**BSSPD: A Blockchain-Based Security Sharing Scheme for Personal Data with Fine-Grained Access Control**

**Abstract**

Privacy protection and open sharing are the core of data governance in the AI-driven era. A common data-sharing management platform is indispensable in the existing data-sharing solutions, and users upload their data to the cloud server for storage and dissemination. However, from the moment users upload the data to the server, they will lose absolute ownership of their data, and security and privacy will become a critical issue. Although data encryption and access control are considered up-and coming technologies in protecting personal data security on the cloud server, they alleviate this problem to a certain extent. However, it still depends too much on a third-party organization’s credibility, the Cloud Service Provider (CSP). In this paper, we combined blockchain, ciphertext-policy attribute-based encryption (CP-ABE) and Inter Planetary File System (IPFS) to address this problem to propose a blockchain-based security sharing scheme for personal data named BSSPD. In this user centric scheme, the data owner encrypts the sharing data and stores it on IPFS, which maximizes the scheme’s decentralization. The address and the decryption key of the shared data will be encrypted with CP-ABE according to the specific access policy, and the data owner uses blockchain to publish his data-related information and distribute keys for data users. Only the data user whose attributes meet the access policy can download and decrypt the data. The data owner has fine-grained access control over his data, and BSSPD supports an attribute-level revocation of a specific data user without affecting others. To further protect the data user’s privacy, the ciphertext keyword search is used when retrieving data. We analyzed the security of the BBSPD and simulated our scheme on the EOS blockchain, which proved that our scheme is feasible. Meanwhile, we provided a thorough analysis of the storage and computing overhead, which proved that BSSPD has a good performance.