

# Efficient Resource Management for Infrastructure as Service Cloud Providers

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**Abstract**—Cloud computing consists of a variety of computing services that are running on the service provider's infrastructure. Due to the restricted amount of computing resources and dramatic increase in cloud users, cloud providers may fail to provide service to potential cloud users. A cloud user who, at any given time, fails to receive the needed resources with the expected quality, may likely switch from one cloud provider to another. Cloud providers should offer high quality services, with a guarantee of not restricting the number of accepted requests, maximize their profit, utilize their resources, and dynamically increase their available resources using cloud federation strategy, which prompt cloud service providers to collaborate and trade computing resources. This study is based on different scenarios of standalone cloud and federated cloud using discrete event simulation, explores the impact of profit, and processing costs before and after cloud federation. The study presents policies for decisions whether cloud providers should outsource resources or use internal resources and the effect of outsourcing on the provider's benefits. Additionally, the study proposes a new resource allocation for cloud providers in the federated environment based on the quality matchmaking algorithm for selecting the suitable cloud provider.

**Keyword**—Cloud computing, cloud federation, discrete-event simulation, Infrastructure-as-a-service, resource allocation, service measurement index



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