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SLA AND IDLE SERVER MONITORING ALGORITHM WITH FEEDBACK IN QOS LOAD BALANCING

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ABSTRACT

The scheduling algorithm plays vital role in day-today life. The load balancer can map task to resource that based on some particular objectives. The main objectives of load balancing is resource utilization and task completion. Cluster formation is done based on properties and processing power of server and assign task to first phase. In First phase, Service Level Agreement (SLA) algorithm determines priority of tasks, cost estimation and assign task to the respective cluster to second phase. In second phase, the Idle-server monitoring algorithm applies to check server is idle or not and result is forwarded to third phase which check whether task is get processed or not and reassignment of task will be done and analyze the result. The main aim is to understand the processing power and number of tasks are going to be processed by server to maximize throughput. This paper shows that maximum throughput by introducing Quality-of-Service in cloud environment.

Keywords: *Cloud computing, Quality of Service, Load balancing scheduling techniques, Load balancing algorithm*

I. INTRODUCTION

The cloud load balancing is one type of load balancing method that is performed in cloud computing environment. Load balancing is process of distributing or dividing workloads across multiple computing system or resources. A load balancing reduces cost and maximizes availability of resources which is associated with document management systems. In order to suit user requirements, it uses a precise method to map the tasks to appropriate cloud resources, though by default maximum strategies are static in nature [6].

Whenever cluster formation is done then the cluster of server should be session-aware, so that any client connect to any cluster of servers at any time , the user gets unpredicted experience.[10] This is usually achieved with in-memory database or shared database. In distributed resources, scheduling problem is process that maps and manages the implementation of independent tasks. In order to meet the users specific need, process can provide appropriate resources to ensure that the workflow can be successfully completed.[6] Cloud Computing is state which gives proper and on-demand network access to shared pool of computing resources like network, storage, servers and services that are to be rapidly released with the efficient way in minimum management.[7]

At present, cloud computing is suffering from some challenges like security, QoS, Power Consumption and Load Balancing etc. Currently, as there is an increase in technology and consumer demands, there is excessive workload which calls for the need of the load balancer.[6] To balance the task properly the task should be get prioritize so that the tasks can be handled properly. The priority of task is depend upon the processing power of ant server or system. The processing power is calculated depend upon the hardware configuration such as input and output functionalities of system[6] [7].

The concept of balancing the load on the server on cloud has an important effect on performance. [10] The uneven distribution of load among the servers result in server overloading and may lead to crashing of servers. This degrades the performance of server. Load balancing is technique that distributes the load equally among the servers which avoid the overloading of server, server crashes and performance degrades. Load Balancing is an important factor that good response time, effective resource utilization. Thus the effective load balancing is needed.[6][10]

II. RELATED WORK

This section describes the related work of Qo Sscheduling algorithm[6] in cloud environment. The main challenge of cloud computing is distribution of work load in well balanced manner. So the distribution should be done among the different nodes so that resources should be properly utilized. To optimize this problem, good load balancer

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should be used [1].In distributed work flow, the process that can provide the appropriate resources to ensure that the work flow can be successfully completed in order to meet users need. In other words the work flow scheduling algorithms are work flow instances of system instances by relevant rules and relational allocation of idle system resources so that the workflow can be easily implemented. The scheduling algorithms mainly have two types as: Market driven algorithm[6][9]and Performance driven algorithm[6][9].

The Performance Driven algorithm can optimize the performance of system without considering the cost and map the workflow tasks to resources according to policies. There are two representative algorithmsofPerformancedrivenalgorithmas: HeterogeneousEarliest Finish Time algorithm [6] and throughput maximizingstrategy[6]. TheMarket Driven scheduling algorithms manage resource allocationof any task and itconsiders thecost.Therepresentative algorithms areBacktracking[5][9], Generic Algorithm[2][9],LOSSand GAIN algorithm [3][9],Deadlineallocation algorithm(Deadline DistributionAlgorithm)[4][9]and QoS based deadline allocationschedulingalgorithm [6].

