# ROLE OF CLOUD COMPUTING IN OUR LIFE

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## ABSTRACT

Today is the era of Cloud Computing Technology in IT Industries. Cloud computing which is based on Internet has the most powerful architecture of computation. It reckons in of a compilation of integrated and networked hardware, software and internet infrastructure. It has various avails atop grid computing and other computing. The globalization of business, widespread of technological innovations, social and political changes and an increased awareness in customers are some of the factors that have forced the business world to undergo rapid changes. Any organization, to Cloud computing is changing the way computing is undertaken. Cloud computing has thus become a platform for new entrants in multiple sectors innovation. This paper presents the concept of cloud computing, its background, the services it provides and thus give a clear overview of what it is and what it is not. It provides an overview of how cloud computing changes the way computing is carried out, and evaluates the impacts of cloud computing (including its benefits and challenges as well as its economic and environmental impacts). As more services move online, we need to take new steps to protect the rights of consumers and global citizens in the digital age.

## INTRODUCTION

Cloud computing as "*as a service model for computing services based on a set of computing resources that can be accessed in flexible, elastic, on-demand way with low management effort*."Cloud computing is changing the way computing is undertaken. Due to their global scale and the possibility to aggregate the demand of multiple users of cloud computing, especially in 'public clouds'. They are able to provision computing resources in a rapid and elastic way, allowing adjustment to changing requirements. Overall, cloud computing is expected to have a *positive impact on economic growth* and also expected to have *positive environmental impacts* due to its carbon abatement potential. However, the term cloud

computing is currently often used as a marketing term. Furthermore, it shows that the concept covers a whole cloud service consisting of infrastructure as a service, platform as a service and software as a service, as well as multiple delivery models including private, public, hybrid and community clouds.

Cloud computing is a new name for an old concept: the delivery of computing services from a remote location, analogous to the way electricity, water, and other utilities are provided to most customers. Cloud computing services are delivered through a network, usually the internet. Utilities are also delivered through networks, whether the electric grid, water delivery systems, or other distribution infrastructure. In some ways, cloud computing is reminiscent of computing before the advent of the personal computer, where users shared the power of a central mainframe computer through video terminals or other devices. Cloud computing, however, is much more powerful and flexible, and information technology advances may permit the approach to become ubiquitous.

As cloud computing has developed, varied and sometimes nebulous descriptions of what it is and what it is not have been commonplace. Such ambiguity can create uncertainties that may impede innovation and adoption. The National Institute of Standards and Technology has developed standardized language describing cloud computing to help clear up that ambiguity:

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. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models.

Since 2009, the federal government has been shifting its data storage needs to cloud-based services and away from agency-owned, in-house data centers. This shift is intended to achieve two goals: reduce the total investment by the federal government in information technology (IT), which currently stands at about $90 billion each year, and realize other stated advantages of cloud adoption: efficiency, accessibility, collaboration, rapidity of innovation, reliability, and security. However, challenges remain as agencies shift to cloud services. According to a survey conducted in September 2018, federal IT managers expressed

concerns about security in certain cloud environments, the complexity of migrating existing ("legacy") applications to the cloud, a lack of skilled staff to manage certain cloud environments, and uncertain funding.

Planning for cloud adoption by federal agencies began with the 2010 publication of "A 25-Point Implementation Plan to Reform Federal IT Management." More recently, in the 2017 "Report to the President on Federal IT Modernization," the Office of Management and Budget (OMB) pledged to update the government's legacy Federal Cloud Computing Strategy ("Cloud First"). Fulfilling this requirement, the Administration developed a new strategy, "Cloud Smart," which was published on September 24, 2018. The new strategy is founded on what the Administration considers the three key pillars of successful cloud adoption: security, procurement, and workforce.

In the 116th Congress, there has been one cloud-related bill introduced and two hearings directly related to cloud computing:

The Federal Risk and Authorization Management Program (FedRAMP) Authorization Act (H.R. 3941) was introduced on July 24, 2019, by Representative Gerald Connolly. The bill would formally establish within the General Services Administration a risk management, authorization, and continuous monitoring process consistent with the Federal Information Security Modernization Act of 2014."

