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A SURVEY ON SCHEDULING TECHNIQUES IN CLOUD

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ABSTRACT: Cloud computing consists of several consumer who demands a variety of services as per their need which changes from time to time. So it is the job of cloud computing to make the resources available to the customers according to their need. Because many applications are deployed by users in the cloud, therefore proper preparation is essential because different properties are expended. If the app is not properly scheduled, this will cause the loading imbalance in the cloud data midpoints. So cloud scheduling technology is offered to allocate capitals in the fair and use properties resourcefully. In this survey is done on the various scheduling techniques and scheduling algorithm for applications in cloud.

Keywords: Cloud computing, scheduling, scheduling algorithm, scheduling techniques.

I. INTRODUCTION

Cloud computing is a computing technology which consist of large numbers of servers to provide storage, services and resources. Whenever a user requires the services available in cloud, he/she can use the services by paying for it on timely basis. Now a day's more users use cloud because of the advantages of the cloud. Different application consumes various amount and type of resources. Allocation of resources is the major challenging issue in cloud environment. In resource allocation the available resources such as CPU, memory, network, I/O, storage are assigned according to the requirements and usage in an effective way. We need to assign resources in an effective and efficient way so that we can reduce the load in the cloud data centers and increase the resource utilization rate.

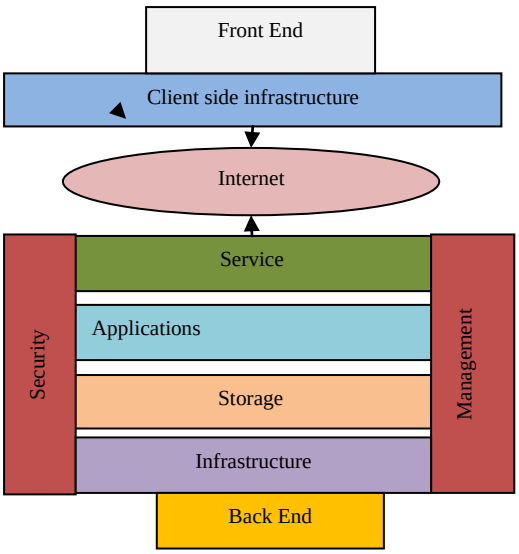

Fig. 1: Architecture of Cloud.

Scheduling techniques are two types of cloud models present in the cloud state such as the cloud deployment model and the cloud service model.

A. Cloud deployment model

Cloud processing model can explained in a few ways. Based on qualities of these models they are grouped in to four different deployment models.

Public Cloud

Public cloud is a form of cloud computing, here the cloud service provider(CSP) provide resources like storage, virtual machines (VM), memory, CPU to public over the internet. Public cloud offering pay-per usage model and sometimes it free cost. Eg: Amazon Elastic Computer Cloud (EC2), Sun Cloud, IBM's Blue Cloud.

Private Cloud

Private Cloud is a kind of cloud computing, privacy and security are mostly maintained for private cloud. It is used by selected users, company or organization instead of the general public cloud. Eg: Amazon Elastic Computer Cloud (EC2)

Hybrid Cloud

Hybrid cloud integrates private cloud and public cloud to create hybrid cloud. In hybrid cloud sensitive data's keeps in private cloud and other data is stored in and accessible from public cloud.

Community Cloud

Several companies and administrations are using community cloud service. It can be shared to particular people or a group of people.

B. Cloud service model

Mainly three services offered by cloud computing such as Platform as Services (PaaS), Infrastructure as Services (IaaS), Software as Services (SaaS) [1]

- **Software as a service model (SaaS)**

This is a model in which the service is provided to the cloud consumer by using the software services which are running on the cloud infrastructure. Cloud provider maintains and manages the software services that consumer use. The cloud service provider charges according to the time taken by the software to finish its activity for the best utilization of this advanced technology. The best example for such service models is Management information system and customer relationship management [2].

