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Cloud Computing Insights: A Brief Review

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ABSTRACT

The technology of cloud is essentially a computing based model of delivering IT resources in the form of various services over the Internet without requiring any hardware or local infrastructure. Cloud computing provides infrastructural support for computing as well as processing of all data type resources, and is specifically adopted in dealing with huge data volumes. Along with increased capacity and processing power, this Internet-based technology has successfully offered a great deal of flexibility. Cloud computing has recognized service-oriented idea successfully with its vast potential impact. Cloud computing has revolutionized how business units and individuals utilize IT resources, thereby providing more accessible, flexible, and efficient solutions for managing and processing data at scale. In this present brief review paper, we provide overall insights on cloud computing along with its broad range of services.

KEYWORDS: Cloud Computing, AWS, Virtual Machine

1. INTRODUCTION

On-demand network access to computer resources, which are frequently supplied by some outside party and need only minimal supervision, is mainly termed as cloud computing. Here, these resources mainly include storage space, servers, networks, apps, or services [1-4]. Major IT companies, mainly Microsoft, IBM, Google, Amazon, and many more have successfully begun to build new data centres for hosting cloud computing applications spread across various locations throughout the world to ensure data consistency in the event of site collapse or other unprecedented failure events [4, 5].

Cloud computing technology refers to the deployment of hardware and software applications in virtual data centres through internet platform. Customers can customise cloud computing services, and rates are determined by the usage services as well as resources [6-12].

Rest of this paper is structured as follows: In Section 2, there is brief explanation of the cloud computing background with its key attributes. Subsequently, section 3 describes the different cloud types. Section 4 provides insights of cloud computing service models along with issues faced in the contemporary scenario. Thereafter, the paper is concluded in the final section 5.

2. BRIEF BACKGROUND

Cloud computing has evolved in several aspects since 1960s, with Web 2.0 being one of the significant recent developments. However, cloud computing for the general public has been somewhat of a late developer, as the Internet only began to offer substantial bandwidth in the late 1990s decade. The launch of Salesforce.com in the year of 1999 introduced the idea of offering enterprise apps over a basic website, was one of the first significant events. The services company paved the path for the delivery of programs via

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the internet by both mainstream and specialized software companies. The following advancement was the launch of Amazon Web Services (abbreviated as AWS) in the year 2002, which offered a vast range of cloud-based services. Thereafter, in the year of 2006 or so, Amazon introduced Elastic Compute Cloud (commonly known as EC2), that lets individuals and small businesses rent computers to run their own software. The first commercially available cloud computing infrastructure provider was Amazon EC2/S3, which offers '*Software-as–a-Service'* (SaaS) online video platform to UK newspapers and TV broadcasters [8-12].When Web 2.0 took hold in 2009, Google and other companies began to offer particularly browser-based enterprise apps, such as Google Apps. This was another major turning point in the history of cloud.

Essentially, cloud computing has the four characteristics like:

i) On-demand based self-service
ii) Broad networking access facility
iii) Pooling of resources and elasticity
iv) Measured services

A new distributed computing paradigm called cloud computing promises to provide consumers with affordable, scalable on-demand services without requiring significant upfront infrastructure investments. The key role that cloud computing has played in removing an enterprise's scale as a crucial component of its financial success is one of the primary causes of its success. The concept of "data centres," which removes the need for small businesses to invest heavily in infrastructure development in order to establish a global clientele, is a prime illustration of this shift [12-14].

It should be noted here that the emergence of universal high-speed bandwidth, the maturation of virtualization technology, and universal software interoperability standards are other significant aspects that have made it possible for cloud computing to advance in due course of time. Cloud computing offers remarkable scalability, flexibility, cost efficiency, and easier access to updates and innovation involving complex data processing tasks [12-14].

3. CLOUD TYPES

I. Public and Private Clouds

Public clouds are mainly owned and run by business units that utilize them to provide other business services or individuals with quick access to reasonably priced computer resources. As public cloud services are owned and operated by providers, consumers do not need to own hardware, software, or related infrastructure. A service provider that hosts the cloud infrastructure makes public clouds accessible to the broader public. Amazon Elastic Compute Cloud (EC2), Google App Engine, Windows Azure Services Platform etc. are a few instances of such public clouds. In short, public cloud is ideal for businesses that need scalability, cost-effectiveness, flexibility, and access to advanced technology without a lot of infrastructure management or significant upfront investment.

On the contrary side, private clouds are typically owned by a specific company and offer automation, monitoring, scalability, flexibility, and provisioning. Private clouds offer significant benefits in terms of security, control, and compliance, making them a suitable choice for businesses that need dedicated environments for their workloads, especially when data privacy and regulatory compliance are top priorities.

II. Hybrid and Community Clouds

Hybrid cloud is made up of two or more clouds (public, community, or private) which are still distinct entities, but are well connected to provide the benefits of several deployment types. For example, parts of applications may be moved to the public cloud during moments of high demand. With a hybrid cloud, organizations can keep certain workloads in their private cloud (for security, compliance, or performance reasons) while using public cloud for less critical tasks or burst capacity. By combining the best of both worlds, a hybrid cloud can help organizations in optimizing their IT infrastructure to meet evolving business demands.

