

Application of cloud computing in e-commerce sector of Bangladesh

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Abstract

In the current world, consumers are facing delays and malfunction in ordering and receiving goods and services. The idea of cloud networking comes in this situation. Cloud networking is a virtual platform that complements physical stores. It is also the platform which connects to support effective and rapid transportation system for both suppliers and direct customers. In this paper, we have introduced a new cloud network model. In which, vendors, suppliers and consumers will be benefited by one another. This mutual beneficial model is hoped to help the consumers who are facing difficulties in their specific fields. Here, vendors who are willing to offer their services are enlisted in the database this gives the consumers a pool of option from which they can choose their desired ones. This mutual beneficial model is hoped to help the consumers who are facing difficulties in their specific fields. Here, vendors who are willing to offer their services are enlisted in the database this gives the consumers a pool of option from which they can choose their desired ones. Keeping the current COVID 19 situations in consideration, many companies are facing obstacles in timely delivery and transportation. The Cloud Networking Model we introduced will come in use to combat this situation. As it minimizes human interaction and generally confirms the safety needs to protect oneself from the Pandemic.

1.Introduction

Online business in Bangladesh have been increasing over the years. In Bangladesh the e-commerce industry set sail in the late 90s but was unable to expand immediately. The e-Commerce sector has seen dramatic growth since the early 2000's when Bangladesh lacked widespread internet access or a reliable online transaction system. In this research paper application of cloud computing networking has been done to improve the operational functions of e-commerce organization. The core idea of cloud computing technology is to integrate a large amount of computing resources networked to form a centralized system for efficient management and scheduling. Such resources pool can provide dynamic, flexible and on-demand services to users.

The E-commerce system in Bangladesh is still in an early stage of exploration and application. It has to deal with platform security, technical and regulatory standards and some other unresolved issues. Scholars have identified the development areas of e-commerce in our country's context [9]. Some sophistication has to be applied to our existing e-commerce system in order to bring about

a solid development in this growing field. Cloud based e-commerce has been introduced recently as a suggestion to advance the e-commerce sector. Many researchers have crafted and proposed cloud-based models to fill the loopholes of e-commerce [1,5,7,11]. However, Bangladesh has its unique e-commerce structure. Both e-commerce and cloud computing are exclusive areas in this country context. As a result, integrating cloud computing with e-commerce isn't a much-researched field in Bangladesh. But e-commerce is gaining acceptance and popularity day by day. Covid-19 pandemic situation, people's awareness about e-shopping and other factors gradually causing an expansion of our e-commerce sector. A collaboration of e-commerce and cloud computing is therefore much needed. This paper has brought the matter under light. We've suggested a model of cloud computing-based e-commerce similar to other models proposed for developing country's e-commerce system. Our model is crafted in such way that is implementable in the context of Bangladesh.

The e-commerce sector suffers from lack of fine logistics and sound transportation system that restrict e-commerce trading to expand. The main goal of the paper is to- (1) Introduce the concept of cloud-based e-commerce, (2) propose a cloud-based e-commerce model suitable for Bangladesh. Section 2 of the paper show a discussion of literature review. In section 3, the methodology of the paper is shown. In section 4, we have proposed a cloud-based model and discussed the operation of the framework and its advantages. In section (5) we attempted to show the feasibility of the model through some survey data. Section (6) shows the concluding remarks and future work.

2.Literature Review

2.1 Overview of Cloud Computing

Rather than buying storage and keeping files in the storage, cloud-based storage saves the data to a remote database. Cloud computing or simply known as "Cloud" is the delivery of different services through online. It is a model for managing, storing and processing resources via the internet. These resources can be data storage, servers, databases, networking and software.[1] It is the on-demand network access to shared computing resources. According to the official definition of National Institute of Standards and Technology (NIST), "Cloud computing is a model for enabling ubiquitous, 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." [2] A user needs an electronic device that has access to the web, the data and a software program that can run it. Cloud computing is becoming increasingly popular in business, education, information and technology and security, etc.

Cloud computing services provide users with multiple functions, regardless of the kind of service. The functions include:

1. Email
2. Storage, backup and data retrieval
3. Data Analytics
4. Audio and Video Streaming
5. Test and Development
6. Delivering Software on Demand

Several small businesses and big corporations are using cloud computing for its benefits that include cost savings, boosted productivity, speed and efficiency, performance and security. There are basic three types of cloud computing and each of them is different from the others. The public cloud gives us services on its server and storage on the internet which is owned by a third party. The private cloud is owned by a specific business or organization and it is provided on a private network. The firm's data center may host it. Hybrid cloud is a combination of both public and private cloud services. This type of cloud allows more flexibility and leverages the user's security and infrastructure.

Cloud services have three different models that give different services. The models are SAAS, PAAS and IAAS.

