

A survey on User's security in cloud

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Abstract

Cloud computing is a new wave in the field of information technology. Some see it as an emerging field in computer science. It consists of a set of resources and services offered through the Internet. Hence, "cloud computing" is also called "Internet computing." The word "cloud" is a metaphor for describing the Web as a space where computing has been preinstalled and exists as a service. Operating systems, applications, storage, data, and processing capacity all exist on the Web, ready to be shared among users [1].

Keywords- Cloud computing, cloud security, IaaS, PaaS, SaaS.

I. Introduction

In recent times cloud computing has become more and more popular and is applied for various purposes. Cloud computing itself is in principle an abstraction of the physical infrastructure which is offered as cloud services to service users. The abstraction levels of these cloud services are Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS). Popular examples are Google Docs [7] for SaaS, Google's App Engine [8] for PaaS, and Amazon's EC2 [9] for IaaS.

Cloud computing is a systematic arrangement of computer technology which is a kind of abstract concept where user can use the resource available on cloud without having a complete control on them. Cloud computing is a better way of running business. Instead of having the data by their own one can use the concept of shared data. The major power of cloud computing is that, if someone wants to use any application which is running on the cloud then one has to simply log in to the web and run the application and customize it according to the requirement.

Service Models: The service models in cloud computing is explained below:-

➤ **Software as a Service (SaaS).** The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email) or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or

even individual application capabilities, with the possible exception of limited user-specific application configuration settings [14].

➤ **Platform as a Service (PaaS).** The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment [14].

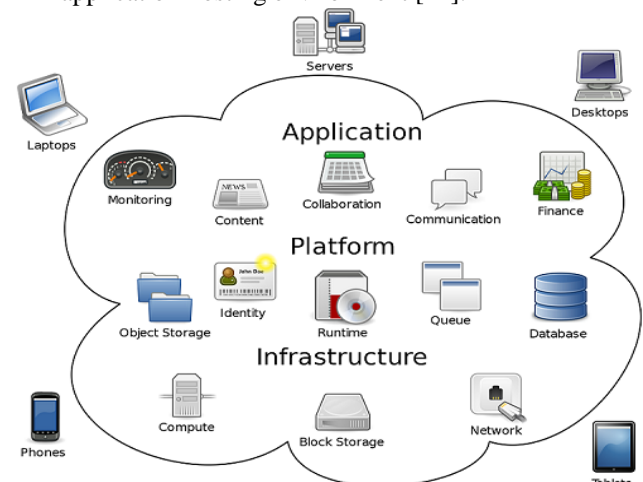


Fig 1. Cloud computing services

➤ **Infrastructure as a Service (IaaS).** The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary

software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications, and possibly limited control of select networking components (e.g., host firewalls) [14].

Deployment Models: The deployment models in cloud computing is explained below:-

Delivery Model	Description
Vendor cloud (External)	Vendor (or provider) cloud computing services can be accessed across the Internet or a private network, using one or more data centres, shared among multiple customers, with varying degrees of data privacy control. Sometimes called “public” cloud computing.
Private cloud (Internal)	Computing architectures modelled on vendor clouds, yet built, managed and used exclusively by a single enterprise; uses a shared services model with variable usage of a common pool of virtualized computing resources. Data is controlled within the enterprise
Hybrid cloud	A mix of vendor cloud services, internal cloud computing architectures, and IT infrastructure, forming a hybrid model that uses industry good practice technologies to meet specific needs.
Community cloud	Community clouds are used across organizations that have similar objectives and concerns, allowing for shared infrastructure and services. Community clouds can be deployed using any of the three methods outlined above, simplifying cross-functional IT governance.

Table 1 - Delivery models

II. Cloud Computing in today’s era

Cloud computing is the use of delivering hosted services over the internet. Information is provided to the computers involved on demand. With cloud computing you’re accessing services and different resources to perform jobs with changing and dynamic needs. An application can access the cloud for a service instead of standing and non-dynamic

resource typically provided. The cloud can manage multiple infrastructures and ties all resources needed together and will give access to services when needed which prevents services from running when they aren’t needed which can save valuable resources. Many cloud computing infrastructures are data centers that deliver the different on demand services. The cloud maintains itself and all of its resources only requiring people to maintain the actual hardware and operating systems in complete working order for the cloud to run effectively. Many companies are now investing in cloud computing and research groups are researching new ways to put it to good use. Some experts say cloud computing is the way of the future and predict that it will be widely used in the near future [12]. Businesses are running all kinds of applications in the cloud these days, like CRM, HR, accounting, and custom-built applications. Cloud-based applications can be up and running in a few days, which is unheard of with traditional business software. They cost less, because we don’t need to pay for all the people, products, and facilities to run them. The concept of cloud computing is more scalable, more secure, and more reliable than most applications. Plus, upgrades are taken care of for the users, so our applications get security and performance enhancements and some new features automatically [10].

