# Packet Scheduling in Cloud by Employing Genetic Algorithm

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**Abstract-** **The problem of packet scheduling is a single-hop multichannel system, with the goal of minimizing the average message waiting time. The problem of finding a schedule with minimum message waiting time is NP-complete, by means of polynomial time reduction of the time table design problem to our problem. We present also several heuristics that result in outcomes very close to the optimal ones. Resource scheduling strategies in cloud computing are used either to improve system operating efficiency, or to improve user satisfaction. This paper presents an integrated scheduling strategy considering both resources credibility and user satisfaction. It takes user satisfaction as objective function and resources credibility as a part of the user satisfaction, and realizes optimal scheduling by using genetic algorithm. We integrate this scheduling strategy into Agent subsequently and propose cloud computing system architecture based on Multi-agent. The numerical results show that this scheduling strategy improves not only the system operating efficiency, but also the user satisfaction.**

**Keywords – Cloud computing, resources credibility, customer satisfaction, resources scheduling, multi-agent**

## I. INTRODUCTION

Cloud computing system takes advantage of the tens of millions of idle computing resources on the Internet so that it can be more powerful than the centralized computing system. However, its resource scheduling faces challenges due to its massive resources, heterogeneous nature, and network communication delay. Scholars have put forward a series of scheduling strategies for the scheduling problems of Cloud Computing and distributed resources. Distributed resource scheduling strategy forecasting model based on ant colony algorithm to improve the dynamic and real-time performance of the distributed computing and real-time performance and effectiveness of resource scheduling. The communication portion of many parallel and distributed systems, as well as communication networks, or part of them, is formed by single-hop multichannel systems.

Packet scheduling problems arise in many different settings; so much work is present in literature. There are papers about the optimization of an objective function, with respect to a set of constraints on the physical communication medium, such as the number of channels, or precedence constraints on messages, or, in case of real-time traffic, the compliance of the deadlines. The simulation experiments show that the algorithm has good dynamic control ability. It can reduce processor load and improve the delay of task processing as needed and make use of system resources more rationally. It deduces the task assignment method under multi-node conditions, and then improves the load balancing algorithm based on fair indexes with this method. Induces a general model of load balancing scheduling on the basis of in-depth study of load balancing scheduling problem in distributed systems and conducts a detailed analysis of the various factors that affect load balancing.

Cloud computing and distributed resource scheduling, this paper presents an integrated cloud computing resources scheduling strategy considering both resources credibility and user satisfaction base on the Multi-agent Genetic Algorithm. Strategy deals with both user satisfaction and resources credibility in the objective function. It integrates resource credibility into the function of user satisfaction and takes user satisfaction as optimization objective.

## II. LITERATURE REVIEW

In this paper **[3]** Virtual Computer-Integrated Manufacturing (VCIM) has been proposed is developed by R. Marian et al. (2012) for one and a half decade with purpose of overcoming the limitation of traditional Computer-Integrated Manufacturing (CIM) as it only works within an enterprise. VCIM system is a promising solution for enterprises to survive in the globally competitive market because it can exploit effectively locally as well as globally distributed resources.

A Genetic Algorithm (GA) based approach for optimising resource scheduling in the VCIM system is proposed. Firstly, based on the latest concept of VCIM system, a class of resource scheduling problems in the system is modelled by using agent-based approach. Secondly, GA with new strategies of handling constraint, chromosome encoding, crossover and mutation is developed to search for optimal solution for the problem. Finally, a case study is given to demonstrate the robustness of the proposed approach.

In this paper **[5]** Grid computing is a collection of distributed resources interconnected by networks is designed by P. Singhal et al. (2012) to provide a unified virtual computing resource view to the user. Grid computing has one important responsibility of resource management and techniques to allow the user to make optimal use of the job completion time and achieving good throughput. It is a big deal to design the efficient scheduler and is implementation. In this paper, the constraint based job and resource scheduling algorithm has been proposed. The four constraints are taken into account for grouping the jobs, i.e. Resource memory, Job memory, Job MI and the fourth constraint L2 cache are considered.

It is smaller and extremely fast computer memory. The use of more constraint of the resource and job can increase the efficiency more. The work has been done in MATLAB using the parallel computing toolbox. All the constraints are calculated using different functions in MATLAB and are allocated to the resource based on it. The resource memory, Cache, job memory size and job MI are the key factors to group the jobs according to the available capability of the selected resource. The processing time is taken into account to analyze the feasibility of the algorithms.

In this Paper **[6]** Future Generation Computer System (FGCS) journal is designed by R. Rangan et al. (2010). This special issue compiles a number of excellent technical contributions that significantly advance the state-of-the-art in federated management of Grid and Cloud computing environments. Federated management of administratively distributed grids and clouds offers significant benefits including: (i) improving the ability of resource providers to meet SLA compliance [4] for clients and offer improved service by optimizing the service placement and throughput according to users' QoS needs; (ii) enhancing the peak-load handling and dynamic system expansion capacity of every Grid/Cloud domain through federation without the need for setting up a new software or hardware infrastructure in every location, and (iii) adapting to failures including natural disasters and regular system maintenance more gracefully as providers can transparently migrate their services to other domains in the federation, thus avoiding SLA violations and resulting penalties.

