American Journal of Engineering Research (AJER)
e-ISSN : 2320-0847 p-ISSN : 2320-0936
Volume-03, Issue-03, pp-91-102
www.ajer.org

Research Paper Open Access

Cloud Computing for Technical and Online Organizations

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Abstract: - Cloud computing is a new computing model which is based on the grid computing, distributed computing, parallel computing and virtualization technologies define the shape of a new technology.It is the core technology of the next generation of network computing platform, especially in the field of education and online.Cloud computing as an exciting development in an educational Institute and online perspective.Cloud computing services are growing necessity for business organizations as well as for technicaleducational institutions.Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on-demand.Application of storage technology can significantly reduce the amount of cloud storage servers, thereby reducing system development costs, reduce the system caused by the server a single point of failure. Cloud storage services meet this demand by providing transparent and reliable storage solutions.In this paper shows that the cloud computing plays an important role in the fields of TechnicalEducational Institutions and Online.The research study shows that the cloud platform is valued for both students and instructors to achieve the course objective and the nature, benefits and cloud computing services, as a platform for Educational environment and online.

Keywords: - *Cloud Computing, Technical Educational Institutions and Online.*

I. INTRODUCTION

Technical education was acknowledged in time as one of the pillars of society development. Through the partnerships between universities, government and industry, researchers and students have proven their contribution to the transformation of society and the entire world economy (Lazowska et al., 2008). The tendency observed during the last few years within the higher education level (Mircea, 2010; Bozzelli, 2009), is the universities' transition to research universities and ongoing update of the IT (Information Technology) infrastructure as foundation for educational activities and Science research. With the evolution of technology, the number of services which migrate from traditional form to the online form grows as well. For these specific services, an adequate providing form must be found in the online environment, using the proper technologies, guaranteeing the access of large number of users, fast and secure payment services (Ivan et al., 2009).

Cloud Computing has got different meaning to people working in different areas of computer science. Cloudcomputing has become a highlight for the IT specialists in recent years. To implement this technology, great stepshad been taken. To develop this domain [1], the pledged profits have determined the companies to invest a bigamount of money for research. It is an internet depended service delivery technique that offers internet based services, computing and storage for users in all markets that contains financial health care and government.Cloud computing is a new and rising information technology that shifts the way IT architectural solutions are suggest by means of moving towards the theme of virtualization: of data storage, of local networks (infrastructure) as well as software [2-3].

Cloud Computing is a new model for hosting resources and provisioning of services to the consumers. It provides a convenient, on-demand access to a centralized shared pool of computing resources that can be deployed by a minimal management overhead and with a great efficiency.The term "Cloud Computing" sprang from the common practice of depicting the Internet in pictorial diagrams as a cloud Internet.Cloud Computing providers depend on the Internet as the intermediary communications medium leveraged to deliver their IT resources to their consumers on a pay-as-you-go basis. By using cloud computing consumers can be access

resources directly through the internet, from anywhere by using any internet devices, and at any time without any technical or physical concerns.

National Institute of Standards and Technology (NIST) defines Cloud Computing is on-demand access to a shared pool of computing resources. It is an all-inclusive solution in which all computing resources (hardware, software, networking, storage, and so on) are provided rapidly to the consumers.Cloud computing is a comprehensive solution that delivers IT as a service. Computers in the cloud are configured to work together and the various applications use the collective computing power as if they are running on a single system. Cloud computing is a centralized virtual software available in the server which provides all the required resource to the users where the user don't need to think about the location or a device. Just need to browse and have all that is required.The flexibility of cloud computing is a function of the allocation of resources on demand. This facilitates the use of the system's cumulative resources, negating the need to assign specific hardware to a task. Before cloud computing, websites and server-based applications were executed on a specific system. With the advent of cloud computing, resources are used as an aggregated virtual computer. This amalgamated configuration provides an environment where applications execute independently without regard for any particular configuration.Educational Institutions are under increasing pressure to deliver more for less and they need to find ways to offer rich, affordable services and tools. Cloud computing has the potential to provide computation and storage resources as services. Both the public as well as the private institutions can use the cloud computing to deliver better services with limited resources.

Cloud computing gets its name as a metaphor for the Internet. Typically, the Internet is represented in networkdiagrams as a cloud, as shown in Figure 1.

