AECSD/IAEx

DLT/BLOCKCHAIN in Post Trade – Hype or Reality?

5 September 2019
Digitization changes society and economy from manual to digital

<table>
<thead>
<tr>
<th>Mobility</th>
<th>Music</th>
<th>Photography</th>
<th>Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electronic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Table of images showing historical and modern representations of mobility, music, photography, and markets]
DLT > BLOCKCHAIN > BITCOIN

**DLT**
- is used to document specific transactions
- any number of equivalent copies of the ledger can be maintained decentrally by different parties
- data stored as continuous expandable list of records, newly added transactions are included in all copies of the ledger
- different consensus mechanisms possible to agree on current status of the ledger/new transactions

**Blockchain**
- is one of the best-known DLT implementations
- data stored as "blocks" linked together as a "chain" using cryptographic techniques
- each block typically contains a cryptographically secure "digital fingerprint" of the previous block
- blocks include immutable timestamp and transaction data

**Bitcoin**
- is the first blockchain application and world's leading cryptocurrency (for means of digital payment)
- transactions are legitimized without trusted third party/counterparty (peer-to-peer)
- agreement on a transaction is achieved via proof-of-work, where the miners compete with each other to solve a cryptographic puzzle
### Characteristics of Distributed Ledger and Blockchain technology

<table>
<thead>
<tr>
<th><strong>Peer-to-Peer Transfer</strong></th>
<th><strong>Instant settlement</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>No need for an intermediary</td>
<td>Trading, trade execution, netting and settlement, can all occur at the trade-entry level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Security</strong></th>
<th><strong>Robustness</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryptographic code &amp; consensus mechanism</td>
<td>No single point of failure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Token &amp; Smart Contracts</strong></th>
<th><strong>Transparency &amp; Auditability</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Token as “digital cargo container” with Smart Contracts to execute and move value autonomously</td>
<td>Transparent movement of securities, visible to all the participants</td>
</tr>
</tbody>
</table>
The digital economy is heading towards decentralisation

From
- Centralized infrastructure
- Economy of central platforms
- Governance by central party
- Intermediaries

To
- Decentralized infrastructure
- Economy of open innovation platforms
- Peer-to-Peer governance
- Less intermediaries
Is there a future for CSDs?

How many copies of the ledger are there?

- One copy
  - Centralised ledger
    - All parties reconcile their local databases with a centralised electronic ledger that is maintained and controlled by a trusted central party.

- Many copies
  - Distributed ledger (permissioned)
    - In a permissioned system, nodes need permission from a central entity to access the network and make changes to the ledger. Access controls can include identity verification.
  - Distributed ledger (permissionless)
    - Each node in a peer-to-peer network stores a full and up-to-date copy of the entire ledger. Every proposed local addition to the ledger by a network participant is communicated across the network to all nodes. In principle, nodes collectively attempt to validate the addition through an algorithmic consensus mechanism. If validation is accepted, the new addition is added to all ledgers to ensure data consistency across the entire network.

Source: BIS Annual Economic Report 2018
Opportunities for AECSD members

- Decentralized private permissioned ledger over different geographies
- CSD as a gatekeeper providing access to the system
- Consensus algorithm, uniform business standards
- Common interledger standards or protocols, technical interoperability between the ledgers
- Specialized asset services
Use Case: ASX
Private Permissioned Ledger

Replacement of Australian Stock Exchange’s CHESS
Clearing, settlement, asset registration, and some other post trade services

BENEFITS
- Reduced costs;
- Simpler and more secure investor access;
- Promote innovation and open standards;
- Ensure ability to integrate with counterparties;
- Reliability and streamlining of the processed
HQLA\textsuperscript{x} Business Model

HQLA\textsuperscript{x} is using distributed ledger technology (DLT) to digitize baskets of assets and create a standardized post trade solution to help market participants redistribute liquidity more efficiently.

- **Market Participants**
  - Corporates
  - Banks
  - Central Banks
  - Insurance Companies
  - Pension Funds
  - Asset Managers

- **HQLA\textsuperscript{x}**
  - Distributed Ledger
  - Asset Digitization
  - HQLA Securities
  - Non-HQLA Securities
  - Lending
  - Borrowing

- **EASY**
  - HQLA\textsuperscript{x} creates a layer of interoperability among custodians to permit seamless collateral exchanges

- **FAST**
  - HQLA\textsuperscript{x} allows “atomic” transfer of collateral exchanges in real time

- **EFFICIENT**
  - Capital efficient for banks reducing capital costs
Operating Model

EUREX REPO F7 TRADING SYSTEM
- Eurex Repo electronic trading market (new segment for HQLA\textsuperscript{x} collateral swaps)
- Ability to enter specific opening/closing date & time (to the nearest minute)

DIGITAL COLLATERAL REGISTRY
- Enables atomic change of ownership of baskets of securities
- Delivery vs Delivery ("DvD")

TRUSTED THIRD PARTY (TTP)
- Holds baskets of securities at multiple custodians on behalf of beneficial owners
- Management of exposure requests to triparty agent services

CUSTOMY LAYER (Triparty Agents and Custodians)
- Safekeeping of securities in accounts opened by the TTP
- Collateral management of securities in and out of segregated TTP accounts
Thank you.

Maria Nikulina
Client Account Manager
Global RM & Sales Europe
Clearstream Banking SA

E-mail: Maria.Nikulina@clearstream.com