

# Making your Own NAS

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## ABSTRACT

This project aims to deploy the personal NAS system for remote and centralized storage solutions for all types of handsets and systems. Modern network-attached storage architectures suffer from poor performance, resource management, and inflexibility. We examine the problems of current architectures and propose another format for doing network storage at the user level. Nowadays, we have multiple cloud service providers, so there will always be an issue with data protection and backups. So, to solve all these issues, we came up with the new pre-existing idea of NAS, to leverage the data storage over the network using a GUI or dedicated devices. NAS will act as a public or private cloud storage service, which can be accessed from anywhere on the globe through internet facilities.

**Keywords:** - Network Attached Storage, GUI, backups

## 1. Introduction

In this project, we are building remote storage over the network. Today, we need various types of storage for storing data, which is time-consuming and not always cost-effective. But when we deploy the NAS system/services, we will get a centralized storage system that can be accessed from anywhere over the internet via a static IP address with high network security and storage assignments. Its requirements for deployment make it easy and affordable for anyone for any usage. It can serve in offices, schools, and other institutions for their storage needs, without pinning down the third-party vendors' services and any dependencies. NAS is available in two models: System Model: It will deploy on any system using NAS ISO bootable drive and act as the host system. NAS Dedicated devices model: For massive storage requirements, you choose the NAS devices for providing the central storage services.

### 1.1. Background Work

Today, we have various remote service vendors, but not everyone can use cloud services. Small companies may require centralized storage but cannot afford it. Therefore, a new method has been introduced in the market for storage: NAS. We are continuing the NAS storage services, but with a new pattern to fulfil the basic need for storage for anyone.

### 1.2. Problem Statement

We must develop an easy and swift system for multi-purpose storage facilities. The storage service can be used on a massive and small scale, like on a personal level.

### 1.3. Objectives

To provide cost-effective storage over the network with high availability and fewer chances of data loss. The NAS is easy to deploy and fully loaded with magical features. We will build a storage facility that will help many people access the data without saving the saved data on numerous devices. We do not depend on any third-party cloud service provider for anything. Furthermore, we will deploy our system with a self-backup and storage management system.

## 2. Methodology and modelling

The NAS system is most useful as a storage system for all types of businesses. NAS {Network Attached Storage} or SAN {Storage Area Network}, is on-growing technology for storage systems that are going to replace cloud technology within a few upcoming years.

**2.1. Proposed System**

Storage Area Network (SAN) – a network dedicated to providing data storage.

Network-Attached Storage (NAS) – a specialized computer built from the ground up for storing and serving files.

Disk Latency – the time it takes for a hard drive to either read or write data:

Excellent	< 1 ms
Very Good	< 5 ms
Good	5 – 10 ms
Average	10 – 20 ms
Poor	20 – 100 ms
Unacceptable	100 – 500 ms

Table 2.1: Read and Write time over the drive(s).

Table 2.1, describes the latency of the network in milliseconds (ms) for better management of the data within the network. The high ping in the network could delay in fetching the information and might create redundancy in the server during rewriting the information.

**2.2. Methodology:**

- System for hosting the services, which contains 8GBs RAM and a minimum of 500 GB storage in SSD or HDD;
- NAS Hosting iso file bootable driver as a key;
- Internet for connection and adding the static IP address to the system storage;
- Clients’ user credentials use;
- The amount of storage will be allocated as the need of the client or assigned as the default by the provider(s).

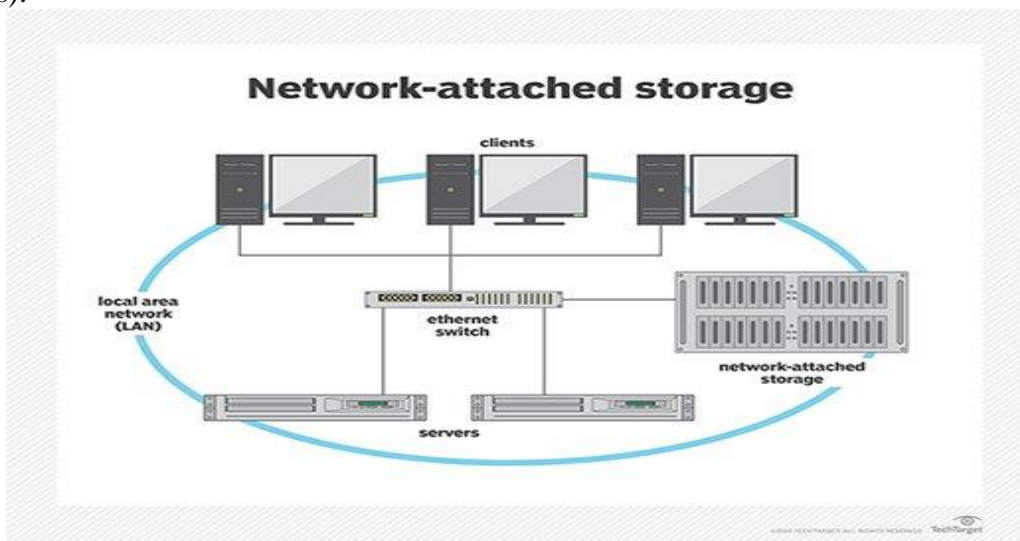


Figure 2.1: Connection of NAS

Fig.2.1 shows the connection outlet of the complete circuit of the NAS system. This explains all the flow of the setup for building the server.

