

Welcome To The Future of Computing: Cloud Computing And Legal Issues

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Abstract:- As the civilization enters into the new millennium, the words of 19th century have suddenly taken a new meaning. The world is undergoing a remarkable technological change. The advancement of Internet along with the expansion of IT infrastructure at large level has revolutionized the way in which information and communication technologies are stored and disseminated, and is creating lasting implications on businesses around the world. These technologies include software, network services, applications etc. which the organization in the past would have purchased or licensed, and installed and maintained by incurring huge costs at their level. Now with the growth of IT infrastructure these technologies are bundled and repackaged into altogether new outsourcing service model which is offered on 'pay as you use' basis. Welcome to Cloud Computing! Cloud Computing has become the new catchphrase of IT infrastructure. As Cloud Computing has become a viable business solution, it is interesting to look at the ability and opportunity for the world to exploit this technological phenomenon. Through this paper I aim to outline the concept, rationale, and various models of cloud computing as well as to offer greater clarity on legal issues associated with cloud computing.

Keywords:- Cloud computing, technology, data security and privacy, cloud computing and cyber crime

1. INTRODUCTION

The 'cloud' is a metaphor for the internet itself. To understand the term, when ever any person uses internet for some search via search engine such as Google, or is availing any web-based services such as sending or receiving emails, he/ she is using a cloud computing. Also, whenever a person is accessing to the web-pages such as Face book or any other social networking sites, he/she is using a cloud application. The rationale of cloud computing is to use the internet facility in such a way that one can maintain the data and various other kind of applications at central remote servers instead of maintaining the same on the individual computers. Cloud computing thus allows its user to have access to his data/files which are in his computer, by clicking on the start button of the menu of 'any computer' form 'anywhere' in the world. Thus the user is facilitated as if he is using his own computer or laptop. The result is, a person could work on anyone's computer from anywhere with the same ease as if he is working on his computer in his own office. The files/data which is located in the user's computer appears as if it has been loaded on the hard drive of the user's computer, but in fact they are not loaded on that computer but are being downloaded from the cloud onto that computer. According to the National Institute of Standards and Technology in the US Department of Commerce, cloud computing means:

'a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g. Networks, servers, storage applications etc) that can be rapidly provisioned and released with minimal management effort or cloud provider (i.e. Internet service Provider) interaction.

To avail the facility of the cloud computing some technical requirements must be met with. The basic technical requirement is that, the configuration of the software and hardware of the remote server (cloud) must match with that computer system of the user. Once the synchronization between the system and its interface software is established, the user can access the cloud's network online. Cloud computer is thus a kind of highly available and reliable pool of computing resources which can be availed as a paid service and which replaces the need for having such kind of hardware, software and other IT infrastructure at the individual level. Thus, cloud computing has turned IT infrastructure into a paid service. The way we are using water and electricity facility by paying for it and we do not keep big water reservoir and neither do we keep sophisticated electricity plant, but we can still avail the services as per our needs by paying for it. In the same way cloud computing has now became the utility. Thus the use of computing resources from a PC maintained by an individual user has now become a kind of metered service where user pay for what he uses, just like electricity or water is a metered service. Thus cloud computing is a good substitute of computing and storage of data, which is lesser in cost and pay per use, as compared to up-front large scale capital investment in IT infrastructure. This also adds to financial benefits which is also apparent. The companies who avail the facilities of cloud computing does not need to make huge capital investments in hardware, software and other IT infrastructure. Thus there shall be considerable cost reduction in maintaining of their own hardware infrastructure and servers and purchasing software licenses. Cloud facilitates the access of data more cheaply as there are centralize storage, memory, processing and bandwidth. Result is, the companies incur low cost thereby avail greater monetary benefits. Since cloud computing is a scalable (metered service like water or electricity metered service), a user can avail the facility more as an when he has a high demand for computing resources and can lower down his utility (i.e. to lessen the use) when demand drops and thereby incur lower costs. In contrast, a company which has made the heavy capital investments in IT infrastructure and has incurred the initial costs, must also have to pay recurring maintenance cost and cannot scale

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down even if its own computing requirements decrease. Companies can increase their profit margins as the cloud lowers operating costs, provides easy mobility and better storage system of the data. In short, running applications purchased from a 'cloud' is much more efficient and cheap than running one's own computer system applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files which are stored online. Earlier, various software applications had to be installed on a single system. With the advent of cloud computing, a single application provides the user with access to a web-based cloud which hosts all the programs as well as the other computing needs of a person. A cloud user will never have to face the issue of loss of data because the hard drive of his PC has crashed or software has been corrupted. If a cloud subscriber's PC fails or is stolen, the subscriber only has to download his data from the cloud and will not even have to restore the files and data from his PC. In short cloud computing refers to the technologies that provide software, data access, storage devices that do not require physical location of the system. The main advantage over the conventional forms of applications is that cloud computing need not depend on a physical structure for its operations. Accordingly, the development of cloud computing will necessarily promote the growth and use of open source software.

