Cloud Computing

By Bill Flowers

You have almost certainly heard the term – *Cloud Computing*. It is one of the most popular subjects in the IT world today. I wanted to talk to you about what it is and what it might mean to Business Analysts.

As I was doing my research, I was amused by the variations in opinions about Cloud Computing. They seemed to run from one end (Cloud Computing is the future and one day all computing will be done in the Cloud) to the other end (Cloud Computing is just standard technology organized and offered in such a way as to make or save somebody some money). As I dug deeper I found that, to some degree, both views may be valid. How it will all balance out is a bit beyond my ability to predict. I do believe, though, that we should not ignore it. Cloud Computing is not going to "go away".

What is Cloud Computing Anyway?

Basically, Cloud Computing means a service provider somewhere out there on the Internet can supply you with the computer power, storage devices, software and/or the means to build and run your own software on their computer center. It is like buying raw computer power, data storage space, applications or the means to build applications off the Internet in much the same way as you buy natural gas from a gas company.   They have a network of gas pipes to get their service/product to you and, for Cloud Computing, the supply device is the Internet, the Web.

The Cloud Computing concept is very broad but there is nothing really new in it. Cloud Computing is existing technology and methods put together to supply valuable services to whoever may need them. It might be seen as no more than an evolutionary technology step from the do-it-yourself computer center to a let-somebody-else-do-it computer center. With Cloud Computing, you let someone else get it all together and you buy (or rent) whatever services you need from them. We will refer to them as *Cloud service providers*.

Years Ago

A long time ago, when I first got into computers, there were mainframes everywhere (little ones back then but they got bigger, much bigger). Eventually, the mainframe population shifted to a different hardware technology, mini computers, and then to client-server structures. It was just one evolutionary step in information technology after other. I guess you could say that Cloud Computing is simply another step in information technology evolution. It pulls neat things like virtualization, the Internet, micro computers and even mobile devices together as one powerful, cost effective solution.

Types of Service Available in the Cloud

So, what types of computer services can one get from Cloud Computing? Just about anything you might want – computing hardware, storage devices, application software, tools to build software and so on. It is all available "out there" at the other end of the Internet.

Of course, because it is part of the computer world, there are special terms used to describe the services. As you read through this article (and most others related to the Cloud), remember that Cloud services, regardless of how complicated and integrated they get, still boil down to computer power, data storage devices, and software. Do not be put off by the techno-babble.

There are at least three basic forms of service available in Cloud Computing.

- **IaaS** (Infrastructure as a Service) – With IaaS, you get sort of an off-site data center (computer power and data storage) where you can run your own software and/or store your data with access through the Internet. The focus with IaaS is the hardware.

- **SaaS** (Software as a Service) – With SaaS, just about everything you need would be provided (computer power, data storage and application software) through the Internet. The focus with SaaS is the software.

- **PaaS** (Platform as a Service) – With PaaS, you get everything you need to build, maintain and run your own application/web software. The Cloud service provider may also make a range of existing modules available for you to assemble your software from. Access is through the Internet.

Of course there are other views of services as well. If you read Cloud Computing material, you may see a couple of other aaS services and some variations in the simplified definitions above. But those three types of service are the fundamentals of the concept:

- computer power and data storage space in the Cloud (IaaS),

- rent/run off-the-shelf application software in the Cloud (SaaS) and

- build/run your own software in the Cloud (PaaS).

All of it is available on somebody else's hardware (that they look after) with access through the Internet.

Public and Private Clouds

So, where *are* these Cloud Computers? Well, they are "out there" somewhere at the other end of the Internet. The important thing is that they are not in your business building. Somewhere out there are a bunch of computers, storage devices and so on.

They are available to you through a rental/lease agreement of some kind or on an "as used" basis.

The "out there" view may not always be true because, as in everything related to the still evolving concept of Cloud Computing, there are some variations. For example, there are Public Clouds and Private Clouds (and some combinations as well). We will probably only need to talk about Public Clouds but we should have a quick look at the public/private variations.

- **Public Cloud** – Resources and services (application systems, storage and so on) available to everybody over the Internet, managed by a Cloud service provider.
- **Private Cloud** – Sometimes called an internal or Corporate Cloud. These are Cloud type services and computer resources supplied by your IT department to business departments in your company. Private Cloud services are protected behind the security barriers (firewall) of your company.