In this relevant connection, community cloud is specifically made to satisfy community demands. These communities are composed of individuals or groups with similar interests. This

encompasses research groups, standards groups, industry groups, and so forth. A community cloud is an ideal solution for organizations that share common goals, security concerns, or regulatory requirements. It allows them to pool resources for cost savings, better compliance, and enhanced collaboration, while maintaining a higher level of control and security as compared to public clouds. This model is particularly useful for industries with strict compliance needs, such as healthcare, finance, and government, where shared infrastructure provides the right balance of cost efficiency, performance, and governance.

4. CLOUD COMPUTING SERVICES

Cloud computing services are particularly classified into different models based on the type of resources and services provided. These robust models help businesses and individuals choose the right viable solutions for their specific requirements. The most common types of cloud computing services are:

A. Infrastructure-as-a-Service (IaaS)

This primarily provides virtualized based computing resources over the internet. It includes virtual machines (VMs), storage, networking, and other basic computing infrastructure. Users can rent IT infrastructure (servers, storage, networking) on dynamic demand. Popular examples are AWS, Micosoft Azure VM, Google Compute Engine etc.

B. Software-as-a-Service (SaaS)

This typical service delivers software applications over the internet on a subscription basis. Such applications are hosted and maintained by the service provider, and users can access them using a web browser. This minimizes maintenance as well as support costs effectively. Examples include Google Workspace, Microsoft Office 365 etc.

C. Platform-as-a-Service (PaaS)

Provides an environment and platform for developers to create, launch, and maintain applications. Without requiring administration of the underlying infrastructure, it comes with database management systems, operating systems, and development tools. Google App Engine, Microsoft Azure App Services are widely used applications in this connection.

D. Cloud Analytics and Big Data Services

Cloud providers also offer tools for analyzing large datasets, including real-time processing, and machine learning tools. Popular examples are Google AI platform, Azure ML, AWS Redshift, Google Big Query etc.

E. Security-as-a-Service (SECaaS)

Provide security solutions ensuring the safety of cloud-based data and applications. Examples include Azure Active Directory, Google Cloud Security Command Centre.

F. Anything-as-a-Service (XaaS)

Vast array of services pertaining to cloud computing as well as remote access are together referred to as XaaS. Cloud networking as a service, cloud backup, storage as a service, communications as a service, monitoring as a service, and even recent services like marketing or healthcare are typical instances in this category.

5. CONCLUSION

Cloud computing has successfully emerged as a potential game-changer for businesses and individuals alike, providing scalable, flexible, and cost-effective feasible solutions for managing IT infrastructure, applications, and data. With its ability to lower costs, improve operational efficiency, and enable global collaboration, it is no surprise that industries of all kinds are rapidly adopting cloud services for a wide spectrum of applications.

Cloud computing technology continues to evolve, and several emerging trends are shaping its future mainly in prominent areas of AI-ML integration, data mining, Edge computing, Quantum computing involving hybrid as well as multi-cloud environments.

REFERENCES

[1] N. Sadashiv and S. D. Kumar, "Cluster, grid and cloud computing: A detailed comparison," 2011 IEEE 6th International Conference on Computer Science & Education (ICCSE), pp. 477–482, 2011.

[2] N. I. of Standards and Technology, "NIST Cloud Computing Program," http://www.nist.gov/itl/cloud/, 2011.

[3] IOS Press, "Guidelines on security and privacy in public cloud computing," Journal of EGovernance, 34, pp. 149-151. DOI: 10.3233/GOV-2011-0271, 2011.

[4] Gartner, "Gartner top ten disruptive technologies for 2008 to 2012. Emerging trends and technologies roadshow," 2008.

[5] Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, and Matei Zaharia, "Above the clouds: A berkeley view of cloud computing," University of California at Berkeley Technical Report No. UCB/EECS-2009-28, Feb 2009.

[6] Mohammed Alhamad, "A Trust-Evaluation Metric for Cloud applications", International Journal of Machine Learning and Computing, Vol. 1, No. 4, 2011.

[7] Nezih Yigitbasi, "C-Meter: A Framework for Performance Analysis of Computing Clouds", IEEE/ACM International Symposium on Cluster Computing and the Grid, 2009.

[8] Borko Furht and Armando Escalante, "Handbook of Cloud Computing", Springer, 2010.

[9] Abah Joshua & Francisca N. Ogwueleka, "Cloud Computing with Related Enabling Technologies," International Journal of Cloud Computing and Services Science (IJ-CLOSER), Vol.2, No.1, pp. 40~49, 2013.

[10] NIST Advisory Working Group, "NIST Cloud Computing Standards Roadmap", NIST Special Publication, 2011.

[11] Peter Mell and Timothy Grance, "The NIST Definition of Cloud Computing", NIST Special Publication, 2011.

[12] M. Malathi, "Cloud Computing Concepts", IEEE, 2011.

[13] L. Gonzalez, L. Merino, J. Caceres, and M. Lindner, "A Break in the Clouds: Towards a Cloud Definition", Computer Communication Review, 39(1), 2009.

[14] D. Plummer, T. Bittman, T. Austin, D. Cearley, and D. Smith, "Cloud computing: Defining and describing an emerging phenomenon", Technical report, Gartner, 2008.