CLOUD COMPUTING: A NOVEL DIGITAL STORAGE PARADIGM

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Abstract: *Cloud computing has become a necessity among academic scholars in educational institutions to reduce the prevalence rate of file loss. The primary focus of this study is storage facilities in cloud computing. Many cloud storage options include Office Live, OneDrive, Google Drive, Google Keep, and Google Docs. The user receives services through the cloud computing system, which is scalable and reliable. One of the main objectives of cloud storage is to prevent file loss and damage. In addition, it aims at exposing lecturers to efficient ways of using different cloud storage facilities. Most cloud computing software currently consists of reliable services delivered through data Centres built on servers in various levels of virtualization technologies. Another objective of cloud storage facilities is that the service or files are accessible anywhere in the world, provided the system is connected to the internet. Cloud service tools necessitate good internet access; cloud storage may not be possible without access to the internet. Furthermore, cloud computing can guarantee data security, and the user does not need to protect the data himself again. Therefore, there is a need to ensure an adequate understanding of different storage facilities and their usage among lecturers in tertiary institutions to achieve this goal. Against this backdrop, the paper examined the various storage facilities and their usage.*

Keywords: Cloud computing, storage, internet, data security, dropbox and google drive

INTRODUCTION

A relatively recent method of data storage, cloud computing has existed for a long time. Based on its distinctive features and utilization of distant resources via the internet, it is swiftly gaining popularity among users. On the other hand, data kept in the cloud can be accessed and checked remotely over the internet. While some academics seem to have no idea what cloud computing is, many claims to be having difficulty understanding how to use cloud computing and its tools. The professors can maintain an accurate record of information in the cloud without losing it because they have a solid understanding of cloud computing components.

Cloud storage can be accessed as long as mobile devices are connected to the internet. According to Aremu and Adeoluwa (2022), M-learning uses internet-connected laptop computers, iPads, mobile phones, tablets, and personal digital assistants (PDAs) for a never-ending supply of learning opportunities.

The researcher claims that many academic specialists are not aware of the value of cloud computing or how to use it effectively. Because of their ignorance or lack of understanding, lecturers don't seem to support the successful adoption of cloud computing. Cloud computing is a relatively new kind of distributed computing that is still in its infancy, according to Lamba and Singh (2011). A new paradigm in computing called cloud computing intends to offer scalable, affordable on-demand computing

infrastructures with high service quality. Nowadays, there are various definitions and interpretations for "cloud computing."

Different scholars have different definitions of cloud computing. "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 cloud provider interaction," according to the National Institute of Standards and Technology (NIST, 2011). According to Chandran and Angepat(2010), cloud computing is an internet-based architecture in which shared data, software, and resources are accessible to computers and other devices on demand (2010). With various topologies, services, and deployment patterns, cloud computing technologies can coexist with different technologies and software design methodologies (NIST, 2011).

Academic lecturers are encouraged to be educated on cloud software to prevent data loss. Material, including lectures and other private information, can be saved in the cloud to prevent loss or distortion. More and more accounting software is being hosted off-site or in the cloud. Instead of being installed on the entity's computer and storing data, the program is kept on a distant server. Using Internet-connected cloud technology, users can save data or documents online, referred to as cloud storage. Accessing your data from anywhere is another benefit of the cloud. This new cloud technology is also linked to improved accounting data security. Not all citizens have access to information; the administrator has the power to control who does.

RATIONALE FOR CLOUD STORAGE IN EDUCATIONAL SYSTEM

The prevalence of file loss in higher education is frightening and requires an immediate response. However, there is an immediate urgency to stop the situation. The researcher discovered that some lecturers are unfamiliar with the importance of various cloud services that can be used to avoid document loss in higher institutions. At the same time, the researcher has observed that some lecturers lack adequate knowledge of how to effectively use various cloud applications that can assist in preventing document loss. Due to a lack of basic knowledge and awareness, many lecturers appeared to be unfamiliar with using some cloud storage tools. However, cloud computing helps students, teachers and administrators access learning materials, easily collaborate with one another, and save money on data storage. Gordon (2019). The use of cloud services such as Dropbox, OneDrive, Google Drive, Google Keep, Google Docs, Live Skydrive and Office Live can reduce file loss and improve appropriately. Having a positive attitude toward something about which one is unsure can be challenging. Due to a lack of basic knowledge and awareness, many lecturers appeared to be unfamiliar with using the tools mentioned above. (Badger, Grance, Patt, & Voas, 2011).

