V1.0.0

THIRTYSOMETHING

DIY-NAS

About my DIY-NAS

ThirtySomething

15.04.2022

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Change history

Version	Date	Section	Description	Name
1.0.0	02.04.2022	–	• Start with description	ThirtySomething

Table 1: Change history

1 Initial situation

In 2010 I bought my first NAS. It was a Synology DS411slim. The device is running up to now. For a few years now, it is only supplied with security updates. That is quite remarkable for the fact that it has already 12 years on the hump.

Now I've run out of space - I have 4*2TB running there in RAID 10, which gives about 3.7TB. In addition, the performance is, well, not quite up to date.

2 Search for alternatives

2.1 Use a mini PC in front of the NAS

Realizing this situation I was searching for alternatives. The first idea was to use a mini PC in front of the NAS. This failed for some reasons.

- Using the NAS directly for Docker volumes
- The CPU of the mini PC does not support Intel VT
- The network as bottleneck for Docker containers

2.2 Hardware alternatives

Then I decided to by a new NAS system. But which kind of NAS will it be? I've spent a long time to search the internet for possible soultions. There have been surpisingly four variants:

- Commercial NAS system
- Commercial NAS with custom OS
- DIY NAS system on PC base
- DIY NAS system with separated storage case and mini PC

I didn't know about the possibility to pimp a TerraMaster NAS with a different OS. This is also possible for Western Digital NAS as described here and here. Also the variant with a mini PC and separated storage case was interesting. But at least the DIY NAS system on PC base won the comparison. The decision was to buy some components and build it by myself.

2.3 The planned hardware

When comparing the different hardware solutions, I also made a comparison between an Intel and an AMD based NAS. The AMD variant won the price/power chapter, so I decided to buy:

- 32GB G.Skill RipJaws V black DDR4-3200 DIMM Dual Kit
- 250GB Samsung 970 Evo Plus M.2 2280
- 400 Watt be quiet! Pure Power 11 CM Modular 80+ Gold
- Black Fractal Design Node 304 cube without power supply
- 4x 4000GB WD Red Plus WD40EFZX 128MB 3.5”
- ASRock Fatal1ty B450 Gaming-ITX/AC AMD B450
- AMD Athlon 3000G with Radeon Vega Graphics 3.5GHz
- Noctua NH-L9a-AM4 topblow cooler

2.4 The bought hardware

Figure 1: John Lennon

This means that the chip shortage on the market and other world events make it difficult to realize these plans. For example, motherboards with

AM4 socket and Mini-ITX format are really hard to get. So I have revised my decision for these components:

- 32GB G.Skill RipJaws V black DDR4-3200 DIMM Dual Kit
- 250GB Samsung 970 Evo Plus M.2 2280
- 400 Watt be quiet! Pure Power 11 CM Modular 80+ Gold
- Black Fractal Design Node 304 cube without power supply
- 4x 4000GB WD Red Plus WD40EFZX 128MB 3.5”
- ASRock H610M-ITX/AC mITX Intel H610 DDR4 S1700
- Intel Core I3-12100 tray
- Noctua NH-L9i-17xx topblow cooler

The difference is that the CPU is a latest generation Intel I3 with socket 1700. The accompanying motherboard is brand new. This has some consequences: OMV 5 does not support the network chip of the motherboard. So I decided to run the OMV 6 beta on my DIY NAS. I also gave TrueNAS a try – it looks much more professional than OMV, but it’s also a little bit more complicated to understand and to configure. And beside this it has no native support of Docker.

3 The hardware build

Although I build up my last PC more than 25 years ago assembling the hardware was a breeze. The only surprise was the mounting position of the power supply. As I understand how to do this everything was fine.

4 The software installation

4.1 The operating system

The basic installation of OMV works without any problems. This is known from debian. Additional Volker Theile, the founder of the OMV project, and his team have done a very good job. Thank you guys!

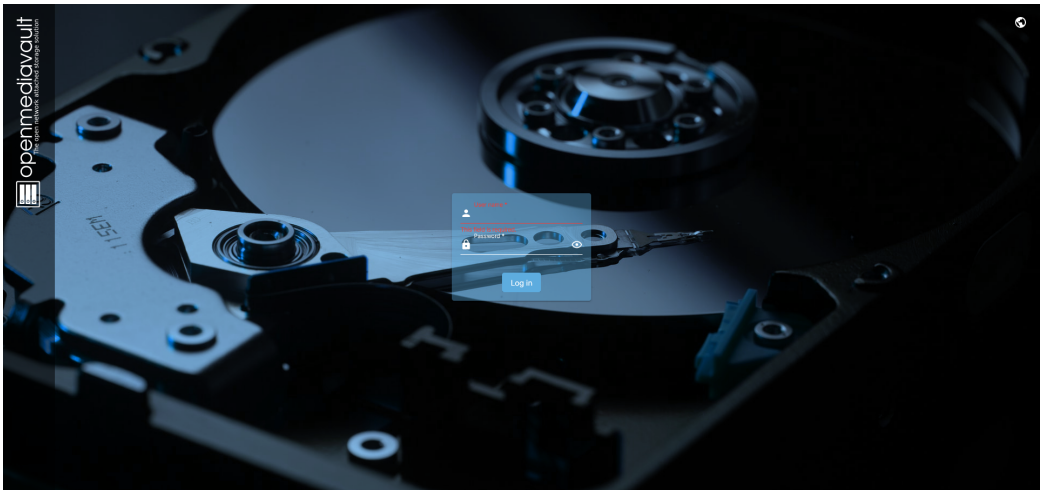

Figure 2: The OMV login page

4.2 The disks

All attached disks are working. The system disk is a NVME SSD with a 250 GB capacity. All others are 4 TB WD RED disks.

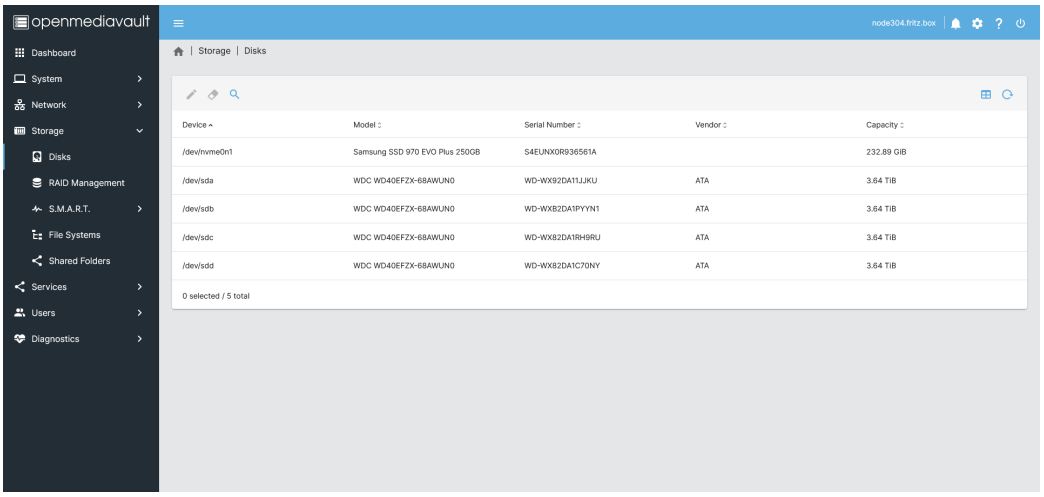

Figure 3: The OMV disks

4.3 The RAID storage

Configuring the RAID was also less problematic. But there is an important point: As long as the RAID system is created, do not use the RAID! During the RAID build I was playing around with OMV plugins to see the

