

Opportunities of Cloud Computing

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ABSTRACT: The target of this paper is to review the opportunities of cloud computing and investigate its relationship among different factors that must be taken into consideration throughout the process. The paper design on overall research base to provide experiential aware of analysis the adopting cloud computing for innovation. Cloud Computing is a system of marvelous properties. All these properties should advertise to gain potential in the market of cloud computing technology. The lack of awareness of the uses of new technologies is a big hurdle in the way of progress of upcoming technologies such as cloud computing. By overcoming, these hurdles we can spread this technology widespread. The research as cloud computing technology is a new technology and many users are not familiar with its all positive aspects. There are many points that should be taught to the users and after that they will be able to utilize all of its aspects and after that, this technology will gain potential and will become much popular. To achieve more benefits of cloud computing, the research suggests that enterprises need assume number of steps. It suggests that collaborative innovation is not necessarily an immediate consequence of adopting cloud computing. The theoretical foundation of this paper formed by conducting a comprehensive literature review on opportunities of cloud computing. A new model presented to illustrate the relationship between cloud computing and four specific factors.

KEYWORDS: Cloud, Storage, Network, Application, Security, Sharing, Privacy.

1 INTRODUCTION

There is a growing literature on the opportunities in cloud computing (Lehman and Vajpayee 2011). A few is known about how discover or create the opportunities of cloud computing. The process in which we store our photos and important documents online instead of our computer is called the cloud computing. For this purpose, we use web mail and social networking sites. We can store our information and all our personal data in cloud computing instead of using hard drive or updating applications for our needs (Almulla and Yeun 2010). We can also do an online invoicing services instead of using the in house that people used years ago, that online invoicing service system is also a Cloud Computing. By The use of internet, we can store our information anywhere at any time at different locations. Cloud computing increase our privacy. Delivery of different services through internet is also called cloud computing services (Mell and Grance 2009). Sometimes cloud computing allows us to use hardware and software data online and all this data managed by other person know as third parties. For Example social networking sites online business web mail and online file storage are represent the service of cloud computing. If network connection is available, we can use Cloud computing service for the storage of our important files and other things. Computer processing power and user of specialized corporate and data space network are the applications that are the shared pool of resources which are provides by cloud computing (Robinson, Valeri et al. 2011). Cloud computing includes the characteristics of demand self-service, resource pooling, measured service, rapid electricity , and broad network access . Broad Network service means providing of internet network. On demand self-service means that customers can request and managed their own computing resources. In pooled resources, customers can draw a pool of computing resources it usually happens in remote data centers. Services can be larger or smaller and it can be measured according to the customer billing service (Catteddu 2010).

Cloud computing is an experience in which all the technologies of world involved. When it comes to technology, Cloud computing consists of two different words. Cloud is also known as symbol of technology in the cloud computing technology and there are many different services and applications which can be delivered in the internet cloud (Catteddu 2010). Cloud computing is an updated version of utility. Computing means the availability over the internet. when we think about it we really focus on cloud computing services (Leland 2008). It is a way to increase the capabilities and capacity to fly without investing in a new infrastructure. Cloud computing is symbol that we know as software service phenomenon. cloud computing is defined as web application is an application that is used via web browser over the internet which is the internet or an intranet .Its goes back to the days of presentations and flow charts that would represent the white clouds that are the basics of internet. Getting connections and doing out information as it floats (Voorsluys, Broberg et al. 2011). In cloud computing there are many advantages such as security and privacy too. There are many remote locations on which data travels. Cloud can provide different services to many customers at a time. All of this may move up the scale of coverage to likely breaches, both unintentional and intentional (Brandic, Dustdar et al. 2010).

Cloud computing is not about the hard drive it is about the storing of data from the hard drive to the internet storage .To access your data in cloud computing is very easy because of all our needs are actually closed to us in fast and easy way from one computer to the other network (Kshetri 2011). The Cloud Computing have been the burning issue since the companies are more inclined towards the cost cutting technologies. The aggressive corporate world has in fact made the idea of out sourcing more significant for the companies and now the companies don't be uncertain in outsourcing their needs in order to improve the effectiveness and success of the firms operations. The Cloud Computing concept is a very important in this world and in cloud computing we need to access our data or program over the internet or at the very least and that data can be synchronized with other information on the internet. With an online connections cloud computing can be done anywhere anytime (Ekanayake and Fox 2010).