CONCEPTUALIZING CLOUD COMPUTING

Cloud computing refers to both the applications delivered as services over the Internet and the hardware and software that supports those services in data centers. Cloud computing can take many forms and be classified into many paradigms. The mobility and cloud computing paradigms are radically changing how we communicate, access and use information resources, and connect with peers and colleagues, affecting all aspects of our lives, including shopping, banking, and health care education (Verma, Dubey, & Rizvi, 2012). Unlike traditional server-based models, cloud computing obtains resources and services from a pool. The resources and services in a cloud are frequently connected with high processing power, scalable computing, and vast volumes of storage capacity (Verma et al., 2012).

On the other hand, the cloud allows enormous storage space to accept extensive data worldwide. It can be used without installation before any personal files can be accessed remotely from any computer, although it requires internet access. Learners can access knowledge from centralized shared resources at

any time and from any location they want, but they must have access to the internet. Cloud services allow you to save data from your local computer on the internet and access it from anywhere.

Rather than allowing users to save educational resources to their devices, cloud computing might store many of them while also providing infrastructure, platform, and application services (Chen, Liu, Han, & Xu, 2010). It can also offer infinite processing capacity for a variety of jobs. For example, mobile cloud learning combines cloud computing and mobile learning (Hirsch & Ng, 2011). Cloud computing refers to various cloud storage options that can store data in the cloud via the internet. Cloud-based data is more secure and safeguarded against loss, theft, and phishing.

CLOUD COMPUTING'S FUNDAMENTAL MODEL

According to SPIModel (2010), there are three models for cloud computing.

1. Software as a Service (SaaS) is a software distribution paradigm in which a service provider hosts programs like Dropbox, Google Drive, Google Docs, and OneDrive and makes them available to users over a network, often the internet.
2. PaaS (Platform as a Service) is a model for delivering operating systems and related services over the internet without downloading or installing. This does not necessitate any installation or downloading, but it does necessitate remote access. This platform allows users to access information from anywhere on the earth as long as they have internet access.
3. Infrastructure as a Service (IaaS) refers to outsourcing operational equipment such as storage, hardware, servers, and networking components. This could also be a remote server with massive storage facilities for large data delivery.

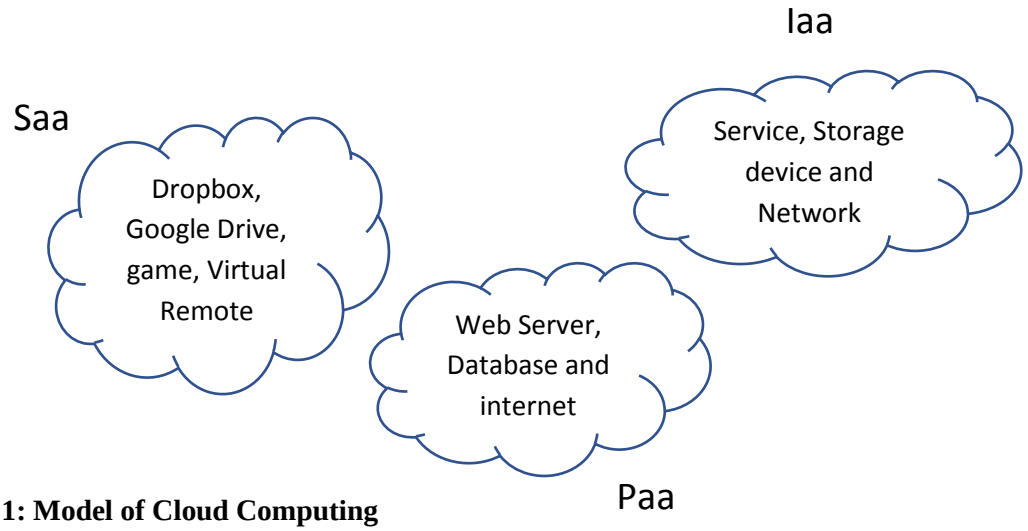

Fig. 1: Model of Cloud Computing

Source: SPIModel (2010)

