Masters Final Oral Defense

Thursday, February 23rd, 2017
113 Atanasoff Hall at 3:00 p.m.

Zhenbi Hu

Parity-based Data Outsourcing: Performance Evaluation and Extension

Our research has developed a Parity-based Data Outsourcing (PDO) model. This model outsources a set of raw data by associating it with a set of parity data and then distributing both sets of data among a number of cloud servers that are managed independently by different service providers. Users query the servers for the data of their interest and are allowed to perform both authentication and correction. The former refers to the capability of verifying if the query result they receive is correct (i.e., all data items that satisfy the query condition are received, and every data item received is original from the data owner), whereas the latter, the capability of correcting the corrupted data, if any. Existing techniques support only query authentication, but not error correction. Moreover, they all rely on complex cryptographic techniques and require the cloud server to build verification objects. In contrast, our approach achieves both without using any encryption. Moreover, it does not require installing any additional software on a cloud server and thus can take advantage of the many cloud data management services available on the market today.

This thesis makes the following contributions. 1) We present an implementation of the PDO model, including parity coding, data encoding, data retrieval, query authentication and correction. 2) We evaluate the performance of this model. We compare it with Merkle Hash Tree (MH-tree) and Signature Chain, two existing techniques that support query authentication, in terms of storage, communication, and computation overhead. 3) We extend the PDO model, which was originally designed for one-dimensional data, to handle multi-dimensional data.

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