Development of Campus Cloud Computing System For E-Learning

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Abstract
Cloud computing is fast growing with high responding to technology. It has lifted the importance of the computer to the entire world. Cloud computing is also defined as Internet-based computing, whereby information, resources, and software, are provided and shared to terminals and portable devices on-demand, just like phone networks. Cloud computing can also be classified as the product or combination of grid computing, distributed computing, parallel computing, and ubiquitous handheld devices. It aims to build and forecast sophisticated service environment with powerful computing capabilities through an array of relatively low-cost computing entity, and using the advanced deployment models like SaaS (Software as a Service), PaaS (Platform as a Service), IaaS (Infrastructure as a Service),HaaS (Hardware as a Service) to distribute the powerful computing capacity to end-users. This paper clearly defines how the students will have their lectures view and download on a real time without internet within the parameter of wireless coverage will enable security, reliability, and privacy of users.

I. Introduction

Background to the Study

The word 'Cloud' is a combination of technological resources such as networks, servers and applications in a common pool where companies and people can rent a series of services and storage to their specific needs. For over 15 years students, teachers, departments and faculties have been using free email accounts whose storage space was not in a specific person's hard drive and was accessible from any computer. Using the same premises today the range of services available is far wider and its integration as an academic solution is important.

Cloud computing is a type of internet based computing that provides shared computer processing resources and data to computer and other devices on demand. It is a model for enabling ubiquitous, on demand access to a shared pool of configurable, storage, application and services. This can be rapidly provisioned and released with minimal management effort. Proponents also claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance. It enables Information technology (IT) teams to more rapidly adjust resources to meet fluctuating and unpredictable business demand. Cloud storage is a system that provides functions such as data storage and business access. It assembles a large number of different types of storage devices through the application software which are based on the functions of the cluster application, grid techniques and distributed file system etc

In 2013, it was reported that cloud computing had become a highly demanded service or utility due to the advantages of high computing power, cheap cost of services, high performance, scalability, accessibility as well as availability. Some cloud vendors are experiencing growth rates of 50% per year, but being still in a stage of infancy, it has pitfalls that need to be addressed to make cloud computing services more reliable and user friendly.

II. Statement of Problem

In present times, there exist lots of observations, comments and claim over students' poor performance in academic pursue. These observations are inability to do research work well, lack of promptness in submission of assessments, bad spellings, incapable of using the computer system etc. Inconsistency of students attending lecture at all times could also result to their poor performance academically. Haven't observed the aforementioned problems, the research work was designed to accommodate and makes it flexible for students to

do their assessments and access lecture notes using the computer system or even from their personal devices such as android phones, Ipad, and laptops etc.

III. Aim and Objectives of the Study

The aim of this research work is to develop a software that would aid students learning and performance at Isah Mustpha Agwai I Polytechnic Lafia using cloud computing for e-learning. Other specific objectives include:

• Evaluate the performance of students' assessments electronically on the new platform.

• Provide academic process and efficiency of teamwork between the students in their class work and other assessments using the new platform.

• Provide the link between 2km radius range of the school community that can be accessible.

IV. Significance of the Study

The research work shall at the end be beneficial as follows;

• The research work would be of benefit to the students as it will boost their performance in becoming more familiar and user friendly with the computer system.

• The student would also benefit the new technology in terms of downloading or streaming uploaded lectures on the platform, submitting and doing their course work, interacting with their fellow colleagues via a chat room.

• The platform would support handheld gadgets such as android phones, Ipads and laptops etc, so that both the students and lecturer would enjoy the new technology.

• Lecturers will benefit as it will assist them in evaluating and accessing the students' performance electronically and would reduce stress, since most of these will be done on computer base and accessed through the computer, it would then be less time consuming.

V. Literature Review

eLearning is a term that means something different to almost everyone who uses it. Some use the term to refer to packaged content pieces and others to technical infrastructures. Some think only of web-based self-study while others realize eLearning can encompass real-time learning and collaboration. Almost all agree that eLearning is of strategic importance. Almost all also agree that eLearning is an effective method that should be blended into a corporation's current learning mix. E-learning and its Implication, the use of these facilities, involves various methods which includes systematized feedback system, computer-based operation network, video conferencing and audio conferencing, internet worldwide websites and computer assisted instruction. This delivery method increases the possibilities for how, where and when employees can engage in lifelong learning. Therefore an E-learning system has more advantages than it has limitations.

Different authors use different terminologies including online learning, Internet learning, distributed learning, networked learning, tele-learning, virtual learning, computer-assisted learning, web-based learning and distance learning interchangeably with the term e-learning, making it difficult to come up with a generic term to define e-learning. The common factor in all these terms is the use of technology in the delivery of teaching and learning.

eLearning Guide (2002) Unlike classroom training, e-Learning is very visible. While much of the classroom experience is packaged in the instructor, and in fact varies from class to class, you can easily see and hear all elements of e-Learning. Everything from screen color to content accuracy to the types of practices is readily available for scrutiny.

