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Cloud computing and the upending of Grove's Law

This is part 4 of a series of articles in which I discuss the technologies and the historical context that led to the mass adoption of cloud computing. In the first article, our exploration began in 1995. Then in part 2 of this series, we learned about how the technology changed, making the Internet revolution, and life as we now know it, possible. Last week, we examined how the rapid increase in the speed of broadband access paved the way for cloud computing and this week we continue that journey.

Over the past few weeks, we've explored the explosion of the Internet and the rapid technological changes that followed. We tracked the effect that widely available Internet access has had upon our culture as a whole.

People now interact online in ways never before possible. The Internet has changed the ways in which we work and play. It has drastically changed our reality in just 15 short years, making activities that were once only science fiction commonplace — activities like video conferencing, telecommuting, and online commerce.

Before the Internet, none of this was possible. And, as I noted previously, the key to making these possibilities a reality was the realization of Moore's Law, which predicted that the price of computing processing power would be reduced by half every two years. This prediction quickly became reality, and as it did, and processing power became increasingly affordable, the Internet became an integral part of our lives.

It was the operation of Moore's Law combined with the lack of realization of another law, however, that made cloud computing possible. This "law" is referred to as Grove's Law and predicted that telecommunications bandwidth would double just once every century. Grove's Law is based on Grove's observation that, historically, computing processing power increased far more quickly than communications bandwidth.

Accordingly, he predicted that, based on past performance, the communications network would develop at a snail's pace compared to processing power.

As it turns out, Grove was wrong. He didn't take into account the forces that would result in the sudden and rapid expansion of the communications network. He had no way of knowing that the

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dot-com boom would occur. Because of all the fiber-optic cable put into place before the economic crash, Internet bandwidth is no longer lacking.

Fast data transfers over the Internet are now a possibility — hence the rise of YouTube and other video streaming services. Before the Internet bandwidth expansion, viewing videos online was a slow, frustrating endeavor. However, with the current abundance of fiber-optic cables, broadband is now cheap and widely available. Data can be quickly transferred over the Internet, and this change has thus ushered in the next stage of the Internet and the age of cloud computing.

Nicholas Carr explains the reversal of Grove's Law in his book, "The Big Switch":

"Now that data can stream through the Internet at the speed of light, the full power of computers can finally be delivered to users from afar. It doesn't matter much whether the server computer running your program is in the data center down the hall or in somebody else's data center on the other side of the country. All the machines are now connected and shared — they're one machine."

Of course, that's all well and good, but why even bother with cloud computing? Why not simply stick with the status quo: buy, house and maintain your own servers and software? The reason is that, for many businesses, the cloud is simply a more convenient, flexible and economical alternative.

Obviously, the computing landscape is changing and it's changing quickly. If you've read the articles in this series that preceded this one, that much should be clear to you by now. It's easy to appreciate such an enormous shift once you've gained an understanding of the big picture.

Cloud computing is the next stage of computing. It's here — and it's here to stay. The only question that remains is when, and how, are you going to use it in your law practice?

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