INTERNSHIP REPORT

On

NAS-Network Access System

By

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NAS Project

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Gandhi Institute of Technology and Management

(DEEMED TO BE A UNIVERSITY)

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

GITAM SCHOOL OF TECHNOLOGY

GITAM

(Deemed to be University)

CERTIFICATE

This is to certify that the project report entitled “NAS-Network Access System” is a bona fide record of work carried out by Barenkala Bhuvan Subramanyam (BU21CSEN0400086) submitted in partial fulfilment of requirement for the award of degree of Bachelors of Technology in Computer Science and Engineering.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DECLARATION

I hereby declare that the project report entitled **"NAS- Network Access System"** is an original work done in the Department of Computer Science and Engineering, GITAM School of Technology, GITAM (Deemed to be University) submitted in partial fulfillment of the requirements for the award of the degree of B.Tech. in Computer Science and Engineering. The work has not been submitted to any other college or University for the award of any degree.

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NAS Project Report

Network Attached Storage (NAS) with Plex Media Server using Raspberry Pi

Abstract:

This project seeks to develop an economical and effective Network Attached Storage (NAS) setup using Raspberry Pi, supplemented with Plex Media Server for streaming media. Leveraging Raspberry Pi's hardware and open-source software, the goal is to construct a holistic NAS system capable of storing, distributing, and streaming media content within a local network. This report delineates the hardware and software arrangement, configuration procedures, and the assessment of the NAS performance post-integration with Plex Media Server.

1. Introduction:

Welcome to my project, where I'll guide you through setting up your own Network-Attached Storage (NAS) system using a Raspberry Pi! NAS systems are incredibly useful for storing and sharing files within a network, whether it's for personal or professional use. However, the traditional options have often come with a hefty price tag. Thankfully, with the rise of affordable hardware like the Raspberry Pi and the availability of open-source software, creating your own NAS has become much more accessible.

In this project, I am going to show you how to harness the power of a Raspberry Pi to build your very own NAS. The Raspberry Pi is a small, affordable, and energy-efficient single-board computer that's perfect for this task. By pairing it with open-source NAS software, we can create a customizable solution that meets our specific storage and sharing needs, all without breaking the bank.

Throughout this project, we'll take you through each step of the process, starting with gathering the necessary hardware and ending with a fully functional NAS system. We'll cover everything from setting up the Raspberry Pi itself to installing and configuring the NAS software. Whether you're a tech enthusiast looking for a fun project or a small business owner in need of a budget-friendly storage solution, this guide has you covered.

With the Raspberry Pi as our foundation, we have a versatile platform that can be adapted to suit a wide range of needs. Whether you're storing documents, photos, videos, or even running a small server, the Raspberry Pi NAS has the flexibility to handle it all. Plus, with its low power consumption, it's an eco-friendly option that won't drive up your electricity bill.

So, if you're ready to dive in and create your own NAS system, grab your Raspberry Pi and follow along with our step-by-step guide. Before you know it, you'll have a fully functional NAS up and running, tailored to your exact specifications and ready to handle all your file storage and sharing needs. Let's get started!

2. Hardware Requirements:

- Raspberry Pi zero 2 W
- MicroSD Card (16GB or higher recommended)
- Power Supply
- Ethernet Cable or Wi fi
- External Hard Drive or USB Flash Drive (for storage)
- Raspberry Pi Case, Cooling Fan (Optional)

3. Software Requirements:

- Raspberry Pi OS or Kali Linux OS
- OpenMediaVault (OMV) for NAS functionality

4. Setup and Configuration:

4.1 Installing Kali Linux OS:

- Download the latest Image of OS from the Raspberry Pi Imager website.
- Flash the Kali Linux OS image onto the microSD card using tools like Rasspberry pi Imager.
- Insert the microSD card into the Raspberry Pi and power it up.

4.2 Configuring Network Settings:

- Connect the Raspberry Pi to the local network using an wi fi.
- Access the Raspberry Pi terminal either through SSH or directly via a monitor and keyboard.
- Configure network settings such as IP address, subnet mask, gateway, and DNS server.

