Why This is a Must Read

This article will save you time, money and headaches and will help you make an informed, personalized decision regarding the cloud computing revolution for your small to mid-size business. If you have no idea what I mean by the “cloud computing revolution,” you may benefit from some facts and figures designed to introduce you to the biggest buzzword in technology right now.

Gartner research firm forecasts that in 2010, global cloud services revenue will reach $68.3 billion. That is a 16.6% increase from 2009, which saw cloud revenue of $58.6 billion, and a 47.2% increase from 2008, which generated $46.4 billion in cloud revenue. Gartner also projects that global cloud services revenue will reach $148.8 billion by 2014 [1]. To put these massive numbers in perspective, the movie industry will make about $10.35 billion this year (2010) on ticket sales [2], which is a slight decline from last year. That means that in 2014, cloud computing will make around 14
times what the movie industry will make in ticket sales.

So now that you have a slightly better idea of how enormous this cloud revolution actually is, you have a pretty big decision in front of you. Do you hop on the bandwagon or stick with what you’ve been using? Cloud computing can take all of your physical servers and all of the data and applications you keep at your business, and move them out of your location and onto the internet, into “the cloud.” The question is, “Is that right for your particular business?” While this article may not tell you exactly which cloud solution to use, it will help you make a decision about whether or not you should go into the cloud at all and will point you in the right direction should you choose to make the jump. Many factors will go into that decision and hopefully this article will help you evaluate those factors in relation to your own business in order to make the choice that will save you money, keep your data safe, and make your life more convenient.

So what is Cloud Computing?

Cloud computing in a nutshell means running apps and storing data online. If that seems like an extremely broad definition to you, you are absolutely right. People use the term “cloud computing” so much lately that it has come to encompass a very large chunk of the internet. Every time you use a dynamic application or save some work online to retrieve it at home, you are using cloud computing. In addition to the situations that immediately pop into your mind from this definition, there are tons of other manifestations of cloud computing that you may or may not know about. Many of these lesser known cloud based solutions could offer a massive benefit to you and your business.

There are 3 main categories of Cloud Computing: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure or Hardware as a Service (IaaS or HaaS). In this article, I will always refer to the last type as IaaS to prevent confusion. You’ll see why both names make sense when I define them. Keep in mind that while these three types are a helpful way to categorize different cloud computing solutions, the line between them isn’t always so clear. Many cloud services encompass more than one of these types and sometimes use all of them in a hierarchal form as shown in figure 2, below.
Google is the major player right now in the world of SaaS. Almost everything they provide, from search, to Google Docs, to Gmail, to Google Translate and more can be placed under the category of Software as a Service. Google claims that cloud computing “is in [its] DNA.”[3] If you want to learn more about how Google’s cloud services might help your business, I recommend that you take a look at the “Top ten advantages of Google’s cloud” at [3].

In addition to Google, a few other companies have begun to make a push for the SaaS market. Microsoft will soon release Office 365, putting much of the functionality of Office into the cloud to allow easier collaboration and access to your documents from anywhere in the world. IBM is also pushing their classic business software, Lotus Notes, into the cloud with “LotusLive” and “LotusLive iNotes”.

One important company in SaaS that is not a huge name like Google, Microsoft, or IBM is SalesForce. SalesForce does primarily CRM and is the world’s 4th fastest-growing company according to Fortune Magazine [4] and the world’s 3rd fastest growing tech company according to Forbes [5]. They are quickly becoming a powerhouse in CRM, SaaS, and cloud computing as a whole. If you’re interested in SaaS, GoApp.com is a useful tool for finding cloud based applications that may suite your business’s needs.

**PaaS – Platform as a Service**

Platform as a Service supplies an environment which allows developers to create and deploy their own custom applications. This sort of thing is great for businesses that have very specific needs or that need applications specifically designed for them. PaaS solutions often include support for application design and development, in addition to hosting, testing, database management, and easy scalability. PaaS prevents developers from having to purchase servers and expensive development software to create and host their applications.

Again, Google is a big name in PaaS. Google has provided application programming interfaces (APIs) for many of their applications (Google Maps API, Google Search API, etc.) and give developers a full dev environment and hosting facility with Google App Engine. Microsoft has recently deployed a PaaS solution called Azure and Facebook has also jumped into the PaaS market, providing APIs that allow third party developers to create and deploy Facebook apps. SalesForce’s “Force.com” option provides a development environment specifically targeted towards the development of business applications [6].