2 OPPORTUNITIES OF CLOUD COMPUTING

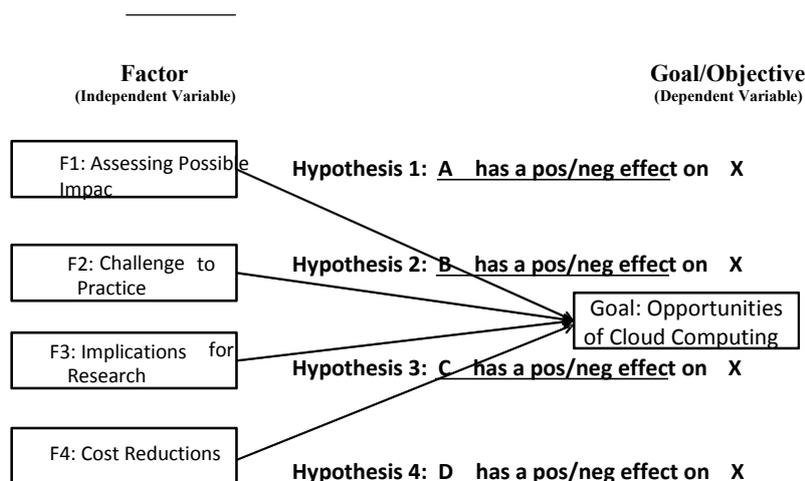


Fig. 1. The Opportunities of Cloud Computing and its relation to four independent variables

Cloud computing is a technology in which users can store their data online at a location which is governed by a third party, instead of keeping data in your own computer (Lehman and Vajpayee 2011). By this technology, there has been large number of opportunities in the development of the information technology. Different companies are interconnected through the internet. We can use a lot numbers of applications online and there is no need to update these application by ourselves (Ojala and Puhakka 2013). There are two types of computing, one is service oriented computing and other is cloud computing. The relationship between these two types of computing is reciprocal to each other. One computing system is responsible for providing service of computing and other for computing of services. These two types of computing system can provide services that can be interchangeably challenges (Batista, Mendonca et al. 2011). Cloud computing has played a very important role in ICT, and has played a role for overcoming the hurdles in the way of advancement in the technology (Firdhous, Ghazali et al. 2013). By this users have got awareness to use new technologies. This technology has also solved

problems related to virtual networking and cloud extensions (Yi and Blake 2010). This is an amazing technology as by using this we can save space on our computer and can share files with others on internet but one thing is of worry that our data can be theft from the remote areas at which the data is stored and third party might be able to access that data. So, steps should be taken to makes some way to ensure the security of the data (Azodolmolky, Wieder et al. 2013).

3 ASSESSING POSSIBLE IMPACT

In cloud models all the organizations are using application as (SaaS, PaaS, IaaS) and deployment models (Private, Public, Hybrid) (PalsonKennedy and Gopal 2010). There are many security issues that are associated with cloud computing as there are many users connected at one server and there is a chance of un-authorized access by a third party (Abuhussein, Bedi et al. 2012). When different computers connected by the internet then security depends on the main core router that is acting as a junction between these connected systems (Shetty, Luna et al. 2012). Different users are connected they might be consumers and customers and all they require a level of accessing for proper exchange of data or information between them (Pedersen, Riaz et al. 2011). Customers that have to use voice information for sharing using computing are reluctant to share due to some security problems. There should be secure system in cloud computing to ensure the privacy of the information to be shared (Silva, Hines et al. 2013).The merit for choosing a security system for cloud computing is that the system should have reliability, stability and scale ability. I think this is the basic need of any transmission system that it should have complete privacy and security of the information to be transmitted or being shared (Kantarcioglu, Bensoussan et al. 2011).

4 CHALLENGES TO PRACTICE

Keeping in mind the issues of security problems in cloud computing system, there have been developed some system that claims that they are completely secured system and can provide full privacy for the data to be transmitted (Behl 2011). These new system are implemented and can provide full privacy and can overcome the challenges related to the threats. There are problems but research is being done to overcome both in academic sectors and as well as in industrial sectors (Tosic 2012). There are some hurdles in the way of cloud computing technology and researchers are trying to solve this by study of problem. The study of cloud computing technology is not only restricted to cloud computing technology only, it is also being done on the mobile cloud computing technology that is very popular now a days (Zhang and Zhang 2012). Cloud technology has many advantages but they have also some drawbacks as leakage of information etc. so nothing is perfect in this world everything has some drawback (Amin, Bib Abu Bakar et al. 2013). So many efforts are being done to overcome drawback and promote the new technologies like cloud computing and mobile cloud computing (Chu, Chih-Hung et al. 2012). It looks like that this technology will got full potential in future as a lot of work is being done to remove the hurdles in the way of such new technologies (Keshavarzi, Haghghat et al. 2013).

