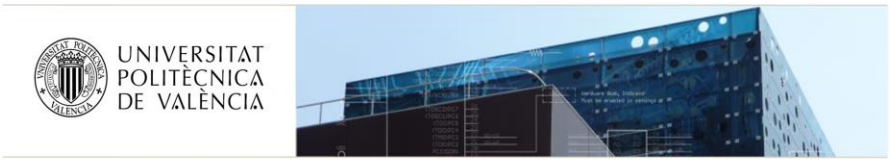
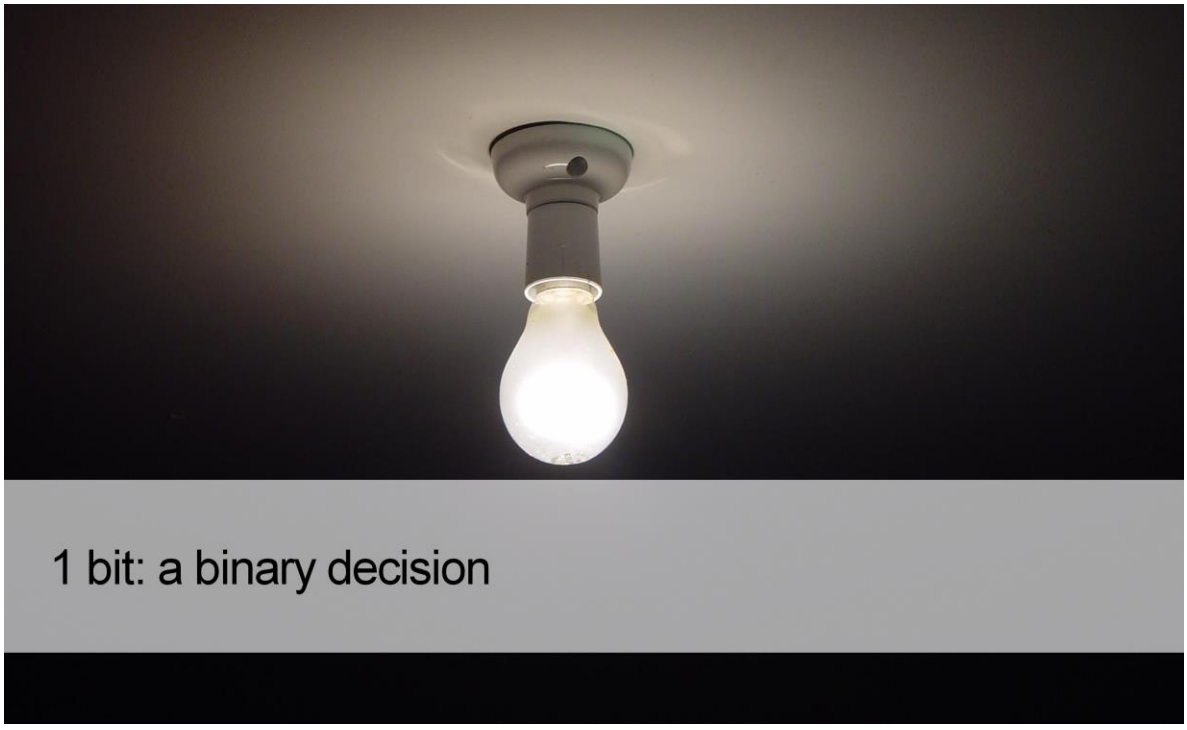


