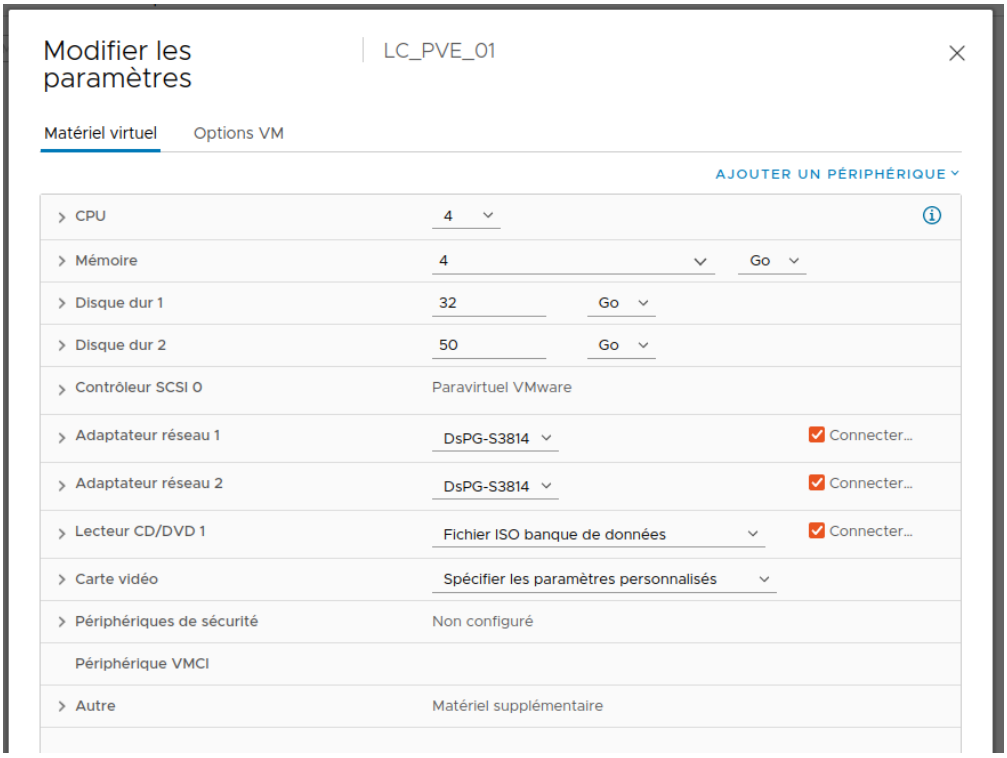
Créer 1 machine avec les références ci dessous et la cloner 2 fois:

```
- 4 CPU
- 4GO RAM
- 1 disque 32GO
- 1 disque 50GO
- 2 cartes réseau (dans mon cas 2 switche 3814)
- 1 ISO Proxmox_ve_7
```



Réaliser l'installation et la configuration de base de proxmox:

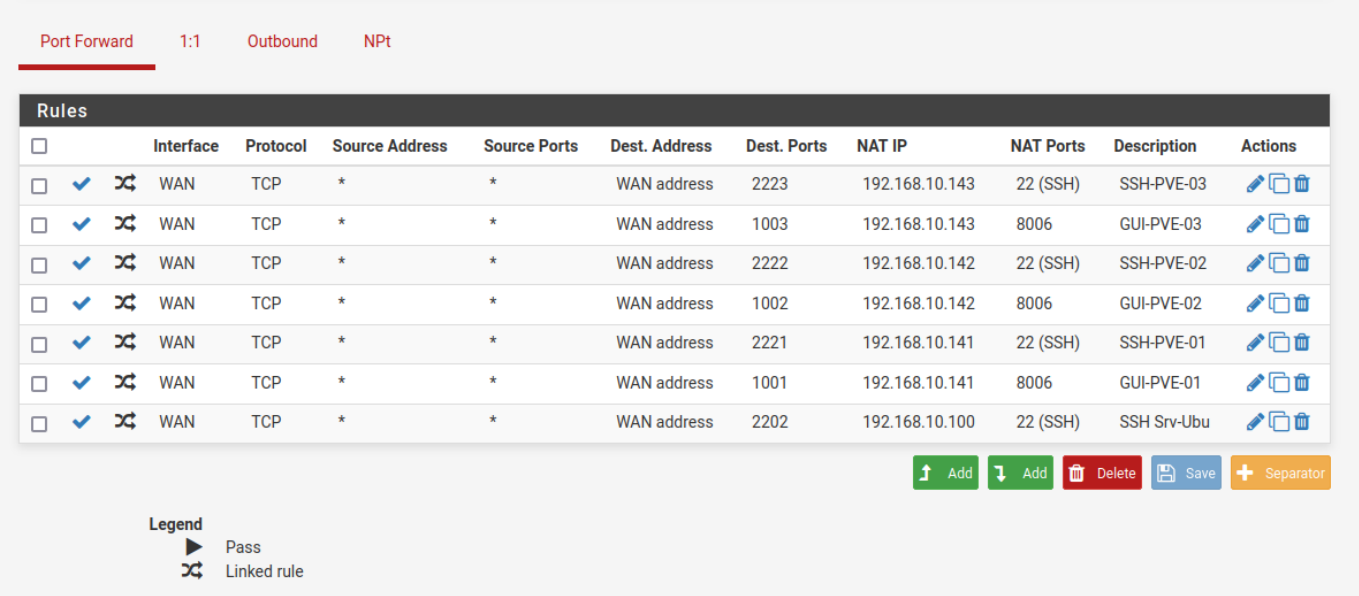
Je commence par réfléchir au ip et ajouter les regles de NAT dans le firewall:

```
pve01.tssr.lab
{
```

```
    adresse local: 192.168.10.141
    GUI: 10.30.10.126:1001
    SSH: 10.30.10.126:221
    id: root
    passwd: Test1234
}

pve02.tssr.lab
{
    adresse local: 192.168.10.142
    GUI: 10.30.10.126:1002
    SSH: 10.30.10.126:2222
    id: root
    passwd: Test1234
}

pve03.tssr.lab
{
    addresse local: 192.168.10.143
    GUI: 10.30.10.126:1003
    SSH: 10.30.10.126:2223
    id: root
    passwd: Test1234
}
```



Port Forward | 1:1 | Outbound | NPt

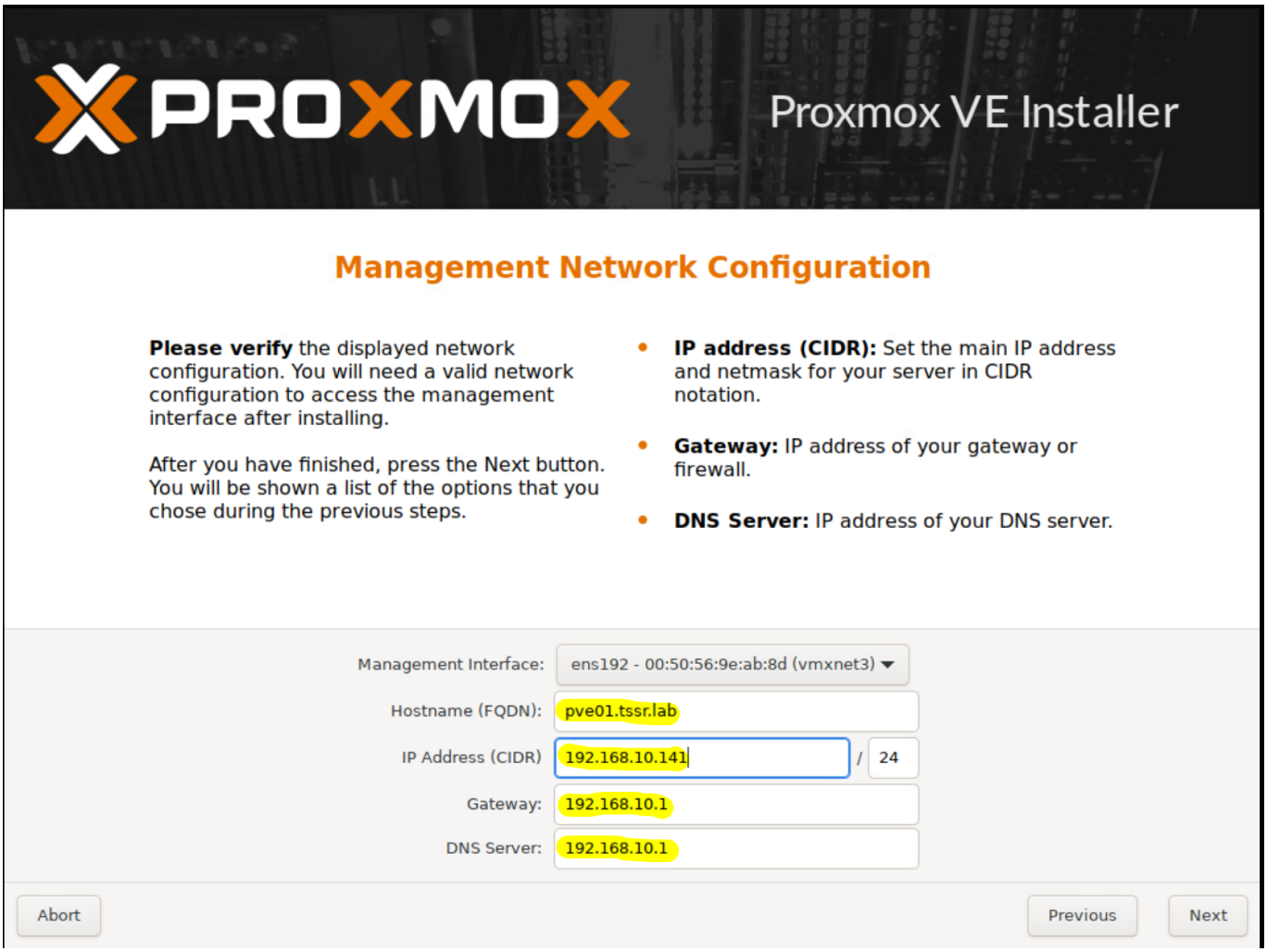
Rules

		Interface	Protocol	Source Address	Source Ports	Dest. Address	Dest. Ports	NAT IP	NAT Ports	Description	Actions
☐	✓	WAN	TCP	*	*	WAN address	2223	192.168.10.143	22 (SSH)	SSH-PVE-03	
☐	✓	WAN	TCP	*	*	WAN address	1003	192.168.10.143	8006	GUI-PVE-03	
☐	✓	WAN	TCP	*	*	WAN address	2222	192.168.10.142	22 (SSH)	SSH-PVE-02	
☐	✓	WAN	TCP	*	*	WAN address	1002	192.168.10.142	8006	GUI-PVE-02	
☐	✓	WAN	TCP	*	*	WAN address	2221	192.168.10.141	22 (SSH)	SSH-PVE-01	
☐	✓	WAN	TCP	*	*	WAN address	1001	192.168.10.141	8006	GUI-PVE-01	
☐	✓	WAN	TCP	*	*	WAN address	2202	192.168.10.100	22 (SSH)	SSH Srv-Ubu	

