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OVERVIEW OF CLOUD COMPUTING, BENEFITS AND DRAWBACKS

Nweso Emmanuel Nwogbaga¹

¹Lecturer

Department of Computer Science
Ebonyi State University
Abakaliki, Ebonyi State,
Nigeria.

Ogbaga Ignatius Nwoyibe²

²Department of Computer Science
Ebonyi State University
Abakaliki, Ebonyi State,
Nigeria.

ABSTRACT

Cloud computing is an infrastructure for facilitating computing services through the internet on requirement and pay-per-use access to a group of shared resources such as networks, storage, servers, and applications, without physically connecting them. The cloud is used as a storage location and database can be accessed from anywhere. This paper have carefully reviewed cloud computing and its uses. How we can implement cloud for better performance and different benefits and the drawbacks.

KEYWORDS: Cloud Computing, Cloud Infrastructure, Database

1.1 INTRODUCTION

National Institute for Standards and Technology defined cloud computing as a model for enabling convenience, on-demand network access to a shared pool of configurable computing resources (such as networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. According to Jeff Kaplan (2007) cloud computing is defined as a broad array of web-based services aimed at allowing users to obtain a wide range of functional capabilities on a pay-as-you-go basis that previously required tremendous hardware and software investments and professional skills. Summarily, it can be simply defined as the delivery

of computing services over the internet as on-demand and pay-per-use basis.

1.2 WHY CLOUD COMPUTING

Cloud Computing is basically a step on from Utility Computing. It is a collection of an integrated and networked hardware, software and Internet infrastructure (called a platform). However, using the Internet for communication helps to provide hardware, software and networking services to clients. This platform enables the provision of cost effective infrastructures and applications and as well reduces its attendant complexities. The cloud is also used as a storage location using the database. The large number of web applications makes the use of distributed storage solution an option in order to scale up the services.

1.3 COMPARISON BETWEEN TRADITION COMPUTING AND CLOUD COMPUTING

CLLOUD COMPUTING	TRADITIONAL COMPUTING
Programs or application runs on a connected server or servers.	Programs or applications runs on local computing devices such as a PC, tablet or Smartphone.
Resources are centralized on the server in order to provide a scalable and on-the-demand computing services	The client connects with the server directly in order to get their resources.
It can run concurrently or supply data to more than one user at the same time utilizing the concept of Virtualization.	It does not make use of data virtualization. Resources are distributed based on first-come-first-serve basis.

1.4 COMPONENTS OF CLOUD COMPUTING

The components of cloud computing are as enumerated thus;

Clients: The cloud computing client is either the computer hardware or software which relies on cloud computing application for service delivery. Without cloud applications, the cloud client is useless.

Services: These include products, services and solutions that are delivered in real-time over the Internet. For example, Web Services that can be accessed by other cloud computing components and software over the internet.

Applications: It helps to eliminate the need to install and run the application on the users own computer, thus alleviating the burden of software cost and maintenance.

Platform: A cloud platform, such as Platform as a service, is the delivery of a computing platform, or solution stack as a service, facilitates for deployment of applications without the cost and complexity of

buying and managing the underlying hardware and software.

Storage: Cloud storage helps in the data storage and data delivery services. Data or information stored in the cloud can never be destroyed by any disaster.

Infrastructure: This is the delivery of cloud computing services using internet facilities such as servers, clients, platforms, applications, etc.

2.1 OVERVIEW OF CLOUD COMPUTING

2.1.1 Cloud Computing Platforms:-

As its name suggests, cloud computing platform is an interface that allows developers to write applications that run in the cloud, or use services provided from the cloud, or both. Different names are used for this kind of platform. The names include but not limited to; on-demand platform, platform as a service (PaaS), etc. Whatever it is called, this new way of supporting applications has great potential. Contextually, there are three types of cloud services. The services are as illustrated in the figure below

