



## STUDYING COMPARATIVE CLOUD COMPUTING TECHNOLOGY

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### **Abstract**

In order to provide quicker innovation, adaptable resources, and scale economies, cloud computing is the supply of computing services, including servers, storage, databases, networking, software, analytics, and intelligence, over the Internet. As technology advanced in recent years, cloud technologies were increasingly utilized. Cloud technologies are appealing because data may be stored, transmitted to numerous locations at once, and accessed at any time. It is a system that enables data storage on the Internet, releasing users from the constraints of physical settings and storage devices and enabling access from any location at any time.

### **I. Introduction**

The name “cloud computing” first appeared in the early 2000s, but the idea of “computing as a service” has been present since the 1960s, when computer bureaus allowed businesses to rent time on mainframes rather than having to purchase one themselves. These “time-sharing” services were primarily replaced by the development of the personal computer (PC), which made owning a computer much more accessible, and subsequently by the emergence of corporate data centers, which allowed businesses to store enormous amounts of data. But in the application service providers, utility computing, and grid computing of the late 1990s and early 2000s, the idea of renting access to computing resources has repeatedly come up. Then came cloud computing, which truly took off with the appearance of software as a service (SaaS) provider and hyperscale cloud computing companies like

Amazon Web Services. In recent years, the pace of advancement in electronic and communication tools has reached previously unheard-of levels. New technological advancements or innovations occur daily in our lives. Due to cloud technology, it is also possible for individuals and gadgets to exchange information, move data, and store data centrally. Cloud technologies are appealing because data may be stored, transmitted to numerous locations at once, and accessed at any time. It is a technology that was created in the 1960s and offers functions including data transfer and storage. It is a system that enables data storage on the Internet, releasing users from the constraints of physical settings and storage devices and enabling access from any location at any time. The cloud ecosystem's devices are not physically linked. This service is offered by distant network servers. It is also known as data virtualization. It is intended to operate applications, transfer content and services, and securely store and manage data. It is accessible from any Internet-connected device. A collection of virtual services known as "cloud computing" ensures that data is stored in an Internet-accessible, external environment and operates on a pay-as-you-go basis, allowing customers to only pay for the services they really use. Cloud technologies allow users to store their data and programs in a remote location and make them accessible whenever they want. They are practical and simple to use. It is a well-known service provider due to the advantages of ease of administration, configuration, access, and service. It offers services for either individual or business use. In the modern era, it may be argued that communication and access to the Internet are available everywhere. Even compared to earlier decades, recent years have seen a lot more growth. The use of cloud computing has surpassed traditional data storage and transit methods as well. In the commercial environment, these systems are more frequently employed since they offer quick and secure data transport, storage, manageability, and accessibility. The rapid development of this industry and diverse security requirements are due to the increasing demand for cloud computing [10-14]. Open-source software is used in the

distributed system architecture of cloud computing. Users' personal data and the locations where it is physically stored are kept private. One benefit of cloud computing is that it can do a variety of functions and be accessed from anywhere in the world. It offers excellent business mobility and can be moved to the cloud using browsers. This increases the appeal of cloud computing products, which also saves on traditional storage costs. The benefits and drawbacks of cloud computing were also examined in this study. The security flaws in cloud technology were thoroughly investigated for this study [3]. The advent of cost-effective, secure, and collaborative cloud-based accounting tools has changed financial administration for companies of all kinds. Organizations can gain a competitive edge, increase efficiency, and improve decision-making skills by adopting these technologies [4]. The study illuminates the transformational effect of fusing blockchain with cloud computing, opening the door to new opportunities and advancements in the digital age [5] through this thorough analysis. Cloud-based computing solutions have had a huge impact on the accounting business, altering how accountants manage financial data. Businesses may now store and access their accounting data on a platform in the cloud, providing users more flexibility and convenience. By doing away with manual data entry, the technology speeds up the creation of financial accounts and reports and reduces errors [6]. Here, we outline the effective application of a widely used comparative genomics method. Although there is a lot of misunderstanding about what the cloud is, the study indicated that IT managers are actively implementing cloud computing projects to achieve bioscience goals. The survey also discovered that addressing access, security, and performance issues is necessary for mainstream enterprise adoption [7]. This study tries to pinpoint the strategic course for bringing cloud computing technology into Ukraine's educational system in order to modernize it. Methods: To investigate the present trends in the modernization of the educational system and the function of information and communication technologies, the study uses analysis and forecasting.



**Figure 1.** A model of cloud computing technology.

## **II. Models of Cloud Computing Deployment**

There are many different kinds of clouds, and each one is unique. On servers and in storage located on the Internet, public clouds offer their services. These are run by independent firms that manage and control all the infrastructure, software, and hardware. Customers use accounts that virtually anybody may use to obtain services. Private clouds are only accessible to a small number of clients, typically just one company or organization. The cloud computing service could be hosted by the company's data center. On a private network, many private cloud computing services are offered. As the name suggests, hybrid clouds combine both public and private services. This kind of architecture gives the user more options and improves the infrastructure and security for the user.

