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Research Article

Energy Efficient Task Scheduling Algorithms for Cloud Computing Data

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ABSTRACT
Cloud computing refers to Internet based development and utilization of computer technology, and hence, cloud computing can be described as a model of Internet-based computing. Scheduling is a critical problem in Cloud computing, because a cloud provider has to serve many users in Cloud computing system. So scheduling is the major issue in establishing Cloud computing systems. The main goal of scheduling is to maximize the resource utilization and minimize processing time of the tasks. In this thesis, an efficient task-grouping based approach has been proposed for task scheduling in computational cloud. Proposed work is grouping the tasks before resource allocation according to resource capacity to reduce the communication overhead. Cloud Resources are heterogeneous in nature, owned and managed by different organizations with different allocation policies. In our scheduling algorithm tasks are scheduled based on resources computational and communication capabilities. Here tasks are grouped together based on the chosen resources characteristics, to maximize resource utilization and minimize processing time and cost. Task scheduling is a decision process by which tasks are assigned to available resources to optimize various performance metrics. Hence in this thesis, we have specifically focused on improving computational cloud performance in terms of total processing time and total processing cost and reduce communication overhead. A simulation of proposed approach using CloudSim toolkit is conducted. Experimental results show proposed algorithm performs efficiently in computational cloud environment.

INTRODUCTION

This consists of cloud computing system, the evolution of cloud computing system, other technologies like grid and also discuss with characteristics of cloud, cloud computing services. The development of the cloud computing system goes stage by stage that includes the Grid computing, mobile computing, distributed computing. Cloud computing is first used in 1950s, during that time the mainframe system were available in the business field. The mainframe system was installed in a huge room and end users are accessing the mainframe system through terminals. In the year 1970, the IBM launches multi user Operating System having a number of virtual machines at a machine.

The Virtual machine Operating System has taken the application of sharing the access to a mainframe to a higher level by considering a number of virtual machines providing different accessible machines at single physical machines. The idea of cloud computing was first got by J.C.R Licklider and John Mc Carthy in 1969. The main goal behind this is everyone goes interconnected and thus able to access data

through anywhere. The useful data are stored in a data center, which is a huge data storage space. The processing of the request or data performed through servers. This availability and security of data will be inscribed. The service provider and the clients must have a consent each other for the usage. This is nothing but Service Level Agreement(SLA). Then in 1999, salesforce.com put this idea into an application. A Cloud computing based services of web launched by amazon in 2002. It is providing on demand services to the users those who are subscribed. We have so many definitions of the Cloud computing due to its popularity. Some definitions by well-known experts, scientists and organizations are: Cloud computing defined as a style of computing, where IT-enabled capabilities are supplied as a service to end users using the Internet.

Resource Allocation Technique

Certain scheduling policies like Global scheduling policy employs the various details of the device to distribute the work to the multiprocessor and it also regulates the performance of the system. An essential technique of resource allocation is listed and described below,

- Static Scheduling Algorithm
- Dynamic Scheduling Algorithm
- Heuristic Scheduling Algorithms
- Opportunistic Load Balancing
- Min-Min technique
- Max-Min technique

FCFS for parallel processing and is aiming at the resource with the smallest waiting queue time and is selected for the incoming task. The Cloud Sim toolkit supports First Come First Serve (FCFS) scheduling strategy for internal scheduling of jobs. Allocation of application-specific VMs to Hosts in a Cloud-based data center is the responsibility of the virtual machine provisioned component. The default policy implemented by the VM provisioned is a straightforward policy that allocates a VM to the Host in First-Come-First-Serve (FCFS) basis. The disadvantages of FCFS is that it is non preemptive. The shortest tasks which are at the back of the queue have to wait for the long task at the front to finish .Its turnaround and response is quite low

