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Research Paper

Potential Benefits and Problems

in Cloud-Based Computing

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Introduction

A fast growing area of information technology is that of cloud-based computing. Cloud-based computing offers clients a means of accessing information and programs—which would be traditionally accessed via software and hard-disk—over the internet. Presently, there are many ostensible benefits of this technology and, at the same time, there are many risks associated with its implementation. In this paper, it is my aim to evaluate the significance of cloud-based computing on the basis of its potential pitfalls, which include security concerns and lack of preparedness on the part of clients, and its possible benefits, such as the possibility of saving time and money.

Background

Simply put, cloud-based computing refers to a process in which data and various applications are stored on the server and delivered to the client upon request, as opposed to being stored on the hard-disk of that client's PC. As noted on epic.org, "cloud computing is an evolution from…previous efforts at shared computing" (Clifford, 2010, "Background", para. 4). These previous methods of shared computing include everything from early stages of the internet to local area networks. Basically, any system which allows multiple users to access the same data from different access points falls under the heading of shared computing.

An early pioneer in "commercial and scientific infrastructure cloud computing initiatives" was Amazon Web Services (Rochwerger et al, 2009, p.12). In 2006, Amazon Web Services announced the beta version of its Elastic Compute Cloud service, otherwise known as Amazon EC2 (Barr, 2006, para. 1). The first service of its kind, EC2 allowed users to tap into computing power on an as-needed, pay-per-hour of use basis

(Barr, 2006, para 2). This is an early version of cloud-based computing as we know it today. .

Potential Problems

As is the case with any emerging technology, there are a number of areas of uncertainty and issues which can pose threats to clients utilizing cloud-based computing. These potential problems primarily center on security concerns. There are also issues to be considered from both a legal and an ethical standpoint.

Security Concerns

Perhaps one of the biggest drawbacks to cloud computing is the array of security concerns attached to it. Vulnerability of information remains one of the principal problems in the world of computing. There is an understandable fear that, by its very nature, cloud-based computing is even more susceptible to attack than the self-contained, hard-disk computers of old. For many companies, the utilization of cloud-based computing would involve "the action of outsourcing data centers and services to a third-party organization" (Osayamwen, 2010, para. 4). The security implications of this arrangement are significant. Through an arrangement of this kind, a company would be largely dependant on an outside organization for its day to day business operations (Osayamwen, 2010, para. 5). In the business sector, as in others, it seems there is a disinclination to shake the mindset of control and self-reliance regarding both data and daily operations.

Another major barrier to the proliferation of cloud computing is a lack of trust on the part of corporations. These trust issues stem largely from security concerns revolving

around oversight of operations. In August of 2011, the Commission on the Leadership Opportunity in U.S. Deployment of the Cloud, a commission composed of 71 experts in the field, “determined that a lack of trust is the primary impediment to cloud adoption” (“Higher Education,” 2011, para. 5). This commission also found that “firsthand insight and lessons learned from successfully implementing a trusted, department-wide cloud computing environment” was “integral in defining decision roadmaps, developing metrics of trust, and establishing key findings and recommendations for the Transparency and Accountability portion of the Commission's report.” (“Higher Education,” 2011, para. 5) The lack of trust in cloud computing as a viable option is a direct correlation to both the lack of knowledge and a lack of proven success in the field. Essentially, it all comes back to the fact that people are hesitant to place their business operations under the control of a new technology which, although promising, is largely unproven.

Potential Benefits

The potential benefits of implementing cloud-based computing are abundant. From an IT standpoint, cloud computing offers “a way to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software” (Knorr, n.d., p 1). This provides IT personnel with much more flexibility, a vital commodity in the IT field. In September of 2011, Marshall University, a fast growing college, “deployed Opscode's Chef to quickly and easily automate a large portion of its nearly 300 servers” (“Marshall,” 2011, para. 3). Opscode’s cloud infrastructure automation handles more basic operations, which, according to Eric G Wolfe, the senior Linux administrator for Marshall University, “‘frees up resources.

Because we are such a small team, the amount of time we can save means we can focus on more complicated problems'" ("Marshall," 2011, para. 4). Time saving capabilities such as this are of major importance to small IT groups like that of Marshall University.

Cloud infrastructure can help a business save money as well as time. Most obviously, money spent paying personnel would be reduced. Cloud infrastructure not only frees up time for existing personnel, but it alleviates the need for hiring and training of new employees, which is a very cost-intensive process. As Megha Bahree (2011) pointed out in an article about the Tata Group, an India based cloud infrastructure company; cloud-based computing affords "the chance to roll out services without a commensurate rise in staff numbers…[to] small and medium-sized businesses" (para. 7). By accessing utilities in the cloud on an as needed basis and paying per use, these smaller companies can grow their business while committing only a portion of their capital. This shows how, when utilized well, cloud computing can level the playing field for businesses that cannot afford major investments in staffing and software. Basically, cloud-computing allows businesses to save on overhead while simultaneously achieving the benefits of growth.

