The Concept of Cloud Computing and Issues Regarding its Privacy and Security

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Abstract

The cloud computing is the fastest growing concept in IT industry. The IT companies have realized that the cloud computing is going to be the hottest topic in the field of IT. Cloud Computing reduces cost by sharing computing and storage resources, merged with an on-demand provisioning mechanism relying on a pay-per-use business model. Using cloud computing, the user can access their resources virtually via internet and do not need to carry their data anywhere. This paper concludes the survey about the previous research papers on cloud computing. The concept of cloud computing and its various security issues and privacy issues has been discussed in this paper.

Keywords :*cloud computing , privacy issues , security issues ,*

1. Introduction

In recent years, Internet becomes the essential part of the life. So its need is increasing quickly. Along with this the high computing power also increases the cost of hardware and the power consumption. As the quality of computing increases the storage space requirements also increases. So a new technique named cloud computing is trying to solve these problems.

The basic principle of cloud computing is to make the computing be assigned in a large number of computers, rather than local computer or remote server. The cloud computing is extension of grid computing, distributed computing and parallel computing [3]. In cloud computing the recourses are shared via internet.Cloud computing provides the fast, quick and convenient data storage and other computing services via internet.

The cloud computing system is like your virtual computer that is a virtual location of your resources.The user can access their resources those are placed on a cloud as on their real system resources. The user can install applications, store data etc. and can access through internet anywhere.The user do not need to buy or install any hardware to upgrade his machine. They can do it via internet.In future we may need only notebook PC or a mobile phone to access our powerful computer and our resources anywhere.

2. Benefits of Cloud Computing

1. The cloud computing has a huge scale
2. The user resources are placed on a virtual location, so the user can access their resources from any location anytime from their mobile or notebook pc.
3. Cloud computing is highly reliable.
4. It provides versatile services and applications.
5. It can be extended up to any level.

6. It is a large pool of resources, so the user can buy any according to need.[3][5]
7. It is Extremely inexpensive

3. Cloud Computing Services

The services of cloud computing are divided into three categories:

1. Iaas(Infrastructure as a service)
2. Paas(Platform as a service)
3. Saas(Software as a service)

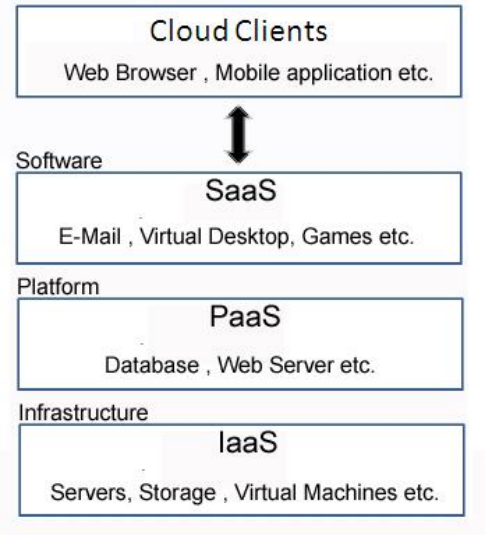

Figure 1: Categories of Cloud Computing

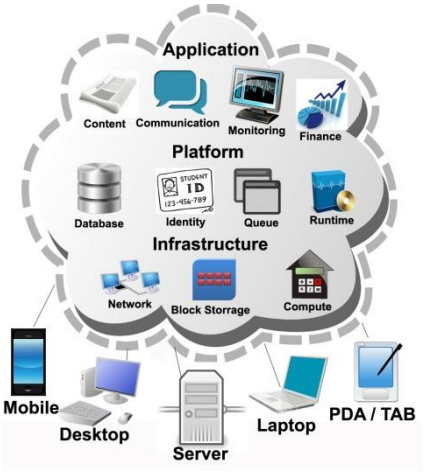

Figure 2 : The Cloud

The Cloud computing can also be divided into five layers:- client , applications, platform, infrastructure and services.[2]

