



# Imp - Byte

## Dictionary

Jul 10, 2020


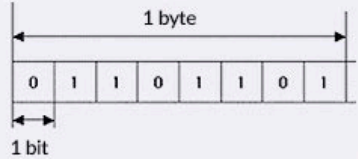
Bit, Nibble (4 bits), Byte (8 bits), Kilobyte (KB), Megabyte (MB), Gigabyte (GB), Terabyte (TB), Petabyte (PB), Exabyte (EB), Zettabyte (ZB), and Yottabyte (YB).

Remarkable progress in technology has us living surrounded by volumes of data incomparable to the past. Keeping up with the increase in data volume, storage media are also developing fast. A variety of storage media has come our way, from HDDs and SSDs to external hard drives, portable storage media (USB), and the Cloud, and their storage capacity has expanded vastly. The definition of 'high capacity' has rapidly changed, from kilobytes (KB) to megabytes (MB) to gigabytes (GB) and now, terabytes (TB). It appears the age of the petabyte (PB) isn't too far away. Let's have a look at the **'Byte'**, a commonly used unit not many of us completely understand.

**The 'bit': The smallest signaling unit**

**The 'byte': A basic unit of information**

# = bit and byte =

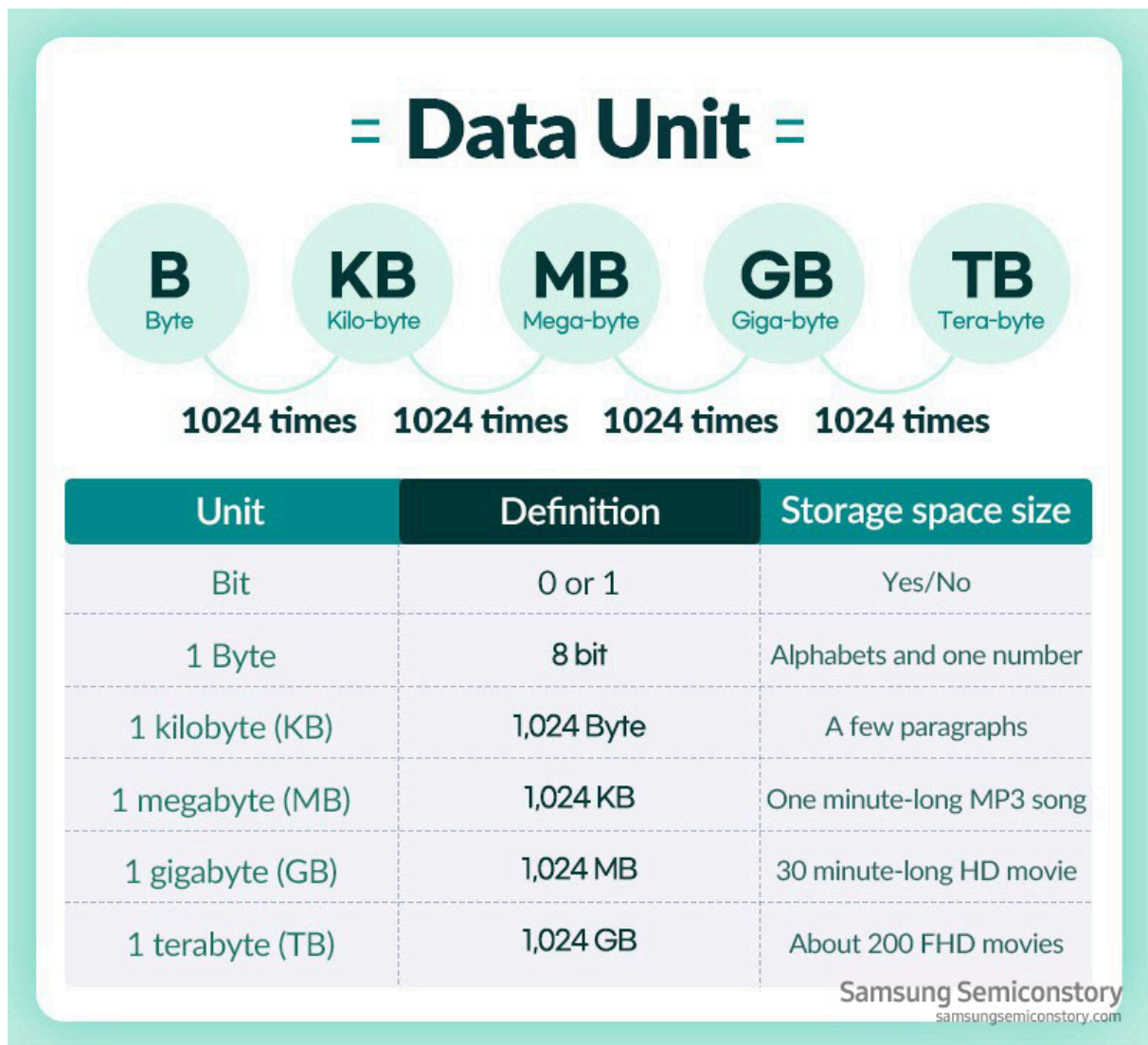
Bit (binary digit, bit)	Byte
Measurement unit that can only have two values, 0 and 1	Unit that indicates the amount of data, consisting of eight bytes
 <b>0 OFF FALSE</b> <b>1 ON TRUE</b>	