Data storage and representation

Bits, bytes and buzzwords

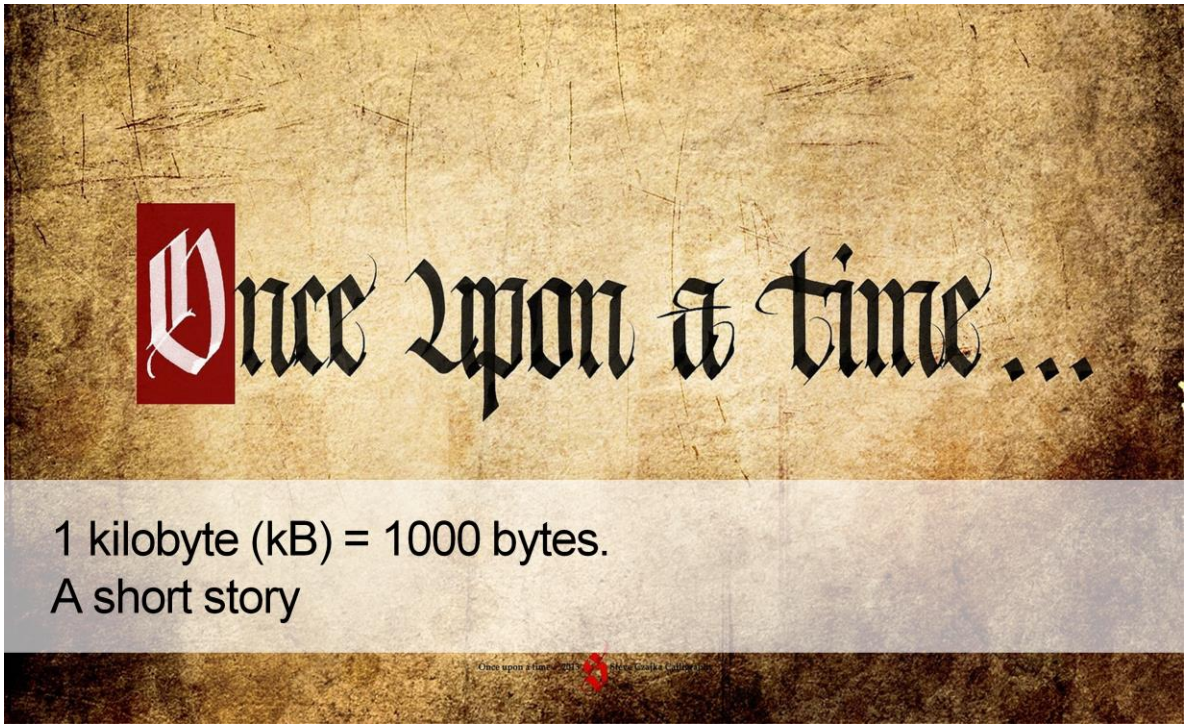
We are going to see some magnitudes related to the amount of information

As in the case of the powers of ten, we have special names to express the powers of 2.

