# AREDN on Proxmox

# Inhalt

# System Overview

This is the setup we want to achieve:

| | |
|---|---|
| Tunnelserver in the AREDN mesh | |

Remote

net1 / vmbr0/untagged

net0 / vmbr0/VLAN10

eth0 / vmbr0/VLAN10

Your VM Tunnelserver

Your management VM (Debian)

net2 /vmbr0 / VLAN2

Managed switch

Port on VLAN2/tagged

Port 1

hap router for telephones and antennas

Port 2-4

Port 5

Telephone

Ev. Antenna

# 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

# Proxmox installation

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

Find the IP address of your Proxmox server (using Advanced IP Scanner)

Open a web browser and navigate to the Proxmox web UI (e.g. https://192.168.0.230:8006/

# VLAN enabling of the Proxmox network

Navigate to pve8→Network

vmbr0 is the same as port 1 on the hap router and is connected to the internet (for tunnels) It is default on Proxmox.

Make vmbr0 VLAN aware:



## VLAN definition for this document

VLAN1: Used as "untagged" VLAN by AREDN

VLAN2: Used for Device-to-Device (DtD) communication by AREDN

VLAN10: Used as LAN network for the Tunnel Server (by the author, can be changed)

VLAN20: Used as LAN network for the Telephone Server (by the author, can be changed)

# Create an AREDN VM (Tunnel or Telephone Server)

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

and

https://youtu.be/8nsdrWeeg8o

## Creating the VM

Click the Create VM button at the top right:



And fill in a name and an ID for your VM (start at boot not ticked):



Start at boot can be ticked when everything works

## 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)

SSD emulation:    ☐                      Backup:         ☑
Read-only:        ☐                      Skip replication: ☐
                                         Async IO:       Default (io_uring)

---

## Create: Virtual Machine

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

Sockets:          1                      Type:           x86-64-v2-AES
Cores:            2                      Total cores:    2

VCPUs:            2                      CPU units:      100
CPU limit:        unlimited              Enable NUMA:    ☐
CPU Affinity:     All Cores

Extra CPU Flags:

| | | | |
|---|---|---|---|
| Default | -○◉○+ | md-clear | Required to let the guest OS know if MDS is mitigated correctly |
| Default | -○◉○+ | pcid | Meltdown fix cost reduction on Westmere, Sandy-, and IvyBridge Intel CPUs |
| Default | -○◉○+ | spec-ctrl | Allows improved Spectre mitigation with Intel CPUs |
| Default | -○◉○+ | ssbd | Protection for "Speculative Store Bypass" for Intel models |
| Default | -○◉○+ | ibpb | Allows improved Spectre mitigation with AMD CPUs |
| Default | ○◉○ | virt-ssbd | Basis for "Speculative Store Bypass" protection for AMD models |

❓ Help                                    Advanced ☑    Back    Next

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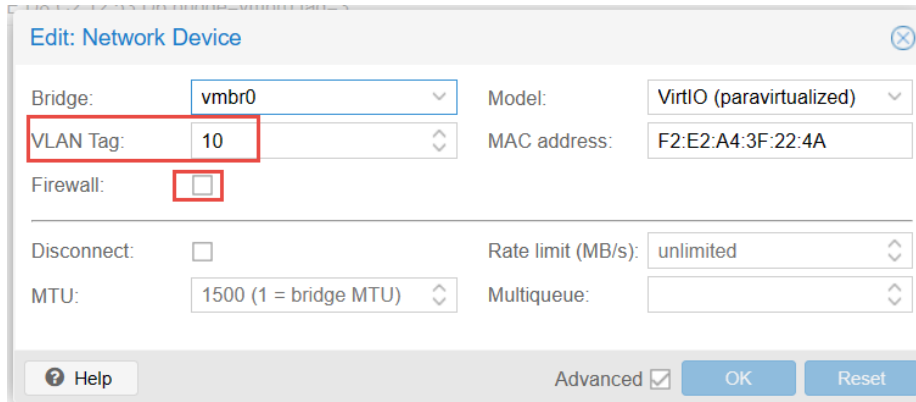


Confirm the summary and wait till the VM is created

## Configuring the AREDN VM

Change VLAN tag and remove firewall of Network device (net0) to create LAN port
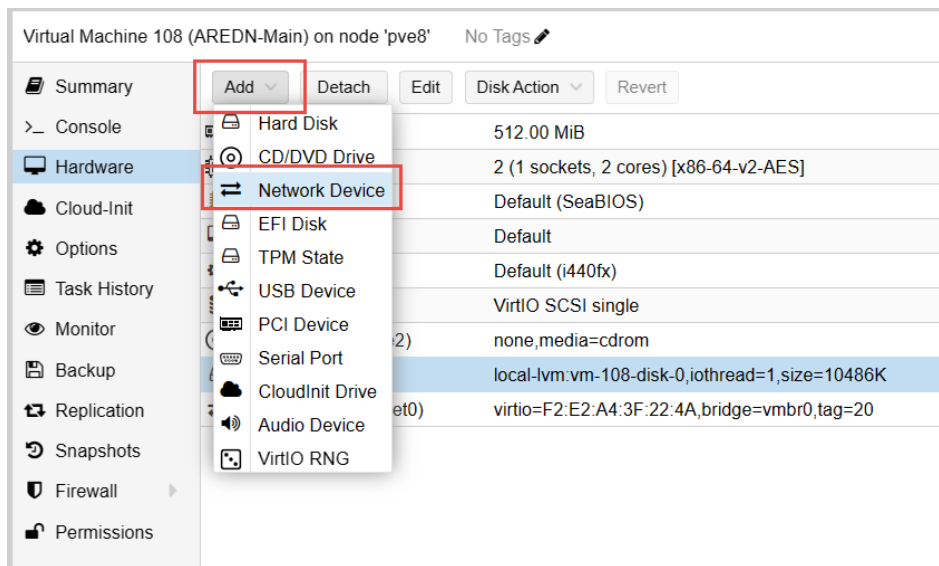


VLAN 10 is used to insulate the DHCP server of the AREDN node. If you forget it, you can shut down your whole home network when you start the server!