- **Platform as a service model**

This is a model in which the developers create, run and manage their applications on the platform which is offered by the cloud environment. The cloud infrastructure is provided by the cloud environment which includes operating system, network storage, servers and storage, though developers have complete control over their applications. The best example for such model is Microsoft Azure, Right scale and Google application engine [2].

- **Infrastructure as a service model**

This is a model in which huge set of computing resources (storing and processing capability) is managed by the cloud providers. Operating system, applications (deployed), storage and limited control over network components such as Host firewalls is done by the cloud consumer. It reduces the hardware cost up to the larger extent. IaaS is offered by Go Grid, open stack, Eucalyptus and Amazon web services [2]

II. SCHEDULING IN CLOUD COMPUTING

Task scheduling is the process of allocating the resources to the particular job in specific time. The main detached of preparation is to capitalize on the resource operation. Curtailing the to come time is the area of preparation. A good preparation procedure yields decent system presentation. In the mist there are frequent and distinct capitals obtainable. The cost of performing tasks in cloud depends on which resources are being used so the scheduling in a cloud environment is different from the traditional scheduling. Cloud Computing Atmosphere Work Preparation is a major and interesting issue. Task Development problem is NP-complete problem. Various deterministic determining algorithms have been planned, but more growth plans make the plan faster and more receptive. Old Scheduling Algorithms like First Low First Serv (FCFS), Shortest Job First (SJF), Round Robin (RR), Min-Min, Max-Min Processes are not much better for scheduling difficulties with cloud computing. So we want a better solution to this problematic problem.

1.1. Types of Scheduling

The preparation can be illustrious as Static Preparation and Active Scheduling.

Standing Scheduling: In Inert Scheduling all data are known to scheduler around tasks and properties before implementation. It has less runtime above. [3]

Energetic Scheduling: In Energetic Scheduling material about task machineries is not identified before completing. Task performance time may not be recognized. It has more runtime overhead. [3]

II. DIFFERENT TYPES OF SCHEDULING ALGORITHMS

A. Round Robin Round Robin (RR)

Procedure is one of the algorithms engaged by procedure and network scheduler in calculating. Equality is mainly absorbed in Round robin. RR preparation is modest, easy to instrument, and starvation-free. The scheduler allocates a immovable time unit per technique, and sequences finished them. RR uses the circle as its line to store jobs. Each job has the same execution time and it will be executed in turn. Suppose a job can't whole its work through its chance, it will be kept back to the line waiting for the following chance. Main feature of RR algorithm is execution of each job in turn and it doesn't have to wait for the previous one to get completed.

B. Earliest Deadline First

The basic principle of this algorithm is very intuitive and simple to understand. In this scheduling algorithm, at every scheduling point the task having the shortest deadline is taken up for scheduling. Earliest Deadline First (EDF) or Smallest Period to go is a active preparation procedure castoff in actual operating systems that residences procedures in a importance queue. When a preparation event befalls (end of task, release of new task.) then the column will be examined for the procedure that is neighboring to its limit, the found procedure will be the following that is going to be scheduled for implementation.

C. Deadline Distribution Algorithm

The deadline distribution algorithm [19] encounters the deadline for distributing results to reduce the cost. This algorithm dividers a workflow and allocates the complete deadline into every task created on their assignment and dependences.

Deadline distribution algorithm usages Synchronization Task Scheduling (STS) for harmonization responsibilities and Branch Task Scheduling (BTS) for division divider correspondingly. Each task has its own sub deadline and a local optimal schedule can be generated for every task. Suppose every local timetable assurances conclusion of their task implementation within their sub-deadlines, the entire workflow execution will be accomplished within the general limit

D. Compromised-time-cost scheduling Algorithm

A compromised-time-cost scheduling algorithm in which they measured cost controlled workflows by cooperating performance while and cost with user say. This algorithm deliberates the physiognomies of cloud calculating to house example concentrated cost-constrained workflows by compromising performance time and cost with user contribution allowed on the fly.

