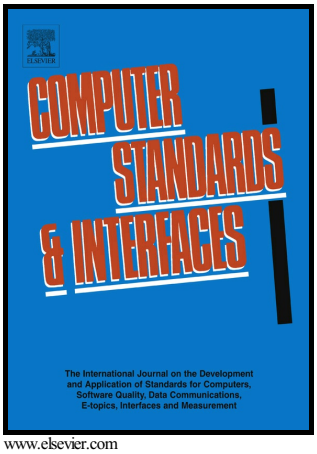
Identity-based conditional proxy re-encryption with fine grain policy

Chunpeng Ge, Willy Susilo, Jiandong Wang, Liming Fang



www.elsevier.com

PII: S0920-5489(16)30234-3
DOI: http://dx.doi.org/10.1016/j.csi.2016.12.005
Reference: CSI3182

To appear in: *Computer Standards & Interfaces*

Received date: 18 May 2016
Revised date: 22 October 2016
Accepted date: 23 December 2016

Cite this article as: Chunpeng Ge, Willy Susilo, Jiandong Wang and Liming Fang, Identity-based conditional proxy re-encryption with fine grain policy *Computer Standards & Interfaces,* http://dx.doi.org/10.1016/j.csi.2016.12.005

Identity-based conditional proxy re-encryption with fine grain policy

Chunpeng Ge[1], Willy Susilo[2]*, Jiandong Wang[3] & Liming Fang[3]

[1]Department of Computer Engineering,
Jiangsu University of Technology, Changzhou, China
Email: gecp@nuaa.edu.au
[2] Centre for Computer and Information Security Research (CCISR),
School of Computing and Information Technology,
University of Wollongong, Australia
Email: wsusilo@uow.edu.au
[3]College of Computer Science and Technology
Nanjing University of Aeronautics and Astronautics, Nanjing, China

Abstract. An identity-based conditional proxy re-encryption scheme (IB-CPRE) allows a semi-trusted proxy to convert a ciphertext satisfying one condition, which is set by the delegator, under one identity to another without the necessity to reveal the underlying message. In ICISC 2012, Liang, Liu, Tan, Wong and Tang proposed an IB-CPRE scheme, and left an open problem on how to construct chosen-ciphertext secure IB-CPRE supporting OR gates on conditions. In this work, we answer this aforementioned problem by constructing an identity-based conditional proxy re-encryption scheme with fine grain policy (IB-CPRE-FG). In an IB-CPRE-FG scheme, each ciphertext is labeled with a set of descriptive conditions and each re-encryption key is associated with an access tree that specifies which type of ciphertexts the proxy can re-encrypt. Furthermore, our scheme can be proved secure against adaptive access tree and adaptive identity chosen-ciphertext attack.

Keywords: Conditional proxy re-encryption, Identity-based proxy re-encryption, Chosen-ciphertext security.

1 Introduction

Identity-based proxy re-encryption(IB-PRE), introduced by Green and Ateniese [1], enables a proxy to convert a ciphertext encrypted under Alice's identity into one encrypted under Bob's identity. To capture the conditional property, Shao, Wei, Ling and Xie [2] introduced the notion of identity-based conditional proxy re-encryption(IB-CPRE), in which only ciphertexts satisfying a special condition can be convert by the proxy. However, their scheme is only proven secure in the random oracle. Further, Liang, Liu, Tan, Wong and Tang [3] proposed an identity-based conditional proxy re-encryption scheme in the standard model.

*Corresponding Author: Willy Susilo.