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A Survey on Cloud computing and various scheduling algorithms

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Abstract: *Cloud Computing presents an interesting problem of job scheduling. Because there are multiple jobs available at a time while resources are limited .Hence we have to intelligently schedule these jobs such that performance is maximized. There have been several approaches to this problem, starting from mathematical approaches to evolutionary approaches. Hence in these years several evolutionary algorithms have been proposed for optimized job scheduling.*

Keywords: *Cloud computing; scheduling; ant colony optimization; job scheduling; resource management.*

I. INTRODUCTION

Nowadays Cloud Computing is the only area on which lots of companies are spending a lot of money because they feel that it is the future of technology. It is still in its early ages and needs a lot of improvement. Apart from big companies like Amazon, Google, Microsoft, SAP etc no one is able to contribute to this field.

In cloud computing, the word cloud (also phrased as "the cloud") is used as a metaphor for "the Internet," so the phrase *cloud computing* means "a type of Internet-based computing," where different services such as servers, storage and applications are delivered to an organization's computers and devices through the Internet.

This service can solve many problems such as :-

- Organizations need not to buy the whole set of servers. They can just have services from the service providers.
- It's easy to handle as many responsibilities are given to cloud provider.
- They can expand their work easily as the resources are near to infinity.
- It serves best for the elastic applications(Applications which scale very fastly for example facebook).

Scheduling the jobs in cloud is a big challenge nowadays. As if jobs i.e. Cloudlets [1] are scheduled properly then the overall execution time can be reduced significantly. But, Scheduling is an NP Hard problem so it is very important to apply some heuristics to get best outcome many times. In cloud environment the main purpose of the scheduling algorithms is to efficiently use the available resources properly so that managing the load balancing between the resources so that to get the minimum execution time for job completion.

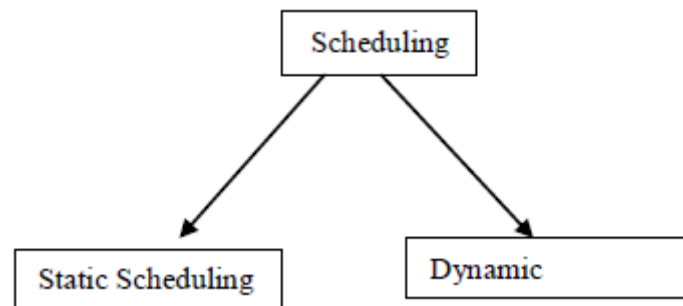


Fig 1:- Types of scheduling

A. Cloud Computing Architecture

The Cloud Computing architecture works on a layered approach. It has many actors like Cloud client, Cloud supplier, Cloud Auditor, Cloud Broker, Cloud Carrier. The mix of these actors produce the architecture of Cloud Computing [3]. It's a very vast area that is why it's difficult to understand how everything is happening however this reference architecture provides an excellent overview.

Each actor play a very big role in the cloud computing working model. They have to play their part to get the job done and satisfy the customer [1]. The different cloud consumers are defined below:-

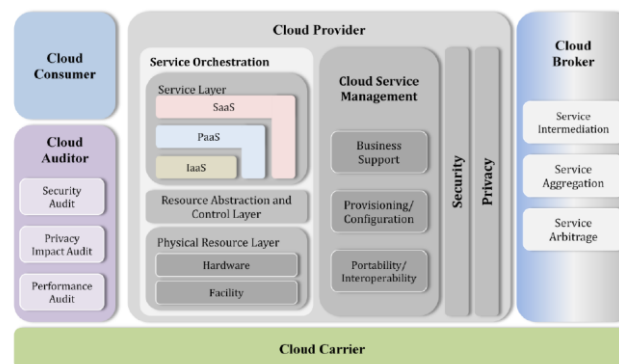


Fig: 2 Cloud Computing Architecture

II. LITERATURE REVIEW

Cloud computing is service-focused to provide high quality and low-cost information services by pay per-use model in which guarantees are offered by the cloud service providers through customized SLA. Cloud computing reduces the investment on hardware, software and professional skills .Cloud computing helps user applications dynamically provision as many compute resources at specified locations. I have reviewed a number of the research papers to gain some basic background and improve the already developed scheduling algorithms till now. This field is growing very fastly in the recent past so the amount research going on is intensive.

A. D. Thilagavathi¹, Antony Selvadoss Thanamani propose two algorithms like Firefly Algorithm and Intelligent Water Drop. In this study, they address a job scheduling problem on High Performance Computing environment, in which to obtain near optimal solution so as to complete the task in minimum period of time as well as utilizing the resources in an efficient way is considered as the objective. To tackle this problem, Firefly Algorithm (FA) algorithm is proposed .From the results, it is proved that IWD and FA are more efficient and it also avoids the problem of consuming a large number of iterations. They take time as parameter[2].

B. Sung-Soo Kim, Ji-Hwan Byeon , Ajith Abraham proposed a binary artificial bee colony (BABC) algorithm is developed for binary integer job scheduling problems in grid computing and further propose an efficient binary artificial bee colony extension of BABC that incorporates a flexible ranking strategy (FRS). Two variants are introduced to minimize the makespan. In the first a fixed number of best solutions is employed with the FRS while in the second the number of the best solutions is reduced with

each new generation. Simulation results for benchmark job scheduling problems show that the performance of their proposed methods is better than those alternatives.[3].

C. Linan Zhu and Qingshui li proposes the key research for cloud computing the process of the work scheduling and resource allocation problems based on ant colony algorithm . Ant Colony Optimization (ACO) is a metaheuristic combinatorial optimization technique that mimics the foraging behavior of Ants.. ACO starts with initialization of parameters and ants along with permissible range. Each ant and its permissible range are processed to construct path. And in CloudSim simulation environment and simulation experiments, the results show that the algorithm has better scheduling performance and load balance than general algorithm. The take parameters reliability ,response time and cost.[4]

D. Shaobin Zhan, Hongying Huo researches the principle of PSO, analyzes special properties of cloud computing environment, puts forward Simulated Annealing (SA) algorithms, improves the optimization and solution speed and advances scheduling efficiency. In their research annealing algorithm is added into PSO algorithm, and mixed scheduling algorithm is proposed, which not only increases convergence speed of PSO, but also avoid sinking into local optima. The experimental results indicate that, improved particle swarm optimization algorithm shortens the average operation time of tasks, supplies proper resources to user task efficiently in the environment, increases utilization ratio of resources[5].

E. R. N. Calheiros, R. Ranjan and R. Buyya, in this paper authors described almost everything which is required to develop and test any cloud related policy. The authors gave a brief knowledge about the tool cloudSim and basic knowledge of Cloud Computing. They defined that cloudSim supports almost all the functionality required to de_ine the policies in Cloud Environment. According to them cloud computing is a parallel and distributed system which consists of a collection of interconnected and virtualized computer that are dynamically provisioned. Some of the cloud computing platforms are Microsoft Azure, Amazon EC2, Aneka, Google App. It also defined the layered design architecture of cloud computing.[6]

III. COMPARISON

Scheduling Algorithm	Parameters	Objective	Tool	Environment
PSJN	Cost and Time	Effective and fast execution of task	Private cloud	Cloud Environment
Shortest job Scheduling	Arrival Time, Process Time, Deadline and I/O requirement	Effective resource allocation under defined parameters	MATLAB	Cloud Environment
Optimized ABC algorithm	Cost, Profit and priority	Measure the cost and performance more accurately	SimGrid	Cloud Environment
Improved Cost Based Algorithm	Cost and task grouping	Minimize the cost and completion time.	CloudSim	Cloud Environment
User Priority guided MIN-MIN scheduling	Makespan	To promised the guarantee regarded the provided recourses	MATLAB	Cloud Environment
Ant Algorithm	Pheromone Updating rule	Enhance the performance of basic ACO	CloudSim	Grid Environment
MACO	Pheromone Updating rule	Improve the performance of grid system	MATLAB	Grid Environment
ACO	Cost and time	Improve the efficiency and reliability in all conditions	CloudSim	Grid Environment

IV. CONCLUSION

Scheduling is one among the foremost necessary tasks within the cloud computing atmosphere. during this paper we tend to discuss the various sorts of programming algorithms. Most acceptable technique for programming is that the heuristic technique. scheduling is one altogether the foremost crucial task in cloud computing atmosphere. throughout this paper we have analyze varied programming rule and tabulated varied parameter. we've noticed that space management is important issue in virtual atmosphere. Existing programming rule provides high turnout and is worth effective but they're not acting on handiness. so we'd like algorithmic rule that improve handiness and time in cloud computing atmosphere.

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