

A Survey in Scheduling For Real-Time Tasks on Virtualized Clouds

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Abstract: One of the current emerging trend is cloud computing. The achievement of cloud computing is the amount of rising level in case of real-time applications such as signal processing and weather forecasting. Temporarily, scheduling for real-time tasks is playing a vital role for a cloud provider to retain its QoS and enrich the system's performance. A mechanism include in novel agent-based scheduling in the environment of cloud computing is formulated to allocate real-time tasks and dynamically provision resources. On the basis of the bidirectional announcement-bidding mechanism, an agent-based dynamic scheduling algorithm named ANGEL is proposed for real-time, independent and periodic tasks in clouds. In this paper, I have discussed the concept about the scheduling process and have done a survey about the past.

Keywords: Real Time Task Scheduling, Novel Agent-Based Scheduling.

I. CLOUD COMPUTING

Cloud computing is one of the latest emerging technique. Cloud computing is of computing services over the internet. Nowadays cloud environment is used in most of the business organizations and educational institutions. The ultimate definition for the cloud computing has been developed by NIST was the cloud computing is a model for allowing convenient, on demand network access to a shared huge number of configurable resources such as networks, servers, storage, applications, and services that can be quickly provisioned and released with minimal management effort or service supplier communication. This cloud model encourages availability and is group of five essential features, three service models, and four deployment models. Cloud computing provides high quality and low-cost information services. It is a pay-per-use model in which guarantees are offered by the cloud service providers.

II. CHARACTERISTICS OF CLOUD COMPUTING

The following are the characteristics, in which the cloud computing include,

- On-demand self service
- Broad network admission
- Resource sharing
- Rapid elasticity and
- Measured facilities

III. SERVICE MODELS

Cloud computing provides various service models. They are

- Software as a service(SaaS) – Software on a single platform
- Platform as a service (PaaS) – Platform from where the software and data can be accessed.
- Infrastructure as a service (IaaS) – sharing of hardware resources for executing service.

IV. SCHEDULING

In cloud computing scheduling is the most prominent activity. Scheduling is one of the tasks performed to get maximum profit and to increase the efficiency of the work load of cloud computing. The main focus about the scheduling algorithm is to employ the resources properly while managing the load between the resources to get the minimum performance time.

There are numerous algorithms for scheduling in cloud computing. To gain high performance is the main advantage of scheduling. Examples of scheduling algorithms are Round-Robin, Min-Min, FCFS, Max-Min and Meta-heuristic algorithms etc.

V. TASK SCHEDULING

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.

VI. VIRTUALIZATION

Virtualization is a technique that creates abstract layer of system resources and it hides the complexity of hardware and software environment. Virtualization is usually implemented with hypervisor technology. With the help of virtualization we can take one server to be appearing as many. The common forms of virtualization are desktop virtualization, server virtualization, virtual networks, and virtual storage.

Hypervisor or virtual machine monitor (VMM) is software which runs on virtual machine. A hypervisor that runs one or more virtual machines is called as host machine.

This machine can be a server or a computer. In this each virtual machine is called as guest machine. Also the important paybacks on virtualization contain sharing of resources, encapsulation, isolation, hardware independence, portability.

VII. LITERATURE SUMMARY

A. Static scheduling algorithms

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.

Comparison Table

S. No	Paper Name With Author	Problem Reviewed	Methanoyl or Algorithm used to solve the problem	Benefits	Limitation	Conclusion	Future Work
1	A. Verma, S. Kaushal, "Deadline constraint heuristic based genetic algorithm for workflow scheduling in cloud"	Deadline of executing the tasks and budget	DBD-CTO algorithm	It lowers the cost of computation and completes task in given time boundary.	For scheduling small and medium size workflow, the result will be of similar graphs.	The simulation results show that the proposed algorithms have a promising performance as compared to SGA.	Need to be extended for real-time applications.
2	S. Selvarani, G.S. Sadhasivam, "Improved cost-based algorithm for task scheduling in cloud computing"	To schedule groups of task in cloud computing platform, where resources are having different resource costs and different computation performance	Improved Cost-Based Task Scheduling Algorithm	It measures resource cost as well as computation al performance also improves (computation /communication) ratio.	Increased the execution of tasks / transfer of data between tasks ratio by grouping various tasks during execution.	Result of his work shows that for this particular algorithm time taken to complete tasks after grouping of tasks is very less as compared to when grouping is not done.	Extend to handle more complex scenario involving dynamic factors such as dynamically changing cloud and other various QoS attributes.
3	S. Pandey, L. Wu, S. MayuraGuru,R. Buyya, "A particle swarm optimization-based heuristic for scheduling workflow applications in cloud computing environments"	Minimizing the total cost of executing the applications on resources that is provided by the cloud service providers	A PSO-based Heuristic for Scheduling Workflow Applications	It gives three times cost saving as compare to BRS and also balances the load on resources by distributing tasks to available resources.	Scheduling of tasks considers both computation cost and data transmission cost.	The heuristics that is propose d in this paper is as generic that it can be used for any number of tasks by increasing the particle dimensions and the resources number.	Extend to support scheduling workflows of real applications such as brain imaging analysis.
4	LizhengGuo, Guojin Shao, Shuguang Zhao, "Multi-Objective Task Assignment in Cloud Computing by Particle Swarm Optimization"	All the data of task to all resources in cloud computing environment makes the total cost and time of processing and communication to minimize.	Multi-Objective Task Assignment in Cloud Computing by Particle Swarm Optimization	Minimizing the total transferring time and the time of execution.	Not the one but includes processing and transferring time, processing and transferring cost as well.	This algorithm is efficient in decreasing all types of cost and time in cloud computing environment.	Need to be apply for real-time applications in which both the category are suited.

