

Dynamic Pricing for Maximizing Cloud Revenue: A Column Generation Approach

ABSTRACT

Virtualization underpins the emergence of Infrastructure as a Service (IaaS) to provide service delivery. Even with virtualized resources, the cloud industry suffers from underutilization off the peak load periods. Hence it is essential for a pricing mechanism to satisfy both customers' demands and budgets as well as maximizing the cloud revenue. The limited works on dynamic pricing consider selling the entire population of VMs in the cloud, resulting in increased processing time and risk. Motivated by the aforementioned concerns, this paper proposes a dynamic pricing model that strives to minimize the inevitable stagnant VMs, while working to maximize cloud revenue. In particular, this paper explores the factors that drive price dynamism following the pay-as-you-go pricing scheme that is rapidly adopted in cloud services. We present a new dynamic pricing approach based on a linear programming relaxation of Stochastic Markov Decision processes. To further reduce the high dimensionality, we employ column generation. Numerical evaluations show practical scalability, as well as prominent influences that could be adopted by cloud providers for revenue maximization.