

# Why Cloud Computing?

## ... Will cloud computing help my business?

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Over the last decade, discussions about the future of information technology have been dominated by one phrase - cloud computing. Cloud computing technology is not only behind the success of recent entrants into the Fortune 100; Google and Amazon, but is also being embraced by long-time technology giants Microsoft and Apple. Why is this? *What is cloud computing and how can it help my business?* This executive briefing is intended for business leaders seeking answers to these two fundamental questions and in particular why cloud computing is driving enormous business value – a promise that IT makes, but in practice often struggles to achieve.

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### What Is Cloud Computing?

Before trying to answer this question, it is perhaps better to start with what cloud computing allows us to do. Namely, as a result of cloud computing, businesses no longer have to purchase servers and software that are physically located in their respective places of business. In fact, with cloud computing it is no longer necessary to purchase server hardware and software at all – instead it can be obtained as a monthly service by a variety of third party providers. With cloud computing the servers and software are typically located in remote data centers that address the computing requirements of hundreds or even thousands of companies concurrently, achieving economies of scale that heretofore weren't possible. Software that "runs in the cloud" appears on our standard desktop or laptop PCs with essentially no loss of user functionality thanks to the availability of high speed Internet communications. In fact the user experience on our PC can just as easily be delivered to mobile devices such as tablets and smart phones, providing us with far greater flexibility when working remotely.

### How Did We Get Here?

Let's take a brief history walk going back to the 1960's and the emergence of mainframe computers. IBM dominated the computer industry during this decade and it was during this time that the benefits of information technology to business became apparent – these first com-

puters drove tremendous labor efficiencies in the areas of accounting and payroll in particular. The high cost of these computers however led to the creation of the first generation of cloud computing – except no one referred to it as such. Instead it was described as service bureaus or time-sharing. Mainframes located in worldwide data centers were able to meet the needs of banks and other large organizations through remotely connected computer terminals.

As we entered the 1970's, the cost of computing was driven lower through the emergence of mini-computers first popularized by Digital Equipment Corporation. Mini-computers made it possible for many more businesses to afford computers, and entirely new categories of software applications emerged including CAD / CAM (Computer-aided Design / Computer-aided Manufacturing) and MRP (Manufacturing Resource Planning) systems. But from a computer architecture standpoint, the user experience continued to be driven through a remotely connected terminal.

In the 1980's the third wave of computing arrived with the invention of the personal computer led by Steve Jobs and Apple Computer. Personal computers not only drove down the cost of computing, but also made it accessible to businesses of any size, even putting computers in our homes for the first time. With computers, now a volume business, the market for software exploded with programs, both custom and off-the-shelf, as well as software for a growing consumer market such as video

games and personal finance programs.

The major drawback however to personal computers was the fact that they were inherently disconnected from one another. This was particularly troublesome to business where information sharing is required and duplication of effort is a major productivity loss. The need however was quickly addressed in the fourth wave of computing, where PC's were networked together and connected to a central server or collection of servers in what became known as client / server computing. Client / server was the state-of-the-art all through the 1990's, but the genesis of cloud computing emerged during this decade with the dawn of the Internet.

The potential of the Internet was seized by cloud pioneers, such as Jeff Bezos of Amazon and Sergey Brin and Larry Page with the launch of Google in 1998. But it wasn't until the middle of the next decade that the term "cloud computing" actually came into widespread use. As the fifth wave of computing, cloud computing is difficult to define because unlike a single development such as the personal computer or file server, cloud computing is actually a collection of IT technologies that in combination have allowed the industry to return to the 1960's and the notion of the service bureau, but to do so in a way that goes well beyond what was conceived of during that era.

1960's

1.

Mainframes

1970's

2.

Mini-computers

1980's

3.

Personal Computers

1990's

4.

Client / Server

2000's

5.

Cloud Computing

## Five Decades of Computing

Without going into the actual technology of cloud computing, what is perhaps more important is what cloud computing has achieved and the implications to businesses and individuals alike. The technology breakthroughs associated with cloud computing include virtually unlimited scale in computing power combined with high speed, ubiquitous access. The largest single computers today are still referred to as mainframes, but in cloud computing, the solution is to combine hundreds or even thousands of relatively low cost servers in data centers that are able to operate collectively to meet the computing needs of millions of simultaneous users. It is estimated for example that Google has upwards of 1 million servers in its data center! The advancements in both software and hardware that make it possible for these separate servers to essentially function as a single platform is what is allowing the industry to reinvent itself once again. When combined with the ubiquity of the Internet, and the advancements in wireless communications and mobile devices, we find ourselves able to perform all of our traditional IT functions from any location and at any time.

So when we purchase an e-book on Amazon, search for a restaurant on Google, or download a song from iTunes, we are doing so as a result of cloud computing.

