A Review on Cloud Computing

SWAPNIL RAJ, MRINAL PALIWAL

SOEIT, Sanskriti University, Mathura, Uttar Pradesh, India

Email Id-swapnil.cse@sanskriti.edu.in

ABSTRACT: ***In today's world, technology is rapidly dominating every current field. Cloud computing has become one of the most in-demand and widely utilised technologies on the planet. Cloud computing refers to the on-demand availability of computer resources through the internet. Cloud computing provides virtual document storage, application, and arrangement/set-up. MNC firms such as Amazon, Microsoft, and Google have already embraced this technology and provide consumers services such as AWS and Microsoft Azure. Cloud computing, like any other technology, has various advantages and downsides, such as security and privacy, isolation failure, legal concerns, and so on. These difficulties may be resolved with the assistance of IT specialists. The author of this review article discusses the introduction, hazards of cloud computing, deployments, and service models provided by cloud computing. As a result of the increasing speed of the internet, cloud computing's future looks bright.***

KEYWORDS: Cloud Computing, Network, Security, Services, Technology.

1. INTRODUCTION

The term "cloud" can refer to either the Internet or a network. Cloud, to put it simply, is anything that is available at a remote location. Cloud services such as private and public networks can be delivered via networks. Some of the requests that will be processed in the cloud include e-mail, customer relationship management (CRM), and web conferencing. The phrase "cloud computing" refers to the availability of computer resources through a network[1]. A third party is someone who is in charge of managing software and hardware in a remote location. Cloud services include online business applications, virtual file storage, webmail, and social networking sites. Information and resources may be accessible from cloud models from anywhere there is an internet connection. Cloud computing makes use of a common pool of resources that includes user applications, specialised corporate, computer processing power, and data storage space to provide on-demand accessibility[2].

Cloud computing refers to the use of the internet to access, operate, and build programmes. It provides applications, infrastructure, and data storage on the cloud. Author stated that one does not need to install any software on their personal computer because one may access cloud services via mobile. As a result, platform dependencies are no longer an issue with cloud computing. In addition, cloud services enable our business application to be mobile and collaborative[3].