Click the Add button > Network Device



to create the WAN port

Add the DtD interface in VLAN2



The result should look like that:
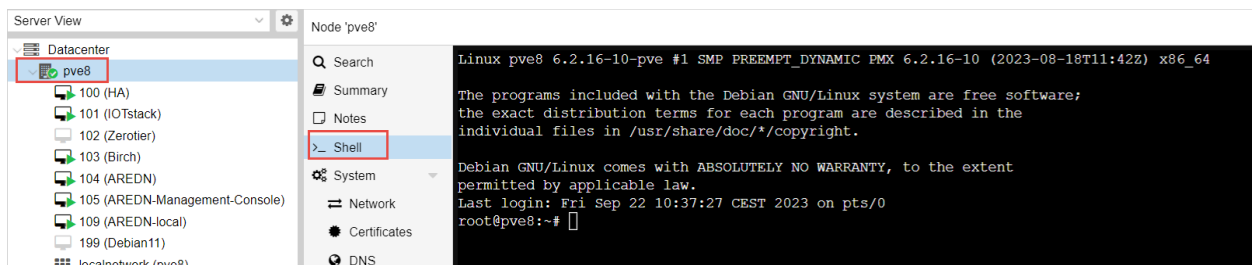


And finally, detach and remove harddisk (scsi0)



## Setting Up the AREDN Disk

Go to the shell of the server and download the image



```
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
```

Adjust the release if you want. Or upgrade your VM later using the AREDN VM

extract the AREDN 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:
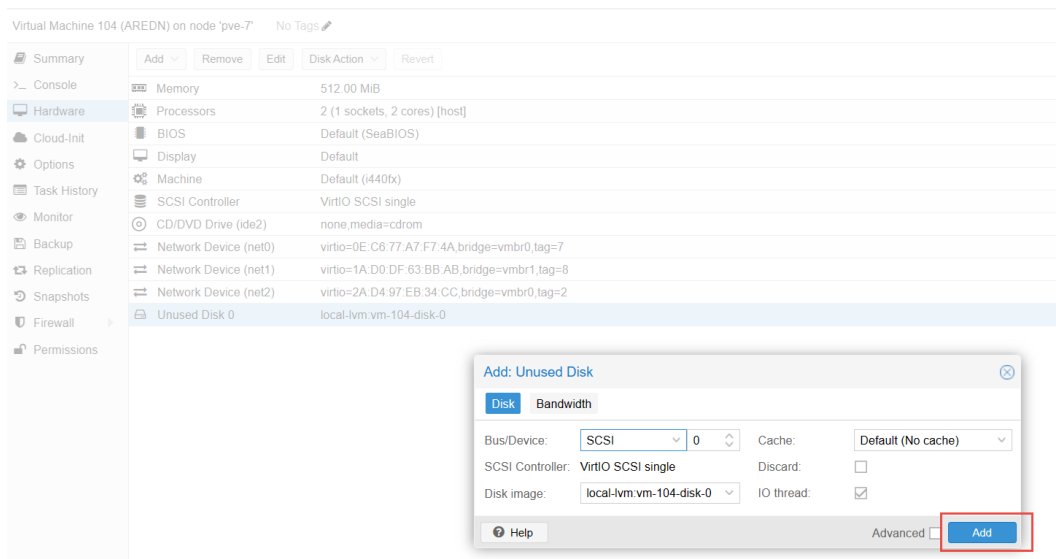


