

Live NAS Server with Raspberry Pi

Lakshay Chawla

Undergraduate student,
Department of Electronics and Communication Engineering, University Institute of Engineering,
Chandigarh University, India

Lakshaychawla6677@gmail.com
<https://lakshaychawla.herokuapp.com>

Abstract

With the growing use of computers in our daily lives, the craze of wireless domains and cloud storage is growing daily, with this project on *LIVE NAS SERVER WITH RASPBERRY PI*, the idea is to use Raspberry Pi as a low cost NAS Server, which can be used to access Network Storage seamlessly on the LAN Network and to achieve this with low cost and low data consumption. This project gives us flexibility, to use Network Storage without the mess of any wired devices and eases team work.

Introduction

Using this application of *NAS Live server with Raspberry Pi*, we can use a SATA HDD, SSD or NVMe (with proper USB extensions) as a Network-attached storage or local cloud storage under any client machine within our LAN (Local Area Network). This *Live NAS Server* can be achieved with a Linux machine with Network attached storage (HDD used for this project) and Samba Software installed, in the UNIX OS server machine, connected with the LAN (Local-Area-Network) Router, it provides us a interface with which, one can access the cloud network with the correct login credentials as one will set while configuring the *Raspberry pi*. The software/package which can provide us cloud storage through our NAS (Network-Attached Storage) i.e. HDD/SSD or any other storage device is *Samba*. *Samba Server* has to be installed in Raspberry Pi Server Computer running on Raspbian or any other Linux distro for using *NAS Live Server*.

The main aim of this project is to build a low cost *Live NAS server with Raspberry PI*, with simple steps and components.

This paper is organized as follows, I start by describing about the architecture of *Live NAS Server* and the major components used (Section-I). The other section (Section-II) describes the equipment/packages used for setting up *Live NAS Server*. Next Section (Section 3) guides user to set up Raspberry Pi followed by connecting SATA HDD to Raspberry Pi (Section 4) by configuring the boot configuration file. Then describing the installation and configuring *Samba Server* in our server machine i.e *Raspberry Pi*. Then (Section 5), which describes to access NAS, from client's machine.

SECTION-I

DESCRIBING THE PROJECT AND ITS COMPONENTS

NAS (Network-attached storage) server is a data storage server computer, which provides access to its data to a group of clients within the network, through hardware, software, or configuration. This project of *Live NAS Server* using Raspberry pi, acts as a server for cloud data storage which provides data access to the clients under LAN(Local-Area-Network) at low cost and low power consumption.

This server is built with Raspberry Pi as the server for Network-attached storage, which will be connected to the main router, for serving data access to client machines. Raspberry Pi is a mini-computer based on Linux OS, and running on Raspberry OS (previously called Raspbian) and other Linux distros. It runs of a 32-bit processor and 1 GB RAM (For Raspberry pi 3B+) with great CPU performance. And gives one a PC like interface for dealing with almost all the UNIX applications.

This mini-computer is capable of serving data with other client computers. Other than a NAS Server, Raspberry Pi can be used to realize many applications/devices, significantly at low costs and low power usage, with the flexibility of using USB hubs, one can add infinite USB external storage to share among clients using this server.

To build this Live NAS Server, Raspberry Pi must be configured with *Samba Server*.

Samba package is the standard Windows interoperability suite of programs for Linux and Unix systems. It is an important component to seamlessly integrate Linux/Unix Servers and Desktops into Active Directory environments. It can function both as a domain controller or as a regular domain member. This package gives network administrators flexibility and freedom in terms of setup, configuration, and choice of systems and equipment. It allows file sharing between machines running Windows and UNIX OS and provides ample services and protocols. Samba sets up network shares for chosen UNIX directories or the NAS (Network-attached storage) and such selected directories can be accessed easily through the client machine normally like a local computer directory with correct user credentials, which have to be set up in server machine while installation.

SECTION-II

EQUIPMENTS REQUIRED FOR SETTING UP LIVE NAS SERVER AND ITS ARCHITECTURE

For realizing this idea of *Live NAS Server*, the requirements will be:

- Raspberry Pi (any model)
- All Desktop elements, for setting it up.

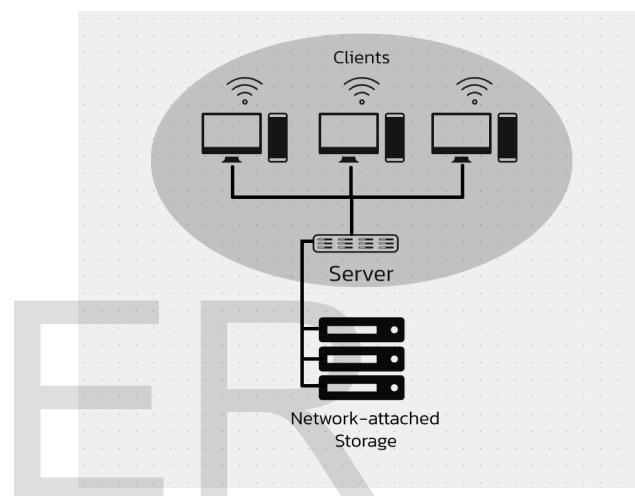
Note: SSH can also be used to link Raspberry Pi with another machine if Raspberry Pi's IP is known. One can access it by using the command:

```
$ ssh pi@IP_ADDRESS
```

After one has to register the correct password for getting into Raspberry Pi's SSH connection and use the command line seamlessly.

