

Ecommerce based on Cloud Computing: The Art of State

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ABSTRACT

The emergence of several computing paradigms, the most recent cloud computing, has resulted from significant technological advances in the information and communication technologies (ICT) sector in the last decades, with the most significant improvements in internet services and virtualization techniques. Individuals and businesses may access various cloud services and solutions from some big cloud service providers worldwide. As a result, more businesses are migrating to the cloud, causing the cloud services industry to expand. Organizations can profit from cloud technology in various ways, but there are also dangers and issues connected with this phrase. Cloud computing is a way to improve Ecommerce by making it easier for people to buy and sell things. This paper explains the concept and features of cloud computing and how cloud computing can help Ecommerce.

Keywords: Amazon web service, cloud computing, ecommerce, microsoft azure, google cloud platform.

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I. INTRODUCTION

Online shopping has become an essential part of a person's life because of the increasing variety and quantity of products and goods available on Ecommerce websites [1].

Ecommerce is described as a global commercial and economic activity that appeared after the extensive spread of the Internet in the nineties. This trading activity is based on the buying and selling of products or services over the Internet, commonly through social media platforms. The idea of Ecommerce can be popularized so that it is not dependent on buying and selling tangible products only but includes all activities that take place over the Internet, like selling digital services, completing bank transactions, presenting products to customers, implementing sales agreements, receiving the price of products, and many more features [2], [3].

Starting a domain of Ecommerce requires service products to sell, buy, and trade in general, along with the online store to carry out trading operations by adding a payment gateway.

The Covid-19 pandemic, which forced people to stay at home, positively boosted global Ecommerce activity. Ecommerce has greatly succeeded, enhanced the scope of its work, increased its share of the total retail sales and become an integral part of supporting economic activity in the countries. Especially since the principle of electronic commerce is based on establishing electronic stores to sell products or services via the Internet [4].

This list will explain the benefits of electronic commerce [5] [6]:

- Securing job opportunities for people sitting at home who need work to fill their spare time and, in return, earn them material profits.

- Earn money by working in the scope of Ecommerce.
- Learn about a wide range of serious and effective work in the field of electronic commerce.
- Due to the high percentage of Ecommerce sales at this time, the global economy is booming.
- Electronic commerce has preserved the shares of companies and strengthened their presence in the commercial markets.
- The fields of communication and information technology have developed thanks to the great demand for electronic stores for electronic work.
- The low cost of communications in light of the contribution of Internet networks in enhancing the effective presence of electronic commerce and its developments and increasing the scope of competition among e-business merchants.
- Increasing the services of couriers and courier companies to deliver electronic sales.

Also, electronic commerce has the following characteristics [2]:

- Cancel the idea of completing partner contracts in offices, so the merchant manages his business from his office, and the consumer runs his business from his home.
- Focusing on the adoption of electronic media to complete electronic commerce transactions, such as technological devices and computers connected to the Internet.
- Absence of paper handling in contracts for Ecommerce businesses. Providing greater opportunities to learn about goods and their specifications, services and prices when roaming in electronic stores

- The possibility of buying and selling through electronic stores from anywhere globally.
- Save time in the specified period between the payment of funds, receipt of products, and save effort thanks to working at home.

Overcoming obstacles to transferring funds, the money is paid through electronic payment methods.

II. ECOMMERCE MODELS

Ecommerce mostly includes all commercial practices that take place over the Internet. Ecommerce is classified into three popular categories according to the nature of business [7]:

1. Business_to_Consumer (B2C) Ecommerce

It is a type of direct commercial transaction between the seller and the buyer and it is called B2C, and it is the most popular and most competitive Ecommerce model. Where one party represents the company that provides its products and services, and the other party is the consumer who buys those products and services. In most cases, this reduces inefficiencies and cost that can chief better profits and lower prices. It provides disintermediation, "Disintermediation: the term given to the process of eliminating of intermediary organizations between the producer and the consumer". An example of a manufacturing firm that has effectively embraced this model is Dell, achieving a strong competitive advantage. People can select their individual computers online, and Dell gathers the components and ships the devices directly to the consumer within less than six days.