Change boot order:
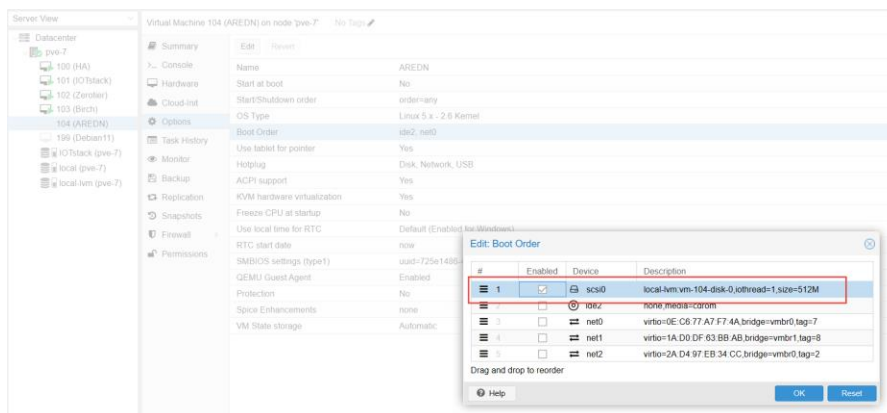


Double click Use tablet pointer > Uncheck the Enabled box > Click OK
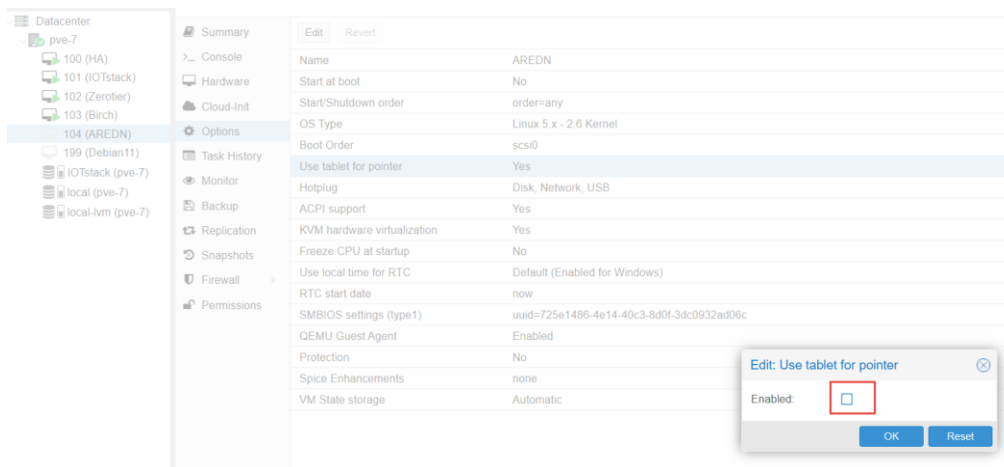
Go to Console and press "Start Now"
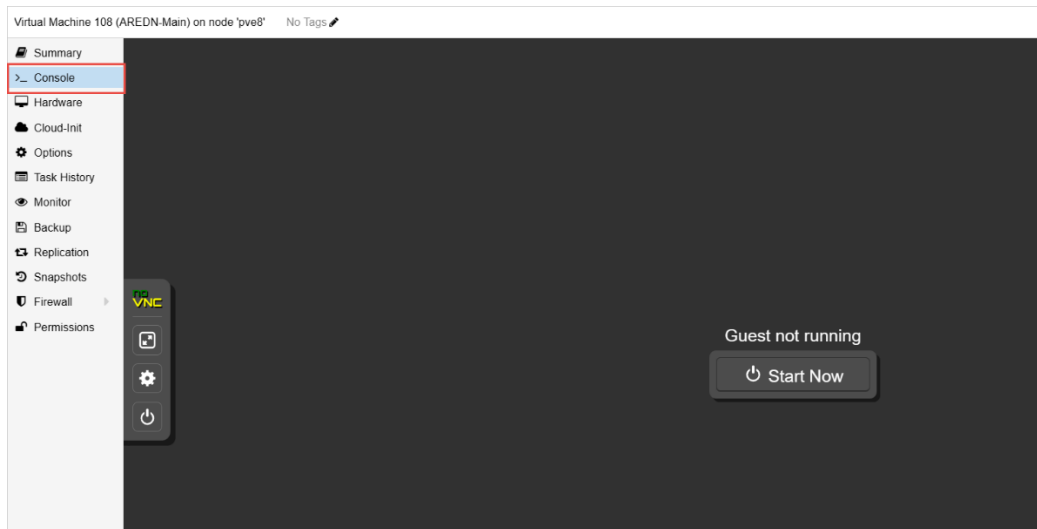


Watch the boot process, wait for the text to stop scrolling and press "Enter"



Run the following command to change/set the root password

```
passwd
```

Type a new root password twice. Attention: It is a US keyboard (Y/Z)

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/VLAN10.

Type

```
Ip addr
```

To check the address of your VM. It should be 192.168.1.1

```
root@NOCALL:/# ip addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel master br-lan state UP qlen 1000
    link/ether f2:e2:a4:3f:22:4a brd ff:ff:ff:ff:ff:ff
3: eth1: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN qlen 1000
    link/ether ce:89:6d:54:3a:ac brd ff:ff:ff:ff:ff:ff
4: eth2: <BROADCAST,MULTICAST> mtu 1500 qdisc noop state DOWN qlen 1000
    link/ether de:d8:c2:12:53:d6 brd ff:ff:ff:ff:ff:ff
5: tunl0@NONE: <NOARP> mtu 1480 qdisc noop state DOWN qlen 1000
    link/ipip 0.0.0.0 brd 0.0.0.0
6: br-lan: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP qlen 1000
    link/ether f2:e2:a4:3f:22:4a brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.1/24 brd 192.168.1.255 scope global br-lan
       valid_lft forever preferred_lft forever
7: eth0.2@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP qlen 1000
    link/ether f2:e2:a4:3f:22:4a brd ff:ff:ff:ff:ff:ff
    inet 192.168.2.1/24 brd 192.168.2.255 scope global eth0.2
       valid_lft forever preferred_lft forever
8: eth0.1@eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP qlen 1000
    link/ether f2:e2:a4:3f:22:4a brd ff:ff:ff:ff:ff:ff
```

# 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)
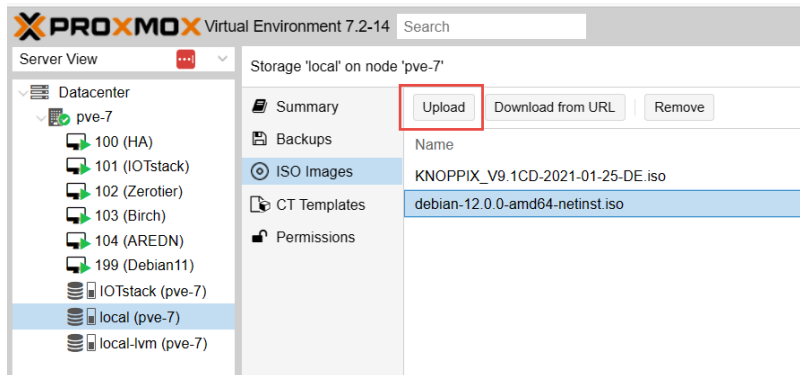


## Create VM
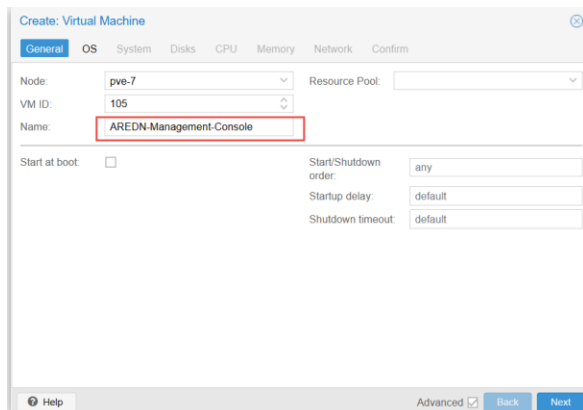


On the OS tab,
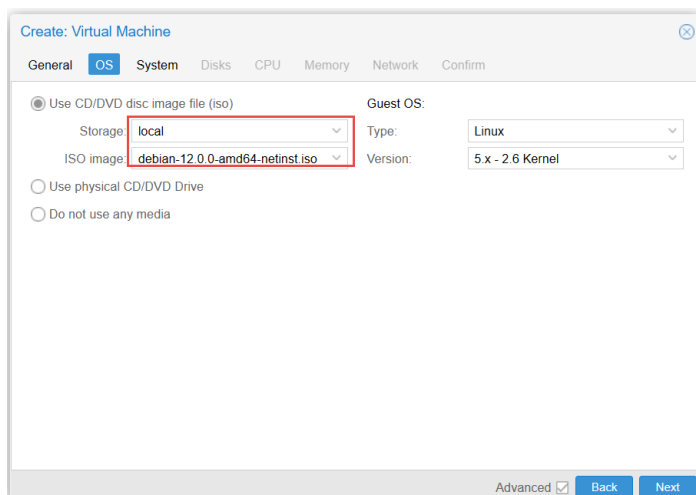
Leave the defaults on the System tab



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



On the CPU tab


,

On the Memory tab



Network tab: Add the VLAN number of the LAN port of the AREDN server you want to connect to and untick the firewall.