Cloud computing first came into concept back in the 1960’s when John McCarthy proposed that computers may someday be organized in a method that would involve it acting as a public utility. Telecommunication companies began offering VPN (Virtual Private Network) services during the 90’s that were much lower in cost then there at the time offered point-to-point data circuits that provided their services. The cloud symbol represents the difference between the user’s and provider’s responsibilities. In 2007, major companies such as IBM, Google, Amazon (although Amazon helped development of cloud computing earlier on as well), and different school universities created a huge cloud computing research project which allowed many to see the prospects of cloud computing and the positive effects it could have on IT users and those who sell IT services. Cloud computing has been predicted to be put to use by nearly 80 percent of fortune 500 companies by the year 2012 and will continue to grow in use as the years go by through cloud computing, businesses, consumers or public organizations can use services that they would not otherwise be able to afford. In particular, small organizations or individuals are able to use highly advanced services that could, in turn, allow them to develop and sell their own services. Cloud computing, therefore, offers an enormous potential for creativity and innovation in the services available on the internet [11].

Some examples of its use:

- ❖ Social networking sites may offer their members, irrespective of their technical skills, the opportunity to develop games, birthday calendars and so on, which the member can then advertise and sell on the site to other members. Sharing pictures on social networks is already common place [11].
- ❖ Online customer relationship management: companies can manage their interactions with customers and potential clients, for instance, marketing or technical support of customers. These can be outsourced to large specialized organizations, sometimes based in other countries. As they only charge for the time and space actually used, even very small companies can afford highly developed services without having to buy and install specific software. The savings can then be used to improve the business in other ways [11].
- ❖ Any software developer can use cloud computing services to rent the necessary development tools in order to create his or her own software products. As the developer only needs to pay for the services used for the amount of time they were used for, this offers significant savings compared to buying expensive software tool licenses for a period of time that exceeds what is needed [11].

III. Security in cloud

Cloud computing opens up a new world of opportunities for businesses, but mixed in with these opportunities are numerous security challenges that need to be considered and addressed prior to committing to a cloud computing strategy [13]. Cloud computing security challenges fall into three broad categories:-

- 1) **Data Protection:** Securing your data both at rest and in transit
- 2) **User Authentication:** Limiting access to data and monitoring who accesses the data
- 3) **Disaster and Data Breach:** Contingency Planning

Data resting in the cloud needs to be accessible only by those authorized to do so, making it critical to both restrict and monitor who will be accessing the company's data through the cloud. In order to ensure the integrity of user authentication, companies need to be able to view data access logs and audit trails to verify that only authorized users are accessing the data. These access logs and audit trails additionally need to be secured and maintained for as long as the company needs or legal purposes require. As with all cloud computing security challenges, it's the responsibility of the customer to ensure that the

cloud provider has taken all necessary security measures to protect the customer's data and the access to that data [13].

Cloud computing is supported by big companies that hope the investments on cloud computing see a return on investment in the near future [1].

Some examples of emerging cloud computer technology are:

- Microsoft** : Window Live Service, Window Azure
- Google** : Google Docs, Google App Engine
- Amazon** : Amazon Simple Storage Service, Elastic Compute Cloud
- IBM** : Blue cloud
- Apple** : Mobile Me

