



How to Use KVM

Firmware Version 8.3.0

Edge Computing Support List

Model	Architectures	Processor	Processor *	Memory	Memory *	Internal Storage Size	Internal storage			External storage via USB port ^		
							Application	Docker *	KVM#	Application	Docker *	KVM#
SDX Pro	X86	8 Cores @ 2.2GHz	4 Cores @ 2.2GHz	8GB	4GB	500GB /1TB /2TB	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE
Balance 2500 EC	X86	8 Cores @ 3.3GHz	4 Cores @ 3.3GHz	16GB	8GB	1TB	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE
EPX with Expansion Module (EXM-LCDT)	X86	4 Cores @ 2.1Ghz	2 Cores @ 2.1Ghz	16GB	8GB	1TB	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE
MAX HD2/4 MBX with MediaFast	X86	4 Cores @1.6Ghz	2 Cores @1.6Ghz	8GB	4GB	120GB / 500GB	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE
MAX BR2 Pro	ARM 64	4 Cores @ 1.8Ghz	2 Cores @ 1.8Ghz	2GB	1GB	8GB	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE
MAX Transit Duo Pro	ARM 64	4 Cores @ 1.8Ghz	2 Cores @ 1.8Ghz	2GB	1GB	8GB	TRUE	TRUE	FALSE		N/A	
SDX	X86	4 Cores @ 2.2GHz	2 Cores @ 2.2GHz	4GB	2GB					FALSE	TRUE	FALSE
MAX MBX Mini	X86	4 Cores @1.5GHz	2 Cores @1.5GHz	4GB	2GB					FALSE	TRUE	FALSE
MAX HD2/4 MBX	X86	2 Cores @ 1.3GHz	1 Cores @ 1.3GHz	4GB	2GB					FALSE	TRUE	FALSE
PDX	X86	4 Cores @1.6Ghz	2 Cores @1.6Ghz	8GB	4GB					FALSE	TRUE	FALSE
Balance 310X	X86	2 Cores @ 1.3GHz	1 Cores @ 1.3GHz	4GB	2GB					FALSE	TRUE	FALSE
Balance 380X	X86	2 Cores @ 1.5GHz	1 Cores @ 1.5GHz	4GB	2GB					FALSE	TRUE	FALSE
Balance 580X	X86	2 Cores @ 1.5GHz	1 Cores @ 1.5GHz	4GB	2GB	N/A		N/A		FALSE	TRUE	FALSE
Balance 310 5G	X86	2 Cores @ 1.5GHz	1 Cores @ 1.5GHz	4GB	2GB					FALSE	TRUE	FALSE
Balance 310 Fiber 5G	X86	2 Cores @ 1.5GHz	1 Cores @ 1.5GHz	4GB	2GB					FALSE	TRUE	FALSE
Balance 710	X86	2 Cores @ 3.5GHz	1 Cores @ 3.5GHz	2GB	1GB					FALSE	TRUE	FALSE
Balance 1350	X86	2 Cores @ 3.5GHz	1 Cores @ 3.5GHz	4GB	2GB					FALSE	TRUE	FALSE
Balance 2500	X86	4 Cores @ 3.5GHz	2 Cores @ 3.5GHz	8GB	4GB					FALSE	TRUE	FALSE

* Maximum resource allocation is limited to half of the device's processor count and memory for docker use. This value cannot be adjusted.

Avoid over-allocating the processor and memory to the KVM as this may impact the overall performance of the router.

^ Available in firmware 8.3.2



What is KVM

Kernel-Based Virtual Machine



KVM is a **software feature** or a Linux operating system component that provides native support for virtual machines on Linux.

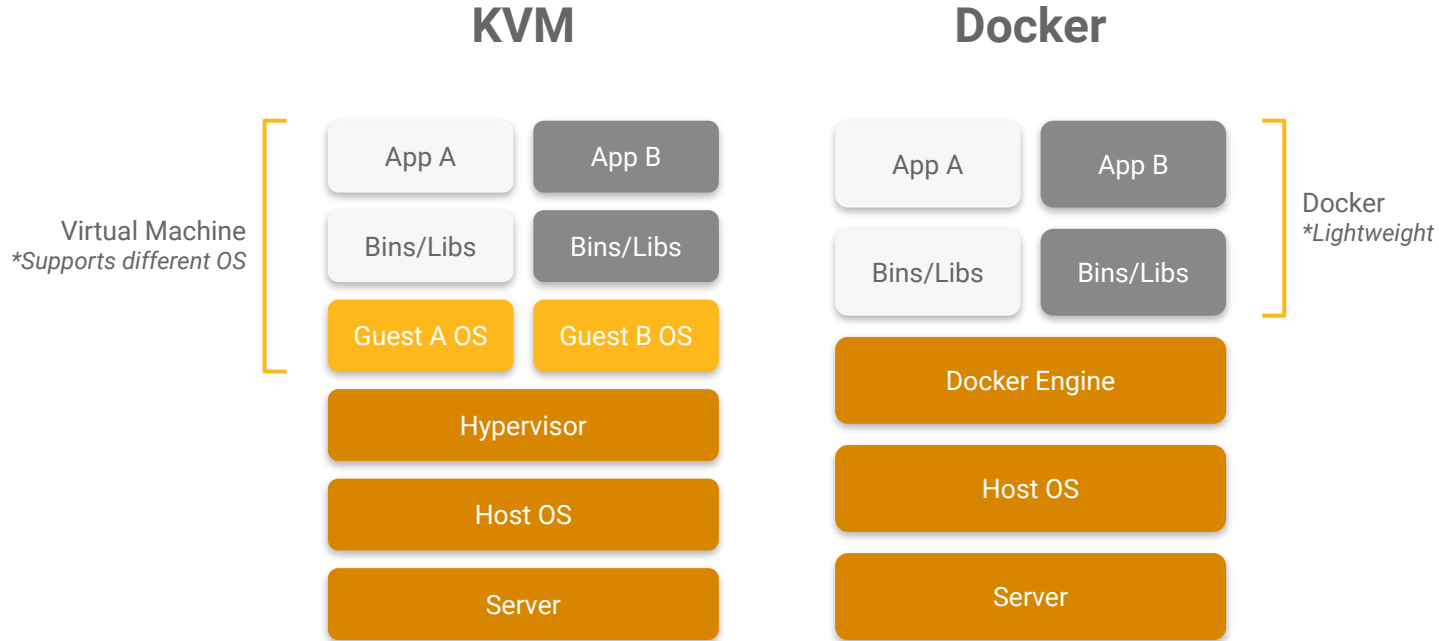


It **shares hardware resources** like CPU, network bandwidth, and memory with physical machines.



