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RESEARCH ARTICLE

A SURVEY FOR TASK SCHEDULING IN CLOUD COMPUTING

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ABSTRACT

This implementation aims towards the establishment of performance qualitative analysis on make span in VM task allocation and process according to their deadline, then implemented in CloudSim with Java language. Here major stress is given on the study of dead line based task scheduling algorithm with heterogeneous resources of the cloud, followed by comparative survey of other algorithms in cloud computing with respect to scalability, homogeneity or heterogeneity and process scheduling. A previous study also indicates change of MIPS will affect the response time and increase in MIPS versus VM decreases the response time. When image size of VM is implemented against the VM bandwidth then no significant effect is found on response time and it remains constant for which these parameters are investigated. But in case of Cloudlet long length versus Host bandwidth a pattern is observed in which response time increases in proportionate manner. Using the modified approach the reduction in the down time of the various processes are achieved as shown in results.

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INTRODUCTION

Fog computing (Stefania Conti, 2017) or fog organizing, otherwise called fogging, is a design that utilizations at least one collaborative end-client customers or close client edge gadgets to do a considerable measure of capacity (as opposed to put away fundamentally in cloud server farms), correspondence (as opposed to directed over the web spine), control, setup, estimation and administration. Fog computing may be seen each in quite huge cloud frameworks and large info structures, creating relevance the developing troubles in about to knowledge impartially. This outcomes in Accessary in Nursing insufficiency of flavour of the no inheritable majority. The impacts of giveaway computing on overcast computing and extensive fated frameworks brawn accommodations; though, a usual vista cruise may be easy is Co-conspirator in Nursing court in verified substance broadcast, a obstruction that has been handled upon the assembly of measurements that endeavour to boost accuracy. Fogginess display contains of a gain revenge oneself on Adscititious in Nursingd an info unbiased. as an the actuality, on the matter plane, blab computing empowers computing serving to brook at the yearn of the encrypt objectively than servers in a very server farm. Contrasted with overcast computing, reveal computing underscores connection to end-clients and consumer destinations, deceive step off event and approximately associated with mingling, lassitude diminishment and resolve familiarity transmit supplementary grant to finish higher quality of service (QoS) (Gajender Pal, 2014), and edge examination/stream mining, transportation concerning prevailing shopper experience (Junwei,) and excess within the event of disappointment. Fog computing (Stefania Conti, 2017) or fog networking, also known as fogging, (Salim Bitam, 2017 and Manreet Kaur, 2014) is an architecture that uses edge devices to carry out a substantial amount of computation, storage, communication locally and routed over the internet backbone, and most definitively has input and output from the physical world, known as transduction. Fog computing consists of Edge nodes directly performing physical input and output often to achieve sensor input, display output, or full closed loop process control. It may also use smaller Edge Clouds often called as Cloudlets at the Edge or nearer to the Edge than centralized Clouds residing in very large data centers. The processing power in advanced Edge Clouds like those that control autonomous vehicles can be considerable compared to more traditional Edge personal devices, for example mobile phones and personal computers. Fog computing can be perceived both in large cloud systems and big data structures, making reference to the growing difficulties in accessing information objectively. This results in a lack of quality of the obtained content. The effects of fog computing on cloud computing and big data systems may vary. However, a common aspect that can be extracted is a limitation in accurate content distribution, an issue that has been tackled with the creation of metrics that attempt to improve accuracy (Santosh Kumar, 2012).

