A Review on Various Techniques for Job Scheduling in Cloud Computing

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Abstract: Abstract- The term “cloud computing” is a recent buzzword in the IT world. Behind this fancy poetic phrase there lies a true picture of the future of computing for both in technical perspective and social perspective. Though the term “Cloud Computing” is recent but the idea of centralizing computation and storage in distributed data centers maintained by third party companies. Cloud computing is aimed at providing IT as a service to the cloud users on-demand basis with greater flexibility, availability, reliability and scalability with utility computing model. This new paradigm of computing has an immense potential in it to be used in the field of e-governance and in rural development perspective in developing countries like India.

Keywords: cloud computing, load balancing, one time password, Round Robin, First come First Served.

1. INTRODUCTION

1.1 Cloud Computing: Cloud computing, also known as 'on-demand computing', is a kind of Internet-based computing, where shared resources, data and information are provided to computers and other devices on-demand. It is a model for enabling ubiquitous, on-demand access to a shared pool of configurable computing resources. Cloud computing and storage solutions provide users and enterprises with various capabilities to store and process their data in third-party data centers. It relies on sharing of resources to achieve coherence and economies of scale, similar to a utility over a network. At the foundation of cloud computing is the broader concept of converged infrastructure and shared services.

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management effort. Proponents claim that cloud computing allows companies to avoid upfront infrastructure costs, and focus on projects that differentiate their businesses instead of on infrastructure. Proponents also claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and enables IT to more rapidly adjust resources to meet fluctuating and unpredictable business demand. Cloud providers typically use a "pay as you go" model. This can lead to unexpectedly high charges if administrators do not adapt to the cloud pricing model.

1.2 Types of Cloud Computing:

1.2.1 Public Cloud: the whole computing infrastructure is situated on the premises of the whole computing company that offers the cloud service. The location remains, separate from the customer and he has no physical control over the infrastructure. Public cloud use shared resources; they do excel mostly in performance, but are also most vulnerable to various attacks.

1.2.2 Private Cloud: Cloud infrastructure is used by one organization. It is not shared until we doest find its situation. The cloud is externally hosted. Company can also choose one private cloud because company have this one option also, which is more expensive, but they don’t have physical control over the infrastructure. Public cloud use shared resources; they do excel mostly in performance, but are also most vulnerable to various attacks.

1.2.3 Hybrid cloud: we use both private and public cloud depending on their purpose. For example, public cloud can be used to interact with customers, while private cloud is use to secure the data of the customers.

1.3 LOAD BALANCING:
Load balancing is the technique which makes sure that every processor within the system or every node in the network consume equal amount of power and finish approximately equal amount of work at any
instant of time. The load can be identified as data uploading capacity, CPU load or network delay. Now these days the load is balance, developers are focusing on related issues like how to increase network bandwidth and reduce response time and delay in the data transfer. Cost has become the main challenging issues in cloud computing so developers are need to be take care of cost at the time of providing the solution of the above stated problem of load balancing. To optimize the performance of cloud architecture various load balancing mechanisms should be followed in a well manner. Overloaded nodes across the server and storage side often lead to performance degradation and are more vulnerable to various failures.

1.4 CLOUD COMPUTING APPLICATION & MECHANISMS

Cloud computing is web based development and utilization of Internet based computing and storage. The cloud principles arose from a direct industrial need to improve the resource utilization without impacting on consumer requirements, i.e. use the available resources more efficiently.

1.4.1 Infrastructure as a service (IaaS) and platform as a service (PaaS): When it comes to IaaS, using an existing infrastructure on a pay-per-use scheme seems to be an obvious choice for companies saving on the cost of investing to acquire, manage and maintain an IT infrastructure. There are also instances where organizations turn to PaaS for the same reasons while also seeking to increase the speed of development on a ready-to-use platform to deploy applications.

1.4.2 Privatecloud and hybridcloud: Among the many incentives for using cloud, there are two situations where organizations are looking into ways to assess some of the applications they intend to deploy into their environment through the use of a cloud (specifically a public cloud). While in the case of test and development it may be limited in time, adopting a hybrid cloud approach allows for testing application workloads, therefore providing the comfort of an environment without the initial investment that might have been rendered useless should the workload testing fail.

1.4.3 Test and development: Probably the best scenario for the use of a cloud is a test and development environment. This entails securing a budget, setting up your environment through physical assets, significant manpower and time. Then comes the installation and configuration of your platform. All this can often extend the time it takes for a project to be completed and stretch your milestones. With cloud computing, there are now readily available environments tailored for your needs at your fingertips. This often combines, but is not limited to, automated provisioning of physical and virtualized resources.

1.4.4. Big data analytic: One of the angles offered by utilizing cloud computing is the capacity to take advantage of limitless amounts of both organized and unstructured information to bridle the advantage of separating business esteem. Retailers and suppliers are currently separating data got from customers purchasing examples to focus on their publicizing and promoting effort to a specific fragment of the populace. Long range informal communication stages are currently giving the premise to examination on behavioral examples that associations are utilizing to infer significant data.

1.4.5. File storage: Cloud can offer you the possibility of storing your files and accessing, storing and retrieving them from any web-enabled interface. The web services interfaces are usually simple. At any time and place you have high availability, speed, scalability and security for your environment. In this scenario, organizations are only paying for the amount of storage they are actually consuming, and do so without the worries of overseeing the daily maintenance of the storage infrastructure. There is also the possibility to store the data either on or off premises depending on the regulatory compliance requirements. Data is stored in virtualized pools of storage hosted by a third party based on the customer specification requirements.

