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Enhanced Genetic Based Algorithm for Optimized Resource Sharing in Cloud Scheduling

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ABSTRACT: Cloud computing is the most usable type of technology for the current organizations. These are replacing organizations existing private infrastructure. The technology will be based on shared resources. Multiple clients share the resources amongst the each other for pay per use basis. Number of the users are growing with same resources. This will pressurized the resources and decrease the performance of the cloud. The cost of accessing will be increased. To save such system there requires scheduling of the resources. In existing researches the genetic based approaches have been used for the scheduling of the resources. But the performance can be enhanced further by using genetic with hard constraints. This will considers the cost and the time while identifying the optimal resource. It also increase the efficiency. The proposed approach has been evaluated on different parameters like cost, time, generations etc. In all the respects the proposed technique has shown the better results.

KEYWORDS: Genetic, Fuzzy, Hard constraints

I. INTRODUCTION

In current times various small, medium and large organizations are using IT for the automation of their organizations. But the scenario is getting changed day by day. Currently these organizations are talking about the cloud for the services. But lack of the knowledge and high level of complexity involved restraining the enterprises to shift from the existing technology to the cloud based technology. Various research papers based on the study of the impact of the cloud on the enterprise working. How cloud is useful and what are the various factors which are responsible for adapting cloud.

In current report basic aim is to study these issues in relation to cloud. Which enforce the cloud to be adopted for the enterprise as the natural choice for the performance enhancement and for the cost saving. In current times there are different issues that are required to be studied and also identifying the complexities which are not visible from outside. Making a knowledgeable system for those who does not knows anything about the cloud. It makes them to be thinking in the line of adopting the technology for future benefit for their enterprise.

Generally if we see cloud is of three types .
- a. Public Cloud: it is the collection of the various distributed or centralized resources. These resources are being shared by the cloud service providers for sharing of the servicing. It is based on pay per use. Anybody who wants to be the part of the system can register and use the services. Security is of main concern for the system. At any point of time any malicious user can try to destroy the cloud system.
- b. Private cloud: Private cloud is the privately owned cloud. Where the services are being shared for the specialised group of people. Anybody can not be the part of the system. In case of private cloud security is not the main concern. Because the people who want to be the part of the system need to have various conditions for the private cloud.
- c. Hybrid cloud: It is the mix of the cloud. Where the resources are lying in two types of domains. It is having various public services and private services for the clients.

So the topic will be Cloud architecture and its impact in the enterprise system.

In current report different issues are addressed. Various research papers are studied. All these research papers are in line to different issues like cloud and its impact on the enterprise working. How the enterprises can have benefits from the cloud architecture. The total research also considers various complexities lies into the system while adopting cloud and what are various advantages of the cloud for the enterprise. This approach can save large cost of the enterprise.

1.1 Need of Job Scheduling

1) Load Balance – While allocation of the resources for the task in the cloud environment scheduling is required. Because scheduling will select the best resource for the task. Because it is centrally controlled, the resources are being allocated to the process or task with considering the current load on the resource. Most currently available task will be selected for the allocation. This will automatically balance the load on the resources for the given task. So on the whole we can say cloud includes two issues one scheduling and another is the load balancing. While having scheduling the balancing of the load is also considered for the cost effective usage of the resource for the task[9].

2) Quality of Service – Cloud mainly involve in two types of resources. One is the computing resources and other is the storage resources.

3) Efficiency– Because cloud cater worldwide. There are various types of clients. These clients belongs to different part of the society. That means number of users are more the services automatically be cost effective. It also provides the ability to use the business model of economies of scale. Because it can be achieved with more number of users.

4) The best running time –Tasks are divided into different categories based on users needs. Each user will be give with given set of resources in cost effective way.

5) The throughput of the system – because there can be more number of requests even beyond the capacity. This means there requires better system management so that the usability of the resources should be optimal.

II. LITERATURE SURVEY

VatsalGajera(2017) et al.[2]: In 21st century there are various level of changes in processing and storage resources. The growing amount of these resources are generating various types of benefits for the organizations. But the probability of obsolete of these complex hardware is high. To avoid these complexities of the hardware and software companies want to shift from personal computing devices to the shared cloud. Where large number of resources are being kept with use and leave bases. This can be cost effective for the organizations. They cut the cost of the operations for the enterprise. This paper has researched on various issues related to the cloud and its various complex issues. It makes people to understands the complexities in terms of costing and security while keeping the data at cloud outside their own campus. How the cloud services are selected and what makes these resources to be useful for the organizations.

