

Technology Advisory Committee

Distributed Ledger Technology Sub-Committee

Presenters: Brad Levy and Erik Barry

Bigger than the Internet

Enabling global connectivity (“The Internet”) with DLT

- ▶ The internet was built for messaging and it was repurposed for commerce, DLT may make that commerce safer
- ▶ DLT is not an industry specific technology, it has the potential to impact Finance, Health Care and all Supply Chains from the most virtual to the most physical
- ▶ DLT can be a massive game changer, in essence the Internet 3.0 where data and applications can be distributed and used safely
- ▶ Given how new some of these technologies are, the issues are still not well understood and there will be unintended consequences (good and bad)

“It’s easy to move compute where the data is, not the data where the compute is”
Antonio Neri, HPE President & CEO

A DLT world requires trusting both the technology and people or institutions building and running it

- ▶ In Aristotle’s Rhetoric, Aristotle described three modes of persuasion (in other words, convincing others to Trust something):
 - ▶ Ethos or Authority (“personal character”)
 - ▶ Pathos or Appeal based on emotion (“frame of mind”)
 - ▶ Logos or Logic (“proof”)

Does 100% tech led “proof” lead to greater certainty and trust or throttle adoption?

DLT introduces “new” but solvable issues

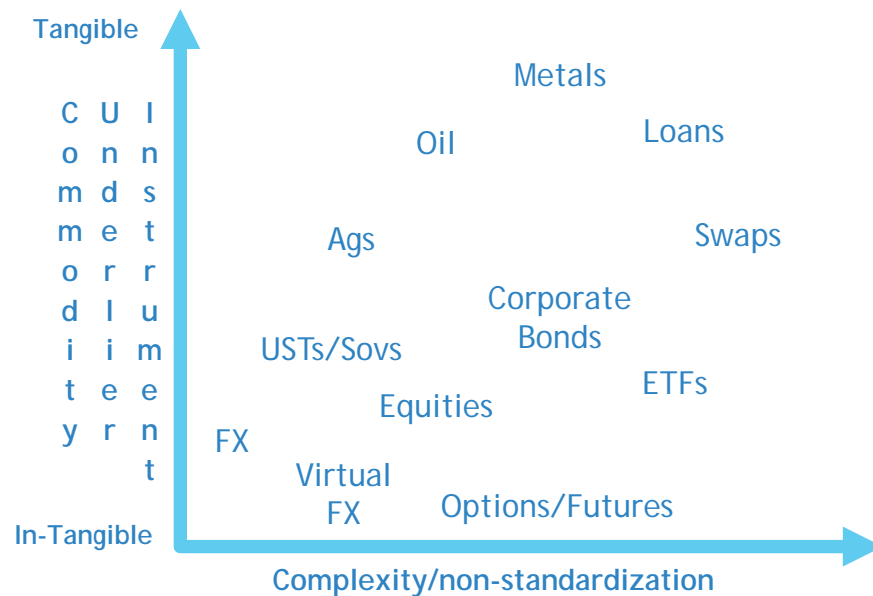
▶ Operational and Technology Concerns

- ▶ Are Innovations in cloud-based storage, communications technology, digital asset custody necessary or desirable pre-requisites to grow DLT?
- ▶ Does reliance on DLT’s fully-automated and encrypted systems create systematic vulnerabilities to cyber-attacks, hacks, computer failures. How should back-up systems be envisioned and operated?
- ▶ Should DLT be introduced into less-liquid markets first to test the viability of DLT while minimizing costs and potential fallout from failure?
- ▶ Will larger firms dominate and limit new entrants and innovations or will new entrants disrupt existing infrastructure and create risk during transition?
- ▶ Will the slowness of some of the new technologies/methods be an acceptable compromise or will or need for speed dominate any early adoption

