Abstract
In recent years, cloud computing has changed the way we think about IT. Cloud computing terms means virtualized computer network. It still is in infancy. Cloud computing provide fast and secure data storage. It is mostly used to sell hosted services through application to operate client server at a remote location. The term E-commerce means electronic marketing. It changed the traditional way of business marketing. It provides flexibility through online and in that cloud computing will help to business activities.

Keywords: Cloud computing, Cloud security, Cloud providers, E-commerce, Cloud computing architecture.

Introduction
Cloud computing is a style of computing in which scalable and elastic IT is delivered as a service using Internet technologies (https://rgtechnologies.com). The cloud computing is a new development that is based on the promise that data and applications are stored centrally and can be accessed through the Internet. By using cloud computing, users can access resources from anywhere, anytime whenever they need it. Cloud computing is the emerging technology for delivering computing resources as a service. The popularity and also the areas of the applications of cloud computing have considerably multiplied once it had been planned by Google in 2007. Cloud computing has certainly improved and matured over the past few years, and it has reached a level that is good enough to be used at the larger Ecommerce level.

Online services allow remote execution of functions through the internet which provide independent platforms and connect applications. Cloud computing which is a buzzword nowadays is applied to many industries at present. Today cloud computing became an impressive solution to address the challenges in storage and process of high-volume data with low-cost, high-speed, on-demand and pay-per-use characteristics. E-commerce, the use of computer networks to facilitate transactions involving the production, distribution, sale and delivery of goods and services in the marketplace, has grown from merely streamlining relations between consumer and business to a much more robust phenomenon embracing efficient business processes within a firm and between firms.

Cloud Computing
In a computing context, 'cloud' refers to "storing and accessing data and programs over the Internet instead of your computer's hard drive," according to PC Magazine. The servers storing the data and running the programs are usually hosted by a cloud service provider. The term "cloud e-commerce" refers to the process of outsourcing of a remote network of servers hosted on the Internet to use application services, store and process data. Essentially, it is a cloud-based e-commerce versus software installed on a local server.

Cloud computing architecture: Cloud computing architecture refers to the components and subcomponents required for cloud computing. These components typically consist of a front end platform (fat client, thin client, mobile device), back end platforms (servers, storage), a cloud based delivery, and a network (Internet, Intranet, Intercloud). Combined, these components make up cloud computing architecture (https://en.wikipedia.org).

Cloud Computing Market: The global cloud computing market size is expected to grow from USD 272.0 billion in 2018 to USD 623.3 billion by 2023, at a Compound Annual Growth Rate (CAGR) of 18.0% during the forecast period. The cloud computing market is an immensely lucrative market for cloud computing service providers, as several companies from diverse verticals are progressively adopting cloud computing services. This market is expected to grow further in North America and Europe, whereas it is expected to hold a significant growth rate in APAC, Latin America, and MEA. Furthermore, factors such as increased automation and agility need to deliver enhanced customer experience and increased cost savings and return on investment, are expected to drive the market growth.

Types of Cloud Computing
Making the choice of whether to invest time and money into private, public or hybrid cloud computing can be a difficult decision for online merchants simply because of the ambiguity of the three choices (www.bigcommerce.com). There are basically three types of cloud computing.

Public Cloud: A public cloud is a type of computing in which a service provider makes resources available to the public via the internet. Resources vary by provider but may include storage capabilities, applications or virtual machines. Public cloud allows for scalability and resource sharing that would not otherwise be possible for a single organization to achieve (https://www.citrix.com).

Public cloud services are best for development systems and web servers. Your cloud computing provider will give you a slice of their digital space that they must share with other tenants.
Popular public cloud offerings such as Amazon Web Services (AWS), Salesforce’s CRM system and Microsoft Azure, all exemplify this familiar notion of cloud computing. Today, most businesses take a multi cloud approach, which simply means that they use more than one public cloud service.¹²

![Attractive Opportunities in Cloud Computing Market](image)

**Attractive Opportunities in Cloud Computing Market**

- The global cloud computing market size is estimated USD 272.0 billion in 2018 and expected to reach USD 623.3 billion by 2023.
- The market growth can be attributed to the growing adoption of cloud computing services, globally.
- Increase in the adoption of hybrid cloud services is expected to provide growth opportunities for vendors in the market.