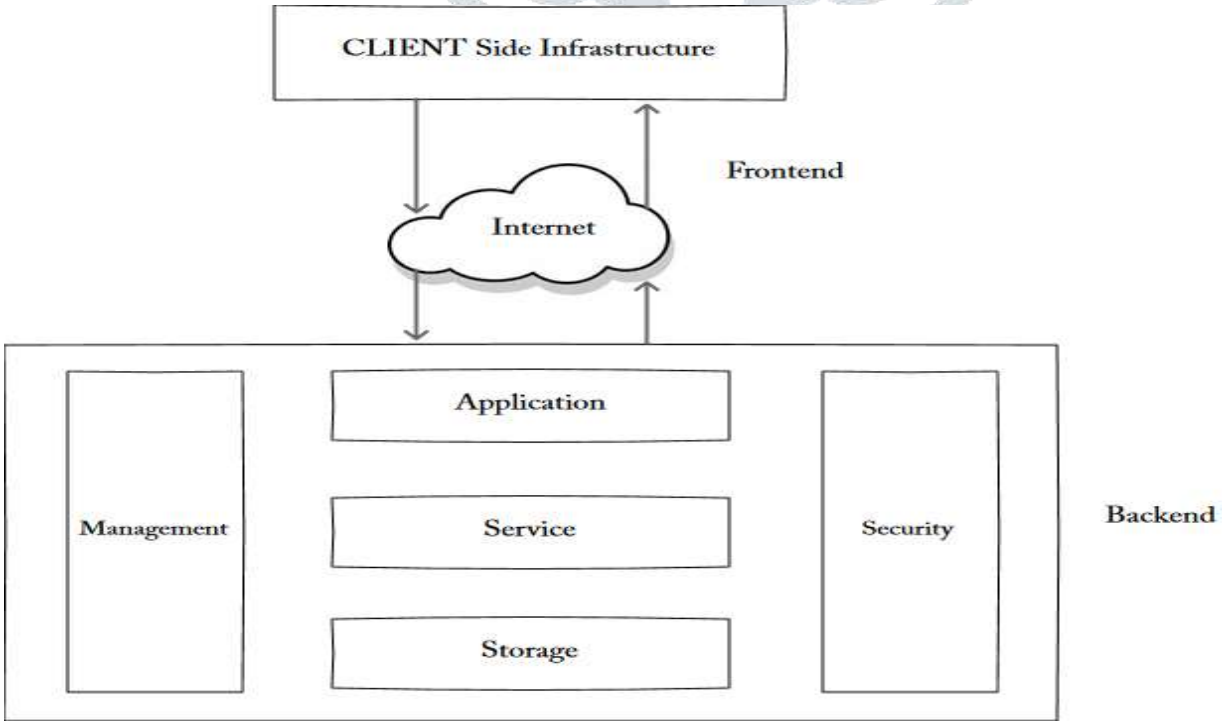

Figure 1: The above figure shows the design of cloud computing

The design of cloud computing is seen in Figure 1. Client-side infrastructure, Internet, Applications, Service, Storage, Security, and Management are all part of this architecture[4].

1.1 History:

The debut of mainframe computers adaptable to thin clients in 1950 marked the beginning of cloud computing. Cloud computing has evolved from fixed customers to dynamic clients, or software to facilities, since 1950. Table 1 summarises the history and future of cloud computing.

Table 1: Representing the History and Vision of Cloud Computing

S.no	Mainframe	Starting of the Personal Computers	Server/Client architecture	Hosted Environment	Cloud Computing
1.	It is first implemented on 1950s.	It is first introduced in 1960s.	It is implemented in the year of 1990s.	It is implemented in the year of 2000.	It is implemented in the year of 2011.
2.	The phase of automation begins here.	The demand in rise of personal desktop.	It provides Virtual Private Network.	Management of IT infrastructure is done.	It provides the services model i.e. SaaS, PaaS, IaaS.
3.	The infrastructure in this is localized.	The beginning of information technology services starts here.	High Bandwidth is demanded with the introduction of client architecture.	The demand of virtualization is increased with the introduction of hosted environment.	It provides utility computing model.

1.2 Cloud Computing Service Models:

Cloud computing establishes on the reference of services model[5]. It is classified into three models such as PaaS, SaaS, IaaS.

Figure 2: The above diagram displays the various service models of cloud computing[6]

Figure 2 shows various services models in cloud computing. These services are clarified as:

1.2.1 Software as a Service (SaaS): It is a computer model that allows customers to access cloud-based software. Users do not need to install any software on their PCs as a result of this. However, apps

that are only available on an isolated network can be downloaded over the web. Users may gather, evaluate, and collaborate on projects with this tool.

1.2.2 *Platform as a Service (PaaS):* It is a cloud-based platform that allows operators and users to build, manage, and deploy applications. Users may alter and check their customised programmes with the addition of storage and other computational resources using in-built gears.

1.2.3 *Infrastructure as a Service (IaaS):* It is a service that offers clients with computer resources such as networking, storage, and servers. Companies can test their own apps and platforms inside the confines of a facility provider's arrangement.

1.3 Deployment models of cloud computing:

The deployment's model classified into Hybrid, Private and Public Cloud as displayed in Figure 3.

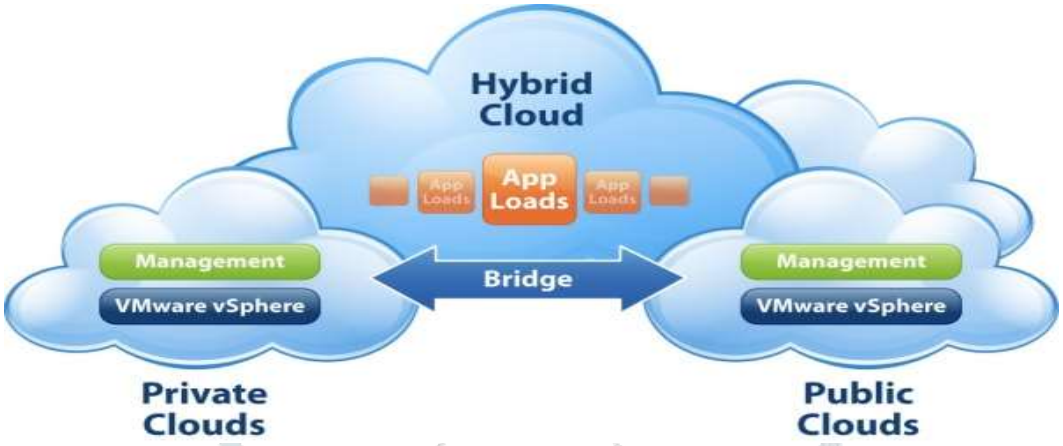

Figure 3: The above diagram shows the classification of deployment's model in cloud computing.

