49

Review on Cloud Computing and its Services

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Abstract

Cloud computing is a technology that provides access to resources such as network, storage, and servers with the help of the internet on pay as you use or based on the demand. This innovative technology has the potential to revolutionize the IT sector, impacting the improvement and the choice of IT hardware, as well as raising the want of Software as a Service (Saas). It can also benefit new internet service providers by reducing the amount of investment needed for hardware and operating costs. Cloud computing also eliminates the need for worrying about over- or underprovisioning, which can lead to the inefficient use of resources and loss of consumers and income. This article provides an overview of cloud computing and highlights critical areas for future research in this rapidly developing field of computer science.

I. INTRODUCTION

Cloud computing stands for the delivery of some various computational services, such as databases, servers, networking, storage, and over the internet. The intelligence provision of these services gives us an opportunity for faster innovation, more flexibility. Cloud also offers an alternative for the data centers that are on the premises. Many people are already introduced to and familiar with popular cloud services like Emails and Google Documents, and some of the most used and in demand cloud computing platforms include AWS Elastic Cloud Compute, Google Cloud Engine, and AWS Lambda. In addition to these well-known

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Page No. 679

platforms, Microsoft's [7]

Azure, Google Cloud Platform (GCP) and Amazon Web Services are also prominent players in the field of cloud services. Cloud is adaptable and is mostly used for businesses with changing or increasing bandwidth needs.

Cloud also benefits us by expense savings by offering readily available computing resources without the need for acquisition and maintenance costs. Some examples of cloud services are Gmail and Facebook. Additionally, cloudcomputing is used in financial and banking services to collect and store financial data from customers. There are three main cloud distribution models, namely public, private, and hybrid clouds, which allow businesses to choosethe best option for their specific needs. Cloud encompasses both the software & the hardware systems in the data center, as well as all of the applications provided as services over the web, usually known as Software as a

Service (SaaS PaaS (Platform as a). While some of the vendors use the term IaaS (Infrastructure as a Service) and Service to justify their solutions, we dodge these terms as their established meanings have a wide range.) Cloud computing allows

II. EASE OF USE

1. Seamless network connectivity, providing access to its services from any device with an internet connection. This ubiquitous accessibility is due to the cloud's feature to upload and store the data and the documents in astandard format, facilitating collaborative work.

2. Research shows that approximately one half of the workforce spends almost 3 days per week working remotely, emphasizing the importance of cloud computing in enabling workers to stay connected while away from theoffice.

3. Collaborative features such as simultaneous document editing, video calls, and group conferences enhanceworker productivity and mobility.

III. TYPES OF CLOUD COMPUTING

● **Public Cloud:**

Organizations have access to a public cloud with the help of an internet connection on a pay as you use basis. It ishandled by an external cloud service provider, making it an affordable

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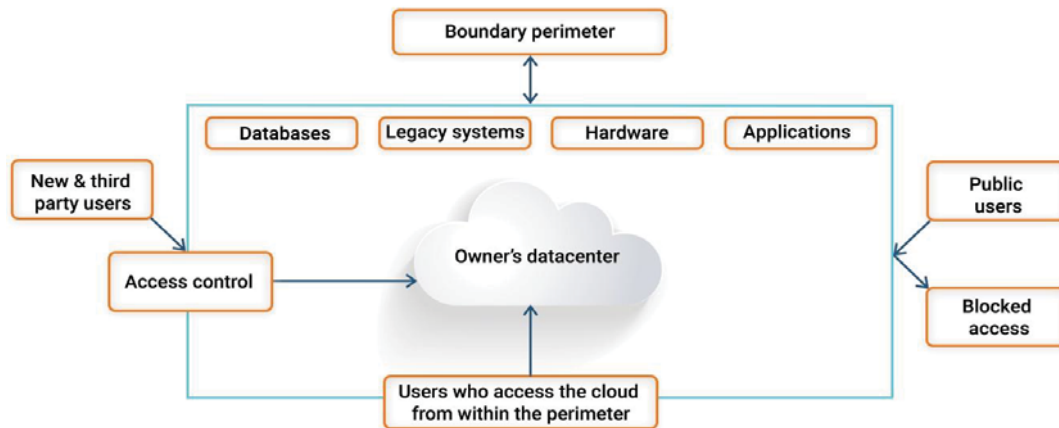
Page No. 680

