INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

ISSN
INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.488

Authentication using SaaS in Cloud Computing

Ankita Kirad, Chandana Oak

MCA Student, Dept. of Engineering., PES' Modern College of Engineering, Pune University, Maharashtra, India

Professor, Dept. of Engineering., PES' Modern College of Engineering, Pune University, Maharashtra, India

ABSTRACT: Nowadays, Cloud is facing many security issues as it is openly available. Cloud Computing is majorly facing the issue of data theft and fake login in. To avoid malicious users to handle important data we need to authenticate cloud. Authentication is a technique that plays an important role in cloud computing security. Security attacks can be prevented using different authentication mechanisms. Authentication of cloud can be done in various such as we can use user login, biometric authentication, and may more. There are multiple authentication technologies for verifying the identity of a user before granting access to resources. There are mainly three types of cloud computing services models namely SaaS (Software as a service), PaaS (Platform as a service) and IaaS (Infrastructure as a service). Cloud computing is extremely useful in handling huge amounts of data. By using software as a service (SaaS), users can access software and databases in the business model. Providing security to the data is a very important factor that has always been an important factor contributing to the quality of service. Many techniques are introduced to increase the performance of cloud architecture. Cloud vendors use SaaS to provide secure service. SaaS is also referred to as 'on-demand software'. SaaS services are mainly used to deal with security issues and can be easily used to provide their solution.

KEYWORDS: Cloud Computing, SaaS, Authentication, Security.

I. INTRODUCTION

Cloud computing [1]provides the service over the internet by using computing resources i.e software and hardware. There are three cloud computing service models: PaaS (Platform as a service), IaaS (Infrastructure as a service) and SaaS (Software as a service). Software as a service (SaaS) [2] sometimes referred to as "software on demand," is software that is deployed over the Internet. With SAAS, a provider licenses an application to customers either as a service on-demand, through a subscription, in a "pay-as-you-go" model, or at no charge. This approach is the part of the utility computing model where all of the technology is in the "cloud" accessed over the Internet as a service. SaaS is becoming an increasingly prevalent delivery model as underlying technologies that support web services and service-oriented architecture (SOA) mature and new developmental approaches become popular. SaaS is also often associated with a pay-as-you-go subscription licensing model. We can authenticate data in SaaS using integration of Active directory. Nowadays, there is a huge increase in usage of SaaS applications which gave rise to the issue of too many user directories which are not integrated with Active Directory.

II. RELATED WORK

Architecture of Cloud Computing:

Cloud Architecture [3] Consist of 4 main components such as:
- Front-end that include client,
- Back-end platform which includes server and storage,
- Cloud based delivery that includes PaaS, SaaS and IaaS,
- A Network that includes internet, intranet, intercloud.

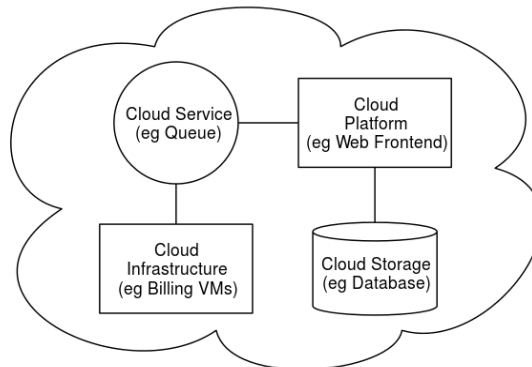After combining these components, we make up a cloud computing architecture.

Fig 1.1 Architecture Of Cloud Computing

The **front end** refers to the client part of cloud computing system. It consists of interfaces and applications that are required to access the cloud computing platforms, **Example - Web Browser**. It is the responsibility of the back-end to provide the security of data for cloud users along with the traffic control mechanism. The server also provides the middleware which helps to connect devices & communicate with each other. In Cloud-based delivery SaaS is a cloud computing services which provide customers with installation and maintenance of application on virtual machine, PaaS service which provides the users with application platforms and databases as a service, IaaS is taking the physical hardware and going completely virtual.

