

Proxmox PVE

- Basis Installation nach <https://www.sysorchestra.com/proxmox-5-on-hetzner-root-server-with-ipv4/>
- Referenz-Doku https://pve.proxmox.com/wiki/Category:Reference_Documentation
- Command line tools: <https://pve.proxmox.com/pve-docs/>
- Hetzner proxmox Doku: https://community.hetzner.com/tutorials/install-and-configure-proxmox_ve/de?title=Proxmox_VE#netzwerkkonfiguration-hostsystem-routed
- Hetzner Netzwerk Doku: https://wiki.hetzner.de/index.php/Netzkonfiguration_Debian
- Netzwerk mit zwei Routing Tabellen/Default Routes: <http://www.rjsystems.nl/en/2100-adv-routing.php>

Verzeichnisstruktur

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kvm VM images	/mnt/data/images, /var/lib/vz/images	
kvm VM configs	/etc/pve/nodes/tokoeka/qemu-server	
LXC images	/var/lib/vz/images	
LXC configs	/etc/pve/nodes/tokoeka/lxc	

PVE Server Backup

<https://xcruft.com/content/proxmox-config-backups>

User Management

User in PVE erstellen (entspricht dem shell User). Erst dann ist die Administration per Web GUI möglich.

```
pveum user add [user@pam]
```

Gruppe erstellen:

```
pveum groupadd admin -comment "System Administrators"
```

Rechte zuweisen:

```
pveum aclmod / -group admin -role Administrator
```

Benutzer der Gruppe zuweisen:

```
pveum user modify testuser@pam -group admin
```

User auflisten

```
root@pveroser:~# pveum user list
```

userid	comment	email	enable	expire	firstname
groups	keys	lastname	realm-type	tokens	
alex@pam		pam	1	0	
root@pam		admin@netzwissen.de	1	0	
		pam			
thommie@pam		pam	1	0	

User disable

```
pveum user modify root@pam -enable 0
```

Andere Felder modifizieren

```
pveum user modify admin@pam -email admin@netzwissen.de
```

Gruppen auflisten

```
root@pveroser:~# pveum group list
```

groupid	comment	users
admin	System Administrators	alex@pam,thommie@pam

2FA löschen: über gleichberechtigten User, dann Löschen von "x" im Feld "Key ID"

Command Line

qm = Management der **kvm** VMs

pct = Management der **lxc** Container

Alle VMs (KVM und lxc) auf einmal runterfahren

```
pvenode stopall
```

VM löschen

```
qm destroy 105
```

Mounten eines Containers auf dem Host

```
pct mount 108 mounted CT 108 in '/var/lib/lxc/108/rootfs'
```

Gemeinsames Guest Share (smb)

```
mount.cifs \\\10.10.10.1\\guests /mnt/guests
```

Speicherverbrauch ermitteln

```
du -a /home | sort -n -r | head -n 5 find / -type f -size +100M
```

Container umbenennen

```
pct set <VMID> --hostname <newname>
```

Container betreten

```
pct enter <VMID>
```

Datei senden und empfangen

Datei senden

```
pct push <VMID> <file> <target>
```

Datei empfangen

```
pct pull <vmid> <path> <destination> [OPTIONS]
```

Backups manuell

```
vzdump 102 118 122 --compress zstd --mode stop --prune-backups 'keep-last=2'  
--mailnotification failure --mailto admin@netzwissen.de --quiet 1 --storage  
storagebox_191707
```

Alle VMs auf einmal runter fahren

```
pvesh create /nodes/localhost/stopall
```

Doku: <https://www.historiantech.com/increasing-operational-efficiency-in-proxmox-with-pvesh/>

PVE Templates

Erreichbare Templates auflisten

```
pveam update  
pveam available
```

Runterladen

```
pveam download local debian-10.0-standard_10.0-1_amd64.tar.gz
```

