

A Review on Data Storage Security and Privacy Protection Issues in Cloud Computing

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ABSTRACT

Cloud computing is term which uses combine concept of “software-as-a-service”, “platform-as-a-service” and “infrastructure-as-a-service”, provide convenient and on-demand services to requested end users. Cloud computing has a potential to rapidly change the nature of Information and Communication Technology. Cloud Computing has many advantages as well as disadvantages. This paper provides introduction of cloud computing along with service models of cloud computing and various categories of cloud computing. This paper also provides analysis on data Storage security and privacy protection issues associated with cloud computing.

Keywords: Cloud Computing, Software-as-a-Service, Platform-as-a-Service, Infrastructure-as-a-Service, Private Cloud, Public Cloud, Hybrid Cloud

1. INTRODUCTION

Cloud Computing: “The cloud will change IT as nothing before it has” and that is because the cloud offers businesses the opportunity to do more things faster and better. Cloud is a large group of inter-connected computers, which is a major change in how we store information and run application [1]. Cloud computing is a shared pool of configurable computing resources, on-demand network access and provisioned by the service provider [1]. The advantage of cloud is cost savings. The prime disadvantage is security. To ensure security, cryptographic techniques cannot be directly adopted. Sometimes the cloud service provider may hide the data corruptions to maintain the reputation. The data which is placed on the cloud is accessible to everyone but security is not guaranteed. [2] Cloud computing is innovation that uses advanced computational power and improved storage capabilities. Cloud Computing is the combination of a technology, platform that provides hosting and storage service on the Internet [3]. Main goal of the cloud computing is to provide scalable and inexpensive on-demand computing infrastructures with good quality of service levels.[4][5] The most important one is that the customers don't need to buy the resource from a third party vendor, instead they can use the resource and pay for it as a service thus helping the customer to save time and money. Cloud is not only for Multinational companies but it's also being used by Small and medium enterprises.

2. CLOUD COMPUTING SERVICE MODELS

- **Software as a Service (SaaS).** The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.[6]
- **Platform as a Service (PaaS).** The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment.[6]
- **Infrastructure as a Service (IaaS).** The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).[6]

Private clouds

Private clouds are data center architectures owned by a single company that provides flexibility, scalability, provisioning, automation and monitoring. The goal of a private cloud is not sell “as-a-service” offerings to external customers but instead to gain the benefits of cloud architecture without giving up the control of maintaining your own data center.

Private clouds can be expensive with typically modest economies of scale. This is usually not an option for the average Small-to-Medium sized business and is most typically put to use by large enterprises. Private clouds are driven by concerns around security and compliance, and keeping assets within the firewall.

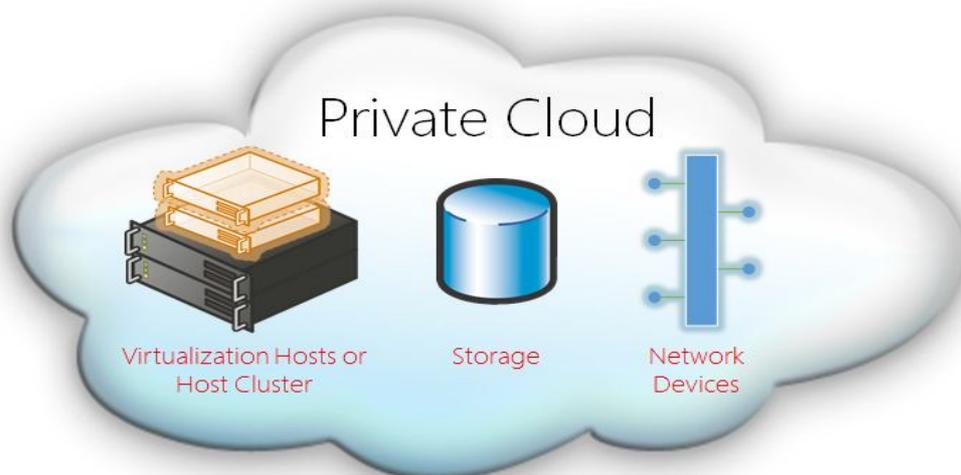


Figure 3: Private Cloud

Hybrid Clouds

By using a Hybrid approach, companies can maintain control of an internally managed private cloud while relying on the public cloud as needed. For instance during peak periods individual applications, or portions of applications can be migrated to the Public Cloud. This will also be beneficial during predictable outages: hurricane warnings, scheduled maintenance windows, rolling brown/blackouts.

