Users' Awareness of Cloud Storage Forensics in Malaysia: A Review

Arvind Kumar Pandey, Assistant Professor

Department of Computer Science, Arka Jain University, Jamshedpur, Jharkhand, India

Email Id- arvind.p@arkajainuniversity.ac.in

ABSTRACT: Because it is primarily utilized by businesses and students in Malaysian higher learning institutions, cloud storage services are gaining widespread acceptability and appeal. While cloud storage services have grown in popularity over the past two years, most people are still adjusting to this new technology, and some individuals are still unsure what cloud storage services are. The authors provide the findings and analyses of a study on Malaysians' knowledge and worries regarding cloud storage services, as well as its forensics and security problems, in this article. Questionnaires were sent to 250 cloud storage customers in Malaysia and 50 members of the general public in order to get feedback from the general public, particularly students, on cloud storage services. Participants' answers provided useful information regarding public awareness and understanding of cloud services. This article also looks at and discusses relevant topics that need to be improved.

KEYWORDS: Cloud Computing, Cloud Storage, Cloud Forensics, Cloud Security, Storage.

1. INTRODUCTION

Various kinds of regular customers and professional companies, as well as government agencies and organizations that may store huge amounts of data, such as educational institutions, are increasingly using cloud storage services [1]. Cloud storage is the current trend in data storage because of its ease and accessibility, anytime and anywhere. Cloud storage still has a lot of issues and worries. Can cloud storage administrators or investigation officers, for example, access users' private data if the security of the cloud storage system has been breached, and what would be the best method to prevent that from happening [2], [3]? To investigate these issues, a survey of cloud storage users and white collar users from the Information Technology and business related sectors was performed. The research uses questionnaires to gather data from students at various Malaysian institutions. The authors think that this study will benefit investigators, examiners, and developers, as well as forensic investigation firms, who are interested in creating forensics tools, countermeasures, and methods based on public awareness of cloud storage in Malaysia.

1.1. Introduction to Cloud Computing:

Cloud computing is revolutionizing how information technology is handled and consumed, resulting in cost savings, faster technology and innovation, and the capacity to scale applications on demand [4]. Cloud computing is a paradigm for on-demand network access to a shared pool of customizable computer resources that may reduce administration and service provider involvement. Servers, networks, storage, services, and applications, for example, may be deployed easily and quickly. Cloud computing, in its most basic definition, is a collection of technologies that serve as a platform for providing hosting and storage services via the internet[5]. Furthermore, since cloud computing refers to the high-end of information technology for society, the primary goals of cloud computing are to create and provide a standard service, with low-cost on-demand computing infrastructure, by ensuring enough resource, quality, and service level stability.

1.2. Cloud Computing Security and Issues:

Security and privacy concerns will continue to be a source of worry. From social media to personal banking to government infrastructure, we all live in more linked settings in the twenty-first century, and network security is no longer an afterthought. Cloud computing raises a number of security concerns since it encompasses a wide range of technologies, including operating systems, virtualization, databases, transaction management, and the most significant technology at the time, the network [6]. As a result, cloud computing poses a security risk for the majority of these technologies and systems. For example, the network that links the cloud systems must be

sufficiently secure to prevent security and privacy problems in those systems, or the mapping of real computers to virtual machines must be done securely.

The primary goal of this study is to examine and determine the degree of knowledge of cloud storage services among ordinary users and white-collar workers in Malaysia. This aims to raise Malaysians' knowledge of cloud storage services, which necessitates a better understanding of the security concerns that surround cloud storage and suggestions for individuals who use these services. The information was collected by utilizing a series of questionnaires that were provided to the respondents directly and with the goal of the questions being clearly expressed in order to accomplish the research's goal.

2. DISCUSSION

Storage in the cloud in the field of information technology, forensic research is a relatively young study subject and a popular issue. As individuals attempt to adjust to this new technology and service, the majority of them are also seeking to learn more about what this new technology has to offer[7]. Furthermore, as more individuals utilize cloud storage services, security and forensic investigators will face more hazardous problems and obstacles. This is because cloud storage services are available to anybody with an Internet connection. Hackers and other criminals are allowed to utilize the services to carry out their criminal operations. Hacking operations will be carried out by a crew of hackers who will discover any system weaknesses. For example, during the Apple incident in 2014, a gang of hackers took nude photos of approximately 26 different celebrities [8]. Furthermore, cloud computing is internet-based computing. People used to run apps or programs from software downloaded on a physical computer or set up servers inside their companies in the last 10-20 years. Cloud computing technology, on the other hand, now enables users to access the same types of applications and platforms through the internet [9].

Data for this study was gathered via a questionnaire that was delivered directly to respondents in order to get the most relevant and useful information. Questionnaires may also provide a number of advantages, such as receiving public feedback, comments, ideas, and views in a timely manner. The questionnaire for this study was created using Google Forms, since researchers discovered that most individuals prefer to use this template to respond to surveys because it is simple to complete. The researchers devised ten questions that were split into three sections: cloud computing, cloud forensics, and cloud storage security, as well as future cloud storage aspirations. The questions, on the other hand, were designed and produced to gather essential information in order to accomplish the paper's goal.