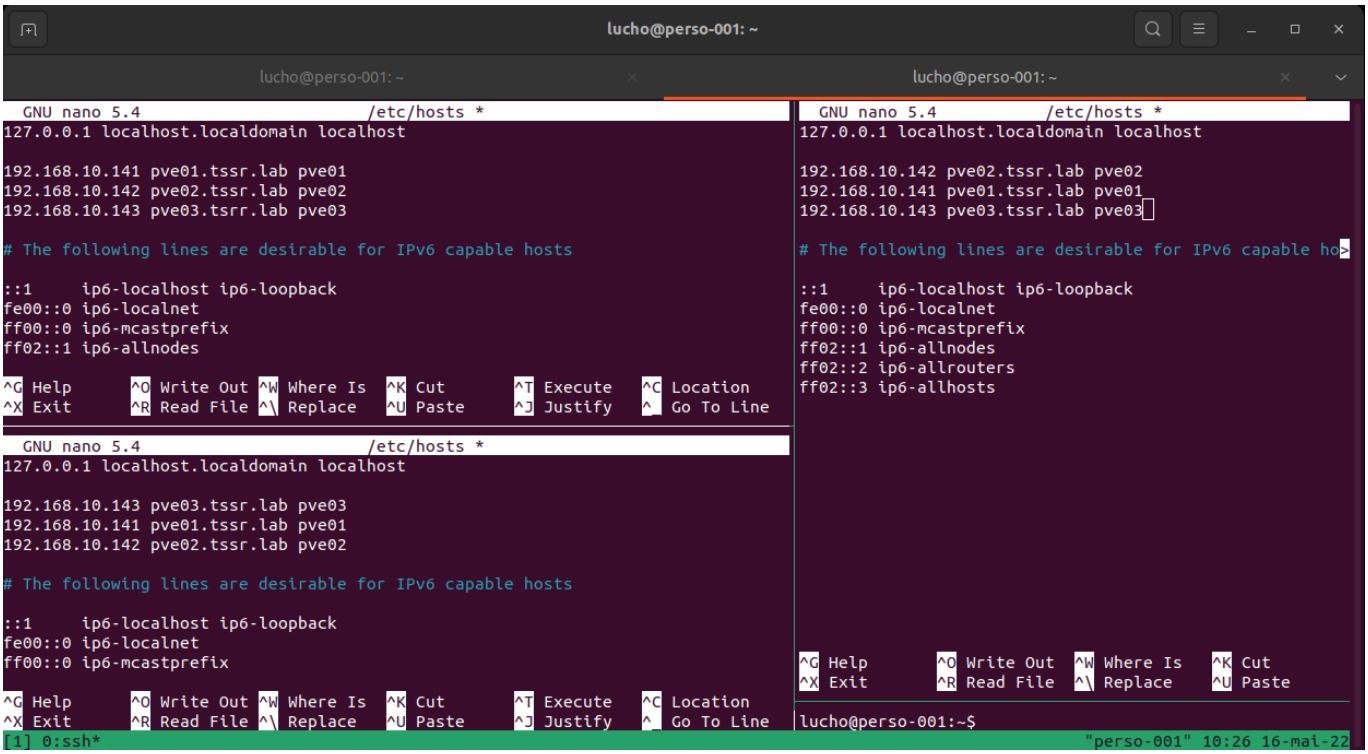
Add | Add | Delete | Save | Separator

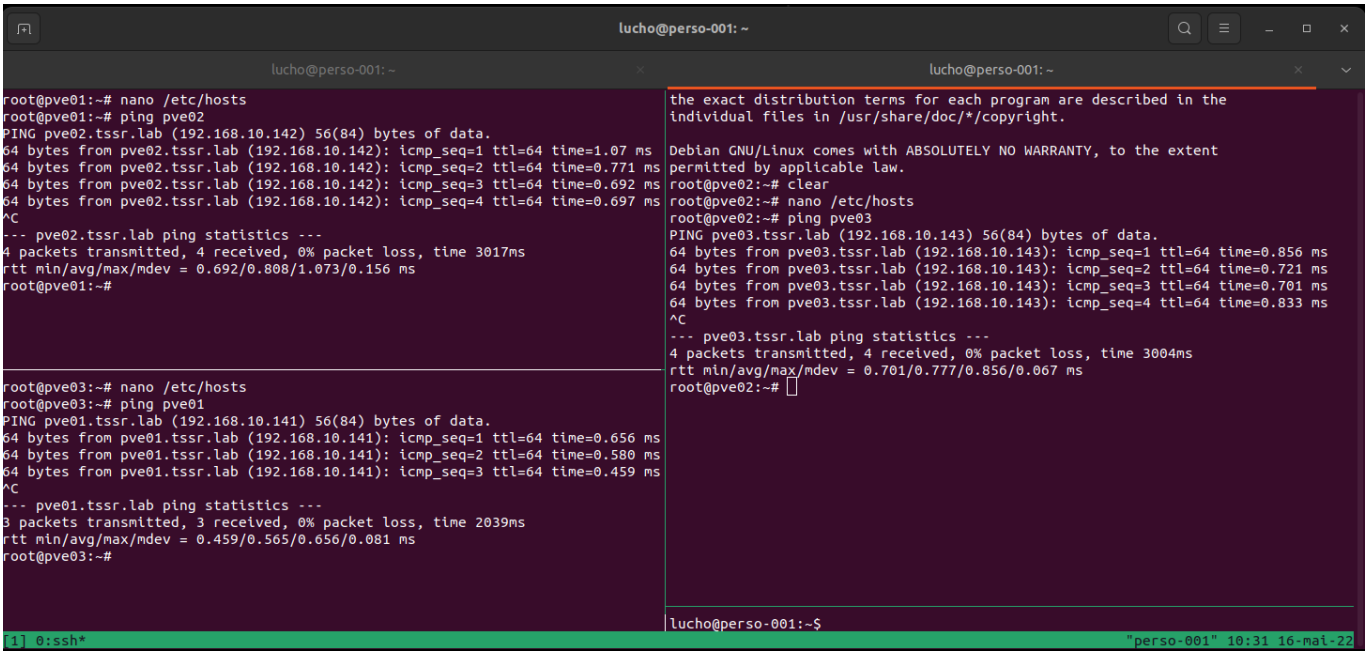
Legend
Pass
Linked rule

Installation de proxmox en faisant attention de configurer le reseau correctement:



Une fois l'installe faite, modifier le fichier host comme suis et vérifier en faisant pinger les machines:





Remplacer les sources apt entreprise par les sources no-subscriptions:

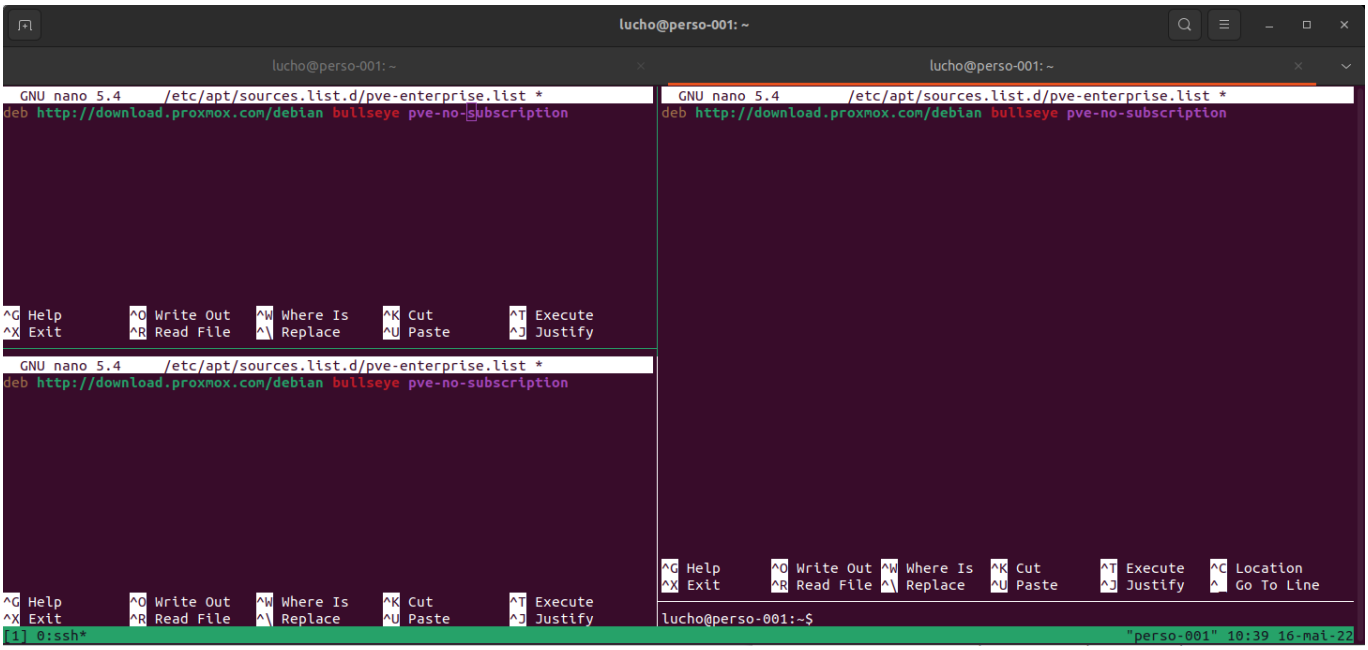
```
nano /etc/apt/sources.list.d/pve-entreprise.list
```

Remplacer :

```
deb https://enterprise.proxmox.com/debian/pve bullseye pve-enterprise
```

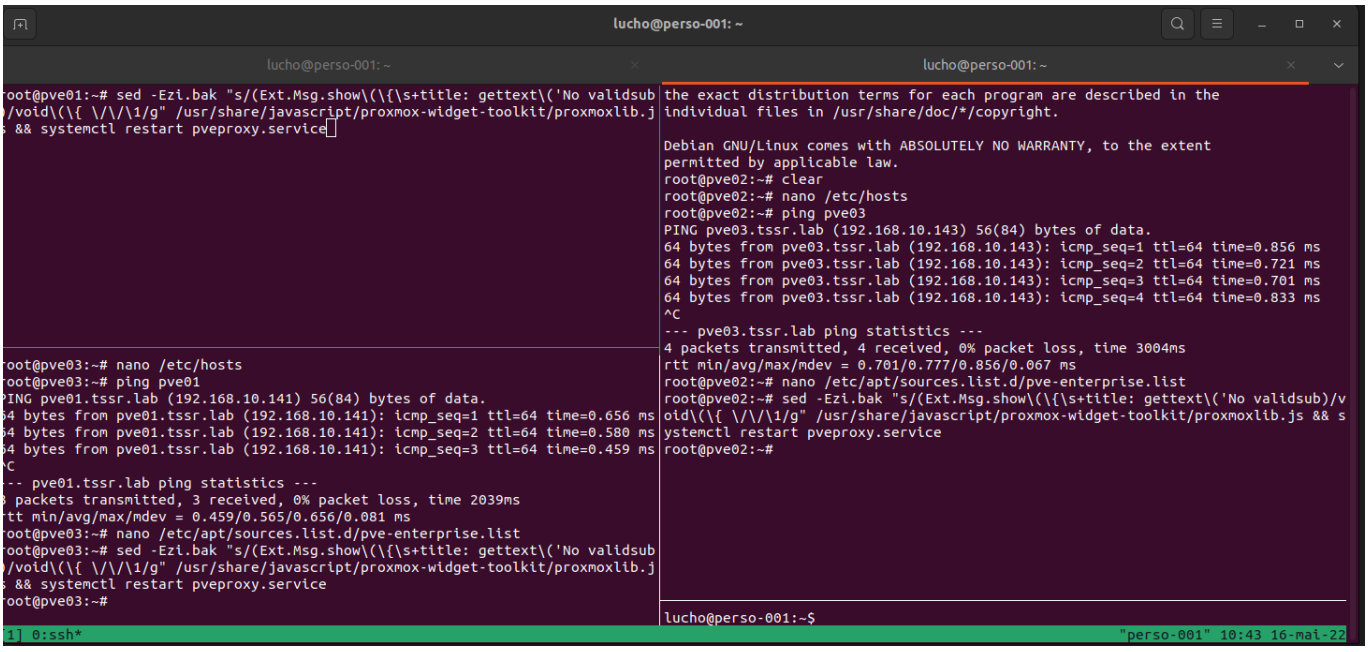
Par:

```
deb http://download.proxmox.com/debian bullseye pve-no-subscription
```



Nous allons supprimer le message d'erreur dans le fichier proxmox-widget-toolkit:

```
sed -Ezi.bak "s/(Ext.Msg.show\(\{\s+title: gettext\('No validsub)/void\(\{
\/\/\1/g" /usr/share/javascript/proxmox-widget-toolkit/proxmoxlib.js &&
systemctl restart pveproxy.service
```