option for companies looking to cut their IT operating costs. Since the cloud service provider is accountable for creating and maintaining resources, businesses can take advantage of the services and infrastructure offered by public clouds. They are suitable for small to medium-sized organizations with limited budgets that require a simple and fast platform to deploy IT resources. Public clouds offer easy scalability, high reliability, and are cost-effective, with no location-based limitations. However, they are not the most secure.
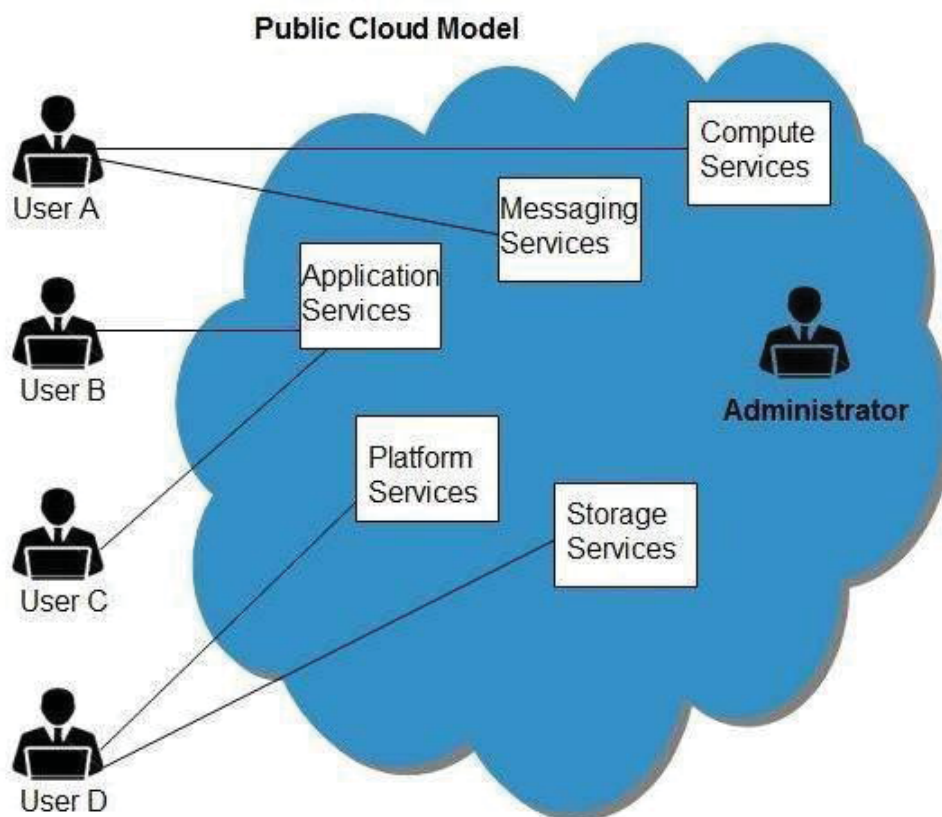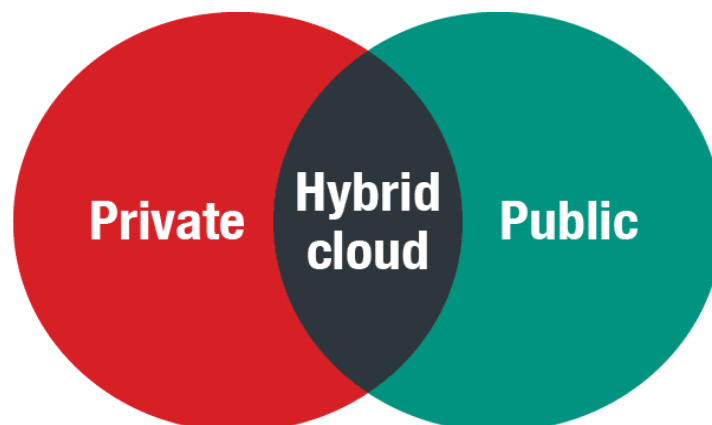

- **Private Cloud:**

This cloud distribution approach uses a single company's customized infrastructure, providing a specific environment where business-wide access to IT resources is consolidated. The internal infrastructure may be eitherreadily available or managed. As major productions, private clouds may be adjusted to meet all of a company's ITrequirements. Private clouds are known for their higher security standards, customized benefits, and remote accessibility. However, they require IT expertise.