In Malaysia, stratified sampling is used to target certain groups. This technique allows for the classification of a target population into several groups [10]. However, the emphasis of this study was on cloud storage forensic and security users. The researchers also calculated the proportions required for the sample to be representative of the study. They also defined the target demographic as several kinds of consumers. To make the findings more precise, the researchers split the relative percentages of each category from the survey. Users of cloud storage services with various educational backgrounds will have different perspectives on cloud storage forensic and security problems. This is the target demographic in this research on the acceptability of cloud storage services, which included a total of 250 consumers. Information Technology has 55 students, Forensic and Security Computing has 75, Software Engineering has 40 students, Business Administration has 40 students, Mobile Technology has 20 students, and others have 20. In addition, fifty white collar respondents from the industry took part in this study. In all, 300 users of cloud storage services took part in this study.

2.1. Findings and Analysis:

The results and analysis of data gathered by the authors through questionnaire will be the focus of this section. In addition, utilizing diagrams and figures, the data for this study will be presented and evaluated.

2.1.1. Demographic Distribution of Respondents:

Figure 1 depicts the spread of survey participants. It shows the participants' educational backgrounds as follows: Information Technology students account for 18%, Forensic and Security Computing students account for 25%, Software Engineering students account for 13%, Business Administration students account for 13%, Mobile Technology students account for 7%, and others account for 7%. Furthermore, white collar professionals in the information technology, security, and business sectors account for 17% of the respondents.

2.1.2. Respondents Perception of Cloud Computing in Malaysia:

The researchers asked participants about their perceptions and interpretations of cloud computing as a development in Malaysia in this question. The questions used a five-point Likert scale, with strong agree, agree, neutral, disagree, and strongly disagree as the options. The aim of this question is to examine respondents' perceptions about cloud computing at this time, when the technology is rapidly evolving. Figure 2 depicts respondents' perceptions on cloud computing as a current trend in Malaysia. The majority of respondents (75%) strongly agreed that cloud computing is now "a part of the changing and expanding process from the early years of computing" in Malaysia. Cloud computing is a trend that is "compromising security and lowering cost," according to 20% of respondents. Only 5% of respondents strongly believe that cloud computing is simply a "product of the recession for lowering information technology costs."

As a consequence of the findings, the researchers may conclude that cost reduction is not the primary motivation for cloud adoption. According to the findings, 75% of respondents think cloud computing is a growing and changing computing process. Because the environment has changed, IT is expanding and changing rapidly, as the very fundamental understanding of Information Technology. To meet clients 20 years ago, a salesperson, for example, would need to bring as many papers as possible. Today, however, he just needs a tablet or a smartphone to access all of the required papers, which are saved in cloud storage. IT has become a top priority for everyone these days, and it is also altering people's lifestyles. This is how 75% of participants feel about cloud computing, which they believe will alter the way people save data.

2.1.3. Cloud Storage Service's Security:

The majority of information technology users are now unconcerned about new technology that is being brought to the market, but they are concerned about the system's security. As a result, the majority of respondents think cloud storage is insufficiently secure for storing personal information. Only 23% of respondents feel comfortable storing personal items such as pictures and movies in cloud storage and believe that cloud storage services are safe locations to store their personal information. On the other hand, despite the fact that Malaysia has had no serious security breaches from cloud storage services, such as data breaches or photo breaches, the majority of cloud storage users do not trust cloud storages and do not put their personal information and documentation there, preferring instead to store their important data on their personal hard disks or pen-drives and keep them with them at all times.

Moreover, just 23% of respondents think cloud storage service providers can offer a safe location for customers to keep their personal information and have a secure backup plan in the event of a data breach. It may be due to the fact that they believe cloud storage service providers who really are offering the facility and working in the market must be sufficiently secure, rather than offering an unsecure service to the market because it may face legal action from some users if a security breach occurs, or at the very least lose customers.

2.1.4. Cloud Forensics' Challenges:

Figure 4 shows the findings of the participants' responses to the difficulties of cloud storage forensics in Malaysia. In this question, more than one response was allowed, as indicated in the figure, and the numbers are in percentages. Because Malaysia is not a developed nation like Singapore, the findings indicate that the respondents take it extremely seriously. As a result, in order to become a developed nation, Malaysia must not only concentrate on industrialization, but also increase its efforts in the information technology sector, which is a component of the development process.

Besides that, the analysis of the results clearly shows that 95% of respondents believe it is a very significant challenge that some regulations in Malaysia have tagged with "limited skill set from the investigator or the authorization power for investigator is being limited" as a result of "limited skill set from the investigator or the authorization power for investigator is being limited." Furthermore, 78 percent of cloud storage users believe it is very important that investigators lack jurisdiction when a crime occurs. Aside from that, 86 percent of participants think the lack of forensic specialists in Malaysia is a major problem, and 75 percent believe the lack of experience is a major issue in Malaysia. This implies that forensics specialists will be unable to examine any crimes using cloud storage that occur in Malaysia.