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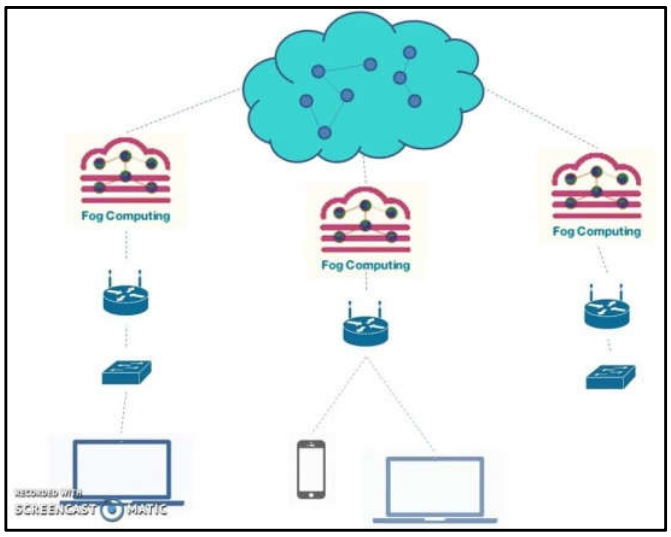

Fig. 1. Fog Computing

Related Study

StefaniaCont et al. (Stefania Conti, 2017) received support figuring out how to pick a server enactment approach that guarantees the base job misfortune likelihood. At the point when fog-computing nodes can't be fueled by the principle electric network, some ecological neighborly arrangements, for example, the utilization of sun based or wind-based generators could be embraced. Their generally unusual power yield makes it important to incorporate a vitality stockpiling framework keeping in mind the end goal to give control, when a pinnacle of work happens amid times of low-control age. An advanced administration of such a vitality stockpiling framework in a green fog-computing node is important keeping in mind the end goal to enhance the framework execution, enabling the framework to adapt to high job entry crests notwithstanding amid low-control age periods. Salim Bitam *et al.* (2017), proposed another bio-propelled enhancement approach called Honey bees Life Algorithm (BLA) went for tending to the job scheduling issue in the fog computing condition. The proposed approach depends on the advanced circulation of an arrangement of assignments among all the fog computing nodes. The goal is to locate an ideal tradeoff between CPU execution time and distributed memory required by fog computing services set up by portable clients. Fog computing expands cloud computing by sending advanced assets at the start of portable clients.

In this new worldview, administration and working capacities, for example, job scheduling go for giving superior, savvy services asked for by versatile clients and executed by fog nodes. Manreet Kaur and Monika Bharti (Manreet Kaur, 2014), discussed a paradigm for preventing misuse of user data and securing information. The users are provided with on-demand services through the Internet. But it also involves risks like data theft and various other attacks. By performing such attacks, the intruders can peep into documents which can results in misuse of data and also interpretation of highly confidential data for illegal purposes. For securing user data from such attacks a new paradigm called fog computing can be used. This technique can monitor the user activity to identify the legitimacy and prevent from any unauthorized user access. Santosh Kumar and R. H. Goudar (Santosh Kumar, 2012) investigate several cloud computing system providers about their concerns on security and privacy issues and explore the concept of cloud architecture and compares cloud computing with grid computingand aimed to pinpoint the challenges and issues of cloud computing and identified several challenges from the cloud computing adoption perspective. However, security and privacy issues present a strong barrier for users to adapt into cloud computing systems. Gajender Pal et al. (2014), provides a better understanding of the cloud computing and identifies important research issues in this burgeoning area of computer science. On demand or on pay per use of resource such as: network, storage and server these all facilities are provided by cloud computing through internet is called cloud computing. Although, cloud computing is facilitating the Information Technology industry, the research and development in this arena is yet to be satisfactory. GE Junwei and YUAN Yongsheng presents a genetic algorithm consider total task completion time, average task completion time and cost constraint. Compared with algorithm that only consider cost constraint (CGA) and adaptive algorithm that only consider total task completion time by the simulation experiment. Amit Agarwal and Saloni Jain (2014), presented a Generalized Priority algorithm for efficient execution of task and comparison with FCFS and Round Robin Scheduling. Algorithm should be tested in cloud Sim toolkit and result shows that it gives better performance compared to other traditional scheduling algorithm. Cloud is developing day by day and faces many challenges, one of them is scheduling. Scheduling refers to a set of policies to control the order of work to be performed by a computer system. A good scheduler adapts its scheduling strategy according to the changing environment and the type of task. Ekta Rani and Harpreet Kaur (Ekta Rani, 2017), followeda Raven Roosting Optimization Algorithm (RRO) is followed to light on the load balancing for task scheduling problems solution in cloud environment. Heterogeneity of birds, insects enroll in roosting. In raven Roosting, Roosts are information centers or can say servers and scrounge feature of common ravens inspired to solve problems. This technique is good enough to handle number of overloaded tasks transfer on Virtual Machines (VMs) by determining the availability of VMs capacity. Raven Roosting Optimization (RRO) random allocation of VMs to Cloudlets results huge change in makespan with respect to VM to which allocated.

