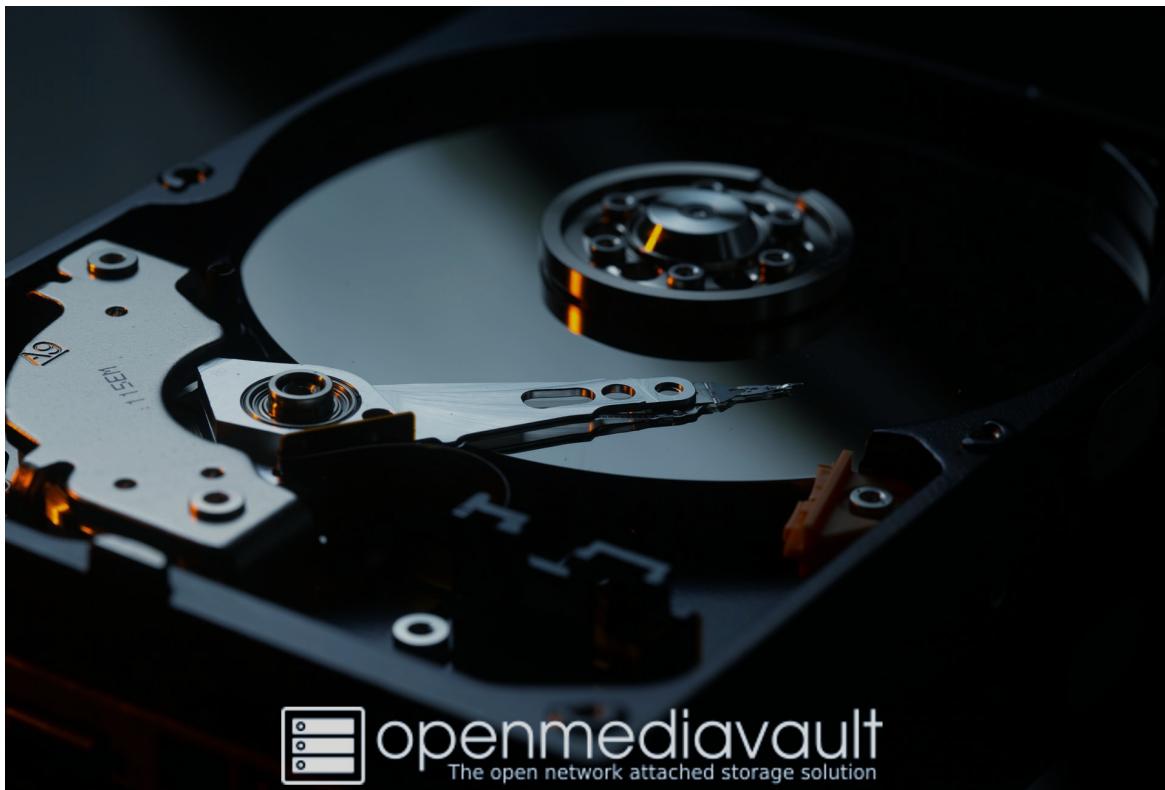


**This document is a first rough draft that will not be updated.  
See the updated -> [wiki document](#) for the latest information.**

# **Getting Started with**



## **Openmediavault 6**

January 9th, 2021 – First Draft Rev 0.1

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## Version History:

January 9th, 2021 – Rev 0.1 (First Draft for OMV6)

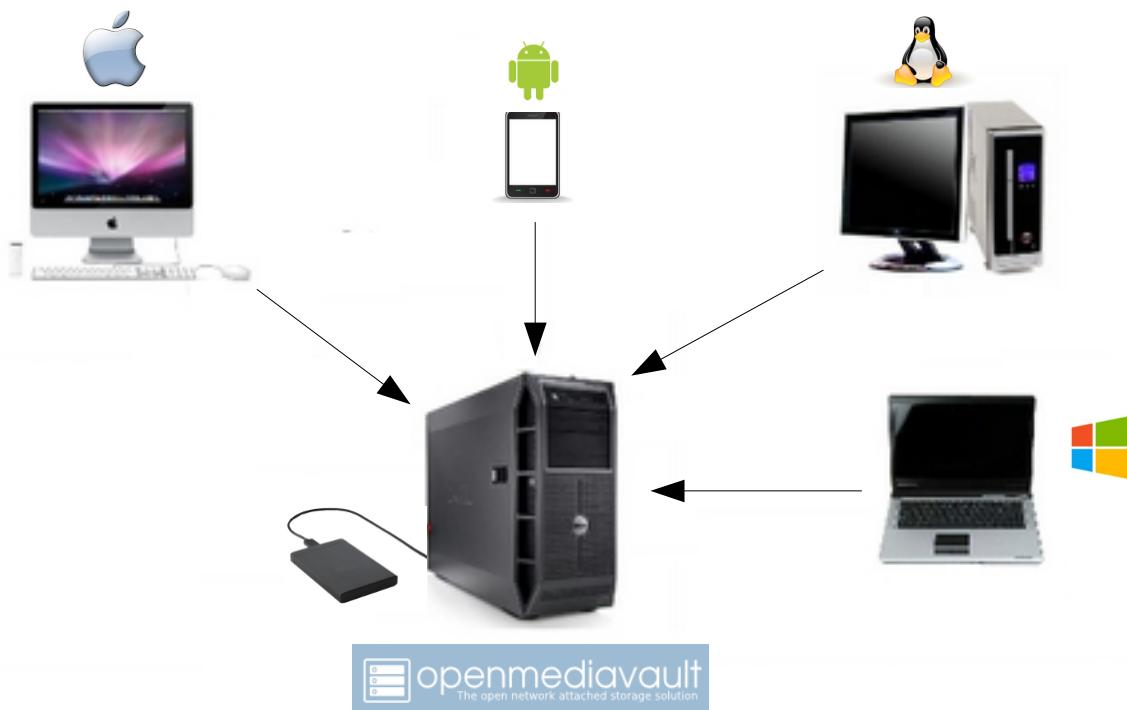
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# Introduction to Openmediavault

Openmediavault is a File Server / NAS system designed to work on most modern IBM compatible PC systems, to include typical amd64 or i386 PC's and select ARM devices. Openmediavault can be thought of as filling a role similar to Microsoft's Server Essentials, but extends far beyond the role of a basic File Server with additional functionality added VIA plugin's and Dockers. Openmediavault is designed to work with popular client operating systems and multiple filesystem types, utilizing proven data sharing techniques on small and medium sized Local Area Networks.

In meeting the needs of it's intended users, individuals and small-to-medium-sized businesses, Openmediavault is designed for flexibility.



## History

Openmediavault's history began with Volker Theile, who was the only active developer of the FreeNAS project by the end of 2009. Volker became interested in completely rewriting FreeNAS, for use on Linux. Initially, he named the rewritten package **coreNAS**. Shortly thereafter, Volker discarded the name **coreNAS** in favor of **openmediavault**. Openmediavault's initial release was on 17 October 2011. It's built upon very mature and proven software layers and is under constant development. Openmediavault relies on the Debian project and uses their system and repositories as a base. The project focus is on creating and maintaining a stable and extensible NAS system that is intuitive and easy to use.

## **Purpose**

The purpose of openmediavault is to provide a NAS system that is highly “extensible” with value added plugin’s and access to numerous Dockers that are desirable and beneficial to home users and small businesses at little to no cost.

One of the ambitions of the openmediavault project is to make advanced NAS technologies and features available to inexperienced users in an easy to use WEB GUI, thereby making it possible for people, without extensive knowledge of Linux, to gain easy access to advanced technologies.

## **Getting Involved**

If businesses and home users find openmediavault to be beneficial, please consider supporting the project with a modest donation. While openmediavault is free, donations to cover Web site costs, hardware for testing, and other unavoidable expenses are needed and very much appreciated.

[Donate to openmediavault](#) (Main project development) and

[Donate to omv-extras.org](#) (Support for Single Board Computers and Development of Plugins.)

---

The openmediavault project is looking for coding talent and contributors. If you have developer experience, (Python, BASH, PHP, Javascript) the project would like to hear from you. Users with Linux experience are invited to help out on the [openmediavault Forum](#).

---

## **About this Guide**

In computing, generally speaking, there are several ways to do the same thing. By extension, methods and methodology become progressively more advanced as a user's skill level increases. With these notes in mind, methods found in this guide may not be considered as “Best Practice”, especially from a hardened security perspective. The purpose and intent of this guide is to provide a walk-through to get users up and running as quickly and easily as possible.

- This guide contains links to external sources of information and software. It's best used on a PC connected to the Internet.
- This is a community document and a work in progress. Input and feedback are welcome and can be sent to: [omvguide@gmail.com](mailto:<u>omvguide@gmail.com</u>)

### **Beginners:**

This document is intended for beginners who will, primarily, be using the openmediavault's GUI. Beginners are assumed to have basic knowledge of computers and their LAN systems, and a Windows or Apple PC.

The focus of this guide will be to take a technically easy route, for the widest possible cross section of new users, toward accomplishing basic tasks using methods and processes that are easy to understand and duplicate.

### **Advanced Users:**

Openmediavault was designed to be intuitive for advanced users and beginners alike.

After the installation is complete, for a streamlined setup, see the [Quick Start Guide](#).

## **A Cautionary Note for Advanced Users:**

Many of the configuration files traditionally used to customize Debian Linux are controlled by the openmediavault system database. As a result, manual edits of configuration files may be overwritten as of the next, “on-demand”, configuration change in the openmediavault GUI. Further, it is possible to “break” openmediavault with alterations and permissions changes to the files of the boot drive, on the command line. In the beginning it's best to rely, primarily, on the GUI for configuration and control. Otherwise, before attempting to customize the operating system, backing up the boot drive is highly recommended.

## ***Linux Experts, Admin's, and Developers:***

Users in this category may prefer the information available on the [Project's Wiki](#). \*\*(Update to ReadtheDoc's Ver 6 when ready.)\*\*

(Continued)

## **Hardware**

Hardware requirements to run openmediavault are very modest, however, actual hardware requirements for specific “use cases” vary widely. The following is intended only as general guidance.

### **Compatibility:**

Openmediavault 6.X is currently supported by Debian 11, “Bullseye”.

Compatible hardware and other requirements of Debian Linux are available at [Debian.org](https://Debian.org)

### **64 bit hardware (amd64):**

The openmediavault project maintains convenient, fully integrated, openmediavault/Debian installation ISO's. This is the best method for getting openmediavault up and running quickly.

### **32 bit Hardware (i386):**

While openmediavault is supported by 32 bit Debian installations, it's a two step scripted process referenced in; [\*\*“Installing on i386 32-bit Platforms”\*\*](#). The openmediavault project does not provide integrated 32 bit installation ISO's.

### **ARM Hardware:**

The openmediavault project provides scripted installation support for ARM Single Board Computer (SBC) platforms. Supported platforms are the Raspberry Pi, models 2B and higher, and the various ARM platforms supported by the [\*\*Armbian Project\*\*](#).

### **Minimum Hardware requirements**

Openmediavault/Debian will run on I386, AMD64, and select ARM platforms with 1GB of ram or less, but performance expectations should be adjusted accordingly. The system boot drive should have a minimum of **8GB** capacity.

### **Recommended Minimum requirements**

For basic File Server operations - 1 or 2 users:

- Intel Core 2 Duo or equivalent AMD processor and 1GB of RAM.
- Any of the ARM Single Board Computers supported by openmediavault. At least 1 GB of RAM would be preferred.

If flash media is used, (USB thumb-drives, SD-cards, etc.) the system boot drive should have at least 16GB capacity, for longer life.

## ***Recommended Hardware and Considerations for a good use experience***

### **amd64**

- Intel i3 (or equivalent AMD processor), 4GB ram or better (ECC preferred) and a 16GB system boot drive will provide good performance in home or small business use cases.
- As the number of NAS users increase and server processes are added, processing power and memory requirements increase.
- For file caching, in support of normal file system operations, performance is better with more RAM.
- The number of a Motherboard's SATA or SAS ports can be a factor if future storage expansion is needed.
- A case design that accommodates the physical installation of additional hard drives can be helpful.
- Integrated video is preferred over add-on Video cards. With openmediavault's headless server design, add-on Video cards are an excessive and unnecessary power drain with no performance benefit. Installing a high end, high powered Video card in a headless server is analogous to installing a 65 to 200 watt light bulb in a closet, without a switch, and closing the door.

### **ARM - Single Board Computers:**

Performance levels vary greatly among the various models of **Single Board Computer** (hereafter referred to as an “**SBC**”) that are supported by Armbian, Raspbian, and openmediavault. While most will support file server operations for a few users, if running server add-on's or Dockers is a requirement, research supported SBC's carefully before buying. [Armbian's](#) or [openmediavault's](#) forums may be of assistance, along with Internet product reviews.

\*\*When considering an SBC as a primary NAS server for home use, note that support for SBC's is for **the current openmediavault release only**. Accordingly, SBC users should read the ending cautionary note in [Operating System Backup](#).\*

### **Raspberry PI's**

(Hereafter referred to as “R-PI's”.)

Given the current market for SBC's, the majority of SBC users will likely be owners of R-PI's.

Openmediavault runs well on the R-PI 4. While openmediavault will run on an R-PI model 2B and the various models of the R-PI 3, it is not recommended. Performance is poor. What exactly does “poor performance” mean? In this context, if the R-PI's CPU is running at 100%, openmediavault my not show up on the local network and / or network shares may not open. This may give the false impression that there's a software or permissions problem. In other instances, the WEB GUI login page may not respond.

These issues may appear to be software related, but that's not always the case. Older R-PI's are very easily overstressed and, during periods where the CPU is running at 100%, they may not respond to external input. With this performance limitation in mind, earlier versions of the R-PI (2B and 3X models) should be used only as a basic file server for 1 or 2 user home environments, where multitasking is less likely. If running automated tasks, it's best to schedule them to run in the early morning hours when user access would not be affected.

In addition, R-PI's suffer from USB under powering in models 2B and 3X. See notes regarding this issue in [USB Power - A Common Raspberry PI problem](#)

## **Where CPU Power may be Needed – “Transcoding”**

If a users' primary consideration is setting up a media server, CPU selection may need careful consideration.

Transcoding is a process for translating media file formats into types that mobile devices understand. Since mobile devices are low powered, they're not capable of re-processing high resolution media files smoothly so the processing burden is often transferred to the media server.

### **Pre-2011 Intel and AMD CPU's**

[Plex](#), a popular media server, recommends at least 2000 on the CPU's [PassMark](#) score for each concurrent 1080p transcoded stream. ([See the advice article here](#)) However note that this advice applies to pre-2011 Intel and AMD CPU's.

Look up an older CPU here → [PassMark CPU Benchmarks](#)

---

### **2011 and Newer Intel CPU's**

As of the beginning of the Sandy Bridge CPU series in 2011 and later, a core has been added to **Intel** CPU's for the sole purpose of video transcoding. CPU's with [Quick Sync](#), to include Celeron and Atom models that are relatively low powered, do a good job of transcoding for portable devices.

If NAS administrators have numerous smart phone users, in their homes or businesses, who will be watching transcoded video on the small screen, CPU loading and Video processing features may require some additional thought and research.

Additional reading → [Intel Quick Sync versus similar AMD technology](#).

## **Selecting a Boot Drive**

Nearly any type of hard drive, SSD, or flash device (USB thumb-drives and SD-cards) 8GB or larger, will function as an openmediavault boot drive.

However, some notions of achieving a “Faster” or a “Better Performing NAS server” by using certain types of fast boot media should be dispelled.

Server boot requirements and considerations are different when compared to desktop and business workstation requirements.

- Given openmediavault's lean configuration, boot times can be fast. Boot times of 1 minute and Shutdown times of 20 seconds are common, even when using relatively slow flash media such as USB thumb-drives and SD-cards. (Recent models can be quite fast – check their benchmarks.)
- Typically servers are rebooted no more than once a week. When automated, a reboot event is usually scheduled after-hours when users are not affected.
- After the boot process is complete, most of openmediavault's file server functions are running from RAM.

### **Conclusion – for Linux file server operations, fast boot media is not important.**

- “The WEB/GUI is more responsive with fast media.”

This is the single instance where an SSD or a spinning hard drive may create the illusion of higher performance. In the traditional role of a NAS as a File Server, when the server boots, the Linux kernel and most of the necessary processes required to act as a File Server are loaded into RAM - the fastest possible media for execution.

Navigating openmediavault's WEB/GUI interface is another matter. Loading WEB pages may call files from the boot drive which may make the server appear to be slower, when using slow media. However, the speed of the boot drive has little impact on overall file server function and actual NAS file serving performance.

\*\*The above assumes that adequate RAM has been provisioned.\*\*

## **Final Notes on Choosing a Boot Drive**

Openmediavault's boot requirements are very modest:

While some users prefer traditional hard drives or SSD's, the boot requirement can be served with USB thumb-drives and SD-cards, 8GB or larger.

With USB connections on the *outside* of a PC case, cloning USB drives for [operating system backup](#) is an easy process. Given this consideration, some users prefer USB thumb-drives and other external flash media to internal drives. Further, given the ease of operating system recovery in the event of a boot drive failure, beginners are encouraged to consider using flash media.

If flash media is used:

**New** name brand drives are recommended such as Samsung, SanDisk, etc. While not absolutely essential; **USB3** thumb-drives are preferred, due to their more advanced controllers, and SD-cards branded **A1** for their improved random read/write performance. **USB3** thumb-drives and **A1** spec'ed SD-cards are faster and, generally speaking, more reliable than similar items with older specifications.

While boot drive size matters, bigger is not always better. An acceptable size trade off for wear leveling and the speed of cloning is between 16 and 32GB.

(“Wear leveling” will be explained during the installation and configuration of the flash-memory plugin. The **flash-memory plugin** is required for flash media. Its purpose and installation are detailed in [The Flash Memory Plugin.](#))

#### **Use-case exceptions where boot media larger than 32GB may be useful:**

- Running applications that utilize WEB interfaces, such as Plex, Emby, etc.
- Hosting Web or Media Servers with extensive content.
- Hosting Virtualized Guest operating systems with desktops. (Does not apply to ARM platforms. ARM platforms can not virtualize i386 or amd64 operating systems. )

(There's no penalty for starting with a smaller boot drive. Moving to a larger drive, if needed, can be done later.)

**\*\* Note:** Buying flash devices on-line, even from reputable retailers, comes with the substantial risk of buying fakes. Buying flash drives, in sealed packaging, from walk-in retail stores with liberal return policies is recommended. The use of cheap generics, fakes or knockoffs is highly discouraged. They tend to have a short life and they're known to cause problems, even if they initially test error-free.

In addition, to detect fakes or defective media even when new; all SD-cards and USB thumb-drives, should be formatted and tested in accordance with the process outlined under [Format and Testing Flash Media](#). If they fail error testing, return them for a refund.\*\*

---

### ***Hardware - The Bottom Line***

Again, openmediavault/Debian's hardware requirements are modest. Nearly any IBM compatible PC or Laptop produced in the last 10 years could be re-purposed as an openmediavault server.

However, it should be noted that newer hardware is, generally speaking, more power efficient and it's higher performing. The power costs of running older equipment that is on-line, 24 hours a day, can easily pay for newer, more power efficient equipment over time.

Further, the supported ARM platforms are both power efficient and capable of providing file server functions in a home environment. (Again, performance expectations should be adjusted in accordance with the capabilities of the hardware.)

# Installing on Single Board Computers (SBC's)

Installation guides for SBC installations are available ➔ [here](#).

---

## Installing on i386 32-bit Platforms

An installation guide for 32-bit installations is available ➔ [here](#).

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## amd64 (64-bit) Platforms

This guide assumes the user will be installing from a CD, burned from an image found in [openmediavault's files repository](#), using 64 bit hardware. Information for creating a bootable USB thumb-drive, as a software source, is provided as well.

### Downloading

Beginners should download **the latest stable version** from [Sourceforge.net](#) and copy or download the SHA or MD5 checksums for the ISO. The checksum value will be used with the MD5 SHA checksum utility.  
(Windows Notepad can open MD5 files by selecting “All Files”, next to the file name drop down.)

#### \*\*Warning\*\*:

If users install Beta or Testing versions of openmediavault, they are agreeing to be a “tester”. As part of being a tester, users may experience issues or bugs that can not be resolved which may result in lost data. Plan accordingly, with full data backup.

### Verify the download

After the download is complete, verify the download with a [MD5 & SHA checksum utility](#). MD5 and SHA hashes check for image corruption that may have occurred during the download.

#### \*\*Note\*\*

**Beginners - DO NOT SKIP THIS STEP.** The chance of image corruption is higher when downloading and it's pointless to build a server with flawed software. Even the **slightest** corruption of the installation ISO may ruin your installation and the effects may not be noticed until well after your server is built and in use. Headaches can be avoided by checking the image.

## ***Installing - amd64 Platforms***

### **Burning a source CD**

Assuming a CD/DVD drive is installed; in most cases, double clicking an installation file, with an “.ISO” extension, will trigger a CD burning utility on a Windows Computer or a MAC. If help is needed for this process, see the following link.

[How to burn an ISO image in Windows 7, 8, 10](#)

### **Creating a Bootable ISO Thumb-drive**

For PC's without an Optical drive; the openmediavault ISO can be installed using a Thumbdrive as the ISO source, and install the Debian/openmediavault system to a second thumb drive or hard drive.

For assistance in creating a bootable ISO thumb-drive, see the following link.

[How to install an ISO file on a USB drive](#)

\*\*Before creating an ISO thumb-drive consider checking the thumbdrive, to be used as a software source, using the utilities and process described below in, [Preparing Flash Media](#). \*\*

---

\*\* If installing to a standard hard drive or SSD, skip to ➔ [Openmediavault Installation](#). \*\*

---

### **Preparing Flash Media**

To use flash media as a boot drive, a couple utilities are recommended:

[SDFormatter](#) (get the latest version), and [h2testw1.4](#) .

- [SDFormatter](#) installs in the same manner as a typical Windows program.

- [h2testw1.4](#) is stand-alone “portable” application. Simply unzip h2testw\_1.4 onto the desktop, open the folder, and double click the executable.

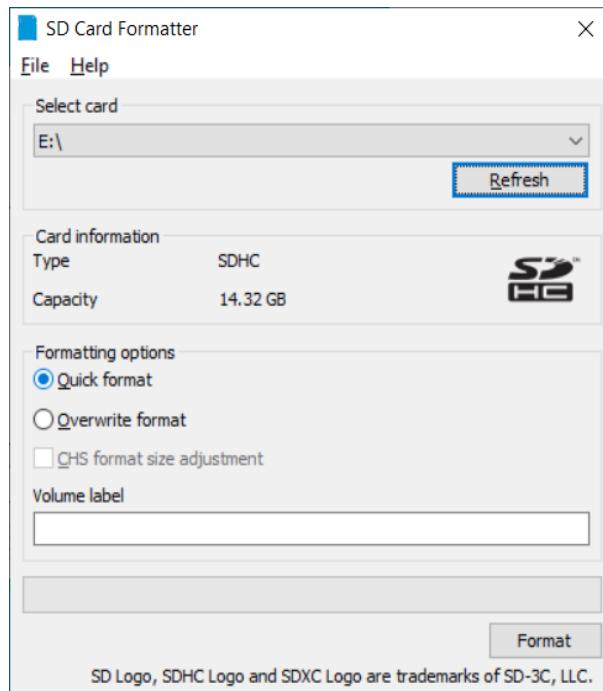
Due to the rise in counterfeit media and media that reports a fake size, it's recommended that all USB thumb-drives and SD-cards, new or used, be formatted with **SDFormatter** and tested with **h2testw1.4** before using them.

## **Format and Test Flash Media**

Using SDFormatter, do a clean format:

(While SDFormatter was designed for SD-cards, it can format USB thumb-drives for error testing. SDFormatter will detect a USB thumb-drive.)

A volume label is optional and the default options are fine.

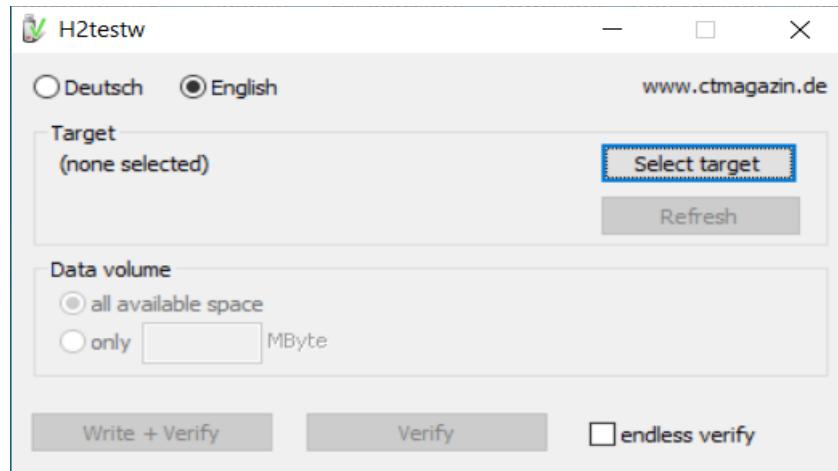


Click on **Format** and **Yes**

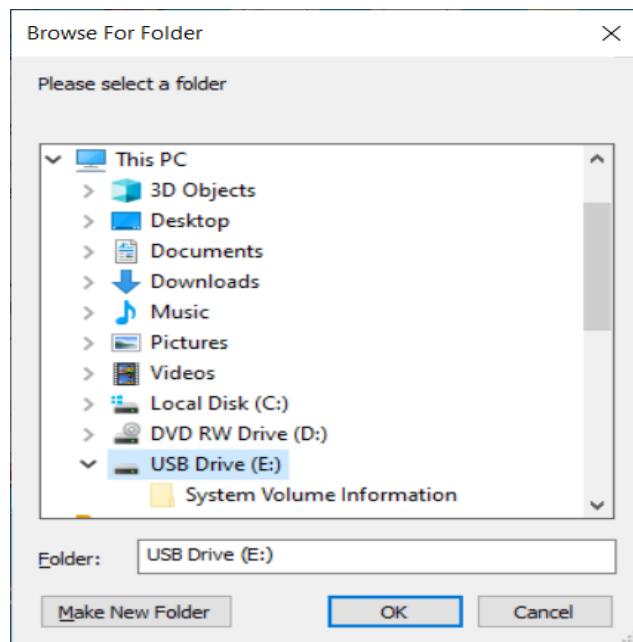
**When the format is finished, remove and reinsert the SD card or Thumbdrive.**

**Open h2testw and select your language.**

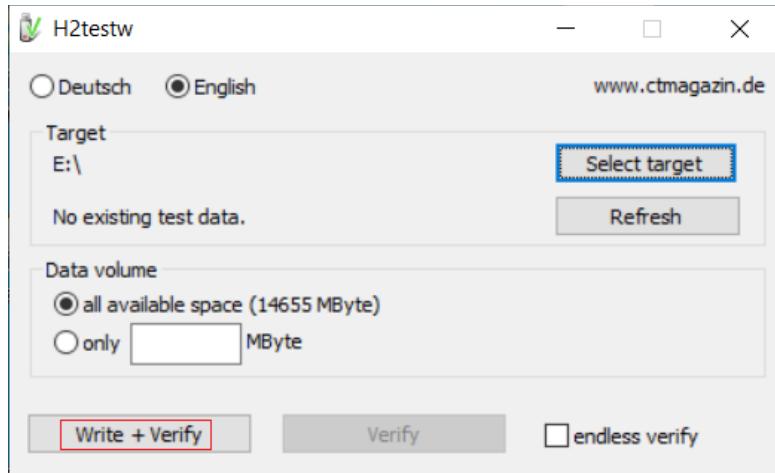
**Then, click on Select target**



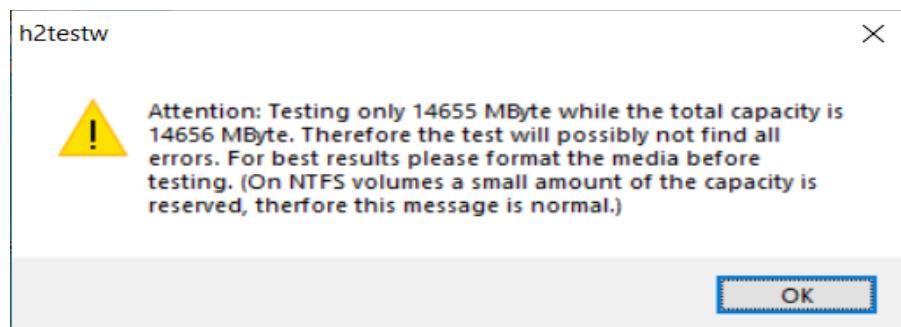
**Under This PC, select the flash media previously formatted and OK.**



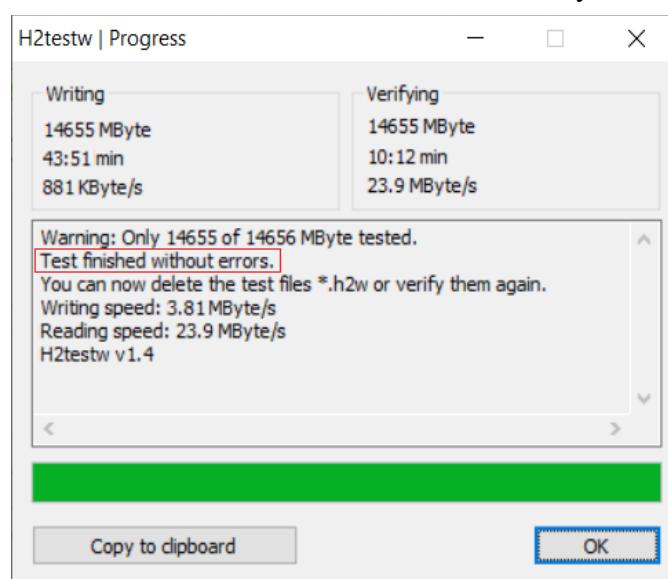
Select **Write+Verify**. (Do not check endless verify)



A dialog box similar to the following may pop up, drawing attention to a “1MB” difference.  
Ignore this and click on **OK**.



“Without errors” is the desired outcome.  
(If media tests with errors or is much smaller than is indicated by its labeled size, don't use it.)



After H2testw verifies the USB thumb-drive, do one more clean format, using SDFormatter, before using the thumb-drive.

