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Investment of the cloud computing in Education & Learning

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ABSTRACT: Cloud computing is the result of evolution and adoption of existing technologies and paradigms. The goal of cloud computing is to allow users to take benefit from all of these technologies, without the need for deep knowledge about or expertise with each one of them. The cloud aims to cut costs, and helps the users focus on their core business instead of being impeded by IT obstacles.
Building cloud computing serves educational institutions, such that it will serve the educational and administration staff and students.
In our research, web pages site for the educational foundation and the university was designed to spreading the educational concepts specific for the learning of far distance cultures for two types synchronize or unsynchronized by using the cloud to design the students information management systems to monitor the students records from the first day in the course to the last day, which will help the educational staff and the administrator staff to get the right information in a proper time to take a right decision, with high speed and quality.
Finally, planning and building a system using cloud computing technique was explained, and how to design it, what we need of requirements to build this system, as well as how to test and implement that system was presented.

KEYWORDS: Investment, Cloud Computing, Educational, Learning, Services.

1 INTRODUCTION

The cloud computing is a development technique depending of move the process and the storage area for the computer to the cloud, such that the cloud is a service device we can access to him through the internet , by using this technique they will convert all the information technology programs from products to the services .

The original of cloud computing idea return to the middle of sixty of previews century when John McCarthy said it will organize the computing to become a general services, but he was means in that time by using a telephone network to do this technique, as well as we can take a (Gmail – Hotmail – Yahoo) as example for cloud computing.**[1]**

1.1 CLOUD COMPUTING COMPONENTS

The cloud computing consists of three main parts, they are: **[5]**

A- Software As a Services.
B- Platform As a Service.
C- Infrastructure As a Service.

A. SOFTWARE AS A SERVICES

That means we can use a specific application stored at cloud, for example we can use the Word program which store in the information center and connect with him through Net, such that we can written in it and modify and insert data then we can get at output from him, in other word we can do all these activities at the cloud, and our computer is only a connecting tool.

B. PLATFORM AS A SERVICE

It means we can use a cloud as platform to put several applications at it and using these applications, as well as we can put a complete operating system, such that there are some integrity between these applications.

For example we can design something in the photo shop and we can insert this design to the other application to move it and add some effects at him and finally we will get at a video with sound, for example of the Platform is (Google Apps), in this platform we can add any application we need to it.

C. INFRASTRUCTURE AS A SERVICE

In this type we will deal with the cloud as infrastructure have specific process ability and a specific storage area, and a specific user's numbers. Such that we have ability to do what we want , for example we can install many operating systems and setup many applications at every system , as well as we can allow to the specific users number to enter to every operating system to use it applications without mix between them.

1.2 CLOUD COMPUTING TYPES

We have three samples to build the cloud computing, they are. **[5]**

A- Public Clouds.
B- Private Clouds.
C- Hybrid Clouds.

A. PUBLIC CLOUDS

The public cloud has the following properties:

- It introduces his services to several customers.
- It found in external building.
- The cloud locates in specific place and the customer in other place.
- It reduces the cost and the risks.

B. PRIVATE CLOUDS

This type has the following properties:

- It locates in internal or external building.
- It will be reliable from the company that dealing with here.
- It will be reliable from the cloud
- It will be reliable from the host company.
- It will give the company ability to monitor the cloud.

C. HYBRID CLOUDS

It has the following properties:

- They are combining between the properties of the public cloud and private cloud.
- It will be used in the company which has a small data, or the companies which needs to the specific applications.
- In this type the customer can choice between the applications and services of the public cloud and the applications and services of the private cloud.

- In this type the company has ability of controlling at the security.

1.3 THE ADVANTAGES OF USING CLOUD COMPUTING

A. ESSAY TO ACCESS

That means the customer can access to all the own applications and own services from any place and in any time through internet, because the own information will not store in own computer it will be store at the company servers that introduce this service.

B. DECREASE THE COST

Such that it will not necessary at the companies to bay many computers have a high speed processors and a high wide storage area , but it can for every ordinary computer to use any web browser to access to the cloud computing which used by the company to do all the activities like (documents edit , file storage , photo edit ... , etc.). As well as it is not necessary to bay a big cost servers to get at the email services to the employees, or bay the big storage unit to do and store the data backup and company information.

C. UTILIZATION FROM THE CLOUD COMPUTING INFRASTRUCTURE

Such that we can useful from the cloud computing infrastructure to do our work, for example the company can useful from the infrastructure to doing the scientific experiment, as well as to doing the complex calculations which the normal computer needs to many years to complete it. The companies that introduce these services like Google Company and Amazon company, such that these companies have services able to doing this operations in a several minutes or several hours.