Volume 8, Special Issue 7, May 2023
4th National Student Research Conference on
"Innovative Ideas and Invention in Computer Science & IT with its Sustainability"

Page No. 681

PRIVATE CLOUD

- **Hybrid Cloud:**

An ethical option for companies looking for the perks of both the private cloud and the public cloud models is to use a hybrid cloud environment. A hybrid cloud approach that combines the two models offers a more customized IT solution that addresses the specific needs of a company. Hybrid clouds are extremely flexible and available, cost-effective, and provide improved security. However, the use of interaction on the network level in both the private and the public cloud may cause disagreement.

Private
- Available primarily for large enterprises
- Owned and operated by the organization

Hybrid cloud
- Combines features of both private and public clouds
- More cost-effective than private cloud, but still scalable and customizable

Public
- Offered by third-party providers such as Amazon Elastic Compute Cloud (EC2), Dropbox, and Microsoft Azure
- Available for the general public

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Page No. 682

Hybrid Cloud

Benefits
- Best of both the worlds
- Better Control
- Cost-effective

Limitations
- Low visibility and control
- Additional complexity
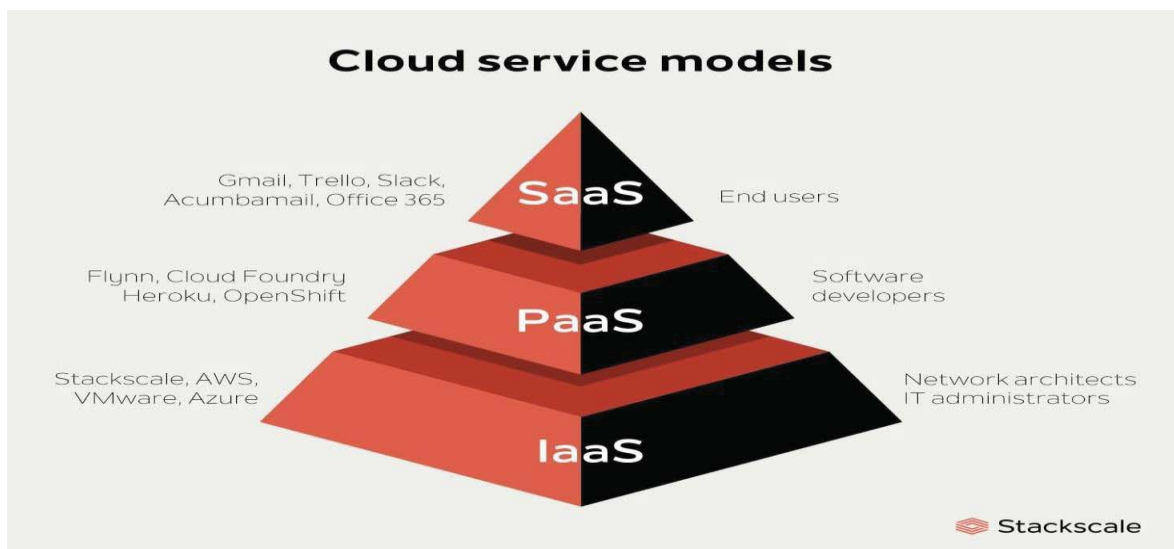- Compliance and legal risks
- Cost concerns

Use Case
- Best of both the worlds
- Switch between different delivery models based on security & scalability requirements

IV. CLOUD SERVICES

The three main cloud service models are

1) Infrastructure as a Service (IaaS)

2) Platform as a Service (PaaS)

3)Software as a Service (SaaS)

Each of the models offers different functionalities in the terms of storing and processing data, and they can beused individually or in combination with each other.