2. TYPES OF CLOUDS

There are three main types of cloud computing:

2.1. Public Cloud

A public cloud is one in which the infrastructure and other computational resources that it comprises are made available to the general public over the internet. A public cloud is owned by the provider selling cloud services and is external to the user's organization. However it is submitted that there is greater risk in terms of data security that anyone who subscribes to the cloud has access to it. Thus public cloud shares the characteristics of a multi tenant in nature as the data of one company is necessarily stored along with the data of another company on the public cloud.

2.2. Private Cloud

A private cloud (internal cloud) is one in which the infrastructure and computational resources is operated exclusively for a particular company or organization. Thus, it aims to provide services to limited number of users behind a firewall. The private cloud can be managed either by the organization/company itself or a third party and may be hosted within the organizations data centre or outside it. The private cloud is reminiscent of an internet, access to which is limited to the personnel of a particular company/organization. A private cloud is usually used by a large company and it offers various applications to upgrade or downgrade the resources as required by them. It must be noted that private cloud does not offer the basic advantage of cloud computing because the user still has to incur the up-front capital costs in creating its own private cloud, but these cost is much lesser than the traditional way of owning IT infrastructure.

2.3. Hybrid Cloud

A hybrid cloud is a composition of two or more clouds (private or public) that remain separate cloud entities but share certain technology which permits interoperability. The hybrid model means that companies can extend their private cloud network to the public cloud service provider. Apart from above three there are three main kind of service models also which aims to offer services. They are:

A). SaaS (Software as A Service)

It is the most widely known and widely used form of cloud computing. It provides all the functions of a sophisticated traditional application to many customers and often thousands of users, but through a Web browser, and not a locally-installed application. Little or no code is running on the Users local computer and the applications are usually tailored to fulfill specific functions. SaaS eliminates customer worries about application servers, storage, application development and related, common concerns of IT. Highest-profile examples are Salesforce.com, Google's Gmail and Apps, instant messaging from AOL, Yahoo and Google, and VoIP from Vonage and Skype.

B). PaaS (Platform as a Service)

Delivers virtualized servers on which customers can run existing applications or develop new ones without having to worry about maintaining the operating systems, server hardware, load balancing or computing capacity. These vendors provide APIs or development platforms to create and run applications in the cloud – e.g. using the Internet. Managed Service providers with application services provided to IT departments to monitor systems and downstream applications such as virus scanning for e-mail are frequently included in this category. Well known providers would include Microsoft's Azure, Salesforce's Force.com, Google Maps, ADP Payroll processing, and US Postal Service offerings.

C). IaaS (Infrastructure as a Service)

Delivers utility computing capability, typically as raw virtual servers, on demand that customers configure and manage. Here Cloud Computing provides grids or clusters or virtualized servers, networks, storage and systems software, usually (but not always) in a multitenant architecture. IaaS is designed to augment or replace the functions of an entire data center. This saves cost (time and expense) of capital equipment deployment but does not reduce cost of configuration, integration or management and these tasks must be performed remotely. Vendors would include Amazon.com (Elastic Compute Cloud [EC2] and Simple Storage), IBM and other traditional IT vendors.

3. CHALLENGES AND LEGAL ISSUES INVOLVED IN CLOUD COMPUTING

Every new technology brings lots of advantages along with it, and cloud computing is not an exception to it. However it has some grey areas also which needs to be answered. The wide use of cloud computing over the past few years has raised several issues. It must be understand that the purpose of cloud computing service is to facilitate the computing needs of hundreds and thousands organizations over a virtual computing infrastructure located somewhere on the Internet, which is very much contradictory to the

conventional service providers. Thus it becomes important on the part of the organizations to get assurance that their data shall be safe, and secure. Apart from these there are some technical and legal issues also.

3.1. Data Privacy and Confidentiality

Data privacy and confidentiality are two major issues with cloud computing. Cloud facility can be availed by any individual or organization. It may happen that an individual who is using cloud facility may not mind sharing his data with cloud service provider, but the same may not be the case with the institutions or companies. There are fair chances that some organizations or companies may be diffident in sharing their information with cloud service provider. There are chances that some companies may have their own laws that restrict the sharing of their data totally. In such cases it becomes important for all the parties involved in cloud computing to be well aware about the laws which may be unlikely from the user's point of view. Where information is of very sensitive nature such as defense, aerospace, brokerage etc. it is highly required that such data is well safeguarded.

3.2. Backup

Backup of the important data has always been an important concern. Now if an organization that is availing cloud facility takes the backup of the data on its own existing server then the very purpose of moving the data to a cloud would be defeated. On the other end if the backup is taken over the cloud then issues of data privacy and security shall still remain.

3.3. Interception of data

There are some countries that have laws pertaining to interception of data. During the pendency of suits, it may be mandatory for a company to give access to the data to the investigating agency. In such cases, since the data is located in cloud, it may become difficult for the agency to have access to such data.

3.4. Intermediary

The main purpose of the mediators in the virtual world is to facilitate the transitions between third party on the internet. Intermediaries in the virtual world bring together or facilitate transactions between third parties on the internet. These intermediaries provide virtual access to host, and transmit products/services originated by third parties. Almost under all data protection laws there are certain rules by virtue of which these intermediaries are absolved of liabilities. In such cases the organizations that avail cloud computing services must to verify that their rights are effectively protected under the laws.