1.4 THE DISADVANTAGES OF USING CLOUD COMPUTING

A. DISCONNECTION OF THE INTERNET SERVICE

If we loss with the internet we can't access to our cloud, and we can't doing any work, but the programmers develop some of the HTML applications and Java Script Application which able the user to access to own cloud and do own applications, after the net coming it will update the own cloud automatically.

B. SECURITY FEARS

Some of the companies and persons have fears from put all his information and his files at the cloud, such that if the cloud company exposure to a success infiltrate they will lose all information as well as the hacker will get at the user information.

1.5 CLOUD COMPUTING SECURITY

All the cloud companies are interested of the cloud security, and if we want interested at the cloud security we should focus at the following points. **[11]**

A. DATA SECURE

This point is sharing between the customer and Cloud Company, such that the customer should check the internet connection quality before application his activities like (process his information or store his information, as well as the company should kept the customer information from losing.

B. IDENTIFICATION SYSTEM

It is a system which checking the user identification and making sure the user has this account.

C. HARDWARE SECURE

The company should check the network quality and server's quality which using it, and they don't have any secure gaps.

D. APPLICATIONS SECURE

The company should check all the applications that using by the user doesn't have any secure gaps, and in any times they are having a good quality working.

E. PRIVACY

Such that the company should availability for every customer a special user name and password to enter to own cloud, which give to the cloud computing strength and more secure.

2 LITERATURE REVIEW

2.1 PROJECT REPORT ON "STUDENT INFORMATION MANAGEMENT SYSTEM"

Student information management system lead to a better organization structure since the information management of the students is well structured and also lead to better as well as efficient utilization of resources.

Student Information Management System can be used by education institutes to maintain the records of students easily. Achieving this objective is difficult using a manual system as the information is scattered, can be redundant and collecting relevant information may be very time consuming. All these problems are solved by using this system.

Throughout the system the focus has been on presenting information in an easy and intelligible manner. This system is very useful for those who want to know about Student Information Management Systems and want to develop software / websites based on the same concept.

The system provides facilities like online registration and profile creation of students thus reducing paperwork and automating the record generation process in an educational institution.

The main objective of this System is to allow the administrator of any organization to edit and find out the personal details of a student and allows the student to keep up to date his profile .It will also facilitate keeping all the records of students, such as their id, name, mailing address, phone, number, DOB, ….. etc. So all the information about an student will be available in a few seconds. **[13]**

2.2 STUDENT DATABASE MANAGEMENT SYSTEM

An organized and systematic office solution is essential for all universities and organizations. There are many departments of administration for the maintenance of college information and student databases in any institution. All these departments provide various records regarding students. Most of these track records need to maintain information about the students. This information could be the general details like student name, address, performance, attendance, … etc., or specific information related to departments like collection of data. All the modules in college administration are interdependent. They are maintained manually. So they need to be automated and centralized as, Information from one module will be needed by other modules. For example when a student needs his course completion certificate it needs to check many details about the student like his name, reg. number, year of study, exams he attended and many other details. So it needs to contact all the modules that are office, department and examination and result of students.

The features and improvement that allow achievement to this goal will be demonstrated and highlighted, this work is useful for easy user interface. We are planning to utilize the powerful database management, data retrieval and data manipulation. We will provide more ease for managing the data than manually maintaining in the documents. The system is useful for saving valuable time and reduces the huge paper work. **[11]**

2.3 OVER VIEW OF STUDENT MANAGEMENT SYSTEM

The SIS is designed to assign a unique Student Identifier (SID) to each student, such that it is collect demographic, performance, and program participation data for each student. The goal of this system is to develop and deploy a student

information system that provides the state education agency, state and federal entities, the education community, and the public with timely and accurate data collection and reporting for students, schools, school districts, and the state. This information system developed and deployed for the ISBE, provides secure and appropriate access for applications such as student record inquiry, retrieval, and transfer. This system serves as the vehicle to collect all student-related information electronically from school districts.

The SIS application facilitates the batch and online generation of a State ID, as well as the collection and the maintenance of student information for data reporting purposes. Dependent on which system function is utilized, users are able to request a new State ID, search the system for an existing student with a State ID, view records, add or update records, request records, and view summary or detail reports of student records in the system. When batch processes are used, the SIS application provides users with appropriate result codes and messages. The SIS application also provides data validations and offers helpful messages when online processes are used. **[12]**

2.4 SIMS FOR THE ARAB OPEN UNIVERSITY

The Arab open university which has branch in Saudi Arabia used this system to act as academic advisor for the students, such that the student can register and see all his information from his home or his work place, this system named (oasis) this system lead the student to right way for choice his courses.**[15]**.

