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Specification**

**ISO/TS 23516**

**Blockchain and distributed ledger  
technology — Interoperability  
framework**

*Technologies des chaînes de blocs et technologies de registre  
distribué — Cadre d'interopérabilité*

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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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This document was prepared by Technical Committee ISO/TC 307, *Blockchain and distributed ledger technologies*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

This document is intended to establish a common understanding of interoperability among distributed ledger technology (DLT) systems and between DLT systems and non-DLT systems. Standardization is a key enabler of interoperability, which is important for the efficient use and wider adoption of DLT.

To ensure interoperability of DLT systems, multiple interoperability facets and interoperability layers must be considered. Establishing a common DLT interoperability framework can increase trust and adoption. Examples of key DLT interoperability requirements include transferring assets between systems, preventing invalid transactions and preventing loss of ownership.

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# Blockchain and distributed ledger technology — Interoperability framework

## 1 Scope

This document specifies a framework for interoperability between DLT systems, between DLT and entities outside the DLT system, the relationships and interactions between these and cross-cutting aspects.

## 2 Normative references

The following documents are referred to in the text in such a way that their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 22739, *Blockchain and distributed ledger technologies — Vocabulary*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 22739 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

### 3.1

#### **cross authenticated DLT synchronization**

#### **cross authenticated distributed ledger technology synchronization**

method to synchronize two or more *DLT systems* (3.14) via adding transactions onto each system

### 3.2

#### **distributed ledger**

ledger that is shared across a set of *distributed ledger technology (DLT) nodes* (3.10) and synchronized between the DLT nodes using a consensus mechanism

[SOURCE: ISO 22739:2024, 3.23, modified – Note 1 to entry has been removed]

### 3.3

#### **DLT**

#### **distributed ledger technology**

technology that enables the operation and use of *distributed ledgers* (3.2)

[SOURCE: ISO 22739:2024, 3.25]

### 3.4

#### **DLT gateway**

#### **distributed ledger technology gateway**

software component connected to one or more *DLT nodes* (3.10), providing functionality that is not present in the DLT node software

**3.5**

**DLT interoperability**

**distributed ledger technology interoperability**

ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged, where at least one of these systems is a *DLT system* (3.14)

**3.6**

**DLT interoperability mode**

**distributed ledger technology interoperability mode**

purpose of the information exchanged in the *DLT interoperability scenario* (3.7)

**3.7**

**DLT interoperability scenario**

**distributed ledger technology interoperability scenario**

systems or applications that are exchanging information to achieve *DLT interoperability* (3.5)

**3.8**

**DLT interoperability solution**

**distributed ledger technology interoperability solution**

*DLT solution* (3.14) built for *DLT interoperability* (3.5)

**3.9**

**DLT network**

**distributed ledger technology network**

network of *DLT nodes* (3.10) which make up a *DLT system* (3.14)

[SOURCE: ISO 22739:2024, 3.30]

**3.10**

**DLT node**

**distributed ledger technology node**

device or process that participates in a network and stores a complete or partial replica of the ledger records

[SOURCE: ISO 22739:2024, 3.31]

**3.11**

**DLT node proxy**

**distributed ledger technology node proxy**

software component connected to one or more *DLT nodes* (3.10), providing functionality only present in the DLT node software

**3.12**

**DLT oracle**

**distributed ledger technology oracle**

service that updates a *distributed ledger* (3.2) using data from outside of a *DLT system* (3.14)

[SOURCE: ISO 22739:2024, 3.32, modified – Note 1 to entry has been removed.]

**3.13**

**DLT solution**

**distributed ledger technology solution**

solution built using a *DLT system* (3.14) to accomplish some business objectives common to a group of *DLT users* (3.15)

[SOURCE: ISO 22739:2024, 3.34, modified – Note 1 to entry has been removed.]

**3.14**

**DLT system**

**distributed ledger technology system**

system that implements a *distributed ledger* (3.2)

[SOURCE: ISO 22739:2024, 3.35]

### 3.15

#### **DLT user**

#### **distributed ledger technology user**

entity that uses services provided by a *DLT system* ([3.14](#))

[SOURCE: ISO 22739:2024, 3.36]

### 3.16

#### **interoperability**

ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged

[SOURCE: ISO/IEC 22123-1:2023, 3.6.1]

## **4 Benefits of distributed ledger technology (DLT) interoperability**

Benefits from DLT interoperability can include:

- interaction between permissioned and permissionless DLT networks;
- exchange of data between systems;
- availability of consistent data;
- synchronization of state between systems;
- ensuring authenticity, integrity and confidentiality of the data exchanged;
- transferability of digital assets;
- non-duplication of digital assets;
- minimising the potential for technology lock-in;
- cross-jurisdictional data flows and compliance.

## **5 Overview of distributed ledger technology (DLT) interoperability**

### **5.1 General**

When addressing DLT interoperability, the following should be considered:

- What are the systems or applications that are exchanging information? (See [5.2](#).)
- Why are they exchanging information? (See [5.3](#).)
- How is this information exchanged? (See [5.4](#) and [5.5](#).)

The additional sections describe the different DLT interoperability facets (see [Clause 6](#)), highlight specific considerations for DLT interoperability solutions (see [Clause 7](#)) and detail DLT interoperability architecture concerns (see [Clause 8](#)).

### **5.2 Distributed ledger technology (DLT) interoperability scenarios**

DLT interoperability is required to involve at least one DLT system. There are various DLT interoperability scenarios:

- Connecting a DLT system to non-DLT system: This scenario has the widest scope. DLTs are a modern invention, but there are many other types of systems. Connecting a DLT system to a non-DLT system can therefore be a complex and diverse task.