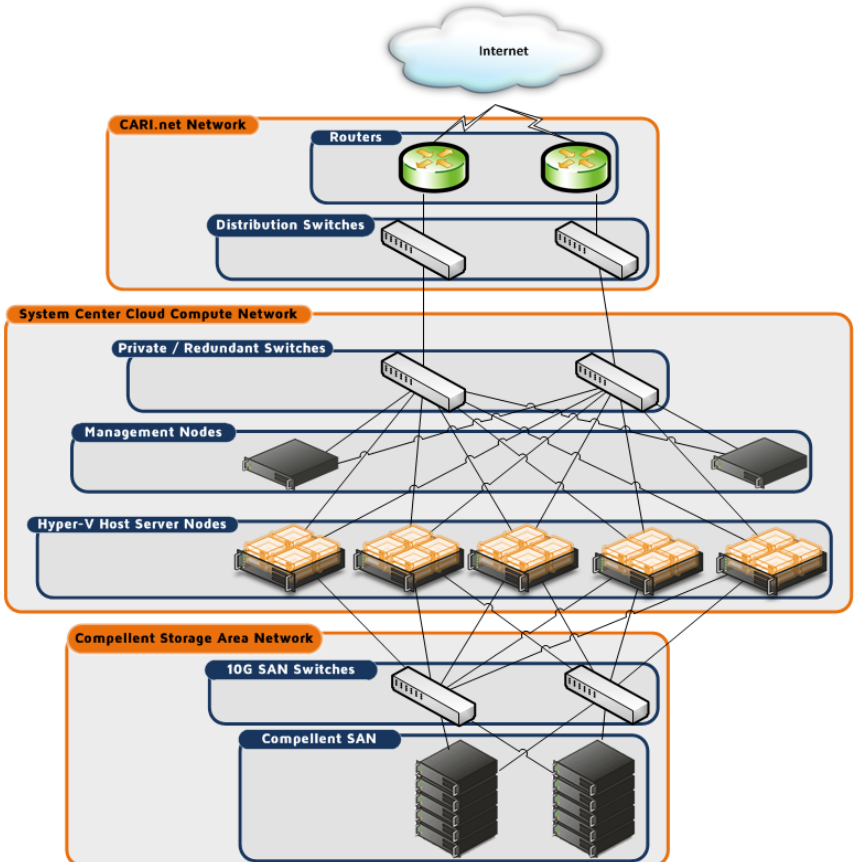

Figure 1: A cloud is used in network diagrams to depict the Internet.

There are eight fundamental elements that are vital to enabling the cloud concept to not just exist, but to grow to its fullest potential (see Figure 2). From the perspective of Rayport and Heyward (2009), it is essential to have the following conditions in the cloud environment:

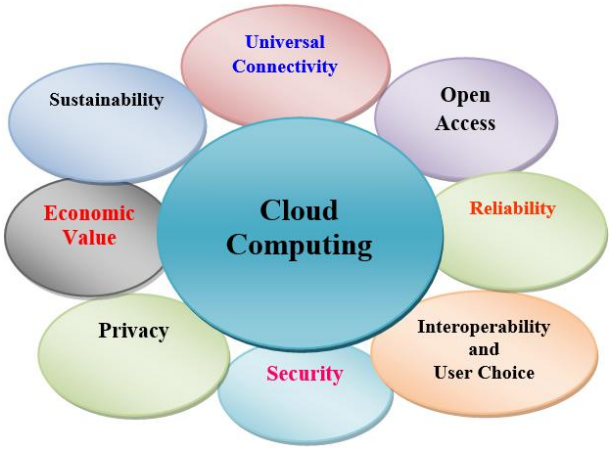

Figure 2: The 8 Fundamental Elements of Cloud Computing.

Universal connectivity—users must have near-ubiquitous access to the Internet.
Open access—users must have fair, non-discriminatory access to the Internet.
Reliability—the cloud must function at levels equal to or better than current stand-alone systems.
Interoperability and user choice—users must be able to move among cloud platforms.
Security—users' data must be safe.
Privacy—users' rights to their data must be clearly defined and protected.
Economic value—the cloud must deliver tangible savings and benefits.
Sustainability—the cloud must raise energy efficiency and reduce ecological impact.
Cloud uses virtualization as its key technology [4] .When end user submits their requirement a separate Virtual Machine is created to run their specific application. In a single host machine itself multiple Virtual Machines can be run to utilize theresources.

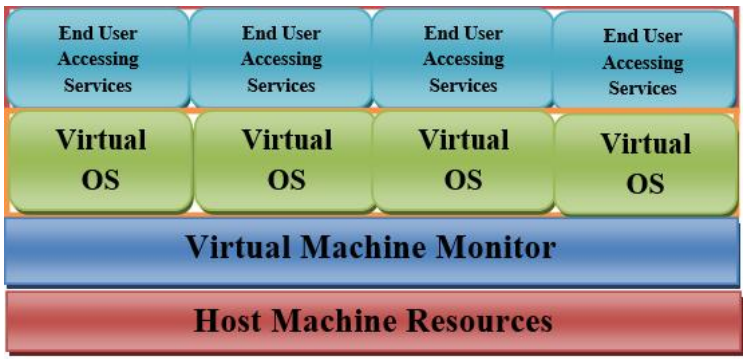

Figure. 3.Virtualization Technique.

Cloud storage is provided storage services, the network data stored in local storage service provider to provide online storage space. Furthermore, most of today's smart phones and tablet devices have good support for diverse networks and protocols. Thus, connectivity can be established between mobile participants via 4G, Wi-Fi, and Bluetooth. Physical machines may be dynamically allocated to virtual machines (VMs) which in turn may be migrated to other physical machines in case of machine faults. While this kind of flexibility increases availability and reduces cost, the highly dynamic nature in which VMs are allocated and migrated raises security concerns. Actually, Cloud computing is not a completely new concept. It has similar features as Grid computing that has been investigated for more than a dozen of years.

