INSIDER OF CLOUD COMPUTING AND ITS VARIOUS CHALLENGES
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Received on 25-10-2016

Abstract:
Now-a-days cloud computing is an advance technology that attracted many organizations, businessmen and government agencies. Storage of data is headache for most of the users. User wants to access their data from anywhere in any system. Cloud computing is the best solution for fast storage and retrieval of data. But every coin has two sides, there are some disadvantages of cloud computing. One of the main issues is security. Cloud service provider and customer should make sure that data saved in the cloud is not lost or theft by the hackers. This paper gives the overview of cloud computing, its features, various cloud model and architecture, who can access the cloud, its advantages, disadvantage of service, parameters that affects the security of cloud and its access control.

The major access control models are as listed, Role Based, Discretionary, and Mandatory Access Control. To provide more secure access control it uses clock and hierarchical structure. This helps the users to upload, download or delete files from the cloud easily.

Key Words: NIST (National Institute of Standards and Technology's), PaaS (Platform as a Service), IaaS (Infrastructure as a Service), SaaS (Software as a service).

1. Introduction:
Cloud computing denotes to application distributed services on the internet as well as the system hardware and software in database that delivers these services. According to NIST, the basic cloud delivery models, dependent on who delivers the cloud services are of 4 types. The organization may use one model or combination of several models to deliver its services related to business and application.

Several researchers have previously spoken issues of access control in his field. Daniel Nurmi et-al contributed an idea of an authorization system to regulate the execution of virtual machines to make sure that only owner can modify them.
Stefan Berger et-al helped an authorization model dependent on security labels to regulate control to data shared, virtual machines and network resources. Jose Alcaraz Calero et-al contributed research in centralized authorization system which gives a federated path-based control mechanism. They presented an architecture which can be applied using an XML based creation.

2. Services in Cloud Computing:

![Services of cloud computing](image)

Cloud computing [3] is termed as storing and utilizing the programs and data whenever needed over the Internet in place of personal system’s hard drive. It is a system model that provides services in the form of on-demand services, it is available for everyone, anywhere and anytime, including clouds referring to the internet and the web.

The several services which are based on cloud that are[1] offered are as follows:

- **Web related Cloud Computing:** Functionality of the web services are delivered to the company and an entire application is not delivered for their purposes.
- **Service as an Infrastructure:** The storage potential of the cloud setup was make use by many companies and organizations. Expansion of the storage space based on their needs without worrying about dedicated servers on site.
- **Software and its Service:** Storage is not considered and a person can access any particular software of its need.
- **Platform and its corresponding Service:** Maintaining and hard driver’s services are not considered but still the companies and organization run their own application.
- Services that considered under utility: Organizations stores a lot of data and they also open and operate it remotely a virtual data center that stores all such data that can be access.

- Commerce services: The different creation of core applications are used by the employees and members of the organizations. All the desired services are provided to the organization by the application that the services they desire.

3. Cloud Computing Models:

Cloud Computing [2] is going to describe about the broad range of services. The Cloud is wide collection of facilities and services and organizations can choose the time and place to access features of the Cloud Computing.

Cloud computing services are majorly classified as:

1. Infrastructure (IAAS)
2. Software (SAAS)
3. Platform (PAAS).

4. Service of software in cloud computing:

According to the demand the services are offered to their customers. A different instance services runs on the cloud. Customers don’t need any licenses security, while for the provider the lowering of costs takes place and the application that is prepared has to be maintained. [12] The cloud infrastructure needed not to be supervised or handle by the people in the organization and also need not deal with storages and operating system, etc.
4.1 Features of SaaS

• It provides the web controls to industrial based software.
• Main hub (central location) controls the software.
• Software provided in an “one to many” based model.
• Software covers, bugs and any modification is not in the hands of end users.
• Application Programming Interfaces permit for collaboration among different components of software.

