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NAS (Network Attached Storage)

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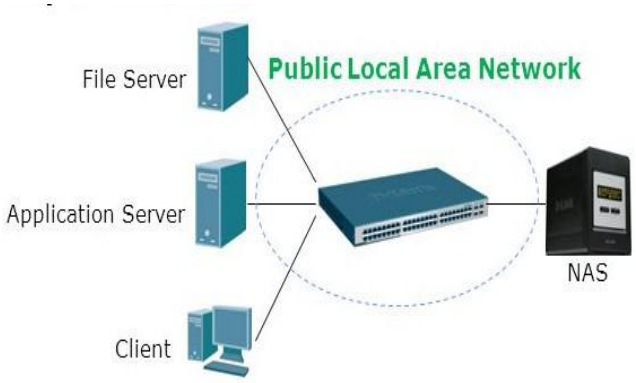
Abstract - *There are online storage with limited space and also in their privacy they can delete our data whenever they want, also there is risk of data leakage of data or account may get blocked, no loss of data as well as secured, space can be added also access anywhere in the world. NAS is a file-level computer data storage device connected to a computer network providing data access to heterogeneous network clients. A NAS Unit is Essentially a Self-Contained Computer Connected to a Network, With the Sole Purpose of Supplying File – Based Data Storage Services to Other Devices on the Network. NAS are usually accessed by Workstations and Servers through a Network Protocol Such as TCP/IP and Applications Such As Network File System (NFS) or Common Internet File System (CIFS)/Server Message Block (SMB) For File Access.*



Key Words: NAS, Server, Storage, FreeNAS, Data centre

1. INTRODUCTION

Network Attached Storage (NAS) is an IP-based file-sharing device attached to a local area network. NAS provides the advantages of server consolidation by eliminating the need for multiple file servers. It provides storage consolidation through file-level data access and sharing. NAS is a preferred storage solution that enables clients to share files quickly and directly with minimum storage management overhead.

What is NAS (Network Attached Storage?)

NAS also helps to eliminate bottlenecks that users face when accessing files from a general-purpose server. NAS uses network and file-sharing protocols to perform filing and storage functions. These protocols include TCP/IP for data transfer and CIFS and NFS for remote file service. NAS enables both UNIX and Microsoft Windows users to share the same data seamlessly. To enable data sharing, NAS typically uses NFS for UNIX, CIFS for Windows, and File Transfer Protocol (FTP) and other protocols for both environments. Recent advancements in networking technology have enabled NAS to scale up to enterprise requirements for improved performance and reliability in accessing data. A NAS device is a dedicated, high-performance, high-speed, single-purpose file serving and storage system. NAS serves a mix of clients and servers over an IP network. Most NAS devices support multiple interfaces and networks.

This device uses its own operating system and integrated hardware, software components to meet specific file service needs. Its operating system is optimized for file I/O and, therefore, performs file I/O better than a general purpose server. As a result, a NAS device can serve more clients than traditional file servers, providing the benefit of server consolidation.

2. Literature Survey

NAS recently gaining general acceptance, because it can share multiple file across server.it is better to understand and cost effective. NAS is a file server which employs a network file system to provide a file access interface to a network. Network attached storage (NAS) is a mainly used for file sharing rather than computing intensive application which require higher processing power. Network attached storage (NAS) is most popular virtualized environment. It also helps to store and access the file through one central location. Security can be implemented in network attached storage by using and authentication model to secure the storage from hacker ESXI [1].Network attached storage in the data centre where it hold in vm files, files ISO and NAS is a storage shared over the network at the file system level ESXI [2].

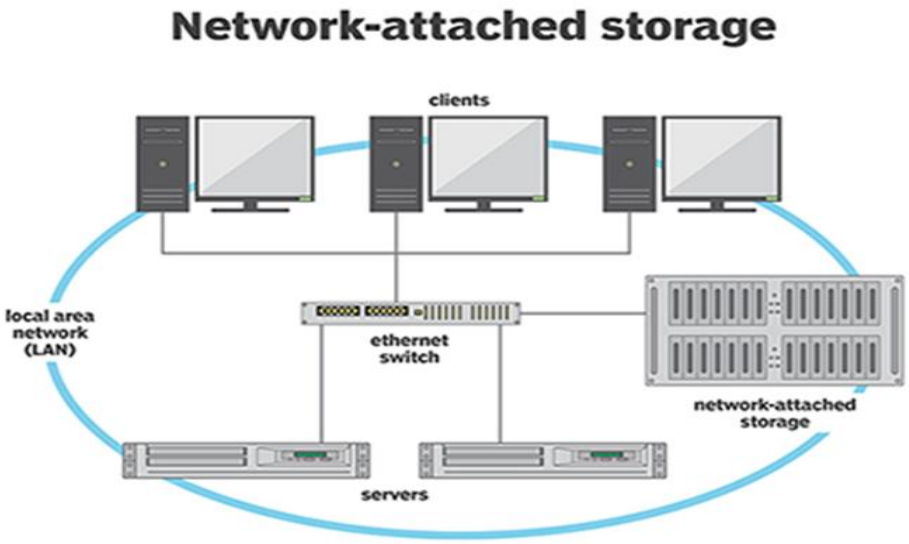
It provides an easy way for data sharing and backup among multiple consumer electronic devices in home network TESA [1]. Disk writes are common for many home NAS devices since home NAS is usually used for data storage and backup. It's also called as information storage system. Network based storage combined with smart storage management, can provide it.

