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Priyanka Singh, Balasubramanian Raman

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Reversible Data Hiding for Rightful Ownership Assertion of Images in Encrypted Domain over Cloud

Priyanka Singh and Balasubramanian Raman

*Department of Computer Science and Engineering, Indian Institute of Technology
Roorkee, Roorkee, Uttarakhand, INDIA*

Abstract

The explosive growth in the multimedia contents is shifting the global infrastructure towards cloud based paradigm which is facilitated with enormous storage capacity and high end computational resources. However, the high chances of security breaches possible in the wide attacking surface of public cloud is alarming for measures that could put it in check. Encryption before outsourcing may serve as a possible solution but maintaining the same cloud services in encrypted domain is very challenging problem. Towards this end, we have proposed a reversible data hiding scheme in encrypted domain that will securely transmit the media information over cloud architecture and prove its rightful ownership. The scheme is based on Chinese Remainder Theorem(CRT) based secret sharing scheme that distributes the media information into multiple encrypted shares and embeds a secret information into the encrypted shares based on a secret key. These data embedded encrypted shares could now be securely outsourced to the remotely distributed cloud data centers where they may be attacked by the intruders. The robustness has been validated against different attack scenarios in the encrypted domain and the proposed scheme was found to be performing satisfactorily well.

Keywords: Chinese Remainder Theorem, Secret Sharing, Reversible Data Hiding, Encrypted Domain, Rightful Ownership

1. Introduction

Cloud based paradigm has attracted the global infrastructure with substantial benefits of high end computational resources and enormous stor-

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