2. Consumer_to_Consumer (C2C) Ecommerce

This kind has grown popular with the proliferation of e - market websites in which people offer their items for sale to other persons in exchange for a pre-agreed-upon fee from the site whereby the transaction occurs. eBay is among the most well-known instances of this. The web offers many C2C sites, among the most famous are eBid ,Bidzcom, Craigslist, ePier and QXL. C2C development has resulted in a decrease in the usage of newspaper pages to promote personal things. Many individuals earn a livelihood by selling stuff on online auction platforms.

3. Business-to-Business (B2B) Ecommerce

A subtype of Ecommerce in which all partners are companies. B2B Ecommerce is a great tool for linking company partners in a digital supply chain to cut replenishment time and costs. Covisint is an example of B2B is a web support business - to - business by using data translation and code translations to permit automakers and parts vendors to cooperate on order management, shipping, and other industrial related operations. Covisint is expanding its data translation and collaboration services into the healthcare business in order to access patient data among healthcare professionals and insurance companies. Ecommerce was not available in the early 1990s. B2C Ecommerce is now a \$1 trillion-a-year worldwide area [9]. As "points of sale," systems will be replaced by tablets that link to a single Ecommerce platform, and Ecommerce will likely allow and simplify all consumer touch-points [10]. Fig. 1 summarize the different modes of Ecommerce.

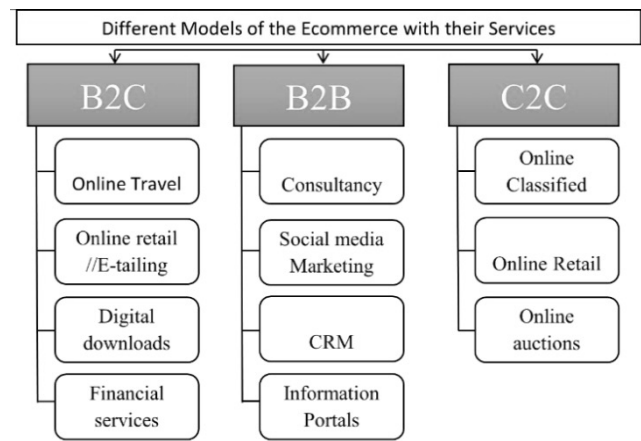


Fig.1. Different modes of Ecommerce [8].

III. COULD ECOMMERCE EXAMPLES

Companies require consideration of many aspects when choosing the Ecommerce platform that best suits their needs. Among the many, here are the excellent examples [11]:

1. Shopify: one of the best-known Ecommerce platforms. It has the second largest market share with 20,000 websites. It offers a way to launch a business and start selling quickly.
2. Big-commerce: one of the top names in Ecommerce based on cloud computing. It is a software service, and you can use it to sell physical or digital products; big commerce is primarily aimed at people who do not have many web design skills.
3. WiX: is a fast platform for creating a website also provide Ecommerce services. It allows registration using Facebook and Gmail accounts, characterized by ease of use and organization.
4. Esty: another all in one Ecommerce and online shopping solution focused on handmade or vintage items and supplies, as well as unique factory-manufacture items. The site follows the tradition of open craft fairs.

IV. CLOUD COMPUTING

Cloud computing is regarded as a revolutionary term by most governments and businesses. Computing does not have a consolidated definition at this time. The most accepted definition is that introduced by the U.S. National Institute of Standards and Technology (NIST): "Cloud computing is a model for quickly enabling convenient access to networks and applications through a common set of configurable computing resources (e.g., servers, networks, applications, and storage) operating with little or no interference from the service provider to deliver it immediately" [12]. Cloud computing shares a cloud proprietorship of infrastructure and applications that provide a cloud over the Internet. Cloud computing is a modern and growing technology innovation that uses the web and far-off servers to preserve users' information and applications. It could be a modern and growing technology innovation that produces the idea of virtualization of knowledge and knowledge storage in infrastructure. A product provided by the cloud meets the

consumer's needs and is conscious of the problems involved in using this service. It also allows clients and companies to use applications without installation and access their files and information in any zone of the world with the assistance of the Internet [13], [14].