As we know the cloud has greatlysimplified capacity provisioningprocess, itposes several challenges in the area of Quality-of Service (QoS) management. Quality of Service demoted the performance level, reliability and availabilityoffered by infrastructure and application[9].

The cloud computing is technique where groupofserversaredistributed indata center that allows centralized data storage and online access to computingresourcesor services. Astherequest enters, ithastobe distributed equallyamongthe serversother- wiseresultsinserver overloading,performance degrades and noteffectiveutilizationofre- sources.[9] Effective load balancingtechnique improvesresponsetime ofthe task aswell as utilizes the resourceseffectively.

Backtracking

Backtracking[9]isgeneralalgorithmthat finds all the solutionto somecomputationalproblem, notablyconstraintssatisfaction problems, whichincrementallybuilds candidates (backtracks) to the solutions and it determines that candidate cannot possiblybecompleted tovalid solutions. Backtrackingcanbeapplied fordifferent problemsthat admit theconcept ofpartial candidatesolutionandrelativelyquick test ofwhetheritcan possiblybecompletedtovalid solutions.Backtracking[5]isimportantmethod forsolving problems suchthatcrosswords, Sudokuand many other puzzles.It ismost popular and convenienttechniqueforparsing. Butwhen the problemislarge then itisvery difficult to backtrack each problem to find solutionand sometimesitbecomes very time consuming job so the backtracking is not efficient forlarge problems.[5]

Disadvantages isthat ifdata islarge then itisvery difficult tobacktrackeachproblem tofind solutionand sothis process istoo time consumingand not reliable.

Generic Algorithms

By applying the principle of evolution, genetic algorithm provide robust search technique that allows a high-quality solution to be derived from a large space in given polynomial time. The Genetic Algorithm [2][9] always combines the exploitation of the best solutions from the past searches with the exploration of new regions of the solution space and solution of any problem in search space can be represented by individuals. So this algorithm is very popular. The fitness function in population determines the quality of individuals.

Disadvantages of this scheduling algorithm is complex and time consuming so it is not reliable.

QDASchedulingAlgorithm

AQoS-based Deadline Allocation Algorithm[6];QDA in short, considerscloud computing environment and thecharacteristics of workflow. The QDA algorithm [6] refersthemain sub-deadlineallocation criteria ofComprisedTime Cost SchedulingAlgorithm. The CTC algorithm [4] uses QoS utility functionvalue asa service resourceselection conditionand it takes userperformanceinto account.

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QDA algorithm[6]takes set of work instancesoftask as input,performthe scheduling and generateoutput as instance set. Firstcheck whetherany uncompletedtask is present if yes then get first priority of executionand ifno then the main task isget dividedinto some instancesand dependupon performance evaluation techniques predict theExpectedExecution Time[6]ofvarious instances executing in each resource node and also calculate averageexecutiontime for differenttasks.

Afterallthiscalculation, The QDA algorithm[6]then assumetheexecutionoftask isdone asStream-mode, inthiseachtaskisget executedin FIFO manner.Dependuponthis Utility functionisget derivedby considering the utility functions and the candidate set is created in ascending order. The allocationof allsub-tasks toitscorrespondingserviceresourcesisdone andoneroundschedulingis executed.