## **amd64 – Openmediavault Installation**

If your PC platform won't boot onto a CD or USB thumb-drive with the installation ISO, it may be necessary to change the boot order in BIOS, to set the CD/DVD drive or USB boot to the top of the boot order. This link may provide assistance on this topic. → [How To Enter BIOS](#)

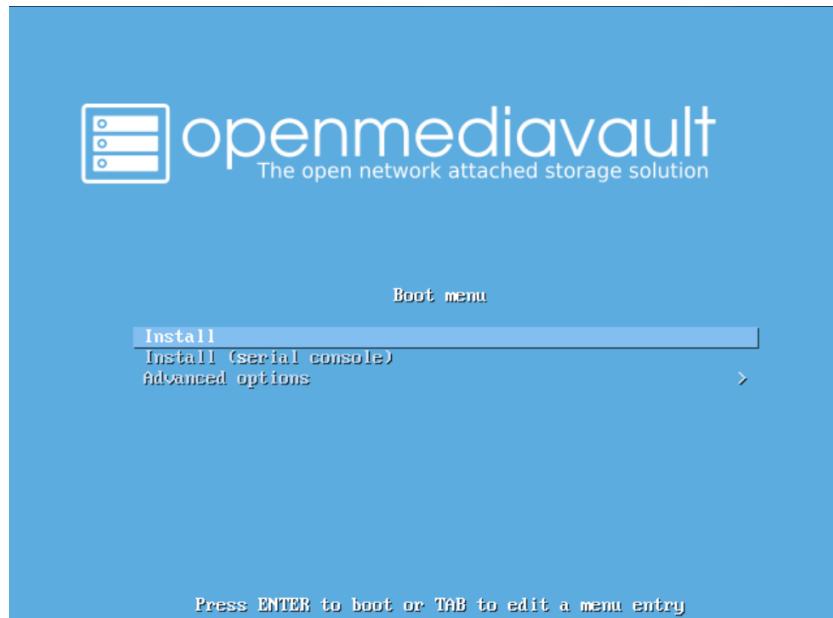
If difficulties are encountered during the ISO installation, consider the ➔ [Alternate 64bit installation](#) guide.

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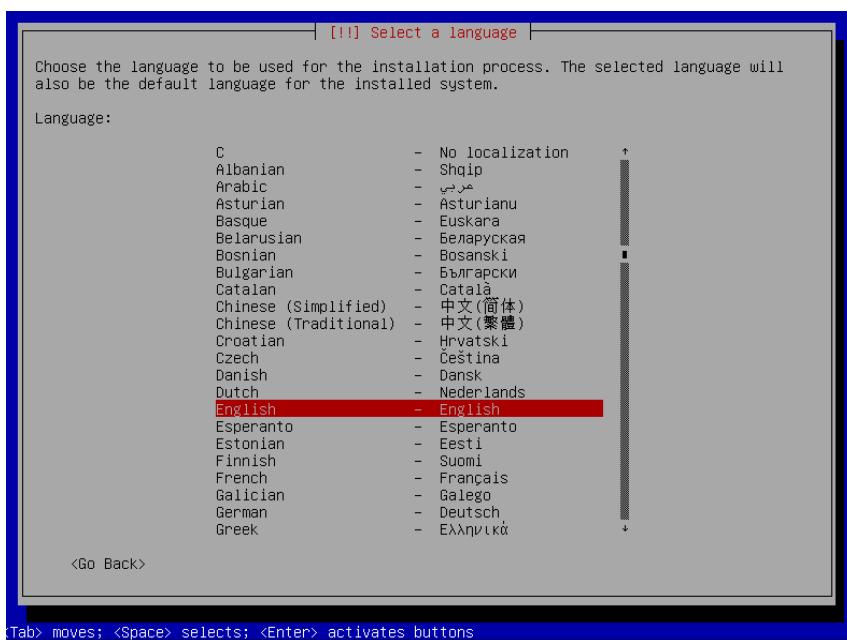
An installation walk-through:

If offered a choice, chose the text install.

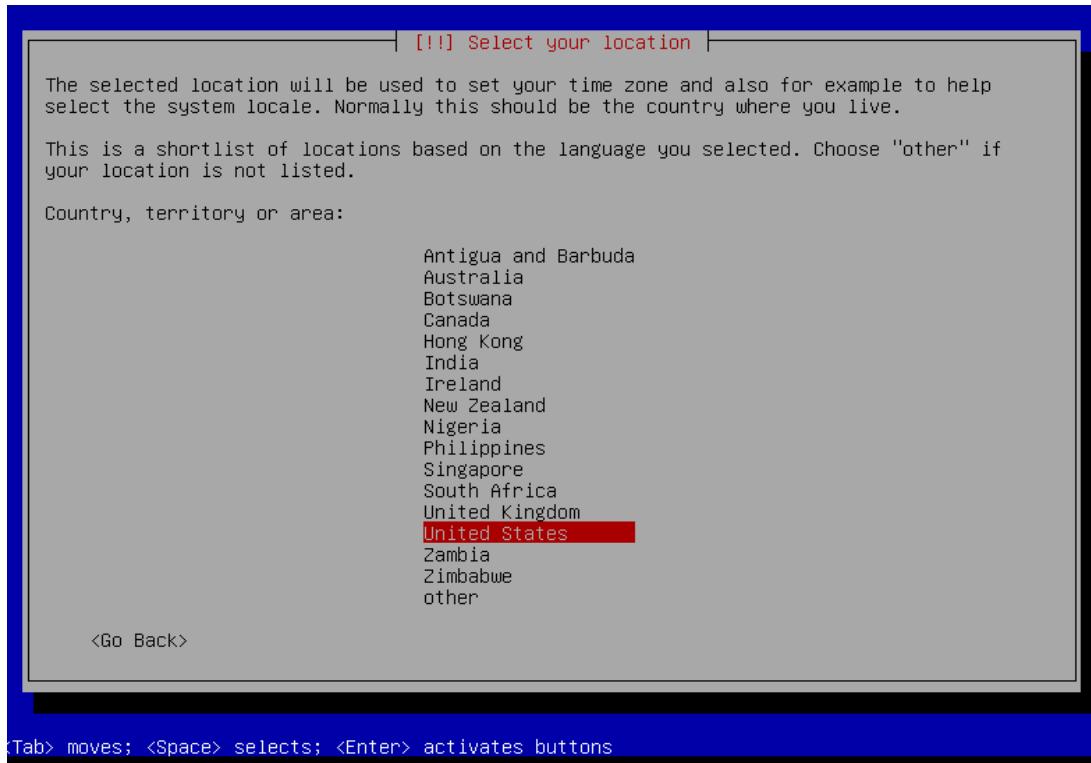
### **Boot Menu: Select Install**



### **Select a Language: (As needed)**

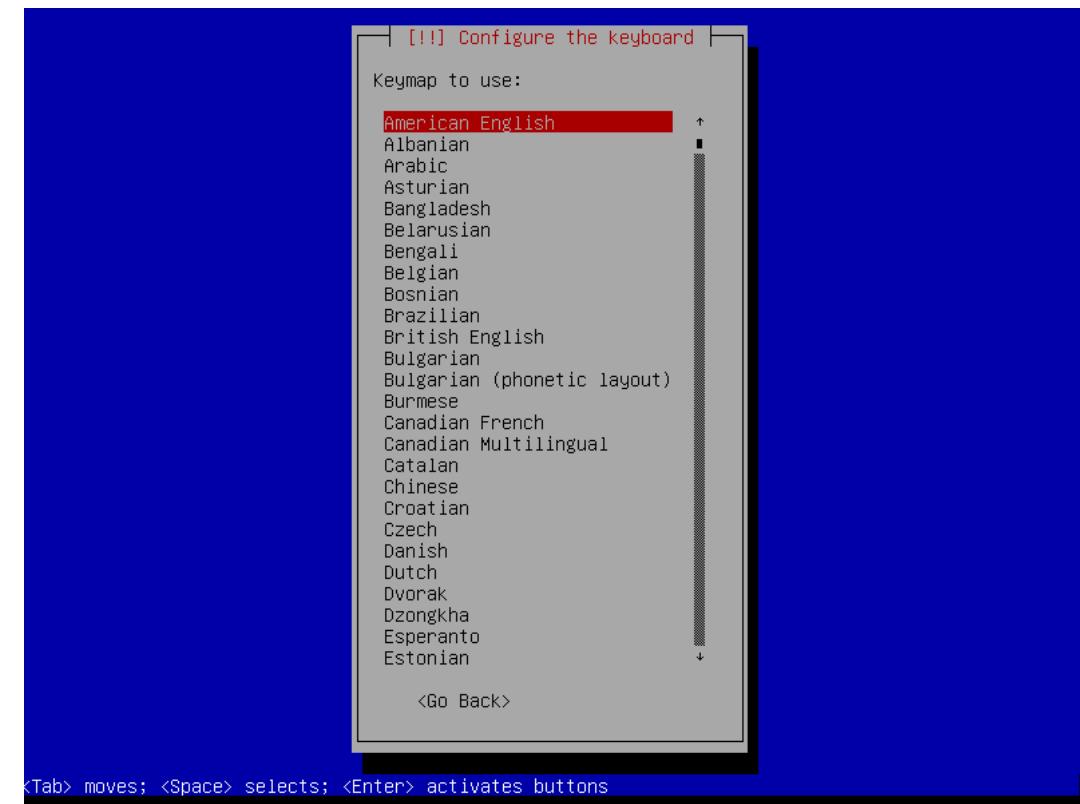


## Select your Location: (As appropriate.)



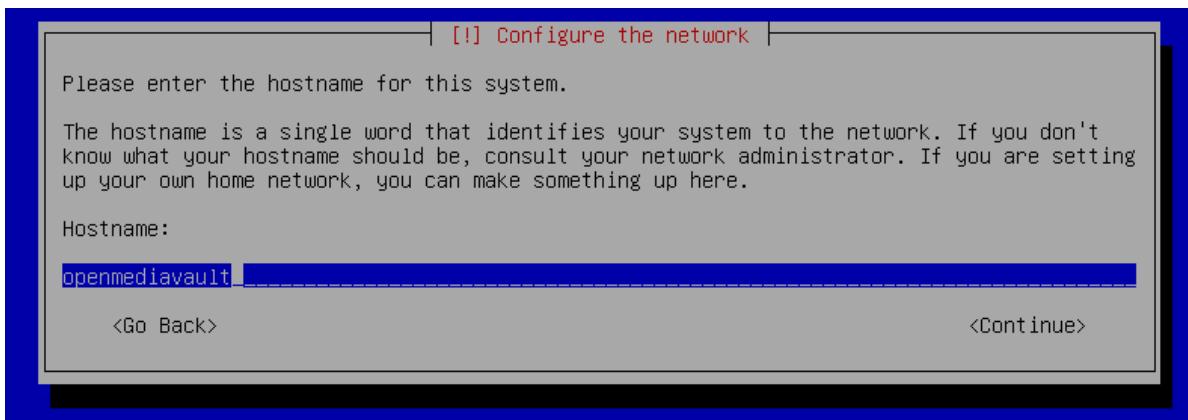
<Tab> moves; <Space> selects; <Enter> activates buttons

## Configure the Keyboard: (Select as appropriate)



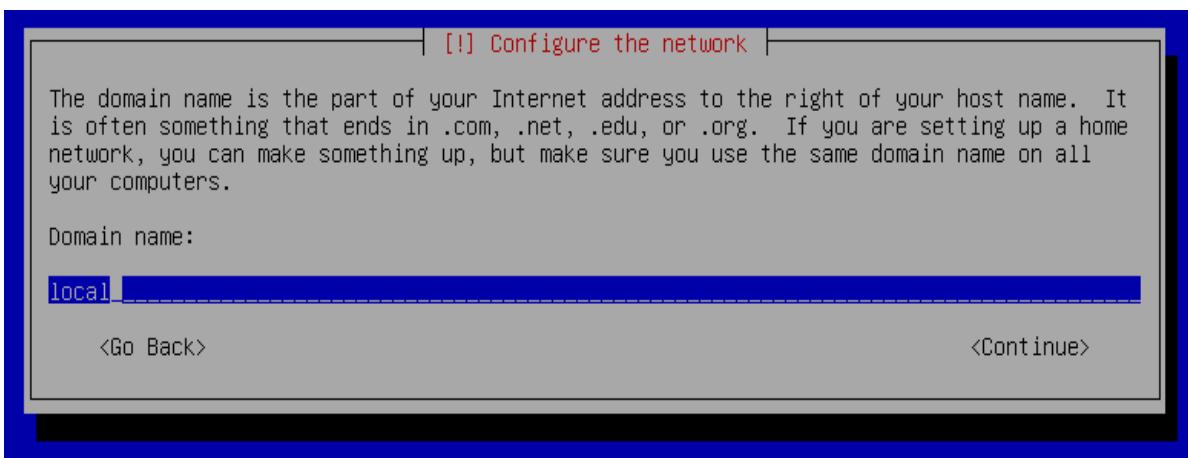
<Tab> moves; <Space> selects; <Enter> activates buttons

**Configure the Network:** While the default hostname is fine, a server name that is a bit shorter might be easier to work with later on. (Something like **OMV1**).



### Configure the Network:

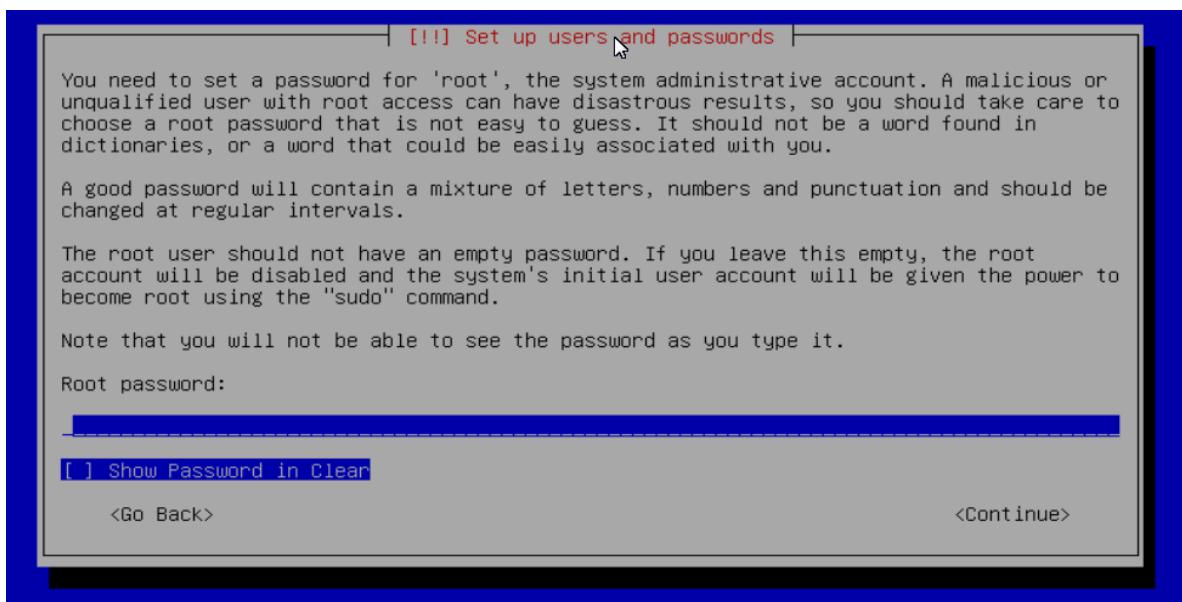
If applicable, enter your domain name suffix. Otherwise, for home users and businesses with peer to peer networks, the default entry is fine.



## **Set up users and passwords:**

Follow the on screen guidance for setting the **root password**.

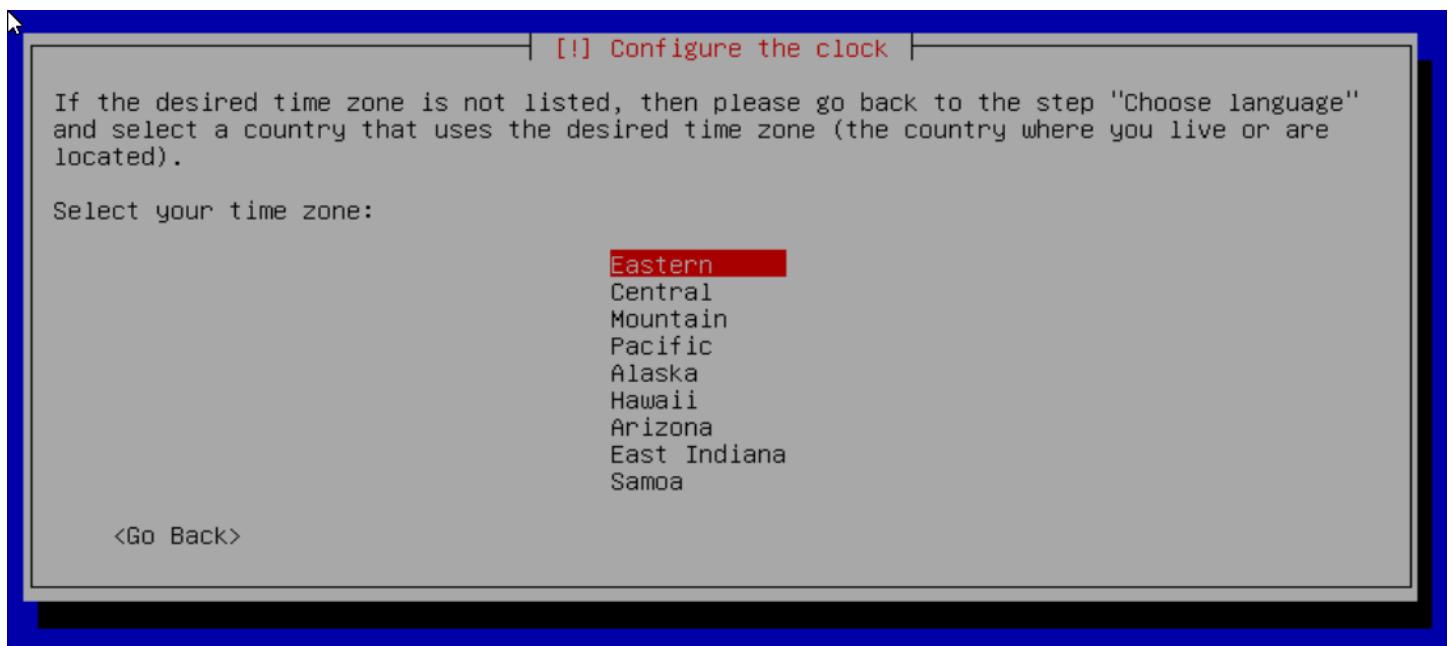
While **not** recommended, it would be better to write down the root password, then to forget it.



---

## **Configure the Clock:**

Select your time zone.



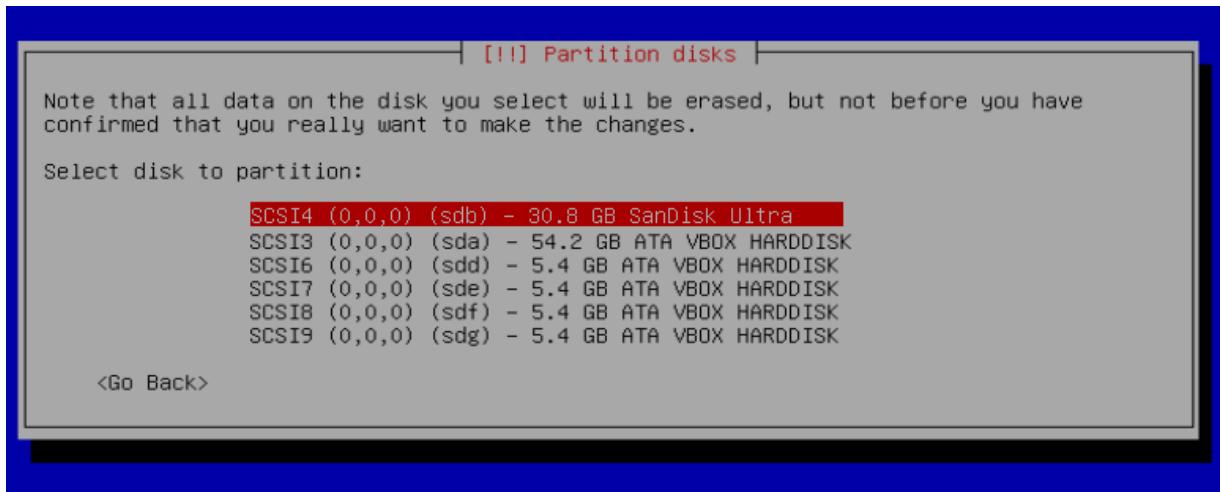
### **Partition Disks 1:**

If two storage devices are available for installation, this screen is displayed.



### **Partition Disks 2:**

If installing to a single internal drive, there will be only one selection available. In this particular example, the installation is placed on a USB thumb-drive.



---

### **Partition Disks 3:**

(No Pic)

A 3rd window asks for confirmation of partition selections. Select Yes.

\*\*If installing to a USB drive, at this point, it is possible to an error may pop-up regarding partitioning the drive, and recommend a reboot. Follow the recommendation. After the reboot, the partition operation should succeed the 2<sup>nd</sup> time around.\*\*

---

The system installs.....

**Configure the Package Manager:  
Debian Archive Mirror Country  
(NO PIC)**

While the advice given in this screen is true, without testing, there's no way to know which Debian archive mirror is best. Without testing, picking your country or the closest location to your country would be the logical choice.

---

**Configure the Package Manager:  
Debian Archive Mirror  
(NO PIC)**

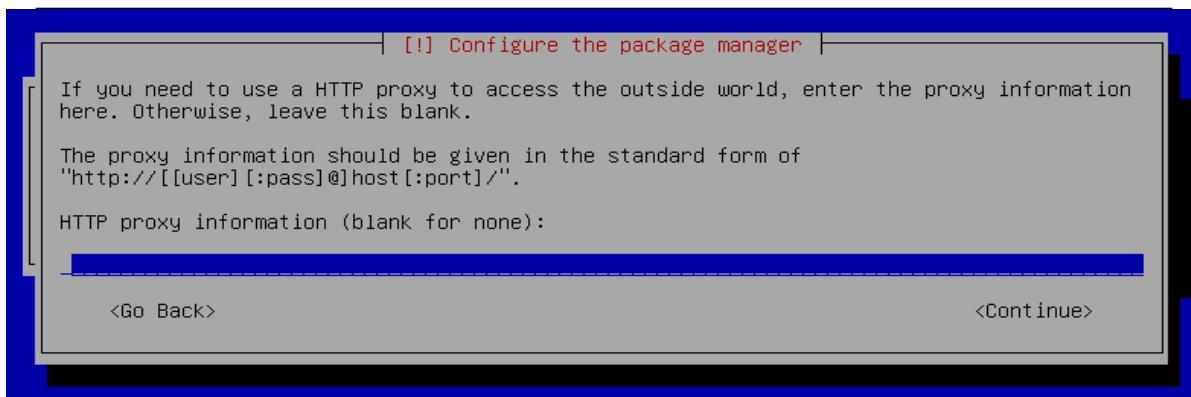
The default choice is usually best.

---

**Configure the Package Manager:  
HTTP proxy**

In most cases this entry will be blank.

(If a proxy is required, note the form of entry required in the dialog box.)

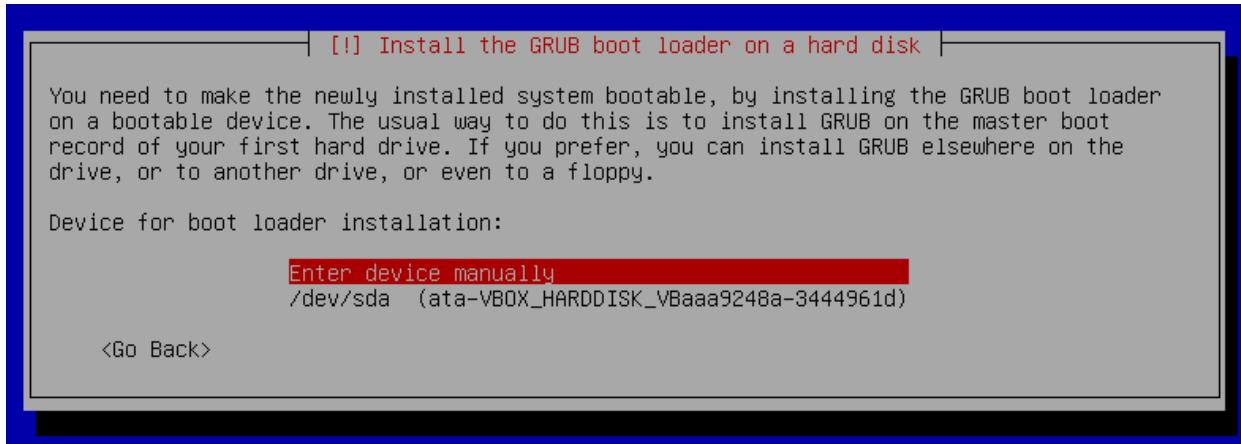


\*\* If installing to a hard drive, **the following screen may or may not appear**. \*\*

### Install the GRUB Boot Loader on a Hard Disk:

Select the appropriate boot disk in your server.

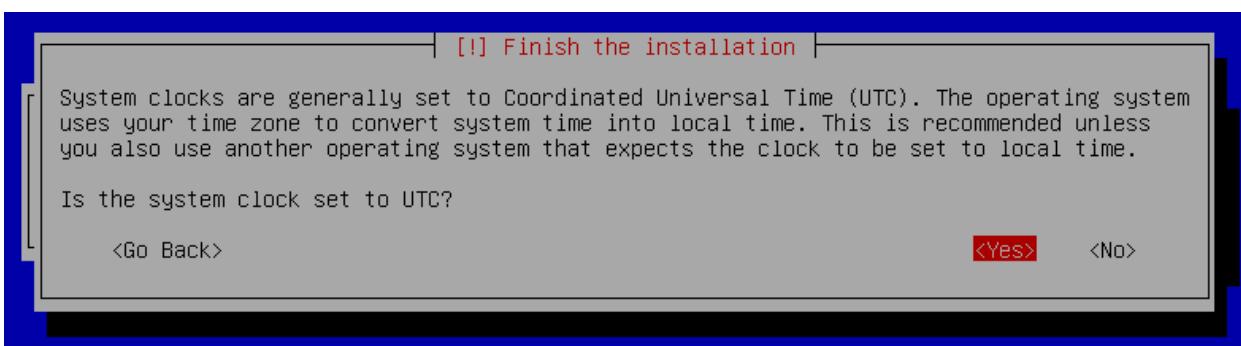
(Generally the boot drive will be **/dev/sda** which is, in most cases, the first SATA port.)



**The following screen may or may not appear.**

### Finish the Installation:

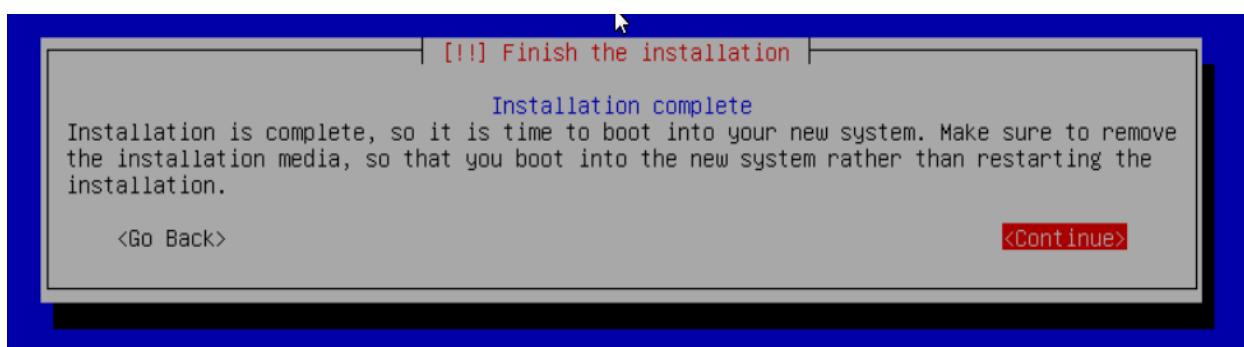
Accept the default.



### Installation Complete:

**Remove the CD or USB installation source, then hit ENTER.**

(Otherwise, the installation process may re-start.)



## First Boot

Allow the installation to boot. Normally, the text above the login prompt will provide an **IP address** to be used for opening the console in a web browser. If an IP address is available, skip the following and proceed to [\*\*Initial Configuration.\*\*](#)

---

**There are two exception cases on the first boot that users should be aware of.**

### 1.) No address from the DHCP server:

Normally, DHCP will assign an IP address to openmediavault and the address will be printed to the screen. However, on odd occasions the following issue may be observed.

```
To manage the system visit the openmediavault web control panel:  
No network interface(s) available  
  
By default the web control panel administrator account has the  
username 'admin' and password 'openmediavault'.  
It is recommended that you change the password for this account  
within the web control panel or using the 'omv-firstaid' CLI  
command.  
  
For more information regarding this appliance, please visit the  
web site: http://www.openmediavault.org  
  
openmediavault login: _
```

This is usually due to a slow response from your DHCP server, during a fast boot process.

---

An easy method of finding the IP address is:

At the login prompt type **root**

Enter your previously set root **password**.

At the # prompt type: **ip addr**

```
root@OMV-Server:~# ip addr  
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group def  
t 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  
        inet6 ::1/128 scope host  
            valid_lft forever preferred_lft forever  
2: eno1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP  
oup default qlen 1000  
    link/ether 6c:0b:84:de:b4:59 brd ff:ff:ff:ff:ff:ff  
    inet 192.168.1.55/24 brd 192.168.1.255 scope global eno1  
        valid_lft forever preferred_lft forever
```

To access the WEB control panel, the IP address for the wired Ethernet interface is needed. In this case it's **192.168.1.55** (/24, the subnet mask, can be ignored.)

## **2. A random IP address is assigned, that is not in the user's network:**

In the following example, the actual network is 192.168.1.0/24

```
openmediavault 6.0-16 (Shaitan) openmediavault tty1
Copyright (C) 2009-2021 by Volker Theile. All rights reserved.

To manage the system visit the openmediavault web control panel:

enp5s0: 192.168.178.16
enp5s0: fe80::d99e:4b57:61a8:b72
virbr0: 192.168.122.1

By default the web control panel administrator account has the
username 'admin' and password 'openmediavault'.
It is recommended that you change the password for this account
within the web control panel or using the 'omv-firstaid' CLI
command.

For more information regarding this appliance, please visit the
web site: https://www.openmediavault.org

openmediavault login:
```

This is usually a one time event where the fix is simple – simply login as root and type **reboot** on the command line. The address will be correct the second time around.

On very rare occasions, depending on the model and type of router, it may be necessary to reboot the router AND follow that with a reboot of the OMV server.