S.DEVIPRIYA(2013) et al.[3]: Author in this paper has identified factor that small and medium enterprises are considering while adopting the cloud mechanism. The cloud services the adoption model has been builded for the SME of the Malaysia. Various factors which came out of the discussion was that the major reason for the adaptation of the cloud services is the cost saving. Second is the complete advantage of the resource can be taken place only if the complete resources will be provided to the SME as IT resources. There are abundance number of systems are required which enforce the system to have cloud for the enterprise for the system enhancement. Nevertheless the cloud adaptation can further be researched for identifying other external factors for the system enhancement and easy adaptation of the cloud computing for saving system resources. Author in this paper has reviews various organizations and the factors that are responsible for the adaptation of the cloud computing. According to the author there are various factors like security privacy, trust and complexity. These factors enterprise considers while adapting the cloud services for itself. In current time there are various factors which are there except mentioned above is the cost. Adopting cloud computing will save large amount of the cost for the organization. Because for the applications the shared services will be used. These shared services are like on the basis of pay per use. There is least chances of the obsolete of the resources. Upgraded softwares will be provided by the cloud service providers.

Rajwinder Kaur et al. [4]: Cloud computing is to provide highly efficient computing resources. So that any client can access the services with minimum time and with minimum cost itself.

Shaminder Kaur (2012) et al.[5]: Author in this paper has proposed a scheme of RASA. It is resource awareness simple annealing approach. Where the improvement is done over to Max-Min and Min-Min algorithm. It uses the improved approach over to the existing Max-Min and Min-Min approach. Where the task is give priority with mix of the Max-Min or Min-Min type of criteria. The performance of the RASA has shown improvement over to the existing algorithm. Such that the response time and task execution time get minimized.

Hitoshi Matsumoto (2011) et al[6] in this author has proposed a new algorithm named as Cooperative PSO. It is the improved protocol for the task scheduling and load balancing compared to the CPSO. The performance in terms of the various efficiency performance has shown the improvement. Such that the system has been upgraded from existing CPSO to the new Cooperative PSO.

Pankaj Arora (2012) et al. [7] proposed a new set based approach for defining the workflow of the scheduling problem. It provides the user with the ability to set the constraints which are pertained to the quality of the task submitted by the users. Research has been done in considering comprehensive Learning PSO. They have implemented S-PSO, which defines the one quality parameter. This parameter will helps in specifying the various quality perspective like response time, total time of the execution.

III. ALGORITHM

1.   Build a population set of the various resources. These resources are in the form of virtual machines and the data centers.
2.   Based on Simple annealing and GA identify the local best resource from the population set.
3.   Identified element will be compared to the hard constraints. If the resource fulfills the hard constraints then select the element else reject the element. This will provide the edge for selection of the element based on both local search and the global search.
4.   Hard constraints are set for the resource availability time, resources last task performance and the task expected time required.

IV. FLOWCHART
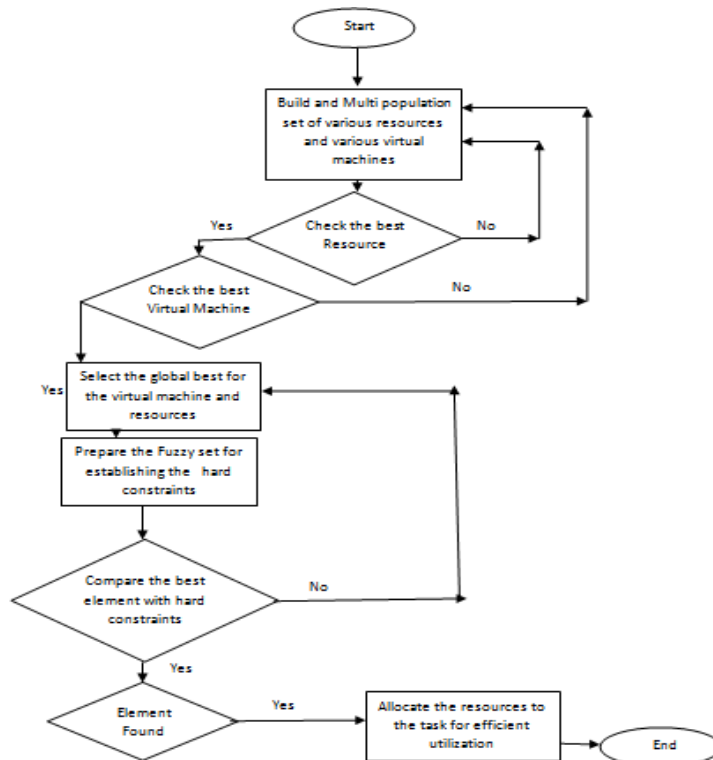
V. RESULTS AND DISCUSSIONS.
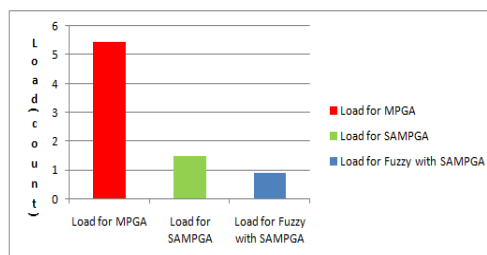
5.1 Comparison for Load

