Academic Science

Data Storage in Cloud Computing

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Abstract— Cloud computing is the computing technology which provides resources like software, hardware, services over the internet. Cloud computing provides computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. . Cloud based data storage systems have many complexities regarding critical, confidential, sensitive data of client. The trust required on cloud storage is so far had been limited by users. The data storage in the cloud has been a promising issue in these days. This is due to the fact that the users are storing their valuable data and information in the cloud. Storage as a Service is generally seen as a good alternative for a small or mid-sized business that lacks the capital budget and/or technical personnel to implement and maintain their own storage. Data store is main future that cloud service provides to the companies to store huge amount of storage capacity. But still many companies are not ready to implement cloud computing technology due to lack of proper security control policy and weakness in protection which lead to many challenge in cloud computing.

**Keywords**: Cloud Computing, enterprise, security, model, attacks, storage.

Introduction- Cloud computing is the most demanding an emerging technology throughout the world. Cloud computing is an Internet based computer technology. Cloud computing is a promising computing model that enables convenient and on-demand network access to a shared pool of computing resources. Some of the major firms like Amazon, Microsoft and Google have implemented the "CLOUD" and have been using it to speed up their business. In computer networking, cloud computing is computing that involves a large number of computers connected through a communication network such as the Internet. In science, cloud computing is a synonym for distributed computing over a network, and means the ability to run a program or application on many connected computers at the same time. Cloud computing can be the ability to use applications on the Internet that store and protect data while providing a service — anything including email, sales. It can be using a storage cloud to hold application, business, and personal data.

The "cloud" in cloud computing can be defined as the set of hardware, networks, storage, services, and interfaces that combine to deliver aspects of computing as a service. The benefits of cloud computing are many. One is reduced cost, since you pay as you go. Other benefits are the portability of the application is that users can work from home, work, or at client locations. This increased mobility means employees can access information anywhere they are.

Cloud storage is an important service of cloud computing, which allows data owners to move data from their local computing systems to the Cloud.

Cloud computing's scalability is another key benefit to higher education, particularly for research projects that require vast amounts of storage or processing capacity for a limited time.

CLOUD COMPUTING MODEL
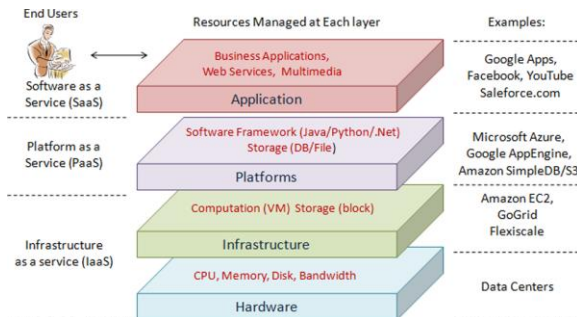
1. Cloud Software as a Service (SaaS) :
Software as a Service provides software or application which can be used over the internet and user does not have not aware of any information regarding operating system, physical hardware.
 This type of application can be access via internet and through browser at user side.

2. Cloud Platform as a Service (PaaS) :
Platform as a Service provide the setup of client's software packages and other tools which set up on service providers' physical hardware over the internet. So whole establishment is take place on service providers' environment and user can access that software after authentication process passes successfully. This user can free from the hardware failure problem by adopting this service.

3. Cloud Infrastructure as a Service (IaaS) :
In this type of cloud, user can have whole virtual server and user can access it as he can access it local like start, stop, and access and configure the server. In this type of service, user pays only for the capacity and model he needs them.

Data Storage in Cloud

In cloud storage system, companies stores their data in the remotely located data server. Storage as a Service is generally seen as a good alternative for a small or mid-sized business that lacks the capital budget and/or technical personnel to implement and maintain their own storage infrastructure. Accordingly, correctness of the data is assured. Even though sometimes unauthorized person may modify or delete the data which leads to server compromise and/or random Byzantine failures. Because it can be the first step for fast recovery of the storage errors. SaaS is also being promoted as a way for all businesses to mitigate risks in disaster recovery, provide long-term retention for records and enhance both business continuity and availability. The cloud storage systems propose an effective and flexible distributed scheme with explicit dynamic data support for file distribution across cloud servers. The benefits of cloud computing are significant—economies of scale, potential cost savings, fast deployment and easy scalability. Data storage in a cloud is a process where a user stores his data through a CSP into a set of cloud servers, which are running concurrently, cooperated and in distributed manner. Data redundancy can be employed with technique of erasure-correcting code to further tolerate faults or server crash as user's data grows in size and importance. Thereafter, for application purposes, the user interacts with the cloud servers via CSP to access or retrieve his data. . In some cases, the user may need to perform block level operations on his data. The most general forms of these operations we are considering are block revise, erase, insert and affix.