NIST (National Institute of Standards and technology) defined cloud computing as a model for enabling 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 intersection.

Qusay (2010) said that the contents of IaaS and SaaS are not the same. From the perspective of IaaS, cloud storage provides a service for data storage, archiving and back up. From SaaS point of view, cloud storage service is very diverse the service has online backup document notes saves network disk business, photo preservation and sharing home video. Just like the IaaS business to provide cloud storage. Service providers like Amazon S3, however, there are more cloud storage provider that try to sell the SaaS business, such as Ever note and Google Docs.

Based on the few points presented above and many more will be discussed later, cloud storage could be defined as a model in cloud computing in which remote servers are used to store and accessed data online using virtualization techniques. Cloud storage is not just hardware, but network equipment, storage equipment, servers, applications, public access interface, the access network and the client program.

Wang (2011) said that cloud storage is a type of storage accessible online that stores data across multiple drives with different sizes, located in different areas.

Top ten security risks that are associated with cloud storage
There are top ten security risks that are associated with Cloud computing, esepcially software as a service (SaaS model (Open web application security project (OWASP), 2014) Cloud Top Ten Security Risks). Despite the fact that, the top ten cloud providers have overcome many of their hurdles. So many others need improvement on their functionalities. The security risks, according to OWASP (2014) are as follows

Data Ownership and Accountability
If an organization owns a traditional data centre, it is that organization's responsibility to keep the data secure physically and logically. But once a decision has been taken to host data using public cloud, the organization loses power in terms of the control it has over such data. There should be guirantee of data recovery and backups by all cloud storage providers.

User Identity Federation
The issue of federated authentication should be made compulsory. This is to avoid problems that are associated with migration of applications and service from one service provider to another. Identities needed for backend development could be serious problem during such migrations.

Business continuity and Resiliency
Every IT compliant organization gives great priority to business continuity. But for an organization that employs the services of a storage provider, this responsibility is saddled on the cloud provider and it could be very risky because there is no certainty on how the business can still be managed, if there is a disaster

Regulatory Compliance
Countries or continents may have legal difference when it comes to cloud operates. This causes variance in security levels of cloud storage provider located in different parts of the world.

User Privacy and Secondary Usage of Data
For users of services such as Google Docs. Youtube and Yahoo Mail, their personal data are stored in the cloud and most of the providers are silent about what will happen to personal data of users in terms of usage moreover, the problem of default share to all used by some services such as Facebook. Twitter and linkedln, cloud allow personal details to be reveal to others this issue triggers the need for creation of clear distinction data that can be used for security purpose and those that cannot. It is very common to see advertisements that are related to a user's recent communication. This is because; users' data are been used for secondary purposes.

Service and Data Integration
Cloud is susceptible to interception, baed on this, clients cannot easily take this risk. Data ought to be transferred securely from a user to the cloud provider.

Multi Tenancy and Physical Security
Multi tenancy means the use of the same services and resources for some many clients such as the use of the same CPU, database and network. This is good but the challenge is email support knowledgebase, tutorial using video, manual/guide for users, online chat support for telephone Windows 8.7 Vista, XP, and MAC OS support

Pictorial Design of the Project – Cloud Computing, Isah Mustapha Agwai I Polytechnic, Lafia

Cloud computing
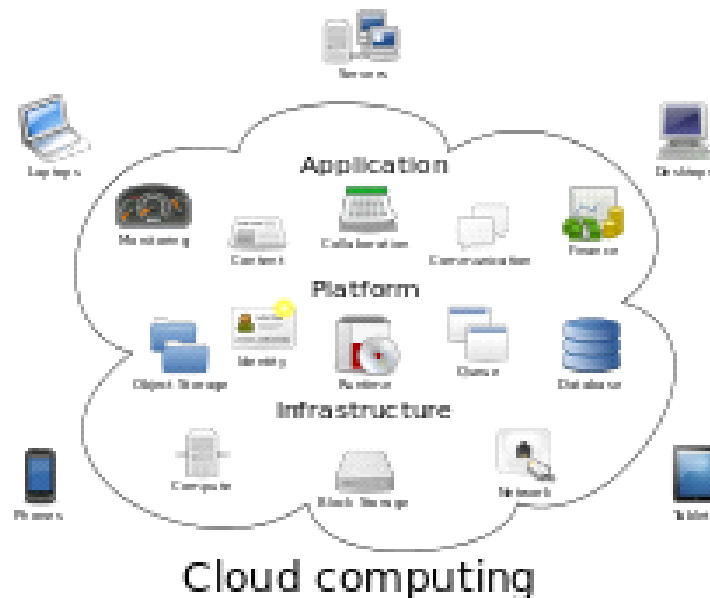
VI.Research Methodology

Methodology is a systematic, theoretical analysis of the method applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. And the methodology used for this research work is the SSADM. **(Structured System Analysis and Design Method)**

Stages of SSADM (Structured System Analysis and Design Method)

The SSADM method involves the application of a sequence of analysis, documentation and design task concerned with the following:

Stage 0: Feasibility Study

The Feasibility stage is a short assessment of a proposed information system to determine if the system can meet the business requirements of an organization, assuming the business case exists for developing the system. The analyst considers possible problems faced by the organization and produces various options to resolve these issues. Either the organization or you must decide if the cost of resolving the problems is worth likely benefit to the project.

