Knobbe Martens

Overview of Distributed Ledger Technology

Knobbe Europe Practice Series

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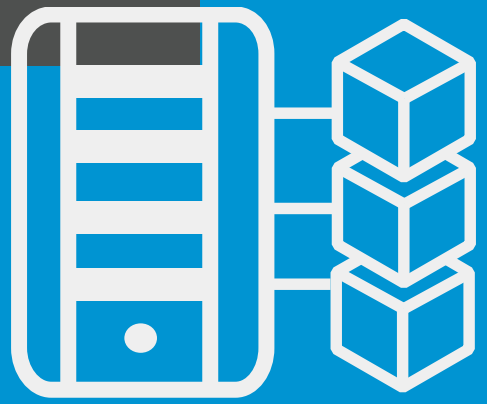
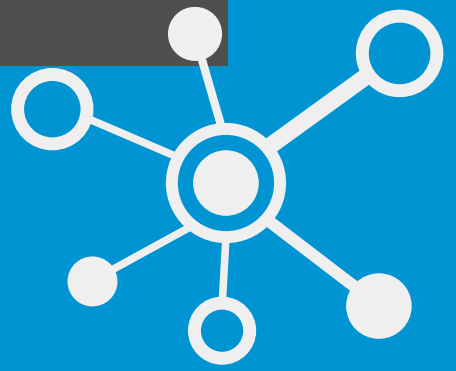
Technical Description

Distributed Ledger Technology (DLT)

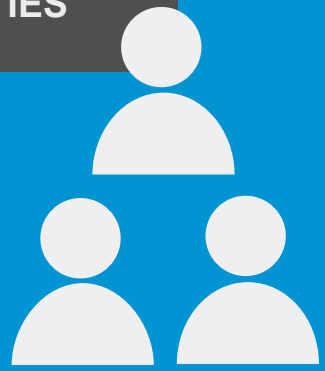
IMMUTABILITY



DECENTRALIZED STORAGE



ELIMINATION OF TRUSTED THIRD PARTIES



Distributed Ledger Technology (DLT)

- Immutability
  - DLT-based systems can be characterized in that transaction data is recorded and it will be maintained in a manner that does not allow for the modification of the transaction.
  - This makes the transaction data, once accepted by the DLT based system, immutable (e.g., not capable or susceptible to change).
  - DLT based systems can be distinguished from other technologies, such as a distributed database, in which data maintained may be subject to change or require additional verification that the data has not been changed.

Distributed Ledger Technology (DLT)

- Decentralized storage
  - DLT based systems can be further characterized in not having any form of centralized data storage or administrative functionality.
  - Transaction data will be replicated and maintained by multiple computing systems/devices utilizing some form of consensus algorithm.
  - DLT based systems can be distinguished from other distributed technologies, such as embodiments of a distributed database, in which a distributed database requires form of centralized data source (e.g., a designated origin source) and central administration for controlling the distribution of the distributed data and reconciliation of differences in data.

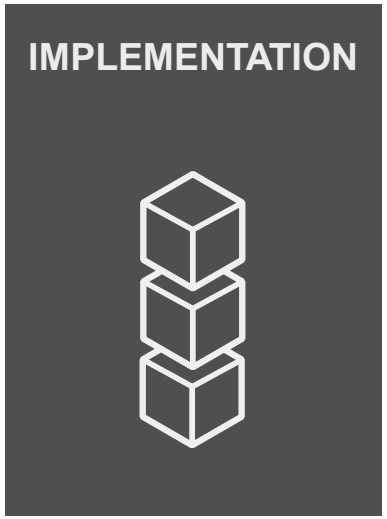
Distributed Ledger Technology (DLT)

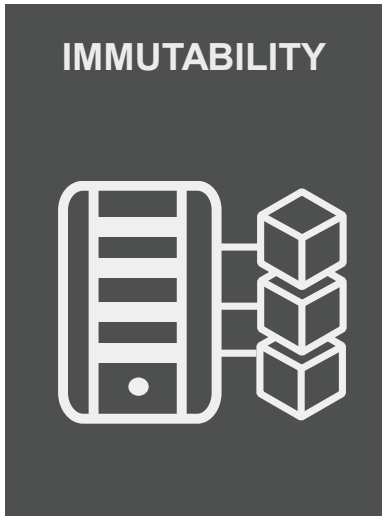
- Elimination of trusted third parties
  - DLT based system can be further characterized in that the various components that are configured to function may be outside of the control of any single entity or organization.
  - The DLT based system components may be considered to be provided by, or associated with, third party systems such that no individual component can be trusted.
  - DLT based systems can be distinguished from other distributed technologies, such as embodiments of a distributed database, in which such systems are of a closed nature to allow a single entity/organization to maintain control.

