

An Efficient Profit-based Job Scheduling Strategy for Service Providers in Cloud Computing Systems

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ABSTRACT

In the cloud computing environment, one of the major activities is Job Scheduling. With the concepts of the existing profit-based scheduling mechanism, we have designed an enhanced model which gives better profits to the cloud service providers. Cloud users deploy the jobs requests on the cloud. A set of jobs which are ready to execute will be picked and arranged in non-decreasing order of their profits before execution. By carrying out these operations in parallel the processing time will be reduced. Thereby, we can guarantee the better profits to the service providers with the better Quality of Service (QoS).

Keywords: Cloud Computing, Cloud Service Provider, Cloud User, Job Scheduling, Profit, QoS.

1. INTRODUCTION

The need of computing is swiftly increasing day to day as the technologies are growing. Investing more on the computation by providing more resources is not economical for any organization. This is the reason for cloud computing paradigm evolution. Cloud computing is one of the upcoming latest technology which is developing drastically [1]. Cloud defined as on demand pay-as-per-use model in which shared resources, information, software and other devices are provided according to the clients' requirement when needed [2]. Through cloud computing the computing resources and services can be efficiently delivered and utilized, making the vision of computing utility realizable [3]. Cloud system comprises of three main components: cloud service provider, cloud services and cloud consumer. Cloud user consumes the services provided by the providers based on their requirements. Cloud provider offers Infrastructure as a Service (IaaS), Software as a Service (SaaS) or Platform as a Service (PaaS)) through cloud. IaaS mainly focus on the efficient use of the cloud infrastructure. Paas provides platform to build and deploy the applications. Instead of developing their own software solutions, cloud consumers can subscribe to solutions using SaaS. In Software as a Service (SaaS), companies evaluate existing software SaaS solutions based on how close they meet their functional and non-functional requirements [4]. Virtual Machines (VMs) concept divides the physical resources into number logical units and enables the abstraction of an application and operating system from the hardware [5]. Using virtualization, dynamic resources can be managed effectively on cloud. Through VMs services and mapping it to physical server, the heterogeneity and interoperability subscriber's requirements can be better solved and QoS can be guaranteed. The resources on cloud are highly dynamic and heterogeneous, VMs should adapt to the cloud environment to fully utilize services and resources to achieve best performance. In order to improve resource utility, resources must be properly allocated [6]. One of the challenging issues in cloud computing is job scheduling. Scheduling in cloud is responsible for selection of best suitable resources for task execution, by taking some static and dynamic parameters and restrictions of tasks' into consideration. Conventional job scheduling methods in cloud rarely focus on the maximum profits for the service providers. In today's challenging economic environment; the promise of reduced expenditure gives new lease to the cloud service providers. So, service providers always think of gaining maximum profit by offering cloud computing resources and meeting job QoS (Quality of Service) requirement of the users [7]. To meet both the requirements, job scheduling systems must take efficient and economical strategies. This paper mainly focuses on these issues by using enhanced profit-based scheduling algorithm.

2. PROPOSED MODEL

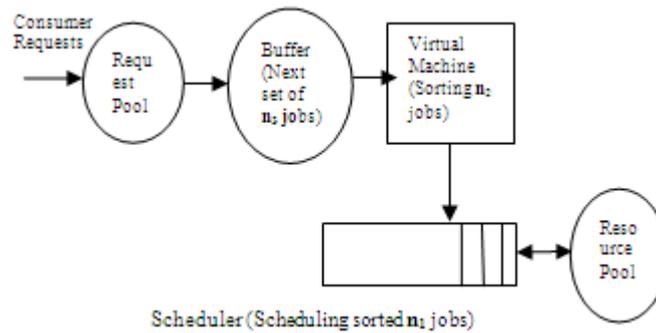


Figure 1: Architecture of Profit-Based Job Scheduling.

2.1 Algorithm

Our proposed algorithm can be described as follows-

Step1: Cloud consumers send the jobs requests to the service providers.

Step2: These requests will be stored in the Request-Pool.

Step3: Select the requests which are ready-to-execute from the Request-Pool and place it in the Buffer.

Step4: Put these jobs onto a Virtual Machine and sort it in ascending order of their profits by using any time efficient sorting algorithm.

Step5: The sorted list will be given to the job scheduler for the execution by using appropriate resources from the Resource-Pool.

Step6: Repeat step-3 to step-5 for next set of ready-to-execute jobs.

Job's profit will be measured based on the following parameters-

- i. Usage of Low-Cost Resources.
- ii. Less Execution Time.
- iii. Combination of the both.

3. ANALYSIS

In our proposed algorithm the following operations will be executing in parallel. Thereby, the overall processing time will be reduced-

- i) Reading next set of jobs n_3 from Request-Pool to Buffer.
- ii) Sorting the previous set of jobs n_2 in the VM.
- iii) Executing the set of sorted jobs n_1 which are there in Job Scheduler.

Our proposed algorithm gives better results, because of-

- i) Three major processing parts of our algorithm will be executing in parallel. This reduces the processing time, leads to better Quality of Service (QoS).
- ii) Usage of the best time-efficient sorting algorithm (whose time efficiency is $\log_2 n$).
- iii) Less starvation for the Low-Profitable jobs in that time span.

4. CONCLUSION

Proposed algorithm gives the better profits to the cloud service provider by executing more profitable jobs prior to the less profitable ones with the better Quality of Service (QoS). In future we try to enhance this proposed algorithm by considering other scheduling parameters also to achieve more profits. And also, we try to implement this strategy in cloud environment.

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