5 IMPLICATIONS FOR RESEARCH

A lot of research has been done on this technology and this provided a roadmap for the IT technologies. It technologies emerged and faced a lot of problems (Zhenyu 2011). So the researchers have done work to overcome these problems and presented many theoretical work as well as they have implemented this work practically (Zhixiong and Yoon 2010). Also researches make the idea clear that what is the secure cloud computing, how it works and how it can be use full for the users and users might trust on this technology. While cloud computing allows to transparently scale back-end functionality, this functionality ensures the complete privacy while sharing the information that is much more sensitive processes (Henze, Hummen et al. 2013). This provides a confidence in users to use new technologies and have advantages of technologies like cloud computing and mobile cloud computing (Gueyoung, Mukherjee et al. 2013). Problem is that if a user want to choose a cloud computing technology then it is not as simple as a user think, there are provided different layers so he might not be able to choose a secure technology according to his requirement and might not be able have advantage of cloud computing technology (Pant and Parappa 2013). The researchers discussed all the technologies that ensure the security for the users, data send by users and received by receiver systems (Neal and Rahman 2012).

6 COST REDUCTIONS

The main advantage of cloud computing is that all the computers are interconnected and can share the information with them on the internet , can store data on internet, can use applications without updating but the main and very important feature is the reduction of cost (Anitha and Damodharan 2013). The main advantage is to the providers. They can save a lot of their money by providing connections to consumers in a properly planned manner. By this, a provider can reduce cost than

the on demand by proper planning the connections for users (Tanimoto, Hiramoto et al. 2011). Cloud computing is advantageous not only in a business sector but it is also advantageous economically because it has reduced cost of the system, cost of the hardware, cost of the software and also there is no need of maintenance related to such type of technology (Owusu and Pattinson 2012). It also does not require many operators for this so it is very advantageous to use this both I business sense and economically (Xinhui, Ying et al. 2009). The reduction in cost of the system is very important feature related to that technology and attracted the users in industries to use this technology but there are no efficient tools by which we might able to estimate the cost, that has been reduced because of using this technology (Peng, Yanbo et al. 2012). Unlike the traditional server optimization strategies which consider only load balancing and scheduling of resources based on the usage of CPU, RAM and BW in physical servers, this technology gives the cost reduction as well as gives maximum utilization of the system all the time (Sahu, Pateriya et al. 2013).