**IaaS – Infrastructure as a Service**

Infrastructure as a Service is when a services provider outsources pieces of physical equipment for hosting. IaaS embodies the concept of **virtualization**, which is the breaking down of very large, powerful servers into smaller “virtual” servers for individual users or subscribers [7]. To these subscribers, it seems like they have their own private server, specifically dedicated to them by their service provider. In reality, they have a virtual piece of a very large computing power. IaaS is often used for web hosting and fully customized internet solutions.

The major name in IaaS right now is Amazon’s EC2 (Elastic Compute Cloud) service. With EC2, users can purchase fully customized virtual servers and do whatever they want with them. The name includes the word “elastic” due to the fact that your resources can very easily be scaled up or down in a matter of minutes [8]. That means that if your
business is more successful than expected, and web traffic creates a need for more server power, it is very simple to allocate that computing power to your currently running virtual instances. Other IaaS providers include RackSpace and GoGrid.

**Why the Revolution?**

So why are people flocking to cloud computing? What advantages make everyone see it as the future of computing? Two of the fundamental differences between cloud computing and traditional computing that seem to be pushing a lot of people into the cloud are its scalability/flexibility and the ability to access cloud solutions from anywhere in the world.

Scalability is a benefit I discussed briefly in the IaaS section. Essentially, cloud computing takes the risk and hassle out of the initial purchase. If you buy physical servers that end up being too weak or too strong, it could either mean you’re stuck with extra hardware and wasted a ton of money, or it could mean that you need to by more servers and reconfigure everything, a very time consuming and expensive task. With cloud computing, it is very simple and quick to change the size and power of your computing solutions, so you no longer have to worry about guessing the success of your business when making an initial purchase.

The ability to access the same data or application from anywhere in the world is a result of a concept called *multi-tenancy*. Multi-tenancy means that all users, connecting from anywhere on any device, access the same copy of the data or application in the cloud. This is great for a number of reasons. First of all, we now live in a world where we are constantly connected to the internet. More often than not, you and your employees will have internet enabled smart phones which are entirely capable of accessing most cloud based solutions. This portability will allow your company to access your business’s data and applications on the go while making a delivery or taking a business trip across the country. In addition, multi-tenancy greatly enhances the collaborative capabilities of a business. When everyone accesses the same copy of your data regardless of where they are, there is no disconnect between individual users of your system. Everyone is always on the same page (literally).

Cloud computing also seems to fit well into the world’s movement to become more green. Eliminating power hungry servers and backup units from your location will dramatically reduce your power consumption. In addition, cloud computing often allows users to switch to very low power devices because the majority of the “heavy lifting” is done on the server side, in the cloud. Again, this bodes well for the growth in popularity of smart phones and netbooks.

**The Suppliers**

I’ve already spoken a bit about the suppliers of cloud computing and some of the options they provide in the sections about the three types of cloud computing. However, I think that it’s worth noting the confidence that these businesses have in the cloud computing revolution and the return that they have already been seeing.

At a speech at the University of Washington in March 2010, Microsoft CEO, Steve Ballmer said, “The cloud sort of is part of that Internet gift. It’s the next step, it’s the next phase, it’s the next transition,” and went on to call cloud computing “the thing that literally I will tell you we’re betting our company on, and I pretty much everybody in the technology
industry is betting their companies on. [9]” Microsoft and IBM have both launched massive cloud computing advertising campaigns and are investing billions of dollars in their cloud solutions. They seem to be doing a pretty good job with these campaigns. When I told a friend of mine that I was writing an article on cloud computing, he responded with, “Oh, that’s the Microsoft thing, right?”

Companies are also investing lots of time and money into cloud research. Google and IBM recently teamed up to create the IBM/Google Academic Cloud Computing Initiative (ACCI), which is a multi-university project dedicated to training students to tackle the tough problems that will be presented by cloud computing the future. [10]

Amazon is the perfect example right now of a company who was ahead of the game in cloud computing and are reaping the benefits. Figure 3 on the right shows the bandwidth consumption of Amazon’s global website versus the bandwidth consumption of its cloud solutions, Amazon Web Services, from 2001 to 2008. As you can see, Amazon is now using much more computing power on its cloud computing solutions than it is on Amazon.com shopping sites globally.

