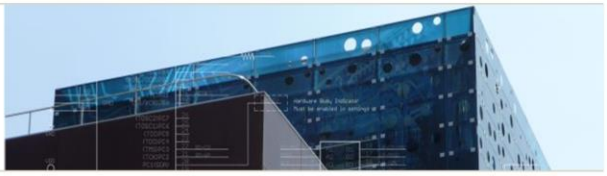
UNIVERSITAT POLITÈCNICA DE VALÈNCIA



Data storage and representation

Storage Devices. Solid State

In this unit we are going to see the solid state storage technology.

Solid state storage is the general name we use for an electronic permanent storage without moving parts.

It can be used to name several different technologies but most of the devices found in the market are based in nonvolatile NAND-based flash memory, that is able to retain data without power and can be read and written in blocks.

The main problem of flash memory is that it has a maximum number of rewrite cycles. Nowadays technology has made this number big enough to be forgotten by the consumer of USB pendrives and

memory cards.

A USB flash drive (or pendrive) is a device that uses flash memory and an integrated USB connection to be plugged in the computer. They have replaced diskettes and CDs as removable media.

They are increasing in size and we can find USB drives at reasonable prices between 8 and 128 gigabytes, and not so cheap ones with up to 1 TB.

Memory cards

Memory cards are also based on flash memory, but they are sealed in a plastic cartridge. Their main problem is the absence of a unique standard, therefore multiple sizes and shapes are used. Anyway, the secure digital (SD) format seems to be the winner of this format war .

Their capacity are in the same range as USB pens. And they are used in digital cameras and as an expansion in portable electronic devices.

If you want to use them for High Definition video recording or in high end photo cameras you have to pay attention not only to its capacity but also to its

transfer speed, as not all memory cards are suitable for all uses.

The same type of memory is used internally as main storage in tablets, smartphones, ebooks, video game consoles and, in general, in any electronic device.

As the cost of this technology is decreasing and larger devices are affordable, it is being used to manufacture drivers that are replacing the hard disks, especially in laptops. They are called disks but, however, they contain no disk, so solid state drives seems to be a more appropriate name.

Its main advantage is the speed in reading operations that you can notice clearly when you boot the computer or launch a program. Installing an SSD in your old desktop computer or laptop as the system disk can give it a significant speed boost. Besides, the absence of moving parts makes them a robust device.

As they are random access devices in which the reading speed does not depend on the location of the information, in solid state drives the defragmentation process is not necessary, and, as they have a maximum number of write cycles, it is even not recommended.

SSD’s maximum number of write cycles is quite high, but it could become a problem in disks that are accessed a lot and that are used for several years, as for the ones installed in servers.

Attribution

The sources of some of these figures are :

- https://www.flickr.com/photos/ambuj/345356294
- https://commons.wikimedia.org/wiki/File:Flash_memory_cards_size_comparison_(composite).svg
- https://en.wikipedia.org/wiki/Solid-state_drive#/media/File:Mtron_SSD.jpg
- https://en.wikipedia.org/wiki/Nokia_9000_Communicator#/media/File:Nokia-9110-4.jpg