Identity-Based Proxy-Oriented Data Uploading and Remote Data Integrity Checking in Public Cloud

More and more clients would like to store their data to public cloud servers (PCSs) along with the rapid development of cloud computing. New security problems have to be solved in order to help more clients process their data in public cloud. When the client is restricted to access PCS, he will delegate its proxy to process his data and upload them. On the other hand, remote data integrity checking is also an important security problem in public cloud storage. It makes the clients check whether their outsourced data are kept intact without downloading the whole data. From the security problems, we propose a novel proxy-oriented data uploading and remote data integrity checking model in identity-based public key cryptography: identity-based proxy-oriented data uploading and remote data integrity checking in public cloud (ID-PUIC). We give the formal definition, system model, and security model. Then, a concrete ID-PUIC protocol is designed using the bilinear pairings. The proposed ID-PUIC protocol is provably secure based on the hardness of computational Diffie-Hellman problem. Our ID-PUIC protocol is also efficient and flexible. Based on the original client's authorization, the proposed ID-PUIC protocol can realize private remote data integrity checking, delegated remote data integrity checking, and public remote data integrity checking.