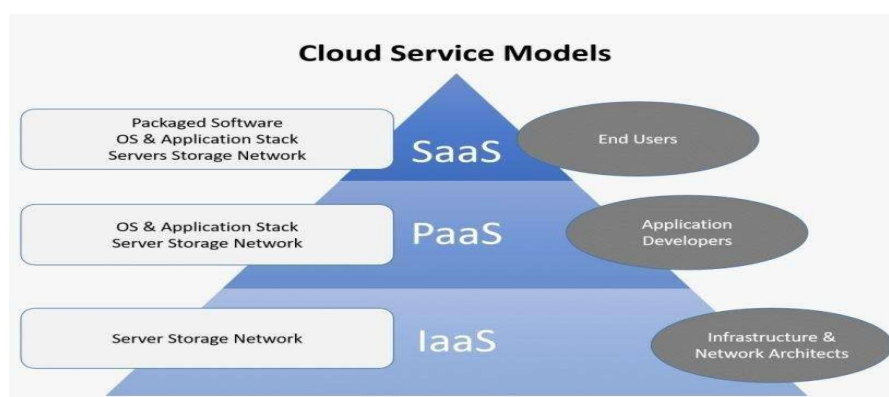


Fig: The cloud computing models are arranged in this pyramid form

1. Software-as-a-Service (SaaS): This model offers on-demand pay per use of application software to users. The resources in this model are managed by the providers. SaaS can be found in Microsoft 365, Gmail, Google doc, etc.
2. Platform-as-a-service (PaaS): This is a platform made up of programming, a web server, an operating model and a database. We can manage data and the application of resources, compile and run our resources without worrying about the underlying infrastructure. Popular PaaS providers are Amazon web services and Windows Azure.
3. Infrastructure-as-a-service (IaaS): This service offers computing architecture and infrastructure in a virtual environment so that multiple users can access it. The resources include servers and networking, data storage and virtualization. Popular IaaS providers are Amazon web services and Rackspace.com.

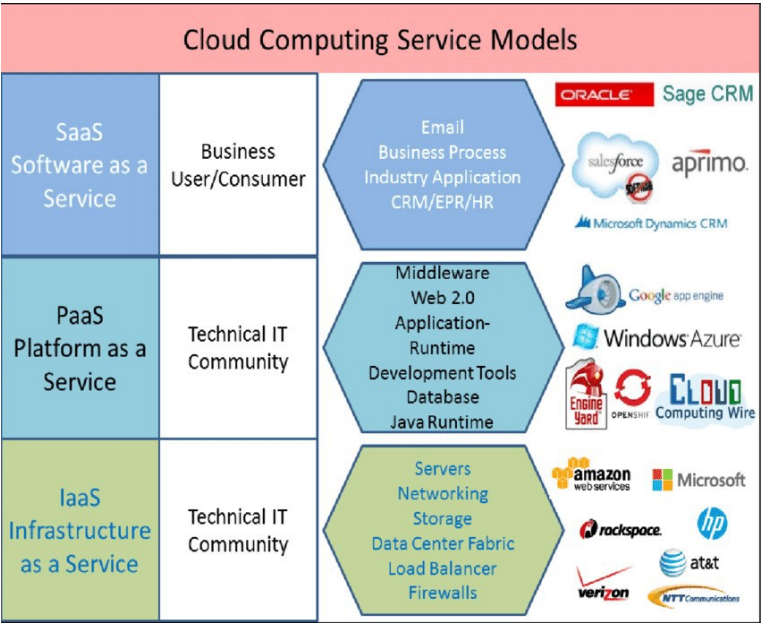


Fig: Models of Cloud with Examples

2.2 Overview of E-commerce in Bangladesh

With the rapidly increasing globalization, global business community is moving towards Business-to-Business (B2B) e-commerce. Moreover, Bangladesh has also picked up her place in e-commerce. Since the early 2000’s, the e-commerce sector has seen dramatic growth regarding the fact that Bangladesh lacked widespread internet access or a reliable online transaction system. In 2009, Bangladesh Bank, Bangladesh’s central bank, permitted online transactions. In 2013, the Bangladesh Bank also approved online transactions using debit and credit cards.[16] According to the International Telecommunication Union (ITU), the number of internet users in 2017 has nearly tripled to 18.2 percent from 6.5 percent of the population in 2013 and continues to grow. 30 percent of the population has a mobile-broadband subscription while only 2 percent of the population has broadband connection. The E-Commerce Association of Bangladesh (e-Cab), the trade body for eCommerce in Bangladesh, has reported that there are about 700 e-commerce sites and around 8,000 e-commerce pages on Facebook. According to a 2017 report, ten-billion-taka worth of transactions takes place per year through e-commerce sites.[17]. Some people are optimistic about Bangladesh’s e-commerce aspect. In 2019, Fahim Mashroor, chief executive officer of AjkerDeal.com, said in an interview with the daily star that the market size would be a maximum \$500 million in the next 4 years. In the month of July of 2019, Shamika N Sirimanne, director of technology and logistics at the United Nations Conference on Trade and Development (UNCTAD), said “Bangladesh is fertile ground for e-commerce to take root and benefit companies and consumers alike,” [19] This really shows Bangladesh has great opportunities in e-commerce sector.



