**Amrita School of Computing, Amritapuri Campus,**

**Amrita Vishwa Vidyapeetham**

**Department of Computer Science & Engineering(AI)**

**PROJECT ABSTRACT**

**NAS Using Raspberry pi**

Course Code and title: 22AIE211 Introduction to Communication & IoT  
Project Group Number: 13

Student Details:

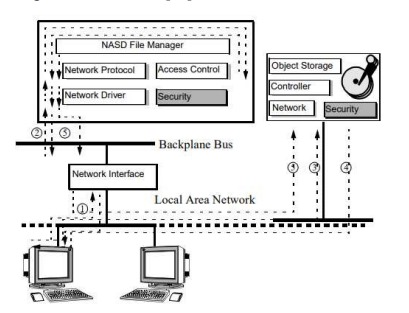
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**Abstract:**

Using a single-board computer (SBC) to build a Network Attached Storage (NAS) system is a useful and affordable solution to organize and safeguard your data at home or in a small workplace. NAS systems are specialized storage devices that are network-connected and provide safe and effective data access and storage for several users and devices. You may create a reliable and secure network area network (NAS) by utilizing adaptable and reasonably priced SBCs like the Raspberry Pi. Installing the NAS software and operating system, configuring the hardware, and putting security precautions in place to safeguard your data are all part of the procedure. Visual aids that help explain the process include network diagrams, flowcharts of the software installation procedures, and schematics of the hardware configuration.

Previous work published in IEEE journals has explored various aspects of NAS systems and their applications in data storage and processing. Adnan, Ilham, and Usman (2017) conducted a performance analysis of ETL processes in Apache Hadoop using NAS storage configured with iSCSI over Ethernet. Their study demonstrated that low-cost NAS components could effectively deliver scalable performance for big data applications. Confais, Lebre, and Parrein (2017) proposed an object store service for fog and edge computing infrastructures, integrating IPFS with scale-out NAS to create a scalable and efficient storage solution crucial for decentralized computing environments. Additionally, Adji et al. (2021) performed a literature review comparing cloud storage and NAS, highlighting the performance benefits of NAS in improving company operations while noting its cost-effectiveness and scalability. These studies collectively underscore the potential of NAS systems, particularly when paired with advanced configurations and technologies, to provide robust and efficient storage solutions in various computing contexts.

The project focuses on building a secure Network Attached Storage (NAS) system using a single-board computer (SBC) to enhance data storage and accessibility. The implementation involves several steps: setting up the hardware, installing the operating system, configuring NAS software, and ensuring data security. The hardware setup includes connecting the SBC to storage devices (e.g., hard drives or SSDs), a power supply, and network interfaces. A flowchart or block diagram, like the one provided, visually represents these connections, showing the NASD file manager, network protocol, access control, network driver, security layers, and the interaction between the network interface and the local area network (LAN).



In this setup, the NASD file manager handles the management of network protocols, access control, network drivers, and security measures. The backplane bus connects the NASD file manager to the object storage, which includes a controller, network interface, and security features. The local area network (LAN) facilitates communication between client computers and the NAS system. The diagram illustrates how data flows from the client computers through the network interface to the NAS, where it is processed and stored securely.

1. **Component List:**
2. **Raspberry pi 4**
3. **5v fan**
4. **Resistor(4.7ohm)**
5. **Temperature sensor**

**Software Requirements:**

1. **Raspberry**
2. **pi OS**
3. **NAS software**
4. **python**

**References:**

1. Adnan, A. A. Ilham and S. Usman, "Performance analysis of extract, transform, load (ETL) in apache Hadoop atop NAS storage using ISCSI," 2017 4th International Conference on Computer Applications and Information Processing Technology (CAIPT), Kuta Bali, Indonesia, 2017, pp. 1-5, doi: 10.1109/CAIPT.2017.8320716.
2. B. Confais, A. Lebre and B. Parrein, "An Object Store Service for a Fog/Edge Computing Infrastructure Based on IPFS and a Scale-Out NAS," 2017 IEEE 1st International Conference on Fog and Edge Computing (ICFEC), Madrid, Spain, 2017, pp. 41-50, doi: 10.1109/ICFEC.2017.13.
3. D. S. Adji, G. Eduardus, Michael, Minawati and W. Budiharto, "Performance Analysis Between Cloud Storage and NAS to Improve Company's Performance: A Literature Review," 2021 1st International Conference on Computer Science and Artificial Intelligence (ICCSAI), Jakarta, Indonesia, 2021, pp. 263-268, doi: 10.1109/ICCSAI53272.2021.9609792.