

NETWORK ATTACHED INFORMATION STORAGE

Anvitha R, Anusha S, Aishwarya H G, Bindhu A G, Dilip Chandra E

School of Electronics and Communication Engineering, REVA University, Bengaluru, Karnataka

ABSTRACT

Storage is the method of retention or retrieval of data on a computer or any other electronic devices. The storage space available for storing data is called as the ware house. The Network Attached Storage systems deals with file management systems that occur at different file location connected through a network rather than storage devices. The authorized client machines can directly access the files stored on a network attached storage device without any intervention from the file server. It emphasis performance, scalability and security for sharing files over a network. We have implemented our NAS using SSH and SAMBA protocols.

1 INTRODUCTION

Data storage refers to the collective methods and technologies that capture and retain digital information on electronic optical or silicon based storage media or sometimes over a network. Data storage is the most important component since the consumers have to rely on it to preserve information ranging from personal photos to business critical information. The rapidly developing technology for peripheral storage devices has opened new doors to security technologies. Therefore, it is now become possible to develop a cost effective technology that can directly communicate with the network that has a server acting at the intermediary. The proposed project aims at designing and building a system using disk drives directly connected to the network. The primary motivation for the NAS architecture is cost effective and scalable performance.

2 RELATED WORK

2.1 STORAGE: There are basically two modes of data storage: a) offline storage b) online storage.

a) Offline storage: This is the storage media that must be manually inserted into the system. The information is safely stored and retrieved when required. The data stored is permanent and its is unaltered until edited by user, the data stored is also more portable and can be accessed easily .eg: hard disk ,pendrives.

b) Online storage: It is a concept of storing of electronic data over a network. This type of data is more secured ,portable and can be accessed from any part of the world . It helps in sharing of files among the multiple users at the same time.

Networked storage: Networked storage is an online data storage mechanism that uses special devices connected directly to the network media. These devices will be assigned with an IP address and can then be accessed by the clients via the server. The server acts as the gateway to the data. In some cases, networked storage allows the device to be directly accessed without any intermediate source .The biggest advantage of networked storage is expandability.

2.2 RASBERRY PI: The raspberry pi is a series of small single board computer developed by the Raspberry pi foundation to promote teaching of basic computer science in schools. The Raspberry Pi platform can run the Linux operating system, which means that the Applications of open source software can be used directly with it.

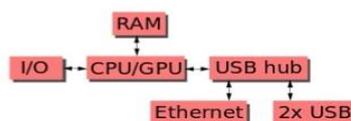


Figure1. Block diagram of Raspberry pi model B

The SD card inserted into the slot on the board acts as the hard drive to the Raspberry. It is powered by USB and the video output can be viewed on a traditional RCA TV set, a more modern monitor, or even a TV using a HDMI port. This enables all the basic features of a computer. It also has an extremely low power consumption of 5watt.

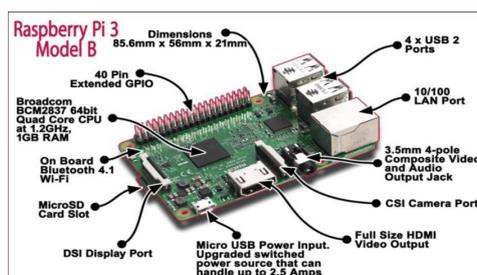


Figure2: Raspberry pi3 physical layout

The availability of drivers for opened source software makes the raspberry pi interfaced with devices such as keyboard, camera with USB, and adapter of WIFI, without having any source proprietary alternatives. Raspbian is a Debian based operating system for Raspberry pi. There are several versions available including Raspbian Stretch and Raspbian lassic. The operating system is a UNIX type, open source model. The latest release includes Raspbian Stretch with Desktop. The working platform involves ARM i386 version. The kernal is a monolithic environment.

2.3 NAS PROTOCOLS

The network protocols used to access the information stored in NAS are:

A. NFS (Network File System): NFS is a client/server application that helps the users to store and update files on a remote computers.

B. CIFS (Common Internet File System): CIFS is an application layer network protocol that provides File sharing and file locking mechanisms. CIFS is implemented on some of the operating system such as UNIX, Linux, and VMS via SAMBA. Locking mechanism allows local buffering and exclusive access.

