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Use of Cloud Computing by Professional Librarians in Curtailing the Spread of Covid-19 Pandemic: The Nigerian Scenario

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Abstract

Recent events across the globe show that the outbreak of different diseases has been on the increase. The study highlights briefly on the origin of Covid-19, its symptoms and the ravaging challenges the world saw as a result of the Covid-19 pandemic. The study further gave definitions of cloud computing, highlights the different models of cloud computing upon which anchor the bases of the librarianship profession and went further to highlights how this global pandemic can be curtailed with the application of cloud computing technology models through information preservation, dissemination and accessing these information to prevent it spread in Nigeria.

Keywords

Cloud computing , Covid-19, Libraries, Librarians, Pandemic

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Introduction

Information technology is beautiful. It tends to make what we imagine as impossible to be very possible and within reach. In the past decades, the emergence of devastating diseases emanating from different parts of the world have sent tensions to various medical practitioners and this have redirected the steps of researchers back to the laboratories on how to curb the menace of these

diseases. During the peak crisis of Covid-19 pandemic, economic activities across the globe still survive to keep the nations afloat. Offices and families still engage in their daily functions to keep activities alive. However, the tendency of physically coming in contact has to be highly prohibited for the sake of contracting the disease which rapidly crept into all nations of the world. Singh, et al (2021) stated that, the current situation of the COVID-19 pandemic has compelled people to work from their homes. In Nigeria, Federal and States Civil Servants on level 1-12 were asked to work from their homes, while officers on level 13 and above were properly guided with the use of nose mask, hand sanitizers and to observe social distances as they have to communicate, and collaborate online. This communication and collaboration from distance and not coming in physical contact has brought to the prime, the relevance of cloud computing in curbing this crisis of Covid-19 pandemic. These pandemics outbreaks have led to the untimely death of millions of people in the world and the statistics of the deteriorating health across the globe is still counting and increasing on daily bases.

What is Cloud Computing?

This is an online electronic platform, where information resource seekers can use various electronic devices such as Smart Phones, Laptops, Personal Computers (PCs) etc to access Software designed to help analyze, configure, optimize or maintain a computer database. This technology provides for easy utility of computer programs in managing of billions of information resources across the Internet. According to Peter and Timothy (2011), they defined cloud computing is 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 interaction. It is an information technology model designed for aiding a universal, convenient, on-demand network access to a shared pool of configurable computing resources that can quickly provide and disseminate information with little running cost or service provider interaction. Lakshman, Bapuji and Rajendra (2013), defines cloud computing as the product of the combination of grid computing, distributed computing, parallel computing, and ubiquitous computing, with the aim of building and forecasting 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 these

powerful computing capacity to end-users. It's a technology that uses the power of the cloud to proffer solutions to industries, organizations and nation's challenges. An example of Cloud Computing model is Software as a Service (SaaS), where you input data on software and the data is transformed remotely through a software interface without your computer being involved.

This technology gives you the ability to remotely work on and transform data (for example, coding an application remotely). It should be clear that cloud computing and cloud storage are two (2) different entities. While cloud storage is essentially a system that allows you to store data on the Internet, as you would save on a computer system, cloud computing is used to work on and complete specified assignment. They are both related in that you have to move data to the cloud (cloud storage) before you can make use of cloud computing systems.

Cloud computing technology have tremendously influenced the daily routine of the library activities which involves the acquisition of information resources, processing and organizing of information resources and making these recorded information available to library users. These services provided on cloud computing are physical services provided in the library settings. However, the advent of cloud computing has taking these services to the cloud wherein the models of Software-as-a-service (Saas), Platform-as-a-service (Paas) and Infrastructure-as-a-service (Iaas) are used to deploy these daily routine of the library to the cloud. The deployment method of rendering these services includes the public deployment method; which everyone has access with the web interface, which is generally run on a free or pay-as-you-go model, the second is the private deployment method; which provides services to specific institutions or individuals, the third is the hybrid deployment method; which combine the public and private deployment method together, while the last deployment method is the community deployment method which offer collaborative services to communities.

The Coronavirus popularly referred to as Covid-19 pandemic originated from the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS COV-2) which came to bare towards the end of 2019 at Wuhan province of China. It was first isolated from three people with pneumonia connected to the cluster of acute respiratory illness cases. Chaplin (2020), Robert and Stuart (2021) stated that the International Committee on Taxonomy of Viruses (ICTV) announced "Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)" as the name of the new virus on 11 February 2020 that this name was chosen because the virus is genetically related to

