

CLOUD COMPUTING FOR STARTUPS

How To Know If Cloud Computing Is Right For Your Startup

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INTRODUCTION

Cloud computing has been a popular topic lately, including the discussion of various cloud computing solutions such as [Amazon AWS](#), [Google App Engine](#), and [Salesforce.com](#). Many of the discussions revolve around enterprise IT, but few are talking about what this means for startups.

In this eBook, we'll cover the following topics:

- A simple definition of cloud computing
- The five types of cloud computing
- How to determine if cloud computing is a good fit for your startup
- Common myths about cloud computing
- Steps to prepare your startup for taking advantage of the cloud

WHAT IS THE DEAL WITH ALL THE CLOUD COMPUTING BUZZ?

Cloud Computing is getting quite a bit of buzz in the media right now. Are you wondering if you are missing out on something? There are several circumstances that have allowed cloud computing to emerge:

- Internet standardization and protocols
- The low cost of hardware and storage, making them commoditized
- Hardware virtualization, which has become mainstream in recent years

It wasn't long ago that individuals and businesses started by moving their software and data storage from local hard drives to Internet-based solutions. As they did this, they began to depend on the software and services to complete their personal and business needs.

These recent circumstances now make constructing software applications easier, faster, and cheaper. It also provides anywhere/anytime access for customers, preventing them from being tethered to their software or data. Combined with a down economy in 2008, is encouraging many companies to start evaluating and implementing cloud computing solutions.

CLOUD COMPUTING DEFINED

Cloud computing can best be summarized this way:

Cloud Computing is about elasticity and deferred cost

This may be an over-simplification, but I think it is important to keep things simple at this point. Too many terms and definitions have been thrown around about cloud computing recently, making things complicated and difficult to understand.

Let's start by expanding on this definition and then build on the concepts to find out what it means for you and your startup.

ELASTICITY - "ONLY WHAT YOU NEED"

Elasticity is the on-demand growth or shrinkage of a resource *for a specific time*. In short: only what you need, when you need it.

Is your business growing? Grow your storage and CPU power. Is your business stabilizing? Keep what you have. Is your business slowing down after a busy season? Shrink your resources until next time. Use what you need, when you need it.

Often, Amazon's Elastic Compute Cloud (EC2) comes to mind as an example. Amazon provides customers with the opportunity to grow or shrink the number of virtual servers they need at a given time, giving them nearly unlimited compute power.

Elasticity, however, is about more than just CPU power. Any resource that can be automated and managed can be made elastic: CPUs, memory, storage, databases, bandwidth, message brokers, deployment platforms, web applications, etc.

Elasticity vs. Scalability

It is important to remember that elasticity is different from scalability. Scalability is dealing with growth or shrinkage of resources over time, whereas elasticity is related to a specific period of time.

Several years ago, Toys 'R' Us experienced a severe shortage of servers during the Christmas season. This caused a variety of problems when taking orders online. Their need wasn't driven from month-over-month growth (scalability), but increased web traffic for that specific time of the year (elasticity).

DEFERRED COST - "SHARING THE LOAD"

It takes money to build up an IT infrastructure: servers, bandwidth, rack space, firewalls, switches, test environments, production environments, email services, invoicing systems, and CRM systems. This infrastructure takes time and money to locate, install, and maintain. This is money your startup has to spend on infrastructure rather than investing directly into the product. Cloud computing strives to change this by distributing the cost over many solutions.

Instead of every startup building the same infrastructure, you get to outsource it to someone who is more capable of monitoring and managing what you need. In short, cloud computing helps you defer the cost by paying for only what you need now rather than everything up front. Plus, you get to share the cost with other customers that need the same kind of resources. Cloud computing builds on these "economies of scale" and can work in favor of your startup if used correctly.

Other costs that should be factored into this deferred cost model include:

- Personnel (and middle managers) for hardware/software monitoring and management
- Hardware repairs and downtime if critical hardware or software is down
- Security, facilities, cooling, electricity, backup power systems, etc

Cloud computing can provide a large reduction of infrastructure, creating a huge advantage for many startups.