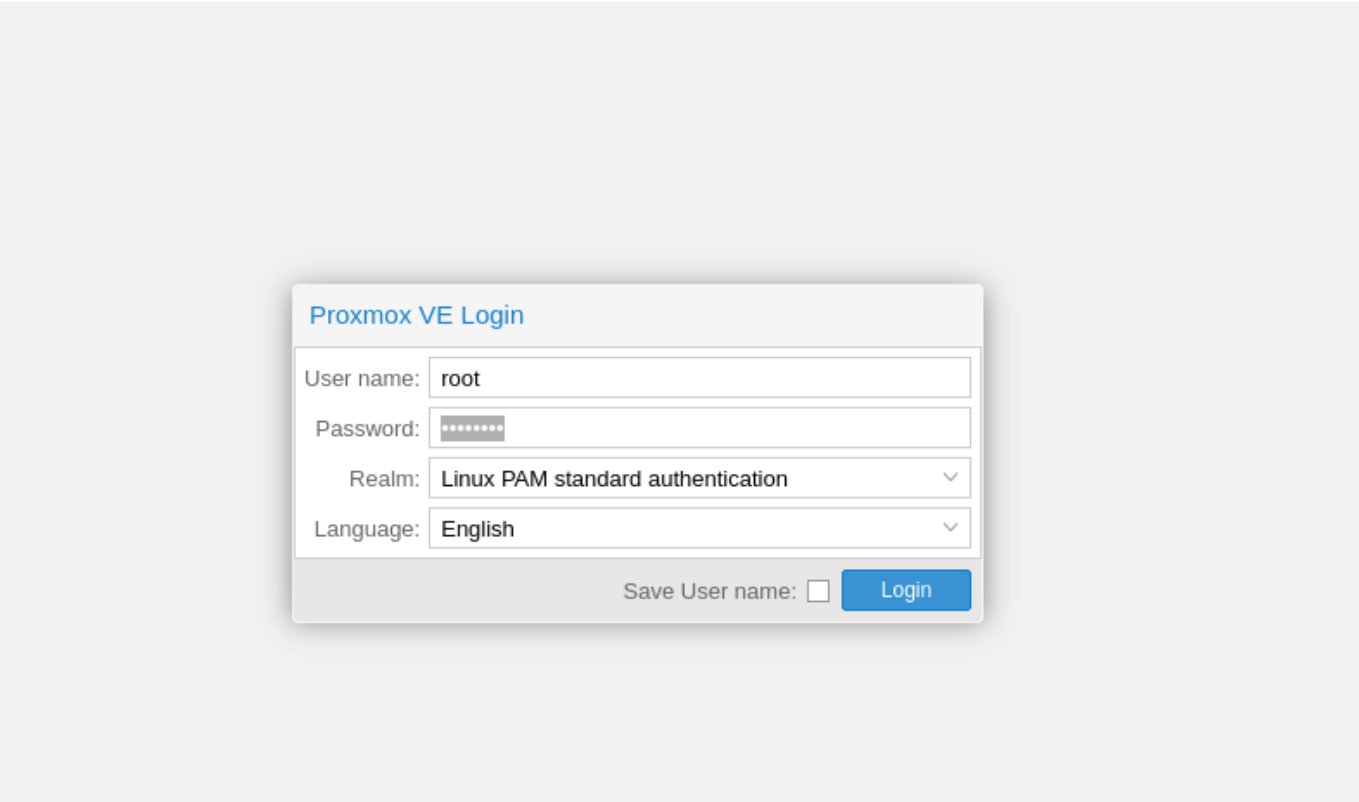


Après ça vous pouvez lancer la commande :

```
apt update && apt upgrade -y && reboot
```

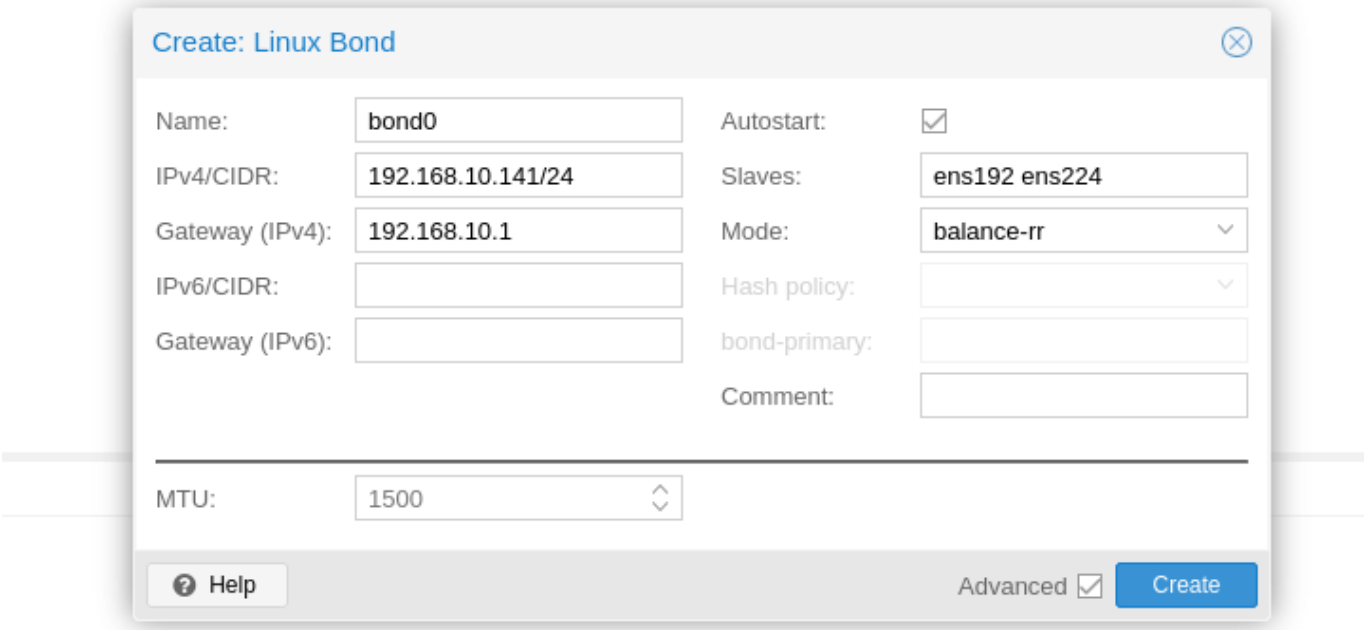
On se connecte à l'inerface web de notre pve01

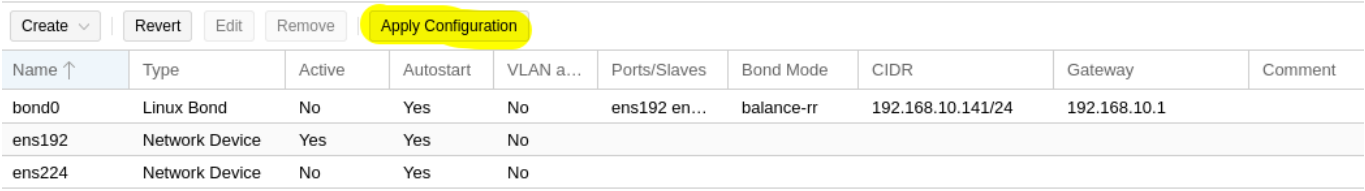
```
https://10.30.10.126:1001
```



Création du bond0 à la place du vmbr0 (cette étape est à réaliser sur les 3 serveurs)

On commence par supprimer le vmbr0 et on crée le vmbr0





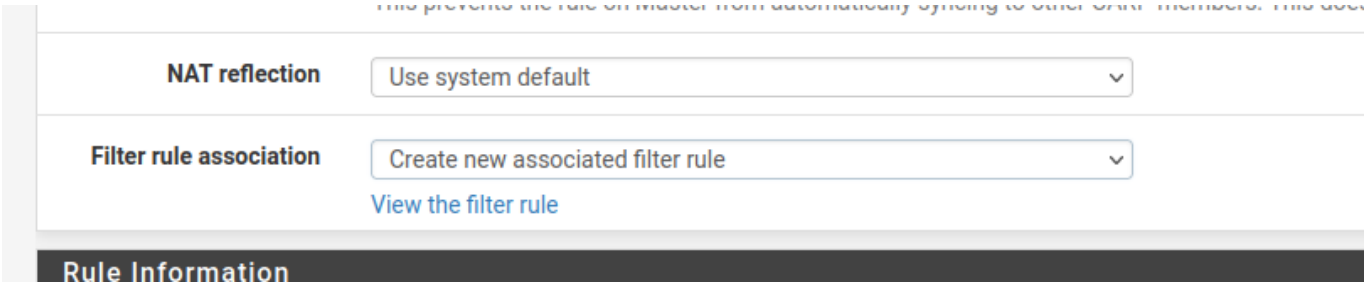
On fais cette configuration sur les 3 serveurs et on reboot

Ensuite on vas creer une nouvelle regle associée dans le pfsense (car on a changé l'interface donc nos regles nat ne fonctionnent plus)

Message d'erreur exemple:

```
kex_exchange_identification: read: Connection reset by peer
Connection reset by x.x.x.x port 22
lost connection
```

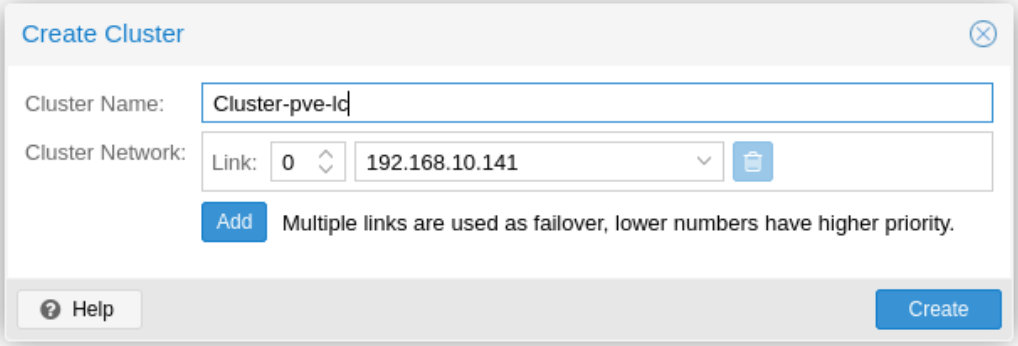
Donc on crée de nouvelles regles associés dans le pfsense pour chacune de nos regles:

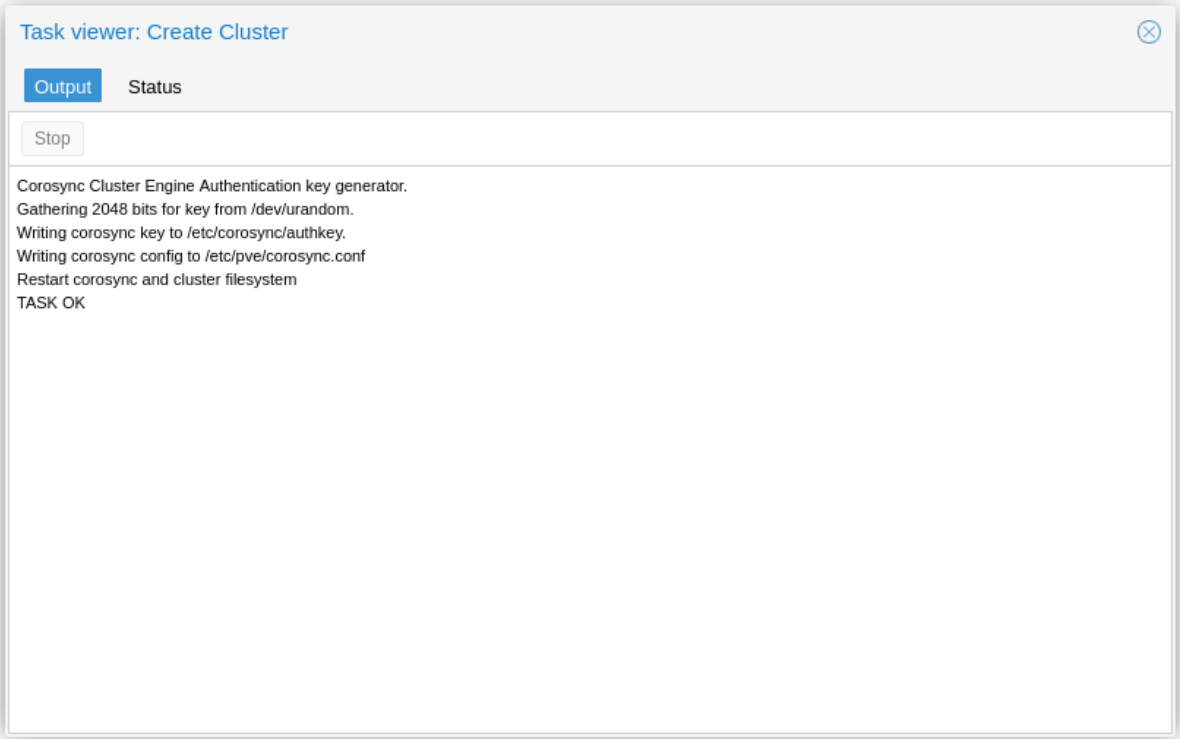


Creation du cluster et ajout des serveurs dans le proxmox:

On vas sur l'interface web du serveur pve01:

```
Dans Datacenter > Cluster > Cliquer sur "Create Cluster":
```