Edit: Do not add the VLAN right now. Add it when you are finished with the installation and want to connect to an AREDN node. Otherwise you will not be able to continue.
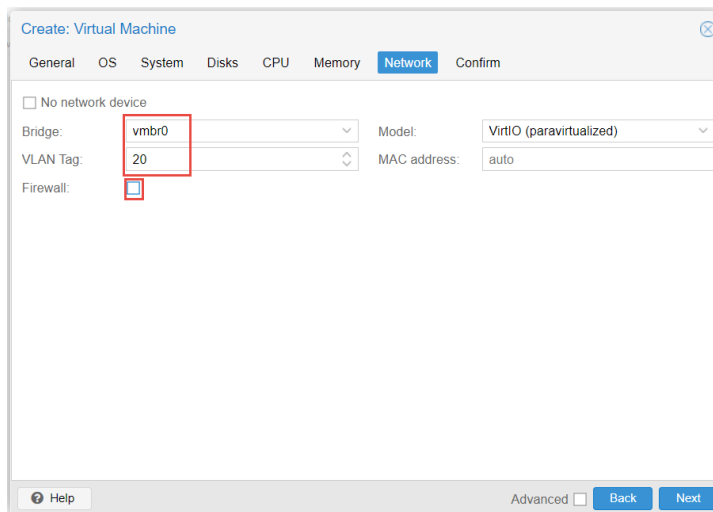


Verify the summary and click Finish

Start the VM



Graphical Install
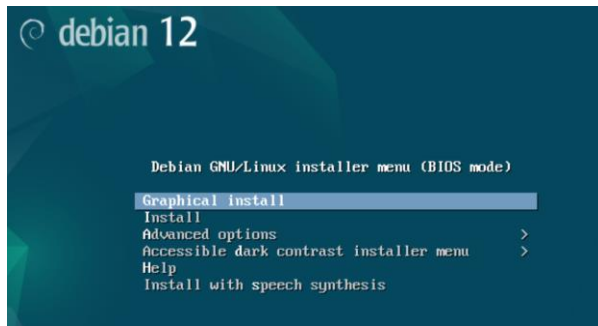
Select a language
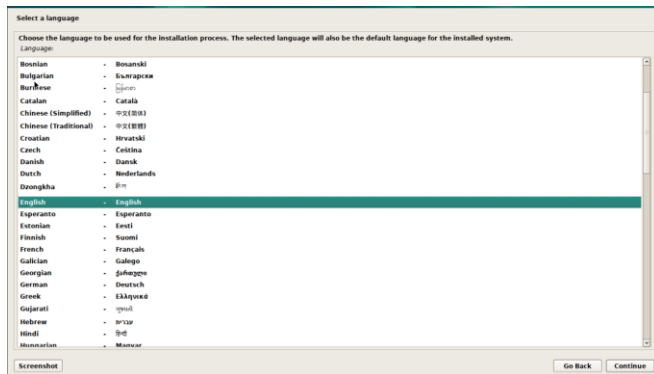


Select a Location (other →Europe→Switzerland)
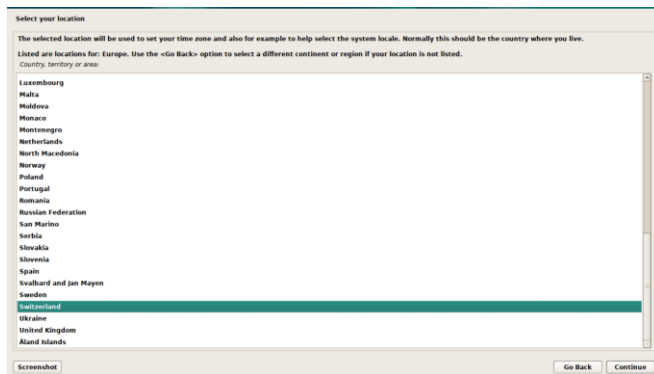


Select locales (can be adapted later)
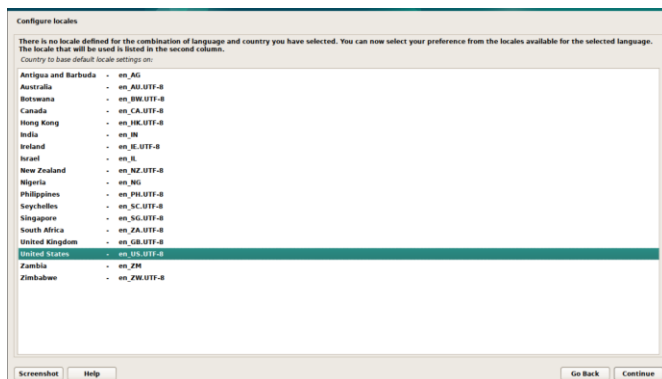
Select a keyboard layout (can be changed later)
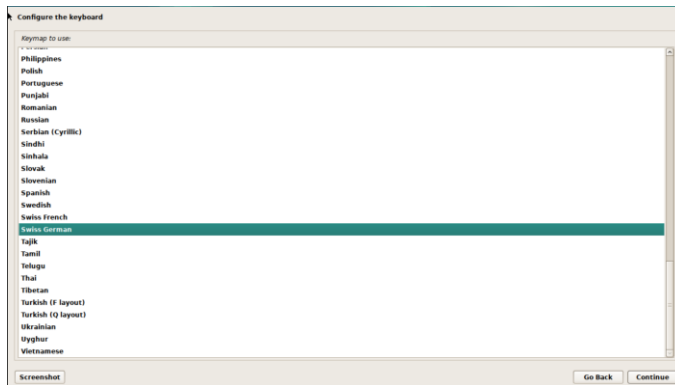


