Thalan-Harry Cowlishaw

Storing the Universe

The library inside your pocket and whether you actually need it

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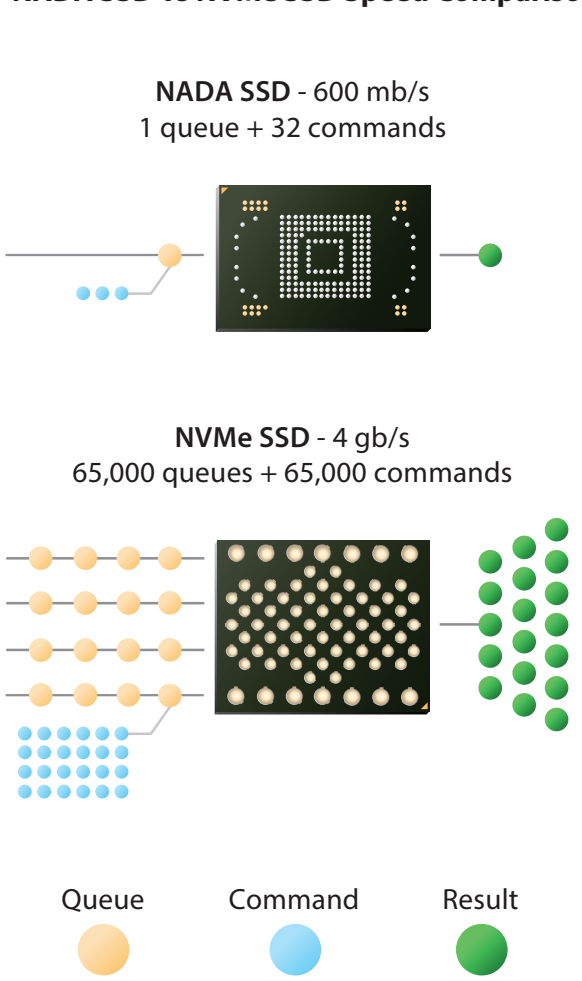
For centuries, humans have been striving to make the access and exchanging of information as easy as possible. From stone tablets to digital tablets, society is constantly improving on the way information is stored. But nothing in our history can compare to the innovative genius of data storage within the iPhone. Now, you can keep an entire library inside your pockets, and access it all within seconds.

Storage is at the heart of the iPhone; if there was none, the phone wouldn't function at all. There are two key factors to the quality of a storage system: size and speed. A larger memory means more files can be held, and a faster input/output rate results in a smoother user experience. Information on any device is expressed through its components as binary data. This data is retrieved from the iPhone's Solid State Drive (SSD), the digital storage device that contains all of the memory and files. The data is processed in queues and commands. The queue is how many tasks the SSD can complete at once and commands are the actions required to complete said queue.

Most mobile phones use a NADA SSD that can output a memory retrieval speed of 600mb/s, which is quite fast, but Apple completely changed the game in 2015 with the release of the iPhone 6S. What's so special about this? Well, this was the first mobile phone to use a Non-Volatile Memory Express (NVMe) SSD that could multitask more tasks at a more complex level, making the retrieval speeds wildly faster. The NVMe SSD is capable of speeds up to 4gb/s. That's over six times faster than any competitor at the time! As time has passed, Apple's storage options have improved immensely. The newly-released iPhone 13 Pro is available in sizes of up to 1TB of internal storage, outrunning the iPhone 12 by drastic measures all across the board.

But is that much free space a bit overkill? As time has moved on, Apple's storage capabilities have increased dramatically, with the new iPhone 13 Pro being fifteen times larger than that

NADA SSD vs NVMe SSD Speed Comparison



of the iPhone 4, released only 10 years prior. This is because other technological advancements, such as 5G download speeds, create demand for the memory to keep up. However, most users would argue that the standard 256BG choice is more than enough for storing photos and music for offline use. With its average file being between 3MB - 2000MB, the iPhone 13 Pro is theoretically capable of storing 333,000 photos, 300,000 books, 166,000 songs, 500 TV episodes, or just over 150 movies. Most would say this is far more than necessary, especially in an era populated with online streaming and cloud storage, so why the massive size increase?

A fair assumption would be for Apple to upsell their products and maintain a regal status in the market. Upselling storage space has become an important asset to Apple's business model, with a 6% increase in profits earned from high-storage iPhones in the last seven years, equating to roughly $24.6 billion AUD in revenue (Toni Sacconaghi, 2019).