On July 17, 2019, the House Committee on Government Reform Subcommittee on Government Operations held a hearing, "To the Cloud! The Cloudy Role of FedRAMP in IT Modernization." The purpose of the hearing was to examine the extent to which FedRAMP has reduced duplicative efforts, inconsistencies, and cost inefficiencies associated with the cloud security authorization process.

On October 18, 2019, the Committee on Financial Services Task Force on Artificial Intelligence (AI) held a hearing, "AI and the Evolution of Cloud Computing: Evaluating How Financial Data Is Stored, Protected, and Maintained by Cloud Providers." Among other topics, the hearing explored how AI could be used to improve cloud management functions.

Additionally, there have been two hearings on the implementation status of the Federal Information Technology Acquisition Reform Act. These hearings provide an update on data

center optimization, which is an indication of the extent of agency adoption of cloud computing.

## BACKGROUND

During the 1960s, the initial concepts of time-sharing became popularized via RJE (Remote Job Entry); this terminology was mostly associated with large vendors such as IBM and DEC. Full-time-sharing solutions were available by the early 1970s on such platforms as Multics (on GE hardware), Cambridge CTSS, and the earliest UNIX ports (on DEC hardware). Yet, the "data center" model where users submitted jobs to operators to run on IBM's mainframes was overwhelmingly predominant.

In the 1990s, telecommunications companies, who previously offered primarily dedicated point-to-point data circuits, began offering virtual private network (VPN) services with comparable quality of service, but at a lower cost. By switching traffic as they saw fit to balance server use, they could use overall network bandwidth more effectively. They began to use the cloud symbol to denote the demarcation point between what the provider was responsible for and what users were responsible for. Cloud computing extended this boundary to cover all servers as well as the network infrastructure. As computers became more diffused, scientists and technologists explored ways to make large-scale computing power available to more users through time-sharing. They experimented with algorithms to optimize the infrastructure, platform, and applications, to prioritize tasks to be executed by CPUs, and to increase efficiency for end users.

The use of the cloud metaphor for virtualized services dates at least to General Magic in 1994, where it was used to describe the universe of "places" that mobile agents in the Telescript environment could go. As described by Andy Hertzfeld:

"The beauty of Telescript," says Andy, "is that now, instead of just having a device to program, we now have the entire Cloud out there, where a single program can go and travel to many different sources of information and create a sort of a virtual service."

The use of the cloud metaphor is credited to General Magic communications employee David Hoffman, based on long-standing use in networking and telecom. In addition to use by General Magic itself, it was also used in promoting AT&T's associated PersonaLink Services.

**2000s**

In July 2002, Amazon created subsidiary Amazon Web Services, with the goal to "enable developers to build innovative and entrepreneurial applications on their own." In March 2006 Amazon introduced its Simple Storage Service (S3), followed by Elastic Compute Cloud (EC2) in August of the same year. These products pioneered the usage of server virtualization to deliver IaaS at a cheaper and on-demand pricing basis.

In April 2008, Google released the beta version of Google App Engine. The App Engine was a PaaS (one of the first of its kind) which provided fully maintained infrastructure and a deployment platform for users to create web applications using common languages/technologies such as Python, Node.js and PHP. The goal was to eliminate the need for some administrative tasks typical of an IaaS model, while creating a platform where users could easily deploy such applications and scale them to demand.

In early 2008, NASA's Nebula, enhanced in the RESERVOIR European Commission-funded project, became the first open-source software for deploying private and hybrid clouds, and for the federation of clouds.

By mid-2008, Gartner saw an opportunity for cloud computing "to shape the relationship among consumers of IT services, those who use IT services and those who sell them" and observed that "organizations are switching from company-owned hardware and software assets to per-use service-based models" so that the "projected shift to computing ... will result in dramatic growth in IT products in some areas and significant reductions in other areas."

In 2008, the U.S. National Science Foundation began the Cluster Exploratory program to fund academic research using Google-IBM cluster technology to analyze massive amounts of data.

