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Practical-oriented Protocols for Privacy-preserving Outsourced Big Data Analysis: Challenges and Future Research Directions

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Abstract

With the significant increase in the volume, variety, velocity and veracity of data generated, collected and transmitted through computing and networking systems, it is of little surprise that big data analysis and processing is the subject of focus from enterprise, academia and government. Outsourcing is one popular solution considered in big data processing, although security and privacy are two key concerns are often attributed to the underutilization of outsourcing and other promising big data analysis and processing technologies. In this paper, we survey the state-of-the-art literature on cryptographic solutions designed to ensure the security and/or privacy in big data outsourcing. For example, we provide concrete examples to explain how these cryptographic solutions can be deployed. We summarize the existing state-of-play before discussing future potentially beneficial research topics.

Keywords: Big data analysis, Privacy-preserving, Outsourced Big Data, Oblivious RAM, Security, Practical-oriented, Secure query

1. Introduction

With constant advances in multimedia and social networks, software-defined networks, cloud storage and other storage high capacity, high performance, high reliability and

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