III. PROPOSED SYSTEM

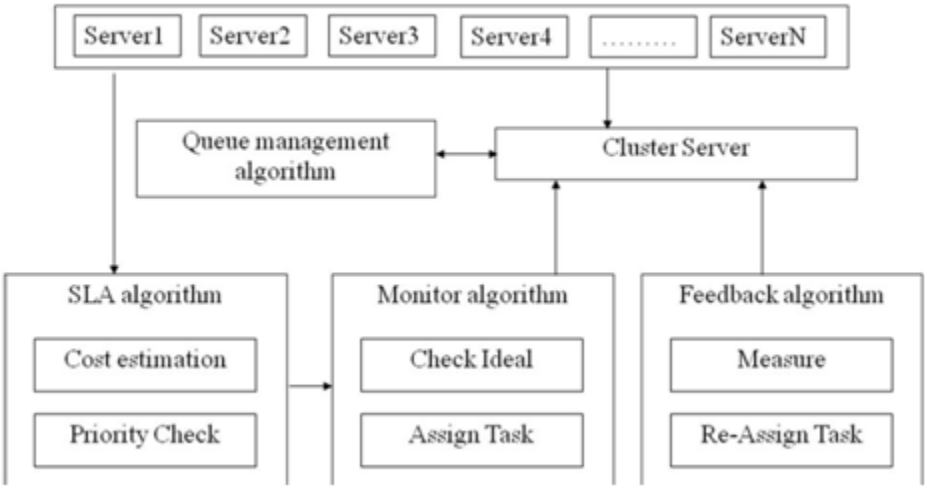

Figure 1. Architecture

Based onaboved i s c u s s i o n , the algorithms arehaving somedisadvantages. Thebacktrackingalgorithmisnotefficientand the generic algorithmisnot reliable means it iscomplex and timeconsuming scheduling algorithmand the QoS schedulingalgorithm proposedinthis papertoovercome them. Currently,due totheincreasedusage ofcloud, there i s atremendousincrease i n workload.

Theunevendistributionofloadamong the s e r v e r s resultsin servero v e r l o a d i n g and may lead to the server crash. This affects theperformance. Cloud computingservice providerscan a t t r a c t the c u s t o m e r s and maximizetheir p r o f i t b y providing Qualityof Service (QoS). Providingboth Q o S andl o a d balancing amongtheserversarethemost challengingresearchissues.

Hence, in this paper, the framework is designed to offer both QoS and balancing the load among the s e r v e r s in cloud. This paperproposes t h r e e algorithms. First of a l l , the serverswith d i f f e r e n t processing powerare groupedtogether and formsdifferentclusters. In the first stage, Service Level Agreement (SLA)based scheduling algorithmdetermines the priorityofthe tasks and assigns the tasks to the respectivecluster. In the second stage, the Idle-ServerMonitoringalgorithmbalances theload amongtheservers withineachcluster and inthird stage itmeasuresany incomplete task is presentinto queueor not. If presentthen t h i s taskisgetprocessed.

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The proposed architectureprovides better responsetime,waiting time,effectivere- source utilizationand balanceloadamong the server ascomparetoother existingalgorithm.

SLA based Scheduling Algorithm

In Service Level Agreement Algorithm, as per the priority of task, scheduling is done means whatever the input is accepted form user get executed in priority manner. The highest priority will get first chance. For computing the priority of task the some factors to be get considered as deadline, cast and task length.

Idle Server Monitoring Algorithm

The Idle ServerMonitoringAlgorithm run withineachcluster tomonitorserversand it checksany idle server in cluster. If thisalgorithmfoundanyidleseverintoclusterthen it assign tasktothatidentifiedserver. Ifthis algorithmdoes not foundany idle server thenthetaskisput intotheQueueand maintainthe status.

Feedback Algorithm

The Feedback Algorithmperform monitoringof taskandreassignmentof tasktoserver. Frmonitoringthe task itwill check queue continuously, if task is present into queuethen cluster formationshouldbe done to check the priority of task and as per thepriioritythetaskgetdistributed asper processingpower. Then thisalgorithmchecksforidleserver intoparticulatecluster. Iffound then taskgetexecutedsuccessfully.

IV. RESULT

Thissection describesthe performanceofpro- posedalgorithm.This modeluses twostage Implementation. Theeffectivenessofproposed model is evaluatedunderthe differentloads and itsresult iscomparedwith existingalgorithm suchasRoundRobinand QDAscheduling algorithm.The three matrix as responsetime, waitingtime andresourceutilizationis consideredasperformancemeasures.

