Chapter 8
A Cloud Trusting Mechanism Based on Resource Ranking

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ABSTRACT

The cloud-based computing paradigm helps organizations grow exponentially through means of employing an efficient resource management under the budgetary constraints. As an emerging field, cloud computing has a concept of amalgamation of database techniques, programming, network, and internet. The revolutionary advantages over conventional data computing, storage, and retrieval infrastructures result in an increase in the number of organizational services. Cloud services are feasible in all aspects such as cost, operation, infrastructure (software and hardware) and processing. The efficient resource management with cloud computing has great importance of higher scalability, significant energy saving, and cost reduction. Trustworthiness of the provider significantly influences the possible cloud user in his selection of cloud services. This chapter proposes a cloud service selection model (CSSM) for analyzing any cloud service in detail with multidimensional perspectives.

INTRODUCTION

Cloud computing is one of the emerging fields in modern computing environments like databases. It is an intelligent integration of communication network, programming methodologies, database techniques and the internet. Generally, in a traditional computing environment, if a user wants to access some information resource for short time duration then it is necessary for him/her to buy the resources even if these resources will be of no use after some time period. This unnecessary resource occupying without having no further use was a major concern in past two decades- especially for fast growing organizations. In the present era of computing, cloud computing offers the solutions to such types of problems. The aim of Cloud computing is to deliver the required resources to the end users as per their need and demand. Cloud computing enables the users that they can pay for services based on the duration of resource requirements (Clerk Maxwell et al., 1892).

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Cloud computing enables anytime and anywhere contact to shared pools of composition system resources and higher-level services that can be quickly provisioned with minimal management effort, often over the Internet. Cloud computing relies on sharing of the resources to achieve coherence and economics of sale similar to a public utility. Cloud computing has emerged as a paradigm to deliver on demand resources (e.g., infrastructure, platform, software, etc.) to customers similar to other utilities (e.g., water, electricity and gas).There are three most popular services provided by Cloud service providers in Cloud computing architecture and these three services are based on the needs of IT customers (G. Eason et.al., 1955). The first and foremost service is Software as a Service (SaaS) and it provides customers to access the complete application like a service. The second one service is called Platform as a Service (PaaS) and it provides customers a platform on which they can create or develop other application on top of it. Third service is called Infrastructure as a Service (IaaS) and it provides customers virtual environment, where they can deploy, run and manage their applications, virtual machines, and data storage. Technically, we can say that IaaS offers to customers and incremental scalability (scale up and down) of on-demand services like computing resources and storage (Maxwell, 1892), (Jacobs and Bean, 1963).

The cloud computing services offer organizations to start out building applications on the cloud infrastructure and creating their businesses agile by versatile and elastic cloud services. However, moving applications and/or information into the Cloud is not simple. The various challenges exist to leverage the complete potential that cloud computing guarantees. These challenging areas are typically associated with the actual fact that existing applications have specific needs and characteristics that require to be met by Cloud service providers.

Other than that, with the expansion of public Cloud offerings, for Cloud customers it is become progressively troublesome to determine that providers will fulfill their QoS needs (Maxwell et al., 1892). Every Cloud supplier offers similar services at totally different costs and performance levels with different sets of options where provided services could be low-cost for storage services; they will be pricy for computation.

Therefore, given the diversity of Cloud service offerings challenge for customers to select the ‘‘right’’ Cloud providers that can satisfy their requirements. There may be trade-offs between different functional and non-functional requirements fulfilled by different Cloud providers. So, it makes tough to evaluate the service levels of different Cloud service providers in required quality, reliability and security of an application be ensured. For that reason, it is not enough to simply determine various Cloud services; however, it is important to evaluate and get the best suited Cloud service provider. Third-party clouds enabled organizations are targeted on their base businesses instead of dispensing resources on computer infrastructure and maintenance. Proponents also claim that cloud computing allows enterprises to get their applications up-to-date faster with improved manageability, less maintenance, resources to meet fluctuating and unpredictable demand etc. Cloud providers typically use a “pay-as-you-go” model.

The chapter proposes cloud service trustworthiness selection model which offers customers to evaluate Cloud offered services and rank them based on their ability to satisfy the need of customer’s Quality of Service (QoS) of the Cloud. The chapter is organized as follows. Section 2 contains different related works that have been carried out in support of our proposed Cloud service ranking model. Sections 3 explains our proposed work which includes the methodology that has been used to determine a Cloud ranking model using Analytical Hierarchical Process (AHP) based multi-criteria selection discussed in details. Section 4 elaborate analysis and validation of our proposed model where AHP based computation has been performed to get the different parameters (capacity, cost, performance, security and