Happy Customers

There tons of examples right now of businesses raving about their move into the cloud. SalesForce advertises that some of their “2 million success stories” include Starbucks, Qualcomm, NBC/Universal, Dell, Cisco, Dr. Pepper/Snapple, and even Google. Each of these success stories has a detailed profile on the SalesForce website [11].

For example, Starbucks built a website using SalesForce called “mystarbucksidea.com” that allows customers to give ideas and suggestions for Starbucks about everything from drinks to service to decorations. One of the big advantages for Starbucks in this case was the quick roll-out of the site and very easy scaling. The site was up and running in 6 weeks with SalesForce and allowed Starbucks to quickly and easily allocate more resources when needed.

For Dell, the main benefit of cloud use with SalesForce was “a centralized location they could go to to determine the status of current and past technology partnership evaluations.” [12] Using SalesForce CRM and Force.com, Dell was able to have a centralized solution that was globally consistent and could be accessed from anywhere in the world.

Microsoft features a case study of Coca-Cola’s use of their cloud solutions at [13]. Coca-Cola used Microsoft Online Services to allow its 72,000 employees to collaborate in a central location, thus increasing productivity.

Cloud computing seems to have worked out very well in these examples, but that doesn’t necessarily mean that it is right for your business right now. The rest of this article will be devoted to determining the right plan of action for your particular situation.
The Big Decision

Assuming you didn’t just skip to this section, you should have the context necessary to make your decision. Although the beginning of this article may at times have seemed like an advertisement for cloud computing, the cloud is not right for every business and every situation. Many people still feel more comfortable with their traditional computing solutions and have opted to continue using them. However, the important thing is that you consider this decision carefully and thoroughly with the right information at your disposal. Several factors are going to play a role in your decision. The factors we’ll discuss here are:

1. Cost
2. Security
3. Scalability
4. Maintenance
5. Access and Control

In the process of looking into these factors, we’ll develop some major questions you should ask yourself when deciding whether the cloud is right for your business.

Cost

The cost structure of cloud computing is fundamentally different from that of traditional computing. Cloud services and solutions are typically pay-as-you-go subscriptions. You generally pay only for what you use and plan options are usually very flexible. This format means that you will not make a large capital expenditure like when purchasing expensive on-site hardware. However, you will have a recurring subscription fee. Consider the situation of buying a new car. If you have a solid amount of money saved up, but it isn’t quite enough to get that new Lexus that you have your heart set on, you may consider renting it and hoping that you get a raise and can support your decision for an extended period of time. In this metaphor, cloud computing is like renting that new car you can’t afford to buy. The big question then becomes, “Do you have the money for a large capital expenditure?” On the other hand, if you’ve already made a large expenditure on brand new equipment, and you don’t see yourself upgrading again anytime soon, why start paying a monthly fee? You may want to re-evaluate the decision again when you have an upgrade that will require another large expenditure.

The full cost-benefit analysis of cloud computing versus your traditional computing solutions is a very difficult one to make because there are a number of cost-affecting factors that are tough to measure. For instance, with cloud computing, there is a very low management overhead. I’ll go into more detail about this when I talk about the maintenance factor of your decision, but the main point related to cost is that you will no longer have to pay for your IT guys to fix, maintain, and upgrade your systems. That work will pretty much all be handled for you by your cloud service provider. This will free up your IT guys to work on expansion and consulting.

Another factor that will go into the cost difference with cloud computing is power consumption. I mentioned before that eliminating the power hungry servers and backup systems from your business would dramatically reduce your overall power consumption. This difference will certainly show up on your electrical bill, so if you find yourself cringing when you look at the cost of power consumed by leaving your hardware running 24/7, you may find relief in a cloud based solution.

Many of you may be looking for specific, hard numbers in this section of the article. I can give you examples like that Google apps for Business is $50 per user per year [14] or that SalesForce’s most
popular Sales Cloud package runs at $125 per user per month with a 30 day free trial [15] and that mid-range business servers usually run over $2000.

However, due to the vast variety in both cloud and traditional solutions, in addition to the other factors like management overhead and power consumption, cost analysis is really something that needs to be done on a case-by-case basis. Get specific for your business. What hardware would you buy if you stuck with traditional options? What cloud services might you subscribe to? How much are you paying your IT guys to maintain and repair your in-house systems? How much power are you consuming with physical hardware at the office? In order to get a full picture of how the movement into the cloud can affect the finances of your business, you will want to ask yourself these sorts of questions and consider a time period of around 5 years into the future.