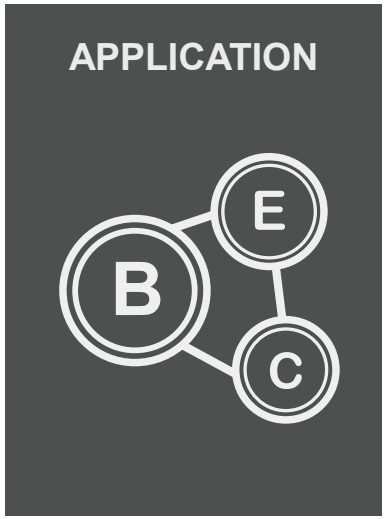
Public Block Chain (DLT)

General Principles

- Public Blockchain corresponds to a subset of DLT-based systems for receiving, maintaining, and providing transaction data defined in the utilization of a sequence of “blocks” as the technical mechanism for maintaining transaction data.
- An individual block is configured to be of a sufficient size to maintain a set of transaction data and associated metadata describing the transaction (e.g., thousands of individual pieces of transaction data).
- Although not required, a Public Blockchain system is often defined in that transaction data within any individual block can be unrelated and may be associated from different entities.





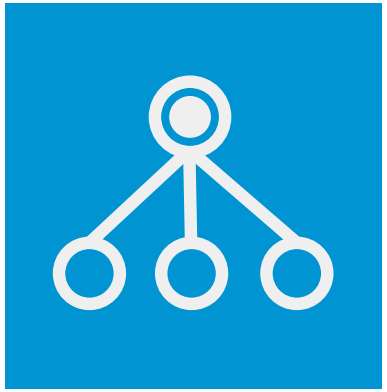


Directed Acyclic Graphs (DAG)

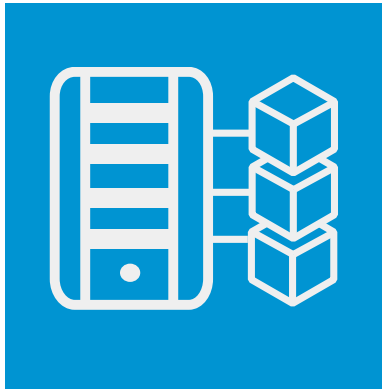
General Principles

- DAG corresponds to a subset of DLT-based systems for receiving, maintaining, and providing transaction data defined in the utilization of a sequence of “nodes” as the technical mechanism for maintaining transaction data.
- An individual node is configured to be of a sufficient size to maintain a single piece of transaction data and associated metadata describing the transaction. The transaction data may be generally available to general public, depending on the specific policies of the DAG system.

IMPLEMENTATION

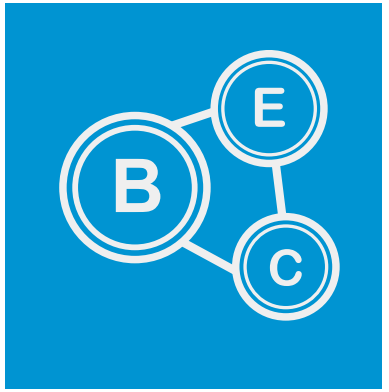


IMMUTABILITY



INTERFACES

APPLICATION



DLT Layers

Mining Layer

- Algorithms/techniques for addressing immutability

Propagation Layer

- Algorithms/techniques for receipt and distribution of transaction data between nodes

Semantic Layer

- Algorithms/techniques for implementing consensus between “nodes” for distribution of transaction data or generating results

Application Layer

- Deploying applications or systems that utilized the DLT transaction data (e.g., smart contracts, digital currencies, exchanges, etc.)

Applications

Electronic Currencies

Transaction data relates to transactions involving a digital asset (e.g., coin)

- Transaction data is maintained by the DLT in an immutable and distributed manner
- Transaction data is associated with a digital signature of the current “owner” of the coin including the owner’s private key
- Transaction data is generally publicly available using public key

Application interface

- Maintain encryption keys
- Provide transaction data for addition to the DLT and replication
- Provide request for previously stored transaction data in the DLT
- Requires some form of compensation (e.g., wallet) for interface actions

Smart Contracts

Transaction data includes executable code that is maintained in a DLT

- Executable code is maintained by the DLT in an immutable and distributed manner
- Request to execute contract will be executed by a “winning node” and validated by the other distributed nodes
- Executable code can perform various information gathering or information processing actions to generate the results

Application interface

- Provide terms or code to DLT miners for addition to the DLT and replication
- Provide request for execution of the code (e.g., run the smart contract) and receive the consensus result from the DLT
- Requires some form of compensation (e.g., wallet) for interface actions