**2.3. Requirements for the setup:**

- Data Backups;

- External access over the Internet;
- Access from LAN;
- Optimized Data Security;
- Maintainability;
- System Health Monitoring.

#### 2.4. Software Requirements

- Trust NAS is the application that divides the hardware and software for NAS services;
- High-speed network for fast transactions of the data over the storage segments;
- RAM of 08 to 12 GB minimum for good processing capacity of the system;
- SSD minimum of 500 GB for storage services, but 1TB SSD with HDD will be the best pair for storage of back-ups;
- A node system of minimum i5, if i7 will be the best choice for the node computation.

#### 2.5. Tool(s)

- TrueNAS applications;
- Network management tools for protocol assignment for the network;
- LAN connection for network layer connections.

#### 2.6. Hardware Requirements:

- Minimum of RAM 08 GB or 12 GB.
- Minimum storage of 500 GB is recommended.
- High-speed internet connection.
- Low latency and ping of the network.
- The best drive for storing the data is WD NAS Drives.

#### 2.7. Data Flow Diagram

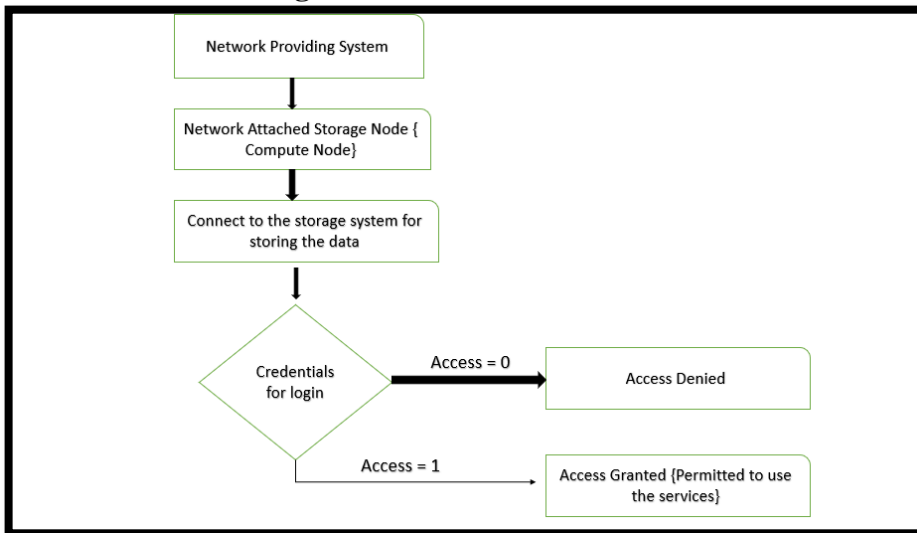


Figure 2.2: Data Flow Diagram

Fig. 2.2. explains the credentials process to access the NAS storage services. Only the allowed username would be able to use the server else the device will be detected as a threat system.

#### 2.8. The process involved in the system design

- Deploying the NAS system into the node for services;
- Connect the node with LAN {Local Area Networking} via ethernet or wireless format;
- Complete the installation of the TrueNAS application into the compute node;
- Assign the storage for the client according to SLA {Service Level Agreement};

- Provide the Credentials for login into the storage arena, for more security use multi-level authentication patterns;
- Now users can use the interface for storing the data;
- Create HDD storage on the node side for backups of the data, for recovery at the time of failure;
- Monitor the flow of network traffic to avoid the traffic reaching the bottleneck of the node and service line.

