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Blockchain and distributed ledger technologies — Guidelines for governance

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National foreword

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CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 documents 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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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.

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Introduction

This document addresses how key governance characteristics such as decision rights, accountabilities, and incentives operate effectively and efficiently in DLT systems.

Due to the fast-evolving nature of DLT systems and their adoption, this document has been developed at a level of abstraction to provide guidance and instruction in diverse contexts. "Distributed ledger technologies" (DLT) includes blockchain technologies. The specific blockchain technology will be named explicitly only where specific characteristics of blockchain technologies warrant doing so.

DLT systems challenge our existing understanding of governance as these systems are often decentralized in their governance. In the case of permissionless public distributed ledgers, they can comprise an unrestricted number of potentially pseudonymous DLT users and nodes. Even permissioned public blockchains can have hybrid governance structures, comprising elements of centralized as well as decentralized governance. In the absence of a central governing authority for distributed ledger systems, several governance questions regarding ownership, decision rights, responsibilities and accountabilities, and incentive structures emerge that cannot be addressed by applying traditional governance mechanisms.

Thus, for distributed ledger systems, it is important for participants to establish who they are dealing with (identity) and who is responsible and accountable for the directing and control of the DLT system (governance). For organizations and broader industries, it is difficult to engage in the development of DLT systems in the absence of effective DLT-governance mechanisms.

In general, DLT systems aim for decentralizing decision rights and the technical implementation of accountability. The locus of achieving consensus is decentralized, meaning that the records that form the foundation of the DLT systems are not only distributed but also in many instances validated by multiple DLT users. Moreover, disagreements can be resolved in a decentralized way if users initiate 'forks' by copying and branching existing codebases and developing them further according to differing goals.

As DLT systems gain importance, incentive alignment becomes increasingly important. While incentives are at the core of all economic activities, in DLT systems aligning incentives adequately is important for effective functioning because in many DLT systems incentives provide the means of achieving consensus. Unless incentives are properly aligned, the nodes of the DLT system will not contribute to consensus. Improper incentive alignment threatens the integrity of the system and can prevent a DLT system's effective functioning.

Smart contracts can allow for decentralized governance mechanisms, but many present-day DLT systems continue to be characterized by a degree of centralized, often informal, decision-making. In DLT systems, accountability in principle will increasingly be implemented technically rather than institutionally through traditional contracts.

Smart contracts allow for specifying and enforcing accountability using codified rules on-ledger. However, in some cases it is not possible to implement autonomous transaction enforcement completely on-ledger. In these cases, some form of off-ledger institutional involvement can be necessary for effective dispute resolution among DLT users. The establishment of 'off-ledger' governance instruments will be beneficial in assuring participants in the integrity of DLT systems.

Standards in these areas will also benefit DLT developers and providers looking to establish new DLT systems that provide confidence to stakeholders. A key accountability issue concerns identity in DLT systems, usually granted through the public addresses that are used to conduct transactions in public DLT systems. Given multiple and pseudonymous identities, this could be a problem. Some users will wish to identify themselves using traditional institutional means (e.g. driver licenses linked to their DLT identities). Other technical approaches can seek to address the problem of ensuring confidence in user identity, for example by linking reputation to public addresses. Overall, the shift toward the enforcement of accountability through technology has only begun and it is likely that institutions will continue to play important roles for ensuring accountability in DLT systems for some time to come.

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This document is organized as follows. Clause 4 presents governance principles for DLT systems. Clause 5 discusses the governance framework for DLT systems. Clause 6 discusses the governance of different types of DLT systems. Clause 7 the lifecycle of DLT systems. Clause 8 discusses the roles involved in the governance of DLT systems. Clause 9 discusses governance instruments for DLT systems. Clause 10 examines governance considerations of the interoperability of DLT systems.

The audience includes but is not limited to academics, architects, participants, users, developers, regulators, auditors, and standards development organizations.

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Blockchain and distributed ledger technologies — Guidelines for governance

1 Scope

This document provides guiding principles and a framework for the governance of DLT systems.

The document also provides guidance on the fulfilment of governance, including risk and regulatory contexts, that supports the effective, efficient, and acceptable use of DLT systems.

2 Normative references

The following documents are referred to in the text in such a way that some or all of 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 https://www.electropedia.org/

3.1
distributed ledger technology governance
DLT governance
system for directing and controlling DLT systems including the distribution of on-ledger and off-ledger decision rights, incentives, responsibilities, and accountabilities

3.2
governing body
entity that is accountable for the performance and conformance of the distributed ledger technology governance

4 Governance principles for DLT systems

4.1 Overview

This clause sets out nine action-oriented principles for good governance of DLT systems that will be elaborated in more detail throughout the document. The principles are intended to help stakeholders evaluate and improve governance mechanisms, structures and activities, with a view to meet governance objectives, which are: effective, efficient, and acceptable use of DLT systems. This is primarily achieved by providing stakeholders with the right incentives to perform their roles within a governance framework.

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