**Security**

Security is the factor that is currently preventing the most people from moving into cloud computing.

People want to have the feeling that their data is right there in their hands and for some people, that’s hard to feel with cloud computing. There are people who do not trust Google or Amazon to handle the security of their life’s work and want to be able to walk into the other room and see their data safe and sound on physical servers.

In addition, some business owners trust only their own employees touching their data. They only want their IT team handling security and are not comfortable handing their business’s most valuable information over to be protected by their cloud service provider.

One of the big questions about security thus becomes, “Do you trust your service provider with the security of your data?” To some people, it seems like Google and Amazon’s security expertise surpasses that of their own IT team and so they feel even more comfortable with their data in the hands of these experts. However, some people simply sleep easier having personal contact with the people guarding their data.

One way to reduce these concerns with the security of cloud computing is to have an active communication with your service provider before subscribing to anything. The first step to this relationship is making sure you read all of the agreements your provider asks you to sign. Read the Privacy Policy, Quality of Service, and Service Level Agreements. These documents will be imperative to how your cloud provider handles your company’s data. In addition it is very important that you realize
that these agreements are negotiable. If you don’t like something that the service provider is asking you to sign, contact them and make sure that you are happy with the terms of your contracts. You should also feel comfortable asking your service provider specific questions that you might have. For example, you may want to find out where your data is stored geographically, how data recovery is handled, or what will be done with your data when your contract is terminated. Source [16] features a list of 7 things that you should find out from your service provider when entering a cloud computing agreement.

If you would like to know the specific security concerns related to cloud computing, the Cloud Security Alliance outlined the following issues as the “top threats” to cloud computing in December 2009:

- Abuse and Nefarious use
- Insecure APIs
- Malicious Insiders
- Shared Technology Vulnerabilities
- Data Loss/Leakage
- Account, Service and Traffic Hijacking
- Unknown Risk Profile

For more information about what these risks entail and how cloud providers are attempting to remediate them, see source [17].

**Scalability**

As mentioned briefly in previous sections, scalability is one area where cloud computing has a huge leg up on traditional computing models. Most cloud solutions are extremely flexible in the number and power of resources allocated towards your subscription. Therefore, it is very easy to up your available resources when you find that your business is doing better than expected and large traffic is causing you issues. On the other hand, you also won’t have to be concerned with overestimating your business’s success. If you purchase 10 physical servers and spend time and money setting them all up, only to realize your business only needed 2 servers, there’s not much you can do about the time and money you’ve wasted. You’re pretty much stuck with the extra computing power. With the cloud, a few clicks will downgrade your subscriptions and give you only the resources you need. This goes back to the pay-for-what-you-use philosophy of cloud computing.

Terms you may hear in relation to cloud security are “private” and “public” cloud. When you opt to use a public cloud solution, your data and applications are hosted in a large cloud provider’s “public cloud”. That means that your data sits in a common place with other customers of that cloud provider. On the other hand, a private cloud exists behind a firewall in a company’s own cloud space. If you are concerned about your potential “neighbors” in the cloud and would be more comfortable with your own cloud space, you may want to look into private cloud solutions.

Figure 5: Secure Cloud
The real question you’ll want to ask yourself in relation to scalability is whether or not scalability is even a concern for you. For startups with a big potential upside or a big potential risk, scalability is probably a huge factor in your decision. On the other hand, for businesses that have had a constant, stable size and success for 20 years, scalability is not much of a concern. If you can very accurately and confidently predict what you will need in the future, you do not need the scalability advantages that the cloud offers. However, businesses whose success is somewhat uncertain should definitely consider the benefits of cloud computing.

Maintenance

Maintenance of servers and computer systems can be a huge hassle for some businesses, particularly when they don’t have a dedicated IT team that can quickly resolve issues as they come up. For some, the ability to outsource maintenance and upkeep would be a dream come true. Cloud computing offers just that. All issues and bugs are handled for you by your cloud service provider as part of your subscription. In addition, there is often a quick and dedicated emergency response plan for your cloud provider to handle and hopefully prevent disasters. Service providers will also handle any upgrades that you may need to implement, so you will no longer have to worry about downtime and extra expenses during a big upgrade.

