

Creating an LXC Container

This document describes how to create and configure a standard LXC container.

The following documents will only describe the installation and configuration of applications within a functional LXC container.

🎯 Goal

Create an LXC container with the following specifications:

- **CTID:** 110
- **Hostname:** apache110
- **IP:** 192.168.137.110/24
- **Gateway:** 192.168.137.1
- **DNS:** inherited from the host
- **RAM:** 512 MB
- **Hard Drive:** 8 GB
- **Template:** `/var/lib/vz/template/cache/ubuntu-24.04-standard_24.04-2_amd64.tar.zst`

Additional Steps

1. Create a user `pdal` (sudoer) with the password: `myPassword`.
2. Perform a system update (`apt update/upgrade`).
3. Set the `timedatectl` timezone to `Europe/Berlin` or your timezone.
4. Check network connectivity (Gateway & DNS resolution).

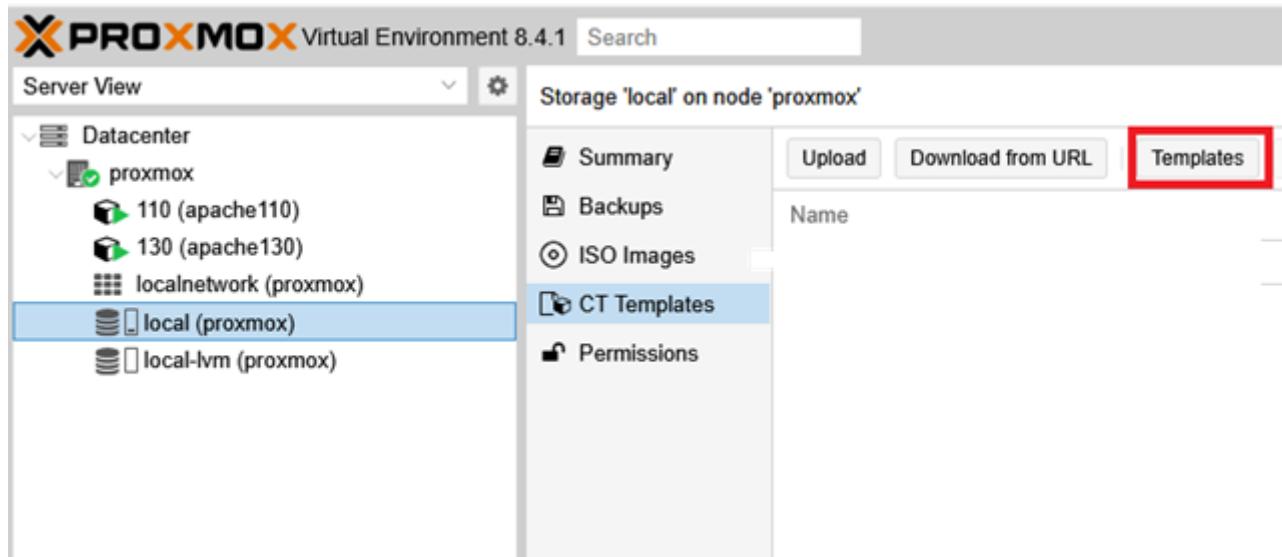
Note: For the PDAL project, you can exceptionally use the same user and password every time. This should, of course, never be done in production systems.

✳️ 1. Check and Upload the Template

- Check under `Datacenter → <local> → Templates` to see if your template is available.

The screenshot shows the Proxmox VE 8.4.1 interface. On the left, there's a tree view of Datacenter storage pools: proxmox (with containers 110 (apache110) and 130 (apache130)), localnetwork (proxmox), local (proxmox) which is selected, and local-lvm (proxmox). On the right, the 'Storage 'local' on node 'proxmox'' screen is displayed. It has tabs for Summary, Backups, ISO Images, CT Templates (which is selected), and Permissions. Under CT Templates, there's a 'Name' input field containing the value 'ubuntu-24.04-standard_24.04-2_amd64.tar.zst'. There are also 'Upload', 'Download from URL', and 'Templates' buttons at the top of this section.

- If not: **Upload** or download via the web UI.



- Navigate to "Templates":

| Type | Package | Version | Description |
|------|-------------------------|-----------|--|
| lxc | fedora-41-default | 20241118 | LXC default image for fedora 41 (20241118) |
| lxc | gentoo-current-openrc | 20250508 | LXC openrc image for gentoo current (20250508) |
| lxc | alpine-3.21-default | 20241217 | LXC default image for alpine 3.21 (20241217) |
| lxc | ubuntu-24.10-standard | 24.10-1 | Ubuntu 24.10 Oracular (standard) |
| lxc | archlinux-base | 202409... | ArchLinux base image. |
| lxc | centos-9-stream-default | 20240828 | LXC default image for centos 9-stream (20240828) |
| lxc | devuan-5.0-standard | 5.0 | Devuan 5 (standard) |
| lxc | debian-12-standard | 12.7-1 | Debian 12 Bookworm (standard) |
| lxc | ubuntu-20.04-standard | 20.04-1 | Ubuntu Focal (standard) |
| lxc | ubuntu-22.04-standard | 22.04-1 | Ubuntu 22.04 Jammy (standard) |
| lxc | debian-11-standard | 11.7-1 | Debian 11 Bullseye (standard) |
| lxc | alpine-3.22-default | 20250617 | LXC default image for alpine 3.22 (20250617) |
| lxc | opensuse-15.6-default | 20240910 | LXC default image for opensuse 15.6 (20240910) |
| lxc | openeuler-25.03-default | 20250507 | LXC default image for openeuler 25.03 (20250507) |
| lxc | alpine-3.20-default | 20240908 | LXC default image for alpine 3.20 (20240908) |
| lxc | ubuntu-25.04-standard | 25.04-1 | Ubuntu 25.04 Plucky (standard) |
| lxc | ubuntu-24.04-standard | 24.04-2 | Ubuntu 24.04 Noble (standard) |
| lxc | almalinux-9-default | 20240911 | LXC default image for almalinux 9 (20240911) |