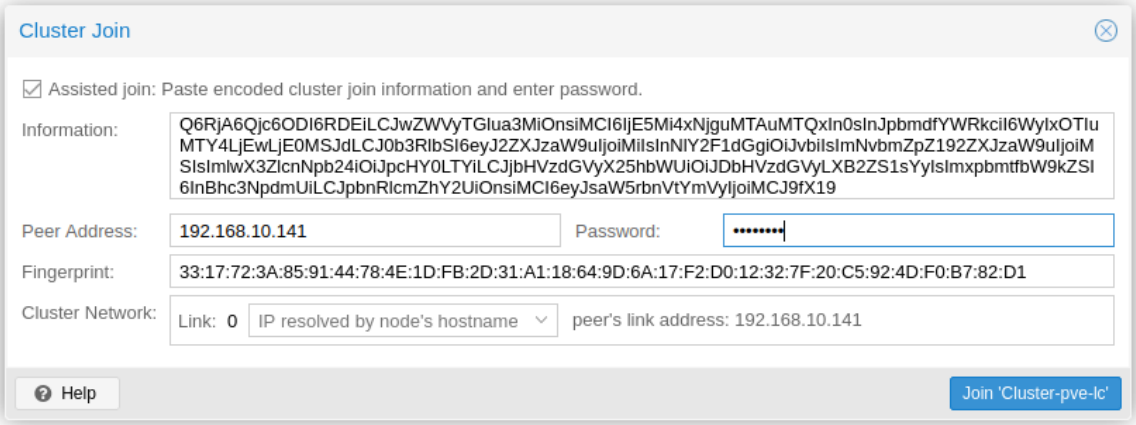




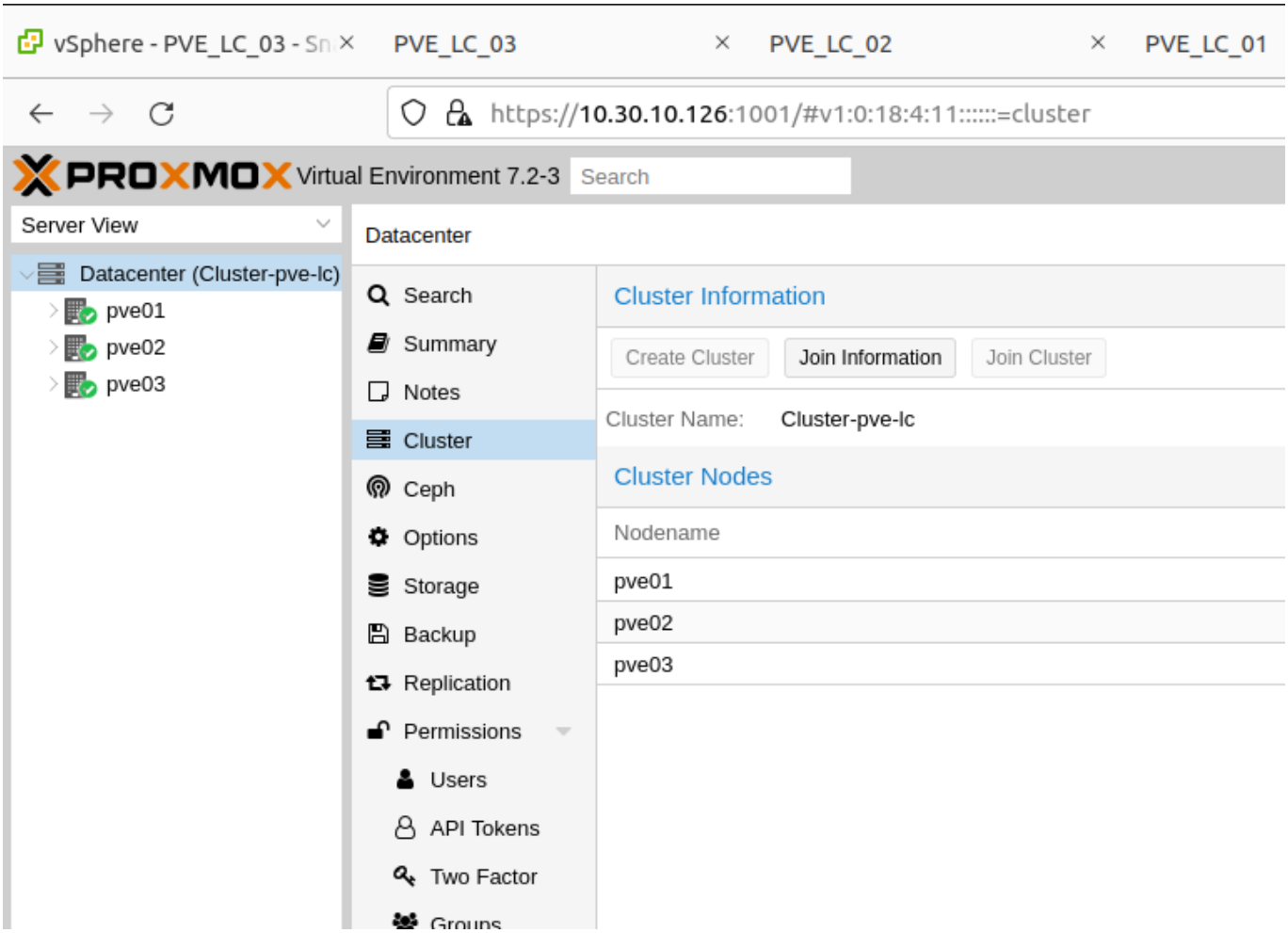
Ensuite on ajoute pve02 et pve03 au cluster:

```
Sur pve01 cliquer sur "Join Information" et copier la clef
```


```
Sur pve02 et pve03 cliquer sur "Join Cluster" et coller la clef précédement
copié sur pve01 en entrant le mot de passe root de pve01
```

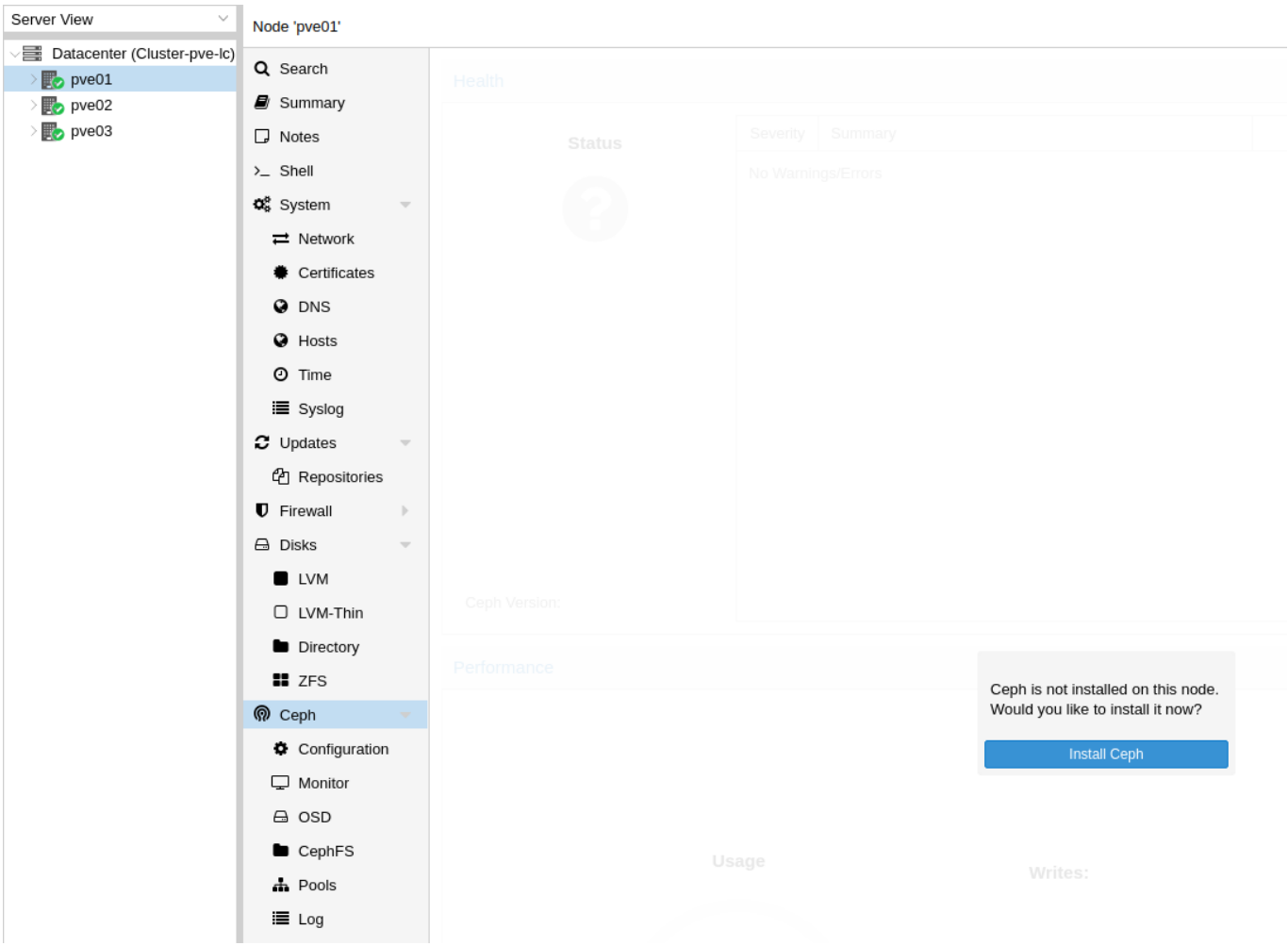


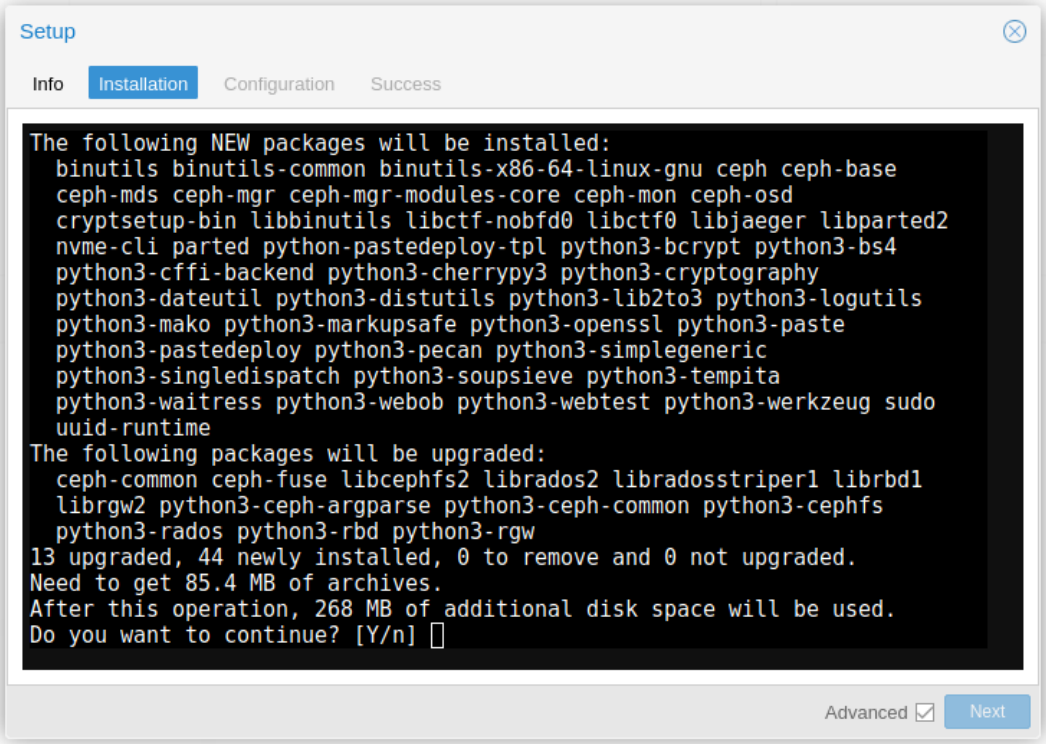
Ensuite nous pouvons nous reconnecter sur l'interface de pve01 et nous pouvons voir que pve02 et pve03 on étaient ajoutés avec succés sur le cluster

