Who Coined 'Cloud Computing'?

Now that every technology company in America seems to be selling cloud computing, we decided to find out where it all began.

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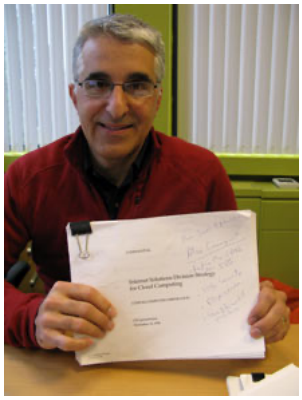
Cloud computing is one of the hottest buzzwords in technology. It appears 48 million times on the Internet. But amidst all the chatter, there is one question about cloud computing that has never been answered: Who said it first?



Proof of concept: George Favaloro poses with a 1996 Compaq business plan. The document is the earliest known use of the term "cloud computing" in print (click **here** to view).

Some accounts trace the birth of the term to 2006, when large companies

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such as Google and Amazon began using “cloud computing” to describe the new paradigm in which people are increasingly accessing software, computer power, and files over the Web instead of on their desktops.

But *Technology Review* tracked the coinage of the term back a decade earlier, to late 1996, and to an office park outside Houston. At the time, Netscape’s Web browser was the technology to be excited about and the Yankees were playing Atlanta in the World Series. Inside the offices of Compaq Computer, a small group of technology executives was plotting the future of the Internet business and calling it “cloud computing.”

Their vision was detailed and prescient. Not only would all business software move to the Web, but what they termed “cloud computing-enabled applications” like consumer file storage would become common. For two men in the room, a Compaq marketing executive named George Favaloro and a young technologist named Sean O’Sullivan, cloud computing would have dramatically different outcomes. For Compaq, it was the start of a $2-billion-a-year business selling servers to Internet providers. For O’Sullivan’s startup venture, it was a step toward disenchantment and insolvency.

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Cloud computing still doesn’t appear in the Oxford English Dictionary. But its use is spreading rapidly because it captures a historic shift in the IT industry as more computer memory, processing power, and apps are hosted in remote data centers, or the “cloud.” With billions of dollars of IT spending in play, the term itself has become a disputed prize. In 2008, Dell drew outrage from programmers after attempting to win a trademark on “cloud computing.” Other technology vendors, such as IBM and Oracle, have been accused of “cloud washing,” or misusing the phrase to describe older product lines.

Like “Web 2.0,” cloud computing has become a ubiquitous piece of jargon that many tech executives find annoying, but also hard to avoid. “I hated it, but I finally gave in,” says Carl Bass, president and CEO of Autodesk, whose company unveiled a cloud-computing marketing campaign in September. “I didn’t think the term helped explain anything to people who didn’t already know what it is.”

The U.S. government has also had trouble with the term. After the country’s former IT czar, Vivek Kundra, pushed agencies to move to cheaper cloud services, procurement officials faced the question of what, exactly, counted as cloud computing. The government asked the National Institutes of Standards and Technology to come up with a definition. Its final draft, released this month, begins by cautioning that “cloud computing can and does mean different things to different people.”

“The cloud is a metaphor for the Internet. It’s a rebranding of the Internet,”

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says Reuven Cohen, cofounder of Cloud Camp, a course for programmers. "That is why there is a raging debate. By virtue of being a metaphor, it's open to different interpretations." And, he adds, "it's worth money."

Part of the debate is who should get credit for inventing the idea. The notion of network-based computing dates to the 1960s, but many believe the first use of "cloud computing" in its modern context occurred on August 9, 2006, when then Google CEO Eric Schmidt introduced the term to an industry conference. "What's interesting [now] is that there is an emergent new model," Schmidt said, "I don't think people have really understood how big this opportunity really is. It starts with the premise that the data services and architecture should be on servers. We call it cloud computing—they should be in a "cloud" somewhere."

The term began to see wider use the following year, after companies including Amazon, Microsoft, and IBM started to tout cloud-computing efforts as well. That was also when it first appeared in newspaper articles, such as a *New York Times* report from November 15, 2007, that carried the headline "I.B.M. to Push 'Cloud Computing,' Using Data From Afar." It described vague plans for "Internet-based supercomputing."

Sam Johnston, director of cloud and IT services at Equinix, says cloud computing took hold among techies because it described something important. "We now had a common handle for a number of trends that we had been observing, such as the consumerization and commoditization of IT," he wrote in an e-mail.

Johnston says it's never been clear who coined the term. As an editor of the Wikipedia entry for cloud computing, Johnston keeps a close eye on any attempts at misappropriation. He was first to raise alarms about Dell's trademark application and this summer he removed a citation from Wikipedia saying a professor at Emory had coined the phrase in the late 1990s. There have been "many attempts to coopt the term, as well as various claims of invention," says Johnston.

