

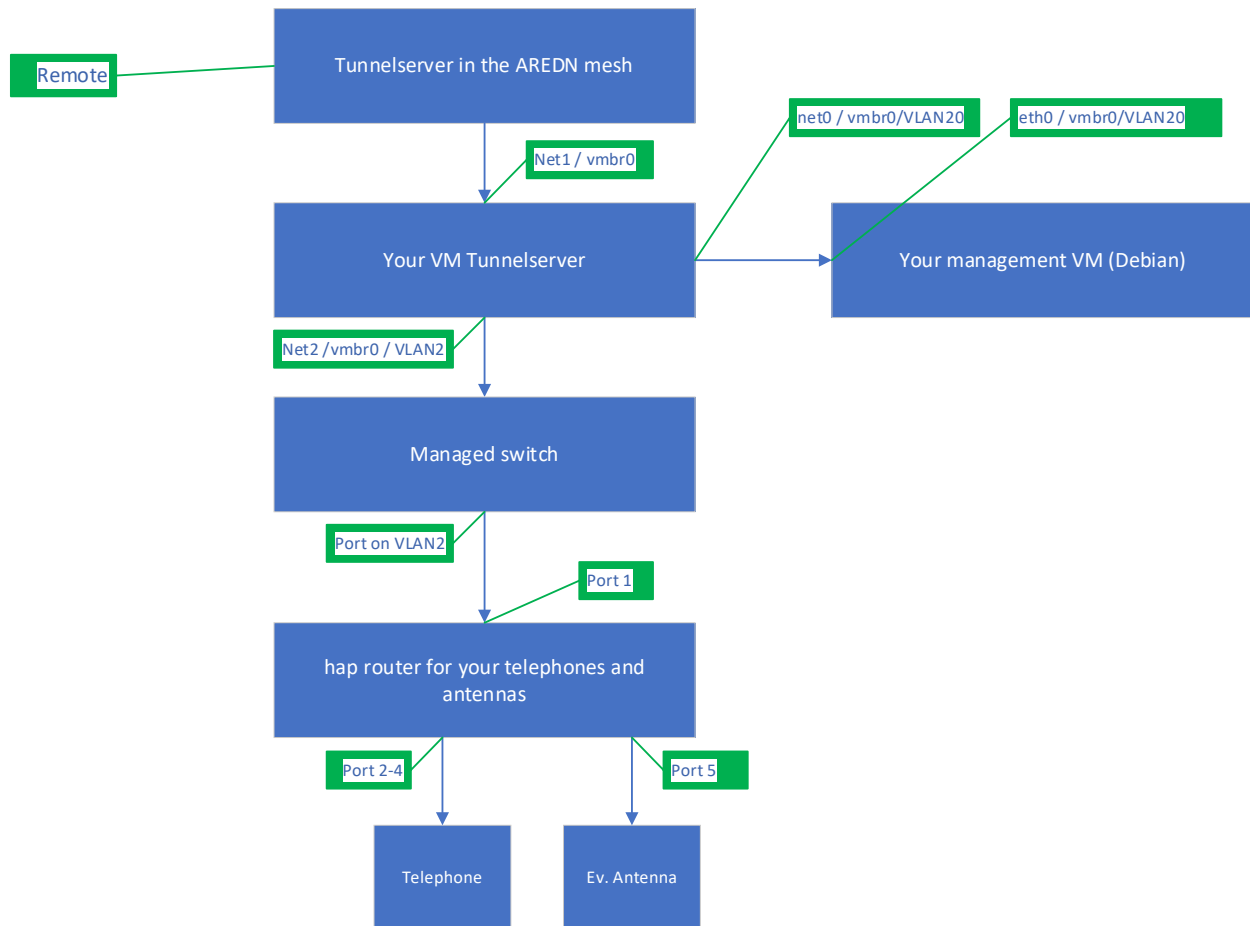
# AREDN on Proxmox

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Managed Switch: .....	<b>Fehler! Textmarke nicht definiert.</b>

## System Overview

This is the setup we want to achieve:



## Needed Steps

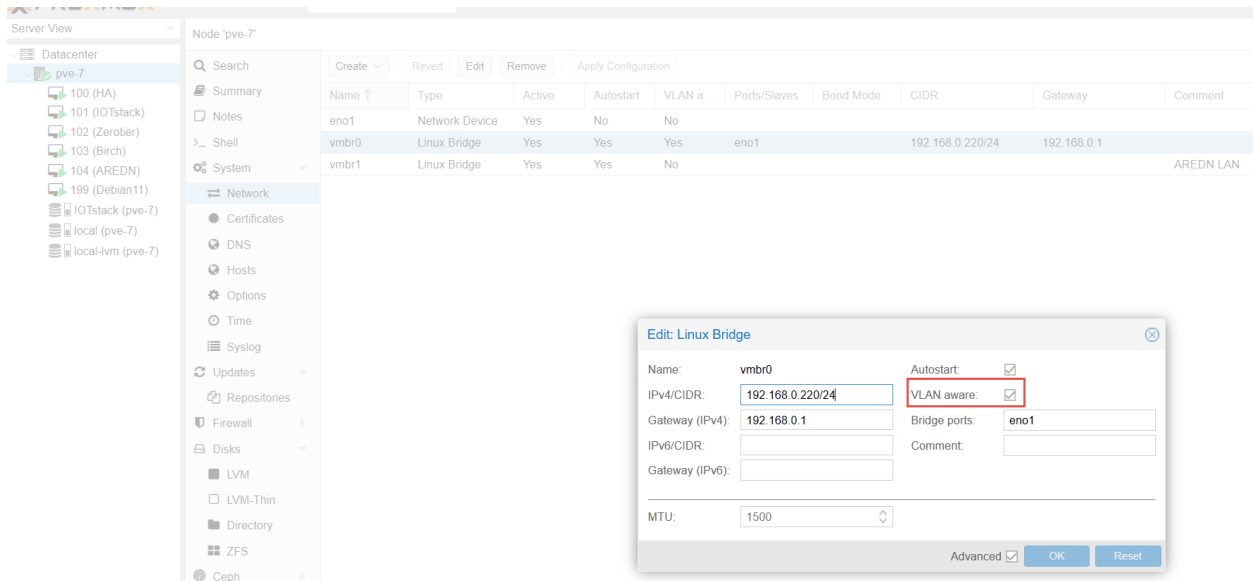
- 1- Install Proxmox on an X.86 machine (PC)
- 2- Adjust network of the node
- 3- Create an AREDN VM
- 4- Create a Debian VM (or any other distribution that can run a terminal and a browser)
- 5- Connect to AREDN from Debian to setup the network configuration as well as the AREDN node

## Install Proxmox

You find many tutorials to install Proxmox on an X86 machine.

## Adjust the network of the node

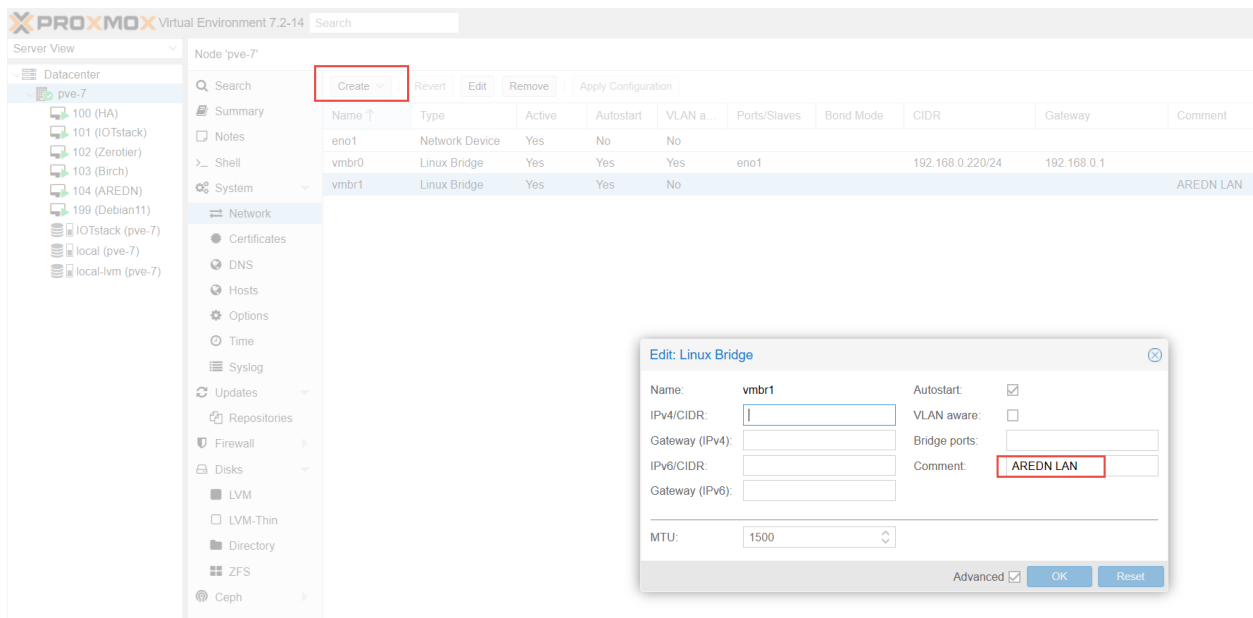
Make vmbr0 VLAN aware:



The screenshot shows the Proxmox VE interface for Node 'pve-7'. The 'Network' tab is selected in the left sidebar. The 'Edit: Linux Bridge' dialog is open for the bridge named 'vmbr0'. The 'VLAN aware' checkbox is checked, and the 'Bridge ports' field is set to 'eno1'. The 'Advanced' checkbox is also checked.

Name	Type	Active	Autostart	VLAN a...	Ports/Slaves	Bond Mode	CIDR	Gateway	Comment
eno1	Network Device	Yes	No	No					
vmbr0	Linux Bridge	Yes	Yes	Yes	eno1		192.168.0.220/24	192.168.0.1	
vmbr1	Linux Bridge	Yes	Yes	No					AREDN LAN

Create a second bridge for the management of the AREDN machine. This bridge is not connected to your home network. It only exists in Proxmox and will connect the AREDN machine to the Debian machine. Like that we insulate the internal DHCP server from your home network where it can hurt.



The screenshot shows the Proxmox VE interface for Node 'pve-7'. The 'Create' button is highlighted in the top bar. The 'Edit: Linux Bridge' dialog is open for the bridge named 'vmbr1'. The 'Comment' field is set to 'AREDN LAN'. The 'Advanced' checkbox is also checked.

Name	Type	Active	Autostart	VLAN a...	Ports/Slaves	Bond Mode	CIDR	Gateway	Comment
eno1	Network Device	Yes	No	No					
vmbr0	Linux Bridge	Yes	Yes	Yes	eno1		192.168.0.220/24	192.168.0.1	
vmbr1	Linux Bridge	Yes	Yes	No					AREDN LAN

## Create AREDN VM

Based on: <https://i12bretro.github.io/tutorials/0405.html>

and

<https://youtu.be/8nsdrWeeg8o>

Creating the VM

Open a web browser and navigate to the Proxmox web UI <https://ProxMoxDNSorIP:8006/>

Click the Create VM button at the top right

Create: Virtual Machine

General

OS

System

Disks

CPU

Memory

Network

Confirm

Node:

pve-7

Resource Pool:

VM ID:

104

Name:

AREDN

Create: Virtual Machine

General

OS

System

Disks

CPU

Memory

Network

Confirm

☐ Use CD/DVD disc image file (iso)

Storage:

local

ISO image:

Guest OS:

Type:

Linux

Version:

5.x - 2.6 Kernel

☐ Use physical CD/DVD Drive

☒ Do not use any media

Create: Virtual Machine

General

OS

System

Disks

CPU

Memory

Network

Confirm

Graphic card:

Default

SCSI Controller:

VirtIO SCSI single

Machine:

Default (i440fx)

Qemu Agent:

☒

Firmware

BIOS:

Default (SeaBIOS)

Add TPM:

☐

Create: Virtual Machine ⓧ

General OS System **Disks** CPU Memory Network Confirm

scsi0 🗑️ **Disk** Bandwidth

Bus/Device: SCSI 0 Cache: Default (No cache) ⌵

SCSI Controller: VirtIO SCSI single Discard: ☐

Storage: local-lvm IO thread: ☒

Disk size (GiB): 0.01 ⌵

Format: Raw disk image (raw) ⌵

Create: Virtual Machine ⓧ

General OS System Disks **CPU** Memory Network Confirm

Sockets: 1 ⌵ Type: host ⓧ ⌵

Cores: 2 ⌵ Total cores: 2

Create: Virtual Machine ⓧ

General OS System Disks CPU **Memory** Network Confirm

Memory (MiB): 512 ⌵

Create: Virtual Machine ⓧ

General OS System Disks CPU Memory **Network** Confirm

☐ No network device

Bridge: vmbr0 ⌵ Model: VirtIO (paravirtualized) ⌵

VLAN Tag: 20 ⌵ MAC address: auto

Firewall: ☐

🔍 Help Advanced ☐ Back Next

Add VLAN 20 (to prevent DHCP server interacting with your home network (and untick firewall):



Create: Virtual Machine

General
OS
System
Disks
CPU
Memory
Network
Confirm

Key ↑	Value
agent	1
cores	2
cpu	host
ide2	none,media=cdrom
memory	512
name	AREDN
net0	virtio,bridge=vmbr0
nodename	pve-7
numa	0
ostype	l26
scsi0	local-lvm:0.01,iouthread=on
scsihw	virtio-scsi-single
sockets	1

☐ Start after created

Advanced ☐
Back
Finish

Confirm the summary

Select the newly created OpenWRT VM from the left navigation panel and detach and remove the disk

Datacenter
pve-7
100 (HA)
101 (IoTstack)
102 (Zerotier)
103 (Birch)
104 (AREDN)
199 (Debian11)
IoTstack (pve-7)
local (pve-7)
local-lvm (pve-7)

Summary
Console
Hardware
Cloud-Init
Options
Task History
Monitor
Backup
Replication
Snapshots
Firewall
Permissions

Add
Detach
Edit
Disk Action
Revert

Memory	512.00 MiB
Processors	2 (1 sockets, 2 cores) [host]
BIOS	Default (SeaBIOS)
Display	Default
Machine	Default (i440fx)
SCSI Controller	VirtIO SCSI single
CD/DVD Drive (ide2)	none,media=cdrom
Hard Disk (scsi0)	local-lvm:vm-104-disk-0,iouthread=1,size=10486K
Network Device (net0)	virtio=0E:C6:77:A7:F7:4A,bridge=vmbr0

Click the Add button > Network Device. This will become your LAN connection

**Edit: Network Device**

Bridge:  Model:

VLAN Tag:  MAC address:

Firewall: ☐

[? Help](#) ☐ Advanced

Add a third network with VLAN20 for Dtd (untick Firewall)

**Add: Network Device**

Bridge:  Model:

VLAN Tag:  MAC address:

Firewall: ☐

[? Help](#) ☐ Advanced

Result:

Network Device (net0)	virtio=92:E6:52:0D:E8:AA,bridge=vmbr0,tag=20
Network Device (net1)	virtio=4E:17:D3:64:AD:6F,bridge=vmbr0
Network Device (net2)	virtio=2A:D4:97:EB:34:CC,bridge=vmbr0,tag=2

## Setting Up the OpenWRT Disk

Go to the shell of the server and download the image

Server View

- Datacenter
  - pve8
    - 100 (HA)
    - 101 (IoTstack)
    - 102 (Zerotier)
    - 103 (Birch)
    - 104 (AREDN)
    - 105 (AREDN-Management-Console)
    - 109 (AREDN-local)
    - 199 (Debian11)
    - localnetwork (pve8)

Node 'pve8'