diskstats – and damaged the RAID build. After a reboot the system hangs on the filesystem check. I was shocked - also about the large amount of blocks the fsck found and tried to repair. It took a while to understand what happens. Then I've startet from scratch and everything was okay. The creation of the file system at the end went without problems. A filesystem check found nothing to do.

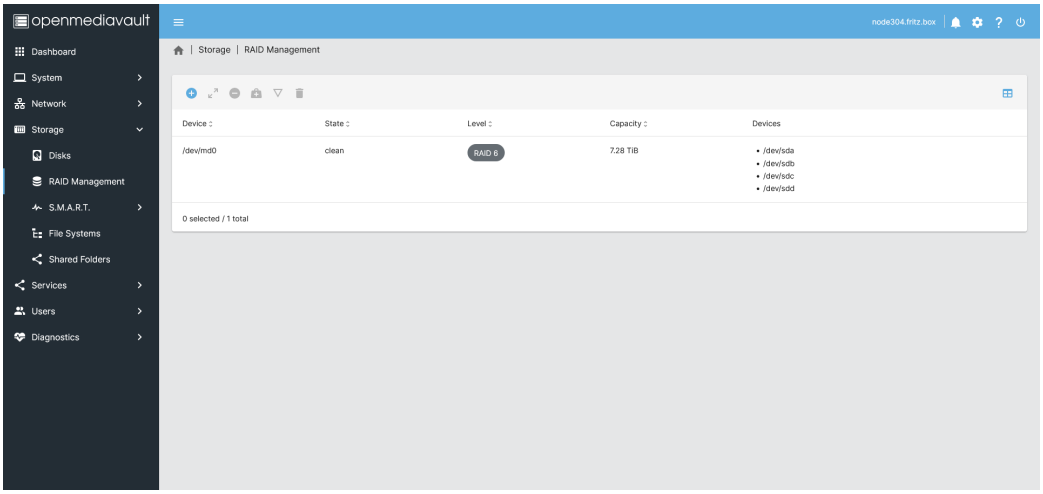

Figure 4: The OMV RAID

4.4 The file system

This was a simple step – just create a filesystem on the previously created RAID volume.

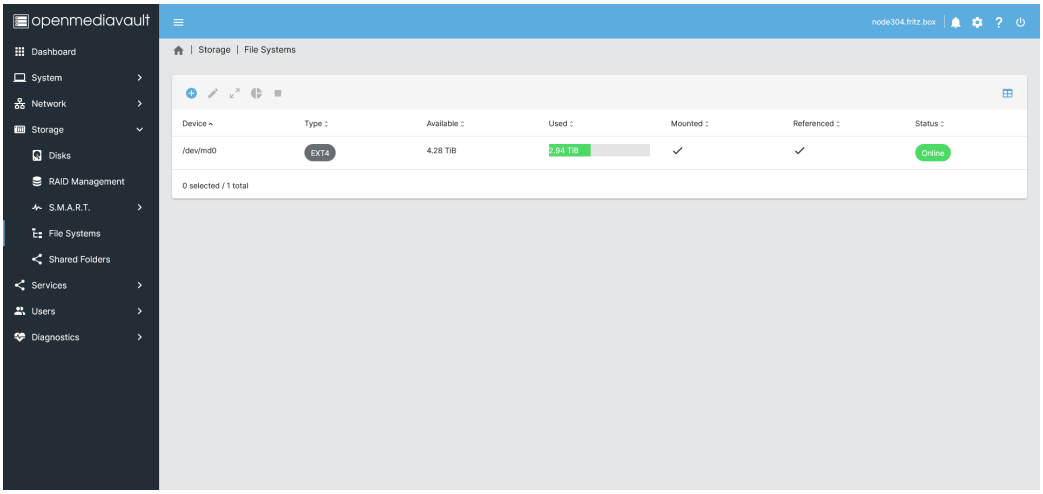

Figure 5: The OMV filesystem on the RAID

4.5 Shared folders

Some common folders should be defined before anything else is done:

- The folder `docker` for the use of Docker.
- The folder `homes` as base folder for the users home directories.
- The folder `music` for the miniDLNA plugin.
- The folder `quarantine` for the use of ClamAV.
- The folder `video` also for the miniDLNA plugin.

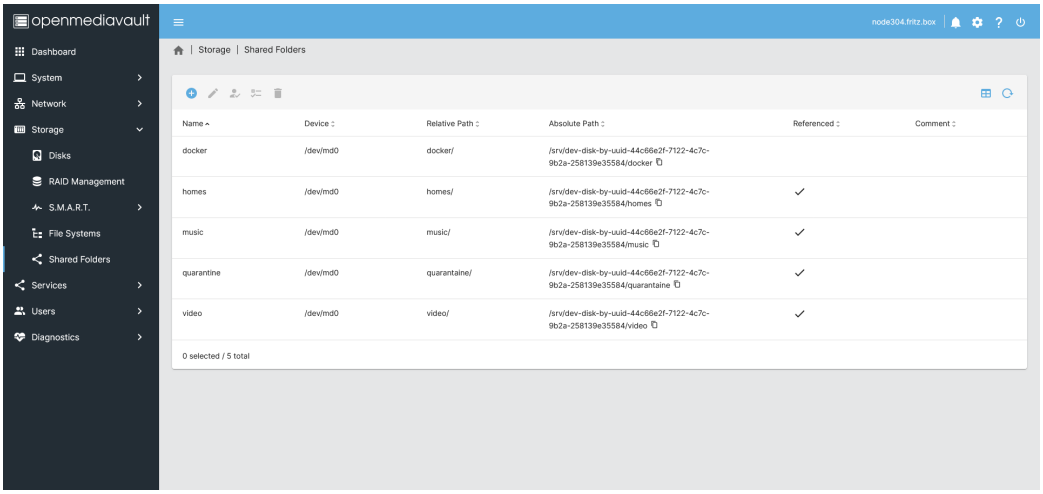

Figure 6: The OMV shared folders

This „shared folders“ are defined as container to be used inside of OMV. To make them accessible from the network you have to enable services for them.