7 EXPLANATION AND DISCUSSION

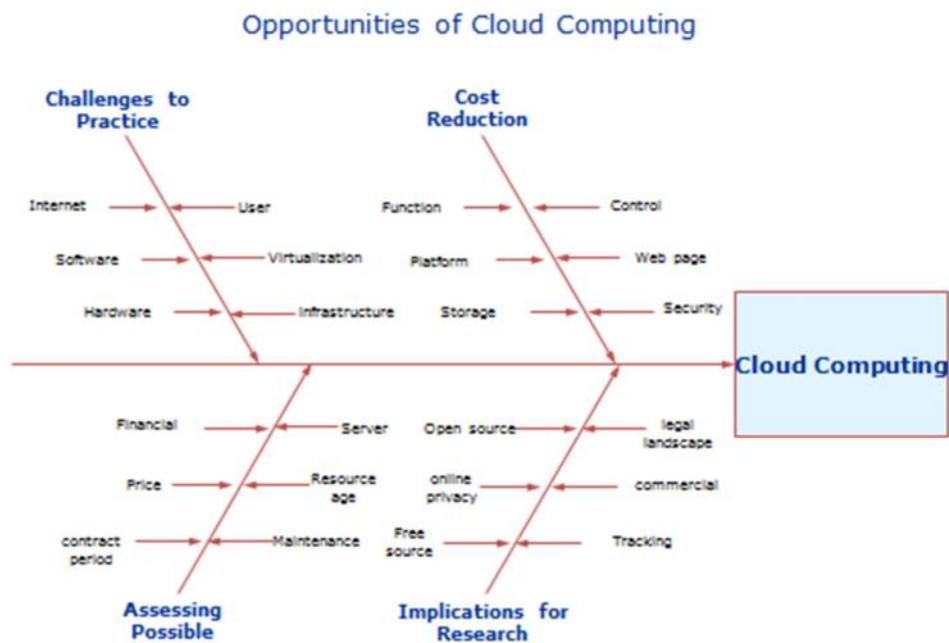


Fig. 2. Cloud Computing

There is plenty to consider as far as the functions of these specific factors, which play a role in regards to the Opportunities of Cloud Computing. Cloud Computing component cannot be easily implemented by one person alone. Successful implementation of computing requires proper implementation of cloud computing components. Cloud computing will not be possible without of these components. Cloud computing involves different experience and back grounds of persons. Cloud computing is very expensive business but companies' still use cloud computing because of its advantages. The first component of the cloud computing is the client the end user. Everything ends in Cloud computing with the client such as applications hardware components and everything is useful for client in cloud computing. Nothing will be possible without the client the end user. The Client involves two types of forms first the hardware component and the second is the combination of the hardware and the software. An important component of cloud computing is my model which is the end user of client as he is the benefited with the idea. Whether a corporate client or an individual client applications, are meant to be made to look the needs of the clients which may need us to make easy through the software or an hardware components. In any industry whether it is the product or service customers are king in the industry. Satisfaction of the customer is very significant in cloud computing concept as well in the marketing department (Wang, Wang et al. 2012).

The second component of the cloud model is the service or the function of cloud computing. The main reason of cloud computing become trendy due to the acceptance of the businesses and the easier way to execute the business process. Cloud computing is all about the services and the business process with an probable output. The component of cloud computing services is based on two things first the end user the client and the second is proper development of the

application. If client comes up with the optimization condition the company needs to expand the required software which is the function necessary to be done. With the experience of the user service could be used in a very effective manner (Youseff, Butrico et al. 2008).

Another important component of cloud computing is the application which is the back bone of service. The service is totally dependent on the application. The application is completely different because in this application services realized. Application is based on the actual coding of the developers. Applications are very important and due to their coding because they are well handling and provides security and functionally by this purpose application could work as predictable. The Applications will drop in the middle of the model while they are crucial as the first component of model. The other important component is the platform which is soft infrastructure for the application. In a normal applications or websites they do not work as cloud computing, in the applications are directly connected to the servers. But in the cloud computing the application is still begins to another application called the platform or the soft infrastructure. The platform usually includes different programming languages such as JAVA script , and XML (A Vouk 2008).

Storage is another important component of cloud computing which means the warehouse of cloud computing. The storage holds the data and information on function that how they will be implemented. Everything that could be provided by the application knows and the function that could be gain by service are possible through storage. The storage facility is based on how to protect from different attacks and availability of backup. Cloud computing is always about reliability and accessibility of service which will obviously require the storage to be available all the time. The backbone of cloud computing is the infrastructure. Infrastructure is only possible through the needed data storage provide and the availability of service.(Michael Armbrust) Communications has the power to make different changes by management and load balancing .So infrastructure being a very important factor needs to up to the standard and requires larger investments in order to react to the needs of cloud computing. In cloud computing there are many components which have to be Optimize by well-functioning application and secured application for cloud computing (Dillon, Wu et al. 2010).

The cloud computing means anything that involves delivering services over the internet. These services divided into three categories: which are platform software and Infrastructure as a service. In the internet there are many clouds which represents the process of cloud computing that usually used in the internet to represent the diagrams and flowcharts (Dikaiakos, Katsaros et al. 2009). A cloud can be private or public. A public cloud sells their services on the internet to anyone. For Example Amazon web services is the biggest public cloud service. Private cloud is a network in which data and services can be supplies to a limited number of people. When a service provider use public cloud and to create their private cloud that will become virtual private cloud. Even its public or the private cloud computing the basic function of cloud computing is to give access to computing resources, IT services easy and scalable. For each model functions as the basic building block for cloud computing. However, in case of mutual infrastructure, there a case of ordinary layer that serves as the basic building block for the sharing. Usually, the common layer based on the total model. There are many examples of this happening today with solutions such Backup-As-A-Service or Storage-As-A-Service (Balaouras, Yates et al. 2009). Cloud computing services also called network-based services. The services which appears to be provided by real hardware server and are infect served up by virtual hardware simulated by software by running one or more machines this whole process also called cloud computing . Such services do not physically exist and cannot be moved anywhere and cannot be measured .Grid computing is comparable to cloud computing. It is a type of computing where unexploited in a network of processing cycle are harnesses to solve problems for any single machines (Turilli, Wallom et al. 2013).