In 2009, the government of France announced Project Andromède to create a "sovereign cloud" or national cloud computing, with the government to spend €285 million. The initiative failed badly and Cloudwatt was shut down on 1 February 2020.

**2010s**

In February 2010, Microsoft released Microsoft Azure, which was announced in October 2008.

In July 2010, Rackspace Hosting and NASA jointly launched an open-source cloud-software initiative known as OpenStack. The OpenStack project intended to help organizations offering cloud-computing services running on standard hardware. The early code came from NASA's Nebula platform as well as from Rackspace's Cloud Files platform. As an open-source offering and along with other open-source solutions such as CloudStack, Ganeti, and OpenNebula, it has attracted attention by several key communities. Several studies aim at comparing these open source offerings based on a set of criteria.

On March 1, 2011, IBM announced the IBM SmartCloud framework to support Smarter Planet. Among the various components of the Smarter Computing foundation, cloud computing is a critical part. On June 7, 2012, Oracle announced the Oracle Cloud. This cloud offering is poised to be the first to provide users with access to an integrated set of IT solutions, including the Applications (SaaS), Platform (PaaS), and Infrastructure (IaaS) layers.

In May 2012, Google Compute Engine was released in preview, before being rolled out into General Availability in December 2013.

In 2019, Linux was the most common OS used on Microsoft Azure. In December 2019, Amazon announced AWS Outposts, which is a fully managed service that extends AWS infrastructure, AWS services, APIs, and tools to virtually any customer datacenter, co-location space, or on-premises facility for a truly consistent hybrid experience.

**Cloud computing: Definitions, characteristics, service models and deployment**

Cloud computing has become the IT focus of many companies, and is leading many IT companies to brand their offerings as cloud computing services. I trying to describe the definition of cloud computer and describes the main characteristics of cloud computing including an overview of cloud service and deployment models.

*CHARACERISTICS*

*Definitions and characteristics of cloud computing*

Cloud computing does not refer to a specific technology but rather to a concept comprising a set of combined technologies. It is a model for enabling, convenient on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage,

applications, and services). Also, Cloud computing can be understood *as a service model for computing services based on a set of computing resources that can be accessed in a flexible, elastic, on-demand way with low management effort*. The following *characteristics*, which are generally inherent to cloud computing:

- *On-demand self servic*e: Users of clouds can "unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction with each service provider".

- *Availability of "infinite" computing resources:* Cloud users do not have to plan the provision of their computing resources in advance as they have the potential to access computing resources on demand.

- *Rapid elasticity and adaptability:* Elasticity is one of the key features of cloud computing. Users can buy computing services at any time at various granularities. They are able to up- and downscale those services according to their needs.

- *Elimination of up-front commitment:* Users of cloud services do not have to make heavy, upfront IT investments allowing companies to start small and to successively increase hardware and software resources only when needed.

- *Short-term pay for use:* Users are able to pay for their use of cloud services on a short-time basis thereby only paying for the time they use the computing resources and release them when they do not need them anymore.

- *Network access:* Computer services are accessed over the network and through standard mechanisms, which allow users to connect several devices to the cloud (e.g. laptops, mobile phones).

- *Pooling of resources:* Providers are pooled to serve multiple customers using a multitenant model, with different physical and virtual resources dynamically assigned. Users of cloud computing usually do not know and are unable to control where the provided cloud computing resources are exactly located.

- *Measured service and adaptability:* Cloud computing systems are able to react on-time to changes in the amount of computing resources requested and thus automatically control and leverage resources.

## *BENEFITS*

Cloud computing allows people access to the same kinds of applications through the internet. *Why* are so many societies moving to the cloud? It's because cloud computing increases knowledge, efficiency, helps improve any problems and many more benefits. These benefits are:

- Flexibility: Cloud-based services are ideal and very flexible into given any services.

- Disaster recovery: It helps us to inventing any disaster recovery that is lost in flood, or burning cases.

- Automatic software updates: The beauty of cloud computing is that the suppliers take care of them for any person and roll out regular software updates – including security updates – so you don't have to worry about wasting time maintaining the system yourself.