II. CLOUD COMPUTING BUILDING BLOCKS

The cloud computing model is comprised of a front-end and a back-end. These two elements are connected through a network, in most cases the Internet. The front end is the vehicle by which the user interacts with the system; the back end is the cloud itself. The front end is composed of a client computer, or the computer network of an enterprise, and the applications used to access the cloud. The back end provides the applications, computers, servers, and data storage that creates the cloud of services.

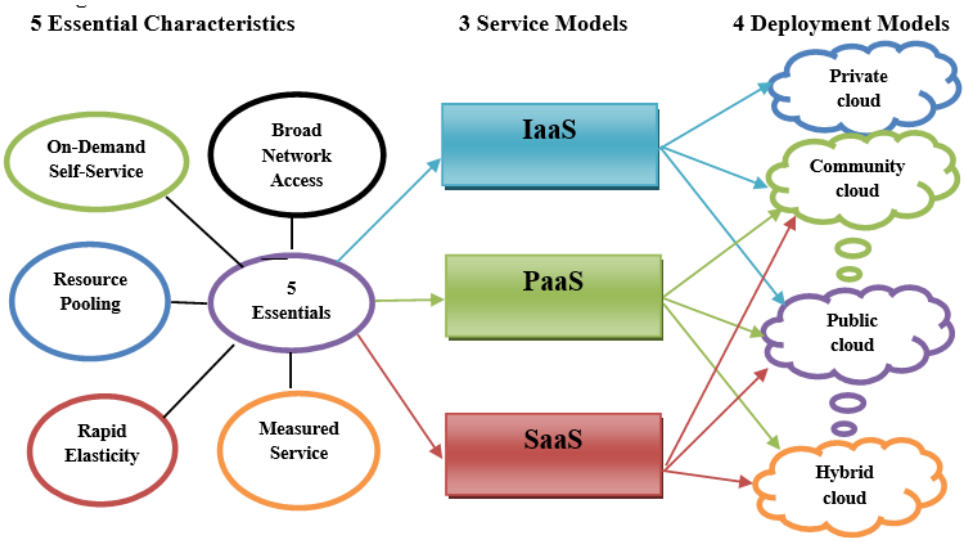

Figure 4: Cloud Computing Service Levels.

A.Essential Characteristics of Cloud Computing:

- *On-Demand Self-Service:* Customers can automatically provision computing capabilities and resources on their own when needed without necessitating any human intervention.
- *Broad Network Access:* Access and capabilities are available over the network through standard devices, such as cell phones, laptops, PDAs, etc.
- *Resource Pooling:* Resources such as network bandwidth, virtual machines, memory, processing power, storage capacity, etc. are pooled together to serve multiple customers using a multi-tenant model. That is, virtual and physical resources are dynamically assigned and reassigned based on need and customers' demands.
- *Rapid Elasticity:* Depending on demand, resources and capabilities can be quickly and automatically deployed and scaled at any quantity and at any time.
- *Measured Service:* Customer usage of the vendor's resources and services are automatically monitored controlled and reported offering a high level of transparency for the customer and vendor.

B.Service Models of Cloud Computing:

- *Software as a Service (SaaS):* The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user -specific application configuration settings.
- *Platform as a Service (PaaS):* The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.
- *Infrastructure as a Service (IaaS):* The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).

C. Deployment Models Of Cloud Computing:

- *Private cloud:* The cloud infrastructure is provisioned for exclusive use by a single organizationcomprising multiple consumers (e.g., business units). It may be owned, managed, and operated by the organization, a third party, or some combination of them, and it may exist on or off premises.

- *Community cloud:* The cloud infrastructure is provisioned for exclusive use by a specific community of consumers from organizations that have shared concerns (e.g., mission , security requirements, policy, and compliance considerations). It may be owned, managed, and operated by one or more of the organizations in the community, a third party, or some combination of them, and it may exist on or off premises.
- *Public cloud:* The cloud infrastructure is provisioned for open use by the general public. It may be owned, managed, and operated by a business, academic, or government organization, or some combination of them. It exists on the premises of the cloud provider.
- *Hybrid cloud:* The cloud infrastructure is a composition of two or more distinct cloud infrastructures (private, community, or public) that remain unique entities, but are bound together by standardized or proprietary technology that enables data and application portability (e.g., cloud bursting for load balancing between clouds).

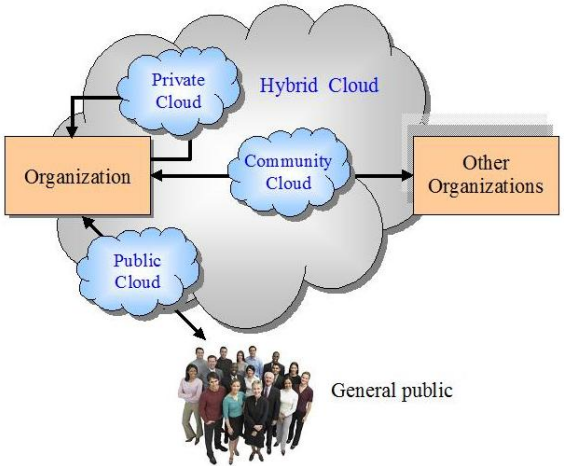

Figure 5: The cloud computing deployment models.