Cloud computing work are not fully clear at present time it depends many companies to defined their own technologies of cloud computing. Connecting the computer systems and the software required to make computing work which the standards for are not completely define. Cloud computing is very important in the data center and for small business. For a small and medium sized business, the benefit of cloud computing is very high. In small and medium sized business sector there is a lack of financial resources and time to purchase and maintain an infrastructure. Small businesses can achieve these resources enlarge or reduce services as a change in business needs by using the cloud computing services (Buyya, Yeo et al. 2008). Cloud computing, web applications is important. The reality why cloud computing is requires for sure web application and protocols. Cloud computing facilities impact as well freed the companies from the trouble of infrastructure by connecting the applications through internet. The willingly available application will help in making the customer interrelate readily and professionally. The applications in it being difficult but the advantage of the application is in its use for educational purposes as well as corporate purpose. With the passage of time cloud computing becoming more complex and difficult and different types of hybrid, private and public cloud based infrastructure and systems are already in use, for this purpose companies collection of cloud management tools needs to fixed all these problems they are just as flexible and measurable as its cloud computing strategies (Miller 2008).

Cloud management tools help companies computing based services are working properly and act together with a user and other services. Cloud computing is an on demand service that is acquire by mass appeal in corporate data centers. These clouds helps the data center to operate like the internet and computing resources, like many function start in the market and convert into small business owner. In a simple word a cloud computing is taking services and moving them outside the systems. Economics has a great impact on the future of cloud computing. The computing economics will support the idea of economics with the computing model and will open the opportunities for cloud computing to a great contract which means computing economics will help in making computing more associated to social and environmental background (Subashini and Kavitha 2011).

8 CONTRIBUTION AND NEW INSIGHT

I believe that cloud computing can be improved productivity and use all around. The opportunities of Cloud Computing will become not only financial profit but also more secure for everyone. Cloud computing is used as the energy demand of the internet which is rising with the shift of cloud computing, supply of renewable energy keep rapidity to prevent having unenthusiastic impacts on the climate. As cloud becomes more well liked and demands on the internet companies hosting online services using more energy for their data centers. This looks at the contribution of cloud computing to climate modify to help bring about the benefits from well-built renewable energy policies. Cloud services also well liked because the cost and difficulty can be reduce by owning and operating computers and networks. The benefits are low upfront cost since customers do not invest in the business of information technology and they not get software licenses or hardware purchases. Cloud providers are specialized in a particular area such as e-mail can bring some superior services in which single company might not be able to have the funds for develop.

Cloud computing is an emerging concept, which contribute a lot to society and will help the companies to achieve their goals to cost compensation. The concept already has various factors to believe. It will take time to finally become the basic part of the association. The pros of cloud computing need lots of hard work and studies to moderate the concerns. The contribution of this subject cover many feature of the technological field. The insight that study provided will help the companies to be aware of the concept more and to study the concept in perspective of the marketing policy. The significant aspects of its linked concepts studied in the paper.

As Cloud Computing becomes more demandable and common on the internet, most of the companies offering online services for seeking more energy for their data centers. Contribution of cloud computing effects the climate change and bring some strong energy policies and economy-wide initials decrease. For Example, Google is most famous cloud based company to express the potential of a cloud. Nowadays, cloud computing growing more because of laptops, smart phones, iPods, tablets, and kindles. The trends in cloud based computing effects the greater attention and growth in development of energy efficient data centers design. It will also increase the scale and size of data centers which brings major trends. Due to the continuous significant development of cloud based computing despite economic downturn. Unless could data centers are intentionally with some most advanced sources of electricity the operators of data centers are also stuck with the same problem that a common man has. They are ready to accept the mix of dirty energy sources and clean energy sources that the electric resources provide to feed the cloud.

Many of cloud computing companies are following the sitting strategies and the design that can decrease the energy consumption of their data centers. Unfortunately, collective demand for computer resource increases even the more well organized data centers serve only two provide successful services. It is clear that the more demand of energy increases the cloud growth. Where necessary cloud extension or reinforcement costs should be increase by the operators of data center and shared between all customers. Because all the environmental benefits are good for public and system operation. Cloud computing may not be everything for everyone or even cheaper than anything in some cases there are many legal issues in it. However, is also an effect a big shift in the way things are done according to the IT domain. It might be slow nowadays but after time will fly and we will look back and see that it has changed everything. It is very big shift as the switch to client server computing. The education and cloud computing sounds indistinct on the face of it. It is because of very few publishers and people are come from the education sector. Most of the time cloud computing is only related with businesses and how they can influence their efficiencies. Most importantly, the evolution to the cloud brings unplanned change and change that can be to inefficiency in our business. However, cloud computing is your desired solution to gain operational cost saving or increase revenue it will depend on your ability to manage the changes that the cloud will have on people.