E. Back-tracking Algorithm

Backtracking algorithm finds answers to computational problematic that incrementally builds applicants to the keys, and deserts each partial contender c as soon as it regulates that c cannot feasibly be accomplished to a legal explanation. The back-tracking algorithm allocates obtainable tasks to the least exclusive computing capitals. The spontaneous task's parental tasks are arranged. Suppose more than one task is obtainable, the algorithm allocates the task with the major computational request to the loosest capitals in its obtainable reserve list. This procedure is recurrent until all tasks have been arranged. Afterward each step, the implementation time of the present obligation is calculated. If the execution time exceeds the time constraint, the back tracks the previous step, removes the resource with minimum expense from its resource list and reassigns tasks with the reduced resource set. Backtracking keeps the previous steps where the resource list is empty and reduces the relative resource list and reassigns the tasks.

F. Genetic Algorithm

Genetic Algorithm (GA) is a experimental that impersonators the expansion of acknowledged variety. It starts with a set of initial solution and then with the help of genetic operators, will generate the new solution. This algorithm handles a large search space, applicable to the complex objective function with the help of a local optimum solution, avoiding the trap. Dramatists have industrialized a inherited algorithm, which deliver a cost founded multi QoS preparation in cloud. Inherited algorithms be appropriate to the greater class of Evolutionary Algorithm (EA).

G. Adapted ant colony optimization preparation set of rules

Adapted ant gathering optimization is an method for expanded service distribution and preparation instrument in cloud paradigm. The main goal of this optimization technique is to minimalist the scheduling quantity to package all the expanded requirements conferring to the diverse resource allocator obtainable under cloud computing location.

H. Enhanced activity created cost based algorithm

This procedure is used for effectual preparation of tasks to obtainable capitals in mist. In this algorithm the cost and computation performance are scheduled. It similarly recovers the computation or communiqué ratio by alliance the user tasks conferring to a exact cloud resource's dispensation competence and directs the assembled jobs to the reserve.

I. Particle Swarm Optimization algorithm

Particle swarm optimization is used to decrease the total charge of implementation of request workflows on Cloud computing locations. It analyses the total cost of implementation by varying the communiqué cost amongst possessions and the implementation cost of calculating funds.

J. Market Oriented Hierarchical Scheduling

Market-oriented hierarchical scheduling approach contains of service-level preparation and task-level preparation. Provision level scheduling deals the Task-to-Service project and the task-level development contracts with the optimization of the Taskto-VM project in native mist data centers. It can be used to optimize the time and cost simultaneously.

K. Profit-driven Service Request Scheduling

Two collections of profit-driven amenity demand scheduling algorithms are obtainable. These procedures are planned including a pricing perfect using procedure sharing (PS) and two acceptable deferral metrics created on service and presentation. Authors have demonstrated the efficiency of consumer applications with interdependent services. The evaluation of the algorithm was done on the basis of maximum profit and utilization. [4]

III. LITERATURE REVIEW

Zhiyuan Xu et al. in [5] accessible competent resource distribution structure and it is named Deep Underpinning Learning (DRL). It diminishes the total influence ingesting and also confirms the request of each wireless user is pleased. It defines the action space, state space and reward function for DRL agent, at the same time by applying a Deep Neutral Network to approximate the action-value function along with communicate the reserve distribution problem as a bowed optimization problematic.

Wahid Hussain establish al. in [6] implemented agent based architecture for resource allocation by defining the roles at each level in dynamic environment. This architecture has different strategies related to resource allocation such as performance scalability, reliability and security related problems in distributed environment. Broker agent, service providers, consumer agent, expert agent, monitoring agents and network administrator are included in this proposed architecture. Moreover, monitoring agent includes RHA, AA, RAA, ENA, CAA and GLAA agents. In system architecture, the role and duties of each and every agent is briefly explained. Efficiency, reliability, content analysis, scalability are considered in the proposed system.