Non-Fungible Tokens (NFT)

Transaction data includes digital assets that are maintained in a DLT

- Digital assets and associated transaction data are maintained by the DLT in an immutable and distributed manner
- Immutable nature of the digital asset (e.g., image, video) create the value proposition of the NFT
- Transaction data creates ownership chain

Application interface

- Provide transaction data for addition to the DLT and replication
- Provide request for previously stored transaction data in the DLT
- Requires some form of compensation (e.g., wallet) for interface actions

Ownership vs. Copyright

- NFT is directed to uniqueness of digital asset and ownership history/chain
- Copyright issues still remain related to distribution, publication and replication

Patentable Inventions - DLT

Potentially Patentable Subject Matter

Addressing Energy Consumption Issues

Scalability Improvements

- Metered block creation
- Block validation

Security Enhancements

- Majority consensus attacks
- Orphan chains
- Data privacy

Resolving Broken Links

Novel Use Cases

Trademark and Copyright - DLT

How DLT Impacts Trademark/Copyright Rights

- DLT can be used as a mechanism to steal company websites and demand ransom payments
- Cryptocurrency names can cause consumer confusion and potentially infringe trademark rights
- Even if a party prevails in a trademark infringement suit, anonymity can make it more difficult to enforce such rights
- DLT can be used to reduce the availability of counterfeit goods
- Purchase of an NFT does not necessarily include a transfer of the underlying copyright

USPTO Updates

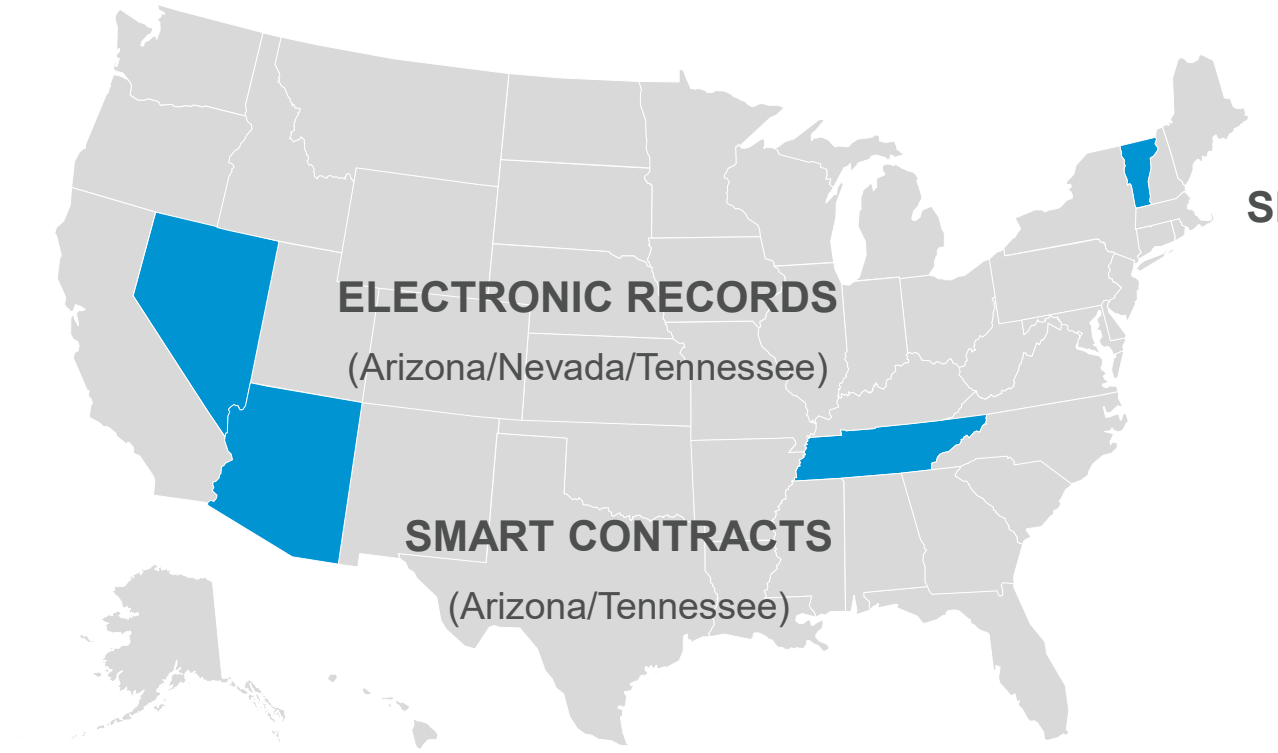
DLT Examination is Evolving

- Majority of DLT applications being routed to Art Units 3685 or 2434
- Historically, USPTO has treated DLT applications as being directed to finance/business methods
- Now, turnover in examiners being assigned to blockchain and cryptocurrency art units
  - Examiners more likely to have a background in DLT technology
  - Examiners with a background in finance/business methods are transferring to different art units

Overview of U.S. Law

Admissibility of Evidence - State Law

Each state has its own laws regarding the admissibility of evidence. Generally, however, state laws regarding admissibility of evidence are similar to the Federal Rules of Evidence.