Enter a hostname for the VM
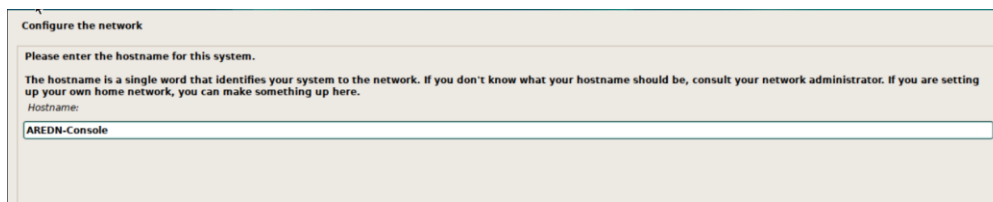


Leave domain name empty
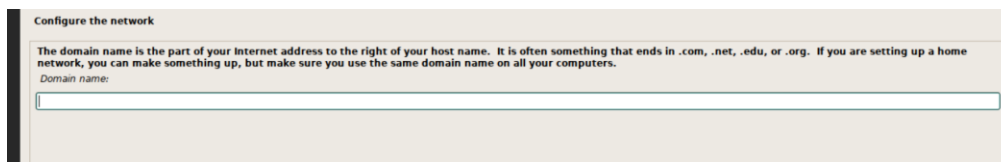


Leave root password empty
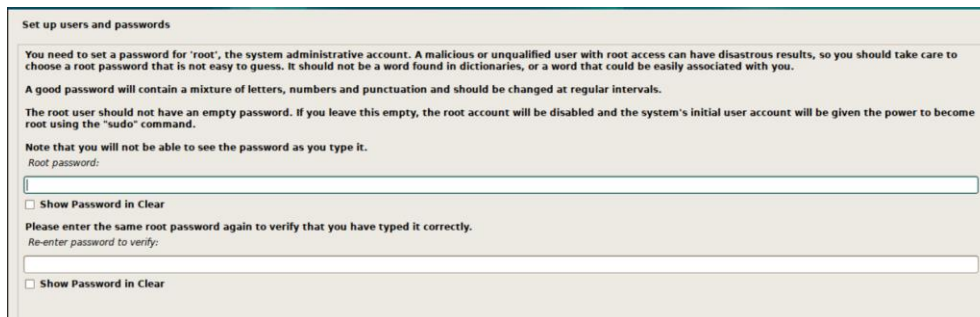


Enter the full name for the new user
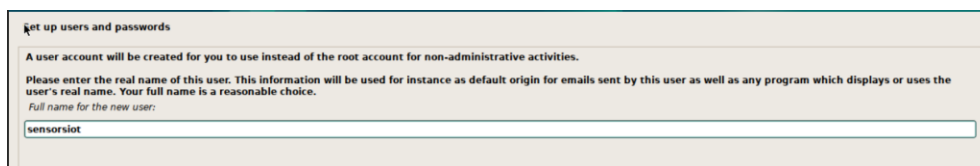


Enter the username for the new user

**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:*

sensorsiot

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:
  SCSI3 (0,0,0) (sda)

The following partitions are going to be formatted:
  partition #1 of SCSI3 (0,0,0) (sda) as ext4
  partition #5 of SCSI3 (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 Caledonia
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 | 🖭 Memory | 4.00 GiB |
| ☁ Cloud-Init | 🖭 Processors | 2 (1 sockets, 2 cores) [host] |
| ⚙ Options | ▮ BIOS | Default (SeaBIOS) |
| 📋 Task History | 🖵 Display | Default |
| 👁 Monitor | ⚙ Machine | Default (i440fx) |
| 🖺 Backup | ▤ SCSI Controller | VirtIO SCSI single |
| | ⦿ CD/DVD Drive (ide2) | local:iso/debian-12.0.0-amd64-netinst.iso,media=cdrom,size=738M |
| ↹ Replication | 🖴 Hard Disk (scsi0) | local-lvm:vm-105-disk-0,iothread=1,size=16G |
| ⟲ Snapshots | ⇄ Network Device (net0) | virtio=2E:72:31:08:AA:FA,bridge=vmbr1 |
| 🛡 Firewall ▸ | | |
| 🔓 Permissions | | |

Go to the Console and login
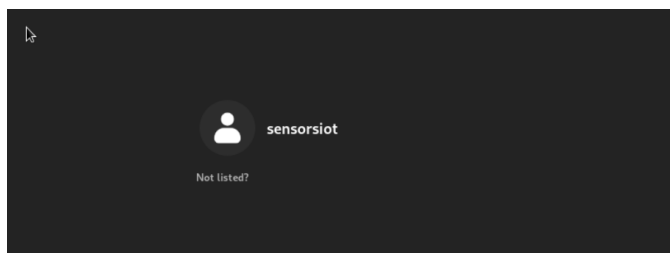


Start Firefox. On http://localnode.local.mesh you should see your AREDN server on the same VLAN because your Management Console is connected via the vmbr0/10 interface.

