

Impact of Latency on the Economics of Cloud Computing

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Abstract: Cloud Computing is one of the modern technology in which the research community has shown their interest. Here in this study paper, we have discussed about Latencies and what are the effects of latencies on the Cloud Computing environment. We have also discussed how to reduce the recovery time after a disaster occurs over the cloud platforms and advantages of the CloudSim. This study focuses on how to avoid long Latencies impact on the Cloud Computing platforms.

Keywords: Cloud Computing, Latencies, CloudSim.

I. INTRODUCTION

Cloud Computing is a collection of many traditional and new concepts in the several research areas like SOA(Service-Oriented Architectures), distributed computing, grid computing and virtualization. Cloud computing can be taken as a model that allows users to access the computing infrastructure temporarily, over the network. Cloud provider supplies it as service possibly at more than one abstraction.

Many businesses depends on a service called Disaster Recovery (DR) [9] to prevent either manmade or natural disaster from causing expensive service disturbance. Current DR services are very costly and provide very weak assurance about the amount of data lost or time required to restart services/operations after a failure occurs. Cloud computing platforms offers DR as a service at very low cost and by the use of automated virtual platforms it can also reduce the recovery time after a failure.

Cloud computing services are provided to the end users as a service, where they will pay according to their usage, for those applications who have complicated composition, configuration and deployment requirements. It is difficult to calculate the performance of cloud applications, workload models and resource models in a repeatable manner under different systems and user configuration. To overcome this problem, CloudSim has been introduced, it is a simulation toolkit that enables modeling and simulation of cloud computing system and application environment. It supports both system and behavior modeling of cloud system components like data centers, Virtual Machine (VM).

II. HOW TO REDUCE LONG LATENCIES

- The optimal energy efficiency for communication can be achieved from the [12] bulk data transfer. The computation unload needs very careful design in order to avoid long latencies into the user visible operations.
- To decrease the latencies in transferring the data from its storage to its processing site, the cloud providers have installed DaaS systems [10] close to the computational infrastructure.
- The “Pay-as-you-go” model of cloud computing platforms can reduce the cost of Disaster Recovery (DR), since different types of resources are needed before and after a failure occurs. Virtual Machine startup can be easily programmed which means the additional resources can be brought online fast as soon as failure is identify.
- Parallel batch processing allows user to gain a large amount of processing power [13] to examine terabytes of data in [14] very short period of time. Compute intensive desktop applications which can offload the data to the cloud, leaving only the processed data at the front end with the presence of network bandwidth will also reduce the latencies.

III. CLOUD DISASTER RECOVERY (DR) MECHANISM

Cloud computing has many useful features for Disaster recovery but still there are some more requirements that must be possessed by cloud environments to provide Disaster recovery (DR) as a cloud service.

A. Network Re-configuration

For business continuity, when an application is brought online in the backup site , cloud DR service must reconfigure [1] the network setup. When an application is accessed from public internet, different types of network reconfiguration are required like alter DNS or updating routes to switch traffic to the fail over site. To support all above features, the cloud computing platforms need better co-ordination with network service providers.

B. Security and Isolation

When an enterprise is prepared to fail over from private data centre to a cloud during a failure occurs it will require powerful warranty about the privacy of its storage, network and virtual machine resources. Cloud must assure that the performance of the cloud applications will be unaffected by the disaster or any other failure occurs.

C. Virtual Machine Migration and Cloning

Virtual machine migration simplifies the failback mechanism for taking an application to its original site after the failure occurs. The Remus system [11] has revealed that how virtual machine migration is useful in synchronizing both memory and disk state of a VM to a backup server. This also allows full system disaster recovery mechanism that allows complete transparent failover during failures. To support all this cloud must reveal some additional hypervisor services to their customers and migration approach must be developed for WAN environments.

IV. CLOUDSIM

It is a [4-6] generalized and expandable simulation system that allows modeling , simulation and experimentations of evolving cloud infrastructures and application services. Scientist and business based developers can also use CloudSim and can evaluate the performance of a newly developed application services which are easy to implement. Some of the advantages of the CloudSim are as follows:

- Time effectiveness : It requires very less amount of time to develop cloud based application tools test environment.
- Flexibility and applicability : In heterogeneous cloud platforms , developers can model & test their application service performance with very less development efforts and programming.
- To measure the accessories and service delivery strategy in a repeatable and controllable manner that to free of cost.
- It is a self-supporting environment for designing clouds, service dealer and allotment policies.
- Availability of virtualized engine that helps in creating and managing the multiple, independent virtualized services on data center.
- Flexible in switching between time and space shared allotments of processing fundamental to virtualized services.

V. CHALLENGES FOR CLOUD PROVIDERS

There are some aspects which need to be worked upon:

- The most important factor for the energy utilization of a wireless modem is the activity time of the interface. The latencies related with the activation and deactivation of a wireless modem interface changes by the change in technology and are lengthy in cellular communication in comparison with WLAN.
- It is necessary to place the primary and backup sites separated, but as the distance increases it also raise the cost of WAN bandwidth and will suffer long network latency.
- The greater latency in communication between the nodes is the problem in acquiring [2] scientific [3] application. Since, parallel scientific application were developed to work on tightly coupled nodes, but they need to be modified to allow the high communication latencies in the cloud platforms.
- Today, most of the cloud applications lack some of their functions. Cloud applications lack the availability of resources or QoS guarantees that some industries demand from their IT dealers. Like , other services rely on centrally located data, cloud services data are even lost by the hardware or software failure by the acts of natural or terrorist attacks.
- CloudSim : The real framework like [7-8] Amazon EC2 and Microsoft Azure used for measuring the application capability is limited toughness of the infrastructure. Hence it is very time taking to reconfigure the capabilities of the applications across a large scale cloud framework over many test runs.

VI. CONCLUSION

In this paper, a brief overview of cloud computing is discussed, there are many services offered by cloud platforms that has been used by many organisations. The cloud disaster recovery mechanism is also explained, it can be used at a very low cost and can reduce the recovery time after a failure occurs. In this paper, we have also discussed the methods of reducing the latencies and Cloudsim and its benefits. There are some challenges that need to be performed by the cloud providers in order to make it more useful and reliable.

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