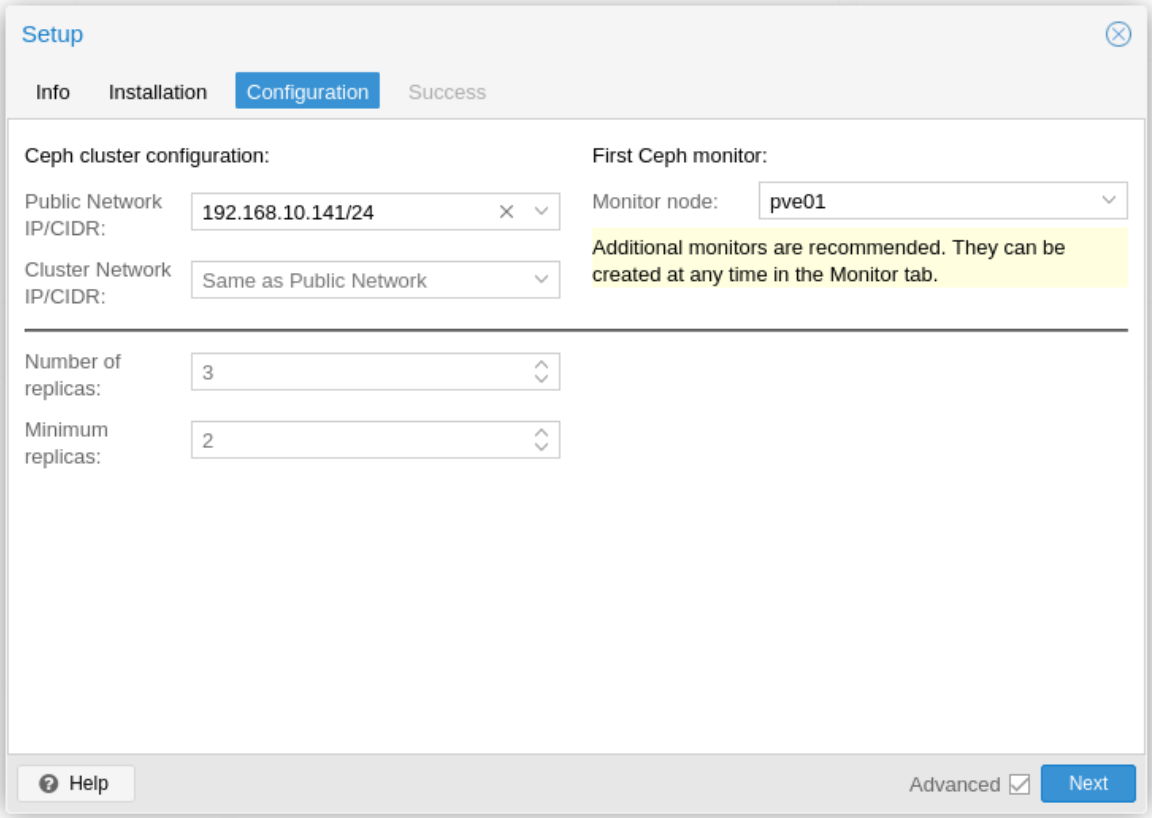


Installation CEPH:

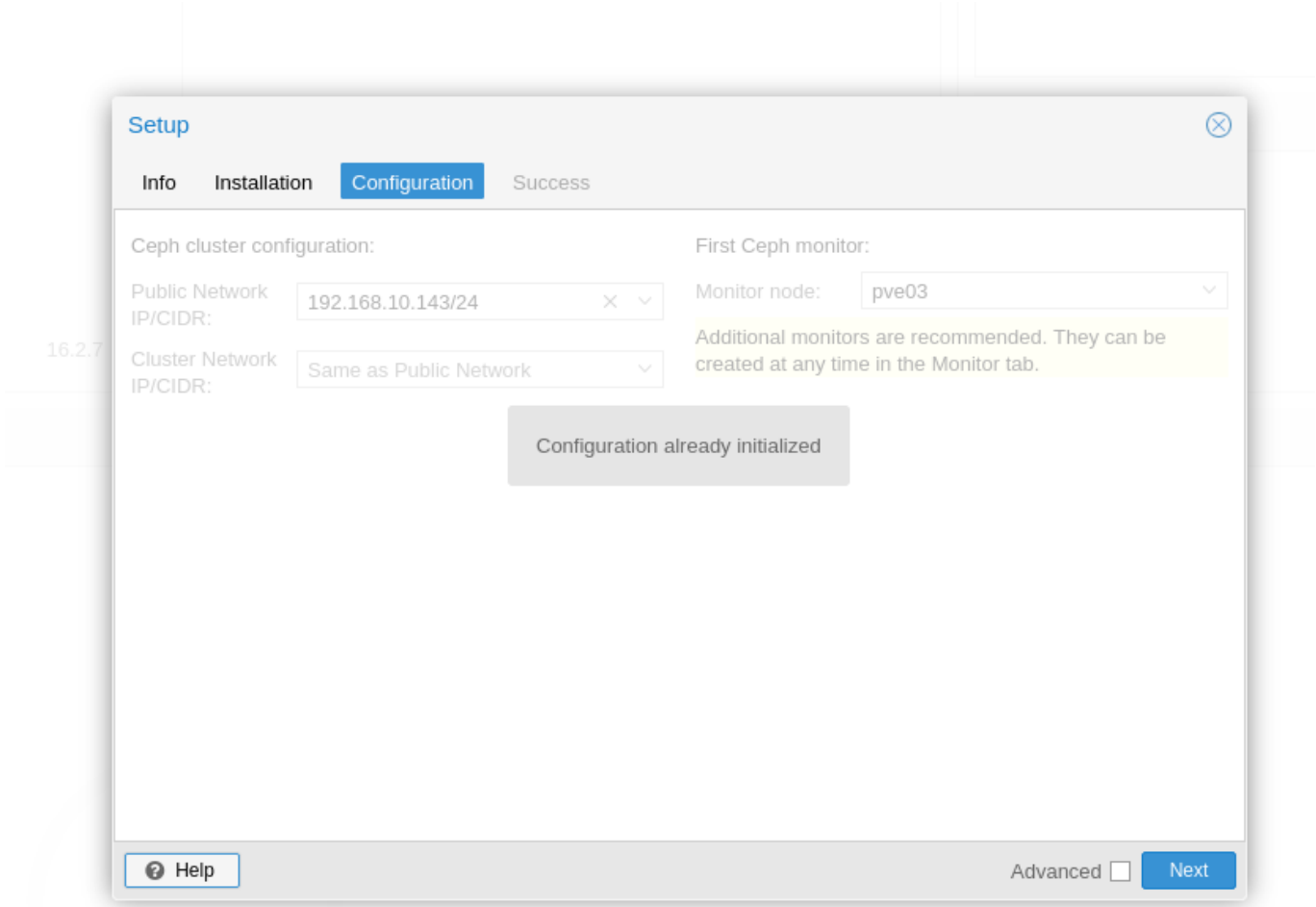
```
Sur notre pve01 installer CEPH
```


Server View
Datacenter (Cluster-pve-lc)
pve01
pve02
pve03
Node 'pve01'
Search
Summary
Notes
Shell
System
Network
Certificates
DNS
Hosts
Time
Syslog
Updates
Repositories
Firewall
Disks
LVM
LVM-Thin
Directory
ZFS
Ceph
Configuration
Monitor
OSD
CephFS
Pools
Log
Health
Status
Severity
Summary
No Warnings/Errors
Ceph Version:
Performance
Ceph is not installed on this node.
Would you like to install it now?
Install Ceph
Usage
Writes:
IOPS:


Setup
Info
Installation
Configuration
Success
The following NEW packages will be installed:
binutils binutils-common binutils-x86-64-linux-gnu ceph ceph-base
ceph-mds ceph-mgr ceph-mgr-modules-core ceph-mon ceph-osd
cryptsetup-bin libbinutils libctf-nobfd0 libctf0 libjaeger libparted2
nvme-cli parted python-pastedeploy-tpl python3-bcrypt python3-bs4
python3-cffi-backend python3-cherrypy3 python3-cryptography
python3-dateutil python3-distutils python3-lib2to3 python3-logutils
python3-mako python3-markupsafe python3-openssl python3-paste
python3-pastedeploy python3-pecan python3-simplegeneric
python3-singledispatch python3-soupsieve python3-tempita
python3-waitress python3-webob python3-webtest python3-werkzeug sudo
uuid-runtime
The following packages will be upgraded:
ceph-common ceph-fuse libcephfs2 librados2 libradosstriper1 librbd1
librgw2 python3-ceph-argparse python3-ceph-common python3-cephfs
python3-rados python3-rbd python3-rgw
13 upgraded, 44 newly installed, 0 to remove and 0 not upgraded.
Need to get 85.4 MB of archives.
After this operation, 268 MB of additional disk space will be used.
Do you want to continue? [Y/n]
Advanced
Next

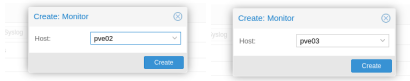



```
Faire de meme sur pve02 et pve03 a différence pret que cette fois ci la
configuration lors de l'install CEPH est déja initializé sur la conf de
notre pve01
```



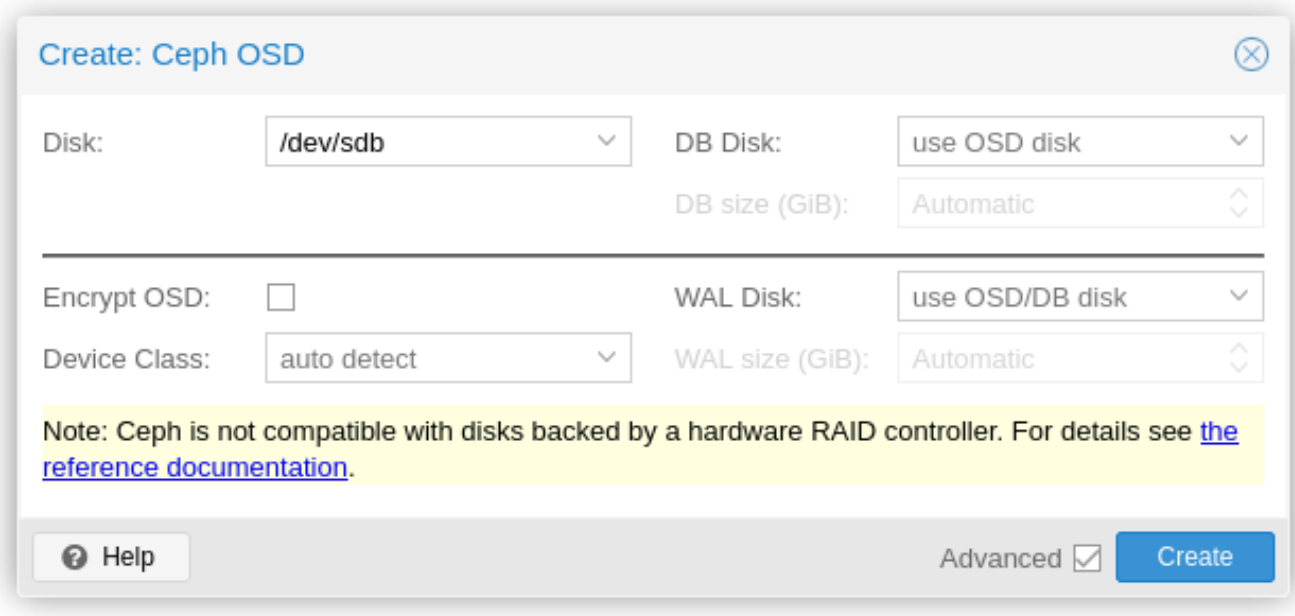
Maintenant nous allons créer des monitors pour chacunn de nos pve:

```
Dans pve01 cliquer sur CEPH > Monitor > Create
```

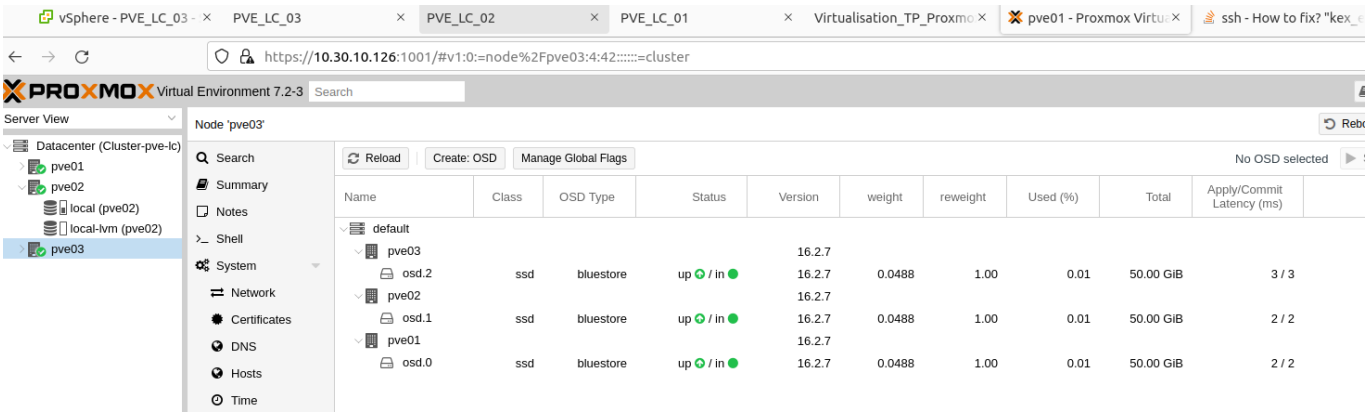


Créer un OSD :

```
Dans pve01 cliquer sur CEPH > OSD > Create: OSD (répéter l'opération sur
les deux autres pve)
```

