**Cache**

* To store data locally in order to speed up subsequent retrievals. Pronounced "cash."

**1**. **Web cache**

**2**. **Browser cache.**

**Reserved areas of memory** (RAM) in every computer that are used to speed up processing. Pronounced "cash," they **serve as high-speed staging areas** that are **constantly filled** with the **next set of instructions or data**. Caches have faster input/output than the areas that feed them. For example, memory caches are high-speed memory, which is faster than main memory, and disk caches are main memory, which is faster than disk.

**Memory Caches:** A memory cache, also called a "CPU cache," is a **memory bank** that ***bridges*** main **memory** and the **processor**. Comprising faster **static RAM** (SRAM) **chips** than the **dynamic RAM** (DRAM) used for **main memory**, the cache allows instructions to be executed and data to be read and written at higher speed. Instructions and data are transferred from main memory to the cache in fixed blocks, known as cache "lines," using a look-ahead algorithm.

Temporal and Spatial (Time and Space): Caches take advantage of "temporal locality," whereby unchanging data constants such as high-low limits, messages and column headers are used over and over again. Caches also benefit from "spatial locality," because the next instruction to be executed or the next set of data to be processed is often next in line. The more sequential they are, the greater the chance for a "cache hit." If the next item is not in the cache, a "cache miss" occurs, and it must be retrieved from slower main memory.

**Levels 1, 2 and 3 (L1, L2, L3)**

Today's CPU chips contain two or three caches, with L1 being the fastest. Each subsequent cache is slower and larger than L1, and instructions and data are staged from main memory to L3 to L2 to L1 to the processor. On multicore chips, the L3 cache is generally shared among all the processing cores. See write-back cache and write-through cache.

1. **Web cache:**

A folder full of Web pages in the user's computer that is maintained by the Web browser for a period of time. If the local, cached page has not been updated on the Web, it is retrieved immediately by the browser, saving download time.

A computer system in a network that keeps copies of the most-recently requested Web pages in memory or on disk in order to speed up retrieval. If the next page requested has already been stored in the cache, it is retrieved locally rather than from the Internet. Web caching servers (or caching servers or cache servers) sit inside the company's firewall and enable all popular pages retrieved by users to be instantly available. Since the content of Web pages can change, the caching software is always checking for newer versions of the page and downloading them. Pages will be deleted from the cache after a set amount of non-activity.

1. **Browser cache:**

A temporary storage area in memory or on disk that holds the most recently downloaded Web pages. As you jump from Web page to Web page, caching those pages in memory lets you quickly go back to a page without having to download it from the Web again. In order to ensure that the latest page is displayed, the browser compares the dates of the cached page with the current Web page. If the Web page has not changed, the cached page is displayed immediately. If the Web page has changed, it is downloaded, displayed and cached.

When you quit the browser session, the cached pages are stored on disk. Settings in your Web browser let you set the amount of space to use for the cache, which is essentially a disk folder, and the length of time to hold the pages

**Static RAM (SRAM, S-RAM):**

A fast memory technology that requires power to hold its content. Static RAM (SRAM, S-RAM) is used for high-speed registers, caches and relatively small memory banks such as a frame buffer on a graphics card. In contrast, the main memory in a computer is typically dynamic RAM (DRAM). Static RAM chips have access times in the 10 to 30-nanosecond range, while dynamic RAM is usually above 50 ns.

Static RAM is fast because the six-transistor configuration of its pretzel-like flip-flop circuits keeps current flowing in one direction or the other (0 or 1). The 0 or 1 state can be written and read instantly without waiting for a capacitor to fill up or drain; however, the six transistors take more space than dynamic RAM cells made of one transistor and one capacitor.

**Dynamic RAM (DRAM, SDRAM):**

The most common type of computer memory and generally available today in the form of synchronous dynamic RAM chips (SDRAM). Most all volatile memory is dynamic RAM because it uses only one transistor and one storage capacitor for each bit. It is denser and much less costly than "static RAM," it’s faster counterpart.

Dynamic RAM: Unlike non-volatile firmware chips (flash, ROM, EEPROM, etc.), which hold their contents when the power is turned off, both dynamic RAM (DRAM) and static RAM (SRAM) require constant power.

The capacitors in a dynamic RAM chip are electrical storage tanks that do a poor job of holding a charge. They constantly leak, and the memory chip would lose its content were it not for the refresh circuitry that continuously re-energizes the capacitors approximately 15 times per second.

In 1968, dynamic RAM was patented by IBM, and the first commercial chips came from Intel and Mostek in the early 1970s with a capacity of 1,000 bits.

**Storage vs. Memory**

Storage and Memory are the **two major holding areas** in a **computer**, tablet or smartphone. In the past, they were identified and referenced correctly, but today "memory" may refer to either one.

**Storage** Is "***Non-Volatile***" means **retains/holds** content **when is power is off**, whereas **Memory (RAM)** Is "***Volatile***" means **loses** all content when **power is turned off**.

**Storage** comprises **hard drives** and **solid-state drives (SSDs)**, which ***hold*** **programs** and **data**. The ***primary attribute*** of ***storage*** is that it ***retains its content*** when the ***power is turned off***. USB drives and optical discs are also storage.

**Memory** is made up of "**random access memory**" **(RAM) chips**, which is often upgradable by the user in a desktop computer but not in a phone or tablet. In contrast to storage, memory (RAM) loses all of its content when the power is turned off. See RAM.

When an application is run, the software and data are copied from storage to memory (read), and memory is where the data are compared and calculated. The updated data may be displayed or printed and then copied (written) back to storage. See computer and byte addressable.

Why the Confusion?

The problem with these terms is that many storage devices today use "flash memory" chips (see below). Consequently, people think storage and memory are the same. To avoid confusion, refer to "storage" and "RAM" rather than storage and memory. For more details, see storage, memory and storage memory.

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| STORAGE DEVICES (Non-Volatile) | MEMORY CHIPS (Volatile) |
| hard drive (magnetic disk)  SSD (flash memory)  USB drive (flash memory)  SD card (flash memory)  CompactFlash (flash memory)  CD-R (optical disc)  DVD-R (optical disc)  DVD-RAM (optical disc)  magnetic tape (tape cartridge) | dynamic RAM (DRAM chips)  static RAM (SRAM chips) |