

## SOLID STATE DRIVE

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**Abstract:** Solid state drive (SSD) is a nonvolatile storage device similar to a hard disk and does functionally everything a hard drive does. It uses integrated circuit assemblies as memory to store data and have no moving mechanical components. This distinguishes them from ancient mechanical device magnetic disks reminiscent of magnetic disc drives (HDDs) or floppy disks, that contain spinning disks and movable read/write heads. This paper attempts to highlight the advantages and disadvantages of a SSD and its history. SSDs had origins within the fifties with 2 similar technologies: core memory and charged electrical condenser computer storage (CCROS). The increase in the use of SSD over a traditional hard disk makes analysts expect annual sales of SSD drives to exceed quite three hundred million by the year 2025.

**Keywords:** Solid state drive, hard disk drive, non volatile memory, core memory, CCROS

### INTRODUCTION

A solid-state drive (SSD, conjointly referred to as a solid-state disk though it contains neither a associate actual disk nor a drive motor to spin a disk) could be a solid-state device that uses microcircuit assemblies as memory to store knowledge persistently. SSD technology enable easy replacements in common applications as it primarily uses electronic interfaces which are compatible with ancient block input/output (I/O) magnetic disc drives. In addition, new I/O interfaces, like SATA categorical, are designed to handle specific needs of the SSD technology. SSDs don't have any moving mechanical parts. This distinguishes them from ancient mechanical device magnetic disks reminiscent of magnetic disc drives (HDDs) or floppy disks, that contain spinning disks and movable read/write heads. Compared with mechanical device disks, SSDs area unit usually additional proof against physical shock, run wordlessly, has lower interval, and lower latency. However, whereas the value of SSDs has continued to say no over time, consumer-grade SSDs area unit (as of 2016) still roughly fourfold per unit of storage than consumer-grade HDDs.

## **DEVELOPMENT AND HISTORY**

SSDs had origins within the Fifties with 2 similar technologies: core memory and charged electrical condenser computer storage (CCROS). These auxiliary memory units (as contemporaries known as them) emerged throughout the age of vacuum-tube computers. Though, their use ceased with the introduction of cheaper drum storage units.

Later, within the Nineteen Seventies and Eighties, SSDs were enforced in semiconductor memory for early supercomputers of IBM, Amdahl, and Cray, however they were rarely used as a result of their prohibitively high worth. Within the late Nineteen Seventies, General Instruments created associate degree electrically alterable computer storage (EAROM) that operated somewhat just like the later NAND non-volatile storage. Sadly, a ten-year life wasn't realizable and plenty of firms abandoned the technology. In 1976, Dataram started commercialism a product known as Bulk Core, that provided up to a pair of MB of solid state storage compatible with Digital instrumentation Corporation (DEC) and information General (DG) computers. In 1978, Lone-Star State Memory Systems introduced a sixteen KB RAM solid-state drive to be employed by oil firms for seismic information acquisition. In 1989, the Psion megacycle per second four hundred portable computers enclosed four slots for removable storage within the type of flash-based "solid-state disk" cards, mistreatment a similar kind of non-volatile storage cards as employed by the Psion Series three. The flash modules did have the limitation of wanting to be re-formatted entirely to reclaim area from deleted or changed files; recent versions of files that were deleted or changed continuing to require up area till the module was formatted.

In 1991, SanDisk Corporation created a twenty MB solid state drive (SSD) that oversubscribed for \$1,000.

In 1994, STEC, Inc. bought Cirrus Logic's flash controller operation, permitting the corporate to enter the non-volatile storage business for client electronic devices.

In 1995, M-Systems introduced flash-based solid-state drives. They had the advantage of not requiring batteries to take care of the information within the memory (required by the sooner volatile memory systems), however weren't as quick because the DRAM-based solutions. Since then, SSDs are used with success as HDD replacements by the military and region industries, also as for different mission-critical applications. Here the solid-state drives succeed, because of

their ability to face up to extreme shock, vibration and temperature ranges as these applications need the exceptional unit of time between failures (MTBF) rates.

In 1999, BITMICRO created variety of introductions and announcements concerning flash-based SSDs, together with an eighteen GB three.5-inch SSD.

In 2007, Fusion-io declared a PCI e-based SSD with a hundred, 1000 input/output operations per second (IOPS) of performance in a very single card, with capacities up to 320 gigabytes.

Enterprise flash drives (EFDs) are a unit designed for applications requiring high I/O performance (IOPS), responsibility, energy potency and, additional recently, consistent performance. An EFD generally is an SSD with the next set of specifications that may generally be employed in notebook computers. The term was initially utilized by EMC in January 2008, to assist them establish SSD makers UN agency would supply merchandise meeting these higher standards. There isn't any standards bodies UN agency management the definition of EFDs, therefore any SSD manufacturer could claim to supply EFDs after they might not truly meet the necessities.

