



Chapter IX

E-Commerce Security

Steven Furnell, Network Research Group, University of Plymouth, UK

Abstract

This chapter considers the requirements for security in business-to-consumer e-commerce systems. Experience to date has revealed that these services are potentially vulnerable to a wide range of Internet-based threats. Some of these, such as data streaming and phishing, can be closely tied to the e-commerce domain, whereas others (such as malware, denial-of-service attacks, and Web site defacement) represent more generally applicable problems that nonetheless assume additional significance in an e-commerce context. The existence of the threats demands a variety of safeguards. Technical measures can be used to ensure the confidentiality and integrity of transactions and to support authentication of the parties involved. In addition, supporting measures are considered valuable to raise consumer awareness of security and boost confidence in e-commerce services. It is concluded that e-commerce represents an area of continued growth, and potential threats are likely to grow rather than diminish. As such, appropriate attention by service providers is crucially important.

Introduction

Among the most significant requirements for the success of e-commerce are security and trust on the part of both the consumers and the businesses offering services. This chapter addresses the topic of e-commerce security from the *business-to-consumer*

(B2C) perspective, based upon the variety of services that have arisen in parallel with the commercialisation of the Internet and the Web. Although many such services incorporate protection, ample evidence suggests that security incidents are an increasing threat to the e-commerce domain.

The chapter begins by identifying the growth of e-commerce services and the consequent requirement for trust on the part of the consumers and businesses involved. This discussion draws upon survey findings from recent years, revealing that security is unsurprisingly one of the main concerns that surround the wider scale acceptance of consumer-focused e-commerce. Leading on from this, attention is given to a variety of the threats to which such systems are exposed, supported by examples that have occurred in practice. Awareness of these threats may naturally affect consumers' willingness to utilise the services, which brings consequent challenges for service operators in gaining their confidence. As such, the chapter then proceeds to discuss safeguards that can be used to provide the necessary protection and reassurance. This begins with consideration of technical measures and identifies a number of security protocols and services that have arisen specifically to serve the demands of online payments and e-commerce. This is followed by an examination of supporting measures that can be used to foster consumer trust and security awareness. The chapter concludes with brief consideration of future trends in online commerce that are likely to increase the requirement for security still further. It should be noted that the discussion does not aim to provide a tutorial or "how to" guide for actually implementing the safeguards but rather to raise awareness of relevant issues pertaining to both consumers and merchants in order to provide a starting point for interested readers.

Background

Within a relatively short time, electronic commerce services have risen to become a core element of the Internet and Web environment. The success has primarily been driven by the advantages for the consumer, such as increased convenience and choice, combined with the reduced cost of the products and services being offered. Findings published by Forrester Research have indicated that online retail sales in the United States exceeded \$100 billion in 2003 (Johnson, Walker, Delhagen, & Wilson, 2004), representing a 38% increase over the previous year. The U.S. is by no means alone in this respect, and the signs point towards continued growth in other regions as well (Fortune, 2004).

In addition to increasing in volume, B2C e-commerce offerings have evolved considerably since the early days of the Web. The initial use of commercial Web sites was effectively as an electronic "shop window" where visitors could see product and service availability, but could not purchase them directly. Today's sites have, of course, moved well beyond this — which in turn serves to increase the requirement for security, as sensitive personal and financial details are regularly provided during the course of transactions.

Given that e-commerce is thriving, one may be tempted to assume that security aspects must have been addressed and that the resulting environment is trusted one. Unfortu-

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