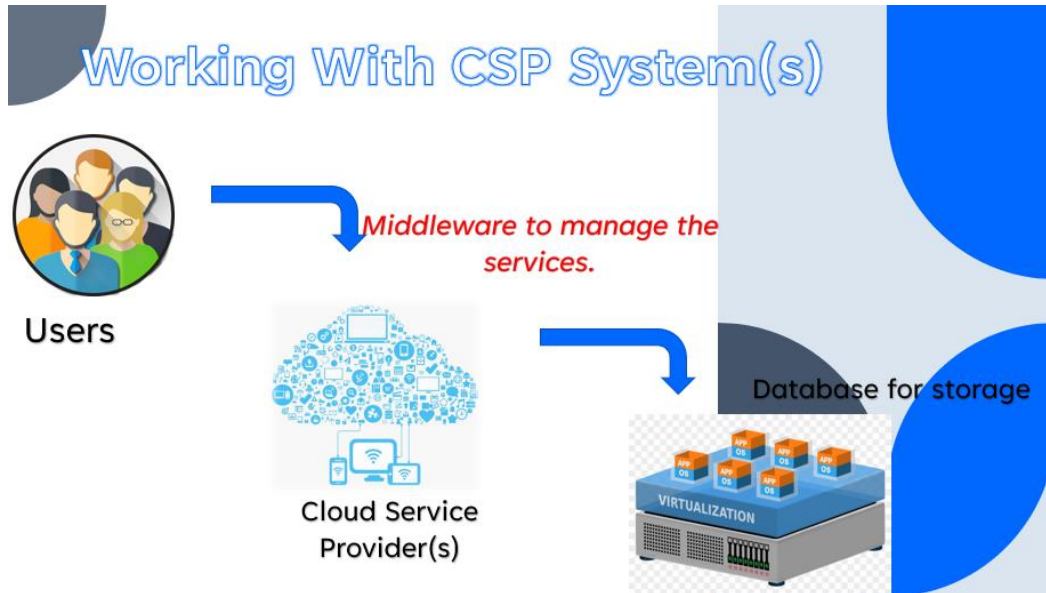


Figure 2.3: Working without NAS Architecture

Fig.2.3. Shows the architecture of the service without the NAS implementation. That you need an extra vendor for all your storage work, which will charge you a high fare for your usage with fewer data security and with an anonymous data storage location.

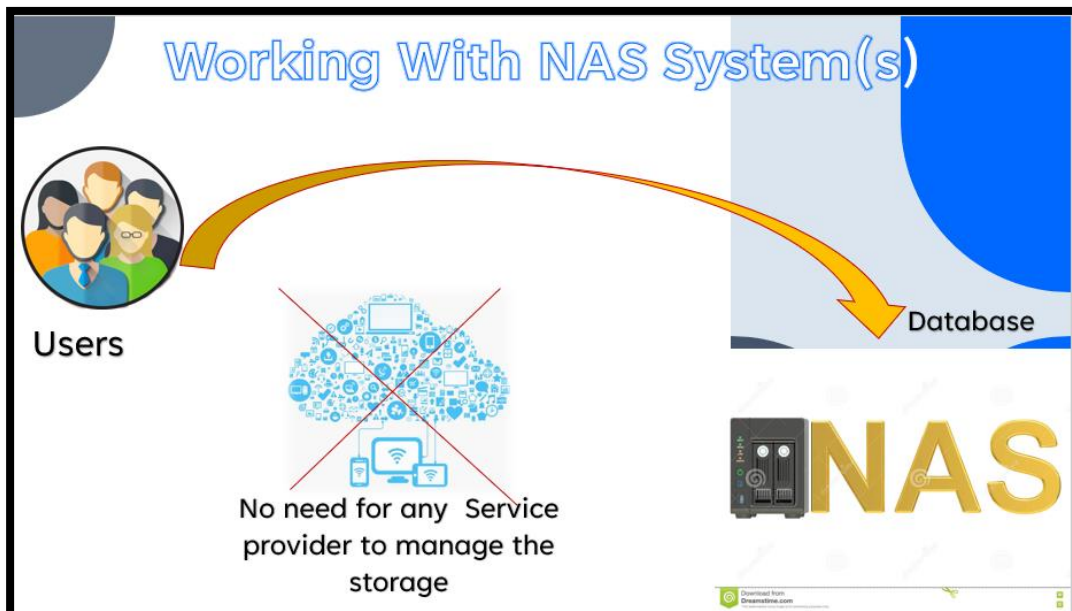


Figure 2.4: Working with NAS Architecture

Fig.2.4, Shows the architecture of the service with the NAS system. NAS will provide you with direct interaction with your database, and even user can locate their data storage centre with different types of network protocol(s).

## 2.9. Area of focus

### Network System management

- You need good speed internet services.
- Low latency issues.
- Backup supports.
- Host server/system management interface.

### For the System needs

- You need to use a minimum of 8GB RAM for better processing of the data.
- Need SSD for the fast read and write operations over the network.

## 3. Conclusion

In the era of wireless technology, if you still using SD or a local storage system for storing your data. Then you are just wasting your money and internet no-usage things.

When you use your internet transmission for social media or entertainment, then use your data traffic for your servers and host the public or private cloud service over the network.

NAS offers centralized storage which is easy to maintain, it's a very valuable option over cloud services; it does not need huge investments over it to establish as well as for maintaining its services.

NAS can be built on a server or it can be built on any local computer system. NAS is available in two forms; Application and hardware. But the selection of the form is based on the usage of the organization or the service provider.

Its implementation is simple and easy, which makes it more favourable for everyone.

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