Deshmukh A. et.al. (Deshmukh, 2015) discussed/described different load balancing strategies, algorithms and methods and by studying pros and cons of different techniques used for load balancing, authors are specifically giving priority to Dynamic load balancing method rather than Static load balancing. They investigate that comparative behavior of load balancing with different parameters; dynamic load balancing is more reliable and after that they conclude that efficient load balancing can clearly provide major performance benefit. Alam, B. et.al. (2008), stated that in Round Robin Scheduling, the time quantum is fixed and then processes are scheduled such that no processes get CPU time more than one time quantum in one go. If time quantum is too large, the response time of the processes is too much which may not be tolerated in interactive environment. If time quantum is too small, it causes unnecessarily frequent context switch leading to more overheads resulting in less throughput. In this paper, a method using fuzzy logic has been proposed that decides a value that is neither too large nor too small such that every process has got reasonable response time and the throughput of the system is not decreased due to unnecessarily context switches.

Bee Swarm optimization

A novel optimization scheme by hybridizing an artificial bee colony optimizer (HABC) with a bee life-cycle mechanism, for both stationary and dynamic optimization problems. The main innovation of the proposed HABC is to develop a cooperative and population-varying scheme, in which individuals can dynamically shift their states of birth, foraging, death, and reproduction throughout the artificial bee colony life cycle. That is, the bee colony size can be adjusted dynamically according to the local fitness landscape during algorithm execution. This new characteristic of HABC helps to avoid redundant search and maintain diversity of population in complex environments. As in this research a study is done on to schedule the job in fog computing that are in static manner i.e. in which the jobs are pre-scheduled and length of job is already known to administrator. But in case if critical a job with shorter deadline is there then this algorithm will not consider this job, and it will end at starvation of resources. This leads to the designing of a new algorithm in which the preemptive job scheduling or dynamic job scheduling is to be designed.

Research Gaps

- No Dynamic Scheduling: Existing schemes are reluctant to dynamic scheduling as in the concept of dynamic scheduling the drawbacks of one scheduling scheme can be overcome in run time.
- No optimization of bandwidth: Bandwidth consumption is main drawback of the current scheduling schemes as less number of jobs can be executed in a particular bandwidth amount.
- No resource scheduling for preemptive Jobs: Preemptiveness is the concept in which a job whose dead line is early can be executed prior to other jobs by preempting them. This can be an advantage when less dead line based jobs are to be executed earlier.

METHODOLOGY

- First of all VMs are created and allocated to multiple hosts according to requirement of resources.
- After the allocation of VMs tasks are assigned to various VMs for completion.
- Task given to VMs are to be scheduled to avoid any kind of congestion of task and to achieve the operations successfully.
- After task allocation and scheduling if there is any kind of overutilization then one has to check the over utilized machine and also an optimal destination on which the over utilized machine may be transferred according to the resource required.
- After the selection of optimal destination the VM is switched to that particular machine.
- The migration policy is based upon the Cache Memory Optimization which includes the loop fusion and loop interchange, using which the data is stored in a buffer and faulty pages are reduced to a great extent.
- After the completion of all the resources the VM that is migrated is switched back to actual host for reusing of memory.
- In the last results and generated and validated.