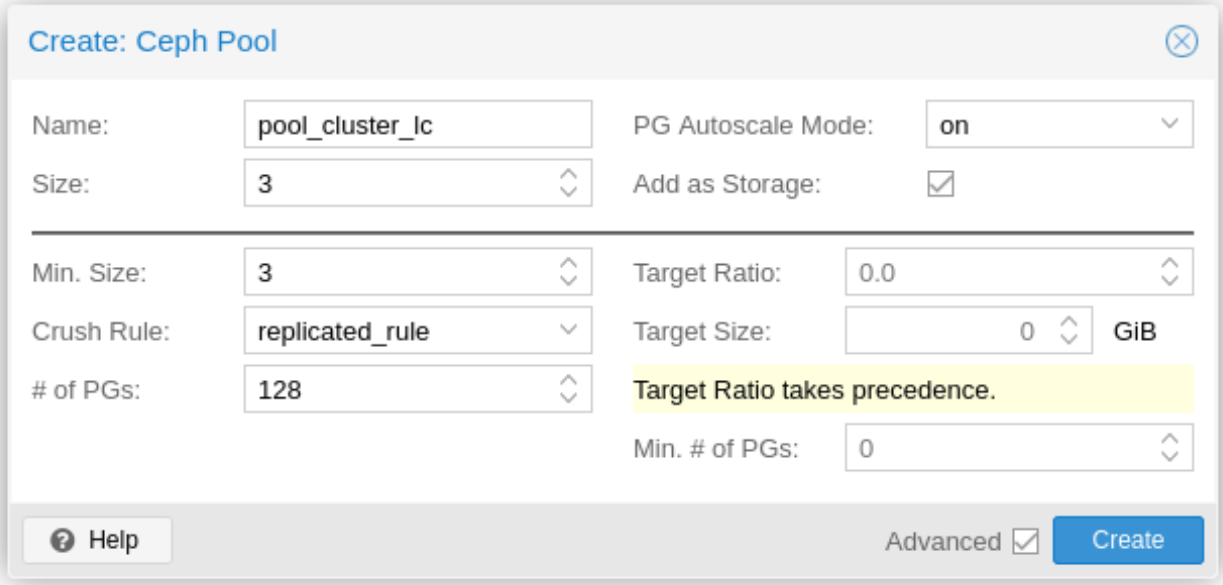



```
Vous allez obtenir cela
```

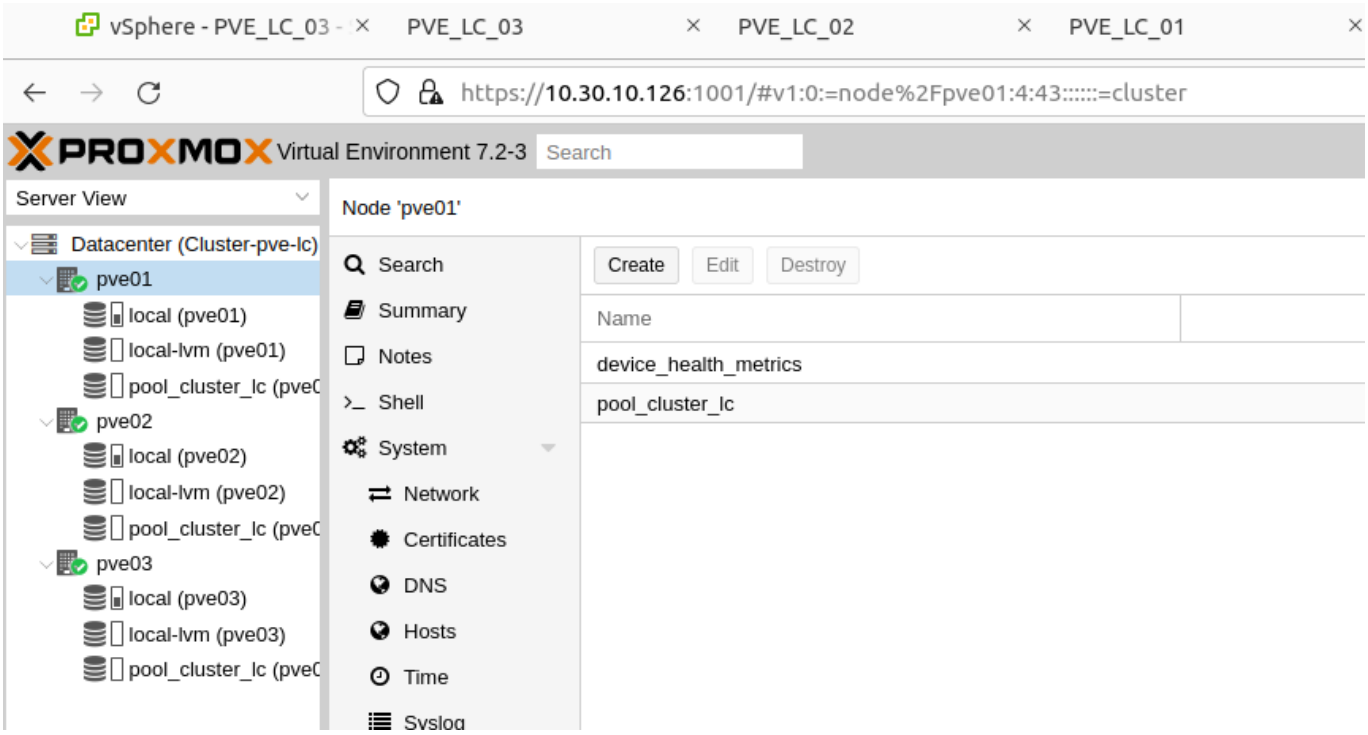


Ensuite nous allons créer un pool de stockage:

```
Dans pve01 cliquer sur CEPH > pools > Create
```



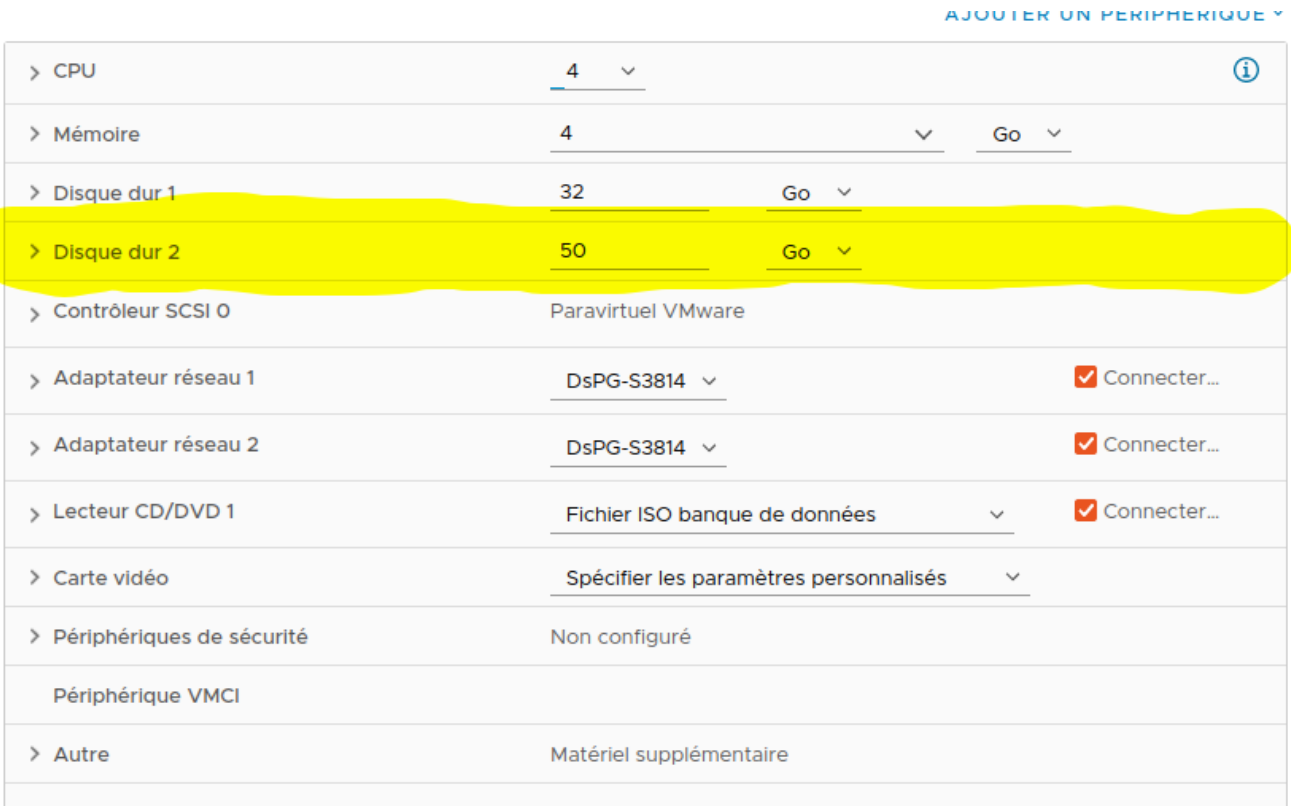

```
Un disque est apparut sur les pve de notre cluster
```



Test de résilience et d'autoréparation

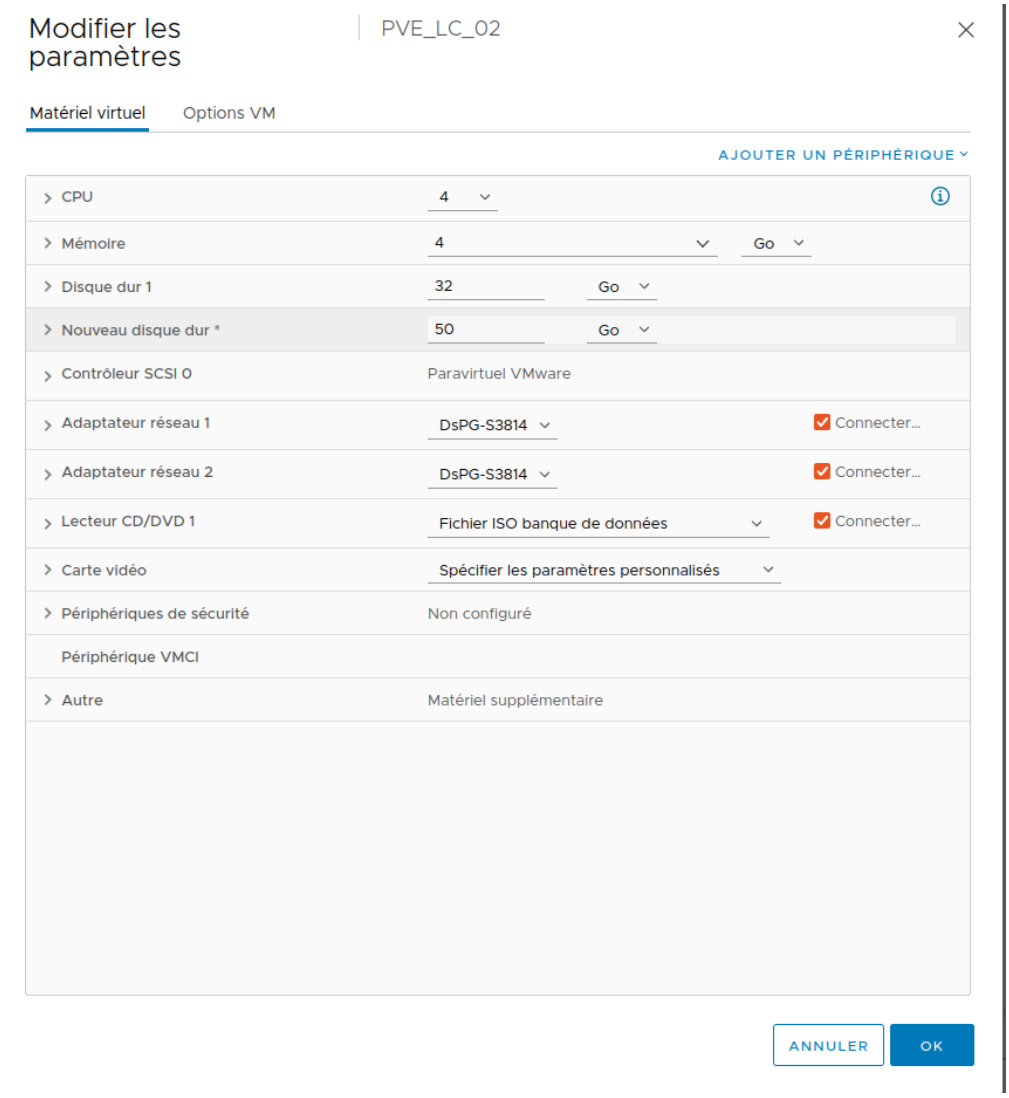
```
Eteindre pve02 > Retirer un disque > le rallumer > Observer le comportement
de l'OSD partagé
```

```
Dans VSphere clique droit sur pve02 eteint > Changer les parametres
systemes
```