It allows developers to scale computing infrastructure for **different operating systems** without investing in new hardware and allows large numbers of virtual machines to be deployed easily in cloud environments.

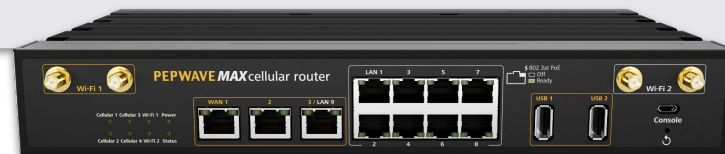
KVM vs Docker



Demo Unit Information

System Information

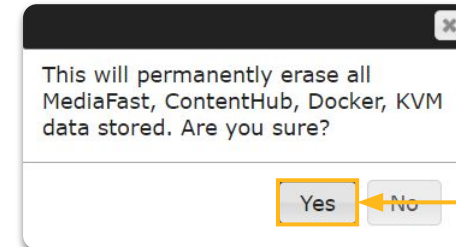
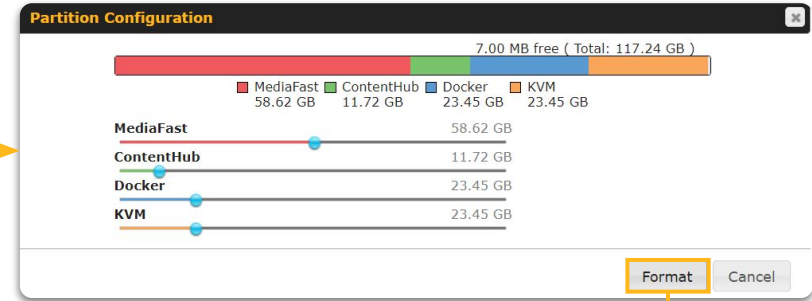
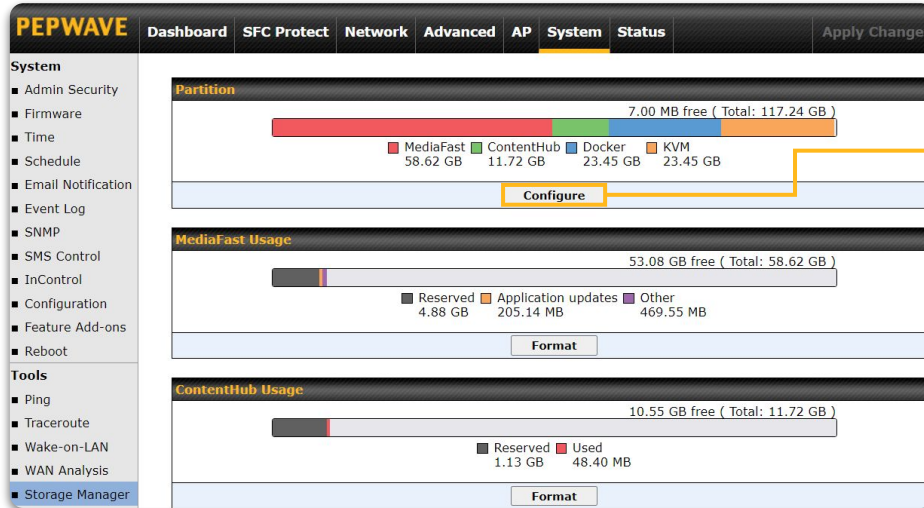
Device Name	MBX-2C57
Model	Pepwave MAX HD4 MBX with MediaFast
Product Code	MAX-HD4-MBX-MFA-LTEA-K
Hardware Revision	3
Serial Number	2938-5147-2C57
Firmware	8.3.0 build 5551
SpeedFusion VPN Version	9.2.0



KVM Preparation

Plan the disk space for KVM

System → Tools → Storage Manager



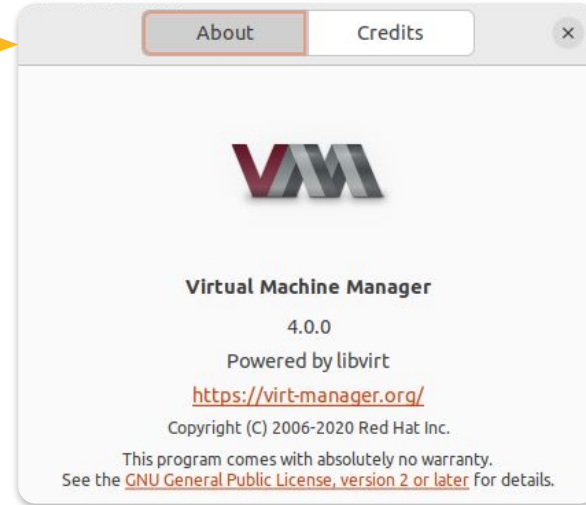
KVM Preparation

Virtual Machine Manager

[Virtual Manager](#)

For ubuntu user:

- To install, virt-manager via terminal, enter:
[sudo apt install virt-manager]
- Follow the [instructions](#) to install