Fig: According to a 2019 report, the estimation of e-commerce market growth until 2023

Currently, the following four categories of e-commerce are popular in Bangladesh:

1. Business-to-Business (B2B)
2. Business-to-Consumer (B2C)
3. Consumer-to-Consumer (C2C)
4. Business-to-Employees (B2E)

The Information and Communication Technology (ICT) Act, 2006 was enacted to facilitate e-commerce and encourage the growth of information and communication technology (ICT) of Bangladesh. The ICT Act, which was amended in 2013, has significant implications for e-commerce and mobile commerce in Bangladesh.

Though being a developing country, some sectors in Bangladesh has adapted technology with great success. This aspect is favoring the country's e-commerce prospects. Some sectors are mentioned below:

1. Online shopping
2. Online cards, gifts
3. Banking sectors
4. Web hosting, Domain
5. Online transportation system, hotel management and tourism etc. [18]

The growth of the industry has been impeded by low usage of credit and debit cards and the unavailability or restrictions on major online transaction sites like PayPal. In March 2017, Bangladesh bank gave permission to Sonali Bank, a state-owned bank, to launch online money-transfer services with PayPal in the country. However, several challenges to e-commerce in Bangladesh remains. The challenges include insufficient delivery mechanisms, low internet suitability, lack of a concrete online transaction system, online fraud, lack of a privacy policy, etc.

Popular e-commerce websites in Bangladesh include:

Clickbd

Rokomari

Daraz

Foodpand

a Chaldal

Bagdoom

Sohoz



Fig: Major E-commerce websites in Bangladesh

2.3 Related works

Technology has advanced tremendously over the past few years and cloud computing has become a favorite topic to businesses of all sorts. Cloud computing has become a powerful tool for lucrative businesses. Cloud computing has been introduced in our country a few years back. Nevertheless, many businesses in Bangladesh have adopted cloud for data storage. Microsoft has mentioned that Bangladesh has a great potential in cloud computing. According to Sook Hoon Cheah, president of Microsoft South East Asia New Markets, “Microsoft is aiming to get huge business through its cloud solution segment in Bangladesh, as the country has been advancing digitally for the last few years”. Sonia Bashir Kabir, former Managing Director of Microsoft Bangladesh, claimed that they were seeing huge business prospects as there are 160 million people in the country, generating huge data. So, Bangladesh has a great opportunity in cloud computing.

The adaptation of cloud computing for e-commerce businesses in an international context has been widely discussed by many researchers, which showed that how cloud computing can facilitate e-commerce businesses in the developed and developing countries. (Gabriela Kiryakova, N. A. 2015, Jia Yu, J. N. 2013,). Many researchers proposed models and frameworks of cloud computing-based e-commerce system on the context of the developed or developing countries.

Saleh [11] proposed a five-layer cloud-based e-commerce system for lowering the costs through the effective implementation of EC activities and solve the problems of enterprises which cannot develop EC activities due to lack of resources.

Kanu Goel and Manu Goel [7] proposed an integrated model of E-commerce and cloud computing focusing on the reduction of data redundancy and the efforts to recognize in between e-commerce vendors.

Jia Yu, J. N. [5] proposed a service-oriented e-commerce turban model with cloud computing, that can be used to analyze the facilities of cloud-based e-commerce.

Talib [1] proposed cloud computing- based delivery model to integrate the e-commerce as service enterprise.

All the models and frameworks are sophisticated solutions of many e-commerce challenges. However, in the context of Bangladesh, which is a third world underdeveloped and less technologically advanced country there are not enough scholarly researches in this concept of integration of cloud computing and e-commerce. Using cloud computing in e-commerce has been overlooked.

Our study puts a light onto the concept of using cloud computing for e-commerce business to make cloud computing easier and more accessible for e-commerce businesses, to reduce costs and time, eliminate a lot of hassles and complications of operation in a way that is implementable in the context of Bangladesh. Our research elaborates the implementation process thoroughly. It gives suggestion and aid to the retailers on applying cloud computing to their logistics network and facilitating the traditional system. E-commerce business will likely to have profitable results from our model.

3. Methodology

The purpose of our study is to identify and recognize the scope of using cloud computing service into the delivery system of e-commerce businesses in our country. Our model will be able to facilitate and accelerate product the operational function of e-commerce.

3.1 Sampling

The target population for this study were personnel working in e-commerce industries like Daraz, Evaly, Bagdoom, Chaldal etc. For the qualitative research paper, a questionnaire was sent in google form to business personnel and e-company executives. This questionnaire is set for understanding how much cloud computing is compatible for the e-commerce industry of Bangladesh & how much our model would facilitate the e-commerce business. Total number of

35 persons responded to our questionnaire from 18 different e-commerce companies. A questionnaire was also sent in google form to 4 out of 7 reputed organizations in our country who use cloud computing which are Robi Axiata Limited, Eastern Bank Ltd, ACI Limited & 10 Minute School. The purpose of this questionnaire is analyzing the facilitation & impact of cloud computing

system in an organization. All these responses were analyzed to interpret the compatibility of cloud based e-commerce system.