4.6 Users

In the settings the option `User home directory` is enabled and points to the previously created (homes) folder. Then I created the users.

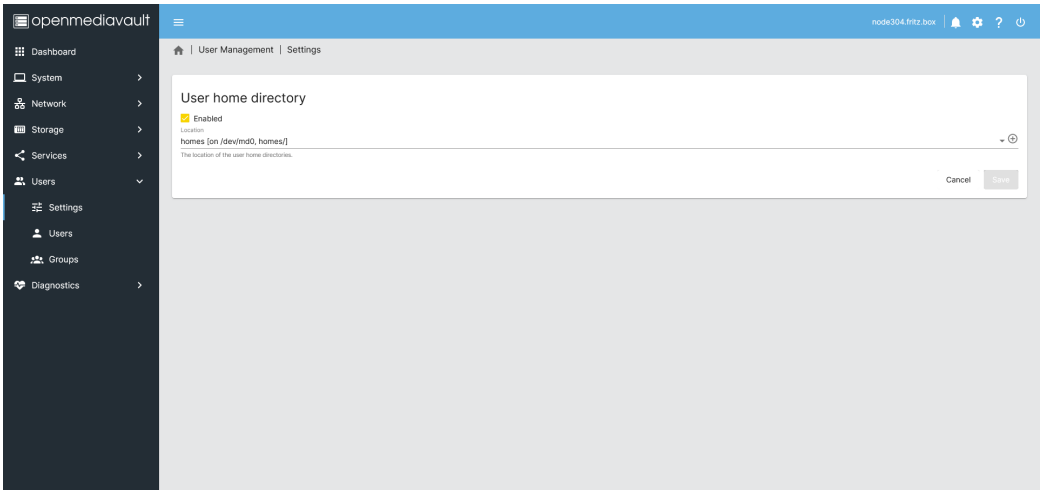

Figure 7: The OMV users home directory

4.7 CIFS shares

Simple - enable the `SMB/CIFS` service, enable the `home directories` and then create shares for the previously defined `shared folders`. Allow read/write access for the administrator of the shares (me), the others got read access to them.

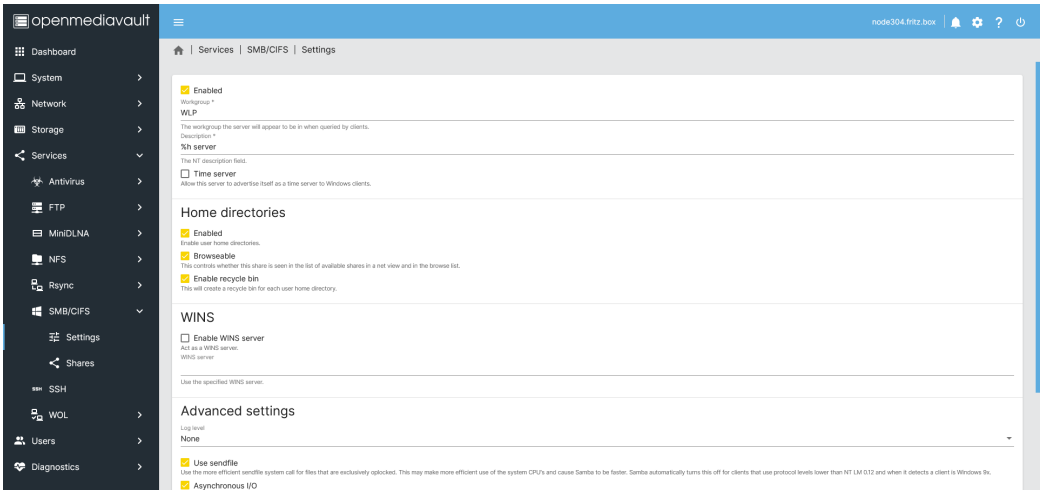

Figure 8: The OMV CIFS settings

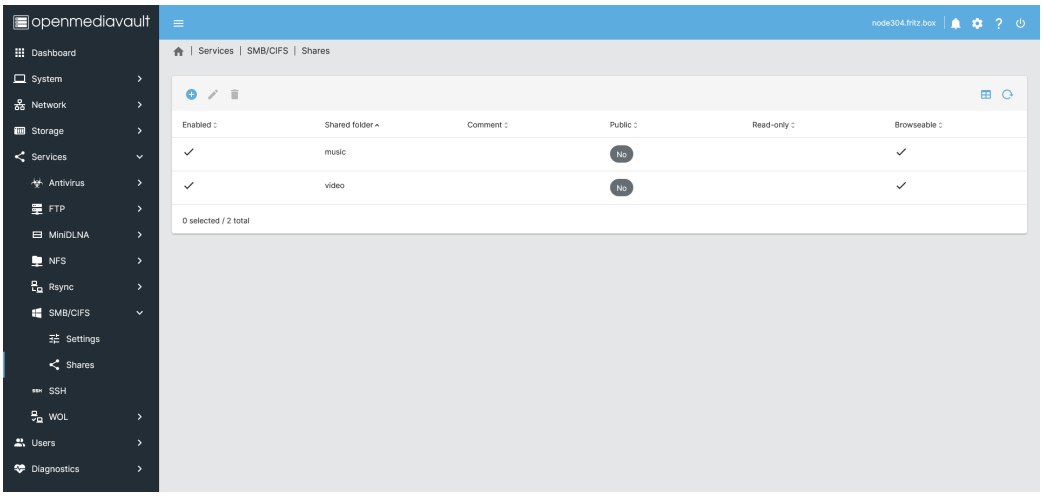

Figure 9: The OMV CIFS shares

As you can see there is actualy no public access to this shares. This means that only priviledged users can access them.