As users no longer possess their data locally, it is of critical importance to assure users that their data are being correctly stored and maintained. That is, users should be prepared with security means so that they can make continuous correctness assurance of their data stored in

Cloud Servers even without the existence of local copies. In case those users do not necessarily have the time, feasibility or resources to monitor their data, they can delegate the tasks to an optional trusted Third Party Auditor of their respective choices. In our model, we assume that the peer-to-peer communication channels between each cloud server and the user is authenticated and reliable, which can be achieved in practice with little overhead. Companies still think long and hard about moving applications and data to the cloud from traditional, on-premise computing models, and many are hesitating to move applications containing sensitive data. The benefits of cloud computing are significant— economies of scale, potential cost savings, fast deployment and easy scalability.

The characters of cloud computing

1 Ultra large-scale The scale of cloud is large. The cloud of Google has owned more than one million servers. Even in Amazon, IBM, Microsoft, Yahoo, they have more than hundreds of thousands servers. There are hundreds of servers in an enterprise. Cloud enlarge the user's computing power.

2. Virtualization
Cloud computing makes user get service anywhere, through any kind of terminal. The resources it required come from cloud instead of visible entity. You can complete all you want through net service using a notebook pc or a mobile phone. Users can attain or share it safely through an easy way, anytime, anywhere. Users can complete a task that can't be completed in a single computer.

3 High reliability
Cloud uses data multi-transcript fault tolerant, the computation node isomorphism exchangeable and so on to ensure the high reliability of the service. Using cloud computing is more reliable than local computer.

4 Versatility
Cloud computing doesn't aim at certain special

application. It can produce various applications supported by cloud, and one cloud can support different applications running it at the same time.

5. High extendibility
The scale of cloud can extend dynamically to meet the increasingly requirement.

6. On demand service
Cloud is a large resource pool that you can buy according to your need; cloud is just like running water, electric, and gas that can be charged by the amount that you used.

7. Extremely inexpensive
Because the cloud's special fault tolerance can be built by very inexpensive nodes, the centered management of cloud make the enterprise needn't undertake the management cost of data center that increase very fast. The versatility can increase the utilization rate of the available resources compared with traditional system, so users can fully enjoy the low cost advantage. You can spend only a few hundred dollars and a few days to accomplish a task that you must do it spending thousands of dollars and several months before.

Cloud Computing Attacks

As more companies move to cloud computing, look for hackers to follow. Some of the potential attack vectors criminals may attempt include:

a. Denial of Service (DoS) attacks: Some security professionals have argued that the cloud is more vulnerable to DoS attacks, because it is shared by many users, which makes DoS attacks much more damaging.

b. Side Channel attacks: An attacker could attempt to compromise the cloud by placing a malicious virtual machine in close proximity to a target cloud server and then launching a side channel attack.

c. Authentication attacks: Authentication is a weak point in hosted and virtual services and is frequently
targeted. There are many different ways to authenticate users; for example, based on what a

person knows, has, or is. The mechanisms used to secure the authentication process and the methods used are a frequent target of attackers.

d. Man-in-the-middle cryptographic attacks: This attack is carried out when an attacker places himself between two users. Anytime attackers can place themselves in the communication's path, there is the possibility that they can intercept and modify communications.

e. Inside-job: This kind of attack is when the person, employee or staffs who is knowledgeable of how the system runs, from client to server then he can implant malicious codes to destroy everything in the cloud system.

Security

It is clear that the security issue has played the most important role in hindering Cloud computing. Without doubt,putting your data, running your software at someone else's hard disk using someone else's CPU appears daunting to many.

Well-known security issues such as data loss, phishing, botnet (running remotely on a collection of machines) pose serious threats to organization's data and software Security measures assumed in the cloud must be made available to the customers to gain their trust. There is always a possibility that the cloud infrastructure is secured with respect to some requirements and the customers are looking for a different set of security. In order to have a secured Cloud computing deployment, we must consider the following areas, the cloud computing architecture, Governance, portability and interoperability, traditional security, business continuity and disaster recovery, data center operations, incident response, notification and remediation, Application Security, Encryption and Key management, identity and access management.