![Cloud computing architecture](image)

**Fig. 1: Cloud computing architecture**
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Fig. 2: Types of Cloud Computing

Table 1
Worldwide public cloud service revenue forecast (Billions of U.S. dollars)

<table>
<thead>
<tr>
<th>Service Model</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Business Process Services (BPaaS)</td>
<td>42.2</td>
<td>46.6</td>
<td>50.3</td>
<td>54.1</td>
<td>58.1</td>
</tr>
<tr>
<td>Cloud Application Infrastructure Services (PaaS)</td>
<td>11.9</td>
<td>15.2</td>
<td>18.8</td>
<td>23.0</td>
<td>27.7</td>
</tr>
<tr>
<td>Cloud Application Services (SaaS)</td>
<td>58.8</td>
<td>72.2</td>
<td>85.1</td>
<td>98.9</td>
<td>113.1</td>
</tr>
<tr>
<td>Cloud Management and Security Services</td>
<td>8.7</td>
<td>10.7</td>
<td>12.5</td>
<td>14.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Cloud Systems Infrastructure Services (IaaS)</td>
<td>23.6</td>
<td>31.0</td>
<td>39.5</td>
<td>49.9</td>
<td>63.0</td>
</tr>
<tr>
<td><strong>Total Market</strong></td>
<td><strong>145.3</strong></td>
<td><strong>175.8</strong></td>
<td><strong>206.2</strong></td>
<td><strong>240.3</strong></td>
<td><strong>278.3</strong></td>
</tr>
</tbody>
</table>

BPaaS = business process as a service; IaaS = infrastructure as a service; PaaS = platform as a service; SaaS = software as a service.
Note: Totals may not add up due to rounding.

Source: Gartner (September 2018)

Private Cloud: Private cloud refers to a model of cloud computing where IT services are provisioned over private IT infrastructure for the dedicated use of a single organization. A private cloud is usually managed via internal resources. A private cloud offers flexibility, cost savings, security, and control benefits. These benefits are particularly valuable for businesses with predictable workloads or customization requirements, and businesses in regulated industries.

Hybrid Clouds: A hybrid cloud is a combination of a private cloud combined with the use of public cloud services where one or several touch points exist between the environments. The goal is to combine services and data from a variety of cloud models to create a unified, automated, and well-managed computing environment. The top 5 hybrid cloud provider companies are: Amazon, Microsoft, Google, Cisco and NetApp.

Three Types of Cloud Computing Services: Although there are new concepts arising every other day, the following three are the basic service models on which the cloud runs (https://intellipaat.com).

Top Cloud Initiative in 2019
The top cloud initiative planned for 2019 is optimizing existing cloud use and costs. It is also worth noting that 35% of the organizations intend to invest in automating governance policies and processes.
**IaaS**
Users get the IT infrastructure that includes storage, servers, virtual machines, networks from service providers, etc.

**PaaS**
This cloud service provides environments for various purposes like development, testing, etc. It helps developers create applications quickly.

**SaaS**
A SaaS cloud service allows developers to code and deliver software applications on the cloud with the help of the Internet.

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**CLOUD COMPUTING**

**Software-as-a-Service**
- Consumer applications.
- Google docs, Windows Live Hotmail, salesforce.com

**Infrastructure-as-a-Service**
- On demand creation of server resources with root access.
- Amazon Elastic Compute Cloud, GoGRID, MOSSO

**Platform-as-a-Service**
- Primarily for developers. Usually limited to one or two programming languages.
- Amazon Elastic MapReduce, Windows Azure, Google

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**Top Cloud Initiatives in 2019**

- Optimize existing use of cloud (cost savings): 64%
- Move more workloads to cloud: 59%
- Expand use of containers: 39%
- Implement a cloud-first strategy: 38%
- Automated policies for governance: 35%
- Better financial reporting on cloud costs: 35%
- Expand public clouds we use: 33%
- Implement CI/CD in the cloud: 33%
- Move on-prem software to SaaS: 29%
- Manage software licenses in the cloud: 24%
- Enable IT to broker cloud services: 20%

