

Chapter 5

Mutual Recognition Mechanism Based on DVCS Oracle in the Blockchain Platform: DVCS Oracle in the Global Supply Chain

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ABSTRACT

The main purpose of this chapter is to present the need to use the mutual recognition mechanism (MRM) of electronic signatures based on the DVCS oracle in the blockchain platform for the global supply chain. The authors begin their research by comparing a single-domain traditional supply chain with a multi-domain global supply chain. In the second case, the necessity of using an MRM electronic signature based on the DVCS oracle is justified. Various options for constructing MRM are discussed. The chapter provides a comparative assessment of the electronic signature validation protocols and the rationale for using the DVCS protocol to implement the blockchain oracle. As a result, the authors propose to use a well-tested software and hardware complex of the Litoria DVCS as a DVCS oracle and illustrate its use with practical examples.

“And if blockchain technology becomes a key tool for increasing the progress of mankind, then in the future it can become an information platform on the scale of the Universe.” (Swan, 2018)

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INTRODUCTION

Over the past thirteen years since the appearance of the first blockchain platform and the first Bitcoin cryptocurrency (Satoshi, 2008), many different events have occurred. Sometimes they were contradictory, from uncontrollable delight (Swan, 2018) (Kustov & Stankevich, 2019) to complete rejection and skepticism. Serious concerns have been expressed that the blockchain will kill medium and small businesses (Chris, 2017). There have also been repeated attempts to reconcile skeptics with optimists (Kustov & Stankevich, 2018).

However, despite all these contradictions, blockchain technology is dynamically developing and embracing more and more new sectors of the economy, sometimes taking on a global character. The supply chain is no exception. At the same time, along with the positive results of the widespread introduction of blockchain technology, its distinctive negative features are increasingly manifested, among which it should be mentioned:

1. The widespread use of smart contracts, developed mainly in the Solidity language (Dannen, 2018), reveals more and more vulnerabilities in smart contracts (Shapiev, 2019) that bring significant financial losses (Report, 2019). These vulnerabilities arise for two main reasons:
 - a. insufficiently secure technology for developing smart contracts, which results in errors in their development;
 - b. Both insufficient reliability of the source data transmitted to the smart contract from the external environment.
2. Limited supply on the market of reliable hardware and software communication tools (that is, oracles) of smart contracts operating in a closed environment, with information flows in the surrounding world.
3. Supply chains from interdepartmental trade turnover, closed within one country, everywhere acquire a global character (Kupriyanovsky et al., 2016). Electronic document flow is becoming cross-border. The widespread use of electronic signatures in the exchange of electronic documents creates many problems in verifying electronic signatures made using different cryptographic standards. There is a need to develop a secure mechanism for verifying electronic documents before writing them to the blockchain platform. In their research, the authors develop the idea of using a mutual recognition mechanism for this purpose, the core of which is the DVCS oracle.

STATEMENT OF THE RESEARCH TASK

So, the data in supply chains are not always prominent, accessible, or trusted. The use of blockchain technology helps to ensure the exchange of secure data with supply chain partners using blockchain-based solutions with restricted access rights.

Currently, this problem is becoming very relevant. Consumers want guaranteed quality, so their participation in supply chains is very demanding. The selection of suppliers becomes very careful to ensure a minimum of risks and high transparency choice.

In this chapter, the authors propose conducting a study of ways to reduce disruptions in supply chains using a mutual recognition mechanism to increase data reliability to assess the possibility of future blockchain applications.

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