A NOVEL APPROACH FOR IMPROVING RESOURCES IN ANGEL BASED SCHEDULING FOR REAL TIME TASKS IN CLOUD COMPUTING

P.Ponsekar,
Assistant Professor,
Department of Computer Science,
Kovai Kalaimagal College of Arts and Science,
Coimbatore, Tamilnadu ,India

D.Ramya,
MPhil Scholar,
Department of Computer Science,
Kovai Kalaimagal College of Arts and Science,
Coimbatore,Tamilnadu,India

Abstract: Cloud computing provides shared resources on demand. Resources utility can be increased or decreased as per demand. Cloud computing offer users to pay only for what they use and work load they use. Cloud computing mainly aims to cut down the cost by sharing the resources. Clouds are used in real time application like Gmail, Google Documents, Microsoft Sky Drive and Amazon Clouds, Drop box. Scheduling the work in cloud platform plays a vital role in real time applications. So we propose an agent-based work scheduling mechanism with Earliest Deadline First (EDF) scheduling algorithm in cloud computing. The mechanism is bidirectional announcement-bidding and it contains three phases namely basic matching phase, forward announcement-bidding phase and backward announcement-bidding phase. In proposed system there are two mechanism namely forward and backward announcement-bidding phases and heuristics for selecting contractors which is called as ANGEL. This paper combines with EDF scheduling for the better performance to produce time-consuming and process executions. In real world application deadline has to be strictly maintained otherwise the result will be useless.

Keywords: EDF, Cloud Computing, Angel, Task Scheduling, Data Centers, Virtual Machines.

I.INTRODUCTION

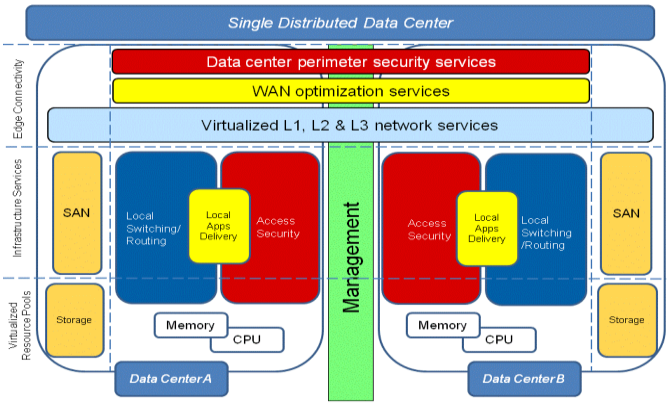
Cloud computing has the potential to dramatically change the landscape of the current IT industry. While there exist different interpretations and views on cloud computing, it is less disputable that being able to effectively exploit the computing resources in the clouds to provide computing service at different quality levels is essential to the success of cloud computing It gives users a variety of storage, networking and computing resources in the cloud computing environment via Internet, users put a lot of information and accesses a lot of computing power with the help of its own computer. According to R.Buyya that defines the cloud as " Cloud is a parallel and distributed computing system which basically consist of a collection of inter-connected and virtualized computers that are provisioned dynamically and presented as one or more than one unified computing resources based on service-level agreement (SLA) established through negotiation between the service providers of cloud and users [1]. Cloud computing is a large-scale distributed computing model, which depends on the economic size of the operator of cloud that is abstract, virtualized and dynamic. The main content of cloud computing is to manage computing power, storage, various kind of platforms and services which assigned to the external users on demand through the internet. Cloud computing is a rapidly emerging computation paradigm with the goal of freeing up users of cloud from the management of hardware, software, networks and data resources and shifting these burdens to cloud service providers[2]. Clouds provide a very large number of resources, including platforms for computation, data centers, storages, Networks, firewalls and software in form of services. At the same time it also provides the ways of managing these resources such that users of cloud can access them without facing any kind of performance related problems. Cloud Computing Services are divided into three classes, according to the abstraction level and the service model of providers, namely: (1) Infrastructure as a Service, (2) Platform as a Service, (3) Software as a Service. Distribution, virtualization and elasticity are the basic characteristics of cloud computing. Virtualization is one of the main features of cloud. Most of the software and hardware have provided support to virtualization. We can perform virtualization on many factors such as hardware, software, storage and operating system, and manage them in cloud platform.