Fig. 1 Comparison for Load

Fig. 1 the comparison for the base and the proposed technique. The comparison shows the load for the different approaches for the resource allocation to the tasks. Once the efficiency is required the resources are allocated to the task with the proposed fuzzy based approach. Which is much efficient approach.
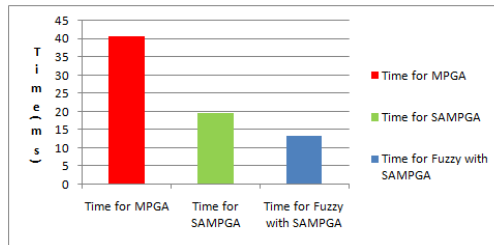
5.2 Comparison For Time

Fig. 2 Comparison of Time.

Fig. 2 represents the time of the execution for the resource to the tasks. This allocation will be done such that the less time will be required for the identification of the optimal resource for the task. This will be better approach compares to the base technique.
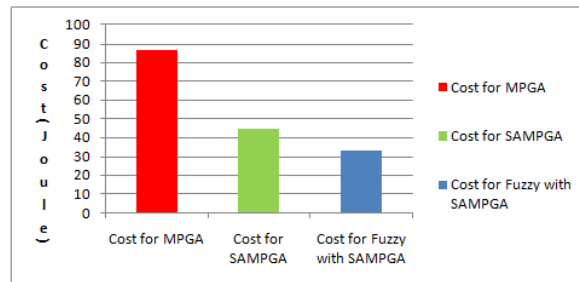
5.3 Comparison For Cost

Fig. 3 Cost Comparison

Fig. 3 shows the graph for the comparison of the cost for the execution of the task from the cloud. The proposed approach has better cost compared to the base technique.
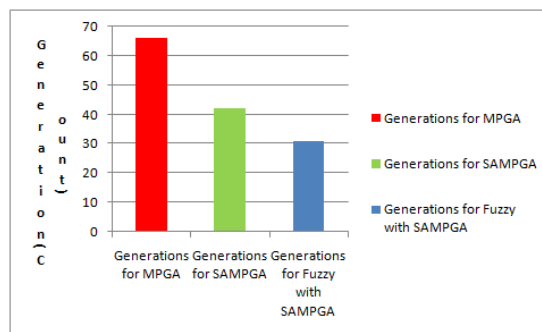
5.4 Comparison Of Generation

Fig. 4 Generation Comparison

Fig. 4 shows the graph for the comparison of the base and the proposed technique. the proposed technique allocation will be much efficient compared to the base technique. the number of generations are less for the proposed technique compared to the base technique.

5.5 Comparison of the base and proposed for different parameters.

Table 1 Comparison of performance between MPGA and Fuzzy with SAMPGA

Parameter	MPGA	Fuzzy with SAMPGA	Percentage Improvement
Load	5.4	0.87	16%
Time	40.57	13.21	33%
Cost	86.14	33.19	39%
Generations	66	31	47%

Table 1 shows the comparison of the existing and proposed technique for all the four parameters. In the last column there is a percentage improvement. This represents that the proposed technique has shown improvement over to the existing scheduling technique.

