



## Book Cloud Computing

### Web-Based Applications That Change the Way You Work and Collaborate Online

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## Recommendation

In the information technology world, the clouds keep rolling in. But this is hardly a cause for concern. These “clouds” are not threatening thunderheads but Web-based applications and services, accessible from any Internet connection. For instance, many businesses today use Salesforce for customer relationship management and many people use Gmail. In either case, users access these applications through a Web browser, such as Internet Explorer or Firefox. However, the users’ data (customer names, e-mails and so on) isn’t stored on their computers but “in the cloud,” the technical term – or geek-speak – for “somewhere on the Internet.” Some applications target the consumer, some target the business user and some target the software developer. Whoever the targeted users are, cloud-based applications and similar technologies are the next big trend in IT and *BooksInShort* assures you that Michael Miller’s brief, basic and very enthusiastic guide will help you understand them even if you are a novice. Sometimes it’s useful to have your head in the clouds.

## Take-Aways

- Cloud computing is the next big disruptive information technology trend.
- Cloud computing uses the Internet as a computing platform.
- Some cloud-based applications and services are focused on consumers.
- You are probably already using cloud-computing applications, such as Gmail.
- Other cloud-based applications include Facebook and Flickr.
- Many cloud services, like Salesforce, focus on the enterprise customer.
- Cloud computing means storing data in the cloud – that is, on the Internet.
- It also means having an on-demand “virtual data center.”
- With cloud computing, you can use as much or as little capacity as you want.
- Adoption of cloud computing has just begun. Expect massive cloud coverage.

## Summary

### What Is Cloud Computing?

The name “cloud computing” comes from the symbol for a group of networked computers that are connected to the Internet. When network engineers draw diagrams of computer networks, they often symbolize the Internet as a puffy “cloud” shape. This symbol condenses away the unnecessary details about what is in that cloud of linked computers. For instance, when you think about the Internet, the precise location of the computers it relies on usually doesn’t matter to you. Since so many computers are involved, they are spread all over the world. Similarly, the precise configuration of these computers also doesn’t matter in many cases. They might be powerful or weak, servers or desktops. But because they are so numerous, their aggregate power is immense. These ideas – Internet scale and abstraction of unnecessary detail – are at the core of cloud computing.

“Cloud computing portends a major change in how we store information and run applications.”

Sign up for a Gmail account – or an account with any other Web-based e-mail service – and compose an e-mail. Save it. Compose another one and send it to a

colleague. Where is your e-mail kept? How does your memo reach your coworker? You have no idea.

Google offers one of the “most popular examples” of cloud computing. It has many huge data centers – enormous buildings with thousands of computer servers in them – all over the world. Google’s programs and functions – Gmail, Google Calendar, Picasa, Docs and Spreadsheets – are in the cloud. Google owns some datacenters and leases others. In which one of the centers, on which computer (or group of computers), is your e-mail? While you could find out with some digging, you probably don’t know. More importantly, though, you don’t care. You just wrote your e-mail, and pushed “Send,” and it traveled via “the cloud.”

“If you’re using a Web-based program such as Gmail or Hotmail, you’re computing in the cloud.”

Now, add two more ideas: access from anywhere and from (almost) any computing device. Recall that the cloud is made up of many computers usually distributed across many places. These computers tend to be connected to the Internet at many points. Once a network of computers is connected to the Internet, you can access it from anywhere that you have a connection. Similarly, any computer with a Web browser can access and use the cloud, even if that computer has very little computing power. That lack of computing power generally doesn’t matter. The real computing power lies not on the computer you use to connect to the cloud. The computing power is in the cloud.

“With cloud computing, everything you do is now Web-based instead of desktop-based.”

In many ways, cloud computing resembles the power grid. The power grid is large and spread over a wide area. The details of power generation don’t matter to the average user. When you wake up and plug in your coffee maker, you don’t know or care whether the power you need to make coffee comes from the local hydroelectric dam or is being transferred over power lines from a wind turbine a thousand miles away. You just access power from anywhere that has a socket. And you don’t have different kinds of power for different appliances. Your coffee maker and your laptop generally use the same sort of power. This was not always the case. About a century ago, there was no power grid. Companies produced their own power. Look for the same thing to happen with computing power as companies move more and more functions out of their own data centers and “into the cloud.”

## Types of Cloud Computing

Cloud computing is a relatively new technological development. Yet even at this early stage, different subtypes of cloud computing have started to appear. They include the following four:

### 1. “Software-as-a-Service”

With Software-as-a-Service, known as SaaS (pronounced “sass”), a vendor writes a software application, hosts it on its datacenter and makes it available to thousands of users over the Internet. Users access the application through a Web browser. For example, word processing applications you can employ via the cloud include Google Docs, Adobe’s Buzzword, ajaxWrite, Docly and Glide Write.

### 2. “Platform-as-a-Service”

Platform-as-a-Service is called PaaS (pronounced “pass”). PaaS offerings provide developers with a set of Lego-like building blocks they can use to create their own applications or to run their own programs.

### 3. “On-demand computing”

On-demand computing is also known as “Infrastructure-as-a-Service,” or IaaS. On-demand computing offerings, which are designed for developers and IT professionals, are most analogous to electrical power. On-demand computing provides “raw” computing and storage – as much or as little as you want, whenever you want. On-demand providers meter usage and bill by the hour or by the storage unit. Amazon, for example, offers on-demand computing capacity.

### 4. “Web services”

You can group other kinds of cloud computing services together as general Web services, which usually are designed to do one specific thing well. They are accessible to developers through an application programming interface (called an “API”). Developers use these interfaces to create software-as-a-service products and to enhance other Web sites. Google Maps is a good example of a Web service. Many restaurants and retail stores embed a Google-based map of their physical locations into their Web sites through the Google Maps Web service.