II. RELATED WORK

Assignments of tasks and the time at which the tasks start to execute are determined a priori. They are usually developed for periodic tasks. Whereas the arrival time of a periodic task is not known a priori and with timing requirements, the tasks must be scheduled by dynamic scheduling strategies. The agent based scheduling algorithms can be classified into two categories, i.e., threshold-based algorithms and market-based algorithms. In the first category, scheduling algorithms are developed from the threshold model in insect colonies for example; price evaluated the adaptive nature inspired task allocation against decentralized multi-agent strategies. Graubner [1] suggested an energy efficient scheduling algorithm that was based on performing live migrations of virtual machines to save energy and the energy costs of live migrations including pre-processing and post processing phases were considered. Campos [2] investigated the dynamics scheduling and division of labours n social insects. Generally, the complexity of this kind of algorithms is high. Another category of agent-based scheduling algorithms derives from market-based mechanism, in which the contract net protocol(CNP)is the mostly used market-based mechanism where groups of individuals employ market-like approaches i.e., action to decide who realizes these goals with bids based on the individual's desire and the ability to finish their goals. Later, Owliya [3] proposed four agent based models for task allocation in manufacturing shop floor in which two of them employed the CNP.

III. MODELS AND PROBLEM FORMULATION

The essential concept of cloud computing system is task scheduling. This algorithm aims at reducing the make span of jobs with lowest resources capably. Scheduling algorithms depends on the type of task to be scheduled. The scheduling algorithm gives better executing efficiency and it maintains the load balancing of systems. The cloud efficiency is depends on the task scheduling algorithm. There are different types of task scheduling. Some are cloud service scheduling, user level scheduling, static and dynamic scheduling, heuristic scheduling, real time scheduling, work flow scheduling etc.



The existing system has a heterogeneity-aware framework that dynamically adjusts the number of machines to equalize between energy and delay of service. In agent-based scheduling, each agent can directly represent a physical object such as a machine, a task, and an operator. Agent-based scheduling algorithms allocate tasks with negotiation, has great advantages for dealing with dynamic tasks in virtual clouds.

To allocate real-time tasks and dynamically provision resources, the system proposes a novel agent-based scheduling mechanism and designs a bidirectional announcement-bidding mechanism based on an improved contract net protocol. And then develops an agent-based scheduling algorithm in virtualized clouds or ANGEL for independent, real-time tasks. This proposed system designed two selection strategies - M AX strategy and P strategy to determine the contractors and investigated a dynamic scaling up method used for our ANGEL to further enhance the schedulability. The agent-based scheduling algorithms can be classified into two categories, i.e., threshold-based algorithms and market-based algorithms.

IV. METHODOLOGY

In proposed system we designed a bidirectional announcement-bidding mechanism based on an improved contract net protocol. In this paper we developed an algorithm in virtualized clouds or ANGEL for independent. We design EDF Algorithm for job selection process. Scheduling algorithms classified into threshold-based algorithms and market-based algorithms. In threshold-based, scheduling algorithms are developed from the threshold model in insect colonies. In market-based mechanism the contract net protocol (CNP) is the mostly used market-based mechanisms where groups has to decide goals, with bids based on the individual's desire and the ability to finish their goals.

Computing the Blocking Time

To compute the blocking time for EDF + PI, we use the same algorithms as for FP + PI. In particular, the two fundamental theorems are still valid:

- Each task can be blocked only once per each resource, and only for the length of one critical section per each task.
- In case on non-nested critical sections, build a resource usage table
- At each row put a task, ordered by decreasing preemption levels
- At each column, put a resource
- In each cell, put the worst case duration £ij of any critical section of task Ti on resource Sj

The Algorithm for the Blocking Time for Task Ti is the Same:

- Select the rows below the i-th
- We must consider only those column on which it can be blocked (used by itself or by higher priority tasks)
- Select the maximum sum of the £k,j with the limitation of at most one £k,j for each k and for each j.

