

# Chapter 16

## Electronic Payment Frameworks

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### ABSTRACT

*This chapter presents what an electronic payment framework is, its main features and benefits, what the main electronic payment frameworks proposed so far are, and the current initiatives that are being developed. For each framework developed so far, the chapter presents its key features and differences with previous works. The presentation of the different frameworks proposed so far will allow the reader to understand the evolution of these frameworks and how different features have been incorporated along the time. Once previous works have been presented, the chapter introduces the most recent work in this field, that is, the work that is being developed by W3C with its web payment activity initiative. The chapter covers the different specifications that have been defined in this initiative and it analyzes the main challenges to be addressed. Thus, the reader will have a broad vision of electronic payment frameworks.*

### INTRODUCTION

The use of electronic payment (e-payment) systems to make payments for the access to contents and services is more and more usual. Currently, for making e-payments we can use systems such as Paypal, Bitcoin, Ripple, Apple Pay, EMV. Indeed, the use of cryptocurrencies as Bitcoin has supposed a revolution in the e-payments arena (Hileman, 2014; Vigna & Casey, 2015).

This diversity of payment options with the support of different business models (pay-per-use, flat rate, the incorporation of discounts, tickets or loyalty information, etc) arises the need of systems that support different issues regarding the purchase such as the discovery of the payment information associated to the product/service with payment options supported, the negotiation of the payment option to make the payment, and the reception of a receipt of the transaction. To cope with these issues, the

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definition of e-payment frameworks has been proposed. These frameworks aim to facilitate, along the purchase process, the exchange of payment information and the use of different payment instruments in an easy way at the same time it guarantees interoperability, trust and security (Jaffe & Boyera, 2015; Ruiz-Martínez et al., 2012).

This article presents what an e-payment framework is, its main features and benefits, what the main e-payment frameworks proposed so far are and, the current initiatives that are being developed. For each framework developed so far, the article presents its key features and differences with previous works. The presentation of the different frameworks proposed so far will allow the reader to understand the evolution of these frameworks and how different features have been incorporated along the time. Once previous works have been presented, the article introduces the most recent work in this field, that is, the work that is being developed by W3C with its Web Payment Activity Initiative. Then, the we present future research directions by indicating the main challenges to be addressed. Thus, the reader will have a broad vision of e-payment frameworks.

## **BACKGROUND**

This section provides some information on the different phases that comprises a payment process. The knowledge of this process is fundamental to understand the different elements that are defined in an e-payment framework.

### **Payment Process**

The process of making purchase on the Internet is divided into the following stages (Maes et al., 1999): need identification, product brokering, merchant brokering, negotiation, purchase and delivery, and product service and evaluation. Thus, once the user realizes that he/she has a need, it gathers information regarding the product and the merchant, then, client can negotiate the conditions with the vendor. Once the conditions have been agreed, the purchase and delivery of the product is made. Finally, several processes related to user satisfaction could be performed.

Recently, the W3C's Web payments activity initiative (W3C, 2014) considered that the simplest purchase comprises four steps: publishing an asset, publishing a license, publishing an offer, and performing the purchase.

In both cases, we can point out that, in order to make a purchase, we have to manage two kinds of information: information describing the product/service and its merchant, and information regarding the payment process: payment systems available to perform the payment, receipts, etc.

## **ELECTRONIC PAYMENT FRAMEWORKS**

This section aims to provide the definition of what an e- payment framework is, what its main features are and its benefits.

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