4. Cloud Computing Vs Grid Computing

Job scheduling is the main goal of grid technology, its purpose is to use each and every resource. It can split a large task into a lot of independent and unrelated sub tasks, and then every node do the independent jobs. Even any node fails to return result, the whole process will not be affected. Whereas cloud computing will group all the resources. But the cloud resources has to complete a special task. The construction of grid is to complete a specified task, then there will be biology grid, geography grid, national educational grid and also. Cloud computing is designed to meet general application, and there are no grids for a special field.[4]

Grid Computinghas some advantages, likethe computing power and amount of information of any computer can be increased up to any level. So it is good for enterprise tasks to increase system efficiency and decrease the management cost. Cloud computing put these advantages to next level. Lots of applications will be completed through internet. Cloud computing will extend the application of hardware and software, and will change the application model of hardware and software[4]. The user side only includes the usage and everything else is on other side.

Characteristic	**Cloud computing**	**Grid computing**
Service oriented	Yes	Yes
Loose coupling	Yes	Half
Strong fault tolerant	Yes	Half
Business model	Yes	No
Ease use	Yes	Half
TCP/IP based	Yes	Half
High security	Half	Half
Virtualization	Yes	Half

TABLE I. Cloud Computing Vs. Grid Computing [2]

5. Cloud Computing Deployment Models

1) Community Cloud :A private or community cloud is an exclusive network that supplies services to a limited number of people or a group of people. Also Community cloud is a cloud that shares infrastructure

among many organizations from some community having common concerns.

2) Public Cloud : A public cloud sells services to anyone on the Internet. A public cloud is needed where many organizations have requirements of same kind and looking to share infrastructure and it can be economically good as the resources are utilized.

3) Hybrid Cloud : A hybrid cloud is the combination of Public Cloud and a Private Cloud. In this, enterprises and organisations can utilize the qualities of both of the cloud offerings.

6. Leading Cloud Service Providers

There are many service providers which provide Cloud Computing Service , some of them are :

1. Amazon
2. IBM
3. RackSpace
4. Google
5. Microsoft
6. CSC
7. BlueLock
8. NephoScale
9. Verizon/Terremark
10. Joyent
11. Salesforce
12. VMware
13. Netsuite
14. 3Tera

7. Cloud ComputingSecurity Issues

Security issues are the most concerned challenges in cloud computing[3]. Cloud is expected to offer the capabilities like encryption strategies to ensure safe data storage environment, strict access control, secure and stable backup of user data. However, cloud allows users to achieve the power of computing which beats their own physical domain. It leads to many security problems. We will discuss the major security concerns in the following:

7.1. Identification and Authentication:The multi-tenancy in cloud computing allows a single instance of the software to be accessed by more than one users[3]. This will cause identification and authentication problem. Because different users use different tokens and protocols , that may cause interpretability problems.

7.2. Access control: Confidential data can be illegally accessed due to lenient access control.If adequate security mechanisms are not applied thenunauthorized access may exist. As data exists for a long time in a cloud, the higher the risk of illegal access[3].

7.3. Data Seizure: The company providing service may violate the law. There is a risk of data seizure by the some foreign government[1].

7.4. Encryption/ Decryption: There is an issue of the Encryption/ Decryption key that are provided. The keys should be provided by the customer itself[1].

7.5. Policy Integration: Different cloud servers can use different tools to ensure the security of client data. So integration policy is one of the major concerns of security.

7.6. Audit: In cloud computing the Cloud Service Provider (CSP) controls the data being processed. CSP may use data while being processed[3]. So the process must be audited. The all user activities must be traceable. The amount of data in Cloud Computing may be very large. So it is not possible to audit everything.

7.7. Availability: Availability is the major concern in the cloud computing. When the client data is virtualized, clients have no control on the physical data[3]. If in the cloud, the data or service is not available, it is rigid to fetch the data.

7.8. Government restrictions: In some countries there are some rules about the data storage , that what kind of data can be stored by its citizens and there is a time limit for which the data can be stored. Sometimes customer stress their financial information on the cloud

, so some bank policies don't allow the customers to store that kind of information outside the country[1].