The Algorithm for Task Agent:

valueList ⟶ Θ
For each vjkA in Vi do
Task agent tiA sends the announcement information to vjkA;

fbijk ⟶ VM agent vjkA calculates the forward bidding value;
if fbijk ≥ 0 then
valueList.add(fbijk);
if valueList ≠ Θ then
Task agent ti selects a bidder vselect based on the values in valueList using the MAX/P strategy;
Else
vnew ⟶ scaleUpResources();

V. EXPERIMENTAL ANALYSIS

Assign a task block to the new task using malloc function. Calculate absolute deadline. Absolute deadline = system up time of the RCX + relative deadline. Traverse through the priority chain till current priority = priority of new task. If absolute deadline of new task < absolute deadline of first task add the new task to the top of the priority queue update the priority block to point to the new task. If absolute deadline of new task < absolute deadline of last task add the new task to the bottom of the priority queue. Traverse through the tasks under the priority. If absolute deadline of new task < absolute deadline of current task. Break add task above the current task.

To compute the blocking time for EDF + PI, we use the same algorithms as for FP + PI. In particular, the two fundamental theorems are still valid, each task can be blocked only once per each resource, and only for the length of one critical section per each task. In case on non-nested critical sections, build a resource usage table at each row put a task, ordered by decreasing preemption levels at each column, put a resource. In each cell, put the worst case duration £ij of any critical section of task Ti on resource Sj.

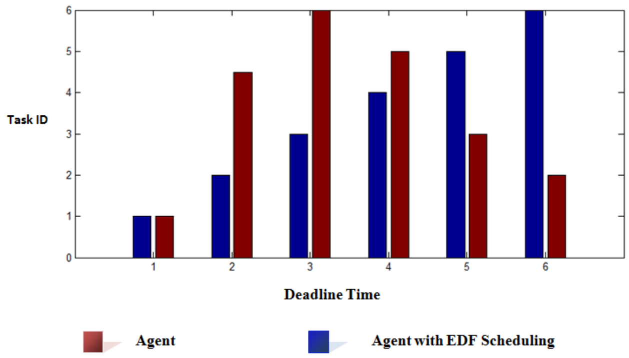


Figure : Evaluation Graph

The above graph shows the performance of the task with agent and agent with EDF scheduling. Existing system used a resource provisioning and Angel scheduling strategy for real-time workflow on IaaS cloud, in which the particle swarm optimization technique was employed to minimize the overall workflow execution within timing constraint.

Malawskiet al. presented several static and dynamic scheduling algorithms to enhance the guarantee ratio of real-time tasks while meeting QoS constraints such as budget and deadline. Besides, they took the variant of tasks' execution time into account to enhance the robustness of their methods. Goiriet al. proposed an energy efficient and multifaceted scheduling policy, modeling and managing a virtualized cloud, in which the allocation of VMs is based on multiple facets to optimize the provider's profit. Agent-based scheduling algorithms allocate tasks with negotiation, has great advantages for dealing with dynamic tasks in virtual clouds.

VI. CONCLUSION AND FUTURE WORK

Work Scheduling is the major task in Cloud Computing. The ANGEL employs a new bidirectional announcement-bidding mechanism, in which our contributions include designing the basic matching policy, forward announcement-bidding and backward announcement bidding, as well as their process flows. We have studies about various Scheduling algorithms which vitally schedules the work before the deadline time so the proposed EDF algorithm which prioritize the work which has shortest deadline. In future we will implement a new scheduling mechanism in which communication and dispatching times are taken into account. Then, we will integrate the scaling down policy with our ANGEL to improve the resource utilization. Finally, we plan to run our ANGEL in a real cloud environment. Future work will be focusing on decreasing the number of task migration and to add predictability. EDF Algorithm reduces complexity to their performance analysis. It also reduces time complexity. Further the algorithm can be implemented in mobile computing and in grid computing.