# Configure the AREDN Tunnel Server

Because our Management Console VM is connected to our AREDN VM via vmbr0/VLAN10 it should get an IP.
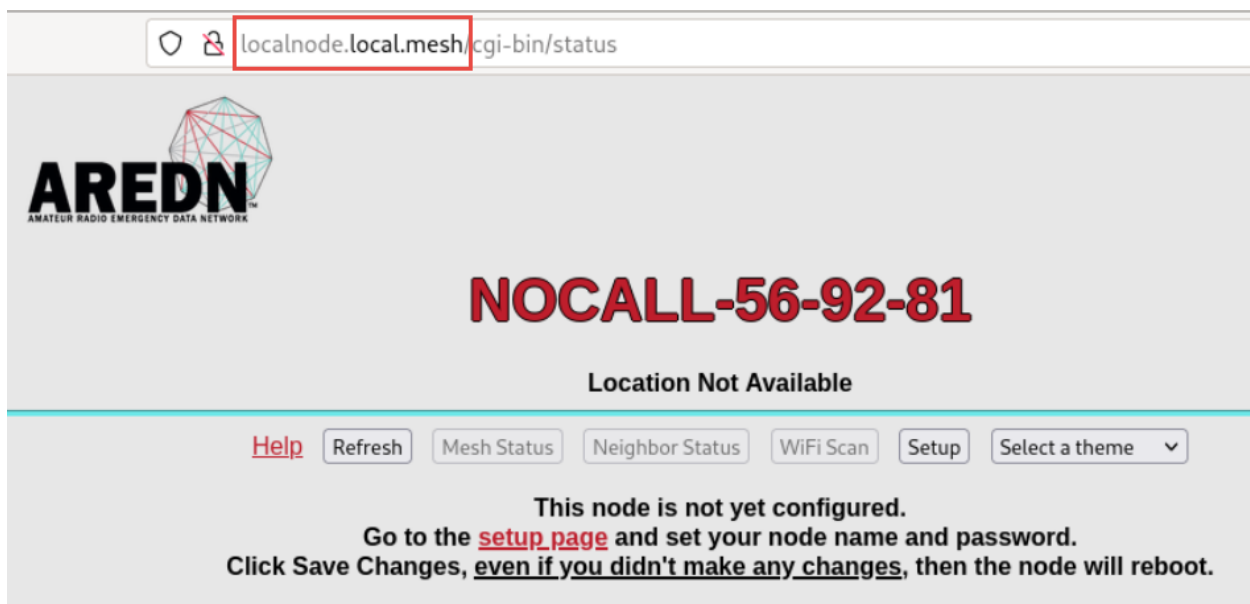


To check the connection, you can ping the AREDN VM:

```
ping localnode.local.mesh
```

## Initial setup of the AREDN router

Open the browser and call localnode.local.mesh



Press setup (password: hsmm)
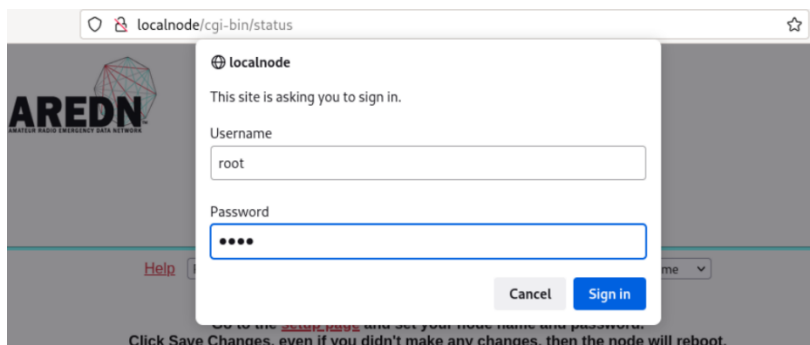
Give it a name and a password, hit "Save changes" and "reboot"



After reboot, your AREDN VM should have an 10.x.x.x address

If the Management Console does not connect to the AREDN VM, it still has its old address.

So type these two commands to get a new address from the AREDN VM:

```
sudo dhclient -r
sudo dhclient
```

From now on, you can manage your AREDN node from the Management Console



## Connection to the configured Tunnel Server (incl. ssh)

Connect again to your AREDN server (unfortunately, Proxmox does not allow copy-paste):

Press yes, and enter the password **hsmm**

If you get a "man in the middle" warning, key in the suggested command:



This is the correct answer:



Now you can try to ssh into your server as before

## Network mapping inside the AREDN VM

In the end we would like the following mapping:

| | Network Device (net0) | virtio=F2:E2:A4:3F:22:4A,bridge=vmbr0,tag=10 | eth0 | LAN port (ports 2-4 on hap) |
|---|---|---|---|---|
| ⇄ | Network Device (net1) | virtio=CE:89:6D:54:3A:AC,bridge=vmbr0 | eth1 | LAN port (port 1 on hap) |
| ⇄ | Network Device (net2) | virtio=DE:D8:C2:12:53:D6,bridge=vmbr0,tag=3 | eth2 | LAN port (port 5 on hap) |

The mapping of the nets has to be done now in the terminal of the Management Console.

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 LAN 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.