8. Privacy Issues

8.1. Unauthorized Secondary Usage

The data may be put to unauthorized uses. The cloud service provider may getcharges from authorized secondary uses of customer's data, most commonly the targeting of advertisements. However, some secondary data uses may be unwanted to the data owner, for example some competitor of user's company may get the sales detail or other important data. Currently there are no such restrictions to such secondary uses[5].

8.2. Lack of User Control

A SaaS environment is used in cloud computing, so the service provider becomes responsible for storage of data, so the visibility and control is limited to the user[5]. The user may need to get control on their data when it is stored and processed in the cloud. This can be a legal requirement or otherwise or a user is switching to some other cloud service provider. On the cloud there is a threat of theft or misuse of data

8.3. Data Proliferation and Transborder Data Flow

In Data proliferation themultiple people or companies may involve and is not controlled by the data owners. Cloud Service Providers ensure availability by making copies of data in multiple datacenters. It never guarantees that a copy of the data or its backups are not stored or processed under some laws or conditions, or that all these copies of data are deleted when they are not required.

The each and every data movement on the cloud are across and between legal jurisdictions, that increases risk factor and legal complexity because the data crosses the organization boundaries.

The local laws can be violated while transferring data on the cloud. Cloud computing worsens the transborder data flow issue because due to the dynamic nature of cloud computing , it is never clear that which server will be used[5].

8.4. Dynamic Provisioning

Cloud computing faces many traditional outsourcing problems. So Itis difficult to judge that which of those is responsible for preserving legal requirements for private data or data handling standards to be set up andfollowed [5]. The cloud is dynamic in nature so is it not yet clear that upto what level cloud outsources involved in processing can be properly identified, checked and ascertained as being trustworthy. There should be some set of rules to be set up for sub-contractors.

9. Conclusion

The Cloud computing is beneficial in so many aspects. It will take the computing to a step ahead. It will provide so many benefits to the users. There are few lacks related to privacy and security are there. But every new technology when comes it has some lacks and its get improved as the time passes as its usage becomes more and more. So for the cloud computing there should be some set of rules the CSPs should follow as the all private data of the users should be safe and confidential.

10. References

[1] KrešimirPopović, ŽeljkoHocenski , "Cloud computing security issues and challenges" ,MIPRO 2010

[2] Chunye Gong, Jie Liu, Qiang Zhang, Haitao Chen and Zhenghu Gong , "Characteristics of cloud computing" , 39th International Conference on Parallel Processing Workshops ,2010

[3] ZiyuanWang , "Security and privacy issues within the Cloud Computing" ,International Conference on Computational and Information Sciences , 2011

[4] Shuai Zhang, ShufenZhang,Xuebin Chen and XiuzhenHuo , "The Comparison Between Cloud Computing and Grid Computing" , International Conference on Computer Application and System Modeling (ICCASM 2010),2010

[5] Siani Pearson and AzzedineBenameur , "Privacy , Security and Trust Issues Arising from Cloud Computing",2nd IEEE International Conference on Cloud Computing Technology and Science

[6] Shuai Zhang , Shufen Zhang , Xuebin Chen and XiuzhenHuo , "Cloud Computing Research and Development Trend" , Second International Conference on Future Networks , 2010

[7] Shufen Zhang , Shuai Zhang , Xuebin and Chen Shangzhuo Wu , "Analysis and Research of Cloud Computing System Instance", Second International Conference on Future Networks, 2010

[8] ZhidongShen and QiangTong ,"The Security of Cloud Computing System enabled by Trusted Computing Technology", 2nd International Conference on Signal Processing Systems (ICSPS) , 2010

[9] AlokTripathi and Abhinav Mishra , "Cloud Computing Security Considerations"

[10] AkhilBehl ,"Emerging Security Challenges in Cloud Computing An insight to Cloud security challenges and their mitigation"