

## PROFIT MAXIMIZATION FOR CLOUD BROKERS IN CLOUD COMPUTING

### Abstract:

Along with the development of cloud computing, more and more applications are migrated into the cloud. An important feature of cloud computing is pay-as-you-go. However, most users always should pay more than their actual usage due to the one-hour billing cycle. In addition, most cloud service providers provide a certain discount for long-term users, but short-term users with small computing demands cannot enjoy this discount. To reduce the cost of cloud users, we introduce a new role, which is cloud broker. A cloud broker is an intermediary agent between cloud providers and cloud users. It rents a number of reserved VMs from cloud providers with a good price and offers them to users on an on-demand basis at a cheaper price than that provided by cloud providers. Besides, the cloud broker adopts a shorter billing cycle compared with cloud providers. By doing this, the cloud broker can reduce a great amount of cost for user. In addition to reduce the user cost, the cloud broker also could earn the difference in prices between on-demand and reserved VMs. In this paper, we focus on how to configure a cloud broker and how to price its VMs such that its profit can be maximized on the premise of saving costs for users. Profit of a cloud broker is affected by many factors such as the user demands, the purchase price and the sales price of VMs, the scale of the cloud broker, etc.. Moreover, these factors are affected mutually, which makes the analysis on profit more complicated. In this paper, we firstly give a synthetically analysis on all the affecting factors, and define an optimal multiserver configuration and VM pricing problem which is modeled as a profit maximization problem. Secondly, combining the partial derivative and bisection search method, we propose a heuristic method to solve the optimization problem. The near-optimal solutions can be used to guide the configuration and VM pricing of the cloud broker. Moreover, a series of comparisons are given which show that a cloud broker can save a considerable cost for users.

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