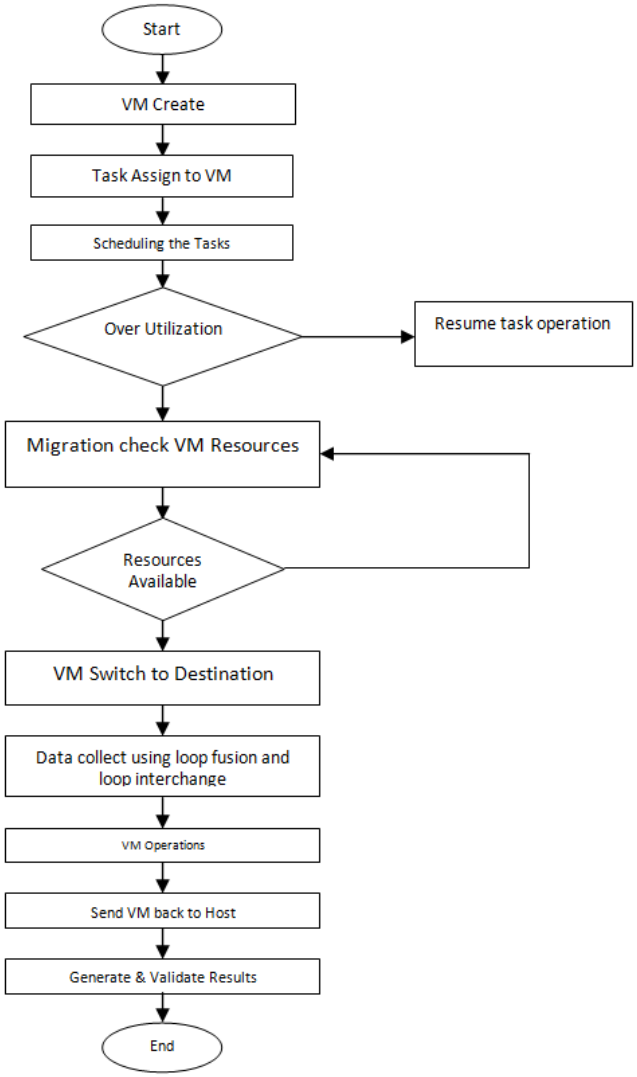

Fig. 2. Flowchart

RESULTS AND DISCUSSION

- **Over Utilization:** Over utilization is the number of cloudlets that are processed by VM form migration or any other mean.
- **Make Span:** Make span is the lag time when one task is executed and other one is to be loaded.
- **Response Time:** is total time that is taken by VM to execute all operations.

Fig 3 is the comparison of existing and proposed protocol for over utilization of resources. Over utilization is the extra task that is to be executed on the VM. Fig 3 is showing the efficiency of proposed scheduling scheme as compare to existing one. In proposed scheduling the over utilization of resources is approx 14% where in case of proposed it is below 10%. Fig 4 is the comparison of existing and proposed protocol for make span VS cloudlet. Make span is the idle time for which VM is doing nothing as it is waiting for the next cloudlet. Fig 4 is showing the makespan of proposed scheduling scheme as compare to existing one. In proposed scheduling the makespan is approx 98ms where in case of proposed it is below 80ms. Fig 5 is the comparison of existing and proposed protocol for response time. Response time is total time taken by VM to complete a task. Fig 5 is showing the response time of proposed scheduling scheme as compare

to existing one. In proposed scheduling the response time is approx 130 ms and response time in proposed is below 100ms. In Table 1 a comparison of existing and proposed scheduling is shown.

