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**- Solid-State Drive (SSD**) is a [Solid-State Storage](https://en.wikipedia.org/wiki/Solid-state_storage) device that uses [integrated circuit](https://en.wikipedia.org/wiki/Integrated_circuit) assemblies as [memory](https://en.wikipedia.org/wiki/Computer_storage) to store data [persistently](https://en.wikipedia.org/wiki/Persistence_(computer_science)). it is also sometimes called solid-state disk, although ssds do not have physical disks. ssds may use traditional [hard disk drive (hdd)](https://en.wikipedia.org/wiki/Hard_disk_drive) form-factors and protocols such as [sata](https://en.wikipedia.org/wiki/SATA) and [sas](https://en.wikipedia.org/wiki/Serial_Attached_SCSI), greatly simplifying usage of ssds in computers. following the initial acceptance of ssds with hdd interfaces, new form factors such as the [m.2](https://en.wikipedia.org/wiki/M.2) form factor, and new i/o protocols such as [nvm express](https://en.wikipedia.org/wiki/NVMe) have been developed to address specific requirements of the [flash memory](https://en.wikipedia.org/wiki/Flash_memory) technology used in ssds

- **Hard Disk Drive (HDD)**, hard disk, hard drive, or fixed disk, is an electromechanical [data storage device](https://en.wikipedia.org/wiki/Data_storage_device) that uses [magnetic storage](https://en.wikipedia.org/wiki/Magnetic_media) to store and retrieve [digital](https://en.wikipedia.org/wiki/Digital_data) information using one or more rigid rapidly rotating disks ([platters](https://en.wikipedia.org/wiki/Hard_disk_platter)) coated with magnetic material. the platters are paired with [magnetic heads](https://en.wikipedia.org/wiki/Disk_read-and-write_head), usually arranged on a moving [actuator](https://en.wikipedia.org/wiki/Actuator) arm, which read and write data to the platter surfaces. data is accessed in a [random-access](https://en.wikipedia.org/wiki/Random-access) manner, meaning that individual [blocks](https://en.wikipedia.org/wiki/Block_(data_storage)) of data can be stored or retrieved in any order and not only [sequentially](https://en.wikipedia.org/wiki/Sequential_access). hdds are a type of [non-volatile storage](https://en.wikipedia.org/wiki/Non-volatile_storage), retaining stored data even when powered off.

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| **Attribute** | **SSD (Solid State Drive)** | **HDD (Hard Disk Drive)** |
| **Power Draw / Battery Life** | Less power draw, averages 2 – 3 watts, resulting in 30+ minute battery boost | More power draw, averages 6 – 7 watts and therefore uses more battery |
| **Cost** | Expensive, roughly $0.20 per gigabyte (based on buying a 1TB drive) | Only around $0.03 per gigabyte, very cheap (buying a 4TB model) |
| **Capacity** | Typically not larger than 1TB for notebook size drives; 4TB max for desktops | Typically around 500GB and 2TB maximum for notebook size drives; 10TB max for desktops |
| **Operating System Boot Time** | Around 10-13 seconds average bootup time | Around 30-40 seconds average bootup time |
| **Noise** | There are no moving parts and as such no sound | Audible clicks and spinning can be heard |
| **Vibration** | No vibration as there are no moving parts | The spinning of the platters can sometimes result in vibration |
| **Heat Produced** | Lower power draw and no moving parts so little heat is produced | HDD doesn’t produce much heat, but it will have a measurable amount more heat than an SSD due to moving parts and higher power draw |
| **Failure Rate** | Mean time between failure rate of 2.0 million hours | Mean time between failure rate of 1.5 million hours |
| **File Copy / Write Speed** | Generally above 200 MB/s and up to 550 MB/s for cutting edge drives | The range can be anywhere from 50 – 120MB / s |
| **Encryption** | Full Disk Encryption (FDE) Supported on some models | Full Disk Encryption (FDE) Supported on some models |
| **File Opening Speed** | Up to 30% faster than HDD | Slower than SSD |
| **Magnetism Affected?** | An SSD is safe from any effects of magnetism | Magnets can erase data |