- Search
- Summary
- Notes
- Shell
- System
  - Network
  - Certificates
  - DNS

```
Linux pve8 6.2.16-10-pve #1 SMP PREEMPT_DYNAMIC PMX 6.2.16-10 (2023-08-18T11:42Z) x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Sep 22 10:37:27 CEST 2023 on pts/0
root@pve8:~#
```

```
wget -O aredn.img.gz
http://downloads.arednmesh.org/releases/3.23.8.0/targets/x86/64/aredn-3.23.8.0-
x86-64-generic-ext4-combined.img.gz
```

extract the openwrt img

```
gunzip ./aredn.img.gz
```

rename the extracted img

```
mv ./aredn*.img ./aredn.raw
```

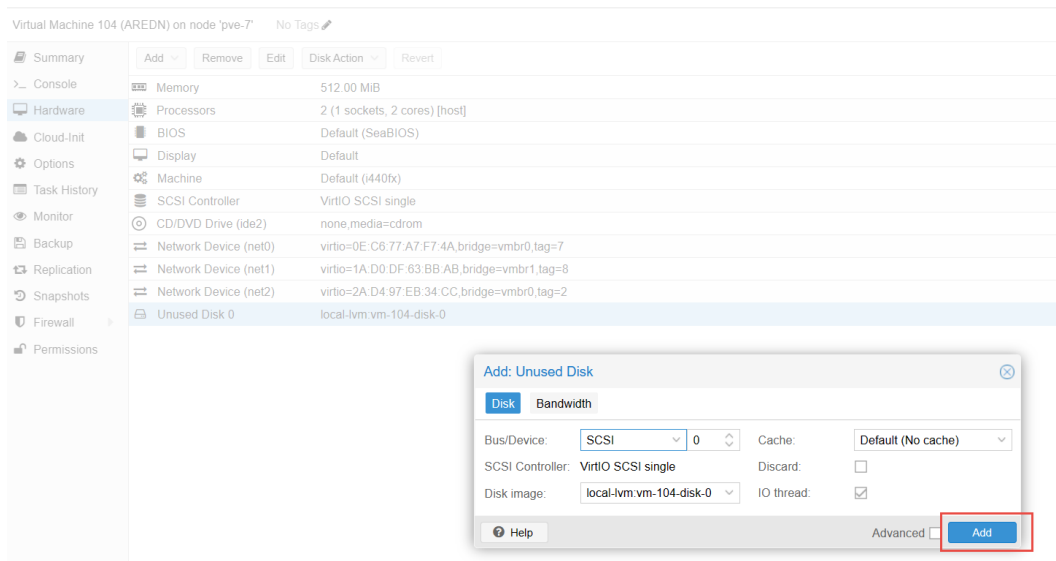
increase the raw disk to 512 MB

```
qemu-img resize -f raw ./aredn.raw 512M
```

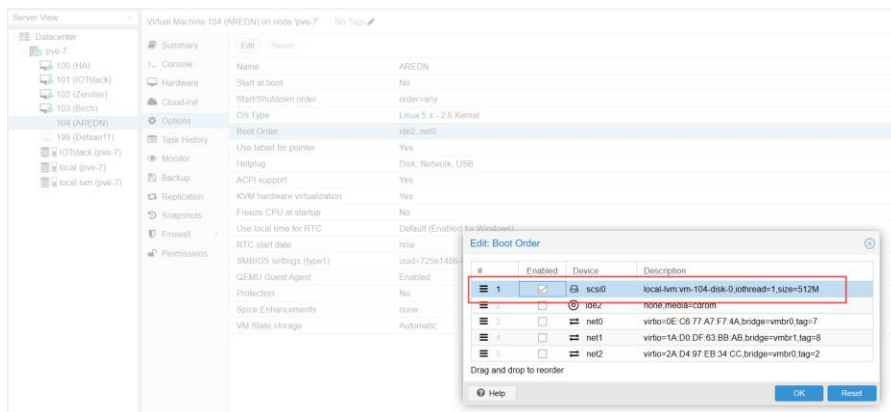
import the disk to the openwrt VM (replace 104 with your VM number)

```
qm importdisk 104 /root/aredn.raw local-lvm
```

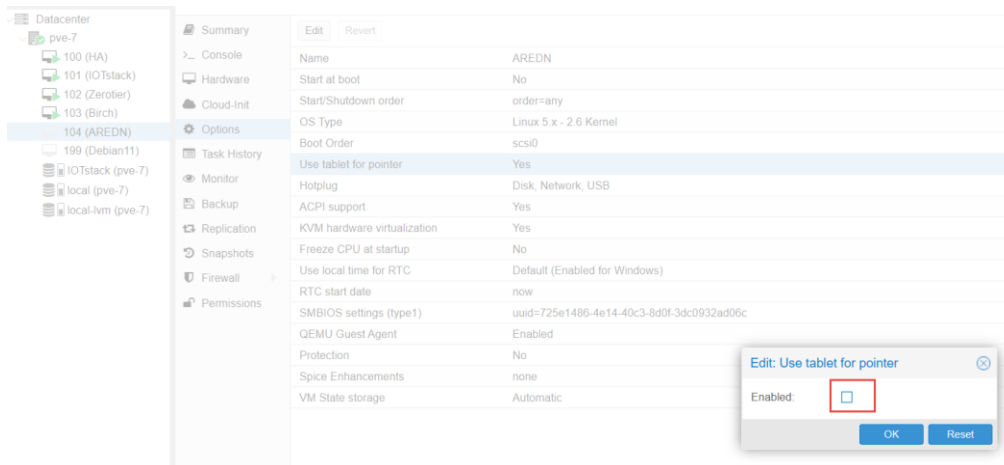
The disk is now visible as “Unused Disk 0”. Add the disk (double click on it) to your VM:



Change boot order:



Double click Use tablet pointer > Uncheck the Enabled box > Click OK



Click the Start button in the top right of the Proxmox screen

Click the Console link to watch the boot process

Wait for the text to stop scrolling and press “Enter”

Run the following command to change/set the root password

```
passwd
```

Type a new root password twice

For the moment we are done with the AREDN node. Because we had to separate the LAN from our home network, we only can manage the node in the Proxmox terminal (it does not offer a browser). To solve the problem, we add a VM with plain vanilla Debian and connect it to VLAN20, too. Like that we have a private connection to manage our AREDN node.

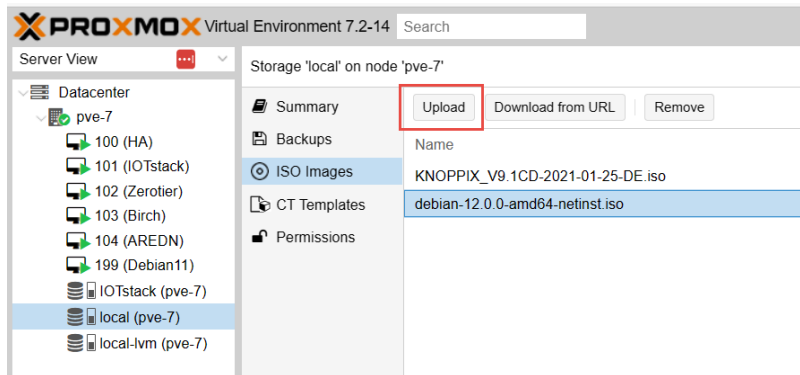
Of course you can use any other VM that offers a browser and is connected to vmbr0/20.

## Create a Debian VM as a management console

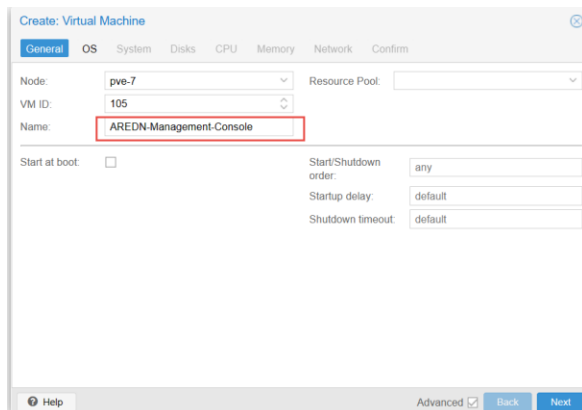
<https://youtu.be/OUC7DMBfR3Y?si=y4r3edcwzzpd2JHJ>

