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Benchmarking Service Availability for Cloud Computing

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Abstract: - Benchmarks have historically played a key role in guiding the progress of computer science systems research and development, But the areas such as availability have been neglected. For cloud computing, the areas such as availability are critically important.In this a new methodology to measure the availability by measuring the service availability is introduced.Service availability deals with the amount of services under process at an instant of time. Since we are measuring the amount of services under process and not whether the system is up or not, this will give a clear cut idea about the availability of cloud for the users.

Keywords: - *Availability,Cloud , Benchmarks.*

I. INTRODUCTION

Cloud computing is an emerging technology. It gets more attention when the major companies like google and Microsoft release the cloud based products and advertise the use of cloud. Cloud computing come to focus only when we think about what the IT has always wanted a way to increase capacity or add different capabilities to the current setting on the fly without investing in new infrastructure ,training new personnel or licensing new software. Here on the fly and without the investing or training becomes the keywords in current situation. Cloud computing offers better solution since it have lots of lots of compute power and storage capabilities residing in the distributed environment of the cloud. What cloud computing does is to harness the capabilities of these resources and make available these resources as single entity which can be changed to meet the current needs of the user.

In a survey undertaken by the International Data Corporation [2]group between 2008 and 2009, the majority of results point to employing Cloud computing as a low-cost viable option to users. The results of the survey shows that cloud computing is suited for individuals who are seeking a quick solution for startups such as developers or research projects and even e-commerce entrepreneurs.Using cloud computing one can decrease the IT budget to a bare minimum.cloud is suited for development and testing also. In cloud computing we need not have much capital. It can deliver a vast array of IT capabilities in real time using all resources such as hardware,software,virtual storage as we log on to cloud. The cloud computing facilities are given by various companies.This allows for cost saving whilst maintaining a secure degree of control within an organization.

The increase in demand of the cloud computing results in the increase in the number of cloud providers.Various cloud providers have different hardware and software configurations, which make the user doubtful to opt the highly available cloud.For this purpose its better to benchmark a cloud according to its availability.In this paper, we present our first steps towards that goal. We have chosen to focus initially on availability, and to begin by developing a general benchmarking methodology for measuring availability.

II. RELATED WORK

Benchmarking Availability by Aaron Brown and David A. Patterson describes a general methodology that can be used to measure and study the availability of arbitrary computer systems. In it availability is measured in terms of quality of service.It begin by establishing a standard definition of availability and the metrics that can be used to report it, then consider how to construct benchmarks that produce those metrics, and finally describe how the results of those benchmarks can be reported and analyzed.

III. BENCHMARKNG SERVICE AVAILABILITY

3.1 Availability Benchmark metrices

In this a different perspective of availability is calculated.Usually the availability of a system at a point of time uses a binary metrics. 1 when the system is up and 0 when the system is down.But for an architecture such as cloud this wont yeild a reliable result. Cloud environments are really service providers and so even if the cloud is up and it cannot provide the service it cannot be told that the cloud is available.

A spectral availability metrics is used to calculate the service availability of the cloud computing environment.Spectral availability metrics will have values that varies between 0 and 1. The value 0 stands for a system that is down , the value 1 stands for a system that is PERFECT and the values in between stands for the

system that is running in degrade states In this availability metrics the availability is not calculated at a pont of time, it is calculated as the simple average overall time.This will give a solid idea of how the system works .Combining these two requirements,its proposed that availability be measured by examining the variations in system quality of service metrics over time. The particular choice of quality of service metrics depends on the type of system being studied.

3.2 Benchmarking Availability

Having selected the availability metrics , the next step is to benchmark the service availabiltiy for a cloud.For benchmarking the cloud we do need a benchmarking environment. Bencharking environment that is created must be realistic , only then it could be useful.To create a realistic environment we would include realistic workloads that are used for the performance analysis. In this existing performance benchmarks to generate a representative workload for the type of system under test, and to measure the desired metrics at a single point in time. These workload-generating performance benchmarks should be adapted to run continuously, repeatedly measuring the desired metric. The system under test may also need to be modified to measure certain metrics.

Having created the benchamrking environment the service availability of system is measured.Measuring the service availability of the system is difficult task especially for the cloud environment. To calcuate service availability we have to calculate the ratio between the requests processing and the requests recieved at a point of time, which is a bit difficult.To process the user requests some of the cloud resources should be allocated to it.So we can redifine service availability as the ratio between the allocated resources and the requested resources. For Ra the allocated resource and Rr the requested resource availability is given by Availability=Ra/Rr

3.3 Analyse Service Availability Benchmark Results

The service availability benchmarking result in some raw data. So some standard techniques should be used to analyse the data.The simplest way is to plot it in a graph. The graph for analysis can be plotted by taking Time in the X-axis and Availability at that time in the Y-axis

IV. IMPLEMENTATION

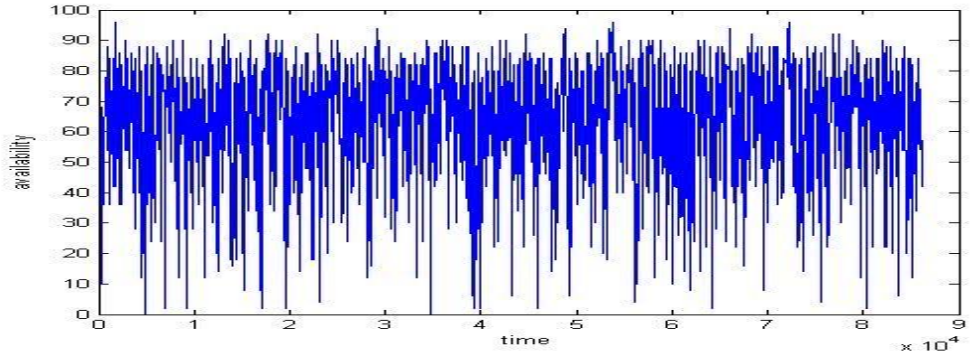
First of all for benchmarking the service availability we have to create a cloud environment. The cloud environment is created using the simulation toolkit CLOUDSIM. It is toolkit usid to simulate cloud environment for various research purposes.The CloudSim toolkit is written in java so that the cloud simulation can be done easily using the NetBeans IDE.Various predefined functions are provided to create the cloud environment.

To benchmark the service availability firstly its needed to create a benchmarking environment.The benchmarking environment is created by providing realistic workloads used for the performance analysis.Here the plantelab workloads are used to create the bench marking environment. Planetlab workloads are realistic workloads that create a realistic scenario for the cloud.

Now the availability of the cloud environment has to be measured. For measuring the service availability of the cloud we have to find the service availability at definte intervals. Here the interval given is 300 nano secs. So after every 300nano seconds the service availability of the cloud is calculated. Service availability is calculated as the ratio of allocated resources and the requested resources.

V. RESULTS

The Service availabiltiy benchmarking of cloud system with Static Threshold (THR) VM allocation policy and Random Selection (RS) VM selection policy was calculated and plotted.



This environment show an an average service availability of 58.8292%.

VI. CONCLUSION

While availability of cloud using traditional availability metrices are calculated then it would be very difficult understand the differnece between each cloud scenario.When we calculate the service availability it can be said that we get a clear cut distinction between various cloud environments. This may be helpful to rate each cloud environments and also to select the best cloud to serve the user.

It also have a limitation that when we are modifying for a real cloud environment, this availability do need administraive privillages and should be made to work in the host systems.More than the user, the cloud providers can find out the service availability and can make decision on the allocation policies,selection policies etc that have to be used for their cloud.

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