Conclusion

To some extent, most people who have used a computer somewhat recently have utilized some aspect of cloud-based computing. It seems that cloud-based computing will only continue to grow in significance. The risks associated with cloud computing are primarily rooted in a misguided lack of trust in the capabilities and security of the cloud. However, the illusion that hard-disk infrastructure is more secure than that of cloud-based

computing is beginning to fade. Overall, the flexibility and cost-efficiency of cloud computing secure its significance in the ever advancing world of information technologies.

References

Bahree, M. Tata Targets Smaller Clients; Outsourcing Giant Uses Cloud Services to Augment Revenue From Big Names. (2011, February 21). Wall Street Journal (Online. Retrieved October 9, 2011, from http://mutex.gmu.edu:2048/login?url=http://proquest.umi.com/pqdweb?did=2272450351&Fmt=3&clientId=31810&RQT=309&VName=PQD

This article is about a business entering the cloud market in India. It was useful because it specifically discussed the benefits of cloud computing for small businesses.

Barr, J. (n.d.). Amazon Web Services Blog: Amazon EC2 Beta. *Amazon Web Services Blog*. Retrieved October 8, 2011, from http://aws.typepad.com/aws/2006/08/amazon_ec2_beta.html

This blog entry talks about the general idea behind cloud computing in its early stages. It was useful because it provided a look at an early version of cloud computing.

CLIFFORD, S., Times, N. Y., 11, J., & 2010. (n.d.). EPIC - Cloud Computing. *EPIC - Electronic Privacy Information Center*. Retrieved October 8, 2011, from http://epic.org/privacy/cloudcomputing/

This site defines cloud computing, and discusses its background, various types, issues and case studies. It was useful in that it provided a good background on cloud computing.

Higher Education; CLOUD2 Commission Releases Federal Cloud Computing Roadmap. (2011, August). Education Letter,30. Retrieved October 10, 2011, from http://mutex.gmu.edu:2048/login?url=http://proquest.umi.com/pqdweb?did=2415926921&Fmt=3&clientId=31810&RQT=309&VName=PQD

This article is about a U.S. committee formed to discuss cloud deployment. It was useful in that it addressed the issues of trust and security which act as a barrier to this technology.

Knorr, E. (n.d.). What cloud computing really means | Cloud Computing - InfoWorld. *Business technology, IT news, product reviews and enterprise IT strategies - InfoWorld*. Retrieved October 7, 2011, from http://www.infoworld.com/d/cloud-computing/what-cloud-computing-really-means-031?page=0,0

This article gives a general overview of cloud computing. It was useful because it demonstrated the benefits for an expanding business.

Marshall University Achieves Greater IT Agility with Opscode :Large Public University Uses Chef for Automation and Configuration Management Freeing up Time and Resources. (6 September). PR Newswire. Retrieved October 9, 2011, from http://mutex.gmu.edu:2048/login?url=http://proquest.umi.com/pqdweb?did=2443685891&Fmt=3&clientId=31810&RQT=309&VName=PQD

This article discusses the implementation of cloud computing at Marshall University. It was useful because it demonstrated the potential benefits of cloud computing for a small IT staff.

Osayamwen, E. (2010, April 1). Preparing Information Assurance Graduates for Tomorrow's Challenges. *Security Technology & Design* , *20*, 34. Retrieved October 8, 2011, from the ProQuest database. http://mutex.gmu.edu:2048/login?url=http://proquest.umi.com/pqdweb?did=2041537051&Fmt=3&clientId=31810&RQT=309&VName=PQD

This article talks about the role of cloud computing in the globalized economy. It was useful because it addressed the security concerns that arise from the outsourcing of daily operations to third parties.

Rochwerger, B., Breitgand, D., Ben-Yehuda, M., Emmerich, W., Galán, F., Levy, E., et al. (2009). The Reservoir Model and Architecture for Open Federated Cloud Computing. *IBM Journal of Research and Development*, *53*(4). Retrieved October 8, 2011, from http://www.reservoir-fp7.eu/uploads/Publications/The%20RESERVOIR%20Model%20and%20Architecture%20for%20Open%20Federated%20Cloud%20Computing.pdf

This article contained a model for cloud infrastructure. It was useful in that it provided some background information regarding the pioneers of cloud computing.