## **III. Benefits of Using the Cloud**

The specific advantages depend on the sort of cloud service utilized, but, in general, employing cloud services frees businesses from having to purchase or manage their own computing infrastructure. There is no need to purchase servers, maintain operating systems or applications, decommission

outdated hardware or software, or dispose of it because the supplier will handle all of these tasks for you. It may make sense to use a cloud provider rather than internal resources for common apps like email. Cloud services may be able to provide end users with a more secure and effective service since a company that specializes in managing and securing these services is likely to have better skills and more experienced people than a small business could afford to hire. Because they just pay for the resources they use, businesses using cloud services are able to move projects forward more quickly and try out ideas without incurring lengthy procurement delays or significant up-front expenditures. Advocates of the cloud frequently point to this idea of corporate agility as a major benefit. It should be simpler and quicker to launch new apps with the flexibility to quickly spin up new services without the time and effort required for conventional IT procurement. Additionally, the elastic nature of the cloud makes it simpler to scale up a new application fast if it proves to be really successful. It might be more cost-effective for a business to host an application in the cloud rather than have dedicated hardware and software that sit idle for a large portion of the time if the program has large usage peaks, such as those that only occur at specific times of the week or year. For services like email or CRM, switching to cloud-hosted applications could free up internal IT workers, and if such programs do not produce any competitive advantage, there would not be much of an impact elsewhere. Moving to a service model also moves spending from capital expenditure (capex) to operational expenditure (opex), which may be useful for some companies.

#### **IV. Cloud Services Types**

No matter the service type, cloud computing services provide users a number of features, like as

- (1) Email.
- (2) Storage, backup, and data retrieval.
- (3) Creating and testing apps.

- (4) Analyzing data.
- (5) Audio and video streaming.
- (6) Delivering software on demand.

## **V. Types of Cloud Computing**

### **(1) Software-as-a-Service (SaaS)**

Customers must license a software program in this case. Usually, licenses are offered on demand or under a pay-as-you-go arrangement. Microsoft Office 365 contains a mechanism like this.

### **(2) Infrastructure-as-a-Service (IaaS)**

It involves a technique for offering anything over IP-based connectivity as part of an on-demand service, from operating systems to servers and storage. Clients can obtain these resources through an outsourced, on-demand service rather than having to buy software or servers. IaaS systems like IBM Cloud and Microsoft Azure are well-known examples.

### **(3) Platform-as-a-Service (PaaS)**

Of the three layers of cloud computing, this is regarded as the most complicated. PaaS and SaaS are quite similar, with the main distinction being that PaaS is a platform for developing software that is distributed over the Internet rather than delivering software as a service online [1].

## **VI. Gains from Cloud Computing**

Companies from all industries can profit from using cloud-based software, which can be accessed through browser or native app on any device. Users may seamlessly transfer their files and settings from one device to another as a consequence. Using cloud computing for file access is simply the tip of the iceberg. Users may check their email on any computer and store files using services like Dropbox and Google Drive due to cloud computing. Users can back up their music, files, and images using cloud

computing services, ensuring that they will always have access to them in the event of a hard drive accident. Large firms can save a ton of money this way as well. Companies had to invest in pricey information management infrastructure and technology purchases, construction, and maintenance before the cloud became a practical substitute. Fast Internet connections can replace expensive server farms and IT staff in businesses, allowing workers to do jobs online by interacting with the cloud. People can conserve storage space on their computers or laptops by using the cloud infrastructure. Software businesses can now sell their wares online rather than through more conventional, tangible ways like discs or flash drives, which allow customers to upgrade software more quickly. Customers of Adobe, for instance, can use an online subscription to access the applications included in its Creative Cloud. This makes it simple for consumers to download updates and fixes for their programs.

## **VII. Problems with the Cloud**

There are hazards, of course, with all the speed, efficiencies, and innovations that come with cloud computing. Security has always been a major worry when using the cloud, especially when dealing with private financial and medical documents. Although regulations require cloud computing firms to strengthen their compliance and security measures, it is still a problem today. Important data is encrypted for protection, but if the encryption key is lost, the data is gone as well. Cloud computing firms' servers are susceptible to internal errors, power outages, and natural calamities. The geographical reach of cloud computing cuts both ways: a California blackout may render customers in New York helpless, and a Texas company could lose its data if something causes its Maine-based provider to fall. This illustrates the geographical reach of cloud computing. There is a learning curve for both employees and management, as with any technology. However, errors can spread throughout an entire system when numerous people access and alter data through a single gateway [2].

### VIII. Conclusion

Cloud computing is widely used, which makes it a target for assaults. The fact that cloud technology is accessible to all devices in the same ecosystem is the key distinction between attacks to which it is subjected and those to which it is not. The nature and volume of attacks are both altered by this circumstance. The cyber world is constantly evolving, and cyber attacks [8, 9] and their techniques are no exception. A comparison of cloud computing technology has been included in this paper.

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