

# Getting Started with Proxmox: A Beginner's Guide to Virtualization

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Photo by on

*Proxmox is arguably virtualization's best-kept secret, and the big boys definitely want it to stay that way. Let me introduce you to Proxmox if you've been looking for the best hypervisor but haven't found it yet.*



Why am I allowed to make such a bold statement on a thing you've never heard of?

**The answer's easy...I've used it.**

**Using KVM for full virtualization and OpenVZ for container virtualization, Proxmox combines the best of both worlds .**

It is an open-source virtualization platform made for managing containers and virtual machines. It offers a strong and adaptable solution for setting up and administering virtual environments. A strong platform that makes it simple for users to handle virtual machines and containers is called Proxmox Hypervisor. It is an ideal solution for small and medium-sized businesses looking to virtualize their IT infrastructure.

*The formal name of it is "Proxmox Cluster file system" (pmxcfs). PMXCFS is a database-driven filesystem that houses configuration files. While using Coro sync, all modifications made to files or copies or deletions of files on this filesystem are promptly replicated across all nodes. The Coro sync cluster engine is an approach to group communication that is used to provide high availability inside an application.*

## Key-Features of Proxmox Hypervisor 💡

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1. It is a project led by the community that is always expanding, with new features and enhancements being introduced on a regular basis.
2. Allows for both KVM-based and container-based virtualization. It enables the usage of several virtual machines and containers on a single physical server.
3. Offers a centralised management interface for managing virtual machines and containers from a single place. This simplifies the deployment, monitoring, and management of virtual environments
4. Offers a high-availability functionality for virtual machines and containers to ensure optimum uptime. In the case of a hardware breakdown, it automatically identifies and migrates virtual computers to another node.

5. Enables users to relocate virtual machines and containers from one host to another without affecting the host's performance. This function is beneficial for load balancing, maintenance, and hardware upgrades.
6. Has an integrated backup and restore functionality that allows users to backup virtual machines and containers to an external storage device. It also enables incremental backups, which saves time and space on the hard drive.
7. This feature allows customers to duplicate virtual machines and containers to a distant site in the event of a disaster.
8. Allows users to establish several virtual environments for various departments or clients by supporting multi-tenancy. Each virtual environment is separated from the others, guaranteeing the highest level of security and privacy.
9. Enables users to add more virtual environment nodes as needed. This makes it simple to scale the virtual environment as the company expands.

## Distinct Facts....

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👉 Proxmox Hypervisor is based on **Debian Linux**, a widely used distribution in the Linux community. This implies that users may benefit from Debian's stability and security while simultaneously reaping the benefits of a virtualization platform.

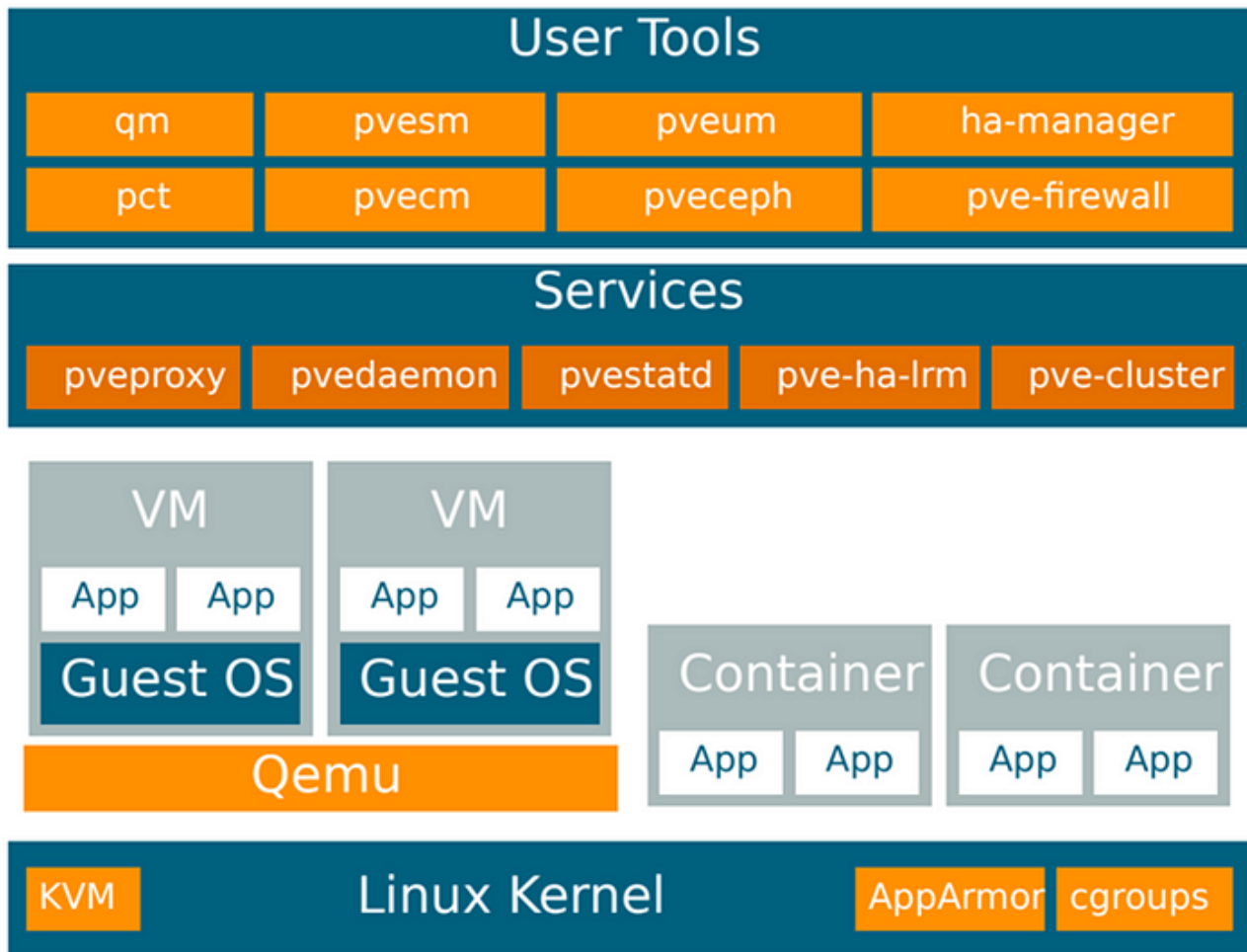
👉 Proxmox Hypervisor is also intended to function with a wide range of hardware, including Intel and AMD CPUs, making it a versatile option for enterprises with varying hardware requirements.

👉 Proxmox Hypervisor also has a comprehensive range of networking options. It can establish virtual networks with VLAN tagging, bridges, and bond interfaces and supports both virtual and physical network interfaces. This enables users to create complicated network topologies and effortlessly link their virtual environments with their current network infrastructure.

👉 The most essential aspect is that this is a free product that is only supported by a small group of developers and community members. Isn't it exciting?

## Proxmox Architecture

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Proxmox is a **cluster-based hypervisor** with an emphasis on high availability. It is intended for use with numerous server nodes. They provide redundancy or high availability to the platform while increasing uptime by installing several nodes in a cluster. In a production virtual environment, a cluster of nodes might range from a few dozen to several hundreds. It may be impractical for an administrator to make changes to configuration files on the cluster one node at a time. Depending on the number of nodes in the cluster, changing a single minor parameter in each node's configuration file might take many hours.

Here's a brief comparison to help you understand Proxmox even better!

Parameter	Proxmox VE	VMware ESXi	Hyper-V
Maximum logical CPUs per host	768	896	512
Maximum RAM per host	12 TB	24 TB	48 TB
Nodes per cluster	No explicit limit	96	64
Maximum VMs per host	No explicit limit	1024	1024

Fig 1: Comparison of different Hypervisors

Features	Proxmox VE	VMware ESXi	Hyper-V
Based on	Linux KVM	VMkernel	Windows
Product type	Open source	Proprietary	Proprietary
Central management	Built-in	Supported with paid license	Supported
High availability	Supported	Supported	Supported
Load balancing	Supported	Supported	Supported
Live VM migration	Supported	Available with paid license	Supported
Migration/Conversion	Possible with third-party tools	Possible with native and third-party tools	Possible with native and third-party tools
Backup and restore	Supported	Supported	Supported
Licensing/Pricing	Free	Free with limited features, fully featured paid license	Free/included with Windows license
Support and updates	Subscription	Subscription	Included with Windows
Remote management options	Web client and CLI	Web client, CLI, PowerCLI, vCenter Server, System Center—Virtual Machine Manager (VMM)	Hyper-V manager, PowerShell, Windows Admin Center (WAC), System Center—Virtual Machine Manager (VMM), vCenter Server
Market share	Low	High	Medium