4.8 Tuning

4.8.1 SMB/CIFS

Transfering data from the old NAS to the new one takes a lot of time. To speed up the process I searched for some tuning and found this here:

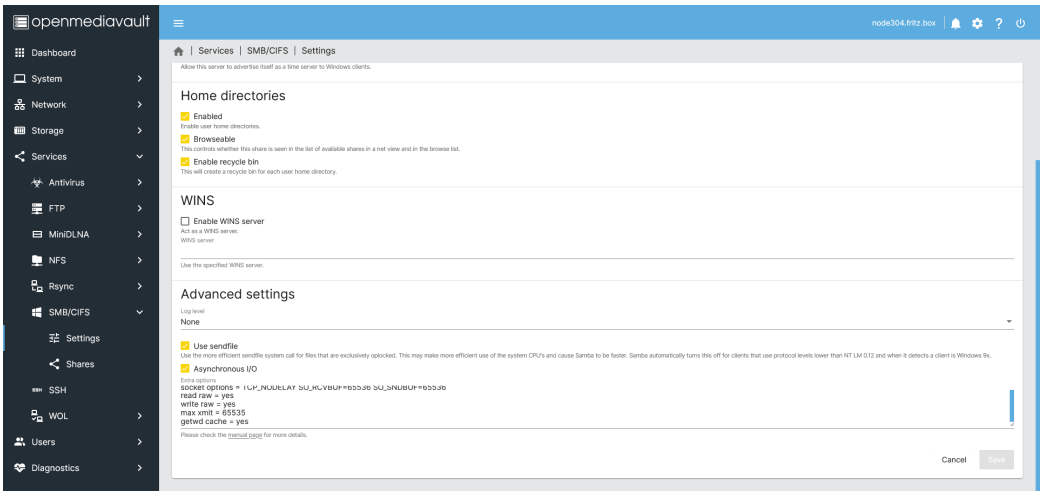

Figure 10: The OMV advanced CIFS settings

5 OMV plugins

5.1 ClamAV

To protect the data I want to use an antivirus program. As open source solution there is ClamAV available – and also as plugin for OMV.

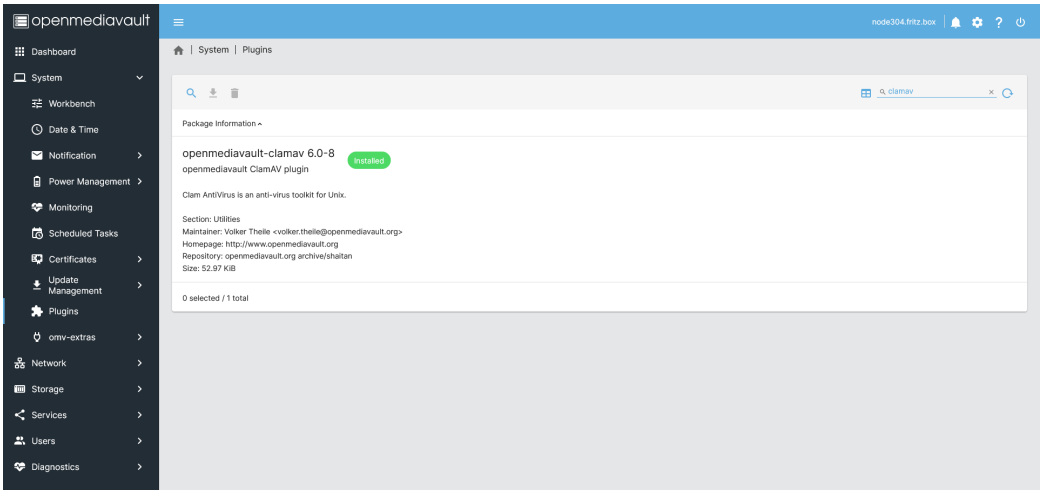

Figure 11: The OMV ClamAV plugin

In the setup we use the previously defined quarantine folder.

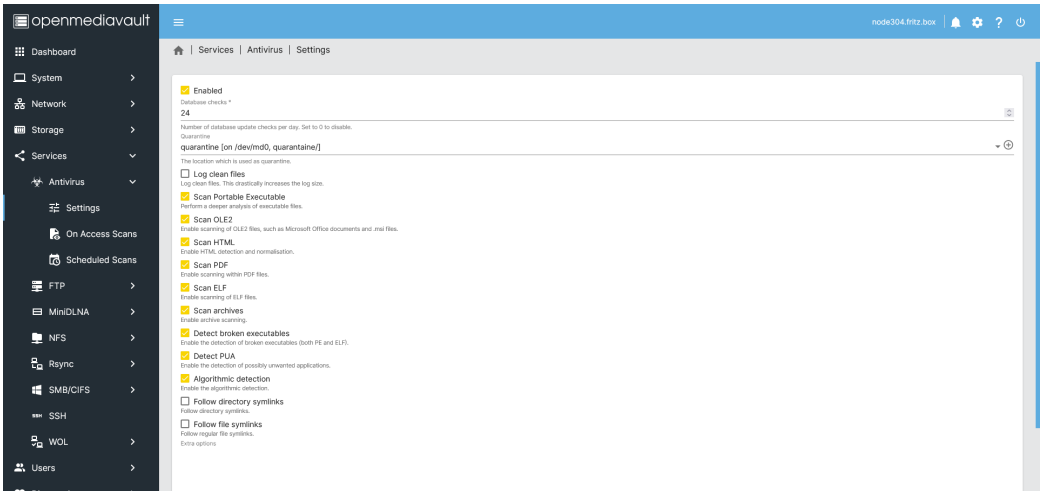

Figure 12: The antivirus settings

I enabled a scan on access for specific folders.

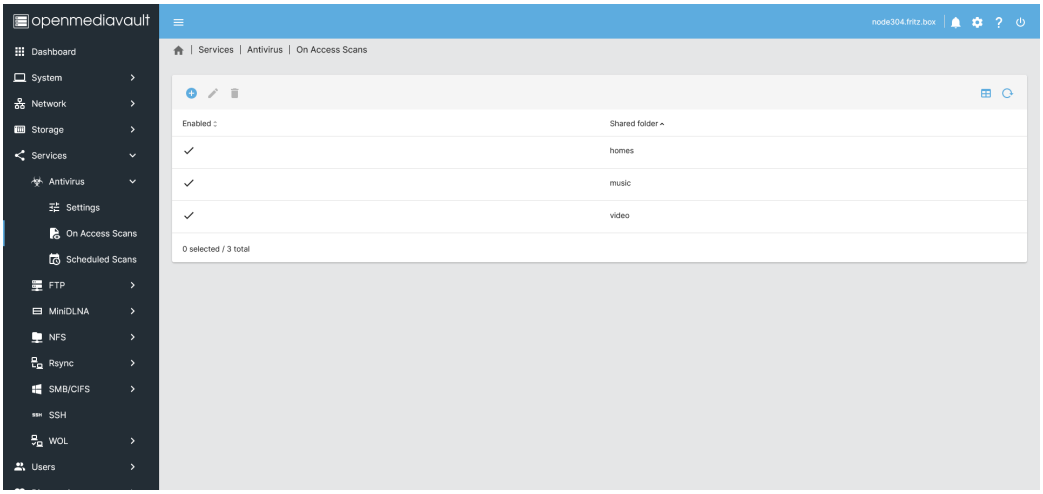

Figure 13: The antivirus on access scan

Also I've enabled a scheduled scan for these folders, too.