In this paper **[8]** one of the many definitions of "cloud" is that of an infrastructure-as-a-service (IaaS) is developed by B. Sotomayor et al. (2010) system, in which IT infrastructure is deployed in a provider's data center as virtual machines. With IaaS clouds' growing popularity, tools and technologies are emerging that can transform an organization's existing infrastructure into a private or hybrid cloud. OpenNebula is an open source, virtual infrastructure manager that deploys virtualized services on both a local pool of resources and external IaaS clouds. Haizea, a resource lease manager, can act as a scheduling back end for OpenNebula, providing features not found in other cloud software or virtualization-based data center management software.

In this Paper **[10]** in order to replace the traditional Internet software usage patterns and enterprise management mode, this paper proposes a new business calculation mode- cloud computing is developed by R.F. Sun et al. (2010), resources scheduling strategy is the key technology in cloud computing, Based on the study of cloud computing system structure and the mode of operation, The key research for cloud computing the process of the work scheduling and resource allocation problems based on ant colony algorithm , Detailed analysis and design of the specific implementation for cloud resources scheduling . And in CloudSim simulation environment and simulation experiments, the results show that the algorithm has better scheduling performance and load balance than general algorithm.

An ant colony algorithm for the basic model, detailed analysis and design of the cloud resource scheduling the concrete realization, And in the simulation software CloudSim simulation experiment, from the results we can see that, the algorithm for calculating node distribution and load balancing has good performance.

III. GENETIC ALGORITHM BASED RESOURCE SCHEDULER FOR DISTRIBUTED CLOUD COMPUTING ENVIRONMENT

The Existing method is application of scheduling in cloud resource sharing did not provide Efficiency and user satisfaction. MMWT problem in cloud system is trivial when messages have deadlines to be met. The Proposed Method of Plan to present a Genetic Algorithm based Resource Scheduler for distributed cloud computing environment to minimize message waiting time, resources efficiency, and user satisfaction.

Gene operators are used to evaluate message waiting time concurrently from different resources. Optimal resource scheduling provides autonomy, learning ability, and sociality. Genetic Algorithm based Resource Scheduler for Distributed Cloud Computing Environment is classified into three types. They are
  ➢ Distributed Cloud Data Sharing
  ➢ User and Resource Objective Function
  ➢ GA Resource Scheduler

*a. Distributed Cloud Data Sharing*

Distribute cloud computing system utilize more number of idle computing resources on the internet. To have better powerful than centralized computing system. Data sharing needs to address resource scheduling due to more number of resources, heterogeneous nature and message communication delay. Scheduling of resources assign jobs submitted by users to appropriate resources to meet the needs of users and maximize system operating benefits. Distributed cloud data sharing improve dynamic and real-time performance. Dynamic regulatory capacity of fixed processing nodes distributed systems is identified.
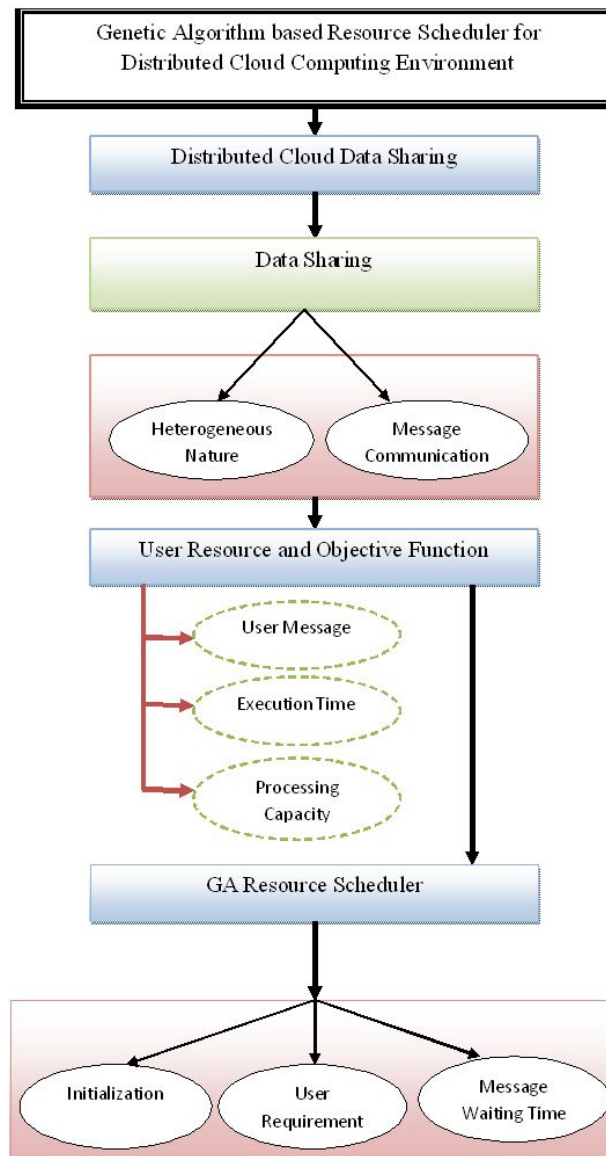
Figure 3.1 Architecture Diagram of Genetic Algorithm based Resource Scheduler for
Distributed Cloud Computing Environment