Number of responses of different e-commerce organization:

NO.	Name of E-commerce	Number of Collected Responses
1.	Daraz	05
2.	Othoba	03
3.	Amazon	02
4.	Rokomari	02
5.	Priyoshop	04
6.	Ajkerdeal	03
7.	Iferi	01
8.	Evaly	02
9.	Deligram	03
10.	Doctor food	01
11.	Shopway	01
12.	Pickaboo	02
13.	Shohoj	01
14.	Bagdoom	01
15.	Shoparu	01
16.	Palllibazar	01
17.	Chaldal	01
18.	Salextra	01

3.2 Data Collection

Implementation of the idea of cloud computing of developed countries into e-commerce of Bangladesh has been portraited in the research. The process of collecting information for the research:

1. It was essential for our research paper to collect information about the acceptance of cloud computing and current circumstances of internet service to apply cloud. Therefore, e-commerce businesses in our country like Daraz, Evaly, Chaldal, Ajkerdeal, Rokomari, etc. were approached to provide us with the information. A questionnaire was sent to some of these e-commerce businesspersons, regarding opinions on the satisfaction level on present business operations, cloud computing and our opinion on our cloud computing model.
- 2.The secondary data was used greatly in this case. A significant help from secondary data have been taken to understand the current e-commerce situation and the demand of it in the country. Help has been taken from secondary data to build up our cloud computing model. For secondary data research papers related to cloud computing & e-commerce from the year 2008 to present have been used.
3. Companies that use cloud computing were also approached to understand the availability and requirements of cloud services. 7 organizations who use cloud computing system in our country were sent a questionnaire regarding the facilitation & impact of cloud computing system in an organization.

3.3 Measures

Two set of questionnaires was created for the research. One set was sent to different e-commerce industry & the other was sent to 7 organizations who use cloud computing system.

The questionnaire which was sent to e-commerce industry has two sections. The 1st section was for measuring how much cloud computing is compatible for the e-commerce industry of Bangladesh. There were 13 questions under this section. The 2nd section had 3 questions & was for measuring how much the proposed cloud model would be feasible in perspective of e-commerce industry.

The questionnaire which was sent to organizations useing cloud system had 7 questions for analyzing the facilitation & impact of cloud computing system in an organization.

4. Proposed Cloud Computing Model

This model is constructed on the basis of various existing cloud computing models, types, and services []. This is a model which portraits the system of networking through cloud computing. In short cloud networking.

4.1 Cloud networking model

In our model we have shown how a third party will connect an e-retailer with various delivery service giving vendors through the cloud networking. Which would eventually make the system more digitized, easier & faster. We also have shown how database in cloud here would work.

4.2 Operation process through the proposed cloud networking model

After the installment of this whole system it would very easy to operate. After the confirmation of the purchase of a product the next thing is to is packaging & delivering. After confirmation the e-retailer which has been shown as “Users” in the diagram will log on to the program of the cloud. This program will run on the virtual machine of the cloud networking system. Through this virtual machine they will have access to various delivery giving service providers API. The API of various vendors will be categorized in various panels in the virtual machine as biker panel, cab panel, truck panel, pickup panel etc. The user will look for available service provider nearby as per their necessity & confirm the delivery. The database here will continuously record all the activities through the virtual machine of the cloud system.

The organization would be able to store all its data in the database of cloud computer. Users can access those data with appropriate password from any geographical location. In this model, a cloud database is a database service built and accessed through a cloud platform. It serves many of the same functions as a traditional database with the added flexibility of cloud computing. Users install software on a cloud infrastructure to implement the database.