KVM Demo Setup



KVM Installation

Advanced → Edge Computing → KVM

To install the system locally, we need to upload the ISO file to the MBX first

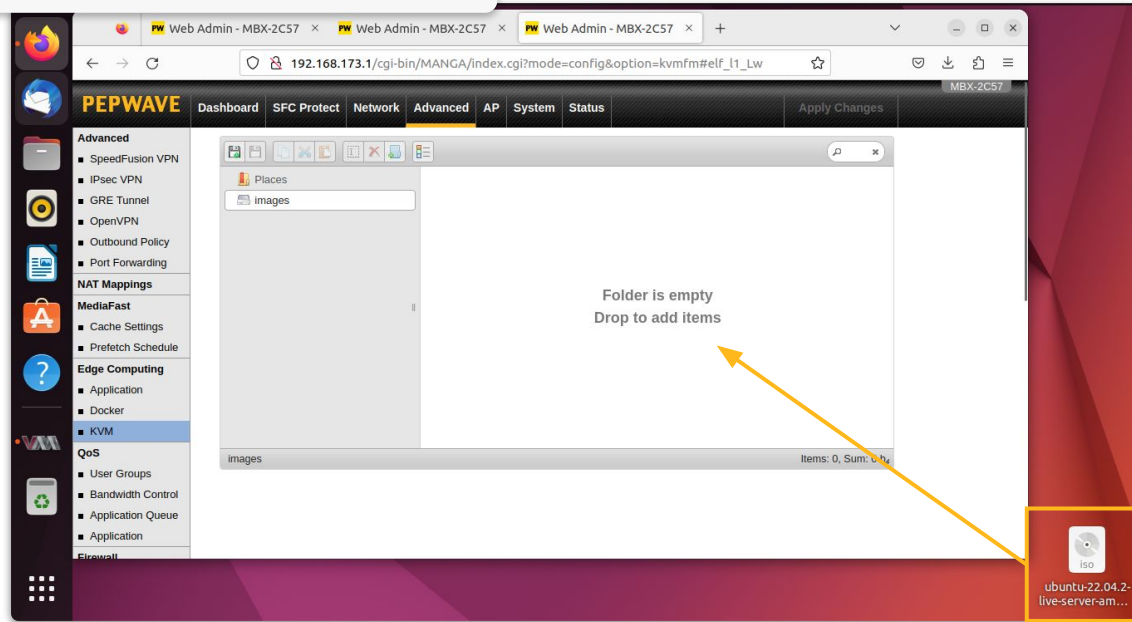
The screenshot displays the PEPWAVE web interface. The top navigation bar includes the PEPWAVE logo and tabs for Dashboard, SFC Protect, Network, Advanced (selected), AP, System, and Status. An 'Apply Changes' button is on the right. The left sidebar lists various settings categories: Advanced (with sub-items: SpeedFusion VPN, IPsec VPN, GRE Tunnel, OpenVPN, Outbound Policy, Port Forwarding), NAT Mappings, MediaFast (with sub-items: Cache Settings, Prefetch Schedule), and Edge Computing (with sub-items: Application, Docker, and KVM, which is highlighted). The main content area shows the 'KVM' settings, with a toggle switch labeled 'Enable' that is currently checked. A 'Save' button is positioned below the toggle. A text instruction reads: 'Click [here](#) to open file manager'.

PEPWAVE	Dashboard	SFC Protect	Network	Advanced	AP	System	Status	Apply Changes
Advanced								
<ul style="list-style-type: none">SpeedFusion VPNIPsec VPNGRE TunnelOpenVPNOutbound PolicyPort Forwarding								
NAT Mappings								
MediaFast								
<ul style="list-style-type: none">Cache SettingsPrefetch Schedule								
Edge Computing								
<ul style="list-style-type: none">ApplicationDockerKVM								

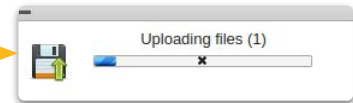
KVM
Enable ☒
[Save](#)
Click [here](#) to open file manager