**b.** *User and Resource Objective Function*

Objective function evaluate user order values based on job dependencies adjusts jobs according to user order Values key jobs finished quickly with resource allotment. Evaluation of user job to resource requirement workflow execution time is done. Resource credibility of the objective function shows processing capacity and reliability of resources, waiting period of message. Resources with higher credibility are utilized, lower credibility are unlikely to be utilized. Load conditions of the resources get more balanced.

**c.** *GA Resource Scheduler*

Credibility of the resource is dynamic vary with performance utilization, online rate and success rate of completed jobs. Utilize resource credibility into GA scheduling strategy. Scheduling becomes dynamic change with resources variance. GA Resource Scheduling Strategy obtains global optimal solutions. GA scheduling algorithms comprises of user requirement gene encoding, cloud resource population initialization, gene operation on user requirement to resource and fitness assessment with optimality of message waiting time to accomplish the cloud data sharing.

IV.PERFORMANCE RESULTS AND DISCUSSION

Simulation experiments are carried out in the CloudSim environment based on the JACK agent language. CloudSim is simulation software of cloud computing which announced by Gridbus project in April 2009. CloudSim software framework consists of SimJava, GridSim, CloudSim, and UserCode. CloudSim is an extensible simulation toolkit that enables modeling and simulation of cloud computing systems and application provisioning environments.
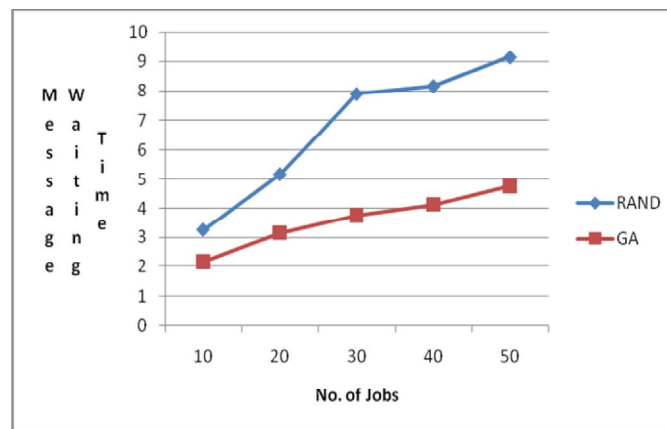


Figure 4.1 GA of Message Waiting Time

Figure 4.1 shows the efficiency for five values of traffic matrix sparsity: 0, 25, 50, and 75, 90 percent. Notice that for all the heuristics, efficiency decreases with very sparse traffic matrices. This happens because when the matrices are sparse it is most likely that the few nonzero entries are in competing positions, so the waiting times of some messages grow.

Figure 4.2 shows proposed method of GA is increase the value of Overall user satisfaction. It is increased the percentage of 10 to 15%. On the converse, when a matrix is totally filled, there is a greater number of scheduling possibilities and then competing entries can be placed in different switching matrices.
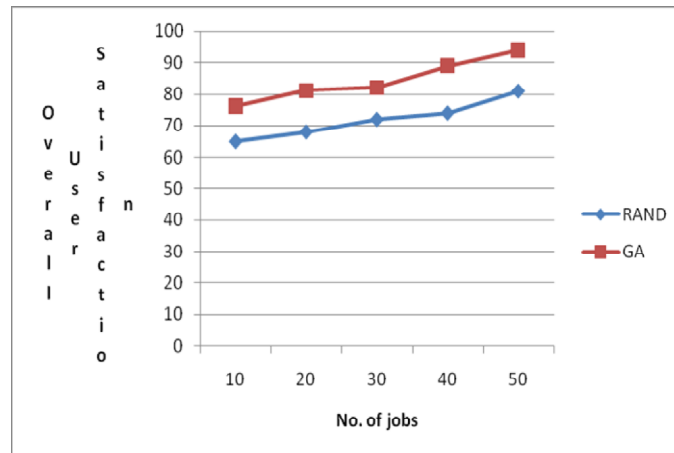
Figure 4.2 GA of Overall User Satisfaction

## V. CONCLUSION

An integrated assessment model considering both resource credibility and user satisfaction is established in this paper, and a resource scheduling strategy based on genetic algorithm is designed on the basis of this model. Then a cloud computing system resource scheduling architecture is proposed based on Multi-agent framework. The numerical results show that this system enhances user satisfaction and reduces the average job access time. The operating efficiency of the cloud computing system is finally improved.

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