Xiao- long et al. in [7] implemented an algorithm based on Pareto-fruit fly optimization to solve the issues in resource allocation as well as task scheduling problem in cloud computing environment. PFOA was implemented to solve the issues in multi objective resource allocation and task scheduling.
Brototi Mondala et al. in [8] introduced a load balancing technique. For allocating the task to the servers or virtual machines, Stochastic Hill climbing optimization technique is used. Cloud Analyst examines the performance of the technique. A stochastic climbing used to balance load in cloud environment. This methodology is compared with two methodologies First Come First Serve and round robin.
Amr Alaska's et al. in [9] planned an process prediction constructed reserve apportionment algorithm (PBRA). Resource reservation cost will be reduced in this method and much resource is reserved in cloud. Algorithm is proposed to minimize the issues of taking decision for resource allocation. The cost is reduced by determining reservation time and the quantity of reserved resources in the cloud.

IV. CONCLUSION

As the cloud computing technology is changing day by day a lot of new challenges are emerging. Anathema is the task preparation in a cloud calculating situation. Here comparative study shall be helpful in selection of appropriate scheduling algorithms for using different types of services as per the requirements of cloud consumers as well as cloud service providers.

REFERENCES

[1] AICY EALIYAS, DR. S. P. JENO LOVESUM, "Resource Allocation and Scheduling Methods in Cloud- A Survey" , Proceedings of the Second International Conference on Computing Methodologies and Communication (ICCMC 2018) IEEE Conference Record # 42656; IEEE Xplore ISBN:978-1-5386-3452-3.
[2] Michael Armbrust, Armando Fox, Rean Griffith, Anthony D. Joseph, Randy Katz, Andy Konwinski, Gunho Lee, David Patterson, Ariel Rabkin, Ion Stoica, and Matei Zaharia, "A View of Cloud Computing (Draft)" in Communications of the ACM 2010, Vol 53, No 4.
[3] Henzinger, Thomas A., et al. "Static scheduling in clouds." memory 200.o1 (2011): i1.
[4] Yash P. Dave,Avani S. Shelat,Dhara S. Patel , Rutvij H. Jhaveri, "Various Job Scheduling Algorithms in Cloud Computing: A Survey" , ICICES2014 - S.A.Engineering College, Chennai, Tamil Nadu, India.
[5] Zhiyuan Xu, Yanzhi Wang, Jian Tang, Jing Wang, and Mustafa Cenk Gursoy, A Deep Reinforcement Learning based Framework for Power- Efficient Resource Allocation in Cloud RANs , IEEE ICC 2017 Next Generation Networking and Internet Symposium,978-1-4673-8999- 0/17/2017 IEEE V.
[6] Wahid Hussain, Rao Muzamal Liaqat, Nazar Abbas Saqib, A Secure Agent Based Architecture for Resource Allocation in Cloud Computing.
[7] Xiao-long Zheng, Ling Wang, A Pareto based Fruit Fly Optimization Algorithm for Task Scheduling and Resource Allocation in Cloud Computing Environment,Department of Automation, Tsinghua University Beijing 100084, China,978-1-5090-0623-6/16/-2016 IEEE
[8] B. Mondal , K. Dasgupta , P. Dutta , Load balancing in cloud computing Using stochastic hill climbing-a soft computing approach, Procedia Technol. 4 (11) (2012) 783C789
[9] W. Ming , Z. Chunyan , Q. Feng , Resources allocation method on cloud computing, in: 2014 International Conference on Service Sciences (ICSS), 2014, pp. 199–201.

[1] Offloading Framework for Heterogeneous Mobile Cloud" , 1939-1374 (c) 2015 IEEE.
[2] Hongxing Li, Guochu Shou, Yihong Hu, Zhigang Guo , "Mobile Edge Computing: Progress and Challenges " , 2016 4th IEEE International Conference on Mobile Cloud Computing, Services, and Engineering.
[3] Minseok Jang and Myong-Soon Park , Sayed Chhattan Shah , "A Mobile Ad hoc Cloud for Automated Video Surveillance System" , 2017 Workshop on Computing, Networking and Communications (CNC).