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CLOUD COMPUTING : DELIVERY OF COMPUTING AS A SERVICE

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Abstract

Cloud computing technology has been a new exhortation in the IT industry and expecting a new perspective for coming world. It is a manner of computing which is having dynamically scalable virtualized resources provided as a service over the Internet. It reduces the time required to procure heavy resources and boot new server instances in minutes, allowing one to quickly scale capacity, both up and down, as ones requirement changes. Nevertheless the technology is hot in the market and is ready to cater to the small and medium business segment. As per one of the estimates from Gartner, by year 2012, 20% of enterprise market e-mail seats will be delivered via Cloud. As per another estimate from Gartner, Software as a Service is forecast to have a compound annual growth rate of 17% through 2011 for CRM, ERP and SCM markets in SMB segment. While the enterprises are exploring the possibilities of adopting this technology, it is imperative for these enterprises to critically evaluate the feasibility of this technology for their specific businesses. This paper highlights various aspects associated with Cloud Computing

INTRODUCTION

Cloud computing lets you access all your applications and documents from anywhere in the world, freeing you from the confines of the desktop and facilitating wholesale group collaboration. But cloud computing isn't for everyone; there are pros and cons to this type of web-based computing. Cloud computing represents a major change in how we

store information and run applications. Instead of hosting apps and data on an individual desktop computer, everything is hosted in the "cloud"—an assemblage of computers and servers accessed via the Internet.

This type of web-based computing frees you from the tyranny of desktop computing and opens up new forms of group collaboration. But as attractive as all that sounds, cloud computing isn't for everyone. Let's take a look at how the average end user can benefit from cloud computing—and why some end users should avoid these web-based applications, at least for now. India's 73% of population lives in the rural areas and villages. This rural segment, commonly referred to as the 'bottom of the pyramid' showing a huge opportunity for companies. Even for the people, who can afford a computer become a headache to maintain, upgrade and buy licenses for the software on regular basis. Also, they need to carry their computer everywhere they go. If a "personal computer" can be made available on cloud, accessible from any where, that too free or minimal charges (pay-as-you-use) rural people can afford and grow their personnel life. The Cloud Computing can help the rural population in overcoming the huge costs incurred on infrastructure, software etc., hurdles and it can lead to rural area development and an overall economic progress of the nation. Using cloud computing to reduce price will create a world without poverty.

Cloud computing is an umbrella term used to refer to Internet based development and services. The cloud is a metaphor for the Internet. A number of characteristics define cloud data, applications services and infrastructure:

- Remotely hosted: Services or data are hosted on someone else's infrastructure.
- Ubiquitous: Services or data are available from anywhere.
- Commodified: The result is a utility computing model similar to traditional that of traditional utilities, like gas and electricity. You pay for what you would like.

Software as a Service (SaaS)

SaaS is a model of software deployment where an application is hosted as a service provided to customers across the Internet. SaaS is generally used to refer to business software rather than consumer software, which falls under Web 2.0. By removing the

need to install and run an application on a user's own computer it is seen as a way for businesses to get the same benefits as commercial software with smaller cost outlay. Saas also alleviates the burden of software maintenance and support but users relinquish control over software versions and requirements. They other terms that are used in this sphere include Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

Cloud Storage

Over time many big Internet based companies (Amazon, Google…) have come to realise that only a small amount of their data storage capacity is being used. This has led to the renting out of space and the storage of information on remote servers or "clouds". Information is then temporarily cached on desktop computers, mobile phones or other internet-linked devices. Amazon's Amazon Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are the current best known facilities.

Data Cloud

Cloud Services can also be used to hold structured data. There has been some discussion of this being a potentially useful notion possibly aligned with the Semantic Web [2], though concerns, such as this resulting in data becoming undifferentiated [3], have been raised.

Opportunities and Challenges

The use of the cloud provides a number of opportunities:

- It enables services to be used without any understanding of their infrastructure.
- Cloud computing works using economies of scale. It lowers the outlay expense for start up companies, as they would no longer need to buy their own software or servers. Cost would be by on-demand pricing. Vendors and Service providers claim costs by establishing an ongoing revenue stream.
- Data and services are stored remotely but accessible from 'anywhere'.