With a known IP address, proceed to [\*\*Initial Configuration\*\*](#)

(Continued)

# Initial Configuration

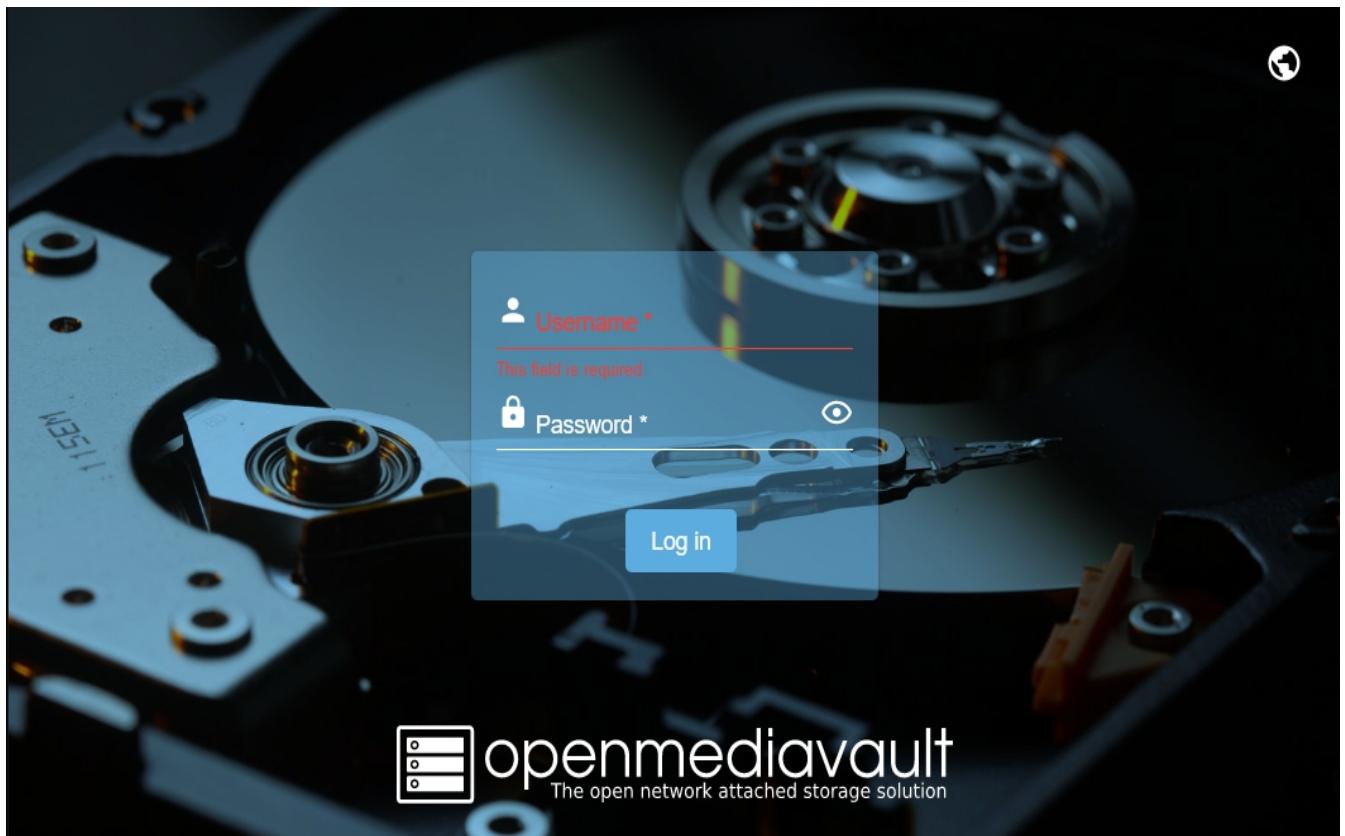
## **Web console login**

In a web browser, type in the IP address provided by the first boot screen:

Set the language of your choice.

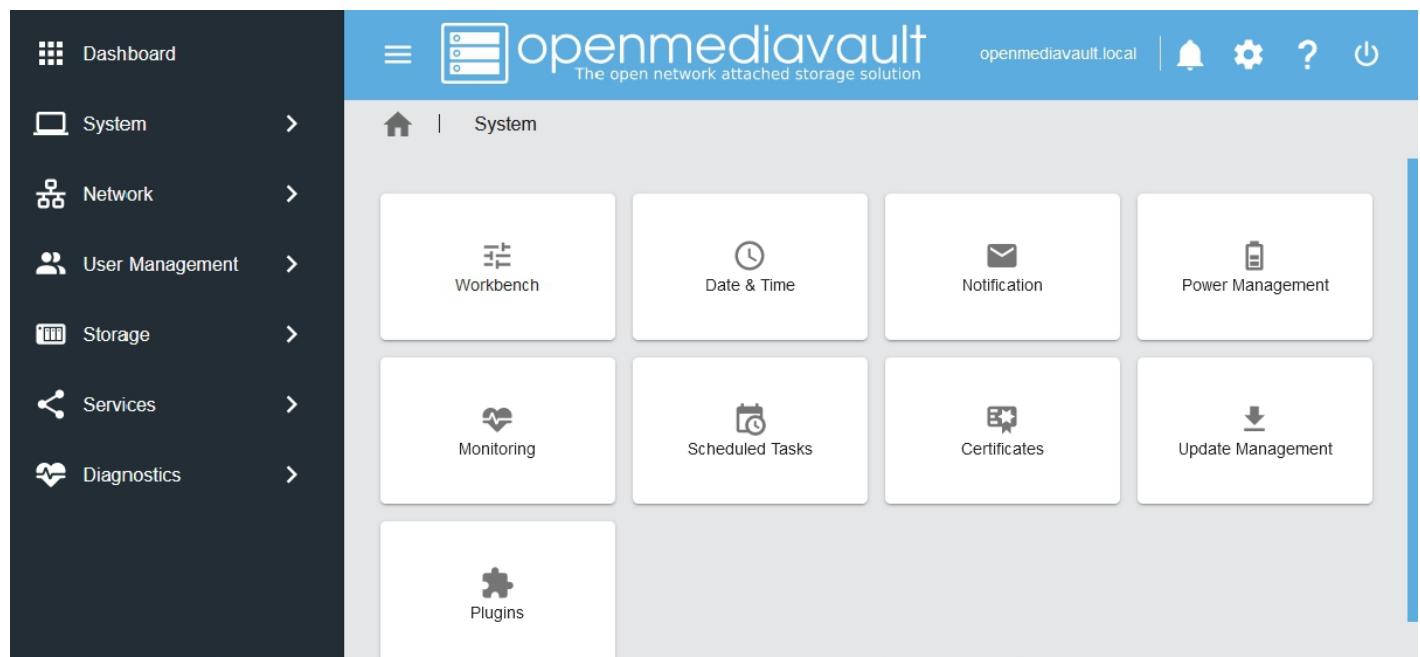
The user name is **admin** and default password is **openmediavault**

(In the following, by clicking on the **eye icon**, the default password would be shown unmasked.)



## Quick Start Guide for Advanced Users:

- In the left hand column, start at the top with **System**, and work your way down, choosing and activating the services and features needed for your use case.
- For amd64 and i386 users, a static address for the openmediavault server and setting the address of a [public DNS server](#) is recommended. (\*SBC users, see the section, [Network Interfaces – SBC Users.\\*](#)) As an example: Googles servers 8.8.8.8 and 8.8.4.4 support **DNSSEC** for better security, and **ANYCAST** which will direct DNS queries to a nearby server with low network latency. There are several choices for Public servers that support these features. [List of Public DNS Servers](#) .
- For a browseable network share, a minimum of one shared folder would need to be configured and that folder would need to be added to SMB/CIF to be visible on the network.

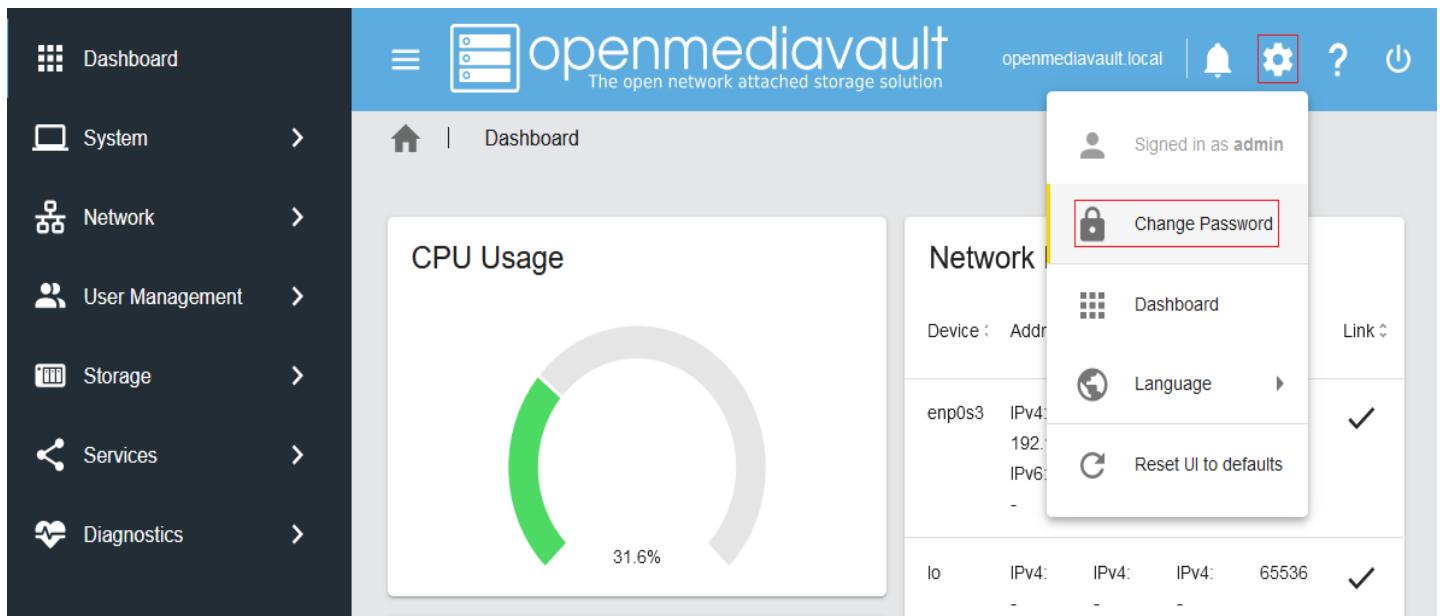


# Basic Openmediavault Configuration

This section will guide new users through the initial setup of openmediavault. It addresses how to add a plugin, enabling OMV-Extras, how to setup a shared folder and make it browseable on the network with an SMB/CIF share.

## Change Password

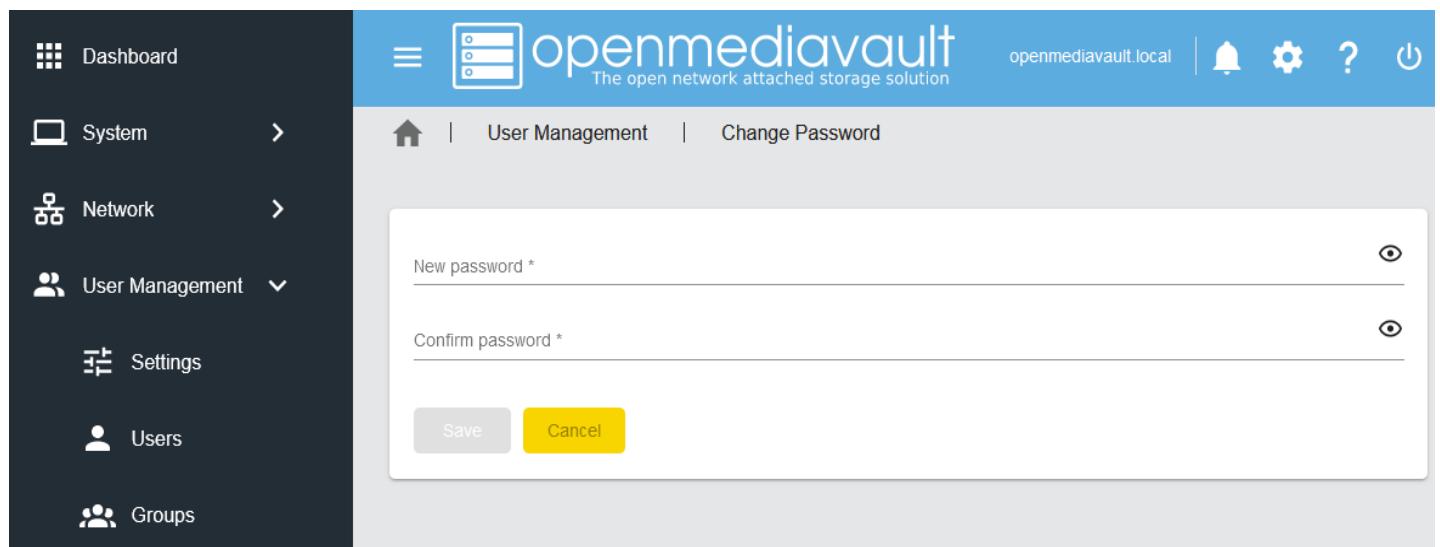
Click on the **Settings Icon** and **Change Password**.



Enter a **strong password**, confirm it and **Save**.

(This is one of a few instances where the yellow “confirmation” banner does not appear.)

This setting changes the GUI login **password**. The user **admin** will remain the same.



## System Settings

Under System, Workbench:

To allow a bit more time for configuration in the GUI, **users should consider lengthening the automatic log out time.**

The screenshot shows the OpenMediaVault Workbench interface. On the left, a sidebar menu includes options like System, Workbench, Date & Time, Notification, Power Management, Monitoring, Scheduled Tasks, Certificates, Update Management, and Plugins. The 'Workbench' option is currently selected. The main content area displays the 'System' configuration page. It has fields for 'Port \*' set to 80 and 'Auto logout' set to 60 minutes. Below this is a 'Secure connection' section with options for SSL/TLS enabled (unchecked), Certificate (None), Port (443), and Force SSL/TLS (unchecked). At the bottom are 'Save' and 'Cancel' buttons. A yellow confirmation banner at the bottom states: "Pending configuration changes. You must apply these changes in order for them to take effect." with a checkmark icon and a curved arrow icon.

When the yellow confirmation banner appears, clicking **the check mark will apply** the change.  
(The arrow is “**revert**”. Clicking the curved arrow will undo the last change.)

**Under System, Date & Time (No Pic)**

In the **Time Zone** field, click the pop down arrow and select your Time Zone.

The screenshot shows the OpenMediaVault web interface. On the left, a sidebar menu is open under the 'System' section, with 'Date & Time' selected. The main content area is titled 'Date & Time'. It shows the current time zone set to 'America/New\_York'. There is a checked checkbox for 'Use NTP server' with the value 'pool.ntp.org' listed below it. A section for 'Allowed clients' is present with a note about CIDR notation or host names. At the bottom are 'Save' and 'Cancel' buttons.

(Continued)

## Server Notifications

### Under System, Notification, Settings:

If enabled, E-mail setting entries are required if users want to take advantage of automated server notifications and reports. (Highly Recommended.) Other actions and scripts, in **Scheduled Jobs** for example, can use this information to E-mail a report of task execution or status, as users may deem necessary.

To gather the required information for entry in the **Settings** window, users should refer to the SMTP settings for their E-mail clients. Note that most ISP's are using **SSL/TLS** secured E-mail connections.

Fill in \* fields with user E-mail settings

Enabled

SMTP server: smtp.googlemail.com

SMTP port: 587

Encryption mode: SSL/TLS

Sender email: omvuser@gmail.com

Authentication required

Username: omvuser

Password: \*\*\*\*\*

Recipient

Primary email: omvuser@gmail.com

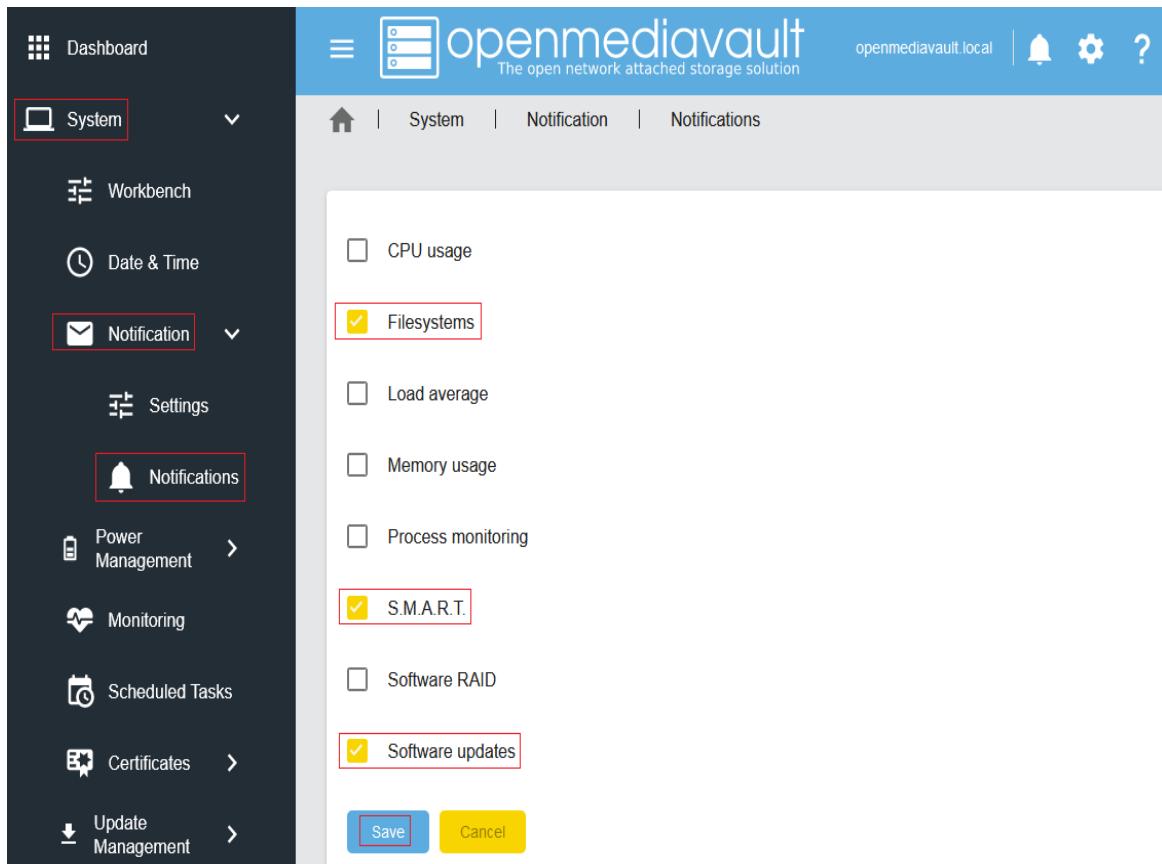
Secondary email:

Save Cancel Test

## Under System, Notification, Notifications:

Select various functions for error reporting.

If using a minimalist platform, such as older hardware or SBC's, E-mails regarding system resources, memory, etc., may become bothersome. Unchecking boxes for these resources would eliminate excess E-mails, while maintaining **Storage reports** on hard drive health and file system errors.



### \*\*Note\*\*

Using **Filesystems** and **SMART** Notifications is *highly* recommended. If SMART monitoring of hard drives is enabled, under **Storage, SMART, Settings** and short drive self-tests are enabled on spinning drives in the **Storage, SMART, Devices**, the system may notify the user of hard drive errors *before* a hard drive fails completely.

For an explanation of drive self-tests and an example of how to set up a drive self-test, see the section; [Drive Self-Tests](#)

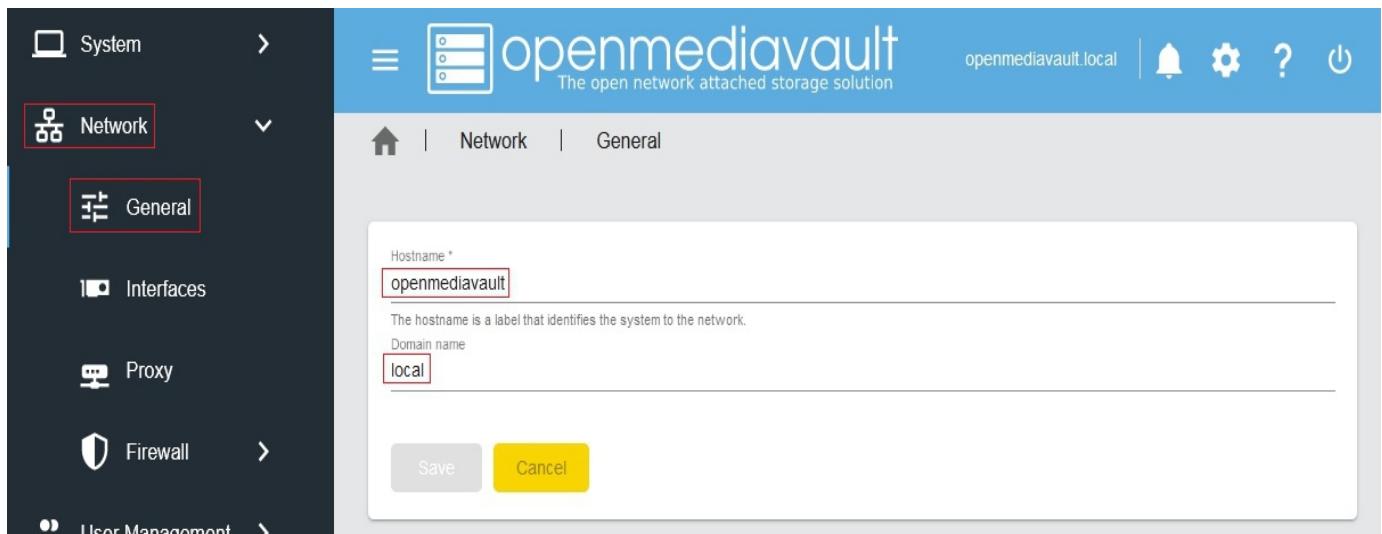
Under, **Network, General**.

#### Hostname:

The hostname is the name that will appear on your network and on the command line. While the default is fine, if desired, the hostname can be changed here.

#### Domain name:

The default is fine. If needed, the Domain suffix can be changed here. (Very few users will use Fully Qualified Domain Names.)



## Network Interfaces – SBC Users

Part of the **SBC** installation process was setting the wired interface to DHCP. SBC users should consider leaving their wired network interface set to DHCP, until [Docker](#) and [Portainer](#) are installed.

If a static IP address is needed:

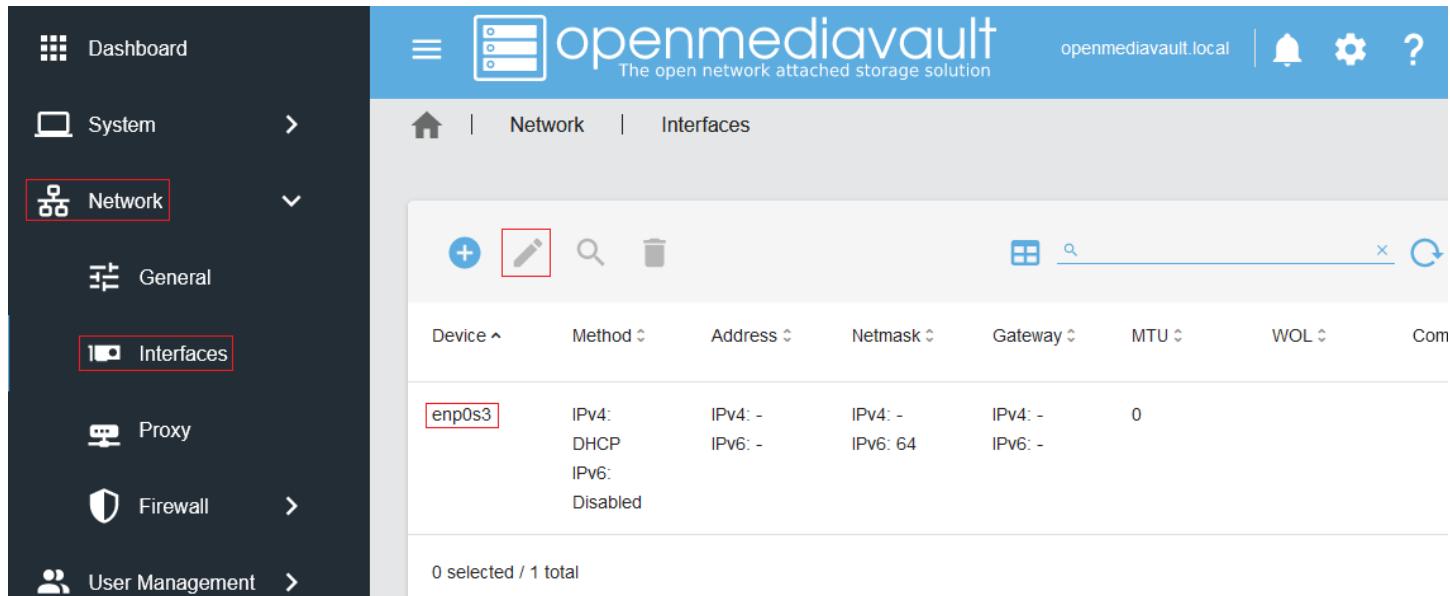
Note that your SBC has been assigned an IP address by your LAN's DHCP server. (Typically, a router.) See your router's documentation for information on setting a “Static”, or “Reserved” DHCP lease.

## Network Interfaces – i386/amd64 Users

Under, System, Network, Interfaces:

Highlight / click on the **interface** line found under the **Device** column, and click the **Edit** button. Use the first interface line/name found.

(\*\*The interface name may not be the traditional Linux **eth0**. A variety of different names may be found, such as **eno1** or others.\*\*)



The screenshot shows the OpenMediaVault web interface. The left sidebar has a 'Network' section with 'Interfaces' selected, also highlighted with a red box. The main content area is titled 'Interfaces' and shows a table of network interfaces. The first row, 'enp0s3', is selected and highlighted with a red box. The table columns are: Device, Method, Address, Netmask, Gateway, MTU, WOL, and Com. The 'enp0s3' row shows: IPv4: DHCP, IPv6: Disabled. The status bar at the bottom says '0 selected / 1 total'.

Device	Method	Address	Netmask	Gateway	MTU	WOL	Com
enp0s3	IPv4: DHCP IPv6: Disabled	IPv4: - IPv6: -	IPv4: - IPv6: 64	IPv4: - IPv6: -	0		

(Continued)

\*\* The following is an example only. If users are unsure of the entries needed for the following screen, leave **IPv4** set to **DHCP** and skip **Network, Interfaces** settings.\*\*

The screenshot shows the openmediavault web interface. The left sidebar has a dark theme with icons and labels: Dashboard, System, Network (selected), General, Interfaces (selected), Proxy, Firewall, and User Management. The main content area has a light blue header with the openmediavault logo and the URL 'openmediavault.local'. Below the header, there's a breadcrumb navigation: Home | Network | Interfaces | Edit. The 'Interfaces' section is expanded, showing 'IPv4' and 'IPv6' sections. In the 'IPv4' section, the 'Method' dropdown is set to 'Static', and the fields 'Address' (192.168.1.10), 'Netmask' (255.255.255.0), and 'Gateway' (192.168.1.1) are filled in. The 'IPv6' section has 'Method' set to 'Disabled'. There are also tabs for 'Edit' and a dropdown menu.

- It is recommended that users assign a **static IP address**, to the new openmediavault server, that is outside the address range of the network's DHCP server.
- In many cases, the Netmask will be as shown and the Gateway address will be the address of the user's router.
- If IPv6 is not needed, leave it at the default setting – Disabled.

(- Scroll Down to Advanced settings - )

While not visible in the screen capture above, it is recommended that users consider using a public DNS server address. A list of public DNS servers is available → [here](#). Use a server that supports **DNSSEC**, for better security, and **ANYCAST**, for low latency end point DNS servers that are closer to user locations.

Enter the selected address in the **DNS IP address field**. For the majority of users, the remaining fields under **Advanced settings** should remain at the defaults.

#### \*\*Note\*\*

**When saving a new static IP address**, the user will be “**going out on a limb and cutting it off**”. Since the address provided by the network DHCP server may be different from the static IP address chosen by the user, when the new address is changed, saved and applied, the GUI web page will stop responding. This is normal and expected. Type the new address, entered in the dialog box, into the URL line of your Web browser to reconnect.

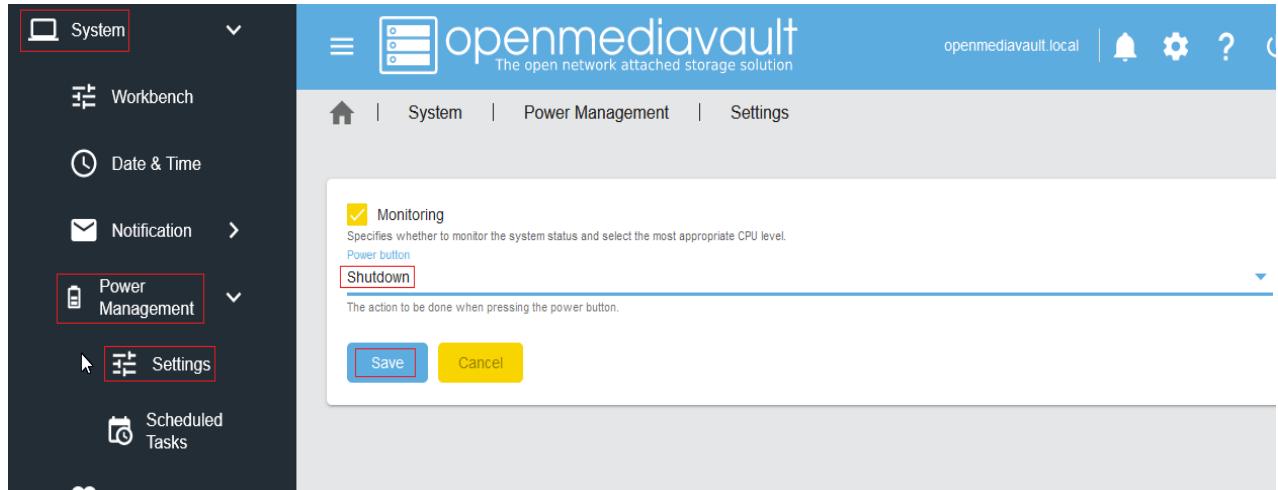
## (Optional)

### Under System, Power Management

The **Settings window** allows for the automation of various power related tasks, such as an scheduled reboot.

In the **Power button** drop down, amd64 and i386 users should select the action preferred.

Since power buttons are not available on some SBC installations, SBC users may chose to select “Nothing”.

