Cloud Computing

Gavin O'Donnell
Computer Science Department, Letterkenny Institute of Technology, Ireland

Nigel McKelvey
Computer Science Department, Letterkenny Institute of Technology, Ireland

Kevin Curran
School of Computing and Intelligent Systems, University of Ulster, Northern Ireland

INTRODUCTION

Cloud Computing can be described as web service oriented computing that provides an environment which acts as a service in delivering software and information management in a way that would have typically only been available in product format. This is done through personal devices – such as a laptop – that would access the services available through the network of servers that is called the "cloud" (Marston, 2011).

Cloud Computing offers new ways to provide useful services on demand at a much cheaper make-up. The technology is ever developing and there are many cases of ongoing research to further improve this technology which inevitably will change the way businesses operate forever and provide many new opportunities for organisations alike (Mather et al., 2009).

It is important to point out that the idea of Cloud Computing – although it may seem like a new phenomenon – was originally realised in the early 1960"s when John McCarthy foreseen computing in the form of a global network that would act as a public service; which in a sense is how Cloud Computing is commonly viewed since its emergence over the past few years. As more aspects of work and life move online, the Internet is continuing to provide a platform for business and society at a much larger scale as well as the already highly-satisfactory communications means available (Ohlman et al., 2009).

The much talked about cloud environment is continuing to grow and the core principles of Cloud Computing are swiftly entering the curriculum in many Computer Science degrees around the world. This assessment will be widely welcomed in the industry as it can be seen that many organisations are devoting vast amounts of resources in the development of cloud services. This article will take a look into the affects Cloud Computing has on those Businesses, how those businesses go about implementing the technology, the security issues surrounding Cloud Computing and a brief look into what is next for Cloud Computing.

BACKGROUND

The emergence of cloud computing represents a fundamental change in the way information technology (IT) services are developed, maintained, used and paid for. Information technology services within an organisation have become even more complex in recent years, causing the management and the distribution of computing resources to be at such an intricate level, that the software involved had made computing more expensive than ever. However, the promise of cloud computing has allowed organisations to present these computing resources to clients in a way that substantially helps organisations reduce the upfront costs of computing; thus, better align their needs and budgets (Mikkilineni & Sarathy, 2009).

Cloud Computing improves the competitive edge of businesses by providing IT resources immediately which enables them to efficiently meet the needs of customers more than ever. This all-new business agility enables the delivering and processing of new products to reach competent levels even during peak times throughout the year. The implementation of cloud computing services by an organisation will only encourage more innovation amongst staff, as the level of risk is substantially reduced with no huge upfront costs for development and testing. The cloud becomes

an adaptive and intriguing method when successfully implemented by organisations, inevitably pulling in the end users for their respective needs.

Regarding the end-user, Cloud Computing has several different models. First of all, there is Software as a Service (SaaS) and this model provides access to software applications over a network. Available to multiple users over the Internet, this model supports applications with their own data centre which allows them to essentially run on the cloud, eliminating the need to install and run the application on a computer. There are many consumer based SaaS services such as hosting and storage services; Dropbox being the most obvious storage service. It is also worth noting that the SaaS services require their own licenses and is responsible for application implementation in the cloud (McFedries, 2008).

Platform as a Service (PaaS) is for software suppliers who want to concentrate on the development of new applications without the cost and complexity of buying and managing the hardware and software needed. PaaS is cloud services with built-in integration of web services and databases; so basically developers use these services to develop their own product from an existing SaaS or develop a new web application. Revenue share mechanisms are in place between the developers and the owners; however the developers usually receive in-and-around 75% of this revenue. Finally, there is Infrastructure as a Service (IaaS). This represents hardware services such as storage, power and memory services are provided also. The best thing about this model is users can pay-as-you-go, so to speak. There is also the option of signing a contract for a specific amount of time. This is mainly because the user is responsible for everything, meaning the users have to prepare the application environment in their virtual machines. The best example of this type of provider is HP"'s BladeSystem *Matrix* (Weiss, 2007).

In the meantime, there are a lot of steps to be taken for the hype to surround this development to mature into a steady success. Many regulations have to be put in place, the interoperability of already existing cloud environments needs to be developed, and most importantly the flexibility of the technology needs to continue to grow to assist the traditional IT environments which have supported us for years. The key characteristics and variables that these organisations would use to calculate the possible success of cloud computing adoption is still, some-what, up in the air.

Several questions are still being raised about the availability of cloud platforms, as no organisation wants to earn a bad reputation because of downtime.

IMPLEMENTING CLOUD COMPUTING

Cloud Computing is a framework for offering services in new advantageous ways. In a sense, it can be considered as a phase of evolution regarding the expanding and building of the previous successful factors of IT to enable the environment to reach even higher levels of efficiency.

In reality, the planning process regarding the transfer to Cloud Computing will follow the same principles of any planning process. Firstly, the two main questions that need to be answered are; where are you now and where do you want to go? After these questions are answered, we can expand on them and develop a detailed understanding of the requirements needed to complete the process and deliver the service. Fortunately, when moving to Cloud Computing, most of the required applications will already be in place, so it is only a matter understanding the details of the system in place and then building additional requirements to further the system. Implementation details will vary from one application to the next, so it is important to provide solid information in both business and technical aspects. Business requirements includes details of who is responsible for the service in the organisation, the importance of that service to the organisation, and what strategic objective is served by the application. This highlights the services that will run in the cloud and the important requirements for them. Technical, Implementation and Operational Requirements includes details from servers, resources required, platform services, backup requirements, disaster recovery, and compliance issues (Sullivan, 2010).

A move to cloud will open up many new opportunities. For example, additional services could be implemented with the consolidating of already-in-place applications and resources. Long-term, Cloud Computing will continue to influence businesses through the basis of its ability to allow several applications access the single-storage units instead of duplicating several data sets to perform the same job in the traditional IT environment. This gives new advantages from a statisti-

Related Content

Software Engineering and the Systems Approach: A Conversation with Barry Boehm
Jo Ann Lane, Doncho Petkovand Manuel Mora (2008). *International Journal of Information Technologies and Systems Approach (pp. 99-103).*
www.irma-international.org/article/software-engineering-systems-approach/2542

An Adaptive Curvelet Based Semi-Fragile Watermarking Scheme for Effective and Intelligent Tampering Classification and Recovery of Digital Images
K R. Chetanand S Nirmala (2018). *International Journal of Rough Sets and Data Analysis (pp. 69-94).*
www.irma-international.org/article/an-adaptive-curvelet-based-semi-fragile-watermarking-scheme-for-effective-and-intelligent-tampering-classification-and-recovery-of-digital-images/197381

Web Engineering in Small Jordanian Web Development Firms: An XP Based Procses Model
Haroon Altarawnehand Asim El-Sheikh (2009). *Utilizing Information Technology Systems Across Disciplines: Advancements in the Application of Computer Science (pp. 130-141).*
www.irma-international.org/chapter/web-engineering-small-jordanian-web/30722

High-Performance Reconfigurable Computing
Mário Pereira Vestias (2018). *Encyclopedia of Information Science and Technology, Fourth Edition (pp. 4018-4029).*
www.irma-international.org/chapter/high-performance-reconfigurable-computing/184109

Implementation of a Service Management Office Into a World Food Company in Latin America
Teresa Lucio-Nietoand Dora Luz Gonzalez-Bañales (2021). *International Journal of Information Technologies and Systems Approach (pp. 116-135).*
www.irma-international.org/article/implementation-of-a-service-management-office-into-a-world-food-company-in-latin-america/272762