

Can You Trust the Cloud?

A Practical Guide to the Opportunities and Challenges of the Document 3.0 Era

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Cloud Computing

Executive Summary

Cloud computing is one of the hot topics of our day. And it deserves all the attention. Why? Because it has the potential to deliver a wide range of innovative services for the management of infrastructure, development platforms, software applications and complex business processes more efficiently and cost-effectively than ever before. It will also speed up the development of intelligent, proactive “next gen” documents, which will improve the productivity of Knowledge Workers around the world.

But several challenges must be addressed before the cloud becomes a widely accepted paradigm for computing. There are concerns about data security, privacy and regulatory compliance. Not to mention ongoing debate around public vs. private vs. hybrid clouds.

Nevertheless, cloud computing has become a dynamic force in the business world. And forward-thinking clients have discovered that the right approach to cloud-based services can help them improve the performance of their service offerings while lowering costs, creating a compelling competitive advantage.

For more information, please read on...

Portrait of a very hot topic

When it comes to IT and the Internet, popular topics and buzzwords emerge on a regular basis. Web 2.0...social media...virtualization...the list goes on and on. Today, however, the subject that seems to be capturing the attention of the IT world is cloud computing. And some very prominent names are making bold predictions about its future. Cloud computing “represents the next frontier,” said Microsoft’s Steve Ballmer when addressing a group of CEOs at his company’s headquarters.¹

“The cloud will change everything,” Dr. Ajei Gopal, a top executive with CA Technologies, told thousands of people at a company conference in Las Vegas. “Instead of being a monolithic supplier of technology services to the business, the IT department becomes the manager of a dynamic supply chain of internal and external resources that delivers services to the business and its internal and external clients.”²

Across the country at a convention in Boston, Joe Tucci, the CEO of EMC Corp., described the impact of cloud computing this way: “We’re now going through what I believe is pretty much going to be the biggest wave in the history of information technology.”³

According to a 2011 Ernst and Young survey, 51% of organizations are currently using cloud services, or plan to use them within the next year. And IDC predicts that cloud services will have a major impact on the IT market. The cloud’s projected five-year annual growth rate of 26 percent is more than six times the rate of traditional IT offerings. IDC also estimates that we’ll see \$27 billion in net new IT revenue by 2013, with 27 percent coming from cloud services.⁴

So why all the excitement? And why are so many people calling cloud computing the Next Great Thing?

We’ll try to shed some light on these issues, since they are pivotal to any discussion about the future of information technology, Knowledge Work and the role of outsourcing in business transformation.

First things first: a practical definition

In an attempt to demystify some of the confusion surrounding this popular topic, the National Institute of Standards and Technology offers this definition of cloud computing:

“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

More precisely, cloud computing is an emerging style of computing with the following attributes:

1. Elasticity: An ability to quickly scale out and scale in
2. On-demand self-service: The provisioning of computing capabilities as needed
3. Resource pooling: The pooling of providers' computing resources to serve multiple consumers
4. Utility: Metered service utilization with payment based on usage
5. Broad network access: Availability over the network

Wikipedia offers a more streamlined definition that captures the same basic points: "Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the Internet)."

Bottom line? We're talking about shared technological resources, sophisticated services and business processes delivered over the Internet on demand. In a sense, there's nothing new about this. It's the basic model for IT outsourcing, which has been around for years.

Cloud computing is also more pervasive than many people realize. Take email as an example. In essence, this Information Age correspondence consists of data stored on a server that could be located just about anywhere inside or outside your firewall. It's also integrated with software applications that allow you to read, respond and file your email according to your own preferences. In other words, there's a lot of complex technological machinery behind your email. And it's not stored on your laptop or PC. Where is it located? Most likely, it's in the cloud.

It could be a cloud that exists in your data center. Or it could be floating around in the digital universe we call the Internet. But for practical purposes, it's a cloud. In fact, the term "cloud" comes from the diagrams originally used to represent a powerful infrastructure supporting telecommunications and IT.