An example is that the Intel DC S3700 series of drives, introduced within the fourth quarter of 2012, that focuses on achieving consistent performance, vicinity that had antecedently not received a lot of attention however that Intel claimed was vital for the enterprise market. In 2014 we witnessed the birth of a renaissance in SSD inspired enterprise architecture - on a scale of ambition we haven't seen since the Year of SSD Revolutions in 2007

## **ARCHITECTURE AND FUNCTION**

The key elements of an SSD square measure the controller and also the memory to store the information. The first memory element in an SSD was historically DRAM volatile memory, however since 2009 it's additional normally NAND flash non-volatile memory.

Every SSD includes a controller that includes the physics that bridge the NAND memory elements to the host laptop. The controller is an embedded processor that executes firmware-level code and is one in all the foremost vital factors of SSD performance.

## **SOLID STATE DRIVE ADVANTAGES**

1. They are additional sturdy. With ancient arduous drives, the continual motion generated by little moving components creates heat, that could be considered as a leading factor for drive

failures. As a result of SSDs not having moving components, they are additionally reliable and vibration/shock-resistant than ancient arduous drives. They are conjointly additional immune to common drops, accidents, and wear and tear since they do not have the tiny, inclined components of ancient arduous drives. If you happened to drop your laptop computer associate in nursing it had an SSD put in, your screen would most likely break before the SSD. That is SSD sturdiness.

2. They are quicker. While not moving components to slow your pc down, SSDs are not simply faster; area unit} able to go once you are. Crucial SSDs provide instant-load performance, that means quicker boot times, quicker application loading times, and higher system responsiveness.
3. They are easier to hold. Since SSDs weigh lower than arduous drives, they are additional mobile-friendly and that they facilitate build your laptop computer easier to hold. With light-weight elements and solid construction, SSDs square measure higher fitted to the trials of constant travel.
4. They are additional economical. Since SSDs haven't any moving components, they need less power to control, which suggests you will get longer battery life. They are even quieter, too.
5. They are straightforward to put in. With very little quite a screwdriver and your owner's manual, you'll be able to install an important SSD — no expertise necessary.

### **SOLID STATE DRIVE DISADVANTAGES**

1. The foremost noticeable disadvantages of SSDs are restricted storage capability (compared to ancient onerous drives) and high worth per GB. One should buy a 1TB drive for one thing like \$100, whereas a 128GB SATA 6GB/sec SSD drive prices around \$200.
2. Whereas ancient onerous drives are capable of storing the maximum amount as 3TB of knowledge in an exceedingly single drive, SSDs usually are ready to hold no over 512 GB. This can be because of the big size of the non-volatile storage chips that the info is keep upon. However, as SSD technology will improve and mature, the dimensions of chips can step by step fall, leaving higher capability SSDs.

3. The employment of non-volatile storage conjointly means SSDs value considerably over ancient onerous drives. The price per GB for a SSD drive is often the maximum amount as 10x more than a standard drive. This figure is falling quickly, however. The price per GB of SSD storage halved once comparison figures from 2011 and 2012.

## **SOLID-STATE MEMORY**

Compact non-volatile storage is often a solid-state non-volatile memory. Solid-state memory is a computer memory that is stored within a hardware device that contains no moving parts. For example, Compact Flash memory is commonly a solid-state non-volatile memory. Solid-state storage (SSS) is a type of computer storage media made from silicon microchips. SSS stores data electronically instead of magnetically, as spinning hard disk drives (HDDs) or magnetic oxide tape do.

### **SSDs in consumer Electronics**

SSDs have gained a great deal of prominence in consumer natural philosophy with variety of little format media devices equivalent to smart phones, mp3 players and pill devices completely utilizing SSDs for storage. There are different reasons why this has happened...

- The read/write performance of SSDs is unmatched.
- SSDs take up less area that is vital in client electronic devices wherever area is at a premium.
- Also, at the client side, wherever the devices are portable and projected to sudden movements, SSDs are shown to be more reliable than storage device choices.
- Finally, the high price of storage is generally passed on to the buyer UN agency is commonly willing to pay on top of average costs for additional storage.

### **SSDs in the business world**

SSDs have additionally become progressively standard within the world of business. The short read/write performance of those drives has dramatically sped up computing performance, which means that a lot of work will be worn out a shorter quantity of your time.

SSDs also are turning into a lot of common in servers. Websites and applications running on the server perform dramatically higher, as do giant databases, high volume exchange servers and streaming media servers.

## CONCLUSION

Analysts expect annual sales of SSD drives to exceed quite two hundred million by the year 2026, and it's simple to check why. The superior read/write speeds provides a level of performance that a standard disk drive may never hope to match, and therefore the improvements ensures that drives can last longer, too. As the value of SSDs is continuously falling, SSDs can assuredly become the factual storage choice of alternative.

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