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Cloud Workflow Scheduling With Deadlines and Timeslots Availability

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Abstract:
Allocating service capacities in cloud computing is based on the assumption that they are unlimited and can be used at any time. However, available service capacities change with workload and cannot satisfy users' requests at any time from the cloud provider's perspective because cloud services can be shared by multiple tasks. Cloud service providers provide available time slots for new user's requests based on available capacities. In this paper, we consider workflow scheduling with deadline and time slot availability in cloud computing. An iterated heuristic framework is presented for the problem under study which mainly consists of initial solution construction, improvement, and perturbation. Three initial solution construction strategies, two greedy- & fair-based improvement strategies and a perturbation strategy are propose. .Different strategies in the three phases result in several heuristics. Experimental results show that different initial solution and improvement strategies have different effects on solution qualities.

Introduction

Now a day's much attention has been paid on workflow scheduling in service computing environments (cloud computing, grid computing, Web services, etc). Resources are generally provided in the form of services, especially in cloud computing. There are two common ways for service delivery:

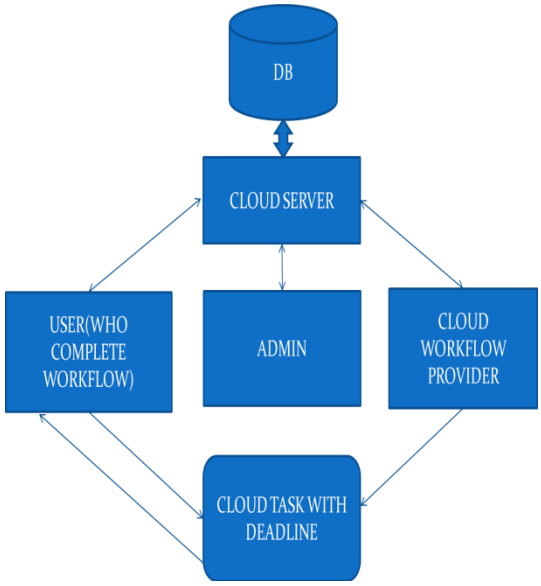
(i) An entire application as a service, which can be directly used with no change.

(ii) Basic services are combined to build complex applications, e.g., Xignite and StrikeIron offer Web services hosted on a cloud on a pay-per-use basis [1].

Among a large number of services in cloud computing, there are many services which have same functions and supplied by different cloud service providers (CSPs). However, these services have different non-functional properties. Basic services are rented by users for their complex applications with various resource requirements which are usually modeled as workflows. Better services imply higher costs. Services are consumed based on Service-Level Agreements, which define parameters of Quality of Service in terms of the pay-per-use policy. Though there are many parameters or constraints involved in practical workflow scheduling settings, deadline and time slot are two crucial ones in cloud computing, a new market oriented business model, which offers high quality and low cost information services. However, the two constraints have been considered separately in existing researches. It is necessary to consider both of the constraints jointly because:

(i) Deadlines of the workflow applications need to be met.

(ii) Unreserved time slots are crucial for resource utilization from the perspective of service providers new resources (saving money).



Proposed system

1. We consider workflow scheduling with deadline and time slot availability in cloud computing.

2. Service capacities are usually regarded to be unlimited in cloud computing, which can be used at any time.

3. Available service capacities change with workloads, i.e., they cannot satisfy user's requests at any time when a cloud service is shared by multiple tasks.

4. There are two candidate services with different workloads. Though there are many available time slots, not all of the meet requirements of activities of workflow instances.

Objectives of proposed system

1. We have considered workflow scheduling with deadline and time slots constraints in cloud computing to minimize total costs.
2. Three initial solution construction strategies were developed among which the MCARF and the MACF showed more effective than the EFTF on initial solution construction.
3. Generally, longer execution time implies cheaper cost cloud computing for the DTCTP

Conclusion

The Cloud computing model enables users to obtain their required services with desired QoS (such as deadline) by paying an appropriate price. In this paper, we propose a new algorithm named the SaaS Cloud Partial Critical Path (SC-PCP) for workflow scheduling in SaaS Clouds, which minimizes the total execution cost while meeting a user-defined deadline. We evaluate our algorithm by simulating it with synthetic work flows that are based on real scientific workflows with different structures and sizes. The results show that SC-PCP outperforms another highly cited algorithm called Deadline-MDP. Furthermore, the experiments show that the computation time of the algorithm is very low for the Decrease Cost and the Fair policies, but is much longer for the Optimized policy, although still acceptable for the mentioned workflows. In the future, we plan to extend our algorithm to support other Cloud computing models, such as IaaS and other pricing models.

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