The WAN port has to be connected to the internet. Vmbr0 is connected to the RJ45 connector of your server. 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 '10.60.118.4'
        option netmask '255.0.0.0'
```

All networks have to 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 browser and start to customize your server.

Give it the name: Callsign-VM-TUNNELSERVER (if not done before).

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.



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



# Backup of the VM
Backup machine to the local directory
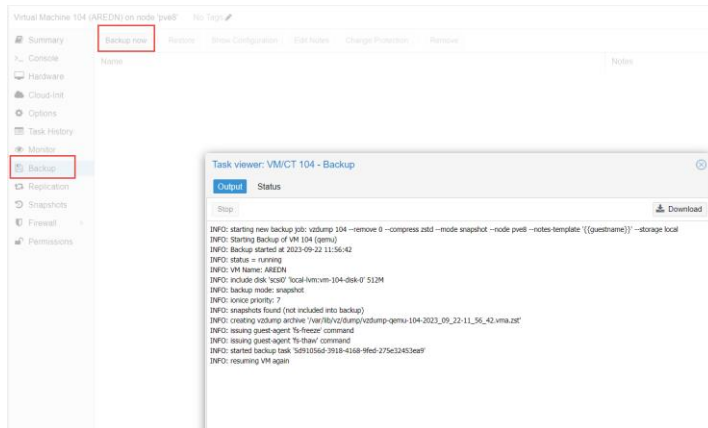
You find this directory
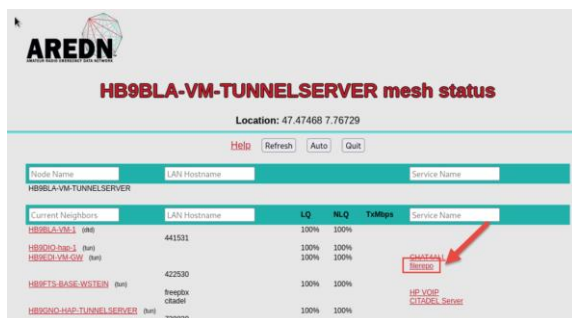
```
cd /var/lib/vz/dump/
```

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

## Install QUEMU Agent

This step is needed to control (e.g. shut down) the AREDN VM from Proxmox

You have to be connected to the SwissDigitalNet for this task

In your Management Console, you go to mesh status and select HB9EDI's filerepo:



And copy this link (right mouse click):
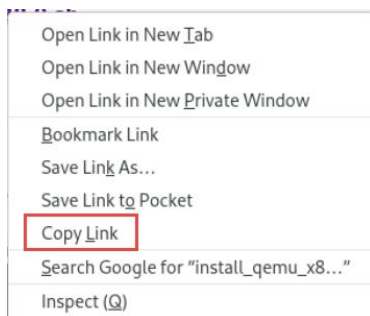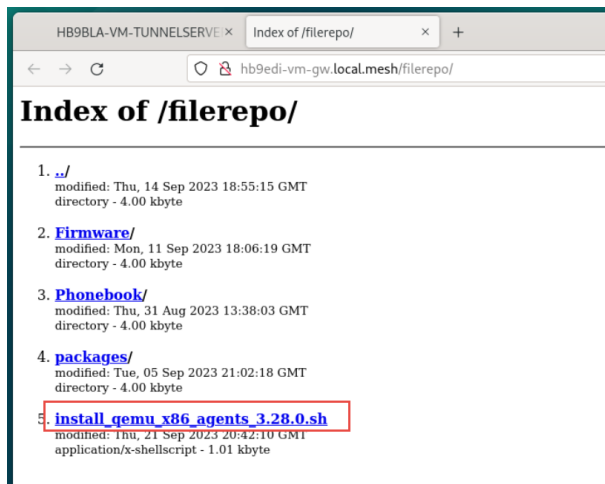
Now you paste the link into your terminal and add the yellow command

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

Finally, you enable Guest Agent and reboot the machine



Now your Tunnel Server can be controlled by Proxmox.

# AREDN Virtual Machine as a Telephone Server

## Overview
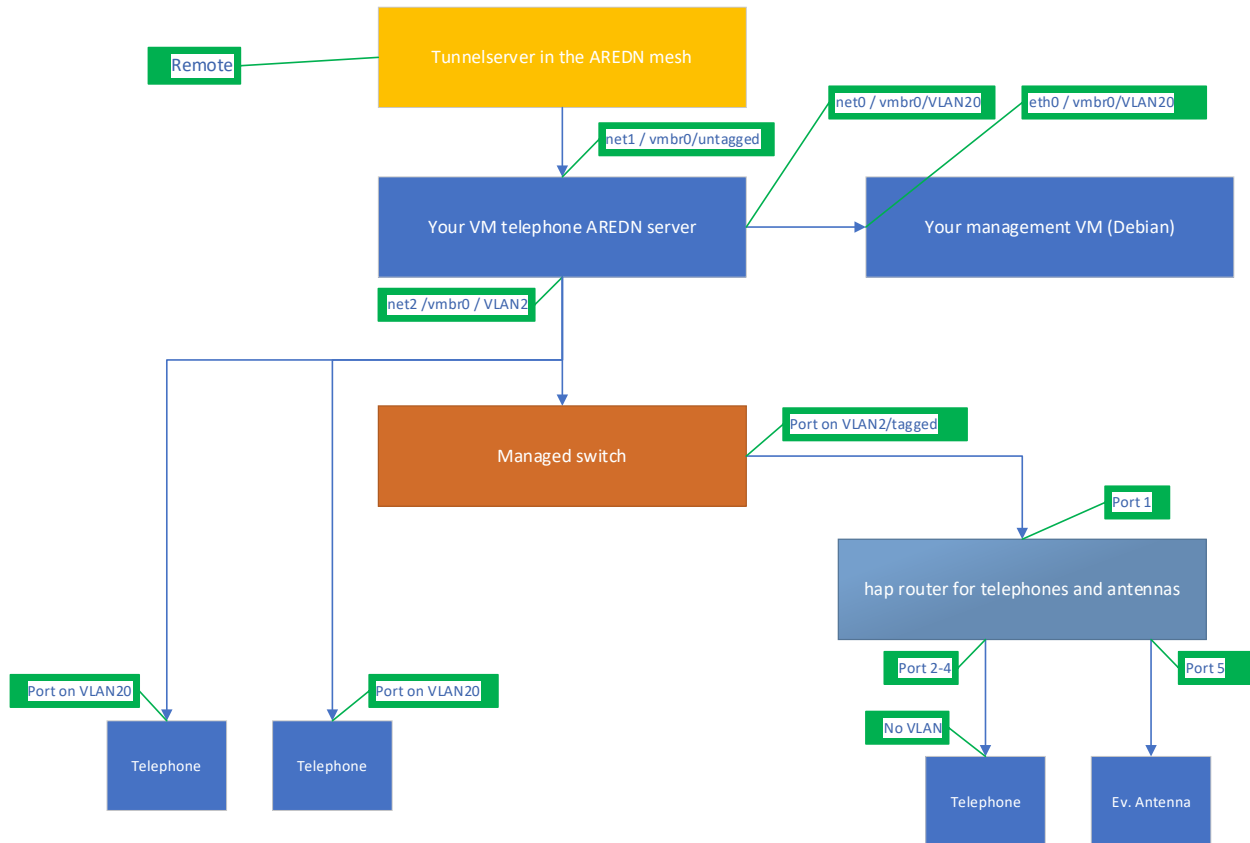


## Setup

We create 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.

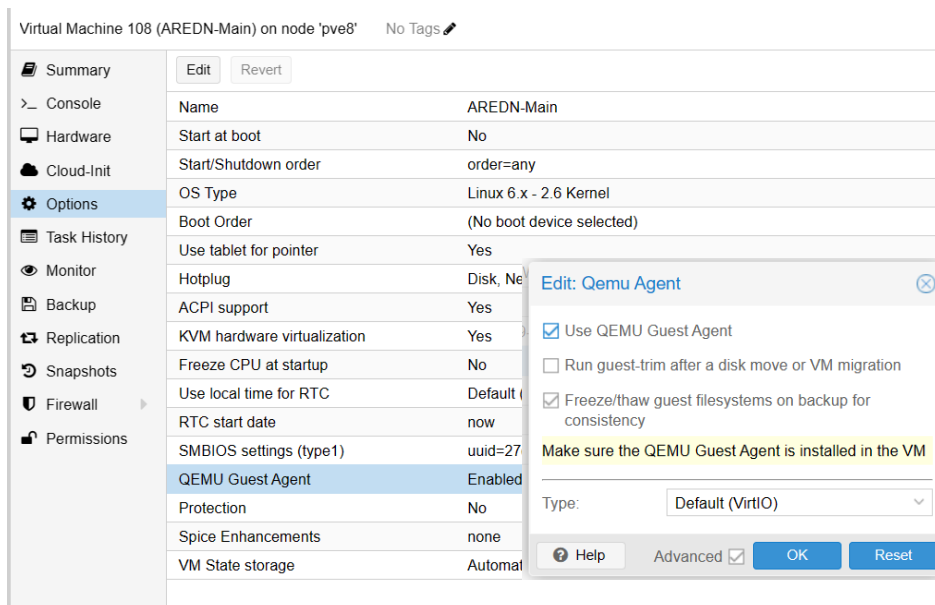Do not copy the VM of the Tunnel Server.

The basis setup has to be done the same way as for the Tunnel Server. The main difference is that we chose VLAN10 as the management connection:

| | | |
|---|---|---|
| ⇄ Network Device (net0) | virtio=AA:88:4A:2F:F5:D1,bridge=vmbr0,tag=20 | |
| ⇄ Network Device (net1) | virtio=0A:DC:B3:77:C5:08,bridge=vmbr0 | |
| ⇄ Network Device (net2) | virtio=3A:55:E2:13:D0:C1,bridge=vmbr0,tag=2 | |

And we have to change the network of the Management Console, too:

| | | |
|---|---|---|
| ▦ Memory | 2.00 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,iothread=1,size=16G | |
| ⇄ Network Device (net0) | virtio=2E:72:31:08:AA:FA,bridge=vmbr0,tag=20 | |

Do not assign the same VLAN to two AREDN management connections (you will get two concurrent DHCP servers)!

Now we should be able to manage the Telephone Server from the Management Console.

Maybe you have to reassign a new IP to the Management Console:

```
sudo dhclient -r
sudo dhclient
```

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 20, we must change the VLAN of the phone, too. We login and go to Network→ Advanced and enable VLAN 20.
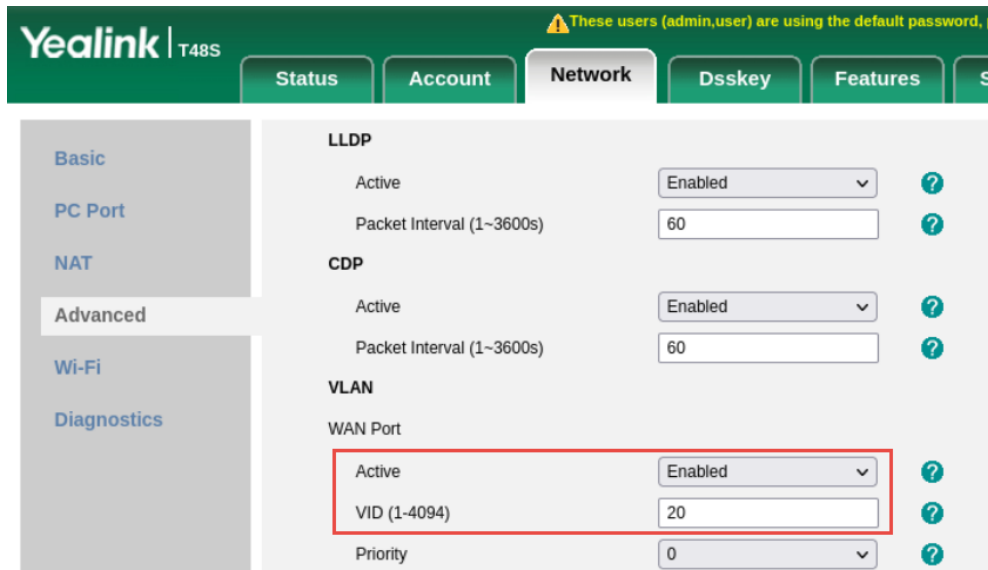


Now your phone should get a 10.xx.xx.xx address (instead of a 192.168.xxx.xxx) and you can install the phonebook and the SIP server as in every hap router and make the first test call.

The Tunnel Server VM and the telephone VM should be connected by a DtD link. You see this in the neighbour status:

### HB9BLA-VM-1 neighbor status

Location: 47.47469 7.76729

Help  Refresh  Quit

| Neighbor | Link | SNR | Distance | Quality | Status ⑦ |
|----------|------|-----|----------|---------|----------|
| hb9bla-vm-tunnelserver | DtD | - | 0.0 miles | 100% | active |

Be aware that you can only manage your VMs (other than the Tunnel Server) and phones from the Management Console. They are not connected to your home network.

You can shut the Management Console VM down if you do not need it if you do not have too much resources on your server.

## Final tip:

You can connect your Management Console to whatever AREDN VM you want (select VLAN 10 for the Tunnel and VLAN20 for the Telephone Server). From there, you can reach all your devices without changing the VLAN of the Management Console .