The findings revealed that respondents lack adequate confidence in or belief in Malaysian forensics professionals' ability to investigate and overcome any issue that may arise. When it comes to advice, the majority of people (80%) believe that rules and regulations are inadequate. As a result, this is not a good idea for Malaysians who think the Malaysian enforcement agency would be unable to take action against crime. Furthermore, some of the respondents think that recent instances in Malaysia are the cause for the society's lack of trust in the investigation.

2.1.5. Cloud Storage Services Development in Malaysia Next 10 Years:

Figure 5 shows that 76 percent of the participants believe that cloud storage services would be more efficient and used by the majority of Malaysia's population. This is because the world is developing, particularly information technology, and Malaysia will have no option but to follow in the footsteps of the rest of the globe. However, 24% of those polled disagree, believing that cloud storage services in Malaysia would be ineffective in the next ten years since the country faces many challenges. In addition, the authors received some feedback from the 76 percent of responders. They think that information technology will alter the culture of Malaysians' life styles in the future, allowing them to use any technological product. People now, for example, may sign any document using an electronic signature document rather than a physical signature document, as they could 20 years ago. On the other side, 24% of respondents think that government policies may stifle and slow growth, or that they may be an impediment to Malaysia achieving its Vision 2020, which was presented by Malaysia's fourth Prime Minister, Tun Dr. Mahathir Mohamad. Malaysia is also not considered a developed country, according to H.S. Borji, because its level of industrialization and overall standard of living are not comparable to the most well-known developed countries in the world, such as the United States of America, the United Kingdom, Singapore, Australia, and Russia. As a result, Malaysia still has work to do in terms of national growth, and one of the most important development processes may undoubtedly be the development of information technology.

3. CONCLUSION

According to the findings of this research, Malaysians have a relatively low degree of awareness about cloud storage services at the present. It may be due to a variety of factors, including Malaysian culture or government policy. Furthermore, cloud forensics poses major difficulties for cloud storage forensics, which cannot be overlooked by associated departments such as police agencies, forensic investigation departments, and cloud computing specialists. As a result, there is a pressing need to develop cloud storage forensics capabilities and performance, which includes a set of investigative processes. Cloud storage services, on the other hand, are providing new possibilities to society, as individuals will alter the way they live and get things done more efficiently and quickly. Finally, a plan for Malaysia to regulate and oversee the internet should be explored, since no major crimes using cloud storage services have been recorded in Malaysia thus far. This may be the reason for the shortage of skilled investigators. As a result, if this occurs, the society and associated departments will get panicked. Furthermore, one of the major issues in becoming a developed nation is developing and expanding Information Technology. This is because information technology may help a country's growth in a variety of ways. For example, since the market is changed by contemporary technology, the need for IT is becoming more broad and large. Consumers are increasingly turning to IT platforms like as Alibaba or other online shopping websites for product information.

REFERENCES

[1]   H. L. Yang and S. L. Lin, "User continuance intention to use cloud storage service," *Comput. Human Behav.*, 2015, doi: 10.1016/j.chb.2015.05.057.

[2]   L. Wei *et al.*, "Security and privacy for storage and computation in cloud computing," *Inf. Sci. (Ny).*, 2014, doi: 10.1016/j.ins.2013.04.028.

[3]   E. Johnson, "Lost in the cloud: Cloud storage, privacy, and suggestions for protecting users' data," *Stanford Law Review*. 2017.

[4]   S. Shilpashree, R. R. Patil, and C. Parvathi, "'Cloud computing an overview,'" *Int. J. Eng. Technol.*, 2018, doi: 10.14419/ijet.v7i4.10904.

[5]   D. Quick, B. Martini, and K. K. R. Choo, *Cloud Storage Forensics*. 2013.

[6]   D. Zissis and D. Lekkas, "Addressing cloud computing security issues," *Futur. Gener. Comput. Syst.*, 2012, doi: 10.1016/j.future.2010.12.006.

[7]   B. Martini and K. K. R. Choo, "Cloud storage forensics: OwnCloud as a case study," *Digit. Investig.*, 2013, doi: 10.1016/j.diin.2013.08.005.

[8]   "iCloud leaks of celebrity photos." https://en.wikipedia.org/wiki/ICloud_leaks_of_celebrity_photos (accessed Sep. 06, 2018).

[9]　　F. Daryabar, A. Dehghantanha, and K. K. R. Choo, "Cloud storage forensics: MEGA as a case study," *Aust. J. Forensic Sci.*, 2017, doi: 10.1080/00450618.2016.1153714.

[10]　　C. Cervellera and D. Maccio, "Distribution-preserving stratified sampling for learning problems," *IEEE Trans. Neural Networks Learn. Syst.*, 2018, doi: 10.1109/TNNLS.2017.2706964.