NAS is a data storage mechanism that uses special devices connected directly to the network media.

- Supports comprehensive access to information: Enables efficient file sharing and supports many-to-one and one-to-many configurations. The many-to-one configuration enables a NAS device to serve many clients simultaneously. The one-to-many configuration enables one client to connect with many NAS devices simultaneously.
- Improved efficiency: Eliminates bottlenecks that occur during file access from a general-purpose file server because NAS uses an operating system specialized for file serving. It improves the utilization of general-purpose servers by relieving them of file-server operations.
- Improved flexibility: Compatible for clients on both UNIX and Windows platforms using industry-standard protocols. NAS is flexible and can serve requests from different types of clients from the same source.
- Centralized storage: Centralizes data storage to minimize data duplication on client workstations, simplify data management, and ensures greater data protection.
- Simplified management: Provides a centralized console that makes it possible to manage file systems efficiently.
- Scalability: Scales well in accordance with different utilization profiles and types of business applications because of the high performance and low-latency design.
- High availability: Offers efficient replication and recovery options, enabling high data availability. NAS uses redundant networking components that provide maximum connectivity options. A NAS device can use clustering technology for failover.
- Security: Ensures security, user authentication, and file locking in conjunction with industry- standard security schemas.

3. Methodology

we are using raspberry pi all pc are connected to the LAN cable and main server are connect to the raid server, because of if any problem in main server to we recover all data by raid server.



Functional Requirements

Registration and login:

Firstly, we have to register into the NAS os and then log into the dashboard.

Dashboard (home page):

In the main dashboard, main modules are shown which would help client to select any modules they want like memory usage, CPU temperatures, CPU usage, and reports.

Memory Usage:

Memory is check how much memory are free and how much active and how much is cache file and how much is non active and how much wired.

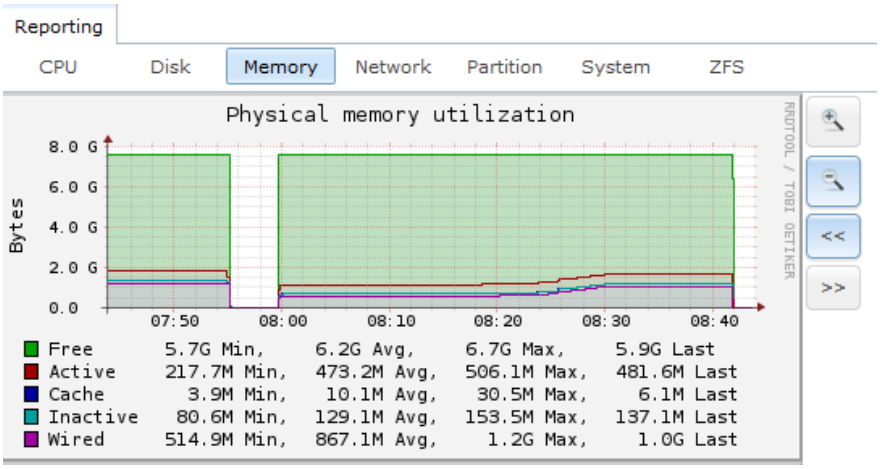


Fig -1: Memory Usage

CPU Usage:

In CPU usage you can show user usage, interrupt usage, system usage, and also show idle usage.

Fig -2: CPU usage

Reports: In report free NAS include all usage like network, partition, system CPU, disk, memory, target, etc…

Fig -3: Reports

Non-Functional Requirements

1. **Security**

   Security service is good as compared to working NAS server.

2. **Concurrency and Capacity**

   Project is able to handle multiple users and is executed properly so that no complications occur and multiple users can register and use the server.

3. **Performance**

   The performance is better of NAS server and we would further make improvements so that it makes user easy to use.

4. **Reliability**

   The NAS project is reliable enough for the client and server.

5. **Maintainability**

   The maintainability of NAS is better and we would continue for improvisation of it.

6. **Usability**

   The project simple so that the user can easily access and use data server.

7. **Documentation**

   So, our projects have a minimum of documentation at different levels. So, it makes the user easy to understand.

4. CONCLUSION

NAS can provide offline working, data sharing, manage to all the system.it is free for particular place like collages, companies, schools, working area. But outsiders can be used via payment.it is higher secure like digital signature, own ID & Password. Now this NAS is a less space compared to other NAS. The configuration parameter used in our experiment were 10,000 files, 10,000 transaction. The file size is 10GB to 15GB & per client uploaded multiple files at a time.

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