In parallel there has been backlash against cloud computing:

- Use of cloud computing means dependence on others and that could possibly limit flexibility and innovation. The 'others' are likely become the bigger Internet companies like Google and IBM who may monopolise the market. Some argue that this use of supercomputers is a return to the time of mainframe computing that the PC was a reaction against.
- Security could prove to be a big issue. It is still unclear how safe outsourced data is and when using these services ownership of data is not always clear.
- There are also issues relating to policy and access. If your data is stored abroad whose FOI policy do you adhere to? What happens if the remote server goes down? How will you then access files? There have been cases of users being locked out of accounts and losing access to data.

Advantages of Cloud Computing

- Lower computer costs. You don't need a high-powered and high-priced computer to run cloud computing web-based applications. Since applications run in the cloud, not on the desktop PC, your desktop PC doesn't need the processing power or hard disk space demanded by traditional desktop software. When you're using web-based applications, your PC can be less expensive, with a smaller hard disk, less memory, more efficient processor, and the like. In fact, your PC in this scenario doesn't even need a CD or DVD drive, as no software programs have to be loaded and no document files need to be saved.
- Improved performance. With fewer bloated programs hogging your computer's memory, you'll see better performance from your PC. Put simply, computers in a cloud computing system boot and run faster because they have fewer programs and processes loaded into memory.
- Reduced software costs. Instead of purchasing expensive software applications, you can get most of what you need for free. That's right—most cloud computing applications today, such as the Google Docs suite, are totally free. That's a lot

better than paying $200+ for similar Microsoft Office software—which alone may be justification for switching to cloud applications.

- Instant software updates. Another software-related advantage to cloud computing is that you're no longer faced with choosing between obsolete software and high upgrade costs. When the app is web-based, updates happen automatically and are available the next time you log into the cloud. When you access a web-based application, you get the latest version—without needing to pay for or download an upgrade.
- Improved document format compatibility. You don't have to worry about the documents you create on your machine being compatible with other users' applications or operating systems. In a world where Word 2007 documents can't be opened on a computer running Word 2003, all documents created by web-based applications can be read by any other user accessing that application. There are no format incompatibilities when everyone is sharing docs and apps in the cloud.
- Unlimited storage capacity. Cloud computing offers virtually limitless storage. Your computer's current 200 gigabyte hard drive is peanuts compared to the hundreds of petabytes (a million gigabytes) available in the cloud. Whatever you need to store, you can.
- Increased data reliability. Unlike desktop computing, in which a hard disk crash can destroy all your valuable data, a computer crashing in the cloud shouldn't affect the storage of your data. That also means that if your personal computer crashes, all your data is still out there in the cloud, still accessible. In a world where few individual desktop PC users back up their data on a regular basis, cloud computing is the ultimate in data-safe computing.
- Universal document access. Ever get home from work and realize that you left an important document at the office? Or forget to take a file with you on the road? That's not a problem with cloud computing, because you don't take your documents with you. Instead, they stay in the cloud, and you can access them whenever you have a computer and an Internet connection. All your documents

are instantly available from wherever you are; there's simply no need to take your documents with you.

- Latest version availability. Another document-related advantage of cloud computing: When you edit a document at home, that edited version is what you see when you access the document at work. The cloud always hosts the latest version of your documents; as long as you're connected, you're never in danger of having an outdated version.
- Easier group collaboration. Sharing documents leads directly to collaborating on documents. To many users, this is one of the most important advantages of cloud computing—multiple users can collaborate easily on documents and projects. Because the documents are hosted in the cloud, not on individual computers, all you need is a computer with an Internet connection, and you're collaborating.
- Device independence. Finally, here's the ultimate cloud computing advantage: You're no longer tethered to a single computer or network. Change computers, and your existing applications and documents follow you through the cloud. Move to a portable device, and your apps and docs are still available. There's no need to buy a special version of a program for a particular device, or to save your document in a device-specific format. Your docs and their apps are the same no matter what computer or other device you're using.

Limitations

There are a number of reasons why you might not want to adopt cloud computing for your particular needs. Let's examine a few of the risks related to cloud computing:

- Requires a constant Internet connection. Cloud computing is impossible if you can't connect to the Internet. Since you use the Internet to connect to both your applications and documents, if you don't have an Internet connection you can't access anything, even your own documents. A dead Internet connection means no work, period—and, in areas where Internet connections are few or inherently

unreliable, this could be a deal-breaker. When you're offline, cloud computing simply doesn't work.