A simple cloud taxonomy

If you consider the email example above, you can quickly understand one of the fundamental distinctions involved in cloud computing.

If your email server is located in an outsourcing partner's carefully controlled data center, it's part of a private cloud. On the other hand, if you use an Internet-based email program like Microsoft Hotmail, Yahoo Mail or Google's Gmail, the server that holds your email is part of a "public cloud" that can be accessed and used by anyone equipped with a computer and web browser.

Of course, there are other kinds of clouds out there in IT-land, including hybrid clouds, which combine public and private clouds in a customized configuration. Hybrid clouds are a sensible solution for a growing number of business applications. There are also community clouds used by multiple organizations to achieve a common goal. (Google's cloud for the U.S. government is often cited as an example.)

These many clouds offer advantages in terms of scalability, multitasking and multitenancy. Users can share a single application, database or other resources, which dramatically reduces the need for organizations to keep investing in their own computing resources.

Obviously, these cloud variations have different features, advantages and applications. But they all have the potential to improve the traditional paradigm for enterprise computing.

Let's talk about some of the general advantages of cloud computing. Then you'll understand why so many business leaders view the cloud as the next giant leap forward in IT, document management and business process outsourcing.

The power of the cloud

Let's go back to the basics. Cloud computing provides an entirely new model for enterprise computing because it converts a fixed-cost infrastructure into a new paradigm based on transactional, "pay as you go" fee-based services.

These services are divided into four basic categories:

- Business Process as a Service (BPaaS)
- Software as a Service (SaaS)
- Software Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

Because the cloud turns so many fixed cost scenarios into services, it is a remarkably effective platform for outsourcing. As a result, you can tap into the cloud for your computing infrastructure, your software applications and a wide range of sophisticated business process services. When you do, here are some of the benefits.

Unlimited storage for documents and data. You get more capacity without having to expand your data center or add servers to your network. All the storage you'll ever need is available in the cloud—24 hours a day, seven days a week.

Unlimited processing power. The same argument applies for processing power. With a direct pipeline to the vast computational power available in a public, private or hybrid cloud, you don't have to add more CPUs to your in-house IT infrastructure. You just use your web browser to get whatever processing power you need.

Dynamic flexibility and scalability. When you transform storage, processing power and software applications into a service, you no longer have to build, manage and maintain a costly infrastructure designed to handle your peak capacity needs. Instead, you only pay for what you use, regardless of the peaks and valleys in demand. This flexibility offers a tremendous advantage to cyclical businesses, as well as to companies testing a new offering or product line. Rather than investing in permanent resources you may not need in the future, you simply tap into the cloud for what you need now.

Economies of scale. When you take advantage of a centralized infrastructure that supports multiple clients, you gain an economy of scale that's impossible to achieve on your own. That's why cloud computing is the most cost-effective approach to enterprise computing.

Benchmark technology and the latest best practices. Leading cloud providers typically have the size and resources to offer innovative technology and the latest best practices. In fact, they have to. It's essential for their long-term success.

Streamlined implementations. As the focus in the services world shifts from customization to standardization, clients reap enormous benefits in terms of cost, quality and speed. The transformation of the cloud into a highly efficient platform for service delivery enhances these benefits, providing greater cost-effectiveness and faster cycle times for the complete development and implementation process.

More outsourcing options for small businesses. The traditional model of service development and delivery often prices small and medium businesses (SMBs) out of the market for outsourcing opportunities. But thanks to the efficiency and scalability of the cloud, they, too, can take advantage of a growing portfolio of world-class services.

More capabilities for real-time and online collaboration. As more documents, data and applications move to the cloud, it will be easier for Knowledge Workers to share information online, create and revise documents and collaborate in real-time. In many cases, collaborative efforts will be enhanced through the integration of popular document management applications with social media. This heightened focus on collaboration is a fundamental part of the vision for the Web 2.0 world.