SELF-AUTHENTICATION

(Vermont)

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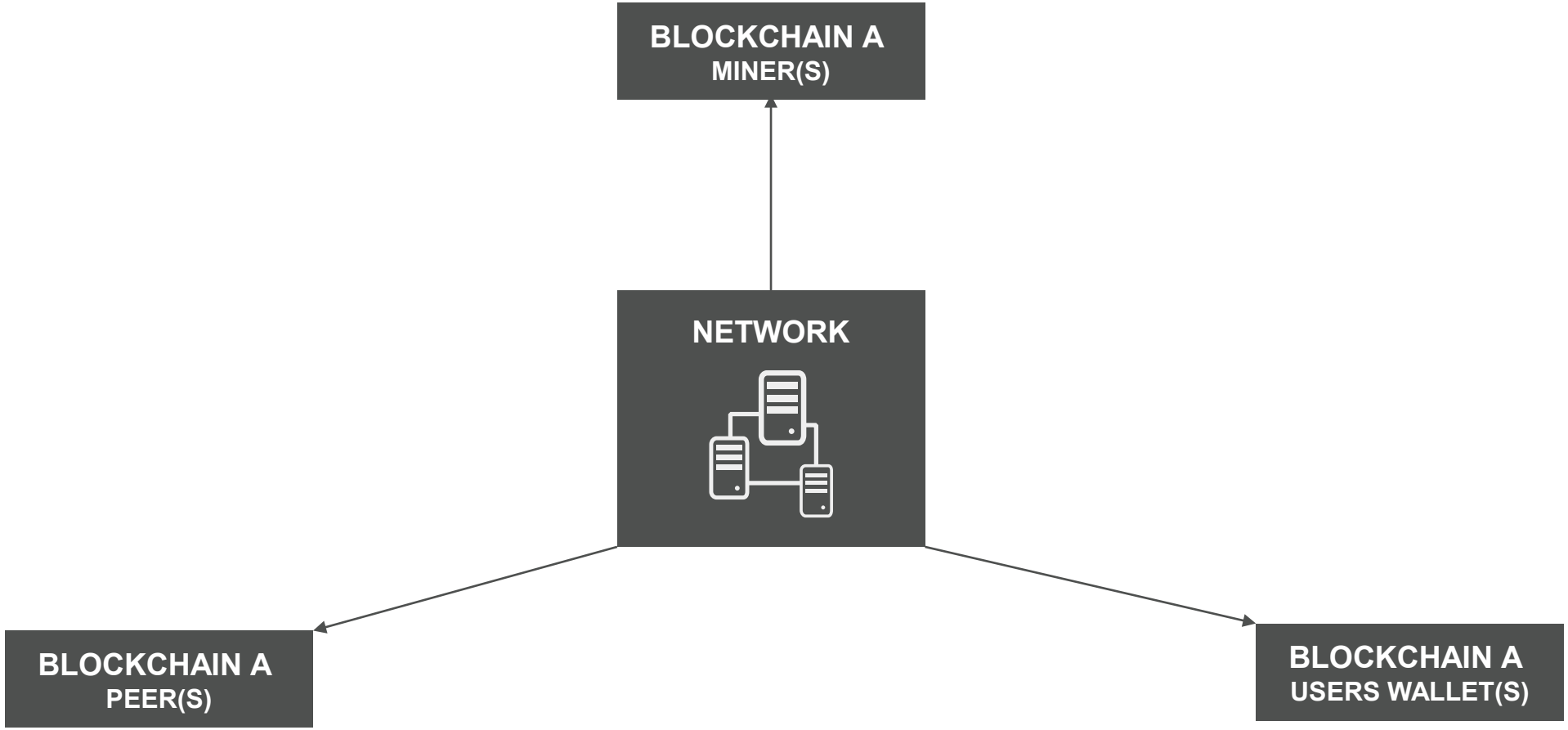
Thank you!

Appendix – Sample Blockchain Diagram Showing Network Participants



Appendix – Sample Blockchain Diagram Showing Transactions Stored in Blocks