



## Chapter XVII

# A Framework for Electronic Bill Presentment and Off-Line Message Viewing

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## Abstract

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*A security framework for secure message delivery and off-line message viewing of electronic bills is presented. This framework is implementable toward smart applications such as electronic bill presentment and payment systems.*

## Introduction

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The Internet has revolutionised the biller-consumer interaction through the use of electronic billing systems that facilitate online payments. Traditionally, the system required presentation of bills through paper statements for products/services provided

and settlement of bills through cheques sent through snail mail. This process obviously is quite time consuming. The electronic bill ensures prompt delivery of the billing statements with online guidance and instructions for payments via e-mail/interactive Web sites, cuts down on bill delivery costs, ensures prompt payment processing, and hence seems to be better favoured as compared against the traditional paper-dependent manual system. Despite the obvious benefits, it has been found that a majority of consumers are apprehensive about using these electronic systems. Security and privacy issues surrounding the transfer of financial information are cited as one of their primary concern. They fear that the confidentiality and integrity of data transferred can be compromised when transacted electronically.

This chapter argues that electronic bill presentment is still viable, and security concerns can be eliminated by adopting the security framework for secure message delivery and online message viewing. This effort will help increase the trust over electronic commerce and specifically to electronic billing systems. The ERI framework has been named as such based on the first letters of the author's names.

## **Motivation and Background**

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The growth of various Internet-based communication technologies has not managed to stall the popularity of electronic mail or e-mail. Since the 1970s, e-mail has remained the communication tool of choice for many professions all over the world (Berghel, 1997; Oppliger, 2004). One technical advantage of e-mail over alternative means of communication is the speed that e-mail can be transmitted notwithstanding geographical distances. Another obvious advantage of e-mail is that it does not require scheduled endpoint connectivity. As such, both senders and receivers are able to interact with their messages in an autonomous fashion. Another important characteristic is that e-mail is both paperless and archivable (Berghel, 1997; Oppliger, 2004).

These important characteristics have attributed to e-mail being investigated as a medium for transmitting bill statements, invoices, and other confidential information (Carenini, Ng, Zhou, & Zwart, 2005).

The term "secure messaging" refers to the ability to provide data confidentiality, data integrity, data origin authentication, and nonrepudiation of origin services for e-mail (Oppliger, 2004). Despite the positive attributes that e-mail offers, security of e-mail is still a primary concern, especially with respect to using e-mail as a medium to deliver confidential information. E-mail messages are generally not protected as they move across the Internet. It would be possible for e-mail messages to be misdelivered, intercepted, or even read by unauthorized persons. Additionally, e-mail contents can be covertly changed without the knowledge of the original sender. It can be lamented that ordinary Internet e-mail simply lacks the capability to assure integrity, privacy, and authenticity. This sentiment is echoed in Simson et al. (Simson, Margrave, Schiller, Nordlander, & Miller, 2005).

Fortunately, we have seen numerous efforts to make secure Internet e-mail possible. These include the initiatives by the Internet Activities Board's privacy task force, which

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