CENTRE ESPECÍFIC
D´EDUCACIÓ A DISTÀNCIA DE
LA COMUNITAT VALENCIANA

ACTIVIDAD EVALUABLE

SEGURIDAD Y ALTA DISPONIBILIDAD

UD6. Proxmox y Virtualbox (video en inglés)

Autor: MANUEL FERNANDEZ

Se pide:

1. Crear un documento **en inglés** con las capturas de pantallas relativas a la instalación y configuración de Proxmox sobre virtualbox guiadas.

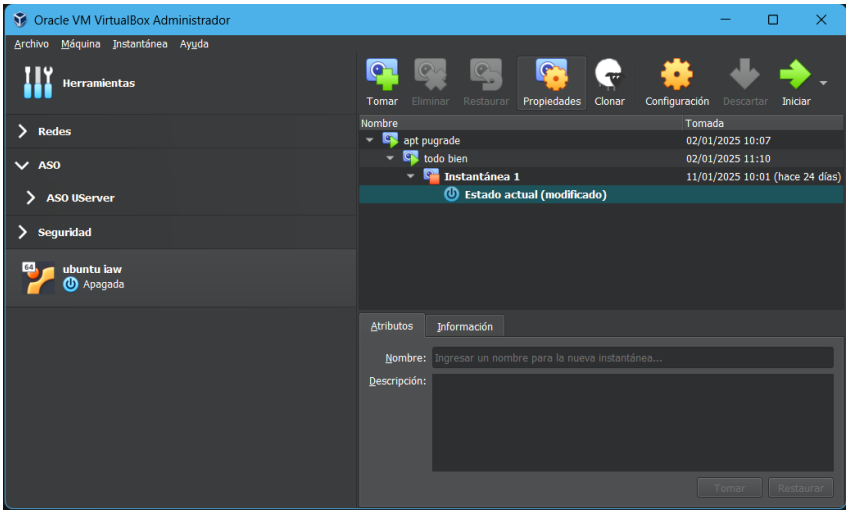
2. Crear un video **en inglés** explicativo de 3 minutos explicando los conceptos de virtualización.

3. Crea un video **en inglés** de 2 minutos relacionado con las características y diferencias principales entre los sistemas de virtualización tratados en esta práctica.

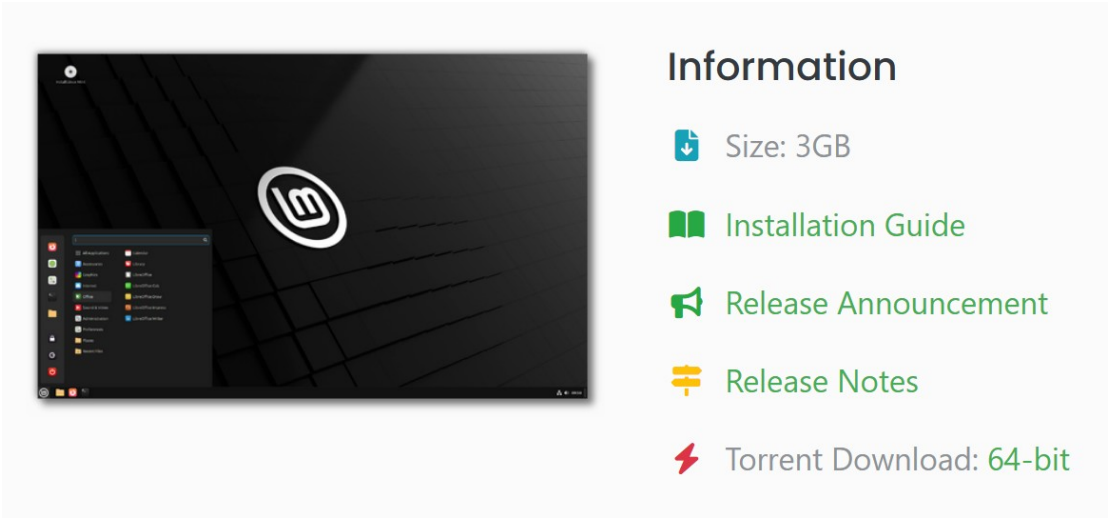
1. Virtualization with VirtualBox

1. Installing VirtualBox

*Verify the installation by opening **VirtualBox** and confirming it starts correctly once the installer has finished:*

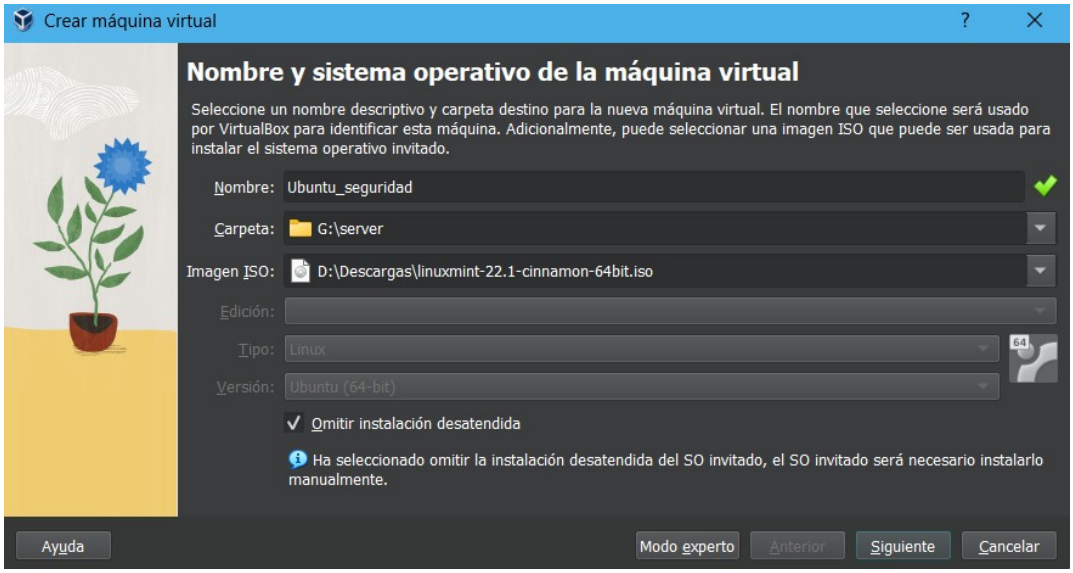


We choosed linux mint for this task:

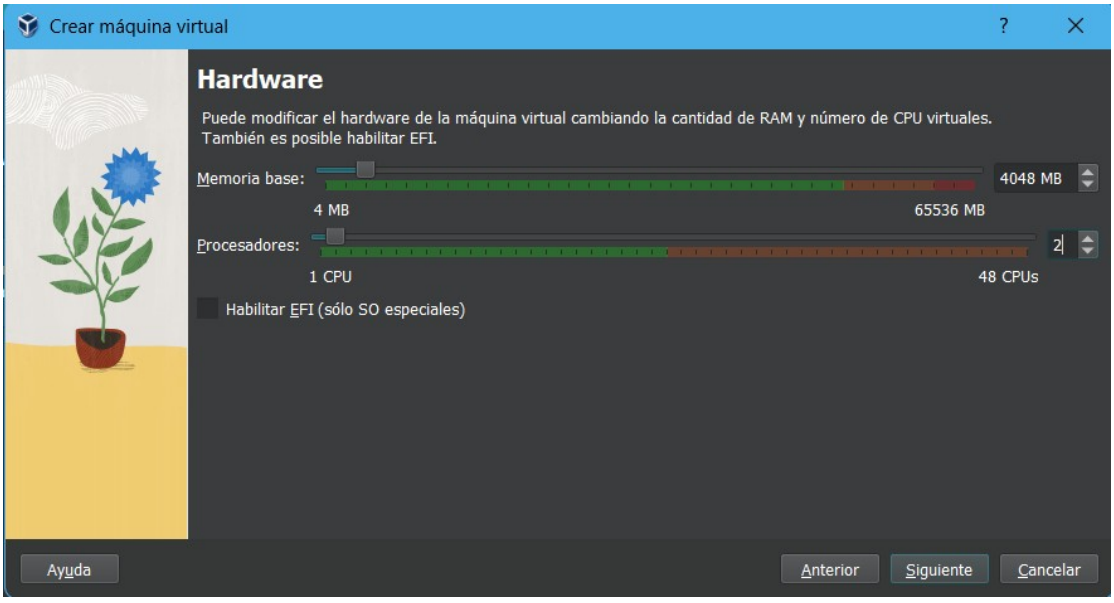


Creating a Virtual Machine (VM) in VirtualBox

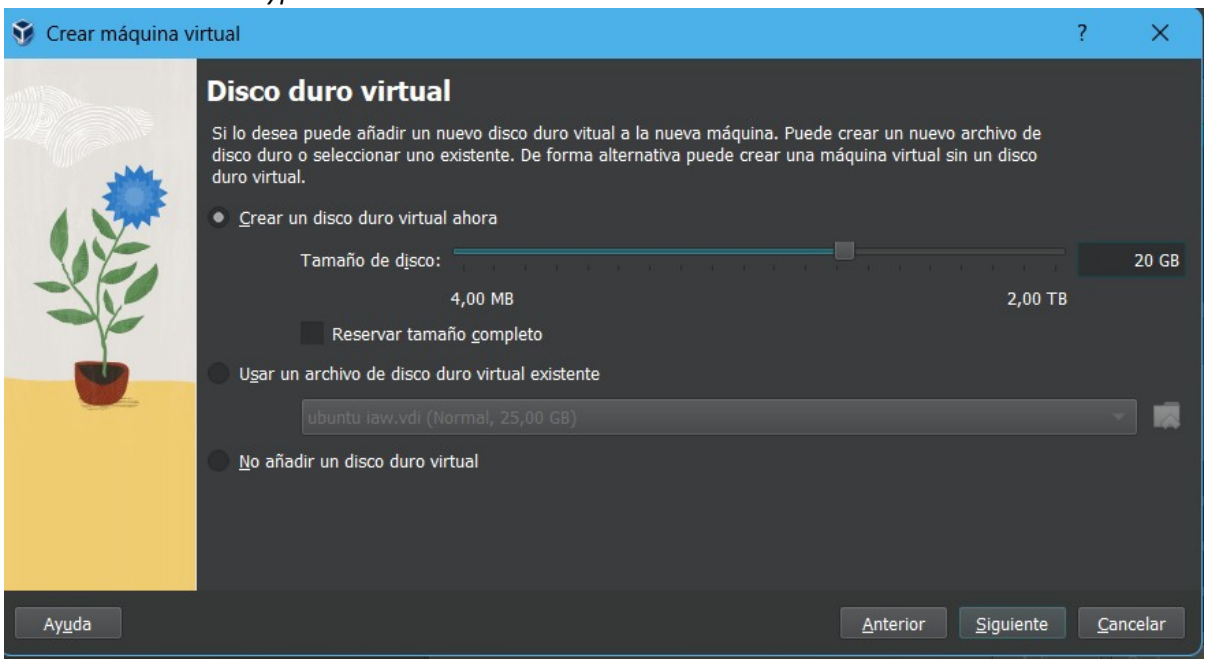
1. *Name the VM (e.g., "Ubuntu_VM"), select **Linux** as the type, and **Ubuntu (64-bit)** as the version.*



2. *Allocate RAM to the VM (recommended: at least 2 GB).*

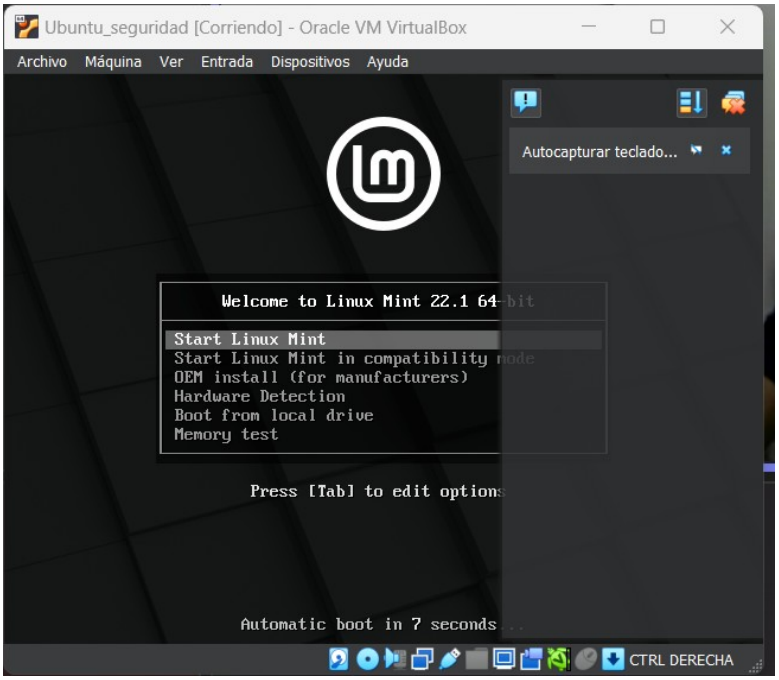


3. *Create a virtual hard disk by selecting the **VDI (VirtualBox Disk Image)** format and **Dynamically allocated** as the type. A recommended size is 20 GB.*



4. *I skipped this part because we arealy put the path of the iso on the first step.*

5. *Start the VM and proceed with the installation of Ubuntu by following the installer's prompts.*

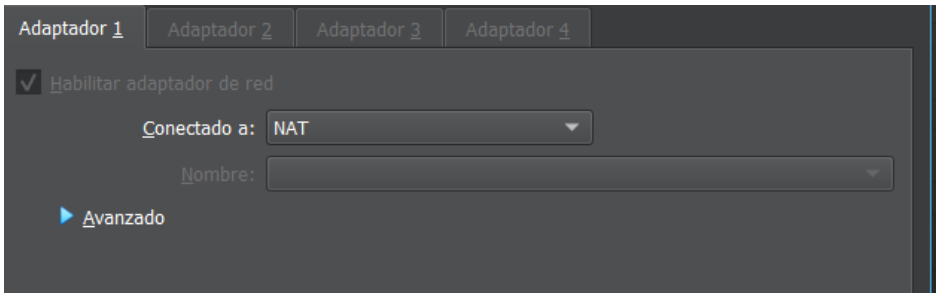


Basic Configuration of the VM

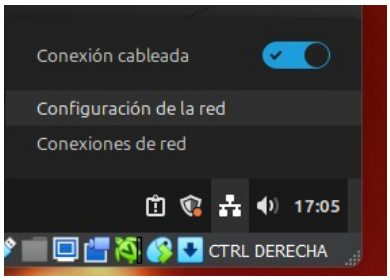
Steps: Once Ubuntu is installed,

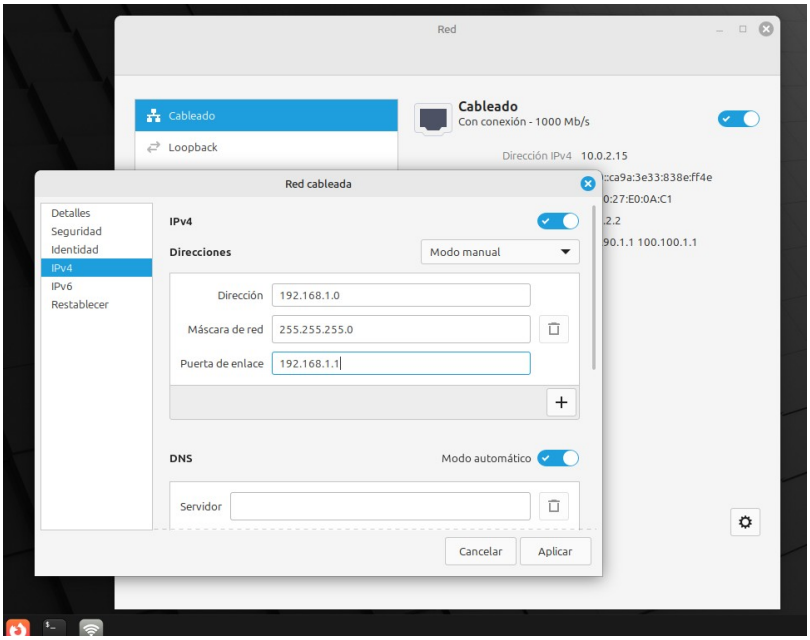
6. Perform some configurations:

- By default the network type that virtualbox puts its NAT:

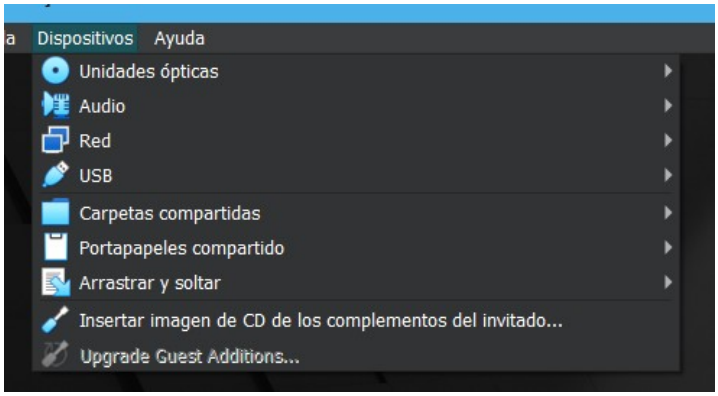


Configure the IP through the GUI:

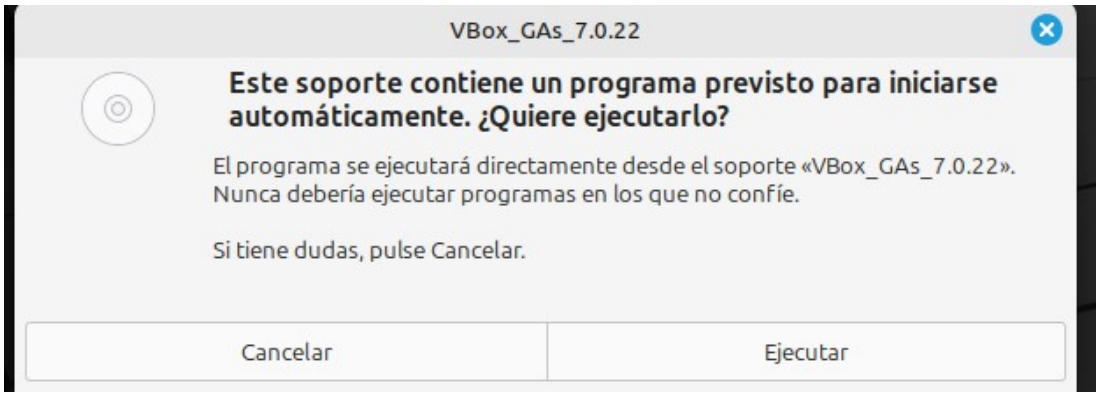




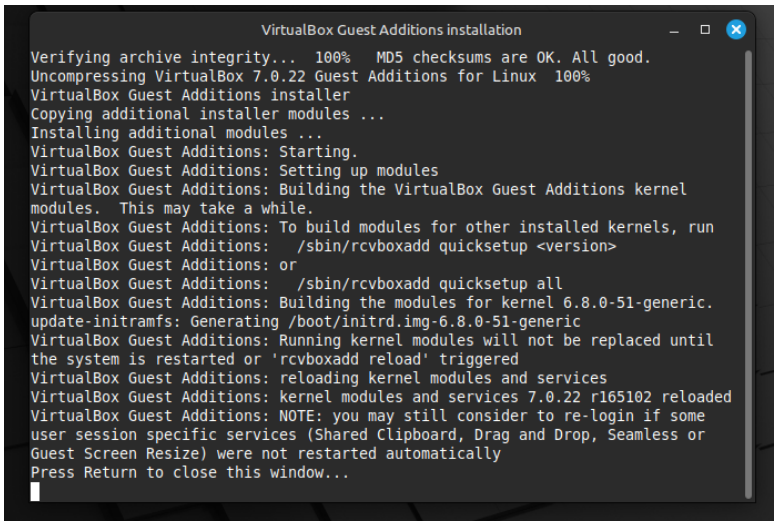
- To Install **Guest Additions** we have to choose the option below, insert the CD below:



It will show a pop up instantlly:

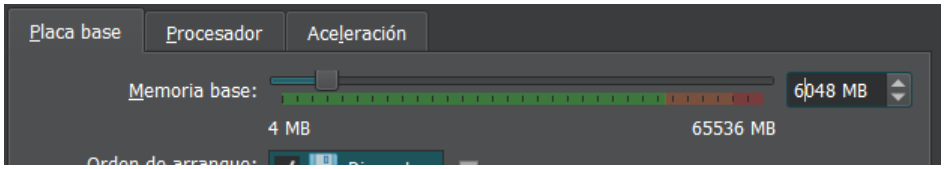


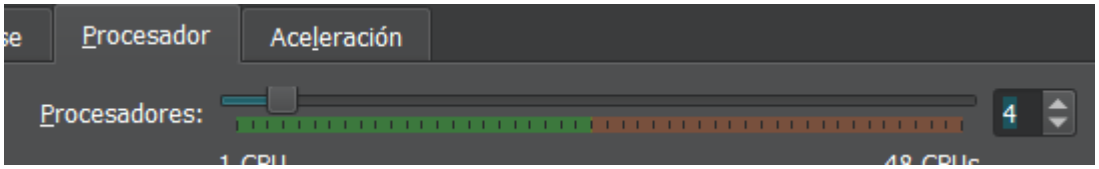
And it will automatically start the installation:



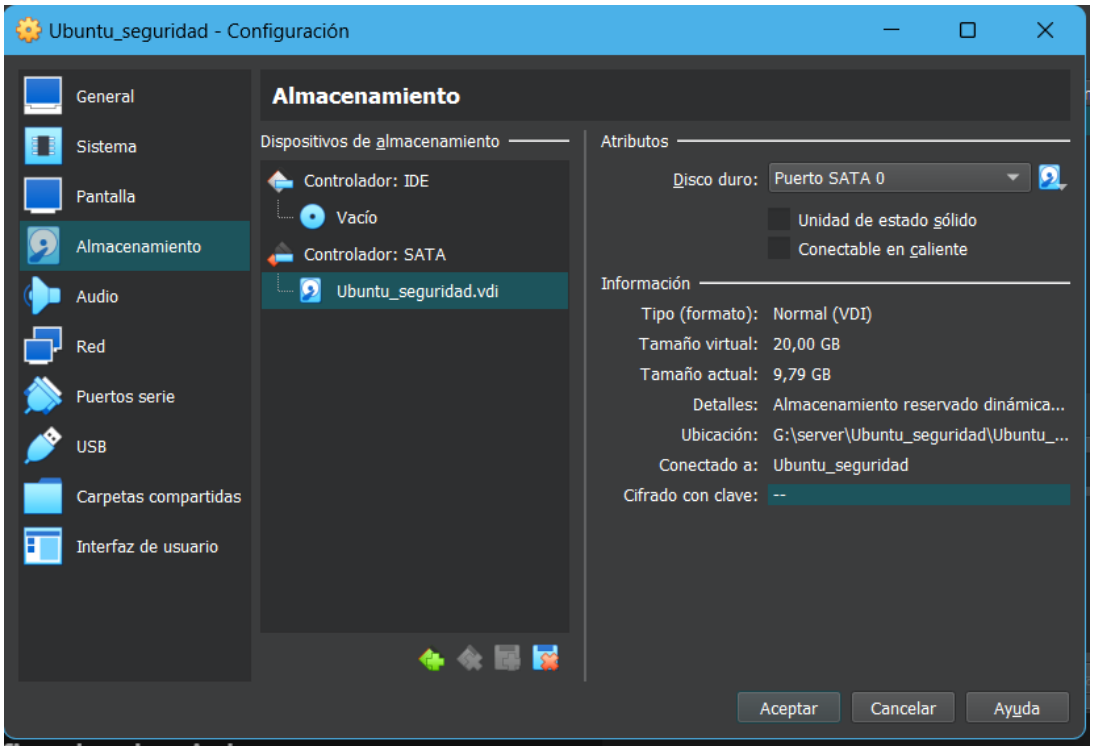
7. Configure the machine's resources:
   - Adjust the number of CPUs and RAM from the VM's configuration settings in VirtualBox.

*Once is installed we can click the configuration button, and then **we go to system:***

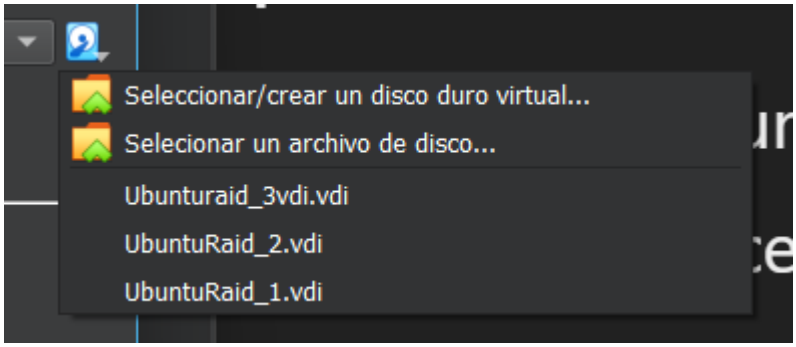




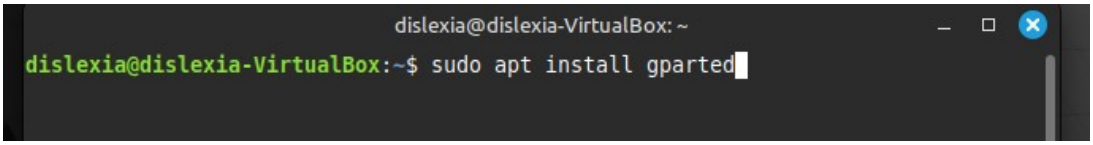
- Ensure sufficient disk space is allocated and perform functionality tests (VM boot, network verification, etc.).



Here we can update or add a new VDI to the machine:

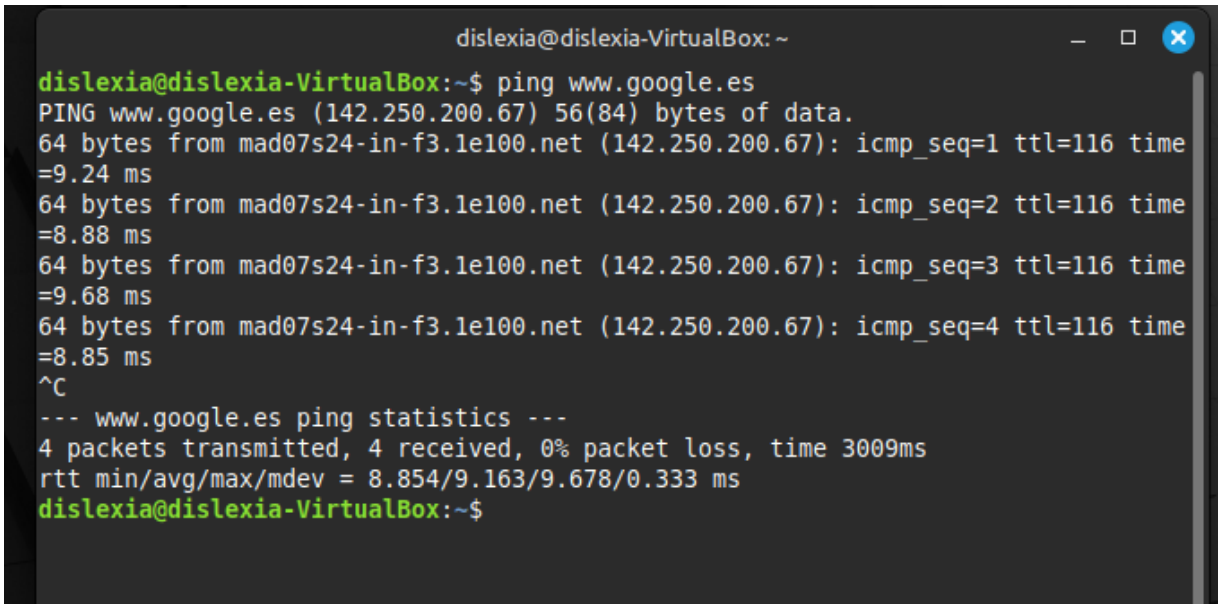


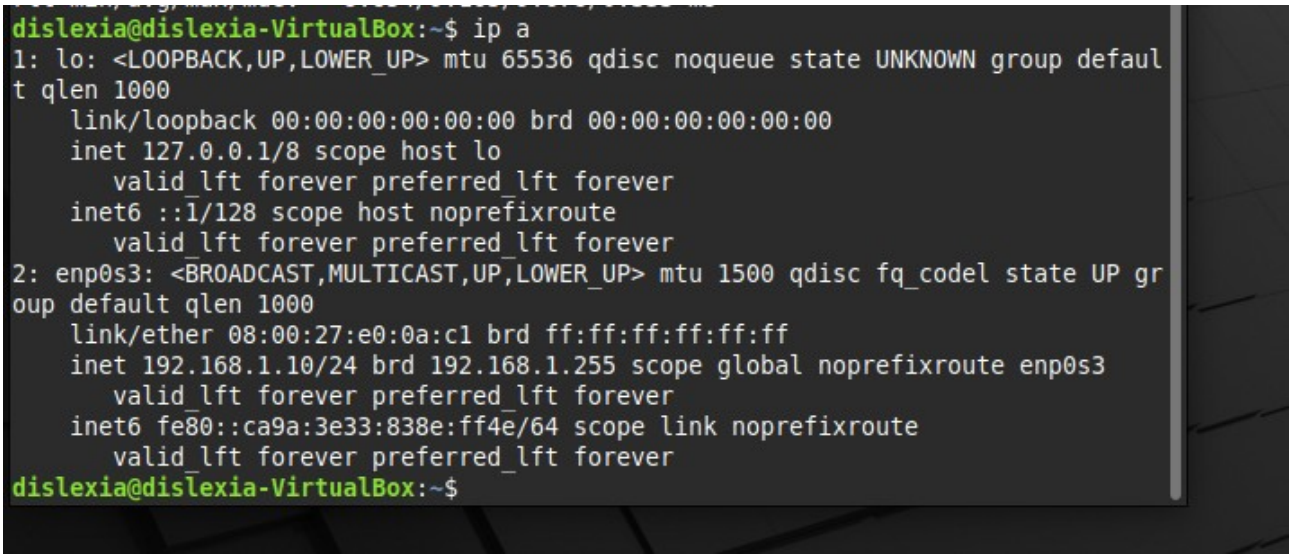
Another option that we can use inside the machine its installing gparted and resize or play with the hole partition.



2. Testing Connectivity and VM Functions

Verify that the VM has internet access and that the resources are functioning correctly:





2. Virtualization with Proxmox VE

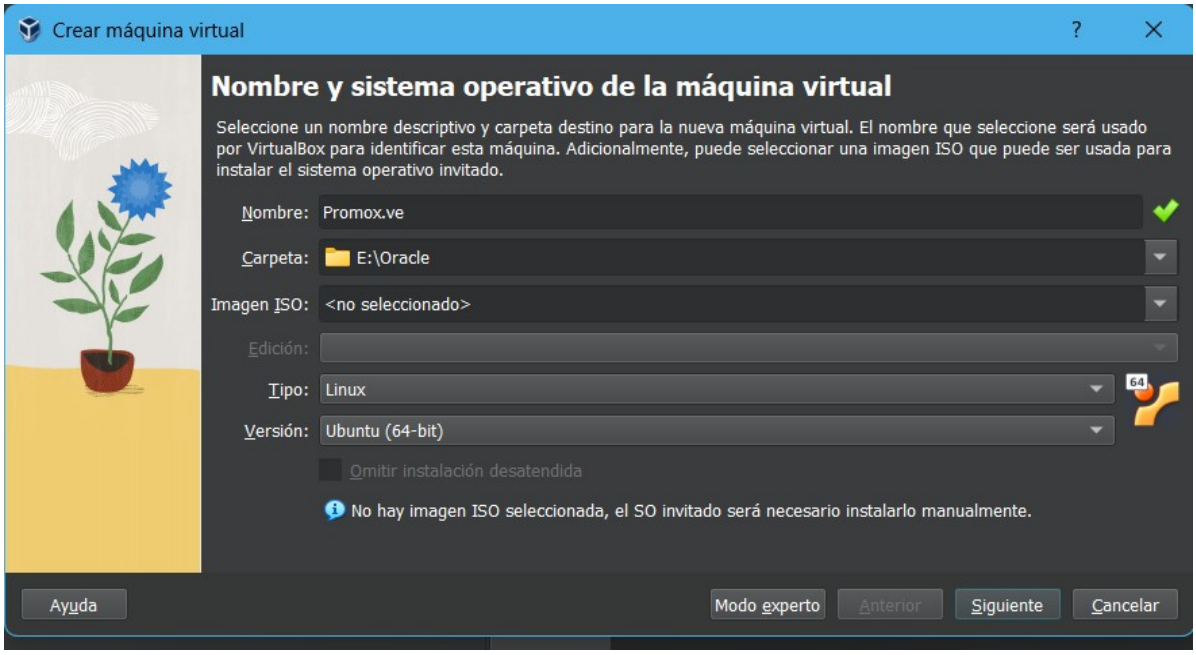
1. Installing Proxmox VE

Objective: Install Proxmox VE on a physical server or a VM.

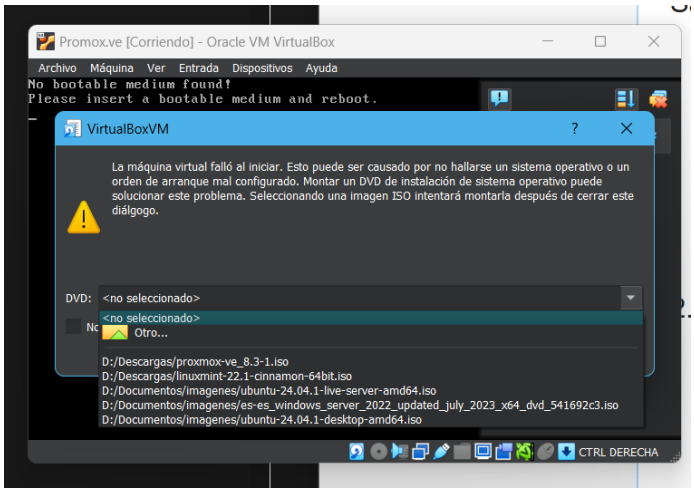
Steps:

1. Go to the official Proxmox website and download the Proxmox VE ISO.

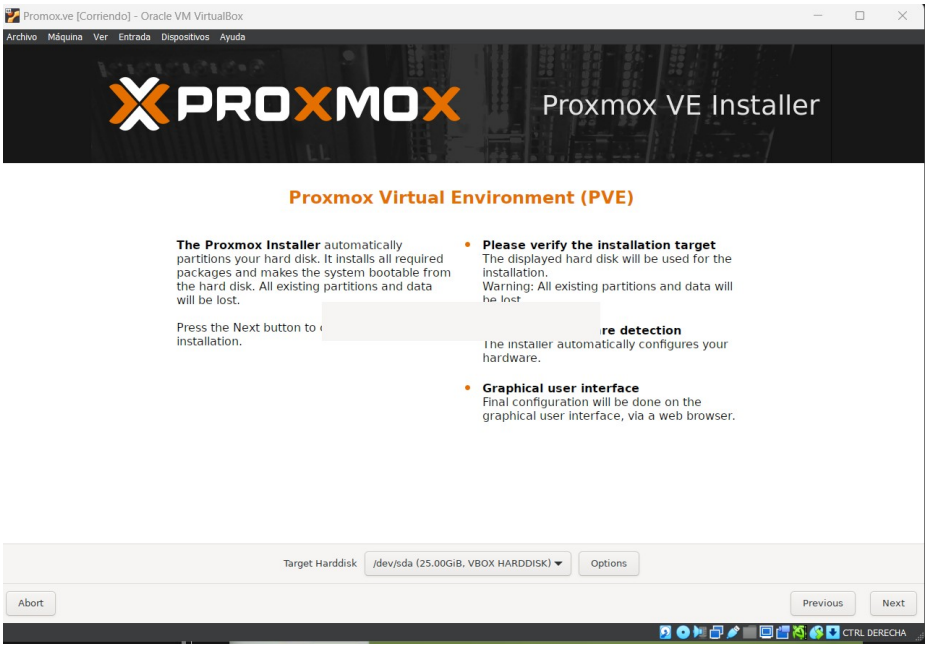
2. Create a virtual machine in **VirtualBox** or install Proxmox on a physical machine by selecting the **Proxmox VE** option during the installation.

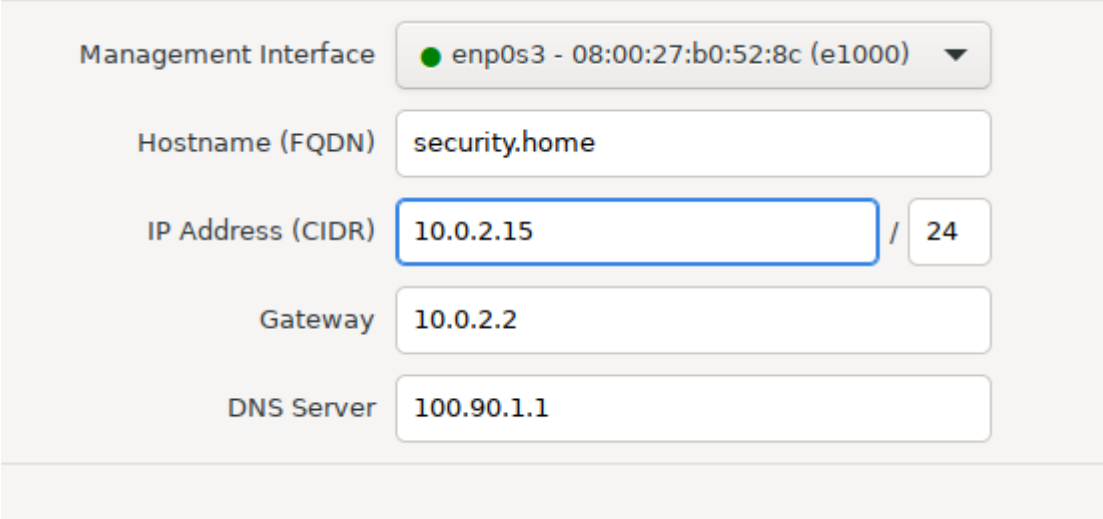


3. Follow the installation steps to complete the Proxmox setup.

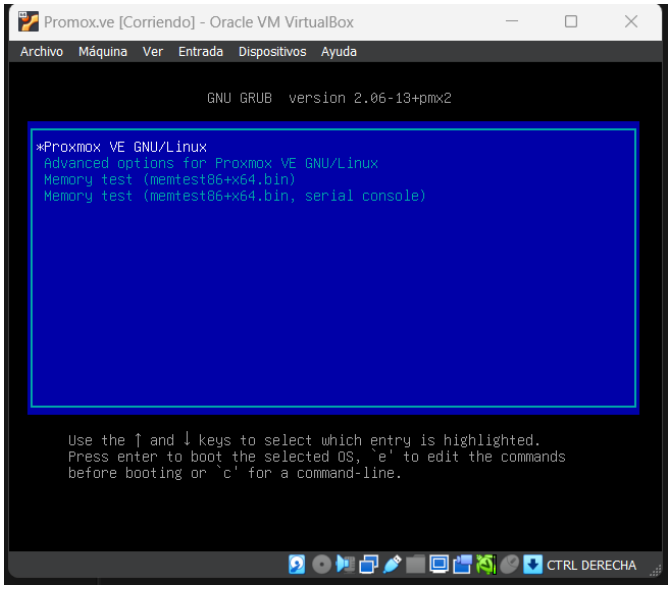


We follow the installer:





And we wait until it finish.