KVM Installation

Advanced → Edge Computing → KVM



Uploading

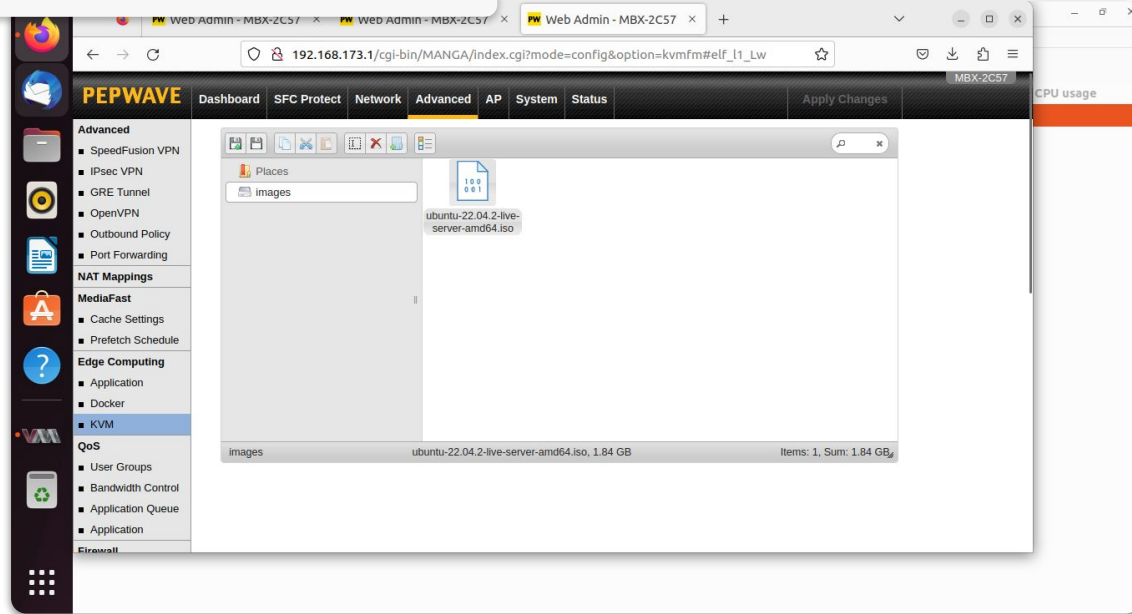


Drag the ISO to file manager

KVM Installation

Advanced → Edge Computing → KVM

Upload completed

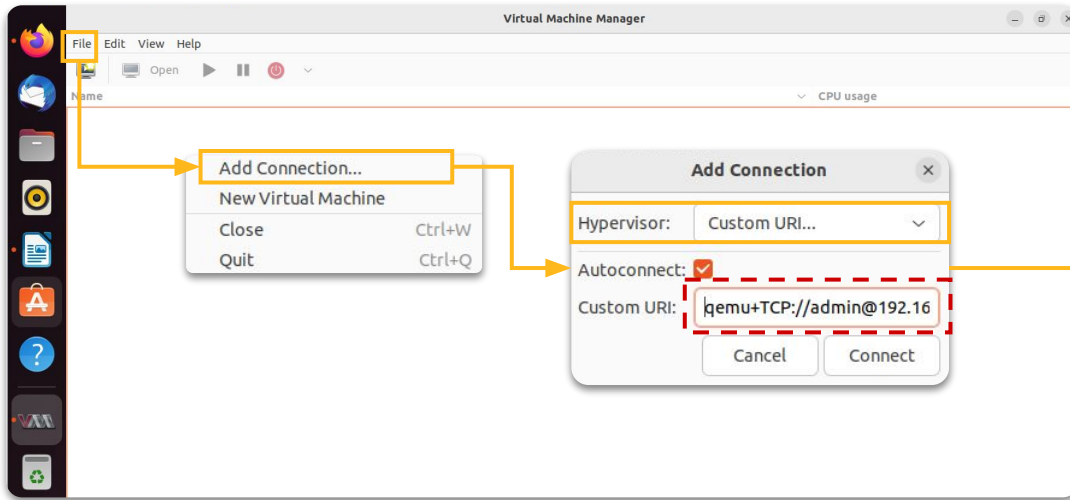


KVM Installation

Virtual Machine Manager → Add Connection

[qemu+TCP://admin@**device's IP address**/system]

- In this case, qemu+TCP://admin@192.168.137.1/system



Use the Peplink device's login information

Authentication required

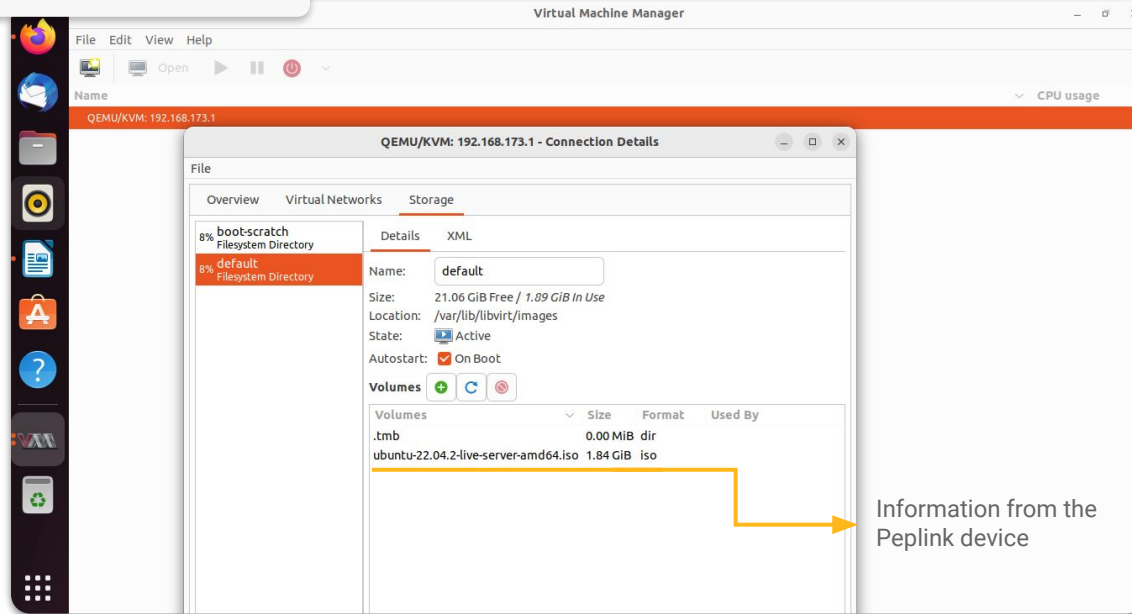
Please enter your authentication name:

Please enter your password:

Cancel OK

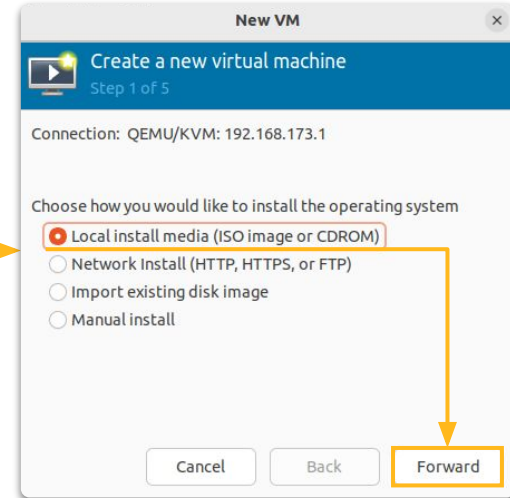
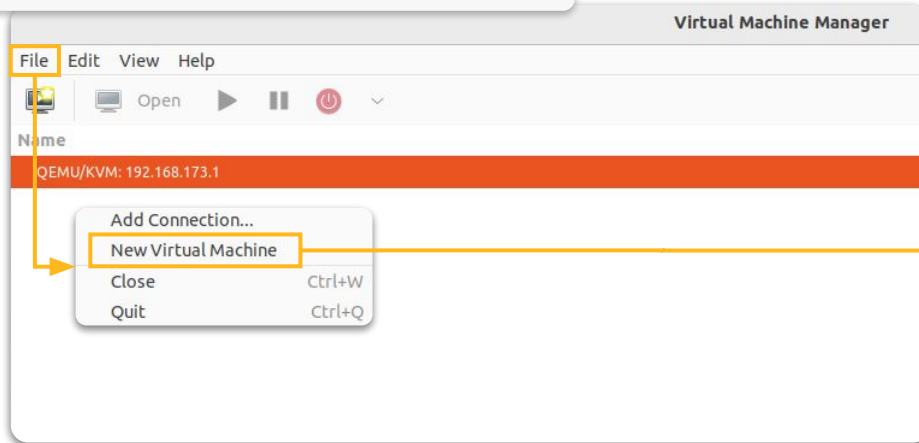
KVM Installation

Virtual Machine Manager



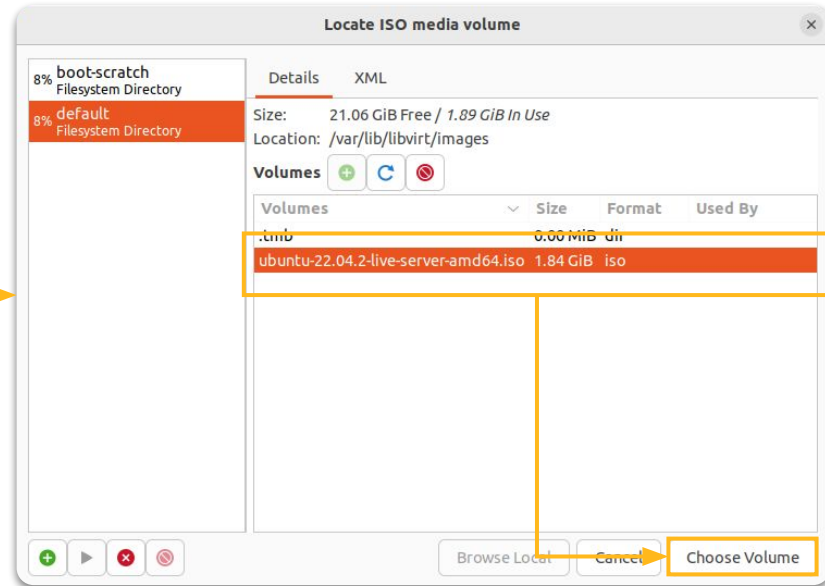
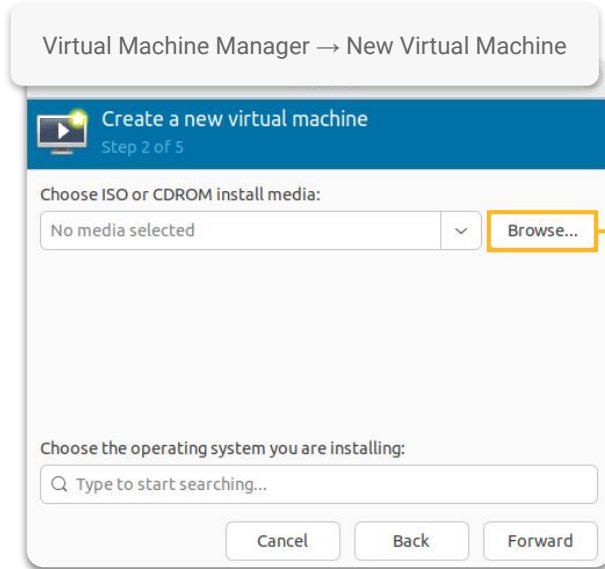
KVM Installation

Virtual Machine Manager → New Virtual Machine



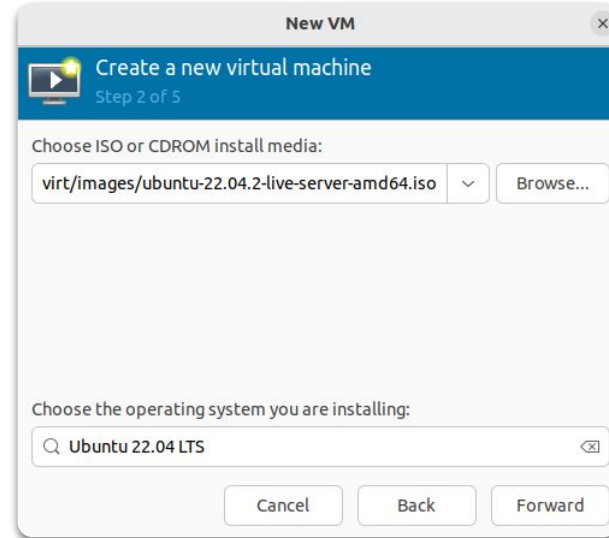
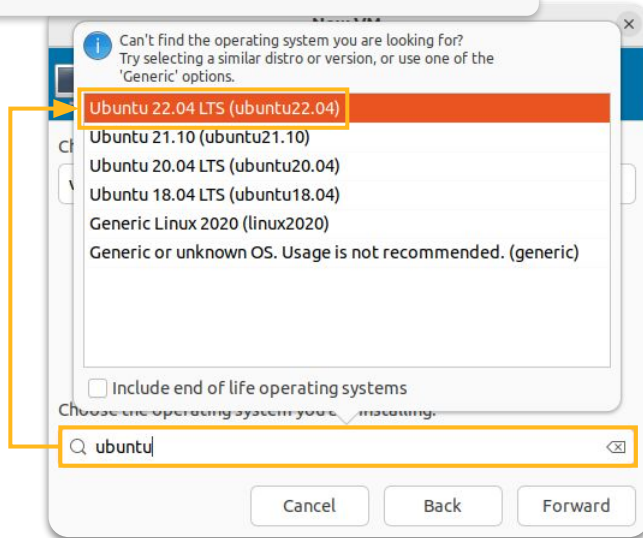
*Because we uploaded the ISO file to the MBX