9 CONCLUSION

Cloud Computing provide many advantages. For teams and organizations, Cloud computing enabled to streamline processes. Cloud computing is huge nowadays and either we are using cloud computing for our business or for our personal use. That means we have learned lots from taking look at pros and cons. Cloud computing is a way in which IT department changed by IT. Cloud computing provides many range of paths in a business including platforms and applications infrastructure that are available as an online service of cloud provider. Many people may be confused by the range of terminology and offerings which are used to describe them and will be unsure of the benefits and risks. These Ranges are from basic infrastructure offerings through platform support to full applications. Because of Cloud computing nowadays knowledge is getting superior in demand market. Considering the offerings and current advances in cloud computing it shows that this technology is here to stay for a long time. Nowadays all of the big businesses in the IT industry have some sort of cloud computing offering their standards for cloud computing services such as Microsoft, Amazon, and Google Etc.(Jensen, Schwenk et al. 2009).

As we conclude that Cloud computing is a powerful new concept for large-scale data processing which is measurable, dependable and available. In cloud computing there are large self-handle server pools available that decreases the overhead and reduce management annoyance. Cloud computing services can also develop and reduce in size according to need. Cloud computing is mainly valuable to small and medium businesses, where effective and affordable IT tools are significant to helping them become more dynamic without spending lots of money on data centers and technical equipment. In addition, it is a new promising construction needed to expand the internet to become the good computing platform of the future. The factors of utility computing and web applications are the ventures in many ways. They shows the concept by means of providing a vast lots of choices for the companies to choose between in order to fulfill their technological needs without investing any sources of income or capital resources. The experience also bring anxiety along with that and these are the concerns of security and dependability. As well obliges a lots of trust on the company on condition that the service and along with that it needs to dealt the subject in a way that customers who are the eventual user of the application will be grateful for the company's efforts and vast investments of the company. The paper had existing it is own model of cloud computing and discussed the important factors in the model in which the client were the most important of them. Software licensing and computing economics are also converse and it is exposed from the studies that software licensing have negative collision on the concept while computing economics have allot of impact but only requires the experience to be studied more (Rittinghouse and Ransome 2009).

After reading and reviewing Cloud Computing studies, government reports and white papers attending several Cloud Computing events and reading many Cloud Computing blogs. I came to know that privacy, infrastructure, and security in Cloud Computing are the main factors of the whole process. So, still cloud computing have not been fully squeeze by education systems, education leaning environment, universities and, the business community. Education systems and business are enthusiastic for the next generation technology solutions the infrastructure problems and the systems. That is features in the 21th century education, business model and workplace. Cloud computing can be the basic technology infrastructure that can transform business, education if it is correctly and safely implemented (Turilli, Wallom et al. 2013). The concept is very much inclined by the factors discussed in the study and establish out that these factors are further divided into many sub factors that will collision the concept of cloud computing. The factors have their advantages and as well disadvantages and the earlier researcher done an important work over the issue. However, there is still a need to do a lot of work on the cloud computing particularly when discussing it in association with the marketing subject. The experience requires lots of investment and will brought vast revenues but is riskier as well. There are many examples of cloud computing such as Microsoft, Apple, Amazon, Dropbox etc. (Kshetri 2011).

