

Accountability as a Way Forward towards Cloud Information Privacy

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ABSTRACT: *Cloud computing is a new technical concept that allows us to access data and applications on-demand from any place at any time. Cloud computing has become one of the most common and rapidly growing technological advancements due to its flexible payment models, recognizable Web interface, scalability, and independence from local machines. As a result, cloud computing has the ability to enhance healthcare delivery as well as current health information systems and practices. Only a few examples have included ability to use massively scalable computing tools, remote access to electronic health records through computer or mobile devices, and processing and analyzing data from wearable technology. Despite the many benefits of cloud computing, major security, privacy, and regulatory issues continue to stymie the cloud's integration with medical care. The focus of this review is to clarify the fundamental aspects of cloud technology, as well as to recognize its potential applications, benefits, challenges, and solutions to those challenges.*

Keywords: *Cloud computing, Security, Cloud security, Types of cloud computing*

INTRODUCTION:

In the first chapter, we define cloud computing and cloud administrations, as well as the

various layers and types of cloud computing. We look at the differences between cloud computing and cloud management. The following are examples of underutilized developments that allow cloud computing. In addition, we look at cloud computing's highlights, metrics, and security problems. We outline the major cloud computing stages, as well as the vendors that market them and the services they provide. We address the issues with cloud computing as well as the potential for cloud computing to become obsolete. Cloud computing is a relatively modern computing paradigm in which administrations are distributed around the Internet as highly adaptable and frequently virtualized properties. Cloud computing has become a major innovation trend, with many analysts predicting that it would reshape data innovation (IT) types and the IT commercial core. Clients access programmes, capacity, and data using a variety of devices, including PCs, portable workstations, smartphones, and PDAs, thanks to cloud computing technology.

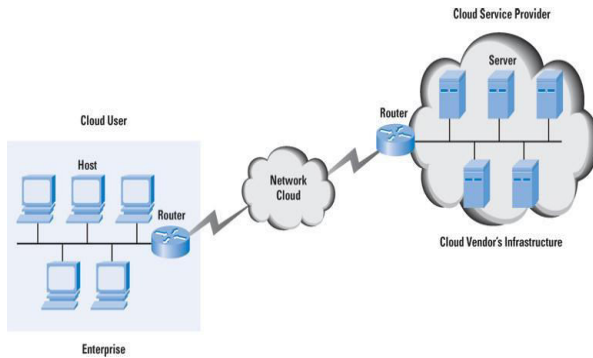


Fig.1. Cloud computing

TYPES OF CLOUD COMPUTING:

In most cases, cloud computing is viewed in one of two ways. Either on the basis of the proven arrangement or the benefit that the cloud promotes.

Cloud may be classified as

- Public
- Private
- Hybrid
- Community cloud

depending on the implementation model.

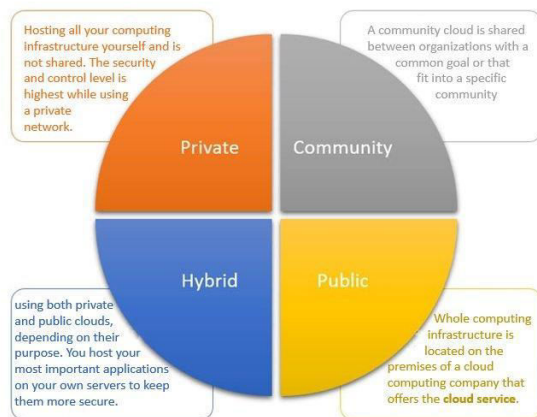


Fig 2. Classification of deployment model

Public Cloud:

Open cloud is a cloud computing network that offers application capability and a variety of specialised administrations over the internet. The specific type allows multiple clients to gain access to cloud-based equipment assets through remote

administration or the internet. A few points of interest of open cloud incorporate:

- Adaptability
- Efficiency in terms of cost
- Maintenance-free
- Enhanced dependability

Third-party providers are offering additional perks, such as Software-as-a-Service (SaaS), which accede clients to access and use cloud-based services from anywhere on the internet.

Private Cloud:

Private clouds provide computing capabilities that are tailored to the needs of a single company or organisation. It can be implemented physically at information centres inside an organization's perimeters or managed by third-party vendors. Businesses benefit from getting more leverage over data protection and privacy thanks to it. A few preferences incorporate:

- Flexibility is essential.
- Increased privacy and protection
- More power
- The ability to scale

Private clouds are imbued with extra layers of encryption for the preparation of private information and delicate data in order to ensure absolute assurance.