- Select the corresponding template and click "Download".

| | | | |
|-----|-------------------------|----------|--|
| lxc | ubuntu-22.04-standard | 22.04-1 | Ubuntu 22.04 Jammy (standard) |
| lxc | debian-11-standard | 11.7-1 | Debian 11 Bullseye (standard) |
| lxc | alpine-3.22-default | 20250617 | LXC default image for alpine 3.22 (20250617) |
| lxc | opensuse-15.6-default | 20240910 | LXC default image for opensuse 15.6 (20240910) |
| lxc | openeuler-25.03-default | 20250507 | LXC default image for openeuler 25.03 (20250507) |
| lxc | alpine-3.20-default | 20240908 | LXC default image for alpine 3.20 (20240908) |
| lxc | ubuntu-25.04-standard | 25.04-1 | Ubuntu 25.04 Plucky (standard) |
| lxc | ubuntu-24.04-standard | 24.04-2 | Ubuntu 24.04 Noble (standard) |
| lxc | almalinux-9-default | 20240911 | LXC default image for almalinux 9 (20240911) |

After the download, the template should now be displayed.

🛠️ 2. Create the Container

1. Right-click on the node → **Create CT**

2. **General:**

- CT ID: **110**
- Hostname: **apache110**
- Password: (set root password)
- Unprivileged:

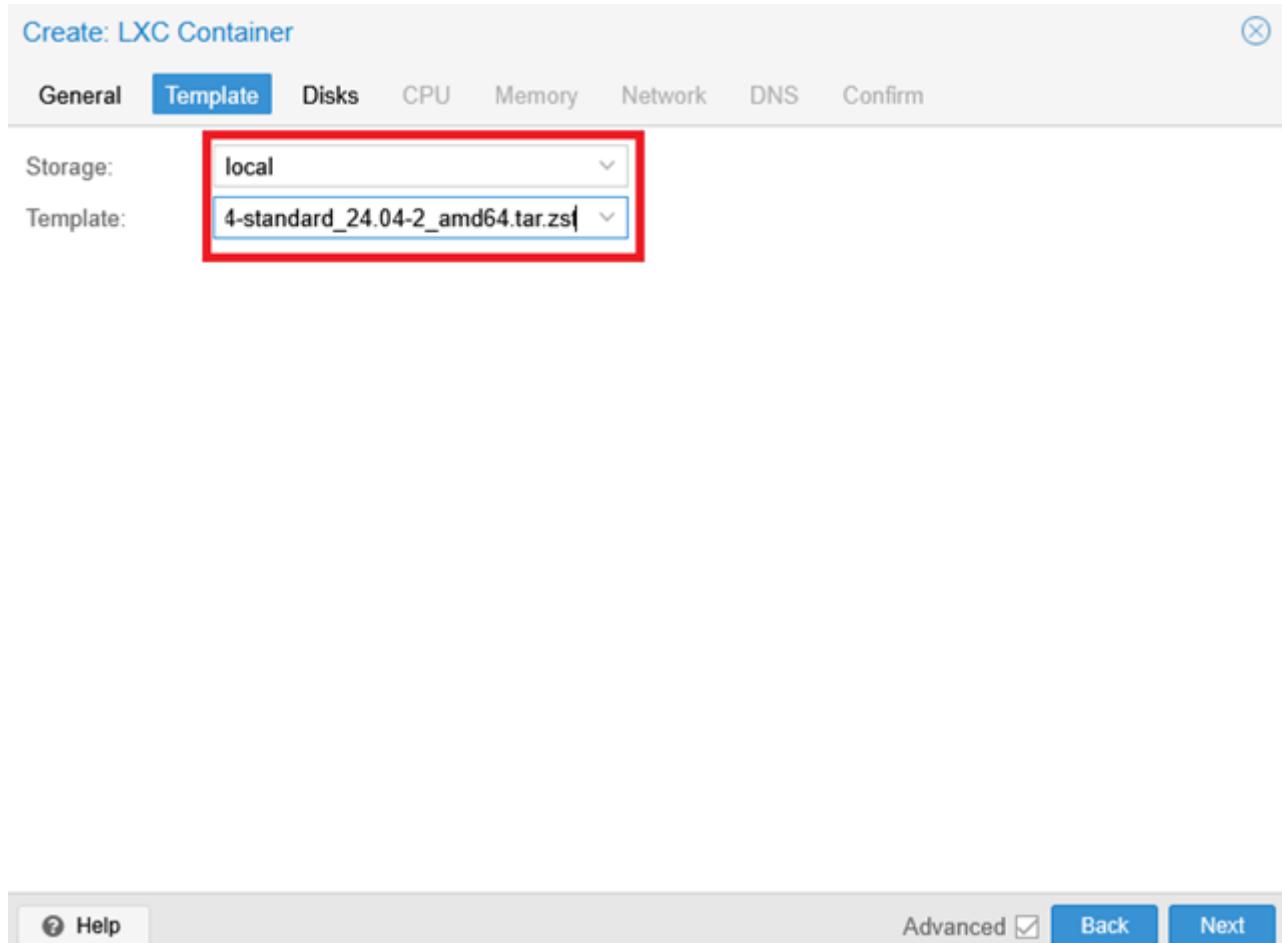
Create: LXC Container

| General | Template | Disks | CPU | Memory | Network | DNS | Confirm |
|---|---|-------|-----|--------|---------|-----|---------|
| Node: proxmox CT ID: 110 Hostname: apache110 Unprivileged container: <input checked="" type="checkbox"/> Nesting: <input checked="" type="checkbox"/> | Resource Pool: Password: ***** Confirm password: ***** SSH public key(s): Load SSH Key File | | | | | | |
| Tags No Tags + | | | | | | | |
| Help Advanced <input checked="" type="checkbox"/> Back Next | | | | | | | |