*Source: RightScale 2019 State of the Cloud Report from Flexera*
Cloud Computing in the E-Commerce
The term “cloud e-commerce” refers to the process of outsourcing a remote network of servers hosted on the Internet to use application services, store, and process data. Essentially, it is cloud-based e-commerce versus software installed on a local server. Furthermore, cloud computing is one of the biggest sectors in tech right now, and it is becoming a necessity for many businesses, especially e-commerce. Since the emergence of cloud computing, a lot of e-commerce firms began to expand their business to cloud computing. Some famous E-commerce businesses such as Amazon, Google and Alibaba have involved cloud computing in their long-term strategies.

Cloud computing enables an e-commerce application to cater to the changing demand and scenarios of the market. It allows upscale or downscale the services according to the demand, traffic, and seasonal spikes. Cloud provides the scalable architecture your business needs.

Many e-Commerce businesses thrive in using this service in order to easily recollect and transfer files to many users online. There are a lot of benefits for e-commerce to be using cloud computing in order to protect but also transfer their data easily, so it can be accessed by its workers while also protecting under a private connection.

The Cloud services are making it possible for the e-commerce companies to reach their goals and provide a customized experience to the customers. The companies which have embraced cloud have a competitive advantage over the ones who have not adopted it yet, consequently, these technologies are adaptable to various platforms such as mobile devices hence increasing their use.

Cloud-computing based E-Commerce Framework: This framework reduces the implementation time and cost of hardware and software. But it does not address other challenges like the cloud services standards, regulatory issues and security of the applications and platforms.

Figure 4: Proposed Cloud-computing-Based E-Commerce Framework
E-commerce industry chain based on cloud computing: When cloud computing is migrated into the E-commerce industry, one cloud service provider can supply almost all the necessary products and services to an E-commerce website. As a result, the structure of the E-commerce industry chain will be changed.

Benefits of Cloud Computing
Cloud computing has opened up the idea of virtualization of vast server infrastructures. It has made a huge impact on a variety of industries worldwide. One industry that has been greatly impacted is the e-commerce industry (www.futurismtechnologies.com). Moreover, Moving e-commerce operations in the cloud offer loads of business benefits for retailers like flexibility, agility, faster time-to-market, lower costs, better performance and scalability and even stronger security (www.infintrixglobal.com).

Lowered Costs and Big Savings: Cloud computing helps the organizations or business to reduce the cost to be spent on implementation of information technology resources. In today’s world, data is growing rapidly and e-commerce is directly related to the data growth. The need of hardware and software requirement is increased and hence their cost of construction and maintenance also. A virtualized server of cloud technology can save a great deal of hard-earned money and boost overall an e-commerce venture profitability (www.infintrixglobal.com).

Trust: One of the biggest challenges facing e-commerce pioneers in the early days of the web turned out not to be a technical problem, but a human one—trust. It took time to build trust into the networks and establish a set of online credentials that made buyers feel comfortable initiating an online purchase. With the advent of cloud computing, existing businesses and startups can immediately leverage the trust built into established cloud systems such as Google, Amazon and Salesforce.

Speed: A company may be able to roll out an e-commerce application five times faster than before and begin selling immediately on the remote platform.

Quality of e-commerce: In order to sustain the quality of e-commerce, the computing services must be scalable, reliable and provide flexibility of access to products and services from anywhere and anytime in the world. Many of the large cloud service providers such as Google, Amazon, IBM, and Microsoft have their data centers spread across the globe in order to guarantee reliability in accessing the cloud applications in cases of failures.

Redundancy in Cloud Services Cloud-based architectures are disaster tolerant. A cloud-based platform with built-in redundancy can save the business from data loss. It keeps the data secure, backed-up and easily accessible. An e-commerce business depends hugely on the data of its customers. At the time of catastrophic data losses or security threats, redundancy (or the built-in duplication of systems, data, equipment, and other components) helps to overcome the disaster and resume the business in a streamlined way.