TYPES OF CLOUD COMPUTING

Alex (2020) identified four types of Cloud computing: public, private, hybrid, and community.

1. A **Public Cloud** is made available to the general public on a pay-as-you-go basis; the marketed service is Utility Computing.

2. **The private cloud** refers to an organization's internal data centres that are not open to the general public.
3. **Hybrid Cloud:** Organization host some critical, secure applications in private clouds.
4. **Community Cloud:** The cloud infrastructure is shared between the organizations of the same community

BENEFITS OF CLOUD COMPUTING IN THE EDUCATIONAL SYSTEM

Beyond being a basic storage solution, cloud computing has other advantages. It has become critical in modern workplace productivity, efficiency, growth, and organization. Whether utilized at home or work, the benefits of cloud computing are apparent. It improves collaboration and lowers expenses while maintaining data security. In the field of education, cloud computing has a lot to offer. It also contributes to the advancement of procedures. Elechi (2016) emphasized the following advantages of cloud computing in educational settings. First, cloud-based information can be accessed from anywhere with an internet connection. Second, academics can use DropBox to accomplish a variety of activities in the classroom. These academic activities are divided into several categories, beginning with the ability to work on files from anywhere at any time and receive immediate feedback from many people simultaneously and asynchronously. Third, any work saved locally on Dropbox can be synced when the system is backed up online. Dropbox may be used on both a smartphone and a computer. If the local system crashes, all the data is automatically backed up, and the information stored on the drop box may be retrieved without any data loss.

CHARACTERISTICS OF MOBILE CLOUD LEARNING

Chang, Bacigalupo, Wills, and De Roure (2010) state four significant characteristics of mobile cloud learning as follows:

1. **Storage and sharing:** Learning outcomes and resources can be saved and shared in the "Cloud," which offers nearly limitless storage and processing capacity. Documents can be changed and shared in the cloud using services like Google Docs, Live Skydrive, Office Live, and Dropbox.

2. **Universal accessibility:** Students can learn anywhere they have internet access. Because software, programs, and data are hosted on cloud servers, mobile cloud learning allows for a low-cost access interface. This increased accessibility will be highly beneficial to develop countries.

3. **Collaboration:** Learners can collaborate from anywhere in the "Cloud." They can collaborate to build shared knowledge through frequent and convenient contacts from the perspective of social learning.

4. **Learner-centered:** Mobile cloud learning is people-oriented; therefore, it caters to the specific needs of students. Learners on the "Cloud" can choose appropriate resources and track their progress and outcomes.

Mobile cloud learning is primarily used to facilitate communication between educators and students, manage teaching and learning processes, provide knowledge to interested and willing users, and be shared among learners. (Chang, Bacigalupo, Wills, & De Roure, 2010) However, observations have shown by the researcher that the majority of young people today communicate primarily through mobile phones, the Internet, and social media. Learning and educational technologies have been more quickly adopted by today's learners than traditional learning methods, as these new learning methods allow individuals to share their knowledge and experiences through internet sites. Because these learning technologies are adaptable, 'fun,' and manageable, learners have demonstrated improved learning habits (Sharif, 2010).

ADVANTAGES OF CLOUD STORAGE

1. **The cloud keeps content up-to-date**

Many materials and textbooks used in schools are outdated; some even contain ten or older information. Because the world evolves and advances rapidly, and information is continually updated, the information in these resources is sometimes obsolete and even erroneous. Teachers can change their content in real-time using cloud-based materials. Students would always have access to the most up-to-date instructional resources via cloud-based content.

