

Recommendation **ITU-T F.751.22 (06/2024)**

SERIES F: Non-telephone telecommunication services

Multimedia services

Financial distributed ledger technology application guideline

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Recommendation ITU-T F.751.22

Financial distributed ledger technology application guideline

Summary

Recommendation ITU-T F.751.22 specifies the application guideline of financial distributed ledger technology (DLT). It provides:

- General principles from five aspects;
- Reference architecture from both the participant and conceptual architecture views;
- Technical requirements, including functionality, performance, security, governance, maintenance, auditability and interoperability;
- Use cases in trade finance and supply chain finance to illustrate how DLT can be used more reasonably and effectively for financial applications according to this guideline.

History*

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DLT, financial application, guideline, reference architecture.

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FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T F.751.22

Financial distributed ledger technology application guideline

1 Scope

This Recommendation specifies the application guideline for financial distributed ledger technology (DLT). It includes general principles, reference architecture and technical requirements for the application of financial DLT.

This Recommendation is intended for use as a guideline by the interested parties for the financial DLT application.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

None.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 account [b-ITU-T X.1400]: Representation of an entity whose data is recorded on a distributed ledger.

3.1.2 address [b-ITU-T X.1400]: Identifier for entity(s) performing transactions or other actions in a blockchain or distributed ledger network.

3.1.3 application [b-ITU-T Y.2091]: A structured set of capabilities, which provide value-added functionality supported by one or more services.

3.1.4 asset [b-ITU-T X.1400]: Representation of value.

3.1.5 consensus [b-ITU-T X.1400]: Agreement that a set of transactions is valid.

3.1.6 consensus mechanism [b-ITU-T X.1400]: Rules and procedures by which consensus is reached.

3.1.7 digital signature [b-ITU-T X.800]: Data appended to, or a cryptographic transformation (see cryptography) of a data unit that allows a recipient of the data unit to prove the source and integrity of the data unit and protect against forgery, e.g., by the recipient.

3.1.8 distributed ledger [b-ITU-T X.1400]: A type of ledger (see clause 3.1.12) that is shared, replicated, and synchronized in a distributed and decentralized manner.

3.1.9 distributed ledger technology (DLT) [b-ISO 22739]: Technology that enables the operation and use of distributed ledgers.

3.1.10 DLT oracle [b-ITU-T X.1400]: A service that supplies information to a distributed ledger using data from outside of the distributed ledger system.

3.1.11 entity [b-ISO 22739]: Item inside or outside an information and communication technology system, such as a person, an organization, a device, a subsystem, or a group of such items that has recognizably distinct existence.

3.1.12 ledger [b-ITU-T X.1400]: Information store that keeps final and definitive (immutable) records of transactions.

3.1.13 node [b-ITU-T X.1400]: Device or process that participates in a distributed ledger network.
NOTE – A node can store a complete or partial replica of the distributed ledger.

3.1.14 off-chain [b-ISO 22739]: Related to a DLT system, but located, performed or run outside that DLT system.

3.1.15 on-chain [b-ISO 22739]: Located, performed or run inside a DLT system.

3.1.16 smart contract [b-ITU-T X.1400]: A program written on a distributed ledger system which encodes the rules for specific types of distributed ledger system transactions in a way that can be validated, and triggered by specific conditions.

3.1.17 transaction [b-ITU-T X.1400]: Whole of the exchange of information between nodes. A transaction is uniquely identified by a transaction identifier.

3.2 Terms defined in this Recommendation

None.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ACID	Atomicity Consistency Isolation Durability
AML	Anti-Money Laundering
API	Application Programming Interface
CA	Certificate Authority
CFT	Combating the Financing of Terrorism
DApp	Decentralized Application
DAV	Digital Asset Voucher
DID	Decentralized Identifier
DLT	Distributed Ledger Technology
EDD	Enhanced Due Diligence
HSM	Hardware Security Module
KYC	Know Your Customer
ROM	Read-Only Memory
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SDD	Simplified Due Diligence
SE	Secure Element
TEE	Trusted Execution Environment
TLS	Transport Layer Security

5 Conventions

In this Recommendation:

- The keywords "is required to" indicate a requirement which must be strictly followed and from which no deviation is permitted if conformance to this Recommendation is to be claimed.
- The keywords "is recommended" indicate a requirement which is recommended but which is not absolutely required. Thus, this requirement need not be present to claim conformance.