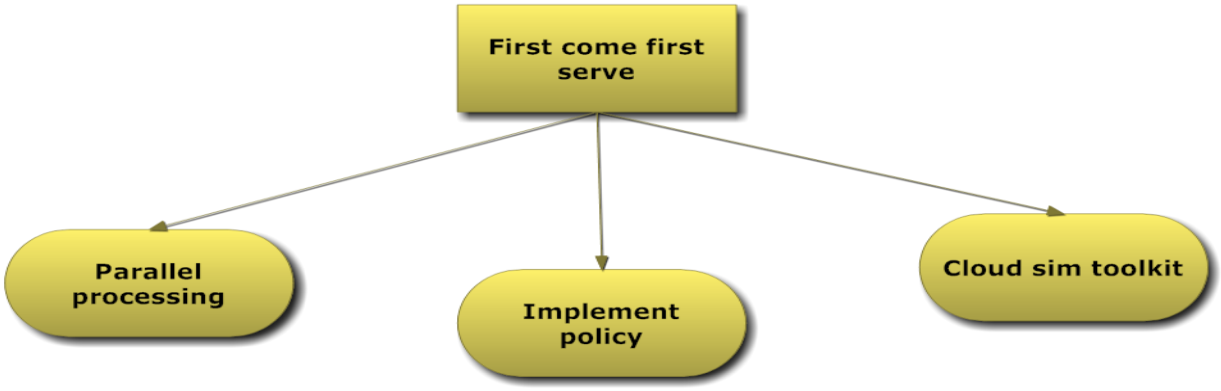


Fig 1 Round Robin Scheduling Round

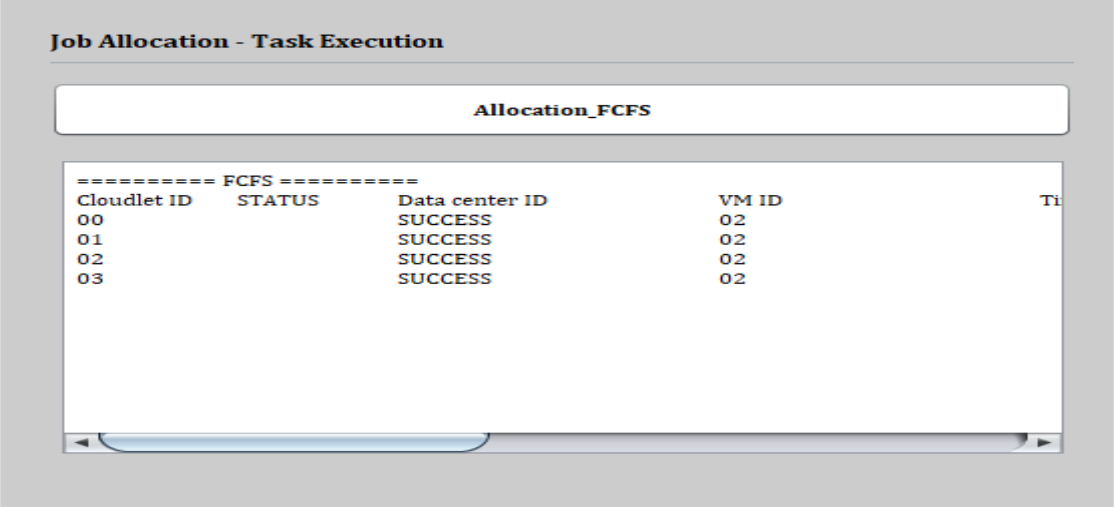
Robin (RR) algorithm focuses on the fairness. RR uses the ring as its queue to store jobs. Each job in a queue has the same execution time and it will be executed in turn. If a job can't be completed during its turn, it will be stored back to the queue waiting for the next turn. The advantage of RR algorithm is that each job will be executed in turn and they don't have to be waited for the previous one to get completed. But if the load is found to be heavy,