Fig 2: Comparing various hypervisors

So, now you have no excuses. Go download it, install it and experience for yourself, the ultimate hypervisor. Follow me

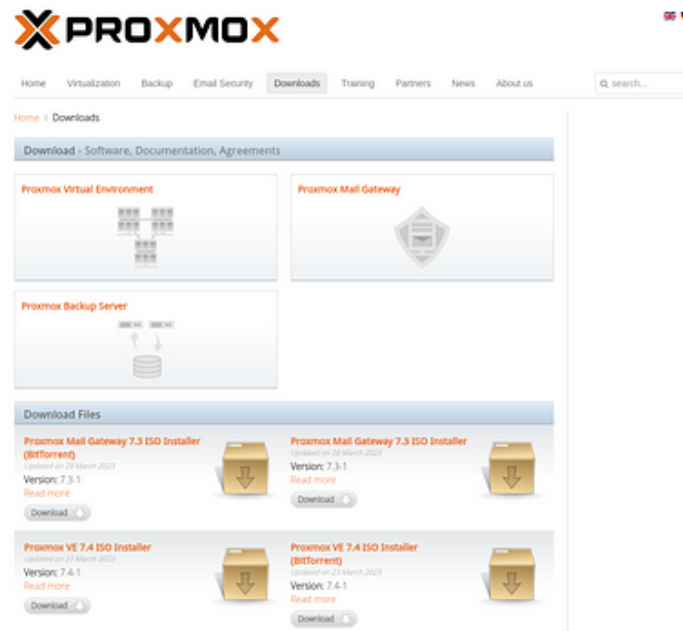
Getting started with Proxmox Hypervisor is easy.

Here we have provided you with detailed steps right from downloading the right application file covering all the essential steps.

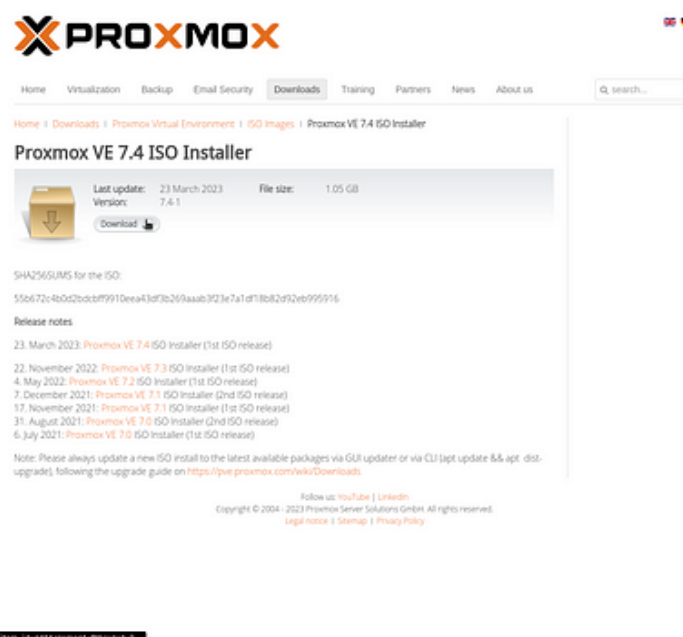
- Downloading Proxmox Hypervisor
- Proxmox Installation
- Creating Proxmox on Virtual Machine

**Downloading Proxmox Hypervisor**

The first step is to download the ISO image from the Proxmox website “” and burn it to a CD or USB drive. Once you have the installation media, you can boot from it and follow the on-screen instructions to install Proxmox Hypervisor.




Select Proxmox Virtual Environment and proceed



Click on download (version may vary)

2.

New VM

 Create a new virtual machine  
Step 1 of 5

Connection: QEMU/KVM

Choose how you would like to install the operating system

☒ Local install media (ISO image or CDROM)

☐ Network Install (HTTP, HTTPS, or FTP)

☐ Import existing disk image


☐ Manual install

Cancel

Back

Forward

New VM



Create a new virtual machine

Step 2 of 5


Choose ISO or CDROM install media:

home/uttkarsh/Downloads/ISOs/proxmox-ve\_7.4-1.iso


▼

Browse...

Choose the operating system you are installing:



None detected



☒ Automatically detect from the installation media / source

Cancel


Back

Forward

i. On KVM, Create a new Virtual Machine of Proxmox



New VM

 Create a new virtual machine  
Step 3 of 5


Choose Memory and CPU settings:

Memory: 2048 — +  
Up to 7554 MiB available on the host

CPU: 4 — +  
Up to 12 available

Cancel Back Forward

New VM



Create a new virtual machine

Step 4 of 5

☒ Enable storage for this virtual machine

☐ Create a disk image for the virtual machine

15.0

–

+

GiB

309.4 GiB available in the default location

☐ Select or create custom storage

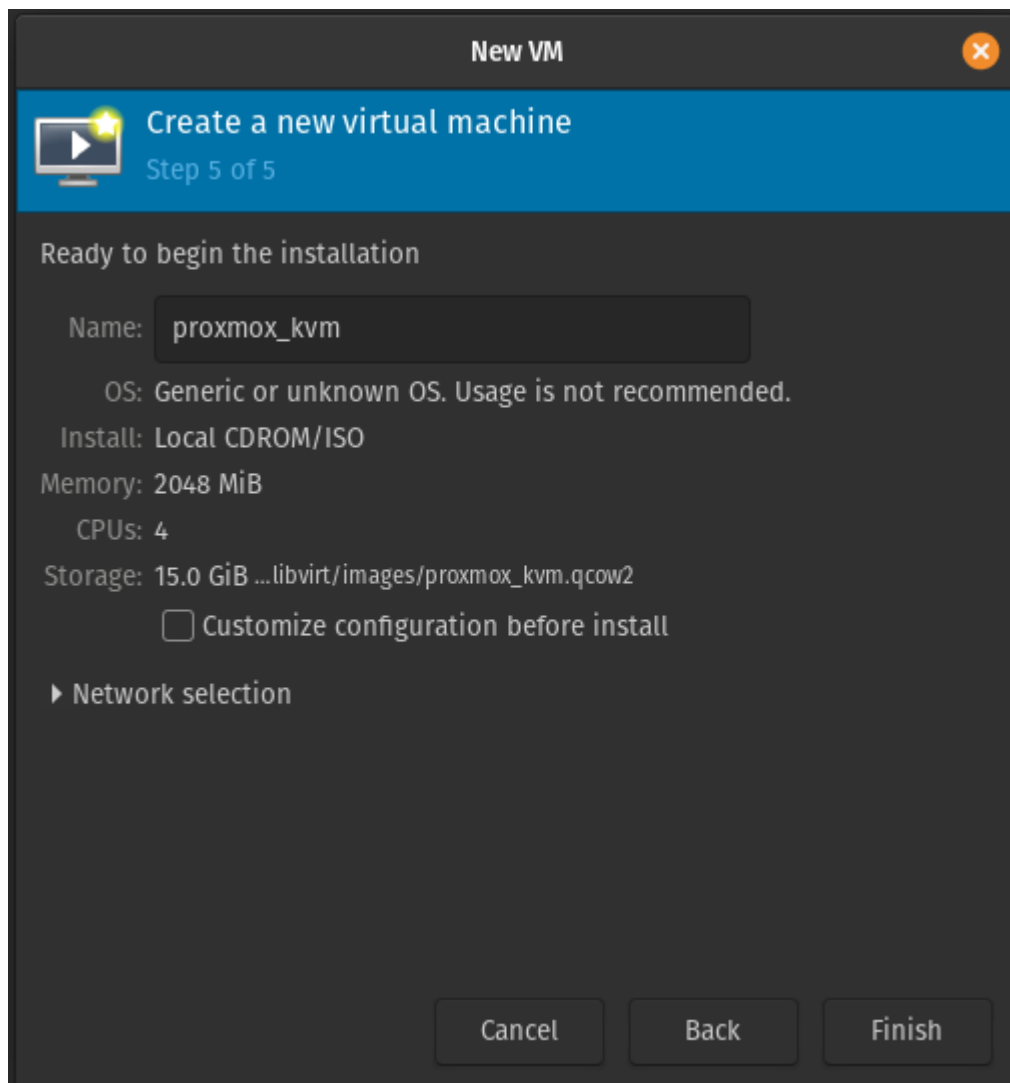
Manage...