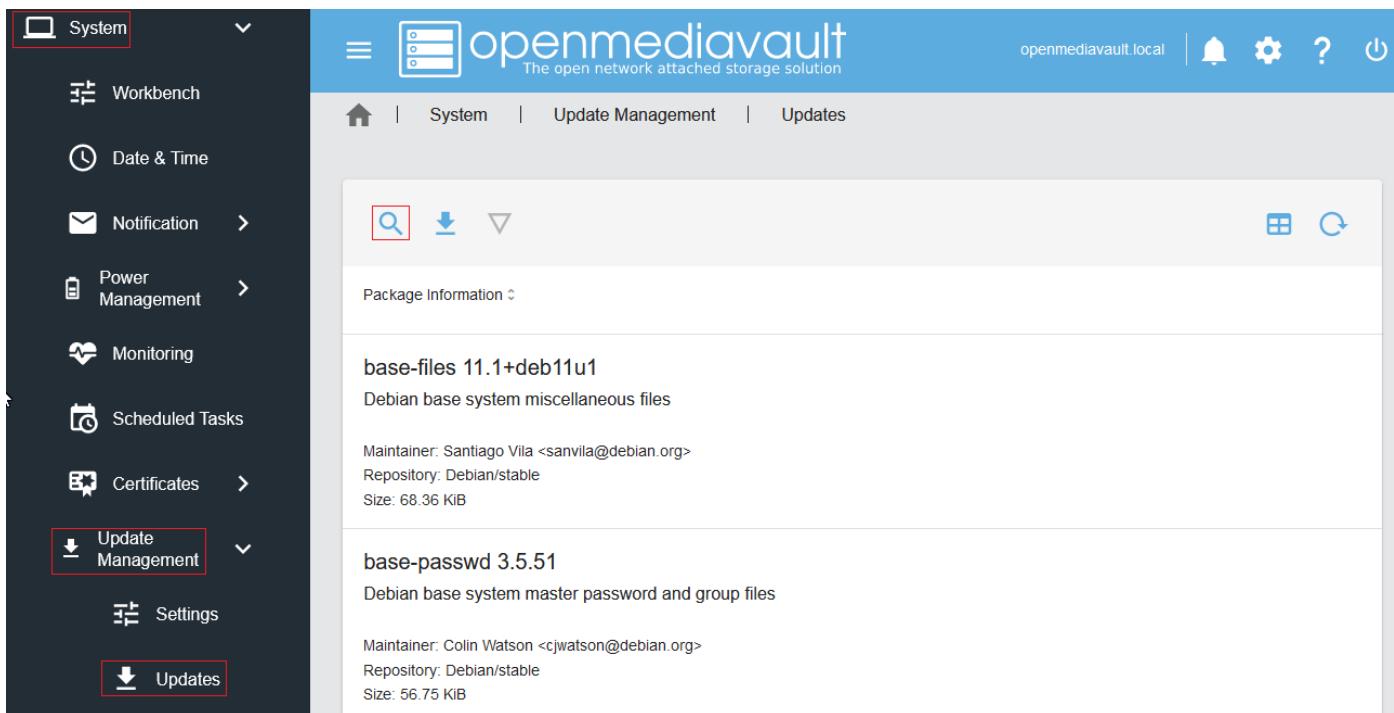


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(Continued)

## Under System, Update Management, Updates:

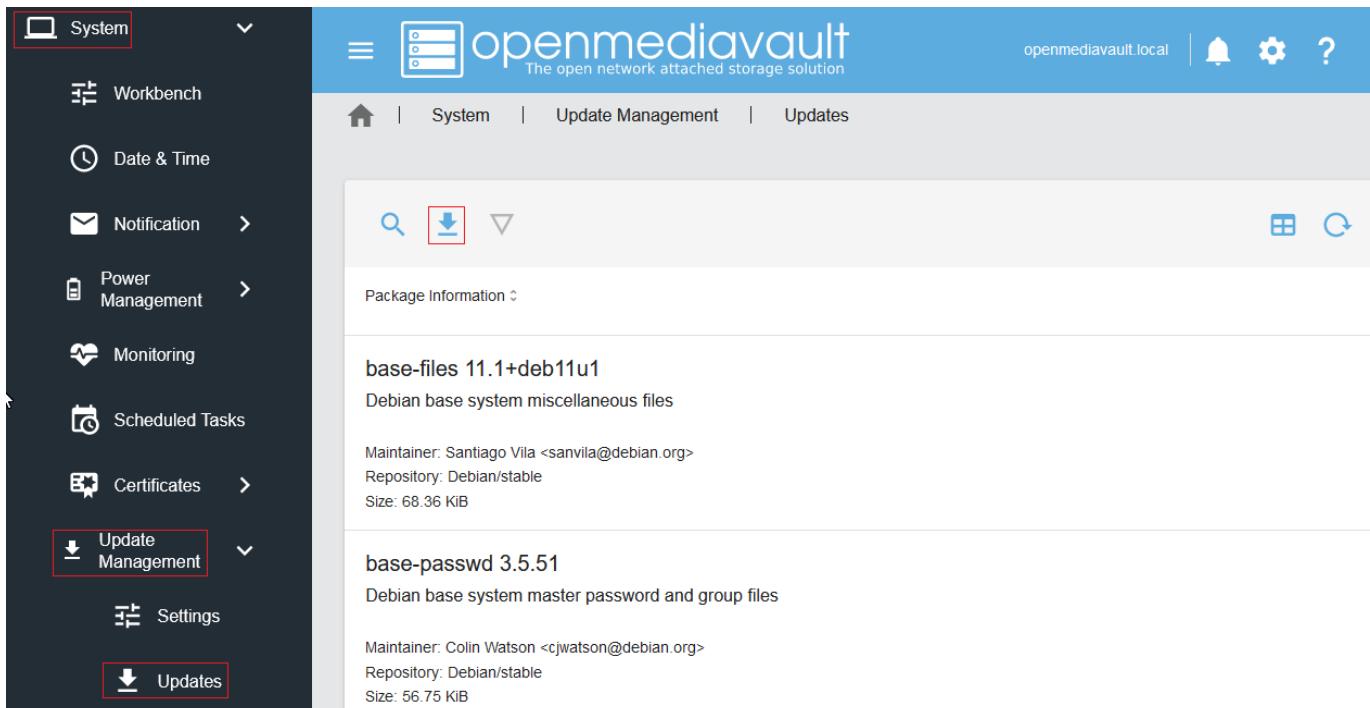
First, click on the **Check** button  , to refresh available updates for your platform.  
(This may take a few minutes.)



The screenshot shows the OpenMediaVault web interface. On the left, a sidebar menu includes 'System', 'Workbench', 'Date & Time', 'Notification', 'Power Management', 'Monitoring', 'Scheduled Tasks', 'Certificates', 'Update Management' (which is currently selected), and 'Settings'. Under 'Update Management', there is a 'Updates' link. The main content area is titled 'openmediavault' and 'The open network attached storage solution'. It shows a breadcrumb navigation: Home | System | Update Management | Updates. Below this is a search bar with a magnifying glass icon, a download icon, and a refresh icon. A table lists package information. The first row is for 'base-files 11.1+deb11u1', described as 'Debian base system miscellaneous files', maintained by Santiago Vila, from the Debian/stable repository, and sized at 68.36 KiB. The second row is for 'base-passwd 3.5.51', described as 'Debian base system master password and group files', maintained by Colin Watson, from the Debian/stable repository, and sized at 56.75 KiB.

When the **Install** button is clicked, all applicable upgrades will be installed. (Recommended for beginners.)

\*\*Note that it is possible to “selectively” upgrade by highlighting specific packages. A click on a package, combined with the **Shift** key can select a range of packages or, if using the **Crtl** key, specific packages can be selected for installation.



This screenshot is identical to the one above, showing the OpenMediaVault web interface. The sidebar and main content area are the same, displaying the 'Update Management' screen with the 'Updates' section. The 'base-files' row is highlighted with a red box around its 'Install' button, indicating it is the target for selection. The other package details ('base-passwd') are also visible below it.

While upgrades are taking place, a progress window will appear. During the upgrade, the “Close” button will be grayed out.

### Upgrade system

```
Reading package lists...
Building dependency tree...
Reading state information...
Calculating upgrade...
The following packages have been kept back:
  linux-image-amd64
The following packages will be upgraded:
  base-files base-passwd bash bind9-host bind9-libs bsdxtrautils
bsutils
  busybox collectd collectd-core console-setup console-setup-linux
debconf
  debconf-i18n distro-info-data fdisk keyboard-configuration libblkid1
  libc-bin libc-110n libc6 libdebcfgclient0 libdns-export1110 libfdisk1
  libgssapi-krb5-2 libisc-export1105 libk5crypto3 libkrb5-3
libkrb5support0
  liblldb2 libmount1 libnftables1 libnss-myhostname libntfs-3g883
  libpam-modules libpam-modules-bin libpam-runtime libpam0g libperl5.32
  libsmartcols1 libss1.1.1 libsystemd0 libudev libuuid1 libwbclient0
libx11-6
  libx11-data locales monit mount nftables ntfs-3g openmediavault
openssl perl
  perl-base perl-modules-5.32 php7.4-bcmath php7.4-cgi php7.4-cli
  php7.4-common php7.4-fpm php7.4-json php7.4-mbstring php7.4-opcache
  php7.4-readline php7.4-xml proftpd-basic proftpd-core proftpd-mod-
crypto
```

Close

When upgrades are complete, the Close button will be active. Click it. The Yellow confirmation banner may appear. Confirm changes to complete the update.

---

## OMV-Extras

((The following does not apply to **SBC** or **i386** users. When using the scripted install, OMV-Extras is installed with openmediavault by default.))

**amd64** users will have a basic set of plugin's appropriate for a basic NAS / File Server. To enable the full range of plugin's available on openmediavault, the installation of OMV-Extras is required.

### Note:

For **amd64** users who installed openmediavault on **SD-cards or USB thumb-drives**; **installing OMV-Extras is a prerequisite** for installing the **flash-memory plugin**. The flash-memory plugin is **required** for flash media boot drives.

## Installing OMV-Extras

To enable OMV-Extras, running a command line is required, as follows:

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

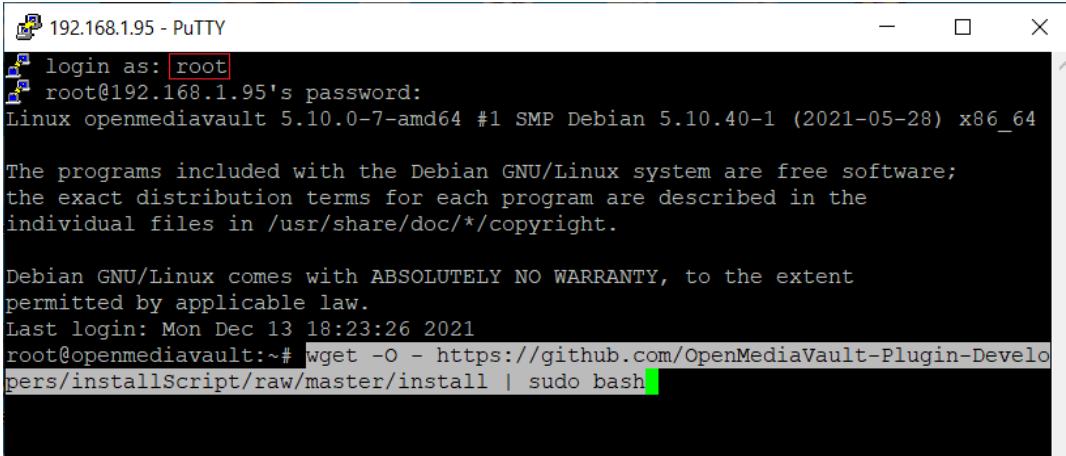
This can be done in two different ways, by SSH client or a scheduled task. Chose one of the two methods as follows.

---

## Installing OMV-Extras using an SSH Client (Preferred)

New users should consider installing and using PuTTY. PuTTY allows users to log into their server from a Windows, Mac, or Linux client. PuTTY will be helpful for on-going maintenance tasks and, if needed, repairs. (Instructions for installing and using PuTTY can be found → [here](#).)

- Open PuTTY and connect to the server's IP address.
- Login as **root**, using the password installed during the installation.
- Copy the command line (above) with (**Ctrl+C**). Click on the PuTTY window and **paste** the command line in using the **right mouse button**.



```
192.168.1.95 - PuTTY
login as: root
root@192.168.1.95's password:
Linux openmediavault 5.10.0-7-amd64 #1 SMP Debian 5.10.40-1 (2021-05-28) 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: Mon Dec 13 18:23:26 2021
root@openmediavault:~# wget -O - https://github.com/OpenMediaVault-Plugin-Developers/installScript/raw/master/install | sudo bash
```

- Hit **Enter**.

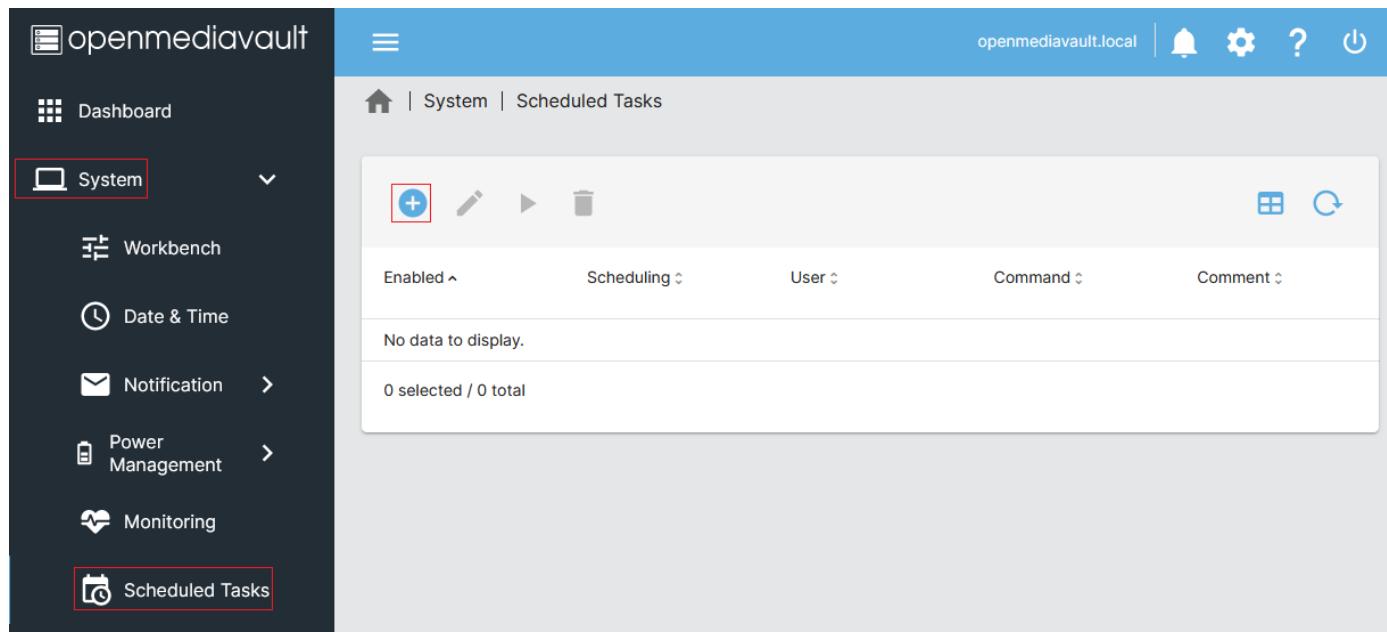
- DO NOT close the PuTTY window or the command will abort. (The window can be minimized.)

When finished, the script will state **Done** and the **root prompt** will return. The window can now be closed.

## Installing OMV-Extras using a Scheduled Task

A scheduled task allows Admin's to run a command line from Openmediavault's GUI.

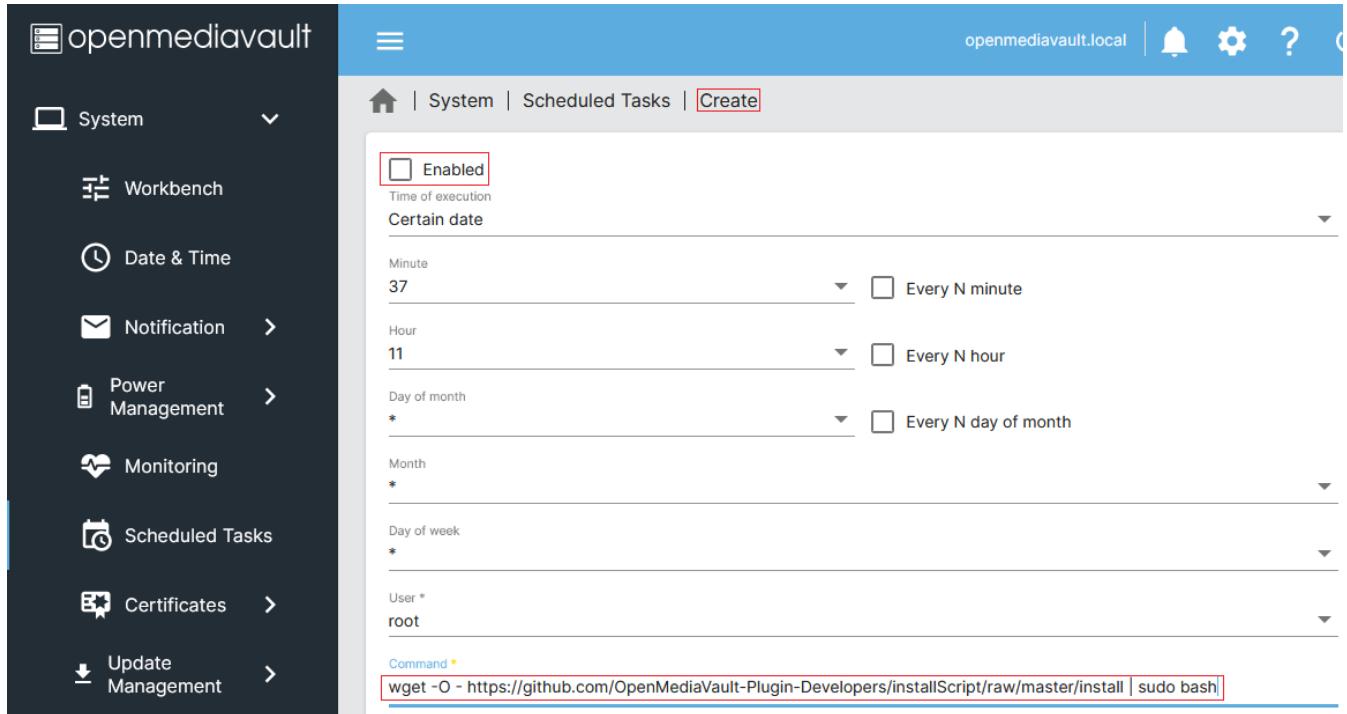
Under **System, Scheduled Tasks**, Click the **Create** button.



(Continued)

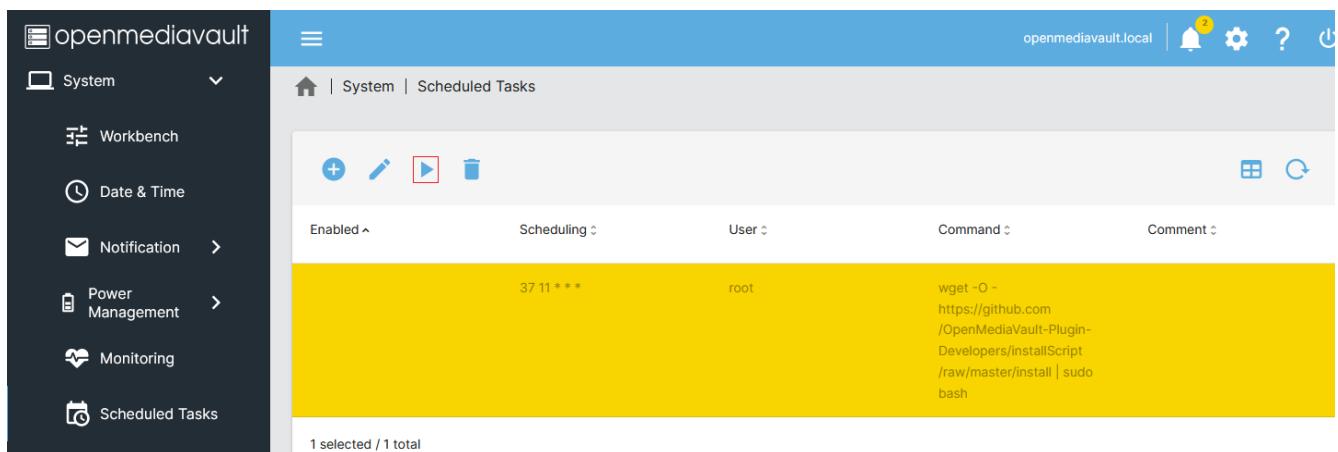
In the **Create** Window:

- **Uncheck Enable.** (In this case, this job will be run manually, using the **Run** button.)
- Copy the Command line above with (**Ctrl+C**) and paste it (**Ctrl+V**) into the **Command** field.



- When finished, scroll down and **Save** the task.
- 

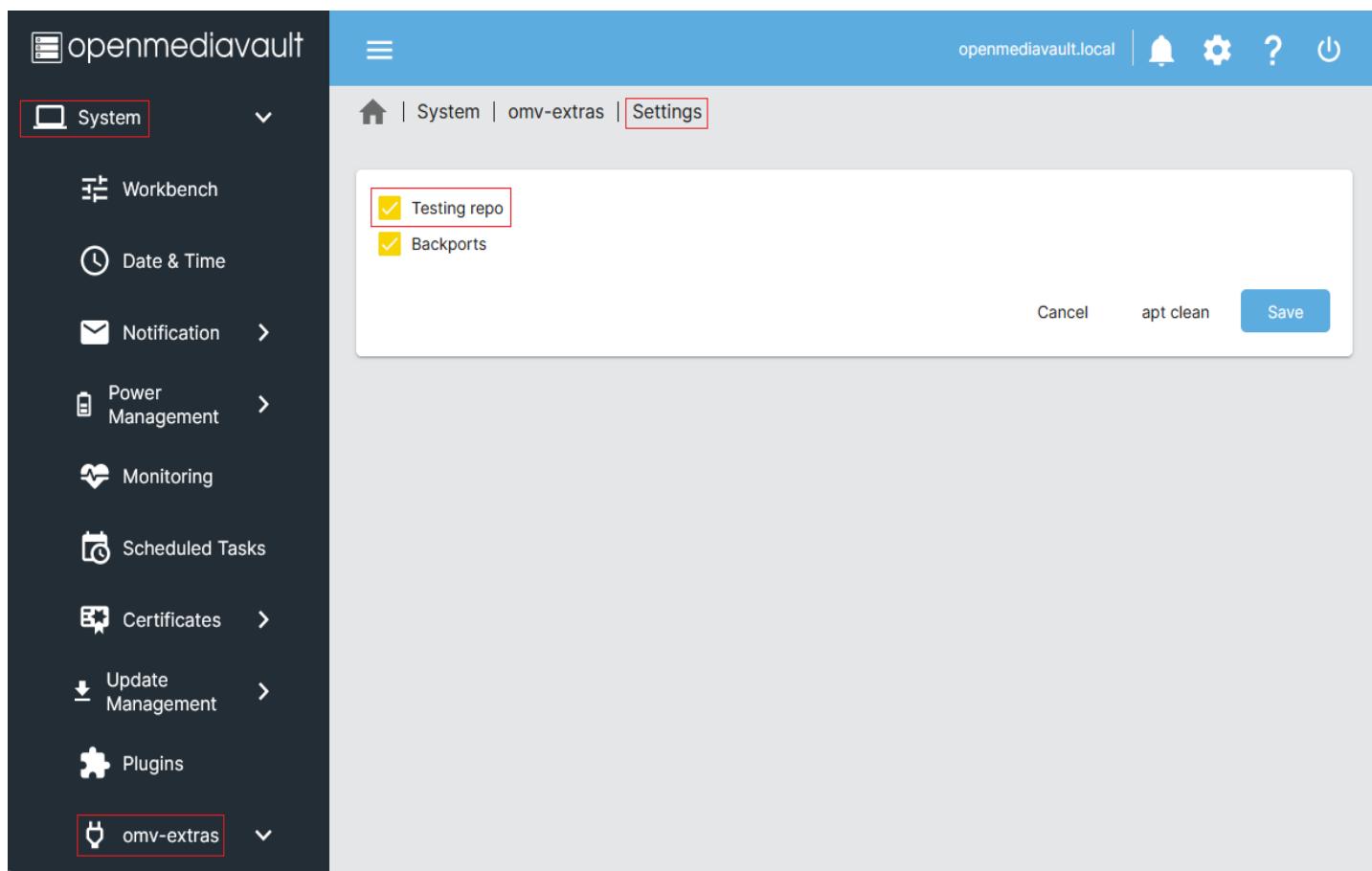
Highlight the **Task** and click the **Run** button.



When the “**Run Scheduled Task**” dialog box pops up, click **Start**. (While the task is running, the **Close** button will be grayed out.) When the task is finished, click the **Close** button.

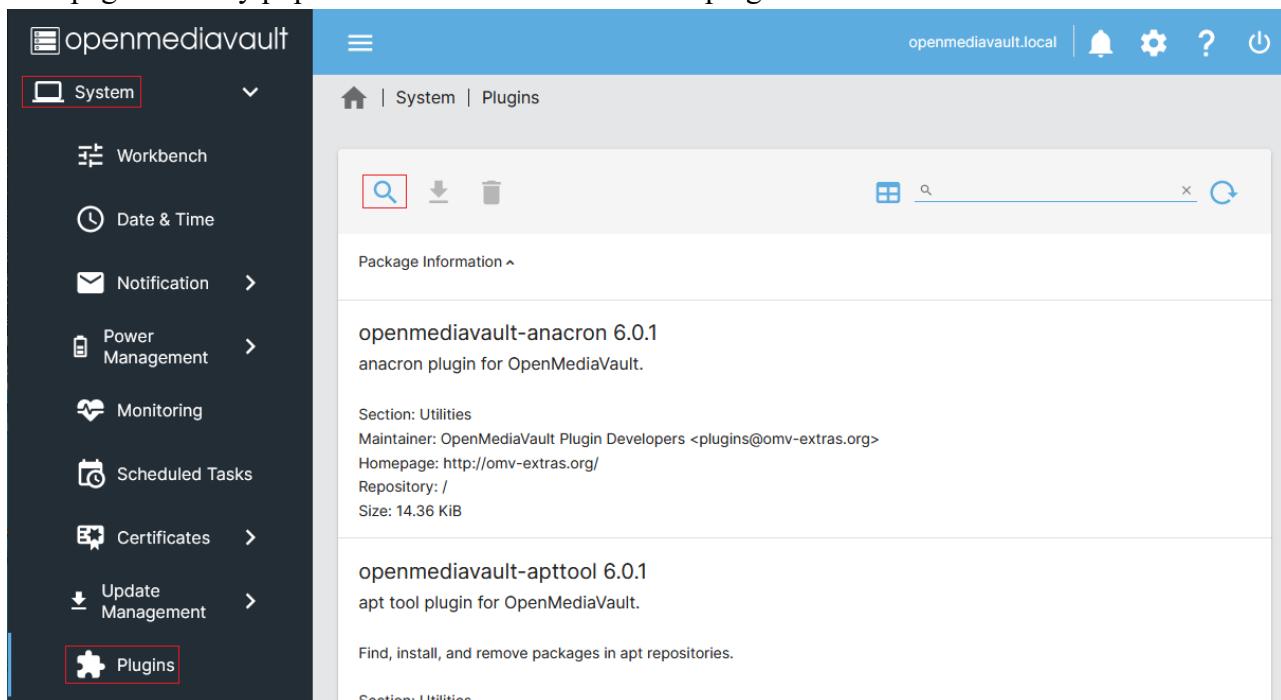
A reboot may be necessary, to **OMV-Extras** to show up in the left column under **System**.

(Optional, but recommended)  
Under System, OMV-Extras, Settings:  
In the Settings, check the box for the Testing repo and click Save.



---

To insure that all plugins are available, go back to System, Plugins, and click the Check button. This will refresh the page and fully populate it with several additional plugins.



## A Basic Data Drive

### General

Openmediavault is capable of setting up basic Linux file systems in the GUI up to, and including “Copy on Write” file systems such as BTRFS and ZFS which combine check summed files, RAID functions, and Logical Volume Management into a single package. However, advanced file systems add complexity which can make administration of a NAS server more challenging for a beginner.

Until some experience is gained, it is recommended that Linux/NAS beginners use single disks with a native Linux file system. In the processes described in the following, **EXT4** will be used with a single data drive.

Some Windows users will want to use USB attached hard drives that are formatted NTFS by Windows. While this is possible, there are technical limitations to consider that are beyond the scope of this guide.

A far easier and better approach would be to format all server connected drives, using openmediavault's GUI, and create a Samba share (SMB/CIF) for Windows clients, as described in [Setting up a Shared Folder](#) and [Creating a SMB/CIF “Samba” share](#). Samba (SMB/CIF) network shares understand the Windows file format and can be configured to accommodate DOS and extended file attributes. Samba shares serve as a “transparent translator” for Windows data storage.

### RAID+USB = Potential Problems

Setting up RAID of any type using “USB to drive” connections is highly discouraged. RAID over USB has known problems. The USB interface (there are several varieties) may filter some the characteristics of hard drives, fail to pass SMART stat's and ATA drive commands, delay the assembly of a RAID array, etc. While USB may work in some RAID cases, it's not as reliable as using a standard hard drive interface. If RAID of any type is considered to be a requirement, drives should be connected with SATA or SAS ports.

If users choose to use RAID over USB connections, it is done at their own risk with the potential for the total loss of stored data. RAID issues involving SBC's, USB connected hard drives, or USB RAID enclosures are not supported on the forum.

RAID is often confused with **backup** which is far more important. For more information, see the explanation of backup, in [Backups and Backup-strategy](#).

### Data Storage - Size matters

In general terms, beginners should do a rough calculation of their storage requirement. When selecting a data drive, the initial fill rate should be between 25 and 50%. As an example, if the calculated data to be stored on the NAS is 1TB, the selected drive should be between 2 and 4TB. With 50%+ drive free space (2 to 3TB) additional data can be accommodated, without the need to expand in the immediate future. When the fill percentage reaches 75%, it's time to plan for more storage.

## Data Drive Set Up

### \*\*Note for Beginners and SBC users\*\*

Openmediavault is designed to separate the Operating System (the boot drive) from data storage. This is “best practice” when setting up a server. Accordingly, openmediavault reserves the drive it is installed on exclusively for the OS. By default, the GUI will not allow the boot drive to be selected when creating a data share. A second hard drive or SSD is required for data storage.

---

(With a data drive installed or connected)

Under Storage, Disks:

**Highlight the data disk** to be used and click on the **Wipe** icon. When prompted for confirmation, click **Yes**, then **Quick**. Finally, close the “**Wiping device**” dialog box.

\*\*Wiping a disk with GPT formatting present may result in an error. Simply re-run the wipe operation a 2<sup>nd</sup> time.\*\*

Device	Model	Serial Number	Vendor	Capacity
/dev/sda	VBOX HARDDISK	VBa66796d1-f57a409c	ATA	36.35 GiB
/dev/sdb	VBOX HARDDISK	VB85ca474d-23c9f08c	ATA	8.00 GiB
/dev/sdc	VBOX HARDDISK	VBcd56be0a-da5b7a56	ATA	8.00 GiB

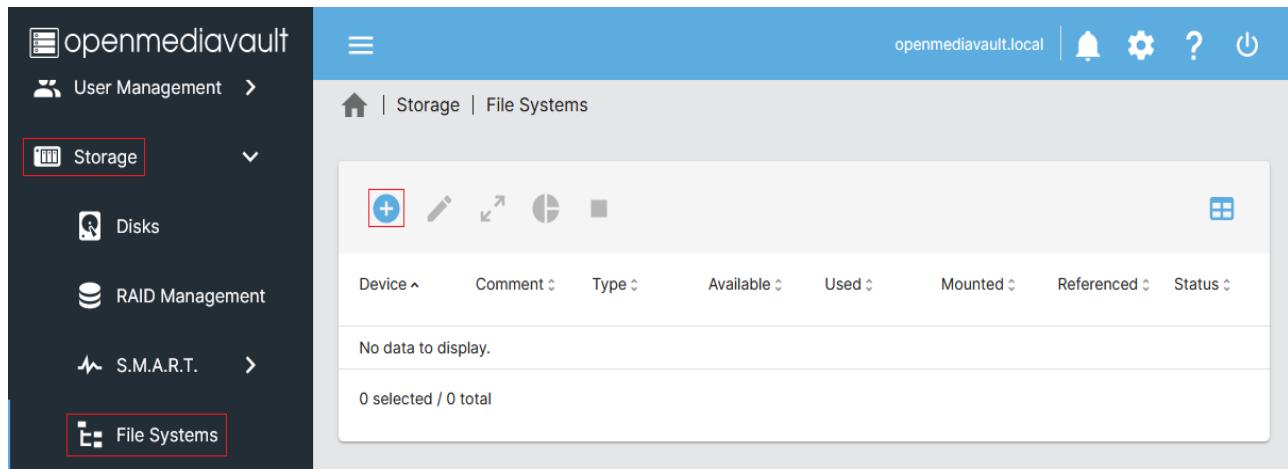
((The first device in the above list **/dev/sda** is the boot drive.))