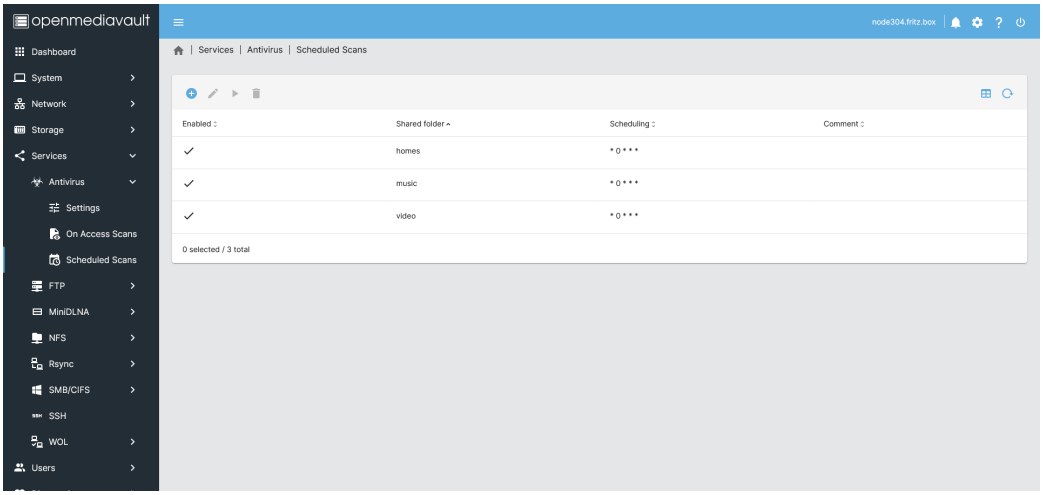

Figure 14: The antivirus scheduled scan

Maybe somebody will claim that all scheduled scans run on the same time. Yes – this was setup to check the power of the CPU. The system load increases to a load of about 3 – that's fantastic from my point of view! This means that there are more than enough reserves. When I'm spreading the schedule I can lower the load.

Figure 15: The antivirus system load on scan

5.2 MiniDLNA

To stream music and videos from the NAS to the network I'm using the ReadyDLNA media server software. In OMV this is used with the oldname `MiniDLNA`.

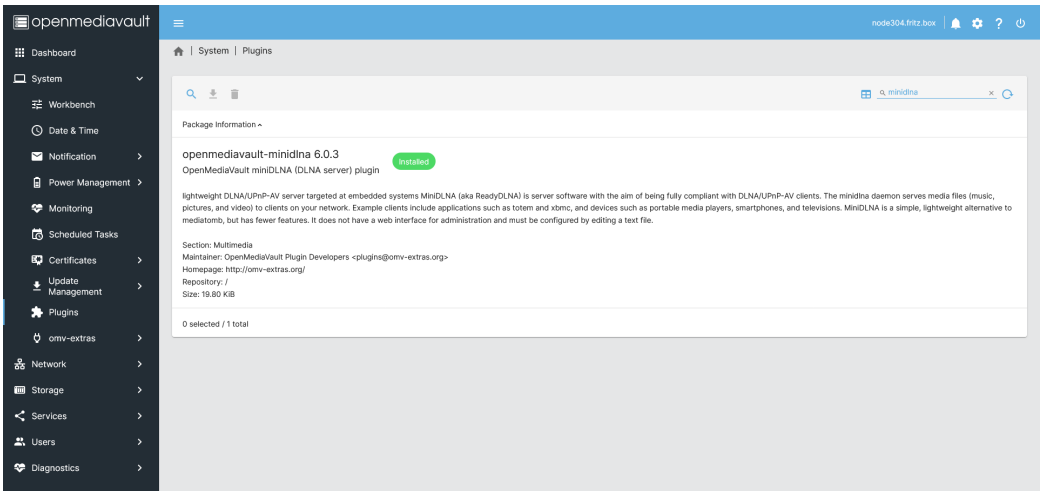

Figure 16: The MiniDLNA plugin

The basic setup is simple - I've checked the `Enable` box and that's it.

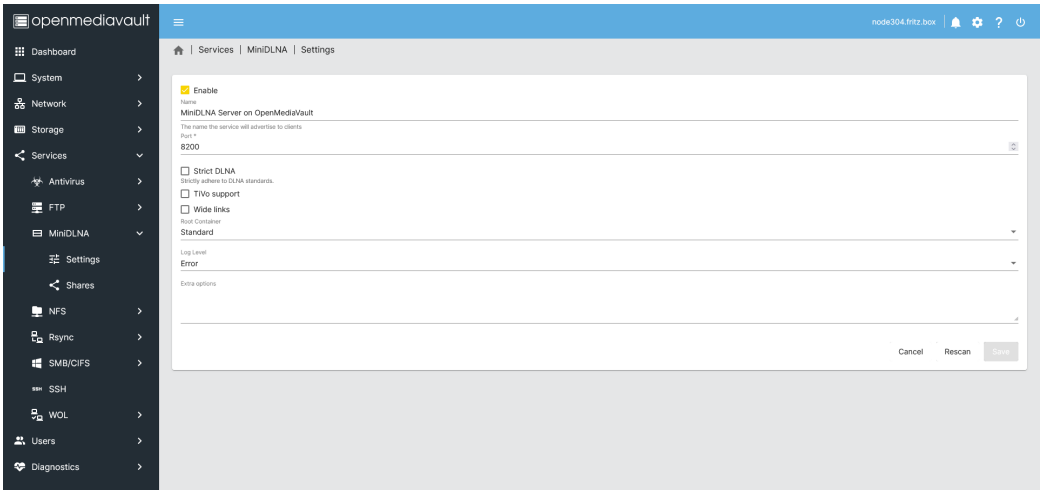

Figure 17: The MiniDLNA settings

Then I have to define the shares and the kind of content of the shares.

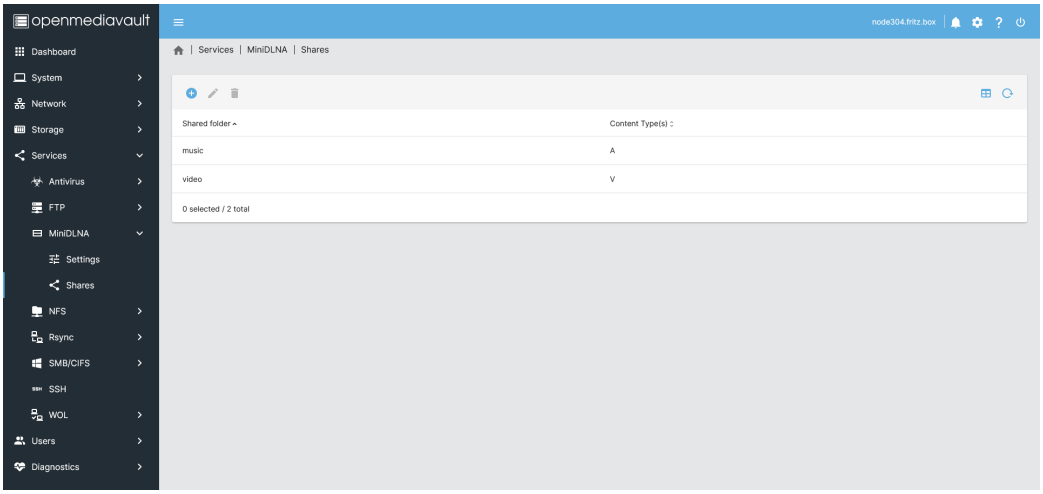

Figure 18: The MiniDLNA shares

5.3 OMV extras

The OMV extras plugin is not available in the plugin list. The way to go is described here. Login as user `root` using SSH and enter the following command:

```
sudo su -
wget -O - https://github.com/OpenMediaVault-Plugin-Developers/packages/raw/master/install | bash
```

Figure 19: The OMV extras installation

Using this plugin enables the Docker and Portainer installation to enhance the capabilities of the NAS.