Amazon, Google, Yahoo, and others have built massive architectures to support their applications and have taught the world how to build scalable architectures to compute storage and application services [15].

In Fig.2, it can see that 2021-2026 annual public cloud revenue growth will be USD 40B+.

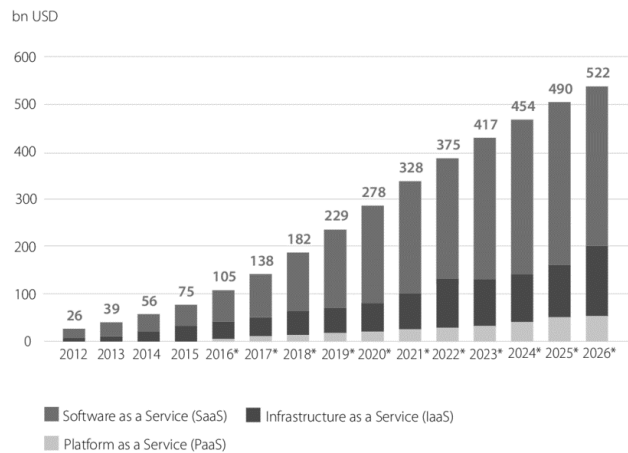


Fig. 2. Public cloud revenue worldwide from 2012-2026, segment (in billion U.S. dollars) [16].

A. Cloud Computing Deployment Models

The uncertainty of the three options makes it difficult for online companies to decide whether to make significant investments in private, public, or mixed cloud computing.:

1) Public Cloud

Through the use of a service provider, you can make apps, storage, and other resources available to the public. This sort of cloud computing is built on the concept of "pay as you go." Third-party service providers own, host, and run public clouds, which are accessible to the general public. Everyone uses the same infrastructure pool, with only minor differences in settings, information security, and reliability amongst clients.

The public cloud allows for scalability and resource sharing that a single organization would not otherwise be able to achieve. Public cloud services are best for web servers and development systems. Cloud computing providers will give you a slice of their digital space with other tenants [17]. Today, most businesses take "a multi-cloud" approach, which means they use more than one public cloud service [18].

2) Private Cloud

A private cloud is a cloud computing architecture in which information technology products are provided across an essential infrastructure for the exclusive use of a single enterprise. The management of a private cloud is often done by internal resources. A private cloud provides the benefits of cloud computing without the loss of control and security risks associated with other cloud infrastructure models. These advantages are especially valuable for businesses with predictable workloads or customization needs and businesses in regulated industries [19].

3) Hybrid Clouds

The hybrid cloud approach is essentially a mixture of public and private clouds. The basic principle of a hybrid cloud is that a single application can be designed to use both types of clouds. While using this hybrid approach it adds complexity that must be maintained, and it also improves the speed and speed of the application. A hybrid cloud mixes a private cloud with public cloud services, with one or more points of contact between the two. The goal is to establish a uniform, predictable, and very well computing environment by combining data and services from several cloud models [20]. Amazon, Microsoft, Google, Cisco, and NetApp are the top five hybrid cloud providers [21].

B. Services of Cloud Computing

Cloud computing is "pay-as-service," which supplies consumers with services on demand. Cloud leads to the new service styles such as "Infrastructure as a Service", "Platform as a Service", and "Software as a Service" [22]. Fig. 3 shows cloud computing service models.

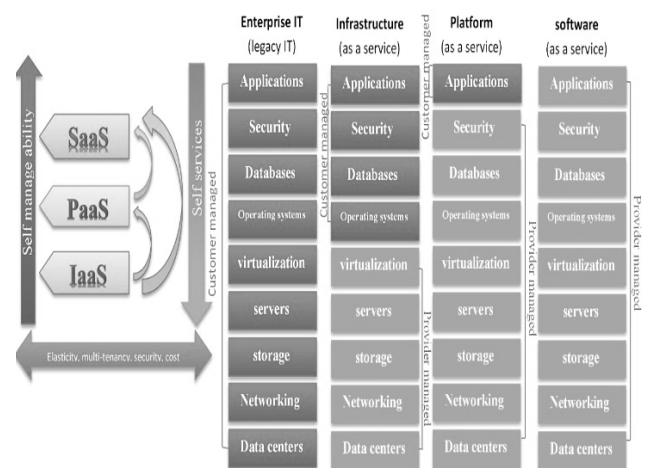


Fig. 3. Cloud Computing Services Models [23].