4.3 Installing and Configuring NAS Software:

Option 1: Using OpenMediaVault (OMV):

- Install OpenMediaVault on the Raspberry Pi using the provided installer.
- Access the OMV web interface and configure storage devices.
- Create shared folders and set access permissions.

- Test the NAS by accessing shared folders and configuring additional services (e.g., FTP, SSH).

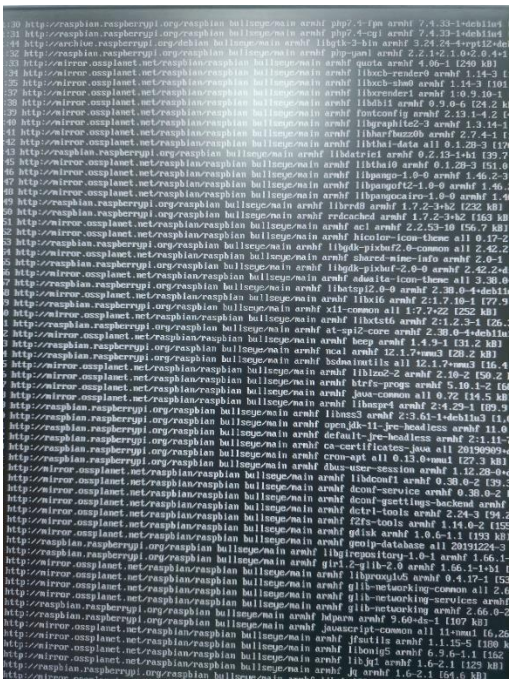
Option 2: Using Plex Media Server

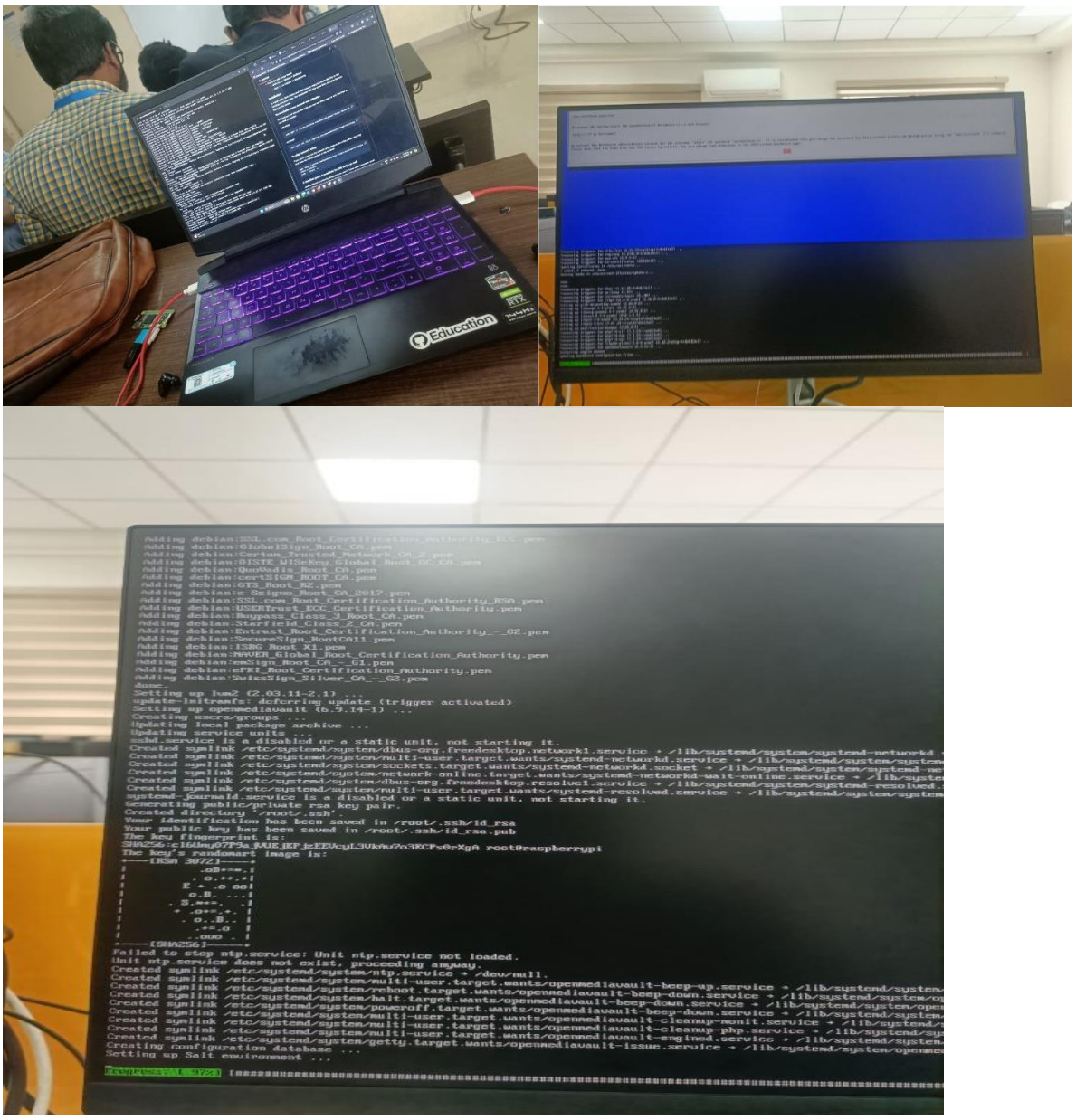
- Download and install Plex Media Server
- Start the Plex Media Server service
- Access the Plex Media Server web interface by navigating to `http://172.22.230.125:32400/web` in a web browser.
- Follow the on-screen instructions to set up Plex, create a Plex account (if necessary), and add media libraries.