## Under Storage, File Systems:

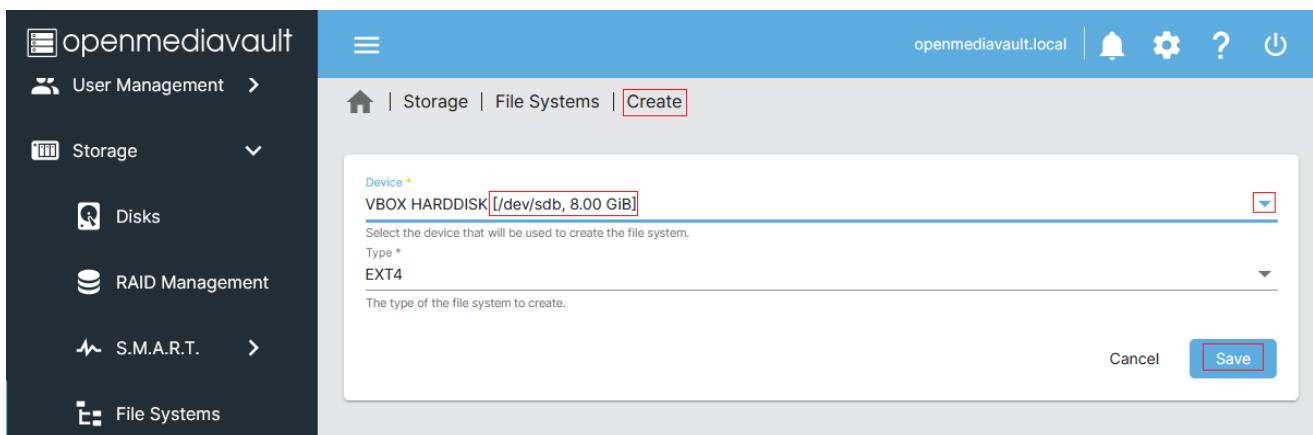
Click the **Create** icon, and click on **Create** in the pop down menu.

Provide a **Label** of your choice, accept the default File System **EXT4** and click on **OK**. Confirm the “**format device**” warning.

Allow some time for the format to complete. When the message “**File system creation has completed successfully**” is displayed, click on **Close**.



In the **Create** window click on the **drop down** arrow and **select the drive** previously wiped. Finally, click **Save**.



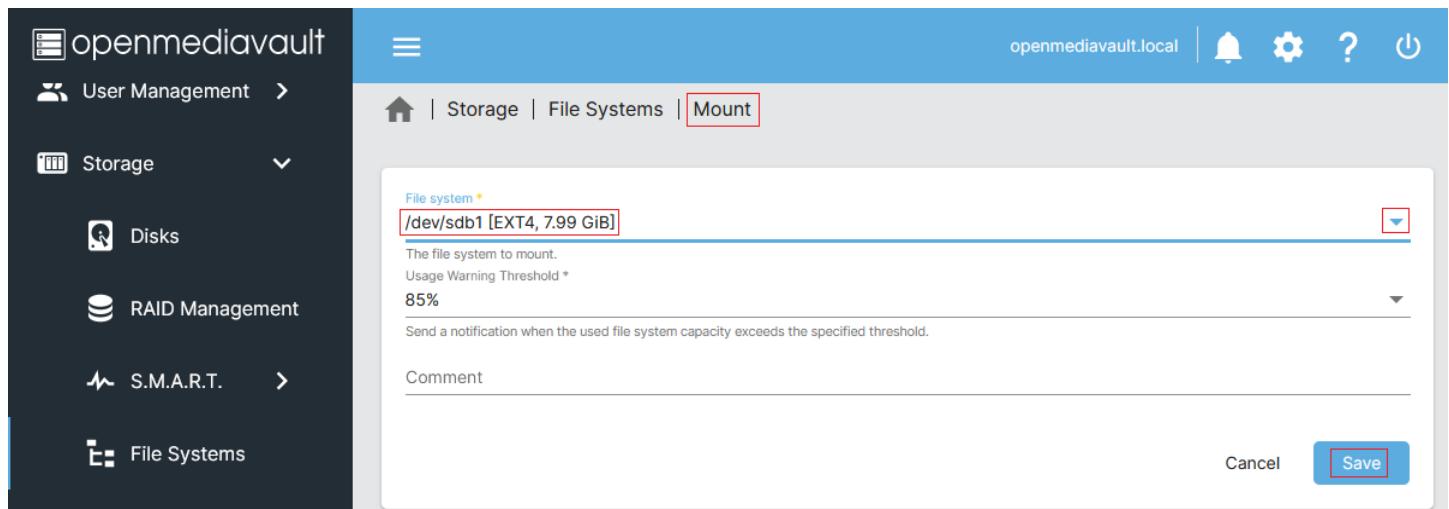
(Continued)

When the format is complete and the **Format** dialog box is **closed**, the **File Systems - Create** window will, automatically, change to the **Mount** window.

\*\*If needed, the **Mount** Window can be found again under, **Storage, File Systems**. Click the **Create** Icon and select **Mount**.\*\*

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In the **Mount** window, click the down arrow in the **File System** field. Select the drive previously formatted, and click **Save**.

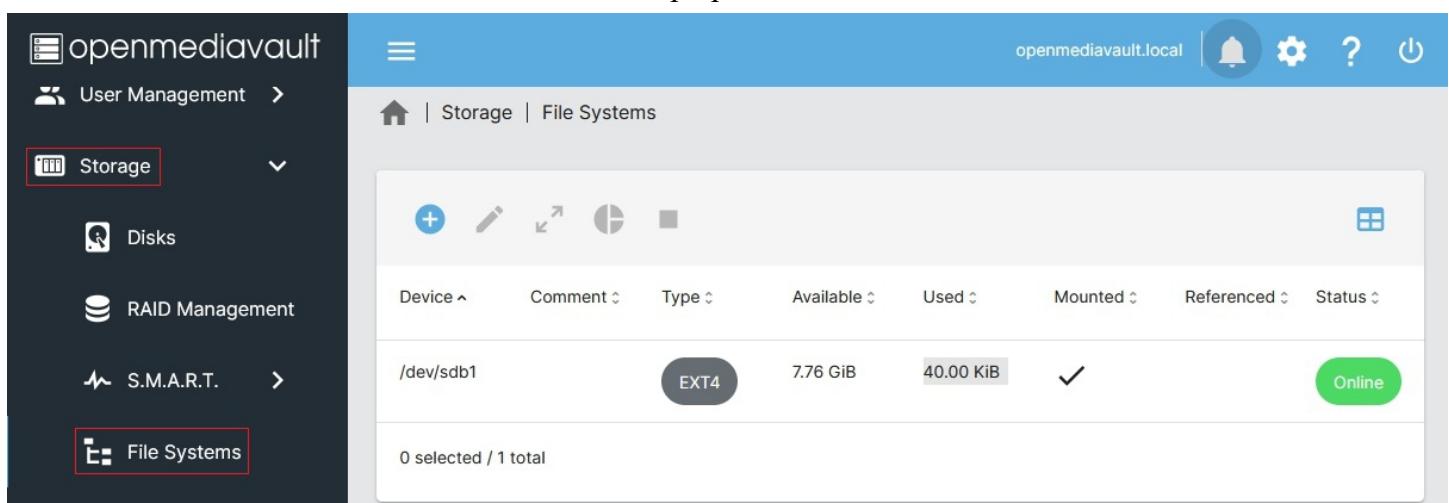


Click **Yes**, in the confirmation dialogue box.

When the yellow confirmation banner appears, click on **Check Mark** to **apply**, and **Yes**.

---

The Data Drive is now prepared for a **Shared Folder**.



# Creating A Network Share

Network shares are the primary reason for setting up and running a NAS. While easy access to data provides convenience to users, storing and backing up data in a centralized location makes it much more manageable.

## Setting up a Shared Folder

The majority of the files and folders in a new openmediavault installation are controlled by the root user. One of the purposes of a **Shared Folder** is to set permissions that will allow regular users access to folders and files used for data storage. A shared folder could also be called a “base share”. The shared folder created in the following will be the foundation for creating a “**Network Share**”, covered later.

Under **Storage**, click on **Shared Folders**, then click on the **Create** button.



In the following example, next to;

**Name:** Add your new shared folder's **name**.

**Device:** Click on the drop down and select the drive that was previously added and formatted.

**Path:** Accept the default

**Permissions:** Click on the drop down and select **Everyone: read/write**

A screenshot of the openmediavault web interface. The left sidebar shows navigation options: Storage (selected), Disks, RAID Management, S.M.A.R.T., File Systems, Shared Folders (selected), and Services. The main content area is titled 'Storage | Shared Folders | Create'. It contains fields for 'Name \*' (set to 'Music'), 'File system \*' (set to '/dev/sdb1 [EXT4, 40.00 KiB (1%) used, 7.76 GiB available]'), 'Relative path \*' (set to 'Music/'), and 'Permissions' (set to 'Everyone: read/write'). A 'Comment' field is present but empty. At the bottom right are 'Cancel' and 'Save' buttons, with 'Save' being highlighted.

Click the **Save** button and **Confirm**.

## The End Result:

The screenshot shows the OpenMediaVault web interface. The left sidebar has a dark theme with white icons and text. The 'Storage' item is highlighted with a red border. The main content area has a light blue header bar with the URL 'openmediavault.local' and various system icons. Below the header is a breadcrumb navigation: Home | Storage | Shared Folders. The main content is a table titled 'Shared Folders'. The table has columns: Name, Device, Relative Path, Absolute Path, Referenced, and Comment. A single row is visible, representing a shared folder named 'Music' located at '/dev/sdb1' with a relative path of 'Music/'. The 'Absolute Path' column shows the full path: '/srv/dev-disk-by-uuid-2e9be4f8-a3ce-40eb-a229-f190df21de22/Music'. The entire row for 'Music' is also highlighted with a red border. At the bottom of the table area, it says '0 selected / 1 total'.

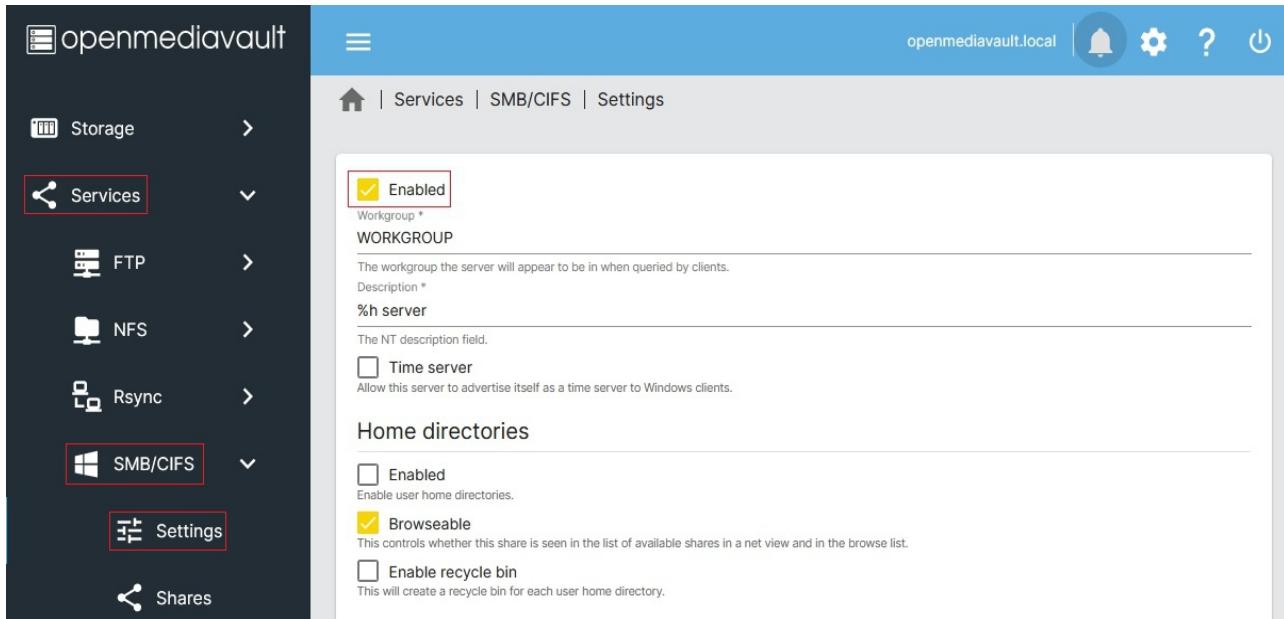
Name	Device	Relative Path	Absolute Path	Referenced	Comment
Music	/dev/sdb1	Music/	/srv/dev-disk-by-uuid-2e9be4f8-a3ce-40eb-a229-f190df21de22/Music		

0 selected / 1 total

## **Creating a SMB/CIF “Samba” Network Share**

In order to make your shared folder viewable in a client's **Windows Explorer**, under **Network**, it's necessary to set up a Samba share using the SMB (Server Messaging Block) protocol. Openmediavault makes setting up a Samba network share an easy task.

Under **Services**, click on **SMB/CIF** then **Settings**. Click in the **Enable** box. If the LAN's workgroup name has been changed from the default, **WORKGROUP**, enter the name in the **Workgroup** field. Leave the remainder of settings in this tab at their defaults.



Scroll down and **Save**. (Confirm with “**Apply**” when the yellow banner pops up.)

(Continued)

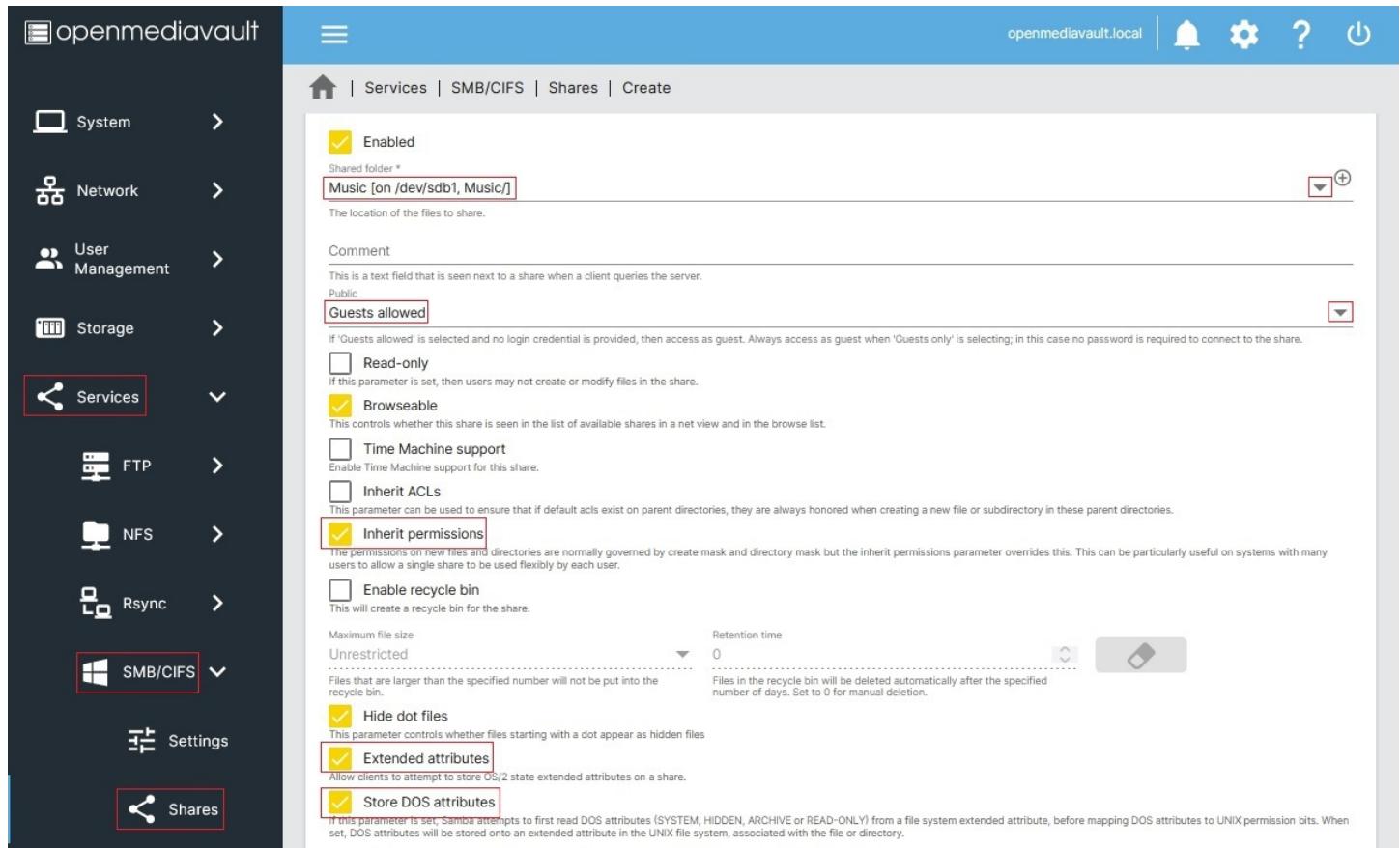
Under **Services, SMB/CIF, Shares** (below Settings) and click on the **Create** button. 

In the Create window, set the following:

**Shared folder \***: Click on the drop down and select **Music** (or the name for the shared folder previously created.)

**Public**: Click on the drop down and select the **Guests Allowed**

Check the boxes for, **Extended attributes** and **Store DOS attributes**. (Leave the remaining settings at defaults.)



Scroll down and Click **Save** and confirm with “**Apply**” when the yellow banner appears.

(Continued)

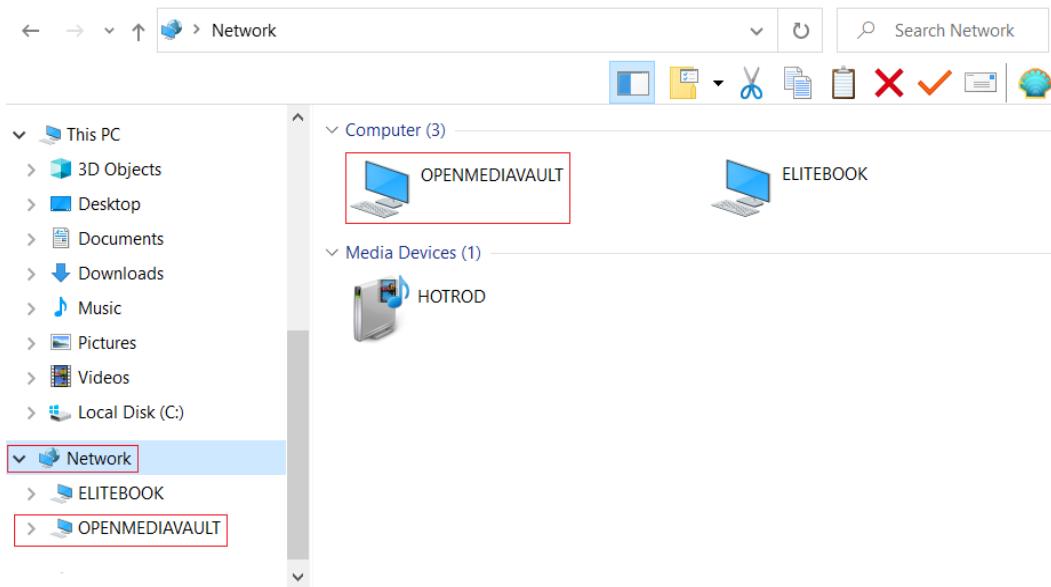
The final result should appear as follows.

The screenshot shows the OpenMediaVault web interface. The left sidebar has a dark theme with white icons and text. It includes 'Services' (selected), 'FTP', 'NFS', 'Rsync', 'SMB/CIFS' (selected), and 'Settings'. The main content area has a light gray background. At the top, there's a blue header bar with the OpenMediaVault logo, the IP address 'openmediavault.local', and various system icons (bell, gear, question mark, power). Below the header, the breadcrumb navigation shows 'Home | Services | SMB/CIFS | Shares'. The main content area displays a table of shared folders. The columns are 'Enabled', 'Shared folder', 'Comment', 'Public', 'Read-only', and 'Browseable'. A single row is visible for 'Music', which is checked under 'Enabled' and 'Browseable', and has a 'Guests allowed' button. At the bottom of the table, it says '0 selected / 1 total'.

## Explore the New Network Share

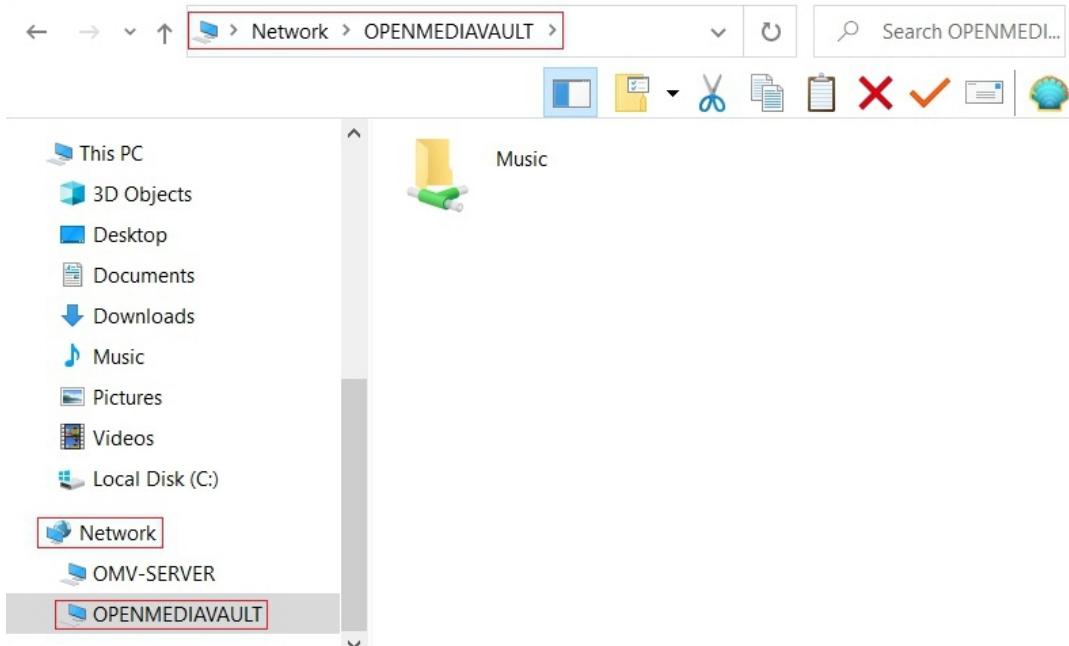
You should now have a browseable Server with a Network share named Music, so let's take a look.

At a network client, open Windows explorer. Scroll down to Network and click on it. There's the new server, OPENMEDIAVAULT.

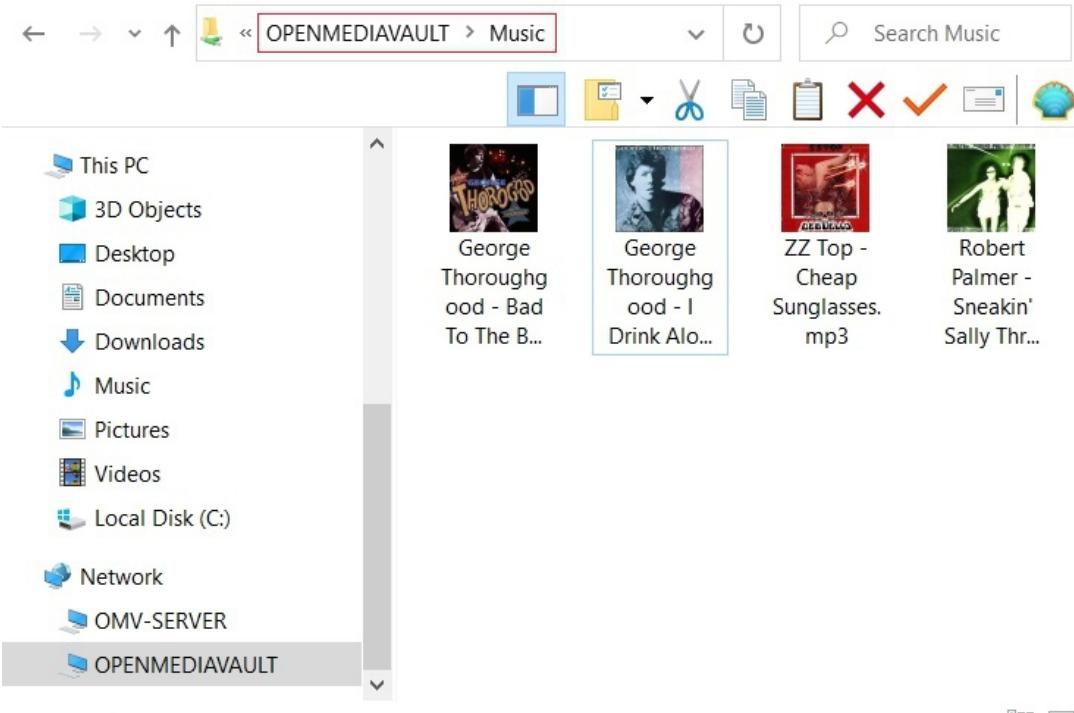


Note: A few minutes may be required for the Windows Network to “Discover” the new server. If users are using **Windows 10** PC's, and the server and share does not appear at a client, see this networking [How To](#).

Now let's look at the server's new Samba share. It's there and browseable.



This share is “writable” with a standard “Copy and Paste”, from a client PC.



**Congratulations!** You now have a functional NAS that can be expanded to accommodate additional network shares. Simply repeat the processes in [Creating A Network Share](#) to create and make additional shares visible on your network.

---

## The Flash Memory Plugin - amd64 users only

amd64 users who installed openmediavault from the ISO image to a **flash media** drive:  
The installation of the Flash Memory plugin is required.

For an explanation of the Flash Memory Plugin, with installation instructions, see this → [document](#).

# Hard Drive Health and SMART

Hard drives are the hardware component most likely to fail, in a server, over time. With continuous use, spinning hard drives last roughly 4 to 7 years, but there are notable exceptions where hard drive life may be significantly shorter or longer.

Given that storage failure is inevitable, the best overall strategy to avoid losing data is 100% backup of the entire data store. Further, it is equally important to monitor the condition of a server's storage media to prevent silent data corruption and, unknowingly, replicating corrupted data to a backup device.

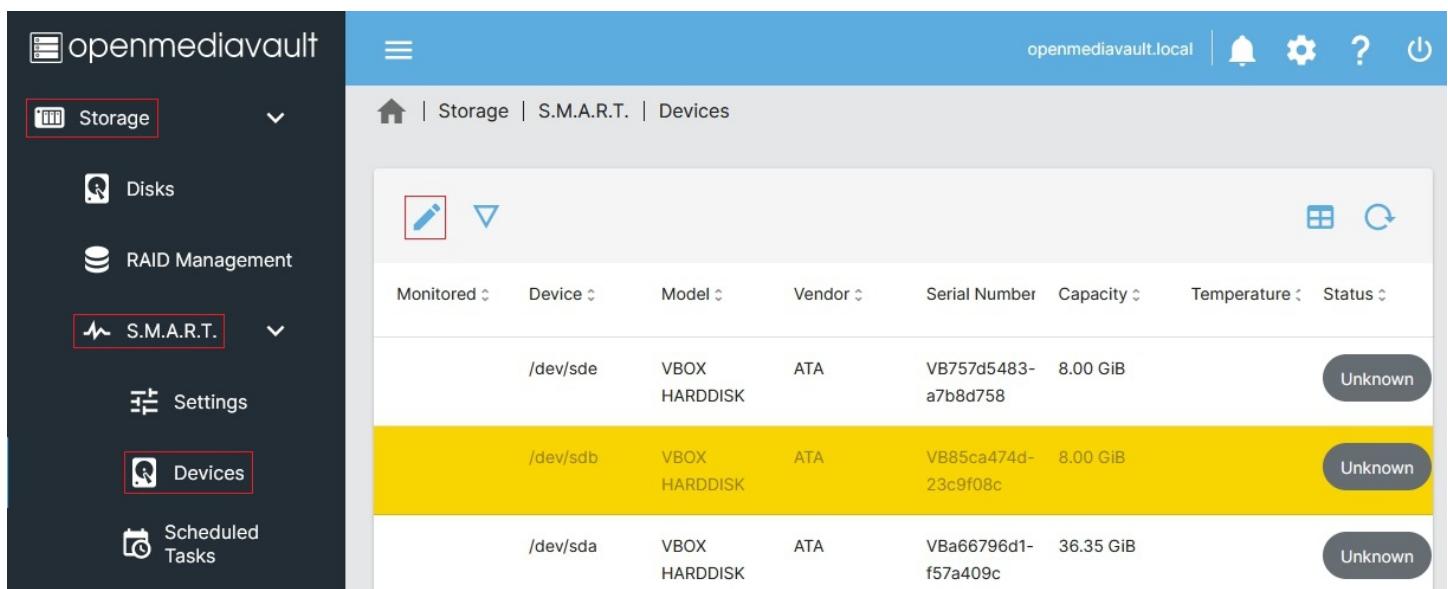
Another characteristic of hard drives is that they rarely fail all at once. While it is possible for a drive to fail abruptly, and without notice, it is a fairly rare occurrence. Typically hard drives begin to fail slowly, gradually accelerating toward a point in time where they become unreadable. This unfortunate circumstance, where data lost to a corrupted or completely unreadable hard drive, might be avoidable with automated testing and monitoring.

To protect the server's data, monitoring devices with SMART is **strongly** recommended.

## Enable SMART

In the **Settings** window, SMART is enabled by default but it's necessary to enable SMART monitoring of each device.

Under **Storage, S.M.A.R.T., Devices**, highlight the drive to be monitored and click on the **Edit** 



Monitored	Device	Model	Vendor	Serial Number	Capacity	Temperature	Status
	/dev/sde	VBOX HARDDISK	ATA	VB757d5483-a7b8d758	8.00 GiB		Unknown
	/dev/sdb	VBOX HARDDISK	ATA	VB85ca474d-23c9f08c	8.00 GiB		Unknown
	/dev/sda	VBOX HARDDISK	ATA	VBa66796d1-f57a409c	36.35 GiB		Unknown

## In Storage, S.M.A.R.T., Devices, Edit:

In the **Device** Field: Select the drive to monitored with the drop down arrow.

Check the box, **Monitoring enabled** and **Save**.

Do this for each drive.

The screenshot shows the openmediavault web interface. On the left, a sidebar menu includes 'Storage', 'Disks', 'RAID Management', 'S.M.A.R.T.', 'Settings', 'Devices' (which is selected and highlighted in red), and 'Scheduled Tasks'. The main content area is titled 'Edit' and shows the 'Device' configuration page. It displays a dropdown menu set to 'VBOX HARDDISK [/dev/sdb, 8.00 GiB]'. Below this, a checkbox labeled 'Monitoring enabled' is checked. The 'Temperature monitoring' section contains two dropdown menus: 'Difference \*' set to 'Use global settings' and 'Maximum \*' also set to 'Use global settings'. At the bottom right are 'Cancel' and 'Save' buttons, with 'Save' being highlighted in red.

