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REVIEW ON CHALLENGES OF CLOUD COMPUTING TECHNOLOGY

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ABSTRACT

Cloud technology gives a set of undeniable characteristics like no open investment, extremely scalable, easy to use, and reduces business risks and operating costs, which motivates business people towards the usage of the cloud for their business. On the other hand, a number of open challenges are there in terms of using or deploying the cloud architecture. In this article, some of the challenges of cloud computing technology were discussed.

Keywords: Cloud Computing, Challenges, Architecture, Software.

Introduction

Computing resources in a cloud computing architecture are centralized and scalable, and can be offered as services on demand. Like ISPs (Internet Service Providers), CSPs (Cloud service providers) offer cloud platforms for their customers to create their own web services on the internet. In general, CSPs offer three types of services, i.e., Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS). Organizations are moving toward IT solutions that include cloud computing for a variety of reasons, including the fact that they only have to pay for resources on a consumption basis [1]. Cloud computing has become a business necessity without managing the infrastructure. The cloud computing idea is being implemented in reality by companies like Microsoft, Amazon, Google, Yahoo!, and VMware. In the cloud, companies can rent computing power (virtual machines) or storage space (virtual space) dynamically, according to the needs of their business. This frees up developers and managers to focus on the business value. Clouds are the new trend in the evolution of distributed systems, the predecessor of clouds being the grid. The user does not require any special skill sets to control the infrastructure of clouds; it provides only abstraction. It can be

utilized as a service on the Internet with high scalability, higher throughput, quality of service, and high computing power. Cloud computing providers deliver common online business applications that are accessed from servers through web browsers [2].

Possible Challenges of Cloud Computing

More and more information on individuals and companies is placed in the cloud. Cloud computing provides dependable and secure data storage center. Challenges of cloud computing can summarize as follows:

a. Traffic Analysis and Management

Study of traffic in the network associated with the cloud plays a main role in terms of increasing the efficiency of the system in the data centers. Moreover, network operators have to know about the flow of traffic in the network for effective management and scheduling decisions. One of the conventional traffic management techniques for splitting the traffic on Ethernet is the Spanning Tree Protocol (STP). Identifying an acyclic path that connects all the nodes in the network is the major task of STP. Connections which form the cyclic paths are expelled by blocking the consequent switch ports. In order to get these features, Ethernet makes use of broadcast-based communication and packet flooding to find out the position of the host, which leads to the possibility of exceedingly unscalable

In addition, the protocol experiences various limitations [3], such as poor usage of the resource, inability to identify redundancy in the path of topology, no reliability in case of link crashes, etc. Smart traffic management in data centres turns out to be of extreme significance to attain improved load balancing and assurance of the quality of service. Scalable traffic management in data centre networks has also turned into a parameter of extreme significance [4].

b. Issues in Resource Allocation

Resource allocation on the server side plays a very important role to assess the performance of the application or service requested by the clients. Some of the issues to be considered in resource allocation are [5]:

- **Nature of the Workloads:** The number of requests for a particular server will vary depending on the demand and characteristics of the services. The amount of the workload on the server can be predictable or unpredictable at a point of time. Another parameter that is to be considered in terms of workload while allocating the resources is whether the requests made by the clients are homogenous or heterogeneous in nature and whether the processing of the request needs interaction with the clients or not.

- **Elasticity:** The requirement for resources may increase drastically in certain periods of time. The cloud must be able to detect the increase in demand for the resources automatically, and the allocation of available resources should be done in an optimal manner.

- **Reducing the Cost and Improving the Usage of the Resources:** The major intention of cloud technology is to give the services to clients at a low cost. Low costs can be achieved by monitoring the resource usage and allocating them to the services with an appropriate monitoring and allocation mechanism.

- **VM Migration:** Virtual machine migration is the technique used to balance the load of requests on servers. To allocate the resources in order to satisfy the load of requests, virtual machines can be changed from one server to another server. Efficient usage of the resources and responsive nature of the servers can be improved with VM migration. But the extra burden of migrating and managing the VMs is a challenging task.

- **Handling of Long Tasks:** If the task running time is more, resources are to be given for that task without any failure. Reliability of the resource plays a major role in this context.

- **Contention among the Resources:** In concurrent execution of the tasks, care must be taken to allocate the resources if the same resource is requested by more than one application at the same time.

- **Over Provisioning and Under Provisioning of the Resources:** Allocating more than the required number of resources or less than the required number of resources should not be done.

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c. Cloud Security and Reliability

One of the issues that are to be addressed in cloud technology is security as well as privacy. Organizations' private information should not be available and accessible by other organizations. Organizations providing cloud services must address security concerns. Clients just pay to these organisations when they are persuaded by security measures.

Another issue is privacy. Proper authentication techniques should be used when a user's data wants to be accessed from any system. With the help of authentication, users are able to use the data and applications appropriate to their requests.

d. Bandwidth

The main issue in cloud technology is the transmission capacity, or bandwidth. When a lot of users talk to the data centre at once, the system can slow down or even stop working if the right steps aren't taken.

Conclusion

Cloud computing is becoming a hugely attractive paradigm, especially for large enterprises. Cloud computing initiatives could affect enterprises within two to three years as they have the potential to significantly change IT.

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