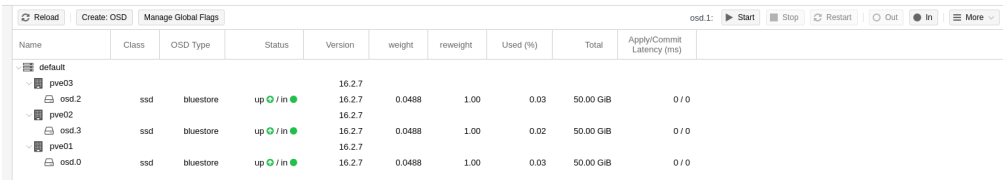


``` On rallume pve02 On peut voir que malgrès la suppression du deuxieme disque pve02 a toujours accés au pool OSD "pool_cluster_lc" Mais un disque est détécté comme down ```


```
On éteind à nouveau pve02
Et on remet un deuxieme disque de 50GO
```
```

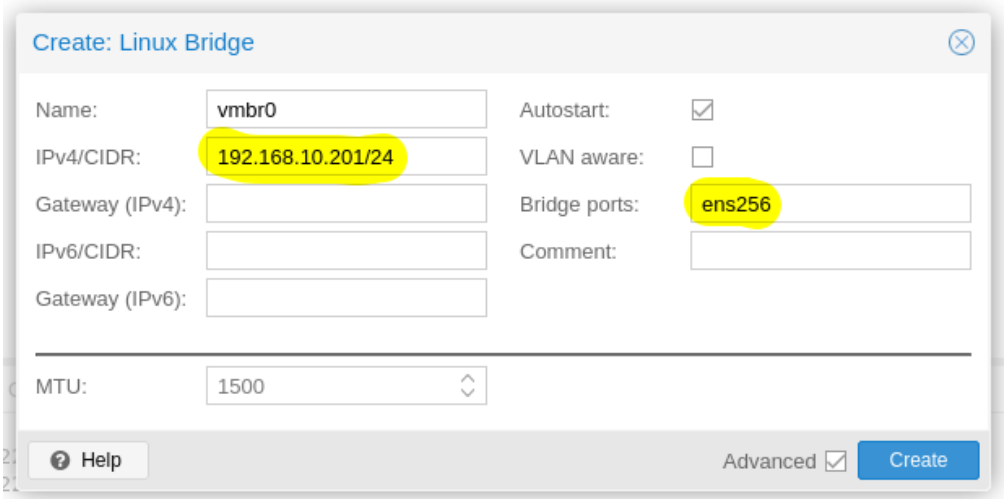


On vas dans OSD
On clique sur In puis start
Et on voit que l'OSD a bien était réintégré



Ensuite on éteind à nouveau tout nos serveurs
Et on y ajoute une 3 eme carte réseau pour le vmbr0 que nous avons supprimé pour le bond0

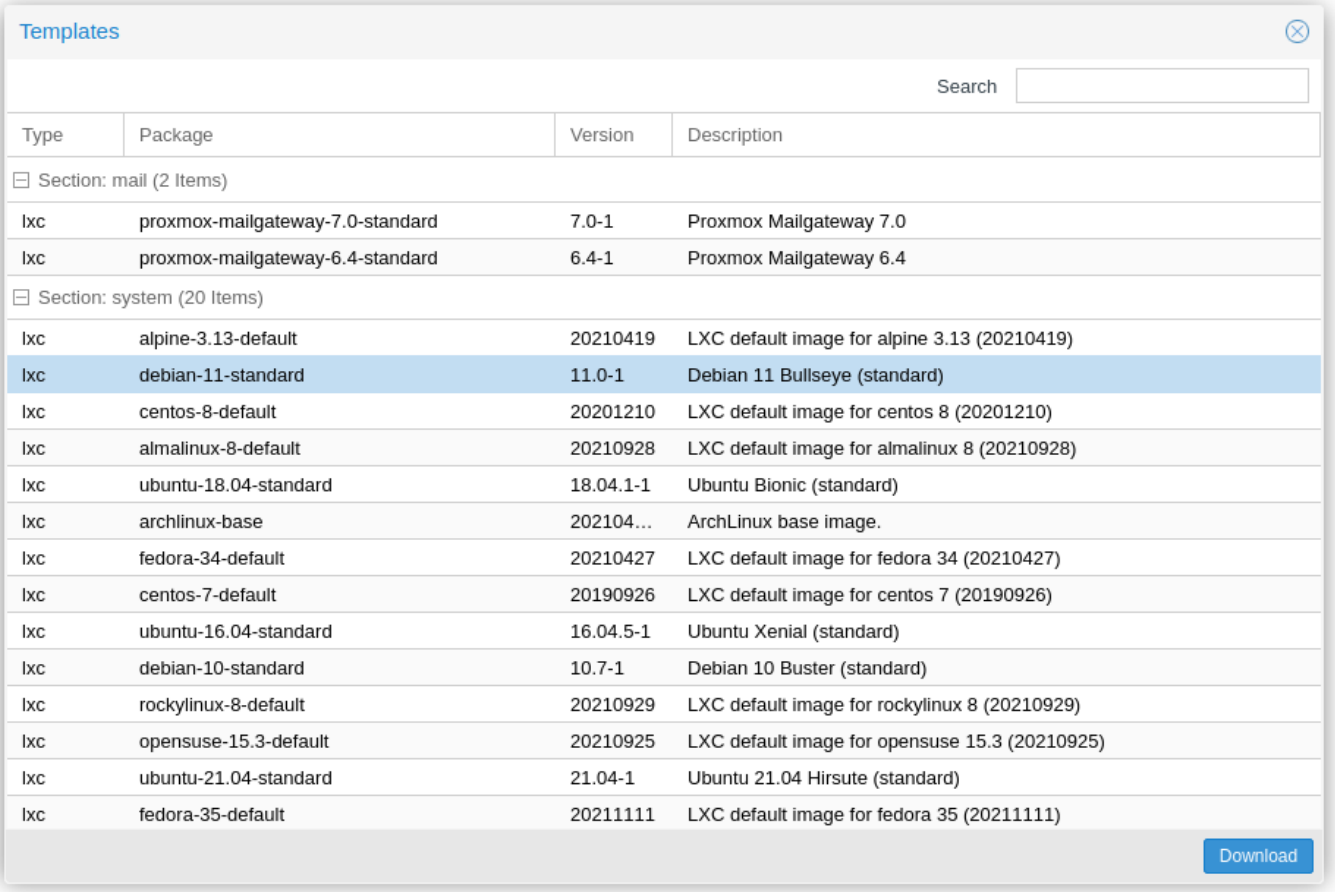
Dans chacun des pve aller dans network > Create > Linux Bridge



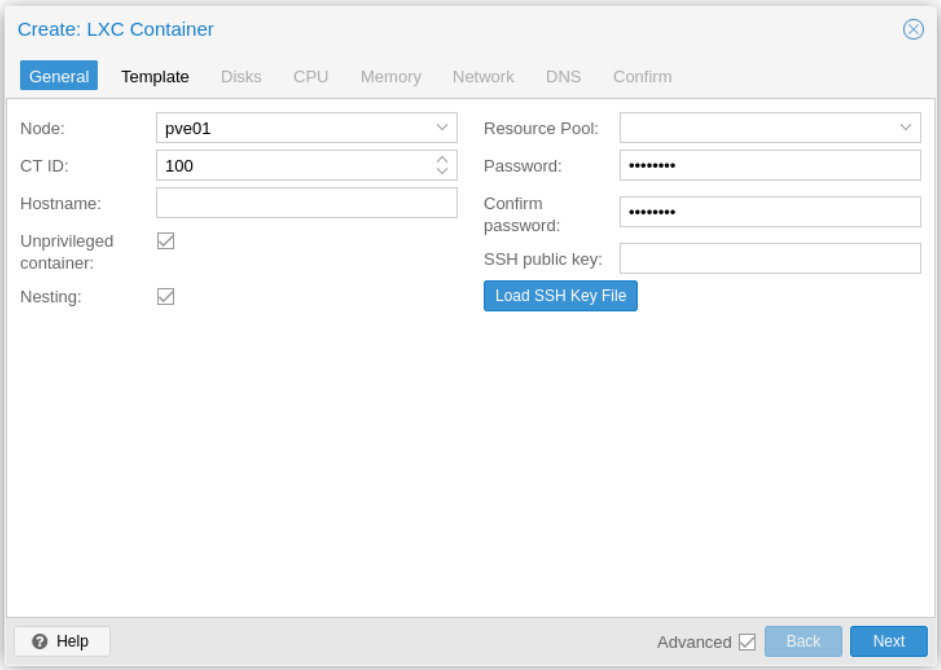
Création du conteneur:

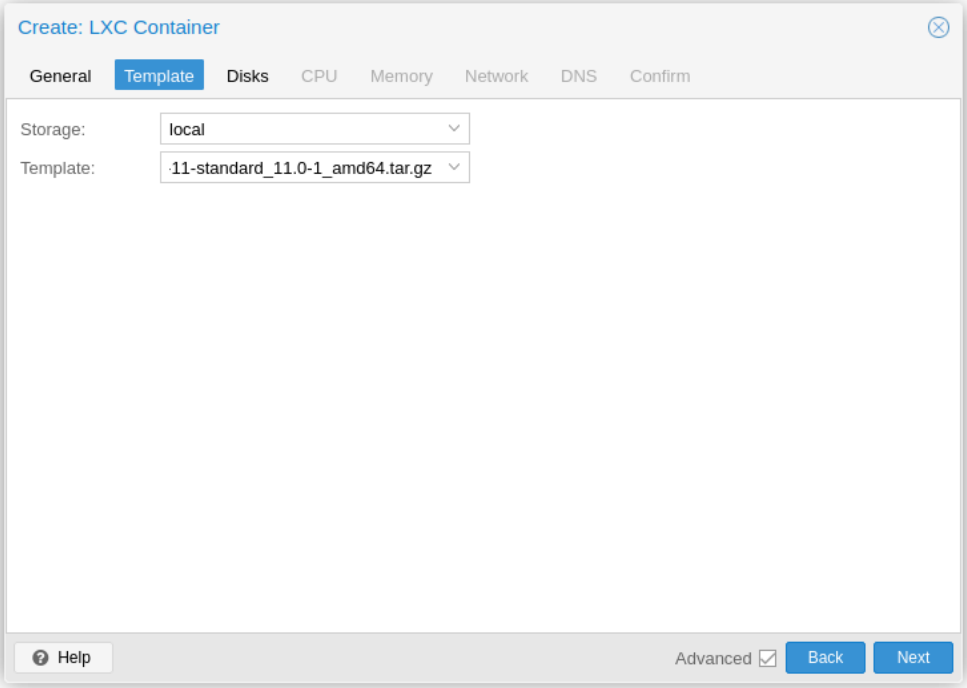
Télécharger le templates debian 11

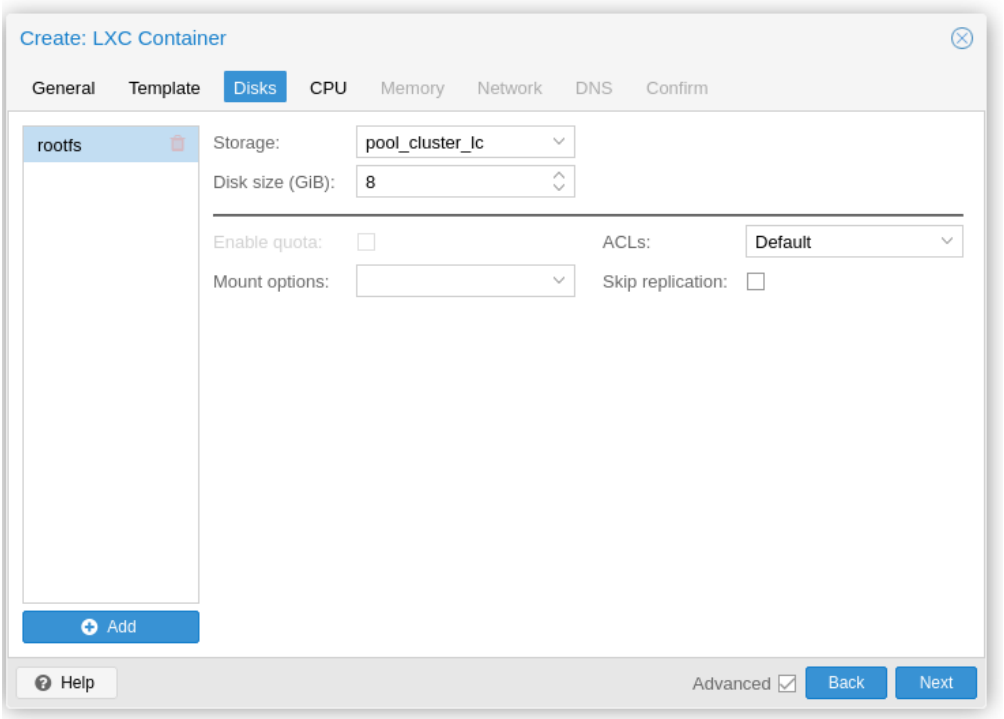
```
Dans pve01 > local > CT Templates > Templates
```