Software as a Service (SaaS)

In this paper, we are focusing on SaaS Services and its Authentication. The software-as-a-service [4] (SaaS) service model involves the cloud provider installing and maintaining software in the cloud and users running the software from the cloud over the Internet (or Intranet). The user's client machines require no installation of any application-specific software since cloud applications run in the cloud. Software as a service [5] is a web-based software and must be accessed with a web browser and an internet connection. SaaS [6] services are useful for companies and businesses as the users do not need to download every software on its server which may increase its storage space and affect its functionality. The SaaS is useful for all types of users as it creates a virtual machine and virtual environment which can be access by users from anywhere, on any device as it is a web-based. SaaS (Software as a Service) in this Software are the major component. In this category, it deals with the software and it's licensing like Microsoft office software's.

The best example of SaaS service is Gmail that is provided by Google Cloud. When users used Gmail, it is not hosted on user email server it is been hosted by google. Google keep track of Gmail and its content are owned by google. The user's data is stored in google cloud**.**

Advantages of SaaS:
1. **Flexible:** SaaS is flexible to use as it is a "pay-as-you-go" service. The user gets to charged only for what he has been used if the cost is unbearable by the user can stop using the service or either the user uses the service according to its need.
2. **Scalable**: SaaS service is scalable and it can be provided according to user demand and need.
3. **Cross-Browser and Cross-Platform:** SaaS can work on any browser maybe its Google Chrome, Mozilla Firefox, or Microsoft Edge it doesn't make any difference. Same goes with Platform it works on any platform may be then it is Windows 7,8,10, MAC or Linux it will be easily running on any platform.
4. **Easy to access**: SaaS services are easily accessible anytime anywhere as they are accessed through the internet. The services are flexible for customer use and easily available at any time.
5. **Updated:** SaaS services are always updated as new the new update arrives in the market it is automatically updated. Each update comes up with the removal of disadvantage in the services.

Disadvantage of SaaS:
1. **Full internet Connection**: SaaS services are dependent on internet connection. Users need throughout internet connection while using SaaS Services if the connectivity is lost the Software will not work.
2. **Speed:** SaaS services will work smoothly if it has a good internet speed. So, it is important for users to have a good internet speed so that their work cannot be interrupted.
3. **Performance**: SaaS performance varies according to the user package and Customer premises.

4. **Security**: SaaS services can be easily accessible by anyone over the internet So it faces a lot of security issues such as Trust, Authenticity, Encryption, etc.

III. LITERATURE REVIEW

SR. NO	TITLE	JOURNAL	AUTHOR	DESCRIPTION	LIMITATION
1	Distributed Scheme to Authenticate Data Storage Security in Cloud Computing	International Journal of Computer Science & Information Technology	B. Rakes, K. Lalith, M. Ismail and H. Parveen Sultan	Author has studied the EC2 and S3 infrastructure and services.	It's still in immature phase and it is need to study what all is necessary to secure cloud computing.
2	Security Issues in Cloud Computing	Journal of Analysis and Computation	D.Sakthipriya,R.priya , S.kalaivani3	Author has discussed various models of cloud computing, security issues and research challenges in cloud computing.	It still not achieves one to one security.
3	Evolution of Cloud Computing	International Journal of New Innovations in Engineering and Technology	Sujata Bhavikatti, R. M. Banakar	Author has focused on the evolutive, feature and issues in cloud computing.	The paper cannot find solution to provide high speed network to users and security.
4	Cloud Computing and SaaS (ERP) Implementation	International Journal of Scientific Research in Computer Science, Engineering and Information Technology	Sayali A. Ambavane, Ajay S. Pawar, Vivek H. Verma, Pallavi Marathe	Author has discussed about SaaS and its implementation, benefit, etc.	It only focuses on SaaS and does not provide with any information about authentication.
5	Authentication Techniques in Cloud Computing: A Review	International Journal of Advanced Research in Computer Science and Software Engineering	Seyed Milad Dejamfar, Sara Najafzadeh	Author has discussed various authentication method in cloud.	It just showed techniques which are already known.
6	Study on Cloud Storage and its Issues in Cloud Computing	International Journal of Management, Technology and Engineering	Dr.T.Kamala Kannan, Dr.K.Sharmil, Mrs.C.Shanthi, Mrs. R.Devi.	Author has help us to understand the all-differed types of cloud storage.	It fails to explain the load balancing in cloud storage.