Cancel

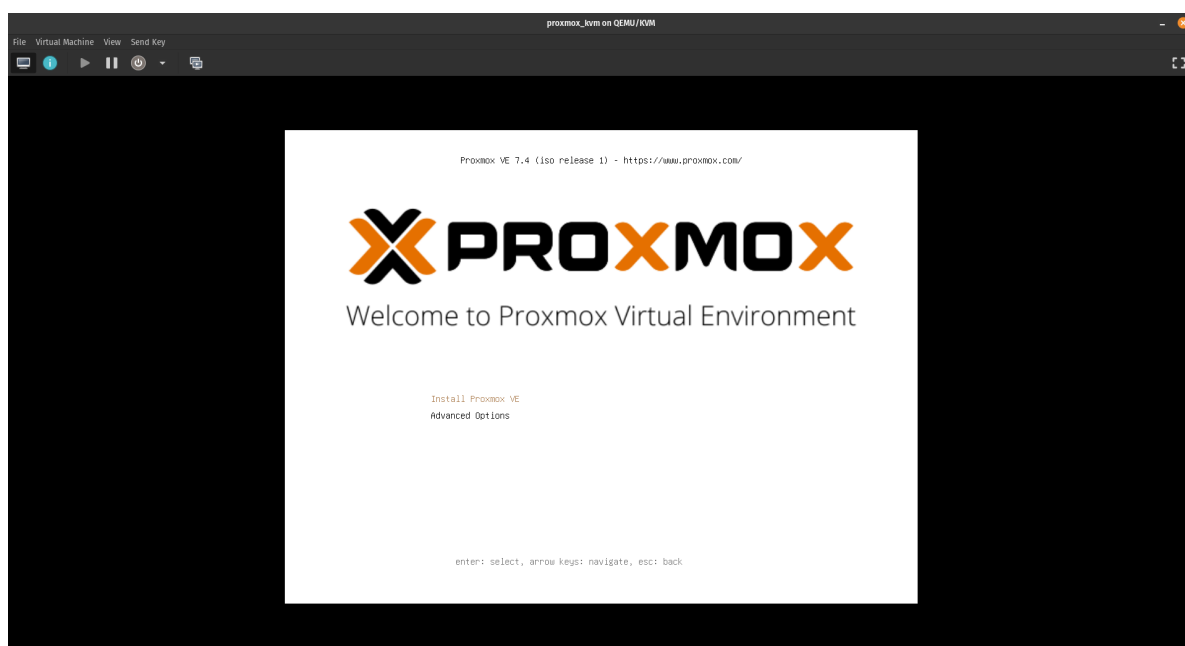
Back

Forward

ii. Allocate Memory, CPUs and Disk Storage



iii. Give appropriate name and click on finish




```
proxmox_kvm on QEMU/KVM
File Virtual Machine View Send Key

Welcome to the Proxmox VE 7.4 installer
Initial setup startup
mounting proc filesystem
mounting sys filesystem
boot commandline: BOOT_IMAGE=/boot/linux66 no ramdisk size=16777216 rw quiet gpt
loading drivers: ISO-pix4 ata.acpi floppy qemu_fwcfg nec_hid ehci_pci uhci_i
ata_rapi aeshl_intel ghesh_cimulni_intel crc32_pciulul crc10d0if_pciulul kvm_intel
modprobe: ERROR: could not insert 'intel_i801': No such device
modprobe: ERROR: could not insert 'intel_tcc_cooling': No such device
searching for block device containing the ISO proxmox-ve-7.4-1
with ISO ID '2004195-c8b1-11ea-8081-27a8ccdd76'
testing device /dev/sr0 for ISO
found Proxmox VE ISO
switching root from Initrd to actual installation system
Starting Proxmox installation
Installing additional hardware drivers
Starting hotplug events dispatcher: systemd-udevd.
Synthesizing the initial hotplug events (subsystems)...done.
Synthesizing the initial hotplug events (devices)...done.
Waiting for /dev to be fully populated...done.
mounts/depts mounted on /dev/pts.
/bin/dbus-daemon
starting D-Bus daemon
attempting to set DHCP leases... Internet Systems Consortium DHCP Client 4.4.1
Copyright 2004-2019 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/

Listening on LFF/ens3/S2:54:00:07:41:e4
Sending on LFF/ens3/S2:54:00:07:41:e4
Sending on Socket/fallback
DHCPDISCOVER on ens3 to 255.255.255.255 port 67 interval 6
```

iv. Click on Install Proxmox VE to get to the next screen as shown above



 Proxmox VE Installer

### Location and Time Zone selection

**The Proxmox Installer** automatically makes location-based optimizations, like choosing the nearest mirror to download files from. Also make sure to select the correct time zone and keyboard layout.

Press the Next button to continue the installation.

- Country:** The selected country is used to choose nearby mirror servers. This will speed up downloads and make updates more reliable.
- Time Zone:** Automatically adjust daylight saving time.
- Keyboard Layout:** Choose your keyboard layout.

Country

Time zoneAsia/Kolkata


Keyboard LayoutU.S. English

Abort

Previous

Next

v. Select target Hard-disk and configure Country and Time Zone

 Proxmox VE Installer

### Administration Password and Email Address

**Proxmox Virtual Environment** is a full featured, highly secure GNU/Linux system, based on Debian.

In this step, please provide the *root* password.

- Password:** Please use a strong password. It should be at least 8 characters long, and contain a combination of letters, numbers, and symbols.
- Email:** Enter a valid email address. Your Proxmox VE server will send important alert notifications to this email account (such as backup failures, high availability events, etc.).

Press the Next button to continue the installation.

Password

Confirm

Email

Abort

Previous

Next

vi. Configure Admin Password and Email Address



## Proxmox VE Installer

### Management Network Configuration

**Please verify** the displayed network configuration. You will need a valid network configuration to access the management interface after installing.

After you have finished, press the Next button. You will be shown a list of the options that you chose during the previous steps.

- **IP address (CIDR):** Set the main IP address and netmask for your server in CIDR notation.
- **Gateway:** IP address of your gateway or firewall.
- **DNS Server:** IP address of your DNS server.

Management Interface:

Hostname (FQDN):

IP Address (CIDR):  /

Gateway:

DNS Server:

Abort

Previous

Next



## Proxmox VE Installer

### Management Network Configuration

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Management Interface:

Hostname (FQDN):

IP Address (CIDR):  /

Gateway:

DNS Server:

Abort

Previous

Next

vii. Configure IP Address and Gateway according to your setup

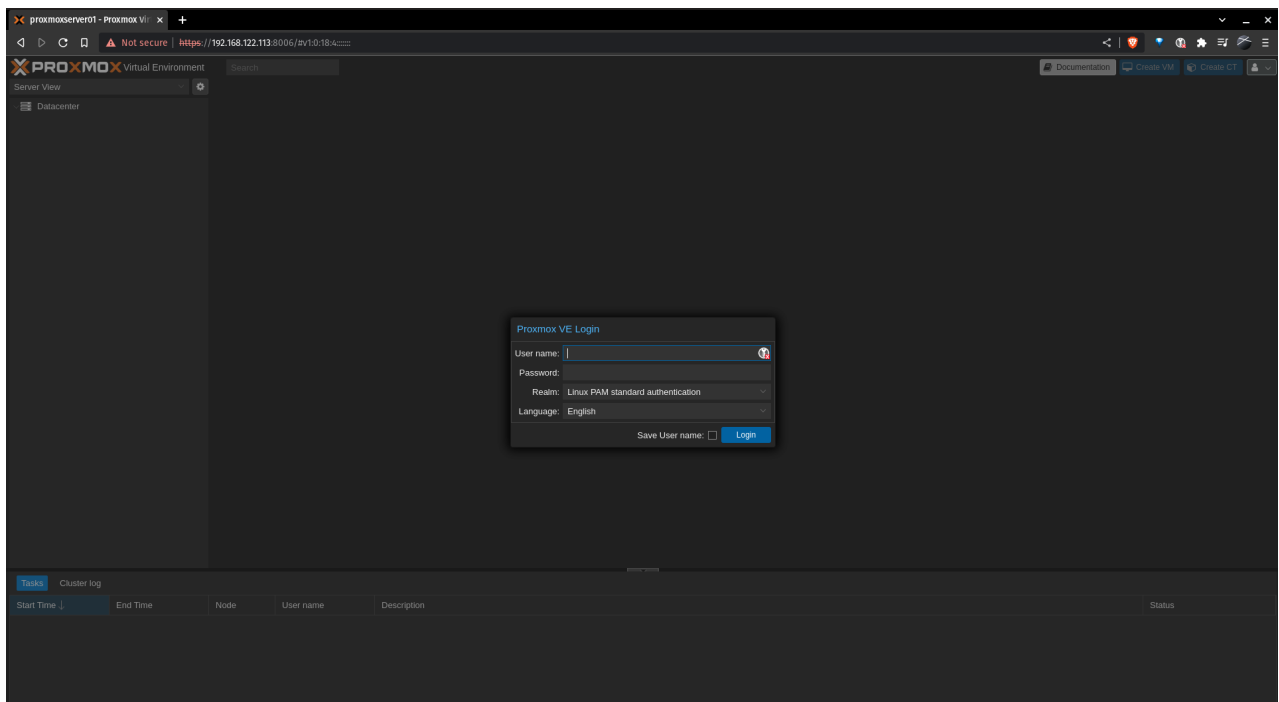
```
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Welcome to the Proxmox Virtual Environment. Please use your web browser to
configure this server - connect to:

  https://192.168.122.113:8006/
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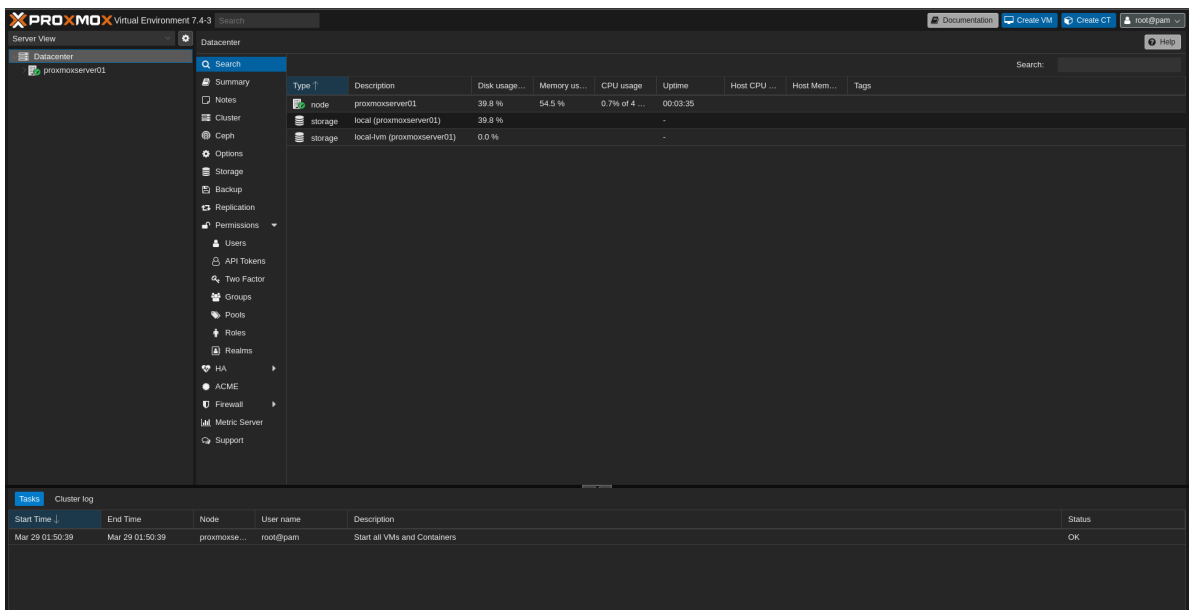
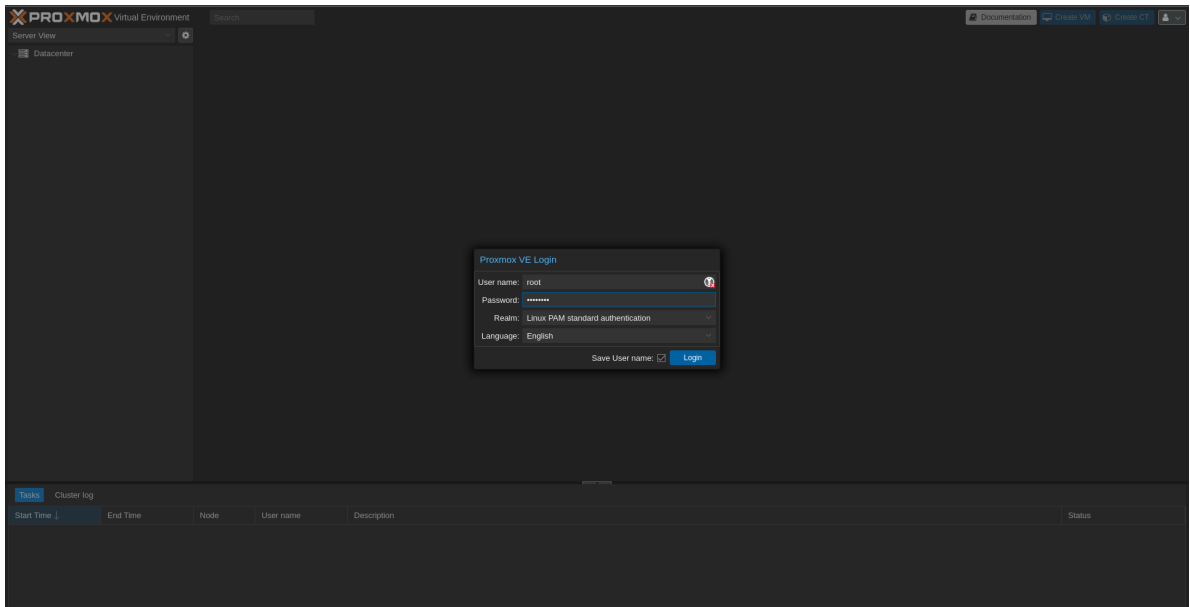
proxmoxserver01 login: root
Password:

Login incorrect
proxmoxserver01 login:
Password:

Login incorrect
proxmoxserver01 login:
```



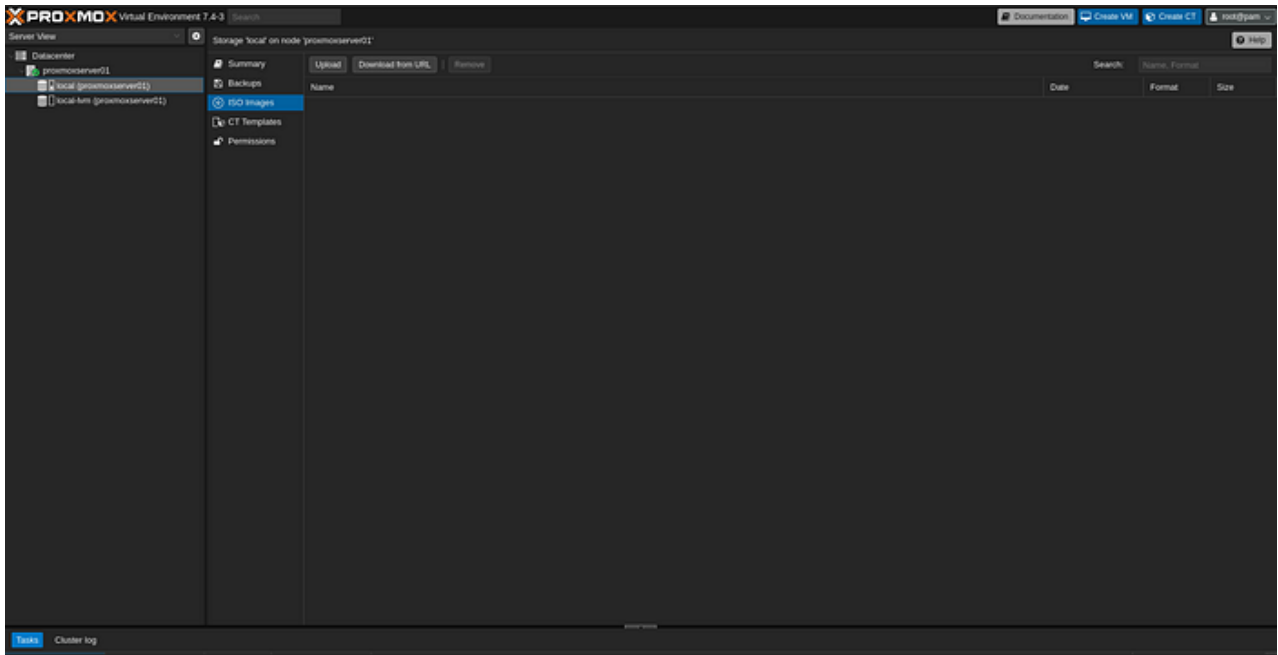
viii. On following standard steps you will be given an IP address, Simply go on that address