KVM Installation



KVM Installation

Virtual Machine Manager → New Virtual Machine



*Some ISO contain different versions so it would be good to point out a specific version

KVM Installation

Virtual Machine Manager → New Virtual Machine

New VM

Create a new virtual machine
Step 3 of 5

Choose Memory and CPU settings:

Memory: 2048 — +
Up to 3739 MiB available on the host

CPUs: 2 — +
Up to 2 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
20.0 — + GiB
21.1 GiB available in the default location

☐ Select or create custom storage
Manage...

Cancel Back Forward

*CPU, memory, and disk space resources might vary with different Peplink models (hardware)

New VM

Create a new virtual machine
Step 5 of 5

Ready to begin the installation

Name: ubuntu22.04

OS: Ubuntu 22.04 LTS

Install: Local CDROM/ISO

Memory: 2048 MiB

CPUs: 2

Storage: 20.0 GiB ... b/libvirt/images/ubuntu22.04.qcow2

☒ Customize configuration before install

Network selection

Failed to find a suitable default network.

Bridge device... ▾

Device name: br0

Cancel Back Finish

*It's a must to tick the configuration and make sure the hypervisor network is on bridge mode and points to **br0** (Ethernet switch)

KVM Installation

Virtual Machine Manager → New Virtual Machine

ubuntu22.04 on QEMU/KVM: 192.168.173.1

Begin Installation Cancel Installation

Overview

- OS information
- CPUs
- Memory
- Boot Options
- VirtIO Disk 1
- SATA CDROM 1
- NIC:a5:1e:2b
- Tablet
- Display VNC
- Console 1
- Channel qemu-ga
- Video VGA
- Controller USB
- Controller PCIe
- RNG/dev/urandom

Details XML

Basic Details

Name: ubuntu22.04

UUID: 7196126b-1c8c-402d-9a0b-2a2599640f53

Status: Shutoff (Shut Down)

Title:

Description:

Hypervisor Details

Hypervisor: KVM

Architecture: x86_64

Emulator: /usr/bin/qemu-system-x86_64

Chipset: Q35

Firmware: BIOS

Add Hardware Cancel Apply

KVM Installation

Virtual Machine Manager → New Virtual Machine

ubuntu22.04 on QEMU/KVM: 192.168.173.1

Begin Installation Cancel Installation

Overview
OS information
CPUs
Memory
Boot Options
VirtIO Disk 1
SATA CDROM 1
NIC:a5:1e:2b
Tablet
Display VNC
Console 1
Channel qemu-ga
Video VGA
Controller USB
Controller PCIe
RNG /dev/urandom

Details XML

Virtual Network Interface

Network source: Failed to find a suitable default network.

Bridge device... ▾

Device name:

Device model: ▾

MAC address:

IP address: Unknown

Link state: ☒ active

Add Hardware Remove Cancel Apply

Must check:

- **Device name: br0**
The br0 is a virtual interface used to bridge two router ports together in software
- **Device model: e1000e** (by your environment)
*The e1000e driver supports most of PCI Express Intel(R) (Intel networking driver)

KVM Installation

Virtual Machine Manager → New Virtual Machine

ubuntu22.04 on QEMU/KVM: 192.168.173.1

Begin Installation Cancel Installation

Overview
OS information
CPUs
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Boot Options
VirtIO Disk 1
SATA CDROM 1
NIC:a5:1e:2b
Tablet
Display VNC
Console 1
Channel qemu-ga
Video VGA
Controller USB
Controller PCIe
RNG/dev/urandom