III. CLOUD COMPUTING CHALLENGES

Cloud computing has emerged as an important solution offering enterprises a potentially cost effective model to ease their computing needs and accomplish business objectives. Some features of cloud computing are:

- *Optimized Server Utilization:* As most enterprises typically underutilize their server computing resources, cloud computing will manage the server utilization to the optimum level.
- *On-Demand:*Cloud computing provides users with customized environments that are tailed to individual requirement. This feature is more user friendly than Grid computing where the application has usually to be adapted to the target architecture.
- *Dynamic Scalability:*Many enterprises include a reasonably large buffer from their average computing requirement, just to ensure that capacity is in place to satisfy peak demand. Cloud computing provides an extra processing buffer as needed at a low cost and without the capital investment or contingency fees to users.
- *Disaster Recovery:*It is a concern of enterprises about the resiliency of cloud computing, since data may be commingled and scattered around multiple servers and geographical areas. It may be possible that the data for a specific point of time cannot be identified. Unlike traditional hosting, the enterprise knows exactly where the location is of their data, to be rapidly retrieved in the event of disaster recovery. In the cloud computing model, the primary CSP(customer service provider) may outsource capabilities to third parties, who may also outsource the recovery process. This will become more complex when the primary CSP does not ultimately hold the data. The Cloud technology is currently still in the development phase. As the sensitive applications and data are moved into the cloud data centers, run on virtual computing resources in the form of virtual machine.

IV. THE BENEFITS OF CLOUD COMPUTING

As cloud computing begins to take hold,several major benefits have become evident:

Costs: The cloud promises to reducethe cost of acquiring, delivering, andmaintaining computing power, a benefitof particular importance in times offiscal uncertainty. By enabling agenciesto purchase only the

computing servicesneeded, instead of investing in complexand expensive IT infrastructures,agencies can drive down the costs ofdeveloping, testing, and maintainingnew and existing systems.

Access: The cloud promises universalaccess to high-powered computing andstorage resources for anyone with anetworkaccess device. By providing suchcapabilities, cloud computing helps tobolster an agency's continuity of operations(COOP) demands.

Scalability and Capacity: The cloud isan always-on computing resource thatenables users to tailor consumption totheir specific needs. Infinitely scalable,cloud computing allows IT infrastructuresto be expanded efficiently and expediently without the necessity of makingmajor capital investments. Capacity canbe added as resources are needed andcompleted in a very short period of time.Thus, agencies can avoid the latency,expense, and risk of purchasing hardwareand software that takes up datacenter space -- and can reduce thetraditional time required to scale up anapplication in support of the mission.Cloud computing allows agencies toeasily move in the other direction aswell, removing capacity, and thus expenses,as needed.

Resource Maximization: Cloud computingeases the burden on IT resourcesalready stretched thin, particularlyimportant for agencies facing shortagesof qualified IT professionals.

Collaboration: The cloud presents anenvironment where users can developsoftware-based services that enhancescollaboration and fosters greaterinformation sharing, not only within theagency, but also among other governmentand private entities.

Customization: Cloud computing offersa platform of tremendous potential forcreating and amending applications toaddress a diversity of tasks and challenges.Its inherent agility means thatspecific processes can be easily alteredto meet shifting agency needs, sincethose processes are typically changeableby making a configuration change,and not by driving redevelopment fromthe back-end systems (Heyward andRayport, 2009).

*Improve Accessibility:*You have access anytime, anywhere, making your life so much easier i.e. Google doc is an application of cloud computing provide the best way to others without cost.

V. CLOUD COMPUTING FOR TECHNICAL EDUCATION:

There was a time when, to use files (word processing files, spreadsheets, etc.) on different computers. Cloud computing is a new business model wrapped around new technologies like virtualization, SaaS and broadband internet. The safety, stability, and ease-of-use of cloud computing in education is resulting in widespread adoption in educational institutions of all sizes and types. Cloud computing entails using a network of remote servers hosted on the internet as opposed to a local server. This helps cut IT costs as well as simplifies content management processes for schools and educational systems. The results of a survey that have been completed in 2009 by Gartner analysts (Figure 6) about the IT trends (especially cloud computing) show that it is being used more in the areas of finance and business when compared to other sectors.

