Technical Report

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Processes and data in e-commerce — Smart contract-based B2B electronic transaction execution and verification —

Part 1: Reference model

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Foreword

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A list of all parts in the ISO 16320 series can be found on the ISO website.

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Introduction

Blockchain technology is influencing the evolution of data processing paradigms due to its tamper-evident and immutable characteristics, particularly in contexts where data integrity and trust are essential. Various industries—such as finance, manufacturing, logistics, public services, commerce, and healthcare—are exploring blockchain as a foundational technology for enhancing reliability and transparency in information processing.

One of the core applications of blockchain is the smart contract. A smart contract can be defined as a software-based mechanism that encodes the terms agreed upon by transacting parties, embeds them within an electronic contract structure, and facilitates automatic execution when predefined conditions are met. Smart contracts are increasingly regarded as a potential solution for automating agreements in decentralized or trustless environments. Smart contract-based transactions offer a number of potential advantages, including:

— automated transaction execution based on predefined conditions, which can streamline business processes and improve processing speed;

— reduced reliance on intermediaries, which can help mitigate risks such as fraud or manipulation, while enabling transparency through preserved transaction records;

— lowered transaction costs due to the use of online platforms for counterpart discovery, contract negotiation, and finalization.

Since the late 2010s, smart contracts have been investigated for a range of use cases, including asset transfers, inheritance, gifting, and product purchases. In many of these applications, transactions can involve personal or sensitive data that can potentially identify the transacting parties. Due to the open and distributed nature of blockchain networks, there are concerns that such data can be exposed during consensus processes or through the traceability of public keys. Additionally, the use of open-source blockchain software introduces potential risks related to security vulnerabilities, including contract tampering or misuse of privileges. Because blockchain data is immutable, errors in deployed smart contracts are also difficult to correct retroactively.

In the context of B2B (Business-to-Business) electronic transactions, interest in smart contract-based solutions has been growing. However, these systems differ significantly from conventional B2B approaches, which often rely on peer-to-peer connections or centralized intermediaries. Smart contract-based B2B transactions are characterized by the use of distributed consensus mechanisms and cryptographically secured data structures. As such, differences can arise in several key areas, including:

— partner discovery and authentication;

— collaborative business processes;

— activity-level transaction management;

— transactional data exchange and document formats;

— security and data integrity assurance;

— validation procedures;

— legal responsibilities and liability considerations.

To support B2B electronic transactions using smart contracts, certain aspects are typically considered during system design and analysis. These can include: defining the contractual terms; specifying the criteria for transaction completion; establishing the transaction processing procedures; identifying the relevant technical agreements; clarifying the roles and responsibilities of transacting parties; and ensuring the reliability and consistency of the exchanged data.

This document provides a reference model intended to support the conceptualization and analysis of smart contract-based B2B electronic transactions. The reference model identifies core components involved in

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such transactions and describes considerations related to their roles and interactions. The smart contract–based B2B transaction validation model, the validation process as well as the required data are presented at a high level in Figure 1.

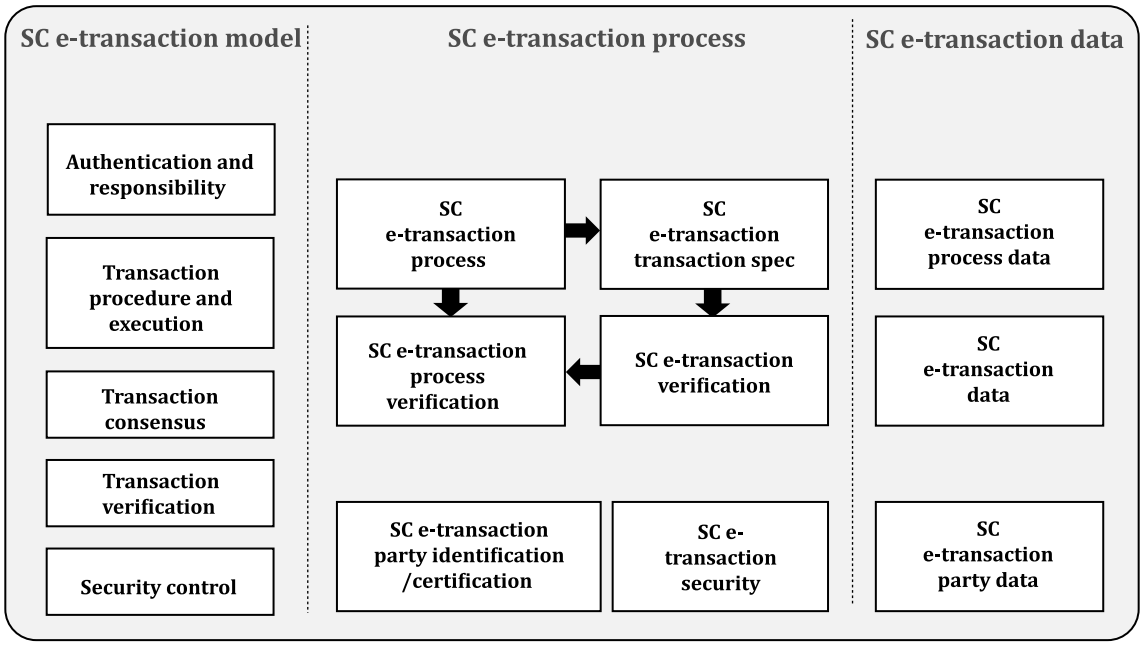

Figure 1 — Overview of the entire model

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Processes and data in e-commerce — Smart contract-based B2B electronic transaction execution and verification —

Part 1: Reference model

1 Scope

This document provides a reference model intended to support the analysis and design of B2B electronic transactions utilizing smart contracts. The model identifies and defines five core components that constitute the foundational elements for such transactions, as follows:

— authentication and responsibility of transaction parties;

— transaction procedure and execution;

— transaction consensus mechanism;

— transaction verification mechanism;

— security controls.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
blockchain(s)
distributed ledger with confirmed blocks organized in an append-only, sequential chain using cryptographic links

[SOURCE: ISO 22739:2024 [1], 3.6]

3.2
blockchain system
system that implements a blockchain

Note 1 to entry: A blockchain system is a type of DLT system.

[SOURCE: ISO 22739:2024 [1], 3.7]

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