Note that some types of flash devices (thumbdrives and SD-cards) may not be monitored.

(Continued)

## **Drive Self-Tests**

Drive self-tests are a tool for early discovery of hard drive issues. Periodic testing of hard drives will uncover the majority of hard drive issues as they begin to develop and, hopefully, before a drive fails completely. The following illustration shows the setup for automated short tests, for an individual hard drive. In this example, a short self-test is run every Sunday at 1:00AM)

A **Short** self-test runs for a few minutes and is an “on-line” procedure, meaning that drives are still accessible during the test. A **Long** self-test is an “off-line” test, meaning drives are not accessible during the test. While a Short test does a quick check of a drive's components, a Long test does everything in a Short test then checks the media (platters) for bad sectors and other imperfections. Repairs are made, if possible, such as reallocating bad sectors.

The down side of a Long test is that it is L-O-N-G, where drive size and spindle speed are factors in the length of the test. Long tests are off-line and, since entire platter surfaces are scanned, it may push a drive that's beginning to fail closer to an actual failure as the test detects and attempts to repair problems.

There are many opinions on which tests to use and the frequency of testing.

- Some data center admins schedule short self-tests once a week and a long test once every 30 to 60 days. (Remember, when scheduling a Long self-test, schedule it for after-hours periods where the server is not in use.)
- Some home NAS admin's schedule a short test, once a week, skipping Long tests altogether.

There's no exact right or wrong but drive self-tests are a tool that should be used as an aid to monitor drive health, in avoiding data corruption and loss.

(Continued)

## Enable Drive Self-Tests

Under **Storage, S.M.A.R.T., Scheduled Tasks**, click on the **Create** button.

The screenshot shows the OpenMediaVault web interface. On the left, a sidebar menu includes 'Storage', 'Disks', 'RAID Management', 'S.M.A.R.T.', 'Settings', 'Devices', and 'Scheduled Tasks'. The 'Storage' item is highlighted with a red border. The main content area is titled 'Storage | S.M.A.R.T. | Scheduled Tasks'. It features a toolbar with icons for '+', edit, play, and delete. Below is a table header with columns: Enabled, Device, Type, Scheduling, and Comment. A message below the table says 'No data to display.' and '0 selected / 0 total'.

In the **Device** field, use the **drop down arrow** to select a drive.

Again, the following selections will run a Short Self-Test every Sunday at 01:00AM

The screenshot shows the 'Create' dialog for a new scheduled task. The sidebar on the left is identical to the previous screenshot. The main area is titled 'Storage | S.M.A.R.T. | Scheduled Tasks | Create'. The 'Enabled' checkbox is checked and highlighted with a red border. The 'Device' dropdown is set to 'VBOX HARDDISK [/dev/sdb, 8.00 GiB]'. Below it, a note says 'S.M.A.R.T. monitoring must be activated for the selected device.' The 'Type' dropdown is set to 'Short self-test'. The 'Hour' dropdown is set to '1'. The 'Day of month' dropdown has an asterisk (\*) and is empty. The 'Month' dropdown has an asterisk (\*) and is empty. The 'Day of week' dropdown is set to 'Sunday'.

Scroll down and **Save**.

## **SMART Attributes**

There are numerous SMART attributes to consider. Unfortunately, only a handful are standardized among the various drive OEM's and many have little to no practical meaning to the end user. Given the variation between drive OEM's, the interpretation of a specific SMART stat may require going to the drive OEM's support site.

A good explanation of individual SMART attributes, and a brief explanation for each, can be found → [here](#).

Where spinning drives are concerned, thanks to the ongoing [BackBlaze drive study](#), a correlation has been made between impending drive failure and specific SMART stat's.

### **SMART stats loosely related to drive failure:**

**SMART 5 – Reallocated\_Sector\_Count.**

**SMART 187 – Reported\_Uncorrectable\_Errors.**

**SMART 188 – Command\_Timeout.**

**SMART 197 – Current\_Pending\_Sector\_Count.**

**SMART 198 – Offline\_Uncorrectable.**

Any one count of the above stats may be meaningless, but it should be noted and closely monitored. If any of the above begin to increment upward, as of the 3rd or 4th count, home or small business admins might want to consider ordering a replacement drive.

### **SMART 199 - UltraDMA CRC errors**

While not directly linked to drive failure, it's worth noting that counts on SMART stat 199 are usually hardware or cable related. This may be due to loose or a bad SATA / SAS cable, a connectivity problem, or an interface issue of some kind with the motherboard or the drive interface board.

## **Drive Failure - The Bottom Line**

When using scheduled drive self-tests in conjunction with SMART E-mail notifications ([see Server Notifications](#)), server admin's and home users will be afforded better protection against the data corruption and data loss due to a failing hard drive.

(Continued)

## Final Installation Notes:

1. Permissions for the shared folder created in this guide, and the SMB network share layered on top of it, are completely open. While these permission settings are OK for home environments, the server should not be exposed to the Internet by port forwarding. (Ports 80 or 443, for example.)  
As users gain knowledge and experience, they should consider tightening up permissions on the underlying Shared Folders and SMB/CIFS network shares.
2. **\*Important\*** Put your new server on a good surge suppression power strip, at the absolute minimum. An **UPS** system is **preferred** and is best practice. In consumer electronics, the majority of failures are related to power supplies and adverse conditions created by line power. The prime causes of power issues and failures are short duration surges, high voltage spikes, brown-outs, and sustained over-volt or under-volt conditions. A good UPS system is designed to counteract these problems. Further, the file system on the boot drive is at risk of corruption from sudden (dirty) shutdowns due to power loss. An UPS minimizes these risks.

## Utilities to Help With Openmediavault Management

Being able to work from the command line would be very useful to users, who may need to gather detailed information on the OS and platform hardware, for troubleshooting and for an occasional edit to a configuration file. Much can be learned with the following utilities that allow users to look at openmediavault “under the hood”.

---

### ***WinSCP***

WinSCP allows users, beginners and experienced alike, to visualize the Linux file structure in a manner similar to Windows Explorer. WinSCP installs on a Window Client and connects to Linux servers, allowing users to work with their server remotely.

One of the more useful features of WinSCP is that it gives users the ability to edit Linux configuration files with a familiar editor like Notepad. For experienced Linux Desktop users who would like to use WinSCP, it will run from WINE (in Linux Mint, Ubuntu and others).

WinSCP can be downloaded here. -> [WinSCP](#)

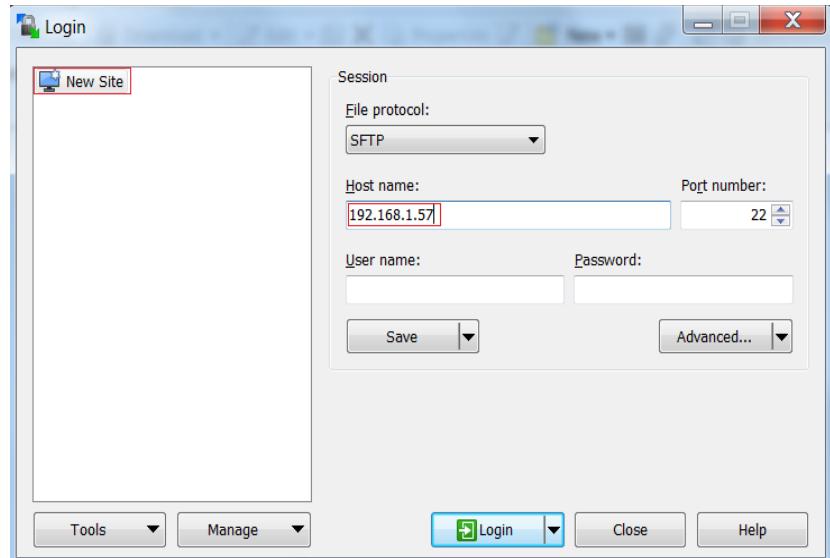
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### **Installing WinSCP**

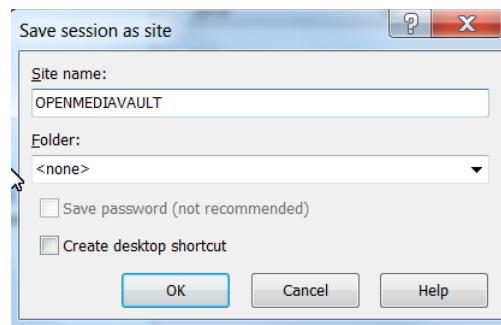
During the installation process, if prompted, select the **Explorer Interface**. This display shows the remote file system only. If the Explorer Interface is not offered it can be selected after the installation, under **View, Preferences, Environment, Interface**.

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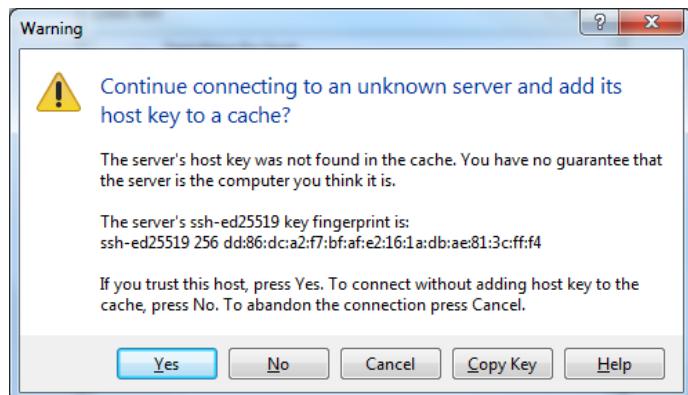
On the first run, the login screen is presented. Click on **New Site** and type in the **IP address** of the new server.  
Click on **Save**.



In Site name: The server's IP address is displayed. Optionally, the site name can be changed. If using WinSCP for a single server, a desktop short cut may be useful. Click on **OK**.



The **login screen** will come back. Double click on the new site name. The following is normal for the first SSH connection to any client or server. Click **Yes**.



The first prompt is for the username. Enter **root**

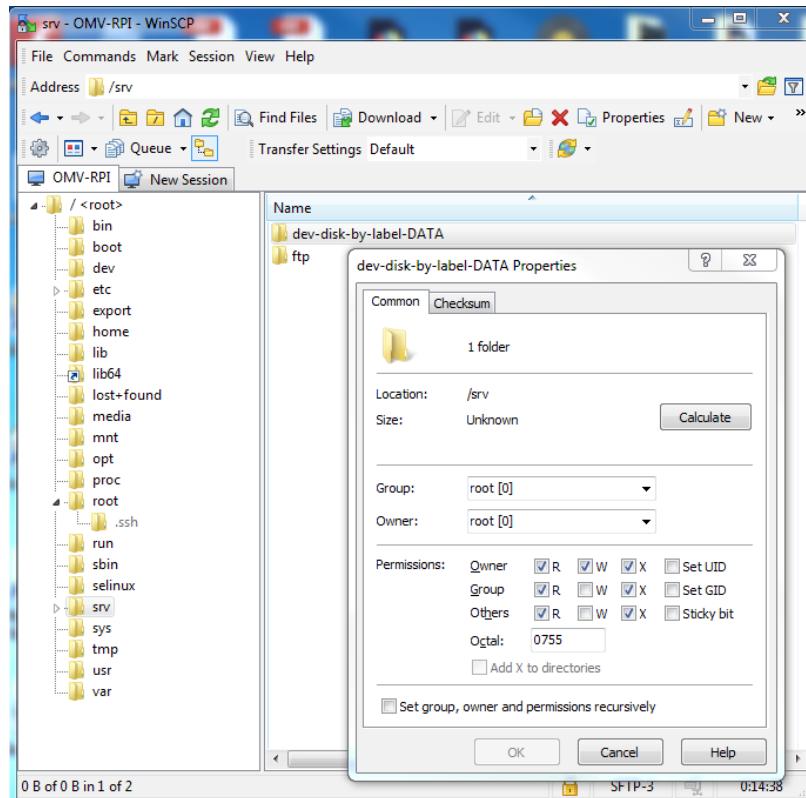
The second prompt is for the root password. Enter the root **password**.

\*\* R-PI users would enter the user **pi** and the pi password or a previously added user with admin privileges. Due to the restrictions of a non-root “sudo” environment, WinSCP will be restricted from root functions. This restriction can be mitigated, but it's beyond the scope of this guide. The following link may of assistance:  
[Connect as root \(sudo\) using WINSCP](#) \*\*

(Continued)

WinSCP opens with a two pane window. Selections are made in the left pane; operations are done on the right. The folder **srv** was selected on the left. **dev-disk-by-label-DATA** was highlighted on the right. A right click of the mouse brings up an operations menu. **Properties** was selected. In this particular popup, permissions could be changed. (Without backup, this is NOT a recommended action for beginners. **Backup** is covered later.)

**\*\*Note\*\*:** As of **openmediavault 5.5.20**, data drives are mounted using **UUID** (Universally Unique Identifier). In WinSCP, the same path might appear as: /srv/dev-disk-by-**uuid-f188c8ad-74d3-443a-a23e-89711270367d** (This is an example only – all disks will have a unique identifier.)



In a similar manner, a configuration file can be highlighted in the right pane. A right click of the mouse brings up the menu, select **EDIT** and Windows notepad, or the internal editor can be used for editing configuration files. Beginners will find either choice to be easier than using **nano** or **vi** on the Linux command line.

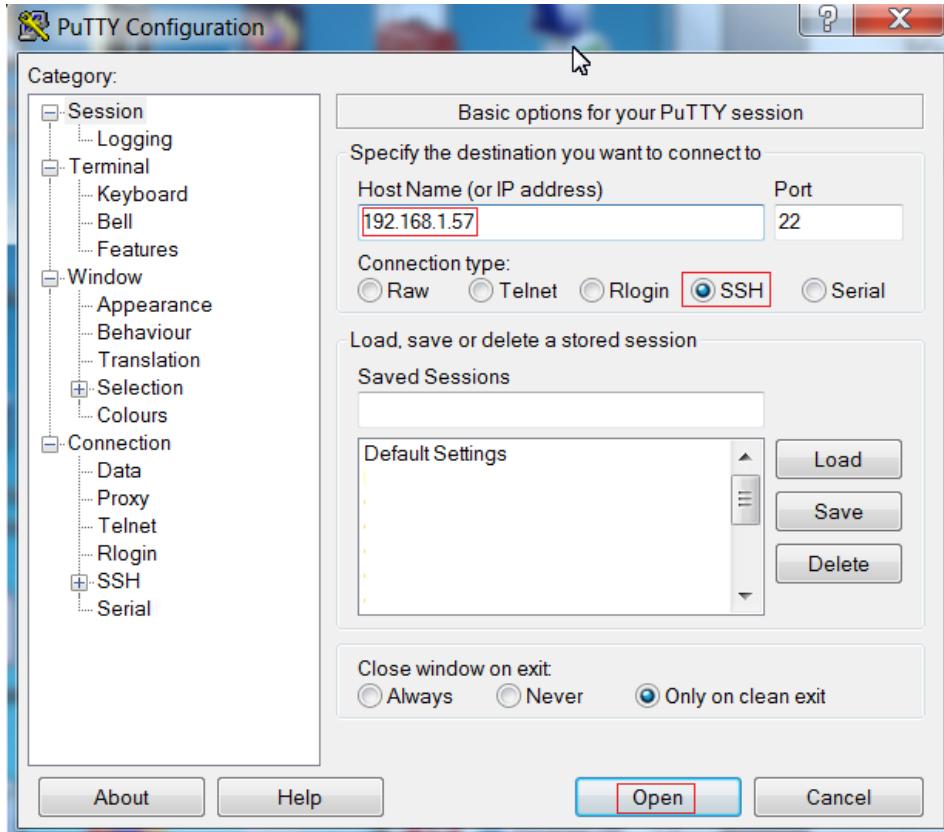
While they can be done in WinSCP, very large file copies, moves, or deletes are best done using [\*\*Midnight Commander\*\*](#).

(Continued)

## PuTTY

PuTTY is similar to a Window's command prompt, but it allows users to work on openmediavault's command line from a remote PC. If PuTTY was not installed as part of your installation process, install it on a Windows PC. It's available here. ➔ [PuTTY](#)

Using PuTTY is as simple as typing in the server's IP address in the **Host Name** field and clicking on open. There will be a warning for a first time connection – click **OK**. Then, login on the command line.



## MC (*Midnight Commander*)

Midnight Commander is a command line file utility that utilizes a very cleverly created graphical interface. It's very useful for navigating through openmediavault's directory structure. It excels in efficient copying, moving, and deleting folders and files.

The installation process:

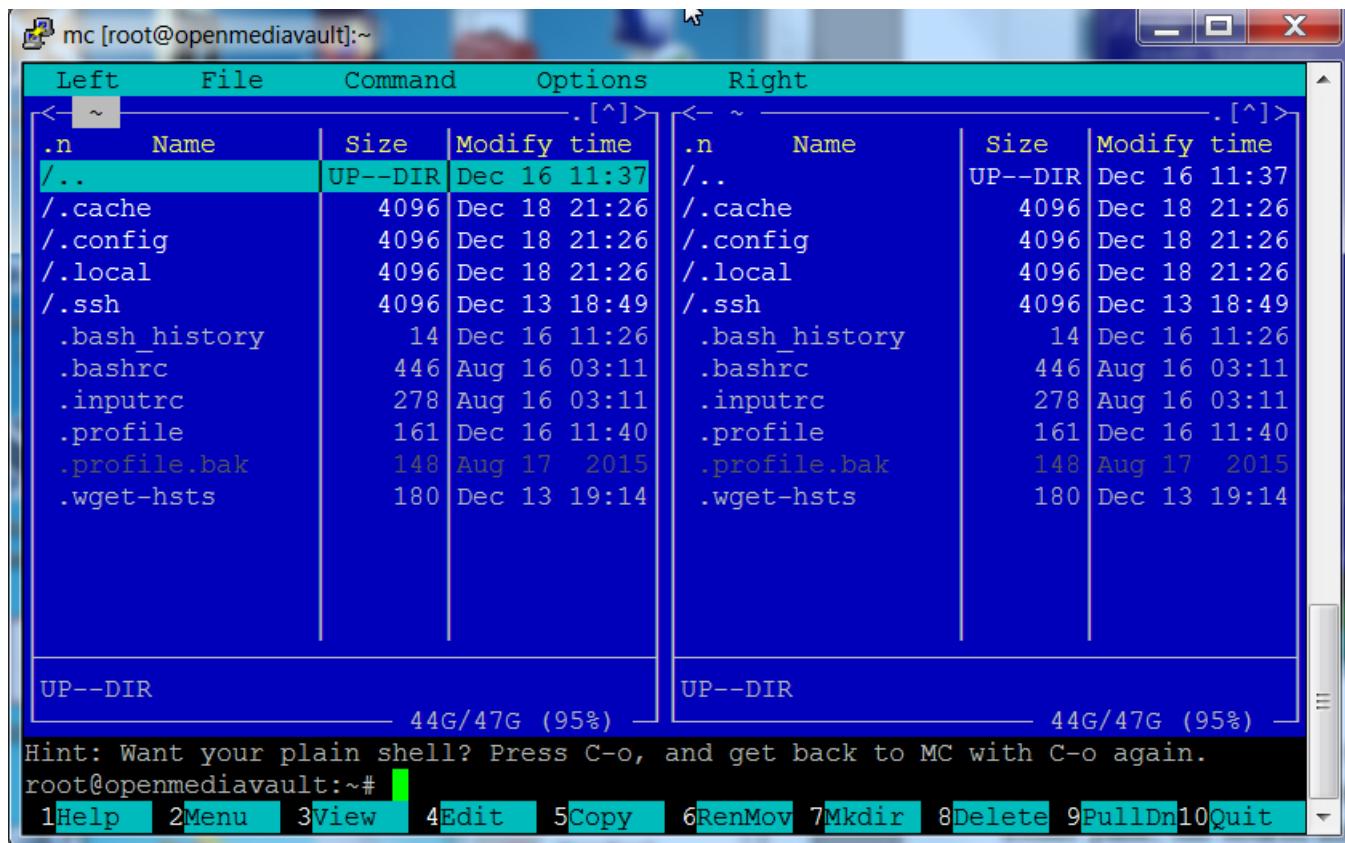
- Use **PuTTY** to get to openmediavault's command line.
- Log in as **root**.
- On the command line type the following; **apt-get install mc**
- When prompted continue with "**Y**"

(R-PI users will log in as **pi** and use **sudo apt-get install mc**)

When the installation finishes, on the command line, type **mc**

Midnight Command is a two pane window where the source is the left pane and the destination is the right pane. Copies and moves are done, left to right. Since it's possible to navigate to any location on the openmediavault host, in either pane, the source and destination can be set for any location.

A mouse works in MC. Click on the various menu items at the top and bottom, to select them. Similarly, files or folders can be selected by clicking on them. To level up, click on the **..** at the top left of either window.



**\*\*Beginners Note:\*\*** Midnight Commander is powerful and potentially dangerous. MC does not have “**Undo**”. A careless operation on the boot drive, such as accidental file “**Move**” or “**Delete**”, can ruin your installation. Work with MC carefully and before doing anything extensive with it, the appropriate backups are recommended. [Operating System Backup – Data Backup](#).

(Continued)

## **Win32DiskImager**

Win32DiskImager is a utility that's designed to write raw image files to SD-cards and USB drives. What makes it stand out from similar utilities is that it can “read” a flash drive and create an image file from the contents of the device. If users decide to use an SD-card or a USB thumb-drive as a boot drive; the ability to read flash media devices makes [Win32DiskImager](#) useful for cloning flash boot drives.

\*\*There is a [known bug](#) in Win32DiskImager V1.0.0\*\*

While the exact cause of the bug has not been determined, the number of affected users is very small. However, this bug [requires](#) the use of the **Verify Only** button after every operation. If the Verification hash is successful, the operation is good. If Verification fails, the read or write has failed and the image file or flashed drive cannot be used.

Details for using Win32DiskImager are found in [Operating System Backup](#), under [Cloning Flash Media](#).

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## **Etcher**

[Etcher](#) is a utility similar to Win32DiskImager that installs on a Windows client. It's designed to write an image files to flash media. In addition to the write operation, Etcher verifies the the image has been written correctly as part of the write operation. With two available USB ports, the latest version of Etcher will clone flash media in an all-in-one operation.

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## **Virtual Box**

Virtual Box is a cross platform virtualization platform that will work with both servers and clients. For learning about openmediavault, there simply is no better tool than working with an openmediavault Virtual Machine (VM). An openmediavault VM can be built, configured, and put on the local network complete with shares, in the same manner as real hardware. VM's can be created, cloned, used for test beds, and destroyed without consequence. Many advanced openmediavault users fully test upgrades, Docker's, plugin's, server add-ons and changes in configuration, in openmediavault VM's before upgrading or reconfiguring their real-world servers.

If users have a Windows client with at least 6GB RAM and plenty of hard disk space, installing Virtual Box on the client to host test VM's of Openmediavault is highly recommended. → [Virtual Box](#)

# Backups and Backup-strategy

It's important to understand the concept of backup and why backup is important. In understanding the concept of backup, an automotive analogy may be helpful.

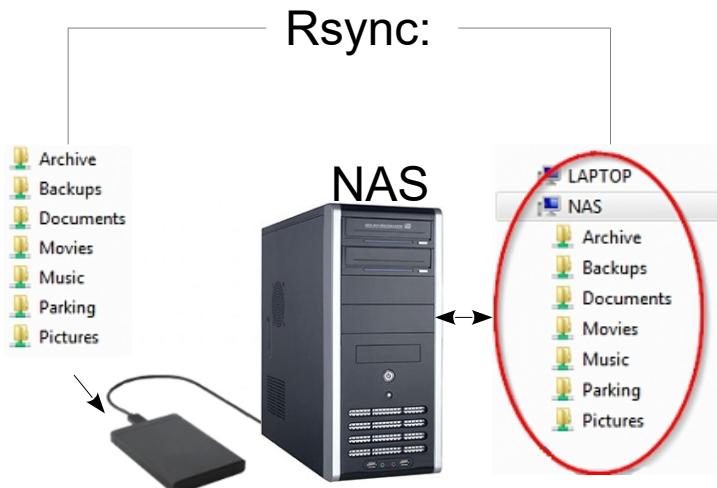
If one has a car and that car has a spare tire, is the “car” backed up? The answer is “No”. There are a great number of things that can happen to a car that can disable it, until parts are replaced or the car is otherwise repaired. These items would include the battery, alternator, any component of the ignition system, the transmission, the cooling system, etc., etc. To backup the car, a second car is needed. This is why using RAID of any type is not backup. At best, RAID could be thought of as a “spare tire” for a PC.

Where the automotive analogy fails, generally speaking, is that when a car fails it can be repaired. In computing, if a user's personal data is lost without backup, it's permanently lost. There are many possible events where data may be corrupted beyond recovery (viruses, ransomware) or is completely lost due to drive failures, a failing drive controller, or other hardware failures. This is why real data back up is far more important than the computing equivalent of a spare tire (RAID).

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## Backing Up Data

### First Level Backup: Replication To an External Drive



The scenario depicted in this graphic represents true backup. There are two full copies of data. With two separate copies, this backup strategy is superior to traditional RAID1 for home or small business use cases for a couple reasons.

- Rsync can be used with most USB connected hard drives where RAID1, when used with USB connected drives, is notably unreliable.
- If there's a drive error, an accidental deletion, a virus, or other data related issue; in RAID1 the effects are instantly replicated to the second drive. With Rsync, both drives are independent and, in most cases, the second disk will be available after the source disk fails. In any case, the Rsync replication interval allows time for admin intervention before the second disk is affected.

## Full Disk Mirroring / Backup with Rsync

While individual shared folders can be replicated using **Services**, **Rsync**, a more efficient approach is using an Rsync Command line, in a scheduled job, under **System**, **Scheduled Jobs** to mirror a drive. This method allows for replicating the file and folder contents of an entire data drive, to an external drive or a second internal drive of adequate size.

- To implement something similar to the following example; it's necessary to add and **mount** a destination drive, in accordance with the section labeled [A Basic Data Drive](#).
  - When formatted, the hard drives used in this example were labeled to indicate their function. This is a good practice that will help new users to easily identify drives and avoid admin mistakes.
  - Dissimilar sized drives can be used, provide that the destination drive is large enough to hold the source drive's data.
- 

The following Rsync command line is an example of how a data drive can be mirrored onto a second drive.

**rsync -av --delete /srv/dev-disk-by-label-DATA/ /srv/dev-disk-by-label-RSYNC/**

The source drive is on the left (**green**) and the destination is on the right (**blue**). In this example, the entire contents of **dev-disk-by-label-DATA** would be copied to **dev-disk-by-label-RSYNC**

The switches are:

**-a Archive Mode.** Archive mode adds an array of options to an Rsync command. It's the equivalent of switches -r -l -p -t -g -o and -D which copies files and folders recursively, copies links and devices, preserves permissions, groups, owners and file time stamps.

**-v Increase Verbosity.** This can be useful when examining Rsync command output or log files.

**--delete Deletes files in the destination drive that are not in the source.** If accidental deletion protection is desired, this switch could be left out of the command line. However, from time to time, it would necessary to be temporarily re-added the **--delete** switch to purge previously deleted and unwanted files from the destination drive.

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To find the appropriate Rsync command line entries for the user's server, under **Storage, File Systems** click on **down arrow** at the top right edge of a column. On the pop down menu, select **Columns** and check the **Mount Point** box.

Under the **Mount Point** column (red boxes) are the full paths needed for the source drive (in this example **/srv/dev-disk-by-label-DATA**) and the destination drive (in this example **/srv/dev-disk-by-label-RSYNC**).

Device(s)	Label	Fsype...	Device	Used	Mounted	Mount Point	Referenced	Status
/dev/mmcblk0			<input checked="" type="checkbox"/> Device(s)	21.62 MiB	Yes	/boot	No	Online
/dev/mmcblk0			<input type="checkbox"/> Identify As	1.26 GiB	Yes	/	Yes	Online
/dev/sda1			<input checked="" type="checkbox"/> Label	515.00 MiB	Yes	/srv/dev-disk-by-label-DATA	Yes	Online
/dev/sda1	RSYNC	ext4	<input type="checkbox"/> Parent Device	514.99 MiB	Yes	/srv/dev-disk-by-label-RSYNC	No	Online
			<input checked="" type="checkbox"/> Filesystem Type					
			<input checked="" type="checkbox"/> Total					
			<input checked="" type="checkbox"/> Available					
			<input checked="" type="checkbox"/> Used					
			<input checked="" type="checkbox"/> Mounted					
			<input checked="" type="checkbox"/> Mount Point					
			<input checked="" type="checkbox"/> Referenced					
			<input checked="" type="checkbox"/> Status					

Displaying items 1 - 4 of 4

**\*\*Note\*\*:** As of **openmediavault 5.5.20**, data drives are mounted using **UUID** (Universally Unique Identifier). The path under the **Mount Point** column will be similar to: **/srv/dev-disk-by-uuid-f188c8ad-74d3-443a-a23e-89711270367d** (This is an example only – all disks will have a unique identifier.)

To avoid source and destination drive confusion when using UUID's:  
The **Mount Point** Column, above, can be moved by “left clicking” on the column head, holding and dragging it to the **Devices** and **Label** columns.