PVE Firewall

zentrale Konfiguration

```
/etc/pve/firewall/cluster.fw
```

Ein/aus auf der command line:

```
pve-firewall stop  
pve-firewall start
```

Wenn die Firewall den Host blockiert: Mit diesem Skript in rc.local wird die FW beim Neustart immer ausgeschaltet:

```
#  
#!/bin/sh -e  
# rc.local  
#  
# This script is executed at the end of each multiuser runlevel.  
# Make sure that the script will "exit 0" on success or any other  
# value on error.  
#  
# In order to enable or disable this script just change the execution  
# bits.  
#  
# By default this script does nothing.
```

```
pve-firewall stop  
  
exit 0
```

Meckermails von CERT-BUND wegen RPC

Portt 11 ist normalerweise offen, wird aber nicht gebraucht, Zitat Proxmox Staff

*regarding port 111 - it should work to just remove `rpcbind, nfs-common` if you don't need it
We might consider doing so in a future version, but since it's expected to deploy PMG behind a
firewall (or configure iptables/nft on it) it's not really high priority*

Service abschalten mit

```
root@kakariki ~ # systemctl stop rpcbind  
Warning: Stopping rpcbind.service, but it can still be activated by:  
  rpcbind.socket  
root@kakariki ~ # systemctl stop rpcbind.socket  
root@kakariki ~ # systemctl stop rpcbind  
root@kakariki ~ # systemctl disable rpcbind  
Synchronizing state of rpcbind.service with SysV service script with  
/lib/systemd/systemd-sysv-install.  
Executing: /lib/systemd/systemd-sysv-install disable rpcbind  
Removed "/etc/systemd/system/multi-user.target.wants/rpcbind.service".  
Removed "/etc/systemd/system/sockets.target.wants/rpcbind.socket".
```

SMB Mount mit Containern

Geht nur mit **privileged** container. Unter /Your LXC Option/Feature muss die "CIFS capability" aktiviert sein.

LXC und KVM Netplan Beispielconfigs

/etc/netplan/default.yaml für zwei Schnittstellen mit festen IPs, default gateway und routing

```
network:  
  version: 2  
  renderer: networkd  
  ethernets:  
    ens18:  
      dhcp4: no  
      addresses: [ 136.243.85.153/27 ]  
      gateway4: 136.243.85.129  
      nameservers:  
        addresses: [ 213.133.98.98, 213.133.99.99, 213.133.100.100 ]
```

```
ens19:
  dhcp4: no
  addresses: [ 10.10.10.10/24 ]
  nameservers:
    addresses: [ 10.10.10.1 ]
  routes:
    - to: 10.10.10.0/24
      via: 10.10.10.1
      metric: 200
    - to: 0.0.0.0/0
      via: 136.243.85.129
      metric: 100
```

Für eine Schnittstelle (ct, nur internes Netz)

```
network:
  version: 2
  renderer: networkd
  ethernets:
    eth0:
      dhcp4: no
      addresses:
        - 10.10.10.16/24
      gateway4: 10.10.10.1
      nameservers:
        addresses: [ 10.10.10.1 ]
      routes:
        - to: 0.0.0.0/0
          via: 10.10.10.1
          on-link: true
/etc/netplan/01-netcfg.yaml (END)
```

Testen:

```
sudo netplan generate
```

Testen mit automatischem zurücksetzen auf den vorherigen Stand

```
sudo netplan try -timeout 180
```

Anwenden

```
sudo netplan apply
```

LXC speziell

https://pve.proxmox.com/wiki/Linux_Container

Debug Modus beim Start

pct start 110 -debug

Port 111 rpcbind

Siehe <https://www.taste-of-it.de/debian-rpc-port-111-offen/> Über iptables auf localhost einschränken:

```
iptables -A INPUT -p tcp !-s 127.0.0.1 -dport 111 -j DROP
```

```
ip6tables -A INPUT -p tcp ! -s IPv6-Adresse -dport 111 -j DROP
```

```
ip6tables -A INPUT -p tcp -s IPv6-Adresse -dport 111 -j ACCEPT
```

```
iptables -A INPUT -p udp ! -s 192.168.0.0/24 -dport 111 -j DROP
```

```
ip6tables -A INPUT -p udp -s! IPv6-Adresse -dport 111 -j DROP
```