4.2 Features of PaaS

• Service to develop, test, deploy, host and preserve applications in the same unified development environment is provided by PaaS.
• Web based UI making tools is going to assist us in creation, modification, testing and deployment of various user interface scenarios.
• Multi-tenant architecture, here same type of development application is used by multiple concurrent users.
• Also has added additional benefits of load sharing and task failure.
• Can combine web services and databases through common standards.
• PaaS also provides a few group/team work enhancement services.
• Billing and subscription management tools can also be provided by this.

4.3 Infrastructure as a Service

This model offers elementary storage and computing abilities as uniform services over the network. Servers, loading systems, networking gear, data center space, etc. are united and made available to handle workloads. [4] The capability delivered to the customer is to rent processing, networks, and other fundamental computing resources where the customer can deploy and run arbitrary software, which may contain operating systems and applications. The customer does not handle or control the underlying cloud organization but has the control over storage, operating systems, deployed applications, and possibly choose networking mechanisms (e.g. Firewalls, load balancers etc.). Some examples of IaaS are: Amazon, GoGrid, 3 Tera etc.

4.4 Features of IaaS

• While the resources are same as that of the services.
• Individuals are accepting for lively scaling.

• It has an erratic rate, and it has effective pricing model.

• A hardware component which is used by more than users.

5. Cloud Services: Benefits

5.1. Fresh Software: Immediate upgrades provide the workers the new functions and interactive features that increase the productivity. Release of the newly improved software is quite often. Newly improved software’s are released once a year on a frequent basis of time.

5.2. Do more with less

Because of the cloud computing the storage in local machines or hardware is being reduced. This is the data center station. This impacts in reduction of management staffs, IT employees to manage the local system. It also reduces the cost of maintenance and development of the infrastructure

5.3. Flexible costs: The rate of cloud computing is much cheaper than that of the traditional methods. Companies only need to pay for the servers maintenance which is much more flexible than any other services.

5.4. Always-on availability

The software is available to the end-users whenever needed. This is majorly connected over an internet connection until worker is connected to it. The application can get to the user whenever needed. Few applications are available offline too, those don’t require internet connection. [13]

5.5. Improved mobility: Tablets and smart phones are used to store the data which provides an easier way to the employees.

5.6. Advanced collaboration

Cloud computing makes better associations by letting discrete organization to come together virtually and effortlessly provided information through shared storage in the present context. This helps to decrease the marketing time and increase the reliability of the customer’s service and product manufacturing.

5.7. Cost efficiency

Since some organizations don’t have a capacity to buy new equipment and control a data storage center. They do not have to spend money and resources on components, facilities and other operational view.
5.8. Reduction on expenses

Business needs to maintain documents like SRS. Cloud computing helps to reduce the expenses of documents which needed to be maintained offline. It stores all the data and documents on clouds and can be regained through server.

5.9. Flexible capacity: According to the circumstances, the flexible ability of the cloud changes.

6. Fault Tolerance in Cloud Computing: Fault tolerance allows the system to keep working whenever one of its parts get down. The component which is not expected quickly or coding that goes down. Instead of shutting down fully, the system operates at its max limits. [11]

6.1 Metrics for Fault Tolerance in Cloud Computing:

The various parameters include availability, security, reliability, performance, response time, scalability, which increases the quality.

Throughput: It determines the amount of work that which has finished its execution. System’s throughput should be high enough.

Response Time: The amount of time used to respond by a program has to be reduced.

Scalability: If the code is compiled correctly it doesn’t affect the fault tolerance limit

Performance: It judges how effectively our system runs by checking its effectiveness. Enhancement of a performance should be done at the perceptible cost.

Availability: The other term of availability can be given as reliability. Item can function at any time under any circumstances.

Usability: It can be termed as an extent by which the item can be utilized by end users to achieve its target with efficient, convincible to the customer in an effective manner.

Reliability: Within a given time in a particular surrounding, the result is highlighted.