## Who Are the Cloud Computing Players?

Cloud computing, like Web 2.0, is the flavor of the month in the information technology (IT) world. Many companies want to call their services “cloud computing,” but who are the real players in the space? Most of them are platform providers – companies that offer cloud-computing resources that you can build upon extensively. These companies include Amazon, Salesforce, IBM and Google. Each has experience running rock-solid, high-availability Internet-scale computing platforms. Others with less experience include 3tera, 10gen, Cohesive Flexible Technologies, Joyent, Mosso, Nirvanix, Skytap and StrikeIron. In addition to these providers of computing platforms, many innovative companies are creating applications that run in the cloud. To get a sense of what’s possible, check out Zoho Wiki, Adobe Buzzword, PBWiki, SmugMug and Lazybase.

## Benefits of Cloud Computing

Before adopting any technology, you should look at its costs and benefits. When it comes to the cloud, the benefits shine through:

- **Lower-cost computers** – Cloud computing can save you money because you don’t need to buy high performance desktop computers to use it. Since most of

the real computing takes place in the cloud, your desktop and laptop machines don't need as much memory, storage or processing power. Contrast this with today's situation, where bigger and bigger desktop applications require more and more memory and storage space, and larger and larger IT budgets.

- **Increased performance** – Once you move applications off the desktop or laptop and into the cloud, the computers you do have will perform better. They'll have less to do.
- **Lower infrastructure costs** – Companies spend a lot of money on server computers – the machines that run in the back office (or off premises) and do things like storing documents and running e-mail servers. Many companies run out of space on their premises and lease space in a public data center. This creates a dilemma when managers plan for future computing capacity, as companies generally buy too many servers or too much data center space to keep up with "spiky" unpredictable demand. Moving your data and computing into the cloud solves this problem and helps save you money.
- **Lower maintenance costs** – Cloud computing means fewer servers on your premises, which means fewer servers you have to maintain.
- **Lower software costs** – Cloud computing reduces software costs in a couple ways. First, you buy only the software you need rather than trying to predict demand. Second, your IT staff doesn't need to install those applications on your own computers. Third, software for cloud computing is generally priced cheaper per user than traditional enterprise software. Some cloud software is free to users because advertising cover the provider's costs.
- **Fewer upgrade headaches** – If you use cloud-based applications, you have to maintain fewer applications on premises. For example, you no longer need to update your systems. Your cloud-computing provider does that for you. As soon as you log on, you're using the latest version of the software in the cloud.
- **More computing power** – All those computers in the cloud means a lot of aggregate computing power. Log on to the cloud and you'll have supercomputer-class capacity.
- **Unlimited storage** – Documents, presentations and media files take up a lot of room. You may think your company has a lot of data to store, and it may, but the data centers of cloud computing providers such as Amazon, Google and IBM have vastly more space they happily rent to you for pennies.
- **Better interoperability** – Ever been frustrated by incompatibilities between Macs and PCs? Between PCs and Linux? These issues don't arise as frequently in the cloud. The cloud is built on open standards. The operating system you use doesn't matter.
- **Easier collaboration** – If you store a document in the cloud, you can give colleagues or customers access to it by giving them permission to view the document in the cloud. This contrasts sharply with storing a document on your hard drive or even your company's server, which may not be accessible to colleagues in other offices and almost certainly won't be accessible to customers or clients.
- **Better protection** – Cloud computing puts you under the umbrella of professional layers of security and backup.
- **Access anywhere, anytime** – Most people have had the experience of forgetting a key document on their worksite computer when leaving for the evening or departing for a road trip. If that document is stored in the cloud, you can access it anywhere.
- **Better synchronization** – Cloud computing can ease version-control headaches. If you have ever started editing a document or working on a spreadsheet only to realize you weren't using the latest version, cloud computing can help. The latest versions are stored in the cloud, accessible to all.
- **Use any device** – The cloud is device-agnostic. It doesn't care if you are using an iPhone, a netbook or a supercomputer. As long as your device has a browser, it usually can tap into cloud-based applications and services.

## Beyond the Silver Lining

Of course, even the friendliest looking clouds sometimes bring rain. Similarly, cloud computing has some limitations. For one thing, to use the cloud you need Internet access. In some areas, you may not have it or you may have intermittent connections. This is changing fast, however, as Internet connectivity becomes ubiquitous.

"Cloud computing might be the next big thing, but that doesn't make it the best thing for everyone."

Another potential drawback is that cloud-based applications tend to have fewer features than desktop applications although many people think this is a good thing (how many fonts do you really need in your word processor?).

Finally, many writers in the information technology press often comment worriedly about the security and safety of the cloud. But the key question is, compared to what? Your security practices are probably not as good as the protections furnished by a top-tier cloud provider. Similarly, you may back up your data regularly, but it may be far safer in the hands of a cloud provider, who has far greater expertise and experience in ensuring data safety.

"We're currently in the early days of the cloud computing revolution."

Temper your security concerns with a dose of realism. Just ask how secure and safe your data is now? Your company is unlikely to have the same rigorous security practices as, say, IBM does for its data centers. The same is true for safety or disaster recovery.

## The Future of Cloud Computing

Complex new technologies rarely appear from nowhere. Typically, they are extensions or recombinations of earlier technology. Even the Internet fits this pattern. Similarly, many aspects of cloud computing have been around in other forms for some time. But cloud computing combines them to make the Internet a computing platform rather than merely a place to present or find text and images on a Web site. When it comes to cloud computing, the sky's the limit.

## About the Author

**Michael Miller** writes about technology. He has written more than 80 nonfiction books during the past 20 years.

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