5	A. Verma, S. Kaushal, "Bi-Criteria Priority based Particle Swarm Optimization Workflow Scheduling Algorithm for Cloud"	Develops an approach for scheduling workflow tasks over the available resources of cloud.	Bi-Criteria Priority based Particle Swarm Optimization	It minimizes the execution cost while meeting the budget and deadline constraint.	The workflow tasks are executed in order of their priority which is basically computed using bottom level.	Experiment results shows that this algorithm has a promising performance when compared with PSO.	Can be extended by considering existing load of resources during mapping of task to a particular resource.
6	Chenhong Zhao, Shanshan Zhang, Qingfeng Liu, JianXie, Jicheng Hu, "Independent tasks scheduling based on Genetic Algorithm in Cloud Computing"	Scheduling tasks to adapt to memory constraints and request of high performance in cloud environment.	Independent Task Scheduling Based on GA	Consider resource and time utilization.	Tasks are a periodic, tasks are non-preemptive and Each task has two ways of access of a process unit i.e. shared and exclusive.	Both recourse and time utilization result that is obtained consists high satisfaction.	Work can be done in future for reducing the solution space in GA to make it more effective.
7	GAN Guo-ning, HUANG Ting-lei, GAO Shuai, "Genetic Simulated Annealing Algorithm for task scheduling based on Cloud Computing Environment"	The QoS requirements of different type of tasks, corresponding to the nature of tasks of user in cloud. i.e. the parameters dimensions are different and orders of magnitude are very different	Genetic Simulated Annealing Algorithm	Considers the QOS requirements of different user tasks.	Algorithm steps first execute steps of GA after then annealing comes which helps improving local search ability of GA.	This approach efficiently completes the searching of resources and allocation process in cloud computing.	Can be modified to support QoS parameters that having different dimensions and also having different orders of magnitude.
8	X. Kong, C. Lin, Y. Jiang, W. Yan, and X. Chu, "Efficient Dynamic Task Scheduling in Virtualized Data Centers with Fuzzy Prediction"	System virtualization provides low-cost, flexible and powerful executing environment for virtualized data centers, which plays an important role in the infrastructure of Cloud computing	fuzzy prediction method& A Non-line dynamic task scheduling algorithm named SALAF	Considering the availability and responsiveness performance, the general model of the task scheduling for virtual data centers is built and formulated	Efficiently improve the total availability of VDCs while maintaining good responsiveness performance.	This approach improve the total availability of the virtualized data center while providing good responsiveness performance.	The task scheduling various virtual data centers.
9	M. Owliya, M. Saadat, R. Anane, and M. Goharian, "A New Agents-Based Model for Dynamic Job Allocation in Manufacturing Shop floors"	Market-based mechanisms such as the contract net protocol (CNP) are very popular for dynamic job allocation in distributed manufacturing control and scheduling. The CNP can be deployed with different configurations of the system elements.	Ring-like model as a competitor for the web-like CNP-based job allocation.	A hybrid model whereby the two individual models will compete for specific performance indicators in any particular manufacturing scenario.	Both models competed closely in terms of manufacturing performance indicators, including time and cost,	The model is based on a ring topology of the resource Holon's, monitored by a supervisor Holon.	Work can be done in future, is to implement, when simulated and tested using the data from a real turbine manufacturing plant.
10	P. Graubner, M.Schmidt, and B.Freisleben, "Energy-efficient management of virtual machines in Eucalyptus"	An approach for improving the energy efficiency of infrastructure-as-a-service clouds is presented.	Map Reduce Applications (relocation algorithm)	Energy costs of live migrations including their pre- and post-processing phases are taken into account. VM live migrations has been added to the EUCALYPTUS Open-source CC system.	It is not possible to save any energy, the presented approach does not consume more energy than the original version of EUCALYPTUS	The results have indicated that energy savings of up to 16 percent can be achieved in a productive EUCALYPTUS environment.	Work can be done in future, would be desirable to gather additional information and change the instance and also initiates live migrations if it has the possibility to shut down an idle server.

B. Agent-based scheduling

Each agent can directly represent a physical object such as a machine, a task, and an operator. It has the ability to allocate tasks through negotiation, which brings great advantages for dealing with dynamically arrived tasks in distributed systems.

I. With this overall comparison the selected concepts are discussed in the future implementation task, they are

PAPER TITLE	METHODOLOGY
Agent-Based Scheduling For Real-Time Tasks in Virtualized Clouds	Real time problem and scheduling tasks are process in virtual cloud
Efficient Dynamic Task Scheduling in Virtualized Data Centers with Fuzzy Prediction	The availability of the virtualized data center while providing good responsiveness performance in the whole
Dynamic Scheduling and Division of Labour in Social Insects	Investigated the dynamic scheduling and division of labours in social insects.
Modeling Well Scheduling as a Virtual Enterprise with Intelligent Agents	Scheduling processes in oil and gas industry using the notion of virtual enterprise with intelligent agents.

VIII. CONCLUSION

The scheduling is one of the most important problems in cloud computing; always there is a chance of alteration of previously completed work in this particular field. During scheduling so many authors has considered various techniques and applied many constraints but as the cloud computing is too vast that they had not been able to capture all features at the same time but they mentioned some facts that there is a chance of modification of algorithms and which part has to be modified. So finally my work in future will be focused by giving importance for to improving the scheduling process.

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