

AN ATTRIBUTE-BASED CONTROLLED COLLABORATIVE ACCESS CONTROL SCHEME FOR PUBLIC CLOUD STORAGE

Abstract:

In public cloud storage services, data are outsourced to semi-trusted cloud servers which are outside of data owners' trusted domain. To prevent untrustworthy service providers from accessing data owners' sensitive data, outsourced data are often encrypted. In this scenario, conducting access control over these data becomes a challenging issue. Attribute-based encryption (ABE) has been proved to be a powerful cryptographic tool to express access policies over attributes, which can provide a fine-grained, flexible, and secure access control over outsourced data. However, the existing ABE-based access control schemes do not support users to gain access permission by collaboration. In this paper, we explore a special attribute-based access control scenario where multiple users having different attribute sets can collaborate to gain access permission if the data owner allows their collaboration in the access policy. Meanwhile, the collaboration that is not designated in the access policy should be regarded as a collusion and the access request will be denied. We propose an attribute-based controlled collaborative access control scheme through designating translation nodes in the access structure. Security analysis shows that our proposed scheme can guarantee data confidentiality and has many other critical security properties. Extensive performance analysis shows that our proposed scheme is efficient in terms of storage and computation overhead.

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