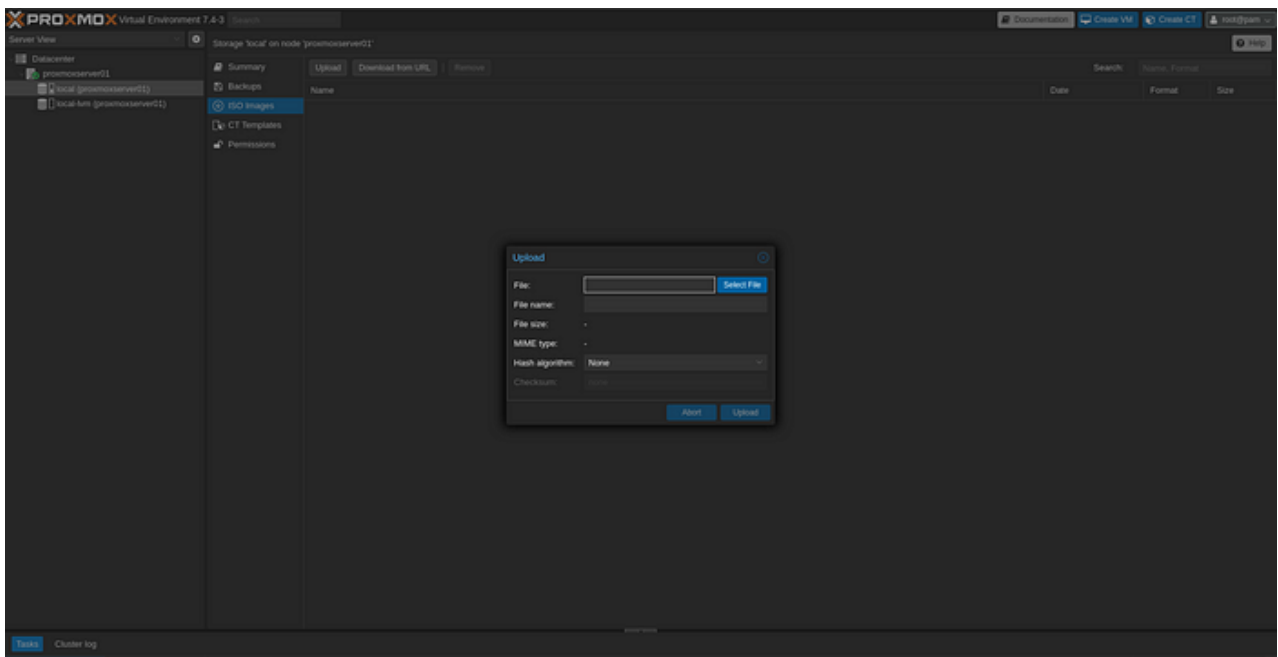
ix. The IP address will take you to Proxmox Virtual Environment