7	A Survey on Cloud Computing and Hybrid Cloud	International Journal of Applied Engineering Research	M.P. Vaishnnave, K.Suganya Devi, P. Srinivasan	Author has discussed about the fundamental components of the cloud computing and the security issues that begin due to the fertilized, shared, public, private and hybrid nature of the cloud.	The paper did not state any solution to the issue.
8	Measuring Information Security and Cybersecurity on Private Cloud Computing	Journal of Theoretical and Applied Information Technology	WENDY, WANG GUNAWAN	Author has discussed how the private cloud can be used for education purpose.	It has just used a small portion of COBIT5 framework it needs to use a bigger section of COBIT5 with ISO to develop the maturity level.

Cloud Computing in [1] gives a detailed idea of the revolution of cloud computing. How the cloud emerges in the market. The various services provided by the cloud. The service model of cloud. The researcher has also studied EC2 and S3 tools in amazon Cloud. The author of [2] research paper has given the detailed idea of IaaS (Infrastructure as a service) and how it works. The researcher has done a detailed study of what is cloud computing and its model. The author has also discussed about the security issues in cloud computing. Author in [7] provides the history of cloud computing. Author explains how cloud computing emerges in market and what all problem it faces in beginning. It shows configuration in cloud computing and the cloud service providers and what all cloud services they provide. Author in [6] discussed the different service model and its implementation. The researcher gives a brief knowledge of SaaS services in cloud computing and its implementation. The Author in [8] provide with techniques used to provide security to cloud. It has also given the basic idea of authentication and existing techniques to authenticate cloud computing. The Researcher in [9] study cloud computing and provide the knowledge of cloud storage. Author in [10] has explain the pros and cons of cloud computing. It also explains the type of clouds in cloud computing. It has risen the issue in cloud computing. Author in [11] research paper studied the COBIT5 framework and cloud computing. It provides the cybersecurity to data saved on cloud.

IV. METHODOLOGY/APPROACH

Authentication in SaaS:
I.   Using Active Directory:
   To overcome the security issues faced by SaaS user we used authentication in SaaS using Active Directory. Users/Customers need to remember the password for windows as well as the software that is been used which has become the more difficult task for the user. Now with the use of authentication user only need to remember its active directory password. The data are safe and can only be accessible by its users.
   To [6]integrate AD with SaaS application it should meet following requirements:
   ▸ Two-way user and group synchronization: As users and groups are added to and removed from AD, these changes should be reflected in the SaaS applications.
   ▸ Access provisioning and deprovisioning: When a client is added to AD, the significant SaaS applications ought to be consequently provisioned and, on the other hand, when a client is expelled from AD, SaaS access ought to be naturally repudiated.
   ▸ Single sign-on (SSO): Users ought to have the option to sign on to the Windows arrange once, and afterward effectively access their SaaS applications without entering an extra arrangement of qualifications

II.   Managing User through IAM:
   Many Companies manages their services that are provided to user or employee using IAM i.e. Identity and Access Management. Using IAM companies only give user or the employee the control of the software and services which are needed for their work or they have demanded.

Using IAM we can create users and assign each user we different roles and give them access to machines according to their work which becomes more reliable and secure as IAM contains user security key and access key which only the user can access which has been given access by the admin.

III.   Using Kerberos:

Kerberos [12] is an authentication technique which done using symmetric key cryptography and requires third party authorization to verify user identity. It works on the basis of the ticket. Ticket-granting ticket (TGT) is the encrypted secret key which is been issued by KDC (Key Distribution Center) and encrypted by ticket-granting services (TGS) which sends the result to the user in an encrypted format.