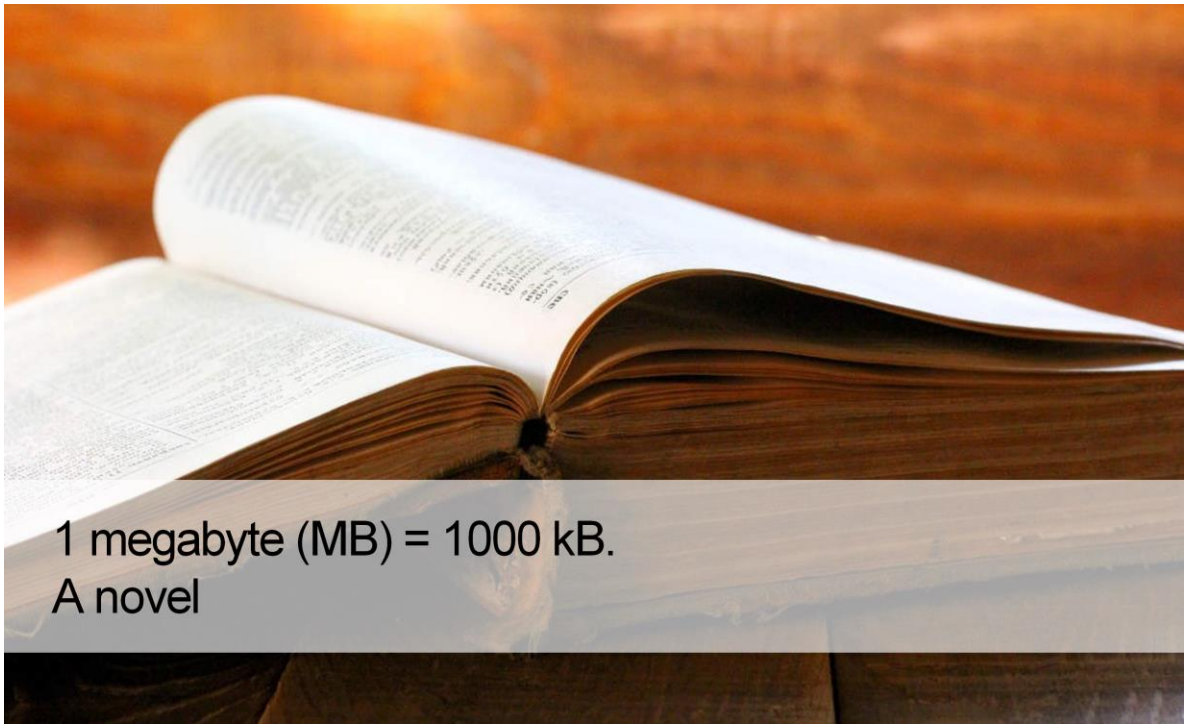


The smaller unit is a bit that represents a binary decision: true, false; on, off.

But the basic unit to exchange information is the byte: a group of 8 bits. With one byte we can represent one character.



The prefix kilo means one thousand. Therefore, 1 kilobyte will be one thousand bytes. This is, for example, the storage capacity needed for a short story

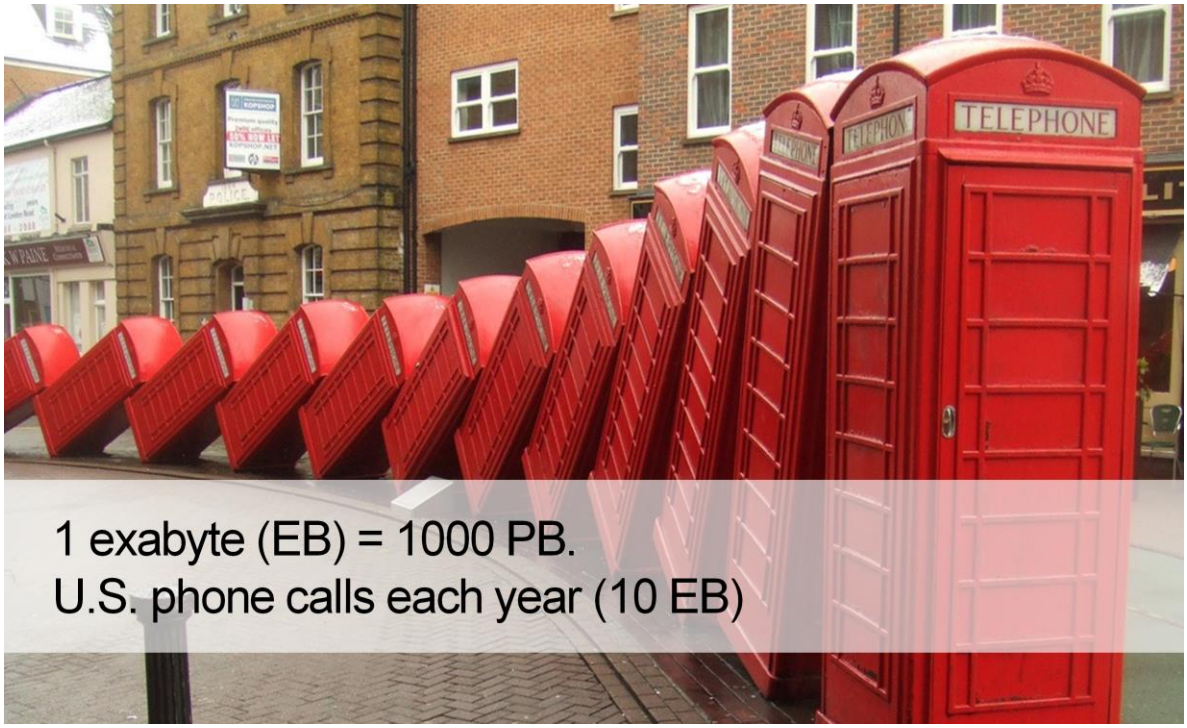


One megabyte is one thousand kilobytes (or one million bytes). The the storage capacity necessary for a small novel.