Stage 1: Investigation of the Current Environment

Detailed requirements are collected and business models are built in the Investigation of the Current Environment stage. This stage is where you develop a business-activity model, investigate and define requirements, investigate current processing in the data flow model, investigate current data and derive the logical view of current services.

Stage 2: Business System Options

The Business Systems Options, or BSO, stage allows the analyst and you to choose between a numbers of business-system options that each describe the scope and functionality provided by a particular development and implementation approach. After you present these to management, the management then decides which BSO is the better option.

Stage 3: Definition of Requirements

This stage specifies the details in the processing and data requirements of the selected BSO option. In this stage you define the required system processing, develop the required data model, determine the systems for existing or new functions, develop the user job specifications, enhance the required data model, develop specific prototypes and confirm the system objectives.

Stage 4: Technical Systems Options

This stage allows you and the analyst to consider the technical options. Details such as the terms of cost, performance and impact on the organization are determined. You identify, define and select the possible technical system option in this stage.

Stage 5: Logical Design

This stage involves you specifying the new system through designing the menu structure and dialogues of the required system. The steps in this stage include defining the user dialogue, defining update processes and defining the inquiry processes.

Stage 6: Physical Design

This is the implementation phase of SSADM. The Physical Design stage is used to specify the physical data and process design use the language and features of the chosen environment and incorporate installation standards. This stage concentrates on the environment in which the new system will be running.

Data Collection: both primary and secondary method of data collection would be adopted in getting data.

VII.   Scope of the Study

The scope of the study is limited to Isah Mustapha Agwai I Polytechnic, Lafia and its close environment as a case of preference; however some selected departments from each of the three schools will equally be used for the same study. This study would be carried out within the period of six months.

VIII.   Features of devices used with their models and configuration

Devices	Model	Configurations/Key Features
Ubiquity Unifi – G3 Camera	UVC-G3-Dome	• 100.4° / 87.8° Horizontal FOV • 2.8mm Fixed Lens with f/2.0 Aperture • Built-In Microphone for Audio
Standalone Desktop Computer	Hp 590-p0033w Pavilion	Desktop I3-8100 3.6ghz, 4gb Ddr4-2400 RAM 1TB Sata 7200 Rpm HDD
SD Memory Card	SanDisk 32GB Micro SDHC	Capacity: 32GB Read Speed: 80MB/s Write Speed: 20MB/s
Dlink Network Cable	D-link Cat-6 Utp Cable - 305 M	

Ubiquity Sectorial Antenna	Air Max Sector - 15 dBi - 2.4 GHz - 123° - 118°	15dBi, 2.4Ghz
TP-Link High Power Wireless Outdoor CPE	TL-WA5210G	12dBi 2.4GHz
DHCP Server	DHCP Server Cumulus	Cumulus Linux Switch IPv4 and IPv6

- **Ubiquity Unified Camera –** The ubiquity unified doom camera was used for the capturing of live footage in the class room when a lecture is ongoing by the lecturer the camera also have and SD Card port which can record and stored all recording directly from the camera.
- **Standalone Desktop Computer**- The standalone desktop computer was used to install the cumulus DHCP server which runs the application interface.
- **SD Memory Card –** The SD scandisk memory card was used to store and as a means of backup in case as lecture is on-going and there is failure on the server the SD card will still store the information.
- **Dlink Network Cable –** The network cable was use to connect between the TP-link wireless router to the server and to the camera for network communication between the devices.
- **Ubiquity Sectorial Antenna –** The sectorial antenna was used to transmit signal to a wider coverage around the campus environment of 2km.
- **TP-Link High Power Wireless Router –** The TP-Link high power wireless router was used to enable a link between departments before redirecting it to the server and publishing it for students login and streaming.
- **DHCP Server –** The DHCP (Cumulus server) was responsible for transmitting the captured video and saved it as archive. The interface login dashboard and controller is managed on the DHCP server.

IX. Strengths, Weaknesses, Opportunities and Threats of the campus cloud computing system for e-learning

Strength	Weakness
• The campus cloud computing system has enhance easy communication between the lecturers and students • Reduces Cost • It will allow the students to hookup to lectures in a real time once they are connected to wireless hotspot of the institution network. • Internet (data) consumption is zero	•Poor infrastructures like few computer laboratories. •Lack of enough technical skilled lecturers. •Students who are not computer literate will find it difficult in using it.
Opportunities	**Threats**
• Students can easily interact with each other and also with others within the campus wireless hotspot coverage. • Allows the student to get feedback from the lecturers. • Learning new skills.	• Technological challenges

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