3.5. Data Storage Location

Regarding the place where the data has to be stored it has to be a customer who should have that choice. In case of cloud computing the details as to where the data is stored is not known to the organizations. Again, there could be multiple clouds also. This may affect the privacy laws of one jurisdiction that is onerous than the other jurisdiction. In such cases it becomes important fix the liability as to who can be held responsible in case of data is lost.

3.6. Governing Laws and Jurisdiction

According to the traditional rules of private international law, the jurisdiction of a nation only extends to individuals who are within the country or to the transactions and events that occur within the natural borders of the nation. However, this traditional rules pertaining to jurisdiction has become less effective with the advancement of commerce and technology. In cases of cloud transactions it may happen that a company which is resident of one country may stored data on a cloud which is located in altogether different country and such cloud may belong to a vendor who is located in a third country. In such cases there are ample chances that the laws of third jurisdictions are applicable. Subject to the dispute resolution mechanism agreed under the definitive agreement, if there is any problem faced by the organization while accessing the data from the cloud or when there is an infringement action, the question which would then arise is which is the appropriate jurisdiction for the purposes of ascertaining the cause of action for initiating a claim. Will it be the country where the server/data centre is located or where the infringing act took place? Therefore, various factors would need to be considered while determining an appropriate jurisdiction along with the harmonization of domestic laws of each applicable country to avoid conflict of laws.

3.7. Vendor Contracts

Organization who provides cloud computing services usually have contracts which are one sided and the same are not easily negotiable. In such cases it may happen that vendor would not provide any warranties in relation to the data security, protection, backup etc. Also, all claims and liabilities arising from the acts of the vendor would be disclaimed.

3.8. Willingness to Cloud

Technically also, for those organizations who do not have/or have very poor internet connectivity cannot move their data over the public cloud.

3.9. Standardization

In case where organizations have their own standard policies which are not matching with the cloud computing agreement it would be difficult for them deal in a cloud computing environment. Such organizations would be expecting too much if they insist upon the vendors to follow their procedures.

4. CONCLUSION

As we have seen, cloud computing offers both business management and IT infrastructure solutions. Cloud computing is thus a new paradigm that has significantly affected the various organizations deals with their data, IT infrastructure and business processes. The wider use of the cloud computing service shall promote competition and shall bring down the service cost which shall be benefited to the end consumer. But, there are still some issues as discussed in the paper that needs to be addressed. Corporate customers who wants to avail benefits out of cloud computing must also be prepared of the implications and potential risks involved. Organizations who are indulging in cloud computing for the first time may put-up their non-core and non-strategic data onto the cloud for the

time being for an experiment basis and internally concentrate on more core business related issues. Later on, after the better understanding of the concept of cloud computing they can determine if cloud computing is really beneficial to them. Cloud computing is thus a paradigm shift in the internet age and is revolutionizing how technology is delivered. However, the advantages in terms of costs, flexibility and availability enjoyed by the users of cloud services also brings with them new challenges against cyber crime, data security, protection of intellectual property and jurisdictional issues. Over the years we have seen that technology and business are interdependent. In the era of globalization and competition it has become literally impossible to separate technology and business. Cloud computing is a new revolution that offers a new business methodology and only time will tell as to how beneficial it is for undertaking business functions.

REFERENCES

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- [2] Pallavi Aiyar, 'Cloud Computing aims to bridge digital divide', Business Standard, July 12, 2010
- [3] Wayne Jansen and Timothy Grance, US Department of Commerce, National Institute of Standards and Technology, 'Guidelines on Security and Privacy in Public Cloud Computing', Draft Special Publication 800-144, January 2011, p. vi.
- [4] It means if Mr. X is using the cloud computing services then his home computer must be compatible with the another computer which is located somewhere else at a distance place and on which Mr. X is presently working. Once the software of both the computer harmonizes then Mr. X shall be able to access his data from his home computer to the place where he is working which is located at some very distance place. A key point to remember is that, at the most basic level, your data resides on someone else's server(s). This means that most concerns (and there are potentially hundreds) really come down to trust and control issues. Do you trust them with your data?
- [5] Wayne Jansen and Timothy Grance, US Department of Commerce, National Institute of Standards and Technology, 'Guidelines on Security and Privacy in Public Cloud Computing', Draft Special Publication 800-144, January 2011
- [6] Pallavi Aiyar, 'Cloud Computing aims to bridge digital divide', Business Standard, July 12, 2010
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- [18] Ibid
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guidelines to banks to follow code of conduct where bank outsource their financial services to third party.

[21]Cheshire and North, 'Private International Law', , 11th ed. Pg. 188

[22]To, USA and most member states of the European Unions have directives/laws on data privacy which may also encompass jurisdictional forums.

[23]As per Indian laws, the parties have the right to choose the law which would govern their contractual relationship. However, courts in India have also considered the choice of law as agreed in the contract and its nexus to the transaction.