

An Overview of Cloud Computing

“A primer for those looking to wade into cloud services.”

by Pete Choppin

For a lot of businesses and their IT staff, "cloud computing" is the latest IT buzzword to leave them scratching their heads. To demystify things, here's a primer in case you are looking to wade into cloud services for the first time.

What Is Cloud Computing?

In general, any service or program sent over an Internet connection can be considered a cloud service. An outside vendor runs the servers and software, so the buyer doesn't have to worry about the technical issues in-house—and can focus on his or her own business.

The services come in a number of forms. Many businesses are already familiar with one aspect of cloud computing: software delivered over the Web. Along with e-mail services like Google Inc.'s Gmail, there are programs that help salespeople keep track of customer information, such as Salesforce.com, and backup data-storage services from providers such as Mozy.com.

Some businesses don't just use software services, they buy computing power from vendors such as Verizon Communications Inc.—much like buying power from a utility. Let's say a retailer expects lots of additional business during the holidays, and its in-house servers can't handle the load of customer orders. The company might pay a vendor for the use of its servers, to shoulder part of the computing work as the need arises.

Other companies, meanwhile, might buy computing power on a regular basis. They might drop one or more in-house servers entirely—or not buy the hardware in the first place—and let a vendor run their vital programs on its machines. Once again, the buyer would pay a fee based on how much computing power it used.

What Cloud Computing Is Not

Because the term "cloud computing" is so broadly used now, there are some misconceptions as to the purposes, usage, and the concept of cloud computing.

First, the concept of the "cloud" is derived from IT and network professionals describing various connections from private networks connecting to the public Internet. To describe the vast interconnecting nature that makes up the World Wide Web, it became commonplace to simply draw a cloud when describing connections to and from the Internet, rather than to go into the various connections such as the ISP, Internet routers, backbones and other complicated and intricate services that actually make up the Internet as we know it. As this became more and more common, the cloud diagram became the standard symbol to represent the Internet.

So if the cloud represents the Internet, anything that is considered "cloud computing" should reference or infer that all of the services and applications in the cloud are, by definition, moved to the Internet.

One misconception I have seen floating around some business and IT circles is that cloud computing equals virtualization. This is not actually true. When we talk about computer virtualization, we are referring to the ability to create entire self-sustained environments that function completely as though they are physically in a "real" environment, but are actually not using separate real, physical hardware. An example would be a virtual machine. This is an entire computer system that uses software that configures special files on a hard drive that mimic a physical machine, and yet there is not a separate, self-contained computer running the system. Virtual machines are usually hosted on powerful servers that manage multiple virtual computers. These can be operated by users that access the server and launch the virtual machine. The virtual environment is completely transparent to the end user and it appears to the user that they are running a separate physical computer, when in fact they are not.

This differs with cloud computing in that the Internet is not hosting these services, but a physical server provides the virtual environment. Cloud computing, on the other hand is moving an in-house service to a third-party company on the Internet, which then hosts these services for you—for a fee.

Another way to look at it is that virtualization provides a computer on which any number of programs, applications and services may be installed, but cloud computing simply provides services and applications that are accessed, hosted and managed on the Internet, primarily by third-party companies.

Costs Involved with Cloud Computing

Unlike traditional applications, which require hardware such as servers and IT staff for maintenance, cloud services may carry less in upfront costs. Consider software. Salesforce.com's offering for businesses costs between \$5 and \$25 per user each month. Google offers a host of programs including e-mail, a word processor, video and a hosted Web site for an annual fee of \$50 per user. For small businesses that have more extensive computing needs, such as drug laboratories with extensive software, cloud services could cost more than \$1,000 a month.

As for buying computing power, some providers charge for a certain amount of memory and computing configuration. [Terremark Worldwide Inc.](#), for example, charges six cents an hour for one gigabyte of RAM and the equivalent of one processor.

One caveat that might bump up costs a bit: If you're going to rely on the Internet for your services, you will need a solid connection. While some believe a business-class DSL connection is sufficient, many industry observers and consultants recommend getting a faster line, such as a T1.

How Much Does Cloud Computing Cost?

Certainly there are some savings that come from cloud computing. Servers, for instance, run between \$2,000 and \$6,000, and companies might need to add multiple machines as demands on their IT system grow. It may also be beneficial for some companies to reduce IT support staff; however, it is important to look at the whole picture and the trade-off for reducing staff vs. relinquishing the control over your applications. Costs for moving to cloud computing may not be as clear cut as simply eliminating hardware, software and personnel.

Is Cloud Computing Reliable?

Not only is it reliable, is it also secure? How much risk are companies willing to take with their data?

This is a big sticking point for many businesses. Many managers and IT administrators are reluctant to let their valuable data flow outside of their internal firewalls. And big-name vendors make more attractive targets for hackers. For instance, wide-scale denial-of-service attacks hit AT&T Inc.'s and Google's Web sites last year.

There are always risks when placing the heart of your business—your data—into the hands of third-party services out on the Internet. Performing a risk analysis before considering moving any data to the cloud is essential. One solution may be to migrate only those services that do not involve crucial data.

A Word of Caution

Amid all the hype surrounding cloud computing, it is important to remember some "gotchas" that can make or break your plans to head into the cloud.

Data quality can be an issue. As companies move e-mail and other applications into the cloud, the integration points (Active Directory, for example) will become weak links and IT problems if your data isn't clean.

There are a range of IT governance issues, not the least of which is [e-discovery](#)—the disclosure of data for legal purposes. One question that can come up: How do you run e-discovery against hosted e-mail? And what privacy protections are in place so that your company's legal experts can access what's needed, but not the cloud service provider? We have experienced this where I work and, as you can imagine, our legal department was extremely concerned with confidentiality and access to data.

Many IT departments overlook or underestimate the network bandwidth requirements for cloud computing. A good rule of thumb to go by is that you may need to increase network capacity by a factor of up to five to be able to handle the transfer of data.

It is clear that IT pros need to do their homework on service-level agreements as they shop among cloud service options. Some provide SLA agreements and some do not.

All of this doesn't mean that IT departments won't move to cloud computing, but it's a reminder that a fair amount of planning and roll-up-your-shirtsleeves work may be required.

It's tempting to think that on-demand, Internet-based software and services are like flipping on a switch. For small projects that may be true, but for enterprise IT, it's seldom the case.

Cloud computing has some real potential. However, the technology still needs to mature. Cloud computing certainly offers some companies some definite advantages, but it is not for every company or every service. IT professionals have their work cut out for them to properly prepare, research and implement cloud services where they make sense, and then make a case for this along with risk assessment and return on investment to their management.

We should see more of this in the future, but trends suggest that companies are reluctant to turn all services over to a third party to take over in the cloud.