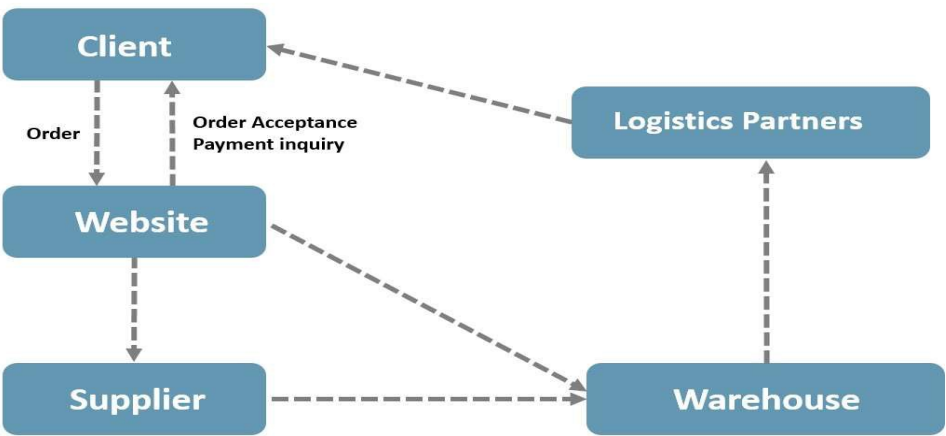


Diagram: Existing E-Commerce Process

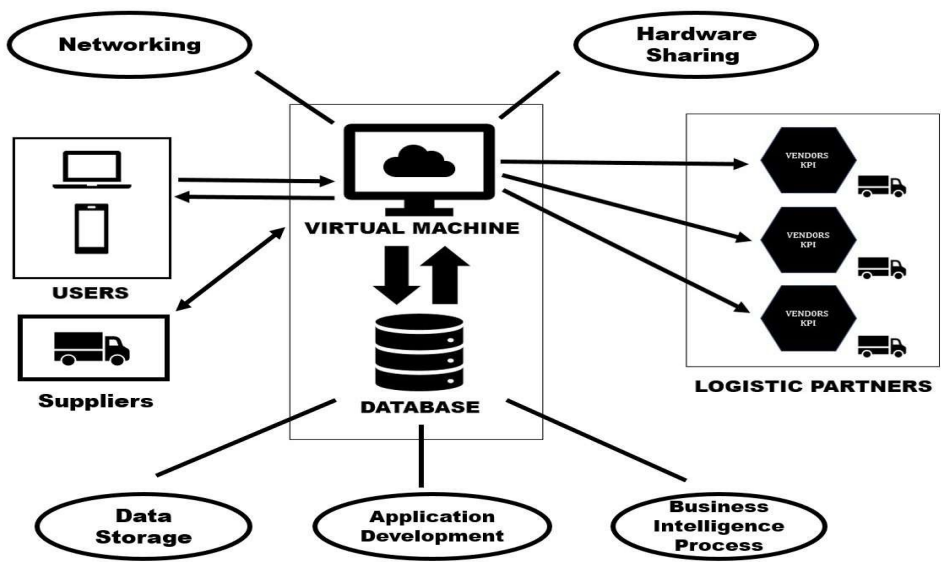


Diagram: The Proposed Cloud Based E-Commerce Model



Diagram: Workflow of the cloud networking model

4.3 Cloud deployed in the proposed model

In this model public cloud has been deployed as the cloud networking system. Public clouds are owned and operated by a third-party cloud service provider, which deliver their computing resources, like servers and storage, over the internet. With a public cloud, all hardware, software,

and other supporting infrastructure is owned and managed by the cloud provider. The users can access these services and manage their account using a web browser.

But here an e-retailer can buy the whole system from a provider & use it as private cloud system. A private cloud refers to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located on the company's on-site datacenter. But this is more expensive than installing public cloud service in an organization.

4.4 Function of cloud service used in virtual machine

In case of virtual machine Infrastructure as a service (IaaS) type of cloud service will be applicable. It is the most basic category of cloud computing services. With IaaS, the e-commerce organization can rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis. By IaaS, the base layer of e-commerce cloud shares IT infrastructure resources and connects the huge system pool together to provide services. Cloud computing allows the hardware layer to run more like internet to make the hardware resources shared and accessed as data resources in secure and scalable way. The base layer can provide the basic hardware resources for the platform layer, and the users can also make use of it as the same as using a local device to use. The applications software infrastructure provided by a professional company to e-commerce companies to pay in the similar way of on-demand access & helps to complete the production, marketing, trading and management. E-commerce companies can use the system to lower the cost to avoid wasting, and more resources can be used for business activities.

Features of IaaS:

- ☐ The organization can quickly set up and dismantle test and development environments, bringing new applications to market faster.
- ☐ Running websites using IaaS can be less expensive than traditional web hosting.
- ☐ IaaS is useful for handling unpredictable demand and steadily growing storage needs. It can also simplify planning and management of backup and recovery systems.
- ☐ IaaS provides all the infrastructure to support web apps, including storage, web and application servers, and networking resources that would require for the organization.
- ☐ High-performance computing (HPC) on supercomputers, computer grids, or computer clusters helps solve complex problems involving millions of variables or calculations & Big data analysis.

4.5 Function of cloud service used in database

In case of database Platform as a service (PaaS) type of cloud service will be applicable. With the support of the powerful hardware, platform layer carries out the tasks of data storage, computing and software development. It can even achieve the tasks of completion of the original mass data storage, business intelligence processing and so on which have been difficult to complete. Users

can choose the devices and the number of devices according to the complexity of dealing with the content. Virtualization technology enables the platform to show a strong level of flexibility.

Features of PaaS:

- ☐ PaaS provides a framework that developers can build upon to develop or customize cloud-based applications.
- ☐ Tools provided as a service with PaaS allow organizations to analyze and mine their data, finding insights and patterns and predicting outcomes to improve forecasting, product design decisions, investment returns, and other business decisions.
- ☐ PaaS providers may offer other services that enhance applications, such as workflow, directory, security, and scheduling.

