**ABSTRACT:**

Cloud computing is a revolutionary computing paradigm, which enables flexible, on-demand, and low-cost usage of computing resources, but the data is outsourced to some cloud servers, and various privacy concerns emerge from it. Various schemes based on the attribute-based encryption have been proposed to secure the cloud storage. However, most work focuses on the data contents privacy and the access control, while less attention is paid to the privilege control and the identity privacy. In this paper, we present a semi-anonymous privilege control scheme *AnonyControl* to address not only the data privacy, but also the user identity privacy in existing access control schemes. *AnonyControl* decentralizes the central authority to limit the identity leakage and thus achieves semianonymity. Besides, it also generalizes the file access control to the privilege control, by which privileges of all operations on the cloud data can be managed in a fine-grained manner. Subsequently, we present the *AnonyControl-F*, which fully prevents the identity leakage and achieve the full anonymity. Our security analysis shows that both *AnonyControl* and *AnonyControl-F* are secure under the decisional bilinear Diffie–Hellman assumption, and our performance evaluation exhibits the feasibility of our schemes.

**SYSTEM ARCHITECTURE:**

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