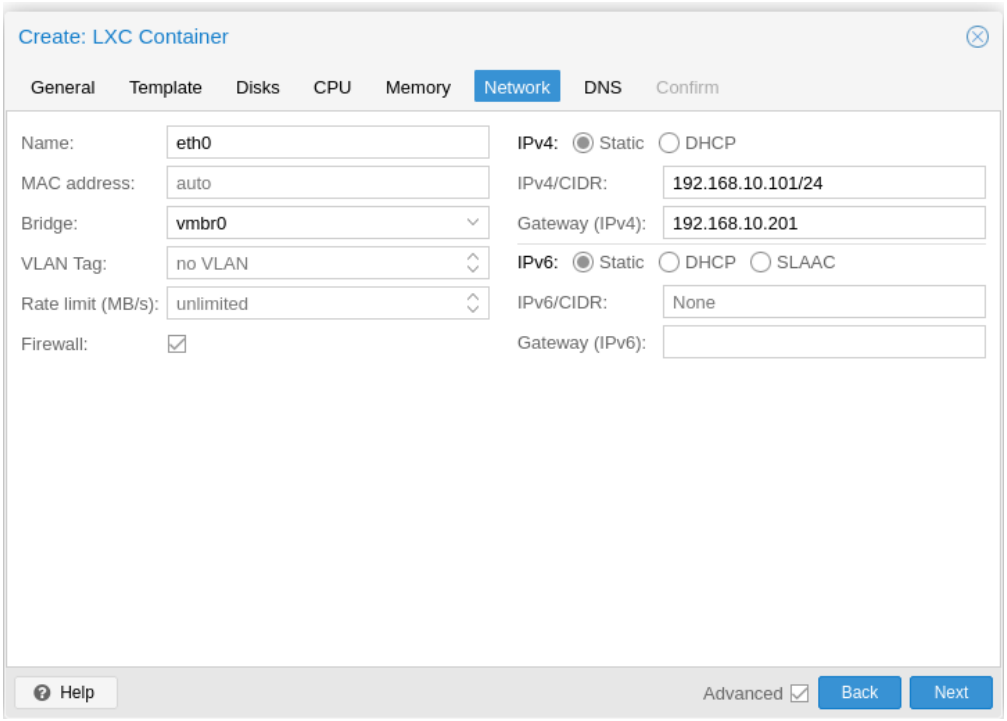


Créer le conteneur dans pve01

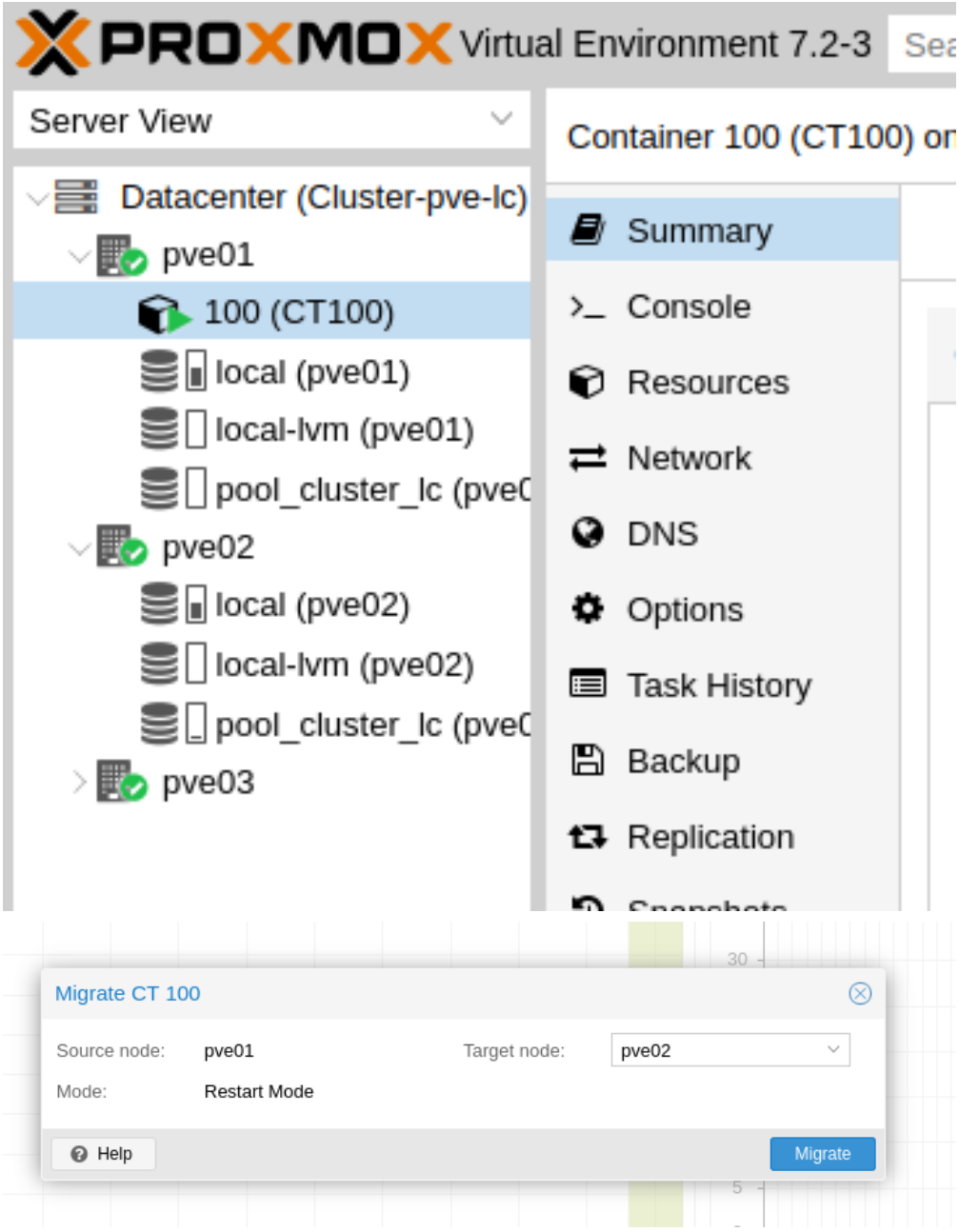

Create: LXC Container
General
Template
Disks
CPU
Memory
Network
DNS
Confirm
Node:
pve01
CT ID:
100
Hostname:
Unprivileged container:
Nesting:
Resource Pool:
Password:
Confirm password:
SSH public key:
Load SSH Key File
Help
Advanced
Back
Next


Create: LXC Container
General
Template
Disks
CPU
Memory
Network
DNS
Confirm
Storage:
local
Template:
11-standard_11.0-1_amd64.tar.gz
Help
Advanced
Back
Next

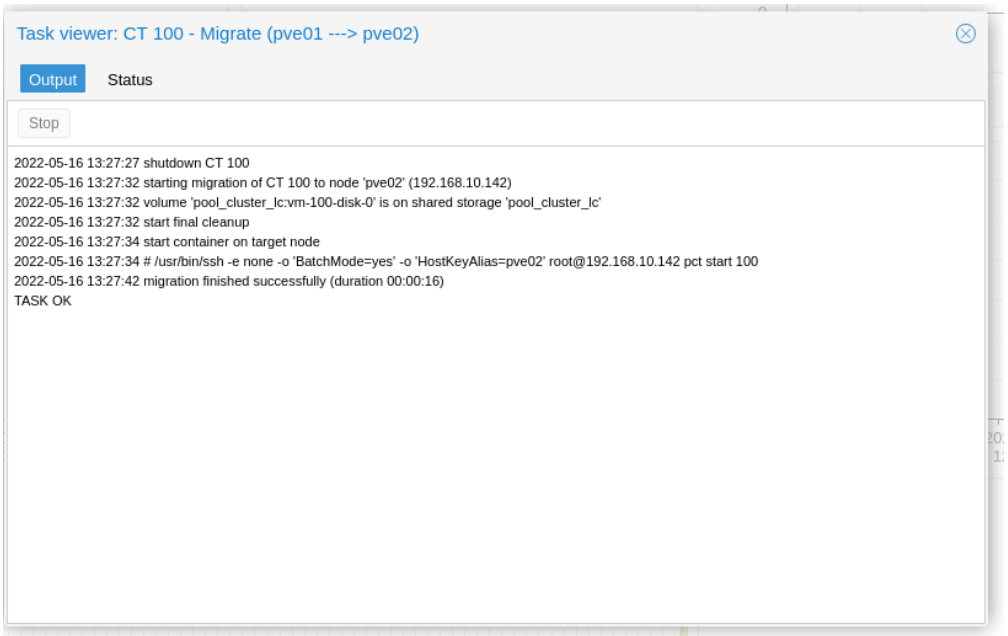


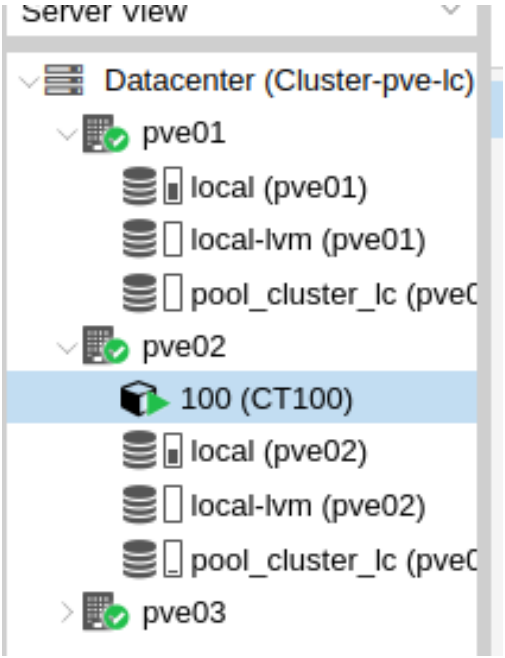



```
On démarre le conteneur
Ensuite on clique en heut à droite sur "migrate"
On selectionne notre pve02 et on clique sur migrate
```




```
Notre conteneur a bien était migré vers notre pve02
```


Task viewer: CT 100 - Migrate (pve01 ---> pve02)
Output
Status
Stop
2022-05-16 13:27:27 shutdown CT 100
2022-05-16 13:27:32 starting migration of CT 100 to node 'pve02' (192.168.10.142)
2022-05-16 13:27:32 volume 'pool_cluster_lc:vm-100-disk-0' is on shared storage 'pool_cluster_lc'
2022-05-16 13:27:32 start final cleanup
2022-05-16 13:27:34 start container on target node
2022-05-16 13:27:34 # /usr/bin/ssh -e none -o 'BatchMode=yes' -o 'HostKeyAlias=pve02' root@192.168.10.142 pct start 100
2022-05-16 13:27:42 migration finished successfully (duration 00:00:16)
TASK OK


Server View
Datacenter (Cluster-pve-lc)
pve01
local (pve01)
local-lvm (pve01)
pool_cluster_lc (pve0
pve02
100 (CT100)
local (pve02)
local-lvm (pve02)
pool_cluster_lc (pve0
pve03