the coronavirus responsible for the SARS outbreak of 2003. Consequently, it was the World Health Organization (WHO) that gave the official name as Covid-19. However, in November 2021, a variant of the SARS-CoV-2 coronavirus emerged, and was named omicron by the World Health Organization (WHO). WHO currently lists the omicron as a variant of concern. The spread of Covid - 19 has turned into a global pandemic which affect all areas of life, and economic activities. The entire physical library structure was not left behind, as it was turned a caricature of itself, as the fear of not getting in contact with the disease makes the library users stay away from the library. According to Elsevier (2021), it was stated that the impact of the novel coronavirus (COVID-19) outbreak has led to a global lockdown, putting countries on high alert with more than 97.46 million positive cases recorded globally, and social separation appears to be the only viable approach to enclosing the virus at present. Library patrons now switch over to the use of online resources to keep them abreast with research activities and the trend of happenings around the globe. However, academic institutions that have their resources available in the cloud thrive very well. The application of this information technology by these academic institutions enables them to checkmate the spread of Covid-19 Pandemic. Professional librarians that are very vast in use of Information Communication Technology (ICT) facilities bring to the fore and update their users on the various ways this disease can be contracted and ways it can be avoided. Most academic institutions and librarians organized series of awareness programmes on how Covid -19 can be contracted and how it can be controlled. According to WHO (2020), COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes. It went further to state that droplet transmission occurs when a person is in in close contact (within 1 m) with someone who has respiratory symptoms (e.g., coughing or sneezing) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets. Ong SW, Tan YK, Chia PY, Lee TH, Ng OT, Wong MS (2020), also stated that transmission may also occur through fomites in the immediate environment around the infected person. Therefore, transmission of the COVID-19 virus can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person (e.g., stethoscope or thermometer).

Curtailing the Spread of Covid-19 through Cloud Computing

Covid-19 forced face-to-face interactions and activities to be moved to a digital platform. To this end educational activities and rendering of library daily routine services was carried out in a virtual classroom through televisions and Internet, such that, seminars and conferences are organized online (Zoom classes). Medical practitioners and ancillary services are carried out through video and conference group calls. With Software as a Service (SaaS) model in cloud computing, information on reference services can be entrenched into the cloud system. Information seekers and reference services providers do not need to come in contact face to face, thereby creating avenue for spreading the coronavirus disease.

Gurudatt, Jayant & Rajnikant, P. (2012), define Software as a service (or SaaS) as a way of delivering applications over the Internet-as a-service, that instead of installing and maintaining software, you simply access it via the Internet, freeing yourself from complex software and hardware management .According to Dowling (2010) Software as a service applications are accessible from various client devices through a thin client interface such as web browser. He went further to state that users are oblivious to the underlying cloud infrastructure such as Dropbox, Google Apps (e.g., Gmail, Google Docs, Google site etc.). Sumit, (2013) stated that SaaS is emerging as a viable outsourcing option for clients interested in paying for the right to access a standardized set of business software functions through the network, by creating an architecture that provides no mechanisms for customizing the software on the vendor side; all customization is done on the client side through standardized interfaces. By the application of this model to librarianship, reference librarians can apply the digital reference services such as Email, Ask a service, Voice Over Internet Protocol (VoIP), Web form, instant messaging, text base chatting and thus put information seekers at space from reaching each other. According to Akturk, Talan and Senol (2021), they stated that pandemic monitoring database have been created, and integration have been established between electronic government services and health services to be used for struggling against pandemic, and intermediate application have been developed. With this Software as a Service (SaaS) platform, researchers and other information seekers need not come in direct contact with the reference librarians for enquiries. With Google Apps Engine any application can be accessed using a browser and it can be deployed on thousands of computer through the Internet. In this case the Software provider

manages access to the application from his server, which include security, availability and performance while the clients only connect to the Internet and access the application. The client has no hardware, Software to buy or install, maintain or to update. This technology meritoriously reshapes the software deployment prototype from program applications with sincere licensing fees and prolonged implementations to one that establishes a dynamic, “pay-as-you-go” Internet delivered service relationship. The beauty of utilizing this technology is that it enables library management to make their software applications run in a virtual environment. Parent’s institutions of the library don’t need to buy expensive software programs that consume so much time during installation and even systems space after installation. This technology makes both the librarian and the library users communicate independently and still achieve sustainable result. The tendencies of contracting Covid-19 pandemic become very slim.

Professional Librarians with the wealth of their information technology knowledge can also bring to a halt the spread of the Covid-19 pandemic with the application of the Platform-as-a-service model of the cloud computing technology. The Platform-as-a-service model, employs infrastructure, operating system and middleware to drive developer productivity, leverages multi-tenancy and dynamic provisioning. Microsoft Azure (2021), stated that, it is a platform that provides a framework that developers can build upon to develop or customize cloud-based applications. Similar to the way you create an Excel macro, PaaS lets developers create applications using built-in software components. Cloud features such as scalability, high-availability and multi-tenant capability are included, reducing the amount of coding that developers must do. Gurudatt and Jayant (2011), defines Platform-as-a-Service (PaaS) as a set of software and development tools hosted on the provider's servers. They went further to state that it is a kind of idea that someone can provide the hardware (as in IaaS) plus a certain amount of application software - such as integration into a common set of programming functions or databases as a foundation upon which you can build your application. Google Apps engine is one of the most famous Platform-as-a-Service providers, it allows developers to write and run their own applications on the platform and also helps developers store data and manage the server.