REFERENCES

- [1] A Vouk, M. (2008). "Cloud computing—issues, research and implementations." *CIT. Journal of Computing and Information Technology* **16**(4): 235-246.
- [2] Abuhussein, A., H. Bedi, et al. (2012). Evaluating security and privacy in cloud computing services: A Stakeholder's perspective. *Internet Technology And Secured Transactions, 2012 International Conference for*.
- [3] Almulla, S. A. and C. Y. Yeun (2010). Cloud computing security management. *Engineering Systems Management and Its Applications (ICESMA), 2010 Second International Conference on, IEEE*.
- [4] Amin, M. A., K. Bib Abu Bakar, et al. (2013). A review of mobile cloud computing architecture and challenges to enterprise users. *GCC Conference and Exhibition (GCC), 2013 7th IEEE*.
- [5] Anitha, G. and P. Damodharan (2013). Resource cost reduction in cloud computing. *Current Trends in Engineering and Technology (ICCTET), 2013 International Conference on*.
- [6] Azodolmolky, S., P. Wieder, et al. (2013). "Cloud computing networking: challenges and opportunities for innovations." *Communications Magazine, IEEE* **51**(7): 54-62.
- [7] Balaouras, S., S. Yates, et al. (2009). "How the cloud will transform disaster recovery services." *Infrastructure & Operations Professionals, July* **24**.
- [8] Batista, T., N. Mendonca, et al. (2011). AltoStratus: A Collaboration Network Focused on the New Research Challenges and Opportunities in Cloud Computing. *Software Engineering (SBES), 2011 25th Brazilian Symposium on*.
- [9] Behl, A. (2011). Emerging security challenges in cloud computing: An insight to cloud security challenges and their mitigation. *Information and Communication Technologies (WICT), 2011 World Congress on*.
- [10] Brandic, I., S. Dustdar, et al. (2010). Compliant cloud computing (c3): Architecture and language support for user-driven compliance management in clouds. *Cloud Computing (CLOUD), 2010 IEEE 3rd International Conference on, IEEE*.
- [11] Buyya, R., C. S. Yeo, et al. (2008). Market-oriented cloud computing: Vision, hype, and reality for delivering it services as computing utilities. *High Performance Computing and Communications, 2008. HPCC'08. 10th IEEE International Conference on, IEEE*.
- [12] Catteddu, D. (2010). *Cloud Computing: benefits, risks and recommendations for information security*, Springer.
- [13] Chu, W. C., C. Chih-Hung, et al. (2012). The Development of Cloud Computing and Its Challenges for Taiwan. *Computer Software and Applications Conference (COMPSAC), 2012 IEEE 36th Annual*.
- [14] Dikaiakos, M. D., D. Katsaros, et al. (2009). "Cloud computing: distributed internet computing for IT and scientific research." *Internet Computing, IEEE* **13**(5): 10-13.
- [15] Dillon, T., C. Wu, et al. (2010). Cloud computing: issues and challenges. *Advanced Information Networking and Applications (AINA), 2010 24th IEEE International Conference on, IEEE*.
- [16] Ekanayake, J. and G. Fox (2010). *High performance parallel computing with clouds and cloud technologies. Cloud Computing, Springer: 20-38*.
- [17] Firdhous, M., O. Ghazali, et al. (2013). Cloud computing for rural ICT development: Opportunities and challenges. *Computing, Electrical and Electronics Engineering (ICCEEE), 2013 International Conference on*.
- [18] Gueyoung, J., T. Mukherjee, et al. (2013). CloudAdvisor: A Recommendation-as-a-Service Platform for Cloud Configuration and Pricing. *Services (SERVICES), 2013 IEEE Ninth World Congress on*.
- [19] Henze, M., R. Hummen, et al. (2013). The Cloud Needs Cross-Layer Data Handling Annotations. *Security and Privacy Workshops (SPW), 2013 IEEE*.
- [20] Jensen, M., J. Schwenk, et al. (2009). On technical security issues in cloud computing. *Cloud Computing, 2009. CLOUD'09. IEEE International Conference on, IEEE*.
- [21] Kantarcioglu, M., A. Bensoussan, et al. (2011). Impact of security risks on cloud computing adoption. *Communication, Control, and Computing (Allerton), 2011 49th Annual Allerton Conference on*.
- [22] Keshavarzi, A., A. T. Haghighat, et al. (2013). Research challenges and prospective business impacts of cloud computing: A survey. *Intelligent Data Acquisition and Advanced Computing Systems (IDAACS), 2013 IEEE 7th International Conference on*.
- [23] Kshetri, N. (2011). "Cloud Computing in the Global South: drivers, effects and policy measures." *Third World Quarterly* **32**(6): 997-1014.
- [24] Kshetri, N. I. R. (2011). "Cloud Computing in the Global South: drivers, effects and policy measures." *Third World Quarterly* **32**(6): 997-1014.
- [25] Lehman, T. J. and S. Vajpayee (2011). We've Looked at Clouds from Both Sides Now. *SRII Global Conference (SRII), 2011 Annual*.
- [26] Leland, W. (2008). "The Future of Statistical Computing." *Technometrics* **50**(4): 418-435.
- [27] Mell, P. and T. Grance (2009). "The NIST definition of cloud computing." *National Institute of Standards and Technology* **53**(6): 50.