The ability to maintain an off-premise disaster recovery site for most organizations is impossible due to cost. While there are lower cost solutions and alternatives the lower down the spectrum an organization gets, the capability to recover data quickly reduces. Cloud based Disaster Recovery (DR)/Business Continuity (BC) services allow organizations to contract failover out to a Managed Services Provider that maintains multi-tenant infrastructure for DR/BC, and specializes in getting business back online quickly.

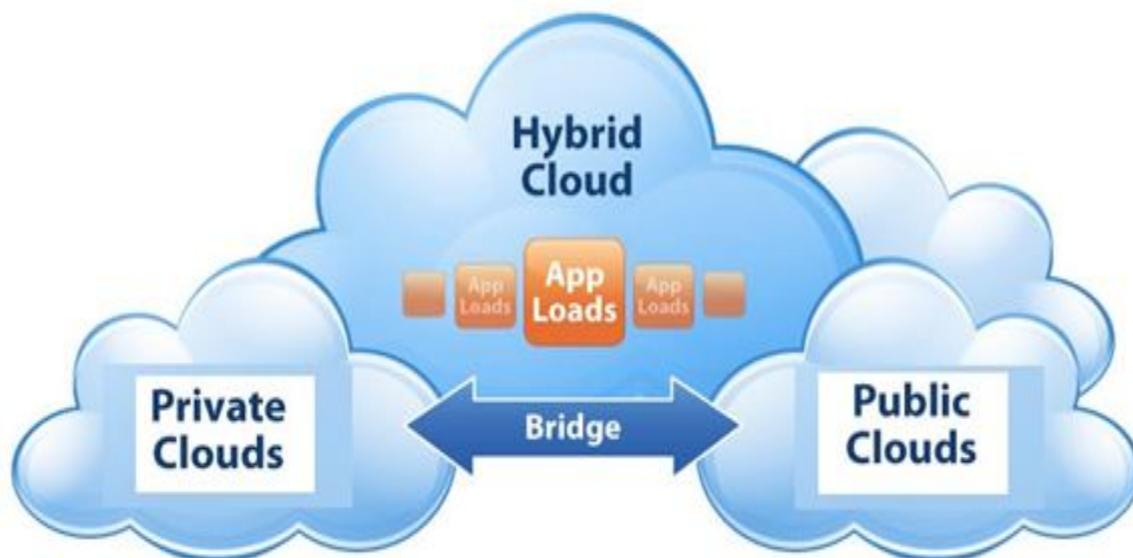


Figure 4: Hybrid Cloud

4. SECURITY ISSUES ON CLOUD

The cloud computing suffers from the lots of drawbacks such as:

- Data Storage Security
- Privacy Protection Issue
- Compliance Issues
- Funding
- Lack of Standardization
- Identity and Access Management
- Reliability and Continuity of Service
- Loss of Internal Control

From this we have mainly discuss first two issues in our review paper. Cloud have many drawbacks but Data Storage and privacy plays an important role in cloud computing.

1. Data Storage Security:

- Cloud data security is a major concern for the client while using the cloud services provided by the service provider.
- User can store any file or application on cloud and received the data from cloud. So there is a problem of Data Security.
- CSP can provide simply the space for storing the file and it doesn't have privilege to secure the content of file.

2. Privacy Protection Issue:

- User's files are not encrypted on some open source cloud storage systems so we can say privacy is not preserve.
- The storage service provider can easily access the user's files. This brings a big concern about user's privacy.
- The user has no supreme control over the software applications including secret data.
- User has to depend on the cloud service provider's action, maintenance and admin it.
- Cloud service providers have to assure about whom, when and what data is being accessed for what purpose. And many website or server had a security complaint regarding voice calls, reading emails and personal data etc.
- The loss of an endpoint access device or access to the device by an unauthorized user can cancel even the best security protocols in the cloud.
- Traditional service providers are subjected to external audits and security certifications. If a cloud service provider does not have these security audits, then it leads to a obvious decrease in customer trust.

5. CONCLUSION

Cloud Computing is an area full of challenges as well as paramount importance and many research problems such as Data storage Security and Privacy Protection issues are yet to be identified. Each storage server hasn't an encrypted file system which store user's data. The system doesn't ensures that the client's data is stored only on trusted storage servers and it cannot be accessed by administrators or intruders. This research paper provides review of cloud computing. This research paper also provides information regarding security issues such as Data Storage Security and Privacy Protection Issues in Cloud Computing.

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