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Enhanced Model for Performance based Ranking for SaaS Cloud Services

By

Sahar Abdalla Elmubarak Ali

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Supervisor

Dr. Adil Yousif

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Abstract

Cloud computing systems assist applications by offering virtualized resources that can be provisioned on demand basis. Computing resources are delivered by Virtual Machines (VMs). Enormous number of cloud providers is offering diverse number of services. The performance of these services is a critical factor for clients to determine the cloud provider that they will choose. However, determining the provider with efficient and effective services is a challenging task. There is a need for an efficient model that help clients to select the best provider based on the usability attributes and measurements. Cloud service ranking is a standard method used to perform this task. It is the process of arranging and classifying several cloud services within the cloud, then compute the relative ranking values of them based on the quality of service required by the clients and features of the cloud services. The objective of this research is to propose an enhanced performance based ranking model to help users choose the best service they need. The proposed model combines the attributes and measurements for cloud computing field and the well-defined and established software engineering field. SMI cloud Toolkit has been used to test the applicability of the proposed model. The experimentation results of the proposed model were promising.

المستخلص

أنظمة الحوسبة السحابية تساعد وتدعم التطبيقات عن طريق توفير موارد افتراضية لمستخدمي هذه التطبيقات. الكم الهائل من الخدمات التي يوفرها مزودي الخدمة أدى إلى ضرورة إيجاد طريقة مناسبة وفعالة تساعد المستخدم على تحديد مزود الخدمة الأنسب له بالنسبة لمتطلباته الشخصية. رغم التحدي كبير في هذه العملية ، إلا أن هنالك حوجة بالغة لإيجاد وسيلة فعالة تساعد العملاء على اختيار المزود المناسب لهم. باعتبار أن كفاءة الأداء هي إحدى العوامل الاساسية لتحديد جودة الخدمة، تم تقيمها باستخدام عملية التصنيف (Ranking) .

عملية التصنيف هي أحدي المنهجيات المتبعة لمعايرة خدمات الحوسبة السحابية، حساب قيمها النسبية، ومن ثم ترتيبها بناءً على متطلبات العميل. يهدف هذا البحث لتكوين نموذج تصنيفي لحساب جودة الأداء، ومساعدة المستخدم على اختيار الخدمة التي تلبي احتياجاته. هذا النموذج يدمج بين خصائص الحوسبة السحابية والمعايير المتبعة في مجال هندسة البرمجيات.

تم اختبار هذا النموذج باستخدام أدوات خاصة تسمى SMICloud toolkit. النتائج التي تحصلنا عليها كانت واعدة جدا.

1.1 Overview

This chapter introduces the research work, state the problem, defines research objectives, significant and describe the thesis structure.

1.2 Problem Background

Cloud computing refers to both the applications delivered as services over the Internet and the system (hardware and software) that provide these services. The service itself is referred to as Software as a Service (SaaS). The data center hardware and software is what we will call a cloud. When a cloud is made available to the general public it's called a public cloud. The term private cloud refers to internal data centers of a business or other organization which is not available to the general public. Thus, cloud computing is the sum of SaaS and utility computing, but does not include small or medium-sized data.

Ranking is an approach that is used to predict the best possible service by collecting, comparing and ordering the related ascription. It's a key factor to evaluate cloud services[1].

Measuring Performance is one of the major aspect of life. Actually people measures performance on daily basis. We do it when driving a car, using mobile phones, accessing the internet, even when reading a paper to determine how good the writer performed. So it's an important part of daily life [2].

In cloud computing, SaaS to be exact, performance measurement mostly relays on time calculation specially when requesting the service and waiting for its response. The amount of time is very crucial, so the sooner the better. There are other attributes such as accuracy, Interoperability and Customization [3].

1.3 Problem Statement

Serval cloud providers are new available. These providers offer different cloud services to their clients. Performance is a crucial aspect of cloud service. Cloud services from different providers have different performance characteristics. From the client point of view, it becomes difficult to determine which provider is best and based on which performance measurements the selection process should be. There is a need for a new performance based ranking model to assist cloud clients to select the suitable provider.

1.4 Research Objectives

The objective of this research is to propose a new performance based ranking model to rank the quality of services (QoS) offered by software as a service (SaaS) providers depending on cloud computing performance characteristics.

1.5 Scope

This study was conducted to provider a ranking model measure the performance under the quality of service (QoS) for software as a service (SaaS). This is done to a number of cloud service providers to determine specific values in order to distinguish the best usable service.

1.6 Thesis Structure

This thesis contains six chapters. Chapter two gives an overall idea of cloud computing and SaaS ranking in cloud computing. Chapter three describes the research methodology. Chapter four describes the proposed enhancement model for measuring SaaS performance. Chapter five applicability of the proposed model. Chapter six provide the conclusion and lessons learned.