SSD

SSD is a non volatile storage device,
It stands for Solid State drive.
SSD stores data on flash memory chips & maintains the data in a permanent state, even when the power is off.

* In comparision to electromechanical devices (drives), SSD's have lower latency Rate and access quickly. These storage devices stores the data is Semiconductor Cells.

* They do not have moving parts.

Types of SSD

* mSATA / SATA
* 2 / M.2
* PCIe
* NVMe

(1) SATA / mSATA — The first interface / generation used with SSD's is called SATA.
SATA delivers speeds upto 600MB/s and its size fits most notebook & PC's.
SATA also comes in smaller size called m-SATA.

"SATA is slowest among all SSD's. but it still has a data transfer rate upto 5x faster than HDD.

② NVMe:

Non-Volatile Memory Express (NVMe) is a protocol for SSD that allows data exchange speeds to reach upto 2600 MB/s.

5x times as fast as SATA / mSATA SSDs

* newer SSD than SATA SSDs.
* more expensive
* require more power than SATA SSDs

* used for business needs.

The NVMe protocol also works with flash memory, which means that even external or portable External NVMe SSD will perform as fast as Internal NVMe SSD.

Based on Connector type, there are two types in SSD as -

① PCIe connector ② M.2 connector.

PCIe

According to Connector used, we can categorize SSDs, which defines the data transfer speed.

PCIe is same connector that is used to connect high Performing graphics card directly to the motherboard.

When NVMe SSDs used PCIe connectors, they deliver fastest possible data proceeing.

M.2 Connector (NGFF). * Known as Next Generation form factor

* SATA M.2 / NVMe M.2 / PCIe NVMe M.2 SSD

* M.2 connector ensures that as SSD reaches the fastest speed possible (2600 MB/s).

* -> if the Motherboard doesn't have an M.2 connector, then alternatively a PCIe card with an M.2 connector is used to connect the NVMe SSD to motherboard. M.2 connector is compatible with SATA, PCIe, & even USB 3.0

Difference between SSD & HDD

SSD	HDD
* SSD is abbreviation of Solid State drive	HDD is abbrebiation of Hard disk drive.
* The time for reading & writing data in SSD is shorter.	* The Time for Reading / writing Data is HDD is longer.
There is lower latency in SSDs.	* There is higher latency in HDD
SSD supports the more operations of I/O per second	* HDD supports fewer operations
* SSD do not have rotating disk, so it is having light space.	* The weight of HDD is heavy
In the SSD's, the transfer of data is not sequential.	In HDD, the transfer of data is sqential.
SSD does not produce noise	HDD produce noise due to mechanical movement.
SSD's are expensive	HDD are cheaper.
SSD's are safe from magnetic effect.	In HDD, magnets can remove the data.
SSD's generate little heat because there is no moving disk	HPD generate more heat because of mechanical part.
It consumes less power than HPD	It consumes more power.
The average boot-up time of OS is 10-13 seconds.	The average boot-up time of OS is 30-40 seconds.
The file opening Speed of HDD is 30% faster than HDD.	The file opening speed is slightly slower.

Advantages Of SSD

- SSD's consume less power
- The speed of reading & writing the data is faster.
- The main advantage of SSD is that is produces less noise
- Due to high speed of SSD's files are transfered quickly.

Disadvantage of SSD

- Cost is high
- Recovery of lost data is not possible.
- The storage capacity of SSD is also less.