A sensible solution for a mobile workforce. With cloud-enabled access to technological resources, documents and data, it's easy for employees to work at home and on the road. As a result, the cloud can improve the productivity of an increasingly mobile workforce, facilitate the growing number of work-at-home programs and help companies attract and retain talented employees who want more flexible work options.

A greener approach to everyday business. By relying on the cloud instead of servers in a data center, companies can reduce the need for heating, cooling and overall energy consumption. Since cloud-based services facilitate telecommuting and work-at-home programs, organizations can also reduce carbon emissions caused by traditional commuting. In some cases, they can even reduce the need to build or lease costly office space, which also helps lessen their environmental impact.

New models for "crowdsourcing." Cloud-based services like Amazon Mechanical Turk make it possible to outsource tasks that require human intelligence in a fast, cost-effective way. Mechanical Turk—which operates as a virtual marketplace for freelance talent—is one of the most prominent "crowdsourcing" options available today.

A quick look at “next gen” documents

Those are some of the major benefits of cloud computing. But this emerging paradigm will also help organizations take full advantage of the dynamic capabilities of the next generation of documents, those of the Document 3.0 age.

To provide some perspective, consider the long history of the document. It started more than four thousand years ago when people began to store information in physical containers. This essential feature of the Document 1.0 era applies to everything from clay tablets and papyrus to modern business reports printed on bond paper.

The next inflection point—the Document 2.0 era—came with the development of digital documents in the early days of the Information Age. These documents were obviously different from physical documents. Yet they, too, were essentially rigid containers for information, with content locked inside. In the 3.0 era, documents will take another bold leap forward, becoming much more dynamic and offering “liberated” content. Here are some of the highlights.

Dramatically improved access to information. Since documents will be based primarily in the cloud instead of on individual hard drives or corporate servers, they will be easily accessible from any computing platform equipped with a web browser. This will help Knowledge Workers find the information they need, when and where they need it, while simplifying collaboration.

Open standards and structure. In the years ahead, proprietary document formats will gradually disappear, replaced by open standards like Extensible Markup Language (XML). These standards will make it easier for people to work with and share all types of documents.

Liberated content. Open standards and other innovations will bring structure to unstructured information. As a result, all the information stored inside digital and physical documents will eventually be as easy to search and access as a well designed database. In addition, content “chunks” will be readily shared, replicated, reformatted, updated and stored outside of their original document.

Documents that are proactive, intelligent and evergreen. In the not-too-distant future, documents will become proactive agents working on our behalf without our conscious involvement or direction. They will automatically update their own content. They will adapt their formats to our viewing preferences and varied reading technologies. And they will help us automate time-consuming steps in document-driven business processes. All of these improvements will increase organizational efficiency and Knowledge Worker productivity.

More powerful one-to-one communications. The next generation of documents will automatically search databases, social networks and the Internet for information and insights that will make their content more relevant to their target audience(s). This cloud-enabled capability will have an enormous impact on the effectiveness of marketing and customer communications.

Elimination of the barrier between physical and digital documents. With the widespread use of imaging and the development of innovative technologies for natural language processing, tracking and content mining, it will be easier to add structure to a wide variety of content. This will result in digital documents that can be readily integrated into fast, efficient workflows, forcing the barriers between physical and digital documents to gradually disappear.

Document Management as a Service. Organizations of all sizes will be able to streamline their business processes through complex, document-driven workflows based in the cloud. They will simply need to scan documents to the cloud for processing, transformation and storage. These documents can also be created online in a fully electronic format. Because the documents are digital, they can be easily linked with other documents and content. They can also be readily shared through social media and other channels. In addition, these documents can be personalized to the reader's implicit or explicit preferences and delivered to any device, whether a printer, e-reader, iPad or other tool. Document Management as a Service will also provide a complete audit trail for traceability, which will improve information security and management control.

