Towards Differential Query Services in Cost-Efficient Clouds

Abstract:

Cloud computing as an emerging technology trend is expected to reshape the advances in information technology. In a cost-efficient cloud environment, a user can tolerate a certain degree of delay while retrieving information from the cloud to reduce costs. In this paper, we address two fundamental issues in such an environment: privacy and efficiency. We first review a private keyword-based file retrieval scheme that was originally proposed by Ostrovsky. Their scheme allows a user to retrieve files of interest from an untrusted server without leaking any information. The main drawback is that it will cause a heavy querying overhead incurred on the cloud and thus goes against the original intention of cost efficiency. In this paper, we present three efficient information retrieval for ranked query (EIRQ) schemes to reduce querying overhead incurred on the cloud. In EIRQ, queries are classified into multiple ranks, where a higher ranked query can retrieve a higher percentage of matched files. A user can retrieve files on demand by choosing queries of different ranks. This feature is useful when there are a large number of matched files, but the user only needs a small subset of them. Under different parameter settings, extensive evaluations have been conducted on both analytical models and on a real cloud environment, in order to examine the effectiveness of our schemes.