

Getting Started With Proxmox

The Proxmox logo is displayed in a large, bold, sans-serif font. The letters 'P', 'R', 'O', 'M', 'O', and 'X' are black, while the two 'X' characters are orange. The logo is centered on the slide.

PROXMOX

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Foreword

- I'm Adam, I live and work here in Chester County as a Linux systems administrator. This is my third PLUG presentation, the last of the 2010s decade and hope you all have a happy 2019 holiday season!
- I have been using Proxmox for only six weeks and am using it mainly as a KVM management front end. As a "Getting Started..." presentation I intend this mainly for those with my (intermediate) skill level who just want to make a lot of VMs so we won't be getting deep into more advanced topics like containerization, clustered storage, API calls, etc. but I will always point out these features where applicable

Introduction – what is Proxmox?

- Proxmox VE (Virtualization Environment) is a Debian-based, open-source server virtualization platform that allows you to quickly provision Linux virtual machines using KVM, or Linux containers using LXC. It can be clustered across multiple servers in an environment, has a flexible storage model, and a web-based management interface similar to oVirt and VMWare ESXi. As powerful and versatile as Proxmox is, it's actually very user friendly and easy to install, which makes it a great way to learn Linux virtualization.
- Proxmox VE sits alongside oVirt and ESXi in a sort of “middle tier” of virtualization solutions, above workstation/desktop hypervisors like VirtualBox or virt-manager, but below enterprise level solutions like OpenStack, vSphere, public cloud, etc.

Why Proxmox at PLUG?

- Proxmox has links (both direct and indirect) to two PLUG presentations given by others earlier this year:
- John Karr's talk on KVM (Central in April, North in June) – Proxmox uses the KVM hypervisor and makes it easier than ever to set up
- Keith Perry's talk on Apache Guacamole (Central in August, North in September) – while Proxmox actually uses NoVNC as its default web console, this provides the same ease of web-based console management that Guacamole does

Proxmox use cases

- make lots of VMs
- make lots of containers
- "pushbutton hyperconverged storage" (if you're really into that)
- reuse old hardware
- build a "home lab" or even a "home cloud"
- build small to medium sized IT infrastructure on a shoestring budget

Proxmox web GUI (demo to follow)

thuban - Proxmox Virtual Environment - Mozilla Firefox

thuban - Proxmox Virtual Environment - Virtual Environment 6.0-4

Virtual Machine 102 (CentOS8-S) on node 'thuban'

Summary

- Status: running
- HA State: none
- Node: thuban
- CPU usage: 1.53% of 2 CPU(s)
- Memory usage: 25.85% (529.34 MiB of 2.00 GiB)
- Bootdisk size: 32.00 GiB
- IPs: No Guest Agent configured

Notes

CPU usage

Memory usage

Network traffic

Tasks

Start Time	End Time	Node	User name	Description	Status
Dec 16 05:54:07	Dec 16 05:54:12	thuban	root@pam	Update package database	OK
Dec 16 02:44:55	Dec 16 02:45:01	deneb	root@pam	Update package database	OK
Dec 15 03:41:55	Dec 15 03:42:01	deneb	root@pam	Update package database	OK
Dec 15 03:18:01	Dec 15 03:18:06	thuban	root@pam	Update package database	OK
Dec 14 05:46:55	Dec 14 05:47:00	deneb	root@pam	Update package database	OK

Proxmox (the company, the product) – Part I

- Proxmox GmbH is based in Austria and first released Proxmox VE in 2008
- The name doesn't mean anything, they just liked how it sounds
- The platform was originally based on OpenVZ but switched to KVM and LXC fairly early on.
- It's mostly written in Perl (with some JS for the front end)
- Proxmox VE is open source and GPL licensed (the AGPL, specifically)
- Although it's officially based off Debian (and hits primarily Buster repos in apt) its kernel is currently a new(ish) Ubuntu kernel from the 5.x line that includes "more features" (their words, not mine) for containerization and hypervisors

Proxmox (the company, the product) – Part II

- Besides Proxmox VE, Proxmox (the company) has one other product, an email gateway/proxy.
- The company's business model is paid support subscriptions and early/priority access to their repos for updates (free users have to wait for new major/minor releases)
- There is a once-per-login "nagware" popup in the web management interface asking you to become a subscriber
 - If this annoys you there is a simple Bash one-liner that removes this:
 - `sed -i.bak "s/data.status !== 'Active'/false/g" /usr/share/javascript/proxmox-widget-toolkit/proxmoxlib.js && systemctl restart pveproxy.service`

Proxmox Installation

- Proxmox is meant to run as a "headless" server
- It has a graphical installer with relatively few options to tweak, and once it's done that's it, you have a plaintext console and most management is meant to run thru its web GUI
- This is a server distro, there is no desktop environment (GNOME/KDE/XFCE/etc) to speak of, although you are free to install desktops on your VMs (and in fact they run quite nicely)

Creating Linux VMs in Proxmox

- Log in to the web management interface and upload the ISO image(s) from your client PC's hard drive
- Or for faster results, just scp/wget the ISOs directly into the `/var/lib/vz/template/iso` folder
- VM creation is an 8 step wizard almost identical to what you see in virt-manager (standalone Linux desktop GUI for KVM) and analogous to virsh (command line).
- In each step you define another virtual resource for the VM to utilize (CPU, RAM, storage, network, etc.)

Proxmox clustering for management

- Designate one of your Proxmox servers as the "cluster manager" (ideally one of your biggest ones) then peer other Proxmox servers to it, this allows you to manage multiple Proxmox servers from inside a single web interface.
- Clustering is also required for distributed storage in Proxmox (more on this in a couple slides)
- Proxmox recommends dedicated NICs for cluster traffic (as a "home lab" user I'm getting by OK without one for now)
- While clustering is one of the most powerful and useful features in Proxmox, documented max cluster size (~36 nodes according to recent forum chatter) show the scalability limits of the platform

Proxmox Security

- If you are going to have multiple users in your environment, Proxmox VE offers role based authentication where you can lock down access to specific VMs or hypervisors throughout the environment along with types of user actions (create VM, delete VM, and so on).
- Besides traditional Unix and PAM logins, Proxmox VE also offers support for LDAP authentication and multifactor (such as one-time passwords, YubiKeys, etc).

Proxmox Networking

- ...One of the "pain points" I (and other PLUG presenters) often run into when installing KVM on stock Linux distros is networking (particularly Ubuntu 18.04/Netplan)
- However Proxmox defaults to a "sane default" bridged network configuration intended to "just work" (with RJ45 copper) out of the box, usually without the need for additional setup
- You can of course customize to your heart's content but with the default bridging setup, all new VMs automatically appear as separate machines on your LAN and are not hidden behind NAT as is the common default in desktop-level virtualization.
- Wireless bridging of VMs over Proxmox is theoretically possible with additional setup (documented solutions use hostapd) but for quickest, easiest setup it's best to use physical (copper/fiber) network connections.

Proxmox Storage

- The default storage model for Proxmox is LVM which makes it easy to add additional local volumes to a virtualization host for more (and larger) VM images
- However there is ample support for more advanced storage options (ZFS, NFS, Ceph, Gluster)
- The support for storage is so extensive in Proxmox that many users do nothing with Proxmox BUT storage - as their projects/organizations scale they will move their containers and VMs into the cloud, and use Proxmox solely to manage NFS shares and/or Ceph clusters.

Install Screenshots / Live Demo

- Proxmox VE takes around 5 minutes to install on bare metal and has a total of 9 screens (screenshot slideshow to follow)
- We'll conclude with a live demo where I create a new Ubuntu or CentOS VM