4.6 The aspects which should be considered while installing the system

For the business health and processes

- ☐ Financial health: The provider should have a track record of stability and be in a fine financial position with sufficient capital to operate successfully over the long term.
- ☐ Organization, governance, planning, and risk management: The provider should have a formal management structure, established risk management policies, and a formal process for assessing third-party service providers and vendors.
- ☐ Trust: You should know about the company and its principles. Check the provider's prominence and see who its partners are. Find out its level of cloud experience. Read reviews and talk to customers whose situation is similar to yours.
- ☐ Business knowledge and technical know-how: The provider should realize your business and what you're looking to do and be able to match it up with their technical prowess.
- ☐ Compliance audit. The provider should be able to corroborate compliance with all of your requirements through a third-party audit.

For the administrative support

- ☐ Service Level Agreements (SLAs): Providers should be able to assure you a basic level of service that you are comfortable with.
- ☐ Performance reporting: The provider should be able to give you performance reports.
- ☐ Resource monitoring and configuration management: There should be sufficient controls for the provider to track and monitor services provided to customers and any changes made to their systems.
- ☐ Billing and accounting: This should be automated so that you can keep track of what resources you're using and the cost, so you don't run up unexpected bills. There should also be support for billing-related issues.

For the technical capabilities and processes

- ☐ Ease of deployment, management, and upgrade: Make sure the provider has mechanisms that make it easy for you to deploy, manage, and upgrade your software and applications.

- ❑ Standard interfaces: The provider should use standard APIs and data transforms so that your organization can build connections to the cloud with ease.
- ❑ Event management: The provider should have a formal system for event management that’s integrated with its monitoring/management system.
- ❑ Change management: The provider should have recorded and formal processes for requesting, logging, approving, testing, and accepting changes.
- ❑ Hybrid capability: Even if you don’t plan to use a hybrid cloud initially, you should make sure the provider can support this model. It has advantages that you may wish to exploit later.

For these security practices

- ❑ Security infrastructure: There should be a comprehensive security infrastructure for all levels and types of cloud services.
- ❑ Security policies: There should be comprehensive security policies and procedures in place for controlling access to provider and customer systems.
- ❑ Identity management: Changes to any application service or hardware component should be authorized on a personal or group role basis, and authentication should be required for anyone to change an application or data.
- ❑ Data backup and retention: Policies and procedures to ensure integrity of customer data should be in place and operational.
- ❑ Physical security: Controls ensuring physical security should be in place, including for access to co-located hardware. Also, data centers should have environmental safeguards to protect equipment and data from disruptive events. There should be redundant networking and power and a documented disaster recovery and business continuity plan.

Logistic partners for delivery service

Panel	Name of service provider
Biker	Paperfly
	E-currrier
	pathao
	Uber
	Parcel BD
	Delivery tiger
	Duronto express
	Obhai

Panel	Name of service provider
Truck driver	Sohoj

	Duronto express
	bidhut
	heavygari
	Truck kothai
	Truck lagbe
	Heavy truck
	Truck BD
	Truck load

Panel	Name of service provider
Three-wheeler puller	obhai
	Paper fly
	Duronto express
	Truck lagbe

Panel	Name of service provider
Pickup driver	Truck kothai
	Truck lagbe
	Amar sheba
	Heavy gari

4.7 Advantages of the proposed cloud networking model

- ☐ Users can access cloud databases from virtually anywhere, using a vendor’s API or web interface. Employees who are working on the premises or at the remote locations can easily access all the could services. All they need is internet connectivity.
- ☐ Making any change in the system is easy.
- ☐ Cloud databases can expand their storage capacities on run-time to accommodate changing needs.
- ☐ Organizations only pay for what they use.
- ☐ Scaling of the server is easy. Always available, and scales automatically to adjust to the increase in demand.
- ☐ In the event of a natural disaster, equipment failure or power outage, data is kept secure through backups on remote servers.
- ☐ Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.

- Cloud computing makes data backup, disaster recovery, and business continuity easier and less expensive because data can be mirrored at multiple redundant sites on the cloud provider's network.
- Using cloud computing, IT costs such as infrastructure, maintenance and operational costs will be decreased. As there is no need to install any application in user's computer, cloud also helps to reduce the cost for infrastructure maintenance and acquisition.
- Cloud computing offers a competitive edge over competitors. It helps the organization to access the latest and applications any time without spending much time and money on installations.
- Cloud computing allows the organization to deploy your service quickly in fewer clicks. This faster deployment allows the organization to get the resources required for its system within fewer minutes.
- In the cloud, software integration is something that occurs automatically. Therefore, the organization doesn't need to take additional efforts to customize and integrate its applications as per its preferences.
- Cloud computing delivers faster and more accurate retrievals of applications and data. With less downtime, it is the most efficient recovery plan.
- Whether the business challenge is expanding into new markets, attracting and retaining new customers or speeding up time-to-market for new products and services, cloud allows organizations to rapidly and easily scale up their operations to support business goals.