Cloud service models

Gmail, Trello, Slack, Acumbamail, Office 365 — **SaaS** — End users

Flynn, Cloud Foundry Heroku, OpenShift — **PaaS** — Software developers

Stackscale, AWS, VMware, Azure — **IaaS** — Network architects IT administrators

Stackscale

IaaS is the most comprehensive service model, providing virtual servers, data storage and operating systems to businesses. This model offers scalability, flexibility, and reliability, eliminating the need for on-premise hardware. It is a fee-for-service facility that can be used by individuals, groups, or organizations. It allows for the scalability, flexibility, and dependability that most of the businesses seek from the cloud services.

Some examples are:

Google Compute Engine (GCE)

Amazon Web Services (AWS)

Microsoft Azure.

i.   PaaS is designed for environments where multiple developers are working on a single project or where an existing knowledge base needs to be utilized. It provides a complete development environment, including application servers, databases, and middleware, which can be accessed through a web-based interface. It is a flexible and powerful service that allows the developers to quickly and easily build web applications, making it an ideal solution for businesses looking to streamline their application development processes. Red Hat OpenShift, VMware and Cloud Platform (OCP) are some use cases.

ii. SaaS is a distribution model that delivers software within the internet on a pay as you use or subscription terms, making it an ideal solution for applications that require a lot of internet or smartphone power.

By cutting off the need for the users to install and use the software applications on their own device or servers, as the applications cloud. Also managed by a third-party provider of the being a cost saving service, since users just pay for the software they want use on a subscription basis, instead of investing in expensive software licenses and hardware.

Some examples of SaaS are: -

Netflix: OTT platform to watch latest movies and tv shows. Salesforce

Zoom: It allows people to schedule and attend online meetings, webinars, and virtual events.