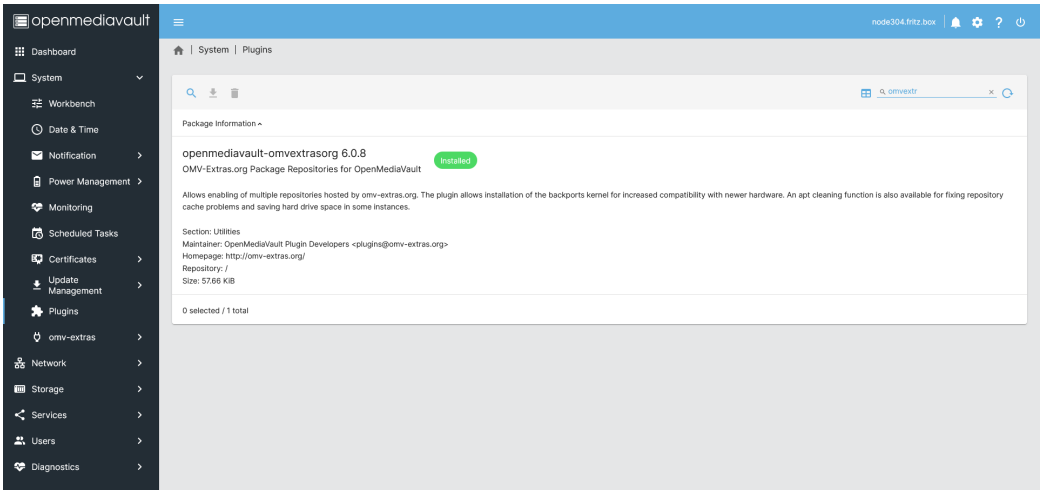

Figure 20: The OMV extras plugin

5.4 WOL

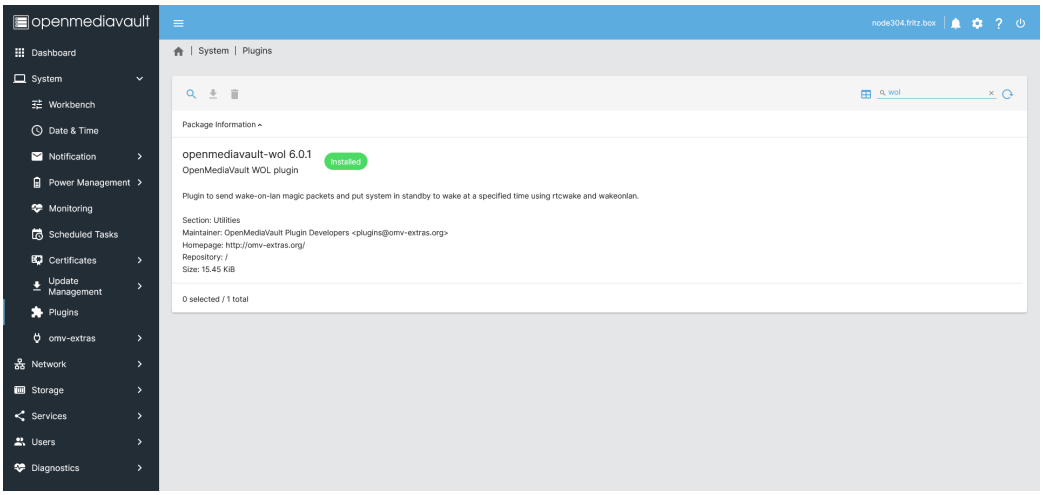

Figure 21: The OMV WOL plugin

6 Docker

With Docker I want to enhance the NAS with features which are not available out-of-the-box. Especially with services my previous NAS offers and which are not native available for OMV.

6.1 Docker installation

The default location of Docker is `/var/lib/docker` on the system disk. Allthough the system disk is a fast SSD, I want to install Docker on the slower RAID storage. So I have to change the path of Docker storage.

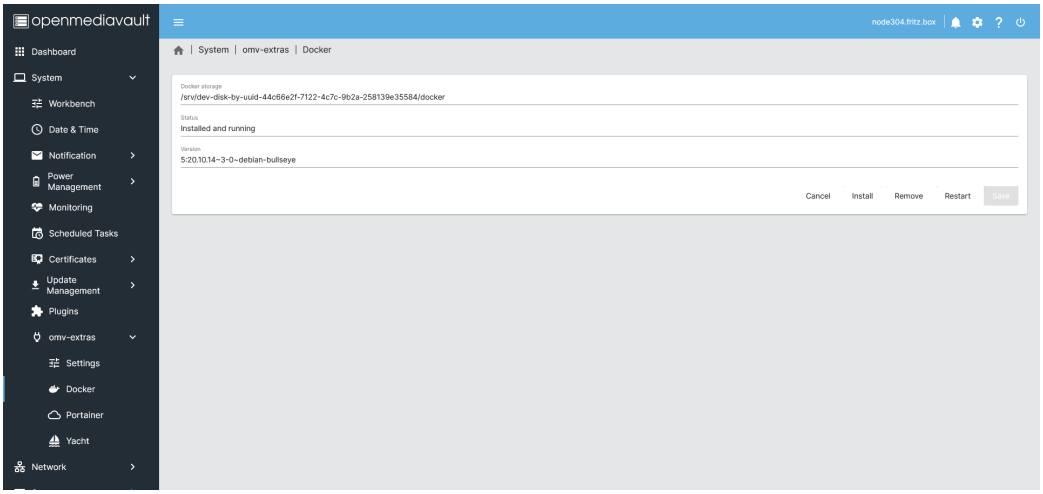

Figure 22: The Docker setup

In case Docker is already installed, see here how to move the Docker storage to another location.

6.2 Portainer

To have more comfort in dealing with Docker we install also Portainer from the OMV extras.