Environment Benefits: If companies are using shared networks then it is good for the growth of our nation and industries. In the shared network paths resources are fully utilized. It will have less impact on the environment (www.educba.com).

Save Capital and Operational Expenses: This is the biggest factor for motivating companies to migrate to the cloud. Cloud computing does not require heavy IT mechanisms to be set up in-house. This saves the company from investing in hardware and the space to store the...
hardware. Cloud uses virtualization techniques, so the need to set up IT infrastructure is completely eliminated. The cloud computing technology takes on the way as your use for charging model, so the cost of operations is also substantially reduced (/www.netandhost.com).

**Data Security:** Information is stored on a remote server; if a personal computer or internal network fails, no information is lost (www.bigcommerce.com).

**Scalability and Flexibility:** It enables businesses to downscale or upscale their IT needs and requirements easily as and when required without expensive changes in IT system (www.infintrixglobal.com/).

**Evaluate New Market Opportunities:** Cloud computing is very effective in understanding the latest market trends and demands. You can take effective changes in your production according to the market tendency. The IT leaders must be well aware about the cloud base approach and their impacts, so that they can choose the perfect solution for their business needs (www.educba.com).

**Immense Company Growth:** When customers respond positively to apps that were created with the help of cloud computing, companies have an opportunity to grow their business at a much faster rate (www.futurisntechnologies.com).

**Challenges of Cloud Computing**

Although cloud computing promises to provide a set of beneficial solutions for e-commerce applications, many challenges come to attention. The following is a list of the main challenges that need to be considered:

**Data Privacy:** The protection of a company owned information and its clients’ privacy is still a key challenge in cloud computing and appropriate technical solutions are desperately needed (https://mafiadoc.com).

**Service Provider Reliability:** The capacity and capability of a technical service provider are as important as price. The service provider must be available when you need them. The main concern should be the service provider’s sustainability and reputation. Make sure you comprehend the techniques via which a provider observes its services and defends dependability claims (www.techwell.com/).

**Reliability and Availability:** Most of the businesses are dependent on services provided by third-party, hence it is mandatory for the cloud systems to be reliable and robust (www.tutorialride.com).

**Interoperability and Portability:** Businesses should have the leverage of migrating in and out of the cloud and switching providers whenever they want, and there should be no lock-in period. Cloud computing services should have the capability to integrate smoothly with the on-premise IT (https://cloudtweaks.com).

**Downtime:** Downtime is the common challenge of cloud computing as no cloud provider guarantees a platform that is free from downtime. Internet connection also plays an important role as if a company has an untrustworthy internet connection, then there may be a problem as they can face downtime.

**Portability:** This means that if the users want to migrate from one CSP to others, the vendor should not lock-in customer data or services and the migration should be easy. There are different laws over data in different countries (www.educba.com).

**Financial commitment:** For most subscription plans, one must make a monthly or annual financial commitment. The service ceases once you stop payment, and in the worst case you might lose access to your business data. Compare this to buying a permanent software license which you only maintain for good reason (https://spatiality.co.ke).

**Conclusion**

Cloud computing plays a vital role in the smart economy. It offers many benefits to the E-commerce. The speed of building E-commerce websites, the cost savings of infrastructure and the reliability of a stable platform are just a few examples of the benefits of a cloud service. They can help companies achieve more efficient use of their IT hardware and software investments and provide a means to accelerate the adoption of innovations. The architecture of the proposed model consists of an internal and external services. Internal services are SaaS, HaaS, PaaS, IaaS, DaaS and CaaS. The external services are internet service provider, IT service provider, software developer, cloud users, system integration provider and hardware suppliers.

Cloud computing offers the platform for the new generation of e-commerce systems where the providers will rely on cloud service providers to satisfy their technical needs to implement and operate successful and trusted commerce applications. More and more research is focusing on providing secure and trusted solutions for cloud-based e-commerce applications without compromising performance and efficiency. The study concluded integrations of the E-commerce development in cloud environment.

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