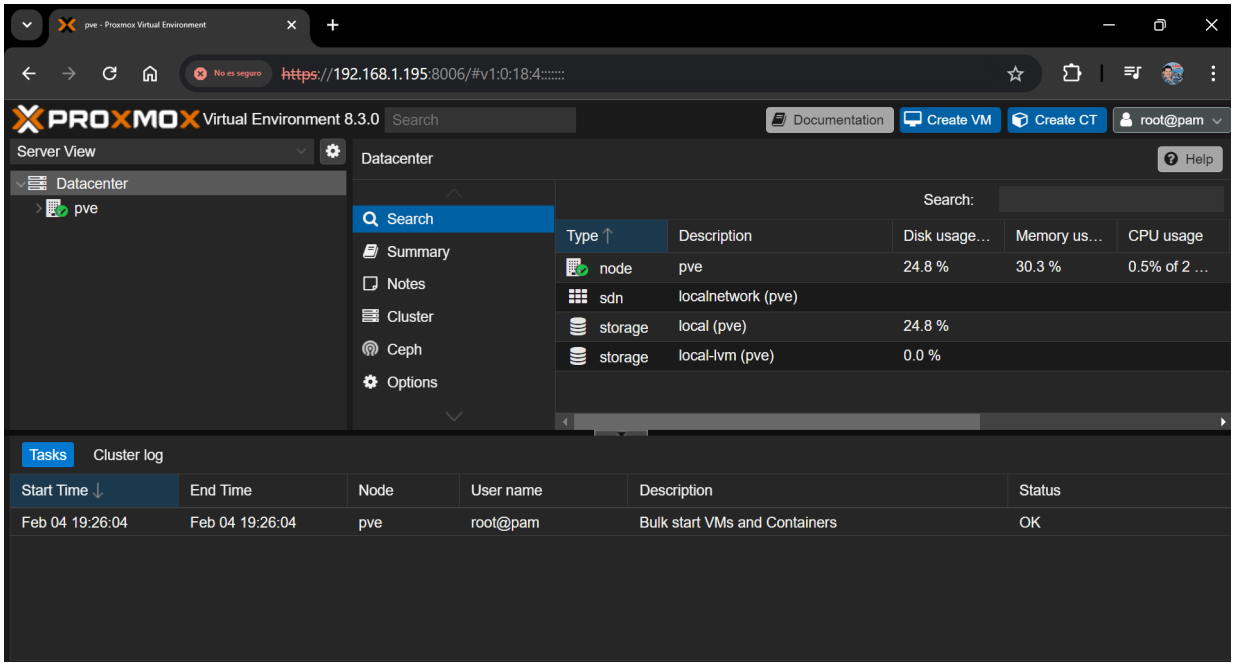
2. Initial Configuration of Proxmox VE

Objective: Configure Proxmox VE to manage virtual machines.

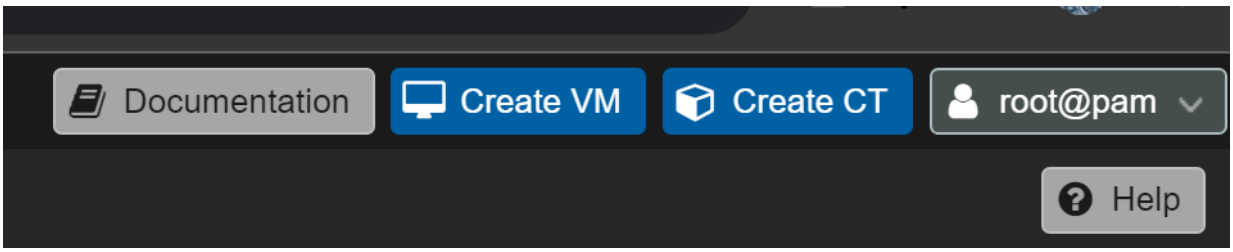
Steps:

1. Access the Proxmox web interface using a browser, entering the assigned IP address of Proxmox followed by port `8006`. Example: `https://<Proxmox_server_IP>:8006`.

2. Log in with the root user and the password set during installation.



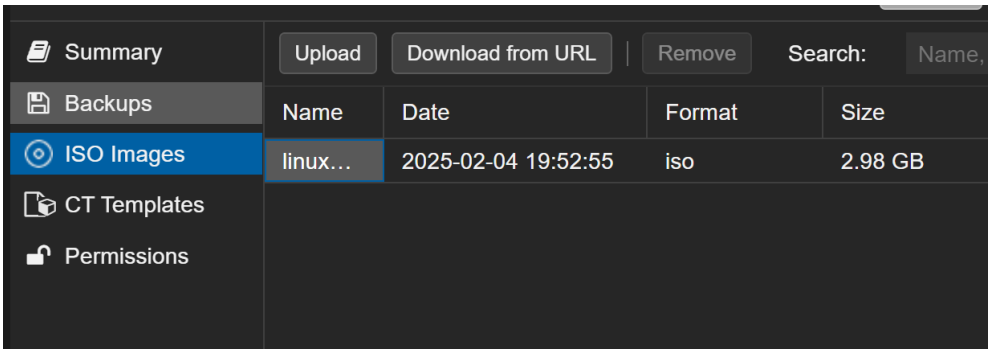
3. In the Proxmox panel, navigate to **Datacenter** → **Node** → **Create VM**.



3. Creating a Virtual Machine in Proxmox

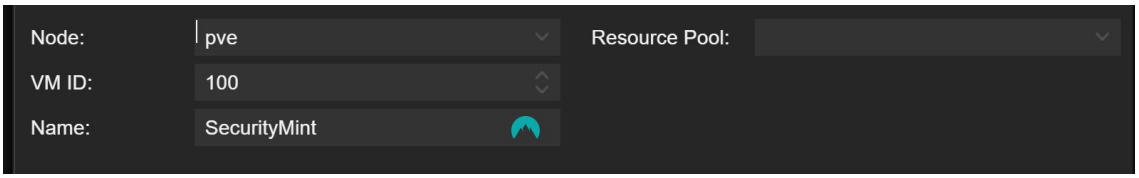
Objective: Create and manage a virtual machine in Proxmox.

We upload to the machine the website:

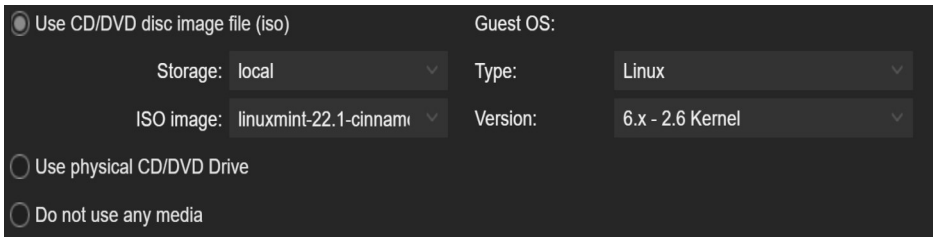


Steps:

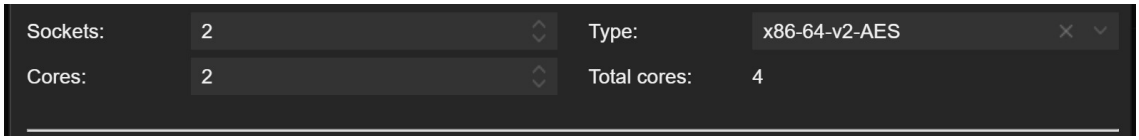
1. Click on "Create VM" and configure the following parameters:
   - **VM Name** (e.g., "Ubuntu_VM_Proxmox").



   - **Select the installation media** (it could be an ISO file, such as the Ubuntu image).Allocate **CPU**, **RAM**, and **hard disk** resources as needed. For example, 2 GB of RAM and 20 GB of disk.