Service providers are often very proud of the server uptime that they offer. Many cloud providers such as Google, Amazon, and SalesForce advertise uptimes of about 99.9%. That means that you will have access to your data at least 99.9% of the time, which is much more that some businesses can say about their buggy systems. If you find that you’ve been spending tons of money on maintaining your physical servers and data infrastructure, and your IT guys have no time to work actually improving and expanding your system, cloud computing may be beneficial to you. The big questions for maintenance are therefore, “Do you have an IT team that can effectively handle maintenance and upgrades on its own?” and “Would their time be better be more valuable if spent expanding and improving the technical aspects of your company?”

Access and Control

As mentioned in the “Why the Revolution” section, one attractive aspect of cloud computing is the concept of multi-tenancy, where everyone accesses the same copy of data and applications from anywhere in the world.

For many businesses, multi-tenancy has the potential to be a game-changer. Imagine having your route drivers enter delivery information into your database from their cell phones while out on deliveries. How about collaborating on price sheets and newsletters while on a business trip in China? To some people, even just the ability to access their inventory and database from home in the middle of the night would be invaluable. If these sort of benefits would mean a great deal to your business, cloud computing may offer you valuable advantages over your current infrastructure.
Many people considering cloud computing express concern that they might not have the same level of control over their data as they would with in-site hardware. However, this is not necessarily the case. Most cloud applications are extremely customizable and you can tweak them to fit your needs as much as you can with local software. PaaS and IaaS offer fully customized options for businesses who want complete control over the way their data and applications behave.

The Questions

Now that we’ve discussed some of the factors that will go into your decision, let’s see if we can determine the right path for your business. Some of the big questions we’ve outlined in the article have been expressed in the table below as statements. Indicate in the table from 1 to 5 how much you agree with each statement, 1 being totally disagree, and 5 being totally agree. When you’re finished, add up the total number of points you marked down for the statements and proceed to the next page to take a look at your results. Keep in mind that these results are not an absolute decision maker. This is just a fun exercise to help you decide whether or not you’re bound for the cloud.

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<th>Statement</th>
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<td>Even if it might save me money, I do not want to be bound to a subscription</td>
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<td>I am comfortable with the power consumption of the computing hardware at my location</td>
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<td>I do not trust Google, Microsoft, Amazon, etc. to handle the security of my data</td>
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<td>I am fine with only accessing my data and applications from within my business location</td>
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<td>Our IT team is capable of handling all maintenance for our infrastructure without compromising the progress of our company</td>
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Now, add up your total and read my suggestion ...
**Results:**

16 or less:

Make the move into the cloud! Your business needs and personal opinions line up perfectly with what cloud computing has to offer. Consult a technical professional or do some research on your own to find the cloud solution that’s right for you.

17 to 24:

Cloud computing appears to be your best option, but only if you find a great service for your business. The cloud is tempting in most aspects, but there are still a couple of things holding you back. Do some research on your own or with a trusted IT consultant to see what your options are in the world of cloud computing. If something fits your needs well, go for it. Otherwise, you may be better holding off for a bit.

25 to 32:

Don’t jump into the cloud just yet. While your business may find some benefits from switching to cloud computing, you may not be quite ready to make the move. Keep an open mind and begin to do some research about cloud solutions that may be of interest to you and your business. Don’t pull the trigger unless you are 100% sure that it is right for the business. There will always be another opportunity to go into the cloud if it is better for you later on.

More than 32:

Stick with what you’re using. I mentioned toward the beginning of the article that the cloud simply isn’t right for some people and you just happen to be one of those people. I recommend coming back to this decision the next time you have to make another large investment in hardware or upgrade your current infrastructure.

**Moving Forward**

So hopefully you now have a better idea of what cloud computing is and whether or not it is right for you and your business. I hope that you feel confident in your decision and can explain to both yourself and to others why you chose to either move into the cloud or stick with traditional computing. Regardless of the decision you ultimately make, I’d like to leave you with one last piece of advice. Re-evaluate this decision at least once every 6 months. The cloud revolution is moving very quickly and huge strides will be made as more research is done and more cloud service providers spring up. What is right for you right now may not be right 6 months from now. Keep an open mind moving forward and always be willing to do what is right for your company at any given instant in time. Good luck!
Sources


Figures:

Title image: Created by Jeremy Klein using Adobe Photoshop

Figure 1: Data taken from source 4 above


Figure 4: From source 15 above


Figure 6: Drawn by Jeremy Klein