There are a few other Cloud related terms as well, such as Hybrid Cloud (using both Private and Public Clouds) and Community Cloud (which serves a number of organizations that have similar needs or requirements). Like many Cloud related concepts and ideas, if you go looking for a comprehensive explanation of these terms, you are likely to find a number of similar but slightly different definitions.

For our purposes in this article, probably all we have to focus on is the Public Cloud concept, a set of services outside of your company (and firewall) that is widely available to the general public.

Why do Businesses Decide to go with Cloud Computing?

Why is the idea of Cloud Computing so attractive? The answer may be slightly different for every organization that adopts Cloud Computing. More often than not though, the answer is simply cost and agility. In your own data center your company pays for all of the hardware, services and related support (disks, tapes, power and so on) on an on-going basis. If you were paying for only the computer time and data storage space you were using as you used it, it would cost you far less than it does now. A Cloud Computing supplier will have many customers running on their equipment so they can afford to charge their customers for only the time their customers use. As a Cloud Computing customer, you would find that there are several different charge methods but the concept is similar for all of them. You do not pay for everything they have, only the time and services you use.

So the simplest and probably most powerful motivation related to Cloud Computing is – reduced cost. It can show up in several ways. For example, if your business is seasonal or if it has busy periods and slow periods, Cloud Computing may have an attractive feature. When you are running on your own data center, there must be enough hardware there to respond to the busiest periods and the hardware must be there all of the time. That may be costly and leave some hardware idle during your slow periods. Cloud

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Computing suppliers usually have a bunch of hardware available all of the time because that is their business. However, you will be paying for only what you use so, if you need only a little bit sometimes and a lot at other times, you do not have to concern yourself with the extra hardware needed for the busy periods or the hardware that is not in use in the idle periods. There are variations in how you might be charged but the "pay for only what you use" idea is pretty standard.

There are other things that make Cloud Computing attractive as well. For example, if you decide you need a new business application, you may be able to simply buy it from a Cloud service provider or build it yourself. In any case there is no time lost in ordering new equipment or getting things prepared. Most of what you need will be waiting out there in "the Cloud" when you need it.

A similar situation comes up if you are running a Cloud Computing solution and your business grows quickly. You may need more computing power and need it right now. The Cloud service provider can probably give it to you overnight. As a Cloud Computing customer, you can scale up your computer power at the drop of a hat.

So, Cloud Computing gives you attractive costs, agility and scalability that may just not be available in your own data center.

It almost begs us to ask the obvious reverse question. What is the down side?

Are there Any Problems with Cloud Computing?

On the down side, once you get outside your firewall, security becomes an issue. Most Cloud Computing companies have implemented quite impressive security methods but, with security, who knows how much is enough?

The second issue is one of control. You no longer have control over the standards that are used. You are subject to the standards adopted by the Cloud service provider.

Then there is the subject of sharing and integration. If you use more than one Cloud service provider, you may have some trouble sharing data back and forth between them and with integrated application functions of any kind. Each of the Cloud service providers seem to have different standards. Eventually this difficulty will probably get straightened out. Common standards will probably emerge or some methods to deal with the differences will be developed but, for now, it can be an issue.

What does it all mean to a Business Analyst?

How might Business Analysts become involved in Cloud Computing? The tasks and rolls assigned to Business Analysts are quite varied so how you may become involved in Cloud Computing situations depends on your skills, background and what the company you work for expects of Business Analysts.

For our purposes in this article, we will focus on PaaS (developing software using tools supplied by a Cloud service provider and running the software in the Cloud) and SaaS (selecting commercial software already available out in the Cloud and getting it into operation for your business users).

Most Business Analysts will have been involved in new software development and the selection of commercially available software packages at some time in their career so the general ideas will probably not be strange to you. But, does the Cloud Computing viewpoint change these work efforts? The short answer is not very much.

Software Selection (SaaS)

In the past, you have probably been involved in selecting commercial software packages to run in your own computer centers. With Cloud Computing/SaaS software, the definition of needs and selection processes will be much the same. With Cloud Computing, there are a few topic areas that go beyond the normal product selection criteria because the end product will be running on external hardware.

