Reasonable Size of Computer RAM (Random Access Memory) Increases from 1 KiloByte in 1968 to 1 GigaByte in 2002 (34 years)

Reasonable Price Window - by Unit of Memory Size

Year	Gen-era-tion	Price per Byte	Price per KiloByte	Price per MegaByte	Price per GigaByte	Price per TeraByte	Price per PetaByte
1966	-4	$512.00	$512,000.00				
1967	-3	$256.00	$256,000.00				
1968	-2	$64.00	$64,000.00				
1968	-1	$8.00	$8,000.00				
1970	0	$2.00	$2,000.00				
1973	1		$256.00	$256,000.00			
1976	2		$128.00	$128,000.00			
1979	3		$32.00	$32,000.00			
1982	4		$4.00	$4,000.00			
1985	5		$1.00	$1,000.00			
1988	6			$128.00	$128,000.00		
1991	7			$64.00	$64,000.00		
1994	8			$16.00	$16,000.00		
1997	9			$2.00	$2,000.00		
2000	10			$0.50	$500.00		
2003	11				$64.00	$64,000.00	
2006	12				$32.00	$32,000.00	
2009	13				$8.00	$8,000.00	
2012	14				$1.00	$1,000.00	
2015	15				$0.25	$250.00	
2018	16					$32.00	$32,000.00
2021	17					$16.00	$16,000.00
2024	18					$4.00	$4,000.00
2027	19					$0.50	$500.00
2030	20					$0.13	$125.00

Reasonable

A reasonable amount of memory has always been matched to a reasonable price. As the price dropped, systems had more memory, and software expanded to fill the available RAM (Random Access Memory) memory.. Simultaneously, the units of size changed. So, when memory cost 1 million US dollars per megabyte, people bought Kilobytes. When memory dropped to 1 US dollar per MegaByte, people bought GigaBytes.

Qualitative differences

Moving data from a mechanical library with a 5 second access time to a magnetic disk with a 5 millisecond access time, speeds up access by a factor of 1 thousand. Moving data from a 5 millisecond access magnetic disk to 50 nanosecond access RAM speeds up database access by an additional factor of 100 thousand. Moral: if you have a slow database, moving the database to 100 Gigabytes of RAM will speed up database processing by a factor of 100 thousand with no changes to the user written software. (The database will have to know how to manage data stored in RAM.) VM or Virtual Memory works this way today, but databases are not optimized to access the entire database from real memory. Almost all databases are slower than users would like. Almost all databases would appear to have instantaneous access if the speed of the database was increased by a factor of 100 thousand. Users are now accustomed to instant response in word processors. The entire screen reformats in response to each character typed. Spell checks appear to be instant. Document pages seem to appear instantly when paging through a document.

When database software is redesigned to access the entire database from RAM, database access will appear to be instant as well. This will be the case even if the sequence of database accesses programmed by applications programmers was not optima. If users are able to use a database under current conditions, that same implementation will appear to have an instant response wine the entire database is accessed from RAM.

PCs are about to cross the 32 bit barrier (4 GigaBytes)

To benefit from the seemingly instantaneous responsiveness of fully RAM based computing, all application software (for example, all of Microsoft Office, will be loaded in RAM at system power up, eliminating the delays that occur when applications are loaded. This will require a little better power management because current RAM designs requires a data refresh about every millisecond.

With the price of a GigaByte of RAM approaching the magic 100 US dollars, which will put a GigaByte of RAM in every PC, the address limitations of the current Microsoft operating systems (Windows XP and Windows.net are limited to 32 address bits and cannot address more than 4 GigaBytes of RAM) will become a more and more visible constraint on the configuration and use of PCs. This is similar to the old 640 KiloByte barrier and the travails of converting from 16 bit to 32 bit software. The next big conversion will be from 32 to 64 bit software which will allow the addressing of 16 ExaBytes (16 quintillion bytes). The entire structure of computing will likely change before it is necessary to transition from 64 bit computing (at least from 64 bit addresses).