Storage Area Networks (SANS)

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1 What is a SAN?

A Storage Area Network, or SAN, is a network that allows files to be stored via a *group* of storage mediums instead of just one medium. This allows for consolidated access of the data and easier scalability – at a cost.

An important thing to note: The difference between a SAN and a NAS is that a SAN exposes the blocks of the logical mediums while the NAS provides an abstracted interface and utilizes higher-level transfer protocols.

2 Implementation Requirements

Prior to considering if a SAN is suitable for your use case, you must first verify that you have the suitable equipment and software:

2.1 Hardware Requirements

In order to utilize a SAN, the following equipment list is divided into two lists: the list required equipment are separated from the list for a fast SAN:

Required Hardware:

- More than one storage mediums. If only one is present, then it technically is not a SAN.
- A network connection is required to interact with the SAN.
- An **interface** is required as direct connections to an individual storage medium is not permitted.

For Better Performance:

- Faster storage mediums would directly correlate to faster speeds.
- **Reliable** and **faster** network connectivity would also be beneficial for the SAN.
- Redundancy is paramount for enterprise grade network mediums – this greatly improves reliability.

2.2 Software Requirements

- A **lightweight** operating system for servers is optimal to provide the **interface**.
- A **controller** is required to manage the storage mediums.
- A logical filesystem built on top of the SAN is required for the SAN to be utilized.
- Often all of these tools are collocated with other utilities that manage, advanced file history management, and backup snapshots.

3 When should I use one?

3.1 Advantages

- **Scalable**. Most SAN management software allow easy modification of the configuration of the storage mediums, allowing for simple replacements and additions of a SAN setup.
- **Fast**. In contrast to a single storage medium, IO capability is mainly limited to *network speed* instead of the speed of the individual storage medium.
- **Easily accessible**. As a SAN is usually connected via a network, it is available everywhere (permitted) in contrast to a physical hard drive.
- **Collaboration friendly**. SANs allow easy multi-user access.

3.2 Disadvantages

- **Network**. It is much easier to not have access to the network instead of not having access to internal storage. In areas with no connectivity, a SAN may not be utilized.
- **Network limited**. If the connection speed of the SAN is rather slow, then the speed of the SAN is slow as well. In addition, it is more prone to disconnections via Denial of Service attacks compared to the VPS.

3.3 A SAN is Optimal When

- Large, scalable data storage requirements must be fulfilled.
- If lots of common **shared** resources are to be stored (for example, it is more feasible to store all the binary installers of company programs on their network to cut bandwidth requirements).
- When reliability is a must.

3.4 A SAN Preforms Poorly When…

- When funding is not clearly available – SANs are **very expensive** when they are set up properly.
- Higher level protocols are more suitable – NASes are known to be **much cheaper**.