www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 3 Issue 7 month July, 2014 Page No. 7337-7340

Heuristic based optimization of users request in cloud computing

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Abstract: ***Cloud Computing is one of the best compliment to information technology. Traditionally if we see the size of an instance or CPU time we will often have to be satisfied with computing approximate solutions but in the case of cloud computing we have to move one step ahead in the form of virtual machines. In cloud computing there are a numerous problems are present while scheduling requests from users. However in practice there is a need to be solving the issue efficiently even if not optimal. In this paper we have tried to obtain the solution based on existing heuristic approaches. Simulation results see the effectiveness of the approach.***

Keywords: Heuristic, SLA, scheduling

1. Introduction

Cloud computing comes into focus only when you think about what IT always needs: a system to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software. Cloud computing encompasses any subscription-based or pay-per-use service that, in real time over the Internet, extends IT's existing capabilities. Cloud computing is at an early stage, with a motley crew of providers large and small delivering a slew of cloud-based services, from full-blown applications to storage services to spam filtering. Yes, utility-style infrastructure providers are part of the mix, but so are SaaS (software as a service) providers such as Salesforce.com [1]. In cloud computing there is a need for exact methods, which guarantee to give an optimum solution of the problem, heuristic methods is the option which only attempt to yield a good, but not necessarily optimum solution. Nevertheless, the time taken by an exact method to find an optimum solution to a difficult problem, if indeed such a method exists, is in a much greater order of magnitude than the heuristic one (sometimes taking so long that in many cases it is inapplicable). Resources and discovering resources is a major challenge in cloud computing [2]. Thus we often resort to heuristic methods to solve real optimization problems. The scheduling problems in cloud computing poses a major challenge and heuristic model can play major part in cloud computing.

2. Related Work

In [1] authors devise an algorithm that will keep the migration time minimum as well as minimizing the number of migrations. This will play a major role in avoiding the performance degradation encountered by a migrating VM. In [2] authors present a framework that ability to minimize the energy cost in the cloud and maintain preeminent Service Level Agreements (SLA). Lightweight approach is used to estimate the power usage of virtual machines at each geographical location. An algorithm Edmonds–Karp algorithm is used to find the shortest augmenting paths (latency).

In [3] authors determine the jobs, and presents an algorithm to generate query plan, whose worst case cost is bounded, based on a greedy approach to answer a SPARQL Protocol and RDF Query Language (SPARQL) query. Authors use Hadoop's MapReduce framework to answer the queries. Their results show that we can store large RDF graphs in Hadoop clusters built with cheap commodity class hardware. Furthermore, authors show that framework is scalable and efficient and can handle large amounts of RDF data, unlike traditional approaches.

In [4] propose a strategy that can handle the high workload at datacenter. And also shows the latency variation at different location. Presume workload and a lot according to latency variation.In [5] researchers rewrite well-known machine learning algorithms to take advantage of multicore machines by leveraging MapReduce programming paradigm. Another area where this technology is successfully being used is simulation.

In [6] group jobs according to MIPS, memory size and bandwidth of the resource. This model reduces the processing time of jobs, utilize grid resources sufficiently, network delay to schedule and execute jobs on the grid due to this study

presented and evaluation an extension from computational-communication to computational- communication-memory based grouping job scheduling strategy, but the algorithm doesn't parallel schedule resource. Scheduling framework for bandwidth aware job grouping-based scheduling in grid computing. In the next section we have discussed System model and then the simulation work is explained. After simulation work we have discussed future work and conclusion. In [7] proposed an improved cost-based scheduling algorithm for maximize their profit. Scheduling plan plays an important role in service providing. A priority based algorithm for scheduling virtual machines on physical hosts in cloud computing environment is proposed. A proposed algorithm is compare with FIFO algorithm.

3. System Model

In the figure 1 we can see that broker is using a pre-analyzer monitor which analyze the users requests and sent it to heuristic logic. The main reason why to use heuristic approach involve are:

1. The heuristic method is more flexible than the exact method, allowing, for example, the incorporation of conditions that are difficult to model.
2. The heuristic method is used as part of a global procedure that guarantees to find the optimum solution of a problem. A good heuristic algorithm should fulfill the following properties:
3. A solution can be obtained with reasonable computational effort.
4. The solution should be near optimal (with high probability).
5. The likelihood for obtaining a bad solution (far from optimal) should be low.