V. CONCLUSION AND FUTURE SCOPE

In cloudcomputing environment, loadbalancingand schedulingare very wideconcepts. In this paper weare specifically focusedon loadbalancing. Duringload balancing there are various techniques and constraintsareappliesbut ascloud computing is too vast all aspects are not being able to capture atasametime. The proposed load balancing methodis based on Idle-ServerMonitoring algorithm, ServiceLevelAgreement algorithmandFeedback algorithm which optimizesphysical resources and remove conflicts. And hence improves the outputofthe system.Bycombiningthese differentparametersanefficientloadbalancing schedulingalgorithm can be obtainedwhich can improve the overall performance of the cloud services.

In future,we are going to incorporatethis into each serversinto cluster cloud computing architecturefor better performanceand effective utilizationofresources.Weare interested inapplyingmore advancedload balancingalgorithmslike ant colony and honey bee algorithmand seehow they affect the load distributionamongcloud servers.

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VII. CONCLUSION

So from above paper we have come up with the system which can mark the attendance of students. As class attendance being important part of institutions/organizations. Recording and maintaining the attendance is an area of administration that requires momentous amount of time and work in schools/college environment. So this RFID system benefits as it is automated to monitor and maintain the records of student. It can be a powerful device in helping to maintain the attendance. RFID is a technology that allows for a tag allocated on identity card to communicate wirelessly with a reader, in order to identify the student. It also automatically creates the detention list as it sends the alert message to the respective parent. The purpose of promoting this technology is to enhance the attendance monitoring in organizations. It is easy to implement and time saving.

REFERENCES

1) MadhurimaRana, SaurabhBilgaiyan, UtsavKar - A Study on Load Balancing in Cloud Computing Environment Using Evolutionary and Swarm Based Algorithms, 2014
2) Yu J, Buyya R. Scheduling scientific workflow applications with deadline and budget constraints using genetic algorithms. Scientific Programming Journal, 2006, 14(3 /4): 217-230.
3) Sakellriou R, Zhao H, Tsiakkour E, et al. Scheduling workflows with budget constraints, 05-22 Pisa, Italy:University of Pisa, Dipartimento di Informatica, 2005:347-357.
4) Yu J, Buyya R, Than CK.A cost-based scheduling of scientific workflow applications on utility grids. The 1st International Conference on E-Science and Grid Computing. Washington, DC: IEEE Computer Society, 2005: 140-147.
5) Menasc D A, Casalicchio E. A framework for resource allocation in grid computing. Proceedings of 12th Annual International Symposium on Modeling, Analysis, and Simulation of Computer and Telecommunications Systems. Washington, DC: IEEE Computer Society, 2004:259-267.
6) Huifang Li, SiyuanGe, Lu Zhang. A QoS- based Scheduling algorithm for Instance-intensive Workflow in Cloud Environment. 26th Chinese Control and Decision Conference (CCDC), 2014:4094-4099.
7) Mark D. Ryan, ―Cloud computing for Enterprise Architectures: Concepts, Principles and Approaches‖, 2013
8) Liu Ke, Jin Hai, Chen Jinjun, Liu Xiao, Yuan Dong, Yang Yun.A compromised-time-cost scheduling algorithm in SwinDeW-C for instance-intensive cost-constrained workflows on a cloud computing platform. International Journal of High Performance Computing Applications, 2010, 24(4): 445-456.
9) A.MalcomMarshall ,Dr.S.Gunasekaran . A Survey on QoS Constraint Based Scheduling Algorithms for cloud Workflows. CONFERENCE PAPER • MARCH 2014 DOI: 10.13140/2.1.3958.7203
10) Ektemal Al-Rayis, HebaKurdi. Performance Analysis of Load Balancing Architectures in Cloud Computing. 2013 European Modelling Symposium. 978-1-4799-2578-0/13.