THE FIVE TYPES OF CLOUD COMPUTING

There are 5 common types of cloud computing services. Each of these can be used independently or in cooperation with other cloud service types to comprise a complete cloud computing solution.

The 5 primary cloud computing service types are:

1. Infrastructure as a Service (IaaS)
2. Platform as a Service (PaaS)
3. Software as a Service (SaaS)
4. Operations as a Service (OaaS)
5. Security as a Service (SaaS)

Let's look at an overview of each service type to better understand what kind of solutions may be available for your startup.

INFRASTRUCTURE AS A SERVICE (IAAS)

IaaS focuses on providing compute cycles, storage, databases, content distribution, and other IT resources on demand. IaaS forms the basis for most cloud computing solutions and often provides nearly unlimited resources and elasticity. Examples include: [Rackspace Cloud](#), [Slicehost](#), and [Amazon Web Services](#) (including [EC2](#), [S3](#), [SQS](#), and [SimpleDB](#)).

While IaaS tend to be the most flexible cloud service type by providing access to raw resources, it often requires more customization. Services such as EC2 provide nearly blank virtual servers but require time for customization and deployment of applications on top to utilize them. Once customized, these virtual servers may be cloned and used as needed, providing applications the resource elasticity needed based on current load requirements.

When selecting an infrastructure service, keep in mind that some services may offer the best performance when combined with other solutions. For example, Amazon's S3 storage service is quite useful, but the network latency of requests is much lower and performance faster when used from their own EC2 instances that reside on the same network infrastructure.

PLATFORM AS A SERVICE (PAAS)

PaaS provides a development platform for building solutions, perhaps for internal business needs or for reselling custom solutions. PaaS is a powerful solution in that it provides a standard infrastructure of libraries and services that enable rapid development of solutions with little overhead. They often provide instant deployment and scalability, helping businesses realize the benefits of cloud computing quickly and at reduced cost.

PaaS can lead to vendor lock-in, however, as applications would have to be ported to a new platform and may be missing expected services previously available. Depending on the vendor's technology and configuration choices, it may be more difficult locating experienced developers that understand the platform service. The rapid development and deployment that most PaaS solutions provide often outweigh these risks for testing markets or launching a v1.0 of a product, however.

Examples of platform services include [Google App Engine](#), [Zoho](#), [Force.com](#), [Heroku](#), and [RunMyProcess](#).

SOFTWARE AS A SERVICE (SAAS)

Software as a Service (SaaS) applications are on-demand applications that can be purchased for a specific period of time. They adopt a business model of leasing access to the application for a specific unit of cost. SaaS applications may also utilize a subscription model, adjusted based on the features available and number of users that will use the application.

Most SaaS-based applications are multi-tenant, meaning that customer data and configuration is partitioned into a “virtual instance”. These partitions may use a shared server or load balanced across multiple servers, allowing the vendor to scale their application as needed without impact to their customers.

SaaS is commonly associated to enterprise solutions such as [Salesforce.com](https://www.salesforce.com). SaaS has also seen a rise during the “Web 2.0” period from smaller vendors providing niche solutions for individuals and small business. This includes solutions such as [Freshbooks](https://www.freshbooks.com), [Unfuddle](https://www.unfuddle.com), [Basecamp](https://www.basecamp.com), and [Highrise CRM](https://www.highrise.com).

SaaS-based products provide a number of advantages, including access from any Internet-capable device, shared cost, automatic “no touch” updates for customers, and integration capabilities from/to third-party solutions using APIs provided by the vendor (when available).

OPERATIONS AS A SERVICE (OAAS)

OaaS removes many of the complexities of application deployment into the cloud by providing runtime governance around cloud resources, platforms, and applications. This enables solutions to be built using common cloud-based services while removing the details of policy enforcement, build image management, runtime resource availability and maintenance, and lifecycle management.

OaaS is a difficult problem, as it has to manage applications against a complex runtime environment that includes a variety of resources and elasticity requirements. Therefore, this type of cloud computing resource is often the most interesting for complex solutions and often the most costly. Examples of OaaS include: [3Tera](#), [Enomaly](#), [RightScale](#), [CloudKick](#), and [rPath](#).

