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基于信任的P2P真实性查询及副本管理算法

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Abstract

For the information sharing Peer-to-Peer (or P2P) systems, the document security is an important metric to evaluate the performance, so this paper concentrates on the optimization of document security in file sharing P2P system. For the highly autonomous P2P systems, because the document security in P2P systems mainly depends on two aspects: the security of the documents' carrier and the mechanisms related to the document, such as the replica management, the improvement of the document security can not depend on the improvement of the peers' security, but rely on the mechanisms related to the document. A query protocol sensitive to the document security is designed first in this paper. Based on this protocol, the mechanisms related to the document can be formally described as functions, and the improvement of the system document security can be transformed into the mathematical analyses on the function space. Derived from the results of mathematical analyses, a set of algorithms for replica managements are designed, aiming at improving the document security. In ideal situation, this set of algorithms can achieve the optimization for document security seen from the theoretical analyses, and in realistic systems, the algorithms can obtain good effects, approach to the optimal level. The algorithms are verified by lots of experimental results.

Li ZJ, Liao MH. P2P authenticity query and replica management algorithm based on trust. *Journal of Software*, 2006,17(4):939-948.

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摘要

文档安全性对于信息共享Peer-to-Peer(或P2P)系统而言是一项重要的性能指标,以P2P系统的文档安全性优化为目标.P2P系统的文档安全性主要取决于两方面的因素:其载体的安全性和文档相关机制的构造,如副本管理等.对于P2P这样高度自主的分布式系统而言,文档安全性的提高无法依赖于结点安全性的提高,而应依靠对文档相关机制的控制来实现.首先设计了一个对文档安全性敏感的查询协议,以该查询协议为基础,与文档相关的机制就可以形式化地表述为函数,而系统文档安全性的提高就转化为函数空间上的数学分析.基于函数分析的结果,设计了一套旨在提高文档真实性的副本管理算法集合.理论分析的结果表明:在理想情况下,该算法集合可达到文档真实性的优化.对于实际系统,经过大量的模拟实验结果验证,该算法集可以获得良好的效果,接近优化水平.

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