Details XML

VNC Server

Type: VNC server

Listen type: Address

Address: All interfaces

Port: ☒ Auto

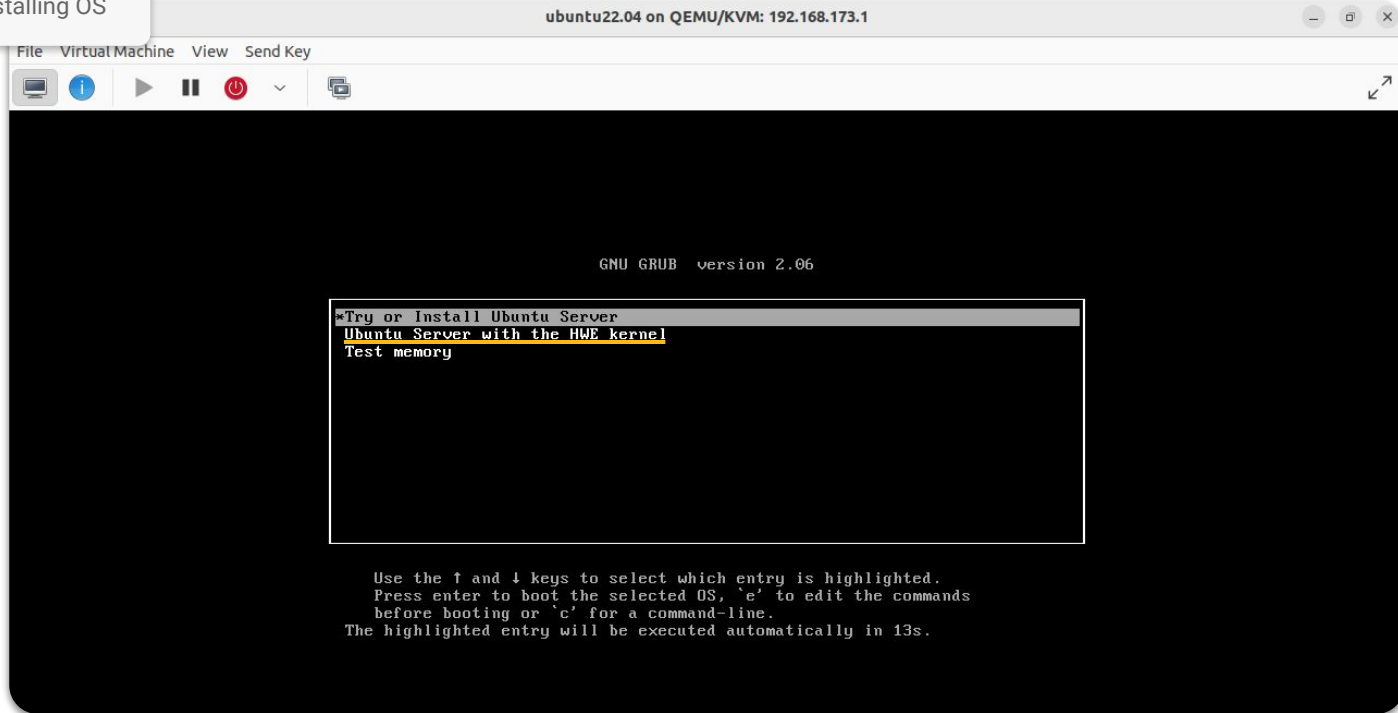
Password: ☐

☐ Show password

Add Hardware Remove Cancel Apply

KVM Installation

Installing OS



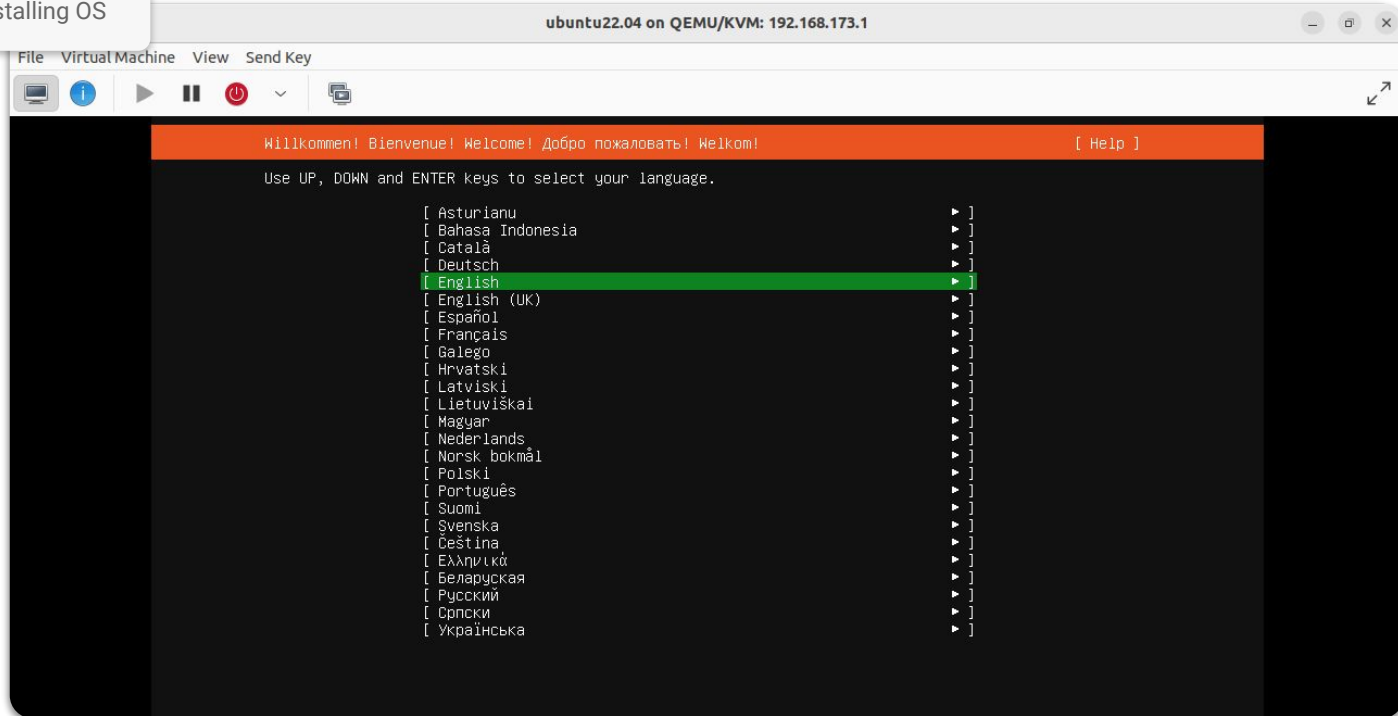
KVM Installation

Installing OS

```
ubuntu22.04 on QEMU/KVM: 192.168.173.1
File Virtual Machine View Send Key
[ 1.794410] pci_bus 0000:0d: resource 0 [io  0xe000-0xefff]
[ 1.795011] pci_bus 0000:0d: resource 1 [mem 0xfda00000-0xfdffffff]
[ 1.795646] pci_bus 0000:0d: resource 2 [mem 0xfb200000-0xfb3ffffff 64bit pref]
[ 1.796469] pci_bus 0000:0e: resource 0 [io  0xf000-0xffff]
[ 1.797378] pci_bus 0000:0e: resource 1 [mem 0xfce00000-0xfceffffff]
[ 1.798040] pci_bus 0000:0e: resource 2 [mem 0xfb000000-0xfb1ffffff 64bit pref]
[ 1.800341] ACPI: \_SB_.GSIG: Enabled at IRQ 22
[ 1.806084] PCI: CLS 0 bytes, default 64
[ 1.808448] clocksource: tsc: mask: 0xffffffffffffffff max_cycles: 0x128aebca
5a7, max_idle_ns: 440795215811 ns
[ 1.808647] Trying to unpack rootfs image as initramfs...
[ 1.815504] Initialise system trusted keyrings
[ 1.816184] Key type blacklist registered
[ 1.817086] workingset: timestamp_bits=36 max_order=19 bucket_order=0
[ 1.822124] zbud: loaded
[ 1.823696] squashfs: version 4.0 (2009/01/31) Phillip Lougher
[ 1.825400] fuse: init (API version 7.36)
[ 1.826562] integrity: Platform Keyring initialized
[ 1.828152] integrity: Machine keyring initialized
[ 1.851895] Key type asymmetric registered
[ 1.852525] Asymmetric key parser 'x509' registered
-
```

KVM Installation

Installing OS



KVM Installation

Installing OS

Choose type of install

[Help]

Choose the base for the installation.

☐ Ubuntu Server

The default install contains a curated set of packages that provide a comfortable experience for operating your server.