6 General principles

The general principles for financial DLT applications are as follows:

- **Problem-oriented:** How financial DLT applications address industry pain points and enable the financial DLT application to profoundly serve the real economy is critical. There is no one-size-fits-all technology, and the same is true for financial DLT applications. The financial sector should consider market development, risk control, regulatory compliance requirements and put equal emphasis on innovation and management to adequately realize the enabling potential of financial DLT applications.
- **Long-term evolution:** Recognizing the systematic, long-term and complex characteristics of DLT application, it is necessary to combine the advantages of DLT inheritance evolution on the basis of traditional technology architecture, especially to meet the high-security requirements of the financial industry level protection baseline and anti-quantum algorithm attack protection, to realize the long-term evolution.
- **Interconnection:** Legacy IT systems often form information silos and systems of various organizations commonly form closed loops. Financial DLT systems need to interact with these systems to enable data exchange such as identity authentication and compliance checks, thus supporting the trusted execution and value transfer of financial DLT services. At the same time, the universality of financial DLT services and technical templates can only be guaranteed if the interconnection of the operating environments is implemented, enabling one-time development and multiple reuse across institutions.
- **Open sharing:** To meet diverse needs of financial DLT business, it is necessary to lower the barrier for the development and use of DLT, encourage the whole society to participate in the development and application of relevant business and technology templates, and establish a rich, efficient and convenient financial DLT business open platform like the mobile application market. Various institutions offer financial DLT services on this platform, which will be integrated and used as building blocks according to the wishes of users to achieve openness, co-construction and sharing.
- **Compliance:** Financial DLT applications should respect and comply with the regulatory policies of various jurisdictions and not jeopardize monetary sovereignty, monetary policy independence and the financial system. At the same time, it should have excellent governance capabilities and provide an auditable accountability mechanism to ensure the sound and healthy development of the financial business.

7 Reference architecture

7.1 General

This Recommendation provides financial DLT systems reference architecture using a participant view and a conceptual architecture view.

7.2 Participant view

7.2.1 General

The financial DLT system participant view references Figure 6 of [b-ISO 23257], as shown in Figure 1 below. This Recommendation specifies seven type of participants: DLT users, DLT administrators, DLT providers, DLT developers, DLT governors, DLT auditors, and financial DLT regulators (see clause 9.2 of [b-ISO 23257]).

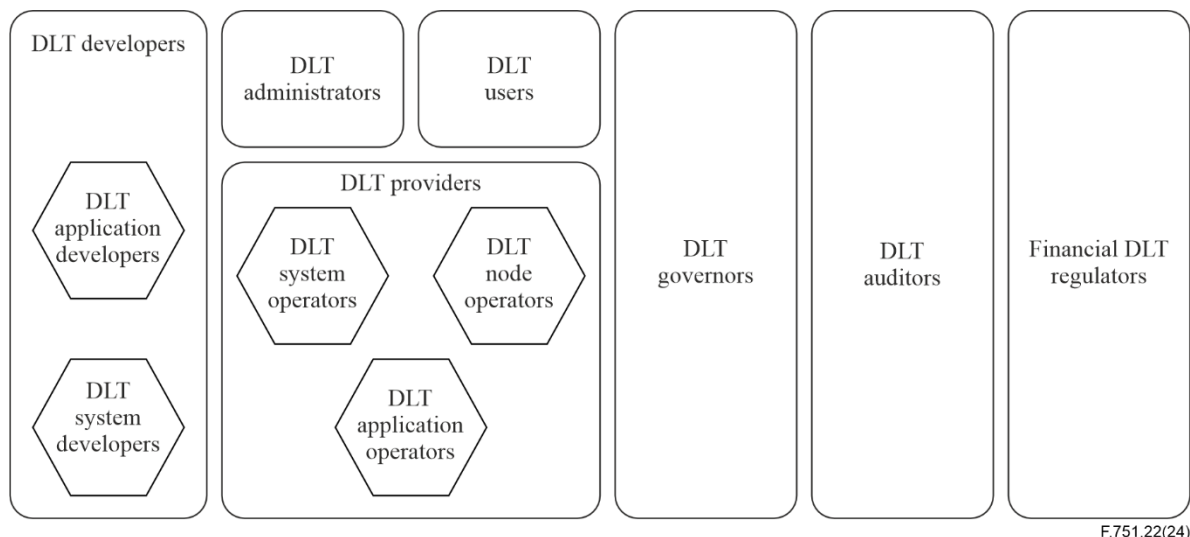


Figure 1 – Financial DLT system participant view

For the financial industry, financial DLT regulations are critical and need to be carefully considered and complied with.

7.2.2 DLT users

A DLT user is a role that uses a DLT solution. This may represent an individual, an organization, a device or a system.

7.2.3 DLT administrators

DLT administrators perform specific administrative activities (in particular for security configuration).

7.2.4 DLT providers

7.2.4.1 General

A DLT provider is a role that may own and operate one or more nodes within the DLT system and the DLT network. Subroles include: DLT system operators, DLT node operators and DLT application operators.

7.2.4.2 DLT system operators

A DLT system operator is a role that administers and operates the physical and virtual systems and networks that host and run the components of the DLT systems and platforms within the DLT nodes.

7.2.4.3 DLT node operators

A DLT node operator is a role that administers and operates one or more nodes within a DLT system for a DLT provider.