▶ Regulatory and Legal Concerns

- ▶ Will DLT necessitate a new regulatory framework, or will existing regulation be modified to adapt to the introduction of DLT?
- ▶ How will international DLT networks function where transactions involve parties in different jurisdictions or with different capabilities?
- ▶ What are the legal frictions and contract law impacts from moving to a less reviewed more automated world?
- ▶ How will DLT impact the prudential regulation of exchanges and clearing houses? Will they face new and unfamiliar risks where they are depending on data or processes captured by DLT networks

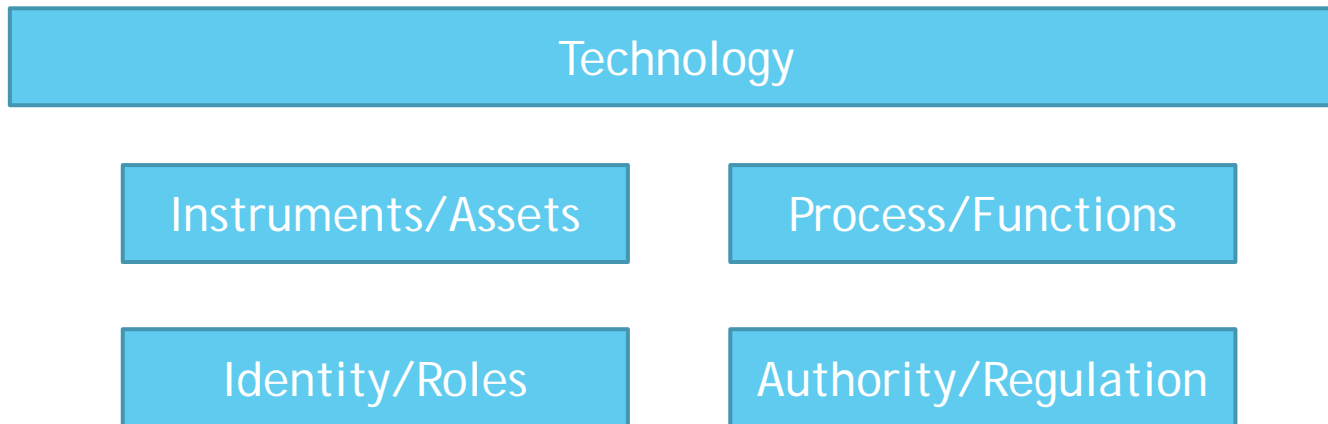
Potential value add of distributed ledger technology



- ▶ DLT needs to be framed in a bigger context, identifying assets and processes to people and applications in a financial markets world
- ▶ DLT supports virtual and physical identifiers, the move to physical makes IoT more important
- ▶ IoT provides scale and access to data and activities that, combined with DLT and other technologies, can and will revolutionize commerce at all levels
- ▶ More complex, tangible (“heavier”) and less automated areas may provide greatest efficiency gains in the medium to long term
- ▶ Areas where the technology can be applied across “instruments” and combined is where bigger value may be, where instruments and underliers can interact more efficiently
- ✓ **Areas where DLT may add value: Trade Matching and Execution, User Identity, Reconciliations, Settlement, Custody, Risk Management, Regulatory Reporting and Oversight**

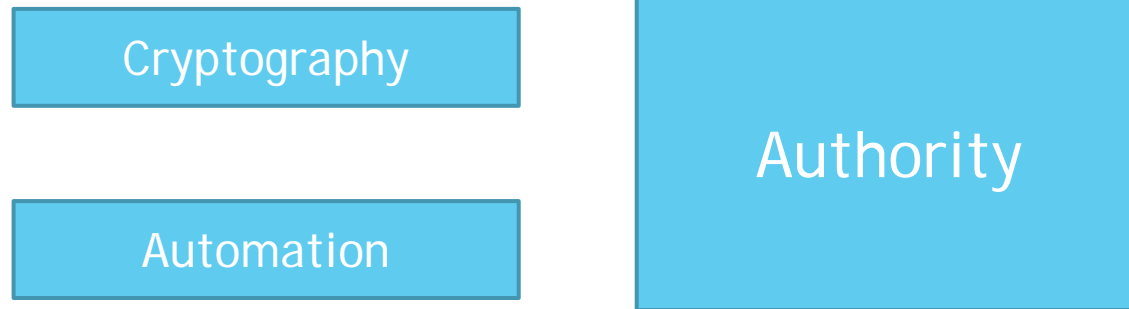
The technology of a distributed ledger

- ▶ For the purpose of this discussion, we can break down the material uses of DLT (and other technologies) into four:



- ▶ Distributed Data: The cloud is driving and solving for **distributed** data and processing
- ▶ Automation: Data is stored and **recorded** on the ledger
- ▶ Cryptography: The **protection** of data is what's missing from today

At the Core of Trust: Cryptography



- ▶ DLT relies on **cryptography** to maintain information and application security
- ▶ Processing large quantities of complex data and validating its content makes **automation** necessary
- ▶ Data protection and automation gives **authority** to a distributed network guided by algorithms that operate on agreed-upon protocols

Tailoring and combining existing and new technologies

Combining current technology with new technology

- ▶ Syndicated Loans - Settlement and changing the way we handle cash (cash vs. asset)
- ▶ Central bank backed virtual currency - Singapore and Canada

Taking existing technology and replacing it with DLT

- ▶ CDS - Trade Information Warehouse (“TIW”) creating a new way to record the life of derivatives
- ▶ ASX - A new replacement to the post-trade equities system

Taking current technology and tweaking it for new instruments

- ▶ CBOE - Exchange listing futures contracts to improve executing risk

Potential FCM Benefits from DLT

Initial Clearing Record of Executed Trade

- ▶ Universally-accepted record of executed trades in the clearing house
- ▶ Common identifier addressable by any permissioned party (based on FCM custody, client account registration, allowed third party services, regulatory bodies)

Post-trade services via consistent API

- ▶ Reduced messaging and allow greater confirmation of fair allocations and order traceability
- ▶ Average pricing, allocation amongst core services available on the ledger to permissioned parties
- ▶ Expiry, exercise, assignment, ex-pit transfer all performed on ledger

Expanded Access and Connectivity Opportunities

- ▶ Permissioned access from any certified vendor allowing greater competition for post trade services
- ▶ Connectivity to industry tools for reference data add-on services
- ▶ Clearinghouse direct-source Variation Margin and Initial Margin Requirement applications to reduce redundant processing

Critical Considerations to Maximize FCM & End User Benefits

- ▶ Open, yet permissioned, access to post-trade services through authorized 1st and 3rd party services to increase choice and competition to industry
- ▶ Agree on common, core services and functionality with defined protocol for addressing contract
- ▶ Reconcile requirements for data retention and bookkeeping to take full advantage of “single ledger” capabilities
- ▶ Thoroughly considered roles and access levels to permit different views and functionalities for CCP, FCM, Regulator, Client, and any purpose-specific 3rd party tool (e.g. reconciliation, allocations, OMS, variation and initial margining)

Challenges on DLT Adoption

- ▶ Avoiding fracturing of process flows
 - ▶ Decreased benefits if move to DLT is still CCP-specific, resulting in separate messaging protocol to each ledger with no standardization
 - ▶ Lower realization of process efficiencies with disparity between agreed core functionality
- ▶ Jurisdictional concerns, much as we've seen with social media, certain nations require data to only exist within their boundaries, potentially running counter to stated goals and basic framework of DLT

Conclusion Summary

What to take away

- ▶ The reach of DLT is potentially expansive and holds out the promise of introducing deeply transformative changes into any process
- ▶ Cryptography is key for DLT's success, and smart contracts can facilitate a protected and automated processes
- ▶ Existing trusted technology and platforms likely to play a significant role bringing the newer technologies forward
- ▶ The technology of virtual currency can be adopted in traditional financial markets, and the regulation and authority of financial markets can be applied to virtual currency
- ▶ New networks take time, require incentives to ramp up and existing networks may also need rule changes or legal/regulatory framework evolution