Google Workspace
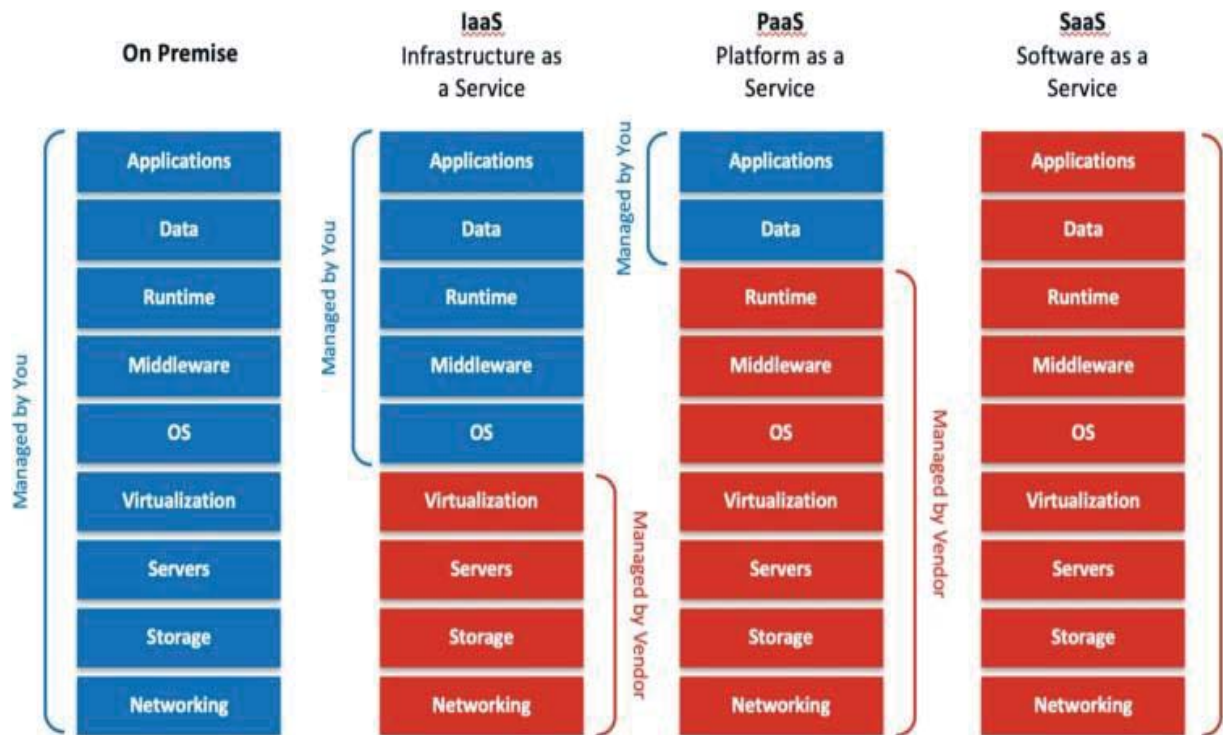
V. MERITS OF CLOUD

Cloud computing offers many benefits and eases the use of day-to-day tasks or operations.

1. Cloud computing enables easy backup and pushing, pulling or recovery of the data once it has beenstored to the cloud.

2. It also provides cloud apps that allow increased collaboration among larger groups of people, due to shared storage in the cloud. Also giving extraordinary convenience by allowing fast and easy accessibility to mutual data remotely at any time, thereby increasing overall productivity and efficiencywithin an organization or group.

3. It can reduce hardware and software maintenance costs, helping organizations to cut out the expenses.

4. Cloud computing also offers flexibility, as it is easy to access all uploaded data with simply a mobiledevice from anywhere.

5. Based on the service provider and subscription, the cloud provides unlimited storage capacity, allowing the users to keep all the important data which may include documents in a particular folder i.e., one place.

6. Lastly, a key advantage of cloud computing is none other than data security, as cloud infrastructure ensures that data and information is securely stored and accessed, backed by regularly updated safetystructures.

VI. DRAWBACKS AND IMPROVEMENTS

Cloud computing has various disadvantages, one being the need for stable internet connection on the operatingdevice which you are using to access the stored data. Potential vendor lock-in when switching between cloud providers, and limited control over the cloud infrastructure managed by the provider.

There lies a fair amount of chance of risk of loss of data or breach when entrusting sensitive information to a third-party cloud service even when cloud providers ensure high security standards for data storage.

Despite the obstacles and complex architecture, cloud computing offers great potential for businesses and is

flourishing significantly in India, with $7 billion as the market estimate to be reached and offering numerous job vacancies for people who are competent in roles such as Cloud Organization Engineer and Cloud Software Plans.

VII. CONCLUSION

In conclusion, cloud computing has the potential to transform the IT sector, and there are crucial areas for future research in this developing field of computer science. Further research is needed to point out the securityconcerns affiliated with cloud computing & to make sure that cloud service providers can provide reliable and scalable services to their customers.

Cloud computing is considered as a new era in the field of data storage and communication technology. It brings a shift in the development approach of computing. With people still trying to comprehend this technology, it is expected that there will be a gradual move from formal computing to cloud computing. The introduction to this technology enables programmers with creative concepts to develop their tools and applications without investing a lump sum of money.

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Page No. 686

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REFERENCES

[1] "Cloud Computing: A Review" by M. Armbrust et al. - https://www.usenix.org/-system/-files/conference/nsdi10/nsdi10-final101.pdf

[2] "Cloud Computing: Benefits, Risks, and Recommendations for Information Security" by J. Zhang et al. - https://www.researchgate.net/publication/228831456_Cloud_-Computing_-Benefits_Risks_and_Recommendations_for_Information_Security

[3] "A Comprehensive Study of Cloud Computing" by P. Mell and T. Grance - https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-146.pdf

[4] "Cloud Computing: State-of-the-Art and Research Challenges" by R. Buyya et al. - https://www.sciencedirect.com/science/article/pii/S0167739X10000582

[5] "Security Issues and Solutions in Cloud Computing" by P. Ristenpart et al. - https://www.usenix.org/system/files/conference/hotcloud10/hotcloud10-final32.pdf

APPENDIX