Hybrid Cloud:

The term "cross breed cloud" refers to a hybrid of open and private cloud. It is also referred as "best of both worlds" because it combines the advantages of private clouds with the benefits of open clouds. It enables smooth production of knowledge and applications for increased adaptability and extended sending options by leveraging a venture

to obtain benefits from both clouds. Among the advantages are:

- Control is excellent.
- Performance in terms of costs
- Transitioning is easy.
- Adaptability

Suppliers that profit from third parties create systems that are only for companies. They have a range of programmes that are customised to the needs of companies. However, companies can only buy cloud services from internationally recognised certified experts with extensive experience implementing cutting-edge cloud arrangements that can help them boost productivity and efficiency while improving the adaptability and availability of their IT infrastructure.

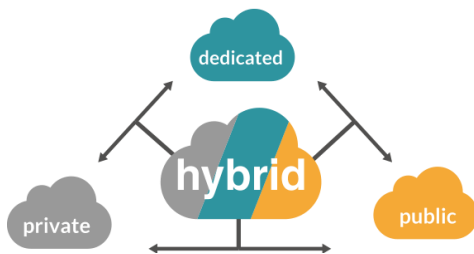


Fig.3. Types of cloud

We're talking about one of two services offered by the cloud model:

- IaaS (Infrastructure as a Service)
- PaaS (Platform as a Service)
- SaaS (Software as a Service)

TYPES OF CLOUD SERVICES:

Infrastructure as a service (IaaS), application as a service (PaaS), software as a service (SaaS), and cloud as a service (FaaS) are the four types of cloud computing services (functions as a service). Since they are built on top of one another, they are referred to as the cloud computing stack.

Infrastructure-as-a-service (IaaS):

IaaS (infrastructure as a service) is the most common form of cloud computing service, allowing you to rent IT infrastructure (servers or virtual machines) from a cloud provider for a subscription.

Platform as a service(PaaS):

The provision of an on-demand environment for designing, testing, distributing, and managing computer programmes is referred to as platform-as-a-service (PaaS). Its goal is to enable developers to quickly build web or mobile apps without having to worry about setting up or managing the basic development infrastructure of servers, bandwidth, organisation, and databases.

Software as a service (SaaS):

Software-as-a-service (SaaS) is a mechanism of delivering programme services over the Internet on demand and on a subscription basis. SaaS makes a difference and you have and oversee the computer program application and basic framework and handle any support (program updates and security patching).

FaaS (function as a service):

FaaS adds another layer of reflection to PaaS, protecting developers from anything in the stack underneath their code. Rather than dealing with the headaches of virtual servers, holders, and programme runtimes, they pass scarcely useful code and schedule it to be triggered by a specific event. FaaS applications expend no IaaS assets until an occasion happens, diminishing pay-per-use expenses.



Fig.4. Types of services

ISSUES IN CLOUD COMPUTING:

1. *Data Security concern*

When we address the security issues of cloud innovation, certain questions remain unanswered. The most significant cloud computing information security concerns include infection attacks and hacking of the client's location. Entrepreneurs should think about these issues before implementing cloud computing in their business. Since you're entrusting the firm's most sensitive private information, you need to make sure the cloud's protection and stability are up to standard.

2. *Selecting the perfect cloud set-up*

It's important to choose the best cloud tool for your business's needs. Public, private, and hybrid clouds are the three types of clouds. Picking the right cloud is the most mysterious aspect of good cloud use. If you don't choose the right cloud, you may have to deal with some significant dangers. Private clouds are used by a few corporations with a lot of data, while open clouds are used by most small businesses.

With half-breed clouds, a few businesses tend to take a more versatile approach. Choose a cloud infrastructure consulting service that is

thoughtful and straightforward regarding cloud use and data security.

3. *Real time monitoring requirements*

It is needed in some offices to track their infrastructure in real time. It is a prerequisite of their company that they continuously track and manage their inventory system. Banks and a few government departments must upgrade their systems in real time, but cloud service providers are unable to satisfy this demand. For cloud administrations providers, this is often a massive challenge.

4. *Reliability on new technology*

It could be a fact of human nature that we believe what we see in front of our eyes. Normally, business visionaries are reluctant to hand over hierarchical data to any unnamed profit provider. They assume that data stored in their office is more secure and easily accessible. They are concerned that by using cloud storage, they would lose control of their data. They believe their information is stolen and sent to an unknown third party. Since they don't know where the data is stored or handled, protection strings are incremented. These apprehensions of unknown benefit suppliers must be dealt with and dispelled in a friendly manner in order to form their minds.