- Capital-expenditure Free: Cloud computing cuts out the high cost of hardware. You simply pay as you go and enjoy a subscription-based model that's kind to your cash flow

- Increased collaboration: Cloud-based workflow and file sharing apps help them make updates in real time and gives them full visibility of their collaborations.

- Work from anywhere: With cloud computing, if you've got an internet connection you can be at work. And with most serious cloud services offering mobile apps, you're not restricted by which device you've got to hand.

- Document control: In business, the more employees and partners collaborate on documents, the greater the need for watertight document control. Before the cloud, workers had to send files back and forth as email attachments to be worked on by one user at a time.

- Security: In daily life, Cloud computing gives you greater security when this happens. Because your data is stored in the cloud, you can access it no matter what happens to your machine. And you can even remotely wipe data from lost laptops so it doesn't get into the wrong hands.

- Competitiveness: Wish there was a simple step you could take to become more competitive? Moving to the cloud gives access to enterprise-class technology, for everyone. It also allows smaller businesses to act faster than big, established competitors.

- Environmentally friendly: In the environment, when your cloud needs fluctuate, your server capacity scales up and down to fit. So you only use the energy you need and you don't leave oversized carbon footprints.

## *HOW THE CLOUD WILL CHANGE OUR LIVES*

"Cloud computing has the potential to generate a series of disruptions that will ripple out from the tech industry and ultimately transform many industries around the world. Here are some of the ways the cloud's ability to access, analyze, store and share information could change our business and personal lives:

- **As a Gamer:**

Gaming is called the "killer app" of cloud computing, and gamers have salivated over demos with complex 3-D graphics delivered to mobile devices through the cloud. While some technical wrinkles remain, players can now enjoy breathtaking gaming experiences anywhere because of the cloud's power to provide higher speed without interruption. The same gaming principles are now being extended to many other areas. "You can deliver information to a patient about using a drug in a way that is as compelling to use as any game or app," says Lynette Ferrara, a partner at the IT consultancy CSC.

- **Fixing stuff will be easier.**

Thanks to the cloud, a cloud-based app alerts drivers of electric cars when their batteries will run out of juice, and a major medical equipment company developed a cloud-based application that feeds information to field system engineers who need to maintain health equipment, helping them head off problems. And when stuff needs to be fixed, the cloud will make that easier, too.

- **You'll actually find what you want in stores.**

With the cloud, inventory records will be much more visible and reliable. Connected shoppers, are beginning to exercise their leverage, such as asking the store to match a price

found on a competitor's website. Retailers' brand value will be dramatically affected by how they satisfy these mobile shoppers.

- **You'll be able to make smarter decisions.**

Having just-in-time training would not be the only way the cloud will help you make wiser choices. It means you can access processing power as needed from the cloud to analyze virtually any type of information wherever you are. Imagine, for example, that you combined live stock market data, weather projections, scanned news stories & depend on the situation and the sentiment or on the spot changes in public opinions. Put those streams of information together, feed them into an advanced simulation on your mobile phone and you could gain unique insight that leads to profitable stock choices.

- **Laptop security breaches will decline.**

"To protect that information, we encrypt it. But there is a fear that many another unauthorized persons restrict the importation of encrypted laptops, so we run the risk of breaking laws and having the laptop subjected to review which might disclose that information." The cloud can eliminate those concerns by having all data securely stored on the Internet. The laptop no longer stores the data; rather, it becomes the instrument by which to access it.

- **Public/private clouds will make homes healthier.**

A recent trade show, experimental technology was showcased that uses an infrared camera mounted above the bathroom mirror to take a daily photo of a person's face. Over time, the images can be stored and analyzed for changes, alerting doctors of pre-cancerous skin cells so treatment can begin earlier.

- **Language barriers will fade.**

"Today, cloud computing gives mobile-device users a level of speech recognition accuracy that is virtually on par with call centre-based transcription services. Imagine you were at a client site and needed to confer with a colleague in another country who speaks only Italian. You contact him on your mobile device and both your words are instantly translated into each other's language using voice recognition and translation software.