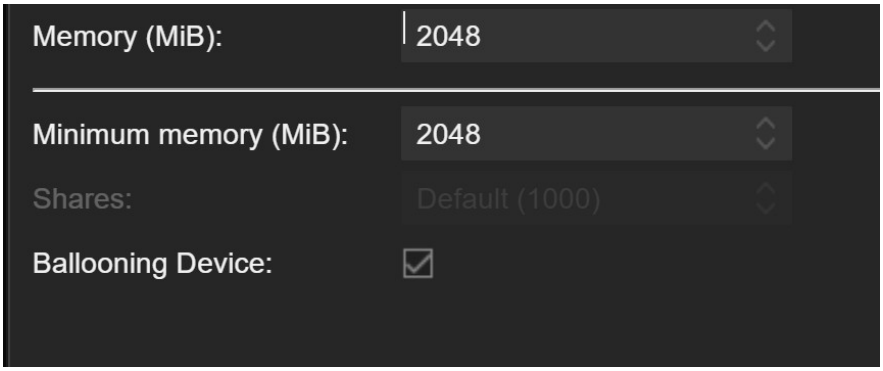


-CPU:



-HDD:

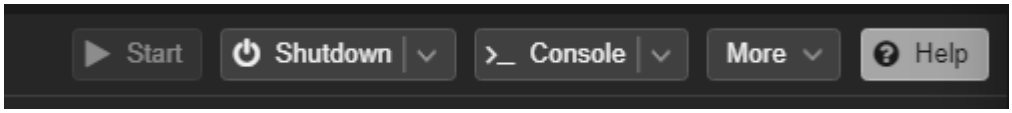
- RAM:



2. Follow the wizard to complete the VM creation process.

Once its created we have will have this in our left menu:

3. Once created, click "Start" to boot the VM and install Ubuntu as you did earlier.

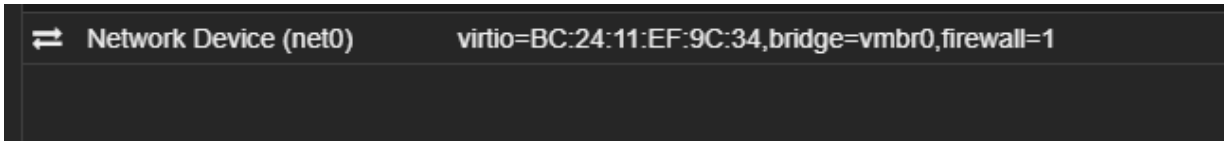


4. Configuring Network in Proxmox Objective:

Configure the network for the VM. **Steps:**

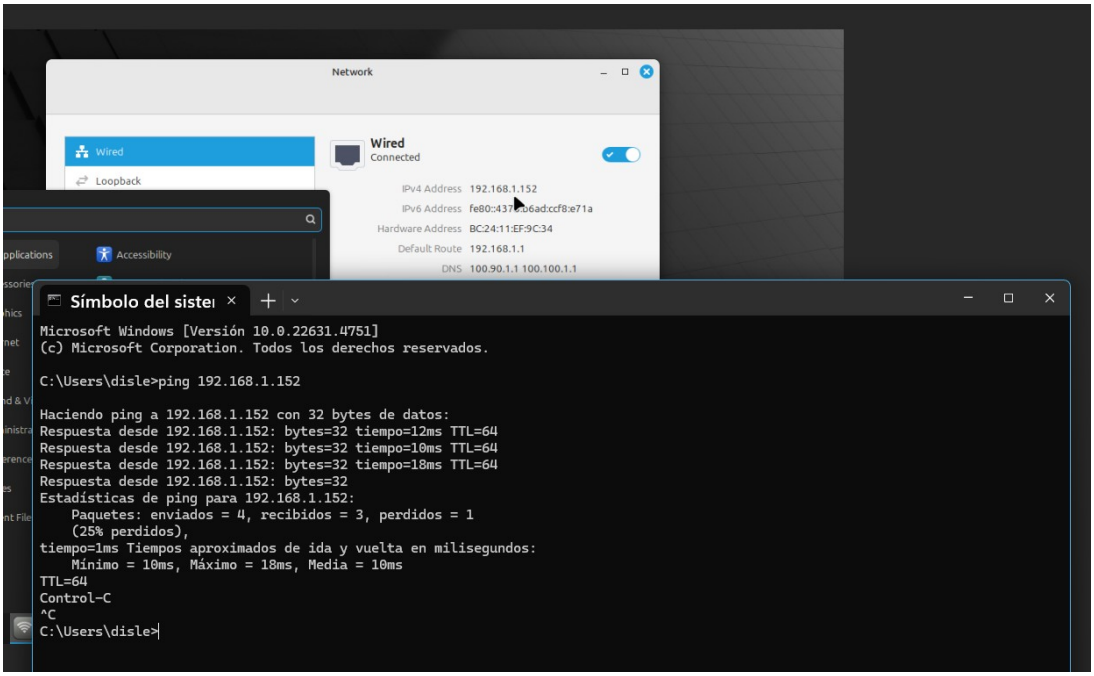
1. During installation, ensure the VM is configured with a **bridged network** or NAT according to the network requirements.

By default its configured in bridge, option vmbr0:



2. If you need access to the VM from other machines, configure a **bridge network** (Bridge) to connect the VM to the physical network.

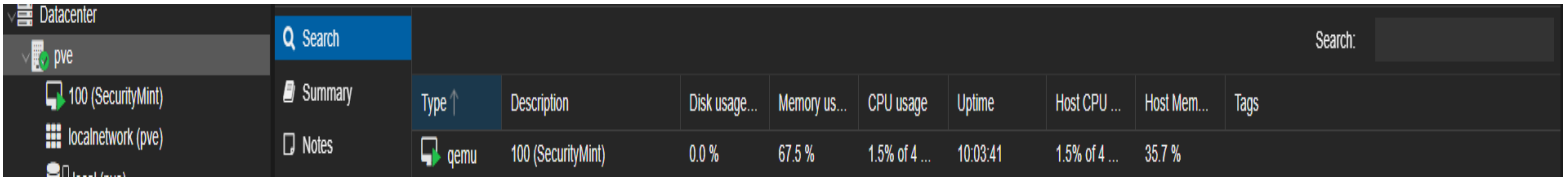
-We can test conectivity throught our main computer with a ping:



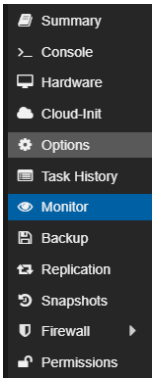
5. Managing Virtual Machines in Proxmox Objective:

Administer and monitor virtual machines. **Steps:**

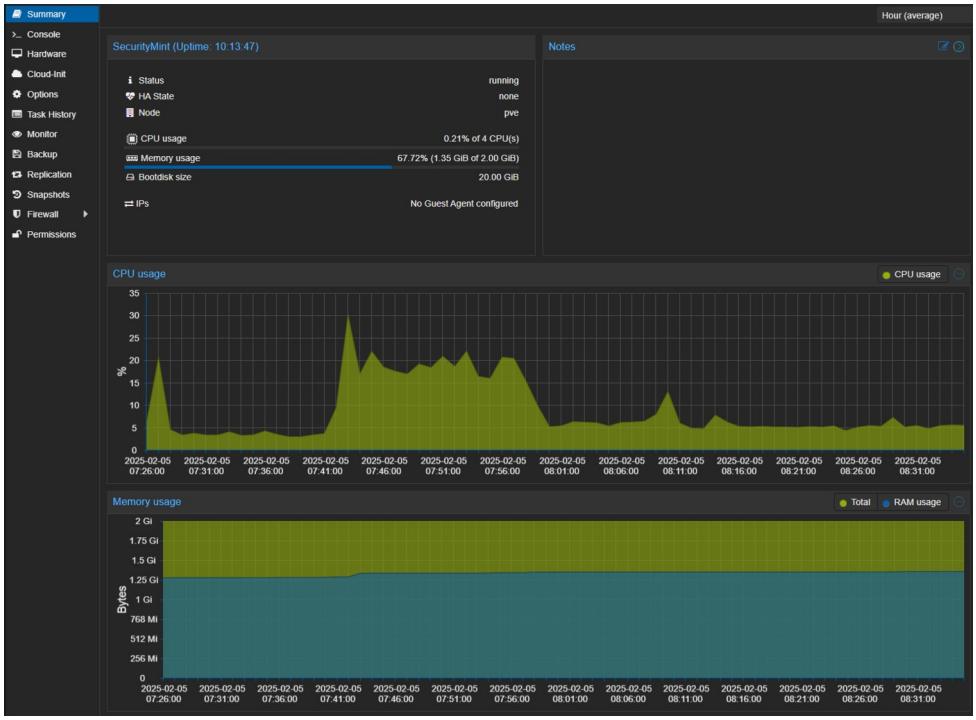
3. Use the web interface to perform administration tasks such as:
    - Clicking on the node pve we can see a table with **general info:**



We can see other info in the VM menu, monitor:

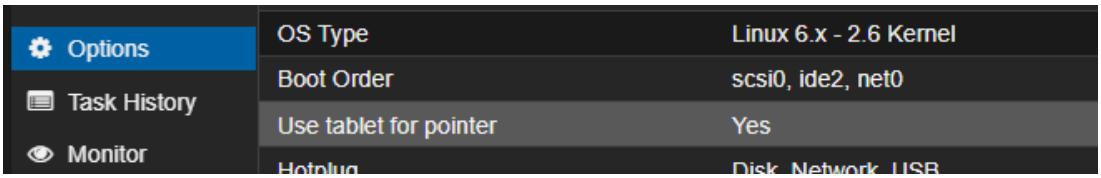


And then in the vm machine we can see the summary also that it will show the graphs:



- Configuring **boot options**, **backup**, and **migration** for the VM.

