

Angel-Agent Based Scheduling for Real Time Tasks in Virtualized Clouds

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ABSTRACT: The success of cloud computing makes an increasing number of real-time applications such as signal processing and weather forecasting run in the cloud. Meanwhile, scheduling for real-time tasks is playing an essential role for a cloud provider to maintain its quality of service and enhance the system's performance, for a given set of jobs the general scheduling problem asks for an order according to which the jobs are to be executed such that various constraints are satisfied. Typically, a job is characterized by its execution time, ready time, deadline and resource requirements. Specifically, the execution of a job cannot begin until the execution of all its predecessors is completed. In this paper, we devise a novel agent-based scheduling mechanism in cloud computing environment to allocate real-time tasks and dynamically provision resources. On the basis of the bidirectional announcement-bidding mechanism, we propose an agent-based dynamic scheduling algorithm named ANGEL for real-time, independent and a periodic tasks in clouds. Extensive experiments are conducted on Cloud Sim platform by injecting random synthetic workloads and the workloads from the last version of the Google cloud trace logs to evaluate the performance of our ANGEL. The experimental results indicate that ANGEL can efficiently solve the real-time task scheduling problem in virtualized clouds.

KEYWORDS: Agent-based scheduling, real-time, bidirectional announcement-bidding mechanism, virtualized cloud.

I. INTRODUCTION 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,

1. On-demand self service
2. Broad network admission
3. Resource sharing
4. Rapid elasticity and measured facilities

III. SERVICE MODELS

Cloud computing provides various service models. They are:

1. Software as a service (SaaS) – Software on a single platform
2. Platform as a service (PaaS) – Platform from where the software and data can be accessed.

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3. 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

1. 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.
2. 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.

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Table 1. Comparison Table

Sl No	Paper Name With Author	Problem Reviewed	Method 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 simulations 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 computational performance also improves (computation / communication) ratio	Increased the execution of tasks / transfer of data between tasks ratio by combining 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.	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 realtime applications in which both the category are suited
4.	M. Owliya, M. Saadat, R. Anane, and M. Goharian, "A New Agents-Based	Market-based mechanisms such as the contract net protocol (CNP) are very popular for dynamic job	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	Both models competed closely in terms of manufacturing -g performance indicators,	The model is based on a ring topology of the resource Holon's, monitored by a supervisor	Work can be done in future, is to implement, when simulated and tested using the

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	Model for Dynamic Job Allocation in Manufacturing Shop floors	allocation in distributed manufacturing control and scheduling. The CNP can be deployed with different configurations of the system elements.		performance indicators in any particular manufacturing scenario.	including time and cost,	Holon	data from a real turbine manufacturing plant.
5.	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 Application(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

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

Table 2 Comparison Table of Methodology

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 Centres 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
Modelling 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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