2. **Cost savings**

Students can access lesson plans, laboratories, grades, notes, PowerPoint slides, and just about anything digital via cloud computing. Teachers can quickly upload and share information with their students. Students can access these materials anytime and from any location as long as they have internet connectivity. They'll never have to worry about misplacing a single significant piece of paper again. This is when Google Drive comes in handy. However, the material must be saved in Google Drive using a Gmail account and then shared with the world.

3. **Easy access**

Students can access lesson plans, laboratories, grades, notes, PowerPoint slides, and just about anything digital via cloud computing. Teachers can quickly upload and share information with their students. Students can access these materials anytime and from any location as long as they have internet connectivity. They'll never have to worry about misplacing a single significant piece of paper again. This is when Google Drive comes in handy. However, the material must be saved in Google Drive using a Gmail account and then shared with the world.

4. **Disaster recovery**

The cloud can back up all critical files and enable other file security. Anything from a natural disaster to unanticipated power outages to a malware attack could deplete one's resources at any time. As a result, the cloud serves an essential purpose by providing data backup on numerous servers worldwide.

5. **Protect and secure data**

Contrary to popular opinion, cloud computing services provide excellent personal information protection. Data security and protection are priorities for cloud service providers, and all of it will be encrypted. In addition, cloud services like Dropbox, Google Drive, Google Docs, and Google Keep are often set up by users on their own.

CATEGORIES OF CLOUD STORAGE SERVICES SUCH AS SOFTWARE AS A SERVICE (SAAS)

- ✓ Dropbox
- ✓ One Drive
- ✓ Google Drive
- ✓ Google Keep
- ✓ Google Docs,
- ✓ Google form
- ✓ Live Skydrive,
- ✓ Office Live

Users can store files online and transfer them between devices using Dropbox, a cloud storage service. Minjuan, Yong, and Muhammad (2014) stressed that mobile cloud learning enhances the learning process for teachers and students. Although some people may have a more challenging time accessing the program, it enables more people to learn using their mobile devices without worrying about other technology. In other words, mobile cloud learning brings the classroom to the learner in contrast to conventional methods. In terms of classroom management, it helps both the teachers and the pupils. However, to benefit from learning, users must accept risks like losing control over programs and jeopardizing the security and privacy of their data.

HOW TO ACCESS DROPBOX APPLICATION

Both the desktop and laptop versions of the application and the mobile version must be downloaded at www.dropbox.com. You must register with your email address before downloading any program. The file will then be

downloaded automatically after that. File synchronization across computers and mobile devices is accomplished using the Drop Box program. As long as the laptop or desktop is online, users can browse files in dropbox folders from anywhere.

Users can now exchange, store, and host data on the Internet without using mainframes, thanks to cloud services (such as Dropbox, OneDrive, and Google Drive).

Fig. 2: Diagram on how to start Dropbox
Source: Dropbox (2022)

Steps to install Dropbox

1) Download dropbox software from the google website to your laptop or desktop
2) Make sure your system is connected to the internet
3) Local the file on the system, double click the file
4) Click I'm new to dropbox if you are a new user
5) Enter your email address as the user name
6) Enter the password
7) Follow the onscreen steps during the installation
8) Click Finish
9) The software will be synchronized

Note: There is a need to download the same software on the mobile device

Follow the above steps to install the software on the mobile phone

i. Enter the username and password
ii. The dropbox software will automatically be synchronized on the mobile phone
iii. As long as your system is connected to the internet and your mobile device is also connected to the internet, the file can now be saved on the application either through the mobile phone or on the computer laptop or desktop.

Dropbox helps to store files on the cloud with easy accessibility from anywhere in the world.

One Drive

With Windows 8 and 10, this cloud application is always preinstalled on the desktop. It is a storage service offered by Microsoft. Windows 8 and 10 include OneDrive, which shows up in the file explorer alongside all of the material stored on the computer's hard drive. However, anyone may access it online by downloading the OneDrive apps for Android, iOS, Windows Phone, and Xbox. Any content can be stored in the service and accessible from any Windows PC or mobile device, including photographs, videos, and documents.