### 3. Creating Virtual Machine on Proxmox

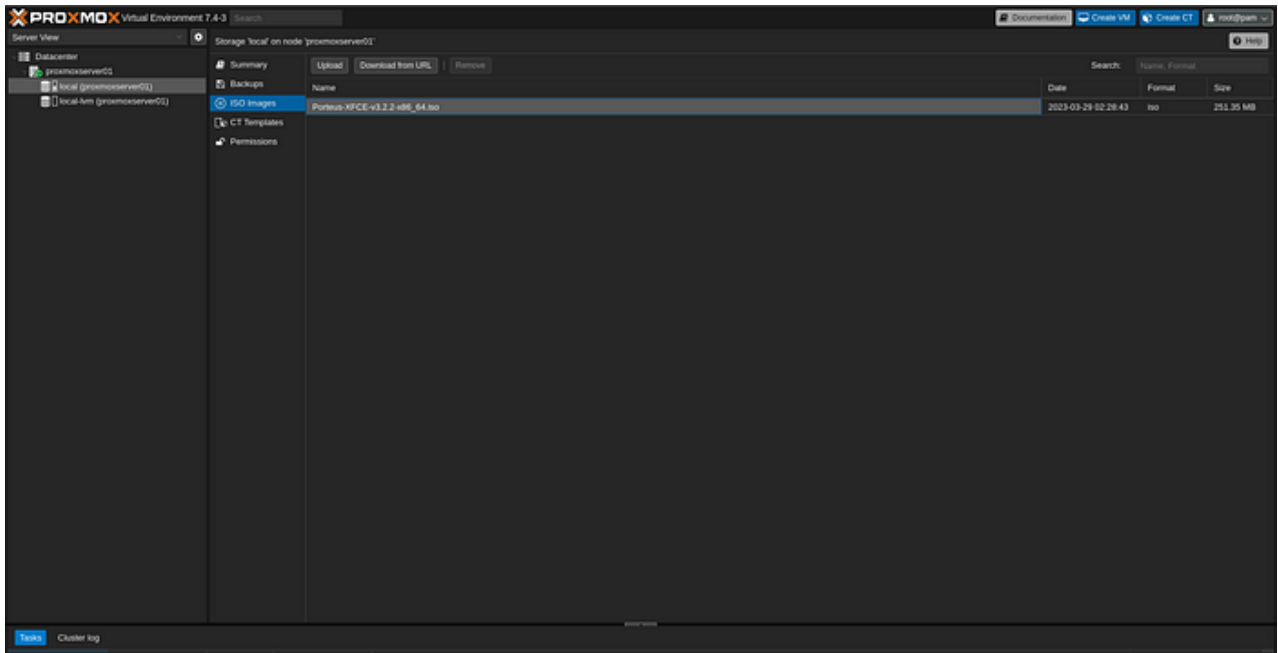




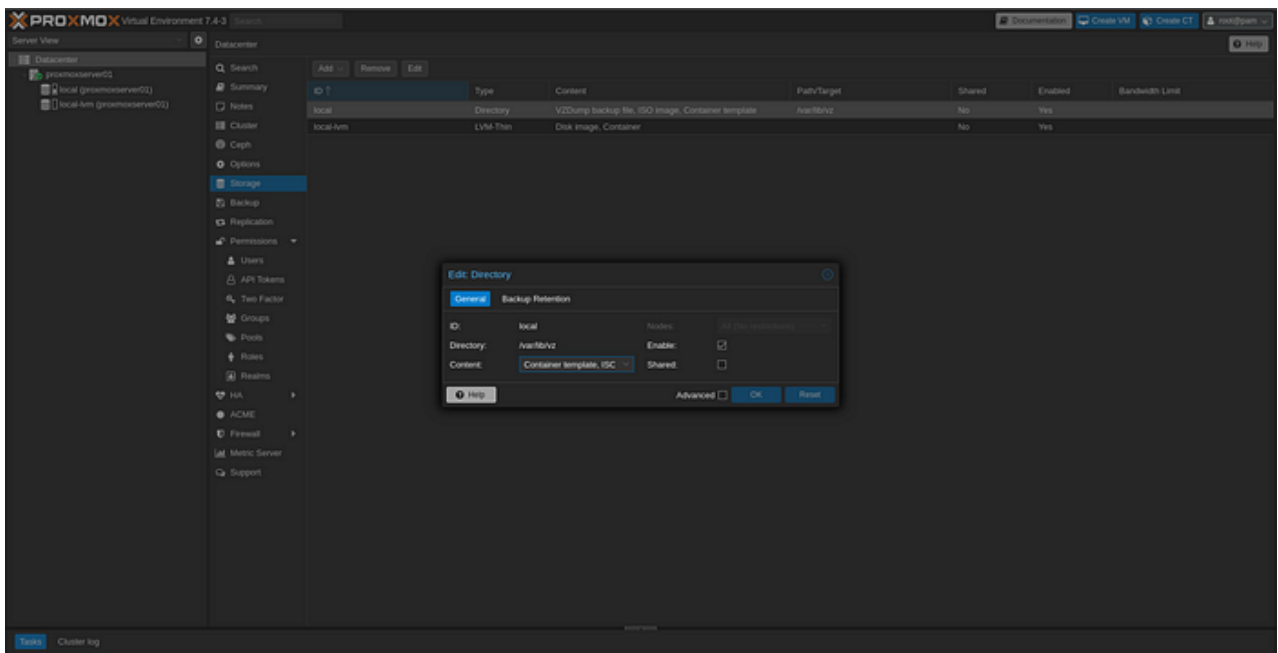
On web dashboard, select ISO images



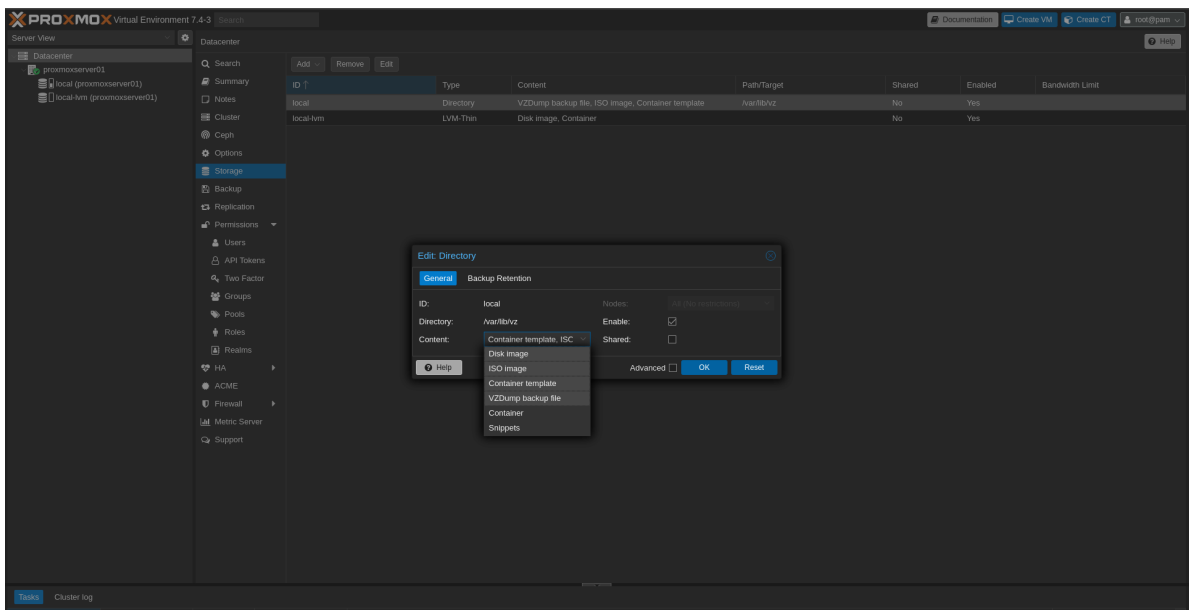
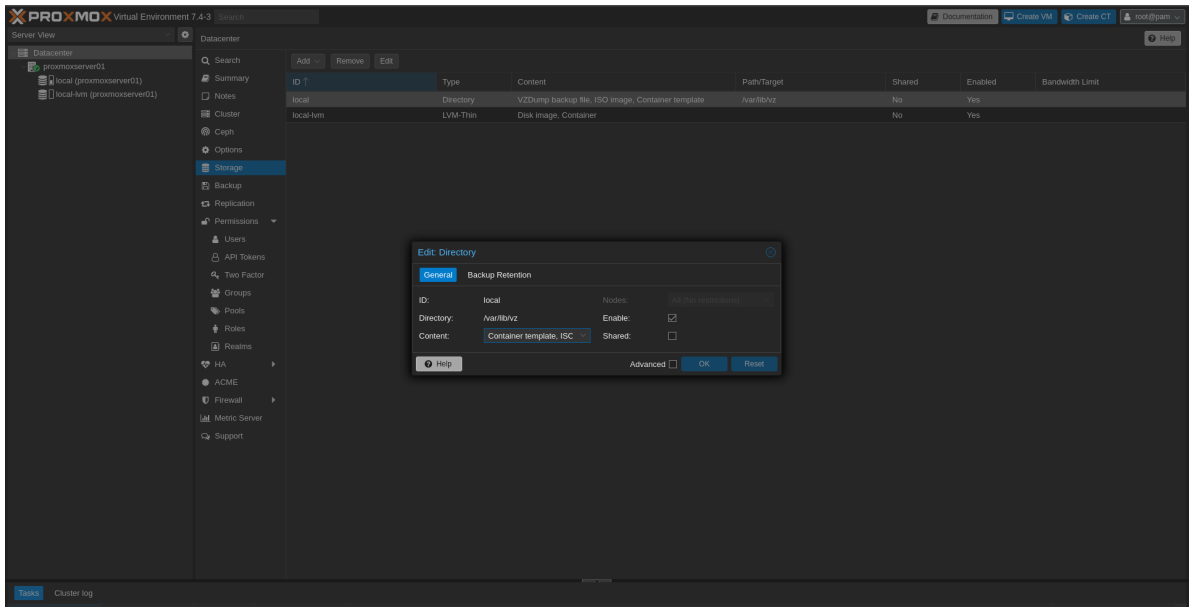
Upload ISO Image file



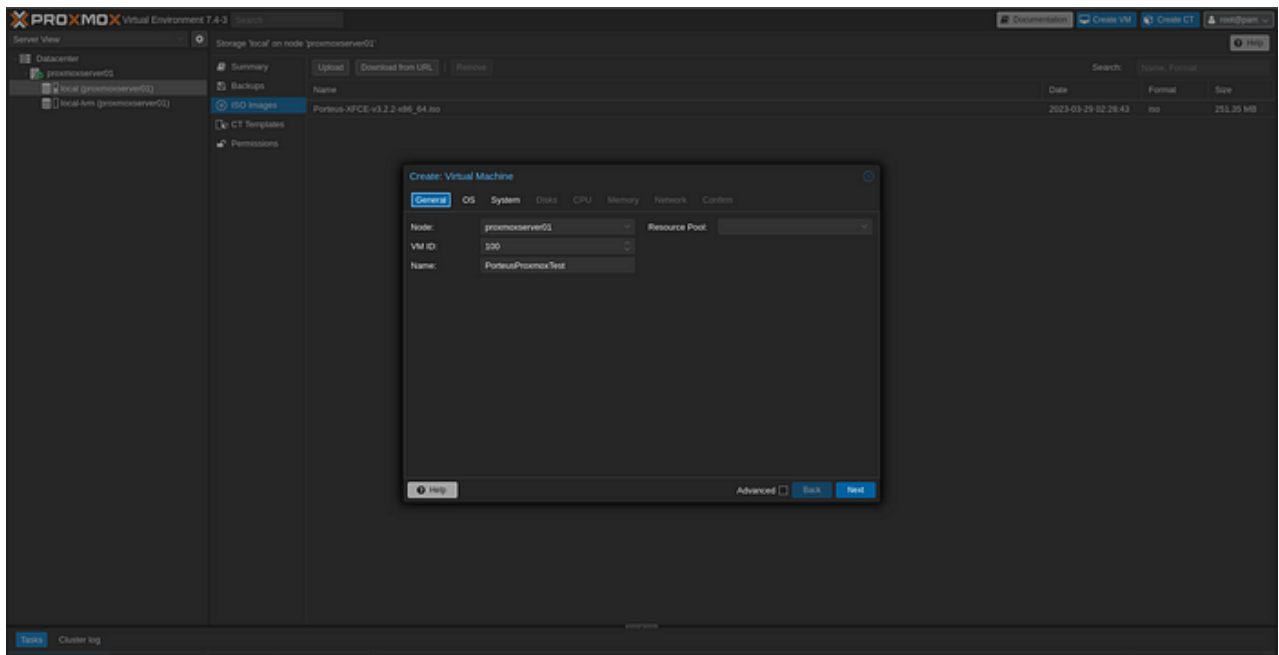
The uploaded ISO file will appear on dashboard



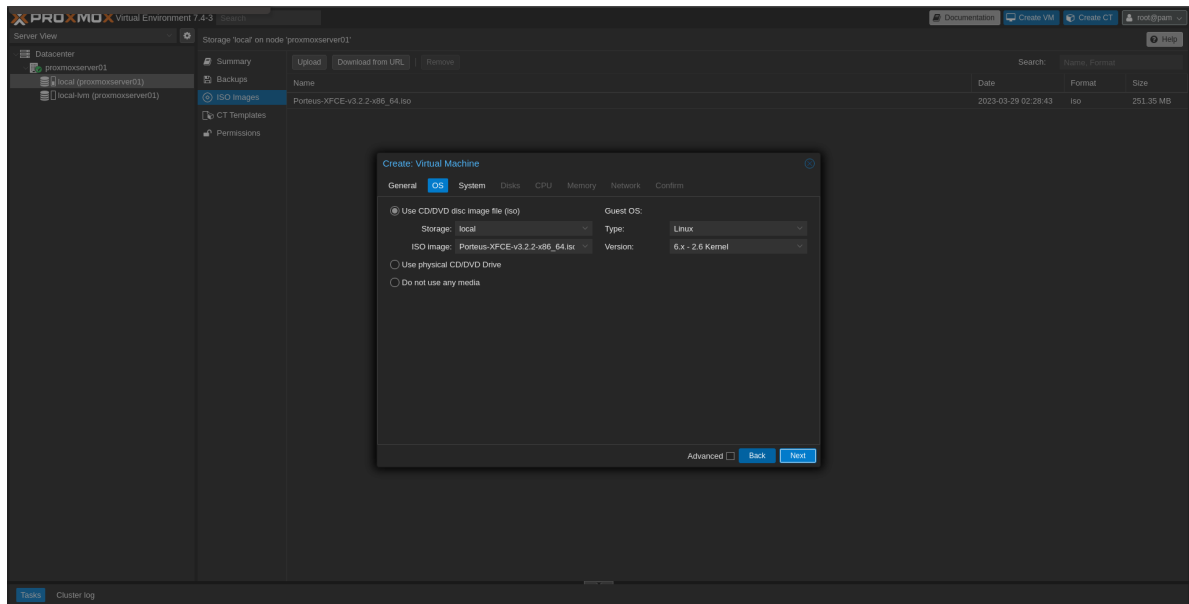
In Storage, Update the Directory as follows