- Doesn't work well with low-speed connections. Similarly, a low-speed Internet connection, such as that found with dial-up services, makes cloud computing painful at best and often impossible. Web-based apps require a lot of bandwidth to download, as do large documents. If you're laboring with a low-speed dial-up connection, it might take seemingly forever just to change from page to page in a document, let alone to launch a feature-rich cloud service. In other words, cloud computing isn't for the broadband-impaired.
- Can be slow. Even on a fast connection, web-based applications can sometimes be slower than accessing a similar software program on your desktop PC. Everything about the program, from the interface to the current document, has to be sent back and forth from your computer to the computers in the cloud. If the cloud servers happen to be backed up at that moment, or if the Internet is having a slow day, you won't get the instantaneous access you might expect from desktop apps.
- Features might be limited. This situation is bound to change, but today many web-based applications simply aren't as full-featured as their desktop-based brethren. For example, you can do a lot more with Microsoft PowerPoint than with Google Presentation's web-based offering. The basics are similar, but the cloud application lacks many of PowerPoint's advanced features. If you're a power user, you might not want to leap into cloud computing just yet.
- Stored data might not be secure. With cloud computing, all your data is stored on the cloud. How secure is the cloud? Can unauthorized users gain access to your confidential data? Cloud computing companies say that data is secure, but it's too early in the game to be completely sure of that. Only time will tell if your data is secure in the cloud.
- Stored data can be lost. Theoretically, data stored in the cloud is unusually safe, replicated across multiple machines. But on the off chance that your data goes missing, you have no physical or local backup. (Unless you methodically

download all your cloud documents to your own desktop—which few users do.) Put simply, relying on the cloud puts you at risk if the cloud lets you down.

Applications and Suitability

Which types of users are best (or least) suited for cloud computing? Given the pros and cons of cloud computing, I think that the following types of users can benefit most from switching to cloud-based applications:

- Collaborators. If you often collaborate with other people on group projects, you're an ideal candidate for cloud computing. The ability to share and edit documents in real time between multiple users is one of the primary benefits of web-based applications; it makes collaborating easy and even fun.
- Road warriors. When you work at the office one day, at home the next day, and in another city the day after that, it's tough to keep track of all your documents and applications. With cloud computing, you don't have to remember which document is where or bring a copy of a document with you. You don't even have to worry about whether a particular application is installed on all your PCs. Since the apps and docs you use are stored on the Web and accessible wherever you have an Internet connection, versioning and compatibility simply aren't issues. You have the same applications and the same documents wherever you go.
- Cost-conscious users. Cloud computing can save you money on both hardware and software. There's no need to invest in large hard disks or super-fast CPUs; since everything is stored and run from the Web, you can cut costs by buying a PC with fewer features. You can save just as much (or even more) on software; instead of laying out big bucks for the latest versions of Microsoft Office, for example, you can use Google Docs or Zoho Office for zero expenditure. When your budget is tight, "free" is a lot better than the hundreds or thousands of dollars you might spend otherwise.
- Users with increasing needs. Need more hard disk space to store all your digital photos and MP3 files? You could purchase a new external hard drive, or you could utilize lower-cost (or free) cloud storage instead. Having trouble running the

latest version of your favorite power-hungry software program? Abandon that power-sapping program and use a less-demanding web-based app instead. In the old days, the only solution to increased needs was to purchase more powerful hardware. With cloud computing, the solution is in the cloud—which saves you money.

Implications

Now let's look at the flip side of the coin. If cloud computing isn't for everyone, who should stay away? Here's the short list:

- The Internet-impaired. Cloud computing is based on the Internet cloud and depends on Internet access. If you don't have Internet access, you're out of luck. Users without readily available Internet access simply shouldn't consider a switch to cloud-based computing. The same rule applies if you have slow Internet access, like that found with dial-up Internet connections; a slow connection isn't much better than none at all when accessing big apps and docs on the Web.
- Offline workers. Along the same lines, anyone who consistently works offline in an environment that's not Internet-enabled probably isn't the ideal candidate for cloud computing. That leaves out those people who work out of a vehicle, at a home or office without Internet access, or while traveling from office to office without guarantee of an Internet connection. No Internet, no cloud computing—it's that simple.
- The security-conscious. Today, we think that cloud computing is safe—but we can't guarantee it. It's certainly possible that cloud systems can be hacked and cloud-based documents accessed by unauthorized users. If your documents require confidentiality, you probably don't want to trust them to cloud computing just yet. When security matters, don't take chances.
- Anyone married to existing applications. This is probably the most important reason not to sign up for a web-based application: You use Microsoft Office. That's right, many web-based applications are not completely compatible with

Microsoft's file formats. It may be difficult or even impossible to open your Word or Excel documents with your web-based apps—and vice versa.

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