SECURITY AS A SERVICE (SECAAS)

SecaaS provides the glue that connects an individual's privacy of identity with single sign-on, profile management, and access rights. These services are independent of a specific device, provide single sign-on, enable easy access to a variety of services under one identity, and pseudonyms to protect an individual's identity between systems as desired.

Examples of security services include: [OpenID](#), [OAuth](#), and [Facebook Connect](#).

ANYTHING AS A SERVICE (XAAS)

As businesses start to learn about cloud computing, services often emerge outside the scope of these five core types of resources. Anything as a Service (XaaS) covers this by allowing anything to be "as a Service" (suffixed to 'aaS').

Examples of XaaS services include:

- Commerce as a Service - Amazon FPS
- People as a Service - Amazon Mechanical Turk
- Information as a Service - Amazon Alexa WIS, Top Sites, Thumbnails, etc

CLOUD COMPUTING MEANS COLLABORATION

Cloud computing also provides the benefit of collaboration. Customers can determine the best way to integrate their data with others and then work to make it happen. No more custom integration with field offices or partners using custom VPNs and special firewall rules. No more installs of specialized middleware software that makes your internal apps available to another office. Everyone that needs access to a cloud resource can be given access.

This capability also means that your startup can offer cloud services to others, allowing your data to be combined with data from other services. This idea is called a "mashup", as it allows customers to mash together data from various service providers to create new and interesting solutions. These mashups are often thought of as automated solutions (i.e. analytic dashboards); however, cloud computing allows mashups between data and human workflow to be created as well.

WHAT CLOUD COMPUTING IS NOT

There are quite a few misunderstandings about cloud computing. I would like to dispel a few of them to prevent confusion.

MYTH: I AM CLOUD-BASED SINCE I DEPLOYED TO A CLOUD SERVICE

Deploying a web application to a cloud-based service like EC2, Mosso, or Google App Engine does not make you a cloud-based startup. As [Lydia Leong wrote](#):

"There is no magic cloud pixie dust that settles on these instances and turns them into application faeries of scalability and joy." Making your application cloud-ready requires special consideration in the code to handle failures and failover, elasticity through both growth and shrinkage, and multi-tenancy. Cloud infrastructures fail often - your app must be prepared or you'll receive a 3am wake-up call when things stop working. There are a number of stories about EC2 instances failing suddenly and startups losing data or experiencing outages until they can recover. Things break, whether they are in-house or in the cloud, so prepare for it.

MYTH: CLOUD COMPUTING IS JUST SOA BY ANOTHER NAME

Because of this, many startups have associated cloud computing as the next evolution of service-oriented architecture (SOA). While SOA and cloud computing can be cooperative, they are not the same. SOA is an architectural approach to software development and integration in an effort to reduce redundancy and time-to-market of key business processes.

Cloud computing is about elasticity and the deferred cost of resources and maintenance. SOA may utilize cloud computing resources; however, SOA does not require cloud computing to exist. Startups utilizing cloud computing may benefit by choosing a SOA-based architecture; however, cloud computing does not require a service-oriented architecture.

MYTH: CLOUD COMPUTING IS JUST GRID COMPUTING BY ANOTHER NAME

Grid computing is [defined in Wikipedia](#) as:

...a form of distributed computing whereby a “super and virtual computer” is composed of a cluster of networked, loosely coupled computers, acting in concert to perform very large tasks. This technology has been applied to computationally intensive scientific, mathematical, and academic problems through volunteer computing, and it is used in commercial enterprises for such diverse applications as drug discovery, economic forecasting, seismic analysis, and back-office data processing...

With cloud computing becoming more accessible to businesses, access to large amounts of computing and storage infrastructure is now possible. This means that cloud computing can be used to perform grid computing tasks without an expensive infrastructure. However, cloud computing is not restricted to just grid computing - it can be extended to providing entire applications for a variety of solutions.

IS CLOUD COMPUTING A MATCH FOR YOUR STARTUP?

While cloud computing may provide a great benefit to your startup, it may not be the perfect solution for all situations. The following questions will provide some checkpoints to help you determine if cloud computing is a good fit.