1.3.1 *Public Cloud:* Clouds that are open to the public are known as public clouds. It is less secure since corporations such as Google, Amazon, and Microsoft give cloud services to the general public over the Internet.

Benefits:

- The cost of public cloud is low as it shares its resources with a lot of people.
- Public clouds are reliable as it provides large no. of resources from various areas if one fails then public cloud will use other one.
- Internet is used to provide services of public cloud therefore it ensure location independence[7].
- As compare to private cloud, Public cloud is made on use-per-pay model and facilities can be accessed by consumer when it needs it.

Challenges:

- It provides less security as resources are shared publicly.
- It is less customizable as compare to private cloud.

1.3.2 *Private Cloud:* Private clouds are ones that can only be accessed by a group or a corporation. Moderator was the one in charge of the clouds. Because of its private nature, it provides more security than public clouds.

Benefits:

- It ensures high security and privacy as compare to public cloud as resources are only accessible locally to an organization.
- Private cloud has high efficiency but have high cost as compare to public cloud.

Challenges:

- The cost is high as it is hard to purchase hardware to fulfil any demand.
- It is only accessible by locals and not accessible to all people.

1.3.3 *Hybrid Cloud*: The term "hybrid cloud" refers to a cloud that is made up of both private and public clouds. The important activities are handled by the private cloud, while the non-essential duties are handled by the public cloud[8].

Benefits:

- *Scalability:* Cloud scalability is high.

- *Security:* It delivers high security as it involves private cloud.
- *Cost effective:* More cost effective than private.
- *Flexibility:* It has high flexibility as it provide both clouds.

1.4 Famous cloud services:

Figure 4 shows various cloud services provided by different organizations.

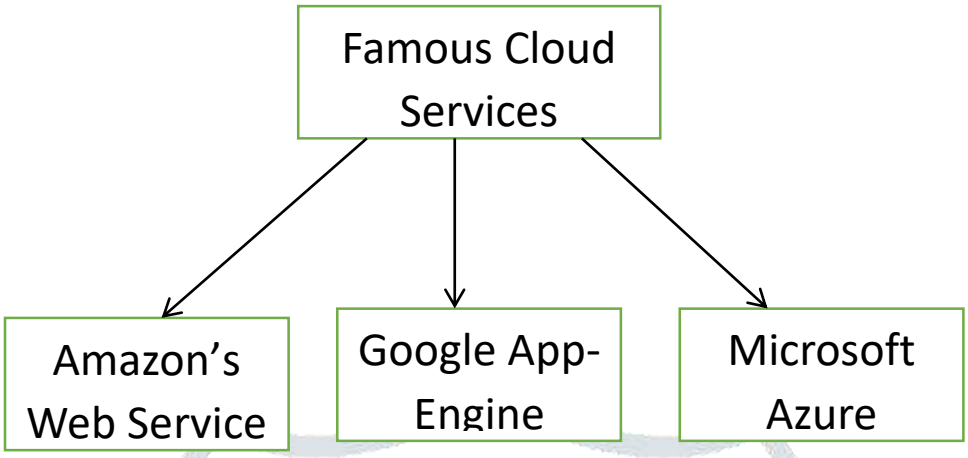

Figure 4: Illustrates the various cloud services offered by different organizations

1.4.1 Amazon's web service (AWS): It is an Amazon-provided cloud-based service. Amazon was also the first firm to offer cloud computing to its customers. The cloud services used are EC2, simple DB, and Simple Queue Service (SQS). The Elastic Compute Cloud (EC2) is a service that allows customers to rent machines in the EC2 data centre to run computer programmes. In Amazon EC2, the Xen virtualization technology is utilised to govern the outside servers. In Amazon EC2, each Xen virtual machine that operates on an outer server is referred to as an instance[9].

1.4.2 Google App-Engine: It's a Google-provided cloud service. Google app-engine is a Google platform for developing and delivering online applications. The languages utilised to create apps are Go, Java, Python, and PHP. The frameworks used in Google app-engine are Webaap2, django, spring, and flask. Programmers finalise storage options such as MySQL databases or object storage through cloud storage. The services Google app-engine manages are the user API and task queries. Google app-development engine's tools include PyCharm, Git, Maven, and Eclipse.