Fig.1. Main page for SIMS for Arab Open University

2.5 SIMS FOR THE NET LANGUAGE INSTITUTE

This institute to be founded in 1998 in Barcelona / Spain by Jonathan dikes, it specialize for learn different language. It is developed a system to store all information for his students named (advisor) in 2007, such that every institute student can connect to his electronic course through this system that belong to institute web side.

Net language developed this system to use by the students, teachers and training managers to access to the educational tools, connect tools, and reports systems. The characteristic of this system is every customer has own login page. As well as all the teacher can connect with his students through evaluate students, insert students marks, ….. etc**.[16]**

2.6 SIMS FOR THE MINISTRY OF EDUCATION / UNITED ARAB EMIRATES

The ministry of education in united Arab emirates design a system to student information management, its contains at a universal data base for the educational organization, to connect the special schools in Dubai and north emirate with them and support the decision owners to give right decision in suitable time.**[17]**.

Fig.2. Main Page for SIMS for Ministry of Education / UAE

3 METHODOLOGY

The cloud computing systems is a base to publishing and commutation the information between the different peoples on the earth, such that it provide all the common extreme with the information in suitable time, it provides the different extreme at the different information, if the extremes are increases and the type of information are increases also, the complexity of website will increase also, and If we want built a powerful website and consistent, in the first we should analyses the information and study the system, it include build the web pages depends on the information that contains each page, and build the relationship between these pages in website, after that we should specific the tools (programs) that needs to design these pages, it include the hardware requirements and software requirements. Then the next step implement design of our website and written the code of this system, finally before publish of our website we should test it and explorer the errors in this website, if it found, then we can publish it. It is illustrate in bellow. **[1]**

- Feasibility study.
- Analyses & planning of the System.
- System requirement specification.
- System design.
- Coding.
- System testing.
- System implementation.

3.1 FEASIBILITY STUDY

A Feasibility study is conducted to identify the best design that meets all the website requirements. This includes an identification description, an evaluation of the proposed systems and selection of the best design for the job. It is involve:

- Operation Feasibility.
- Technical Feasibility.
- Economic Feasibility.

3.2 ANALYSES & PLANNING OF THE SYSTEM

We can summarize this stage in two steps study of the system and input & output representation, The study of the system involve two things, they are:

- **Administrative user interface**

This interface concentrates on the consistent information that is practically, part of the organizational activities and which needs proper authentication for the data collection. These interfaces help the administrators with all the transactional operation like Data insertion, Data deletion and Date updating along with the extensive data search capabilities.

- **The operational or generic user interface**

The interface helps the end users of the system in transactions through the existing data and required services. The operational user interface also helps the ordinary users in managing their own information in a customized manner as per the included flexibilities.

3.3 SYSTEM REQUIREMENT SPECIFICATION

The second step is specifying the website building requirements, it includes the hardware requirements and the software requirements, and so to build and execute our website we need the following software requirements.

3.3.1 DATABASE: ORACLE 10G

If we have database in our website, the Oracle Database has been commonly used to store files closely associated with database applications including medical images, invoice images, documents, ….etc. in the website. **[7]**

3.3.2 PROGRAMMING LANGUAGE : JAVA LANGUAGE

There are many applications of the computer programs, such that we can use the word processors to write documents, Web browsers to explore the Internet, and email programs to send email. These are all examples of software that runs on computers. Software is developed by using programming languages. Such that there are many programming languages to developed these software, like Cobol, Fortran, Basic, Ada, C-language, C++ , Visual basic and Java language,….etc. Each of these languages was designed for a specific purpose.

So the programmers is preference the java language at the others programming languages, because the java language is enables users to develop and deploy applications on the Internet for servers, desktop computers, and small hand-held devices. The future of computing is being profoundly influenced by the Internet, and Java promises to remain a big part of that future. Java is the Internet programming language. It is a powerful programming language and helpful to review computer basics, programs, and operating systems.**[2]**

3.3.3 WEB TECHNOLOGY : JDBC, SERVLETS, JSP

The vast majority of professional web sites today have some sort of database connectivity. Webmasters have hooked online front ends to all manner of legacy systems, including package tracking and directory databases, as well as newer systems such as e-Commerce Systems. Although database-backed systems may be more challenging to develop, the advantages of allowing a database to manage data records are many fold. Within the database, data definition and manipulation is handled through Structured Query Language (SQL). So all database operations that can be performed on a stand-alone application can be performed on servlets too. Such that all the database operations are performed on the server side, and only data is passed to the client.