For the most part, selecting a SaaS software system requires the same preliminary thought about the functionality needed as you have previously done for selecting off-the-shelf software of any kind. The need for clearly defined selection criteria is just as important for SaaS software selection as it was for run-it-yourself packaged software. That usually means defined requirements. However you defined requirements for commercial software previously and whatever standards you had for documenting them probably still apply.

Those requirements probably included data entry and information display images. You may not be able to get exactly what you want from the available SaaS software screens but they can often be structured to your needs to some degree. Unless you are instructed differently, take the same steps in defining what your user needs and wants in the way of data input and display characteristics as you always did.

In Cloud Computing, any need to integrate an application with other applications or any need to acquire data from other applications (or share your data with other applications) may become an issue. Those other applications may run on your private systems or on other Cloud service provider systems. You may want to spend a bit more time with your users dealing with the need or potential need for integration than was necessary with software that would run on your hardware.

Requirements (PaaS)

In PaaS software development, as in SaaS situations, requirements of some kind are sometimes still needed. You have to go into the development process with an understanding of what the business users need and expect. Definition of requirements is one way to do that. Agile methods often bypass the need for documented requirements

and preliminary analysis/definition. We will talk about Agile methods in Cloud Computing below. For now, let us stick with documented needs and requirements.

Requirements formats and processes designed specifically for Cloud purposes may evolve but, right now, the ones you have been using are probably sufficient. Even with Cloud Computing, you still have to understand what your business users want and need and the business processes that the resulting software must support. That is usually documented in requirements.

The Cloud service provider will almost certainly have standards and features beyond the software itself that someone on your team will have to be aware of. They could influence a wide range of things that may come up or should be considered during requirements definition, things like:

- how users access the finished software or interface with it,

- how the software for your project may integrate with existing applications (and possibly other software running on other Cloud sites),

- data structures and storage.

Things of this nature may not be the responsibility of a Business Analyst but they have to be understood and dealt with by someone on the team.

Pay close attention to the potential business need/requirement for integration with other applications, the need for mobile devices and special forms of data display (dashboards for example). All of these topics are challenging when you have to deal with them in your own IT group. Dealing with them through a Cloud service provider may be more difficult (or easier). But you cannot ignore them. It is best to cover them during analysis and requirements definition if you can.

Integration

As mentioned above, with either SaaS or PaaS situations, the sharing/integration of data in real-time or even periodically (monthly perhaps) may be an issue. If you end up dealing with more than one Cloud service provider, the different standards influencing your overall environment may not be entirely compatible. Different Cloud service providers have different standards.

As Cloud ideas evolve and become more standardized, this may be less of a problem but, for now, you should be aware of the potential problems and try to identify them up front so solutions can be found. It may even influence the selection of the Cloud service provider.

Testing

You may find that testing software in the Cloud will be a little bit different but the objectives are still pretty much the same. If you normally test based on the requirements, you can still do that. If you test based on Business Cases, Use Cases or defined business situations, that will work in the Cloud software as well.

The PaaS Cloud service provider may provide tools to assist with testing or there may be limitations that make testing more difficult. If a Cloud service provider is being selected, it may be worth mentioning the need for testing information to whoever is doing the selection. They can then get some feedback information from the potential Cloud service providers. If the Cloud service provider is already selected, you may be able to ask them some pertinent questions directly that may help when you are planning the testing.

Ask things like: What do you recommend for testing? Do you have test tools? Can you suggest test methods based on past experience?

Are Cloud Computing Projects Different?

Cloud Computing projects are much the same as other projects but there are some differences. Many of the differences are of a positive nature or spring from a positive aspect. When using Cloud Computing services:

- You may be able to create web applications and business oriented applications of any kind quickly and even before your company has the development tools and hardware to do this on your own equipment and your own site. You still have to prepare and plan a project but the hardware and tools to do the actual development are probably already there waiting for you. Training of IT development staff may be necessary.

- If you are selecting SaaS software, you may be able to get "hands on" experience almost immediately. This may allow you to get clear answers to some questions by actually running the software. It may not change the way the project is run per se, but it may allow you to focus on more complex issues as the project progresses. Implementation, in the case of SaaS may be more about familiarizing your business users with the product and integrating your defined business processes with the SaaS system rather than implementing the product in your data center.

- The testing phase may be a bit different than you have experienced before (as mentioned above). However, the overall objectives remain the same – does this product really do what we were told it does, what we asked for and what we need it to do? Can our business staff integrate it with their day to day operations? Your requirements should give you the same foundation for testing as they always did.

