The DLT Reference Model and 7 DLT Classes

Iwona Sokalska^{1,2}, Shawn Berney², Dave Mason¹

¹Toronto Metropolitan University, ²Open Sail Assets

OBJECTIVE

Support Consistent DLT Analysis



1 DLT Use-Case Solution Fit Analysis



2 Identify Understudied DLT Designs

FIRST PRINCIPLES

DLT's LEDGER

(READING)

DLT's CONSENSUS (ORDERING, WRITING) **DLT's NETWORK**

(LIMITING)

MODEL

Design Component: LEDGER

DATA STRUCTURE: DAG/Convergent

Design Component: CONSENSUS

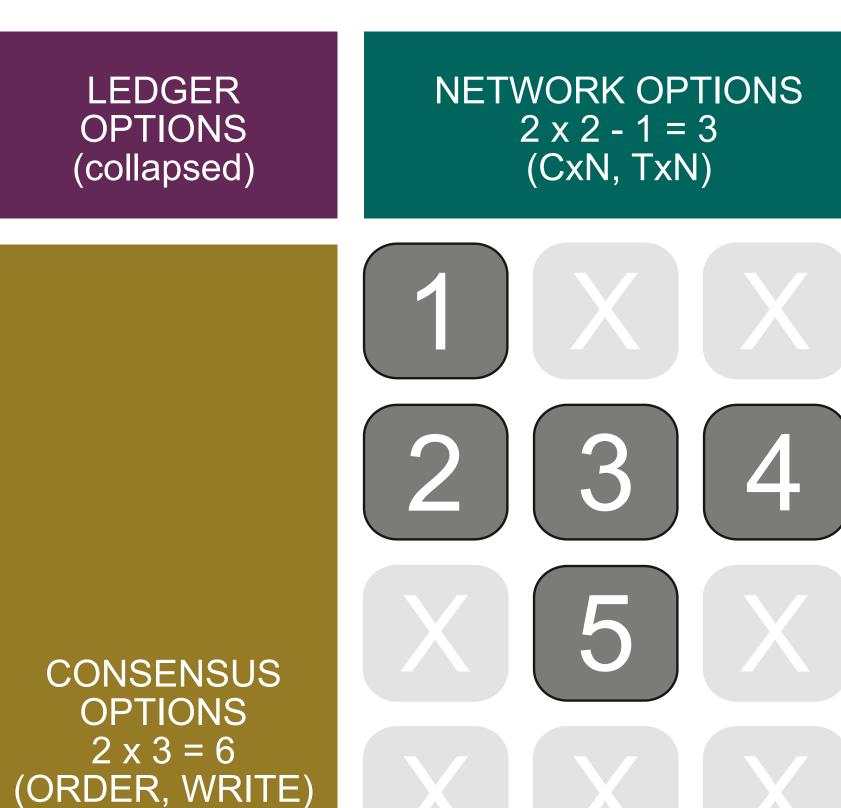
ACTION 1: ORDERING: 2 options ACTION 2: WRITING: 3 options

Hadera HBAR

Design Component: **NETWORK**

Consensus Network (CxN): 2 options Transacting Network (TxN): 2 options

Design Space







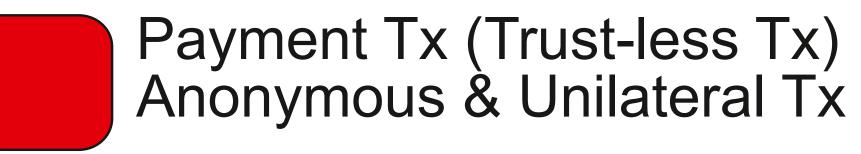
Trust-Aspects for DLTs

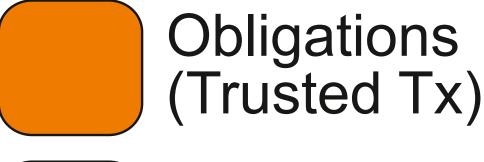
cannot be optimized for both

Payments (Trust-less-Tx)

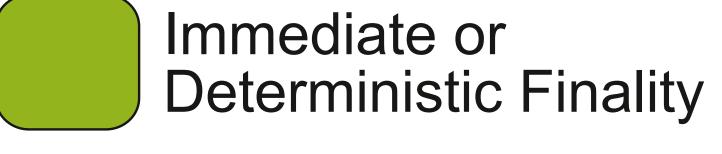
Obligations (Trusted-Tx) and

Trust-Aspects

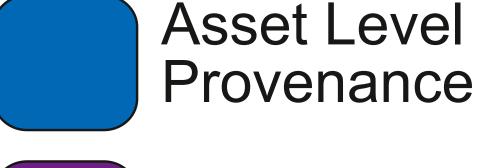


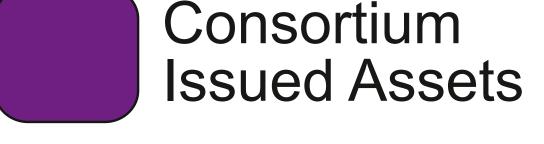










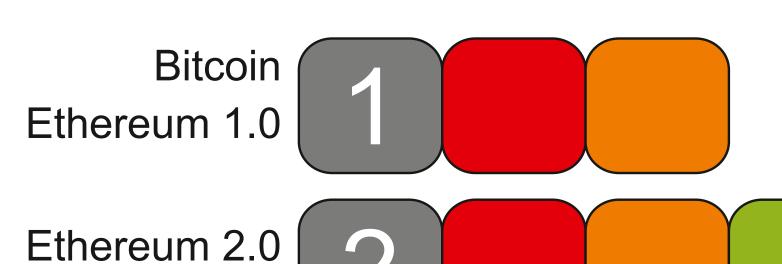


Tx Tear-Offs & Ledger Privacy

Design Space :: Functional Space

Functional Space Classes

Each Functional DLT Class has a unique Trust-Aspect set (FINGERPRINT)



Polkadot Ripple XPR

Pokadot Based Hybrid, Quorum Project

Hamilton¹ Hyperledger Fabric R3 Corda

> ¹Project Hamilton MIT & Federal Reserve Bank of Boston 2020

*Locked to **Asset Level** Provenance

FINDINGS



Multilateral-Notary DLTs

provide maximal Trust-Aspects for **Obligations** (Trusted-Tx)

Of 23 DLTs Reviewed, only one is Notary-Mulitlateral (Class 7) only **two** are Notary DLTs (Class 5 & 7)

Bottom-Up DLT Framework

provides design boundaries for DLT evolution





Connect on LinkedIn with Iwona



Presented at University of Waterloo **Cybersecurity and Privacy Institute Graduate Student Conference** March 2025, Work In Progress Track

