

Using Cloud – Based Web Application for Universities: A Case of University of Technology in Iraq

Nawaf Rashid Mohan^{1,*}, Ahmed Majeed¹, Almahdy Alhaj Saleh¹, Ahmaid R. Mohain²

¹PGC, Limkokwing University of Creative Technology, Cyberjaya, 63000, Malaysia

²Faculty of Computer Science, Tenaga University, City, 43000, Malaysia

Abstract The aim of this project is to design Cloud-based web App prototype system for University of Technology (UTC) in Iraq. This system enables online application to be available via a web site page like Microsoft office, Pixlr (online image editor), Google drive ...etc. By developing this project, it helps Iraqi universities as a solution to reduce the cost of information technology requirements, provision the time and ease to use for education in Iraqi universities. Also it will create of specialized units to develop knowledge and contribute to solving the problems faced by the education sector of Iraqi universities in general. Moreover, the use of UTC system will reduce the demand for human resources, because it does not require a large number of management or maintenance if any problem occurring in the cloud. Also, it will help the student to communicate remotely with the university and lecturers. The Vaishnavi Research Methodology was adopted in this project with its five stages, which includes: Awareness of problem, Suggestion (integrated with System Development Methodology), Development (integrated with Object Oriented Development Life Cycle approach), Evaluation, and Conclusion is used to design the prototype. According to the requirements are collected through the data gathering the prototype model is proposed, and the system is designed. Furthermore, the prototype was evaluated by using SUS questionnaire and the usability results was presented and discussed as well.

Keywords Cloud, UTC, University of Technology

1. Introduction

We currently live in an era characterized by rapid changes in science and technology, which enormously affect the community. The education sector is among the sectors affected by such changes. Thus, a number of education institutions are preparing their personnel to effectively cope with changes and simultaneously deal with modern technology. Aside from economic challenges, universities in Iraq face globalization challenges and the accompanying accelerated evolution, and most of these challenges are cumulative. Iraqi universities are currently constrained by the increasing costs of physical infrastructure and other facilities, a shortfall of resources, and a lack of development in new education techniques [1]. The paucity of funding in Iraqi universities has caused a scarcity in the necessary education requirements, such as developed software and resources; this deficiency is reflected in the low quality of graduates who are particularly ineligible in

terms of possessing adequate scientific knowledge and skills [2]. High-quality specifications should therefore be built into educational institutions to allow them to keep up with new global developments [3]. Iraqi universities continue to operate within the framework of traditional rules, and they lack the basic elements of special contemporary university education systems that are conducive to modern education methods and responsive to the requirements of the times [4].

2. Development

Object Oriented Development Life Cycle approach [5, 6] was adopted in this phase with its four phases, which are design system and database phase, building prototype, testing prototype, and documentation. Table 1 illustrates the environment for creating the prototype:

Table 1. Prototype Development Environment

| | |
|----------------------|---------------------|
| Programming Language | PHP, HTML |
| Database | MySQL Server |
| Operating System | Windows 7 |
| Computer Browser | Internet Explorer 9 |

* Corresponding author:

drashid1981@yahoo.com (Nawaf Rashid Mohan)

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Table 2 illustrates the minimum hardware requirements for creating the prototype:

Table 2. Hardware Requirements

| | |
|-----------------------|------------------------------------|
| Processor | Intel ® Core™ i5 CPU M460 @2.53 Hz |
| RAM | 6 G |
| Free Hard Drive Space | |

3. Literature Review

The cloud computing can deliver the most advanced software and educational materials, hardware resources and services to students and educators in the remote school area in the state, without the need for advanced IT expertise at those locations. At the same point, it providing needed relief for currently strained education budgets [8].

Blue Sky cloud framework developed by Xi'an Jiaotong University (China), enables physical machines to be virtualized and allocated on-demand for e-Learning systems [9].

University of North Carolina State established a cloud computing environment called (VCL) to provide students and faculty members with services and infrastructure either as a private or extended public cloud [10].

Hochschule Furtwangen University developed a private cloud architecture called Cloud Infrastructure and Application (CloudIA) to improve periodic IT tasks such as the management of project PCs with a standard development environment for programming exercises [11].

4. The Proposed System

The purpose of this study is to design a model for integrating cloud technology to the University of Technology in Iraq. So, the UTC system will design appeal to the university that needs or wants more control over their data. The general cloud structure for the University of Technology has been built as shown in figure 1.

