# Analysis Of Software as A Service: Cloud Computing

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**Abstract: -** Software as a service (SaaS) supports to explain any cloud service where users control access to software over the Internet. These applications gain hosted in the cloud and get utilized in different tasks. As standard software, professionals get to buy the software upfront as a package. After purchasing the software, the professional install it onto the computer system for valuable functions. As for the software's license, it might, to some level, limit the level and the number of end users. Accessibility may always use from any place. Instead of having different spots that may not give accurate and appropriate results, accessibility must put re-system development. The system might get positive guidance from one area to help access from anywhere.

**Key Words—** ***Software as a Service, Security measures, QoS.***

## I. INTRODUCTION

Currently, the expansion of bring your device (BYOD), managed devices, social platforms, and connected applications has been posing difficulties to service providers in terms of on-demand network entry, universal connectivity, source sharing, source configuration, downtime, quickness of rule of networks, and most significantly, the portion of human intervention and support included. In the period of automatic analysis featuring suitable funding and withdrawal, seamless connectivity with the help of mobility, and decreased capital and operational expenses, businesses are keener to use services without hosting them on their physical procedures. This phenomenon presents the ideas of cloud computing and cloud source sharing [1]. Service providers search for significant and scalable on-demand explanations with minimal control programmability, commitments, flexibility, interoperability, vendor-agnostic hardware, and secure resource management. With the incorporation of the cloud system, all these elements, as noted above, can be managed with minimal service-provider exchange and centralized control.

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The cloud system can be viewed as a bouquet of five fundamental features: on-demand self-service, resource pooling, rapid elasticity, broad network entry, and estimated service. These service systems can be classified as infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (SaaS). The cloud can be deployed using four different examples: secret cloud, community cloud, public cloud, and hybrid cloud [2].

This paper explores the SaaS business model, traditional software engineering (SE), and service-oriented architecture techniques. The present report summarizes the legacy techniques and their usability in designing and developing a SaaS model and obtaining the best out of the designed model. SaaS [3] is a software fabrication and distribution model where a service provider hosts applications (plug-and-play). Customers can access these applications through networks without adding any physical load to their network or experiencing security threats (secure access to private, confidential data). Customers can handle the physical server where the applications are loaded, the processes involved, or the output generation. They only pay for the services used and achieve the desired results. The specialist organization expects the entire IT organization and different administrations, such as support and updates. For this reason, the IT foundation, including every authoritative assignment, is redistributed. SAAS means Software as a Service in distributed computing. Shoppers need to pay every month or year for permits, don't need a server, and don't have to introduce on the computer

device or laptop [4]. Day by day the cyber-attacks and primary foreign intelligence attacks are increasing [9].

## II. SaaS in Cloud Computing

SaaS in Cloud Computing is a robust and scalable dynamic platform for computing, where configurable resources are made available as services to users over a standard HTTP medium. The underlying advantage is that the users don't need knowledge, expertise, or control over the technology infrastructure in the "cloud" that supports them. A cloud-computing system can be seen as integrating three subsystems: compute, storage, and management [5].

- Compute refers to the computing power needed to formulate complex calculations, which can achieve by installing high-end complex processors in the hardware to provide computing capability.
- Storage is the most critical component of any cloud-computing system. It provides the service of storing large amounts of data in the hardware.
- Management takes care of various application programming interface (API) functions and other management capabilities that the system must depict and organize for processing.

## III. Maturity Model of SaaS

There are several ways service providers can host applications in the SaaS-cloud framework [6–8]. The SaaS model is explained in figure 1.

- Psudo-SaaS: offers an ad-hoc and customized version of the hosted application and runs its instance of the application at the servers.

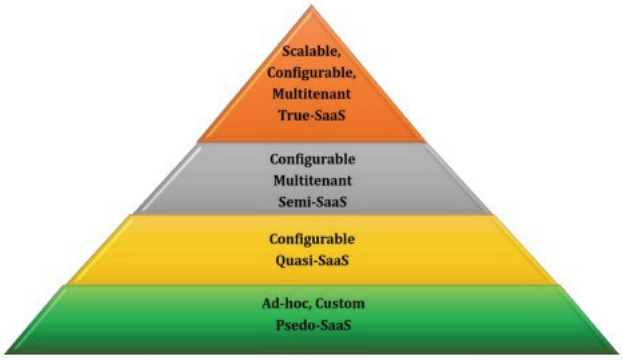


Fig.1. Maturity model SaaS Framework [12]

- Quasi-SaaS: The provider maintains a separate application instance for each customer (or tenant). Each application instance is the same at the coding level but individually customized for each tenant. The customer has the option to specify the appearance and behaviour of the application.
- Semi-SaaS: A single instance serves all customers with the help of configurable metadata that provides a different user experience and feature set for each user. Isolation, authorization, and security policies are implemented to guarantee the privacy of the data of each client. These sharing architectures are hidden from the end user. This approach allows efficient use of computing resources at low costs. However, the application's scalability is a crucial issue of this approach.
- True-SaaS: This approach supports multi-tenancy with application scalability, as the provider hosts multiple clients on a load-balanced framework of identical instances, where data isolation is achieved. Furthermore, because of the configurable metadata, each client (tenant) receives a unique user experience and customized feature set.