VII. REFERENCES

[1] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz, A. Konwinski,G. Lee, D. Patterson, A. Rabkin, and I. Stoica,(2010) 'A View of CloudComputing,' Communication the ACM, vol. 53, no. 4, pp. 50-58.

[2] A. Beloglazov, J. Abawajy, and R. Buyya,(2012) 'Energy-Aware Resource Allocation Heuristics for Efficient Management of Data Centers for CloudComputing,'Future Generation Comput. Syst., vol. 28, no. 5, pp. 755-768.

[3] L. F. Bittencourt, E. R. M. Madeira, and N. L. S. da Fonseca,(2012) 'Scheduling in Hybrid Clouds,' IEEE Communications Magazine, pp. 42-47.

[4] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, I. Brandic,(2009) 'Cloud Computing and Emerging IT Platforms: Vision, Hype, and Reality for Delivering Computing as the 5th Utility,'Future Generation Comput. Syst., vol. 57, no. 3, pp. 599-616.

[5] M. Dong, H. Li, K. Ota, and H. Zhu,(2014) 'HVSTO: Efficient Privacy Preserving Hybrid Storage in Cloud Data Center,' Proc. 3rd Workshop on Communications and Control for Smart Energy Systems (CCSES '14) - INFOCOM '14 Workshop pp. 529-534.

[6] H. M. Fard, R. Prodan, and T. Fahringer,(2013) 'A Truthful Dynamic Workflow Scheduling Mechanism for Commercial Multicloud Environments,' IEEETrans. Parallel and Distributed Systems, vol. 24, no. 6, pp. 1203-1212.

[7] L. He, D. Zou, Z. Zhang, C. Chen, H. Jin, and S. A. Jarvis,(2014) 'Developing Resource Consolidation Frameworks for Moldable Virtual Machines in Clouds,' Future Generation Comput. Syst., vol. 32, pp. 69-81.

[8] Jagbeer Singh, 'An Algorithm to Reduce the Time Complexity of Earliest Deadline First Scheduling Algorithm in Real-Time System,' Dept. of Computer Science and Engineering, Gandhi Institute of Engineering and Technology Gunupur, Rayagada (Orissa), India-765022.

[9] X. Liu, C. Wang, B. Zhou, J. Chen, T. Yang, and A. Y. Zomaya,
(2013) 'Priority-Based Consolidation of Parallel Workloads in the Cloud,' IEEE,Trans. Parallel and Distributed Systems, vol. 24, no. 9, pp. 1874-1883.

[10] Y. Mei, L. Liu, X. Pu, S. Sivathanu, and X. Dong,(2013) 'Performance Analysis of Network I/O Workload in Virtualized Data Centers,' IEEE Trans.Services Computing, vol. 6. no. 1.

[11] M. Mishra, A. Das, P. Kulkarni, and A. Sahoo,(2012) 'Dynamic Resource Management Using Virtual Machine Migrations,' IEEE Communications Magazine,pp34-40.

[12] K. Plankensteiner, R. Prodan, T. Fahringer, A. Kertesz, and P. Kacsuk,(2007) 'Fault-Tolerant Behavior in State-of-the-Art Grid Workflow Management Systems,' Technical Report TR-0091, Inst. On Grid Information, Resource and Workflow Monitoring Services, CoreGRID-Network of Excellence.

[13] X. Qin and H. Jiang,(2006) 'A Novel Fault-Tolerant Scheduling Algorithm for Precedence Constrained Tasks

in Real-Time Heterogeneous Systems,' Parallel Comput., vol. 32, no. 5, pp. 331-356.

[14] J. Rao, Y. Wei, J. Gong, and C. Xu,(2013) 'QoS Guarantees and Service Differentiation for Dynamic Cloud Applications,' IEEE Trans. Networkand Service Management, vol. 10, no. 1, pp. 43-55.

[15] B. Sotomayor, R. S. Montero, I. M. Liorente, and I. Foster,(2009) 'Virtual Infrastructure Management in Private and Hybrid Clouds,' IEEE Internet Computing, pp. 14-22.