1.4.3 Microsoft Azure: It's a Microsoft-provided cloud-based service. Microsoft Azure is a platform and infrastructure for managing and developing applications. Developers may create webpages that can be arrayed using Git, Ftp, and Mercurial by employing PHP, Node.js, and Python. It offers both PaaS and IaaS types of service. SQL Azure Database[11] is used to handle data management services. The built-in APIs allow creators to connect with Microsoft Azure services via HTTP, REST, and XML. It integrates with Git, Microsoft Visual Studio, and Eclipse as well.

1.5 Cloud Computing Advantages:

Figure 5 shows some of the advantages of cloud computing.

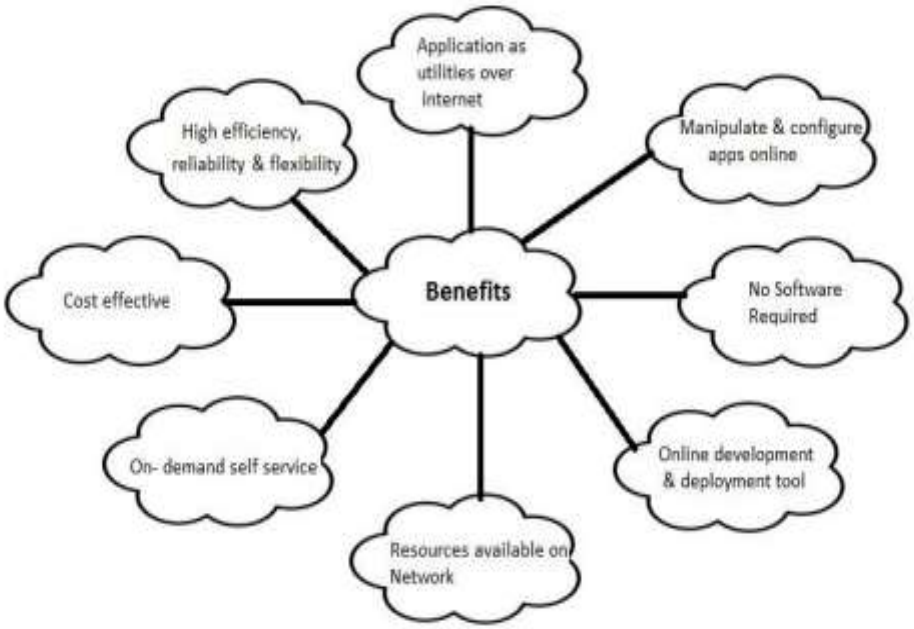

Figure 5: The above diagram shows the advantages of cloud computing

- User can access and configure any application at any time.
- It is more reliable because cloud computing offers load balancing.
- It is highly cost effective as it does not require any hardware or software, it just need internet.
- Cloud computing offers on-demand service as it uses share ports to provide configurable resources.
- It provide online development and deployment tool as Cloud computing involves PaaS as its service model.

1.6 Risks in Cloud Computing:

Figure 6 show the challenges/risks of cloud computing which are mentioned below:

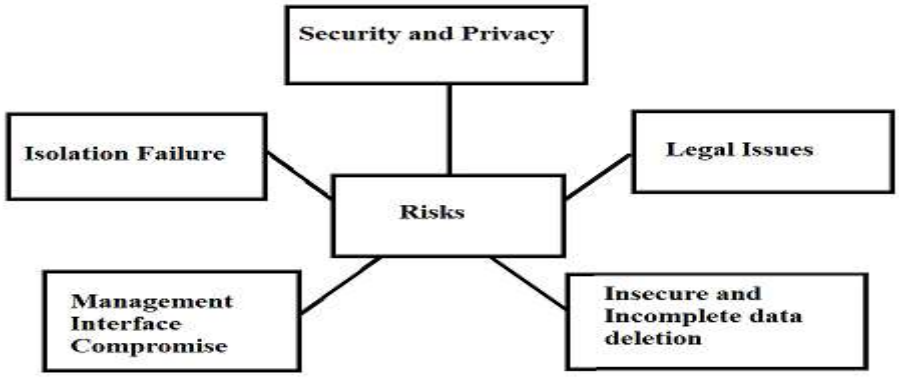

Figure 6: The above diagram shows the risks which is involved in cloud computing

- *Isolation Failure:* In cloud computing, resources are shared, and if one lodger is able to draw the resources of others, this is referred to as isolation failure.
- *Security and Privacy*: It is the most serious problem since a third party is in charge of infrastructure and data management. As a result, disclosing sensitive information to such people is always a risk. However, providers guarantee that no security breaches occur, as this might result in the loss of clients and companies.

