A survey on proof of retrievability for cloud data integrity and availability: cloud storage state-of-the-art, issues, solutions and future trends

ABSTRACT

Cloud storage has emerged as the latest trend for data storage over the traditional storage method which consume more storage spaces of data owner resources for backup and disaster recovery purposes. Due to the openness nature of cloud storage, trustworthy to the storage providers remains a critical issue amongst data owners. Hence, a huge number of businesses around the world remains choosing traditional storage method over cloud storage. This indicates a need for cloud storage providers to adopt cloud integrity schemes to ensure the outsourced data is secured to gain trustworthiness from clients. There are two main cloud integrity schemes available to ensure data integrity and availability: (i) Provable Data Possession (PDP) and (ii) Proof of Retrievability (PoR). PDP and PoR are protocols designed for cloud storage to proof to clients that the stored data is intact. Although PDP and PoR have similar functionality for providing cloud data integrity and availability, PoR is found to be much better than PDP with respect to full data retrievability as PoR provides recovery to faulty or corrupted outsourced data in which PDP does not cover. The objective of this paper is to examine the state-of-the-art of PoR and subsequently to identify the issues of employing PoR on cloud storage and suggest possible solutions. We analyse available PoR schemes. Then, the issues and challenges as a result of employing PoR specifically and cloud storage generally are described. Some possible countermeasures to address the identified issues are suggested. Finally, the potential future work of PoR schemes and future trends of cloud storage are presented.