Recent advances in the development of data access system using remote means with raspberry pi & cloud computing

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Abstract
The cloud storages are becoming expensive these days and can be expected to increase more and more. The cloud storages give certain amount of the storage and then start asking the users to pay for the subscription model. Using Microprocessors and web development, it can offer you a better solution to have a personalised Private cloud storage. A private cloud storage is a storage solution that is hosted on your own network, rather than on a third-party service. This means that your data is stored in a more secure location and you have more control over it. Microprocessors can be used to create a private storage and which will be only accessible to the particular users only. Microprocessors like raspberry pi and the hard drive like SD cards, HDDs are been used to make a private cloud storage. We are installing a NAS server in the raspberry pi and create the website which is used to access the private cloud storage. NAS servers can be secured using a variety of methods, such as encryption and authentication. This helps to protect data from unauthorized access. NAS servers can be secured using a variety of methods, such as encryption and authentication. This helps to protect data from unauthorized access. The work done & presented in this paper is the result of the final year project work that has been done by the eighth sem engineering students of the college and as such there is little novelty in it and the references are being taken from various sources from the internet, the paper is being written by the students to test their writing skills in the starting of their engineering career and also to test the presentation skills during their project presentation.
Keywords: Network, Storage, NAS, Authentication.

1. Introduction
Now everything is done over the internet. The ease of access from anywhere and anytime makes people prefer to secure and store their files and information online [1]. However, cloud providers are constantly increasing their prices. With the help of a Microprocessor, Wi-Fi Modules, and Hard Drive we could build and provide private cloud for anyone for free! This technology can replace Google Drive, iCloud or Drop Box [2]. This project is aimed at reducing the power consumption, cost, remote access of your data, providing a comprehensive layer of security, as well as authentication for the data being read or written without compromising on the portability of data. will be utilizing the power of Microprocessors in the most optimized manner. Microprocessor are general purpose electronics processing devices which can be programmed to execute a number of tasks [3]. They have compact size and low-power consumption, thus becomes ideal for being a portable option as well [10]. Microprocessors operate over a speed of over 3 GHZ, which makes it ideal for reliable speed of the system. The system will be a plug-and-play and can be used for professional and personal usage as well [9]. We could extend this idea of storing to computation and cloud computing [4]. The system

can run on an internal network that is accessible anytime, no matter your internet connection. Unlike cloud storage, which is more vulnerable to third parties and prying eyes, this storage is completely restricted from anyone other than authorized personnel [8]. The system will have a firewall, load balancer and backup strategy on the software to ensure the safety and reliability of the system [5]. The software will be agnostic in nature and thus in case of failure of hardware components will not affect the user with a heavy toil [7]. Even upgrading the computational or storage capacity of the system will be way easier than any other cloud. Each cloud provider has a monthly package to charge for the services, while this system will be a one-time investment [6].

At the end we would have built a secure Private Cloud Storage system that allows users to store and access their personal data for free [11]. Each of these issues contribute to lack of efficiency and potential loss of income if customers cannot wait for a data outage to be corrected [12]. Additionally, when it comes to data storage, small businesses find themselves faced with other storage-related needs such as the lower cost options, ease of operation (many small businesses do not have IT staff), ease of data backup (and it's always accessible when you need it) & the growth capability [13]. When compared as per the perspective of scalability, reliability and ease of access, both of the options have stood the benchmark values. There are two main aspects that we found to differentiate a Cloud Storage and a NAS [14].

2. Literature Survey

To create their own NAS servers using Raspberry Pi, the clinching detail is that this is the first successful attempt at providing remote access of data to clients along with an extra layer of security in the form of Virtual Private Network for any sort of paramount data over several networks. With the help of Dynamic DNS allocation [16], we have managed to keep a constant external IP address of the router so that clients can access the Samba Server in turn having access to the data hosted by the external drive [17]. The reduction in the total power consumption without any compromise on the security, portability and back up of data can classify our model as the most preferable of the ones which already exists [15]. Here, we take advantage of the ease of usage of NAS servers and add a few tweaks to make data storage and accessibility both user friendly as well as preventing loss of data. The Raspberry Pi serves as the host to the external storage devices [18].

We have also enabled RAID backup of data present in the external storage device to prevent loss of data [22]. Implementing the idea of protecting data by using a secondary storage device ensures the maintaining of the confidentiality and integrity of the data stored on the external drive which is mounted to the Raspberry Pi. But this setup works for all devices in a particular LAN only [20]. We use Port Forwarding and VPN, in this case, to make the data remotely accessible across any network. Apart from the remote access given, crucial data can be provided with sufficient security using the virtual private network created [21]. Making use of the fact that the Raspberry Pi draws very little power to host the external drives, this setup can be classified as low power compared to the conventional serverclient method [19].

3. Proposed Methodology

When creating a NAS Server, a Network Attached Storage (NAS) server is a dedicated device or software solution that provides centralized file storage and sharing capabilities over a network [24]. It allows multiple users or devices to access files simultaneously and offers features like data backup, remote access, media streaming, and file synchronization [23].

• To install a NAS server on a Raspberry Pi, you'll need to follow a few steps. First, ensure that your Raspberry Pi is properly set up by connecting peripherals such as a keyboard, mouse, and monitor. Insert an SD card with a compatible operating system, such as Raspbian or Raspberry Pi OS. Boot up the Raspberry Pi and ensure it is connected to the network.

• Next, you'll need to install the necessary packages for setting up the NAS server. This typically involves updating the package lists and installing packages like Samba and Samba Common Bin. Samba is a widely used software suite that enables file sharing and printer sharing between devices.

- Once the installation is complete, you'll need to configure the Samba software. This involves editing the Samba configuration file and customizing it according to your requirements. You can specify shared folders, access permissions, and other settings in this file. For example, you can define a shared folder called "SharedFolder" with a specific path, set it as writable, and restrict guest access.

- After configuring Samba, you'll need to create a user account that will be used to access the shared folders on the NAS server. This user account will require a password. The user account and password will be used for authentication when accessing the NAS server from other devices within the network.

- To apply the configuration changes, you'll need to restart the Samba service on the Raspberry Pi. This will ensure that the new configuration is loaded and the NAS server is ready for use.

- Once the NAS server is set up and running, you can access it from other devices within the network. Simply enter the network address (IP address) of the Raspberry Pi NAS server in a file manager or file explorer on the other devices. You'll be prompted to enter the username and password you created earlier to authenticate and access the shared folders.

- It's important to note that the above steps provide a general overview of installing a NAS server on a Raspberry Pi. The specific details and commands may vary depending on the operating system you are using and your specific requirements. It's always recommended to refer to official documentation or online tutorials for detailed instructions tailored to your setup as shown in the Fig. 1.
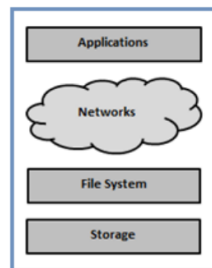

Fig 1. Nas server

4. Conclusions

The Private Cloud Storage project is a novel solution that provides users with a secure and reliable way to store their data remotely. Using Raspberry Pi, the project offers a self-hosted cloud storage solution that can be stored or access it from anywhere using website and Mobile Application Overall, the Private Cloud Storage project is a valuable contribution to the field of cloud storage solutions. It demonstrates the potential of using low-cost hardware to build sophisticated solutions that can offer an alternative to centralized cloud storage solutions. The project provides valuable insights into the development and deployment of cloud storage solutions while emphasizing the importance of data privacy and security in the current digital age [25].

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