- SD card for OS installation
- External Drive (HDD/SATA/SSD/NVMe), with proper USB extensions
- Wireless / Wired connection to LAN Router

The architecture of this server will be like:



SECTION-III

SETTING UP RASPBERRY PI

The raspberry pi has to be booted up normally, with Raspberry Pi OS or any other Linux Distro flashed in a SD card, with all the basic preferences, and it is recommended to update and upgrade the Raspberry Pi OS and programs to the latest version with commands:

```
$ sudo apt update
```

```
$ sudo apt-get upgrade
```

Note: It is advised to update and upgrade the programs and OS before installation of any software into UNIX OS, or any of its distros.

SECTION-IV

CONNECTING SATA HDD TO RASPBERRY PI

Raspberry pi's USB power supply is not capable of handling SATA HDD (Hard Disk Drives), so one has to set up its power supply to maximum usage, keeping the maximum output current as 1 using the following command in the Linux/Raspberry Pi OS terminal

```
$ sudo nano /boot/config.txt
```

, which opens the config.txt file, then append the text file as

```
max_usb_current=1
```

and then reboot the pi to apply changes and Drive must be checked after this step.

SECTION-V

INSTALLING AND CONFIGURING SAMBA PACKAGE INTO RASPBERRY PI

For installing samba in Raspberry pi OS, or any other Linux Distro use command

```
$sudo apt-get install samba samba-common-bin -y
```

in terminal. After the installation command, the configuration file is to be modified, with the client's configuration for accessing the data from the NAS which generally lies in directory,

```
nano /etc/samba/smb.conf
```

In the file specified, some configurations are to be changed, like:

- NAS name, which will be visible on client's network.

Note: In client's machine is appears as a normal local drive.

- Path of the NAS has to be specified which is generally kept as

```
/media/pi/
```

where the connected USB drives are, if one wants a particular directory to be NAS, then that path is to be specified.

- Writable property of the NAS Server is to be kept as Yes, if one wants to give its access but

if the drive is to be kept write protected, this field must be set as No.

- Create Mask and Directory Mask are to be kept as 0777, to define the permissions assigned to the directory while setting up. In this case the permissions are being provided to the home directory, where the NAS storage are being shown. The numbers assigned are bit masks for the directory access privileges.
- Then we have to specify its access to the clients, for which the public parameter is to be kept as no.

So, to set such configurations, the config file must be appended as:

```
[NAS Server Name]
```

```
path = /media/pi
```

```
writable = Yes
```

```
create mask = 0777
```

```
directory mask = 0777
```

```
public = 0
```

After setting up all the configurations of Live NAS Server, one has to set up a password for logging in to NAS Server. Which can be accessed with the command:

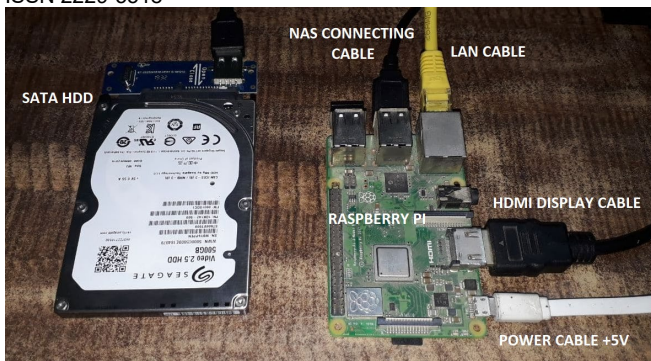
```
$ sudo smbpasswd -a pi
```

Now for to access our NAS, this password has to be entered in the client's side machine, and the client will be able to use our NAS seamlessly.

The setup is almost complete, to bring our Samba Server into action it is necessary to restart our Samba server which can be done with the command:

```
$ sudo systemctl restart smb
```

After this command Samba Server will be configured in the Raspberry Pi. As the NAS will be plugged in to the Raspberry Pi, the clients will be able to use them on their machines like a local drive only.



Setting up server components

SECTION-VI ACCESSING NAS

In client's machine, the NAS Server can be accessed by mapping a network drive, from the file explorer in client's machine and then adding the Folder name as

`\\raspberrypi\NAS_SERVER_NAME`

Then it would ask for the credentials, to access the file, the username will be "pi" and the password will be as entered it was entered while setting up the Samba server.

REFERENCES

1. <https://dergipark.org.tr/en/download/article-file/39702>
2. [https://en.wikipedia.org/wiki/Samba_\(software\)](https://en.wikipedia.org/wiki/Samba_(software))
3. <https://www.samba.org/samba/>
4. <https://lists.samba.org/archive/samba/2003-March/063429.html>
5. <https://www.raspberrypi.org/>
6. <https://pimylifeup.com/raspberry-pi-samba/>

AUTHOR INFO.

Lakshay Chawla,
Undergraduate student,
Department of Electronics and Communication
Engineering, University Institute of Engineering,
Chandigarh University, India