Support of new work practices such as Mobility. Documents that are stored in the cloud and refreshed constantly will become instantly accessible in updated form to all mobile devices, including smartphones, tablets, e-readers and printers. Furthermore, the cloud will provide the processing power to personalize and enrich these documents, "shaping" them to each reader's requirements and to each device's file formats and viewing capabilities.

Although some of these capabilities may seem visionary today, they are all based on research that is currently underway. In addition, there will undoubtedly be other exciting developments to talk about in the next stage of the document's evolution, which will be directly linked to advancements in cloud computing.

Perceptual headwinds slow the pace of adoption

Despite the potential impact on efficiency and productivity, many organizations remain reluctant to embrace the cloud. What's the reason for the hold-up? A number of executives have concerns about the safety, security and privacy of information stored in the cloud. Others worry about the loss of control over documents and data, and question the reliability of cloud-based services.

Certainly, there are stories in the news that keep these issues on the corporate radar. Amazon's Elastic Compute Cloud outage in April 2011 (sometimes referred to as Cloudgate) shut down thousands of web sites for close to 24 hours. Google and Microsoft have also had their share of problems with repeated Gmail, Hotmail and SkyDrive outages. But it's probably the Sony PlayStation Network hack, which caused service outage for over a month, that best illustrates the vulnerability of cloud computing.

Despite the well-known advantages of cloud computing, some organizations remain concerned about the longevity of their cloud-based service provider. In a world where companies come and go at a rapid pace, it's natural to wonder what will happen to your sensitive information and files if your provider goes out of business.

Last, but not least, there is a concern about content access in the future, since the technologies we use to create and read documents may change.

Given these issues, it's no wonder many organizations are taking a "wait and see" approach before making a major commitment to cloud computing. Unfortunately, waiting too long could put you at a competitive disadvantage, particularly if other companies in your industry begin to improve their efficiency and agility with cloud computing.

In addition, all clouds are not the same. Therefore, the well-publicized concerns about cloud computing don't apply equally to every cloud in the digital universe.

The critical distinction between public and private clouds

Let's revisit the important differences between public and private clouds from an outsourcing perspective.

The public cloud refers primarily to third-party providers that deliver services through the Internet, often in a self-service model. Because of this open environment, there are understandable concerns about security, privacy and service reliability.

Private clouds, on the other hand, are gated communities connected to the Internet. With private clouds, access, security, disaster recovery and almost everything else can be more easily controlled. Nevertheless, they still offer significant economies of scale as well as best-in-class technology.

A closer look at security in a private cloud

Thanks to their scale, long history and extensive experience, private cloud providers often establish security and disaster recovery systems that are much more effective than what client organizations could create on their own. In fact, it's a mission-critical requirement.

Of course, no approach to security is perfect. But leading providers can create a trusted environment for client documents, data, applications and business processes by using layered technology, redundant design and a customized approach to tenancy. (This last feature lets clients choose how isolated they want to be in a multitenant or shared services environment.)

Leading providers should also employ state-of-the-art best practices like ISO 27001 and Information Technology Infrastructure Library (ITIL—a comprehensive set of best practices for the management of IT services). They should also base the design of their systems on the same core principles that provide state-of-the-art information security in any environment:

- Security measures must be designed to support the business, not impede it.
- The system should incorporate a “defense in depth” approach involving multiple layers of defense throughout the IT infrastructure—a concept originally developed by the U.S. National Security Agency.
- Standards must be employed to prevent misunderstandings and provide the agility necessary to respond quickly to risks.
- The system must be flexible enough to adapt to changing business conditions and evolving technology.

By taking this comprehensive approach, private cloud providers actually set the standard for information security today. In addition, it’s important to remember that the entire cloud computing industry is constantly working to improve security, interoperability and privacy. Organizations like the Cloud Security Alliance and the National Institute of Standards and Technology, which is known around the world for its expertise on cyber security, are leading the way.

A key requirement for providers: a long record of success

Now let’s consider another prominent issue. Can you count on your provider to deliver the service reliability you need today and tomorrow?