Datenwiederherstellung aus Dumpfile

Dumpfiles werden im Format *.lzo oder *.tar.zst komprimiert abgelegt. Sie enthalten die VM Daten im raw Format.

zst dekomprimieren

```
zstd -d vzdump-lxc-113-2022_05_14-01_30_57.tar.zst
```

danach mit tar xf ...tar auspacken.

```
lzop -x [*.lzo Datei]
```

erzeugt eine unkomprimierte *.vma Datei. Daraus werden die Partitionen als *.raw Dateien extrahiert:

```
vma extract [*.vma] /mnt/tmp/extract/
```

Mit file sieht man, was drin ist:

```
file tmp-disk-drive-scsi1.raw
```

```
tmp-disk-drive-scsi1.raw: DOS/MBR boot sector; partition 1 : ID=0xee, start-CHS (0x0,0,2), end-CHS (0x3ff,255,63), startsector 1, 204799999 sectors, extended partition table (last)
```

kpartx erzeugt daraus passende loop devices

```
root@tokoeke /mnt/data/tmp/extract # kpartx tmp-disk-drive-scsi0.raw
```

```
loop1p1 : 0 2048 /dev/loop1 2048
```

```
loop1p2 : 0 67102720 /dev/loop1 4096
```

Um diese zu mounten, braucht man den offset bis zur Partition:

```
root@tokoea /mnt/data/tmp/extract # fdisk -l tmp-disk-drive-scsi0.raw
Disk tmp-disk-drive-scsi0.raw: 32 GiB, 34359738368 bytes, 67108864 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 074AFDD5-B8AF-4EB9-A630-1B6E2136EBE9

Device Start End Sectors Size Type
tmp-disk-drive-scsi0.raw1 2048 4095 2048 1M BIOS boot
tmp-disk-drive-scsi0.raw2 4096 67106815 67102720 32G Linux filesystem
```

Der Offset ist also **4096 x 512 = 2097152**. Der Mountbefehl sieht so aus:

```
mount -o ro,loop,offset=2097152 harddrive.img /mnt/loop
```

Am Ende unmountet man alles und detached die loop devices wieder

```
root@tokoea /mnt/data/tmp/extract # losetup
NAME          SIZELIMIT OFFSET AUTOCLEAR R0 BACK-FILE
DIO LOG-SEC
/dev/loop1      0         0          0  0 /mnt/data/tmp/extract/tmp-disk-
drive-scsi0.raw 0        512
/dev/loop0      0         0          1  0 /var/lib/vz/images/106/vm-106-
disk-0.raw      0        512

root@tokoea /mnt/data/tmp/extract # losetup -d /dev/loop1
root@tokoea /mnt/data/tmp/extract # losetup
NAME          SIZELIMIT OFFSET AUTOCLEAR R0 BACK-FILE
DIO LOG-SEC
/dev/loop0      0         0          1  0 /var/lib/vz/images/106/vm-106-
disk-0.raw      0        512
```

KVM: qcow2 Device mounten

```
modprobe nbd max_part=8

qemu-nbd --connect=/dev/nbd0 /var/lib/vz/images/100/vm-100-disk-1.qcow2
```

Partitionierung ermitteln und mounten

```
fdisk /dev/nbd0 -l

root@tokoea /mnt/data/images/101 # fdisk /dev/nbd0 -l
Disk /dev/nbd0: 32 GiB, 34359738368 bytes, 67108864 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
```


I/O size (minimum/optimal): 512 bytes / 512 bytes
 Disklabel type: gpt
 Disk identifier: 9D35B183-C931-43A4-88DD-659ED1FAA7EE

Device	Start	End	Sectors	Size	Type
/dev/nbd0p1	2048	4095	2048	1M	BIOS boot
/dev/nbd0p2	4096	67106815	67102720	32G	Linux filesystem

Danach mounten

```
mount /dev/nbd0p1 /mnt/somepoint/
```

Aufräumen

```
umount /mnt/somepoint/

qemu-nbd --disconnect /dev/nbd0

rmmod nbd
```