Download the Debian 11 iso Download

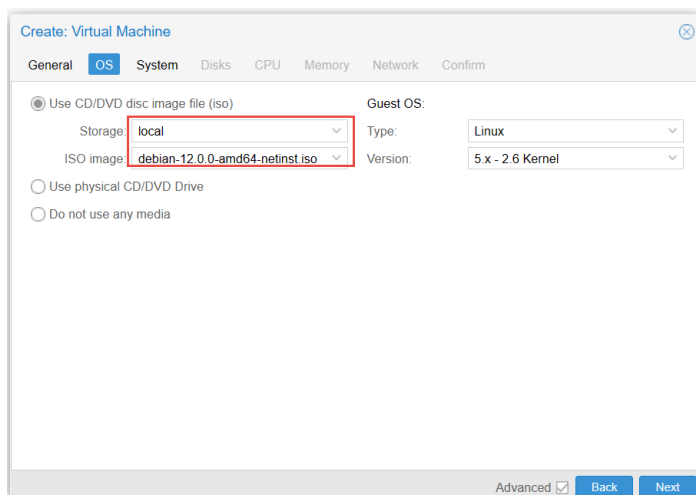
<https://cdimage.debian.org/debian-cd/current/amd64/iso-cd/> (debian-12.1.0-amd64-netinst.iso)



## Create VM



On the OS tab,



Leave the defaults on the System tab

The screenshot shows the 'Create: Virtual Machine' dialog with the 'System' tab selected. The 'General' tab is also visible. The 'System' tab contains the following settings:

- Graphic card: Default
- Machine: Default (i440fx)
- Firmware: BIOS
- BIOS: Default (SeaBIOS)
- SCSI Controller: VirtIO SCSI single
- Qemu Agent: ☐
- Add TPM: ☐

At the bottom, there is a 'Help' button, an 'Advanced' checkbox (checked), and 'Back' and 'Next' buttons.

On the Hard Disk tab, set the Disk size to 16 GiB or more

The screenshot shows the 'Create: Virtual Machine' dialog with the 'Disks' tab selected. The 'Disk' sub-tab is active. The 'scsi0' disk is listed on the left. The 'Disk' sub-tab contains the following settings:

- Bus/Device: SCSI 0
- Cache: Default (No cache)
- SCSI Controller: VirtIO SCSI single
- Storage: local-lvm
- Disk size (GiB): 16
- Format: Raw disk image (raw)
- SSD emulation: ☐
- Read-only: ☐
- Backup: ☒
- Skip replication: ☐
- Async IO: Default (io\_uring)

At the bottom, there is a 'Help' button, an 'Advanced' checkbox (checked), and 'Back' and 'Next' buttons.

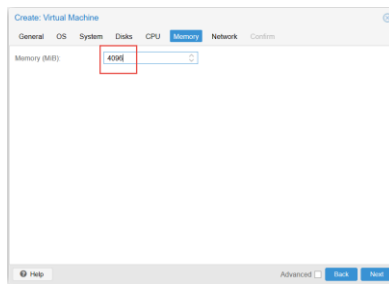
On the CPU tab

The screenshot shows the 'Create: Virtual Machine' dialog with the 'CPU' tab selected. The 'CPU' tab contains the following settings:

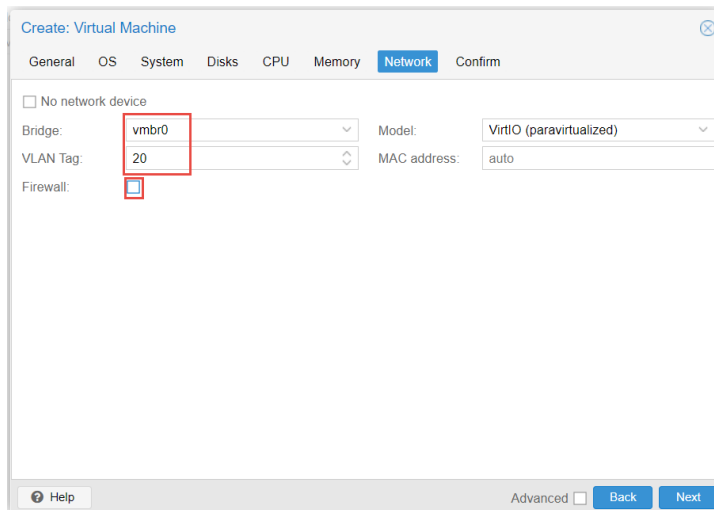
- Sockets: 1
- Cores: 2
- Type: host
- Total cores: 2

At the bottom, there is a 'Help' button, an 'Advanced' checkbox (unchecked), and 'Back' and 'Next' buttons.

