

Hedging Risk in Cloud Computing Markets by Cloud Service Option Contracts: An Extended Abstract

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Cloud computing is recognized today as the most efficient solution to the implementation of computing operations of modern businesses. Cloud technology and services are evolving and expanding. In accordance with numerous forecasts, the pace of development of cloud technology and deployment of cloud services will bring half of the business world in the “cloud” within the next decade. Moving computing components of a business to the cloud, however, is not simple. This movement means managing multiple relationships, multiple contracts with multiple cloud service providers, multiple payments, multiple passwords, multiple data streams. That leads to the question about how to unify all the efforts to get maximum effectiveness and efficiency.

A cloud computing brokerage is an answer to this question. Similarly to brokerages in the financial services industry, cloud computing brokerage represents an intermediary between providers and consumers of cloud computing services. It is a third party company that also creates an additional value to cloud computing services that makes them more specific to the consumers, integrates or aggregates cloud services from different providers and enhances their security. In the nearest future, therefore, we can expect the appearance of the cloud computing brokerage industry, which will be similar to the finance brokerage industry.

All participants of the cloud computing market, i.e., cloud service providers, brokers and consumers, are exposed to risk of changing the service price and (as an extreme form of this change) the service failure. This risk can be mitigated in a similar way as it is done in financial markets, namely, by standardizing cloud services and issuing derivatives on them. The main issue of such a standardization is the quantification of cloud services and introducing their *trading units*. Once these units are introduced, a cloud service of a certain type can be measured and considered as a regular commodity and hence publicly traded on the cloud computing exchange. Cloud service derivatives then can be constructed as commodity derivatives like future and option contracts.

In this article, we consider cloud service option contracts on cloud computing services whose mechanism is similar to that of option contracts on commodity futures. These are *call option* contracts that give the right to buy a specified cloud service of a certain type (underlying instrument) in a certain quantity at a fixed price (exercise price) before or on a specified date (expiration date); and *put option* contracts that give the right to sell. The main attention of our research is focused on multi-leg options contracts that allow the cloud computing brokers to construct risk averse business strategies.