

Application and Security Issues in Cloud Computing

Pallavi, Sahil Mahajan, Vinay Gautam



Abstract: Cloud computing is attaining a pace for resolving complex computing problems. It is basically an abstracted layer of technology which has three service models: Infrastructure as a Service (IaaS), (Software as a Service) SaaS and (Platform as a Service) PaaS, which provide infrastructure, software and a platform to end-user. On the contrary, there are lots of issues which include energy efficiency, cloud integrity, data recovery, backup, etc. Security and privacy issues like data confidentiality and integrity are the most critical ones. This paper highlights the security issues related to data stored and data access from back end (service provider). It collates each and every application related to cloud and available techniques to resolve some issues. Very less research work has been done on applications and security issues of cloud computing together. This article is an analysis of cloud computing applications and security issues as it is used to a great extent. In future this paper will help research community to grab information regarding applications and techniques to resolve the issues related to Cloud computing.

Keywords— Cloud Computing, Security, Cloud Application.

I. INTRODUCTION

Cloud computing is a model for ubiquitous computing which is important and useful to setup applications in the Cloud Computing system or adopt the services provided by it with minimal efforts [1].

It allows people to access applications over internet through web servers. If cloud computing does not exist then you will not be able to update your social networking's status, make online transactions, fire off emails, share documents and files from anywhere in the world. Small-scale businesses will face high expenditure for maintenance of physical machines to store data and run their operating systems. Fig. 1 shows benefits of Cloud computing such as energy efficient, broad network accessing, reduces cost of IT maintenance, Convenient, elastic expansion, elastic computing, enough storage space.

Due to these benefits nowadays, Cloud Computing has become a paradigm and an effective model in applications such as observing personalised Health Plan Ranking [3], Biomedicine Big Data Analysis [4], Library Digital construction [5], Power routing for cluster of microgrids using oblivious network routing [6], E-commerce [7], Accounting information system (AIS) [8], WebGIS system [9], Power Engineering [10], Military intelligence Fusion [11], Internet of things(IOT) [12], Wireless mesh network [13] etc.

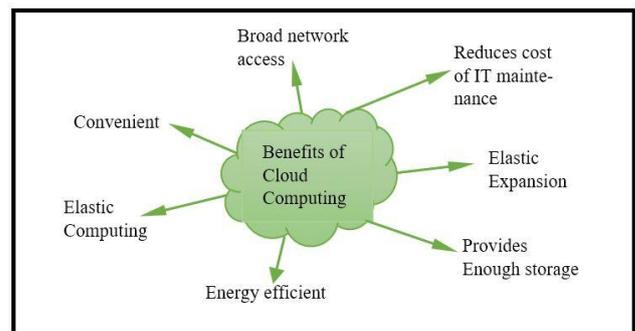


Fig. 1. Benefits of Cloud Computing

According to Mahesh and Ambika [1], due to perpetually increase in the drift of Cloud computing there are lot of issues to be focused such as data integrity, data privacy, data storage, data transmission, data theft etc. the risk factor of these issues is increasing constantly and becomes most critical. While sharing or saving your data on cloud via third party access pass on your internet protocol (IP) and private information to service provider (Cloud domain). These issues will exist for long period of time. Several laws have been announced till date but these laws are invalidated for today's sphere. Hence Privacy and security problems are still more risky [1]. These issues involve misuse of cloud computing, multi-tenancy, trust, audit and many more [1]. Below is the detailed research problem which users face during access of Cloud services.

A. Research Problem

End-User's information which includes name, location, contacts, call details etc. can itself be collected into cloud. The threats in Cloud computing: information can be collected, used and propagated in illegal or unethical manner. This leads to harmful consequences to End User [2].

Sales Force automation [2], social networking sites such as Facebook, Google Applications, Amazon Elastic Cloud (AWS EC2) [14] are few platforms wherever Cloud computing is used.

Salesforce.com's Sales Force Automation suite is one of the demanding cloud services for businesses.

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In this the enterprise upload their data on salesforce.com's databases. After that employees and managers of the enterprise can able to use salesforce.com's software over web to examine their data. To analyse and store huge amount of data is difficult hence cloud is being used. On the other side enterprises are not ready to share their sensitive sale and purchase data because of lack of trust issues between customer and service provider. Threat that is considered in salesforce.com is the theft of sales and purchase data from the service provider's system [2]. Facebook is very popular social networking site which people are accessing since 14 developing years.

They can upload and save data and also communicate with anybody in the world. Managing and storing a huge amount of data is very typical hence Cloud technology is being used. It is easy to compute and store large amount of data. Moreover, Facebook account can be hacked easily which leads to misuse of the confidential information of an individual.

The remaining paper includes four more sections as follows: The methodology section-2 contains applications and uses of Cloud computing. Results and discussion regarding existing solutions of security and privacy issues of cloud computing is stated in section 3. The conclusion emanated from this research is stated in section 4 and acknowledgement in section 5.

II. METHODOLOGY

In this section we have detailed 5 important applications pertaining to Cloud computing.