Therefore based on above steps we use following algorithm:

- Procedure RTW ()//scheduling algorithm of Broker
- If (Work_Submitted())//if there are a set of tasks to be submitted
- GetVmInfo()//get processing power and the bandwidth
- GetTaskInfo()//get information about tasks, including total number and size
- Build_Model(model)//calculate the available latency.
- A=Solve(model)//solve the model and obtain the optimized task allocation scheme A i.e. latency = total response time TRT – request uploading –processing time i.e. $_{i=1}\sum^{n}$ (latency)/ n where' n' is total number of requests
- End If
- While (Exist_Idle())//when there is a idle VM in virtual machine list vmlist
- vmi=GetNextIdle(vmlist)//get next idle virtual machine vmi from vmlist
- Ti=GetTaskNum(A)//get the number of tasks, Ti, allocated to vmi in A
- Bind(A, vmi)//bind Ti tasks to vmi
- SetLatency(A)// set latency used in task transmission End while
- Submit ()//concurrently send tasks with new requests
- End if

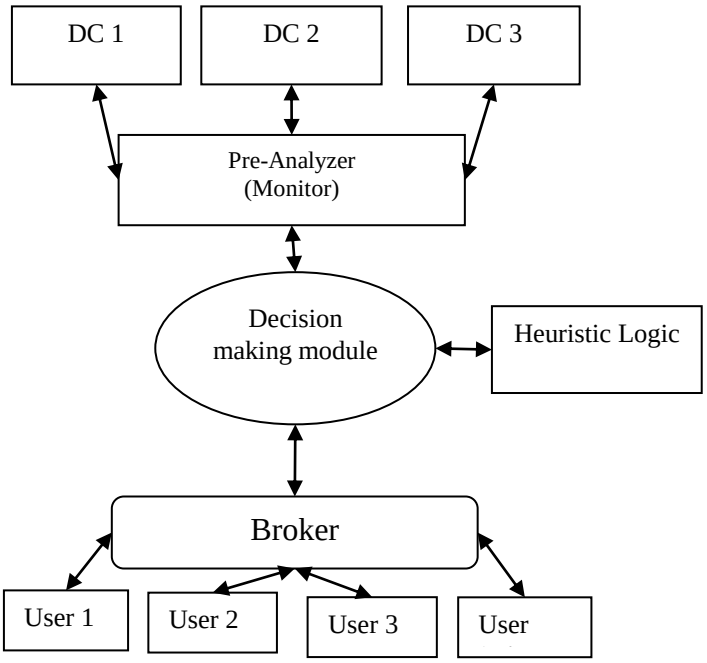

Figure 1: A hyper view of proposed scheme

Simulation Results:

We have implemented our algorithm using cloudsim as simulating tool. In the experimental setup we use following CloudSim 3.01 Configuration:
Scheduling Interval: 300
Job Length= Random Dynamic Workload
VM Types: 4 VM Ram: {880, 1730, 1740, 620}
VM Bandwidth: 100000 (100Mbits)
VM Storage Capacity: 2000 (2GB)
Host Types: HP Proliant ML110 G4 (1x [Xeon 3040 1860 MHz, 2 Cores], 4GB)
HP Proliant ML110 G5 (1x [Xeon 3075 2660 MHz, 2 Cores], 4GB)
Host MIPS= {1870, 2770} RAM= {4096, 4096}
Bandwidth= 1 000 000 (1 Gbit/s)
Storage Capacity= 1 000 000 (1 GB)
DATA CENTER CONFIGURATION
System Architecture= x86
OS= linux
VMM= Xen

To get the real time efficiency we carry out a series of experimental repetition and put a dynamic workload on the datacenters by implementing our algorithms. In the Figure 2 we have evaluated the queue and see the response time

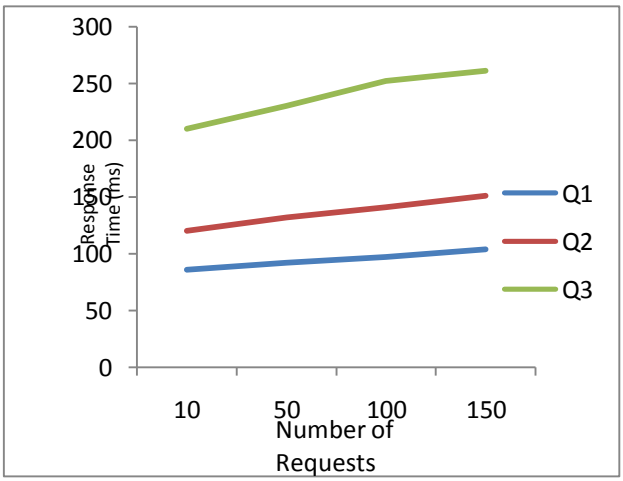

Figure 2: Response Time for Q1, Q2 and Q3

In the Figure 3 we can see the comparison of our proposed algorithm in which we have single hosts and 18 instances to [7]. In the results we can noticed that with the increase in time and workload