## On the Memory tab



## Network tab (untick Firewall)

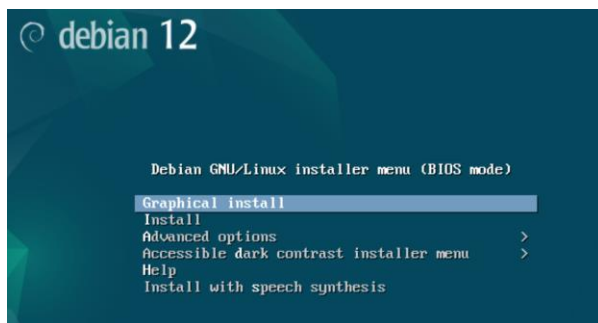


Verify the summary and click Finish

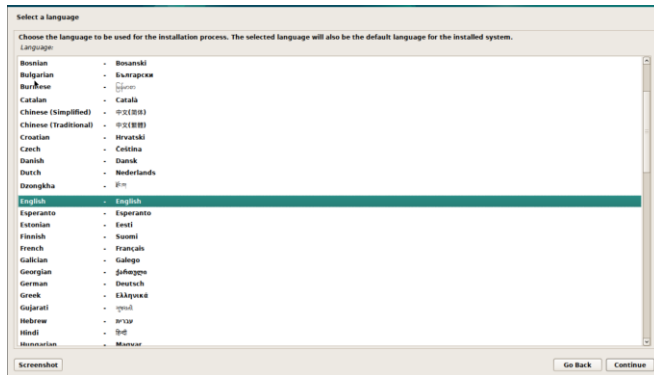
Start the VM



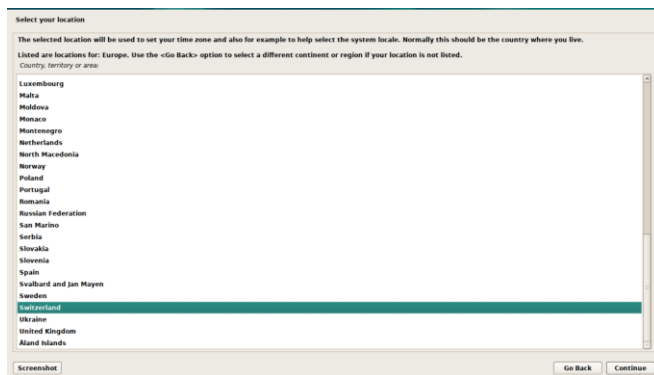
## Graphical Install



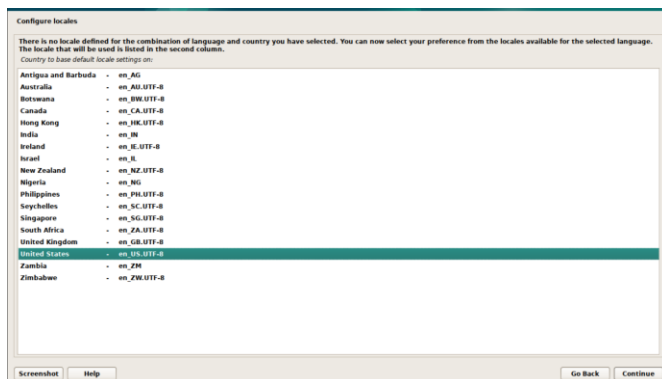
## Select a language



## Select a Location (other →Europe→Switzerland)

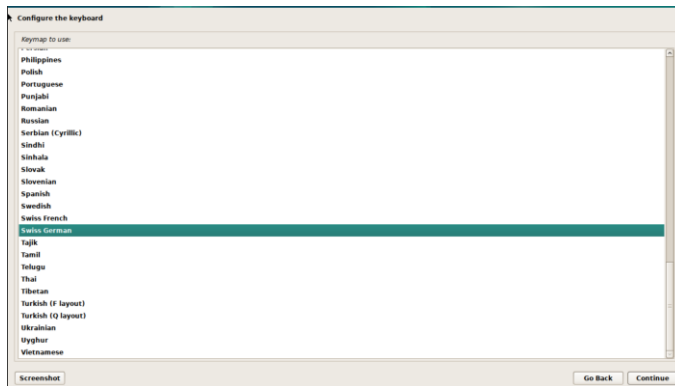


## Select locales (can be adapted later)

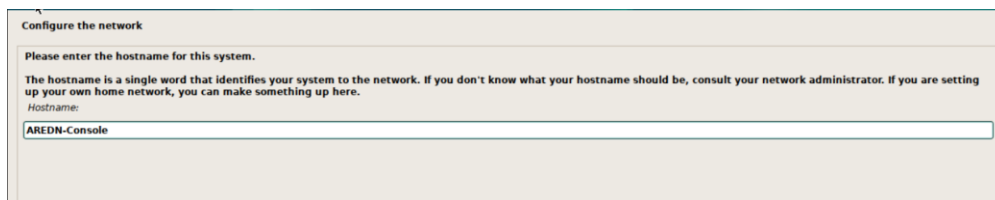


## Select a keyboard layout (can be changed later)

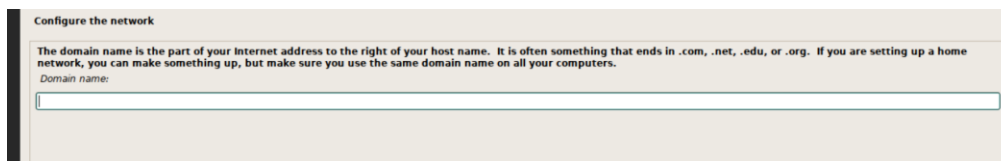




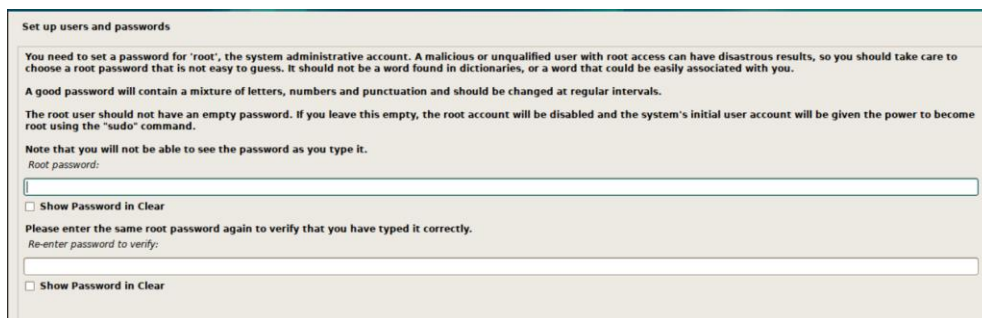
Enter a hostname for the VM



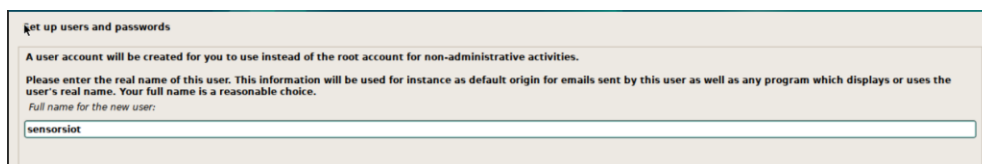
Leave domain name empty



Leave root password empty



Enter the full name for the new user



Enter the username for the new user

**Set up users and passwords**

Select a username for the new account. Your first name is a reasonable choice. The username should start with a lower-case letter, which can be followed by any combination of numbers and more lower-case letters.

Username for your account:

Enter and confirm a password for the new user

**Set up users and passwords**

A good password will contain a mixture of letters, numbers and punctuation and should be changed at regular intervals.

Choose a password for the new user:

☐ Show Password in Clear

Please enter the same user password again to verify you have typed it correctly.

Re-enter password to verify:

☐ Show Password in Clear

Select Disk

**Partition disks**

The installer can guide you through partitioning a disk (using different standard schemes) or, if you prefer, you can do it manually. With guided partitioning you will still have a chance later to review and customise the results.

If you choose guided partitioning for an entire disk, you will next be asked which disk should be used.

Partitioning method:

- Guided - use entire disk**
- Guided - use entire disk and set up LVM
- Guided - use entire disk and set up encrypted LVM
- Manual

**Partition disks**

Note that all data on the disk you select will be erased, but not before you have confirmed that you really want to make the changes.

Select disk to partition:

- SCSI3 (0,0,0) (sda) - 17.2 GB QEMU QEMU HARDDISK**

**Partition disks**

Selected for partitioning:

SCSI3 (0,0,0) (sda) - QEMU QEMU HARDDISK: 17.2 GB

The disk can be partitioned using one of several different schemes. If you are unsure, choose the first one.

Partitioning scheme:

- All files in one partition (recommended for new users)**
- Separate /home partition
- Separate /home, /var, and /tmp partitions

Check and click Continue

**Partition disks**

This is an overview of your currently configured partitions and mount points. Select a partition to modify its settings (file system, mount point, etc.), a free space initialize its partition table.

Guided partitioning

- Configure software RAID
- Configure the Logical Volume Manager
- Configure encrypted volumes
- Configure iSCSI volumes

SCSI3 (0,0,0) (sda) - 17.2 GB QEMU QEMU HARDDISK

- > #1 primary 16.2 GB f ext4 /
- > #5 logical 1.0 GB f swap swap

Undo changes to partitions

**Finish partitioning and write changes to disk**

Select Yes to confirm writing the changes

Partition disks

If you continue, the changes listed below will be written to the disks. Otherwise, you will be able to make further changes manually.

The partition tables of the following devices are changed:  
SCSI0 (0,0,0) (sda)

The following partitions are going to be formatted:  
partition #1 of SCSI0 (0,0,0) (sda) as ext4  
partition #5 of SCSI0 (0,0,0) (sda) as swap  
Write the changes to disks?

☐ No  
☒ Yes

Wait for Debian to copy and install files

Configure the package manager

Scanning your installation media finds the label:  
Debian GNU/Linux 12.0.0\_Bookworm - Official amd64 NETINST with firmware 20230610-10:21

You now have the option of scanning additional media for use by the package manager (apt). Normally these should be from the same set as the one you booted from. If you do not have any additional media, this step can just be skipped.

If you wish to scan more media, please insert another one now.  
Scan extra installation media?

☒ No  
☐ Yes

Configure the package manager

The goal is to find a mirror of the Debian archive that is close to you on the network -- be aware that nearby countries, or even your own, may not be the best choice.

Debian archive mirror country:

- New Zealand
- North Macedonia
- Norway
- Poland
- Portugal
- Romania
- Russian Federation
- Réunion
- Singapore
- Slovakia
- Slovenia
- South Africa
- South Korea
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- Türkiye
- Ukraine
- United Kingdom
- United States
- Uruguay
- Vietnam

Screenshot

Go Back Continue

Configure the package manager

Please select a Debian archive mirror. You should use a mirror in your country or region if you do not know which mirror has the best Internet connection to you.

Usually, deb.debian.org is a good choice.

Debian archive mirror:

- deb.debian.org
- ftp.ch.debian.org
- debian.ethz.ch
- mirror.sinavps.ch
- mirror.iway.ch
- mirror.init7.net
- mirror1.infomaniak.com
- mirror2.infomaniak.com
- debian-archive.trafficmanager.net

Configure the package manager

If you need to use a HTTP proxy to access the outside world, enter the proxy information here. Otherwise, leave this blank.

The proxy information should be given in the standard form of "http://[[user]:pass@]host[:port]]".  
HTTP proxy information (blank for none):

Wait

Participating in package survey

Configuring popularity-contest

The system may anonymously supply the distribution developers with statistics about the most used packages on this system. This information influences decisions such as which packages should go on the first distribution CD.

If you choose to participate, the automatic submission script will run once every week, sending statistics to the distribution developers. The collected statistics can be viewed on <https://popcon.debian.org/>.

This choice can be later modified by running "dpkg-reconfigure popularity-contest".

Participate in the package usage survey?

☒ No

☐ Yes

Select the software to install

Software selection

At the moment, only the core of the system is installed. To tune the system to your needs, you can choose to install one or more of the following predefined collections of software.