PROPOSED APPROACH AND RESULT DICUSSION

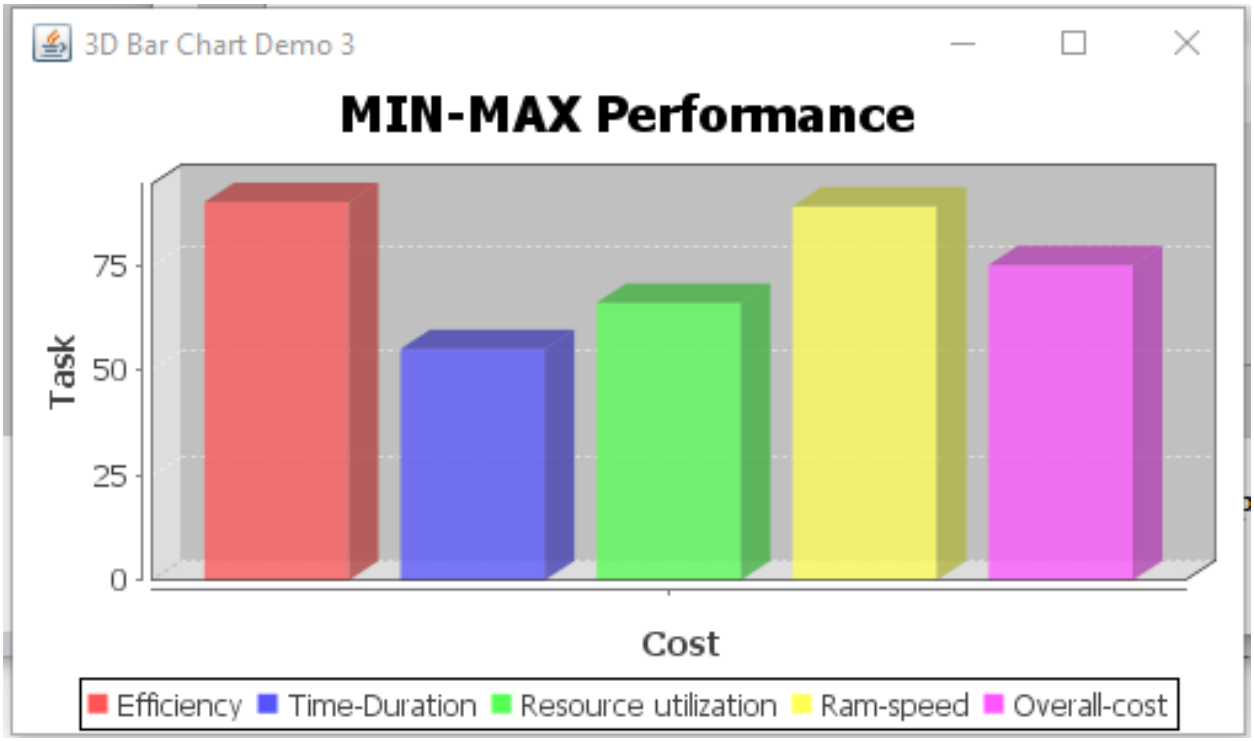
Propose a VM Placement aims to distribute the dynamic workload smoothly to all the hosts in the cloud to gain an improvement in both the utilization of Resources and the speed of execution time. It allocates the incoming tasks to all available VMs. In order to achieve balancing and avoid congestion, the proposed algorithm allocates tasks to the least loaded VM and prevents the allocation of tasks to a VM when the variation of this VM processing time from average processing time of all VMs becomes more than or equal to a threshold value. This leads to a reduction of the overall response time and the processing time of hosts .the system compares three algorithms Time Shared, Space shred and generalizes priority algorithm. Scheduling refers to the set of policies to control the order of work to be performed by a computer system. In proposed system, the system presents a MIN -MAX algorithm for efficient execution of task and comparison with FCFS and Round Robin Scheduling. The chief objective of IT Resource Allocator (ITRA) is to receive as many VM requests as probable while reducing network power ingesting. Each VM request has four parameters that represent maximum usage of CPU, RAM, disk, or bandwidth. When a new request appears, ITRA connects the lowest cost network path to each obtainable server and discards the server with insufficient or insufficient resources. At least one trail is available. Trail costs are calculated as the amount of electricity that the new network power consumes. More clearly, ITRA allocates network paths to minimize the increase in power consumption for network equipment.

Algorithm steps

- Step –1 Create VM to different Datacenter according to computational power of host/physical server in term of its cost processor, processing speed, memory and storage.
- Step-2 Allocate cloudlet length according to computational power.
- Step -3 Vm Load Balancer maintain an index table of Vms, presently vm has zero allocation.
- Step -4 Cloudlet bound according to the length and respective MIPS.
- Step -5 Highest length of cloudlet get highest MIPS of virtual machine.
- Step -6 Datacenter broker sends the request to the Vm identified with id Step -7 Update the available resource



-> Allocation using Min-Max



CONCLUSION

In this work, a dynamic allocation focused on power consumption was proposed for virtual machines, which took into account CPU, RAM, disk and bandwidth. We have implemented two strategies (namely BF and WF) and allocation strategies, and evaluated performance-based universal distributors and non-universal distributors. The number of accepted requests. The replication results show that, compared to the classic equivalent allocation, our work can be extended in the following directions: Trigger-based VM migration technology can be extended to include additional runtime to take support the management team in the actual VM migration. In commercial applications, reliable energy and resource planning virtual machines can be integrated with secure cloud systems. Time-limited transfer accounts can be used to design and test the schedule of computer systems lighting equipment. Energy optimization algorithms can be applied to mobile cloud computing to generate data in heterogeneous environments. In this article, we provide a power-conscious dynamic allocator for virtual machines that takes into account CPU, RAM, disk, and bandwidth.

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