About

Now a home server can come in many different forms i.e even your phone could be a serer, your laptop, your old PC. As long as it has an internet connection and it can store content then in theory it could serve as a server. However, obviously some devices are better optimized for it than others. So in this book we will discuss the different server that exists and the different architectures one can choose from.

But before we do that we would like to provide you with a diagram that shows you how a basic computer works. Not the details and nitty gritty Nerdy stuff no we will use higher levels of abstraction and just tell you what is relevant for you. If you really want to know how a computer works then we recommend to follow some computer science classes!

So for a server to run it basically needs 5 essential things that are relevant for the average Joe! It obviously needs a lot more things but again that is not relevant for purchasing a HomeLab server. So these things are

1. CPU
2. GPU
3. RAM
4. Storage

Now, all of these different items comes in different sizes with different performances, but we will first focus on

1. Redundancy
2. High Availability
3. Backups

OS Redundancy

For a home server to run it basically needs 3 things

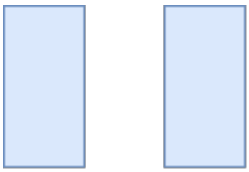
1. An operating system (OS)
2. An environment on top of that operating system on which apps can be hosted
3. Storage that the apps build on top of that environment can use to store files e.g photos, videos, or other data

Now, your phone for instance and other cheap systems store the operating system and the storage on the same drive. This is cheap and efficient however it also has its downside.

> If you store your OS and Storage on the same drive than if the drive fails you loose everything. Not only the OS configuration but your storage data as well

On the other hand if you store the OS and Storage on different drives than if your OS fails then you will still have all your data on your Storage drives if the data is not E2EE.

VM



Storage Redundancy

The first topic we will discuss is storage redundancy

Full SSD Server

As stated before there is data and there is data ;) In the most simple terms small and big data files. Everyone, knows that photos and videos take up most of your storage and not some notes or calendar entries. Hence, this works the same on a server, you have different storage systems for different types of data. However, to keep it simple we will just keep it to two types. Let's call them

1. App Data:
2. Storage Data

Different Storage Mediums

Now, data yes everything is not just stored in some magical cloud in the clouds and does travel through the sky ;) All the data is stored on physical material. Now, there are different materials and mechanisms one could possibly store data. Going back into the old days we used something called punch cards.

Punch cards stored data using patterns of holes punched in predefined positions. Each card typically had:

- 80 columns for data representation
- 12 rows for organizing information

Each hole represented a specific character or command, allowing for binary encoding of data. The presence or absence of holes in each column determined the information stored.

Revision #7
Created 2026-10-24 19:50:02 UTC by dpasn
Updated 2026-10-27 10:10:23 UTC by dpasn