### How Can IT Help My Business?

In most firms today, cloud computing is limited to browsing the Internet and perhaps hosting of the company's web site. Standard applications such as Microsoft Office, email, accounting software and desktop publishing is achieved by investments in an "on-premise" IT infrastructure including application software, servers, networking hardware, and of course desktop and laptop computers. But that describes just the equipment side of the coin. The other half is the expertise that businesses

must acquire in the form of IT staff to support this infrastructure and the software that runs on it. Employees need to be trained in the use of the company's software, questions continually arise, and the technology itself requires constant support in order to keep it operational. In fact, the IT industry estimates that between 70% and 80% of every IT dollar is expended to simply maintain the computing infrastructure of a typical business. That means at best only 30% of IT expenditures are available to improve the usefulness of IT to the business itself – meaning the productivity of the employees and the mission of the company.

**70** % of IT budgets are spent maintaining IT operations.  
– Gartner Group

### Cloud Computing Unlocks Business Value.

The opportunity afforded by businesses today by cloud computing is to generate far greater value from your IT investment dollar. More specifically, cloud computing means that companies are able to shift their IT spending from the acquisition and maintenance of the infrastructure to a focus on how effective employees are using the technology to perform their jobs and to enhance and develop software that better fulfills the goals of the business.

### Types of Cloud Services.

There are many ways in which companies are taking advantage of cloud computing today. In an effort to make sense of it all, you will find different types of service providers that adhere to one or more of the following categories:

- Software as a Services (SaaS)
- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Information Technology as a Service (ITaaS)

Here is a brief explanation of each type and the associated benefits.

#### Software as a Service (SaaS).

This is the most recognized category of cloud computing. The market leader in CRM (Customer Relationship Management) software, Salesforce.com, has built its business strictly through delivery over the cloud. As a SaaS customer, you simply sign up for the application and they will deliver it directly to your computer via the Internet. SaaS providers take care of all software bugs and upgrades, and maintain the entire server infrastructure upon which their application runs.

#### Infrastructure as a Service (IaaS).

If your objective is to have a service provider furnish and maintain the server or servers that run your business applications then IaaS is the alternative to consider. IaaS companies provide computing power in the form of servers, memory and storage priced to fit the specific needs of your business. In addition to the server hardware, IaaS solutions typically include networking equipment, firewalls and the associated platform software. The business remains responsible for purchasing and supporting all of the application software on the IaaS platform, but now the challenges associated with procuring, maintaining and upgrading the server platform is now shifted to the IaaS supplier.

## Platform as a Service (PaaS).

PaaS suppliers are one step up from Infrastructure as a Service. If your business develops software either for in-house use or is marketing Software as a Service (SaaS) to your customers, then PaaS suppliers should be considered. In addition, to all of the server and networking infrastructure available under IaaS, PaaS suppliers also include the operating system, programming environment, web server and database – in other words the software foundation for cloud-based application development.

## Information Technology as a Service (ITaaS).

For companies wishing to maximize their use of the cloud and essentially outsource as much of their IT infrastructure as possible, ITaaS is the answer. Figure 1 depicts the four categories of cloud services with ITaaS at the top, and IaaS at the bottom. It shows the logical hierarchy of cloud computing, starting with the server platform, adding in a software development environment with PaaS, and then moving to SaaS, where a single finished application is sold to the market. ITaaS is the final step, but one where multiple applications are hosted and delivered from the cloud, versus a single application as in the case of SaaS. ITaaS providers host standard productivity applications such as Microsoft Office, email and accounting software, but will also host custom applications as well, all on the same cloud platform. In all cases, ITaaS providers take advantage of a technology called desktop virtualization to deliver these applications directly to your PC, laptop, or mobile device. Some ITaaS providers go even further and will include complete network support, faxing, VOIP phone systems, and remote data backup.

In all four service categories, cloud providers furnish computing as a utility service, with customers simply paying a monthly fee in proportion to the number of users and the breadth of the services chosen by the customer.

## Will Cloud Computing Lower My IT Costs?

There is no question that cloud computing



Figure 1

is giving businesses many new options for meeting the IT needs of their business, and in most cases cloud computing does lead to lower IT expenditures. Cloud computing is sold on a subscription basis, making direct cost comparisons with on-premise computing challenging due to the irregular nature in which IT assets are acquired and deployed. Capital purchases for servers, networking equipment and software occur on an as-needed basis and carry useful lives measured in years. Due to these costs arising in potentially unforeseen manners in the short term, it is recommended that businesses look at the average IT expense over at least a five year period in order to arrive at a meaningful comparison.

