UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF GRADUATE STUDIES AND ACADEMIC ADVANCEMENT

A Web-Based Framework for Developing Cloud Multi-tenant Software as aService Application

A Thesis

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Abstract

Cloud computing portrays a new model for providing IT services over the Internet. In cloud computing, resources and services are accessed from the Internet through web-based tools.

Nowadays, most of the businesses are performed by using the software as a service (SaaS) business model, one of the delivery models of cloud computing by charging the services through subscription.SaaS Multi-tenancy promotes sharing of resources all the way from a single application instance to the database, This allows applications to better fit the cloud computing paradigm. Building cloud saas application from scratch is a very complex task and takes time in developing these applications especially for a university student. There is a need for a framework that makes the creation of cloud saas applications. This research aims to build a new web-based framework for usable saas application development that supports multi-tenancy.
This research proposed a new framework to develop SaaS application and supporting multitenancy.
The proposed framework provide simple creation of a SaaS multitenancy application without writing a Code, and easy to customize to whom know PHP and web technology.

To evaluate the proposed framework the study conducted an empirical study for students at the university of science and technology.The empirical study result revealed that the proposed framework is usable.

المستخلص

الحوسبة السحابية وفرت العديد من الخدمات الفعالة و اصبحت مطلب العديد من المؤسسات لتسهيل و ادارة اعمالها ، وذلك نتيجة لتقليل النفقات ورفع الاعباء عن المؤسسات التي تستخدم خدمات الحوسبة السحابية.

الحوسبة السحابية تصور نموذجا جديدا لتقديم خدمات تكنولوجيا المعلومات عبر الإنترنت و يتم الوصول إلى الموارد والخدمات عبر الإنترنت من خلال المتصفح .

في الوقت الحاضر كل الاعمال تؤدي عبر الانترنيت من خلال نموذج البرمجيات كخدمة (SaaS) و يتم ذلك عن طريق طلب الخدمة عبر الاشتراك في الخدمة برسوم او مجاناً، و الاشتراك هنا بمثابة الايجار لانك تقوم بايجار الخدمة ولذلك ظهرت ميزة تعدد الايجارات في تطبيقات البرمجيات كخدمة لتقوم بالاستخدام الامثل للموارد وذلك بالحصول علي المطلوب فقط من الموارد وتقاسم البقية مع المستاجرين الاخرين.

بناء تطبيق البرمجيات كخدمة (SaaS) من نقطة الصفر هي مهمة معقدة للغاية ويستغرق وقتا طويلا في تطوير هذه التطبيقات وخاصة بالنسبة للطالب الجامعي. وهناك حاجة إلى إطار يزيل التعقيد ويسرع وتيرة العمل .

يهدف هذا البحث إلى بناء إطار عمل جديد لتطوير تطبيقات البرمجيات كخدمة (SaaS) بصورة سريعة و مبسطة و تدعم تعدد الإيجارات.

اطار العمل المقترح في هذا البحث يقوم بتطوير برمجيات كخدمة (SaaS) دون الحوجة الي كتابة اي سطر برمجي.

الإطار المقترح يوفر معمارية تقوم بفصل مكونات التطبيق من عرض و اعمال و تحكم ليسهل بذلك عملية تخصيص التطبيق لمن لديه المعرفة بلغات الويب كـPHP

لتقييم الإطار المقترح أجرت الدراسة دراسة ميدانية للطلاب في جامعة العلوم والتقانة. ونتيجة تلك الدراسة كشفت أن الإطار المقترح قابل للاستخدام.

1.1 Introduction

This chapter explains problem background, research objective, problem statement and Thesis Structure.

1.2 Problem Background

Revolutionary advances in hardware, networking, middleware, and virtual machine technologies have led to an emergence of new globally distributed computing platforms namely cloud computing and the core concept is not a new idea , that happened because networking and virtualization possibilities have increased severely and enabling a new and wider use of the concept, the benefits of cloud computing to provide are cost reductions, IT efficiency, and increased agility and flexibility,This has encouraged a move towards cloud computing, which provides on-demand easy network access to a large pool of computing resources that can rapidly be put to use with minimal interactions and upfront costs[1].

contemporary cloud computing solution focused on Software as services become a significant technology trend, and many experts expect it to reshape information technology processes and the IT marketplace, SaaS is often referred to as software-on-demand and utilising it is akin to renting software rather than buying it,saas application delivering over internet and consumers are able to access software applications by thin client (Browser). because applications are hosted in "the cloud" it can be used for a wide range of tasks for both individuals and organizations[2].

Multi-tenancy is an architecture in which a single instance of a software application serves multiple customers. any customer is called a tenant. this architect was created to enable multiple users (tenants) to access the same application logic simultaneously. Each tenant has its own view of the application that it uses, administers, and customizes as a dedicated instance of the software while remaining unaware of other tenants that are using the same application.and Tenants may have the ability to customize some parts of the application, but they cannot customize the application's code. it can be economical because software development and maintenance costs are shared [3].

the frameworks aim to facilitate software development by allowing designers and programmers to devote their time to meeting software requirements, thereby reducing overall development time.

software frameworks consist of frozen spots and hot spots. Frozen spots define the overall architecture of a software system, that is to say, its basic components and the relationships between them. These remain unchanged (frozen) in any instantiation of the application framework. Hotspots represent those parts where the programmers using the framework add their own code to add the functionality specific to their own project[4].

1.3 Problem Statement

Building cloud saas application from scratch is a very complex task and takes time in developing these applications especially for a university student. There is a need for a framework that makes the creation of cloud saas applications.

1.4 Research Objectives

The objective of this research to build a new web-based framework for usable saas application development that support multi-tenancy.

1.5 Thesis Structure

This document is divided into five different chapters, described as follows:

1. Introduction (Chapter 1) gives a general context about the thesis and describes the structure of the document.

2. Literature review (Chapter 2) presents a brief overview of the literature on the research area and describes the needed concepts that underlie the proposal, which was crucial for our proposal's coherence. In addition, shows the objectives that our proposal wants to address.

3. Research Methodology (Chapter 3) identifies the objectives of the solution and explains the artifact produced.

4.Proposed Framework (Chapter 4) identifies the proposed framework and architect of component,

5.Empirical study (chapter 5)

6.Concluosion & recommendation (chapter 6)