LXC: raw Device mounten

Welche loop devices werden aktuell benutzt

```
<font inherit/monospace;;inherit;;#ff5454background-
color:#ffffff;>root</font>
<font inherit/inherit;;inherit;;#ffff54background-color:#ffffff;>@</font>
<font inherit/inherit;;inherit;;#54ffffbackground-
color:#ffffff;>tokoeka</font>
<font inherit/inherit;;inherit;;#ffff54background-
color:#ffffff;>/mnt</font>
<font inherit/inherit;;inherit;;#ff54ffbackground-color:#ffffff;>#</font>
<font inherit/inherit;;inherit;;#000000background-color:#ffffff;>losetup -
l</font>  NAME          SIZELIMIT OFFSET AUTOCLEAR RO BACK-FILE
DIO LOG-SEC
/dev/loop1          0          0          1  0 /mnt/data/images/108/vm-108-
disk-1.raw  0      512
/dev/loop27         0          0          1  0 /mnt/data/images/112/vm-112-
disk-0.raw  0      512
/dev/loop17         0          0          1  0 /mnt/data/images/111/vm-111-
disk-2.raw  0      512
/dev/loop8          0          0          1  0 /mnt/data/images/110/vm-110-
disk-0.raw  0      512
/dev/loop25         0          0          1  0 /mnt/data/images/125/vm-125-
disk-1.raw  0      512
/dev/loop6          0          0          1  0 /mnt/data/images/100/vm-100-
disk-0.raw  0      512
/dev/loop23         0          0          1  0 /mnt/data/images/122/vm-122-
disk-1.raw  0      512
```

```
/dev/loop13      0      0      1  0 /mnt/data/images/113/vm-113-
disk-0.raw      0      512
```

Ablauf manuell

```
losetup /dev/loop22 disk-drive-ide0.raw
partx -v --add /dev/loop22
mount /dev/loop22p1 /mnt/123
```

```
root@tokoeke /mnt/data/images/116 # losetup /dev/loop19 vm-116-disk-2.raw
root@tokoeke /mnt/data/images/116 # partx -v --add /dev/loop19
partition: none, disk: /dev/loop19, lower: 0, upper: 0
/dev/loop19: partition table type 'gpt' detected
range recount: max partno=1, lower=0, upper=0
/dev/loop19: partition #1 added
root@tokoeke /mnt/data/images/116 # losetup -l | grep 116
/dev/loop19      0      0      0  0 /mnt/data/images/116/vm-116-
disk-2.raw      0      512
/dev/loop8       0      0      1  0 /mnt/data/images/116/vm-116-
disk-0.raw      0      512
/dev/loop18      0      0      1  0 /mnt/data/images/116/vm-116-
disk-1.raw      0      512
```

Auflisten aller Loop-Devices

```
losetup -l
```

Devices abhängen, mit -D alle zugehörigen abhängen

```
losetup -d
```

```
losetup -D
```

Parsen der Partitionstabelle und anlegen von loop Einträgen nach Bedarf

```
partx -v --add /dev/loop20
```

Partitionstabelle zeigen

```
root@tokoeke /mnt # partx -s /dev/loop22
NR START      END  SECTORS  SIZE NAME  UUID
 1  2048 204799999 204797952 97.7G      7a11d514-01
```

pct set

```
pct set 116 -mp1 volume=data:116/vm-116-disk-2.raw,mp=/mnt/data2,backup=1
```

Offen: offset? p1 ?

Daten-Konvertierungen

<https://stafwag.github.io/blog/blog/2018/07/01/migrate-a-windows-vmware-virtual-machine-to-kvm/>

Split disks in eine Datei umwandeln

```
vmware-vdiskmanager -r leapsrv.vmdk -t 0 /tmp/leapsrv_combined.vmdk
```

Wandeln von vmdk nach qcow2

```
qemu-img convert -f vmdk -O qcow2 leapsrv_combined.vmdk  
leapsrv_combined.vmdk.qcow2
```

Andersrum von qcow2 (kvm) nach raw (lxc):

```
qemu-img convert -f qcow2 -O raw vm-109-disk-1.qcow2  
/mnt/data/images/114/vm-114-disk-3.raw
```

