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SDSU
presents
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A Method for Minimizing Computing Core Costs in Cloud Infrastructures That Host Location-Based Advertising Services

Abstract

Cloud computing provides services to a large number of remote users with diverse requirements, an increasingly popular paradigm for accessing computing resources over the Internet. Location-based services (LBS) for offering targeted, real-time advertising is an emerging retail practice wherein a mobile user receives offers for goods and services through a smart phone application. These advertisements can be targeted to individual potential customers by correlating a smart phone user's interests to goods and services being offered within close proximity of the user. In this work, we examine the problem of establishing a Service Level Agreement (SLA) to determine the appropriate number of microprocessor cores required to constrain the query response time for a targeted advertisement to reach a mobile customer, within approachable distance to a Point of Sale (POS). We assume the optimum number of cores required to maintain a SLA is one which minimizes microprocessor core expenses, charged by infrastructure providers, while maximizing application service provider revenues derived from POS transaction fees. This problem is challenging because changes in the number of microprocessor cores assigned to database resources can result in changes in the time taken to transmit, receive, and interpret a targeted advertisement sent to a potential customer in motion. We develop a methodology to establish an equilibrium state between the utility gained from POS transaction revenues and costs incurred from purchasing microprocessor cores from infrastructure providers. We present different approaches based on an exponential, linear, and Huff method to model customer purchase decisions. From these models, the marginal cost and marginal revenue is calculated to determine the optimal number of microprocessor cores to purchase and assign to database resources.

Thesis Committee

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