5. Critical success factors of e-commerce in Bangladesh and Prospect of the proposed model

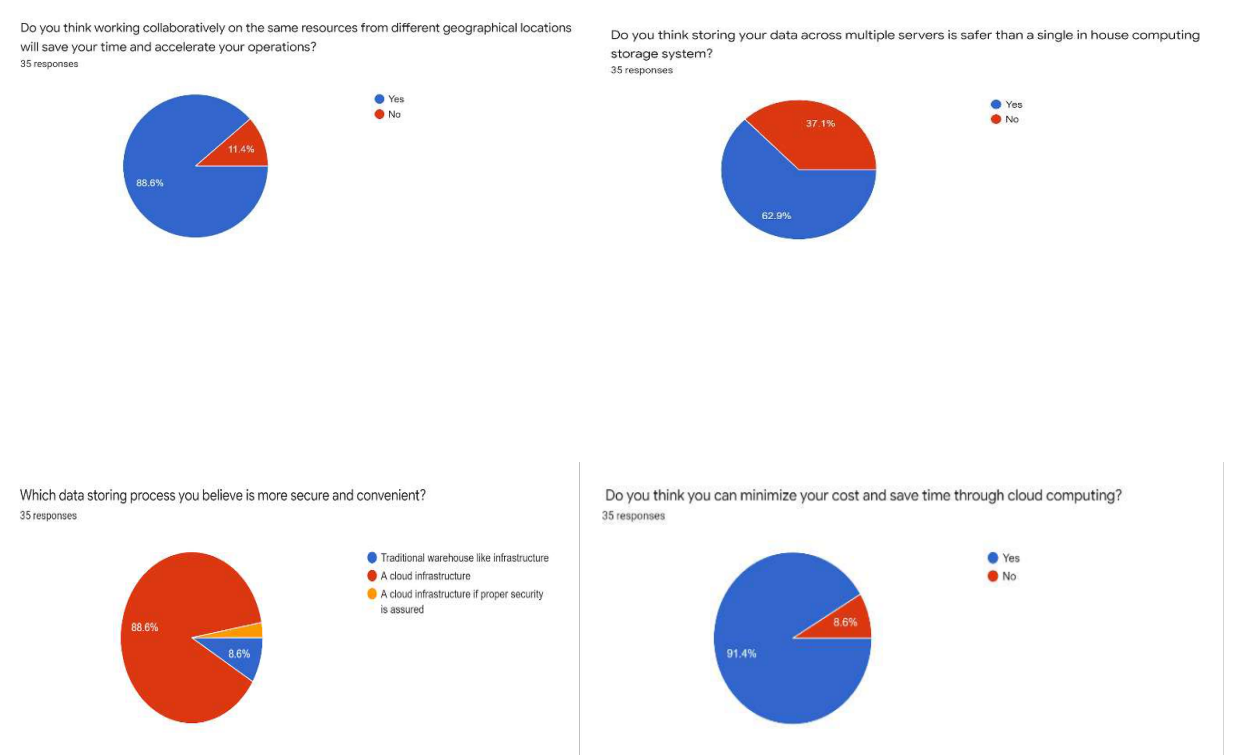
With the advancement of technology, improvement in livelihood criteria and fast pace of living, consumers' shopping behavior have changed greatly. Consumer interest is shifting greatly towards online shopping. Also, Bangladesh being a country with 164.4 million people, social homogeneousness, forward looking infrastructure and low logistics, communication and payment cost possess a tremendous growth potential for e-commerce businesses. In fact, international organizations such as WTO (World Trade Organization) and UNCTAD (United Nations Centre for Trade and Development) have emphasized on the importance of e-commerce for developing countries considering the potentials of e-commerce for these country's financial growth. And so, a healthy flourishing of the e-commerce business sector in our country is a demand of time.

There are multiple factors hindering the growth of our e-commerce sector. Survey was done on the leading e-commerce businesses and to ascertain the problematic aspects. As per the survey and research some of the major current issues of e-commerce businesses are-

- 87.9% e-commerce businesses feel their data is not fully secured in the present on-premise data storing infrastructure, while more than 50% feel severe vulnerability to data threat.

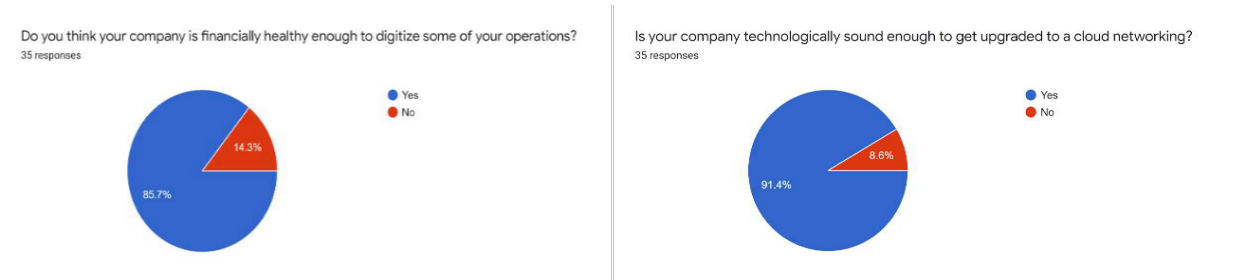
- 84.8% leading e-commerce organizations consider the present delivery logistics process though middlemen complex, hassle-some and time consuming.
- There is a lack of consumer analysis scopes.
- Lack of efficient manpower.