1) Infrastructure as a Service

A sort of cloud computing service paradigm in which computational resources are hosted in the cloud, Infrastructure as a Service (IaaS) is defined as follows: It is possible for businesses to adopt the Infrastructure as a Service model to migrate all or most of their use of their on-premises or data access center infrastructure to the cloud, where another infrastructure is owned and operated by a cloud service provider. Computing facilities, network, and storage system, and several other hardware and software components, can all be considered infrastructure pieces.

In the IaaS model, the cloud service provider also owns and manages the hardware and software, and is the owner or tenant of the data center. In an IaaS environment, customers are a client of services, such as computing or storage services, and you pay for the resources you use. You must pay for some resources, such as computer services. Additional sources, like storage, require capacity. The optimum scenario for using IaaS is when a business seems to have its own app or has the internal resources to develop it. A shop creating an online market may use IaaS to host the workload. Moving a company's payroll services to the cloud is also possible. This service is offered by AWS, Azure, and Google Compute Engine [24].

2) Platform as a Service

In computing, Platform as a Service (PaaS) refers to a group of services that are used in the development and management of modern applications. The PaaS model requires the infrastructure and middleware characteristics that enable programmers, IT administrators, and end users to develop, integrate, migrate, deploy, secure, and manage web and mobile apps. The PaaS model is a cloud-based service that provides infrastructure and middleware components. PaaS makes it easier to build and maintain software and hardware. It usually only works with a small number of different application deployment and development methodologies. They are not intended to be alternatives for enterprise-wide information technology infrastructure and software development workflows. In order to be less flexible than IaaS, PaaS services are commonly used. Examples of this type of service are AWS Elastic Beanstalk, Google Compute Engine, Magento Commerce Cloud, Apache Stratos, and Salesforce.com [24].

3) Software as a Service

Software as a Service (SaaS) is responsible for running and maintaining application software, operating system and other resources. It provides different applications over the Internet. Normally, the user can run these applications using a web browser. SaaS is easy to buy because SaaS pricing is based on monthly or annual fees and allows organizations to access business functions at a small cost, which is lower than licensed applications.

Instead of purchasing licenses and installing, upgrading, maintaining, and running software on his computer, SaaS does have benefit of not requiring the client to perform any of those things. Because the software is provided remotely, SaaS also requires less hardware.

An example of this kind of service may be G Suite, Microsoft Office 365, Salesforce, Netsuite, and Concur [25].

4) Function as A Service

In FaaS, developers are only responsible for the code. The provider will enable access to the application container, language, operating system And hardware, providing a global virtual development environment. An example of FaaS will be AWS Lambda, Azure Functions, IBM OpenWhisk [26] [27].

C. Cloud Computing Providers

In terms of all elements such as price, computation, infrastructure, and storage [28], every cloud service has some advantages as well as disadvantages [29], [30]. Cloud computing advantages, according to one author, are not always associated with monetary gains; instead, they can take on other forms such as greater scalability and security as well as redundancy without difficulty. Today, the cloud computing suppliers that provide IaaS and PaaS options are AWS, Microsoft, and Google, to name a few. According to Synergy Group, Amazon Web Services (AWS) controls a commanding 34 percent of the whole cloud (IaaS and PaaS) market in 2017, while another three parties, Microsoft, Google, and IBM, hold 11 percent, 8 percent, and 6 percent, respectively. These cloud service providers [30] differ in how they organize those Platform as a service cloud services:

1) Amazon Web Services

Elastic Compute Cloud (EC2) is the primary IaaS on Amazon Web Services hosting virtual machines. AWS submits the widest span of instance forms amongst the key cloud providers, with a combination of general-purpose for V.M.s and instances to compute, memory and storage. Clients integrate (EC2) with (AWS data storage services) [31]. Amazon Web Services offers several storage choices, such as:

- Amazon S3.
- The Amazon Elastic File System.
- Amazon Elastic Block Store.