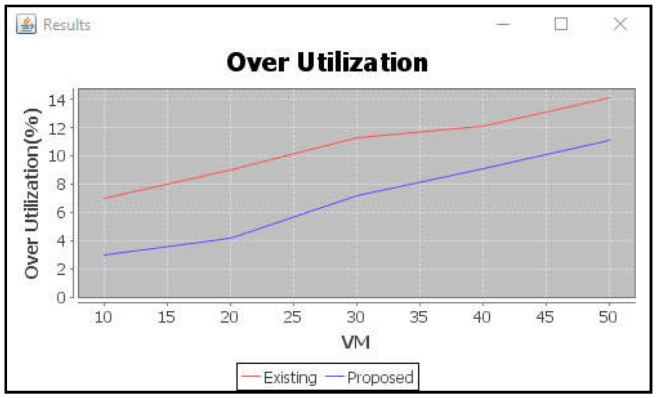

Fig. 3. Comparison over Utilization

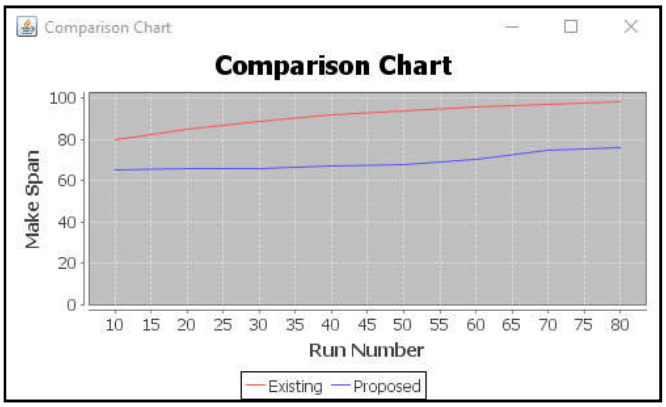

Fig. 4. Cloudlet Size vs Make span

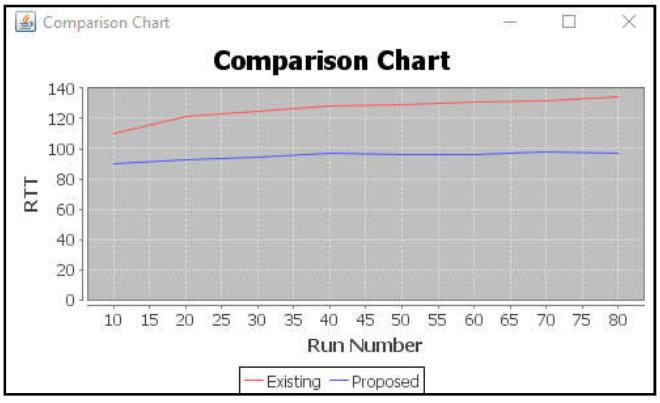

Fig. 5. Comparison Chart for Response Time

As makespan in existing technique is 98ms where as in proposed it is 79. Overutilization in case of existing is 14 where as in proposed it is 11. Response time is 130 in case of existing and 100 in case of proposed technique.

Table 1. Comparison of existing and proposed scheduling algorithm

Technique / Parameters	Existing	Proposed
Make span	98	79
Over Utilization	14	11
Response Time(RTT)	130	100

Conclusion

This implementation aims towards the establishment of performance qualitative analysis on make span in VM task allocation and process according to their deadline, then implemented in CloudSim with Java language. Here major stress is given on the study of dead line based task scheduling algorithm with heterogeneous resources of the cloud, followed by comparative survey of other algorithms in cloud computing with respect to scalability, homogeneity or heterogeneity and process scheduling. A previous study also indicates change of MIPS will affect the response time and increase in MIPS versus VM decreases the response time. When image size of VM is implemented against the VM bandwidth then no significant effect is found on response time and it remains constant for which these parameters are investigated. But in case of Cloudlet long length versus Host bandwidth a pattern is observed in which response time increases in proportionate manner. Using the modified approach the reduction in the down time of the various processes are achieved as shown in results. From the results it is clear that the proposed system used the task deadline as input parameter to improve results.

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