

CLOUD COMPUTING IN ENTERPRISE: PRACTICE, IMPACT AND PROSPECT

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Abstract. In recent years, cloud computing has set off a new upsurge of IT industry. And related research has been carried on by more and more companies, universities and research institutions. With this new business model, IT ecosystem is experiencing great changes and the role of IT department in either university or enterprise is also needed to transform by modern information technique. In this paper, we first give a brief review on cloud computing and then introduce some application cases of cloud computing implementation in Shanghai University. Finally, based on our practical experience, we analyze the influence of cloud computing on enterprise development and look forward to its impact and prospect.

Key words. Cloud Computing, Digital Media Services, Supercomputing Services, Cloud Computing Laboratory.

1. Introduction

The development of Internet led to rapid growth of information and data, as well as new demand for the computing power and storage capacity of existing hardware. Although purchasing hardware devices and software licenses can overcome these problems to some extent, they increase the maintenance burden and operational costs. And normally, the user may just hope to hire the required services with a small fee when they need. In this way, people can conserve resources and the daily life will be more convenient. Under this background, the cloud computing was born.

Cloud computing is a new commercial computing model which converges a lot of computer and network technique, such as grid computing, distributed computing, parallel computing, network storage, virtualization, load balancing, etc [1]. Its core idea is scheduling and managing the resources in a unified way, so as to reduce the processing cost of user terminals and provide strong manipulated ability as required [2]. Currently, the main cloud services platforms on the market include IBM "Blue Cloud", Amazon Web Services, Microsoft's Azure platform, VMware vCloud, Google App Engine and so on. As a new service and service pattern, cloud computing has become the important transition and symbolic transformation in the area of IT service delivery.

In our opinions, the dispute revolved about cloud computing now becomes very limited despite its inherent drawbacks. In fact, it is turning into new standardization rules gradually. In this paper, we take some typical application cases of adopting clouding computing in Shanghai University as a living example to reveal its impact in enterprise development. Through the introduction and analyzing of these cases, we believe that enterprise is experiencing the transformation which includes industrial development, new opportunities and strategies. While all of these also promote the evolution of cloud computing and help the enterprise to discover new commercial value simultaneously.

This paper is organized as follow. Section 2 describes the development situation and tendency in domestic and foreign countries. Section 3 presents the deployment practice of Shanghai University on cloud computing platform. Then we analyze the influence of cloud computing on enterprise development in section 4. Finally, in section 5 we propose the future trends and prospect of cloud technology.

2. Related Work

Cloud computing firstly originated from the research and development of Eucalyptus, an open source infrastructure architecture for cloud computing, at the University of California, Santa Barbara. Then more and more colleges and institutions in the world started researching this topic, such as NASA Nebula Cloud Computing Platform, EU's OpenNebula, UK government's G-Cloud plan, etc [3]. After that, many large multinational companies have introduced into their internal cloud platform architecture too, such as Amazon EC2, Microsoft's Azure platform, Abiquo's Abicloud programs and so on [4]. At present, our government also strong supports this area and a great many of enterprises, colleges and scientific institutions have conducted related researches [5]. Most of them are launching their own research projects or products of cloud computing actively, including "China Cloud" plan, Century Interconnection's CloudEX, Tsinghua Mass Storage System, and provide convenient, reliable and efficient cloud services for the users [6].

In the academia, Dr. Rajkumar Buyya, a professor of Computer Science and Software Engineering in Melbourne University, proposed a cloud architecture for market-oriented allocation of resources in 2009 which transformed the traditional information processing model [7]. In 2010, Michael Armbrustin and his collaborators of UC Berkeley RAD Lab, analyze the ten obstacles and opportunities in cloud computing development [8]. In their opinions, whether the cloud provider sells EC2 or App Engine, computing, storage and networking all focus on horizontal scalability of virtualized resources rather than single node performance. Then in 2013, Daji Ergu and his co-workers present a model for task-oriented resource allocation in cloud computing environment. By pairwise comparison matrix technique and the Analytic Hierarchy Process, the resource can be allocated by ranking their availability and user preferences. Simultaneously, this paper introduces induced bias matrix to identify the inconsistent elements [9]. Furthermore, MMYA Younis insisted that some technical barriers hinder the development of cloud computing, such as security and quality of services. He explores the potential security issues, security challenge and security requirement related to the security of cloud computing for critical infrastructure providers [10].

3. Application Case of Adopting Cloud Computing in University

Cloud computing is now widely implemented and practiced in Shanghai University. It is a reliable and dynamically extensible cloud computing and service platform which integrates all the IT equipment and resources in school. The detailed design is illustrated in figure 1.

The main modules include Cloud-based Digital Media Services, Cloud Storage Applications, Virtualization Experience Laboratory and Supercomputing Services, etc. Through its powerful computing and storage capacity, user can access the required services directly with a simple thin-client device. In addition, IT equipment and resources integration can largely reduce the energy consumption and operational cost. In a word, it not only provides high quality and efficient information services, but also offers a public infrastructure environment.