Even if no Amazon cloud represents a traditional PaaS customers can combine a lot of services that offers by AWS to generate a PaaS. For example,

- AWS CodePipeline: is fully managed continuous delivery service that help you automate your release pipelines for fast and reliable application infrastructure updates.
- AWS Cloud9: It is a cloud-based development environment that solves many problems that arise when developing using the cloud
- AWS Elastic Beanstalk: is an easy-to-use service for deploying and scaling web applications and service.

AWS deals with provisioning, load balancing and deployment. AWS offers less integration of its various PaaS related services compared to the other chief cloud providers. Operators must connect several services to provide PaaS features to construct a whole application deployment and development pipeline. This method is good for businesses that favor picking and choosing their tools, but they need to know about many AWS services and how to connect them [32].

2) Microsoft Azure

Azure Virtual Machines one of the wide range of service that Azure offers to create an instance. It provides Azure Databases and Azure Storage [33]. Its storage succours are separated into subclasses, involving:

- Azure Disc Storage.
- Azure Blob Storage.
- Azure File Storage.
- Azure Queue Storage.

The Azure App Service is a suite of services that bundle together to introduce Azure PaaS, which provides hosting and tools for simplifying developing and deploying applications using a range of frameworks and languages. The App Service provides elasticity for enterprises that needs to adapt their own PaaS operations [34]. App Service include tools and these tools consist of:

- Azure API Apps.
- Microsoft Azure Web Apps
- Azure Web Apps for Containers.

Azure is an appropriate choice for companies looking for an easy way to set up the tools to run PaaS because it is the nearest to PaaS solution as an application service for all cloud providers [35].

3) Google Cloud Platform

Like Azure and AWS, Google provided Google Compute Engine(GCE) as IaaS computing, which offers pre-set and customized machine types. Storage services are also available

at Google like:

- Google Drive Cloud Storage.
- Google Cloud Filestore.
- Google hard drive.

App Engine and Azure App Services similar in supporting applications development and deployment written in different frameworks and languages [36]. Moreover, its characteristics a multiplicity of publishing tools and methods, including:

- Sandbox deployments, low-cost applications, and rapidly expanding and complex requirements are legal in this area.
- A flexible environment for containerized applications running on the Compute Engine or applications based on the Compute Engine network, applications with constant traffic, custom runtimes, and applications based on native code frameworks. Also, developers can consolidate standard and flexible App Engine environments as needed. The App Engine outfits to Linux based development, while the Azure App Service is more adapted to Windows-based services and frameworks. App Service may be preferred by a company that develops apps. NET. Simultaneously, App Engine desired by I.T. shops that prefer Unix tooling and aim to deploy applications using Docker containers, which also run-on Windows but are more run in Linux based environments at home [29], [31].

V. ECOMMERCE BASED ON CLOUD COMPUTING

The development of information technology has led to conversions in different domains, marketing is one of these. The Internet includes employ and practice of information technology in marketing, as now Ecommerce has emerged that allows companies to remove barriers of distance in interacting with customers by conducting direct transactions so that each stakeholder has an equal opportunity to promote their merchandises [37]. Presently, firms implementing Ecommerce will face high environmental costs and all problems have been resolved but with the advent of cloud computing, [38]. Therefore, more Ecommerce companies are moving to cloud computing to achieve high business value. The architecture of a distributed eCommerce system contains software components, like the application server, the client application, the database server, and the needed hardware components (servers, communication infrastructure, and the client computer) [39] [40]. The client application can be a normal web browser or a dedicated application. The client hardware can be represented by a desktop computer or a mobile device. The eCommerce server will use cloud computing, which means that all the resources needed will be changed as needed [41].

Ecommerce systems can benefit from cloud computing by use [42]:

- Services: use the Ecommerce solution given by the provider.
- Platform: use the platform to develop an eCommerce solution based on the providers' development interface.
- Infrastructure: use an Ecommerce solution on the provider's infrastructure.