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Computers use digital electric signals, expressing all information using only '0' and '1'. Each bit of data corresponding to a '0' or '1' is called a 'bit'. Bit is short for 'binary digit.' The bit is the smallest unit of data that a computer processes, but a single bit is hopelessly small and cannot represent much data. The smallest practical unit for expressing information is the byte, which is made up of eight bits. A single byte can represent 256 combinations of data. A single byte consists of eight bits, and each bit can be a 0 or a 1. The number of combinations is equal to 2 to the 8th power.

One byte can represent one letter. However, this is for English and Western alphabets only; Eastern languages like Korean require 2 bytes per character.

**Units of bytes: Each one 1,024 times the last**



Just like 8 bits come together to form a byte, bytes can be assembled into larger units still. Each byte unit is 1,024 times the last. A kilobyte (KB) is 1,024 times a byte, a megabyte (MB) is 1,024 times a kilobyte, a gigabyte (GB) is 1,024 times a megabyte, and a terabyte (TB) is 1,024 times a gigabyte. Computer language is binary, as explained earlier, consisting of '0's and '1's. Each unit is larger than the previous unit by a multiple of 2, that is, 2 to the 10th power.

Still larger units include the petabyte (PB), the exabyte (EB), the zetabyte (ZB), the yottabyte (YB), and the brontobyte. The brontobyte is the largest unit of data volume we have conceived to date, but it's so new that the prefix bronto- is not even official yet. The size of a brontobyte is mind-boggling: In fact, it's enough to contain all of the world's movies, tapes, photographs, sound recordings, and text and speech records.

Now the question that's on everyone's minds. Why is it that my storage device's actual capacity doesn't match what's indicated on the label? This is because capacity is indicated using decimal numbers instead of binary. That is, on labels,  $1,000\text{B}=1\text{KB}$ ,  $1,000\text{KB}=1\text{MB}$ ,  $1,000\text{MB}=1\text{GB}$ , and  $1,000\text{GB}=1\text{TB}$ . A manufacturer defines a 1TB storage device as capable of storing 1,000,000,000,000 bytes, but dividing this number by 1,024 according to the binary system used by computers, we get 976,562,500KB, which divided again by 1,024 gives 953,674.3MB. This is divided again by 1,024 to give a GB number, and the result is 931.32GB. So, your computer recognizes a 1TB drive as having 931GB of storage space. Recently, Samsung Electronics launched the '870 QVO' SSD, a consumer SATA interface drive capable of storing a whopping 8TB. This sort of SSD capacity is an industry first. According to the math above, the 870 QVO can store approximately 490 high-definition 4K videos, each 15GB in size.

The advent of 5G has brought an explosion in data use for images and videos, and data storage requirements are accordingly expected to multiply exponentially. As recently as the early 90s, few of us were familiar with or even aware of the 'terabyte', now a household term for storage devices. The age of petabyte-level personal storage devices may not be far off.

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