VI. CONCLUSIONS

Enterprises are using technology for the automation of the office working on daily basis. They are using fast processing and great storages for daily data. Even the enterprises are using various application softwares like word processing, spreadsheet, power point and another analytical tools. Which helps the organizations to take decision for future for more profitability. But now the issue is that the technology is changing day by day. The existing hardware and softwares are getting obsolete because of changing requirements. Large amount of the cost has to be incurred by the enterprise for updating the software and hardware. These resources belongs to enterprise sometimes are underutilized so makes costing and reduces the profitability of the enterprise. On some occasion enterprise is using these resources for the purpose for which they are not installed for. The solution for all these problem will be shared hardware and software. This shared system can be in form of cloud. This is based on pay per use basis. When enterprise needs the processing and storages they can use from the cloud else they will leave the cloud till the time they does not need it. For the enterprise the issue is to study the various complexities that are related to the cloud and generates the knowledge base system which makes cloud to be adopted for the enterprises without much afraid. Because somebody does not want to store their sensitive data to the place outside their premises. They think the data privacy will be lost. But creating the knowledge can make people to take sensible decisions for the enterprise for the future growth and also meet the future challenges.

VII. FUTURE WORK

The current research is based on identification of the best resource for the task. This whole scheme of the process will be undertaken with the Fuzzyfication of various parameters for the best resource for the given task. In the future various other hard constraints can be included in the Fuzzyfication of the rules for best resource identification.

REFERENCES

[1] Shuibing He, Yang Wang, Xian-He Sun IEEE Fellow and Chengzhong Xu, "Using Min-Max-Memory Claims to Improve In-Memory Workflow Computations in the Cloud", 1045-9219 (c) 2016 IEEE.
[2] S.Devipriya, "Improved max-min heuristic model for task scheduling in cloud", 978-1-4673-6126-2/13.
[3]VatsalGajera, "An Effective Multi-Objective Task Scheduling Algorithm using Min-Max Normalization in Cloud Computing," 2016 IEE
[4]RajwinderKaur and PawanLuthra,"Load Balancing in Cloud Computing", Association of Computer Electronics and Electrical Engineers, 2014.
[5] ShaminderKaurandAmandeepVerma, "An Efficient Approach to Genetic Algorithm for Task Scheduling in Cloud Computing Environment,"I.J. Information Technology and Computer Science, 2012, 10, 74-79.
[6] Hitoshi Matsumoto, Gavriil Tzortzakis, and Alex Delis, "Dynamic Resource Management in cloud environment". Elsevier Press. pp. 41–85. ISBN 0-12-396535-7, 2010.
[7] Pankaj Arora and Mala Kalra, "Cloud Computing Security Issues in Infrastructure as a Service", IEEE International Conference on Intelligent Computing and Integrated Systems (ICISS), Guilin, pp. 673-675, 2012.

[8] Shaminder Kaur, Elina Pacini and Carlos Garc Garino, An Efficient Approach to Genetic Algorithm for Task Scheduling in Cloud Computing Environment, 2012.

[9] Rajesh Piplode and M. Naghibzadeh, "An Overview and Study of Security Issues & Challenges in Cloud Computing" The Third IEEE/IFIP International Conference on Internet, Uzbekistan, 2012.

[10] Vignesh V, resource management and scheduling in cloud environment, Cloud Computing and Distributed Systems Laboratory, Department of Computer, 2013.

[11] Srushti Patel and Pranati Mishra, "A Survey of Resource Allocation Policies in Cloud Computing", International Journal of Computer Science and Information Technologies, vol. 4(3), pp. 416-419, 2013.

[12] S.Devipriya, Han Ruilian, Study on cloud computing task schedule strategy based on MACO algorithm [J]. Computer Measurement & Control, vol.19 (5): pp.1203-1211, 2013.

[13] S.Thamarai Selvi and, R. Eberhart, "Resource Allocation Issues and Challenges in Cloud Computing", vol. 4, pp 1942–1948, 2014.

[14] Youssef fahim, Sarabjit Singh, and Meenakshi Sharma," load balancing improvement of a data center by a hybrid algorithm in cloud computing", World Academy of Science, Engineering and Technology, 2014.

[15] Madhurima Rana, El-Zoghdy Said Fathyy and Inhwan Ryuz JieLix, "A Study on Load Balancing in Cloud Computing Environment Using Evolutionary and Swarm Based Algorithms", Proceedings of the 39th IEEE Conference on Decision and Control, 2014.

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