5. *Dependency on service providers*

It is critical to simply obtain a merchant administration with sufficient infrastructural and skilled capacity for continuous administrations and appropriate functioning. An approved merchant who can conform to the security standards defined by your company's internal policies and government agencies. When choosing a benefit provider, you can carefully examine the benefit level ascension and obtain their

contracts, conditions, and recompense arrangements in the event of any blackout or bolt-in clauses.

Cultural obstacles

Tall business executives and an authoritative hierarchy have also been a significant impediment to the legal use of cloud computing. The best expert will never need to store the company's critical information anywhere they won't be able to monitor and access it. They have a lot of misinterpretations. They believe that cloud computing puts the organisation at risk by leaking vital subtle elements.



Fig.5. Cloud hacking

Because of their mentality, the company is in a state of uneasy equilibrium, making it more reluctant to move to the cloud.

8. Cost barrier

You must bear the high charges of transfer speed in order for cloud computing to function properly. Commerce can save money on equipment, but they should invest a lot of money on transfer speed. Taking a toll isn't a big problem for smaller applications, but it may be a major concern for larger and more complicated ones. It is extremely necessary to have sufficient transmission capacity when exchanging complex and serious information over the organiser. This is frequently a significant deterrent

for small companies, as it limits their ability to incorporate cloud innovation in their industry.

9. Lack of knowledge and expertise

Each company does not have enough details on how the cloud arrangements are carried out. They lack the necessary personnel and equipment to make effective use of cloud technology. Without the correct heading, delivering the data and deciding the correct cloud is very difficult. Educating your workers about cloud computing's techniques and tools can be a major undertaking in and of itself. Demanding that an organisation shift its activities to cloud-based technology without first collecting accurate data is analogous to demanding catastrophe. They will never use this technology for commercial purposes.

Current cloud-based deployment

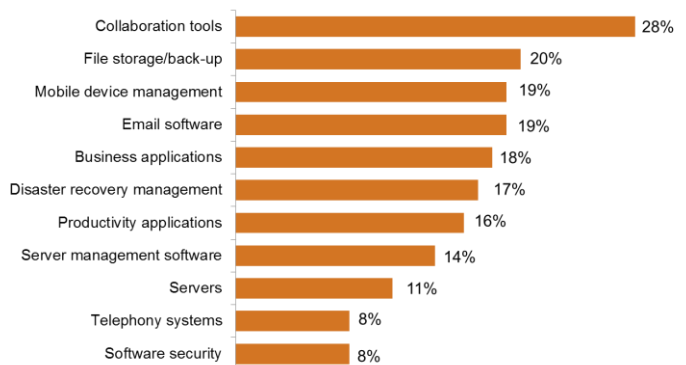


Fig.6. Cloud-based deployment

SOLUTION TO CLOUD SECURITY:

Rock-solid facilities:

Built-in reinforcements are now standard in the most traditional cloud application management arrangements. Look for a firm with strong, high-security data centres that employ sophisticated electronic reconnaissance and multifactor access control systems. The design of its natural systems often plays a role in minimizing the impact of any

administrative disturbances. Furthermore, a high degree of resiliency against a wide variety of disappointments, including common blunders, can be aided by exposure to various geographic areas and extensive repetition.

Protection from the bad guys:

The best suppliers secure the reinforcement data with robust preparation and security testing systems in addition to providing super-strong physical protection. Their mechanisms, on the whole, include basic security features including communicated dissent of benefit (DDoS) defence and secret word brute-force position.

Secure access and data transfer:

All data access and transfers take place over a secure HTTP connection protected by SSL.



Fig.7. Cloud security

One of a kind users :

You can monitor the degree of access by using the identity and access administration features.

Encrypted information storage :

Use the Progressed Encryption Standard (AES) 256 to encrypt the reinforcement data and items.

Security logs :

Detailed, wordy logs of all operations for all account clients.

Native Support :

MongoDB, MySQL, and Linux/Unix/Windows files are among the native backends for various stages and frameworks.

ADVANTAGES OF CLOUD COMPUTING:

1. Lower Costs
2. Availability 24 hours a day, 7 days a week
3. Capacity Flexibility
4. Functioning in all areas
5. Software Security Upgrades that are Automated
6. Collaboration with a Lower Carbon Footprint
7. Control Documents with Ease

CONCLUSION:

We've argued that protection and privacy are important factors to consider when preparing and implementing cloud administrations. Security problems and threats, as well as security measures and security administration models, were all explored in detail in this article - Security risks draw attention to potential security issues. - Cloud service providers (CSPs) may use a range of security models that are defined by security standards. The OVF arrangement, which ensures the creation of modern commerce models that allow businesses to sell a single item on-premises, on-demand, or in a crossbreed sending show, will be the most promising norm for a long time. Models for security administration make recommendations based on benchmarks and best practises in the field of security.

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