The Technical Librarians otherwise referred to as the Cataloguing and Classification Librarian can conveniently deploy the various library software tools into the platform as a service of the cloud computing in order to curtail Covid-19 pandemic. The introduction of Library of Congress

Web into the base of the platform as a service model in cloud computing provides for access to full text schedule of the manual contains. Library users do not need to visit the library or come in contact to each other before they can have access to classification numbers and subject headings. The Library of Congress Online Catalogue (LCOC) which is a database contains vast collection of information materials, with searching aids such as cross-reference and scope notes displays to assist users. Online Public Access Catalogue (OPAC), is an online bibliography of the library collection which includes prints and non-prints such as books, journals, magazines, newspapers, audio-visuals, government publications, theses and electronic resources. According to Fabunmi & Asubiojo (2013), it is an interface of information retrieval system which assists information searchers to access resources of libraries, using several access points. Also the application of the following library software such as Koha, Z39.50, TINLIB, GLAS, LIBSYS, Alice for Windows etc, into the infrastructure, operating system and the middleware to drive developer of the platform as a service model of cloud computing can enhance the curtailing of Covid-19 pandemic.

Professional librarians can further hinder the spread of Covid 19 pandemic through Cloud computing with the aid of the Infrastructure as a Service (IaaS) model. This model can also be referred to as Hardware as a Service (HaaS) model. According to Cloud Computing Tutorial (2019), it's a model that provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc. It's a service delivery method that provides users with the prospect of a cybernetic server that has certain supercomputer power, retention and storage ability to run the operating system while cloud providers host the infrastructure components that are traditionally present in an on-premises data center. It is the base needed to launch any organization's services over the internet in the cloud platform, to make their services available to clients and applications to run them smoothly. It's a network architecture. In this case the client, is provided access to the virtualized components in order to build their own information technology platforms.

The Readers Service Librarian (RSL), can judiciously apply this model to curtail the spread of Covid-19. He can virtual provide a structure whereby patrons can be attended to, for instance hard copy information resource materials demanded by patrons can be delivered to them through the use of Cargo drone technology facilities. According to Onohwakpor & Atamu (2020), they

state that drones have a rapid way of delivering information to users with little or no stress of physically moving from one location to another with the hardcopy of the information resource materials. To this end, the placement of Infrastructure as a Service model of cloud computing by readers services librarians will go a long way in curtailing the spread of Covid 19 pandemic, this is because it provides for virtual mechanism, virtual storage, virtual dissemination of information, virtual networking technology, data center space and other hardware assets as resources that clients can provision.

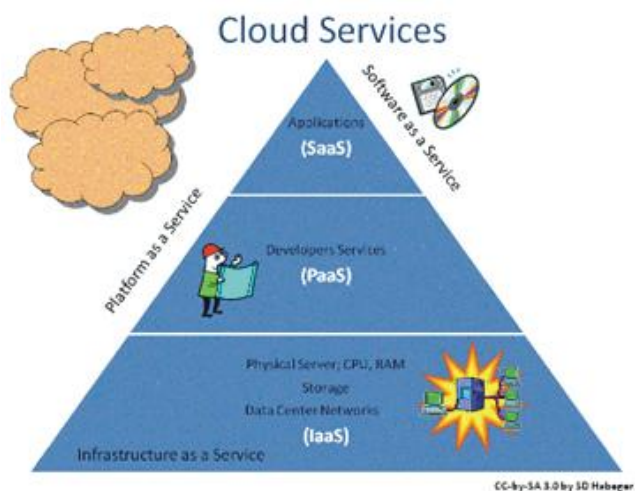


Fig.1: Cloud computing models

According to Wikimedia.org, this image explains the 3 types of cloud service models. Infrastructure-as-a-model (IaaS) is the most basic cloud-service model, provides physical or virtual machines and other resources. Platform-as-a-model (PaaS) cloud act as a computing platform, typically including operating system, programming language execution environment, database, and web server. Software-as-a-model (SaaS) provided access to application software and databases, manage the infrastructure and platforms that run the applications.

Conclusion

Cloud computing no doubt is a welcome development to developing countries. Its technological dividends has gone beyond its imaginations as its application keeps metamorphosing to suit any situation it comes across to the benefits of human existence. This study basically showcased the paybacks of accessing and utilizing cloud computing technology in curtailing the spread of Covid-19 pandemic in the Nigerian economy scenario. The study reveals how reference

librarians can conveniently apply the Software as a service model in rendering library routine services to its users without both parties not necessarily coming in-contact with each other, and thereby hindering the spread of Covid-19, which is majorly spread by coming in contact with an affected person. The study further highlights how the Technical Librarian can apply the Platform-as-a-services model of cloud computing to library software cataloguing and classification tools to render online services to clients without necessarily coming in-contact with each other and by so doing curtailing the spread of Covid-19 pandemic and finally the study bring to view how the Readers Services Librarian (RSL) can apply Infrastructure-as-a-service model of cloud computing to checkmate the spread of Covid-19 pandemic. No doubt the future is bright with the advent of information technology facilities springing up every day to enhance service deliveries in the library world.

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