Note: Proxmox uses three-digit numbers for the CT ID. We will use the last octet of the IP address as an identifier. You should also choose a descriptive name, for example, "apache110."

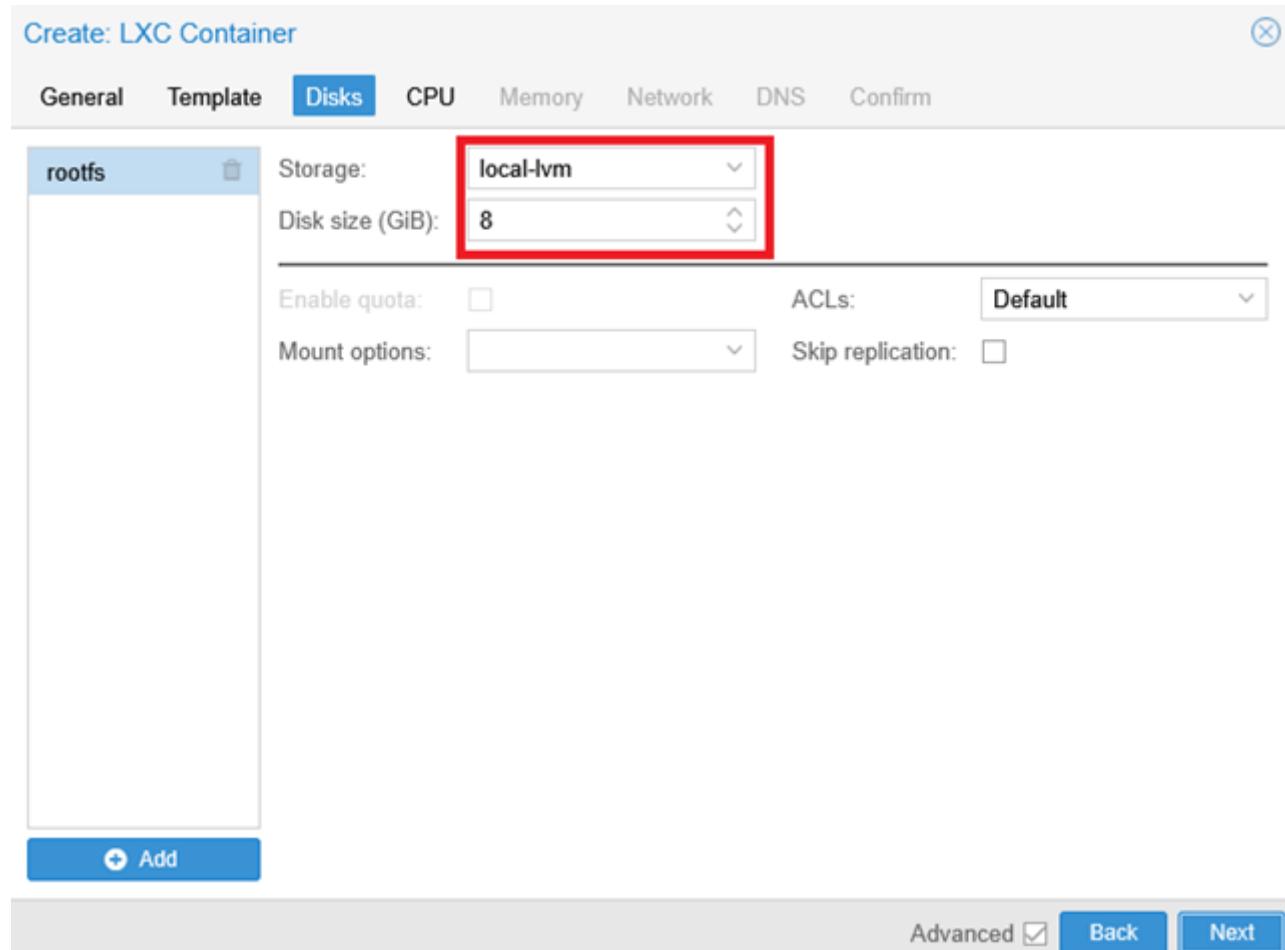