That may explain why cloud watchers have generally disregarded or never learned of one unusually early usage—a May 1997 trademark application for "cloud computing" from a now-defunct company called NetCentric. The trademark application was for "educational services" such as "classes and seminars" and was never approved. But the use of the phrase was not coincidental. When *Technology Review* tracked down NetCentric's founder, O'Sullivan, he agreed to help dig up paper copies of 15-year-old business plans from NetCentric and Compaq. The documents, written in late 1996, not only extensively use the phrase "cloud computing," but also describe in accurate terms many of the ideas sweeping the Internet today.

Cloud 1.0: Entrepreneur Sean O'Sullivan filed a trademark on "cloud computing" in 1997. He poses at the offices of NetCentric, in Cambridge, Massachusetts during the late 1990s.

At the time, O'Sullivan's startup was negotiating a $5 million investment from Compaq, where Favaloro had recently been chosen to lead a new Internet services group. The group was a kind of internal "insurgency," recalls Favaloro, that aimed to get Compaq into the business of selling servers to Internet service providers, or ISPs, like AOL. NetCentric was a young company developing software that could help make that happen.

In their plans, the duo predicted technology trends that would take more than a decade to unfold. Copies of NetCentric's business plan contain an imaginary bill for "the total e-purchases" of one "George Favaloro," including $18.50 for 37 minutes of video conferencing and $4.95 for 253 megabytes of Internet storage (as well as $3.95 to view a Mike Tyson fight). Today, file storage and video are among the most used cloud-based applications, according to consultancy CDW. Back then, such services didn't exist. NetCentric's software platform was meant to allow ISPs to implement and bill for dozens, and ultimately thousands, of "cloud computing-enabled applications," according to the plan.

Exactly which of the men—Favaloro or O'Sullivan—came up with the term cloud computing remains uncertain. Neither recalls precisely when the phrase was conceived. Hard drives that would hold e-mails and other electronic clues from those precloud days are long gone.

Favaloro believes he coined the term. From a storage unit, he dug out a paper copy of a 50-page internal Compaq analysis titled "Internet Solutions Division Strategy for Cloud Computing" dated November 14, 1996. The document accurately predicts that enterprise software would give way to Web-enabled services, and that in the future, "application software is no longer a feature of the hardware—but of the Internet."

O'Sullivan thinks it could have been his idea—after all, why else would he later try to trademark it? He was also a constant presence at Compaq's Texas headquarters at the time. O'Sullivan located a daily planner, dated October 29, 1996, in which he had jotted down the phrase "Cloud Computing: The Cloud has no Borders" following a meeting with Favaloro that day. That handwritten note and the Compaq business plan, separated by two weeks, are the earliest documented references to the phrase "cloud computing" that *Technology Review* was able to locate.

"There are only two people who could have come up with the term: me, at NetCentric, or George Favaloro, at Compaq … or both of us together, brainstorming," says O'Sullivan.

Both agree that "cloud computing" was born as a marketing term. At the time, telecom networks were already referred to as the cloud; in engineering drawings, a cloud represented the network. What they were hunting for was a slogan to link the fast-developing Internet opportunity to businesses Compaq knew about. "Computing was bedrock for Compaq, but now this messy cloud was happening," says Favaloro. "And we needed a handle to bring those things together."

Their new marketing term didn't catch fire, however—and it's possible others independently coined the term at a later date. Consider the draft version of a January 1997 Compaq press release, announcing its investment in NetCentric, which described the deal as part of "a strategic initiative to provide 'Cloud Computing' to businesses." That phrase was destined to be ages ahead of its time, had not Compaq's internal PR team objected and changed it to "Internet computing" in the final version of the release.

In fact, Compaq eventually dropped the term entirely, along with its plans for Internet software. That didn't matter to Favaloro. He'd managed to point Compaq (which later merged with HP) toward what became a huge business selling servers to early Internet providers and Web-page hosters, like UUNet. "It's ridiculous now, but the big realization we had was that there was going to be an explosion of people using servers not on their premises," says Favaloro. "I went from being a heretic inside Compaq to being treated like a prophet."

For NetCentric, the cloud-computing concept ended in disappointment. O'Sullivan gave up using the term as he struggled to market an Internet fax service—one app the spotty network "cloud" of the day could handle. Eventually, the company went belly up and closed its doors. "We got drawn down a rathole, and we didn't end up launching a raft of cloud computing apps … that's something that sticks with me," says O'Sullivan, who later took a sabbatical from the tech world to attend film school and start a nonprofit to help with the reconstruction of Iraq.

Favaloro now heads an environmental consulting firm in Waltham, Massachussetts. What is remarkable, he says, is that the cloud he and O'Sullivan imagined 15 years ago has become a reality. "I now run a 15-person company and, in terms of making us productive, our systems are far better than those of any of big company. We bring up and roll out new apps in a matter of hours. If we like them, we keep them, if not, we abandon them. We self-administer, everything meshes, we have access everywhere, it's safe, it's got great uptime, it's all backed up, and our costs are tiny," says Favaloro. "The vision came true."

by Antonio Regalado

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