SPICE

Doku: https://pve.proxmox.com/wiki/SPICE#Requirements_for_SPICE Hilfs-Skript in
/etc/scripts/spice.sh

```
Usage: ./spice.sh [-u <string>] [-p <string>] vmid [node [proxy]]  
  
-u username. Default root@pam  
-p password. Default ''  
  
vmid: id for VM  
node: Proxmox cluster node name  
proxy: DNS or IP (use <node> as default)
```

Client: virt-viewer, Remmina

ZFS Installation

ZFS installieren

```
apt install linux-headers-amd64 zfsutils-linux zfs-dkms zfs-zed
```

<https://openzfs.github.io/openzfs-docs/Getting%20Started/Debian/Debian%20Bullseye%20Root%20on%20ZFS.html>](<https://openzfs.github.io/openzfs-docs/Getting%20Started/Debian/Debian%20Bullseye%20Root%20on%20ZFS.html>)

Partitionieren

```
root@kakariki /etc/apt # fdisk /dev/disk/by-id/nvme-eui.0025388511c55959
```

(Achtung: gdisk konvertiert MBR nach GPT)

```
/dev/disk/by-id/nvme-eui.0025388511c55959 /dev/disk/by-id/nvme-eui.0025388511c5595b
```

```
DISK1=/dev/disk/by-id/nvme-eui.0025388511c55959-part7 DISK2=/dev/disk/by-id/nvme-eui.0025388511c5595b-part7
```

Dannach zpool anlegen. "mirror" entspricht RAID1

```
zpool create [-dfn] [-m mountpoint] [-o property=value]... [-o feature@feature=value]
              [-o compatibility=off|legacy|file[,file]...] [-O file-system-property=value]... [-R root] [-t tname] pool vdev...
```

```
zpool create \
  -o ashift=12 \
  -o autotrim=on -d \
  -o cachefile=/etc/zfs/zpool.cache \
  -o feature@async_destroy=enabled \
  -o feature@bookmarks=enabled \
  -o feature@embedded_data=enabled \
  -o feature@empty_bpobj=enabled \
  -o feature@enabled_txg=enabled \
  -o feature@extensible_dataset=enabled \
  -o feature@filesystem_limits=enabled \
  -o feature@hole_birth=enabled \
  -o feature@large_blocks=enabled \
  -o feature@livelist=enabled \
  -o feature@lz4_compress=enabled \
  -o feature@spacemap_histogram=enabled \
  -o feature@zpool_checkpoint=enabled \
  -o devices=off \
  -o acltype=posixacl -o xattr=sa \
  -o compression=lz4 \
  -o normalization=formD \
  -o reltime=on \
  -o canmount=off -o mountpoint=/ -R /mnt \
  rpool mirror \
  /dev/disk/by-id/nvme-eui.0025388511c55959-part7 \
  /dev/disk/by-id/nvme-eui.0025388511c5595b-part7
```

zfs Datasets erstellen

zfs create rpool/mirror

Pool und datasets wieder löschen

zpool destroy -f rpool

LE Zertifikate für PVE

```
pvenode acme account register default admin@netzwissen.de  
pvenode config set --acme domains=kakariki.netzwissen.de  
root@kakariki /etc/pve # pvenode acme cert order
```

Loading ACME account details Placing ACME order Order URL:

<<https://acme-v02.api.letsencrypt.org/acme/order/1232182246/198286068416>>

Getting authorization details from

'<<https://acme-v02.api.letsencrypt.org/acme/authz-v3/250346582026>>' The validation for kakariki.netzwissen.de is pending! Setting up webserver Triggering validation Sleeping for 5 seconds Status is 'valid', domain 'kakariki.netzwissen.de' OK!

All domains validated!

Creating CSR Checking order status Order is ready, finalizing order valid!

Downloading certificate Setting pveproxy certificate and key Restarting pveproxy Task OK

ACME DNS validation Hetzner DNS API

export HETZNER_Token="<token>"

```
./acme.sh --issue --dns dns_hetzner -d example.com -d *.example.com
```

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