Google Drive

A complete set of office apps and cloud storage, including 15GB of free storage, are combined in Google Drive. Download and install the Google Drive desktop application for convenient access and remote file management. The file will be automatically synchronized after the work is done.

Google Drive is the best cloud storage option for Chromebook users since it is incorporated into Google's web-based operating system, Chromium. Like other cloud storage services, Drive offers iOS and Android apps that let you see and manage files from your phone. A built-in office suite in Google Drive allows you to edit documents, spreadsheets, and presentations. Files can be uploaded to Google Drive by simply dragging and dropping them there. Google Drive also has access to Gmail attachments.

Procedure

Below are the procedures to operate google drive as one of the cloud storage in a cloud computing environment. The steps by step are written by ogunmodede (2022)

- There is a need to have an account with Google before accessing Google Drive.
- Type www.drive.google.com on the web page.
- Click on the new folder to create a folder where the file will be stored
- Click on upload files to upload files
- Click on the upload folder if there is a need to upload the complete folder from the computer.
- Select the location
- Select the file or folder
- Click open
- One of the advantages of Google Drive is that it gives room for uploading a complete folder from the computer.

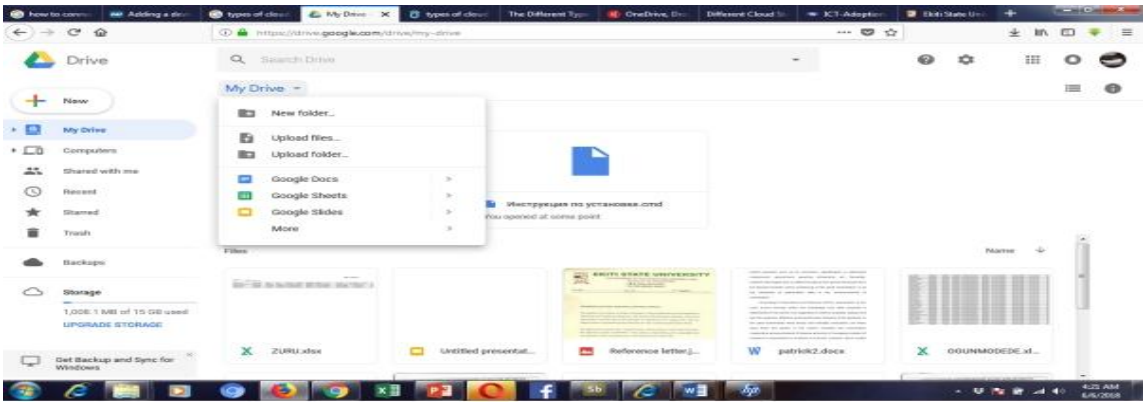

Fig. 3: Google Drive Procedure

Source: Ogunmodede (2022) as generated through screenshot from (Google drive)

Figure 3 above shows what the Google Drive environment looks like. Any available files or folders in google drive are well protected.

CONCLUSION

This study explains how cloud computing could save tertiary education management from data loss. The study further identified various cloud systems that could be useful for e-management in the citadel of learning, such as Dropbox, Google Drive, One Drive, Google Keep, Google Forms, Live Skydrive and Office Live. However, the study discovered that files could be accessed remotely without an internet connection.

SaaS, PaaS, and IaaS are the three fundamental cloud-computing models in the teaching and learning environment. Google Drive and Dropbox are two essential SaaS tools that can

help protect documents from loss. On the other hand, Google Drive storage allows for remote access via open or closed evaluation. Therefore, it was necessary to have internet access for cloud computing to be used.

Tools for cloud services could assist in reducing some of the ambiguity surrounding local storage devices. However, the bandwidth would need to be enhanced to increase the cloud space's storage capacity. In addition, internet access is the main barrier to frequent cloud services; these services would be impossible without an internet connection. Nevertheless, the pricing is fair, and the service is solid.

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