1.4.6. Disaster recovery: This is yet another benefit derived from using cloud based on the cost effectiveness of a disaster recovery (DR) solution that provides for a faster recovery from a mesh of different physical locations at a much lower cost that the traditional DR site with fixed assets, rigid procedures and a much higher cost.

1.4.7. Backup: Backing up data has always been a complex and time-consuming operation. This included maintaining a set of tapes or drives, manually collecting them and dispatching them to a backup facility with all the inherent problems that might happen in between the originating and the backup site. This way of ensuring a backup is performed is not immune to problems such as running out of backup media, and there is also time to load the backup devices for a restore operation, which takes time and is prone to malfunctions and human errors.

2. REVIEW OF LITERATURE

Shaikh et al [1] “Security threats in cloud computing” In this paper author proposed that This study aims to identify the most vulnerable security threats in cloud computing, which will enable both end users and vendors to know about the key security threats associated with cloud computing. In this paper, our work will enable researchers and security professionals to know about users and vendors concerns and critical analysis about the different security models and tools proposed.
expresses concern about critical issues (such as parts of the IT industry. IT organizations have some of them. Kalagiakos et al [5]. "Cloud Computing learning."

Author want to proposed that this paper sees cloud computing ecosystem as a new opportunity in designing cloud computing educational platforms where learning actors can reuse learning resources handled by cloud educational operating systems. To enhance learning objects portability and interoperability not only cloud computing API standards should be advocated by the key cloud providers but also learning resources standards should be defined by the Open Cloud Computing Education Federation as proposed by this paper.

### 3. APPROACHES USED

#### 3.1 Min-Min algorithm:

Min-Min algorithm is a simple, efficient algorithm that produces a better schedule that minimizes the total completion time of tasks than other algorithms in the literature. However, the biggest drawback of it is load imbalanced, which is one of the central issues for cloud providers. In this paper, an improved load balanced algorithm is introduced on the ground of Min-Min algorithm in order to reduce the makespan and increase the resource utilization (LBIMM). At the same time, Cloud providers offer computer resources to users on a pay-per-use base. In order to accommodate the demands of different users, they may offer different levels of quality for services. Then the cost per resource unit depends on the services selected by the user. In return, the user receives guarantees regarding the provided resources.

To observe the promised guarantees, user-priority was considered in our proposed PA-LBIMM so that user's demand could be satisfied more completely. At last, the introduced algorithm is simulated using Matlab toolbox. The simulation results show that the improved algorithm can lead to significant performance gain and achieve over 20% improvement on both VIP user satisfaction and resource utilization ratio.

#### 3.2 Shortest Job First:

Shortest job next (SJN), also known as Shortest Job First (SJF) or Shortest Process Next (SPN), is a scheduling policy that selects the waiting process with the smallest execution time to execute next. SJN is a non-preemptive algorithm. Shortest remaining time is a preemptive variant of SJN. Shortest job next is advantageous because of its simplicity and because it minimizes the average amount of time each process has to wait until its execution is complete. However, it has the potential for process starvation for processes which will require a long time to complete if short processes are continually added. Highest response ratio next is similar but provides a solution to this problem. Another disadvantage of using shortest job next is that the total execution time of a job must be known before execution. While it is not possible to perfectly predict execution time, several methods can be used to estimate the execution time for a job, such as a weighted average of previous execution times.
3.3 First Come First Serve:
In First Come and First Serve (FCFS) occupations are executed on first come, first serve premise. The Job is straightforward and actualizes. But this job is sometimes poor in execution as normal hold up time is high.

<table>
<thead>
<tr>
<th>Process</th>
<th>Arrival Time</th>
<th>Execution Time</th>
<th>Service Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>P1</td>
<td>1</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>P2</td>
<td>2</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>P3</td>
<td>3</td>
<td>5</td>
<td>15</td>
</tr>
</tbody>
</table>

Hold up time of every procedure is following

P0: 0, P1: 5, P2: 11, P3: 15


3.4 Round Robin:
A round robin is a game plan of picking all components in a gathering similar in some sane request, as a rule from the top to the base of a rundown and after that beginning again at the highest priority on the rundown. A straightforward approach to consider round robin is that it is about "alternating." Used as a descriptive word, round robin gets to be "round-robin."

In computer operation, one technique for having diverse project process alternate utilizing the assets of the PC is to cutoff every procedure to a specific brief time period, then suspending that procedure to give another procedure a turn (or "time-cut"). This is regularly portrayed as round-robin process planning. In games competitions and different amusements, interactive processes which generally follow a pattern of alternating between waiting for a command and executing it. If the execution burst of a process is regarded as a separate "job", past behavior can indicate which process to run next, based on an estimate of its running time.

4. CONCLUSION
In cloud computing various users sends request for the transmission of data for different demands. The access to different no. of user increases load on the cloud servers. Due to these cloud server does not provides best efficiency. To provide best efficiency load has to be balanced main problem in the paper is that different jobs can be divides in tasks. The job dependency checking is done on the basis of directed a cyclic graph. The dependency checking the make span has to created on the basis of shortest job first and round robin approach. The minimization can be done on the basis of using min-min algorithm.

5. FUTURE SCOPE
In future we can implement this in real world application. We can use Acyclic Graph for checking the dependency. We can use Min-Min algorithm, Round Robin, Shortest Job First approach.

REFERENCES