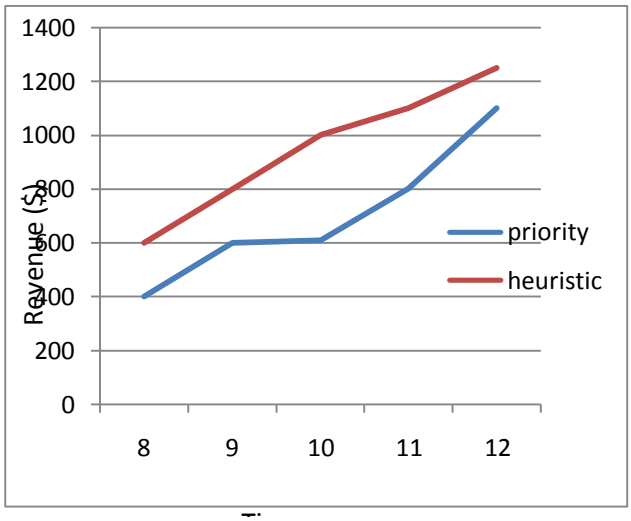

Figure 3: Revenue vs Time

In Figure 4 we can see the cumulative density function of our algorithms which shows the response time of our algorithm which shows less than 190 ms over 80% of requests are being handled by the algorithm.

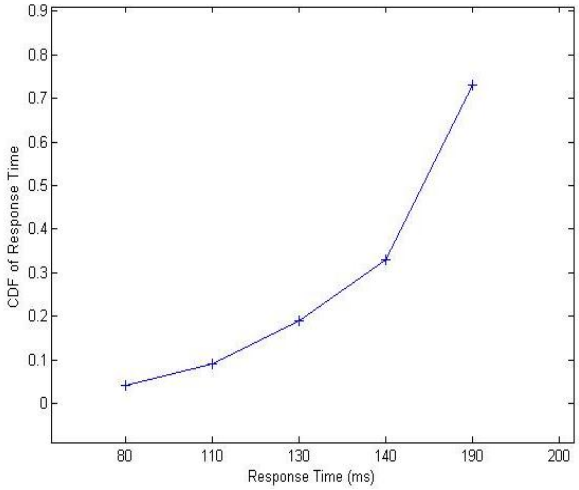

Figure 4: CDF of response time

Conclusion and Future Work:

In this work we try to apply the heuristic approach to cloud computing and see the revenue generation. Further we see the implication and response time and evaluated that the heuristic approaches can outperform

References:

[1] Mofolo, Suchithra in "Heuristic Based Resource Allocation Using Virtual Machine Migration: A Cloud Computing Perspective", International Refereed Journal of Engineering and Science (IRJES), ISSN (Online) 2319-183X.

[1] Kapoor.L, Bawa.S, Gupta.A, "Hierarchical Chord-Based Resource Discovery in Intercloud Environment", UCC '13 Proceedings of the 2013 IEEE/ACM 6th International Conference on Utility and Cloud Computing, pp: 464-469.

[2] SAHIL VASHIST**,** RAJWINDER SINGH, "ENERGY COST AND QOS BASED MANAGEMENT OF DATA CENTERS RESOURCES IN CLOUD COMPUTING", INTERNATIONAL JOURNAL OF COMPUTER SCIENCE & ENGINEERING TECHNOLOGY (IJCSET), ISSN : 2229-3345, VOL. 4, JUN 2013.

[3] C.T. CHU, S.K. KIM, Y.A. LIN, Y. YU, G. BRADSKI, A.Y. NG, AND K. OLUKOTUN, "MAP-REDUCE FOR MACHINE LEARNING ON MULTICORE," PROC. NEURAL INFORMATION PROCESSING SYSTEMS (NIPS), 2007.

[4] LOVENEESH SINGLA, SAHIL VASHIST IN "EFFICIENT WORKLOAD MANAGEMENT IN CLOUD COMPUTING", INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH, ISSN 2277-8179, VOLUME 3, MAY 2014.

[5] NG WAI KEAT, ANG TAN FONG, "SCHEDULING FRAMEWORK FOR BANDWIDTH-AWARE JOB GROUPING-BASED SCHEDULING IN GRID COMPUTING", MALAYSIAN

JOURNAL OF COMPUTER SCIENCE, VOL. 19, NO. 2, PP. 117-126, 2006.

[6] JING XIAO, ZHIYUAN WANG, "A PRIORITY BASED SCHEDULING STRATEGY FOR VIRTUAL MACHINE ALLOCATION IN CLOUD COMPUTING ENVIRONMENT", INTERNATIONAL CONFERENCE ON CLOUD COMPUTING AND SERVICE COMPUTING, 2012.

[7] JING XIAO, ZHIYUAN WANG, "A PRIORITY BASED SCHEDULING STRATEGY FOR VIRTUAL MACHINE ALLOCATION IN CLOUD COMPUTING ENVIRONMENT", INTERNATIONAL CONFERENCE ON CLOUD COMPUTING AND SERVICE COMPUTING, 2012.

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