The idea that's Apple's over-the-top stats are in place to earn a higher profit margin becomes more likely when considering that Apple is the only major smartphone brand that doesn't allow the user to insert their own expandable storage cards, instead of promoting their cloud-based memory subscription service iCloud.

Nevertheless, Apple is at the forefront of smartphone technology, improving upon their previous flagship's specs every year... but how much is too much? With an available 1TB of flash memory but users who rarely exceed 200GB of usage, this 'improvement' being worth $2,600 AUD is more than questionable. However, regardless of where one stands on this argument, I would like to end on a quote from renowned novelist Franz Kafka; "Better to have, and not need, than to need, and not have."

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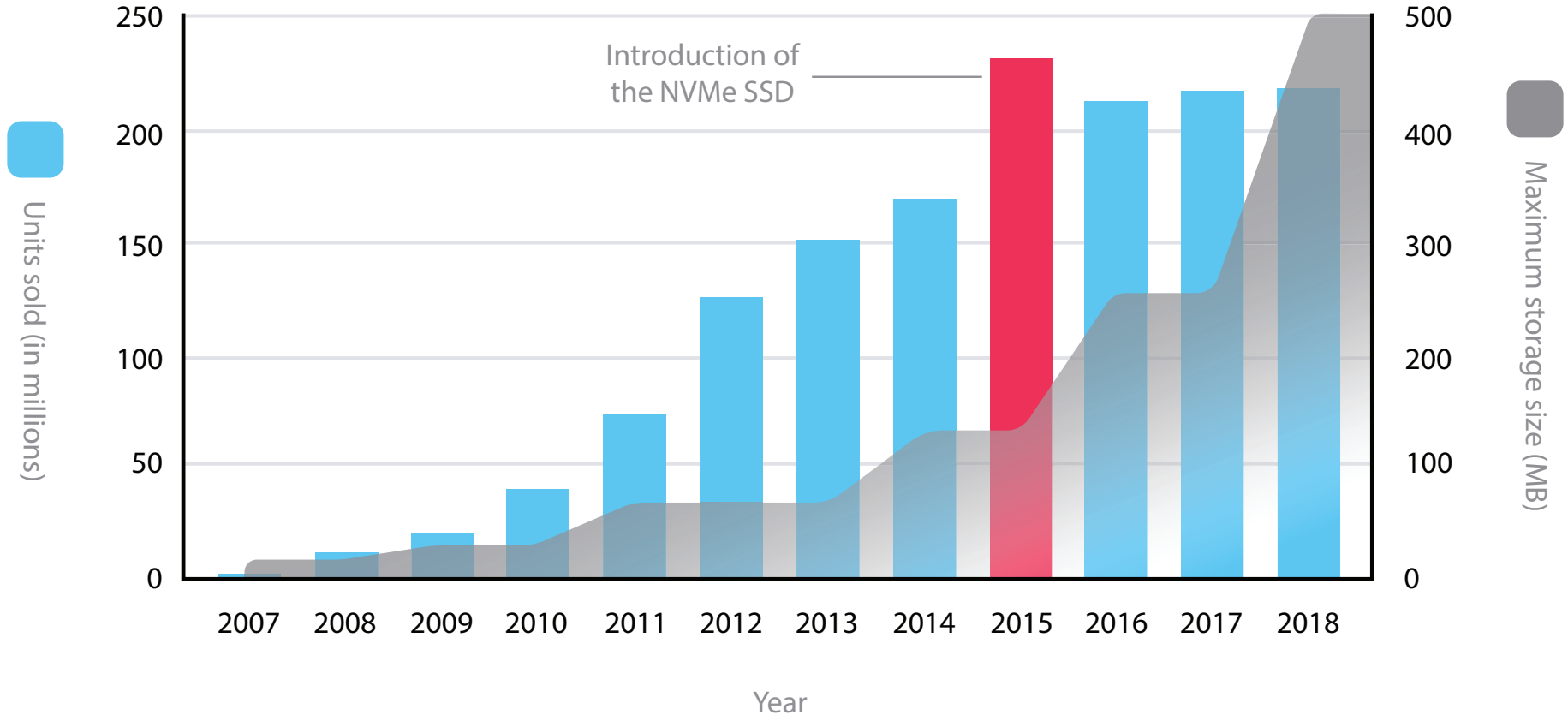
Correlation of worldwide iPhone sales and maximum SSD storage sizes (2007 - 2018)



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Storage capacity of various file types within a 1 Terabyte iPhone 13 Pro