Choose software to install:

- ☒ Debian desktop environment
- ☒ ... GNOME
- ☐ ... Xfce
- ☐ ... GNOME Flashback
- ☐ ... KDE Plasma
- ☐ ... Cinnamon
- ☐ ... MATE
- ☐ ... LXDE
- ☐ ... LXQt
- ☐ web server
- ☒ SSH server
- ☒ standard system utilities

Select (tick) "SSH server"

Wait

Select Yes to install GRUB

Install the GRUB boot loader

It seems that this new installation is the only operating system on this computer. If so, it should be safe to install the GRUB boot loader to your primary drive (UEFI partition/boot record).

**Warning: If your computer has another operating system that the installer failed to detect, this will make that operating system temporarily unbootable, though GRUB can be manually configured later to boot it.**

Install the GRUB boot loader to your primary drive?

☐ No

☒ Yes

Select drive for the boot loader

Install the GRUB boot loader

You need to make the newly installed system bootable, by installing the GRUB boot loader on a bootable device. The usual way to do this is to install GRUB to your primary drive (UEFI partition/boot record). You may instead install GRUB to a different drive (or partition), or to removable media.

Device for boot loader installation:

Enter device manually

/dev/sda (scsi-0QEMU\_QEMU\_HARDDISK\_drive-scsi0)

Reboot

Remove CD drive (it will only be removed after reboot)

Virtual Machine 105 (AREDN-Management-Console) on node 'pve-7' No Tags

Summary Add Remove Edit Disk Action Revert

Console

Hardware

Cloud-Init

Options

Task History

Monitor

Backup

Replication

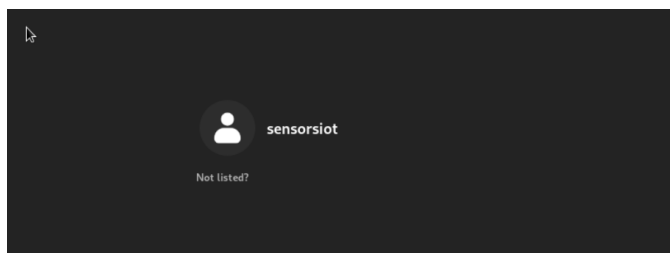
Snapshots

Firewall

Permissions

Memory	4.00 GiB
Processors	2 (1 sockets, 2 cores) [host]
BIOS	Default (SeaBIOS)
Display	Default
Machine	Default (i440fx)
SCSI Controller	VirtIO SCSI single
CD/DVD Drive (ide2)	local:iso/debian-12.0.0-amd64-netinst.iso,media=cdrom,size=738M
Hard Disk (scsi0)	local-lvm:vm-105-disk-0,iouthread=1,size=16G
Network Device (net0)	virtio=2E:72:31:08:AA:FA,bridge=vbr1

Go to the Console and login



Start Firefox. On <http://localnode.local.mesh> you should see your AREDN server because your management console is connected to the AREDN node via the vbr0/20 interface.

## Setup AREDN server networks

Open terminal and ssh into the AREDN server:

```
ssh root@localnode.local.mesh -p 2222
```

Confirm fingerprint with “yes”

## Desired mapping

In the end we would like the following mapping:

🔧	Network Device (net0)	virtio=92:E6:52:0D:E8:AA,bridge=vibr0,tag=20	<b>eth0</b>	<b>LAN port (ports 2-4 on hap)</b>
🔧	Network Device (net1)	virtio=4E:17:D3:64:AD:6F,bridge=vibr0	<b>eth1</b>	<b>WAN port (port 1 on hap)</b>
🔧	Network Device (net2)	virtio=2A:D4:97:E8:34:CC,bridge=vibr0,tag=2	<b>eth2</b>	<b>DtD port (port 5 on hap)</b>

The mapping of the nets has to be done now in the terminal of the Management console. Connect first to your AREDN server:

```
sensorsiot@AREDN-Console: ~  
sensorsiot@AREDN-Console:~$ ssh -l root -p 2222 localnode  
The authenticity of host '[localnode]:2222 ([10.228.113.121]:2222)' can't be est  
ablished.  
ECDSA key fingerprint is SHA256:GzuLrrLzL805914bcGbMPE9KsDg0+hJnXiwd3ZWpYy0.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '[localnode]:2222' (ECDSA) to the list of known hosts  
.  
root@localnode's password: █
```

Press yes, and enter the password

```
ssh-keygen -l root -p 2222 localnode
```

Now you are in the console

```
root@H980P4-VM-TUNNELSERVER:-  
Warning: Permanently added '[localnode]:2222' (ECDSA) to the list of known hosts  
  
root@localnode's password:  
Permission denied, please try again.  
  
root@localnode's password:  
  
BusyBox v1.35.0 (2023-04-27 20:28:15 UTC) built-in shell (ash)  
  
      _   _   _   _   _   _   _   TM  
     / \ / \ / \ / \ / \ / \ / \  
    / X X X / X X X / X X X / X X X \  
   / X X X / X X X / X X X / X X X \  
  / X X X / X X X / X X X / X X X \  
 / X X X / X X X / X X X / X X X \  
/_X_X_X/_X_X_X/_X_X_X/_X_X_X/_X_X_X/  
 AR7TXX RADIO EMERGENCY DATA NETWORK
```

---

```
1) Research AREDN and choose a supported device  
2) Download and install AREDN Firmware  
3) Deploy and enjoy the mesh  
.....  
3. 23.08.0, r20134-5f15225c1e
```

Type:

```
vi /etc/config/network
```

and hit the “insert” key.

Leave the Wi-Fi configuration as it is:

```

##### Loopback configuration
config interface loopback
    option device    "lo"
    option proto     static
    option ipaddr    127.0.0.1
    option netmask   255.0.0.0

##### WIFI configuration
config device
    option name 'br-nomesh'
    option type 'bridge'
    option bridge_empty '1'

config interface wifi
    option device 'br-nomesh'
    option proto 'static'
    option ipaddr '10.124.142.47'
    option netmask '255.255.255.255'

config interface wifi_mon
    option proto none

```

Add two ports to the bridge configuration:

```

### Bridge configuration
config device
    option name 'br0'
    option type 'bridge'
    list ports 'eth0'
    list ports 'eth1'
    list ports 'eth2'

```

Adjust the WAN configuration:

```

##### LAN configuration

config bridge-vlan
    option device 'br0'
    option vlan '3'
    list ports 'eth0:u'

config device
    option name 'br-lan'
    option type 'bridge'
    option macaddr 02:40:B0:C3:7B:A5
    list ports 'br0.3'

config interface lan
    option device 'br-lan'
    option proto 'static'
    option ipaddr '10.61.86.209'
    option netmask '255.255.255.240'
    option dns '8.8.8.8 8.8.4.4'

```

The LAN is connected to eth0 that is net0 in Proxmox on VLAN 20. Only our management console is connected to this network. So the DHCP server inside the AREDN server is insulated and does not harm your home network.

Connect the WAN port to the internet. eth1 is connected to the RJ45 connector of your server using vmbr0. It uses the general purpose VLAN 1 and will get a DHCP address from your home network.

```

-
#### WAN configuration

config bridge-vlan
    option device 'br0'
    option vlan '1'
    list ports 'eth1:u'

config device
    option name 'br-wan'
    option type 'bridge'
    list ports 'br0.1'

config interface wan
    option device 'br-wan'
    option proto 'dhcp'

```

The DtD (device-to-device) port is connected to the RJ45 of your Proxmox server via vmbr0, but this time using VLAN 2. To avoid problems with the DHCP server of other AREDN devices like the hap routers, we have to add a managed switch where we only transfer VLAN 2 to the ports where we connect port 5 of the hap routers or any “antennas”.

```

#### Dtd configuration

config bridge-vlan
    option device 'br0'
    option vlan '2'
    list ports 'eth2:u'

config device
    option name 'br-dtdlink'
    option type 'bridge'
    list ports 'br0.2'

config interface dtdlink
    option device 'br-dtdlink'
    option proto 'static'
    option ipaddr '10.60.118.42'
    option netmask '255.0.0.0'

```

All networks have to be marked “untagged” (e.g. “eth2:u”). They are tagged by Proxmox. And Proxmox does not like tagged stuff from the container.