7. Issues in Cloud Computing

7.1 Security Issues: The challenges faced by companies which uses the services provided by the cloud are nt different from the local system which is used at home. As it may lead to defects, a proper risk acceptance or maintenanceshould be specified. Here, we analyzed thee challenges faced by the organizations through thee vendor or local cloud provider service by implemented designed security control in any privately purchased cloud. The analyzed issues are as follows:
• Hacker may attack the cloud.

• Unauthorized users may access the data.

• Server may get down due to huge amount of traffic on cloud.

• Prominent security risk on cloud.

Security risk on cloud is related with very delivery model of cloud which is dependent on parameters like sensitivity of info assets, architecture design of cloud and security control in a given cloud surrounding. In the below section we will discuss these threats and challenges in general view.[9]

7.2 Security risk and description

Privileged customer’s access

• Only limited access is given by the cloud services to the given customer data. Actions are required to tackle the risks and threats for the customers to use the data which is uploaded in the cloud.

Data storage location and separation

• Users don’t have any idea about the storage location of the amount of data to be stored. There is a risk of storing the data on other customer side environment.

Data discarding

• Where the hardware components are dynamically purchased by the customers, that arise a risk of disposal of the data which is depended on their requirements and availability. The data is not being removed from the data storage systems, backups and hard disks during the decommission is being enhanced within the cloud technology.

[7]

Assuring cloud security

• Without the use of SLAs the users don’t know the security of the system in any of the way. Security controls are audited in any of the ways within their agreements that area needed.

7.3 Data Issues in Cloud Computing

From an extremely secure data storage to various Cloud models that are based on Internet should have an excessive emphasis on its private data and its data security. In the present and current processes, many cloud services need changes or enhancements on the cloud data. Relocation to cloud process has its implications on all types of services and its uses.
The above figure shows the current percentage of data segregation and protection and data leak prevention ratio. [6] Data theft or delete can have major impact on organization, brand name and the trust on the company of the customer may get loss. Customer will think twice before believing on the company whose data is being theft.

Because of multi-tenancy environment of the Cloud it could act as a ‘honey-pot’ for the hackers. If hackers attacked the Cloud they can access and modify data of all the organization hosted on that Cloud.
7.4 Performance Issue

Capacity management techniques and practicing holistic performance engineering mostly decide success of cloud computing. [9]

Hardships in growing and adapting of cloud computing are linked to the basic performance aspects like scalability, availability, performance, capacity. Potential cloud solutions which overwhelm these problems need to be wisely assessed for their authenticity in real-life situations. Bottom of the technical transactions of fundamental cloud services is required to be studied in depth by the performance engineers in advance before explaining to cloud computing users and cloud computing providers to get the cloud services. [8]

Performance modeling techniques used to measure the degree to which cloud services can meet agreed service-level requirements for availability, performance, with an aim to detect potential performance anti-patterns before they happen.

7.5 Infrastructure Issues

Infrastructure of cloud are the components which helps the data to store, retrieve and modify efficiently. The components are placed from an end user to the cloud service provider. There are various components which helps to work the cloud like transmitter, receiver, repeater, machine to store data, etc. The component which stores data should be placed in cool temperature and hygienic environment. The infrastructure or maintenance team should not depend on the single storage source, there should be a backup storage devise which can be helpful when the original storage device gets fail.

8. Conclusion

In this paper, we presented an overview of cloud computing which gives an insider look on security, models. Researchers also specified on advantages and disadvantages of cloud computing. As, cloud have several security issues like anyone can access it. If it is exposed which leads to several threats like unauthorized access to data, intrusions and data theft. To ensure it to make technology more secure. We have proposed several security solutions that are based on several based ways as cryptography and others.

Acknowledgement

This research was supported by Prof. Sudha.S, VIT University. I thank her for sharing her pearls of wisdom that greatly assisted the research. I also would like to show my gratitude to VIT University for giving a platform to showcase the knowledge. The researchers who have already worked in this field helped me to complete the paper with flying colors.
9. References