One of the fundamental highlights of the Kerberos convention is its capacity to give single sign-on inside a confided in space, making it conceivable to furnish clients with better client experience when utilizing a few distinct applications by lessening the number of log-on required during a workday or work meeting. The single sign-on highlight will be one of the essential issues right now, must be practical in all models that will be in the long run proposed and actualized during the approval stage.

V. CONCLUSION AND FUTURE SCOPE

In this review paper, we have studied cloud computing and its Architecture. The various service models in Cloud Computing. The most significant resource in SaaS is client information. The insurance of client information security is very imperative and extensive in such a case that information security isn't ensured, the cloud will for all intents and purposes lose its significance. (Software as a Services) SaaS model provides users with significant benefits, efficiency, and reduced cost. The SaaS services can be secured using different methodologies through which we can authenticate SaaS services. SaaS application can be useful in many ways and future we can use many more authentication techniques to deal with the security issues and to increase its performance. Cloud specialist co-ops offer the types of assistance to clients on pay just for use system. To offer these types of assistance effectively, security is a significant concern. To beat the security issues various sorts of systems are utilized.

In Future SaaS can be authenticate using Biometric Authentication, Fingerprint Detection, Iris Recognition, or Data Encryption Techniques. In Biometric Authentication Face Recognition will be done to recognize a particular user. Iris Detection will be done successfully using user eyesight. Fingerprint Detection will help users to access their applications using their fingerprint. Data Encryption will encrypt data in a cipher code and only users will be given the key to decipher the data. In Future, we can use biometric techniques. Though every biometric technique has some drawbacks. So, for that we can use multi model authentication technique to secure the SaaS using more than one biometric technique.

REFERENCES

[1] K. a. H. S. B.Rakesh, "Distributed Scheme to Authenticate Data Storage Security in Cloud Computing," International Journal of Computer Science & Information Technology, vol. 9, pp. 59-66, 2017.

[2] A. S. P. V. H. V. P. M. Sayali A. Ambavane, "Cloud Computing and SaaS (ERP) Implementation," International Journal of Scientific Research in Computer Science, Engineering and Information Technology, vol. 3, no. 1, pp. 37-45, 2018.

[3] D.Sakthipriya, "Security Issues in Cloud Computing," Journal of Analysis and Computation, pp. 1-5, 2018.

[4] R. Sujata Bhavikatti, "Evolution of Cloud Computing," International Journal of New Innovation in Engineering and Technology, vol. 9.

[5] S. N. Seyed Milad Dejamfar, "Authentication Techniques in Cloud Computing-A Review," International Journal of Advanced Research in Computer Science and Software Engineering, vol. 7.

[6] D. Dr.T.Kamala Kannan, "Study on Cloud Storage and its Issues in Cloud Computing," International Journal of /management, Technology and Engineering, vol. IX.

[7] W. G. WENDY, "Measuring Information Security and Cybersecurity on Private Cloud Computing," Journal Theoratical and Applied Information Technology, vol. 96.

[8]   K. D. P. S. M.P. Vaishnnave, "A Survey on Cloud Computing and Hybrid Cloud," International Journal of Applied Engineering Researcch, vol. 14.

[9]   "okta," [Online]. Available: https://www.okta.com/resources/whitepaper/3-ways-to-integrate-ad-with-saas-apps/.

[10] "What is Software as a Service (SaaS)? – Simplified," Set a Time, 31 December 2018. [Online]. Available: https://setatime.co/blog/what-is-software-as-a-service-saas-simplified/.

[11] "Wikipedia," [Online]. Available: https://en.wikipedia.org/wiki/Cloud_computing_architecture.

[12] "Wikipedia," January 2019. [Online]. Available: https://en.wikipedia.org/wiki/Kerberos_(protocol).

BIOGRAPHY

Ankita Atul Kirad is an engineering student in the Information Technology Department, Progressive Education Society's Modern College of Engineering. She is pursuing Master of Computer Application (MCA) degree. Her research interests are Cloud Computing, Authentication, and Security.

INTERNATIONAL JOURNAL
OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING