DLT terms and definitions (ITU-T X.1400)

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2019 Gartner Hype Cycle for Blockchain Technologies


Episode #5: DLT standardization: ITU-T standards and the way forward
(December 2, 2020)
Underlying technologies behind DLT

1. Use of public key cryptography and cryptographic hash functions: essential for transparency & privacy

2. Nodes of P2P Network validate transactions by consensus, following economic incentive mechanisms (Proof of Work, Proof of Stake, etc.)

3. Every node of network is a client as well as server, holding identical copies of the application state

(Source: https://blockchainhub.net/blockchain-intro/)
DLT – four characteristics

- **Distributed ledger technology**: A chronological record of transactions in a distributed ledger.
- **Smart contract**: Business logic embedded in ledger that can be triggered when certain conditions are met.
- **Network consensus**: All participants agree to a network verified transaction by consensus.
- **Security**: Cryptography is a central feature so that transactions are secure, authenticated & verifiable.
Types of DLT

Permission-less, Public
- Bitcoin
- Etherium

Permissioned, Public
- Land properties
- University certificate

Permission-less, Private
- Public poll

Permissioned, Private
- Medical record

Permissioned vs. Permissionless: Who can write data to a Distributed ledger (i.e., accessibility)
Public vs. Private: Who can read from a distributed ledger (i.e., visibility)
FG DLT D1.1 – DLT terms and definitions

- FG-DLT, TS FG DLT D1.1, Distributed ledger technology terms and definitions (August 2019)
  - Established at the first FG DLT meeting in Geneva on 17-19 October 2017.
  - Interim Drafts were reviewed and updated every FG DLT meeting.
  - Agreed as Technical Specification at the last FG DLT meeting in Geneva 29 July - 1 August 2019.
  - 62 terms were agreed.
ITU-T X.1400 - Terms and definitions for DLT

- ITU-T X.1400
  - NWIP was approved at September 2019 SG17 meeting as TR.dlt-td.
  - TR.dlt-td was changed to X.dlt-td at March 2020 SG17
  - X.dlt-td was consented at September 2020 and X.1400 approved on 28 October after AAP LC (4 weeks).
  - 66 terms were agreed.
Scope of X.1400

- **Scope**
  - This Recommendation contains a baseline set of terms and definitions for distributed ledger technology (DLT). The definition of each term provides a basic characterization of the term, and where appropriate, a note is included to provide additional clarity.

- **66 terms defined** – 4 new terms and definitions were added to those of FG DLT 1.1:
  - 6.9 blockchain system
  - 6.22 distributed ledger technology (DLT)
  - 6.23 DLT system.
  - 6.54 sidechain
Content of X.1400

– 1. Scope
– 2. Reference
– 3. Definitions
– 4. Abbreviations and acronyms
– 5. Conventions
– 6. Terms and definitions related to DLT
  • 6.1 Account
  • ...
  • 6.66 Wallet
– Appendix I Key points and rationales for DLT basic terminology
  • A.1 Defining distributed ledger technology
  • A.2 How does DLT operate?
  • A.3 DLT actors and components
  • A.4 Types of DLT
  • A.5 Potential use cases for DLT
  • A.6 Consensus mechanisms
  • A.7 Smart contracts
Key terms and definitions

- 6.6 block: Individual data unit of a blockchain (see 6.8), composed of a collection of transactions (see 6.65) and a block header.
- 6.21 distributed ledger: A type of ledger (see 6.36) that is shared, replicated, and synchronized in a distributed and decentralized manner.
- 6.28 hard fork: Change to the protocol or rules that result in a fork that is not backward compatible.
Key terms and definitions (cont.)

- 6.33 incentive mechanism [b-ISO/TC 307]: Method of offering reward for some activities concerned with the operation of a distributed ledger system.
- 6.47 permissioned distributed ledger system: Distributed ledger system in which permissions are required to maintain and operate a node.
- 6.48 permissionless distributed ledger system: Distributed ledger system where permissions are not required to maintain and operate a node.
- 6.49 proof of work: Consensus process to solve a difficult (costly, time-consuming) problem that produces a result that is easy for others to verify.
- 6.55 smart contract: 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.
Conclusion and a way forward

- No need to define different and inconsistent terms in every Recommendations (deliverables).
- Baseline set of terms and definitions across all DLT deliverables.
- Widely used by the future Recommendations and texts in DLT area.
- Compatible with ISO 22739:2020, Blockchain and distributed ledger technologies — Vocabulary
- Need to update this Recommendation to add new terms and definitions, if necessary.
Thank you for your attention.

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