An Aspect-Oriented Approach to Privacy-Aware Access Control*

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Abstract

This paper concerns the problem of enhancing enterprise applications with a modular mechanism for enforcing privacy policies on personal data. We propose to use aspect-oriented programming and address the involved issues from the perspective of extending fine-grained access control with privacy concerns. An aspect framework for enforcing access control in Struts-based Web applications is extended with fine-grained privacy protection mechanisms that make the access control aspects privacy aware. The proposed mechanisms are loosely coupled with the underlying application. It is thus easy to adapt them and employ them to migrate existing applications.

Keywords: Privacy-aware access control; aspect-oriented programming

1. Introduction

The rapid spread of information technologies into every facet of our life results in a surge in attention to privacy recently. Bills are enacted and a comprehensive privacy policy becomes a sign of a responsible corporation. However, the complexity and diversity of applications of information makes it very difficult to ensure that the information systems conform to all the privacy regulations and polices. Moreover, new applications are developed daily and the opinions about an adequate privacy protection are diverse and ever-changing. Therefore, how to effectively utilize information technologies to enhance and ensure the conformance of information systems to regulatory requirements is a pressing issue.

In this paper, we argue that aspect-oriented programming (AOP) [1] can be part of the solutions and has the potential to provide fine-grained privacy protection to cater to the privacy needs of each individual. In particular, we approach the problem of enforcing privacy policies in enterprise applications from the perspective of extending fine-grained access control with privacy concerns. Application-level access control is a typical instance of system-wide crosscutting concerns that AOP aims to modularize well. Our previous work [2][3]

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