We tried to architect a cloud-based model that would bridge the mentioned gaps of e-commerce in Bangladesh. We introduced our model to 19 leading e-commerce business holders and 4 out 7 companies of Bangladesh (Robi, EBL, 10 minutes school, ACI) that are using some cloud computing for their operation. The purpose of the survey was to ascertain- i) the usefulness of our model and ii) acceptability and implementability of our model and the readiness of businesses to adapt it in present context. Our survey leads to these observations

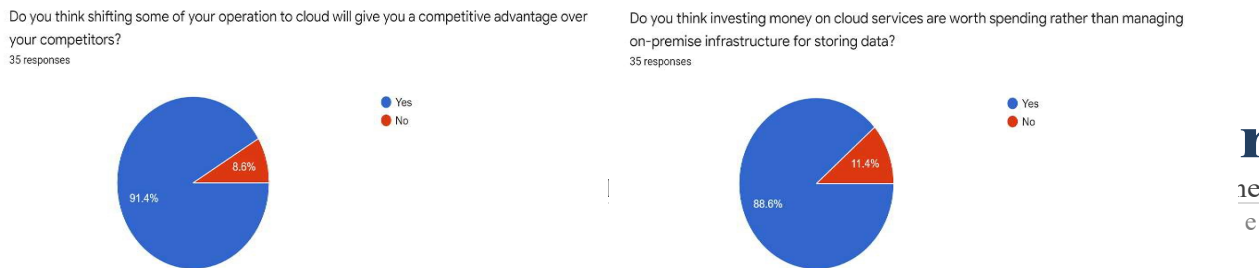


From the data shown in the pie charts from the survey it can be interpreted that a cloud computing-based e-commerce system is very relevant and has potential to mitigate a lot of existing e-commerce issues. This model can effectively reduce cost and time of operation, minimize security concern, minimize requirement of workforce, and broadens consumer analysis scopes.

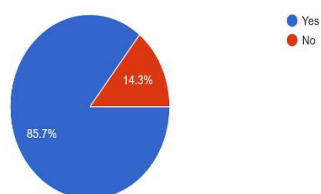
The second concern is the implement ability of the model in our context of Bangladesh. The survey result shows-



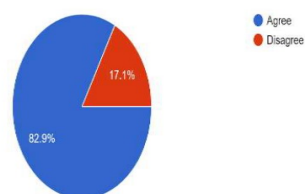
These data show the leading e-commerce businesses have the capability and readiness to adapt a cloud-based operating network. Which means there are definite scopes of applying this model.



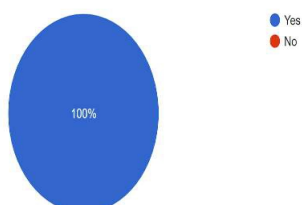
Do you think applying this cloud model will facilitate your logistic operation?
35 responses



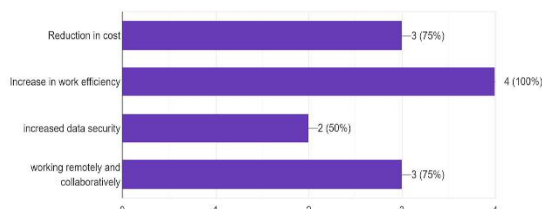
Do you agree the cloud networking process here is easy to maintain & operate?
35 responses



Do you think cloud computing facilitated your operation and data management?
4 responses



Which benefits of cloud computing does your organization enjoy? (you can choose more than one option)
4 responses



As per the survey data, 90.9% of the e-commerce businesses believe adapting our model will give their business a competitive advantage over competitors, spending on cloud computing is believed to be a rational investment by 87.9%, 82% people are believing that the model will increase their efficiency. Also, the trivial number of organizations that have adapted cloud computing for their business operation strongly agrees to be benefitted by it.

These data figures imply that most of the e-commerce businesses can rely upon the model that has been proposed and have a willingness to adapt it. The general concept of using cloud computing for facilitating business operations is also getting popularized since the cloud computing consumer organizations are likely to get highly benefitted by it. This gives our model a sense of acceptability by leading e-commerce businesses.

Conclusion

Cloud computing has opened doors to solve major problems that were faced by the e-commerce sectors to integrate their services with the increasing demands and the scale of users. In the future the study can be extended to analyze some other factors which could have an impact on the adoption of cloud computing for integration with e-commerce facilities. As all of the above discussed things are only possible with the facility of internet, the thing that is to be worried about is the speed and bandwidth of internet availability at affordable prices.

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