The immediate advantage for cloud computing is in opportunity cost. By shifting responsibility for the IT infrastructure to a cloud provider, businesses no longer have to deal with many of the daily challenges associated with today's complex computing systems and the IT staffs that are tasked with keeping them operational. Firms undergoing rapid growth benefit from cloud computing in two ways. First, cloud platforms are designed to scale instantaneously with demand. Secondly, businesses with geographically distributed employees and locations are able to deliver applications as needed without having to install software on each PC or laptop and IP phones can be immediately added to a remote office with minimal setup.

## What About the Security of My Data?

One of the misnomers about data security is the notion that an on-premise server is more secure than having it reside in a remote third party data center. There are many reasons why cloud providers offer superior security. It starts with the physical building. Cloud pro-

viders locate their computing infrastructure in facilities that provide strict control over access rights using security automation technology to automate and record anyone gaining entry into the building. The more likely risk however to data security comes in the form of viruses and hackers. Because cloud providers have so much at risk from cyber attacks, a significant investment in being a cloud services provider is to obtain the latest anti-virus software, firewalls that safeguard against denial of service attacks and management software that precisely validates and controls user permissions to customer applications and data.

## Does the Cloud Fail?

Yes, like any computing system, loss of service is possible. The more important question to ask is what type of service level do cloud service providers achieve and how does this contrast with on-premise computing? Typical service level contracts provide for uninterrupted operation in excess of 99.5% of the entire calendar year, 24 hours / per day. In order to perform at this level of performance, cloud providers invest in platforms that feature many layers of redundancy to mitigate against equipment failure, loss of power, and loss of network communications. The cost of this redundancy is normally well beyond the reach of individual businesses, particularly for firms with fewer than 1,000 employees. But this investment alone is not the whole answer. Cloud providers invest equally in highly skilled IT personnel with in-depth knowledge of the hardware, software and communication systems upon which cloud platforms depend. It is this knowledge that enables cloud providers to quickly identify and correct problems when they do occur, thereby keeping downtimes to an absolute minimum.

## Cloud Computing Is Changing The Way We Think About IT.

As the latest technological wave in information management, it is easy to get caught up in the technology of cloud computing and miss the fundamental paradigm shift that is underway across the industry. For decades now, the industry has evolved on the basis of having each business or organization acquire, maintain and develop IT solutions and the staff to support them on a local basis, or what is referred to as on-premise computing. As these systems have grown in sophistication, the costs associated with their maintenance and support is exceeding 70% of IT budgets as highlighted earlier from the Gartner Group report.

As businesses continue to push for greater productivity our dependence on IT has placed us in a position where these high level of expenditures for on-premise computing seem inescapable. Cloud computing is directly challenging this assumption. Cloud providers not only drive platform efficiencies by aggregating demand across multiple businesses, but these same companies consolidate expertise among the complex technologies that make cloud computing possible. As computing has become in many ways easier for users, it has become increasingly more difficult for IT staffs to deliver consistent, reliable and affordable operation. The success of cloud providers depends on having knowledgeable staff in all aspects of the technology in order to insure a reliable platform, and to diagnose problems when they do arise.

What this means for businesses that move to the cloud, is that a corresponding shift must occur in the roles and responsibilities of the IT staff that remains. With the work load associated with maintaining the infrastructure shifting to the cloud provider, IT staffs can now focus their energies on user productivity and application development. Real value for the business is achieved when employees are using software applications and tools to their fullest extent, and when IT has the time and resources to optimize software applications to enhance their features and functionality, and integrate them to improve overall workflow and collaboration.

What this may mean for many IT organizations however is a reassessment of the skill sets and resources that are now needed as a result of moving to the cloud.

## Remembering Why We Use IT In The First Place.

Information technology has been embraced by business for over five decades because it has consistently helped us to increase revenues, profitability and value. With cloud computing, this trend will continue, but for many businesses it will disrupt the traditional model for procuring and managing IT by delivering computing as a utility service in place of the on-premise, capital and labor intensive approach that has characterized the industry up to now.

## So How Do I Get Started?

As outlined earlier there are many ways to take advantage of cloud computing. The most attractive aspect of cloud computing is that organizations can take advantage of the technology incrementally. For example, instead of investing in a premise-based backup solution, take advantage of the many suppliers offering this on a subscription basis. If you are looking at a new software application such as CRM, again, there are multiple vendors offering cloud-based (SaaS) alternatives. With experience comes not only confidence, but the recognition that cloud computing is now a mature technology and one that businesses can depend on to deliver safe, reliable and cost effective alternatives to on-premise computing. Welcome to the Cloud!

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## Proxios

Proxios, a pioneer in cloud computing technology since 1999, offers businesses a full range of IT services on a subscription basis including application hosting and VOIP phone systems. Proxios hosts proprietary and third party software, delivering your desktop to your office, home or mobile device. Proxios is headquartered in Richmond, Virginia serving customers across the United States and Canada.

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**PROXIOS**