Cloud Ownership and Reliability – Issues and Developments

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Abstract. Cloud computing is a composite paradigm that provides crucial services to individuals and organisations over networked infrastructure at a cost. The Cloud provides custom built applications, made available by a CSP to customers. Several customers can access an instance of one application. The Cloud also affords an avenue for customers to build their own application in a language compatible with a CSP and subsequently deploy that application on the Cloud. In addition, massive scalable storage and computing devices are available on the Cloud. A customers expects optimum services whenever and wherever it is required. Hence, system failure on the part of a CSP must not affect the services being provided to the customer. This paper examines present trends in the area of Cloud ownership reliability and provides a guide for future research. The paper aims to answer the following question: what is the current trend and development in Cloud ownership reliability? In addition, analysis was done on existing work published in journals, conferences, white papers and those published in reputable magazines, to answer the question raised. The expected result is the identification of trends in Cloud ownership and reliability which will be of benefit to prospective Cloud users and service providers alike.

Keywords: Cloud computing · Reliability · Ownership · CSP · TCO
IaaS · SaaS · PaaS

1 Introduction

"Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" [1]. Cloud computing is expanding on all fronts and mutually benefiting both Cloud providers and users alike. These benefits are either in the utilization of Cloud applications or migration of services

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to the Cloud. Cloud computing has three primary services, Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS). SaaS is used by Cloud service providers (CSP) to provide Cloud consumers with applications deployed over the Internet such application can be utilized by individuals or enterprises at a cost. User do not have to worry about installation and licenses. In PaaS, the CSP provides an environment for the Cloud user to create and deploy custom applications. However, the CSP has control over the application deployed. IaaS provides compute resource and storage to Cloud users at a metered rate. This is quite beneficial to both small business and large enterprises alike as they do not have to invest in computing infrastructure. The Cloud user has control over some resources such as storage and the operating system, while the CSP has control over the infrastructure. Cloud computing is offered in four deployment models viz. private, public, community and hybrid Cloud.

A private Cloud is completely owned by an organization and the users are staff of that organization. It can be hosted by a third party or on-premise and it is considered more secured. Public Cloud is owned by large CSP who have large infrastructure to offer services to the public on a pay-as-you-go basis. The services can spread across geographical region, but considered less secure than the private. Community Clouds are owned by several organization with shared or common interest with infrastructure shared by a community of users. Hybrid Clouds are a combination of either private, public or community Cloud. The organizations are unique entities utilizing the Cloud infrastructure which is managed by a single unit.

The issue of ownership and reliability is essential in Cloud computing, as one of the major deterring factors to individuals owning data centres is the huge Total Cost of Ownership (TCO) and associated operational cost. These are often responsible for customers choosing to buy service from CSPs rather than build their own data centres, as this eliminates the need to purchase, deploy and maintain IT assets [2]. A primary advantage of Cloud services is that the Cloud vendors take on the full infrastructure responsibility for running hosted applications.

The TCO is made up of cost of acquisition, deployment, operation and retirement of a product or piece of equipment. This cost can be very huge and often unnecessary particularly if the business objectives of the customer is not IT related. To this end, customers no longer see reasons to spend a lot of money to acquire large data centres (or server room) and spend even more on managing and running them. They would rather outsource this to a CSP, focus on their core competence and also cut down on unnecessary expenses.

Though seemingly attractive, there are also flip side to moving to the Cloud, versus running an in-house data centre. These disadvantages can broadly be classified into two groups: quantifiable and unquantifiable. The quantifiable are those which a direct cost implication can be obtain for, these include but are not limited to monthly or annual Cloud service fees, cost of reliable Internet access and cost of Cloud-compatible software (in the case of IAAS). While the unquantifiable include: security and privacy concerns, legal and ethical issues and data migration and vendor lock-in.

Reliability on the other hand implies being trusted to perform at expected level. The author in [3] considered reliability from a Cloud computing perspective and inferred it to mean avoiding situations whereby as a CSP combines too many Virtual Machines