The Servlets are protocol and platform independent server-side software components, written in Java. They run inside a Java enabled server or application server, such as the Web Sphere Application Server. Servlets are loaded and executed within the Java Virtual Machine (JVM) of the Web server or application server.

Java Server Pages (JSPs) are similar to HTML files, but provide the ability to display dynamic content within Web pages. JSP technology was developed by Sun Microsystems to separate the development of dynamic Web page content from static HTML page design. The result of this separation means that the page design can change without the need to alter the underlying dynamic content of the page. This is useful in the development life-cycle because the Web page designers do not have to know how to create the dynamic content, but simply have to know where to place the dynamic content within the page. **[2]**

3.3.4 CLIENT – SIDE SCRIPTING : JAVA SCRIPT

JavaScript (JS) is an interpreted computer programming language. It was originally implemented as part of web browsers so that client-side scripts could interact with the user, control the browser, communicate asynchronously, and alter the document content that was displayed. **[1]**

3.3.5 USER INTERFACE : HTML / CSS

HTML is the main markup language for creating web pages and other information that can be displayed in a web browser. The HTML is written in the form of HTML elements consisting of tags enclosed in angle brackets like (<html>), within the web page content. Such that the purpose of a web browser is to read HTML documents and compose them into visible or audible web pages, the browser does not display the HTML tags, but uses the tags to interpret the content of the page.

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation semantics (the look and formatting) of a document written in a markup language. It's most common application is to style web pages written in HTML and XHTML, but the language can also be applied to any kind of XML document, including plain XML, SVG and XUL.

CSS is designed primarily to enable the separation of document content (written in HTML or a similar markup language) from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple pages to share formatting, and reduce complexity and repetition in the structural content. **[4]**

3.3.6 SERVER : TOMCAT 7.0

The Apache Tomcat server is an open source, Java-based web application container that was created to run servlet and Java Server Pages (JSP) web applications. It was created under the Apache-Jakarta subproject; however, due to its popularity, it is now hosted as a separate Apache project, where it is supported and enhanced by a group of volunteers from the open source Java community.

Apache Tomcat is very stable and has all of the features of a commercial web application container yet comes under Open Source Apache License. Tomcat also provides additional functionality that makes it a great choice for developing a complete web application solution. Some of the additional features provided by Tomcat other than being open source and free include the Tomcat Manager Application, specialized realm implementations, and Tomcat valves. **[1]**

4 SYSTEM DESIGN

Website design is the solution to the creation of a new website. This phase is composed of several systems. This phase focuses on the detailed implementation of the feasible website. It emphasis on translating design specifications to performance specification. Website design has two phases of development logical and physical design. During logical design phase the analyst describes inputs (sources), out puts (destinations), databases (data sources) and procedures (data flows) all in a format that meats the uses requirements. The analyst also specifies the user needs and at a level that virtually determines the information flow into and out of the system and the data resources.

The physical design is followed by physical design or coding. Physical design produces the working system by defining the design specifications, which tell the programmers exactly what the candidate website must do. The programmers write the necessary programs that accept input from the user, perform necessary processing on accepted data through call and produce the required report on a hard copy or display it on the screen. In our research we will take SIMS design as example, such that he following figure representing for this system.