In a fast-changing world, there are no guarantees. But that shouldn’t stop you from taking action to transform your business. And it’s never too soon to start.

You should look for a partner with a long history of success, a reputation for innovation, a proven commitment to quality and continuous improvement, a global scale, and the experience and expertise to provide a trusted environment for your documents and data.

These are the same basic qualities that most clients look for in any outsourcing relationship. And they certainly apply to services delivered through the cloud, regardless of whether the cloud is public, private or a hybrid.

Stay tuned for future developments

As the cloud continues to evolve into a new paradigm for enterprise computing and service delivery, work will continue on all of the issues covered in this white paper. In addition, leaders in the field are working to develop standards that will ensure the portability of applications and data and make it easier for clients to integrate services from diverse cloud providers.

Another issue that needs to be resolved is software licensing. Applications need to be converted from traditional licensing agreements to “pay as you go” utilities that provide the economy and flexibility clients expect from the cloud.

For all of these reasons, cloud computing is a work in progress, not unlike the biggest cloud of all—the Internet itself. Nevertheless, thanks to the remarkable advancements that have already taken place, the cloud—in all of its variations—is ready to change the way organizations operate on a day-to-day basis.

It will give organizations a better way to manage the technological infrastructure that supports virtually every business activity.

It will provide Knowledge Workers with better access to information and deliver new tools and processes for collaboration, all of which will increase productivity.

And it will lead to a rapid expansion of outsourcing services that can help companies of all sizes improve their business processes and their approach to document management.

As mentioned earlier, cloud computing is inseparable from the concept of outsourcing. So the ultimate issue isn't whether you can trust the cloud. It's whether you can trust your cloud services provider.

If you can, there is no reason to postpone the decision to take advantage of the benefits of this powerful paradigm.

Trust your partner and make the leap.

Go cloud!

For more information on the future of cloud-based documents, read François Ragnet's white paper, Document 3.0: How the next generation of dynamic documents will improve the way we work.

For an additional discussion of the status of cloud computing, read ACS' ITO Perspective on Cloud Computing: "Is It Ready?" ACS, A Xerox Company.

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Previously, Ragnet served as program manager and senior project leader for the Xerox Research Centre in Europe where his team provided innovative technologies in support of next-generation Xerox® offerings. Their goal was to provide solutions that allow users to filter, configure and extract information from documents across advanced platforms that bridge production, printing and scanning. François was also a project leader in wireless technologies—specifically mobility and wireless (Bluetooth), content management, security, print and infrastructure management.

While at the Research Centre of Europe in Grenoble, France, Ragnet was a founding member of the Technology Showroom—a showcase of experimental technologies that hosts international events with customers from all over Europe. Prior to joining Xerox, Ragnet was a researcher at the National Institute of Standards and Technologies in Gaithersburg, MD, where he focused on creation of a demonstration platform for state-of-the-art collaborative work technologies. He holds a master's degree in telecommunications from the Institut National des Telecommunications, Paris, France.

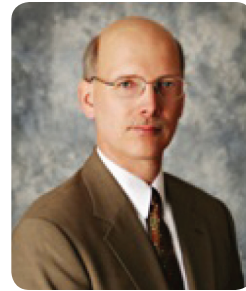
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1. Ballmer, Steve. Seizing the Opportunity of the Cloud. [Remarks by Steve Ballmer, CEO of Microsoft, Microsoft CEO Summit 2010, Redmond, Wash., May 29, 2010]. Retrieved from Online Web site: <http://www.microsoft.com/presspass/exec/steve/2010/05-19ceosummit.msp>
2. Boston.com, A New York Times Publication, May 11, 2010.
3. Network World, May 18, 2010.
4. Gens, Frank. Enterprise IDC's New IT Cloud Services Forecast: 2009–2013. Retrieved from Online Web site: <http://blogs.idc.com/ie/?p=543>