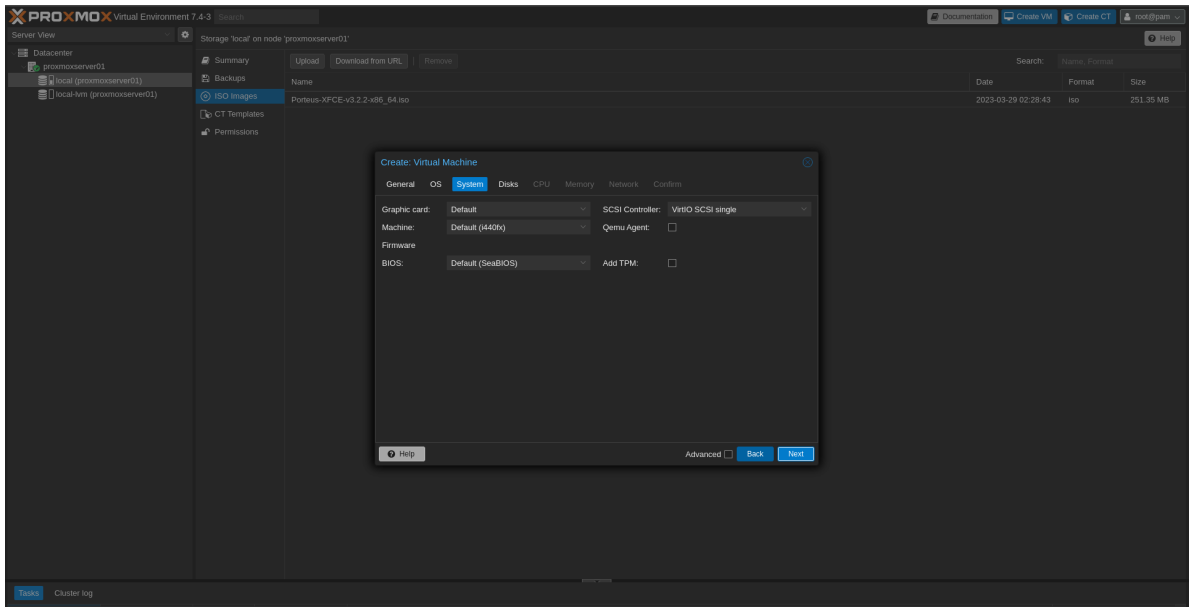


Update Registry

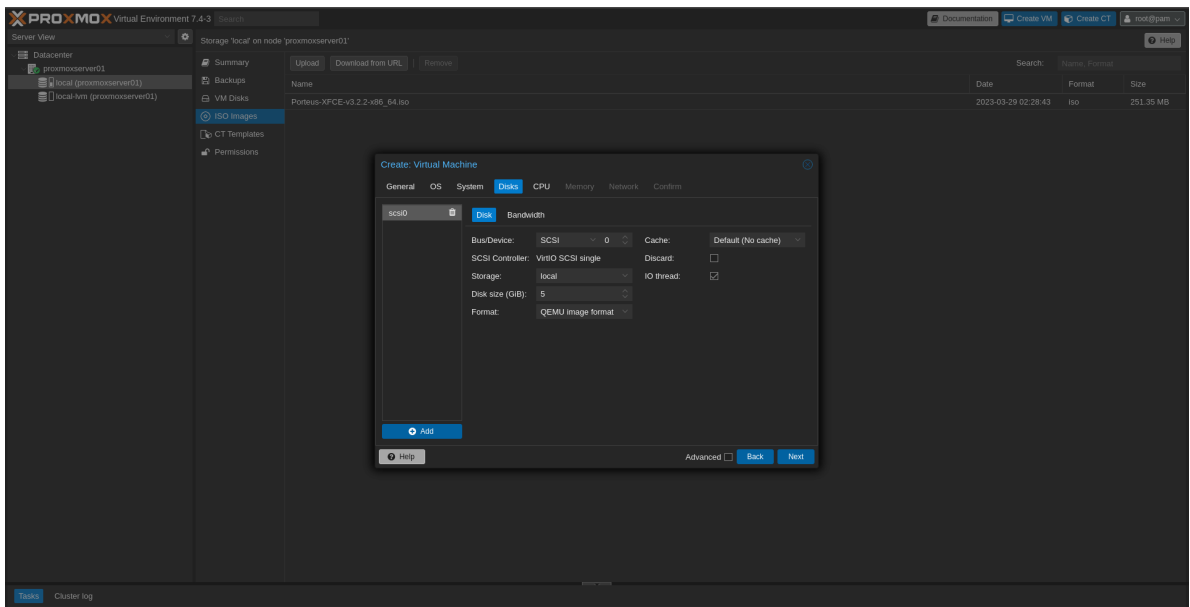


Once done with configurations, click on Create VM (Upper right corner)