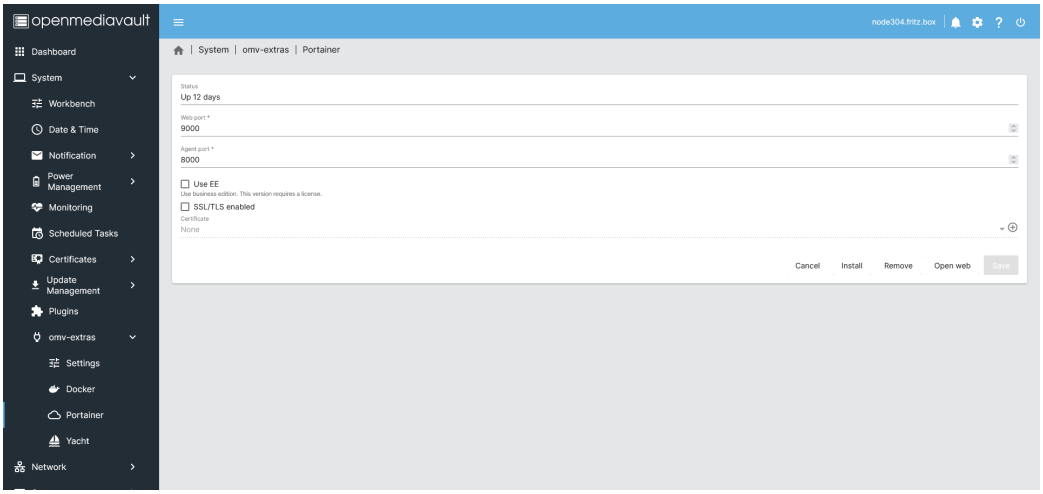

Figure 23: The Portainer setup

After installation Portainer is up and running.

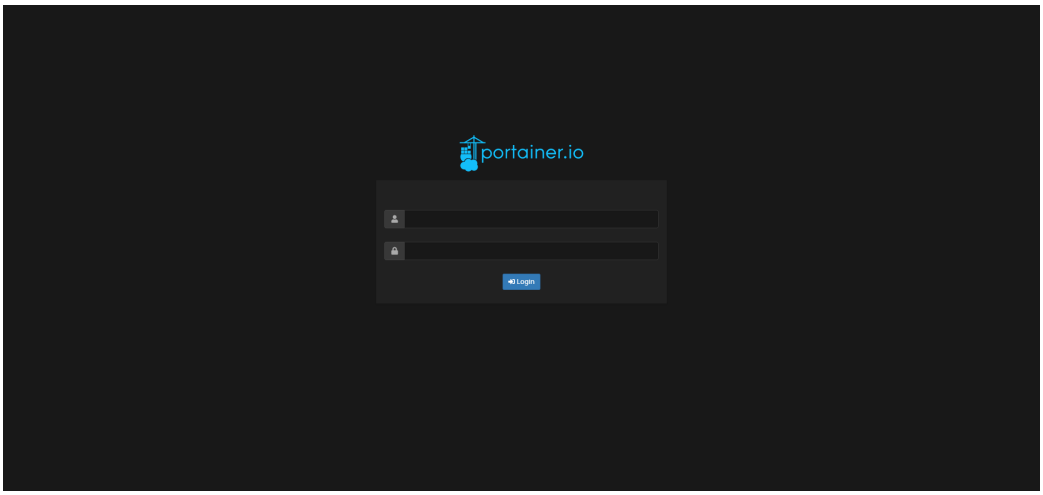

Figure 24: The Portainer login

6.3 SCM-Manager

SCM-Manager provides a comfortable user interface for git, Mercurial and Subversion. Up to now I use Subversion for version control. Some of my repositories are private and I will never publish them to a public hoster like GitHub allthough they offer private repositories. All my other repositories are hosted on my NAS – the plan is to move them to git if possible – just to have them on a more modern version control system.

First of all we have to create a Docker volume for SCM-Manager. This is important for running the backup script.

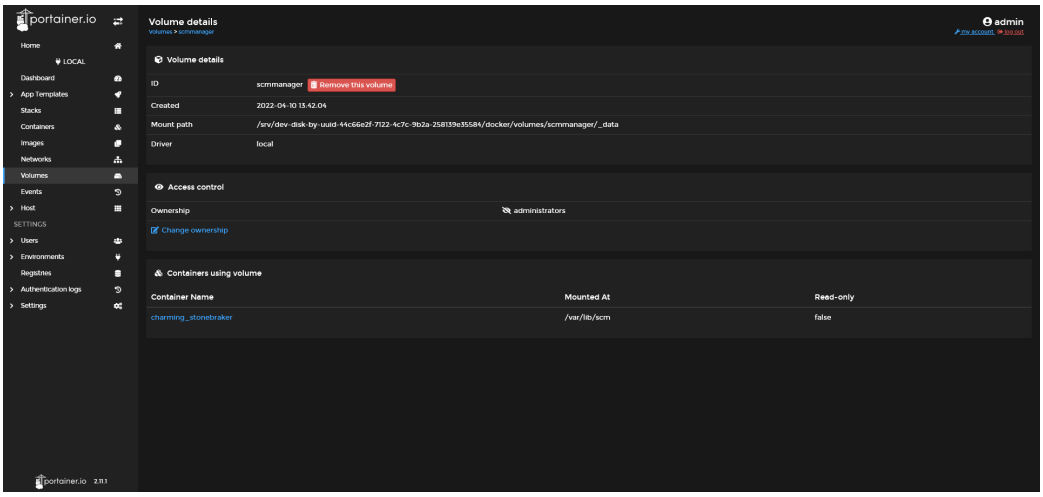

Figure 25: The docker volume scmmanager

Then we can setup the container:

- Mapping port `2222` to `2222` to enable the Subversion protocol
- Mapping port `8080` to `8080` to enable the http protocol
- Mapping of the SCM-Manager volume to `/var/lib/scm`

