International Journal of Scientific Research in Computer Science, Engineering and Information Technology
ISSN : 2456-3307 (www.ijsrcseit.com)
doi : https://doi.org/10.32628/CSEIT2390211

Raspberry Pi as a Personal Cloud Server with Next-cloud

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ARTICLEINFO

Article History:

Accepted: 13 March 2023
Published: 29 March 2023

Publication Issue
Volume 10, Issue 2
March-April-2023
Page Number
191-194

ABSTRACT

This research will show steps on how to build personal cloud storage by using Raspberry Pi (minicomputer), which will help the user to enable cloud storage mode to their external hard drive. Software solutions like Next-cloud, own-cloud are open-source cloud storage applications that allow users to store and access files, photos, and other digital assets from any device with internet access. The main objective of our project is to give a user personal Cloud Storage of his own in a cost-efficient manner which will be much more reliable than any other material cloud service.
Keywords -Raspberry Pi 3 Model, Next Cloud, Storage.

I. INTRODUCTION

To create a personal cloud we use raspberry pi services which allow synchronizing local folders with raspberry pi that act as servers in the cloud. Personal cloud storage offering for free services, synchronizing devices and sharing content. Raspberry Pi can be considered an ideal option for creating a personal cloud storage solution due to its reliable security features. This is mainly because it comes equipped with Secure Shell (SSH) capabilities, eliminating the need for any additional software installation. By enabling secure connections and facilitating Linux command-line operations, SSH provides a reliable means of connecting to your Raspberry Pi server from other computers, including Macs, and Linux computers. Building a personal cloud storage system can be a cost-effective alternative to commercial cloud storage services, and it is a primary objective of this project. Raspberry Pi serves as an ideal hardware platform for developing such a system, due to its compact size, low power consumption, portability, and lightweight design. In this project, we will use an open-source platform like Next-cloud which is used to create and host file services. The proposed service will be accessible to users via the internet, allowing them to store their files online and access them from anywhere with an internet connection.

II. OBJECTIVES

The objective is to create a personal cloud storage solution using Raspberry Pi that includes security features such as encryption and utilizes Next-Cloud for this purpose. Users will access the system using a username and password. Additionally, the cloud storage system will have a feature that allows users to

expand their storage capacity without any additional cost by using their own secondary storage devices. The cloud system is created using Raspberry Pi 3, which is compatible with open source software and WiFi. This system is only accessible to the developer who acts as a user, as they have set their own username and password to log in. The system can be accessed from any location within the same local network (LAN).

III. LITREATURE STUDY

F. Rauf et al.,(2018) [1] talks about a public cloud system, where users can access the cloud using web browser interfaces and are only charged for the duration of their usage, akin to how we pay for electricity at home based on our usage. This approach helps to minimize IT operation expenses. However, public clouds are typically less secure than other cloud models, as all applications and data are at higher risk of malicious attacks. A possible solution to this issue is to implement security checks on both the cloud vendor and client sides, through validation processes. This strategy can improve the overall security of the public cloud system. M. Ithing (2018) tells about how private cloud system operates within an organization's internal enterprise data centre, providing benefits such as easier security management, maintenance, upgrades, and greater control over deployment and usage. This system is similar to an intranet, in contrast to the public cloud, where all resources and applications are managed by the service provider. In the private cloud, these services are pooled and made available to users at the organizational level, with the organization itself managing resources and applications. Z.Adnan (2018) talks about how hybrid cloud is a type of cloud computing that combines the use of both private and public clouds. In this model, a private cloud is connected to one or more external cloud services, creating a more secure way to manage data and applications while also allowing access to information over the internet. This approach enables the organization to meet its needs through the private cloud, but also allows it to request additional computing resources from the public cloud as needed.