- *Management interface compromise:* In the event of a public cloud provider, client administration interfaces may be accessed over the internet.
- *Insecure and incomplete data deletion*: It indicates that additional copies of data are stored but not accessible, thus the information sought for deletion may not be erased[10].
- *Legal issues:* Due to advancements in industry technology, there are several legal problems. Some of the difficulties associated with cloud computing are privacy and data security, data placement, and commercial factors.

2. DISCUSSION

Cloud computing has become increasingly important in our daily lives as users may now save their data on the cloud. MNCs like as Microsoft, Amazon, and Google had already embraced this technology and were offering services such as AWS, Microsoft Azure, and others to their customers. Various industries, such as education, healthcare, and banking, are embracing this idea because to its great efficiency. Users must pay to utilise this system since it manages bandwidth, data storage, transactions, and movements. The author of this paper discusses the introduction of cloud computing as well as the different services given by cloud computing. In addition, this review article examined the cloud computing deployment strategy, cloud computing dangers, and prominent cloud computing applications. As a result, cloud computing has a bright future.

3. CONCLUSION

Cloud computing is now a developing and rapidly advancing technology that is utilised all over the world. The internet is the driving force behind this technology. Virtual file storage, E-mail, social networking sites, and virtual corporate programmes are just a few of the services offered by the cloud. In this paper, the author discusses cloud computing's introduction, deployment methods, and service models, as well as cloud computing's hazards. Many areas, including education, finance, and medicine, are embracing this technology because to its great efficiency. Cloud computing, like any other technology, has various drawbacks, including security and privacy concerns, isolation failure, legal difficulties, and so forth. These problems may be resolved with the help of IT specialists. As a result, the future of cloud computing will be good due to the availability of high-speed internet and other factors.

REFERENCES

[1] P. Srivastava and R. Khan, "A Review Paper on Cloud Computing," *Int. J. Adv. Res. Comput. Sci. Softw. Eng.*, vol. 8, no. 6, p. 17, 2018, doi: 10.23956/ijarcsse.v8i6.711.

[2] A. Tyagi, "a Review Paper on Cloud Computing," *Int. J. Adv. Eng. Res. Dev.*, vol. 3, no. 01, pp. 1–2, 2015, doi: 10.21090/ijaerd.ncrretcs18.

[3] M. Thakur, "a Review Paper on Cloud Computing," *Int. J. Adv. Eng. Res. Dev.*, vol. 3, no. 01, pp. 23–31, 2015, doi: 10.21090/ijaerd.ncrretcs18.

[4] J. H. Park and J. H. Park, "Blockchain security in cloud computing: Use cases, challenges, and solutions," *Symmetry (Basel).*, 2017, doi: 10.3390/sym9080164.

[5] E. Mishra and A. Bhatnagar, "A survey on cloud computing," *Int. J. Innov. Technol. Explor. Eng.*, 2018, doi: 10.2139/ssrn.3368771.

[6] "cloud-service-models." https://www.javatpoint.com/cloud-service-models (accessed Oct. 15, 2018).

[7] M. Ali, S. U. Khan, and A. V. Vasilakos, "Security in cloud computing: Opportunities and challenges," *Inf. Sci. (Ny).*, 2015, doi: 10.1016/j.ins.2015.01.025.

[8] P. Kumari and P. Kaur, "A survey of fault tolerance in cloud computing," *J. King Saud Univ. - Comput. Inf. Sci.*, 2018, doi: 10.1016/j.jksuci.2018.09.021.

[9] X. Xu, "From cloud computing to cloud manufacturing," *Robot. Comput. Integr. Manuf.*, 2012, doi: 10.1016/j.rcim.2011.07.002.

[10] S. Marston, Z. Li, S. Bandyopadhyay, J. Zhang, and A. Ghalsasi, "Cloud computing - The business perspective," *Decis. Support Syst.*, 2011, doi: 10.1016/j.dss.2010.12.006.