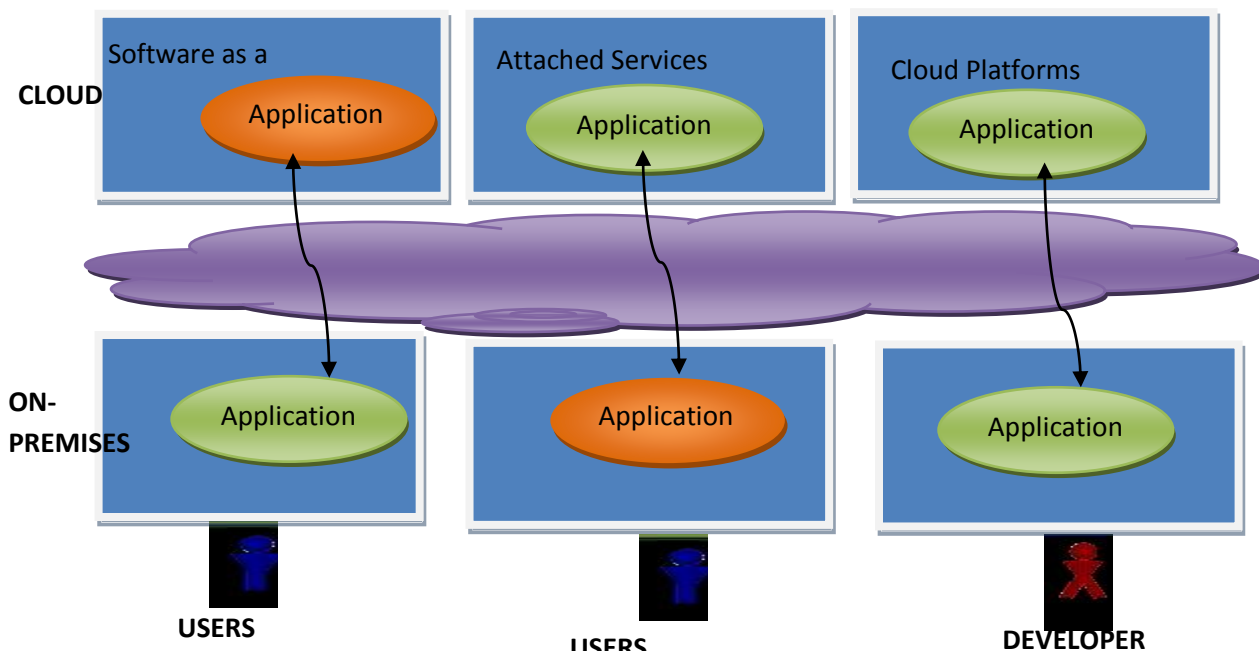


Figure 1: Cloud Computing Platforms

In order to understand what cloud platforms is all about, it is useful to start by looking at cloud services in general. Figure 1 above shows that services in the cloud can be grouped into three broad categories. Those categories are:

- **Software as a service (SaaS):** In this platform, application runs entirely in the cloud, i.e., on servers from an internet service provider. Moreover, the on-premises client is just a browser application or some other simple client. An example of SaaS application is Salesforce.com.
- **Attached services:** Every on-premises application provides useful functions on its

own. An application can sometimes enhance these by accessing application-specific services provided in the cloud. This is because these services are usable only by this particular application, they can be thought of as attached to it. An example of these services is Apple’s iTunes.

- **Cloud platforms:** A cloud platform provides cloud-based services for creating applications. Rather than building your own custom foundation application, one would build on a cloud platform. As in Figure 1 above the direct users of a cloud platform are developers, not the end users.

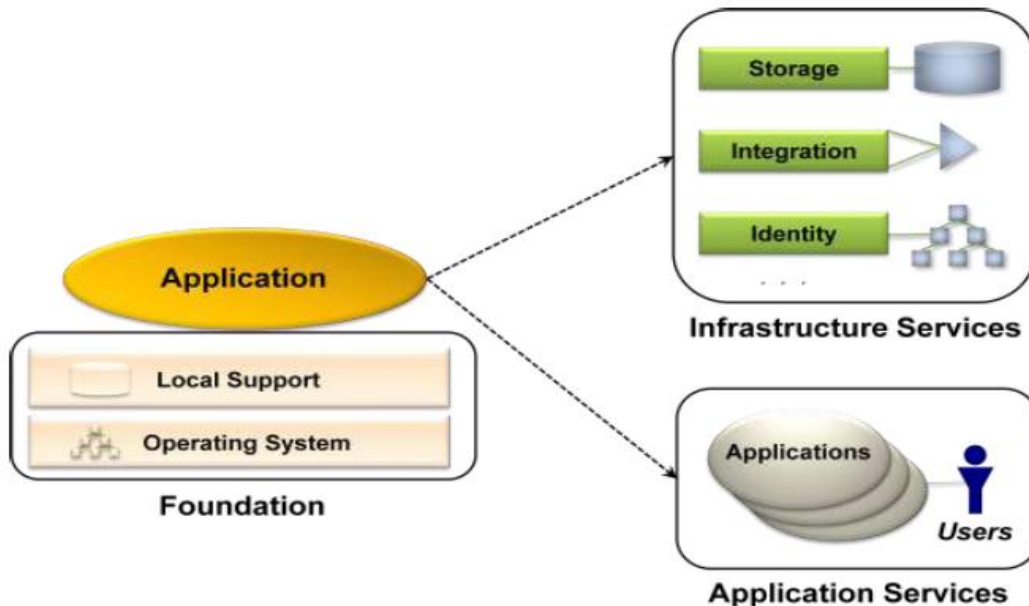


Figure 2: Application platform

Source: www.davidchappell.com January 11, 2016

However, according to David Chapbell (2008), whether a service is an on-premise or in the cloud, an application platform can be thought of as comprising of three (3) parts as in figure two (2) above:

- **The foundation:** This includes the various support functions, such as the standard libraries, the storage unit, and a base operating system.
- **A group of infrastructure services:** This are the applications that frequently use the basic services provided on the client

computers. It offers remote storage of data or information in the cloud. For example, integration services, an identity service, etc.

- **A set of application services:** As more and more applications become service-oriented, the functions they provide become accessible to new applications. Though these applications exist primarily to provide services to end users, they are also part of the application platform.

2.2 FROM ON-PREMISES PLATFORMS TO CLOUD PLATFORMS

In describing on-premises platforms, the general model just described can also be used to think of cloud platforms. Since on-premises and cloud

platforms can be used together, it's important to understand how the two work. Figure 3 below illustrates a clear picture of the concept

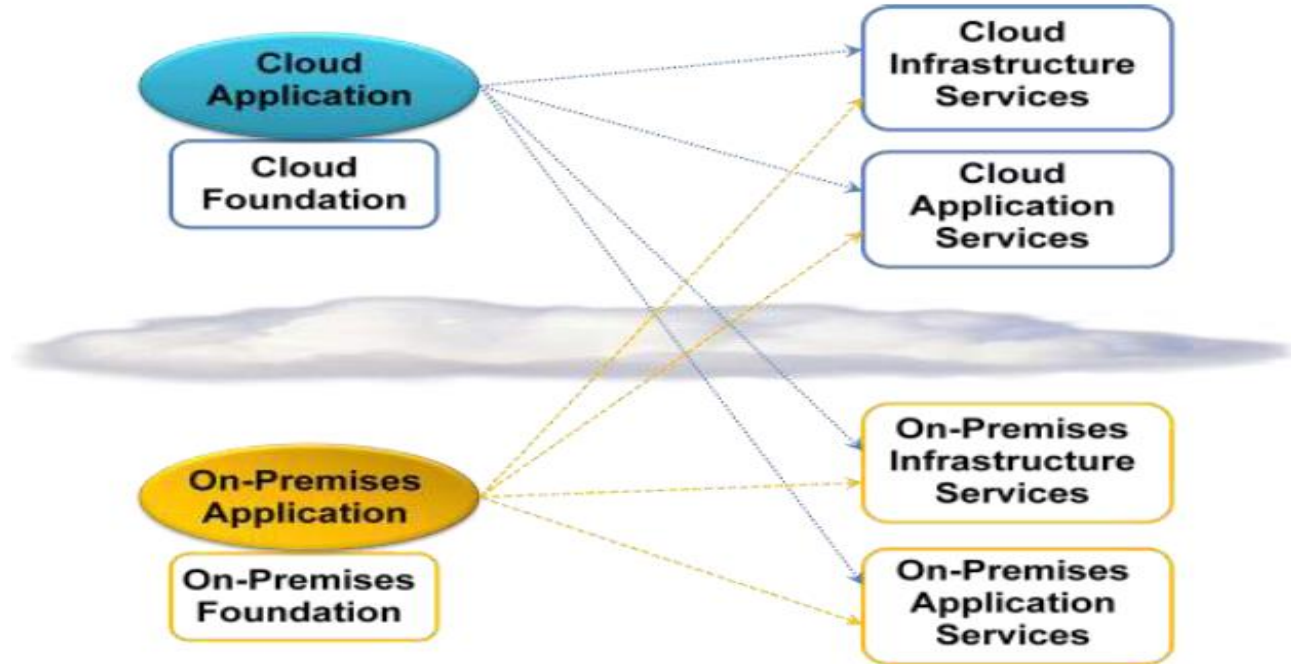


Figure 3: On-Premises platform

Source: www.davidchappell.com January 11, 2016

The above diagram shows that cloud application can be built on a cloud foundation, just as an on-premises application is built on an on-premises foundation. Both kinds of applications can access infrastructure and application services if an on-premise is connected to the cloud.

Industrial analysts have made assertive projections on how Cloud computing will transform the entire computing industry in the near future due to its robustness, scalability, efficiency and cost effectiveness.

There are various applications of cloud computing in today's networked world, Jeffrey Franklin (2010). Many search engines and social websites are using the concept of cloud computing like www.amazon.com, hotmail.com, facebook.com, linkedin.com, whatsapp.com, etc. This is because this service is readily available and easily accessible. It also provides a reliable data storage and security of data is readily assured and guaranteed. Various services can be accessed through it with little or no implementation challenges as shown in figure 4 below.

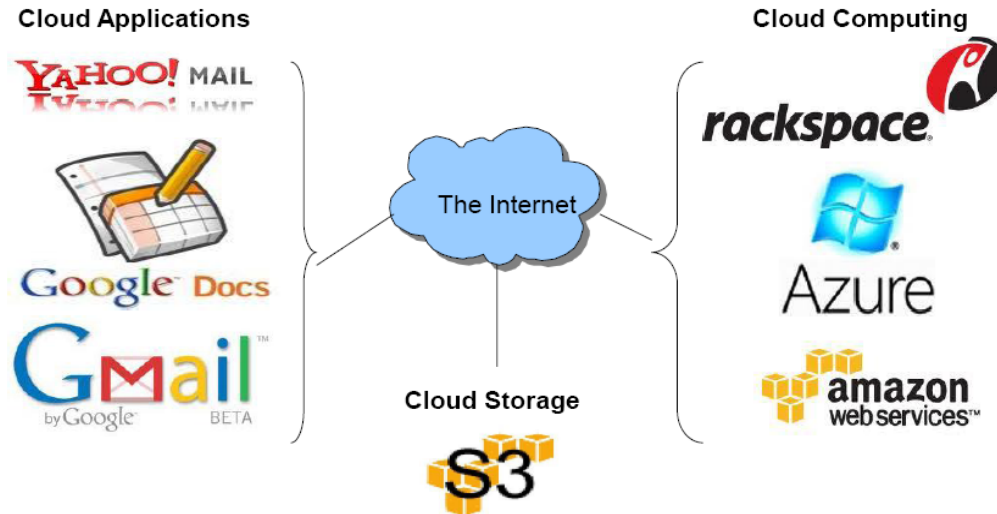


Figure 4: Cloud Implementation

Source: Jeff@LimitlessComputing.com

2.3 PROPERTIES OF CLOUD COMPUTING

There are different key properties of cloud computing. They include;

1. Cloud computing is Task-Centric
2. It is Powerful
3. It is User-Centric and
4. It is Programmable

2.4 MAJOR SERVICE PROVIDERS OF CLOUD COMPUTING

According to Dong Xu (2010), there are several cloud service providers. They include but not limited to the following;

- a. **Google 101-NetworkM:** This is made up of millions of cheap servers that would store very huge amounts of data over the internet.
- b. **Microsoft's Azure:** It is an Internet-scale cloud computing and services platform hosted in Microsoft data centers.
- c. **Amazon's Elastic Compute Cloud-Amazon EC2:** This is a web service interface that provides resizable computing capacity in a cloud. It allows developers to pay only for capacity that they actually use.

2.5 PRIVACY AND SECURITY

Cloud computing allows users to add more capacity, more services and also allows seamless software patches. This is to ensure fast access to data stored and to prevent the loss of data in case of failure of one data center. The users' data are stored on sites that are geographically far apart. Other

security measures that are employed include the following:

- **Standards:** There is a standards regulation which ensures uniformity in how the applications are accessed, stored and modified. However, with standards, enterprises now have neutrality in picking their service providers.
- **Legality:** This answers the question of "who owns the enterprise data?" it helps to solve the problems relating to intellectual property rights when data services are hosted by a third party site.
- **Mentality:** It helps to orientate the consumers to relinquish their ownership mentality to some extent and to develop a broader mindset.
- **Pricing Theory:** The service is cost effective but if the price of the services becomes exorbitant, then pricing theories and mechanisms will be revisited in the near future

2.6 BENEFITS OF CLOUD COMPUTING

There are several advantages of cloud computing and some of them are as discussed below:

- **Price:** Cloud computing equipment is cost effective as setting it up does not require much fund. It saves the money spent on costly devices purchase and maintenance.
- **Simplicity:** It is simple to use and set up. Customers don't have to worry about resource management and other stresses

that come with infrastructure set up and management.

- **Reliability:** Network and data access are guaranteed to be reliably maintained as the service providers are experts in maintaining the infrastructure.
- **Flexibility:** Cloud computing infrastructure is very flexible. It can be easily deployed in any computing environment.
- **Collaboration:** Since all the applications are on the cloud, it becomes a natural fit for consumers to effectively collaborate on a common project or application
- **Quick Deployment:** Cloud computing gives the advantage of quick deployment. This type of functionality helps to make the system start-up easily.
- **Deliver new services.** It makes possible new classes of applications and deliveries of new services that are interactive in nature.
- **Automatic Software Integration.** In the cloud, software integration is usually something that occurs automatically. This means that Cloud users don't need to take additional efforts to customize and integrate their applications to start up at their own pace.
- **Access from innumerable options:** Another advantage of cloud computing is accessing the environment of cloud not only from the system but through other various options. The options include tablets, ipads, notebooks and even mobile phones.
- **Data centralization:** The information for multiple projects and different branch offices are stored in one location that can be accessed from remote places.
- **Data Recovery:** Cloud computing providers enable automatic data backup on the cloud system. The recovery of data when a hard drive crash, which could either not be possible or may cost huge amount of money including time wastage if it is on individual system is made a non issue with the use cloud computing.
- **Sharing capabilities:** All your valuable document and files can be emailed and shared whenever required online.
- **Cloud security:** The cloud server vendors choose only the highest secured data centre for your information. Also, for sensitive information in the cloud, there are proper auditing, passwords and encryptions.
- **Free Cloud Storage:** Cloud is the best platform to store all your valuable

information. The storage is free, limitless and forever secure.

- **Instant testing:** Various tools employed in cloud computing permits you to test a new product, applications, features, upgrade or load instantly. It is quickly available, flexible and scalable for distributed testing environment.

2.7 CLOUD COMPUTING DRAWBACKS

In spite of its many benefits, as mentioned above, Cloud computing also has its disadvantages. Customers need to be aware of these aspects before going in for this technology. The main risks involved in Cloud Computing are:

- **Technical Issues.** Though it is an indisputable fact that information and data stored in the Cloud can be accessed any time and from anywhere, there are moments when the system can have some serious challenges. Even the best Cloud service provider can run into this kind of trouble, in spite of keeping up with high standards of maintenance.
- **Security in the Cloud.** Security is a major issue of Cloud computing. Before adopting this technology, beneficiaries should know that they will be surrendering all their company's sensitive information to a third-party cloud service provider. This could potentially impose a great risk to the company. Hence, customers should ensure that they choose the most reliable service provider, who will keep their information totally secure.
- **Prone to attack.** Storing information in the cloud could make the companies vulnerable to external hack attacks and threats; therefore there is always the lurking possibility of theft of sensitive data.
- **Cost.** At first, a cloud computing application may appear to be a lot cheaper than a particular software solution installed and run in-house. But the customers need to ensure that the cloud applications have all the features that the software supposed to have, if not, identifying those missing features and updating them requires additional costs.
- **Inflexibility.** At some points, cloud computing infrastructure appears to be inflexible. For instance, it is not possible to insert a document created in another application into a Google Docs spreadsheet. So, there are certain features that are not enabled for the customers to use.

- **Lack of support.** There are certain platforms that are supported by cloud computing infrastructure. As such, compatibility issues still prevails in cloud services.

2.8 THE STRATEGY BEHIND THE CLOUD COMPUTING TECHNOLOGY

According to Puja Dhar (2012), a cohesive cloud strategy that drives successful business outcomes relies on collaboration between IT staff and the executives. Just as IT cannot act as an island within the business, cloud computing cannot function as an independent entity within IT. Other cloud providers' proprietary technologies require that you adjust your IT environment to their capabilities In order to ensure cross-platform support or compatibility. A long-term strategy demands an infrastructure that is open and can adapt as your business and IT priorities change. Dell's approach to designing and implementing an open cloud strategy focuses on business and cultural expectations, Jeffrey Franklin (2010),

1. **Cloud computing as a strategy:** Cloud Computing is just a strategy to empower industrial workforce, ensure their growth, and transform businesses. Cloud computing is capable of developing solutions that match your business vision and drive it forward with maximum flexibility and minimum risk.

2. **Cloud computing adapts to your work environment:** Most businesses are already on the cloud journey, but each has unique needs and obstacles. Therefore cloud infrastructure should be customized to adapt to your work environment and not you adapting to it. It should work with you and your staff to match your strategy to the right cloud solutions — without disrupting your business.

3. **Cloud computing works best Using Seamless Integration:** We see cloud computing as a logical progression to what organizations are already doing, and a way for businesses to build on technologies and processes already in place. The bigger the network, the more robust it becomes.

2.9 KEY FEATURES OF CLOUD COMPUTING

1. **It provides On-demand self-service** - user can control computing capabilities without human interaction from the service's provider.

2. **It renders ubiquitous network access** – cloud computing access is promoted through the use of several different technological devices.

3. **It offers location independent resource pooling** - the provider's computing resources are pooled to serve all customers with different resources assigned according to the user's demand simultaneously

4. **Rapid elasticity** – any software update are always made available quickly for the end user for their attention

5. **Pay per use** – Consumers are charged based on the size of their data usage. Charging is based on the storage capacity, bandwidth size, and other computing resources consumed and per month,

CONCLUSION

In this paper, we have been able to lay bare what cloud computing is all about. Through thorough definitions of terminologies used in simple terms, features and technologies required for efficient performance of the system. Moreover, it illustrated several representative platforms and designs for the state-of-the-art cloud computing including the security requirements. It finally outlined the benefits and drawbacks of cloud computing. Cloud computing is an innovative technology that helps us to retain our data perpetually over the cloud using the internet infrastructures.

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