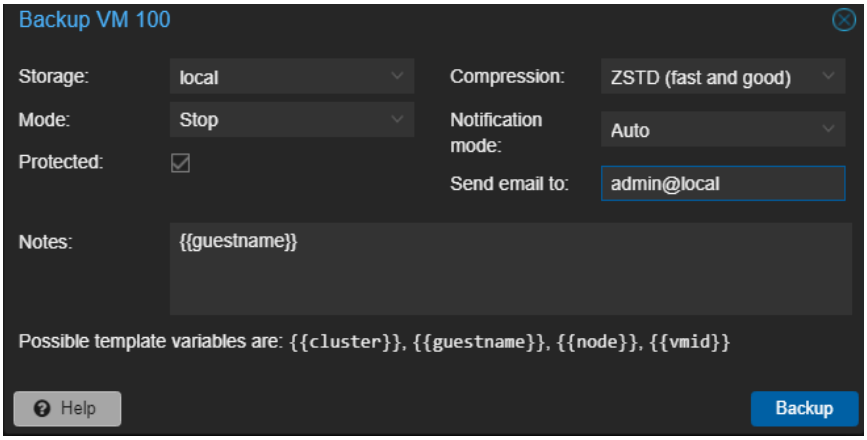
Boot is located on hardware options, with in the boot order:

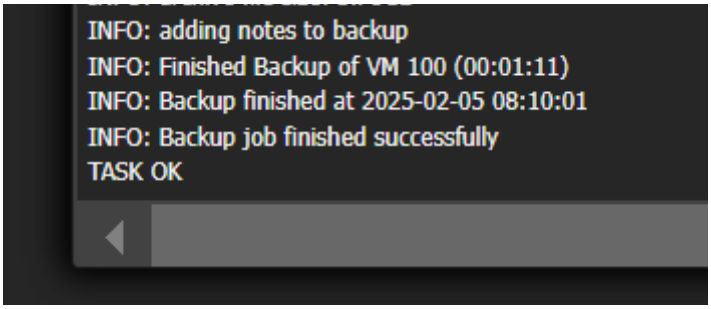


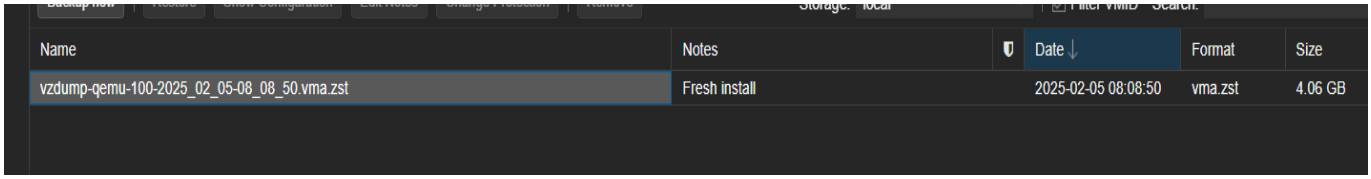
Double-click and it will pop-up a menu to edit the boot order.

-Backup option:

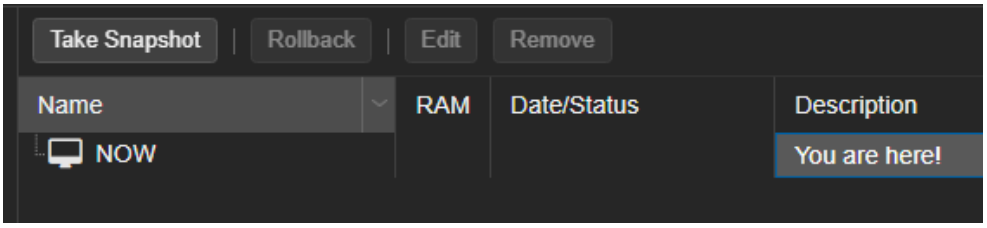
Once its creared will send a email to that mail and we will se on the web interface



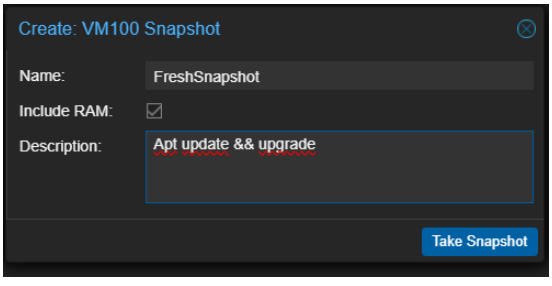




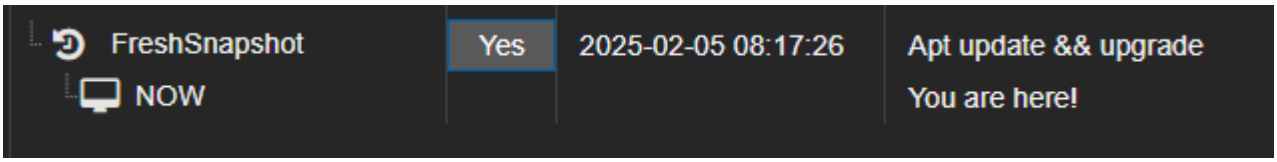
- ***Snapshot option:***



Now we are going to hit take snapshot and later, we hit take Snapshot:

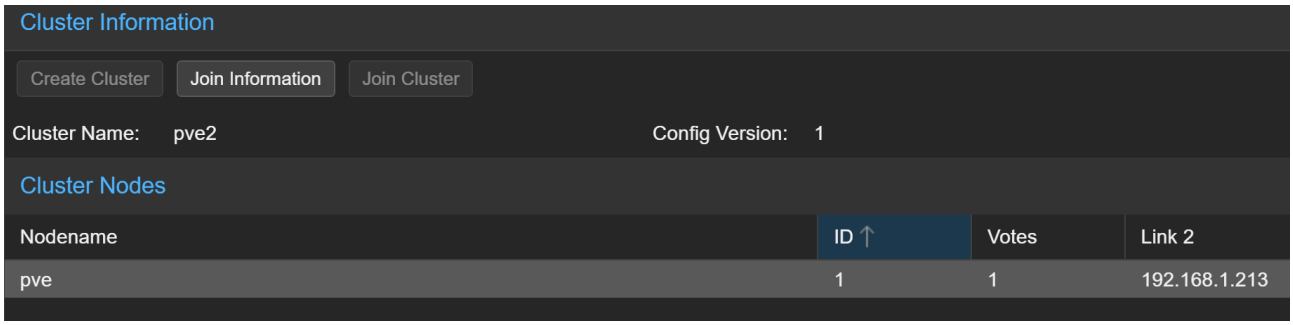


Later we will see this snapshot:

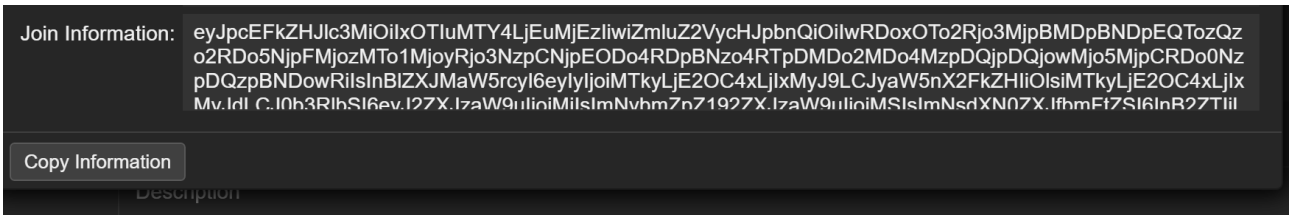


Migration option:

Now lets create a cluster on the datacenter:

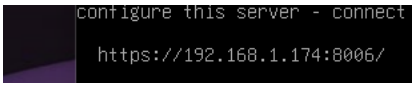


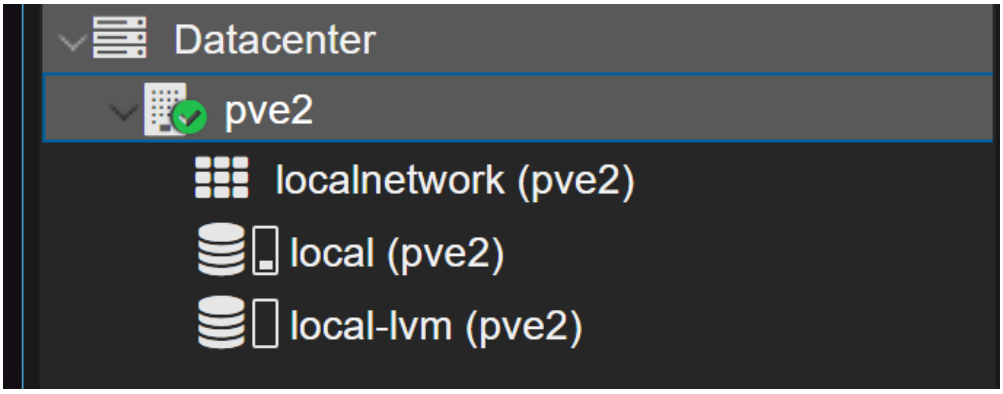
We open the join information button and copy the info to paste on the other node:



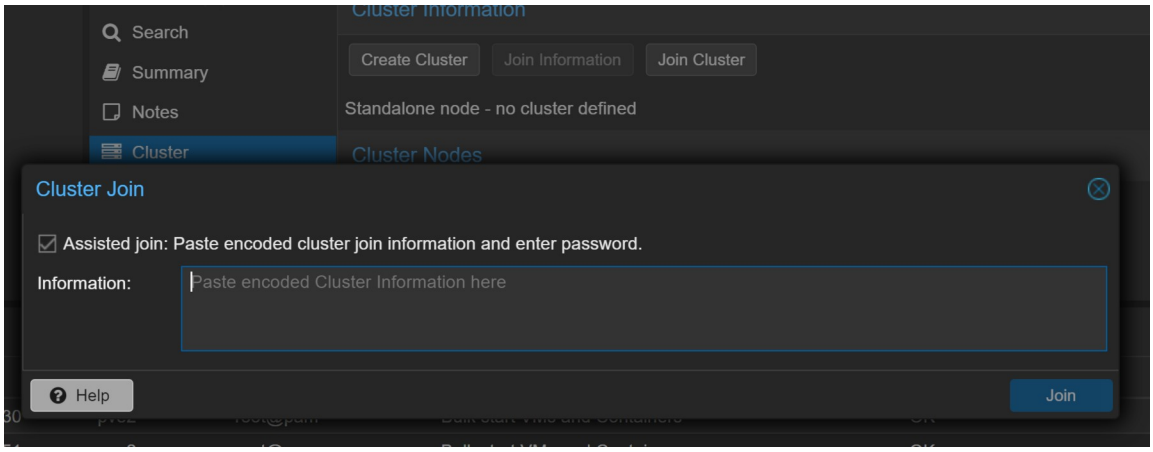
We will have to make a new server in order to migrate our vm to the other server on a "Live migration", so we have to make another node on other machine:

We will now login into the other proxmox interface:

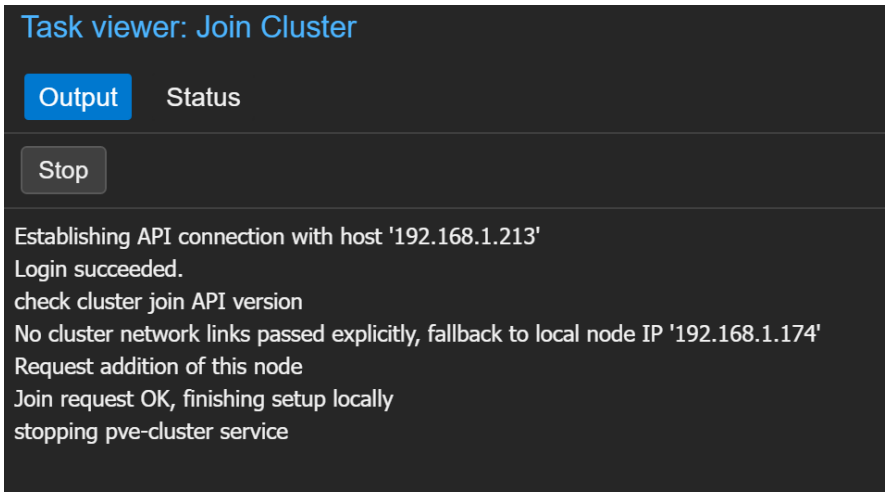


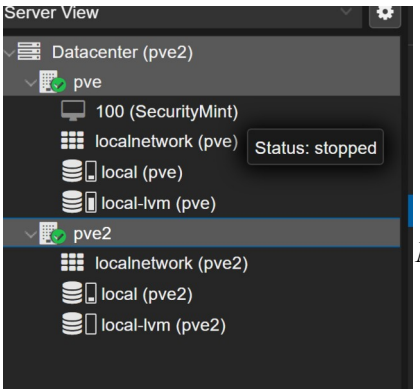


Now we will join the cluster with the join information that we had of the previous node:



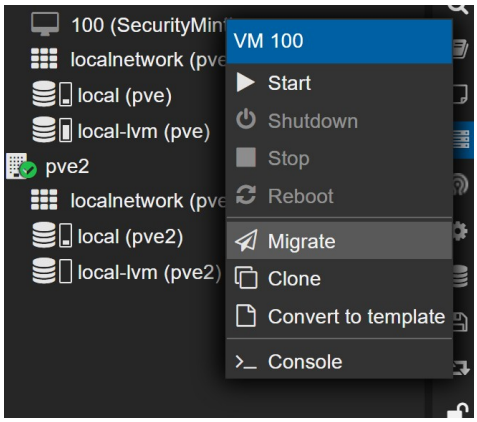
Once its copied we can see the completion of the task:



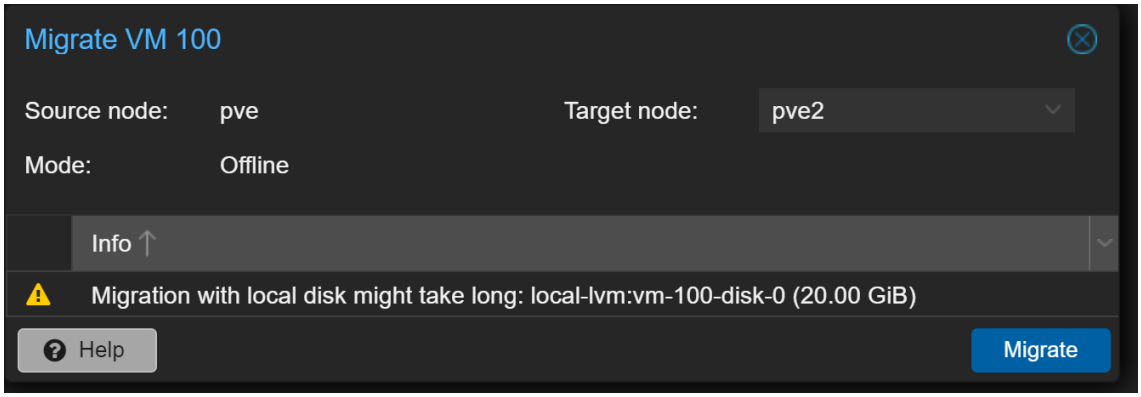


Now we can go to the first interface .213 and see that we have both nodes activated:

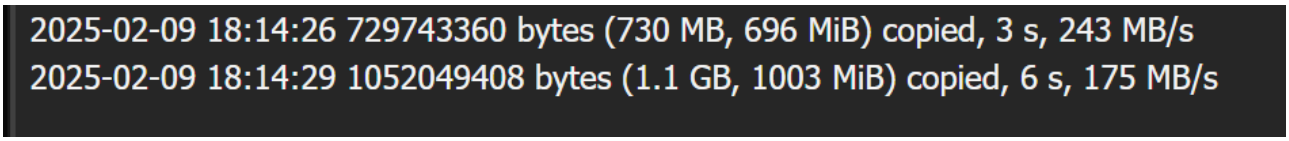
And now if we can get the migrate option right-clicking on the VM:



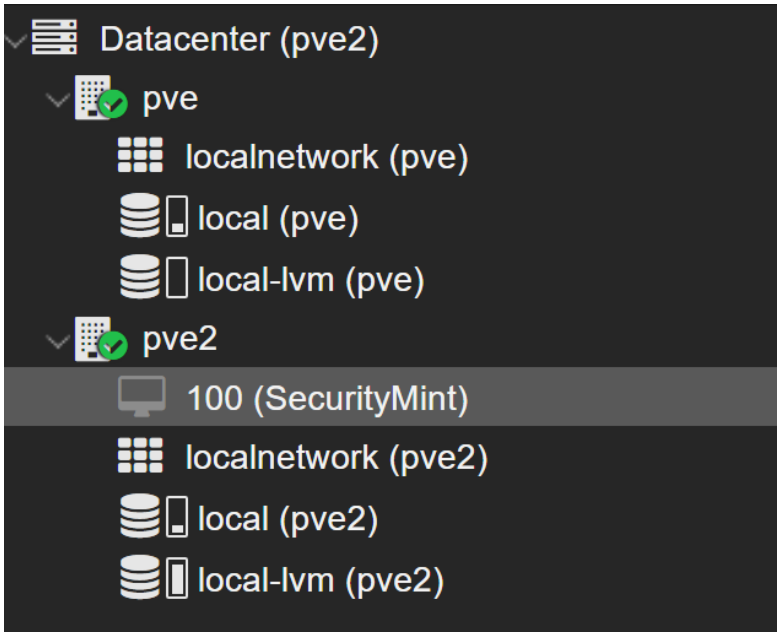
Now its easy, we just have to follow the pop-up:



As we see, the warning that appears its related to the low space on the local disk, but we can hit enter anyways, we will have to wait until the task finish:



And later we will see that the migration was successfully:



3. Comparison of VirtualBox and Proxmox

VirtualBox, as we saw, is super easy to use and configure. To use it, you only need to install the .exe on your operating system. Since it is a Type 2 hypervisor, it can only run on an existing operating system and not directly on bare metal hardware. It provides easy access to the application, but it could be slower and more challenging to use if you have a low-end computer running both your OS and VirtualBox.

Another advantage is that you only need to download an ISO file onto your computer and add a new virtual machine. The installation pop-up will guide you through the process until you power on the machine you created. Additionally, the network configuration options are very easy to understand and set up, even when creating NAT networks or private networks for interconnecting your machines.

On the other hand, the backup and cloning system is very easy to use, allowing you to import a new machine later. If you click "Add", navigate to the directory, and select the .vbox file, the machine will be imported automatically.

However, the snapshot system is a bit tricky compared to other hypervisors like Vmware, overall VirtualBox is a good software choice for students, casual users, or developers who need to quickly deploy an OS for testing purposes.

Now, let's talk about ***Proxmox***, a newer software. This one is a Type 1 hypervisor, which means it can be installed directly on bare metal hardware, without requiring an existing operating system. This makes it very useful for deploying virtual machines or operating systems on old computers or new servers through a remote hypervisor.

Proxmox is harder to get used to. You need to create a node for each system, and each node can contain multiple VMs, forming a cluster. Setting up your first machine is less intuitive compared to VirtualBox, but on the other hand, it offers more advanced options. The networking configuration is also more advanced but harder to understand. Once deployed, you can upload an image from your local storage to the node you created in Proxmox and install it.

Additionally, we saw that you can create a cluster of nodes to migrate machines live or offline, which is a very useful feature. You also have real-time metrics for your node (computer/server) and every VM running on it.

Proxmox is a powerful and professional tool for deploying VMs and clusters on servers or computers. However, it requires a lot of knowledge or extensive documentation reading to master this hypervisor.

Main points:

Feature	VirtualBox	Proxmox
Hypervisor Type	Type 2 (Runs on an OS)	Type 1 (Bare metal)
Performance	Slower, dependent on host OS	Faster, direct access to hardware
Use Case	Desktop virtualization, testing	Server virtualization, data centers
Cluster Support	No	Yes, multi-node clusters
Container Support	No	Yes (LXC)
Snapshots & Backups	Limited	Advanced snapshot & backup features
Networking	Basic NAT/Bridged	Advanced SDN (Software-defined Networking)