- [28] Michael Armbrust, A. F., Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, Matei Zaharia "A View of Cloud Computing." *Communications of the ACM*: 50-58.
- [29] Miller, M. (2008). *Cloud computing: Web-based applications that change the way you work and collaborate online*, Que publishing.
- [30] Neal, D. and S. M. Rahman (2012). Video surveillance in the cloud-computing? *Electrical & Computer Engineering (ICECE), 2012 7th International Conference on*.
- [31] Ojala, A. and V. Puhakka (2013). Opportunity Discovery and Creation in Cloud Computing. *System Sciences (HICSS), 2013 46th Hawaii International Conference on*.
- [32] Owusu, F. and C. Pattinson (2012). The Current State of Understanding of the Energy Efficiency of Cloud Computing. *Trust, Security and Privacy in Computing and Communications (TrustCom), 2012 IEEE 11th International Conference on*.
- [33] PalsonKennedy, R. and T. V. Gopal (2010). Assessing the risks and opportunities of Cloud Computing — Defining identity management systems and maturity models. *Trendz in Information Sciences & Computing (TISC), 2010*.
- [34] Pant, N. and S. Parappa (2013). Seeding the cloud in a secured way: Cloud adoption and security compliance assessment methodologies. *Software Engineering and Service Science (ICSESS), 2013 4th IEEE International Conference on*.
- [35] Pedersen, J. M., M. T. Riaz, et al. (2011). Assessing Measurements of QoS for Global Cloud Computing Services. *Dependable, Autonomic and Secure Computing (DASC), 2011 IEEE Ninth International Conference on*.
- [36] Peng, Z., H. Yanbo, et al. (2012). Cost Optimization of Cloud-Based Data Integration System. *Web Information Systems and Applications Conference (WISA), 2012 Ninth*.
- [37] Rittinghouse, J. W. and J. F. Ransome (2009). *Cloud computing: implementation, management, and security*, CRC press.
- [38] Robinson, N., L. Valeri, et al. (2011). *The Cloud: Understanding the Security, Privacy and Trust Challenges*, RAND Corporation.
- [39] Sahu, Y., R. K. Pateriya, et al. (2013). Cloud Server Optimization with Load Balancing and Green Computing Techniques Using Dynamic Compare and Balance Algorithm. *Computational Intelligence and Communication Networks (CICN), 2013 5th International Conference on*.
- [40] Shetty, S., N. Luna, et al. (2012). Assessing network path vulnerabilities for secure cloud computing. *Communications (ICC), 2012 IEEE International Conference on*.
- [41] Silva, M., M. R. Hines, et al. (2013). CloudBench: Experiment Automation for Cloud Environments. *Cloud Engineering (IC2E), 2013 IEEE International Conference on*.
- [42] Subashini, S. and V. Kavitha (2011). "A survey on security issues in service delivery models of cloud computing." *Journal of Network and Computer Applications* **34**(1): 1-11.
- [43] Tanimoto, S., M. Hiramoto, et al. (2011). Risk Management on the Security Problem in Cloud Computing. *Computers, Networks, Systems and Industrial Engineering (CNSI), 2011 First ACIS/JNU International Conference on*.
- [44] Tasic, V. (2012). Panel discussion EDOC 2012: Next-generation cloud computing: requirements, challenges, and visions. *Enterprise Distributed Object Computing Conference (EDOC), 2012 IEEE 16th International*.
- [45] Turilli, M., D. Wallom, et al. (2013). "Flexible services for the support of research." *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences* **371**(1983): 20120067.
- [46] Voorsluys, W., J. Broberg, et al. (2011). "Introduction to cloud computing." *Cloud Computing*: 1-41.
- [47] Wang, C., Q. Wang, et al. (2012). "Toward secure and dependable storage services in cloud computing." *Services Computing, IEEE Transactions on* **5**(2): 220-232.
- [48] Xinhui, L., L. Ying, et al. (2009). The Method and Tool of Cost Analysis for Cloud Computing. *Cloud Computing, 2009. CLOUD '09. IEEE International Conference on*.
- [49] Yi, W. and M. B. Blake (2010). "Service-Oriented Computing and Cloud Computing: Challenges and Opportunities." *Internet Computing, IEEE* **14**(6): 72-75.
- [50] Youseff, L., M. Butrico, et al. (2008). Toward a unified ontology of cloud computing. *Grid Computing Environments Workshop, 2008. GCE'08, IEEE*.
- [51] Zhang, Y. and Y. Zhang (2012). Cloud computing and cloud security challenges. *Information Technology in Medicine and Education (ITME), 2012 International Symposium on*.
- [52] Zhenyu, Y. (2011). Disrupt the Disruptor: A Theoretical Approach of Cloud Computing on IT Outsourcing Industry Disruption. *Dependable, Autonomic and Secure Computing (DASC), 2011 IEEE Ninth International Conference on*.
- [53] Zhixiong, C. and J. Yoon (2010). IT Auditing to Assure a Secure Cloud Computing. *Services (SERVICES-1), 2010 6th World Congress on*.