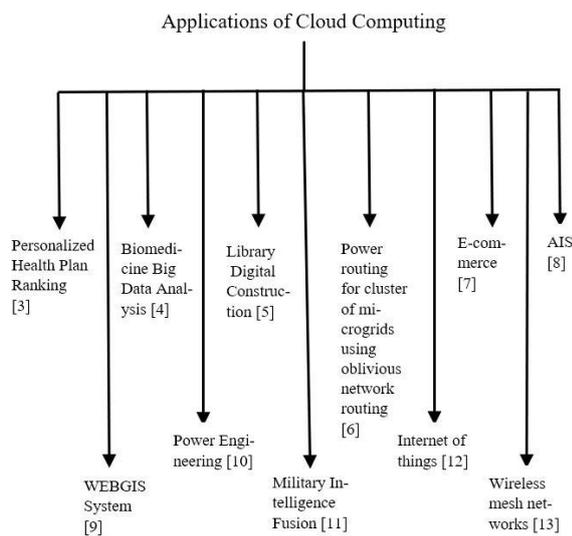


Fig 2. Cloud Computing Applications

1. Personalized health plan ranking:

In personalized health plan ranking, people having similar diseases have grouped together for Medicare and health insurance plans which would help them to find better health plans but due to huge amount of data, substantial storage space and easy searching technique is required. Cloud played a vital role in storing and searching essential data [3]. This elucidate how to operate Electronic Health Records (EHR) and may encounter the goal of Centres for Medicare and Medicaid Services (CMS) i.e. better services, cost reduction and healthy people [3].

2. Biomedicine big data analysis cloud computing in big

data:

Biomedical technology has become more prominent in modern livelihood, treatment of diseases and so on. Hence, the big biomedical data need an operative technology for intervention and analysis of previous and current work to meet the future goals. Cloud Computing technology is one of the most effective way to deal with above mentioned desires [4]. The motive of using cloud computing is that users can access and extract data resources from anywhere and whenever, the downloading speed of documents and other files is comparatively fast and data search become easier [4].

3. Library Digital Construction:

Now, due to unlimited storage space, cloud computing is widely used in building digital library and because of good computational property, cloud computing provides grid technology i.e. it can integrate distributive resources by forming a network between different computer to perform complex computational problems for example weather modelling. It also reduces processing time, increases efficiency minimizes wastage of resources and maximize sharing of resources [5].

4. Military Intelligence Fusion:

Military intelligence fusion is an information fusion which means adjusting, managing, merging, analyzing and handling information from multiple sources to a uniform statement Most of the problems are faced due to data inaccuracy, delay of data, leakage of data, unsafe transfer of data and many more. The idea to use Cloud computing helped in securing the military data safely, enhancing the sharing data and information, processing of vast intelligence information quickly, deploying and maintaining whole intelligence software, and transferring it safely and accurately. Combination of all the data and adjusting it to create, base for different sources made it easy for future [11].

5. E-commerce:

E-commerce is an enterprise for business transactions and online marketing through electronic data Interchange (EDI). In this era of digitalization, the enterprises had to replace the traditional networking which costs very high. Cloud reduces the cost of IT maintenance and E-commerce. Sometimes excessive surfing of e-commerce services triggers blockage or failure of server but Cloud has a property of elastic expansion [7], helps in expanding the server automatically when the surfers' volume is huge. It improves the efficiency of services provided by e-commerce [7]. Also, Cloud provides maximum storage space. Thus, Cloud computing is being used in e-commerce. Table 1 shows the problems associated with privacy and security issues and existing techniques to resolve these problems.

III. RESULT AND ANALYSIS

Cloud techniques and issues are elaborated in table 1:

TABLE 1. Available Techniques and issues in Cloud computing [1].

Issues	Problems	Available Techniques
Privacy issues	Misuse of Cloud Computing	Fog Computing
	Malicious Insiders	Preventing data leakage from Indexing
	Trans border data flow and data proliferation	Anonymity based method, Elliptic Curve Cryptography
	Dynamic provision	Public Auditability and data Dynamics for Storage Security

Security issues	Audit	Fully Homomorphic encryption
	Trust	Using RC5 securing the storage Data
	Multitenancy	Client based privacy manager
	Access	Privacy-Preserved Access Control

3.1. Few Problems in privacy and security:

- **Malicious Insiders:** There is often little bit negligence in hiring or appointing Cloud employees by Service provider which creates an attractive opportunity for a hobbyist hacker, can cease the confidential data without any risk of exposure [13].
- **Misuse of Cloud computing:** It is the feature of IaaS and PaaS. Which defines there are many service providers which offers unlimited storage and computing services with fluent registration even some providers offer free trials to access. Spammers, hackers and other criminals can able to abuse obscurity of Cloud [13].
- **Trans border data flow and data proliferation:** One of the property of Cloud technology is data proliferation which includes various companies and is not handled or managed by Data owner. Thus, duplicity of data may not be ensured and its backup may not be stored in authorized manner [1].
- **Dynamic provision:** Cloud has a vibrant nature hence this is not clear that who is legally has authority for the privacy of data stored by customers [13,14][1].
- **Multitenancy:** It is a part of SaaS which involves operating one program on multiple machines. To reduce cost Cloud service providers (CSPs) use virtual machines to operate multi applications of Cloud but it generates more risk [1].
- **Access:** There is more chances of data theft on cloud environment which is being stored for long time and can be easily hacked [1].
- **Trust:** Still Cloud is unable to build up trust between service providers and customers. Lack of client’s trust can cause many issues while deployment of cloud services. Client still get worried while storing data on cloud [1].

There are several techniques to resolve these issues mentioned in table 1 but still there are critical issues in accessing Cloud services [1].

IV. CONCLUSION

Cloud provides smooth access to computing resources through web servers. This manuscript discusses various applications and benefits pertaining to cloud computing and shed light on some threats related to security and privacy in cloud computing technology. Since researchers have published various techniques mentioned in table 1 but still there are many limitations and disadvantages associated with Cloud computing technology. There is lack of vulnerability analysis. Thus, with the constant increase in Cloud technology’s drift there is need to examine privacy and security risks frequently. As everyone is becoming part of Cloud, we believe awareness among people is the most significant key to minimize the threats in future and there is need of in-depth analysis. They itself can analyse risk before placing their sensitive data over Cloud.

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