3. **Template:**

- Storage: e.g., local
- Select template



4. Root Disk:

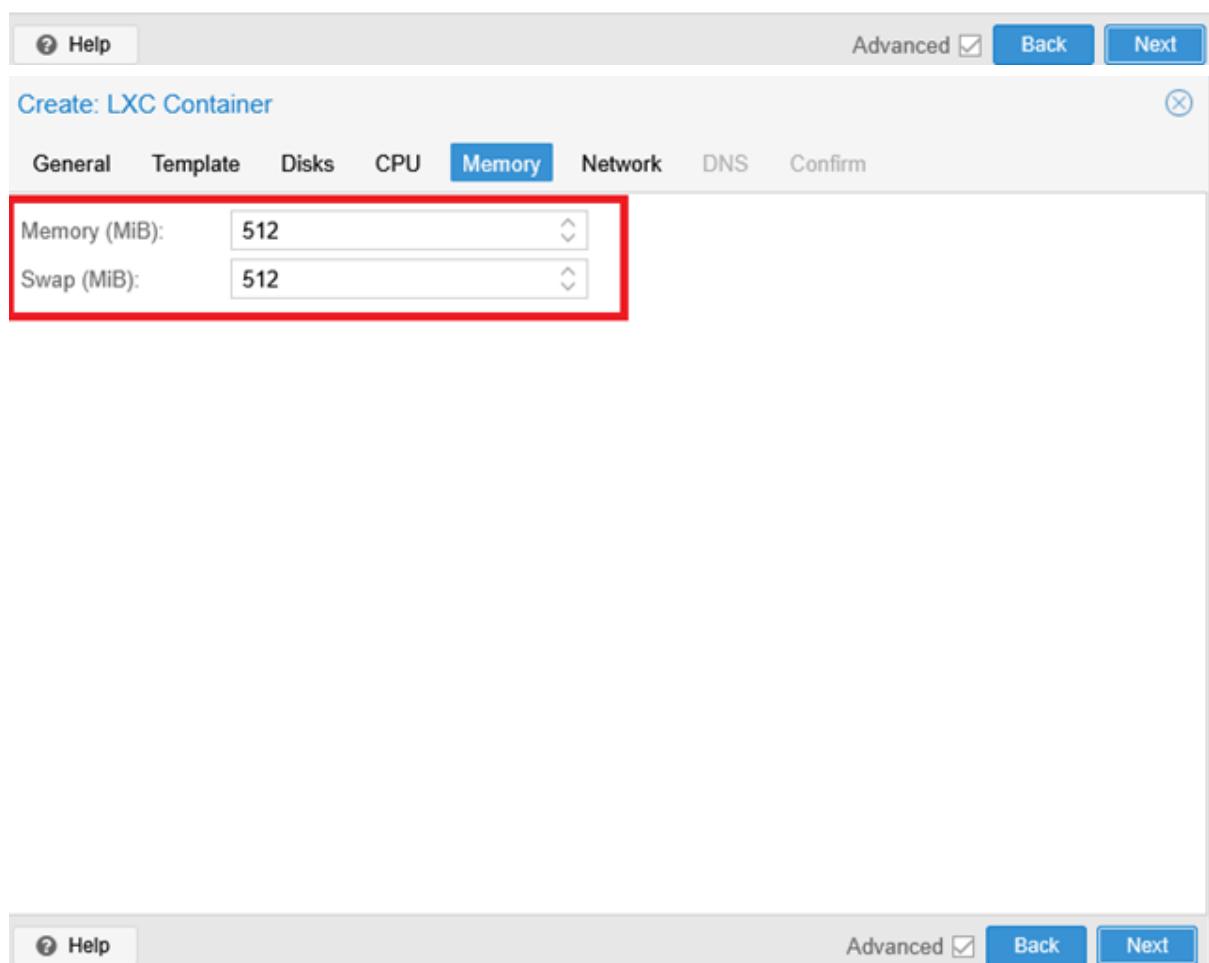
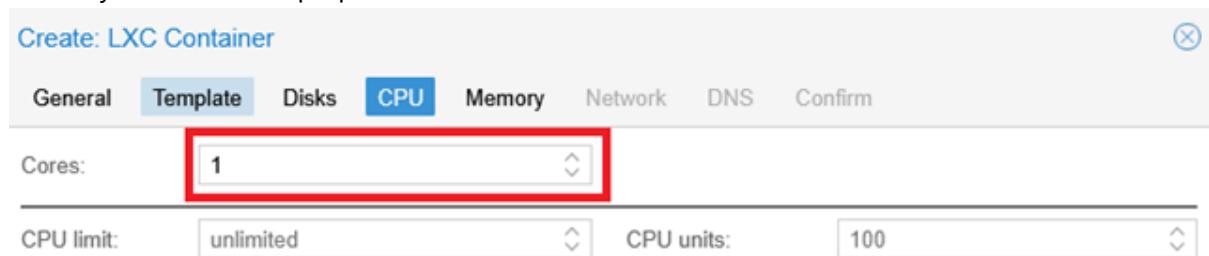
- Storage: local-lvm
- Size: 8 GiB



5. CPU & Memory:

- Cores: 1

- Memory: 512 MiB, Swap optional 512 MiB



6. Network:

- Bridge: vmbr0
- IPv4: Static 192.168.137.110/24

- Gateway: 192.168.137.1

Create: LXC Container

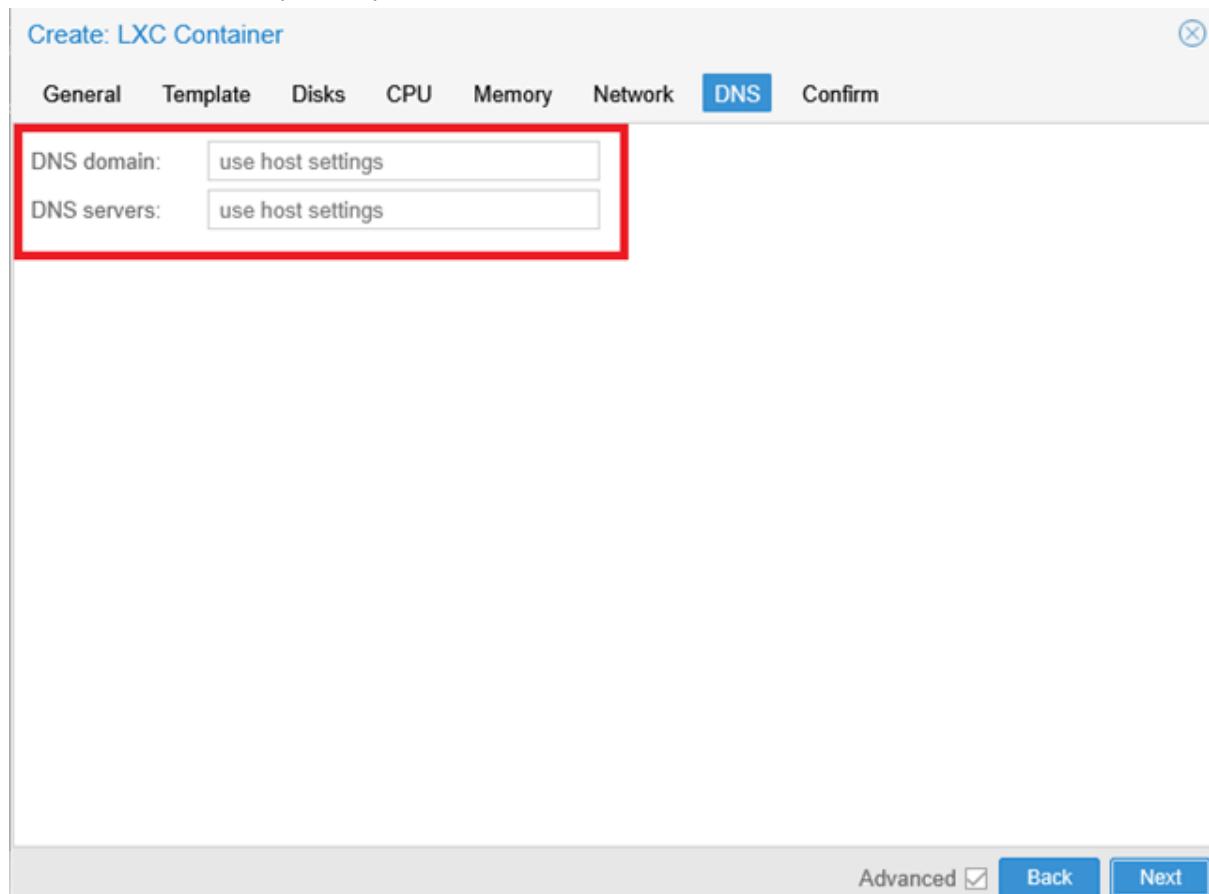
General Template Disks CPU Memory Network DNS Confirm

| | | |
|--------------|-------------------------------------|--|
| Name: | eth0 | IPv4: <input checked="" type="radio"/> Static <input type="radio"/> DHCP |
| MAC address: | auto | IPv4/CIDR: 192.168.137.110/24 |
| Bridge: | vmbr0 | Gateway (IPv4): 192.168.137.1 |
| VLAN Tag: | no VLAN | IPv6: <input checked="" type="radio"/> Static <input type="radio"/> DHCP <input type="radio"/> SLAAC |
| Firewall: | <input checked="" type="checkbox"/> | IPv6/CIDR: None |
| Disconnect: | <input type="checkbox"/> | Rate limit (MB/s): unlimited |
| MTU: | Same as bridge | |

Help Advanced Back Next

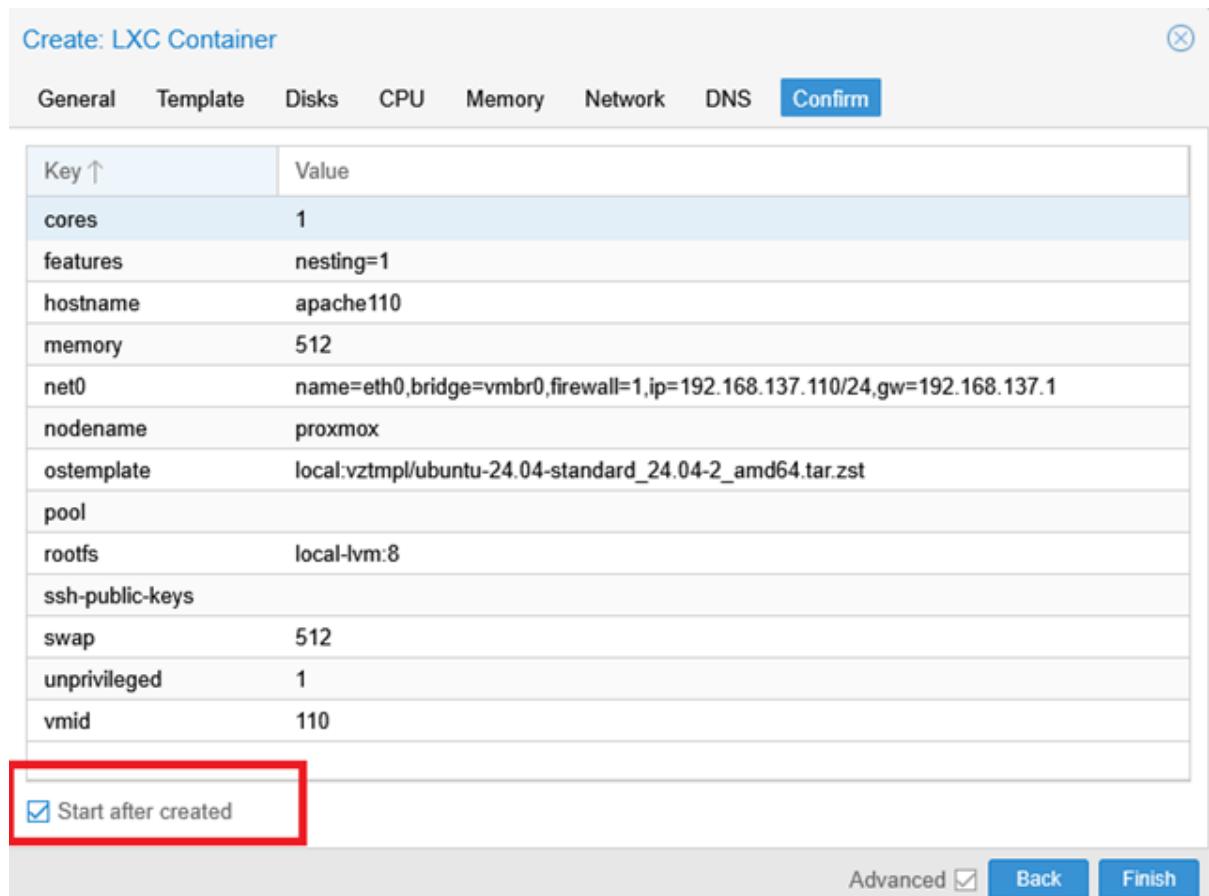
7. DNS:

- "Use DNS from host" (Default)



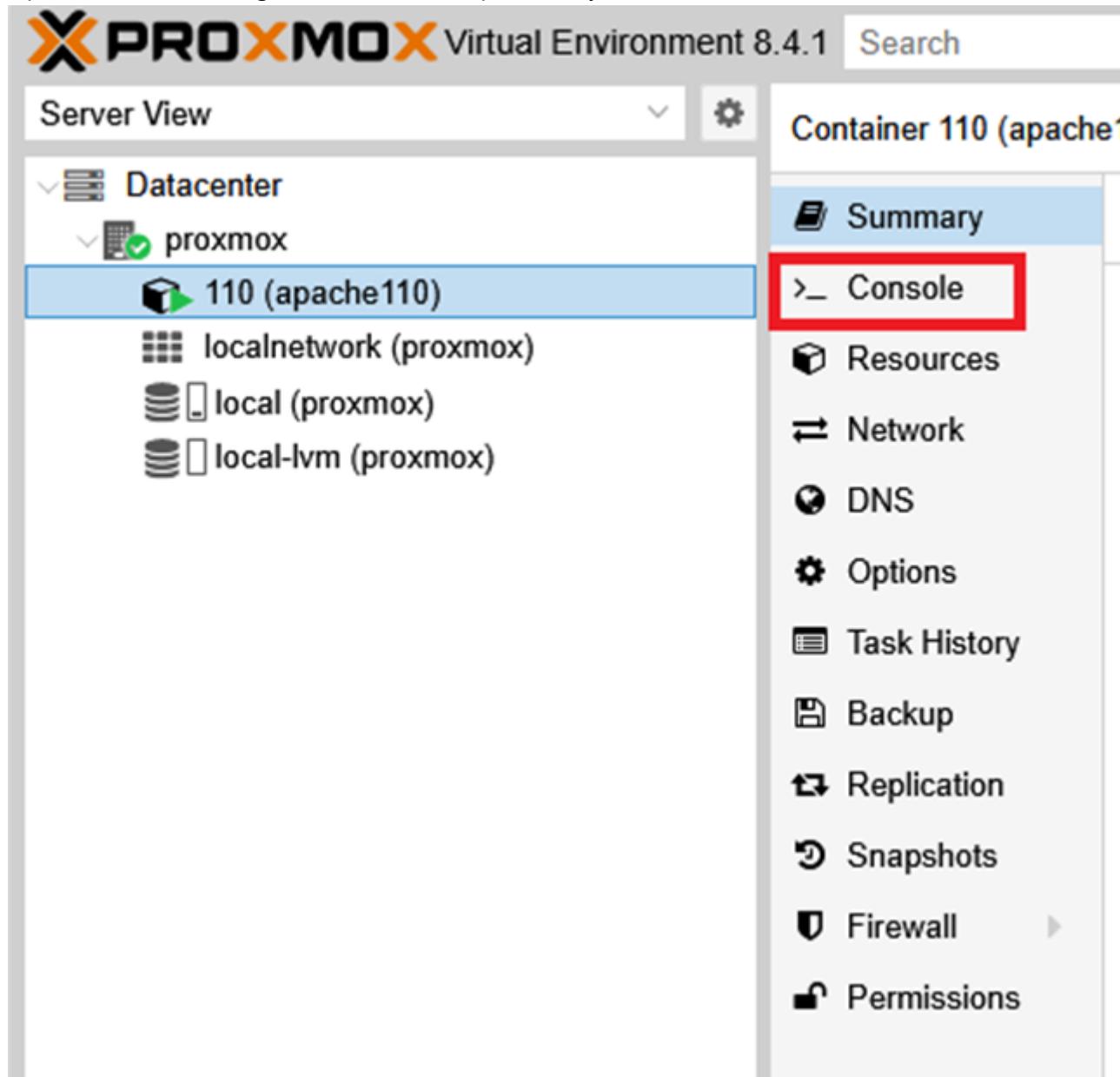
8. Confirm:

- "Start after created":
- Click **Finish**



▶ 3. Start Container & First Steps

- The container will start automatically or can be started manually via the web UI.
- Open the Console → log in with **root** + the password you set.



```
Ubuntu 24.04 LTS apache110 tty1

apache110 login: root
Password:
Welcome to Ubuntu 24.04 LTS (GNU/Linux 6.8.12-11-pve x86_64)

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

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

root@apache110:~#
```

👤 4. Create User pdal & Set as Sudoer

```
adduser pdal
# Password: meinPasswort
usermod -aG sudo pdal
```

```
root@apache110:~# adduser pdal
```

```
root@apache110:~# adduser pdal
info: Adding user `pdal' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `pdal' (1000) ...
info: Adding new user `pdal' (1000) with group `pdal (1000)' ...
info: Creating home directory `/home/pdal' ...
info: Copying files from `/etc/skel' ...

New password: [REDACTED]
```

Set

and confirm the password for user `pdal`.

```
root@apache110:~# adduser pdal
info: Adding user `pdal' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `pdal' (1000) ...
info: Adding new user `pdal' (1000) with group `pdal (1000)' ...
info: Creating home directory `/home/pdal' ...
info: Copying files from `/etc/skel' ...

New password:
Retype new password: [REDACTED]
```

```
root@apache110:~# adduser pdal
info: Adding user `pdal' ...
info: Selecting UID/GID from range 1000 to 59999 ...
info: Adding new group `pdal' (1000) ...
info: Adding new user `pdal' (1000) with group `pdal (1000)' ...
info: Creating home directory `/home/pdal' ...
info: Copying files from `/etc/skel' ...

New password:
Retype new password:
passwd: password updated successfully
Changing the user information for pdal
Enter the new value, or press ENTER for the default
    Full Name []:
    Room Number []:
    Work Phone []:
    Home Phone []:
    Other []
Is the information correct? [Y/n] [REDACTED]
```

```
info: Adding new user 'pdal' to supplemental / extra groups 'users' ...
info: Adding user 'pdal' to group 'users' ...
root@apache110:~# usermod -aG sudo pdal
root@apache110:~# █
```

🌐 5. Network Check

In this step, we ensure that the new container has a network connection.

```
ping -c3 192.168.137.1
```

Note: The `-c3` option executes only three pings.

```
root@apache110:~# ping -c3 -W2 192.168.137.1
PING 192.168.137.1 (192.168.137.1) 56(84) bytes of data.
64 bytes from 192.168.137.1: icmp_seq=1 ttl=128 time=1.10 ms
64 bytes from 192.168.137.1: icmp_seq=2 ttl=128 time=1.52 ms
64 bytes from 192.168.137.1: icmp_seq=3 ttl=128 time=1.43 ms

--- 192.168.137.1 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 1.101/1.348/1.515/0.178 ms
root@apache110:~# █
```

This step ensures that a network connection exists. If problems occur here, please check the container's network settings - [ContainerID → Network → Network Settings](#).

```
ping -c3 8.8.8.8
```

```
root@apache110:~# ping -c3 -W2 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=114 time=10.7 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=114 time=11.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=114 time=12.4 ms

--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 10.675/11.652/12.369/0.715 ms
root@apache110:~# █
```

This step ensures that external IP addresses can be reached.

```
ping -c3 heise.de
```

```
root@apache110:~# ping -c3 -W2 heise.de
PING heise.de (193.99.144.80) 36(84) bytes of data.
64 bytes from redirector.heise.de (193.99.144.80): icmp_seq=1 ttl=244 time=21.9 ms
64 bytes from redirector.heise.de (193.99.144.80): icmp_seq=2 ttl=244 time=16.8 ms
64 bytes from redirector.heise.de (193.99.144.80): icmp_seq=3 ttl=244 time=16.3 ms

--- heise.de ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2004ms
rtt min/avg/max/mdev = 16.264/18.308/21.908/2.553 ms
root@apache110:~#
```

This step ensures that DNS resolution is working correctly.

6. Update the System

With a correctly functioning network, you can now update the system:

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

```
root@apache110:~# apt update && apt upgrade -y
Get:1 http://archive.ubuntu.com/ubuntu noble InRelease [256
Get:2 http://archive.ubuntu.com/ubuntu noble-updates InReleas
Get:3 http://archive.ubuntu.com/ubuntu noble-security InReleas
Get:4 http://archive.ubuntu.com/ubuntu noble/main Translatio
Get:5 http://archive.ubuntu.com/ubuntu noble/main amd64 c-n...
Get:6 http://archive.ubuntu.com/ubuntu noble/restricted Transl
Get:7 http://archive.ubuntu.com/ubuntu noble/restricted amd64
Get:8 http://archive.ubuntu.com/ubuntu noble/universe Translat
Get:9 http://archive.ubuntu.com/ubuntu noble/universe amd64
Get:10 http://archive.ubuntu.com/ubuntu noble/multiverse Trans
Get:11 http://archive.ubuntu.com/ubuntu focal InRelease [256
Fetched 15.5 MB in 8s (1920 kB/s)
Reading package lists... Done
Building dependency tree... Done
159 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree... Done
Calculating upgrade... Done
The following packages will be upgraded:
 apparmor apt apt-utils base-files binutils-dsutils bind9-host bind9-libs b
 dbus-session-bus-common dbus-system-bus-common dbus-user-session dhpcd-k
 gir1.2-glib-2.0 gpgv ibverbs-providers kmod krb5-locales libacl1 libappar
 libbz2-1.0 libc-bin libc6 libcap2 libcap2-bin libcom-err2 libcryptsetup12
 libgcc-s1 libglib2.0-0t64 libglib2.0-data libgmp10 libgnutls30t64 libgpg-
 libk5crypto3 libkmod2 libkrb5-3 libkrb5support0 liblz4-1 liblzma5 libmd0
 libnl-route-3-200 libnss-systemd libp11-kit0 libpam-cap libpam-modules 1
 libproc2-0 libpython3-stdlib libpython3.12-minimal libpython3.12-stdlib 1
```

```
Setting up ubuntu-minimal (1.539.2) ...
Setting up ubuntu-standard (1.539.2) ...
Setting up dbus-user-session (1.14.10-4ubuntu4.1) ...
Setting up python3-update-manager (1:24.04.12) ...
Setting up python3-distupgrade (1:24.04.26) ...
Setting up ubuntu-release-upgrader-core (1:24.04.26) ...
Setting up update-manager-core (1:24.04.12) ...
Processing triggers for install-info (7.1-3build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.4) ...
Processing triggers for ufw (0.36.2-6) ...
Processing triggers for man-db (2.12.0-4build2) ...
root@apache110:~#
```

⌚ 7. Configure Timezone for Display Only and Check Status

```
timedatectl set-timezone Europe/Berlin
```

```
root@apache110:~# timedatectl set-timezone Europe/Berlin
root@apache110:~#
```

```
timedatectl status
```

```
root@apache110:~# timedatectl status
                  Local time: Wed 2025-06-25 13:05:29 CEST
                  Universal time: Wed 2025-06-25 11:05:29 UTC
                         RTC time: n/a
                    Time zone: Europe/Berlin (CEST, +0200)
System clock synchronized: yes
          NTP service: inactive
      RTC in local TZ: no
root@apache110:~#
```

Note: The container gets its system time from the host system (Proxmox). If the system time here is incorrect, check the settings in Proxmox.

🖊 Result

The `apache110` container is now:

- Configured with user pdal (sudo).

- Network checked (Gateway, DNS).
- Fully updated (apt update/upgrade).
- Timezone set to Europe/Berlin.

You can now use the container for your purposes and install or configure corresponding applications.

8. Setting the UTF-8 Character Set

Choosing the correct character set can often simplify your work. First, check which character set is currently set:

```
locale
```

If the output appears as:

```
LANG=C  
LANGUAGE=  
LC_CTYPE="C"  
LC_NUMERIC="C"  
LC_TIME="C"  
LC_COLLATE="C"  
LC_MONETARY="C"  
LC_MESSAGES="C"  
LC_PAPER="C"  
LC_NAME="C"  
LC_ADDRESS="C"  
LC_TELEPHONE="C"  
LC_MEASUREMENT="C"  
LC_IDENTIFICATION="C"  
LC_ALL=
```

the **ASCII character set** is active. This set does not support country-specific special characters—e.g., ü, Ü, €, etc.

Therefore, it makes sense to switch to a UTF-8 character set.

💡 What is UTF-8?

UTF-8 (Unicode Transformation Format - 8-bit) is the **globally dominant character encoding** today. Unlike older encodings (like ASCII or ISO-8859-1), UTF-8 can represent **all characters** and symbols from all languages (including umlauts, accents, Chinese, emojis) in a uniform format. Using UTF-8 ensures that text in log files, console output, and configuration files is displayed **correctly and consistently**.

🌐 National vs. Neutral UTF-8 Locales

UTF-8 character sets come in neutral and country-specific forms. These are defined in the **Locale** (the regional setting).

The Locale determines not only the encoding but also country-specific rules for:

- **Date and Time**
- **Currency and Number Format** (e.g., comma vs. period as decimal separator)
- **Sort Order** (`LC_COLLATE`)

For servers and containers used internationally or for scripts, the **neutral C.UTF-8 locale** is often the best standard.

| Locale | Meaning | Application |
|--------------------------|--|---|
| <code>de_DE.UTF-8</code> | National Locale (German, Germany) | Aligns formats (numbers, sorting) with German rules. Good for desktop users. |
| <code>C.UTF-8</code> | Neutral Locale (C-Standard with UTF-8) | Uses standardized, binary sorting rules and a period as the decimal separator. Optimal for servers and scripts as it provides consistent and predictable output. |

If you prefer a local setting, look up the correct designation in the list under `nano /etc/locale.gen` and replace `C.UTF-8` with the desired designation.

🛠️ Setting up the Neutral C.UTF-8 Locale

By default, the outdated `LANG=C` (ASCII) is often used in the container. To switch this to the modern standard `C.UTF-8`, follow these steps:

1. **Generate Locale (if necessary):** Ensure that the locale is available.

```
sudo locale-gen C.UTF-8
```

1. **Set Standard Locale Permanently:** Overwrite the old `C` settings with `C.UTF-8` in the system's configuration files.

```
sudo update-locale LANG=C.UTF-8 LC_ALL=C.UTF-8
```

3. **Activate Changes:** Log out of the shell and log back in, or restart the container.

```
exit # and log back in
```

4. **Verification:** Check the new settings.

```
locale
```

> **Result:** The output should now show `LANG=C.UTF-8` and `LC_ALL=C.UTF-8`.

Sources

- "Proxmox VE Documentation Index." Accessed: June 4, 2025. [Online]. Available at: [Proxmox PVE-Docs](#)
 - canonical, "Ubuntu Server how-to guides." [Online]. Available at: [Ubuntu Server How-To](#)
-

License

This work is licensed under the **Creative Commons Attribution - ShareAlike 4.0 International License**.

[To the license text on the Creative Commons website](#)