

## Chapter 9

# Digital Rights Management: Open Issues to Support E-Commerce

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### ABSTRACT

*In the era of the information technology and the rapid growth of the Internet access, e-Commerce technologies become very crucial as new and effective ways are needed to manage, transact, distribute, and exploit digital contents (e.g. audio and video). The proliferation of these contents has created a need for Digital Rights Management (DRM) systems. DRM, in addition to other security measures, is essential for the management and the protection of digital property, which is the main component of an e-Commerce system. This chapter highlights the need for DRM as a tool facilitating e-Commerce. It also provides the history of developing DRM and the main components of a DRM system. It also gives an overview of the existing DRM system used in e-Commerce systems. It then discuss some open issues in the current DRM system to support consumers' rights, so supporting e-Commerce business.*

### INTRODUCTION

In the traditional commerce, the physicality of contents helps in the rights management of the contents. In other words, it helps in the copyright protection of these contents. This physicality provides some barriers to unauthorised use of the contents. In an e-Commerce system, contents are in a digital form. With this digital form, digital files can be copied and transmitted to many consumers without limitation. This ease of copying and transmission has caused many serious problems for e-Commerce system. Specifically, this has made content owners who want to maintain

ownership right over their contents reluctant to support e-commerce.

To address these problems, Digital Rights Management (DRM) technology has been developed. DRM is a technology that allows only authorised consumers to access digital contents. It also enables content owners to manage usage rights over these contents. The usage rights are a set of privileges the consumers can practice on a digital content. Examples of these rights are copy permit, pay-per-view, and a one-week rental, etc.

This chapter gives an overview of DRM systems, and a number of open issues that should be addressed to support e-Commerce. First it

explains what DRM is and gives a historical overview of DRM. A fundamental principle of a DRM system, the DRM involved entities, and the DRM components are described. Then the chapter addresses how a DRM system works and describes three exemplar DRM systems. Finally a number of DRM open issues are then discussed.

## DRM OVERVIEW

DRM refers to digital technologies, which enable legal distributions of digital contents (e.g. ringtones, songs, video clips) while enforcing usage rights specified by content owners of these contents. DRM also refers to a set of hardware and software technologies and services which (1) control the authorised use of a given digital content, (2) and manage, through associated usage rights, any consequences of this use during the entire lifetime of the content (Zeng, Yu, & Lin, 2006). These hardware and software technologies include trusted hardware, encryption, digital signature, and individualisation (more details in Chapter 3).

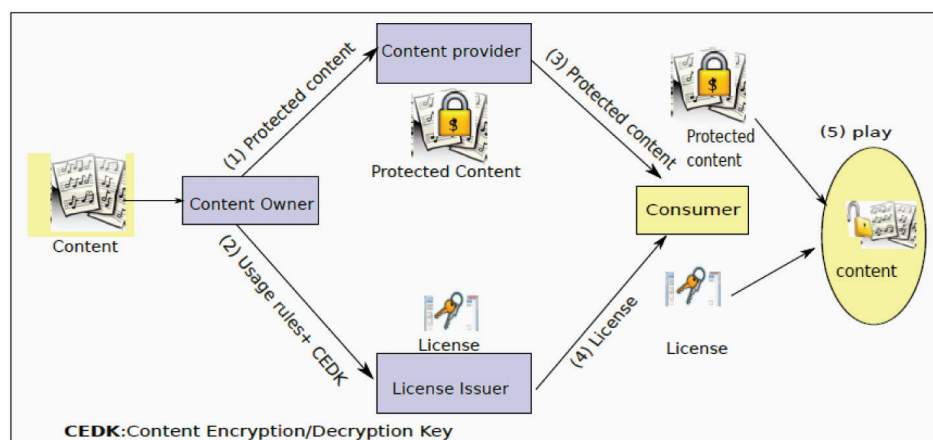
In a typical DRM system, as depicted in Figure 1, a content owner first encrypts digital content with a key and defines usage rights over this content. The content owner then sends the encrypted content and the key along with the usage rights

to a content provider and a license issuer (LI), respectively. When a consumer is interested in the content, he gets the encrypted form of this content from the content provider. However, the consumer cannot access this encrypted content until he pays the LI for a corresponding license. This license contains the key by which the consumer can decrypt the encrypted content. It also contains the usage rights that control the usage of the content, (Zeng et al., 2006; Liu, Naini, & Sheppard, 2003; Joan, Michael, Tomas, & Adam, 2002; Lee, Wu, & Chang, 2007).

## DRM HISTORY

DRM technologies were initially developed for software copy protection in IT industries and for controlling the access of paid TV programs on set-top boxes in audiovisual consumer electronics. One of the earliest DRM systems was the Serial Copy Management System (SCMS). SCMS was developed in the mid-1980s to prevent illegal copies of the first generation of digital recording technology, Digital Audio Tape (DAT). SCMS is based on copy-control bits that can be set either to 00, “unrestricted digital copies allowed,” 11 “one generation of digital copies allowed,” and 10 “no digital copies allowed.”

Figure 1. A typical DRM system architecture



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