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A Survey on Research Issues in Cloud Computing

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Abstract

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. Constructing IT services that use advanced computational power and improved storage capabilities[1]. Sales force, Amazon and Google are currently providing such services. Currently IT industry needs Cloud computing services to provide best opportunities to real world. Cloud computing is in initial stages, with many issues still to be addressed. The objective of this paper is to explore the different issues of cloud computing and identify important research opportunities in this increasingly important area.

Keywords: Cloud; B2C; Grid Computing; PAS; virtual computing.

1. Introduction

Cloud computing is a general term for anything that involves delivering hosted services over the Internet. These services are broadly divided into three categories. Infrastructure as a Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). The name cloud computing was inspired by the cloud symbol that's often used to represent the Internet in flow charts and diagrams.

2. Overview of Cloud Computing

The cloud is the resource that incorporates routers, firewalls, gateway, proxy and storage servers. The interaction among these entities needs to occur in a secure fashion.

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For this reason, the cloud, just like any data center, implements a boundary protection also known as the demilitarized zone (DMZ). The most sensitive information is stored behind the DMZ. Other policies that run in the cloud are resource priority and application partitioning. Resource priority allows processes or hardware requests in a higher priority queue to be serviced first. Application partitioning refers to the usage of one server or storage device for various clients that may have data encrypted differently. The cloud should have policies that divide the users' view of one application from the backend information storage. This may be solved by using virtualization, multiple processors or network adaptors [7]

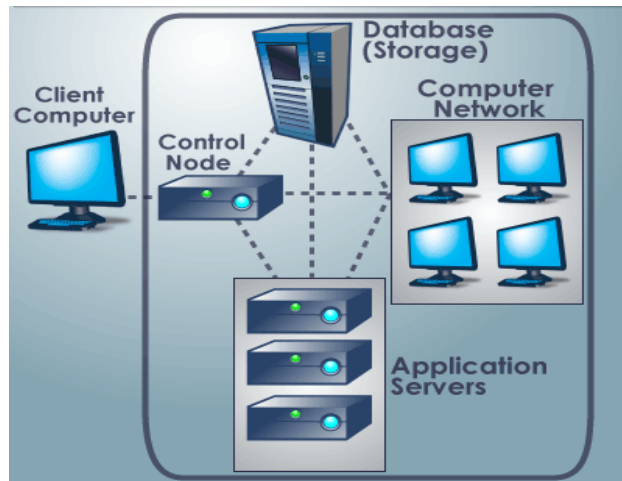


Fig. 1 Typical Cloud Computing System

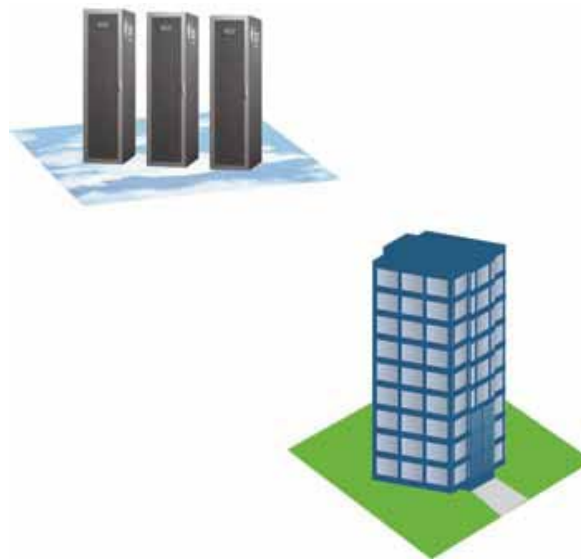


Fig. 2. A public cloud provides services to multiple customers,

3. Benefits of Cloud Computing

- *Reduced Cost*
Cloud technology is paid incrementally, saving organizations money.
- *Increased Storage*
Organizations can store more data than on private computer systems.
- *Highly Automated*
No longer do IT personnel need to worry about keeping software up to date?
- *Flexibility*
Cloud computing offers much more flexibility than past computing methods.
- *More Mobility*
Employees can access information wherever they are, rather than having to remain at their desks.
- *Allows IT to Shift Focus*
No longer having to worry about constant server updates and other computing issues, government organizations will be free to concentrate on innovation[2].