5. Accessing and Managing the NAS:

- Once the NAS is set up, users can access shared folders using file explorer or command-line tools.
- Users can manage shared folders, permissions, and other settings through the NAS software interface (OpenMediaVault and Plex).

6. Result





7. Conclusion:

Key Findings and Effectiveness of the Raspberry Pi-based NAS Solution

The project showed that using a Raspberry Pi for a NAS with Plex Media Server works well. Here's what we found:

1. **Cost-effectiveness:** Using a Raspberry Pi for this purpose is cheaper than buying a ready-made NAS system. It's a great budget-friendly option.
2. **Versatility:** The Raspberry Pi can do a lot. It can be a NAS and a media server at the same time, which is pretty cool for managing home media.
3. **Low Power Consumption:** The Raspberry Pi uses very little power, making it a smart choice for running a NAS without hiking up your electricity bill.

4. **Easy Setup:** Setting up the Raspberry Pi NAS was easy, thanks to good guides and support from the Raspberry Pi community.
5. **Scalability:** While it's good for smaller collections, bigger libraries or heavy use might push its limits. For a larger setup, you might need something more powerful.
6. **User Experience:** Plex Media Server was easy to use. It helped organize our media and stream it to different devices, making our media setup much nicer.

Potential Future Improvements or Extensions to the Project

1. **Better Performance:** Upgrading to a more powerful Raspberry Pi or a different single-board computer could make things faster, especially for big collections or heavy use.
2. **Security Boost:** We could make our setup more secure by adding firewalls, encrypting connections, and keeping everything up to date.
3. **Cloud Integration:** Connecting our NAS to cloud storage services like Dropbox or Google Drive could give us more backup options and access to our media from anywhere.
4. **Adding Features:** We could explore more software or plugins for Plex Media Server to do cool things like connecting with smart home gadgets or setting up parental controls.

By making these improvements, our Raspberry Pi NAS setup could become even better, meeting more needs and being more reliable for our media storage and streaming.

8. Future Work

- Implement automated backups for data redundancy and disaster recovery.
- Explore hardware upgrades or alternative single-board computers for improved performance.
- Enhance security measures for protecting data and ensuring privacy.

9. References:

- Raspberry Pi Official Website
- Plex Media Server Documentation
- OpenMediaVault

Project Guide Signature