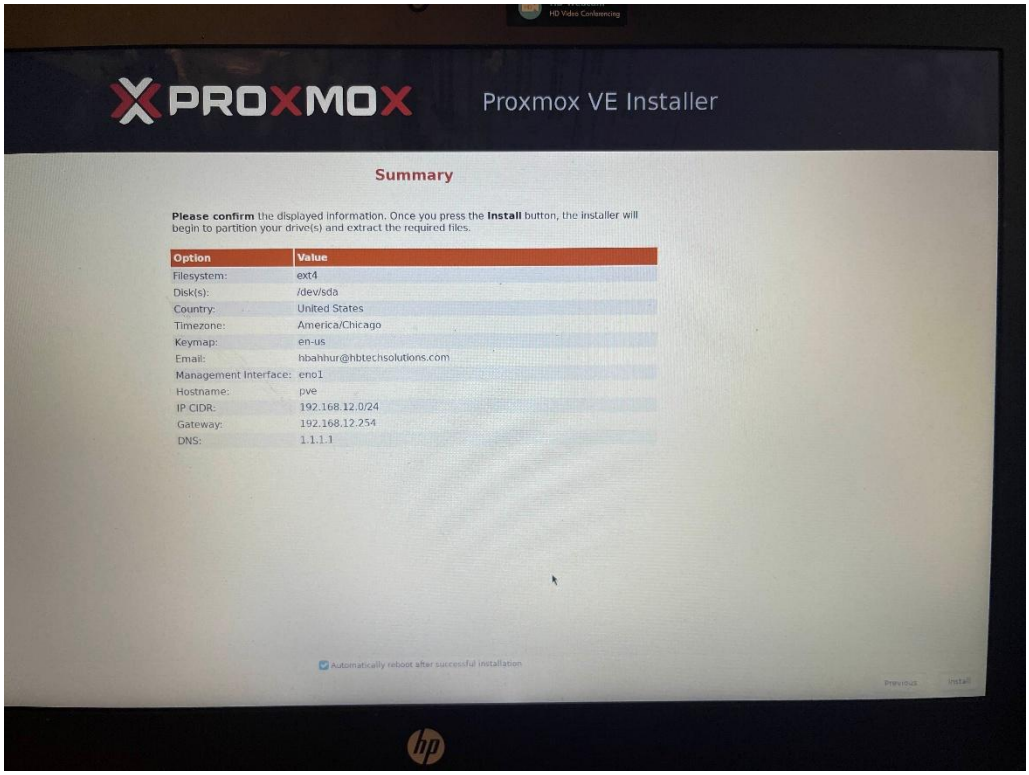


16. This page is important. It will ask you about some network configurations.
    a. **Management Interface**: If you have both Wi-Fi and Ethernet options, you will see both ports. For this tutorial, I'm using the Ethernet port option.
    b. **Hostname (FQDN)**: This part doesn't matter too much. You can make up something here. I own a domain name, so I set it up with pve.hbtechsolutions.com
    c. **IP Address (CIDR)**: This may come auto filled for you. My suggestion here is to set this up with an IPv4 address instead of IPv6. This IP address is statically set. I would pick something that isn't already taken in your network.
    d. **Gateway**: This is usually the IP address of your router.
    e. **DNS Server**: You can use whichever DNS server you want. Two common ones are Cloudflare (1.1.1.1) and Google (8.8.8.8). You can also use any other one that comes to mind.

       Once this is complete, click on next.

