ISO/IEC TR 30176

Edition 1.0 2021-11

TECHNICAL REPORT

colour inside

Internet of things (IoT) – Integration of IoT and DLT/blockchain: Use cases



ISO/IEC TR 30176:2021-11(en)

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.020

ISBN 978-2-8322-1037-5

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INTERNET OF THINGS (IoT) – INTEGRATION OF IoT AND DLT/BLOCKCHAIN: USE CASES

FOREWORD

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IEC TR 30176 has been prepared by subcommittee 41: Internet of Things and Digital Twin, of ISO/IEC joint technical committee 1: Information technology. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
JTC1-SC41/220A/DTR	JTC1-SC41/241A/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1, available at www.iec.ch/members_experts/refdocs and www.iso.org/directives.

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INTRODUCTION

Distributed ledger technology (DLT) provides the capability of a distributed ledger, which is shared across a set of DLT nodes and synchronized among DLT nodes using a consensus mechanism. Blockchain is a kind of DLT, which uses confirmed blocks organized in an append-only, sequential chain using cryptographic links. Blockchain is designed to be tamper resistant and to create final, definitive and immutable ledger records. Either DLT or blockchain can be quoted and used in terms of technology realization for application scenarios. Each participant in a blockchain and DLT network has their own tamper-resistant replica of transaction records associated with the participants who are individuals or organizations. Blockchain and DLT can be applied to solutions involving IoT systems which contain sensors, actuators, tags and readers, wearable devices, and service platforms, all of which are networked.

Through the analysis of the IoT involving the DLT and blockchain technology, the DLT and blockchain technology can help in solving the problems of IoT, especially those existing in the physical system, such as device digital identity, data source trustworthiness, key data forensics, data rights and interests, data assets and value exchange, etc. At the same time, the IoT also provides an important commercial application scenario for DLT and blockchain, and promotes entity and virtual economy combination. The integration of the IoT system with the DLT and blockchain technology can achieve complementary advantages and bring new business opportunities.

In fact, the integration of IoT system with DLT and blockchain can enable the creation of better solutions for many business sectors, particularly where those solutions involve information associated with physical entities, and where the solution spans many organizations with the need for trusted information to be shared by those organizations.

The solutions that can be provided by the integration are important for the business sectors such as agriculture, industry, healthcare, pharmaceuticals, environmental protection, transportation, security, finance, insurance, object tracing, supply chain, smart grid, and smart cities. This document is focused on collecting use cases in some of these sectors.

This document has been prepared based on the applications of IoT and DLT/blockchain technology with the template of IoT use cases.

INTERNET OF THINGS (IoT) – INTEGRATION OF IoT AND DLT/BLOCKCHAIN: USE CASES

1 Scope

This document identifies and collects use cases for the integration of the DLT/blockchain within IoT systems, applications, and/or services.

The use cases presented in this document use the IoT use case template.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

No terms and definitions are listed in this document.

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 http://www.iso.org/obp

4 Symbols and abbreviated terms

APP application
DLT distributed ledger technology
HMI human–machine interface

5 Use case scenarios

5.1 General

Use cases presented in this document depict typical use cases involving blockchain/DLT and IoT systems, applications, and/or services; however, this document is not intended to be an exhaustive list of all realizations.

5.2 Use cases

Table 1 summarizes the use case scenarios in this document along with the key actors in each scenario.