The following figure shows the security architecture of Cloud Computing:-

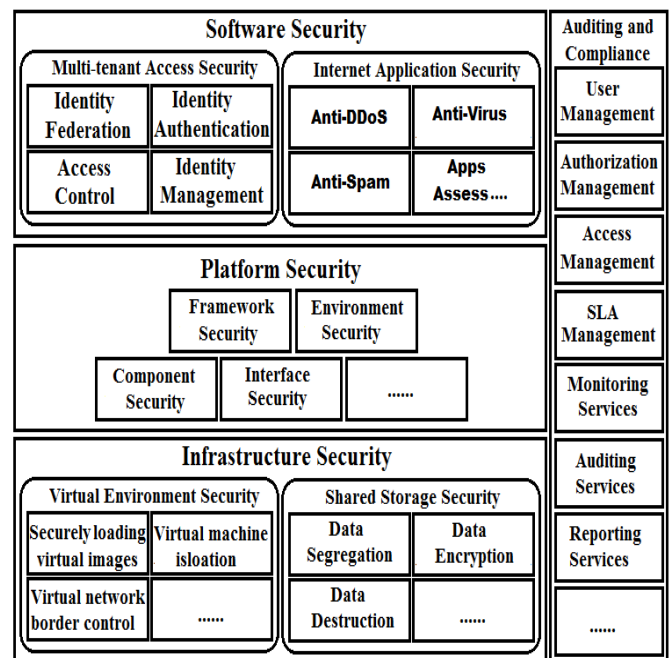


Fig 2. Cloud Computing Security Architecture

Cloud computing will provide the dynamic resource pool, the virtualization, and the high usability for the next generation. Successful applications of cloud computing have been implemented at educational institutions. This effort allows researchers to search, find models, and make discoveries faster than ever. The applications of cloud computing are limitless. Potentially, everything from word processing software to customized computer programs could work on a cloud computing system. Cloud computing is

expected to change and increase business opportunities in the computing industry [1].

IV. Literature Review

A. Cloud computing: Opportunities and challenges

In 2014, Matthew N.O. Sadiku, Sarhan M. Musa, and OMonowo D. MoMOh presents a brief overview of cloud computing. Cloud computing is evolving as a key technology for sharing resources via the Internet. Startups and small and medium businesses are using cloud computing to great advantages. Lack of privacy and security is the main hurdle in the wide adoption of cloud computing. We are almost at the beginning of the cloud era; it is hard to predict the impact of cloud computing on society. Cloud computing is not fully mature and needs to be explored [1].

B. Graphical Password Authentication

In 2014, Shraddha M. Gurav, Leena S. Gawade, Prathamey K. Rane and Nilesh R. Khochare, represents the authentication given to cloud by using graphical password. We have proposed cloud with graphical security by means of image password. We are providing one of the algorithms which are based on selection of username and images as a password. By this paper we are trying to give set of images on the basis of alphabet series position of characters in username. Finally cloud is provided with the graphical password authentication [2].

C. A New Technique of Data Integrity for Analysis of the Cloud Computing Security

In 2013, Rajkumar Chalse, Ashwin Selokar and Arun Katara proposed a technique to check or verify the integrity of data stored at cloud. In their work they explained in cloud data storage system, users store their data in the cloud and no longer possess the data locally. To check the integrity of the data stored at cloud a tag is generated from the data and will be compared with the tag from the downloaded data. If the value of the tag is similar then the integrity of the data is maintained otherwise it is compromised. Thus, storage of files on the distributed cloud servers must be guarantee the correctness and availability of the data files and also there is no unauthorized data modification [3].

D. Security Concerns in Cloud Computing

In 2013, Issa M. Khalil, Abdallah Khreishah, Salah Bouktif, Azeem Ahmad provides comprehensive study of cloud computing security

which includes the dependency level within classification and also provide a solution to solve the problem in form of preventive actions instead of proactive actions. They have identified 46 issues related with cloud computing security. These issues have further been categorized into six classes that form a comprehensive classification [4].

E. Secure Storage and Access of Data in Cloud Computing

In 2012, Arjun Kumar, Byung Gook Lee, HoonJae Lee proposes a method that allows user to store and access the data securely from the cloud storage. It also guarantees that no one except the authenticated user can access the data neither the cloud storage provider. This method ensures the security and privacy of data stored on cloud. A further advantage of this method is that if there is security breach at the cloud provider, the user's data will continue to be secure since all data is encrypted. Users also need not to worry about cloud providers gaining access to their data illegally [5].

F. Three-Dimensional Password for More Secure Authentication

In 2008, Fawaz A. Alsulaiman and Abdulmotaleb El Saddik introduces a new approach to authenticate the user is described which is the 3D password scheme for securing the access only to the authentic user. In this paper, they present a 3D password authentication scheme in which while entering the password user interacts with a 3D virtual environment. The 3D password is a multifactor authentication scheme in which user interacts with a virtual 3D environment and interacts with number of objects present in that environment. User will select some of objects of his choice and the sequence of objects is the password for accessing the particular service [6].

V. CONCLUSION

Cloud computing has been showing its impact on the industry for the past few years and it has heralded a revolutionary change giving new directions to how information technology resources can be best utilized and by reducing the cost and complexity for its users. Cloud computing technology include issues of privacy, security, anonymity, telecommunications capacity, reliability etc. But security plays an important role among them and how cloud provider assures it. Thus, we conclude that it is important to give more importance to user's security, since users don't want to lose their private information as a result of malicious insiders in the cloud.

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