Many more Ecommerce enterprises, especially Small and Medium-sized Enterprises (SMEs) are taking advantage of the benefits of cloud computing, where the growth of this

innovation has led them to compete with the large enterprises in providing products and services as they have a large infrastructure despite their limited infrastructure [43].

Information technology adoption enables SMEs to gain competitive advantage globally [44]. Hoque et al. [45] said information technology could give small and medium enterprises (SMEs) a competitive advantage in the modern economic period, especially in marketing. Internet technology can be used for sustainable commerce through Ecommerce [46], [47].

TABLE I: FEATURES OF CLOUD COMPUTING IN ECOMMERCE [48], [49]

Features	Explanation
Cost reduction	Reduce the expense of Information Technology(I.T.) related to resources, installation, maintenance and implementation.
Gradation	Cloud computing is highly flexible according to demands made by the type of business, allowing a particular service to grow with time and increase its scope.
Convenient	Business requirements are constantly altering. Cloud computing enables I.T. to adapt to these changes quickly by dynamic expansion and self-adaptive.
Security	Distributed and stored data in multiple servers to scatter storage load and guarantee data reliability.
Productivity	Cloud computing is cost-effective as it increases workforce productivity. Cloud software deployment is fast when compared to a standard installation.
Efficiency	I.T. administrations can focus on their business and realize profits through innovation through innovative development and research.
Accessibility and mobility	The client can access the services and products Through smartphones, anytime and anywhere.
Sustain quality	Guarantees the quality of Ecommerce by scalability, reliability and flexibility.
Easy management	Simplify the maintenance of hardware, software, and infrastructure.
Optimization search engine	Make a website more suitable for senior economic officials, increasing traffic to an eCommerce store.

TABLE II: KEY CHALLENGES OF UTILIZING CLOUD COMPUTING IN ECOMMERCE [50], [51]

Challenge	Explanation
Connectivity	Internet must be available to enable the user to access shared information or resources in the cloud.
Security and privacy	It is the biggest concern, as data can be accessed, modified, or damaged during handling or transmission. Today, enterprises faced numerous various requirements to protect customer information.
compliance	It is one of the most important challenges we will face in 2021. When an organization moves data from its internal storage to the cloud, it faces compliance with industry laws and regulations.
Data storage	Cloud customers are concerned about their inability to control where data is stored.
Trust	The user must ensure that his data has not been seen before it is encrypted with the cloud storage service provider or that no one outsider can decrypt the data again.
Integration	Integration legacy system is one of the biggest challenges of cloud computing for multi-cloud use; also, consider that combining new cloud-based applications with legacy systems takes resources, expertise and time.
Replication time	How fast can the data be replicated? It plays a significant role.

Ecommerce systems offer business information, It is more general and comprehensive in its components compared to ordinary trade; It includes: buyers from more than one place or country, sellers from more than one place, and a selling platform available for use at any time and from anywhere as well as without obstacles or barriers and for free, in addition to the freedom that the seller enjoys when offering; It bears the costs of transportation, renting a place, paying bills or commissions, taxes, bills, etc., in addition to the buyer who avoids wasting time and money when looking for products at a good price and high quality and is forced to buy any of what is available in the traditional market without conviction [52].

Ecommerce offers businesses the flexibility to showcase and market products online without having to own or rent an office. These days, many eCommerce companies are getting the advantages of cloud computing profit, as shown in Table I. The biggest challenges in cloud computing applications in eCommerce are indicated in Table II.

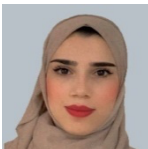
VI. CONCLUSION

Computers, networks, and communications are all used in cloud computing. Various physical devices linked through the Internet may acquire related data and information via cloud computing. Online to Offline has been a popular business strategy in current history, thanks to the concept of "Internet Plus." The challenge of processing large volumes of data at the same time may be solved with cloud computing. SMEs may adapt their IT resources to changing business demands, minimizing duplication and squandering resources to the greatest extent possible. Cloud computing platform services for Ecommerce businesses have been set up in various parts of the nation.

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