4. Challenges in Cloud Computing

- **Self-healing** - in case of application/network/data storage failure, there will always be a backup running without major delays, making the resource switch appear seamless to the user.
- **Multi-tenancy** - the cloud permits multiple clients to use the same hardware at the same time, without them knowing it, possibly causing conflicts of interest among customers.
- **Service-oriented** - cloud allows one client to use multiple applications in creating its own.
- **Virtualized** - applications are not hardware specific; various programs may run on one machine using virtualization or many machines may run one program.
- **Linearly scalable** - cloud should handle an increase in data processing linearly; if "n" times more users need a resource, the time to complete the request with "n" more resources should be roughly the same.
- **Data management**- distribution, partitioning, security and synchronization of data.
- **Cloud data ownership** - in the contract agreements it may state that the CP owns the data stored in the cloud computing environment. The CSP may demand for significant service fees for data to be returned to the enterprise when the cloud computing SLAs terminates.

5. Research Issues in Cloud Computing

5.1 Availability of Service

- More availability problem is Distributed Denial of Service (DDoS) attacks Attackers makes use of large botnet's to reduce the profits of SaaS providers by DDoS by making their services unavailable [4]

- A long botnet attack may be difficult to maintain, since the longer an attack lasts the easier it is to uncover and defend against, and on the same provide, these attacking bots could not be immediately re-used for other attacks.
- These attacks are shifts by cloud computing to the Utility Computing provider from the SaaS provider. In this, who can more willingly absorb it and it also maintains DDOS protection in this competency

5.2 Data Security

- confidentiality, for secure data transfer and access,
- auditability, whether applications security setting has been tampered or not.
- cryptographic protocols, unencrypted data in a local data center is not secure compare to the encrypted data in before place into cloud.
- Auditability can be achieved using remote attestation techniques and it could be added as an extra level away from of the virtualized guest Operating System, in one logical layer maintain some responsible software related to confidentiality and auditability.

5.3 Traffic Management

- There is tight coupling of application's use to network, computing, and storage resources then what is present in other settings. Currently, the work on measurement and analysis of data center traffic is very less.

5.4 Data Issues

- Cloud Computing users are more worried about increase in price, consistency problems, or even to providers leaving out of business. SaaS developers could take the advantage of deploying the services and data on multiple Cloud Computing providers so that failure of a single company does not affect the customer data [5].
- due to high workloads it is not easy to run extra tasks in private clouds compare to the public cloud
- The applications are moved across the boundaries of clouds may complicate data placement and transport. Cloud providers and users have to feel about to minimize costs on the concept of the traffic and the implications of placement at each level of the system

5.5 Performance Issues

- VM migration even though it is not straight forward. Initiating a migration lacks the facility to
- respond to unexpected workload changes and
- detecting workload hotspot. It should be transferred effectively in migrating process the workload in memory state. During the transfer it maintains consistency for applications by considering resources and physical servers.

5.6 Bugs in Large Scale System

- Removing errors in these large scale distributed systems. The debugging of these bugs have to be done at large scale in the production data centers as these bugs

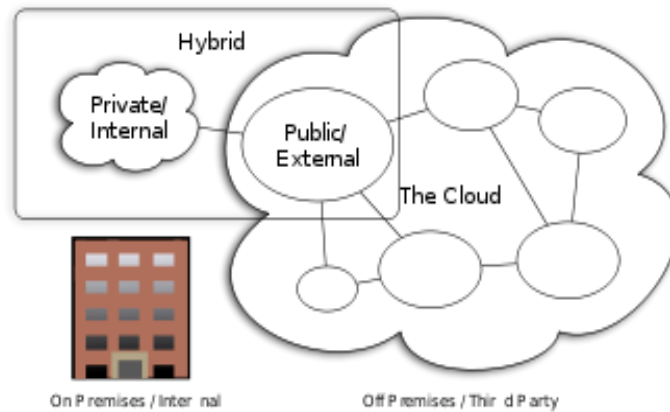


Fig. 3. Public Cloud System[6].

6. Conclusion

Cloud Computing emerged as a major technology to provide services over the Internet in easy way. Cloud computing is still, had excellent features and also have negative comments made on its possible implementation for a large-sized cloud solutions. However, the future looks less cloudy as far as a more people being attracted by the emerging area and can pursuing research to improve on its drawbacks. Some of the issues like security and data issues are very much required for the customers to use the services provided by the cloud. Other Issues are security, performance issues for the service providers to improve the services.

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