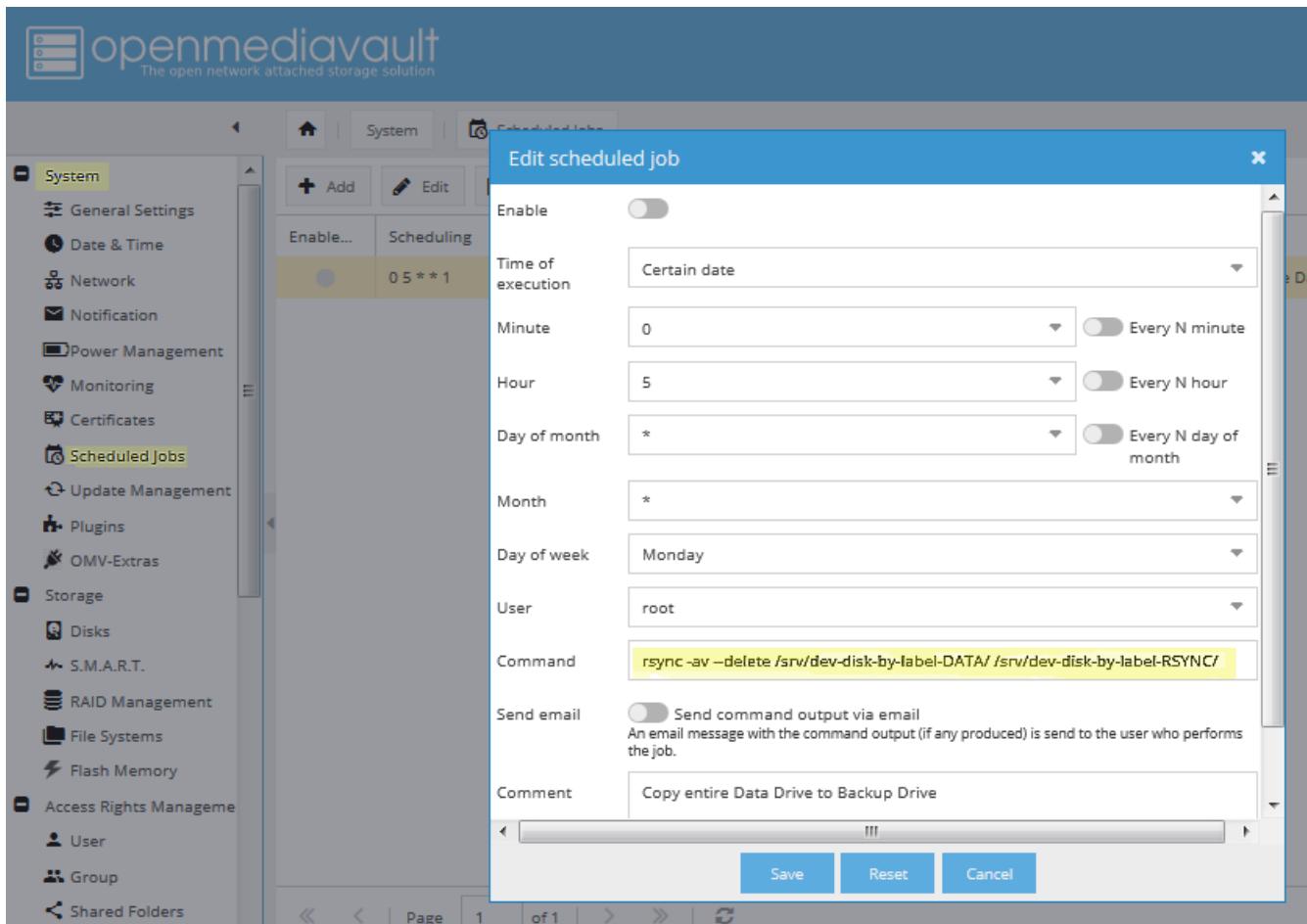
To construct the appropriate command line, add a **slash “/”** after each drive path, in the full command line as follows:

```
rsync -av --delete /srv/dev-disk-by-label-DATA/ /srv/dev-disk-by-label-RSYNC/
```

### **\*\*Beginners Warning, Note and Sanity Check\*\***

- Getting the source (left) and destination (right) in the correct order, in the command line, is **crucial**. If they're accidentally reversed, the empty destination drive will delete all data on the source drive.
- The safest option would be to leave the switch **--delete** out of the command line until it is confirmed that two full copies exist.

As previously mentioned, this Rsync operation can be manually run or automated under: **System, Scheduled Jobs**, as shown in the illustration. Copy and paste the Rsync command line into the command box and select scheduling parameters as desired.



## User Options for Backup:

### - Automated:

As configured above, and if **ENABLED** (green), this Scheduled Job will run the Rsync command line once a week, on Monday, at 05:00AM. After the first run of the command, which may take an extended period to complete, a week or more would be a good backup interval. Generally speaking, the backup interval should be long enough to allow for the discovery of a data disaster (drive failure, a virus, accidentally deleted files, etc.), with some time to intervene before the next automated backup replicates the problem to the 2<sup>nd</sup> drive. This is also a drawback of using automation; if data loss or corruption is not noticed by the user, those problems will be replicated to the back up drive during the next Rsync event. Longer automated backup intervals, such as two weeks or even a month, allow more time to discover issues and disable replication.

### - Manual Run:

If the job is **disabled** (the **ENABLED** toggle switch is gray), the job won't run automatically. However, the job can be run manually, at any time, by clicking on the job and the **Run** button. This may be the best option for users who do not check their server regularly.

**- Delete Protection:**

Removing the **--delete** switch from the command adds delete protection, and may allow the retrieval of files accidentally deleted from the source drive. As previously noted, to clean up the destination drive of intentionally deleted and unwanted files, the **--delete** switch could be manually entered into the command line, from time to time, as may be deemed necessary.

**\*\*Keep in mind:** In the event of a failing or failed data drive it is **crucial** that the drive-to-drive Rsync job is turned **OFF**, if automated. Similarly, after noting a drive problem, DO NOT run the job manually.\*\*

The Bottom Line:

The additional cost for full data backup using Rsync is the cost of an external drive, or an additional internal drive, of adequate size. For the insurance provided, the additional cost is very reasonable.

If errors occur when running the command line, see → [Rsync Drive Copy Errors](#)

## **Recovery from a Data Drive failure - Using an Rsync'ed backup**

### **General:**

\*\*Again, as a reminder, when the NAS primary drive is failing or has failed, it's crucial to turn **OFF** an automated drive-to-drive Rsync command line.\*\*

There are two basic options for restoring data with an Rsync'ed backup drive - they are “with” or “without” a replacement for the source data drive.

### **Restoration Without a Replacement Drive:**

Without a replacement drive on site, which would be the most likely case for most home users and small businesses, the backup Rsync'ed “destination” disk can become the data source for network shares. This involves repointing existing shared folders, from the old drive location, to the backup drive. All simple services layered on top of the shared folder, to include SMB/CIF shares and other shared folder services, will follow the shared folder to the new location on the back up drive.

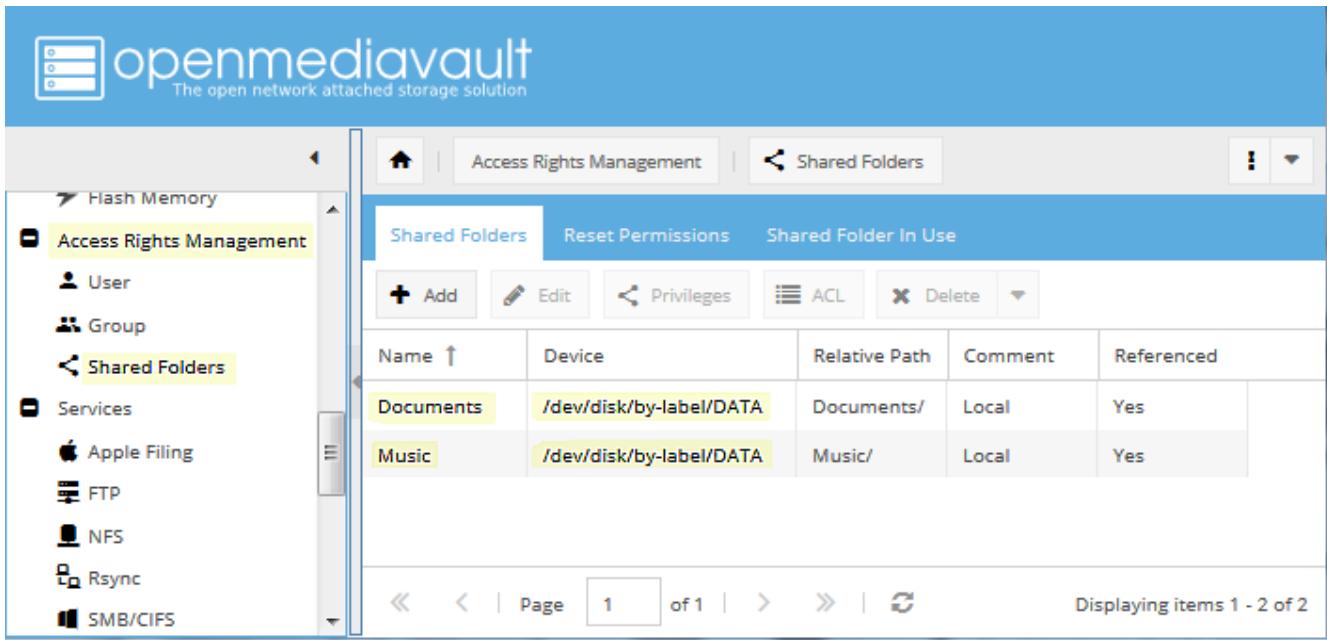
### **Repointing a Shared Folder:**

In the following example, the data drive has failed and it's been determined that it's not repairable. Under **Storage, File Systems** we have a **missing** source drive (labeled DATA) that's **referenced**.

Device(s)	Label	Filesys...	Total	Available	Used	Mounted	Mount Point	Referenced	Status
/dev/disk/by-label/DATA	ext4	n/a	n/a	n/a	No		/srv/dev-disk-by-label-DATA	Yes	Missing
/dev/mmcblk0p1	boot	vfat	62.01 MiB	40.39 M...	21.52 MiB	Yes	/boot	No	Online
/dev/mmcblk0p2		ext4	7.15 GiB	5.77 GiB	1.26 GiB	Yes	/	Yes	Online
/dev/sda2	RSYNC	ext4	83.66 GiB	78.84 GiB	514.99 MiB	Yes	/srv/dev-disk-by-label-RSYNC	No	Online

\*\*Note that there may be **Error** dialog boxes regarding the failed mount of existing shared folders. With a missing but referenced drive, this is to be expected.\*\* When all shares are redirected, these error messages will stop.

The actual references to the failed DATA drive are the **Shared Folders** assigned to the drive, named **Documents** and **Music** as follows:



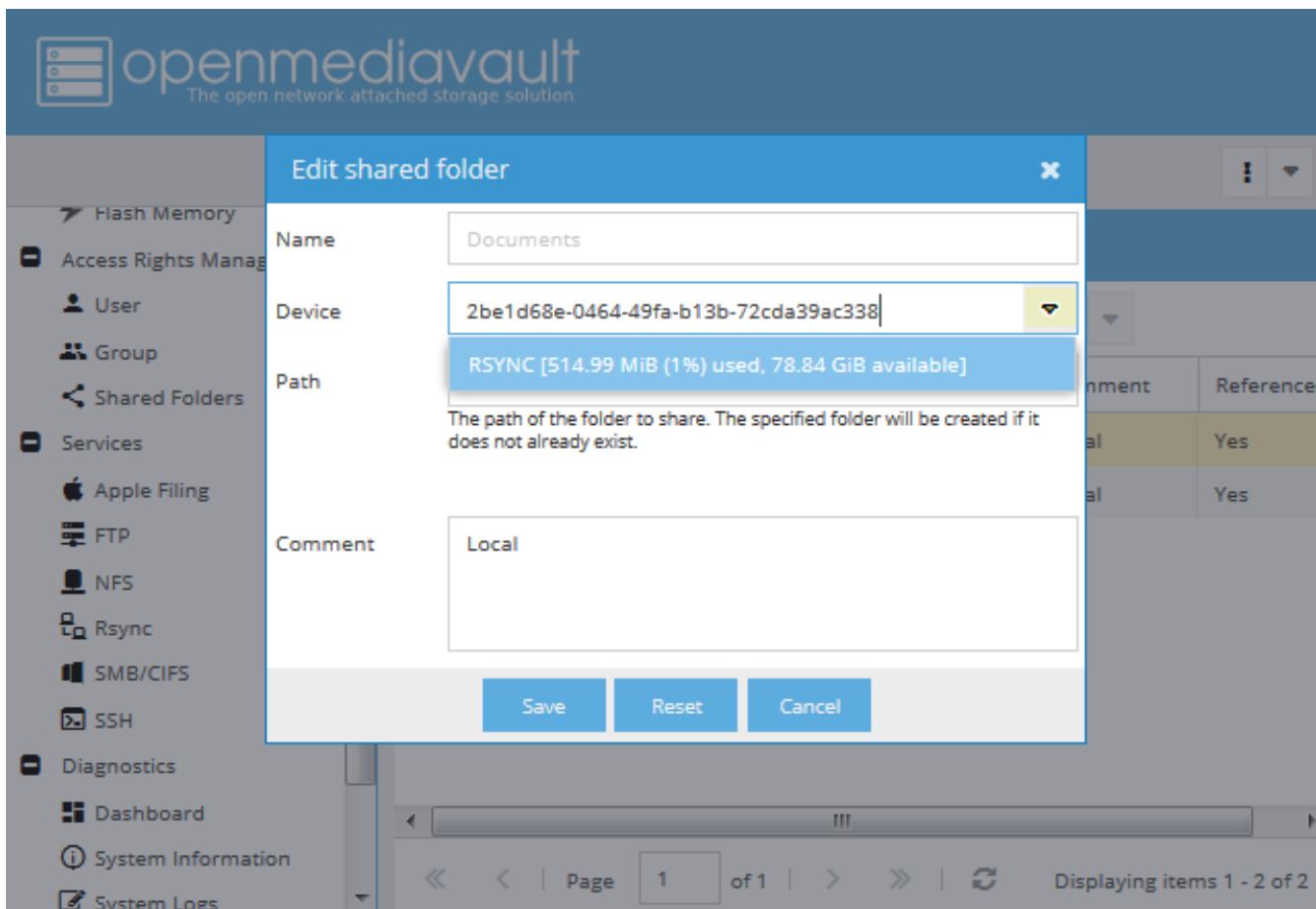
The screenshot shows the OpenMediaVault web interface with the title "openmediavault The open network attached storage solution". The left sidebar contains navigation links: Flash Memory, Access Rights Management (selected), User, Group, Shared Folders (selected), Services, Apple Filing, FTP, NFS, Rsync, and SMB/CIFS. The main content area is titled "Shared Folders" and displays a table of shared folders. The table has columns: Name, Device, Relative Path, Comment, and Referenced. There are two entries: "Documents" with Device "/dev/disk/by-label/DATA", Relative Path "Documents/", Comment "Local", and Referenced "Yes"; and "Music" with Device "/dev/disk/by-label/DATA", Relative Path "Music/", Comment "Local", and Referenced "Yes". Below the table are navigation buttons for pages, and at the bottom right, it says "Displaying items 1 - 2 of 2".

Name	Device	Relative Path	Comment	Referenced
Documents	/dev/disk/by-label/DATA	Documents/	Local	Yes
Music	/dev/disk/by-label/DATA	Music/	Local	Yes

Since the DATA drive no longer exists and there's an exact duplicate of all folders and files on the backup drive, we'll repoint the shared folder named **Documents** to the RSYNC backup. Click on the **Documents** Shared Folder, above, and the **Edit** button.

In the **Edit Shared Folder** Dialog Box, click the **drop down button** on the **Device** Line and select the destination / backup drive. (In this example the drive with RSYNC in the label is the backup.) A confirmation dialog box will prompt “**Do you really want to relocate the shared folder?**” Click “**Yes**” and “**Save**”.

(Remember that *all* contents of the now missing source drive and the destination drive were *identical* as of the last backup, to include the path statement. Changes are not necessary. Repointing the share is just a matter of selecting **the backup drive**.)



Click on **Save**, confirm the change, and it's done.

Do the same process for all remaining Shared Folders. (In this example, Music was repointed as well, but not shown.) Again, error dialog boxes may appear during the process. Acknowledge them (with **OK**) but do not revert, or back out of change confirmations. When all Shared Folders are redirected to the backup drive and saved, the error dialog boxes will end.

In the final result:

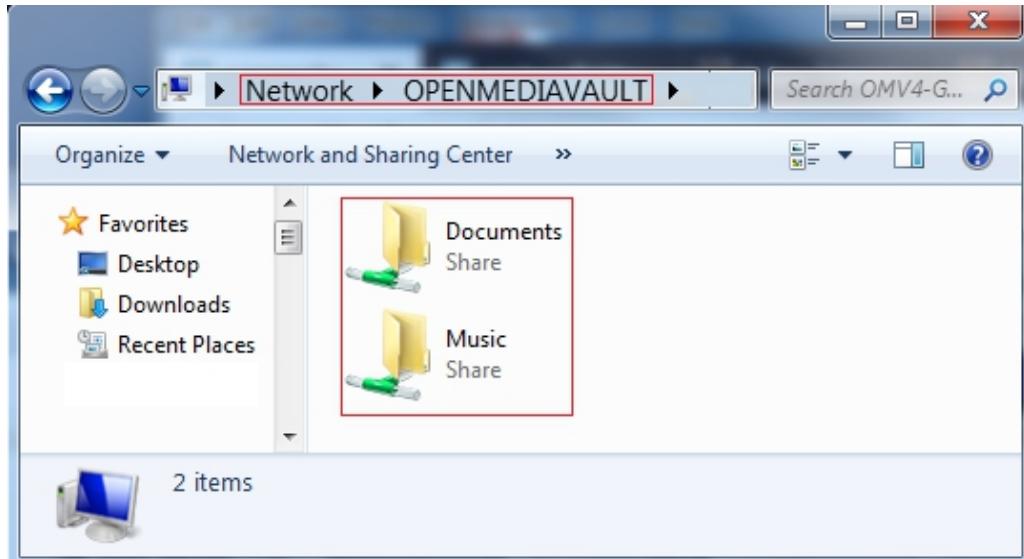
With one operation per shared folder, all shared folders have been redirected to the backup drive labeled RSYNC.

The screenshot shows the OpenMediaVault web interface under the 'Shared Folders' tab. The left sidebar includes 'Access Rights Management' (User, Group, Shared Folders), 'Services' (Apple Filing, FTP, NFS, Rsync, SMB/CIFS, SSH), 'Diagnostics', 'Dashboard', and 'System Information'. The main panel displays a table of shared folders:

Name ↑	Device	Relative Path	Comment	Referenced
Documents	RSYNC	Documents/	Local	Yes
Music	RSYNC	Music/	Local	Yes

Pagination at the bottom indicates 'Displaying items 1 - 2 of 2'.

In this case there were SMB network shares layered on top of the Shared Folders above. The SMB network shares followed their associated Shared Folders, without additional configuration, so SMB shares are up and running on the Network.



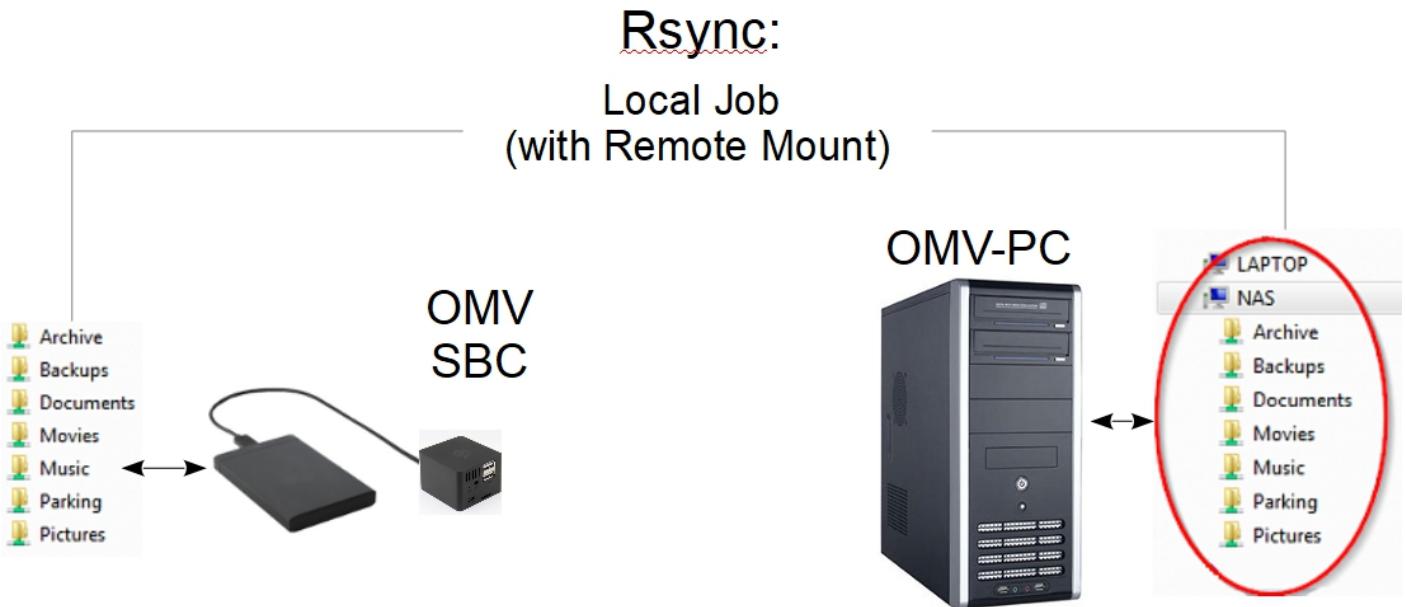
In addition, most simple services that are applied to these shared folders, would follow the shared folder when it is repointed to the backup drive.

One last operation is needed to completely remove the failed DATA drive. Go to **Storage, File Systems** and note that missing drive DATA is no longer referenced. When clicking on the failed drive, the **Delete** button is now active. **Delete** the drive.

Device(s)	Label	Filesy...	Total	Available	Used	Mounted	Mount Point	Referenced	Status
/dev/disk/by-label/DATA		ext4	n/a	n/a	n/a	No	/srv/dev-disk-by-label-DATA	No	Missing
/dev/mmcblk0p1	boot	vfat	62.01 MiB	40.39 M...	21.52 MiB	Yes	/boot	No	Online
/dev/mmcblk0p2		ext4	7.15 GiB	5.77 GiB	1.26 GiB	Yes	/	Yes	Online
/dev/sda2	RSYNC	ext4	83.66 GiB	78.84 GiB	514.99 MiB	Yes	/srv/dev-disk-by-label-RSYNC	Yes	Online

At this point, all shares in this example have been successfully redirected to the backup drive and the server is fully functional again.

## Second Level Backup – Replication to a Second Host



The first item to note, is that this scenario can be accomplished using a LAN client, as the second host, and it could be a Windows client. The additional cost would be the price of a second drive of sufficient size (internal or external) to house the second copy of data, attached to a remote host. The Remote Mount Plugin can mount a Windows network share (a user name and password with write access is required) and Rsync can be configured to replicate NAS data to the Windows share.

As illustrated above, the second host could be a low cost SBC. This scenario can be designed with a number of desirable features.

- First, if backing-up to a second server platform, two fully independent copies of data are possible.
- When using an SBC with openmediavault installed:  
If the primary server failed completely, the second platform can be configured to take over as a backup file server. With all data backed up and resident on the SBC, this data can be made available to the network with SMB shares.
- Other than re-homing clients to the shares on the backup device, there's no recovery time and no "crisis" involved in getting data back on-line. It's already there.

The costs for this level of backup are very reasonable, with the cost of a hard drive of adequate size and an SBC. Good performing SBC's are a low cost option. Older PC platforms or laptops could be configured as a backup server as well.

**The Practical details for setting up Primary Server to Backup Server share replication, using Remote Mount and Local Rsync Jobs are covered here → [Wiki](#) or [PDF](#)**

While replication to an independent host is an excellent method of avoiding data loss catastrophes, there are other potential events which can threaten irreplaceable data. Fires, roof or plumbing leaks and other unforeseen events can result in the loss of data, even on two independent hosts. For these reasons, backup professionals and experienced server administrators recommend an off-site copy. While this may seem extreme, it's actually fairly easy to accomplish. It can be done with an SBC or an old laptop, connected wirelessly, and housed in a utility shed with AC power. Some users set up a backup host in a family members' house, and replicate changed data over the internet.

In the bottom line, if users want to keep their irreplaceable data, an absolute minimum of two full copies is recommended, with a 3<sup>rd</sup> off-site copy preferred. As previously noted, effective backup strategies do not have to be expensive and are relatively easy to set up.

For further information on Backup concepts and best practices, an excellent explanation of Backup is provided by [Backblaze.com](http://Backblaze.com).

## **Operating System Backup:**

By design, the openmediavault/Debian operating system installs on its own partition, segregated from data. This makes copying or cloning the openmediavault boot/OS drive an easy process. So, one might ask, why is a clone or a copy of the operating system important?

Building openmediavault, from scratch, using the installer ISO is a 15-minute proposition, give or take. While it takes longer, roughly 45 minutes to an hour, the actual hands-on portion of an SBC build is even less.

As users configure their servers, add services, reconfigure shares, move their data around, tweak access controls, etc., servers tend to become “works in progress”. Configuring a server to the user's preferences can be an evolution that may take weeks or even months. If a complete server rebuild is required, the customization, add-ons, and the collection of various user tweaks may take several hours to recreate. It is this time and effort that Operating System Backup will preserve.

There are several ways to duplicate an operating system boot drive, but many can be technically involved; requiring network access to remote servers, bootable utilities and somewhat complex processes.

Given the low cost of flash media and with sockets mounted on the *outside* of a PC case, SD-cards and USB thumb-drives lend themselves to **cloning** and very quick recovery.

### ***The Benefits of Maintaining Operating System Backup***

In accordance with “[Murphy's Law](#)”, users may encounter issues where things go wrong. As examples, users may test software on their active server or try new settings. On occasion, installing an add-on may have unintended consequences. Trying new settings or working on the command line, may break openmediavault in a way that might not be recoverable. In other cases, there may be instances where a software update goes south – the source repository may go off-line in the middle of an update resulting in broken packages.

In all of these cases, having a confirmed working clone of the boot drive will allow users to “drop back” to a known good state. The “FIX” would be as simple as shutting down and booting the server on a known working clone.

The advantages of maintaining operating system backup are obvious. Beginners, with very little knowledge of Linux, can work with their servers without fear, which facilitates learning. If a Linux update causes ill effects, it's possible to drop back and selectively install packages to isolate the exact cause of the problem. If an add-on update doesn't work (direct installed software, a plugin, Docker, etc.), the user can gracefully back out of the update and leave the older (but working) software package in place.

It's the easiest, quickest, and most effective fix, for resolving problems with openmediavault and the underlying Debian Operating System.

### **The practical issues of maintaining boot drive clones – when to update and rotate?**

1. It makes sense to apply Linux Operating System updates and wait a week or so, to insure that all is working and that there are no ill effects. If all is well, update the backup and rotate.
2. The above would also apply to add-on packages, Docker, or plugin upgrades. (Plex, Urbackup, Pi-Hole, etc.)

3. If a network share is added, deleted, or any aspect of the NAS is reconfigured that changes the operation of the NAS; the backup would need to be updated. (Otherwise, the configuration of the previously cloned boot drive would not mesh with the configuration and contents of data storage drives.)
4. If a cloning mistake is made (let's respect Murphy's Law), a 3<sup>rd</sup> clone could become a “fallback of last resort”. Given that Linux package upgrades and openmediavault sub-version upgrades have little to no effect on network shares or the high level configuration of the NAS, a 3<sup>rd</sup> clone can be maintained that is updated only when the NAS configuration is changed.

### **\*\*A Last Important Note About Backing Up your OS\*\***

Just as it is in the commercial world, where support for a product may be discontinued, the open source community is constantly moving forward as well.

Users may believe that an ISO file, or image, contains all the software needed for a build. In some current build cases, that assumption would be incorrect. Linux distro's, during the initial build and to finalize the installation, may depend on on-line software repositories. After the installation is complete, patches and updates may be applied which rely on on-line repositories as well.

Can it be assumed that those same software repositories and resources will be available on some future date, exactly as they were at the time of a current build? The answer is “No”. Distributions of a specific Linux version, complete with specific applications, fully patched and updated, can be built for a limited time.

Therefore, if users have extensively configured builds, are using specialty hardware (such as SBC's) or are using openmediavault to serve a critical function; it would be wise to backup the boot drive to an image file, or Clone the fully configured working installation to separate media, and save one or more copies for future use.

---

### **Cloning Flash Media**

To avoid issues that can result from dissimilar sizes, it's best to clone images from/to identical SD-cards or USB thumb-drives. Otherwise, it's easier to clone if a new drive is slightly larger than the working drive.

(And while it's an intermediate level technique, [Gparted](#) can be used to slightly shrink flash drive partitions, to fit on the smaller of the two flash drives.)

#### **The Cloning Process for USB thumbdrives and SD-Cards**

- Install [Win32Diskimager](#) on a Windows PC.
- Format the new SD-Card or USB thumb-drive with [SDFormatter](#)
- Test the new card or USB drive with [h2testw1.4](#), One test is enough. (Do not select endless verify.)  
If the device registers errors, or if the capacity is significantly different from what is that's marked on the label (a fake), return it for refund or throw it away.

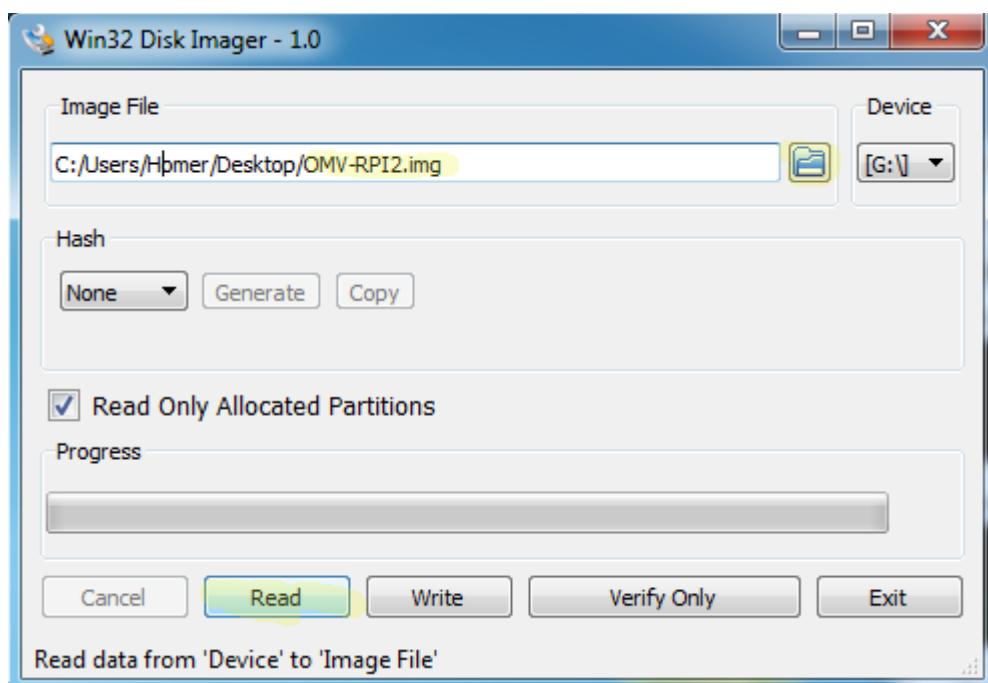
\*\*At this point you should consider marking your working SD-card (with permanent marker?) to make sure you don't mix it up with the blank card. Otherwise, it is possible to read a “blank card” and use the blank image to “overwrite” the working card.\*\*

- Insert the working card and start Win32Diskimager  
**SANITY Check**, make sure you inserted your working SD-card / USB thumb-drive at this point.

**\*\*Note:** Windows will not be able to read the format of the partitions on the working boot drive and offer to format it for you. **DO NOT** format the drive. Close the dialog box with the **X**.

- In most instances, Win32Diskimager will detect USB thumb-drives and SD-cards, and set the Device drive letter. However, it would be prudent to check the letter Windows assigns to the drive with Windows Explorer.
- First click on the folder ICON and navigate to the location where you'll store your image file. Type a name in the file line. (OMV-RPI2.img was used for this example, but users can **add a date** to the name as well, such as OMV-RPI2-04-30-2018.img)
- Check the box for "**Read Only Allocated Partition**". (With larger drives, this option avoids imaging unused space which saves significant time when reading a drive to a new image and, later, when writing the image to another drive.)

- Click **Read**.