QUESTION #1: DOES YOUR STARTUP REQUIRE CUSTOM HARDWARE OR SOFTWARE?

Custom hardware or software can't be installed into cloud vendor data centers. Verify that your solution doesn't require special hardware configurations, or specific operating systems that the provider can't or won't support.

QUESTION #2: DOES YOUR STARTUP HAVE PRIVACY OR COMPLIANCE REQUIREMENTS?

Regulations, such as HIPPA, may restrict co-mingling of your infrastructure with other hosted customers and vendor IT support teams. Privacy is the single largest concern with businesses moving to the cloud, especially around government regulations of data privacy. Make sure you perform the proper due diligence before moving sensitive data to the cloud. Also, consider your intended customer base and if they will have concerns as well.

Moving to the cloud may help your startup, but it may also impact the customers' willingness to conduct business. This may require your startup to adopt a hybrid approach, using a more secure data center for production data but the cloud for development and testing. If the data can be anonymized, you may be able to move some portion of your solution to the cloud to reduce cost and provide needed elasticity without breaking privacy regulations.

QUESTION #3: DOES YOUR STARTUP WORK WITH LARGE AMOUNTS OF DATA?

I've worked with a variety of startups that produce and manipulate extreme amounts of data. Depending on your Internet connection, it may take hours or days to push your data to a third-party cloud infrastructure to make it available to the cloud. This often impacts the cost of your networking infrastructure, monthly bandwidth costs, and bandwidth costs with the cloud provider.

Determine how much data you expect to work with and the frequency of the data collection. Also, consider the cost of backing up this data and restoring it as bandwidth costs may exceed the benefit of moving the data to the cloud.

Finally, find out if the provider provides a way of pushing large amounts of data into their cloud using alternative methods. Some providers support receiving and loading data from hard drives or other media for an additional service fee.

QUESTION #4: DOES YOUR STARTUP HAVE A PREDICTABLE TREND OF SCALING AND RESOURCE REQUIREMENTS?

Some businesses work with a market that has a slow or predictable growth rate. If you have a predictable growth curve, you may not need the elasticity of the cloud. If this is the case, reduced cost and time-to-market may still be important factors for the consideration of cloud computing.

QUESTION #5: DOES THE COST OF CLOUD COMPUTING EXCEED YOUR BUDGET?

Businesses are being lured to cloud computing without considering the hidden costs of replacing all aspects of monitoring, management, and automation. Some vendors offer these services for free, some for an additional fee, and some don't provide them at all. This means you may have access to a large number of servers for your website but no automated way to include them into a load-balanced solution without extra effort. Or, it may require subscribing to an additional vendor that provides Operations as a Service (OaaS) capabilities for your cloud.

Ensure that you have performed a complete cost analysis of moving to the cloud by investigating the full cost of switching. There are often savings in utilizing a cloud-based solution, but some startups have special needs, such as excessive bandwidth or data storage, that can cause the cost to increase greatly from most typical solutions. If this is the case, your startup may benefit from a hybrid cloud approach.

QUESTION #6: WILL CLOUD COMPUTING HELP ME COMPETE IN THE MARKET?

Recent surveys show that many IT departments are confused or uncertain about cloud computing. This means that many solutions in the market today are likely using a pre-cloud approach to their IT: greater spending, more IT staff, and little capability to scale as needed. This provides an amazing opportunity for startups trying to compete against these market solutions by delivering faster and cheaper.

As IT departments embrace cloud computing solutions to solve their business problems, your startup will have an early opportunity to sell into these businesses ahead of the competition without the need to make a shift in IT strategy. You will also have the advantage of time to grow and mature your infrastructure ahead of your competitors.

Consider how cloud computing can provide a competitive advantage for your startup. Don't overlook your ability to utilize various cloud services to deploy quicker, iterate faster, and reduce your overall costs.

QUESTION #7: DO YOU INTEND TO SEEK INVESTOR FUNDING?

Many investors are paying attention to cloud computing and its ability to control IT spending in the early days, while scaling to meet demand as the startup gains traction in the market. Failing to address the cloud computing decision will likely cause investors to reconsider backing your startup.