SAMBA is the reimplement of SMB networking protocol. Samba provides secure and fast file and print services for multiple clients using the CIFS protocol. It functions both as domain controller or as regular domain

member. Samba is a software package that gives network administrators flexibility and freedom in terms of setup, configuration, and choice of systems and equipment.

C. FTP (File Transfer Protocol): This is a file transfer protocol between the computers where file data is transferred with appropriate methods .It is built on client server model architecture ,using control and data connection between clients and server.

D. HTTP (Hyper Text Transport Protocol): This refers to display of information in web pages and Accessing of information via network

2.4 NAS ARCHITECTURE

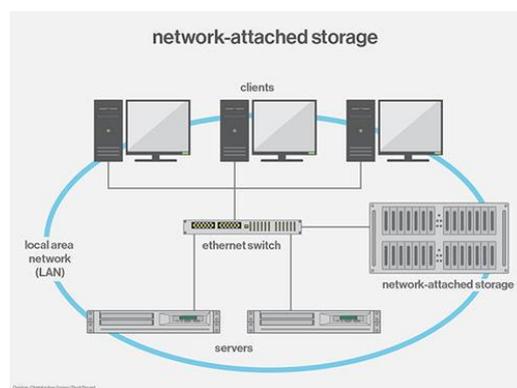


Figure3. NAS architecture

Figure.3. shows a typical NAS architecture. NAS helps the organizations to quickly and easily add file storage capacity to their technology infrastructure. NAS focuses mainly on serving files ,while hiding many of the details of the actual file system implementations. NAS appliances are easy to deploy and are self sustained. NAS works well for organization that need to deliver data to multiple clients over a network. NAS functions well in places where data must be transferred over long distances. NAS can be used for domestic automation of data storage.

3. PROPOSED WORK:

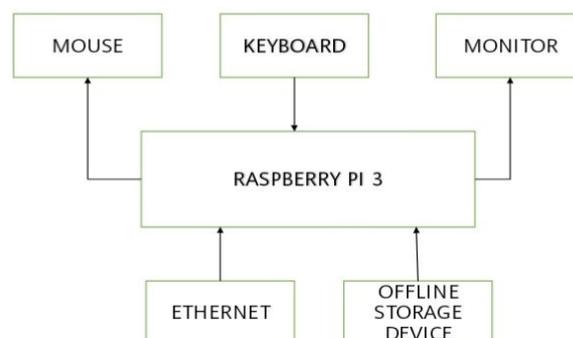


Figure 4.NAS BLOCK DIAGRAM

The Raspberry is powered by USB and the video output can be viewed on a traditional RCA TV set, a more modern monitor, or even a TV using a HDMI port. This enables all the basic features of a computer. It also has an extremely low power consumption of 5watt. Offline storage devices are connected through USB port to Raspberry pi and it also has a separate port to connect Ethernet cable. NAS solutions are configured as file serving appliances accessed through the workstations and servers using a network protocol TCP/IP. Network File System (NFS) or Common Internet File system (CIFS) are some of the applications used for accessing the file. Most of the NAS connections reside between workstation clients and the NAS file sharing facility.

4 CONCLUSION

The implemented NAS architecture is an innovative approach to the problems of high performance and cost effective data storage. By providing security to the network attached storage, we can enable clients to utilize its potential performance. The scalability benefits are inherent in network attached storage without comprising their data security. The essence of our capability scheme is the encapsulation of the bearer access right on a particular version of storage object using secret key shared between clients.

Data storage is more efficient, flexible, and data is centralized which can be used by multiple users at the same time. Management of this system is simple and it is more secured. It also provides scalability of data and high availability through native clustering and replication. Data is well secured with authentication, authorization and file locking in conjunction with industry standard security. The cost is low with ease of deployment. It ensures portability benefits to the user.

REFERENCES

- [1] David F. Nagle, Gregory R. Ganger, Jeff Buttlar, Garth Goodson and Chris Sabol, 'Network support for network attached storage', proceedings of hot interconnects 1999, August 18-20, 1999, Stanford University, Stanford California, USA.
- [2] Anna Suganthi, Karnavel, Rajini Girinath D, 'Network Attached Storage', UAE, March 15.
- [3] National Storage Industry Consortium NASD Working Group. <http://www.hpl.hp.com/SSP/NNAD>.
- [4] Henry M. Levy. Capability-based Computer System. Digital Press, Bedford, Mass, 1984.