Chapter IV

Component-Based Development: Issues of Data Protection

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This chapter focuses on the issues raised by component-based development in the light of new data protection legislation recently introduced in the European Union. Component-based development has been proposed as a software engineering approach that can enable the development of flexible and evolutionary systems. The approach aims at the dynamic composition of information systems from pre-fabricated heterogeneous software components. The integration of components, however, potentially creates ethical issues as data need to be exchanged without the users or developers knowing which components will use what data and when. Our discussion unveils a complex ethical debate with important implications for data controllers and information systems developers.

INTRODUCTION

A fundamental challenge for information systems professionals is the development of information systems that are flexible and can respond to changing user needs within an unstable business environment. System flexibility is a problem that has long haunted the profession and it may be argued that traditional approaches to system development result in static systems that have to work in a dynamic world. This is witnessed in both statistics related to the cost and time devoted to software maintenance (Swanson & Beath, 1989) and the literature devoted to understanding information systems failure (Beynon-Davies, 1995; Poulomenakou & Holmes, 1996; Sauer, 1993). Building on the foundations of object-oriented approaches to
development, “component-based development” has been proposed as a software engineering approach that can enable the development of flexible and evolutionary systems. This is primarily a consequence of mixing the flexibility of object-orientation with the encapsulation of earlier modular approaches to software development. From an object perspective, components may be simplistically viewed as collections of related classes that are strongly encapsulated, communicating with the outside world only via interfaces. With significant behavioral characteristics embedded, this allows them to be viewed as independent units of production, acquisition and deployment. Ideally, the component-based approach aims at the dynamic composition of information systems from prefabricated heterogeneous software components in a “plug-and-play” fashion. Organizations can thus acquire “black-box” components from different sources at different times and deploy them as they see fit.

From an organizational perspective, this ideal places an emphasis on systems integration as opposed to development. Components, potentially drawn from a number of diverse sources, will be integrated together and allowed to operate on data that may be sensitive at both the individual and corporate level. The notion of “black boxes” becomes relevant here: “No matter how controversial their history, how complex their inner workings, how large the commercial or academic networks that hold them in place, only their input and output count” (Latour, 1987, p. 3). Implicit in this notion is an assumption that a black box encapsulates a common understanding about what the technology does and how the technology works. The black-box nature of a component mandates that the user organization will understand it only in terms of what is stated in its interface specification(s) and any additional documentation that is supplied. Concomitantly, it is not necessarily possible to know which components will use what data and when. This feature of component-based development has interesting ramifications in ethical terms that relate strongly to the concept of data protection. The chapter focuses on the issues of data protection and the social considerations that arise for systems development and integration when component-based development is used. The chapter considers the above points in the context of the provisions of recently adopted data protection legislation in the European Union.

In order to present a focused discussion of this legislation, the following section explores the history of data protection in the UK and the adoption and implications of the European Union Data Directive (95/46/EC) in this country. Section 3 describes the principles and advantages of component-based development, focusing in particular on the way in which data are stored and used by applications. Section 4 then discusses why data protection can be an issue in component-based development and highlights the need for better awareness and understanding of the issues involved. Section 5 presents the increasing challenges that affect component-based development, especially in the electronic commerce era where data needs to be exchanged not only across legal entities (organizations), but also across jurisdictions (countries and regions). The chapter concludes with the need and implications of an ethical debate in this area.
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