Some additional questions to consider prior to seeking investors include:

1. How can we utilize cloud computing resources to create an obvious market advantage?
2. Would a cloud-based solution enable the product to extend its capabilities and reach through partnership and integration with other cloud-based products?
3. Is there a way to grow our startup from a simple SaaS-based offering into a PaaS offering over time, becoming a standard platform for a specific market?

Investors expect to see if you have identified opportunities to utilize cloud computing for faster releases, controlled IT spending, support for rapid growth, and generating multiple streams of revenue. Be ready!

I HAVE ANSWERED THESE QUESTIONS - NOW WHAT?

These questions should cause careful thought prior to adopting or avoiding the cloud. Perhaps part of your startup could benefit from cloud computing, while some of it may need to remain internal. This is called a "hybrid cloud" and is quite common with more complex businesses.

The important thing is to assess your needs before jumping in. Once you determine you are ready to take your startup to the cloud, it is time to build a plan for getting your startup cloud ready.

HOW TO MOVE YOUR EXISTING STARTUP TO THE CLOUD

If your startup has a web-based application that you sell and you want to move to the cloud to gain the elasticity and the deferred cost benefits, you'll need to take the following actions:

1. Prepare the code
2. Prepare the development team
3. Prepare the operations team
4. Prepare management

PREPARE THE CODE

One of the first steps is to conduct a code review to determine the cloud-readiness of the application. Not every application can just be moved to the cloud. Often, it requires some careful considerations about the application's assumptions, such as configuration, available file systems, and hostnames/IP addresses of web services and other resources. The application will also need to be aware of the increase and decrease of available resources, such as servers and filesystems. Remember, simply deploying your application to the cloud isn't enough - it requires code-level planning and coordination.

PREPARE THE DEVELOPMENT TEAM

Not only does the code need to be prepared, so does the development team. Developers will need to have a development environment that mirrors the production cloud environment. This can cost additional time and money to setup and have available. The advantage is that developers can test the scalability and resiliency of their application before it ever goes to production by creating a mirrored cloud environment. Rather than waiting for expensive hardware to arrive in your offices, you can allocate a development environment quickly and test the application's ability to scale up and down using your cloud environment.

PREPARE THE OPERATIONS TEAM

Monitoring and managing cloud resources can often require more effort. As mentioned above, Operations as a Service (OaaS) is a way to eliminate some of these difficulties by allowing vendors to monitor and manage your cloud infrastructure for you. Keep in mind that this may impact the application as well, so your operations team will need to work closely with your development team to ensure a smooth transition to the cloud.

PREPARE MANAGEMENT

Cloud computing is thought of primarily as an IT solution. Management shouldn't be impacted, right? Not quite. Management needs to understand the implications of moving to the cloud, both from an operational perspective and a cost perspective. Rather than having a constant monthly hosting fee and depreciated hardware costs, they are now faced with a daily, weekly, monthly, and quarterly cost changes due to spikes in application usage. These spikes are a great thing for your business and are often caused by great marketing initiatives. However, this will require a tighter communication channel between marketing, operations, development teams, and executives to ensure the increased budget is expected.

CHALLENGE: HOW WILL YOUR STARTUP USE CLOUD COMPUTING?

Cloud computing enables a startup to take advantage of some amazing opportunities. The real challenge isn't determining if you should move to the cloud, but how you should move to the cloud. I'll leave you with this question, which a good friend suggested that every startup should ask themselves:

If you had unlimited CPU, unlimited storage, and limitless database capabilities, what would you do with them and how would your startup change as a result?

READY TO LAUNCH YOUR STARTUP?

[Blue Jazz Consulting](#) has a passion for taking startups from idea to revenue. We can help you take the cloud computing leap, or want to know how to migrate your existing application to the cloud. Our services include:

- Cloud Assessment Review - determine what cloud services are a good fit for your startup
- Cloud Readiness Review - understand the steps needed to take your startup to the cloud
- Custom Application Development - we are ready to help you take your startup from idea to revenue

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ABOUT THIS EBOOK

This eBook was published on February 18, 2010 and is based on the best available information at that time.