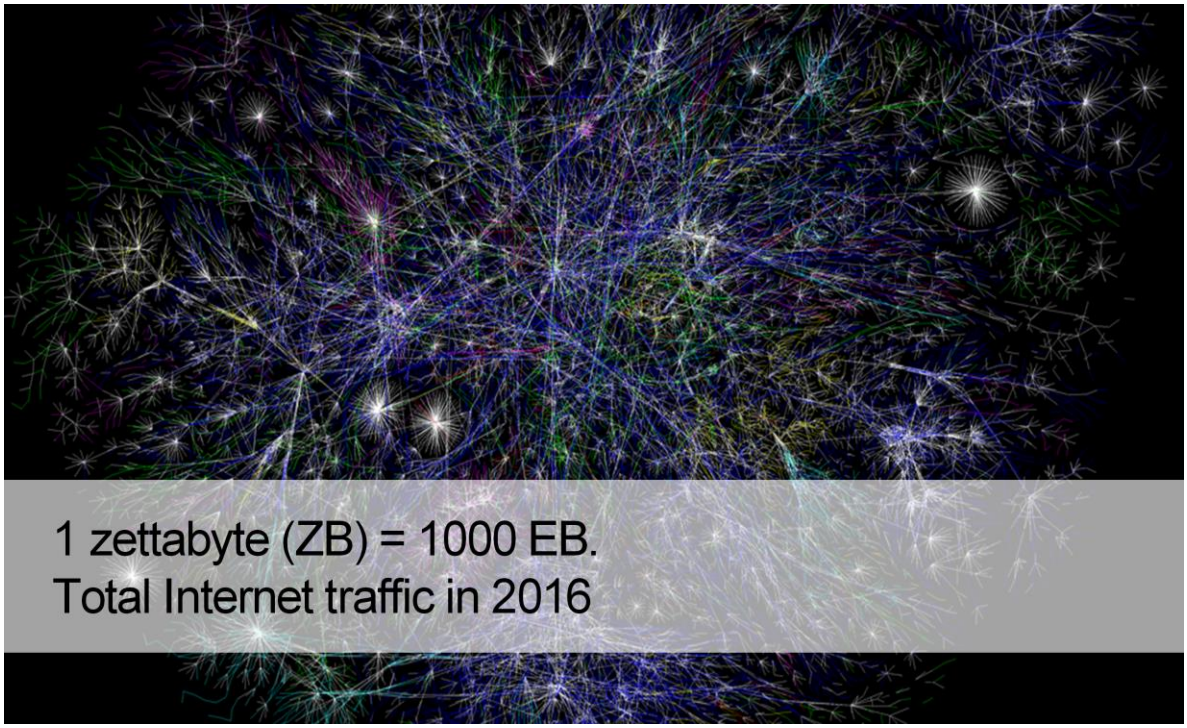
The next order of magnitude is the "gigabyte", one thousand megabytes or one US billion bytes. This is what we need to record a symphony in High Fidelity. The memory of current personal computers is measured in gigabytes

One terabyte is equivalent to one thousand gigabytes. The complete printed collection of the US library of the Congress would need 10 terabytes to be digitised.

The total amount of information in the Internet is measured in petabytes. One petabyte is one thousand terabytes. Google processes daily twenty petabytes of information.



The next magnitude is the exabyte, equivalent to one thousand petabytes. If we had to store all the US phone calls, we would need 10 exabytes.



One zettabyte is one thousand exabytes. It is the expected Internet traffic for two thousand and sixteen.

Finally, the last magnitude is the yottabyte. 1 yottabyte of snowflakes fall on Earth each year.

prefixes

Decimal			Binary		
Value	Metric		Value	Metric	
10^3	kB	kilobyte	2^{10} (1024)	KiB	Kibibyte
10^6	MB	megabyte	2^{20}	MiB	Mebibyte
10^9	GB	gigabyte	2^{30}	GiB	Gibibyte
10^{12}	TB	terabyte	2^{40}	TiB	Tebibyte
10^{15}	PB	petabyte	2^{50}	PiB	pebibyte
10^{18}	EB	exabyte	2^{60}	EiB	exbibyte
10^{21}	ZB	zettabyte	2^{70}	ZiB	zebibyte
10^{24}	YB	yottabyte	2^{80}	YiB	yobibyte

But the binary system uses powers of two, so the multiples on the binary system are measured as powers of two raised to ten, that is one thousand and twenty-four. So, in binary, instead of multiplying by 1,000 each time, we multiply by 1,024 and use the suffix –bi at the end of the prefix.

Usually, the prefixes kilo, mega, giga and so on are used for both multiples: decimal and binary. But formally speaking, the binary prefixes should be used: kibi, mebi, gibi, tebi...

Attribution

The sources of some of these figures are :

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- http://galleryhip.com/powers-of-ten.html
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