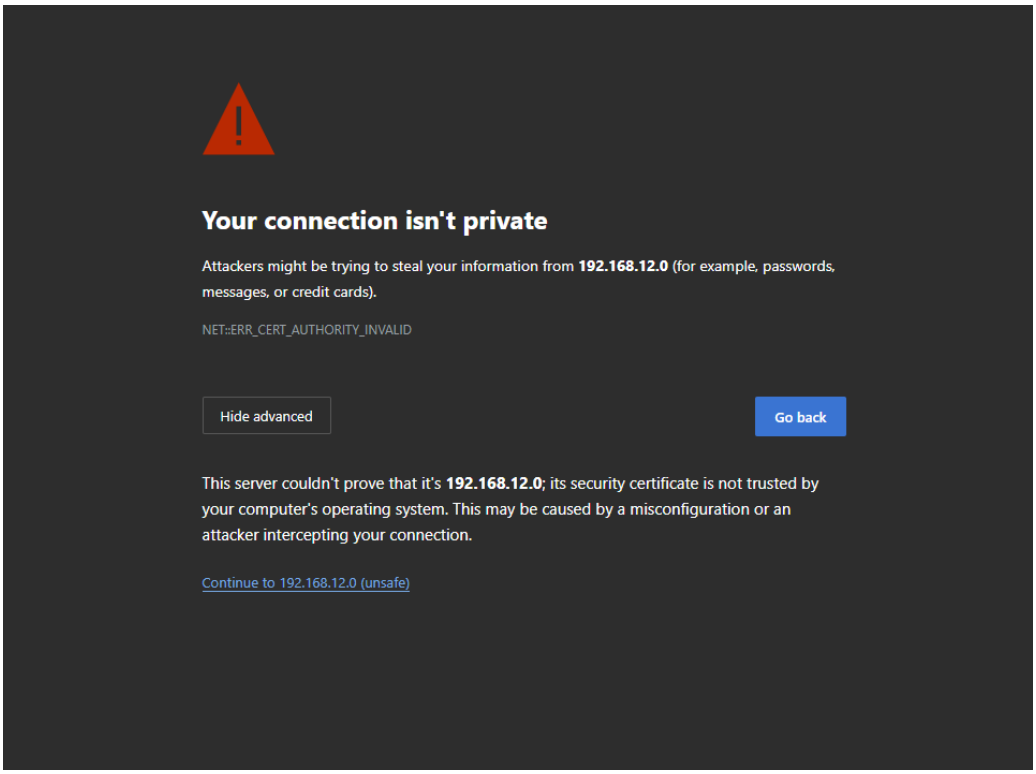


17. This page is the last before installation begins. This will summarize all the info you have entered up until now. If you want to adjust anything before installation, this would be the time to hit the previous and return. If you are happy with your selections, make sure you automatically reboot after successful installation is checked, and click install.

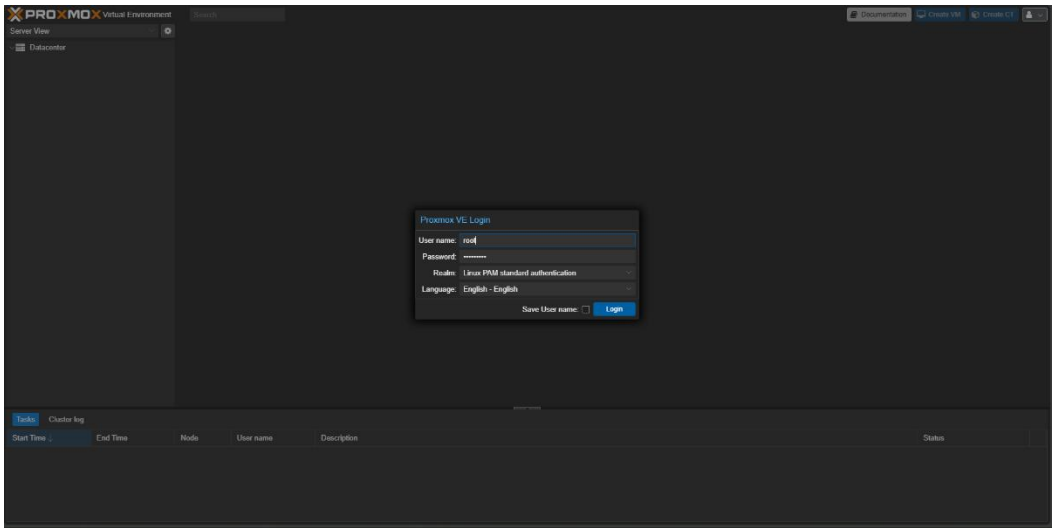


18. Installation and configuration will take some time. Once this is complete, it will reboot. At this time, make sure you remove the installation USB and allow it to boot into your Proxmox installation. You should see a terminal at this point with instructions on where to go to load the web management interface.

19. On another browser, type in “https://[IP address configured]:8006”. You should be greeted with a page that looks like the picture below. Click on Advanced and then click on “Continue to [IP address configured during setup] (unsafe)”



20. The management page should load and look like the picture below. Log in with the username of root and the password you configured during installation.



21. You'll see a pop-up about not having a valid subscription. Click ok and don't worry about that. Proxmox does have a premium feature, but free will work just fine.

At this point, everything is ready to go. You're all set to create virtual machines and virtual containers. A few extra notes I would like to add:

1. You will need to load your own ISO files for virtual machines. You can get these easily from the internet and from official sites. You will load the ISO files into a specific spot on Proxmox to keep a repository of all ISOs. Go to local (pve), click on ISO Images, and click on Upload. Once you save them here, you will see them when you are creating your virtual machines.
2. Virtual containers will have some pre-loaded templates. I've used the Debian template for most Linux things. Virtual Containers are meant to be used for lighter applications. Usually, a single service setup is the most common use here.
3. You can add additional storage, devices, and connections to a virtual machine, even after creation. It requires a little bit of extra configuration, but it can be done. This is helpful if you're setting up a NAS-style solution or even if you're using a virtual router.
4. If you do pass through a graphics card to a Windows-based VM, you will not be able to console into the machine anymore. You will have to use RDP. Make sure RDP is properly configured and secured before you pass through the graphics card.