K. J. Pimple et al.,(2017) [2] The literature review will focus on the current features and functions of cloud storage that are available today. The review has found that there are many companies that provide cloud services, but with varying features. According to S. Jarwal (2017) Raspberry Pi can be utilized to create a personal cloud storage solution. By following proper guidelines, Raspberry Pi can be configured to create an individual's own cloud storage system. The project aims to develop a personal cloud storage system using Raspberry Pi. G. Rajai (2017) tells how the project requires the installation of Putty/ Raspbian and Next-cloud on the Raspberry Pi. The Raspberry Pi is configured using the Raspbian programming language via the command line. P. Ghadshi (2017) describes how Next-cloud is a free open-source software, it provides an alternative to other cloud service platforms. Furthermore, Next-cloud enables users to set up Raspberry Pi as a Cloud server. With this system, users can store data on it and retrieve it from any location with internet access. The available machines come in two models, A and B, which have minor differences in the size of their RAM and the number of input and output ports. G. Dubey (2017) talks about the machines which share many similarities with Cloud-based servers, including limited storage capacity and smaller-scale peripheral capability. Raspberry Pi is an affordable, education-focused, and compact computer with impressive processing capabilities. While it can function similarly to a standard personal computer, it requires a keyboard for command entry, a display unit, and a power supply to operate.

According to H. M. Fadhil et al.,(2019) [3] The Raspberry Pi board comprises several critical components, including a processor, graphics chip,

RAM, optional interfaces, and connectors for peripherals. The board features a 1.2 GHz 64-bit quad-core ARM Cortex-A53 processor, onboard 802.11n Wi-Fi, Bluetooth, and USB boot capabilities. Additionally, the processor relies on SD Flash memory to serve as a hard drive. The unit can be powered using the micro-USB connector, while internet connectivity can be established via an Ethernet or LAN cable.

H. A. Mohammed et al.,(2019) tells how Cloud computing has become a popular and powerful technology in both research and business. However, security concerns have emerged as a major issue, and there is a critical need for improvement in this area. Confidentiality of user data is essential, and cloud maintenance is a major advantage provided by cloud providers. Many top companies offer cloud services, such as Amazon, Microsoft, Rackspace, Google, and Salesforce. Although these cloud services offer significant storage services and infrastructure, they come with a cost that may not be affordable for all users. In our proposed system, users can build their own cloud server to store files, images, text, data, etc., without having to pay a fee for obtaining services. This would enable users to save the cost of using large cloud services.

M. S. Jaseem et al.,(2019) A cloud server is a high-performance physical or virtual infrastructure that is used for processing, storing, and managing applications and data. These servers are created using virtualization software that partitions a physical server into multiple virtual servers. Cloud storage, on the other hand, is a cloud computing model where data is stored on remote servers and managed by a cloud storage service provider, allowing users to customize their data and share it over the internet with friends and business partners.

Our project was implemented on a college network that employs restricted access and firewalls, which block many ports. Therefore, port forwarding was not a viable option for our project. Weaved resolved this issue by using a tunnel protocol that assigns a unique global IP address to the device, which is a function of its actual address.

IV.RESULTS AND DISCUSSION

The proposed system employs a Raspberry Pi, running the Debian Linux operating system, to utilize the hard disk as Cloud Storage. Furthermore, drivers like Apache 2, MySQL, and PHP are installed, allowing the creation of a new web page for Cloud Storage access. Through router port forwarding, devices outside the network can access the website, enabling secure and mobile Cloud Storage. Acting as a central processor, the Raspberry Pi controls all Cloud Storage activities, powered by a micro USB cable connected to a power adapter, with hard disks connected via USB cables. Internet connectivity is achieved through an Ethernet connection during the Debian Linux operating system's initial bootup. Once configured, SSH communication is enabled, granting access to Putty for installing necessary drivers and software. In this project, the Raspberry Pi 3b model serves as the central processor. However, the processor specification can be customized depending on the needs of the organization. For instance, a higher specification processor may be used for hospitals or large organizations, while a lower specification processor may be suitable for schools or small-scale organizations. The efficiency of the processor is dependent on its specification.

V. CONCLUSION

Using a Raspberry Pi for personal cloud storage has numerous benefits, including free cloud services, customizable storage space using a personal hard disk, and added security features such as encryption to ensure data security. Additionally, users can store large amounts of data on their used hard disk and access their personal data from anywhere with internet access. While this type of cloud service is

currently only a prototype, it is cost-effective and can be further improved with additional features to enhance usability, security, or address hardware issues. To improve security, developers can configure and implement suitable measures such as creating passwords for the hard disk and Raspberry Pi, thereby increasing overall security.

III. REFERENCES

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Cite this article as :

R Niyam, Dr. Gobi Natesan, "Raspberry Pi as a Personal Cloud Server with Next-cloud", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 9, Issue 2, pp.191-194, March-April-2023. Available at doi : https://doi.org/10.32628/CSEIT2390211
Journal URL : https://ijsrcseit.com/CSEIT2390211