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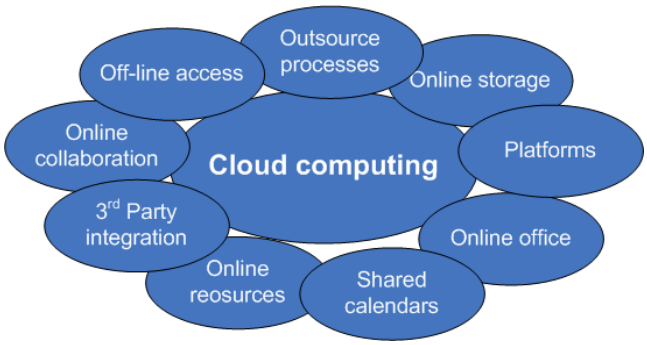


Figure. 6. Cloud computing usage.

*Back Up:*An important function of the Cloud is that it automatically saves content, making it impossible to lose or delete any valuable material. This means that even if a computer crashes, all documents and content will remain safe, saved, and accessible in the cloud.

*Storage:*The Cloud allows its users to store almost all types of content and data including music, documents, E-Books, applications, photos, and much more. We share the information of Attendance and Assignment in our Institute of students in Google doc and share all the information of students on doc via using an ERP Software and utilize the cloud resources

*Accessibility:*Any data stored in the Cloud can easily be accessed from almost any device including mobile devices such as phones or tablets. In our institute an URL provide to the students for accessing the data inside the campus or outside the campus.

*Collaboration:*The Cloud allows multiple users to work on and edit documents at the same time, it enables effortless sharing and transmission of ideas. It also provides the security to edit only those people who gain the right from admin. With this feature, group projects and/or collaborative lesson plans can be optimized for both teachers and students.
*Resource and Time Conscious:*With the availability of content online, it is no longer necessary for teachers to spend time and resources printing or copying lengthy documents or lesson plans. Now, students are able to access homework assignments, lesson notes, and other materials online like ERP Systems of education institute and parents also see the details of the students. Cloud can be used in underdeveloped or emerging countries creating a way of being able to teach children who would not ordinarily have access to education. Students and teachers can share their work without having to use paper. Using paper is costly both to the environment and in monetary terms and is therefore no longer a viable way to educate.
Assignments: The Cloud allows teachers to post assignments online. Students are able to access these assignments, complete them, and save them in a folder to be reviewed later.

VI. AN ARCHITECTURE OF CLOUD TECHNICAL EDUCATION

The model contains physical hardware layer, virtualizationlayer, education middleware layer, application programinterface layer, management system and securitycertification system, see Figure 7.

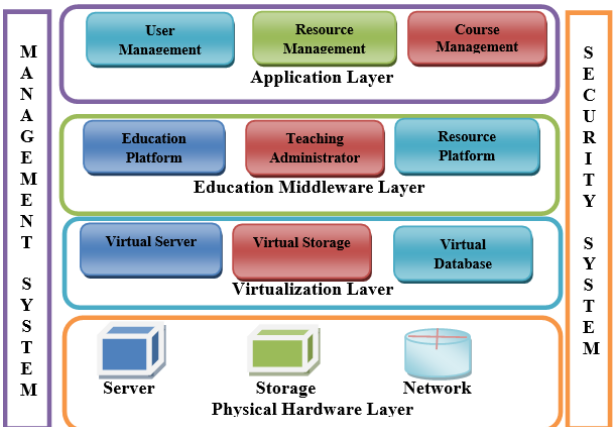


Figure 7. Architecture of Cloud Education model.

*Physical hardware layer*is a basic platformmodel, including servers, storage equipment's, And network equipment's.
*Virtualization layer*with the feature: dynamic configuration,distributed deployment, fee measurementrealizes the five characteristics of cloud computing.
The goal of virtualization layer is to break completelyinformation islands based on existing regionalthrough the distributed technology and virtualizationtechnology. This layer also consists of three parts: virtualservers, virtual storages, and virtual databases.
*Education middleware layer*is the core layer, because it is the basic business platform. This layer is different from existing, and all information attached to it on different computing node including ordinary file and database. So, all application systems on the middleware layer have
*Application program interface layer*can guarantee model's scalability. Because of the diversity of the existing application system and an application system cannot satisfy all the needs of customers. In this layer also provide the necessary interface beside, and still need to be able to provide hosting service.
*Management system*mainly watchers physical condition, virtualization software, hardware and software, open API. Management system can enhance the safety of the software platform.
*Security system*includes identity authentication and authorization, single point login, virtualization software and hardware access control and audit, the education middleware and open API access control.

VII. ADVANTAGES OF CLOUD COMPUTING IN ONLINE(E-COMMERCE)

For describing the different aspects of an online or E-commerce systems, digitally enabled commercial transactions between and among organizations and individuals.Cloud computing is now evolving like never before, with companies of all shapes and sizes adapting to this new technology. The figure 8 shows a high-level view on an E-commerce system's architecture. If used properly and to the extent necessary, working with data in the cloud can vastly benefit all types of businesses. Industry experts believe that this trend will only continue to

grow and develop even further in the coming few years. While cloud computing is undoubtedly beneficial for mid-size to large companies, it is not without its downsides, especially for smaller businesses.

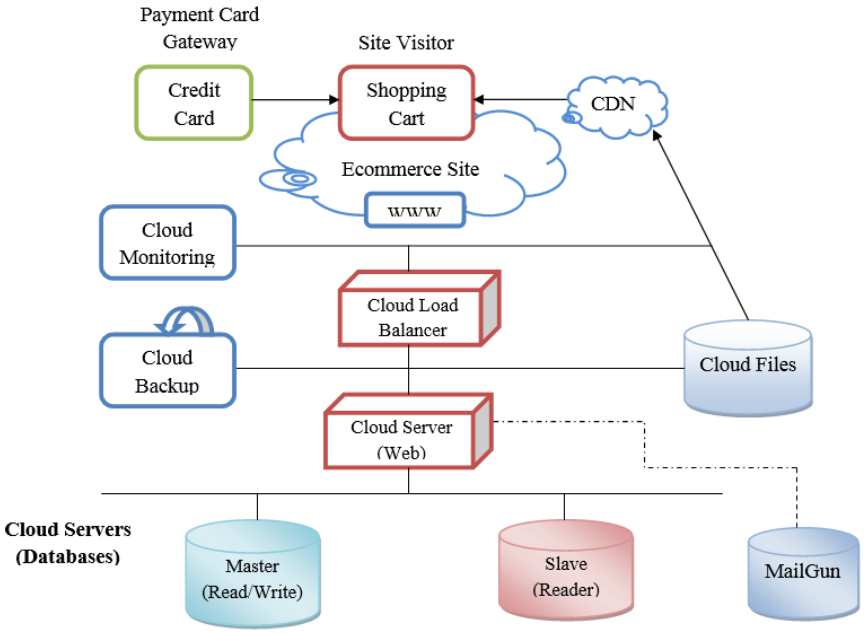


Figure. 8.E-Commerce system architecture.

*Unlimited accessibility:*Developing a business means being constantly connected With Cloud, you can manage your online shop from anywhere and at any time. A browser and an Internet connection are all it takes to process orders, interact with customers, schedule deliveries or generate invoices.
*Security and stability:*Security is one of the most important advantages of the Cloud technology. In the Cloud system, the data of each client is completely partitioned, so that none of the areas interferes with the others. The connection to the servers is secured according to the highest standards, making sure that you are the only one with access to your data. It's like having your own server, without paying considerable amounts of money.
*Full scalability:*Your business grows, so will your technical requirements. Unlike open source ecommerce solutions, which would normally require new investments for extending the technical infrastructure, a Cloud ecommerce system will always be ready to efficiently sustain your new volume of clients, orders, traffic and continuously growing product catalog.
*Minimal costs or No costs:*Cloud solution for E-Commerce, you don't need to worry about the initial investments. You don't need to buy your own server or pay for a separate hosting service. Depending on your business needs, you can always increase or limit the amount of resources you use and also optimize your costs thanks to the scalability of the system.
*Quick Deployment:*Lastly and most importantly, cloud computing gives you the advantage of quick deployment. Once you opt for this method of functioning, your entire system can be fully functional in a matter of a few minutes. Of course, the amount of time taken here will depend on the exact kind of technology that you need for your business.

VIII. PRIVACY AND SECURITY ISSUES

Security and privacy problems appear in technical and online because of operation mechanism and policy mechanism. The failure of security technology makes personal privacy be spread, diffused, aggrieved and scouted without permission. Loopholes in the law led to the network managers could store, amend, exchange, and sell personal information without punishment.We classify the privacy violation phenomenon of technical and online process during the information to be collected, used, saved, and deleted and so on.
*Security issues:*Some of the most serious threats are listed below:

- Deliberate software attacks (viruses, worms, macros, denial of service).
- Technical and human failures and errors (bugs, coding problems, accidents).
- Deliberate acts of espionage or trespass (unauthorized access and/or data collection).
- Deliberate acts of sabotage or vandalism (destruction of information or system).
- Technical hardware failures or errors (equipment failure).

- Deliberate acts of theft (illegal confiscation of equipment or information).
- Quality of Service deviations from service providers (power and WAN service issues).

The primary concern in technical and online is the security that can be summarized as following:

User Authorization and Authentication: The elementary feature of technical and online system is the reliable identification – recognition of the user as a genuine member of a user community because it is the basis for Access control to the online system. Authentication – verification of the user's identity. Authorization – permission to access specific resources.

Entry Points: There are many "entry points" in online system. A system can be attacked only through its "entry points". Designers can limit the security risks by reducing the number of entry points.

Dynamic Nature: The other challenge is the dynamic nature of these systems where there are dynamic sessions where any process may join or leave the group sessions at any time. Security is also concern with each particular member process, a strict session has to be maintained and the credentials are to be verified to control both at the session level and at the participant site.

Protection against Manipulation: One of the issues of E-Learning and online are manipulation from the side of the students the system must be secured against manipulation. There are many possible solutions where any manipulations can be protected by using the techniques of encryption, digital signatures, firewalls, etc.

Confidentiality: Confidentiality refers to the assurance that information and data are kept secret and private and are not disclosed to unauthorized persons, processes or devices.

Integrity: Integrity is that only authorized users are allowed to modify the contents which include creating, changing, appending and deleting data and metadata and the attacks on integrity are generally the attempts made to actively modify or destroy information in the E- Learning and online sites without proper authorization.

Availability: The E-Learning online material e-content, data (or metadata) are to be made available to the learner at the specified session when the user log on to the system for their session at the period of time, if the required material is not available the learner will lose interest and not get the at most use of ELearning system. Mainly there are two types of attacks via blocking attack and flooding attack, e.g.: Denial of Service, Node attacks, Line attacks, Network infrastructure attacks.

*Non-Repudiation:*Non-repudiation is the last step in information security where the learners have to be provided with technical and online services without any possible fraud such as when computer systems are broken in to or infected with Trojan horses or viruses, to deny the works or changes done by them in the system elimination of a refuted activity performed by a user.

IX. RESULT: USING CLOUD COMPUTING

Think of what you do on the web on a daily basis. You check your e-mail. You do your "social networking"—checking Facebook once, twice, 10 times a day, and now twittering. You post and view photos. You store files online, and yes, there can be real work done as well, creating documents, spreadsheets, and presentations entirely online.

The below figures shows the results of this research review work that how cloud used in educational,online and business system in present and future.

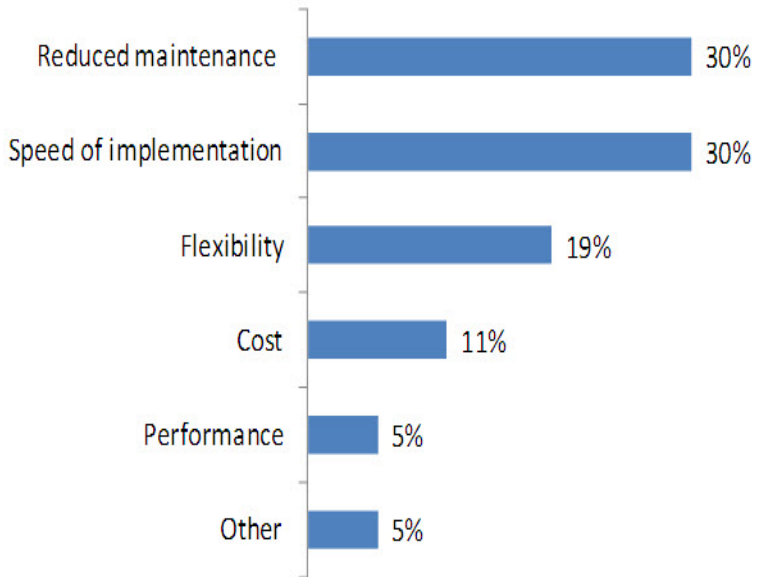


Figure 9: why cloud using in Technical, Online and Business.

Cloud Computing Activities by Different Age Cohorts:

Table 1: Internet users in each age group who do the following online activities (%)

Use of Internet-Based Cloud Activity.	Age				All Ages
	18-29	30-49	50-64	65+	
Use webmail services such as Hotmail, Gmail or Yahoo Mail.	77%	58%	44%	27%	56%
Store personal photos.	50%	34%	26%	19%	34%
Use online applications such as Google Documents or Adobe Photoshop Express.	39%	28%	25%	19%	29%
Store personal videos.	14%	6%	5%	2%	7%
Pay to store computer files online.	9%	4%	5%	4%	5%
Back up hard drive to an online site.	7%	5%	5%	4%	5%
Have done at least one activity.	87%	71%	59%	46%	-------
Have done at least two activities.	59%	39%	31%	21%	--------

Source: Adapted from Horrigan (2008).

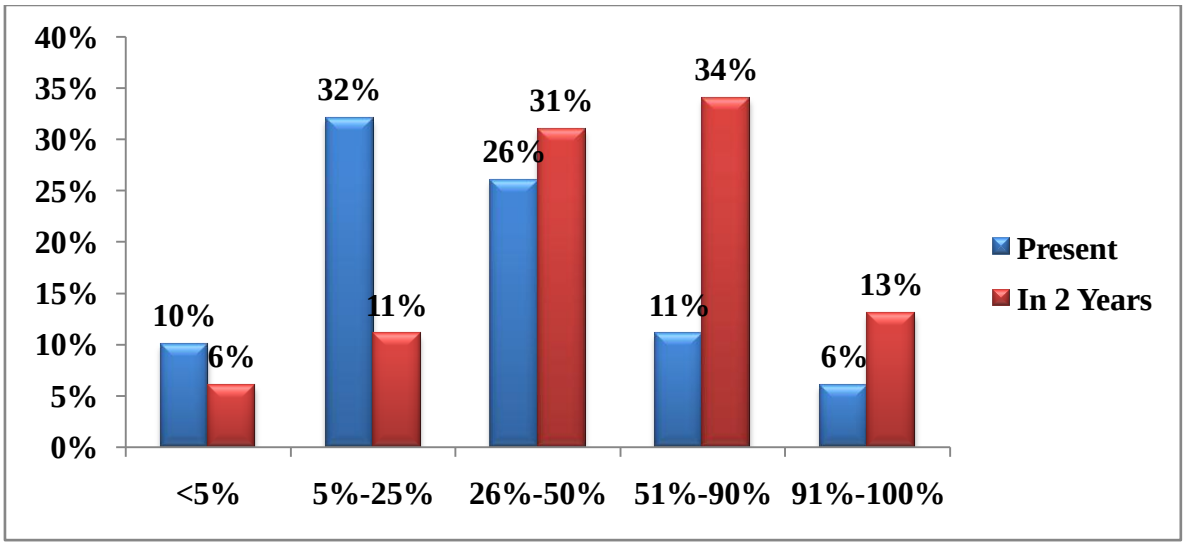
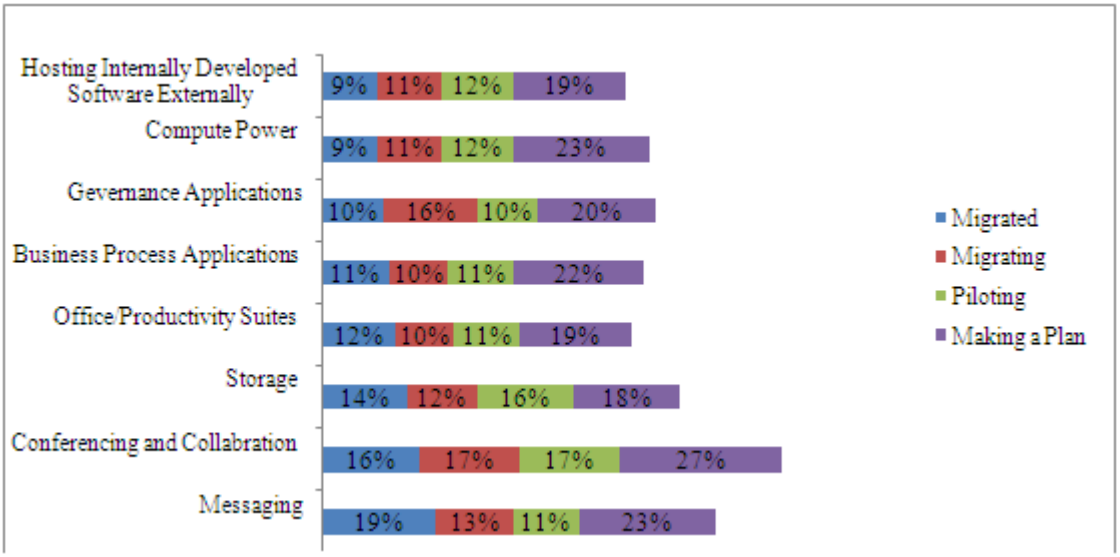


Figure 10: Cloud computing uses at present and next two years.



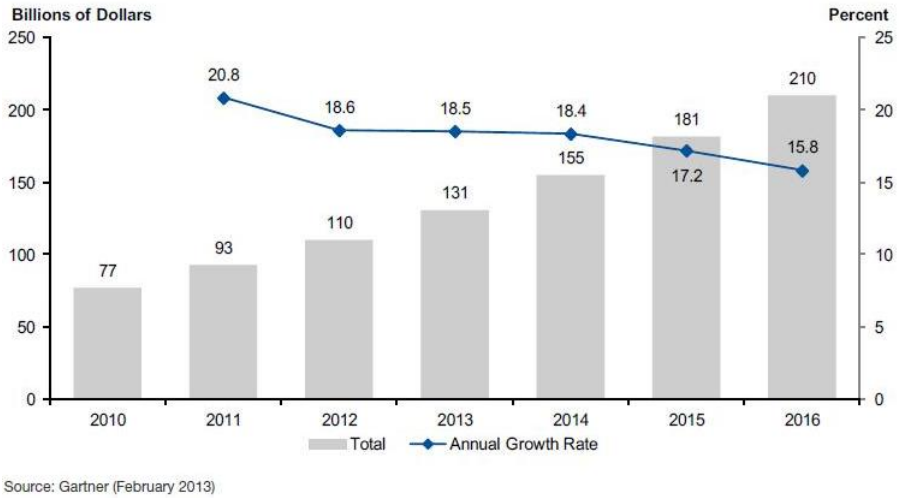


Figure 11: public cloud services market and Annual Growth Rate (2010-2016).

X. CONCLUSION

In this paper,benefits, challenges and security issues of could computing in educational organizational and online advantages provided by cloud, there is a great advantage for university IT staff to take them away the responsibility of the maintenance burden in the university and other online organization. Cloud provides instant global platforms, elimination of H/S capacities and licenses, reduced cost, simplified scalability marketing though cloud services. There will be an online survey to collect the required data for the use of cloud computing in the universities and other governmental or private institutions in the region the cloud computing services needed to deliver the majority of IT services needed by customers do not yet exist. Particularly new payment services with their user base help retailers to enter new markets.

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