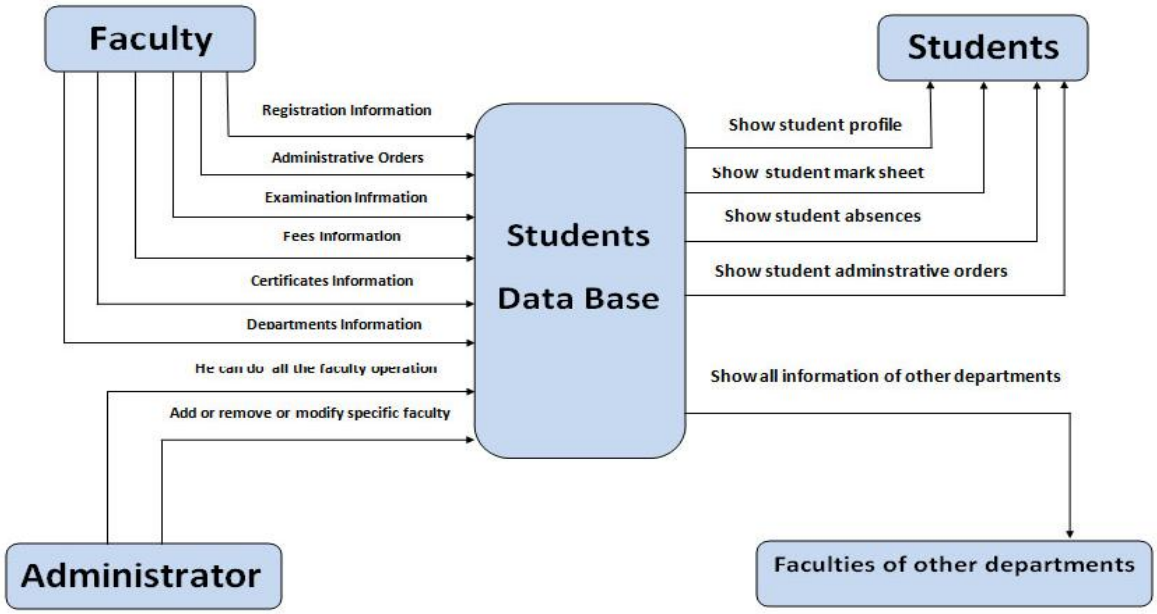

Fig.3. Internal Structure of SIMS [14]

5 CODING

The goal of the coding phase is to translate the design. The aim in this phase is to implement the design in the best possible manner. Well known code can reduce the testing and maintenance effort. During coding, the focus should on developing programs that are easy to read and understand and not simply on developing the programs that are easy to write. Simplicity and clarity should be strived for during the code phase. An important concept that helps the understandability of the programs is structured programming. The program that should be organized as a sequence of statements and during execution of the statements is executed in the sequence given in the program. There are many different criteria for judging of the program, execution time and required memory.

6 SYSTEM TESTING

Website testing is a critical aspect of Software Quality Assurance and represents the ultimate review of specification, design and coding. Testing is a process of executing a program with the intent of finding an error. A good test is one that has a probability of finding an as yet undiscovered error. The purpose of testing is to identify and correct bugs in the developed website. Nothing is complete without testing. Testing is the vital to the success of the system.

7 SYSTEM IMPLEMENTATION

Website publishing includes all those activities that take place to convert from the old system to the new. The old system consists of manual operations, which is operated in a very different manner from the proposed new system. A proper implementation is essential to provide a reliable system to meet the requirements of the organizations. An improper installation may affect the success of the computerized system.

8 RESULTS AND DISCUSSION

The using of cloud computing in the educational and learning field will facilitate for the educational staff and administrative staff follows to the educational foundation and the students likewise to do the following activities:

1- The education staff will able to spread all the scientific and knowledge concepts to the foundation students and all the students' world.

2- Spread learning concepts from a far distance by using a closed television circuit synchronous and asynchronous, such that the teacher will be in a specific place and the students in deferent places.

3- Spread learning videos through record these videos and spreads by using cloud computing to the all-world places, and open educational channels using this technique.

4- By using the cloud computing technique the educational staff will and administrative staff able to monitoring all the activities in the educational foundation from the first day to the last day in the course, such that they will be able to get a right information at right time.

5- By using cloud computing technique we can access to all our information puts at the cloud computing in any time and from any place.

9 CONCLUSION

The using of the cloud computing in the education and learning field will carry out increase the efficiency and the productivity of the educational staff and administrative staff likewise as well as it will increase the students educational level which will belong to the educational foundation through increase the efficiency manage of the students records because they will be able to get all needs information in right time which will carry out to take or make a right decision in a right time, as well as the using of the cloud computing will carry out to decrease the effort for get knowledge , because all the stunts will can get at own knowledge in any time and from any place.

The cloud computing system will facilities us explorer and monitoring all the activities happening in the collage from the first day to the last day in this course, such that we can get at right information in the right time.

Previously the information commutation operations was very difficult between the peoples for example send and received the messages, information commutation, cultures commutation, education commutation and knowledge publishing because it take long time and highest effort and expensive cost, all this reasons to be information commutation operations is impossible operation.

Recently, when can use the world wide web (WWW) and websites to publishing the acknowledge between the nations, such that we can get at desired information in short time, low effort, from any place and suitable cost. As well as we can create and design new website to publish own information to be available for all peoples.

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