In order to have secure cloud system, the following aspect must be considered:

Authentication:

Authentication is the process of verifying a user or other entity's identity. This is typically done to permit someone or something to perform a task. There is variety of authentication system, some are stronger than others. A strong authentication system ensures that the authenticators and messages of the actual authentication protocol are not exchanged in a manner that makes them vulnerable to being hijacked by an intermediate malicious node or person. That is, the information used to generate a proof of identity should not be exposed to anyone other than the person or machine it is intended for.

Authorization:

Authorization is when the system decides whether or not a certain entity be allowed to perform a requested task. This decision is made after authenticating the identity in question. When considering an authentication system for a particular application, it is crucial to understand the type of identifier required to provide a certain level of authorization.

Confidentiality:

Confidentiality is needed when the message sent contains sensitive material that should not be read by others and therefore must not be sent in a comprehensible format. A loss of confidentiality is the unauthorized disclosure of information. Confidentiality, as it relates to security and encryption techniques can be obtained by encrypting messages such that only intended recipient are able to read them.

Integrity:

Integrity is ensuring that the data presented are true and valid master source of the data and includes guarding against improper information modification or destruction to ensure information non-repudiation and authenticity. A loss of integrity is the unauthorized modification, insertion, or destruction of information.

One way of ensuring of data integrity is by using simple checksums which prevent an attacker from forging or replaying messages. Checksum is usually implemented when the channel between

communication parties is not secure and ensure that the data has reached its destination with all bits intact, if bits have been modified,that the modification will not go unobserved.

Conclusion

Understanding a technical area as complex as cloud computing is not easy and requires identifying its fundamental characteristics. Clear concepts and terminology into cloud computing help but do not entirely solve the problem of how to design, develop and adopt a cloud computing system.

One of the core services provided by cloud computing is data storage. This poses new challenges in creating secure and reliable data storage and access facilities over remote service providers in the cloud. The security of data storage is one of the necessary tasks to be addressed before the blueprint for cloud computing is accepted. In this paper we discussed the security requirements of cloud computing data storage security and the solutions for the security problems.

As a part of the future work, first, we'd like to get detail of each characteristic especially the inner technologies .Second, we have more than ten years experience in HPC area and wish to syncretize the HPC into cloud computing. Third, the evaluation of cloud services is an interesting and valuable
research subject.

REFERENCES

[1] Wikipedia, "Cloud computing," http://en.wikipedia.org/wiki/ Cloud_computing

[2] Q. Wang, C. Wang, J. Li, K. Ren, and W. Lou, "Enabling public verifiability and data dynamics for storage security in cloud computing," in Proceedings of the 14th European Conference on Research in Computer Security, 2009, pp. 355–370.

[3]Kan Yang · Xiaohua Jia" Data storage auditing service in cloud computing:challenges, methods and opportunities", WorldWide Web (2012) 15:409–428 DOI 10.1007/s11280-011-0138-0

[4] D. Amrhein, "Forget Defining Cloud Computing,"http://ibm.ulitzer.com/ node/1018801.

[5] K.Valli Madhavi , R. Tamilkodi and R.Bala Dinakar, "Data Storage Security in Cloud Computing for Ensuring Effective and Flexible Distributed System," International Journal of Electronics Communication and Computer Engineering, Volume 3, Issue (1) NCRTCST, ISSN 2249 –071X.

[6]Shyam Patidar, Dheeraj Rane and Pritesh Jain, "A Survey Paper on Cloud Computing," 2012 Second International Conference on Advanced Computing & Communication Technologies."

[7]Cong Wang, Qian Wang, KuiRen, Ning Cao and Wenjing Lou, "Toward Secure and Dependable Storage Services in Cloud Computing," Services Computing, IEEE Transactions on , vol.5, no.2, pp.220,232, April-June 2012.

[8]S.Sajithabanu and E.George Prakash Raj, "Data Storage Security in Cloud," International Journal of Computer Science and Technology, ISSN: 0976-8491 (Online)| ISSN: 2229-4333 (Print), IJCST Vol. 2, Issue 4, Oct. -Dec.2011

[9] Mehdi Hojabr, "Ensuring data storage security in cloud computing with effect of kerberos," International Journal of Engineering Research & Technology (IJERT),ISSN-2278-0181, Vol. 1, issue 5, July - 2012.

[10] P. Mell and T. Grance, "Draft nist working definition of cloud.