- **Social Impact**

The likes of YouTube and Google are testimony to a shift in how people are now interacting with others. From remote locations to the global center stage, an event can reach the four corners of the planet by going viral. *Global* has reached its true significance, and we've seen the emerging of the "citizen journalist" on this global stage. Anyone can turn into an instant reporter, and live news feeds are constantly streaming the media, at times sparking social upheavals.

It has never been as easy to look out for long forgotten friends and classmates with the explosion of social networks and websites proposing ways to connect and relate through online communities. Facebook is of course a primary example.

Public figures and politicians, too, are now turning to engines such as Twitter to get a feel of the community and convey their views while bearing the pressure and influence from the groups they are looking at leading.

Taking advantage of developments in cloud technology and the social media space has allowed these different actors access to *sophisticated analytical* abilities. As an example of that, businesses are now increasingly using data from *social media* platforms in combination with *cloud*-based information resources to get better insights on potential services, innovations and customer requirements.

- **Education**

Educational institutions have been quick to realize the advantages of cloud technology and have been eagerly adopting it for several reasons, including:

- Ability for the students to access data anywhere, anytime, to enroll in online classes and to participate in group activities

- The value of combining business automation processes to streamline subscription, class enrollments and assignment tracking, thus reducing expenses significantly

- Ability for the institutional body to leverage the storage cloud to store the daily 2.5 quintillion bytes of data securely and without the need to cater to a complicated infrastructure

- The benefit of process billing and charging for education and non-education related activities

While these are probably most obvious in a mature and developed market, cloud computing technology also offers benefits to students from developing countries. Access is now instantly available and in many instances free thanks to the proliferation of websites dispensing educational material and cloud knowledge-sharing communities. A simple internet connection can go a long way.

- **Development**

Cloud technology also offers other benefits to developing countries since they no longer have the burden of investing in costly infrastructures and can tap into data and applications that are readily available in the cloud. I briefly mentioned the education sector above, but the same applies to other areas, such as banking, agriculture, health and science.

Take as an example the telecom industry, whereby these developing countries have been fast embracing the smart mobile technology that accelerated development by leaping over the traditional wire and copper infrastructure.

- **Health**

There are many reasons why using cloud technology in the healthcare industry is gaining pace. Some examples include: managing non-siloed patient data and sharing it among different parties such as medical professionals or patients checking their own status and treatment follow-ups; reducing operational costs such as data storage; accessing this data through pervasive devices such as mobile phones and going beyond the traditional intranet; implementing a quick solution in a secure environment that is compliant with the Health Insurance Portability and Accountability Act regulations.

While there may be challenges in integrating old or current tools with new technologies and the corresponding level of services, the benefits will outweigh the inhibition to move to the cloud. According to the industry, healthcare will be a growing market in the coming years, running into the billions.

**CONCLUSION**

As this overview clearly shows that an increasing number of tech-survey any businesses, industry, leaders and any type of related persons are recognizing the many benefits of the cloud computing trend. But more than that, they are using this technology to more efficiently run their organizations, better serve their customers, and dramatically increase their overall profit margins.Cloud computing is recently new technological development that has the potential to have a great impact on the world. It has many benefits that it provides to it users and businesses. For example, some of the benefits that it provides to businesses, is that it reduces operating cost by spending less on maintenance and software upgrades and focus more on the businesses it self. But there are other challenges the cloud computing must overcome. People are very skeptical about whether their data is secure and private. There are no standards or regulations worldwide provided data through cloud computing. Cloud computing operates on a similar principle as web-based email clients, allowing users to access all of the features and files of the system without having to keep the bulk of that system on their own computers. In fact, most people already use a variety of cloud computing services without even realizing it—Gmail, Google Drive, TurboTax, and even Face book and Instagram are all cloud-based applications. For all of these services, users are sending their personal data to a cloud-hosted server that stores the information for later access. And as useful as these applications are for personal use, they're even more valuable for businesses that need to be able to access large amounts of data over a secure, online network connection.

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