## IV. Software Engineering and SaaS Software Engineering

Software Engineering and SaaS Software engineering [1990] (SE) is an application of a systematic, disciplined, and quantifiable method to software development, operation, and maintenance; that is, the application of engineering to software. On the other hand, software development is a planned and structured process of developing a software product. Nevertheless, these terms are often used interchangeably in the literature. Making a transition from traditional SE to SaaS cloud computing is a notion of paradigm shift. It is not a tiny or low-impact technology review. It calls for changing many aspects of software development and operation [10]. This section explores and scrutinizes these challenges toward successful SaaS cloud computing.

## V. Security and QoS Issues

Security and QoS Issues in SaaS and Cloud Computing In this section, some state-of-the-art studies on security concerns of collaborative SaaS and service-level-agreement (SLA)-based quality-of-service (QoS) maximization for SaaS in the cloud-computing environment have been

discussed. The principal worries for security related to collaborative SaaS Cloud have been depicted in Fig 2. the main challenge is selecting an ideal SaaS cloud provider and securing the collaboration service offered to prevent unauthorized disclosure of sensitive information.


Fig.2. Security Concerns in Collaborative SaaS [12]

There is active research being carried out since the conceptualization of Cloud computing. In [11], Khalil et al. extensively discuss the basics of cloud security in the point of vulnerability, risk models, various attacks, and similar security flaws. They categorically discussed the shortcomings of existing security modules. In incorporating Cloud computing SaaS in any industry and real-time solution, quality of service (QoS) plays a vital role.

## VI. Future Research

To make SaaS more popular to Enterprise and IT end users, SDN can play a vital role. SDN-controlled vast area network (SD-WAN) can be a powerful choice to get high performance, availability, and reliability from their SaaS deployments. SD-WAN data can be migrated without depending on the data center traffic by identifying and offloading internet and cloud traffic to achieve consistent, ripple-free SaaS reliability, even during link failure. Dynamic and runtime decisions can be taken to reroute the information and get higher performance. Network Function Virtualization (NFV) is another essential tool for virtualizing important functionalities without changing the physical substrate. NFV can handle the migration of in-network computation from dedicated physical hardware substrate to SDN enabled to do as-needed basis model. A recent trend in wireless communication and Cloud-RAN architecture for radio access networks, including future 5G wireless networks, can be examined. SDN-NFV can be used for all cloud communication concepts. Open issues and future opportunities can be explored to provide seamless, fast, reliable service to the SaaS end users and increase the deploy ability of SaaS.

## VII. Conclusion

From the above discussion and review of recent literature, it can be easily seen that SaaS has the potential to change the whole paradigm of software development and distribution shortly. This paper reviewed several aspects of the SaaS in the cloud computing paradigm. Some challenges of service-level-agreement (SLA)-based quality-of-service (QoS) maximization for SaaS in the cloud-computing environment have been discussed. Security and virtualization are two main aspects to consider making customers more attracted to the services of SaaS. The present paper also conducts an overview study to advance with these cutting-edge research trends and technologies.

## References

[1]. Kim, W., “Cloud Computing: Today and Tomorrow,” Journal of Object Technology, Vol. 8, No. 1, pp. 65-72, 2009.
[2]. Song, Y.; Pang, Y. “How to Manage Cloud Risks Based on the BMIS Model”. J. Inf. Process. Syst. 2014, 10, 132-144.
[3]. Thomas, D., “Enabling Application Agility - Software as A Service, Cloud Computing and Dynamic Languages”, Journal of Object Technology, Vol.7, No. 4, May-June, 2008.
[4]. MHU Shairf, R Datta. Software as a Service has Strong Cloud Security, International Journal of Research in Engineering and Management. 2019; 1(2): 18–27.
[5]. Gartner. Gartner Says Cloud Computing Will Be as Influential As E-business.
[6]. Overview and Issues for Implementation of the Federal Cloud Computing Initiative: Implications for Federal Information Technology Reform Management.
[7]. Jae Yoo Lee, et al., A Quality Model for Evaluating Software-as-a-Service in Cloud Computing, In Proceedings of Seventh ACIS International Conference on Software Engineering Research, Management and Applications, SERA, 2009.
[8]. Pang Xiong and Wen, Li Dong. “Quality Model for Evaluating SaaS Service”, In Proceedings of Fourth

International Conference on Emerging Intelligent Data and Web Technologies, 2013.

[9]. Mohammed, M. A., & Sharif, M. H. U. (2022). A literature review of financial losses statistics for cyber security and future trend. A Literature Review of Financial Losses Statistics for Cyber Security and Future trend16, 16(2).

[10]. Malkawi, M.I. The art of software systems development: Reliability, Availability, Maintainability, Performance (RAMP). Human-Centric Comput. Inf. Sci. 2013.

[11]. Khalil, I.M.; Khreishah, A.; Azeem, M. "Cloud Computing Security: A Survey", Computers 2014, 3, 1-35.

[12]. Waleed, S. A. Journal of Engineering and Applied Sciences, Vol. 7, Issue (1) MAY, 2020.