The roles and responsibilities for most people (Business Analysts included) in Cloud Computing projects are pretty much the same as they always were. However, there will be some differences in how those responsibilities are carried out because the development and operational environment is different.

If you are assisting a project manager, you will almost certainly find there are some new types of challenges and risks that can arise due to the different environment. Do not let any of them distract you too much. There is nothing in Cloud Computing that cannot be understood. It is a new way to provide computing power and operational systems but the technology behind it is pretty much what you already know and use. You just may not have direct control over everything you always did.

Things that you should be Aware of

Agile

Agile methods sometimes bypass traditional requirements by putting the essential people together when the product is being developed so requirements go almost directly from a user's brain to a developer's brain. It works surprisingly well for many in-house development projects. It will probably work in Cloud Computing software development as well.

The iterative and incremental aspects of Agile methods should work very well in the PaaS Cloud as they do elsewhere.

If you have never participated in an Agile project before but find yourself involved in one using Cloud Computing, it will certainly be different. The differences will most likely result from the Agile methods and probably not from Cloud Computing influences.

SOA – Service Oriented Architecture

One subject area that you may run into when dealing with Cloud services and providers is Service Oriented Architecture (SOA). This method/concept seems to be lining up with Cloud Computing.

SOA is an architecture, a structure if you like. It breaks down an application into business oriented pieces (chunks, services). Each of these pieces performs a business function of some kind and they are, more or less, stand alone. They know nothing about any of the other pieces and often perform one major business function. When you get enough of them together and get them interconnected, you have a business application.

SOA shows up often enough in Cloud Computing that you might want to poke around and learn a little bit about it.

Mashups

You will probably hear the term mashups a time or two. Do not let it throw you. It means putting two pieces of software together. Sometimes that is easy, sometimes not. It may involve components supplied by the Cloud service provider and/or components from your own IT group. It may even include pieces of old enterprise level mainframe systems. The technical folks usually put them together. Mashups are not something that

Business Analysts usually have to deal with but you will almost certainly hear the term used when dealing with Cloud Computing.

Standards and Constraints

For new development, you have to know the Cloud service provider's standards and limitations, APIs for example (Application Programming Interface – the rules/methods for using a specific Cloud service). Technical staff may be more interested than you but it would not hurt to ask about them or scan through the Cloud service provider's documentation just in case there is something that your business users may be sensitive to.

The Cloud service provider will almost certainly have features and standards for dealing with operational problems after the SaaS or PaaS software is in production. You might want to make yourself familiar with them. The first time they are needed may very well be difficult for everyone.

Security

One of the big soft spots in Cloud Computing is security. It is very likely that your technology oriented staff will go to great lengths to determine if a Cloud service provider has included sufficient security protection. You may want to go a step further with the business users than usual to determine what parts of the service and the related data/information associated with it that they may be sensitive about.

For in-house systems that run on corporate networks, security problems may not often come up. However, when you are going to an outside agency where the hardware is shared with other customers and access is through the Internet, your users may have some concerns.

In Summary

Cloud Computing could very well change the world of Information Technology (IT) as we know it. Businesses that need some of what Cloud Computing has to offer can certainly not ignore it. Cloud Computing may become a big change in the IT world.

On the other hand, Cloud Computing may only become one more segment of the ever evolving world of computers, how information is captured, used operationally and for planning.

It might be a good idea to keep in touch with what Cloud Computing is offering and how it is evolving. It could just change your professional life, your interests and future. Business folks do not always understand information technology very well so your knowledge, skills and experience are likely to be needed for a very long time to come.

However, the "old way", the way we solve information processing needs now, the historical, in-house information solutions may evolve into something more oriented to the Cloud and they may become more easily implemented. Help your users as Business Analysts always have and your ongoing assistance will probably continue to be, well . . . ongoing.

About Bill Flowers

Bill Flowers has been involved in IT for over 40 years. He has experienced the birth, evolution and demise of many technologies and methods. He has been a programmer, project manager and department manger in the automotive industry, law enforcement, insurance, commercial software development and consulting. He learned many valuable skills from his staff the most important of which might have been when to get out of the way. He is trying to give some of that wisdom back now through articles like this one, training programs and lunchtime presentations about evolving concepts and methods particularly those that mesh with Business Analysts, business needs and change.