The bandwidth requirement in this design must be about 2,000 Mbps download /upload, to support the applications in the UTC .Generally huge amount of cloud servers are necessary to set up UTC. These servers must be stored at the UCT and be controlled by the administrators.

In this model, instead of a powerful processor, large memory and large storage capacity on university devices, the users can use memory and processors and storage via the cloud to run their programs and storage their data. It will be transferred to a centralized and powerful computing platform in the (UTC) system. Any user in university connects to (UTC Website) via the internet, by using his/her device and username and password after authentication.

Simply "Cloud-based web App prototype system for University of Technology (UTC)" refers to an infrastructure in which two operations, data storage, and data processing by enters to the online application function, that contains a lot of

computing applications such as Microsoft office, Pixlr (online image editor), Google drive, and done outside of the of users devices platform.

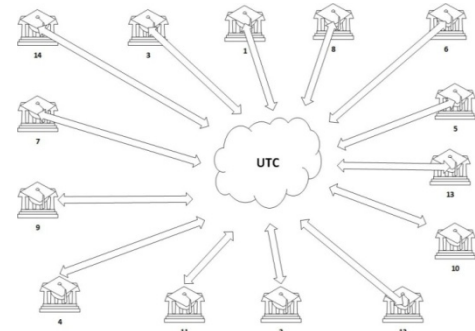


Figure 1. General Structure of UTC

5. Conclusions Concerning the Hypothesis

Cloud-based web app prototype system (UTC) developed to lecturers and students in University of Technology in Iraq to implementation process of operating and storage on the Cloud. The UTC designed in order to minimize effort, time of learning and financial cost of resources.

Like the suffering of the Iraqi universities in increasing the cost of material and lack and skills in the field of new learning techniques, lack of funding which led to scarcity of the necessary education requirements, such as, advanced software and resources, not keep up with global developments of new technology such as cloud computing and used a traditional education system. These problems are solved by the suggested system prototype.

In suggested prototype for University of Technology in Iraq (UTC) have important features such as:

- Implementation time is perceived as a big advantage in UTC. This is the result of the standardized environment which can be accessed throughout an internet connection.
- UTC is shared among different colleges building which means it is tested in different contexts. This will result in a better tested system for online application on the cloud.
- Some applications need to PCs with special specifications, a lot of time to run; the hardware limitations of user's devices prevent users to take advantage of these applications. So, the proposed system UTC reduces the cost and time of implementing these applications by using the online application function.

6. Evaluation

This system prototype is evaluated using the general information and evaluation of user by using the questionnaire [7]. The system has been evaluated by the sample of 40 respondents (administrative staff, lecturers, and students), to see how the system is useful and ease to use by the users. There are 67.5% of the male respondents whereas

47.5% of female respondents. From this evaluation, it shows that the prototype system (UTC) is useful rate of (4.1277) and easy to use rate of (4.1277) as shown in chart 1.

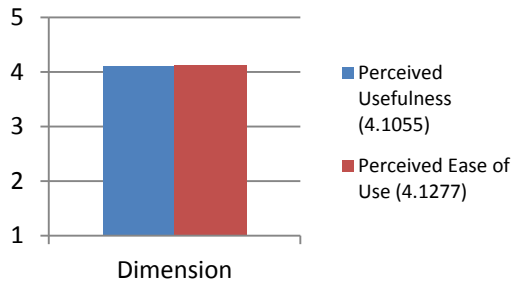


Chart 1. Attributive statistics for dimensions

7. Limitation of the Study

There are also limitations on evaluating the system because designed the system prototype consumed a lot of time so the sample of respondents is limited for 40 only. This prototype system does not connect with the university database, and running only on the local host.

The current system of UTC is already good enough and quite easy to use. But, it is important for University of Technology in Iraq to redesign the website of their system, in order to, make users excited to use it. Also important to introduce and train the user (administrator, students and lecturers) on how to use and operate the UTC system.

8. Future Work

In the future, may be the requirement can be expanding based on the universities that want to use this proposed UTC. For example, the prototype system can have more functions like integrating with Microsoft visual studio, MATLAB. Additionally the prototype of the system has been used in this project were PHP and MySQL for storing the data, for the future it also possible to develop the system prototype by using other technology like JSP/Java, ASP.NET, and using ORACLE for storing the data. One function that should be added as the future work is implementing the system in the smart phone; it can make the users feel the system is more useful for them. In addition, the evaluation of the system in this project only has the sample of 40 respondents, for the future work it can be evaluated by more respondents so that the sample population reflects the actual population.

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