- When the **read** is done, **this is crucial**, click the **Verify Only** button. This will compare the image file just created, to the boot drive. **DO NOT SKIP Verification**. (Win32Diskimager has a known bug which may affect a very small number of use cases.)
  - If verification passes, pull the working boot drive and store it close by. If verification **FAILS**, the image file is corrupt and cannot be used.

**\*\***If the user/admin is running a business or is in another time sensitive scenario, where the NAS server can not be out of service for an extended period; the server can be booted on the source drive while the clone is being written. Thereafter, the drive swap could be accomplished during a low use period.**\*\***

While the resultant image file may be quite large, if the file is retained, it can be used to write another thumbdrive at a later date. In such a case, the image file itself can be saved as a dated backup and archived. The size of the image can be reduced significantly, by using 7zip to compress it before storage.

The last process uses [Etcher](#) to burn the image file and verify it in one pass. Etcher is a free utility that installs on Windows.

- Insert the **new** flash drive and start [Etcher](#). (Etcher typically detects flash drives as well.)
- Select the image file previously created, verify the destination flash media drive, and click the **FLASH!** button.

One of Etcher's features is that it writes the image and verifies it in a single operation. If the operation is successful, the working boot drive has been cloned. Insert the new clone into the server and boot it up. With a successful boot up on the clone, user/admin's will have two verified working copies of their server's boot drive.

\*\*Note – Win32diskimager will write an SD-Card or USB drive, but verification is required and it's a second operation. Etcher combines the write and verification in a single process. If users walk away during the write operation, which can take a long of time, Etcher is the best choice for writing flash media.

# Add-on's – Adding Value to Your Openmediavault server

## General

The [openmediavault Forum](#) has an extensive [Guides](#) section. Whether a user's preference is videos or printed text, there's something for everyone among the numerous "How-To's". Beginners and Advanced users alike should take a few minutes to familiarize themselves with the content in the Guides section of the Forum.

## Openmediavault's Plugin's

Openmediavault has numerous plugin's. Some are integrated into the base package by openmediavault's developer Volker Theile. Examples are iSCSITarget, usbbbackup, among others.

Still more were created by openmediavault plugin developers, such as Remote Mount, the flash-memory plug-in, backup plugins, and more.

Many plugins are integrations of third party packages such as SNAPRAID, MergerFS, etc. While questions or issues regarding the **integration of plugin's**, into openmediavault, are of interest to openmediavault's developers, questions regarding the **operation** of the base software package are best directed to the application's supporting web site.

## Dockers - General

While Dockers are an avenue toward adding **extensive** functionality to openmediavault, they are an advanced topic that may prove to be frustrating for beginners. To get started, beginners should consider installing Docker, then Portainer, as found under **System, OMV-Extras**. While it's command line oriented, this [Docker Tutorial](#) is very helpful for understanding basic concepts. User authored [Docker - How To's](#) can be found on the openmediavault forum.

## So, What is a “Docker”?

Dockers are a type of Virtual Machine (VM) that share the Linux kernel and memory spaces with the host. A Docker is spawned from a Docker image. The resultant VM equivalent, that's built from a Docker image, is referred to as a "container". A container is fully self-sufficient, bare-bones, Linux operating system. The idea behind a Docker image is to create a Linux installation, that is as small and as lean as possible, that includes all necessary dependencies required to run the Docker application and nothing more. Since these containers tend to be very small, they can be constructed and destroyed in rapidly. (After downloading, usually, in a matter of seconds.)

Dockers are more resource efficient when compared to running a full VM in a hypervisor, due to direct allocation of hardware resources. Typically, VM hypervisors provision fixed blocks of memory and may require access to dedicated hard disk space or block device partitions. Whether these dedicated resources are used by the VM or not, they're no longer available to the Host operating system or other VM's. A Docker, on the other hand, uses the needed memory space to run its processes and the host's hard drive for storage, without wasted resources. Resource management is lean and tight, allowing more Docker containers to run concurrently with much greater efficiency.

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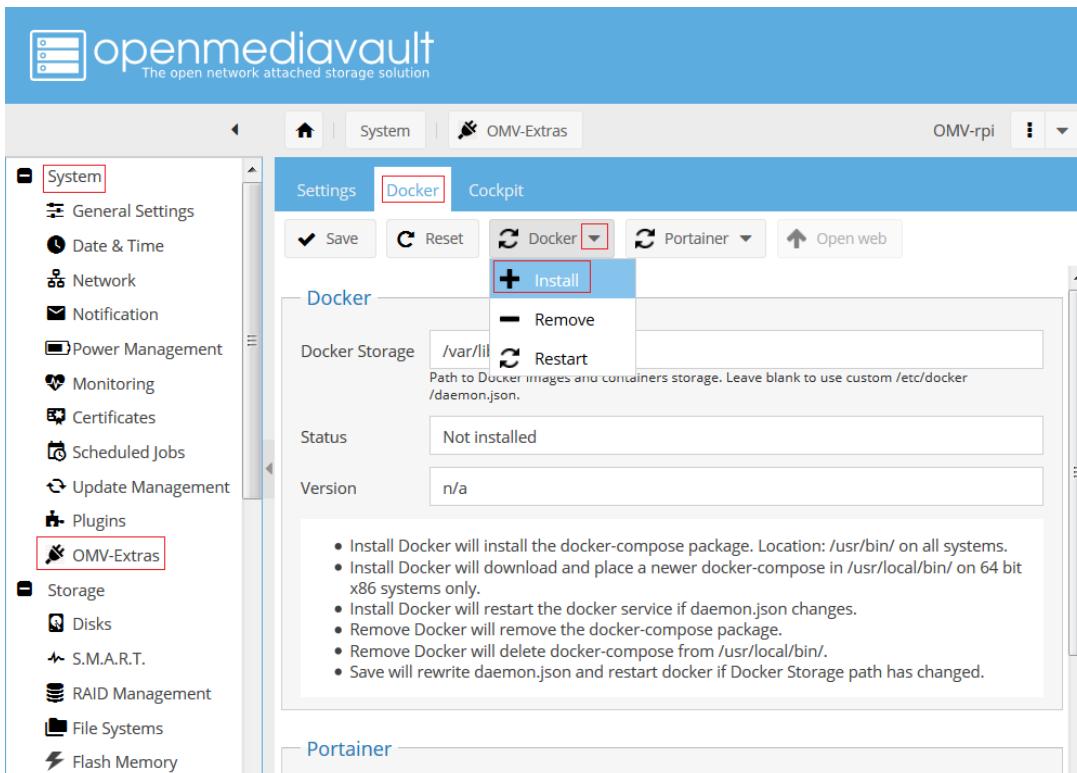
## Installing Docker

Installing [OMV-Extras](#) is a **prerequisite** to installing Docker.

Under System, **OMV-Extras**, in the **Setting** tab, select the **Docker** tab.

**Before installing Docker**, take note of the Docker Storage location. **/var/lib/docker** is on the boot drive. This location is not an issue for hard drives and SSD's of medium capacity (notionally, 64GB or larger.) However, when using flash media to boot (8 to 16GB), the boot drive is not a good location for media servers or downloader type Dockers. There are two possible solutions:

- The easiest solution is to change the Docker Storage path to a data drive. If the default path is changed, downloader output and metadata created by media servers (Plex and others) will be stored on a data drive by default.
- A more advanced solution would be to leave the default storage location in place (var/lib/docker) and configure the Downloaders and media servers to store their output and metadata on a data drive, but this requires individual configuration of each Docker.



To install Docker, click the **Docker Button** and select **Install**.

An install dialog box will popup and scroll as files are downloaded and installed. At the end, **Done** will be displayed. Click the **Close** button.

The **Status** line will report: **Installed and running**.

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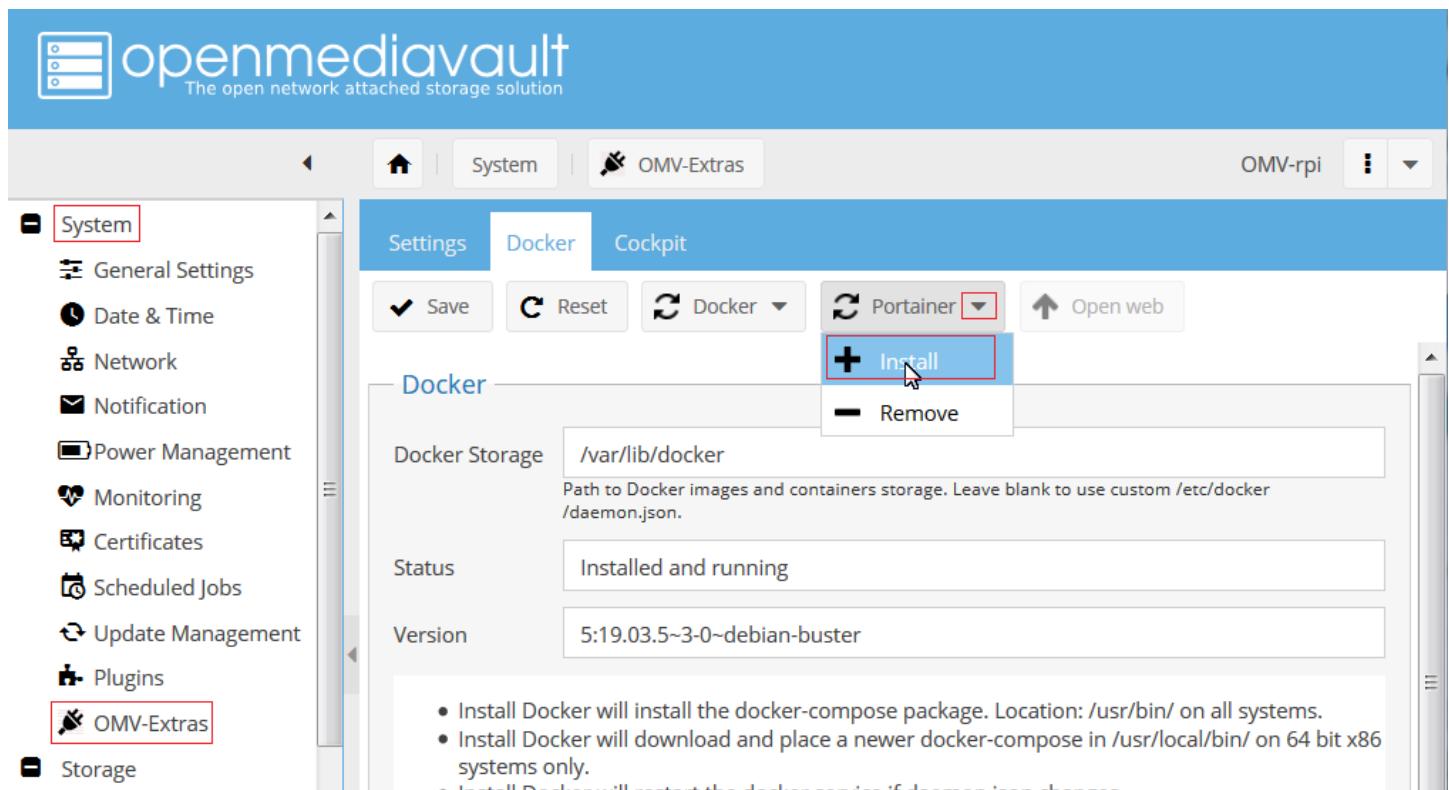
## **Installing Portainer**

Under **System, OMV-Extras**, in the **Docker** tab, scroll down to the **Portainer** section.

### **General:**

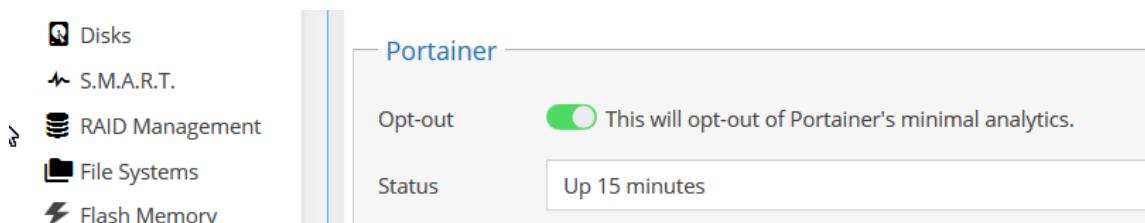
While Portainer is a Docker itself, it is the control interface through which Dockers are downloaded and configured in openmediavault.

Click the **Install Portainer** button.



An install dialog box will popup and scroll as files are downloaded and installed. At the end, **Done** will be displayed. Click the **Close** button.

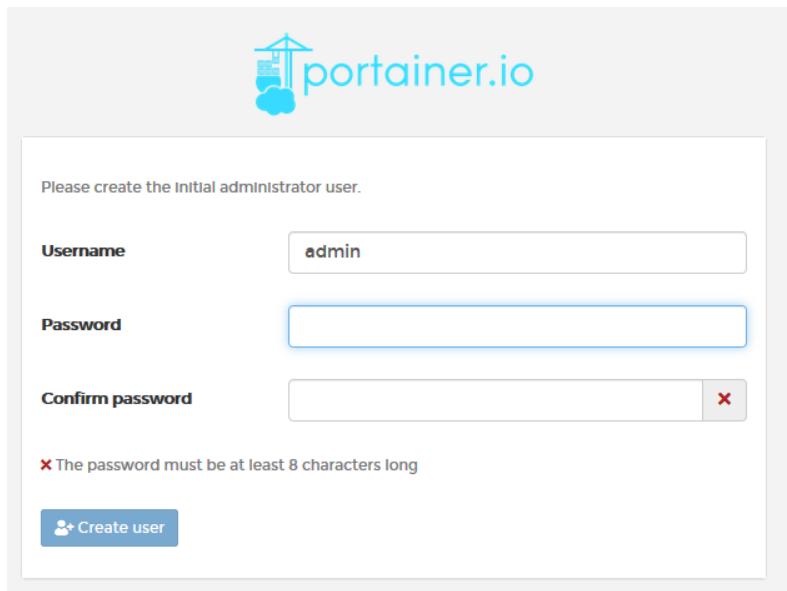
With a successful install, the **Status** line will change to reflect “up” time:



Finally, click on the **Open Web** button.

At this point, Portainer is completely unconfigured. The first configuration requirement is setting a password for the Admin user. Take note of this password. It will be needed to log into Portainer again.

### Click on **Create User**

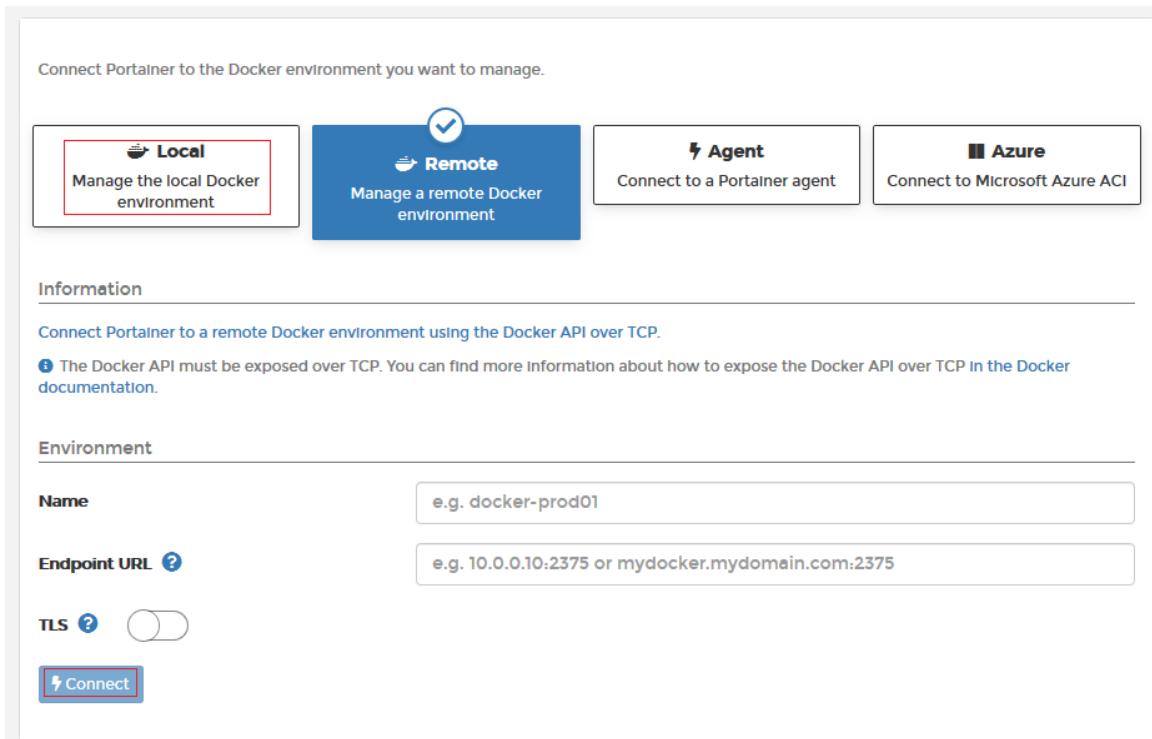


The screenshot shows the 'Create User' form for Portainer. At the top is the Portainer logo with the text 'portainer.io'. Below it is a message: 'Please create the initial administrator user.' There are three input fields: 'Username' (containing 'admin'), 'Password' (empty), and 'Confirm password' (empty). A red error message below the password field says: 'The password must be at least 8 characters long'. At the bottom is a blue 'Create user' button with a person icon.

In the next log in, there will be a login dialog with two empty fields. Enter the username **admin** in the top field and the **password** in the bottom field.

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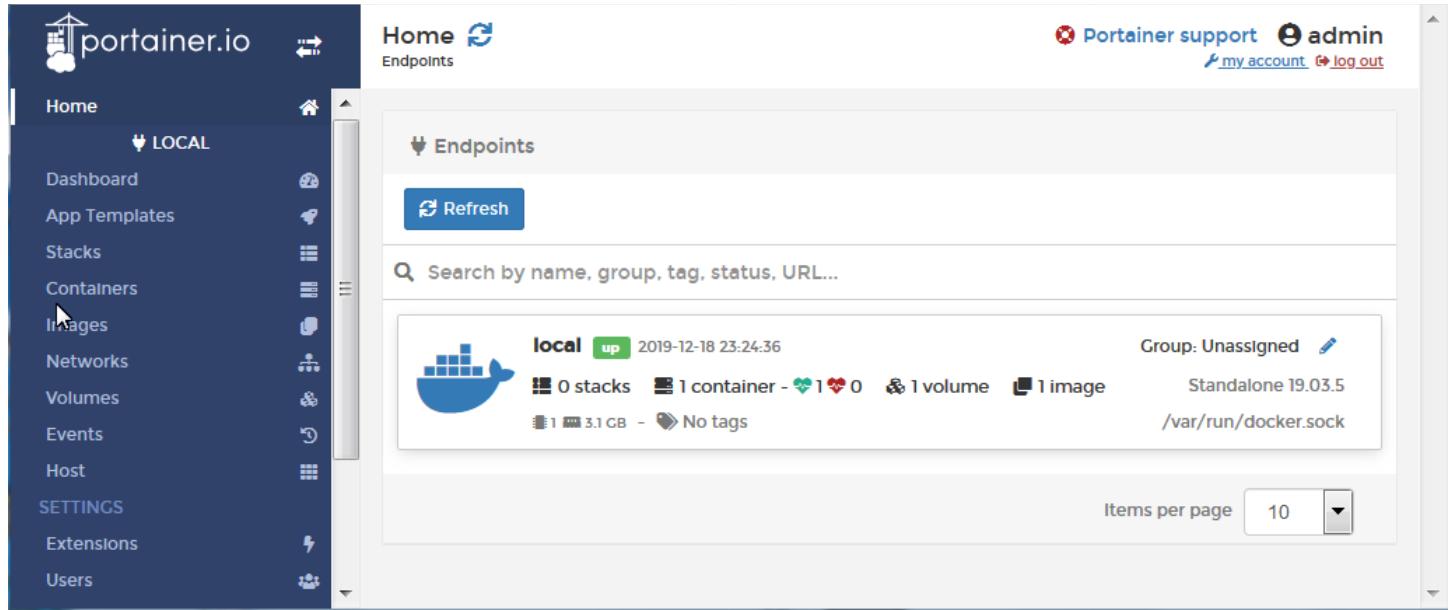
### When this screen pops up, Click on **Local**, then **Connect**



The screenshot shows the connection configuration screen for Portainer. At the top, it says 'Connect Portainer to the Docker environment you want to manage.' Below are four options: 'Local' (highlighted with a red border), 'Remote' (selected and highlighted in blue), 'Agent', and 'Azure'. The 'Remote' option has a checkmark icon. The 'Information' section contains a note about connecting to a remote Docker environment via TCP. The 'Environment' section includes fields for 'Name' (e.g. docker-prod01) and 'Endpoint URL' (e.g. 10.0.0.10:2375 or mydocker.mydomain.com:2375). A 'TLS' toggle switch is shown as off. At the bottom is a blue 'Connect' button with a lightning bolt icon.

## Dismiss the News and Click on Local

The following screen will now be the “**Home**” screen. Using “Local” menu selections on the left, this is where Docker Images are downloaded, containers are created, etc.



The screenshot shows the Portainer.io interface. On the left, a dark sidebar contains navigation links: Home, LOCAL (which is highlighted), Dashboard, App Templates, Stacks, Containers, Images (highlighted), Networks, Volumes, Events, Host, SETTINGS, Extensions, and Users. The main content area is titled "Endpoints" and shows a single entry: "local" (status: up, last updated: 2019-12-18 23:24:36). It details: 0 stacks, 1 container - healthy (1 heart icon, 0 error icons), 1 volume, 1 image, and 1 file (size: 3.1 GB). The container is labeled "No tags". To the right, there's a "Group: Unassigned" section with a pencil icon, and below it, the path "/var/run/docker.sock". At the bottom right of the main area, there's a "Items per page" dropdown set to 10. The top right corner features "Portainer support" with a red cross icon, "admin", "my account", and "log out".

This concludes the installation of Docker and Portainer.

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## **Dockers - It's about choices**

While there are 100,000+ Dockers, available on the [Docker Hub](#), all are not created equal. The offerings, from Docker authors, range from a one-off experiment with no documentation (users are on their own) to organizations like [Linuxserver.io](#) that specialize in building first-rate Docker images. Linuxserver.io offers Dockers that have been thoroughly tested, they support multiple architectures, they provide detailed container setup instructions, their offerings are “Tagged” and they retain inventories of their older images.

## **Selecting a Docker - Primary Considerations**

### **First:**

When installing a Docker, for the greatest chance of success, it is suggested that users follow the guidance provided in [Guides Section](#) of the openmediavault forum.

### **Second:**

Potential Docker users must use Dockers that support their **architecture**. The three primary architectures supported by openmediavault are **ARMHF** or **ARM64**, **i386**(32 bit), and **amd64**(64 bit). In most cases, 32bit Dockers will run on 64bit hardware.

While there may be exceptions, i386 and amd64 Docker images may not run on ARM platforms. “**Multi-arch**” (multiple architecture) Docker images are more platform flexible.

### **Third:**

To increase the chance of success, when attempting to install a Docker without a guide, look for the more popular Dockers with the highest number of “**pulls**” on the Docker Hub. ([hub.docker.com](#)) There are good reasons why these Dockers are broadly popular – they tend to work.

### **Forth:**

In the vast majority of cases, Dockers that fail to work won't have anything to do with openmediavault or Portainer. Their issues tend to originate from selecting the **wrong architecture**, selecting the **wrong network mode** (host, bridged, macvlan) for the application, other configuration issues (such as port 80 openmediavault/Docker conflicts), permissions problems or the Dockers themselves.

Since most Dockers share Network ports with the host (openmediavault), it's important to use ports that are not currently in use. To get a better understanding of network ports and for commands that will reveal ports that are in use, refer to this forum post for more information:

[\*\*\[How-To\] Define exposed ports in Docker which do not interfere with other services/applications\*\*](#)

## **When things go wrong**

First take note of any error dialog boxes. On most Windows and Linux machines it's possible to copy and paste the text out of a dialog box by holding down the left mouse button and dragging the mouse pointer over text, to highlight it. Then use the keys with Ctrl+c (to copy), then click in a Notepad document and use Ctrl+v (to paste). This basic information will be helpful, in searching out the details related to the problem.

### **The First Resource – The Internet**

Users should search the internet first. The solutions for many generic problems can be found with [google](#), [yippy](#), [duckduckgo](#), and other search engines. When searching on key words that match error message or the problem users may be having, in some cases, answers can be found quickly in real time. This is the fastest and often the best way to learn how to fix server problems. Since openmediavault is based on “**Debian**”, it may be a useful search term.

While the search function of the openmediavault forum site will produce “hits” on search criteria, it is by no means all inclusive. If **openmediavault** is included in search criteria, a Google search may generate more result hits on information found on the openmediavault forum, than the forum's integrated search function.

With information from searches, users should make an effort to address their own issues. This approach tends to be the path to the fastest answers and greatly facilitates the learning process.

### **The Openmediavault Forum**

When coming to the forum for help:

First search the forum. In many cases, user problems can be resolved with a few searches and a bit of reading. However, look at the dates of posts and the version of openmediavault referenced. Posts that are 3 or more years old may not apply to the current openmediavault version.

If posting a problem on the forum, start at the [forum index](#), and look for the category that looks to be appropriate for the post. Along with an explanation of the issue, the openmediavault version, the appropriate logs and command line output, if known, and the hardware platform in use are the absolute minimums required. Realize that, without information, even the most experienced users, Moderators, and / or Developers will not be able to provide assistance.

- Ask the right questions. For beginners, this can be deceptively difficult. There's some “straight forward” guidance on this topic here → [Ask the right questions](#).
- While openmediavault's forum is known for responsiveness, it's unrealistic to expect answers in real time. It may be a matter of days before a forum member, who is familiar with the described problem, will read and respond to a post.
- When looking at answers, try to focus on the information presented, not the perceived tone. Remember that support is provided “**gratis**”, so act accordingly.
- Be open-minded. The reason why users post on the forum should be because they couldn't solve a problem on their own. With that in mind, when an experienced forum user replies, taking the time to make a suggestion or requesting more information, forum users should follow up and post the result. Whether the issue is fixed or not, user posts help other users with the same or a similar problem.

- If a forum post or a “How To” fixes your problem, or gets you through a configuration issue, consider giving the author a “Like” or “Thanks”. The gesture is free and it’s an indicator to other users who may have the same problem. In essence, you’d be saying “I agree” or “this worked for me”.
  - When users are experiencing problems with their data store (a file system issue, a hard drive, array, etc.) the working assumption on the part of experienced forum users and moderators will be that **users have full data backup**. Accordingly, recommendations for correcting filesystems, hard drives, and RAID array issues may result in the loss of data. **Keep this in mind.**
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## **Solutions to Common Problems:**

Follow this link to the maintained list on the forum. → [Solutions to Common Problems](#)

## **USB RAID**

**Problem:** I have an SBC and I'm having trouble with RAID. (OR) I have a USB connected drives that I want to configure as a RAID array.

**N/A:** USB RAID is not supported.

## **Rsync Drive Copy Errors**

Problem: Rsync shows errors “Operation not permitted (1)” or “renaming” with regard to the files **aquota.user** and **aquota.group**. These files are found at the root of data drives.

In a very small number of instances, the quota service may interfere with an Rsync drive-to-drive copy.

### **Solution 1:**

Add the following exclude statements to the rsync command line:

**--exclude='aquota.group' --exclude='aquota.user'**

A full command line example:

```
rsync -av --delete --exclude='aquota.group' --exclude='aquota.user'
/srv/dev-disk-by-label-DATA/ /srv/dev-disk-by-label-RSYNC/
```

## Solution 2:

Turn the quota service off.

```
sudo /etc/init.d/quota stop
```

(In the following examples, substitute the appropriate labels for the source and destination drives.)

```
sudo quotaoff --user --group /srv/dev-disk-by-label-DATA
```

```
sudo quotaoff --user --group /srv/dev-disk-by-label-RSYNC
```

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\*\*Note:\*\* As of **openmediavault 5.5.20**, data drives are mounted using **UUID** (Universally Unique Identifier).

Under **Storage, File Systems**, the path under the **Mount Point** column might appear as:

/srv/dev-disk-by-**uuid-f188c8ad-74d3-443a-a23e-89711270367d**

(This is an example only – all disks will have a unique identifier.) Check the **Mount Point** Column in File Systems for the appropriate path for aquota commands.

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Optionally, delete the files **aquota.group** and **aquota.user** from the source and destination drives.

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# USB Power - A Common Raspberry PI problem

## **General:**

Many problems with R-PI's, in versions prior to the R-PI4, are related to under-powering. While the R-PI4 is much improved, depending on the power requirements of connected peripherals, it is not exempt from power problems. The issues caused by under-powering can range from bizarre behavior to data corruption on storage devices.

## **Do I have a problem?**

With all peripherals attached that are normally used – use the command `dmesg` on the CLI and scroll through the output. If an **undervoltage** situation exists, it will be noted in the output.

## **What is the problem?**

Beyond using a power supply with the appropriate current rating for the R-PI model, it should be noted that a USB power source must meet certain voltage specifications “at the socket”. In essence, the output voltage of a USB power supply can't be increased to compensate for external voltage losses typical when using a long USB cable with small gauge wire.

Making matters worse is, models prior to the R-PI4 use a micro USB plug as the power connection. The tiny contacts of a micro USB connection, combined with cables for micro USB that have small gauge wires, drop power supply voltage significantly.

**Consider the following chart of voltage losses, versus wire length and gauge**  
(Note that voltage drops increase as current draw requirements rise.)

AWG	Voltage Drop at 1000mA					
	15cm	50cm	1m	2m	3m	5m
20	0.129993	0.15331	0.18662	0.25324	0.31986	0.4531
22	0.135888	0.17296	0.22592	0.33184	0.43776	0.6496
24	0.145266	0.20422	0.28844	0.45688	0.62532	0.9622
26	0.16017	0.2539	0.3878	0.6556	0.9234	1.459
28	0.18387	0.3329	0.5458	0.9716	1.3974	2.249

AWG	Voltage Drop at 2000mA					
	15cm	50cm	1m	2m	3m	5m
20	0.259986	0.30662	0.37324	0.50648	0.63972	0.9062
22	0.271776	0.34592	0.45184	0.66368	0.87552	1.2992
24	0.290532	0.40844	0.57688	0.91376	1.25064	1.9244
26	0.32034	0.5078	0.7756	1.3112	1.8468	2.918
28	0.36774	0.6658	1.0916	1.9432	2.7948	4.498

### **Potential Remedies:**

- Use a power supply that meets at least the minimum recommended current rating for the R-PI model being used.
  - Use the shortest possible USB cable. Cables that are 1 foot / 30cm or less, made of thick gauge wire are preferred. If a short USB cable is not long enough to place an R-PI in a convenient location, use an AC extension cord rather than a long USB cable.
  - Avoid using direct connected USB powered hard drives. The additional current load will drop voltage and may stress a weak power supply. A self powered USB hub or a drive dock is preferred.
  - Avoid leaving peripherals attached, such as a monitor, keyboard or a mouse. Even when they're not used, they consume power.
- 

### **A Closing Note**

We, who support the Openmediavault project, hope you've found this guide to be useful and that you'll find your Openmediavault server to be efficient, easy to use and enjoyable.