☒ Ubuntu Server (minimized)

This version has been customized to have a small runtime footprint in environments where humans are not expected to log in.

Additional options

☐ Search for third-party drivers

This software is subject to license terms included with its documentation. Some is proprietary. Third-party drivers should not be installed on systems that will be used for FIPS or the real-time kernel.

[Done]

[Back]

KVM Installation

Installing OS

Profile setup [\[Help \]](#)

Enter the username and password you will use to log in to the system. You can configure SSH access on the next screen but a password is still needed for sudo.

Your name:

Your server's name:
The name it uses when it talks to other computers.

Pick a username:

Choose a password:

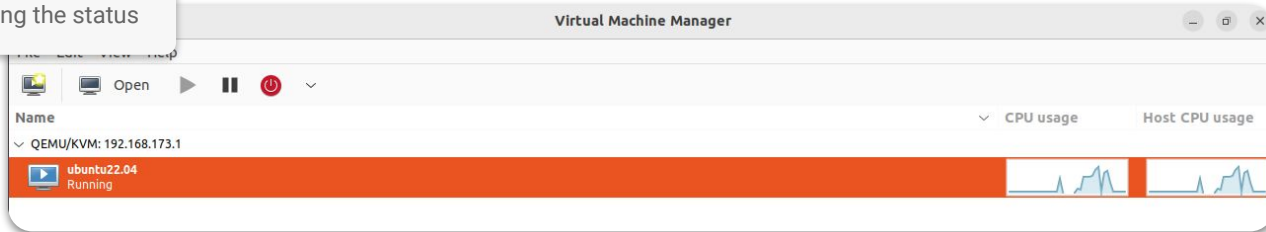
Confirm your password:

[\[Done \]](#)

*KVM login account and password setting

Virtual Machine Manager

Monitoring the status



The screenshot shows the terminal window for the virtual machine 'ubuntu22.04 on QEMU/KVM: 192.168.173.1'. The terminal displays the Ubuntu 22.04.2 LTS login prompt. The user 'kvmadmin' has logged in successfully. The terminal shows the following text:

```
Ubuntu 22.04.2 LTS st-kvm tty1
st-kvm login: kvmadmin
Password:
Welcome to Ubuntu 22.04.2 LTS (GNU/Linux 5.19.0-40-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

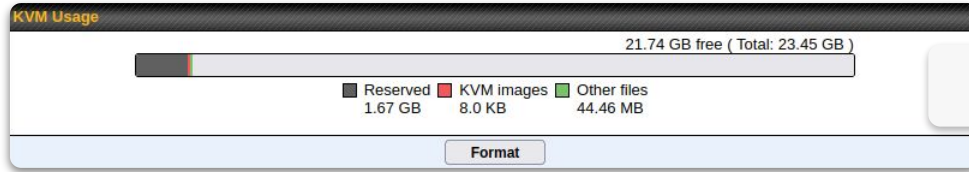
This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.
Last login: Tue Apr 25 03:18:18 UTC 2023 on tty1
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

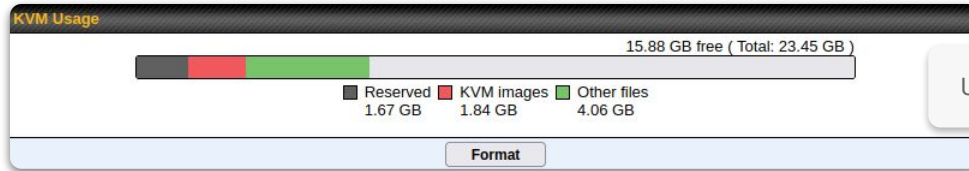
kvmadmin@st-kvm:~$
```

*KVM login as previous setting

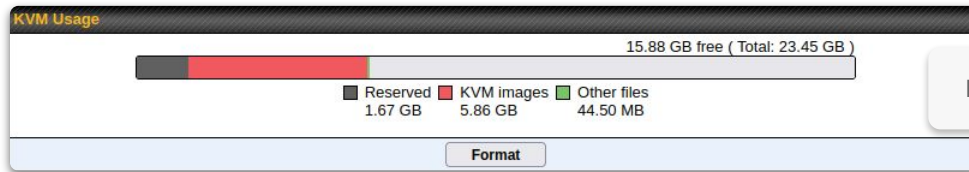
KVM Usage



No uploads



Upload the ubuntu ISO file (1.84 GB)



Established KVM