The rest of the configuration file is only comments and is not changed for the moment.

Press the “escape” button and “:wq” to save your changes.

Reboot.

Now you can connect to localnode.local.mesh via Firefox and start to customize your server.

Give it the name: Callsign-VM-TUNNELSERVER

Connect it as a client to your tunnel server in the AREDN network. Make sure the administrator of your tunnel adjusts the name and the address of your new server. Maybe you want to run in parallel for a few days. After connecting to your tunnel server, you should see the other nodes in the net.

Now, you can add the tunnels you serve. Do not forget to forward port 5525 to the address of your tunnel server.



Node Status Basic Setup Port Forwarding, DHCP, and Services Tunnel Server Administration Advanced Network

Help Save Changes Reset Values Refresh

Connect this node to the following servers:

Enabled?	Server	Pwd	Network	Active	Action
<input checked="" type="checkbox"/>	lv6.rocks	nd	172.31		Del

Contact Info/Comment (Optional):

Now your Server should be connected to the SwissDigitalNet. Congratulations!

**HB9BLA-VM-TUNNELSERVER mesh status**

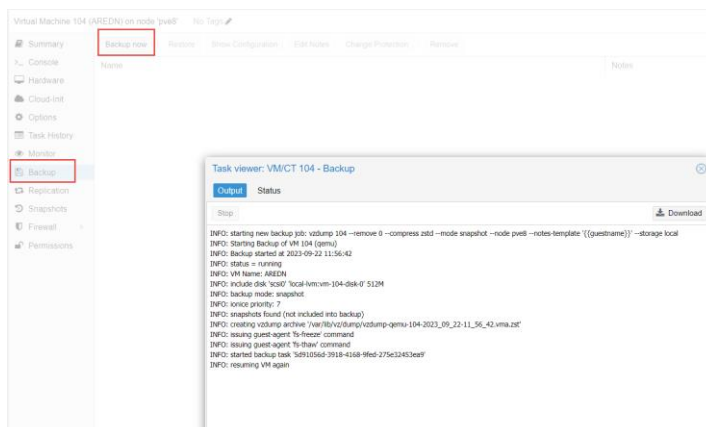
Location: 47.47468 7.76729

Help Refresh Auto Quit

Node Name	LAN Hostname	Service Name
HB9BLA-VM-TUNNELSERVER		
Current Neighbors		
Node Name	LAN Hostname	Service Name
HB9BLA-VM-1 (dd)	441531	
HB9DIO-hap-1 (bun)		
HB9EDI-VM-GW (bun)		CHAT4ALL filerepo
HB9ETS-BASE-WSTEIN (bun)	422530	
HB9GNO-HAP-TUNNELSERVER (bun)	freepbx citadel	HP VOIP CITADEL Server
HB9GVM-HAP-1 (bun)	720830	
HB9HDI-196-151-232 (bun)	870830	
HB9HOQ-HAP-1 (bun)		
HB9VCJ-HAP-1 (bun)	443430	
Remote Nodes		
Node Name	LAN Hostname	Service Name
ETX		

## Backup

Backup machine to the local directory



You find this directory

```
cd /var/lib/vz/dump/
```

on the Proxmox **server**. It can be saved to the local disk using WinSCP

## Install QEMU Agent

Necessary to control (e.g. shut down) the AREDN VM from Proxmox

In your management console, you select the filerepo:

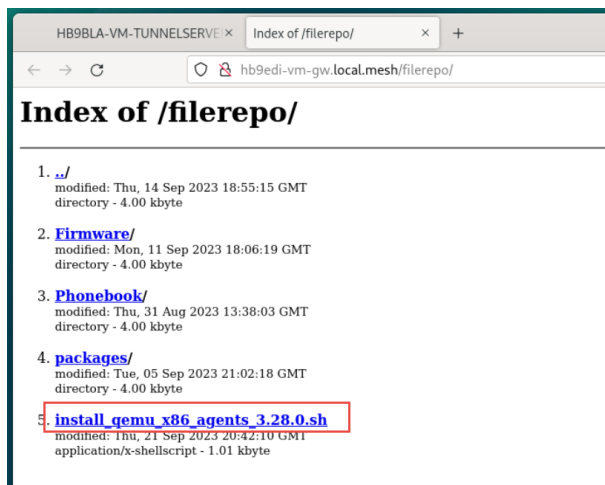
**HB9BLA-VM-TUNNELSERVER mesh status**

Location: 47.47468 7.76729

Help Refresh Auto Quit

Node Name	LAN Hostname	IP	MAC	Service Name
HB9BLA-VM-1	441531	100%	100%	HB9BLA-VM-1
HB9BLA-VM-2	441531	100%	100%	HB9BLA-VM-2
HB9BLA-VM-3	441531	100%	100%	HB9BLA-VM-3
HB9BLA-VM-4	441531	100%	100%	HB9BLA-VM-4
HB9BLA-VM-5	441531	100%	100%	HB9BLA-VM-5
HB9BLA-VM-6	441531	100%	100%	HB9BLA-VM-6
HB9BLA-VM-7	441531	100%	100%	HB9BLA-VM-7
HB9BLA-VM-8	441531	100%	100%	HB9BLA-VM-8
HB9BLA-VM-9	441531	100%	100%	HB9BLA-VM-9
HB9BLA-VM-10	441531	100%	100%	HB9BLA-VM-10
HB9BLA-VM-11	441531	100%	100%	HB9BLA-VM-11
HB9BLA-VM-12	441531	100%	100%	HB9BLA-VM-12
HB9BLA-VM-13	441531	100%	100%	HB9BLA-VM-13
HB9BLA-VM-14	441531	100%	100%	HB9BLA-VM-14
HB9BLA-VM-15	441531	100%	100%	HB9BLA-VM-15
HB9BLA-VM-16	441531	100%	100%	HB9BLA-VM-16
HB9BLA-VM-17	441531	100%	100%	HB9BLA-VM-17
HB9BLA-VM-18	441531	100%	100%	HB9BLA-VM-18
HB9BLA-VM-19	441531	100%	100%	HB9BLA-VM-19
HB9BLA-VM-20	441531	100%	100%	HB9BLA-VM-20
HB9BLA-VM-21	441531	100%	100%	HB9BLA-VM-21
HB9BLA-VM-22	441531	100%	100%	HB9BLA-VM-22
HB9BLA-VM-23	441531	100%	100%	HB9BLA-VM-23
HB9BLA-VM-24	441531	100%	100%	HB9BLA-VM-24
HB9BLA-VM-25	441531	100%	100%	HB9BLA-VM-25
HB9BLA-VM-26	441531	100%	100%	HB9BLA-VM-26
HB9BLA-VM-27	441531	100%	100%	HB9BLA-VM-27
HB9BLA-VM-28	441531	100%	100%	HB9BLA-VM-28
HB9BLA-VM-29	441531	100%	100%	HB9BLA-VM-29
HB9BLA-VM-30	441531	100%	100%	HB9BLA-VM-30
HB9BLA-VM-31	441531	100%	100%	HB9BLA-VM-31
HB9BLA-VM-32	441531	100%	100%	HB9BLA-VM-32
HB9BLA-VM-33	441531	100%	100%	HB9BLA-VM-33
HB9BLA-VM-34	441531	100%	100%	HB9BLA-VM-34
HB9BLA-VM-35	441531	100%	100%	HB9BLA-VM-35
HB9BLA-VM-36	441531	100%	100%	HB9BLA-VM-36
HB9BLA-VM-37	441531	100%	100%	HB9BLA-VM-37
HB9BLA-VM-38	441531	100%	100%	HB9BLA-VM-38
HB9BLA-VM-39	441531	100%	100%	HB9BLA-VM-39
HB9BLA-VM-40	441531	100%	100%	HB9BLA-VM-40
HB9BLA-VM-41	441531	100%	100%	HB9BLA-VM-41
HB9BLA-VM-42	441531	100%	100%	HB9BLA-VM-42
HB9BLA-VM-43	441531	100%	100%	HB9BLA-VM-43
HB9BLA-VM-44	441531	100%	100%	HB9BLA-VM-44
HB9BLA-VM-45	441531	100%	100%	HB9BLA-VM-45
HB9BLA-VM-46	441531	100%	100%	HB9BLA-VM-46
HB9BLA-VM-47	441531	100%	100%	HB9BLA-VM-47
HB9BLA-VM-48	441531	100%	100%	HB9BLA-VM-48
HB9BLA-VM-49	441531	100%	100%	HB9BLA-VM-49
HB9BLA-VM-50	441531	100%	100%	HB9BLA-VM-50
HB9BLA-VM-51	441531	100%	100%	HB9BLA-VM-51
HB9BLA-VM-52	441531	100%	100%	HB9BLA-VM-52
HB9BLA-VM-53	441531	100%	100%	HB9BLA-VM-53
HB9BLA-VM-54	441531	100%	100%	HB9BLA-VM-54
HB9BLA-VM-55	441531	100%	100%	HB9BLA-VM-55
HB9BLA-VM-56	441531	100%	100%	HB9BLA-VM-56
HB9BLA-VM-57	441531	100%	100%	HB9BLA-VM-57
HB9BLA-VM-58	441531	100%	100%	HB9BLA-VM-58
HB9BLA-VM-59	441531	100%	100%	HB9BLA-VM-59
HB9BLA-VM-60	441531	100%	100%	HB9BLA-VM-60
HB9BLA-VM-61	441531	100%	100%	HB9BLA-VM-61
HB9BLA-VM-62	441531	100%	100%	HB9BLA-VM-62
HB9BLA-VM-63	441531	100%	100%	HB9BLA-VM-63
HB9BLA-VM-64	441531	100%	100%	HB9BLA-VM-64
HB9BLA-VM-65	441531	100%	100%	HB9BLA-VM-65
HB9BLA-VM-66	441531	100%	100%	HB9BLA-VM-66
HB9BLA-VM-67	441531	100%	100%	HB9BLA-VM-67
HB9BLA-VM-68	441531	100%	100%	HB9BLA-VM-68
HB9BLA-VM-69	441531	100%	100%	HB9BLA-VM-69
HB9BLA-VM-70	441531	100%	100%	HB9BLA-VM-70
HB9BLA-VM-71	441531	100%	100%	HB9BLA-VM-71
HB9BLA-VM-72	441531	100%	100%	HB9BLA-VM-72
HB9BLA-VM-73	441531	100%	100%	HB9BLA-VM-73
HB9BLA-VM-74	441531	100%	100%	HB9BLA-VM-74
HB9BLA-VM-75	441531	100%	100%	HB9BLA-VM-75
HB9BLA-VM-76	441531	100%	100%	HB9BLA-VM-76
HB9BLA-VM-77	441531	100%	100%	HB9BLA-VM-77
HB9BLA-VM-78	441531	100%	100%	HB9BLA-VM-78
HB9BLA-VM-79	441531	100%	100%	HB9BLA-VM-79
HB9BLA-VM-80	441531	100%	100%	HB9BLA-VM-80
HB9BLA-VM-81	441531	100%	100%	HB9BLA-VM-81
HB9BLA-VM-82	441531	100%	100%	HB9BLA-VM-82
HB9BLA-VM-83	441531	100%	100%	HB9BLA-VM-83
HB9BLA-VM-84	441531	100%	100%	HB9BLA-VM-84
HB9BLA-VM-85	441531	100%	100%	HB9BLA-VM-85
HB9BLA-VM-86	441531	100%	100%	HB9BLA-VM-86
HB9BLA-VM-87	441531	100%	100%	HB9BLA-VM-87
HB9BLA-VM-88	441531	100%	100%	HB9BLA-VM-88
HB9BLA-VM-89	441531	100%	100%	HB9BLA-VM-89
HB9BLA-VM-90	441531	100%	100%	HB9BLA-VM-90
HB9BLA-VM-91	441531	100%	100%	HB9BLA-VM-91
HB9BLA-VM-92	441531	100%	100%	HB9BLA-VM-92
HB9BLA-VM-93	441531	100%	100%	HB9BLA-VM-93
HB9BLA-VM-94	441531	100%	100%	HB9BLA-VM-94
HB9BLA-VM-95	441531	100%	100%	HB9BLA-VM-95
HB9BLA-VM-96	441531	100%	100%	HB9BLA-VM-96
HB9BLA-VM-97	441531	100%	100%	HB9BLA-VM-97
HB9BLA-VM-98	441531	100%	100%	HB9BLA-VM-98
HB9BLA-VM-99	441531	100%	100%	HB9BLA-VM-99
HB9BLA-VM-100	441531	100%	100%	HB9BLA-VM-100

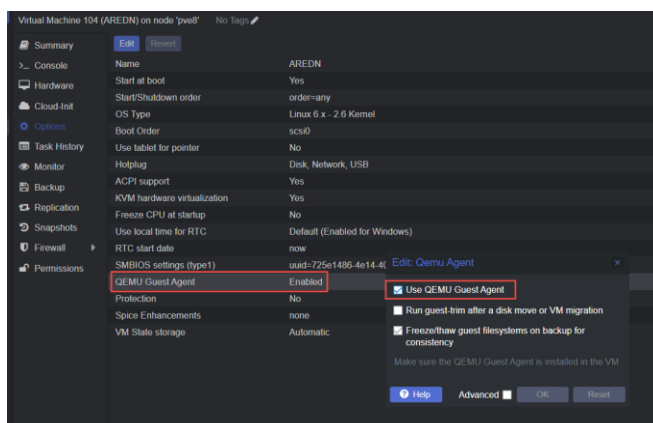
And copy this link:



Now you paste the link into your terminal and add the yellow command

```
curl http://hb9edi-vm-gw.local.mesh/filerepo/install_qemu_x86_agents_3.28.0.sh | ash
```

Finally, you enable Guest Agent



Now your tunnel server on a Gateway is ready to be connected to the world.

## AREDN Virtual Machine as a telephone server

### Setup

I add a new VM in addition to the tunnel server. If you do not operate a tunnel server, you just create a VM for your telephone server

The basis setup has to be done the same way as before. One difference is that we chose VLAN10 as the management connection:

Network Device (net0)	virtio=AA:88:4A:2F:F5:D1,bridge=vibr0,tag=10
Network Device (net1)	virtio=0A:DC:B3:77:C5:08,bridge=vibr0
Network Device (net2)	virtio=3A:55:E2:13:D0:C1,bridge=vibr0,tag=2

And we change the network of the management console, too:

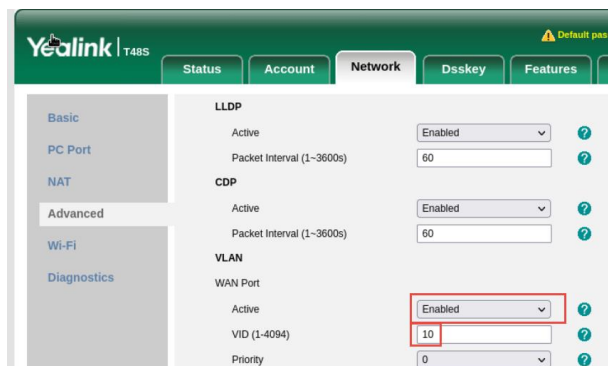
(AREDN-Management-Console) on node 'pve8' No Tags

Add	Remove	Edit	Disk Action	Revert
Memory	4.00 GiB			
Processors	2 (1 sockets, 2 cores) [host]			
BIOS	Default (SeaBIOS)			
Display	Default			
Machine	Default (i440fx)			
SCSI Controller	VirtIO SCSI single			
Hard Disk (scsi0)	local-lvm:vm-105-disk-0,ioread=1,size=16G			
Network Device (net0)	virtio=2E:72:31:08:AA:FA,bridge=vibr0,tag=10			

Now we should be able to manage the telephone server from the management console.

We can connect our phones to our home network instead of the hap router and they should get a normal address in the 192.168.xxx.xxx range.

Because our LAN of the VM is on VLAN 10, we must change the VLAN of the phone to 10, too. We login and go to Network → Advanced and enable VLAN 10.



Now your phone should get a 10.xx.xx.xx address (instead of a 192.168.xxx.xxx) and you can install the phonebook and the SIP server as in every hap router and make the first test call.