Cloud Computing: New Wine or Just a New Bottle?

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The buzz is everywhere: clouds and cloud computing. Although this topic has recently attracted significant momentum and attention in both academia and industry, no common definition exists yet,[1] which begs the question, how can there be so much buzz about something without an accepted definition(s)? It seems quite counterintuitive.

It's generally accepted that cloud computing refers to a new IT paradigm for users. But before we accept this premise, let's first see from a historical perspective where cloud computing fits in and whether it's really different or just the next fad.

This Year's Model?

Figure 1 illustrates the computing paradigm shift of the last half century.

Specifically, the figure identifies six distinct phases. In Phase 1, people used terminals to connect to powerful mainframes shared by many users. Back then, terminals were basically little more than keyboards and monitors. In Phase 2, stand-alone personal computers (PCs) became powerful enough to satisfy users' daily work— you didn't have to share a mainframe with anyone else. Phase 3 ushered in computer networks that allowed multiple computers to connect to each other. You could work on a PC and connect to other computers through local networks to share resources. Phase 4 saw the advent of local networks that could connect to other local networks to establish a more global network—users could now connect to the Internet to utilize remote applications and resources. Phase 5 brought us the concept of an electronic grid to facilitate shared computing power and storage resources (distributed computing). People used PCs to access a grid of computers in a transparent manner. Now, in Phase 6, cloud computing lets us exploit all available resources on the Internet in a scalable and simple way.

As Figure 1 shows, a conceptual layer—a cloud on the Internet—hides all available resources (either hardware or software) and services, but it publishes a standard interface. As long as users can connect to the Internet, they have the entire Web as their power PC. Cloud computing thus refers to the techniques that enable and facilitate this scenario.

When compared to the infinitely powerful Internet cloud, PCs seem like lightweight terminals
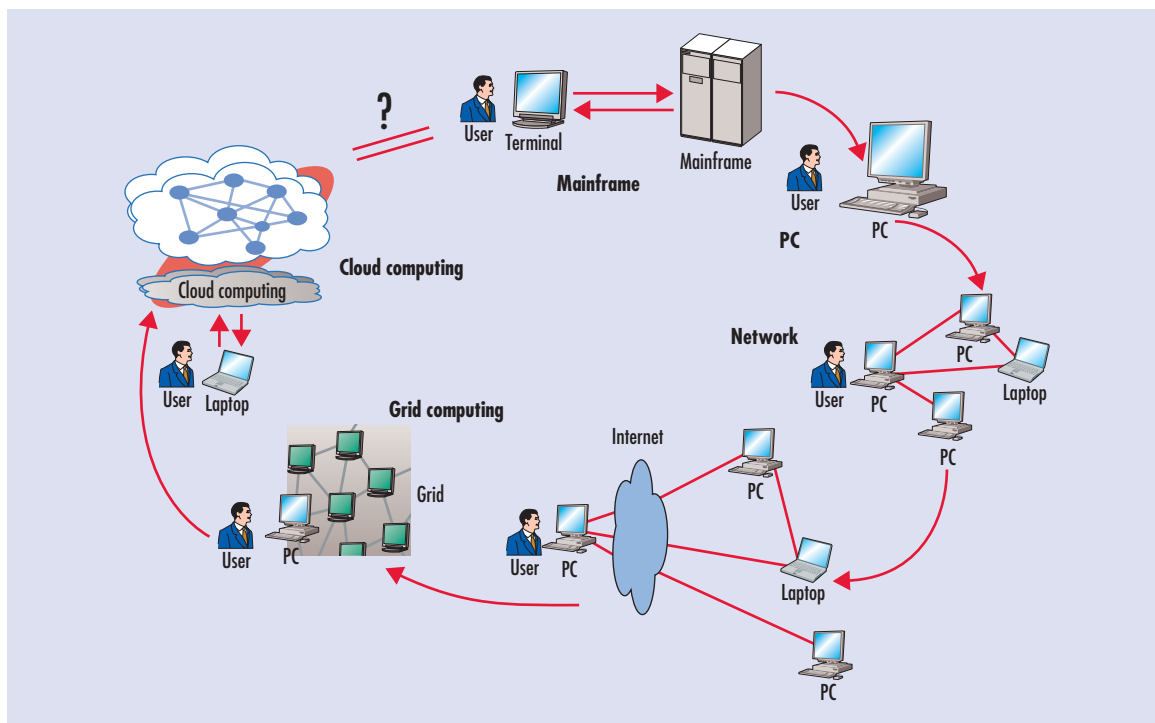
Figure 1. Computing paradigm shift. Over six distinct phases, computers have evolved from dummy terminals to grids and clouds.

allowing users to utilize the cloud. From this perspective, cloud computing seems like a "return" to the original mainframe paradigm.

Of course, the cloud computing paradigm isn't this simple. Unlike a mainframe, which is a physical machine that offers finite computing power, a cloud represents all possible resources on the Internet, suggesting infinite power and capacity. Meanwhile, unlike a simple terminal acting as a user interface to a mainframe, a PC in the cloud computing paradigm possesses significant power to provide a certain degree of local computing and caching support.

In short, cloud computing has become a significant technology trend and could reshape the IT sector and the IT marketplace.[2]

In This Issue

The three articles in this special issue represent three different views for how different IT professionals think of clouds and cloud computing.

In the first article, "Navigating the Next-Generation Application Architecture," Chuck Hutchinson, Karen Castilon, and Jeff Ward suggest that cloud computing refers to a convergence of existing technologies. The article illustrates the new cloud computing-oriented application architecture and identifies its core components. The authors then discuss how organizations should react to the challenges from both a technical and business perspective.

In the second article, "The Case for Cloud Computing," Robert Grossman highlights the uniqueness of clouds given their ability to provide resources and services on the Internet with unprecedented scale and simplicity. The article categorizes clouds into two types based on their goals, one for providing on-demand computing instances and the other for providing on-demand computing capacity. The article also discusses cloud hosting, a pricing model, and the challenges of cloud deployment.

In the final article, "Business Models in the Service World," Christof Weinhardt, Arun Anandasivam, Benjamin Blau, and Jochen Stößer focus on comparing the differences between cloud computing and grid computing through a set of criteria. The article also proposes a cloud business model ontology and uses it as a case study to analyze several well-known service providers.

As you read the three focused articles in this issue, we invite you to keep an open mind about what is or is not cloud computing. Do you think this paradigm offers anything different? Is it just the same old IT packaged up in a new bottle? Or is it really new wine? We welcome you to contribute your ideas and experiences by sending articles to *IT Pro*, www.computer. org/itpro. ⊓⊔

References

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2. N. Leavitt, "Is Cloud Computing Really Ready for Prime Time?" *Computer*, vol. 42, no. 1, 2009, pp. 15–20.

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