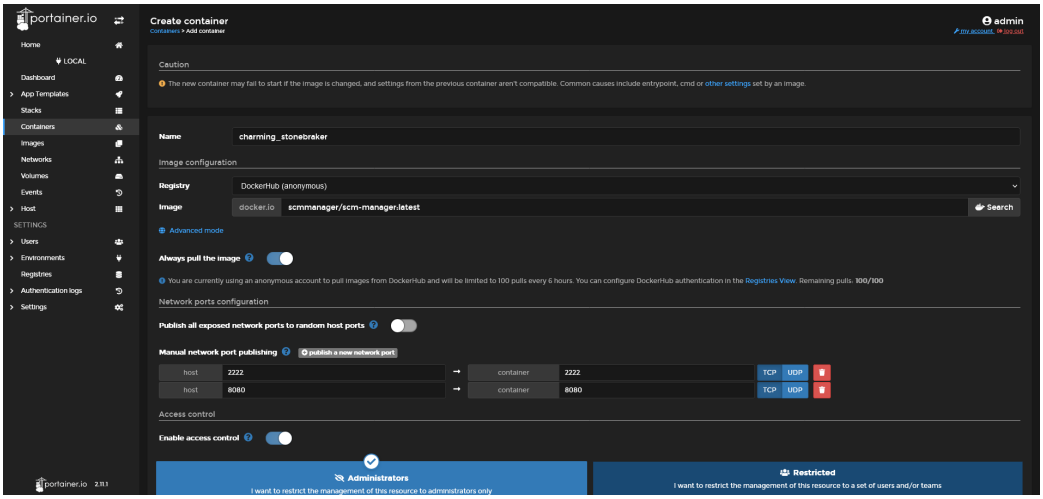

Figure 26: The docker container scmmanager setup 1

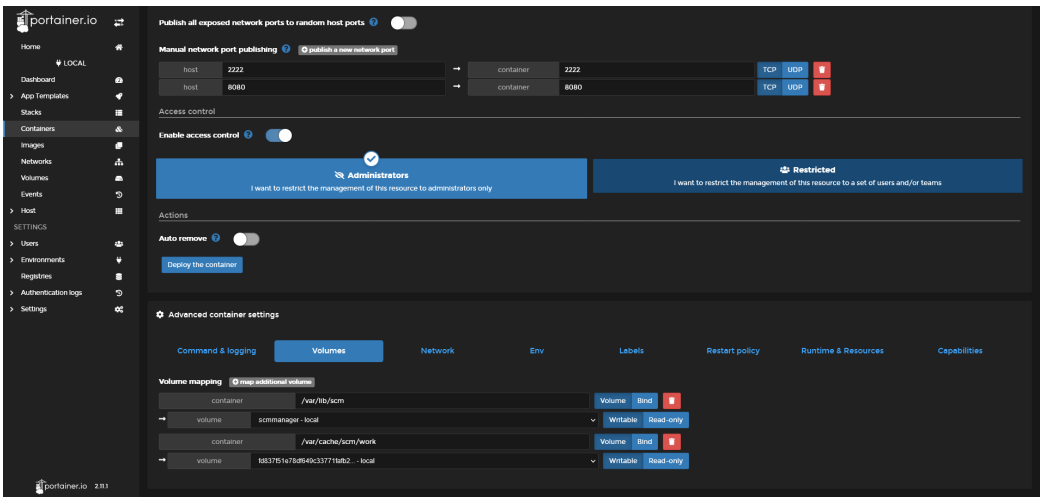

Figure 27: The docker container scmmanager setup 2

The startup of the container should work without any problems.

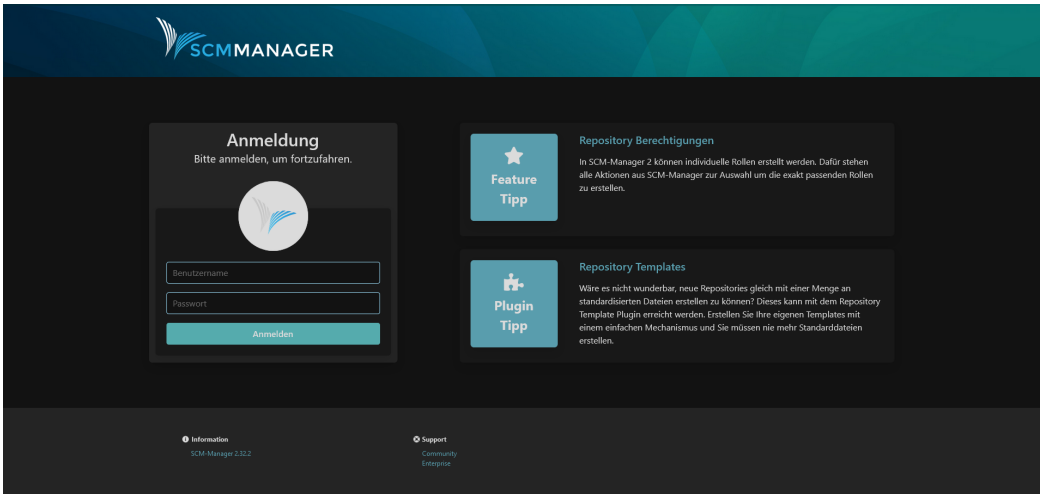

Figure 28: The SCM-Manager login

After importing my repositories, I've setup a backup job. For this I've updated my script svnExport.sh that it will work for SCM-Manager. Setting up a cronjob inside a Docker container is a pita. The previously created volume is required to dynamically export all existing Subversion repositories. The command will be something like this one:

```
/bin/bash /srv/<omv-raid>/<path-to-script>/svnExport.sh >>
/srv/<omv-raid>/<path-to-script>/svnExport.log 2>&1 &
```

Figure 29: Cron command for svnExport

The job is then setup in OMV scheduled tasks accessing the script. **NOTE:** The path to the SCM-Manager repositories needs to be set inside in the script.

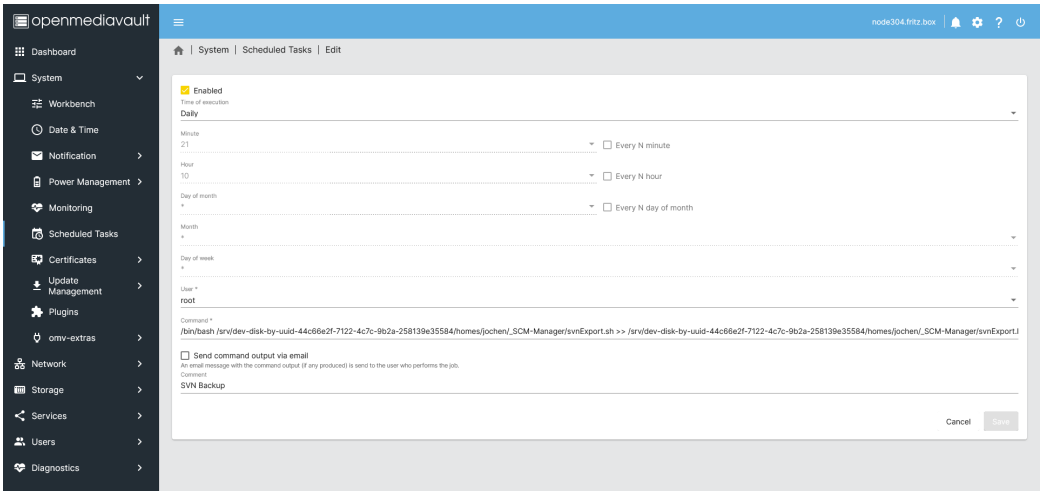

Figure 30: The SCM-Manager backup task

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