Practicing IP Law Ethically in the Cloud: From the Mundane to the Ethics of AI

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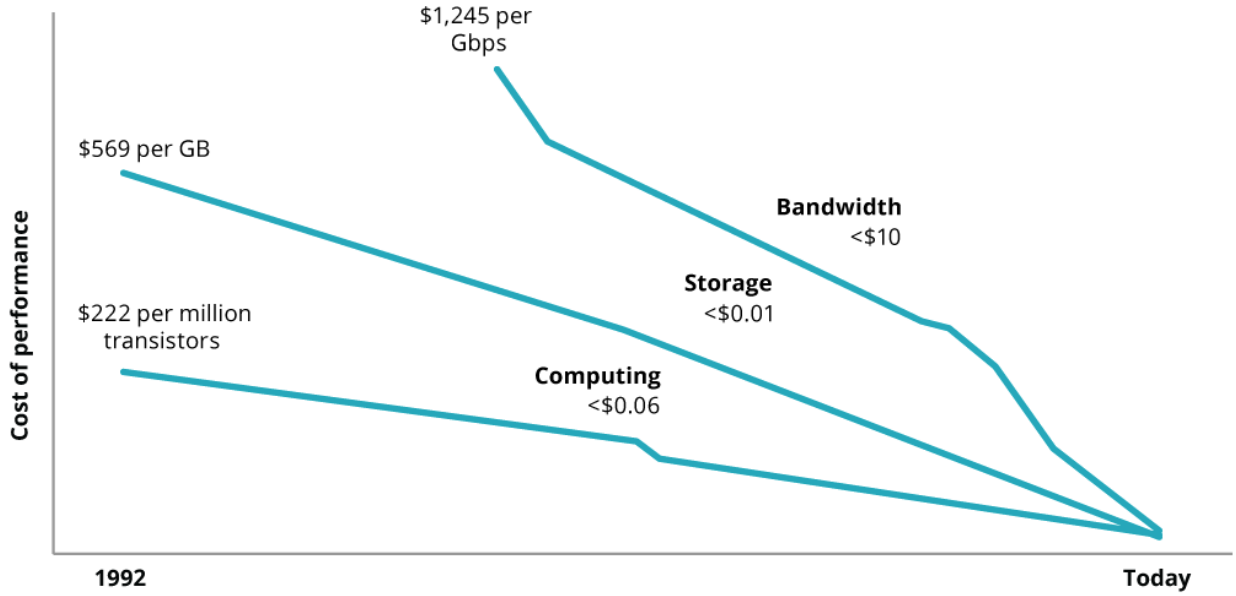
1. Exponential Math: Humanity's Greatest Failing

Moore's Law is a law every lawyer should know. The speed of innovation has increased dramatically in large part because computing power has increased exponentially in accordance with Moore's Law. Moore's Law is the recognition made in 1965 that the number of transistors that could fit on a chip—an integrated circuit—would double every two years.[1] It explains why the cost of computing power, the cost of bandwidth, and the cost of data storage have plummeted, meaning that the speed of innovation has increased. This chart[2] from late 2016 captures the impact of Moore's Law:



To better contextualize the meaning of this exponential decrease in cost of computing, consider this analogy:

Another way to think about Moore's law is to apply it to a car. Intel CEO Brian Krzanich explained that if a 1971 Volkswagen Beetle had advanced at the pace of Moore's law over the past 34 years, today "you would be able to go with that car 300,000 miles per hour. You would get two million miles per gallon of gas, and all that for the mere cost of four cents."[3]

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[1] Annie Sneed, Moore's Law Keeps Going Defying Expectations (Scientific American 2015) (https://www.scientificamerican.com/article/moore-s-law-keeps-going-defying-expectations/)

[2] https://dupress.deloitte.com/content/dam/dup-us-en/articles/3465_Digital-supply-network/figures/digital-supply-network-Fig1.png

[3] Annie Sneed, Moore's Law Keeps Going Defying Expectations (Scientific American 2015) (https://www.scientificamerican.com/article/moore-s-law-keeps-going-defying-expectations/)

Computer power enabled by Moore's Law is reducing time-to-market for a growing number of new products by eliminating the need for humans to do a growing amount of the work, thus allowing products to be brought to market more quickly and more cheaply.[4] Further, computer power, bandwidth, and storage allow more products to contain embedded sensors that automatically and immediately provide testing data, thus more quickly allowing it to identify needed changes.[5] Not only will such sensors allow for testing to be shortened and more efficient, these technologies allow businesses to identify services or products the consumer does not even know it needs—Uber, the ride sharing service, illustrates this phenomenon, replacing cabs.[6] Indeed, products that embody the innovation described by Moore's Law are themselves examples of what Moore's Law is permitting: no one knew they needed an iPhone until they saw one. The reduction of the time and cost needed for research and development, a significant part of time-to-market, will be profound.

An illustration of Moore's law comes from data storage, and looking backward.[7] This technology has rapidly morphed in just the twenty years to take various forms of storage and different variations within each type, including devices using magnetism (zip drives), light (CDs, then DVDs), and other means (thumb drives and other forms of solid state devices). Holographic storage—whatever that means—is apparently coming next.[8]

Why did this section begin by stating that exponential math is humanity's greatest failing? Professor Bartlett, a "famous" mathematician, observed ""The greatest shortcoming of the human race is our inability to understand the exponential function." Change has happened very rapidly: it is happening exponentially, and we cannot perceive that well. For an excellent video by Professor Bartlett on this point, see this: https://www.youtube.com/watch?v=F-QA2rkpBSY

2. Drafting Services: Disruptors?

Disruptive technology displaces existing things or creates entire new needs. Lexis/Nexis and Westlaw have not quite made law books obsolete, but they have come close. At a recent conference, I showed students pictures of Shepard's books: none knew what the red, yellow, and white books were for.

Driverless cars seemingly will soon be ubiquitous, leading to a decline in car wrecks, medical malpractice, franchises (why stop at a hotel: just let the car drive you, and it will come full of gas), and many more economic activities – activities that lead to

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4 *See generally,* Persistent Forecasting of Disruptive Technologies (2010) chapter 3, p. 3 (noting that globalization has led to a shrinking R&D cycle, faster product development in response to consumer demand, a shorter product development cycle, and a shorter product cycle).

5 *See generally,* Peter M. Lefkowitz, Making Sense of the Internet of Things, 59-Fall B. B.J. 23 (2015) (describing vast array of sensors that will provide feedback to consumers, manufacturers, and others about product performance and needs).

6 *See generally, id.*

7 http://www.zetta.net/about/blog/history-data-storage-technology

8 *Id.*

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