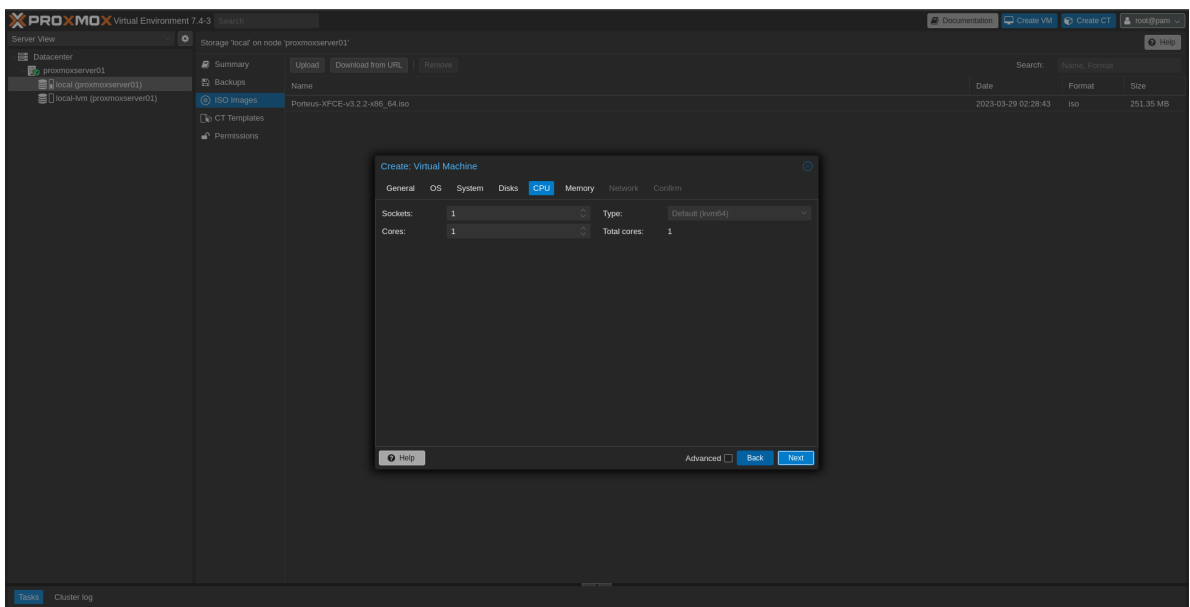


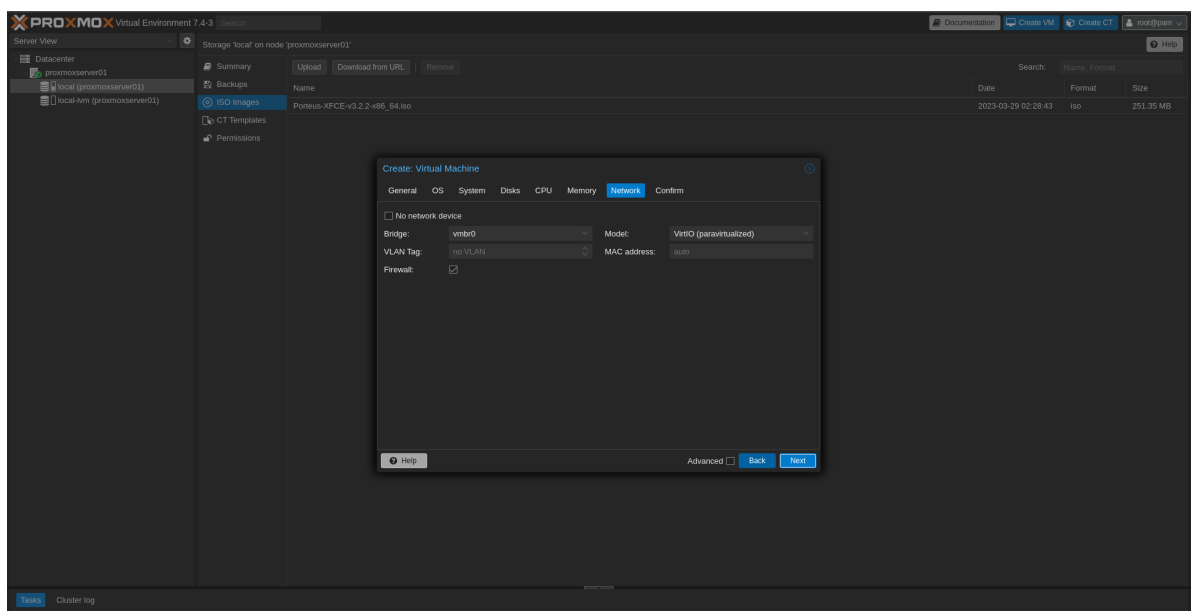
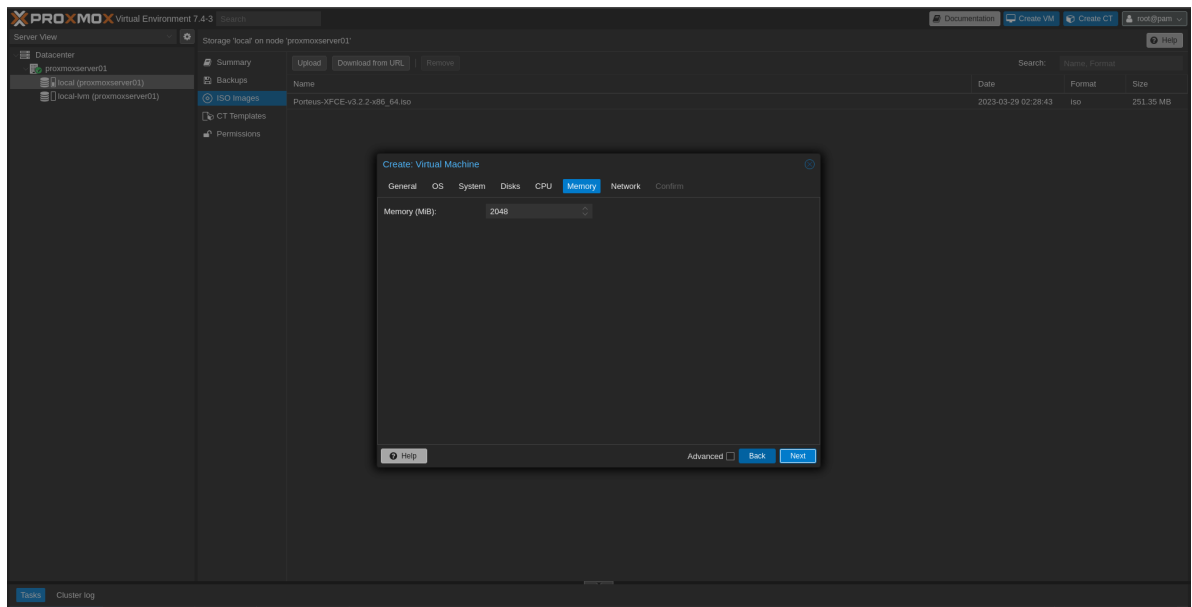


Select appropriate OS and System configurations

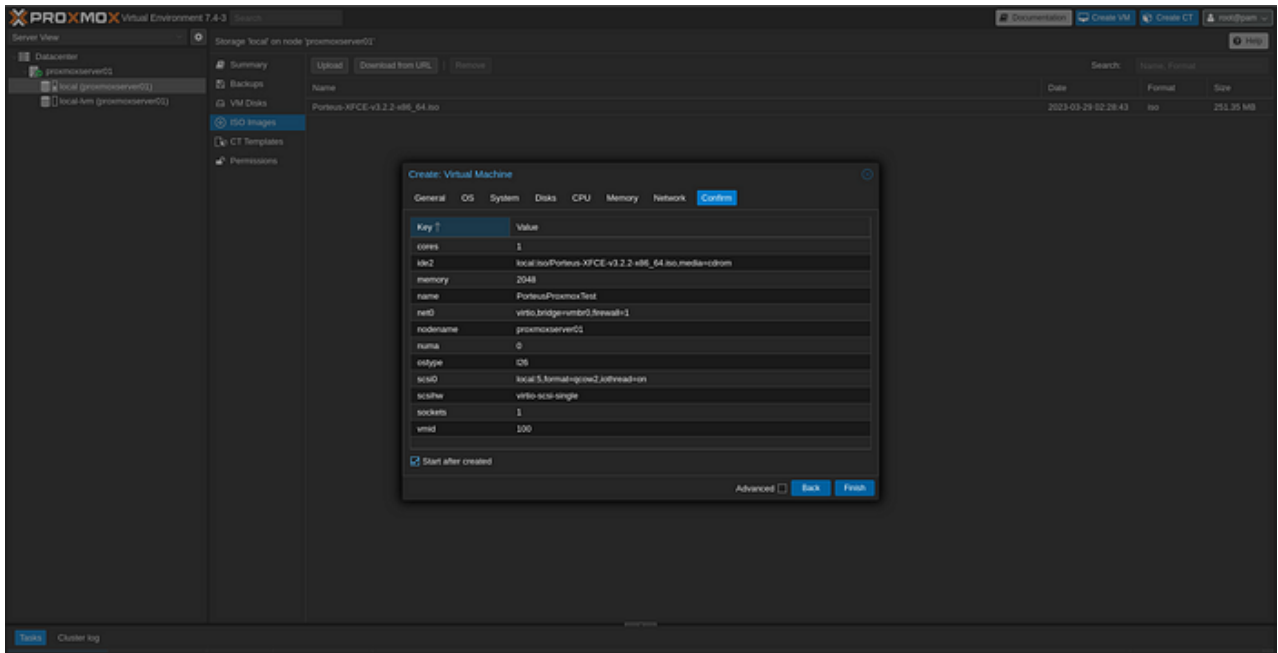


Select appropriate Disk and CPU configurations

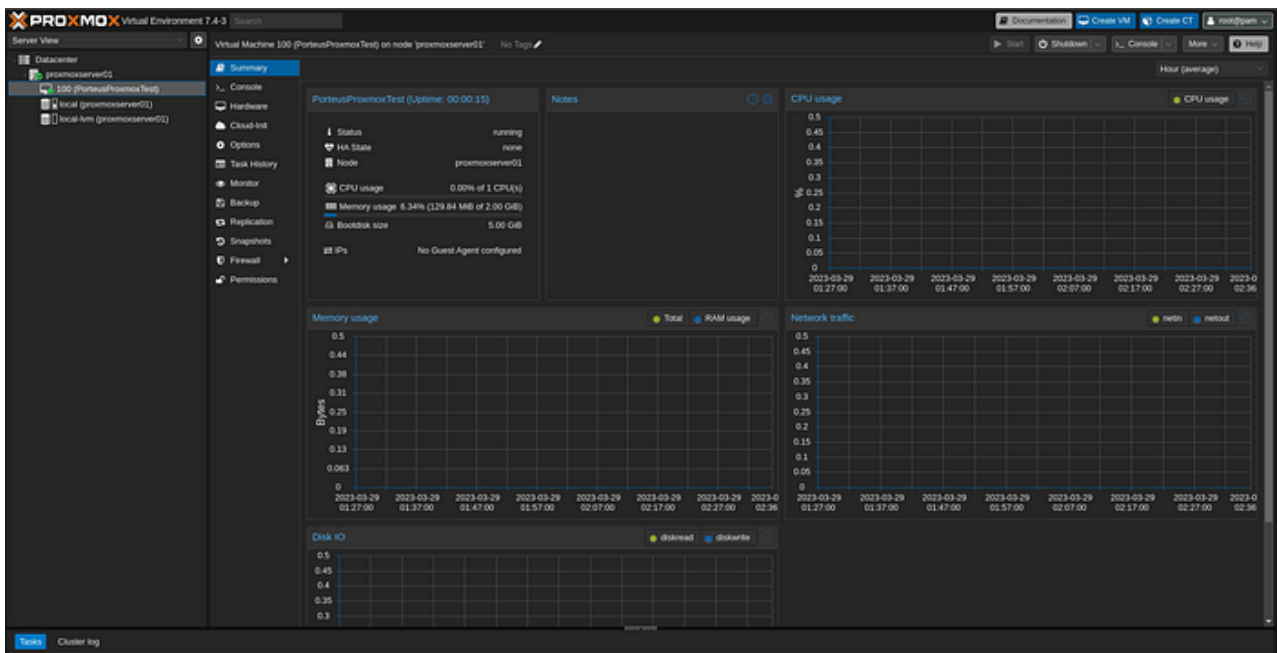




Select appropriate Memory and Network configurations



Confirm your configuration and Click on Next



Your VM will be visible along with its dashboard





Proxmox Hypervisor is a strong and adaptable virtualization platform that offers a variety of features and benefits. It is a suitable option for virtualizing IT infrastructure due to its open-source nature, centralised administration interface, and support for both KVM and container-based virtualization.

Whether you are looking to deploy virtual machines for testing or production workloads, Proxmox Hypervisor is an excellent choice.